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AMELI

Advanced Methodology for European Laeken Indicators

Deliverable 7.1 Appendix

Appendix to the Report on the Simulation Results

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Appendix A.

Overview simulation results (metalist)

The simulations run by the AMELI project are synthesised in the following Tables. There have been many simulations of the AMELI project outside this scheme to develop methods or investigate particular aspects. The simulations in Tables A.1, A.2 and A.3 are the final official runs.

Table A.1.: Metalist of the simulation runs of the AMELI-project, part 1

id	author	date	mean	arpr	rmpg	qsr	gini	other	universe	domain
N0001	FHNW	20101211	1	0	0	0	0	0	AAT-SILC	0
N0002	FHNW	20101227	0	0	0	1	0	0	AAT-SILC	0
N0003	FHNW	20101228	0	0	0	1	0	0	AAT-SILC	0
N0004	FHNW	20101223	0	0	0	1	0	0	AAT-SILC	0
N0005	FHNW	20101130	1	0	0	0	0	0	AAT-SILC	0
N0006	FHNW	20101201	1	0	0	0	0	0	AAT-SILC	0
N0007	FHNW	20101228	0	0	0	1	0	0	AAT-SILC	0
N0008	FHNW	20101229	0	0	0	1	0	0	AAT-SILC	0
N0009	FHNW	20101224	0	0	0	1	0	0	AAT-SILC	0
N0010	FHNW	20101230	0	0	0	1	0	0	AMELIA	0
N0011	FHNW	20101230	0	0	0	1	0	0	AMELIA	0
N0012	FHNW	20110111	0	0	0	1	0	0	AMELIA	0
N0013	FHNW	20101231	0	0	0	1	0	0	AMELIA	0
N0014	FHNW	20110107	0	0	0	1	0	0	AMELIA	0
N0015	FHNW	20110106	0	0	0	1	0	0	AMELIA	0
T1010	UT	20101102	1	1	1	1	1	0	AMELIA	0
T1011	UT	20101112	1	1	1	1	1	0	AMELIA	0
T1012	UT	20101112	1	1	1	1	1	0	AMELIA	0
T1013	UT	20101112	1	1	1	1	1	0	AMELIA	0
T1014	UT	20101112	1	1	1	1	1	0	AMELIA	0
T1015	UT	20101112	1	1	1	1	1	0	AMELIA	0
W0001	TUW	20110208	0	0	0	1	0	0	AAT-SILC	0
W0002	TUW	20110208	0	0	0	1	0	0	AAT-SILC	0
W0003	TUW	20110208	0	0	0	1	0	0	AAT-SILC	0
W0004	TUW	20110208	0	0	0	0	1	0	AAT-SILC	0
W0005	TUW	20110208	0	0	0	0	1	0	AAT-SILC	0
W0006	TUW	20110208	0	0	0	0	1	0	AAT-SILC	0
W0007	TUW	20110208	1	0	0	0	0	0	AAT-SILC	0
W0008	TUW	20110208	1	0	0	0	0	0	AAT-SILC	0
W0009	TUW	20110208	1	0	0	0	0	0	AAT-SILC	0
T1020	UT	20110409	1	1	1	1	1	0	AMELIA	0
T1021	UT	20110409	1	1	1	1	1	0	AMELIA	0
T1022	UT	20110409	1	1	1	1	1	0	AMELIA	0

Table A.1.: Metalist of the simulation runs of the AMELI-project, part 1

id	author	date	mean	arpr	rmpg	qsr	gini	other	universe	domain
T1023	UT	20110409	1	1	1	1	1	0	AMELIA	0
T1024	UT	20110409	1	1	1	1	1	0	AMELIA	0
S0001	SFSO	20110314	1	1	1	1	1	1	AMELIA	0
S0002	SFSO	20110314	1	1	1	1	1	1	AMELIA	0
S0003	SFSO	20110314	1	1	1	1	1	1	AMELIA	0
S0004	SFSO	20110314	1	1	1	1	1	1	AMELIA	0
S0005	SFSO	20110314	1	1	1	1	1	1	AMELIA	0
S0006	SFSO	20110407	1	1	1	1	1	1	AMELIA	0
S0007	SFSO	20110407	1	1	1	1	1	1	AMELIA	0
S0008	SFSO	20110407	1	1	1	1	1	1	AMELIA	0
S0009	SFSO	20110407	1	1	1	1	1	1	AMELIA	0
S0010	SFSO	20110407	1	1	1	1	1	1	AMELIA	0
S0011	SFSO	20110204	1	1	1	1	1	1	AMELIA	0
S0012	SFSO	20110204	1	1	1	1	1	1	AMELIA	0
S0013	SFSO	20110204	1	1	1	1	1	1	AMELIA	0
S0014	SFSO	20110204	1	1	1	1	1	1	AMELIA	0
S0015	SFSO	20110204	1	1	1	1	1	1	AMELIA	0
S0016	SFSO	20110207	1	1	1	1	1	1	AMELIA	0
S0017	SFSO	20110207	1	1	1	1	1	1	AMELIA	0
S0018	SFSO	20110207	1	1	1	1	1	1	AMELIA	0
S0019	SFSO	20110207	1	1	1	1	1	1	AMELIA	0
S0020	SFSO	20110207	1	1	1	1	1	1	AMELIA	0

Table A.2.: Metalist of the simulation runs of the AMELI-project, part 2

id	design	size	oc	ocpar	nr	nrpar
N0001	1.2	6000	OCAR-CCAR, OCAR-NCAR, OAR-CCAR, OAR-NCAR	0.01; 0.001	0	0
N0002	1.2	6000	OCAR-CCAR, OCAR-NCAR, OAR-CCAR, OAR-NCAR	0.001; 0.01	0	0
N0003	1.2	6000	OAR-NCAR	0.001; 0.01	0	0
N0004	1.2	6000	OCAR-CCAR, OCAR-NCAR, OAR-CCAR, OAR-NCAR	0.001; 0.01	0	0
N0005	1.4a	6000	OCAR-CCAR, OCAR-NCAR, OAR-CCAR, OAR-NCAR	0.01; 0.001	0	0
N0006	1.4a	6000	OCAR-NCAR, OCAR-CCAR	0.01; 0.001	0	0
N0007	1.4a	6000	OCAR-CCAR, OCAR-NCAR, OAR-CCAR, OAR-NCAR	0.001; 0.01	0	0
N0008	1.4a	6000	OCAR-CCAR, OCAR-NCAR, OAR-CCAR, OAR-NCAR	0.001; 0.01	0	0
N0009	1.4a	6000	OCAR-CCAR, OCAR-NCAR, OAR-CCAR, OAR-NCAR	0.01; 0.001	0	0
N0010	1.2	6000	OCAR-CCAR, OCAR-NCAR, OAR-CCAR, OAR-NCAR	0.001; 0.01	0	0
N0011	1.2	6000	OCAR-CCAR, OCAR-NCAR, OAR-CCAR, OAR-NCAR	0.001; 0.01	0	0
N0012	1.4a	6000	OCAR-CCAR, OCAR-NCAR, OAR-CCAR, OAR-NCAR	0.001; 0.01	0	0
N0013	1.4a	6000	OCAR-CCAR, OCAR-NCAR, OAR-CCAR, OAR-NCAR	0.001; 0.01	0	0

Table A.2.: Metalist of the simulation runs of the AMELI-project, part 2

id	design	size	oc	ocpar	nr	nrpar
N0014	1.5a	6000	OCAR-CCAR, OCAR-NCAR, OAR-CCAR, OAR-NCAR	0.001; 0.01	0	0
N0015	1.5a	6000	OCAR-CCAR, OCAR-NCAR, OAR-CCAR, OAR-NCAR	0.001; 0.01	0	0
T1010	all	6000	0	0	0	0
T1011	1.2a	6000	OCAR.NCAR	[OCAR| NA| CCAR| rnorm(5e+05||20000) and OCAR| NA| NCAR| (12) and 0.01| OCAR| NA| NCAR| (12) and OAR| RB210| 0.7| 0.1| 0.15| 0.05| CCAR| rnorm(5e+05||20000) and OAR| RB210| 0.7| 0.1| 0.15| 0.05| NCAR| (12)] X [0.001 OEps and 0.01 OEps]	0	0
T1012	1.4a	6000	OCAR.NCAR	[OCAR| NA| CCAR| rnorm(5e+05||20000) and OCAR| NA| NCAR| (12) and 0.01| OCAR| NA| NCAR| (12) and OAR| RB210| 0.7| 0.1| 0.15| 0.05| CCAR| rnorm(5e+05||20000) and OAR| RB210| 0.7| 0.1| 0.15| 0.05| NCAR| (12)] X [0.001 OEps and 0.01 OEps]	0	0
T1013	1.5a	6000	OCAR.NCAR	[OCAR| NA| CCAR| rnorm(5e+05||20000) and OCAR| NA| NCAR| (12) and 0.01| OCAR| NA| NCAR| (12) and OAR| RB210| 0.7| 0.1| 0.15| 0.05| CCAR| rnorm(5e+05||20000) and OAR| RB210| 0.7| 0.1| 0.15| 0.05| NCAR| (12)] X [0.001 OEps and 0.01 OEps]	0	0

Table A.2.: Metalist of the simulation runs of the AMELI-project, part 2

id	design	size	oc	ocpar	nr	nrpar
T1014	2.6	6000	OCAR.NCAR	[OCAR| NA| CCAR| rnorm(5e+05||20000) and OCAR| NA| NCAR| (12) and 0.01| OCAR| NA| NCAR| (12) and OAR| RB210| 0.7| 0.1| 0.15| 0.05| CCAR| rnorm(5e+05||20000) and OAR| RB210| 0.7| 0.1| 0.15| 0.05| NCAR| (12)] X [0.001 OEps and 0.01 OEps]	0	0
T1015	2.7	6000	OCAR.NCAR	[OCAR| NA| CCAR| rnorm(5e+05||20000) and OCAR| NA| NCAR| (12) and 0.01| OCAR| NA| NCAR| (12) and OAR| RB210| 0.7| 0.1| 0.15| 0.05| CCAR| rnorm(5e+05||20000) and OAR| RB210| 0.7| 0.1| 0.15| 0.05| NCAR| (12)] X [0.001 OEps and 0.01 OEps]	0	0
W0001	1.2	6000	OCAR-CCAR, OCAR-NCAR, OAR-CCAR, OAR-NCAR	epsilon=0.01 and epsilon=0.001; mu=300000 and mu=500000	0	0
W0002	1.4a	6000	OCAR-CCAR, OCAR-NCAR, OAR-CCAR, OAR-NCAR	epsilon=0.01 and epsilon=0.001; mu=300000 and mu=500000	0	0
W0003	1.5a	6000	OCAR-CCAR, OCAR-NCAR, OAR-CCAR, OAR-NCAR	epsilon=0.01 and epsilon=0.001; mu=300000 and mu=500000	0	0
W0004	1.2	6000	OCAR-CCAR, OCAR-NCAR, OAR-CCAR, OAR-NCAR	epsilon=0.01 and epsilon=0.001; mu=300000 and mu=500000	0	0
W0005	1.4a	6000	OCAR-CCAR, OCAR-NCAR, OAR-CCAR, OAR-NCAR	epsilon=0.01 and epsilon=0.001; mu=300000 and mu=500000	0	0

Table A.2.: Metalist of the simulation runs of the AMELI-project, part 2

id	design	size	oc	ocpar	nr	nrpar
W0006	1.5a	6000	OCAR-CCAR, OCAR-NCAR, OAR-CCAR, OAR-NCAR	epsilon=0.01 and epsilon=0.001; mu=300000 and mu=500000	0	0
W0007	1.2	6000	OCAR-CCAR, OCAR-NCAR, OAR-CCAR, OAR-NCAR	epsilon=0.01 and epsilon=0.001; mu=300000 and mu=500000	0	0
W0008	1.4a	6000	OCAR-CCAR, OCAR-NCAR, OAR-CCAR, OAR-NCAR	epsilon=0.01 and epsilon=0.001; mu=300000 and mu=500000	0	0
W0009	1.5a	6000	OCAR-CCAR, OCAR-NCAR, OAR-CCAR, OAR-NCAR	epsilon=0.01 and epsilon=0.001; mu=300000 and mu=500000	0	0
T1020	1.2	6000	NA	NA	NA	NA
T1021	1.4a	6000	NA	NA	NA	NA
T1022	1.5a	6000	NA	NA	NA	NA
T1023	2.6	6000	NA	NA	NA	NA
T1024	2.7	6000	NA	NA	NA	NA
S0001	1.2	6000	NA	NA	NA	NA
S0002	1.4a	6000	NA	NA	NA	NA
S0003	1.5a	6004	NA	NA	NA	NA
S0004	2.6	6000	NA	NA	NA	NA
S0005	2.7	6000	NA	NA	NA	NA
S0006	1.2	6000	NA	NA	NA	NA
S0007	1.4a	6000	NA	NA	NA	NA
S0008	1.5a	6004	NA	NA	NA	NA
S0009	2.6	6000	NA	NA	NA	NA
S0010	2.7	6000	NA	NA	NA	NA
S0011	1.2	6000	NA	NA	NA	NA
S0012	1.4a	6000	NA	NA	NA	NA
S0013	1.5a	6004	NA	NA	NA	NA
S0014	2.6	6000	NA	NA	NA	NA
S0015	2.7	6000	NA	NA	NA	NA
S0016	1.2	6000	NA	NA	NA	NA
S0017	1.4a	6000	NA	NA	NA	NA
S0018	1.5a	6004	NA	NA	NA	NA
S0019	2.6	6000	NA	NA	NA	NA
S0020	2.7	6000	NA	NA	NA	NA

Note: designs=all: 1.2, 1.4a, 1.5a. 2.6, 2.7. indicator: m=mean, a= arpr, r= rmpg, q=qsr, g=gini, o=other. *: [OCAR| NA| CCAR| rnorm(5e+05||20000) and OCAR| NA| NCAR| (12) and 0.01| OCAR| NA| NCAR| (12) and OAR| RB210| 0.7| 0.1| 0.15| 0.05| CCAR| rnorm(5e+05||20000) and OAR| RB210| 0.7| 0.1| 0.15| 0.05| NCAR| (12)] X [0.001 OEps and 0.01 OEps]

Table A.3.: Metalist of the simulation runs of the AMELI-project, part 3

id	nrep	sw
N0001	1000	Dbsim
N0002	1000	Dbsim
N0003	1000	Dbsim
N0004	1000	Dbsim
N0005	1000	Dbsim
N0006	1000	Dbsim
N0007	1000	Dbsim
N0008	1000	Dbsim
N0009	1000	Dbsim
N0010	1000	Dbsim
N0011	1000	Dbsim
N0012	1000	Dbsim
N0013	1000	Dbsim
N0014	1000	Dbsim
N0015	1000	Dbsim
T1010	10000	condor
T1011	10000	condor
T1012	10000	condor
T1013	10000	condor
T1014	10000	condor
T1015	10000	condor
W0001	1000	simFrame
W0002	1000	simFrame
W0003	1000	simFrame
W0004	1000	simFrame
W0005	1000	simFrame
W0006	1000	simFrame
W0007	1000	simFrame
W0008	1000	simFrame
W0009	1000	simFrame
T1020	10000	condor
T1021	10000	condor
T1022	10000	condor
T1023	10000	condor
T1024	10000	condor
S0001	1000	condor
S0002	1000	condor
S0003	1000	condor
S0004	1000	condor
S0005	1000	condor
S0006	1000	condor
S0007	1000	condor
S0008	1000	condor
S0009	1000	condor
S0010	1000	condor
S0011	1000	condor
S0012	1000	condor
S0013	1000	condor
S0014	1000	condor
S0015	1000	condor
S0016	1000	condor
S0017	1000	condor

Table A.3.: Metalist of the simulation runs of the AMELI-project, part 3

id	nrep	sw
S0018	1000	condor
S0019	1000	condor
S0020	1000	condor

Appendix B.

Appendix SFSO

B.1. Simulation metadata

Table B.1.: Simulation using the profile log-likelihood, robustified weights, AMELIA regional level

ID	S0001	S0002	S0003	S0004	S0005
Author	SFSO				
Date	20110314				
Median	1	1	1	1	1
ARPR	1	1	1	1	1
RMPG	1	1	1	1	1
QSR	1	1	1	1	1
Gini	1	1	1	1	1
a	1	1	1	1	1
b	1	1	1	1	1
p	1	1	1	1	1
q	1	1	1	1	1
Domains:	[none] (default)				
Universe:	AMELIA				
Sample design	d1.2	d1.4a	d1.5a	d2.6	d2.7
Sample Size	6000	6000	6004	6000	6000
MonteCarlo Replicates:	1,000 (default)				
Criteria Set:	Univariate criteria (default)				
Outlyingness:	[none] (default)				
Contamination:	[none] (default)				
Missingness:	[none] (default)				
Simulation Environment:	Condor				

B.2. Estimator Specifications

- Pseudo maximum likelihood estimators, based on the maximum log-likelihood, of the GB2 parameters a, b, p and q,
- Pseudo maximum likelihood estimators, based on the maximum log-likelihood, of the median, the ARPR, the RMPG, the QSR and the Gini index,

Table B.2.: Simulation using the profile log-likelihood, robustified weights, AMELIA global level

ID	S0006	S0007	S0008	S0009	S0010
Author	SFSO				
Date	20110407				
Median	1	1	1	1	1
ARPR	1	1	1	1	1
RMPG	1	1	1	1	1
QSR	1	1	1	1	1
Gini	1	1	1	1	1
a	1	1	1	1	1
b	1	1	1	1	1
p	1	1	1	1	1
q	1	1	1	1	1
Domains:	[none] (default)				
Universe:	AMELIA				
Sample design	d1.2	d1.4a	d1.5a	d2.6	d2.7
Sample Size	6000	6000	6004	6000	6000
MonteCarlo Replicates:	1,000 (default)				
Criteria Set:	Univariate criteria (default)				
Outlyingness:	[none] (default)				
Contamination:	[none] (default)				
Missingness:	[none] (default)				
Simulation Environment:	Condor				

Table B.3.: Simulation using the full log-likelihood, robustified weights, AMELIA global level

ID	S0011	S0012	S0013	S0014	S0015
Author	SFSO				
Date	20110204				
Median	1	1	1	1	1
ARPR	1	1	1	1	1
RMPG	1	1	1	1	1
QSR	1	1	1	1	1
Gini	1	1	1	1	1
a	1	1	1	1	1
b	1	1	1	1	1
p	1	1	1	1	1
q	1	1	1	1	1
Domains:	[none] (default)				
Universe:	AMELIA				
Sample design	d1.2	d1.4a	d1.5a	d2.6	d2.7
Sample Size	6000	6000	6004	6000	6000
MonteCarlo Replicates:	1,000 (default)				
Criteria Set:	Univariate criteria (default)				
Outlyingness:	[none] (default)				
Contamination:	[none] (default)				
Missingness:	[none] (default)				
Simulation Environment:	Condor				

Table B.4.: Simulation using the full log-likelihood, non-robustified weights, AMELIA global level

ID	S0016	S0017	S0018	S0019	S0020
Author	SFSO				
Date	20110207				
Median	1	1	1	1	1
ARPR	1	1	1	1	1
RMPG	1	1	1	1	1
QSR	1	1	1	1	1
Gini	1	1	1	1	1
a	1	1	1	1	1
b	1	1	1	1	1
p	1	1	1	1	1
q	1	1	1	1	1
Domains:	[none] (default)				
Universe:	AMELIA				
Sample design	d1.2	d1.4a	d1.5a	d2.6	d2.7
Sample Size	6000	6000	6004	6000	6000
MonteCarlo Replicates:	1,000 (default)				
Criteria Set:	Univariate criteria (default)				
Outlyingness:	[none] (default)				
Contamination:	[none] (default)				
Missingness:	[none] (default)				
Simulation Environment:	Condor				

- Variance estimators of the fitted GB2 parameters and indicators based on linearization.

B.2.1. Parametric estimation of the parameters of the GB2 distribution and the median, ARPR, RMPG, QSR, GINI @ AMELIA

In this section, we summarize the performance of the estimators due to different criteria. The general univariate measures of comparison are described in details in Chapter 2. Additional measures will be described. The different simulation types are given in Table B.5.

Table B.5.: Summary of the different simulations

	Method of estimation	Sampling weights		AMELIA level	
		Original	Robust	Global	Regional
1	ML full	+	+	+	-
2	ML prof	-	+	+	+
3	NLS	+	-	+	+
4	Compound	-	+	-	+

B.2.2. Point estimates of the fitted GB2 parameters, simulation type 1 of Table B.5

In Tables B.6, B.7, B.8 and B.9 we can see the following specific notation:

T: point estimator of the fitted GB2 parameter (a, b, p, q),

adj: if the weights were robustified (yes) or not (no),

design: the used sampling design for the sample drawn from the AMELIA universe,

cvsT: coefficient of variation of the fitted parameter over the 1000 simulations,

cvT: mean over all simulations of the coefficient of variation, calculated using the variance estimator by linearization,

cvdT: mean over all simulations of the coefficient of variation, calculated using the variance estimator by linearization and the full design information.

Note that for design d2.6, we were not able to calculate variance estiamtors using the whole design information, thus the values in the tables are equal to 0.

Table B.6.: Point estimator of a

T	adj	design	avgT	madT	varT	cvsT	cvT	cvdT
a	no	d1.2	4.391e+00	4.027e-01	1.797e-01	9.654e-02	9.343e-02	9.343e-02
a	yes	d1.2	3.833e+00	3.240e-01	1.203e-01	9.051e-02	9.380e-02	9.380e-02
a	no	d1.4a	4.415e+00	3.995e-01	1.800e-01	9.608e-02	9.813e-02	9.790e-02
a	yes	d1.4a	3.854e+00	3.290e-01	1.211e-01	9.029e-02	9.160e-02	9.134e-02
a	no	d1.5a	4.376e+00	3.930e-01	1.630e-01	9.227e-02	8.327e-02	8.295e-02
a	yes	d1.5a	3.835e+00	3.307e-01	1.177e-01	8.947e-02	8.294e-02	8.258e-02
a	no	d2.6	4.415e+00	4.800e-01	2.114e-01	1.041e-01	8.248e-02	0.000e+00
a	yes	d2.6	3.865e+00	3.887e-01	1.538e-01	1.015e-01	8.437e-02	0.000e+00
a	no	d2.7	4.424e+00	4.783e-01	2.438e-01	1.116e-01	8.939e-02	1.009e-01
a	yes	d2.7	3.866e+00	4.095e-01	1.676e-01	1.059e-01	9.006e-02	1.035e-01

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Table B.7.: Point estimator of b

T	adj	design	avgT	madT	varT	cvsT	cvT	cvdT
b	no	d1.2	4.700e+04	1.913e+03	6.410e+06	5.387e-02	4.887e-02	4.887e-02
b	yes	d1.2	4.721e+04	2.213e+03	6.962e+06	5.589e-02	5.405e-02	5.405e-02
b	no	d1.4a	4.683e+04	2.067e+03	5.770e+06	5.130e-02	5.188e-02	5.166e-02
b	yes	d1.4a	4.706e+04	2.289e+03	6.253e+06	5.314e-02	5.252e-02	5.232e-02
b	no	d1.5a	4.700e+04	1.868e+03	5.346e+06	4.919e-02	4.329e-02	4.299e-02
b	yes	d1.5a	4.716e+04	2.200e+03	6.127e+06	5.248e-02	4.816e-02	4.788e-02
b	no	d2.6	4.688e+04	2.059e+03	5.355e+06	4.936e-02	4.220e-02	0.000e+00
b	yes	d2.6	4.715e+04	2.320e+03	6.271e+06	5.311e-02	4.871e-02	0.000e+00
b	no	d2.7	4.680e+04	2.141e+03	6.027e+06	5.246e-02	4.583e-02	4.828e-02
b	yes	d2.7	4.707e+04	2.492e+03	6.704e+06	5.501e-02	5.179e-02	5.327e-02

Table B.8.: Point estimator of p

T	adj	design	avgT	madT	varT	cvsT	cvT	cvdT
p	no	d1.2	2.568e-01	2.665e-02	7.391e-04	1.058e-01	1.031e-01	1.031e-01
p	yes	d1.2	3.212e-01	3.220e-02	1.125e-03	1.044e-01	1.045e-01	1.045e-01
p	no	d1.4a	2.556e-01	2.716e-02	7.255e-04	1.054e-01	1.081e-01	1.080e-01
p	yes	d1.4a	3.194e-01	3.139e-02	1.090e-03	1.034e-01	1.020e-01	1.018e-01
p	no	d1.5a	2.577e-01	2.723e-02	7.411e-04	1.056e-01	9.487e-02	9.465e-02
p	yes	d1.5a	3.211e-01	3.275e-02	1.160e-03	1.061e-01	9.410e-02	9.383e-02
p	no	d2.6	2.564e-01	2.881e-02	7.692e-04	1.082e-01	9.404e-02	0.000e+00
p	yes	d2.6	3.201e-01	3.456e-02	1.228e-03	1.095e-01	9.569e-02	0.000e+00
p	no	d2.7	2.564e-01	2.960e-02	8.990e-04	1.170e-01	9.868e-02	1.053e-01
p	yes	d2.7	3.208e-01	3.615e-02	1.322e-03	1.133e-01	1.002e-01	1.094e-01

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Table B.9.: Point estimator of q

T	adj	design	avgT	madT	varT	cvsT	cvT	cvdT
q	no	d1.2	1.014e+00	1.486e-01	3.643e-02	1.882e-01	1.657e-01	1.657e-01
q	yes	d1.2	1.204e+00	1.761e-01	4.629e-02	1.787e-01	1.720e-01	1.720e-01
q	no	d1.4a	1.002e+00	1.410e-01	3.324e-02	1.820e-01	1.754e-01	1.752e-01
q	yes	d1.4a	1.190e+00	1.838e-01	4.275e-02	1.737e-01	1.675e-01	1.672e-01
q	no	d1.5a	1.017e+00	1.468e-01	3.253e-02	1.774e-01	1.484e-01	1.480e-01
q	yes	d1.5a	1.201e+00	1.889e-01	4.345e-02	1.736e-01	1.541e-01	1.536e-01
q	no	d2.6	1.006e+00	1.672e-01	3.342e-02	1.818e-01	1.459e-01	0.000e+00
q	yes	d2.6	1.193e+00	1.981e-01	4.787e-02	1.834e-01	1.565e-01	0.000e+00
q	no	d2.7	1.004e+00	1.623e-01	3.815e-02	1.946e-01	1.564e-01	1.640e-01
q	yes	d2.7	1.193e+00	2.037e-01	4.863e-02	1.849e-01	1.648e-01	1.751e-01

B.2.3. Variance estimates of the fitted GB2 parameters, simulation type 1 of Table B.5

In Tables B.10, B.11, B.12 and B.13 we can see the following specific notation:

V: variance estimator of the fitted GB2 parameter (a, b, p, q),

def: if the variance is calculated using the whole design information (2) or not (1),

adj: if the weights were robustified (yes) or not (no),

design: the used sampling design for the sample drawn from the AMELIA universe

Table B.10.: Variance estimator of a

V	def	adj	design	avgV	biasV	relbiasV%
a	1	no	d1.2	1.972e-01	1.744e-02	9.703e+00
a	2	no	d1.2	1.971e-01	1.740e-02	9.680e+00
a	1	yes	d1.2	2.039e-01	8.355e-02	6.943e+01
a	2	yes	d1.2	2.039e-01	8.356e-02	6.944e+01
a	1	no	d1.4a	3.326e-01	1.526e-01	8.480e+01
a	2	no	d1.4a	3.313e-01	1.514e-01	8.410e+01
a	1	yes	d1.4a	1.328e-01	1.168e-02	9.651e+00
a	2	yes	d1.4a	1.320e-01	1.096e-02	9.049e+00
a	1	no	d1.5a	1.528e-01	-1.017e-02	-6.241e+00
a	2	no	d1.5a	1.517e-01	-1.134e-02	-6.954e+00
a	1	yes	d1.5a	1.078e-01	-9.880e-03	-8.391e+00
a	2	yes	d1.5a	1.069e-01	-1.083e-02	-9.197e+00
a	1	no	d2.6	1.462e-01	-6.517e-02	-3.082e+01
a	1	yes	d2.6	1.345e-01	-1.933e-02	-1.257e+01
a	1	no	d2.7	1.707e-01	-7.311e-02	-2.998e+01
a	2	no	d2.7	2.172e-01	-2.661e-02	-1.091e+01
a	1	yes	d2.7	1.253e-01	-4.230e-02	-2.525e+01
a	2	yes	d2.7	1.671e-01	-4.200e-04	-2.500e-01

Table B.11.: Variance estimator of b

V	def	adj	design	avgV	biasV	relbiasV%
b	1	no	d1.2	1.129e+07	4.876e+06	7.606e+01
b	2	no	d1.2	1.128e+07	4.865e+06	7.590e+01
b	1	yes	d1.2	9.971e+06	3.009e+06	4.322e+01
b	2	yes	d1.2	9.972e+06	3.009e+06	4.322e+01
b	1	no	d1.4a	3.897e+07	3.320e+07	5.754e+02
b	2	no	d1.4a	3.881e+07	3.304e+07	5.727e+02
b	1	yes	d1.4a	7.251e+06	9.978e+05	1.596e+01
b	2	yes	d1.4a	7.200e+06	9.471e+05	1.515e+01
b	1	no	d1.5a	8.506e+06	3.159e+06	5.910e+01
b	2	no	d1.5a	8.419e+06	3.072e+06	5.747e+01
b	1	yes	d1.5a	6.018e+06	-1.091e+05	-1.781e+00
b	2	yes	d1.5a	5.953e+06	-1.743e+05	-2.846e+00
b	1	no	d2.6	7.664e+06	2.309e+06	4.312e+01
b	1	yes	d2.6	7.460e+06	1.189e+06	1.896e+01
b	1	no	d2.7	6.499e+06	4.723e+05	7.836e+00
b	2	no	d2.7	7.073e+06	1.046e+06	1.736e+01
b	1	yes	d2.7	6.625e+06	-7.867e+04	-1.173e+00
b	2	yes	d2.7	6.971e+06	2.666e+05	3.976e+00

Table B.12.: Variance estimator of p

V	def	adj	design	avgV	biasV	relbiasV%
p	1	no	d1.2	1.00e-03	2.70e-04	3.591e+01
p	2	no	d1.2	1.00e-03	2.60e-04	3.585e+01
p	1	yes	d1.2	1.80e-03	6.70e-04	5.981e+01
p	2	yes	d1.2	1.80e-03	6.70e-04	5.982e+01
p	1	no	d1.4a	2.17e-03	1.44e-03	1.992e+02
p	2	no	d1.4a	2.16e-03	1.44e-03	1.983e+02
p	1	yes	d1.4a	1.18e-03	9.00e-05	7.803e+00
p	2	yes	d1.4a	1.17e-03	8.00e-05	7.456e+00
p	1	no	d1.5a	8.00e-04	6.00e-05	8.369e+00
p	2	no	d1.5a	8.00e-04	6.00e-05	7.783e+00
p	1	yes	d1.5a	1.02e-03	-1.40e-04	-1.226e+01
p	2	yes	d1.5a	1.01e-03	-1.50e-04	-1.278e+01
p	1	no	d2.6	7.40e-04	-3.00e-05	-3.667e+00
p	1	yes	d2.6	1.45e-03	2.20e-04	1.784e+01
p	1	no	d2.7	7.40e-04	-1.60e-04	-1.749e+01
p	2	no	d2.7	8.70e-04	-3.00e-05	-3.697e+00
p	1	yes	d2.7	1.08e-03	-2.40e-04	-1.848e+01
p	2	yes	d2.7	1.35e-03	3.00e-05	1.918e+00

Table B.13.: Variance estimator of q

V	def	adj	design	avgV	biasV	relbiasV%
q	1	no	d1.2	7.830e-02	4.187e-02	1.149e+02
q	2	no	d1.2	7.822e-02	4.179e-02	1.147e+02
q	1	yes	d1.2	7.566e-02	2.937e-02	6.344e+01
q	2	yes	d1.2	7.567e-02	2.937e-02	6.345e+01
q	1	no	d1.4a	2.934e-01	2.601e-01	7.827e+02
q	2	no	d1.4a	2.924e-01	2.592e-01	7.798e+02
q	1	yes	d1.4a	5.005e-02	7.300e-03	1.708e+01
q	2	yes	d1.4a	4.989e-02	7.140e-03	1.671e+01
q	1	no	d1.5a	5.860e-02	2.608e-02	8.017e+01
q	2	no	d1.5a	5.821e-02	2.568e-02	7.897e+01
q	1	yes	d1.5a	4.255e-02	-9.000e-04	-2.080e+00
q	2	yes	d1.5a	4.229e-02	-1.160e-03	-2.674e+00
q	1	no	d2.6	5.284e-02	1.942e-02	5.811e+01
q	1	yes	d2.6	5.678e-02	8.910e-03	1.862e+01
q	1	no	d2.7	4.016e-02	2.020e-03	5.286e+00
q	2	no	d2.7	4.447e-02	6.320e-03	1.657e+01
q	1	yes	d2.7	4.493e-02	-3.690e-03	-7.592e+00
q	2	yes	d2.7	5.209e-02	3.470e-03	7.128e+00

B.2.4. Point estimates of the fitted GB2 indicators, simulation type 1 of Table B.5

In Tables B.14, B.15, B.16, B.17 and B.18 the used notation is as for the parameters.

Table B.14.: Point estimator of the median

T	adj	design	avgT	madT	varT	cvsT	cvT	cvdT	relbiasT%
Median	no	d1.2	2.558e+04	3.172e+02	8.315e+04	1.127e-02	1.179e-02	1.179e-02	1.103e-01
Median	yes	d1.2	2.585e+04	3.169e+02	8.442e+04	1.124e-02	1.175e-02	1.175e-02	1.115e+00
eMedian	no	d1.2	2.557e+04	-	1.069e+05	1.279e-02	-	-	-
Median	no	d1.4a	2.559e+04	2.765e+02	7.426e+04	1.065e-02	1.192e-02	1.108e-02	8.527e-02
Median	yes	d1.4a	2.586e+04	2.577e+02	7.536e+04	1.062e-02	1.167e-02	1.083e-02	1.104e+00
eMedian	no	d1.4a	2.558e+04	-	9.798e+04	1.224e-02	-	-	-
Median	no	d1.5a	2.556e+04	2.231e+02	5.646e+04	9.290e-03	1.059e-02	9.650e-03	7.361e-02
Median	yes	d1.5a	2.584e+04	2.269e+02	5.453e+04	9.040e-03	1.039e-02	9.450e-03	1.121e+00
eMedian	no	d1.5a	2.555e+04	-	7.156e+04	1.047e-02	-	-	-
Median	no	d2.6	2.563e+04	7.913e+02	8.638e+05	3.627e-02	1.057e-02	0.000e+00	7.321e-02
Median	yes	d2.6	2.595e+04	7.246e+02	8.718e+05	3.598e-02	1.041e-02	0.000e+00	1.103e+00
eMedian	no	d2.6	2.568e+04	-	8.625e+05	3.617e-02	-	-	-
Median	no	d2.7	2.560e+04	7.463e+02	8.323e+05	3.563e-02	1.169e-02	3.000e-02	1.061e-01
Median	yes	d2.7	2.594e+04	7.323e+02	8.444e+05	3.543e-02	1.160e-02	2.897e-02	1.125e+00
eMedian	no	d2.7	2.566e+04	-	8.579e+05	3.610e-02	-	-	-

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Table B.15.: Point estimator of ARPR and eARPR

T	adj	design	avgT	madT	varT	cvsT	cvT	cvdT	relbiasT%
ARPR	no	d1.2	2.872e+01	2.806e-01	7.547e-02	9.560e-03	9.630e-03	9.640e-03	8.739e+00
ARPR	yes	d1.2	2.765e+01	3.005e-01	8.543e-02	1.057e-02	9.250e-03	9.250e-03	4.547e+00
eARPR	no	d1.2	2.645e+01	-	2.763e-01	1.988e-02	-	-	-
ARPR	no	d1.4a	2.871e+01	2.665e-01	6.858e-02	9.120e-03	9.710e-03	9.650e-03	8.763e+00
ARPR	yes	d1.4a	2.764e+01	2.776e-01	7.627e-02	9.990e-03	9.270e-03	9.200e-03	4.597e+00
eARPR	no	d1.4a	2.642e+01	-	2.753e-01	1.986e-02	-	-	-
ARPR	no	d1.5a	2.873e+01	2.811e-01	8.601e-02	1.021e-02	1.022e-02	1.015e-02	8.817e+00
ARPR	yes	d1.5a	2.765e+01	2.992e-01	8.950e-02	1.082e-02	9.280e-03	9.200e-03	4.643e+00
eARPR	no	d1.5a	2.642e+01	-	2.221e-01	1.784e-02	-	-	-
ARPR	no	d2.6	2.868e+01	3.871e-01	1.671e-01	1.425e-02	1.028e-02	-	8.761e+00
ARPR	yes	d2.6	2.759e+01	4.401e-01	1.907e-01	1.583e-02	9.360e-03	-	4.676e+00
eARPR	no	d2.6	2.635e+01	-	4.327e-01	2.496e-02	-	-	-
ARPR	no	d2.7	2.868e+01	3.810e-01	1.511e-01	1.355e-02	9.700e-03	1.222e-02	8.930e+00
ARPR	yes	d2.7	2.756e+01	4.282e-01	1.903e-01	1.582e-02	9.340e-03	1.212e-02	4.741e+00
eARPR	no	d2.7	2.631e+01	-	4.403e-01	2.522e-02	-	-	-

Table B.16.: Point estimator of RMPG

T	adj	design	avgT	madT	varT	cvsT	cvT	cvdT	relbiasT%
RMPG	no	d1.2	4.667e+01	6.522e-01	4.027e-01	1.360e-02	1.368e-02	1.368e-02	7.016e+00
RMPG	yes	d1.2	4.409e+01	7.071e-01	4.409e-01	1.506e-02	1.293e-02	1.293e-02	9.757e-01
eRMPG	no	d1.2	4.367e+01	-	2.038e+00	3.269e-02	-	-	-
RMPG	no	d1.4a	4.664e+01	6.163e-01	3.711e-01	1.306e-02	1.377e-02	1.370e-02	6.848e+00
RMPG	yes	d1.4a	4.407e+01	6.439e-01	3.970e-01	1.430e-02	1.290e-02	1.283e-02	8.677e-01
eRMPG	no	d1.4a	4.369e+01	-	1.992e+00	3.230e-02	-	-	-
RMPG	no	d1.5a	4.667e+01	6.624e-01	4.723e-01	1.473e-02	1.466e-02	1.459e-02	6.837e+00
RMPG	yes	d1.5a	4.408e+01	6.973e-01	4.749e-01	1.563e-02	1.313e-02	1.305e-02	8.692e-01
eRMPG	no	d1.5a	4.369e+01	-	1.784e+00	3.057e-02	-	-	-
RMPG	no	d2.6	4.658e+01	8.605e-01	7.811e-01	1.897e-02	1.473e-02	0.000e+00	7.024e+00
RMPG	yes	d2.6	4.397e+01	8.746e-01	8.109e-01	2.048e-02	1.322e-02	0.000e+00	8.531e-01
eRMPG	no	d2.6	4.356e+01	-	2.041e+00	3.279e-02	-	-	-
RMPG	no	d2.7	4.657e+01	8.163e-01	7.001e-01	1.797e-02	1.375e-02	1.639e-02	6.885e+00
RMPG	yes	d2.7	4.392e+01	8.600e-01	8.038e-01	2.042e-02	1.295e-02	1.551e-02	8.430e-01
eRMPG	no	d2.7	4.354e+01	-	2.175e+00	3.387e-02	-	-	-

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Table B.17.: Point estimator of QSR

T	adj	design	avgT	madT	varT	cvsT	cvT	cvdT	relbiasT%
QSR	no	d1.2	1.046e+01	3.325e-01	1.019e-01	3.051e-02	3.076e-02	3.076e-02	8.999e+00
QSR	yes	d1.2	9.411e+00	2.986e-01	8.196e-02	3.042e-02	2.678e-02	2.678e-02	-2.155e+00
eQSR	no	d1.2	9.618e+00	-	9.037e-02	3.126e-02	-	-	-
QSR	no	d1.4a	1.045e+01	3.086e-01	9.304e-02	2.918e-02	3.086e-02	3.058e-02	8.939e+00
QSR	yes	d1.4a	9.402e+00	2.661e-01	7.059e-02	2.826e-02	2.677e-02	2.650e-02	-2.143e+00
eQSR	no	d1.4a	9.605e+00	-	8.259e-02	2.992e-02	-	-	-
QSR	no	d1.5a	1.047e+01	3.278e-01	1.119e-01	3.197e-02	3.208e-02	3.178e-02	8.940e+00
QSR	yes	d1.5a	9.408e+00	2.915e-01	8.389e-02	3.079e-02	2.658e-02	2.629e-02	-2.172e+00
eQSR	no	d1.5a	9.615e+00	-	9.314e-02	3.174e-02	-	-	-
QSR	no	d2.6	1.043e+01	5.137e-01	2.783e-01	5.059e-02	3.210e-02	0.000e+00	8.962e+00
QSR	yes	d2.6	9.357e+00	4.455e-01	2.186e-01	4.997e-02	2.664e-02	0.000e+00	-2.138e+00
eQSR	no	d2.6	9.553e+00	-	2.435e-01	5.165e-02	-	-	-
QSR	no	d2.7	1.043e+01	5.093e-01	2.673e-01	4.956e-02	3.081e-02	4.281e-02	8.994e+00
QSR	yes	d2.7	9.336e+00	4.552e-01	2.232e-01	5.060e-02	2.673e-02	3.785e-02	-2.154e+00
eQSR	no	d2.7	9.538e+00	-	2.502e-01	5.244e-02	-	-	-

Table B.18.: Point estimator of the Gini

T	adj	design	avgT	madT	varT	cvsT	cvT	cvdT	relbiasT%
Gini	no	d1.2	3.844e-01	4.09e-03	2e-05	1.045e-02	1.041e-02	1.041e-02	2.263e+00
Gini	yes	d1.2	3.751e-01	4.13e-03	2e-05	1.094e-02	1.025e-02	1.025e-02	-2.189e-01
eGini	no	d1.2	3.759e-01	-	2e-05	1.100e-02	-	-	-
Gini	no	d1.4a	3.844e-01	3.75e-03	1e-05	1.005e-02	1.045e-02	1.034e-02	2.270e+00
Gini	yes	d1.4a	3.750e-01	3.74e-03	1e-05	1.021e-02	1.027e-02	1.016e-02	-1.966e-01
eGini	no	d1.4a	3.757e-01	-	2e-05	1.041e-02	-	-	-
Gini	no	d1.5a	3.844e-01	3.94e-03	1e-05	9.930e-03	1.011e-02	9.990e-03	2.290e+00
Gini	yes	d1.5a	3.750e-01	4.12e-03	1e-05	1.030e-02	9.640e-03	9.520e-03	-1.995e-01
eGini	no	d1.5a	3.758e-01	-	2e-05	1.034e-02	-	-	-
Gini	no	d2.6	3.839e-01	6.85e-03	4e-05	1.702e-02	1.015e-02	0.000e+00	2.280e+00
Gini	yes	d2.6	3.742e-01	6.75e-03	5e-05	1.801e-02	9.680e-03	0.000e+00	-1.814e-01
eGini	no	d2.6	3.749e-01	-	5e-05	1.860e-02	-	-	-
Gini	no	d2.7	3.840e-01	6.98e-03	4e-05	1.732e-02	1.045e-02	1.506e-02	2.296e+00
Gini	yes	d2.7	3.740e-01	6.90e-03	5e-05	1.866e-02	1.029e-02	1.487e-02	-1.999e-01
eGini	no	d2.7	3.748e-01	-	5e-05	1.937e-02	-	-	-

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B.2.5. Variance estimates of the fitted GB2 indicators, simulation type 1 of Table B.5

In Tables B.19, B.20, B.21, B.22 and B.23 the used notation is as for the parameters.

Table B.19.: Variance estimator of the median

V	def	adj	design	avgV	biasV	relbiasV%
Median	1	no	d1.2	9.190e+04	8.747e+03	1.052e+01
Median	2	no	d1.2	9.191e+04	8.758e+03	1.053e+01
Median	1	yes	d1.2	9.614e+04	1.172e+04	1.389e+01
Median	2	yes	d1.2	9.616e+04	1.174e+04	1.391e+01
Median	1	no	d1.4a	9.955e+04	2.529e+04	3.406e+01
Median	2	no	d1.4a	8.704e+04	1.278e+04	1.721e+01
Median	1	yes	d1.4a	9.123e+04	1.587e+04	2.106e+01
Median	2	yes	d1.4a	7.862e+04	3.260e+03	4.326e+00
Median	1	no	d1.5a	7.390e+04	1.744e+04	3.090e+01
Median	2	no	d1.5a	6.155e+04	5.094e+03	9.022e+00
Median	1	yes	d1.5a	7.239e+04	1.786e+04	3.275e+01
Median	2	yes	d1.5a	5.993e+04	5.401e+03	9.904e+00
Median	1	no	d2.6	7.355e+04	-7.902e+05	-9.148e+01
Median	1	yes	d2.6	7.434e+04	-7.975e+05	-9.147e+01
Median	1	no	d2.7	8.966e+04	-7.427e+05	-8.923e+01
Median	2	no	d2.7	7.911e+05	-4.127e+04	-4.958e+00
Median	1	yes	d2.7	9.047e+04	-7.540e+05	-8.929e+01
Median	2	yes	d2.7	7.687e+05	-7.569e+04	-8.963e+00

Table B.20.: Variance estimator of the ARPR

V	def	adj	design	avgV	biasV	relbiasV%
ARPR	1	no	d1.2	7.664e-02	1.170e-03	1.546e+00
ARPR	2	no	d1.2	7.665e-02	1.180e-03	1.562e+00
ARPR	1	yes	d1.2	6.540e-02	-2.003e-02	-2.344e+01
ARPR	2	yes	d1.2	6.541e-02	-2.002e-02	-2.343e+01
ARPR	1	no	d1.4a	7.859e-02	1.001e-02	1.459e+01
ARPR	2	no	d1.4a	7.760e-02	9.020e-03	1.315e+01
ARPR	1	yes	d1.4a	6.564e-02	-1.063e-02	-1.393e+01
ARPR	2	yes	d1.4a	6.460e-02	-1.167e-02	-1.530e+01
ARPR	1	no	d1.5a	8.620e-02	1.900e-04	2.188e-01
ARPR	2	no	d1.5a	8.506e-02	-9.500e-04	-1.108e+00
ARPR	1	yes	d1.5a	6.581e-02	-2.369e-02	-2.647e+01
ARPR	2	yes	d1.5a	6.465e-02	-2.485e-02	-2.776e+01
ARPR	1	no	d2.6	8.701e-02	-8.009e-02	-4.793e+01
ARPR	1	yes	d2.6	6.663e-02	-1.241e-01	-6.506e+01
ARPR	1	no	d2.7	7.744e-02	-7.368e-02	-4.876e+01
ARPR	2	no	d2.7	1.313e-01	-1.984e-02	-1.313e+01
ARPR	1	yes	d2.7	6.633e-02	-1.239e-01	-6.514e+01
ARPR	2	yes	d2.7	1.220e-01	-6.829e-02	-3.589e+01

Table B.21.: Variance estimator of the RMPG

V	def	adj	design	avgV	biasV	relbiasV%
RMPG	1	no	d1.2	4.080e-01	5.260e-03	1.306e+00
RMPG	2	no	d1.2	4.081e-01	5.330e-03	1.323e+00
RMPG	1	yes	d1.2	3.327e-01	-1.082e-01	-2.454e+01
RMPG	2	yes	d1.2	3.328e-01	-1.081e-01	-2.453e+01
RMPG	1	no	d1.4a	4.140e-01	4.281e-02	1.154e+01
RMPG	2	no	d1.4a	4.101e-01	3.893e-02	1.049e+01
RMPG	1	yes	d1.4a	3.231e-01	-7.388e-02	-1.861e+01
RMPG	2	yes	d1.4a	3.197e-01	-7.730e-02	-1.947e+01
RMPG	1	no	d1.5a	4.684e-01	-3.870e-03	-8.200e-01
RMPG	2	no	d1.5a	4.636e-01	-8.630e-03	-1.828e+00
RMPG	1	yes	d1.5a	3.353e-01	-1.396e-01	-2.940e+01
RMPG	2	yes	d1.5a	3.312e-01	-1.437e-01	-3.025e+01
RMPG	1	no	d2.6	4.704e-01	-3.107e-01	-3.977e+01
RMPG	1	yes	d2.6	3.400e-01	-4.709e-01	-5.807e+01
RMPG	1	no	d2.7	4.100e-01	-2.902e-01	-4.144e+01
RMPG	2	no	d2.7	6.147e-01	-8.544e-02	-1.220e+01
RMPG	1	yes	d2.7	3.236e-01	-4.802e-01	-5.974e+01
RMPG	2	yes	d2.7	4.949e-01	-3.089e-01	-3.843e+01

Table B.22.: Variance estimator of the QSR

V	def	adj	design	avgV	biasV	relbiasV%
QSR	1	no	d1.2	1.040e-01	2.090e-03	2.053e+00
QSR	2	no	d1.2	1.040e-01	2.110e-03	2.071e+00
QSR	1	yes	d1.2	6.399e-02	-1.797e-02	-2.192e+01
QSR	2	yes	d1.2	6.400e-02	-1.796e-02	-2.191e+01
QSR	1	no	d1.4a	1.046e-01	1.151e-02	1.237e+01
QSR	2	no	d1.4a	1.027e-01	9.620e-03	1.034e+01
QSR	1	yes	d1.4a	6.357e-02	-7.020e-03	-9.946e+00
QSR	2	yes	d1.4a	6.229e-02	-8.300e-03	-1.175e+01
QSR	1	no	d1.5a	1.132e-01	1.270e-03	1.133e+00
QSR	2	no	d1.5a	1.111e-01	-8.200e-04	-7.312e-01
QSR	1	yes	d1.5a	6.282e-02	-2.107e-02	-2.512e+01
QSR	2	yes	d1.5a	6.144e-02	-2.245e-02	-2.676e+01
QSR	1	no	d2.6	1.128e-01	-1.655e-01	-5.947e+01
QSR	1	yes	d2.6	6.272e-02	-1.559e-01	-7.131e+01
QSR	1	no	d2.7	1.040e-01	-1.633e-01	-6.108e+01
QSR	2	no	d2.7	2.359e-01	-3.143e-02	-1.176e+01
QSR	1	yes	d2.7	6.278e-02	-1.604e-01	-7.187e+01
QSR	2	yes	d2.7	1.530e-01	-7.017e-02	-3.144e+01

Table B.23.: Variance estimator of the Gini

V	def	adj	design	avgV	biasV	relbiasV%
Gini	1	no	d1.2	2e-05	0e+00	-1.983e+01
Gini	2	no	d1.2	2e-05	0e+00	-1.982e+01
Gini	1	yes	d1.2	1e-05	-1e-05	-2.593e+01
Gini	2	yes	d1.2	1e-05	-1e-05	-2.591e+01
Gini	1	no	d1.4a	2e-05	1e-05	6.176e+01
Gini	2	no	d1.4a	2e-05	1e-05	5.854e+01
Gini	1	yes	d1.4a	1e-05	0e+00	4.857e+01
Gini	2	yes	d1.4a	1e-05	0e+00	4.550e+01
Gini	1	no	d1.5a	2e-05	1e-05	5.122e+01
Gini	2	no	d1.5a	1e-05	0e+00	4.776e+01
Gini	1	yes	d1.5a	1e-05	0e+00	3.089e+01
Gini	2	yes	d1.5a	1e-05	0e+00	2.761e+01
Gini	1	no	d2.6	2e-05	-2e-05	-6.197e+01
Gini	1	yes	d2.6	1e-05	-4e-05	-7.369e+01
Gini	1	no	d2.7	2e-05	-2e-05	-5.964e+01
Gini	2	no	d2.7	4e-05	0e+00	-2.967e+00
Gini	1	yes	d2.7	1e-05	-4e-05	-7.030e+01
Gini	2	yes	d2.7	4e-05	-1e-05	-2.674e+01

B.2.6. Point estimates of the fitted GB2 parameters, simulation type 2 of Table B.5

In Tables B.24, B.25, B.26 and B.27 we can see the following specific notation:

reg: if the parameter was fitted on the global (0) or regional (regions 1-4 of the AMELIA universe),

Note that for design d2.6, we were not able to calculate variance estimators using the whole design information, thus the values in the tables are equal to 0.

Table B.24.: Point estimator of a

T	reg	design	avgT	madT	varT	cvsT	cvT	cvdT
a	0	d1.2	3.955e+00	3.514e-01	1.282e-01	9.053e-02	8.867e-02	8.842e-02
a	1	d1.2	3.230e+00	6.021e-01	3.584e-01	1.854e-01	1.714e-01	1.715e-01
a	2	d1.2	6.220e+00	1.046e+00	1.159e+00	1.731e-01	2.037e-01	2.037e-01
a	3	d1.2	6.863e+00	1.151e+00	1.324e+00	1.677e-01	2.197e-01	2.198e-01
a	4	d1.2	6.238e+00	9.983e-01	1.236e+00	1.782e-01	2.017e-01	2.017e-01
a	0	d1.4a	3.960e+00	3.496e-01	1.217e-01	8.807e-02	8.851e-02	8.826e-02
a	1	d1.4a	3.199e+00	5.595e-01	3.282e-01	1.791e-01	1.715e-01	1.716e-01
a	2	d1.4a	6.239e+00	1.028e+00	1.312e+00	1.836e-01	2.046e-01	2.047e-01
a	3	d1.4a	6.922e+00	1.203e+00	1.408e+00	1.714e-01	2.213e-01	2.214e-01
a	4	d1.4a	6.199e+00	1.040e+00	1.216e+00	1.779e-01	1.999e-01	2.000e-01
a	0	d1.5a	3.942e+00	3.311e-01	1.152e-01	8.610e-02	8.004e-02	7.969e-02
a	1	d1.5a	3.209e+00	4.828e-01	2.713e-01	1.623e-01	1.559e-01	1.558e-01
a	2	d1.5a	6.204e+00	9.841e-01	9.880e-01	1.602e-01	1.778e-01	1.777e-01
a	3	d1.5a	6.848e+00	1.049e+00	1.153e+00	1.568e-01	1.971e-01	1.969e-01
a	4	d1.5a	6.150e+00	9.238e-01	9.248e-01	1.564e-01	1.780e-01	1.779e-01
a	0	d2.6	3.984e+00	4.108e-01	1.544e-01	9.863e-02	8.027e-02	0.000e+00
a	1	d2.6	3.174e+00	5.388e-01	3.049e-01	1.740e-01	1.621e-01	0.000e+00
a	2	d2.6	6.182e+00	9.617e-01	8.920e-01	1.528e-01	1.765e-01	0.000e+00
a	3	d2.6	6.878e+00	1.185e+00	1.230e+00	1.613e-01	1.979e-01	0.000e+00
a	4	d2.6	6.182e+00	8.925e-01	8.158e-01	1.461e-01	1.776e-01	0.000e+00
a	0	d2.7	3.988e+00	4.323e-01	1.828e-01	1.072e-01	8.861e-02	8.836e-02
a	1	d2.7	3.192e+00	5.351e-01	3.303e-01	1.801e-01	1.790e-01	1.709e-01
a	2	d2.7	6.232e+00	1.054e+00	1.201e+00	1.759e-01	2.041e-01	2.039e-01
a	3	d2.7	6.909e+00	1.260e+00	1.562e+00	1.809e-01	2.184e-01	2.171e-01
a	4	d2.7	6.213e+00	1.020e+00	1.297e+00	1.833e-01	2.013e-01	2.008e-01

Table B.25.: Point estimator of b

T	reg	design	avgT	madT	varT	cvsT	cvT	cvdT
b	0	d1.2	4.648e+04	2.087e+03	5.438e+06	5.017e-02	4.756e-02	4.735e-02
b	1	d1.2	3.174e+04	3.707e+03	2.091e+07	1.441e-01	1.187e-01	1.188e-01
b	2	d1.2	3.289e+04	1.684e+03	3.052e+06	5.312e-02	5.647e-02	5.649e-02
b	3	d1.2	4.359e+04	1.960e+03	4.591e+06	4.915e-02	5.054e-02	5.056e-02
b	4	d1.2	5.852e+04	3.346e+03	1.337e+07	6.248e-02	6.524e-02	6.526e-02
b	0	d1.4a	4.638e+04	2.174e+03	4.769e+06	4.708e-02	4.738e-02	4.718e-02
b	1	d1.4a	3.179e+04	3.702e+03	1.823e+07	1.343e-01	1.198e-01	1.199e-01
b	2	d1.4a	3.276e+04	1.706e+03	3.343e+06	5.581e-02	5.640e-02	5.642e-02
b	3	d1.4a	4.359e+04	2.019e+03	4.610e+06	4.925e-02	4.997e-02	4.998e-02
b	4	d1.4a	5.852e+04	3.346e+03	1.478e+07	6.568e-02	6.567e-02	6.569e-02
b	0	d1.5a	4.648e+04	2.097e+03	4.758e+06	4.693e-02	4.348e-02	4.321e-02
b	1	d1.5a	3.165e+04	3.128e+03	1.507e+07	1.227e-01	1.083e-01	1.082e-01
b	2	d1.5a	3.281e+04	1.547e+03	2.861e+06	5.155e-02	5.015e-02	5.012e-02
b	3	d1.5a	4.351e+04	1.772e+03	3.404e+06	4.241e-02	4.503e-02	4.500e-02
b	4	d1.5a	5.871e+04	3.251e+03	1.216e+07	5.939e-02	5.930e-02	5.926e-02
b	0	d2.6	4.641e+04	2.139e+03	4.739e+06	4.691e-02	4.304e-02	0.000e+00
b	1	d2.6	3.219e+04	3.642e+03	1.978e+07	1.382e-01	1.167e-01	0.000e+00
b	2	d2.6	3.279e+04	1.468e+03	2.439e+06	4.763e-02	4.964e-02	0.000e+00
b	3	d2.6	4.347e+04	1.814e+03	3.624e+06	4.380e-02	4.494e-02	0.000e+00
b	4	d2.6	5.842e+04	3.028e+03	1.126e+07	5.744e-02	5.872e-02	0.000e+00
b	0	d2.7	4.637e+04	2.292e+03	5.749e+06	5.170e-02	4.739e-02	4.718e-02
b	1	d2.7	3.216e+04	3.825e+03	2.143e+07	1.440e-01	1.264e-01	1.219e-01
b	2	d2.7	3.282e+04	1.678e+03	3.296e+06	5.531e-02	5.617e-02	5.606e-02
b	3	d2.7	4.354e+04	1.976e+03	4.325e+06	4.776e-02	5.022e-02	4.987e-02
b	4	d2.7	5.865e+04	3.518e+03	1.616e+07	6.855e-02	6.543e-02	6.519e-02

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Table B.26.: Point estimator of p

T	reg	design	avgT	madT	varT	cvsT	cvT	cvdT
p	0	d1.2	3.103e-01	3.224e-02	1.012e-03	1.026e-01	9.867e-02	9.852e-02
p	1	d1.2	3.843e-01	8.052e-02	6.165e-03	2.043e-01	1.953e-01	1.954e-01
p	2	d1.2	2.146e-01	3.917e-02	1.550e-03	1.834e-01	2.161e-01	2.162e-01
p	3	d1.2	2.355e-01	4.449e-02	2.072e-03	1.933e-01	2.399e-01	2.400e-01
p	4	d1.2	2.254e-01	3.992e-02	1.768e-03	1.865e-01	2.160e-01	2.161e-01
p	0	d1.4a	3.099e-01	3.176e-02	9.391e-04	9.888e-02	9.848e-02	9.833e-02
p	1	d1.4a	3.875e-01	7.628e-02	6.055e-03	2.008e-01	1.957e-01	1.958e-01
p	2	d1.4a	2.152e-01	3.984e-02	1.604e-03	1.861e-01	2.170e-01	2.171e-01
p	3	d1.4a	2.336e-01	4.376e-02	2.001e-03	1.914e-01	2.419e-01	2.420e-01
p	4	d1.4a	2.266e-01	4.089e-02	1.695e-03	1.817e-01	2.143e-01	2.144e-01
p	0	d1.5a	3.113e-01	3.233e-02	9.859e-04	1.009e-01	9.082e-02	9.057e-02
p	1	d1.5a	3.836e-01	6.937e-02	5.003e-03	1.844e-01	1.811e-01	1.809e-01
p	2	d1.5a	2.145e-01	3.767e-02	1.393e-03	1.740e-01	1.922e-01	1.920e-01
p	3	d1.5a	2.355e-01	4.132e-02	1.886e-03	1.844e-01	2.214e-01	2.212e-01
p	4	d1.5a	2.266e-01	3.732e-02	1.539e-03	1.731e-01	1.957e-01	1.956e-01
p	0	d2.6	3.096e-01	3.371e-02	1.044e-03	1.044e-01	9.106e-02	0.000e+00
p	1	d2.6	3.901e-01	7.763e-02	5.889e-03	1.967e-01	1.884e-01	0.000e+00
p	2	d2.6	2.149e-01	3.630e-02	1.213e-03	1.620e-01	1.908e-01	0.000e+00
p	3	d2.6	2.353e-01	4.273e-02	1.953e-03	1.878e-01	2.220e-01	0.000e+00
p	4	d2.6	2.255e-01	3.625e-02	1.290e-03	1.593e-01	1.951e-01	0.000e+00
p	0	d2.7	3.103e-01	3.467e-02	1.238e-03	1.134e-01	9.856e-02	9.841e-02
p	1	d2.7	3.889e-01	7.233e-02	6.183e-03	2.022e-01	2.043e-01	1.951e-01
p	2	d2.7	2.152e-01	3.950e-02	1.499e-03	1.799e-01	2.164e-01	2.161e-01
p	3	d2.7	2.355e-01	4.543e-02	2.272e-03	2.024e-01	2.386e-01	2.370e-01
p	4	d2.7	2.267e-01	4.093e-02	1.835e-03	1.889e-01	2.161e-01	2.154e-01

Table B.27.: Point estimator of q

T	reg	design	avgT	madT	varT	cvsT	cvT	cvdT
q	0	d1.2	1.135e+00	1.755e-01	3.533e-02	1.656e-01	1.566e-01	1.563e-01
q	1	d1.2	1.419e+00	4.378e-01	2.985e-01	3.852e-01	3.198e-01	3.199e-01
q	2	d1.2	6.416e-01	1.503e-01	2.595e-02	2.511e-01	2.888e-01	2.889e-01
q	3	d1.2	6.261e-01	1.344e-01	2.671e-02	2.610e-01	3.034e-01	3.036e-01
q	4	d1.2	8.437e-01	2.146e-01	6.087e-02	2.924e-01	3.167e-01	3.168e-01
q	0	d1.4a	1.129e+00	1.805e-01	3.126e-02	1.565e-01	1.562e-01	1.560e-01
q	1	d1.4a	1.420e+00	4.296e-01	2.642e-01	3.618e-01	3.210e-01	3.211e-01
q	2	d1.4a	6.394e-01	1.504e-01	2.809e-02	2.621e-01	2.896e-01	2.897e-01
q	3	d1.4a	6.209e-01	1.451e-01	2.735e-02	2.664e-01	3.040e-01	3.041e-01
q	4	d1.4a	8.510e-01	2.243e-01	6.489e-02	2.993e-01	3.157e-01	3.158e-01
q	0	d1.5a	1.139e+00	1.791e-01	3.261e-02	1.586e-01	1.437e-01	1.433e-01
q	1	d1.5a	1.400e+00	3.620e-01	2.275e-01	3.406e-01	2.957e-01	2.955e-01
q	2	d1.5a	6.399e-01	1.432e-01	2.485e-02	2.464e-01	2.566e-01	2.564e-01
q	3	d1.5a	6.221e-01	1.331e-01	2.122e-02	2.342e-01	2.742e-01	2.741e-01
q	4	d1.5a	8.540e-01	2.069e-01	5.660e-02	2.786e-01	2.856e-01	2.854e-01
q	0	d2.6	1.126e+00	1.958e-01	3.519e-02	1.666e-01	1.434e-01	0.000e+00
q	1	d2.6	1.456e+00	4.273e-01	2.945e-01	3.726e-01	3.122e-01	0.000e+00
q	2	d2.6	6.360e-01	1.390e-01	2.000e-02	2.224e-01	2.543e-01	0.000e+00
q	3	d2.6	6.198e-01	1.391e-01	2.335e-02	2.465e-01	2.751e-01	0.000e+00
q	4	d2.6	8.375e-01	1.989e-01	5.014e-02	2.674e-01	2.843e-01	0.000e+00
q	0	d2.7	1.128e+00	1.978e-01	4.109e-02	1.797e-01	1.564e-01	1.561e-01
q	1	d2.7	1.447e+00	4.408e-01	2.974e-01	3.768e-01	3.370e-01	3.215e-01
q	2	d2.7	6.425e-01	1.535e-01	2.758e-02	2.585e-01	2.892e-01	2.885e-01
q	3	d2.7	6.259e-01	1.491e-01	2.826e-02	2.686e-01	3.016e-01	3.000e-01
q	4	d2.7	8.541e-01	2.322e-01	7.245e-02	3.152e-01	3.166e-01	3.151e-01

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B.2.7. Variance estimates of the fitted GB2 parameters, simulation type 2 of Table B.5

In Tables B.28, B.29, B.30 and B.31 the used notation is as for the parameters.

Table B.28.: Variance estimator of a

V	def	reg	design	avgV	biasV	relbiasV%
a	1	0	d1.2	1.268e-01	-1.420e-03	-1.106e+00
a	2	0	d1.2	1.261e-01	-2.140e-03	-1.666e+00
a	1	1	d1.2	3.516e-01	-6.820e-03	-1.902e+00
a	2	1	d1.2	3.519e-01	-6.580e-03	-1.837e+00
a	1	2	d1.2	2.036e+00	8.772e-01	7.569e+01
a	2	2	d1.2	2.037e+00	8.783e-01	7.578e+01
a	1	3	d1.2	2.769e+00	1.445e+00	1.091e+02
a	2	3	d1.2	2.771e+00	1.447e+00	1.093e+02
a	1	4	d1.2	2.124e+00	8.883e-01	7.189e+01
a	2	4	d1.2	2.125e+00	8.897e-01	7.200e+01
a	1	0	d1.4a	1.264e-01	4.710e-03	3.872e+00
a	2	0	d1.4a	1.257e-01	4.000e-03	3.291e+00
a	1	1	d1.4a	3.388e-01	1.066e-02	3.248e+00
a	2	1	d1.4a	3.391e-01	1.089e-02	3.317e+00
a	1	2	d1.4a	2.118e+00	8.060e-01	6.145e+01
a	2	2	d1.4a	2.119e+00	8.072e-01	6.154e+01
a	1	3	d1.4a	3.004e+00	1.596e+00	1.134e+02
a	2	3	d1.4a	3.006e+00	1.598e+00	1.135e+02
a	1	4	d1.4a	1.974e+00	7.580e-01	6.233e+01
a	2	4	d1.4a	1.975e+00	7.591e-01	6.242e+01
a	1	0	d1.5a	1.017e-01	-1.355e-02	-1.176e+01
a	2	0	d1.5a	1.008e-01	-1.444e-02	-1.253e+01
a	1	1	d1.5a	2.738e-01	2.500e-03	9.210e-01
a	2	1	d1.5a	2.734e-01	2.100e-03	7.759e-01
a	1	2	d1.5a	1.450e+00	4.621e-01	4.677e+01
a	2	2	d1.5a	1.448e+00	4.599e-01	4.654e+01
a	1	3	d1.5a	2.085e+00	9.315e-01	8.075e+01
a	2	3	d1.5a	2.082e+00	9.287e-01	8.052e+01
a	1	4	d1.5a	1.412e+00	4.868e-01	5.264e+01
a	2	4	d1.5a	1.410e+00	4.848e-01	5.242e+01
a	1	0	d2.6	1.047e-01	-4.965e-02	-3.216e+01
a	1	1	d2.6	2.972e-01	-7.730e-03	-2.533e+00
a	1	2	d2.6	1.430e+00	5.381e-01	6.032e+01
a	1	3	d2.6	2.202e+00	9.715e-01	7.897e+01
a	1	4	d2.6	1.384e+00	5.680e-01	6.963e+01
a	1	0	d2.7	1.293e-01	-5.346e-02	-2.925e+01
a	2	0	d2.7	1.286e-01	-5.416e-02	-2.963e+01
a	1	1	d2.7	3.818e-01	5.152e-02	1.560e+01
a	2	1	d2.7	3.678e-01	3.751e-02	1.136e+01
a	1	2	d2.7	2.179e+00	9.777e-01	8.139e+01
a	2	2	d2.7	2.225e+00	1.024e+00	8.527e+01
a	1	3	d2.7	2.876e+00	1.314e+00	8.410e+01
a	2	3	d2.7	2.914e+00	1.352e+00	8.653e+01
a	1	4	d2.7	2.174e+00	8.762e-01	6.754e+01
a	2	4	d2.7	2.232e+00	9.346e-01	7.204e+01

Table B.29.: Variance estimator of b

V	def	reg	design	avgV	biasV	relbiasV%
b	1	0	d1.2	1.268e-01	-1.420e-03	-1.106e+00
b	2	0	d1.2	1.261e-01	-2.140e-03	-1.666e+00
b	1	1	d1.2	3.516e-01	-6.820e-03	-1.902e+00
b	2	1	d1.2	3.519e-01	-6.580e-03	-1.837e+00
b	1	2	d1.2	2.036e+00	8.772e-01	7.569e+01
b	2	2	d1.2	2.037e+00	8.783e-01	7.578e+01
b	1	3	d1.2	2.769e+00	1.445e+00	1.091e+02
b	2	3	d1.2	2.771e+00	1.447e+00	1.093e+02
b	1	4	d1.2	2.124e+00	8.883e-01	7.189e+01
b	2	4	d1.2	2.125e+00	8.897e-01	7.200e+01
b	1	0	d1.4a	1.264e-01	4.710e-03	3.872e+00
b	2	0	d1.4a	1.257e-01	4.000e-03	3.291e+00
b	1	1	d1.4a	3.388e-01	1.066e-02	3.248e+00
b	2	1	d1.4a	3.391e-01	1.089e-02	3.317e+00
b	1	2	d1.4a	2.118e+00	8.060e-01	6.145e+01
b	2	2	d1.4a	2.119e+00	8.072e-01	6.154e+01
b	1	3	d1.4a	3.004e+00	1.596e+00	1.134e+02
b	2	3	d1.4a	3.006e+00	1.598e+00	1.135e+02
b	1	4	d1.4a	1.974e+00	7.580e-01	6.233e+01
b	2	4	d1.4a	1.975e+00	7.591e-01	6.242e+01
b	1	0	d1.5a	1.017e-01	-1.355e-02	-1.176e+01
b	2	0	d1.5a	1.008e-01	-1.444e-02	-1.253e+01
b	1	1	d1.5a	2.738e-01	2.500e-03	9.210e-01
b	2	1	d1.5a	2.734e-01	2.100e-03	7.759e-01
b	1	2	d1.5a	1.450e+00	4.621e-01	4.677e+01
b	2	2	d1.5a	1.448e+00	4.599e-01	4.654e+01
b	1	3	d1.5a	2.085e+00	9.315e-01	8.075e+01
b	2	3	d1.5a	2.082e+00	9.287e-01	8.052e+01
b	1	4	d1.5a	1.412e+00	4.868e-01	5.264e+01
b	2	4	d1.5a	1.410e+00	4.848e-01	5.242e+01
b	1	0	d2.6	1.047e-01	-4.965e-02	-3.216e+01
b	1	1	d2.6	2.972e-01	-7.730e-03	-2.533e+00
b	1	2	d2.6	1.430e+00	5.381e-01	6.032e+01
b	1	3	d2.6	2.202e+00	9.715e-01	7.897e+01
b	1	4	d2.6	1.384e+00	5.680e-01	6.963e+01
b	1	0	d2.7	1.293e-01	-5.346e-02	-2.925e+01
b	2	0	d2.7	1.286e-01	-5.416e-02	-2.963e+01
b	1	1	d2.7	3.818e-01	5.152e-02	1.560e+01
b	2	1	d2.7	3.678e-01	3.751e-02	1.136e+01
b	1	2	d2.7	2.179e+00	9.777e-01	8.139e+01
b	2	2	d2.7	2.225e+00	1.024e+00	8.527e+01
b	1	3	d2.7	2.876e+00	1.314e+00	8.410e+01
b	2	3	d2.7	2.914e+00	1.352e+00	8.653e+01
b	1	4	d2.7	2.174e+00	8.762e-01	6.754e+01
b	2	4	d2.7	2.232e+00	9.346e-01	7.204e+01

Table B.30.: Variance estimator of p

V	def	reg	design	avgV	biasV	relbiasV%
p	1	0	d1.2	1.268e-01	-1.420e-03	-1.106e+00
p	2	0	d1.2	1.261e-01	-2.140e-03	-1.666e+00
p	1	1	d1.2	3.516e-01	-6.820e-03	-1.902e+00
p	2	1	d1.2	3.519e-01	-6.580e-03	-1.837e+00
p	1	2	d1.2	2.036e+00	8.772e-01	7.569e+01
p	2	2	d1.2	2.037e+00	8.783e-01	7.578e+01
p	1	3	d1.2	2.769e+00	1.445e+00	1.091e+02
p	2	3	d1.2	2.771e+00	1.447e+00	1.093e+02
p	1	4	d1.2	2.124e+00	8.883e-01	7.189e+01
p	2	4	d1.2	2.125e+00	8.897e-01	7.200e+01
p	1	0	d1.4a	1.264e-01	4.710e-03	3.872e+00
p	2	0	d1.4a	1.257e-01	4.000e-03	3.291e+00
p	1	1	d1.4a	3.388e-01	1.066e-02	3.248e+00
p	2	1	d1.4a	3.391e-01	1.089e-02	3.317e+00
p	1	2	d1.4a	2.118e+00	8.060e-01	6.145e+01
p	2	2	d1.4a	2.119e+00	8.072e-01	6.154e+01
p	1	3	d1.4a	3.004e+00	1.596e+00	1.134e+02
p	2	3	d1.4a	3.006e+00	1.598e+00	1.135e+02
p	1	4	d1.4a	1.974e+00	7.580e-01	6.233e+01
p	2	4	d1.4a	1.975e+00	7.591e-01	6.242e+01
p	1	0	d1.5a	1.017e-01	-1.355e-02	-1.176e+01
p	2	0	d1.5a	1.008e-01	-1.444e-02	-1.253e+01
p	1	1	d1.5a	2.738e-01	2.500e-03	9.210e-01
p	2	1	d1.5a	2.734e-01	2.100e-03	7.759e-01
p	1	2	d1.5a	1.450e+00	4.621e-01	4.677e+01
p	2	2	d1.5a	1.448e+00	4.599e-01	4.654e+01
p	1	3	d1.5a	2.085e+00	9.315e-01	8.075e+01
p	2	3	d1.5a	2.082e+00	9.287e-01	8.052e+01
p	1	4	d1.5a	1.412e+00	4.868e-01	5.264e+01
p	2	4	d1.5a	1.410e+00	4.848e-01	5.242e+01
p	1	0	d2.6	1.047e-01	-4.965e-02	-3.216e+01
p	1	1	d2.6	2.972e-01	-7.730e-03	-2.533e+00
p	1	2	d2.6	1.430e+00	5.381e-01	6.032e+01
p	1	3	d2.6	2.202e+00	9.715e-01	7.897e+01
p	1	4	d2.6	1.384e+00	5.680e-01	6.963e+01
p	1	0	d2.7	1.293e-01	-5.346e-02	-2.925e+01
p	2	0	d2.7	1.286e-01	-5.416e-02	-2.963e+01
p	1	1	d2.7	3.818e-01	5.152e-02	1.560e+01
p	2	1	d2.7	3.678e-01	3.751e-02	1.136e+01
p	1	2	d2.7	2.179e+00	9.777e-01	8.139e+01
p	2	2	d2.7	2.225e+00	1.024e+00	8.527e+01
p	1	3	d2.7	2.876e+00	1.314e+00	8.410e+01
p	2	3	d2.7	2.914e+00	1.352e+00	8.653e+01
p	1	4	d2.7	2.174e+00	8.762e-01	6.754e+01
p	2	4	d2.7	2.232e+00	9.346e-01	7.204e+01

Table B.31.: Variance estimator of q

V	def	reg	design	avgV	biasV	relbiasV%
q	1	0	d1.2	1.268e-01	-1.420e-03	-1.106e+00
q	2	0	d1.2	1.261e-01	-2.140e-03	-1.666e+00
q	1	1	d1.2	3.516e-01	-6.820e-03	-1.902e+00
q	2	1	d1.2	3.519e-01	-6.580e-03	-1.837e+00
q	1	2	d1.2	2.036e+00	8.772e-01	7.569e+01
q	2	2	d1.2	2.037e+00	8.783e-01	7.578e+01
q	1	3	d1.2	2.769e+00	1.445e+00	1.091e+02
q	2	3	d1.2	2.771e+00	1.447e+00	1.093e+02
q	1	4	d1.2	2.124e+00	8.883e-01	7.189e+01
q	2	4	d1.2	2.125e+00	8.897e-01	7.200e+01
q	1	0	d1.4a	1.264e-01	4.710e-03	3.872e+00
q	2	0	d1.4a	1.257e-01	4.000e-03	3.291e+00
q	1	1	d1.4a	3.388e-01	1.066e-02	3.248e+00
q	2	1	d1.4a	3.391e-01	1.089e-02	3.317e+00
q	1	2	d1.4a	2.118e+00	8.060e-01	6.145e+01
q	2	2	d1.4a	2.119e+00	8.072e-01	6.154e+01
q	1	3	d1.4a	3.004e+00	1.596e+00	1.134e+02
q	2	3	d1.4a	3.006e+00	1.598e+00	1.135e+02
q	1	4	d1.4a	1.974e+00	7.580e-01	6.233e+01
q	2	4	d1.4a	1.975e+00	7.591e-01	6.242e+01
q	1	0	d1.5a	1.017e-01	-1.355e-02	-1.176e+01
q	2	0	d1.5a	1.008e-01	-1.444e-02	-1.253e+01
q	1	1	d1.5a	2.738e-01	2.500e-03	9.210e-01
q	2	1	d1.5a	2.734e-01	2.100e-03	7.759e-01
q	1	2	d1.5a	1.450e+00	4.621e-01	4.677e+01
q	2	2	d1.5a	1.448e+00	4.599e-01	4.654e+01
q	1	3	d1.5a	2.085e+00	9.315e-01	8.075e+01
q	2	3	d1.5a	2.082e+00	9.287e-01	8.052e+01
q	1	4	d1.5a	1.412e+00	4.868e-01	5.264e+01
q	2	4	d1.5a	1.410e+00	4.848e-01	5.242e+01
q	1	0	d2.6	1.047e-01	-4.965e-02	-3.216e+01
q	1	1	d2.6	2.972e-01	-7.730e-03	-2.533e+00
q	1	2	d2.6	1.430e+00	5.381e-01	6.032e+01
q	1	3	d2.6	2.202e+00	9.715e-01	7.897e+01
q	1	4	d2.6	1.384e+00	5.680e-01	6.963e+01
q	1	0	d2.7	1.293e-01	-5.346e-02	-2.925e+01
q	2	0	d2.7	1.286e-01	-5.416e-02	-2.963e+01
q	1	1	d2.7	3.818e-01	5.152e-02	1.560e+01
q	2	1	d2.7	3.678e-01	3.751e-02	1.136e+01
q	1	2	d2.7	2.179e+00	9.777e-01	8.139e+01
q	2	2	d2.7	2.225e+00	1.024e+00	8.527e+01
q	1	3	d2.7	2.876e+00	1.314e+00	8.410e+01
q	2	3	d2.7	2.914e+00	1.352e+00	8.653e+01
q	1	4	d2.7	2.174e+00	8.762e-01	6.754e+01
q	2	4	d2.7	2.232e+00	9.346e-01	7.204e+01

B.2.8. Point estimates of the fitted GB2 indicators, simulation type 2 of Table B.5

In Tables B.32, B.33, B.34, B.35 and B.36 the used notation is as for the parameters.

Table B.32.: Point estimator of the median

T	reg	design	avgT	madT	varT	cvsT	cvT	cvdT	relbiasT%
Median	0	d1.2	2.588e+04	3.174e+02	8.537e+04	1.129e-02	1.166e-02	1.082e-02	1.213e+00
Median	1	d1.2	1.627e+04	4.107e+02	1.658e+05	2.503e-02	2.530e-02	2.531e-02	1.812e+00
Median	2	d1.2	2.179e+04	4.124e+02	1.721e+05	1.904e-02	1.922e-02	1.922e-02	7.557e-01
Median	3	d1.2	3.156e+04	5.741e+02	3.269e+05	1.812e-02	1.866e-02	1.866e-02	5.376e-01
Median	4	d1.2	3.704e+04	7.128e+02	4.846e+05	1.880e-02	1.865e-02	1.865e-02	-5.381e-02
Median	0	d1.4a	2.588e+04	2.541e+02	7.604e+04	1.065e-02	1.164e-02	1.080e-02	1.191e+00
Median	1	d1.4a	1.629e+04	4.425e+02	1.755e+05	2.572e-02	2.535e-02	2.536e-02	1.859e+00
Median	2	d1.4a	2.177e+04	4.234e+02	1.669e+05	1.877e-02	1.917e-02	1.918e-02	7.429e-01
Median	3	d1.4a	3.161e+04	6.073e+02	3.184e+05	1.785e-02	1.868e-02	1.869e-02	5.483e-01
Median	4	d1.4a	3.698e+04	7.089e+02	4.873e+05	1.888e-02	1.865e-02	1.865e-02	3.730e-02
Median	0	d1.5a	2.586e+04	2.307e+02	5.428e+04	9.010e-03	1.036e-02	9.420e-03	1.209e+00
Median	1	d1.5a	1.629e+04	3.483e+02	1.381e+05	2.281e-02	2.236e-02	2.235e-02	1.839e+00
Median	2	d1.5a	2.176e+04	3.930e+02	1.375e+05	1.704e-02	1.703e-02	1.702e-02	6.754e-01
Median	3	d1.5a	3.156e+04	5.409e+02	2.889e+05	1.703e-02	1.677e-02	1.676e-02	5.322e-01
Median	4	d1.5a	3.700e+04	5.895e+02	3.721e+05	1.649e-02	1.699e-02	1.697e-02	-2.433e-02
Median	0	d2.6	2.598e+04	7.270e+02	8.646e+05	3.579e-02	1.035e-02	0.000e+00	1.199e+00
Median	1	d2.6	1.636e+04	4.365e+02	1.918e+05	2.677e-02	2.634e-02	0.000e+00	1.841e+00
Median	2	d2.6	2.179e+04	4.345e+02	1.825e+05	1.961e-02	1.904e-02	0.000e+00	6.990e-01
Median	3	d2.6	3.157e+04	5.949e+02	3.829e+05	1.960e-02	1.857e-02	0.000e+00	5.350e-01
Median	4	d2.6	3.705e+04	7.350e+02	5.320e+05	1.969e-02	1.873e-02	0.000e+00	3.768e-02
Median	0	d2.7	2.597e+04	7.282e+02	8.435e+05	3.536e-02	1.160e-02	1.078e-02	1.221e+00
Median	1	d2.7	1.636e+04	4.365e+02	1.918e+05	2.677e-02	2.634e-02	2.596e-02	1.841e+00
Median	2	d2.7	2.179e+04	4.345e+02	1.825e+05	1.961e-02	1.904e-02	1.967e-02	6.990e-01
Median	3	d2.7	3.157e+04	5.949e+02	3.829e+05	1.960e-02	1.857e-02	1.880e-02	5.350e-01
Median	4	d2.7	3.705e+04	7.350e+02	5.320e+05	1.969e-02	1.873e-02	1.891e-02	3.768e-02

Table B.33.: Point estimator of the ARPR

T	reg	design	avgT	madT	varT	cvsT	cvT	cvdT	relbiasT%
ARPR	0	d1.2	2.764e+01	3.001e-01	8.570e-02	1.059e-02	9.260e-03	9.190e-03	4.524e+00
ARPR	1	d1.2	2.844e+01	5.283e-01	2.602e-01	1.794e-02	1.682e-02	1.683e-02	1.985e+00
ARPR	2	d1.2	2.614e+01	5.734e-01	3.289e-01	2.194e-02	2.095e-02	2.095e-02	8.849e+00
ARPR	3	d1.2	2.290e+01	6.757e-01	4.750e-01	3.009e-02	2.954e-02	2.955e-02	9.553e+00
ARPR	4	d1.2	2.525e+01	6.098e-01	3.731e-01	2.419e-02	2.411e-02	2.412e-02	1.123e+01
ARPR	0	d1.4a	2.763e+01	2.783e-01	7.754e-02	1.008e-02	9.290e-03	9.210e-03	4.571e+00
ARPR	1	d1.4a	2.845e+01	4.928e-01	2.381e-01	1.715e-02	1.682e-02	1.683e-02	1.934e+00
ARPR	2	d1.4a	2.608e+01	5.475e-01	3.088e-01	2.130e-02	2.103e-02	2.104e-02	8.906e+00
ARPR	3	d1.4a	2.289e+01	6.752e-01	4.531e-01	2.941e-02	2.968e-02	2.969e-02	9.721e+00
ARPR	4	d1.4a	2.526e+01	6.090e-01	3.692e-01	2.406e-02	2.414e-02	2.415e-02	1.150e+01
ARPR	0	d1.5a	2.764e+01	3.066e-01	8.997e-02	1.085e-02	9.300e-03	9.220e-03	4.607e+00
ARPR	1	d1.5a	2.845e+01	4.870e-01	2.355e-01	1.706e-02	1.641e-02	1.640e-02	1.990e+00
ARPR	2	d1.5a	2.612e+01	5.897e-01	3.336e-01	2.211e-02	2.126e-02	2.124e-02	8.760e+00
ARPR	3	d1.5a	2.287e+01	7.254e-01	5.168e-01	3.143e-02	3.126e-02	3.125e-02	9.790e+00
ARPR	4	d1.5a	2.531e+01	6.051e-01	3.828e-01	2.445e-02	2.503e-02	2.501e-02	1.112e+01
ARPR	0	d2.6	2.757e+01	4.341e-01	1.917e-01	1.588e-02	9.390e-03	0.000e+00	4.638e+00
ARPR	1	d2.6	2.844e+01	4.985e-01	2.759e-01	1.847e-02	1.742e-02	0.000e+00	1.953e+00
ARPR	2	d2.6	2.606e+01	5.628e-01	3.365e-01	2.226e-02	2.091e-02	0.000e+00	8.561e+00
ARPR	3	d2.6	2.285e+01	6.514e-01	4.762e-01	3.020e-02	2.959e-02	0.000e+00	9.639e+00
ARPR	4	d2.6	2.525e+01	5.885e-01	3.864e-01	2.462e-02	2.423e-02	0.000e+00	1.132e+01
ARPR	0	d2.7	2.755e+01	4.205e-01	1.876e-01	1.572e-02	9.370e-03	9.300e-03	4.718e+00
ARPR	1	d2.7	2.844e+01	4.985e-01	2.759e-01	1.847e-02	1.742e-02	1.705e-02	1.953e+00
ARPR	2	d2.7	2.606e+01	5.628e-01	3.365e-01	2.226e-02	2.091e-02	2.088e-02	8.561e+00
ARPR	3	d2.7	2.285e+01	6.514e-01	4.762e-01	3.020e-02	2.959e-02	2.950e-02	9.639e+00
ARPR	4	d2.7	2.525e+01	5.885e-01	3.864e-01	2.462e-02	2.423e-02	2.400e-02	1.132e+01

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Table B.34.: Point estimator of the RMPG

T	reg	design	avgT	madT	varT	cvsT	cvT	cvdT	relbiasT%
RMPG	0	d1.2	4.411e+01	7.073e-01	4.417e-01	1.507e-02	1.290e-02	1.284e-02	1.012e+00
RMPG	1	d1.2	4.535e+01	1.294e+00	1.459e+00	2.663e-02	2.478e-02	2.479e-02	1.943e+00
RMPG	2	d1.2	4.163e+01	1.148e+00	1.316e+00	2.755e-02	2.623e-02	2.624e-02	-5.753e+00
RMPG	3	d1.2	3.592e+01	1.219e+00	1.508e+00	3.419e-02	3.377e-02	3.379e-02	6.666e+00
RMPG	4	d1.2	4.007e+01	1.148e+00	1.357e+00	2.907e-02	2.902e-02	2.903e-02	7.584e+00
RMPG	0	d1.4a	4.408e+01	6.493e-01	3.989e-01	1.433e-02	1.293e-02	1.286e-02	8.848e-01
RMPG	1	d1.4a	4.536e+01	1.146e+00	1.372e+00	2.582e-02	2.482e-02	2.482e-02	2.074e+00
RMPG	2	d1.4a	4.152e+01	1.070e+00	1.218e+00	2.658e-02	2.628e-02	2.629e-02	-5.808e+00
RMPG	3	d1.4a	3.590e+01	1.178e+00	1.394e+00	3.289e-02	3.395e-02	3.396e-02	7.097e+00
RMPG	4	d1.4a	4.007e+01	1.133e+00	1.327e+00	2.875e-02	2.906e-02	2.908e-02	7.699e+00
RMPG	0	d1.5a	4.410e+01	7.138e-01	4.744e-01	1.562e-02	1.315e-02	1.307e-02	9.247e-01
RMPG	1	d1.5a	4.536e+01	1.188e+00	1.374e+00	2.584e-02	2.463e-02	2.462e-02	1.852e+00
RMPG	2	d1.5a	4.161e+01	1.170e+00	1.357e+00	2.800e-02	2.686e-02	2.684e-02	-5.613e+00
RMPG	3	d1.5a	3.587e+01	1.253e+00	1.649e+00	3.579e-02	3.609e-02	3.607e-02	6.564e+00
RMPG	4	d1.5a	4.017e+01	1.148e+00	1.418e+00	2.965e-02	3.046e-02	3.044e-02	7.681e+00
RMPG	0	d2.6	4.397e+01	8.964e-01	8.105e-01	2.047e-02	1.323e-02	0.000e+00	9.348e-01
RMPG	1	d2.6	4.534e+01	1.204e+00	1.544e+00	2.740e-02	2.568e-02	0.000e+00	1.888e+00
RMPG	2	d2.6	4.149e+01	1.151e+00	1.303e+00	2.751e-02	2.612e-02	0.000e+00	-5.762e+00
RMPG	3	d2.6	3.583e+01	1.202e+00	1.496e+00	3.414e-02	3.374e-02	0.000e+00	6.794e+00
RMPG	4	d2.6	4.005e+01	1.112e+00	1.384e+00	2.938e-02	2.920e-02	0.000e+00	7.975e+00
RMPG	0	d2.7	4.393e+01	8.526e-01	7.895e-01	2.023e-02	1.300e-02	1.293e-02	8.937e-01
RMPG	1	d2.7	4.534e+01	1.204e+00	1.544e+00	2.740e-02	2.568e-02	2.517e-02	1.888e+00
RMPG	2	d2.7	4.149e+01	1.151e+00	1.303e+00	2.751e-02	2.612e-02	2.605e-02	-5.762e+00
RMPG	3	d2.7	3.583e+01	1.202e+00	1.496e+00	3.414e-02	3.374e-02	3.361e-02	6.794e+00
RMPG	4	d2.7	4.005e+01	1.112e+00	1.384e+00	2.938e-02	2.920e-02	2.894e-02	7.975e+00

Table B.35.: Point estimator of the QSR

T	reg	design	avgT	madT	varT	cvsT	cvT	cvdT	relbiasT%
QSR	0	d1.2	9.420e+00	3.043e-01	8.162e-02	3.033e-02	2.675e-02	2.648e-02	-2.049e+00
QSR	1	d1.2	1.078e+01	6.383e-01	3.836e-01	5.745e-02	5.436e-02	5.437e-02	-5.165e+00
QSR	2	d1.2	8.112e+00	4.205e-01	1.920e-01	5.401e-02	5.113e-02	5.115e-02	-3.838e+00
QSR	3	d1.2	6.050e+00	3.197e-01	9.723e-02	5.154e-02	5.085e-02	5.087e-02	3.539e+00
QSR	4	d1.2	6.938e+00	3.532e-01	1.312e-01	5.221e-02	5.083e-02	5.085e-02	3.744e+00
QSR	0	d1.4a	9.408e+00	2.628e-01	7.010e-02	2.814e-02	2.678e-02	2.651e-02	-2.053e+00
QSR	1	d1.4a	1.079e+01	6.069e-01	3.425e-01	5.422e-02	5.436e-02	5.438e-02	-5.120e+00
QSR	2	d1.4a	8.084e+00	4.153e-01	1.740e-01	5.159e-02	5.105e-02	5.107e-02	-3.763e+00
QSR	3	d1.4a	6.044e+00	3.167e-01	9.541e-02	5.111e-02	5.103e-02	5.105e-02	3.685e+00
QSR	4	d1.4a	6.944e+00	3.714e-01	1.280e-01	5.152e-02	5.090e-02	5.091e-02	3.874e+00
QSR	0	d1.5a	9.416e+00	2.925e-01	8.283e-02	3.057e-02	2.659e-02	2.630e-02	-2.071e+00
QSR	1	d1.5a	1.077e+01	5.826e-01	3.521e-01	5.510e-02	5.290e-02	5.287e-02	-5.215e+00
QSR	2	d1.5a	8.103e+00	4.285e-01	1.836e-01	5.288e-02	5.090e-02	5.086e-02	-3.822e+00
QSR	3	d1.5a	6.040e+00	3.236e-01	1.090e-01	5.467e-02	5.204e-02	5.201e-02	3.608e+00
QSR	4	d1.5a	6.964e+00	3.480e-01	1.223e-01	5.022e-02	5.240e-02	5.236e-02	3.696e+00
QSR	0	d2.6	9.360e+00	4.490e-01	2.182e-01	4.990e-02	2.662e-02	0.000e+00	-2.022e+00
QSR	1	d2.6	1.076e+01	6.281e-01	4.138e-01	5.979e-02	5.623e-02	0.000e+00	-5.278e+00
QSR	2	d2.6	8.054e+00	3.971e-01	1.922e-01	5.443e-02	5.063e-02	0.000e+00	-3.961e+00
QSR	3	d2.6	6.022e+00	3.095e-01	1.054e-01	5.392e-02	5.067e-02	0.000e+00	3.495e+00
QSR	4	d2.6	6.938e+00	3.662e-01	1.341e-01	5.278e-02	5.104e-02	0.000e+00	3.826e+00
QSR	0	d2.7	9.343e+00	4.591e-01	2.199e-01	5.019e-02	2.676e-02	2.650e-02	-2.047e+00
QSR	1	d2.7	1.076e+01	6.281e-01	4.138e-01	5.979e-02	5.623e-02	5.484e-02	-5.278e+00
QSR	2	d2.7	8.054e+00	3.971e-01	1.922e-01	5.443e-02	5.063e-02	5.060e-02	-3.961e+00
QSR	3	d2.7	6.022e+00	3.095e-01	1.054e-01	5.392e-02	5.067e-02	5.062e-02	3.495e+00
QSR	4	d2.7	6.938e+00	3.662e-01	1.341e-01	5.278e-02	5.104e-02	5.042e-02	3.826e+00

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Table B.36.: Point estimator of the Gini index

T	reg	design	avgT	madT	varT	cvsT	cvT	cvdT	relbiasT%
Gini	0	d1.2	3.752e-01	4.12e-03	2e-05	1.094e-02	1.028e-02	1.017e-02	-1.966e-01
Gini	1	d1.2	3.986e-01	8.48e-03	7e-05	2.123e-02	2.084e-02	2.085e-02	-1.175e+00
Gini	2	d1.2	3.549e-01	7.93e-03	6e-05	2.247e-02	2.162e-02	2.163e-02	1.865e-01
Gini	3	d1.2	3.155e-01	8.14e-03	7e-05	2.570e-02	2.546e-02	2.547e-02	1.108e+00
Gini	4	d1.2	3.275e-01	7.15e-03	5e-05	2.203e-02	2.115e-02	2.116e-02	2.118e+00
Gini	0	d1.4a	3.750e-01	3.80e-03	1e-05	1.020e-02	1.030e-02	1.019e-02	-1.846e-01
Gini	1	d1.4a	3.988e-01	8.49e-03	7e-05	2.044e-02	2.080e-02	2.081e-02	-1.177e+00
Gini	2	d1.4a	3.548e-01	7.35e-03	6e-05	2.176e-02	2.168e-02	2.168e-02	2.174e-01
Gini	3	d1.4a	3.153e-01	8.43e-03	7e-05	2.589e-02	2.558e-02	2.559e-02	1.115e+00
Gini	4	d1.4a	3.277e-01	7.44e-03	5e-05	2.151e-02	2.116e-02	2.117e-02	2.146e+00
Gini	0	d1.5a	3.751e-01	4.07e-03	1e-05	1.025e-02	9.670e-03	9.550e-03	-1.798e-01
Gini	1	d1.5a	3.983e-01	7.49e-03	6e-05	1.941e-02	1.924e-02	1.922e-02	-1.185e+00
Gini	2	d1.5a	3.548e-01	7.76e-03	6e-05	2.121e-02	2.055e-02	2.054e-02	1.975e-01
Gini	3	d1.5a	3.152e-01	8.49e-03	7e-05	2.632e-02	2.464e-02	2.463e-02	1.123e+00
Gini	4	d1.5a	3.279e-01	6.36e-03	4e-05	1.970e-02	2.080e-02	2.078e-02	2.087e+00
Gini	0	d2.6	3.743e-01	6.68e-03	5e-05	1.796e-02	9.720e-03	0.000e+00	-1.754e-01
Gini	1	d2.6	3.982e-01	8.58e-03	8e-05	2.222e-02	2.155e-02	0.000e+00	-1.212e+00
Gini	2	d2.6	3.540e-01	7.69e-03	7e-05	2.291e-02	2.151e-02	0.000e+00	1.491e-01
Gini	3	d2.6	3.148e-01	8.15e-03	7e-05	2.720e-02	2.547e-02	0.000e+00	1.056e+00
Gini	4	d2.6	3.276e-01	7.03e-03	5e-05	2.200e-02	2.124e-02	0.000e+00	2.104e+00
Gini	0	d2.7	3.741e-01	6.98e-03	5e-05	1.857e-02	1.033e-02	1.023e-02	-1.857e-01
Gini	1	d2.7	3.982e-01	8.58e-03	8e-05	2.222e-02	2.155e-02	2.095e-02	-1.212e+00
Gini	2	d2.7	3.540e-01	7.69e-03	7e-05	2.291e-02	2.151e-02	2.148e-02	1.491e-01
Gini	3	d2.7	3.148e-01	8.15e-03	7e-05	2.720e-02	2.547e-02	2.541e-02	1.056e+00
Gini	4	d2.7	3.276e-01	7.03e-03	5e-05	2.200e-02	2.124e-02	2.095e-02	2.104e+00

B.2.9. Variance estimates of the fitted GB2 indicators, simulation type 2 of Table B.5

In Tables B.37, B.38, B.39, B.40 and B.41 the used notation is as for the parameters.

Table B.37.: Variance estimator of the median

V	def	reg	design	avgV	biasV	relbiasV%
Median	1	0	d1.2	9.103e+04	5.665e+03	6.636e+00
Median	2	0	d1.2	7.837e+04	-6.998e+03	-8.197e+00
Median	1	1	d1.2	1.699e+05	4.084e+03	2.462e+00
Median	2	1	d1.2	1.700e+05	4.198e+03	2.532e+00
Median	1	2	d1.2	1.757e+05	3.632e+03	2.111e+00
Median	2	2	d1.2	1.758e+05	3.741e+03	2.174e+00
Median	1	3	d1.2	3.477e+05	2.072e+04	6.339e+00
Median	2	3	d1.2	3.479e+05	2.100e+04	6.423e+00
Median	1	4	d1.2	4.779e+05	-6.716e+03	-1.386e+00
Median	2	4	d1.2	4.783e+05	-6.375e+03	-1.315e+00
Median	1	0	d1.4a	9.081e+04	1.476e+04	1.941e+01
Median	2	0	d1.4a	7.820e+04	2.158e+03	2.838e+00
Median	1	1	d1.4a	1.709e+05	-4.647e+03	-2.647e+00
Median	2	1	d1.4a	1.710e+05	-4.545e+03	-2.589e+00
Median	1	2	d1.4a	1.745e+05	7.513e+03	4.500e+00
Median	2	2	d1.4a	1.746e+05	7.617e+03	4.562e+00
Median	1	3	d1.4a	3.497e+05	3.129e+04	9.828e+00
Median	2	3	d1.4a	3.500e+05	3.157e+04	9.916e+00
Median	1	4	d1.4a	4.762e+05	-1.113e+04	-2.285e+00
Median	2	4	d1.4a	4.765e+05	-1.079e+04	-2.215e+00
Median	1	0	d1.5a	7.182e+04	1.754e+04	3.232e+01
Median	2	0	d1.5a	5.935e+04	5.079e+03	9.357e+00
Median	1	1	d1.5a	1.330e+05	-5.184e+03	-3.752e+00
Median	2	1	d1.5a	1.327e+05	-5.411e+03	-3.917e+00
Median	1	2	d1.5a	1.375e+05	3.870e+01	2.814e-02
Median	2	2	d1.5a	1.373e+05	-1.664e+02	-1.210e-01
Median	1	3	d1.5a	2.804e+05	-8.445e+03	-2.923e+00
Median	2	3	d1.5a	2.801e+05	-8.785e+03	-3.041e+00
Median	1	4	d1.5a	3.953e+05	2.326e+04	6.251e+00
Median	2	4	d1.5a	3.948e+05	2.272e+04	6.106e+00
Median	1	0	d2.6	7.217e+04	-7.924e+05	-9.165e+01
Median	1	1	d2.6	1.886e+05	-3.220e+03	-1.679e+00
Median	1	2	d2.6	1.730e+05	-9.567e+03	-5.241e+00
Median	1	3	d2.6	3.451e+05	-3.782e+04	-9.877e+00
Median	1	4	d2.6	4.839e+05	-4.806e+04	-9.034e+00
Median	1	0	d2.7	9.072e+04	-7.528e+05	-8.924e+01
Median	2	0	d2.7	7.828e+04	-7.652e+05	-9.072e+01
Median	1	1	d2.7	1.886e+05	-3.220e+03	-1.679e+00
Median	2	1	d2.7	1.887e+05	-3.109e+03	-1.621e+00
Median	1	2	d2.7	1.730e+05	-9.567e+03	-5.241e+00
Median	2	2	d2.7	1.862e+05	3.612e+03	1.979e+00
Median	1	3	d2.7	3.451e+05	-3.782e+04	-9.877e+00
Median	2	3	d2.7	3.581e+05	-2.480e+04	-6.477e+00
Median	1	4	d2.7	4.839e+05	-4.806e+04	-9.034e+00
Median	2	4	d2.7	4.990e+05	-3.297e+04	-6.198e+00

Table B.38.: Variance estimator of the ARPR

V	def	reg	design	avgV	biasV	relbiasV%
ARPR	1	0	d1.2	6.552e-02	-2.018e-02	-2.355e+01
ARPR	2	0	d1.2	6.449e-02	-2.121e-02	-2.475e+01
ARPR	1	1	d1.2	2.291e-01	-3.118e-02	-1.198e+01
ARPR	2	1	d1.2	2.292e-01	-3.102e-02	-1.192e+01
ARPR	1	2	d1.2	2.997e-01	-2.923e-02	-8.887e+00
ARPR	2	2	d1.2	2.999e-01	-2.904e-02	-8.830e+00
ARPR	1	3	d1.2	4.576e-01	-1.739e-02	-3.661e+00
ARPR	2	3	d1.2	4.580e-01	-1.703e-02	-3.585e+00
ARPR	1	4	d1.2	3.705e-01	-2.600e-03	-6.969e-01
ARPR	2	4	d1.2	3.707e-01	-2.340e-03	-6.259e-01
ARPR	1	0	d1.4a	6.582e-02	-1.172e-02	-1.511e+01
ARPR	2	0	d1.4a	6.480e-02	-1.274e-02	-1.644e+01
ARPR	1	1	d1.4a	2.292e-01	-8.870e-03	-3.726e+00
ARPR	2	1	d1.4a	2.294e-01	-8.720e-03	-3.664e+00
ARPR	1	2	d1.4a	3.008e-01	-8.000e-03	-2.590e+00
ARPR	2	2	d1.4a	3.010e-01	-7.810e-03	-2.530e+00
ARPR	1	3	d1.4a	4.613e-01	8.210e-03	1.813e+00
ARPR	2	3	d1.4a	4.617e-01	8.610e-03	1.901e+00
ARPR	1	4	d1.4a	3.716e-01	2.390e-03	6.481e-01
ARPR	2	4	d1.4a	3.719e-01	2.690e-03	7.296e-01
ARPR	1	0	d1.5a	6.612e-02	-2.385e-02	-2.650e+01
ARPR	2	0	d1.5a	6.498e-02	-2.499e-02	-2.777e+01
ARPR	1	1	d1.5a	2.180e-01	-1.748e-02	-7.423e+00
ARPR	2	1	d1.5a	2.177e-01	-1.780e-02	-7.559e+00
ARPR	1	2	d1.5a	3.082e-01	-2.545e-02	-7.629e+00
ARPR	2	2	d1.5a	3.077e-01	-2.592e-02	-7.770e+00
ARPR	1	3	d1.5a	5.108e-01	-6.010e-03	-1.164e+00
ARPR	2	3	d1.5a	5.102e-01	-6.610e-03	-1.280e+00
ARPR	1	4	d1.5a	4.008e-01	1.800e-02	4.702e+00
ARPR	2	4	d1.5a	4.002e-01	1.748e-02	4.566e+00
ARPR	1	0	d2.6	6.700e-02	-1.247e-01	-6.506e+01
ARPR	1	1	d2.6	2.479e-01	-2.802e-02	-1.015e+01
ARPR	1	2	d2.6	2.978e-01	-3.874e-02	-1.151e+01
ARPR	1	3	d2.6	4.584e-01	-1.784e-02	-3.747e+00
ARPR	1	4	d2.6	3.750e-01	-1.143e-02	-2.957e+00
ARPR	1	0	d2.7	6.660e-02	-1.210e-01	-6.451e+01
ARPR	2	0	d2.7	6.557e-02	-1.221e-01	-6.505e+01
ARPR	1	1	d2.7	2.479e-01	-2.802e-02	-1.015e+01
ARPR	2	1	d2.7	2.457e-01	-3.019e-02	-1.094e+01
ARPR	1	2	d2.7	2.978e-01	-3.874e-02	-1.151e+01
ARPR	2	2	d2.7	3.000e-01	-3.657e-02	-1.087e+01
ARPR	1	3	d2.7	4.584e-01	-1.784e-02	-3.747e+00
ARPR	2	3	d2.7	4.610e-01	-1.525e-02	-3.203e+00
ARPR	1	4	d2.7	3.750e-01	-1.143e-02	-2.957e+00
ARPR	2	4	d2.7	3.719e-01	-1.449e-02	-3.749e+00

Table B.39.: Variance estimator of the RMPG

V	def	reg	design	avgV	biasV	relbiasV%
RMPG	1	0	d1.2	3.241e-01	-1.177e-01	-2.664e+01
RMPG	2	0	d1.2	3.207e-01	-1.210e-01	-2.740e+01
RMPG	1	1	d1.2	1.263e+00	-1.954e-01	-1.339e+01
RMPG	2	1	d1.2	1.264e+00	-1.945e-01	-1.333e+01
RMPG	1	2	d1.2	1.193e+00	-1.231e-01	-9.354e+00
RMPG	2	2	d1.2	1.194e+00	-1.224e-01	-9.298e+00
RMPG	1	3	d1.2	1.473e+00	-3.526e-02	-2.338e+00
RMPG	2	3	d1.2	1.474e+00	-3.410e-02	-2.261e+00
RMPG	1	4	d1.2	1.352e+00	-4.160e-03	-3.067e-01
RMPG	2	4	d1.2	1.353e+00	-3.200e-03	-2.357e-01
RMPG	1	0	d1.4a	3.249e-01	-7.402e-02	-1.856e+01
RMPG	2	0	d1.4a	3.215e-01	-7.740e-02	-1.940e+01
RMPG	1	1	d1.4a	1.267e+00	-1.050e-01	-7.652e+00
RMPG	2	1	d1.4a	1.268e+00	-1.042e-01	-7.596e+00
RMPG	1	2	d1.4a	1.191e+00	-2.713e-02	-2.227e+00
RMPG	2	2	d1.4a	1.192e+00	-2.641e-02	-2.167e+00
RMPG	1	3	d1.4a	1.487e+00	9.296e-02	6.668e+00
RMPG	2	3	d1.4a	1.488e+00	9.423e-02	6.759e+00
RMPG	1	4	d1.4a	1.357e+00	2.934e-02	2.210e+00
RMPG	2	4	d1.4a	1.358e+00	3.043e-02	2.292e+00
RMPG	1	0	d1.5a	3.360e-01	-1.384e-01	-2.917e+01
RMPG	2	0	d1.5a	3.320e-01	-1.424e-01	-3.001e+01
RMPG	1	1	d1.5a	1.248e+00	-1.264e-01	-9.196e+00
RMPG	2	1	d1.5a	1.246e+00	-1.282e-01	-9.328e+00
RMPG	1	2	d1.5a	1.248e+00	-1.093e-01	-8.055e+00
RMPG	2	2	d1.5a	1.246e+00	-1.113e-01	-8.195e+00
RMPG	1	3	d1.5a	1.674e+00	2.551e-02	1.547e+00
RMPG	2	3	d1.5a	1.672e+00	2.353e-02	1.427e+00
RMPG	1	4	d1.5a	1.496e+00	7.749e-02	5.464e+00
RMPG	2	4	d1.5a	1.494e+00	7.554e-02	5.326e+00
RMPG	1	0	d2.6	3.382e-01	-4.724e-01	-5.828e+01
RMPG	1	1	d2.6	1.368e+00	-1.762e-01	-1.141e+01
RMPG	1	2	d2.6	1.178e+00	-1.249e-01	-9.585e+00
RMPG	1	3	d2.6	1.466e+00	-2.976e-02	-1.989e+00
RMPG	1	4	d2.6	1.373e+00	-1.169e-02	-8.446e-01
RMPG	1	0	d2.7	3.261e-01	-4.635e-01	-5.870e+01
RMPG	2	0	d2.7	3.227e-01	-4.669e-01	-5.913e+01
RMPG	1	1	d2.7	1.368e+00	-1.762e-01	-1.141e+01
RMPG	2	1	d2.7	1.358e+00	-1.859e-01	-1.204e+01
RMPG	1	2	d2.7	1.178e+00	-1.249e-01	-9.585e+00
RMPG	2	2	d2.7	1.185e+00	-1.181e-01	-9.066e+00
RMPG	1	3	d2.7	1.466e+00	-2.976e-02	-1.989e+00
RMPG	2	3	d2.7	1.474e+00	-2.177e-02	-1.455e+00
RMPG	1	4	d2.7	1.373e+00	-1.169e-02	-8.446e-01
RMPG	2	4	d2.7	1.363e+00	-2.154e-02	-1.556e+00

Table B.40.: Variance estimator of the QSR

V	def	reg	design	avgV	biasV	relbiasV%
QSR	1	0	d1.2	6.378e-02	-1.784e-02	-2.185e+01
QSR	2	0	d1.2	6.250e-02	-1.912e-02	-2.343e+01
QSR	1	1	d1.2	3.488e-01	-3.479e-02	-9.069e+00
QSR	2	1	d1.2	3.491e-01	-3.455e-02	-9.007e+00
QSR	1	2	d1.2	1.744e-01	-1.760e-02	-9.167e+00
QSR	2	2	d1.2	1.745e-01	-1.749e-02	-9.111e+00
QSR	1	3	d1.2	9.606e-02	-1.170e-03	-1.202e+00
QSR	2	3	d1.2	9.614e-02	-1.090e-03	-1.123e+00
QSR	1	4	d1.2	1.258e-01	-5.370e-03	-4.091e+00
QSR	2	4	d1.2	1.259e-01	-5.280e-03	-4.023e+00
QSR	1	0	d1.4a	6.369e-02	-6.410e-03	-9.140e+00
QSR	2	0	d1.4a	6.242e-02	-7.680e-03	-1.096e+01
QSR	1	1	d1.4a	3.490e-01	6.470e-03	1.889e+00
QSR	2	1	d1.4a	3.492e-01	6.710e-03	1.958e+00
QSR	1	2	d1.4a	1.725e-01	-1.470e-03	-8.450e-01
QSR	2	2	d1.4a	1.726e-01	-1.360e-03	-7.841e-01
QSR	1	3	d1.4a	9.651e-02	1.100e-03	1.156e+00
QSR	2	3	d1.4a	9.659e-02	1.180e-03	1.241e+00
QSR	1	4	d1.4a	1.263e-01	-1.730e-03	-1.348e+00
QSR	2	4	d1.4a	1.263e-01	-1.630e-03	-1.272e+00
QSR	1	0	d1.5a	6.292e-02	-1.991e-02	-2.404e+01
QSR	2	0	d1.5a	6.154e-02	-2.129e-02	-2.570e+01
QSR	1	1	d1.5a	3.285e-01	-2.357e-02	-6.695e+00
QSR	2	1	d1.5a	3.280e-01	-2.406e-02	-6.832e+00
QSR	1	2	d1.5a	1.719e-01	-1.164e-02	-6.343e+00
QSR	2	2	d1.5a	1.717e-01	-1.191e-02	-6.486e+00
QSR	1	3	d1.5a	1.002e-01	-8.810e-03	-8.084e+00
QSR	2	3	d1.5a	1.001e-01	-8.930e-03	-8.190e+00
QSR	1	4	d1.5a	1.345e-01	1.214e-02	9.923e+00
QSR	2	4	d1.5a	1.343e-01	1.197e-02	9.781e+00
QSR	1	0	d2.6	6.250e-02	-1.557e-01	-7.135e+01
QSR	1	1	d2.6	3.755e-01	-3.836e-02	-9.270e+00
QSR	1	2	d2.6	1.690e-01	-2.315e-02	-1.205e+01
QSR	1	3	d2.6	9.497e-02	-1.046e-02	-9.919e+00
QSR	1	4	d2.6	1.273e-01	-6.780e-03	-5.058e+00
QSR	1	0	d2.7	6.302e-02	-1.569e-01	-7.134e+01
QSR	2	0	d2.7	6.179e-02	-1.581e-01	-7.190e+01
QSR	1	1	d2.7	3.755e-01	-3.836e-02	-9.270e+00
QSR	2	1	d2.7	3.685e-01	-4.533e-02	-1.095e+01
QSR	1	2	d2.7	1.690e-01	-2.315e-02	-1.205e+01
QSR	2	2	d2.7	1.705e-01	-2.164e-02	-1.126e+01
QSR	1	3	d2.7	9.497e-02	-1.046e-02	-9.919e+00
QSR	2	3	d2.7	9.597e-02	-9.460e-03	-8.977e+00
QSR	1	4	d2.7	1.273e-01	-6.780e-03	-5.058e+00
QSR	2	4	d2.7	1.257e-01	-8.440e-03	-6.292e+00

Table B.41.: Variance estimator of the Gini

V	def	reg	design	avgV	biasV	relbiasV%
Gini	1	0	d1.2	1e-05	-1e-05	-2.543e+01
Gini	2	0	d1.2	1e-05	-1e-05	-2.698e+01
Gini	1	1	d1.2	7e-05	0e+00	2.345e-01
Gini	2	1	d1.2	7e-05	0e+00	3.022e-01
Gini	1	2	d1.2	6e-05	0e+00	-6.639e-01
Gini	2	2	d1.2	6e-05	0e+00	-6.019e-01
Gini	1	3	d1.2	7e-05	0e+00	-6.908e+00
Gini	2	3	d1.2	7e-05	0e+00	-6.835e+00
Gini	1	4	d1.2	5e-05	0e+00	-3.536e+00
Gini	2	4	d1.2	5e-05	0e+00	-3.467e+00
Gini	1	0	d1.4a	1e-05	0e+00	4.953e+01
Gini	2	0	d1.4a	1e-05	0e+00	4.647e+01
Gini	1	1	d1.4a	7e-05	0e+00	-1.247e-01
Gini	2	1	d1.4a	7e-05	0e+00	-5.524e-02
Gini	1	2	d1.4a	6e-05	0e+00	-3.132e-01
Gini	2	2	d1.4a	6e-05	0e+00	-2.521e-01
Gini	1	3	d1.4a	7e-05	0e+00	-6.108e+00
Gini	2	3	d1.4a	7e-05	0e+00	-6.034e+00
Gini	1	4	d1.4a	5e-05	0e+00	-3.400e+00
Gini	2	4	d1.4a	5e-05	0e+00	-3.327e+00
Gini	1	0	d1.5a	1e-05	0e+00	3.183e+01
Gini	2	0	d1.5a	1e-05	0e+00	2.856e+01
Gini	1	1	d1.5a	6e-05	0e+00	-1.239e+00
Gini	2	1	d1.5a	6e-05	0e+00	-1.385e+00
Gini	1	2	d1.5a	5e-05	-1e-05	-1.077e+01
Gini	2	2	d1.5a	5e-05	-1e-05	-1.091e+01
Gini	1	3	d1.5a	6e-05	-1e-05	-1.327e+01
Gini	2	3	d1.5a	6e-05	-1e-05	-1.337e+01
Gini	1	4	d1.5a	5e-05	1e-05	1.656e+01
Gini	2	4	d1.5a	5e-05	1e-05	1.641e+01
Gini	1	0	d2.6	1e-05	-4e-05	-7.349e+01
Gini	1	1	d2.6	8e-05	0e+00	-5.445e+00
Gini	1	2	d2.6	6e-05	-1e-05	-1.591e+01
Gini	1	3	d2.6	7e-05	0e+00	-6.943e+00
Gini	1	4	d2.6	5e-05	0e+00	-2.444e+00
Gini	1	0	d2.7	1e-05	-4e-05	-7.005e+01
Gini	2	0	d2.7	1e-05	-4e-05	-7.065e+01
Gini	1	1	d2.7	8e-05	0e+00	-5.445e+00
Gini	2	1	d2.7	7e-05	-1e-05	-7.917e+00
Gini	1	2	d2.7	6e-05	-1e-05	-1.591e+01
Gini	2	2	d2.7	6e-05	-1e-05	-1.537e+01
Gini	1	3	d2.7	7e-05	0e+00	-6.943e+00
Gini	2	3	d2.7	7e-05	0e+00	-6.249e+00
Gini	1	4	d2.7	5e-05	0e+00	-2.444e+00
Gini	2	4	d2.7	5e-05	0e+00	-4.156e+00

Appendix C.

Appendix UH: Estimation for domains and small areas for AMELIA population

C.1. Simulation Setup

Target Indicators:	Poverty rate, Gini coefficient, QSR
Domains for poverty rate:	D=110 regions by NUTS2 by age by gender
Domains for Gini and QSR:	D=40 domains by variable district (DIS)
Domain structure:	Unplanned
Population:	AMELIA
Sampling method:	Unequal probability sampling (PPS) of n = 6000
Monte Carlo Replicates:	1,000 (default)
Criteria Set:	bias, relative bias, rrmse, cv
Estimators for poverty rate:	Direct (default), GREG and EBP
Estimators for Gini and QSR:	Direct (default), prediction, expanded prediction, log-expanded prediction, calibrated, composite
Models:	Logistic mixed model and linear mixed model
Outlyingness:	OCAR,uncontaminated
Contamination:	CCAR,uncontaminated
Missingness:	[none] (default)
Host:	UH
Author:	Risto Lehtonen and Ari Veijanen
ID:	
Date:	September 5, 2011

C.2. This Document

The dcument summarizes selected numerical results on simulation experiments for the AMELIA data set, providing an example of materials that can be extracted from the complete materials of simulation experiments by UH. Several choices have been made concerning population data, sampling design, estimators, models and contamination schemes. For example, we concentrate on AMELIA population and results for the Finnish subpopulation are not shown here.

C.3. Estimator Specifications

Poverty rate: Direct (Default), indirect MLGREG and EBP with logistic mixed model. Several ways to account for sampling complexities are illustrated (none, inclusion of PPS size variable into model, use of design weights in model fitting).

Gini and QSR: Direct (Default), model-based prediction, calibrated prediction, composite.

C.4. Results for poverty rate

In this section, we compare results (bias and accuracy) for poverty rate. Estimators are Direct (Default) estimator, Indirect design-based model-assisted MLGREG and Indirect model-based EBP. GREG and EBP use logistic mixed models with domain-specific random intercepts. Unequal probability sampling design (PPS).

C.4.1. Poverty rate in Amelia, no weights in model fitting, no ISCED in model

Results for Direct (default) poverty rate estimator

domain	size	mean	true value	bias	rel. bias%	rrmse%	cv%
10101	45.879	0.424	0.427	-0.003	-0.79	15.39	15.50
10102	44.554	0.436	0.435	0.002	0.38	15.11	15.06
10201	32.977	0.300	0.300	-0.000	-0.12	27.79	27.84
10202	32.102	0.329	0.331	-0.002	-0.59	24.96	25.12
10301	95.303	0.255	0.258	-0.003	-1.00	17.87	18.03
10302	106.812	0.307	0.306	0.001	0.40	15.87	15.81
10401	55.561	0.226	0.228	-0.001	-0.55	25.01	25.16
10402	59.808	0.228	0.230	-0.003	-1.16	24.04	24.30
10501	41.965	0.179	0.178	0.001	0.81	34.59	34.32
10502	49.458	0.229	0.231	-0.002	-0.80	26.29	26.51
20101	36.945	0.438	0.434	0.004	1.00	17.02	16.83
20102	35.850	0.439	0.440	-0.002	-0.43	16.37	16.45
20201	26.412	0.301	0.305	-0.004	-1.30	32.35	32.76
20202	25.582	0.332	0.331	0.001	0.42	29.80	29.69
20301	76.256	0.264	0.263	0.001	0.20	19.43	19.40
20302	85.446	0.309	0.310	-0.001	-0.21	16.54	16.59
20401	44.080	0.231	0.232	-0.001	-0.37	29.33	29.45
20402	47.521	0.237	0.238	-0.000	-0.21	28.17	28.24
20501	33.505	0.179	0.179	0.000	0.16	37.15	37.10
20502	39.638	0.231	0.232	-0.001	-0.64	29.11	29.30
30101	37.561	0.436	0.433	0.004	0.85	16.12	15.97
30102	36.497	0.438	0.437	0.001	0.16	17.30	17.28
30201	26.720	0.298	0.300	-0.002	-0.54	29.60	29.77
30202	26.010	0.325	0.327	-0.001	-0.38	29.64	29.76
30301	77.770	0.260	0.259	0.001	0.34	20.03	19.97
30302	87.127	0.307	0.307	0.000	0.14	16.64	16.62
30401	45.443	0.230	0.229	0.001	0.41	27.28	27.18
30402	48.418	0.229	0.231	-0.002	-1.03	26.30	26.57
30501	34.013	0.173	0.177	-0.005	-2.61	37.85	38.79
30502	40.191	0.231	0.231	0.000	0.12	31.48	31.46
40101	75.833	0.402	0.401	0.001	0.25	12.53	12.50
40102	72.005	0.404	0.402	0.002	0.41	12.83	12.78
40201	51.753	0.260	0.257	0.002	0.95	23.96	23.72
40202	47.224	0.292	0.290	0.002	0.62	23.33	23.19
40301	141.232	0.237	0.236	0.000	0.18	15.48	15.46
40302	149.290	0.269	0.270	-0.001	-0.28	13.82	13.86
40401	87.969	0.198	0.198	-0.000	-0.07	22.25	22.28
40402	86.624	0.210	0.211	-0.000	-0.20	20.49	20.55
40501	55.344	0.176	0.175	0.001	0.34	28.63	28.55
40502	61.234	0.214	0.213	0.001	0.58	24.77	24.63
50101	70.762	0.408	0.404	0.004	0.87	13.06	12.92
50102	67.043	0.405	0.407	-0.002	-0.58	13.56	13.63
50201	47.964	0.256	0.259	-0.003	-1.28	24.54	24.84
50202	44.225	0.290	0.294	-0.003	-1.13	23.76	24.02
50301	131.956	0.238	0.239	-0.000	-0.18	15.31	15.34
50302	139.614	0.275	0.275	-0.000	-0.02	14.58	14.59
50401	82.125	0.200	0.201	-0.001	-0.62	22.64	22.79
50402	80.548	0.209	0.210	-0.000	-0.19	21.23	21.28
50501	51.823	0.176	0.174	0.002	1.03	31.30	30.98
50502	57.213	0.219	0.217	0.002	0.79	24.90	24.70
60101	29.572	0.342	0.343	-0.002	-0.45	23.18	23.29
60102	27.512	0.344	0.343	0.001	0.22	23.67	23.62
60201	22.626	0.200	0.197	0.003	1.30	41.05	40.52
60202	21.358	0.219	0.220	-0.001	-0.42	39.48	39.67
60301	74.988	0.167	0.166	0.001	0.86	27.17	26.93
60302	77.767	0.210	0.211	-0.001	-0.54	22.14	22.27
60401	39.077	0.154	0.155	-0.001	-0.73	38.38	38.67
60402	41.202	0.172	0.173	-0.000	-0.26	35.24	35.34
60501	35.566	0.193	0.190	0.003	1.46	33.79	33.28
60502	45.945	0.206	0.204	0.002	0.96	31.03	30.74
70101	38.005	0.345	0.344	0.001	0.24	20.35	20.31
70102	35.976	0.341	0.339	0.002	0.49	20.35	20.25
70201	29.277	0.196	0.193	0.003	1.63	39.70	39.05
70202	27.724	0.217	0.222	-0.005	-2.16	35.90	36.64
70301	96.806	0.164	0.166	-0.001	-0.74	23.74	23.92
70302	100.546	0.212	0.211	0.001	0.34	19.52	19.46

70401	50.899	0.157	0.157	-0.000	-0.25	32.86	32.95
70402	53.430	0.176	0.175	0.001	0.86	30.10	29.85
70501	46.362	0.188	0.192	-0.004	-2.09	30.78	31.38
70502	59.841	0.208	0.204	0.004	1.82	27.19	26.66
80101	27.008	0.343	0.341	0.002	0.54	24.84	24.71
80102	25.461	0.347	0.345	0.002	0.61	24.40	24.25
80201	20.702	0.199	0.199	-0.000	-0.04	45.48	45.52
80202	19.632	0.230	0.226	0.004	1.69	44.42	43.67
80301	68.595	0.166	0.167	-0.001	-0.42	27.22	27.34
80302	71.562	0.217	0.216	0.002	0.85	23.01	22.82
80401	36.004	0.158	0.159	-0.001	-0.91	39.44	39.81
80402	37.966	0.176	0.178	-0.002	-1.06	36.27	36.66
80501	32.807	0.193	0.191	0.001	0.73	37.20	36.94
80502	42.327	0.201	0.204	-0.003	-1.24	31.83	32.22
90101	45.472	0.366	0.364	0.002	0.47	17.77	17.70
90102	43.167	0.357	0.359	-0.002	-0.62	18.15	18.26
90201	47.175	0.214	0.214	0.000	0.12	29.95	29.93
90202	45.269	0.246	0.251	-0.005	-1.91	25.98	26.42
90301	108.744	0.190	0.189	0.001	0.48	21.73	21.63
90302	112.445	0.221	0.223	-0.002	-0.78	18.81	18.96
90401	59.874	0.189	0.186	0.003	1.73	27.16	26.66
90402	67.743	0.187	0.188	-0.001	-0.32	27.41	27.51
90501	38.657	0.246	0.247	-0.001	-0.60	29.83	30.02
90502	59.337	0.264	0.263	0.001	0.49	22.45	22.34
100101	46.385	0.361	0.362	-0.001	-0.38	18.69	18.77
100102	43.912	0.362	0.363	-0.002	-0.51	18.68	18.78
100201	47.829	0.217	0.219	-0.002	-0.97	27.34	27.60
100202	46.166	0.253	0.254	-0.001	-0.51	25.85	25.99
100301	110.165	0.191	0.192	-0.001	-0.42	19.98	20.07
100302	114.501	0.224	0.224	0.000	0.07	18.54	18.54
100401	60.475	0.193	0.191	0.002	1.09	28.14	27.83
100402	68.630	0.194	0.194	0.000	0.18	24.89	24.86
100501	39.019	0.252	0.250	0.002	0.89	28.60	28.35
100502	60.517	0.264	0.264	-0.000	-0.01	21.95	21.97
110101	23.190	0.362	0.364	-0.002	-0.53	25.50	25.64
110102	22.209	0.364	0.360	0.004	1.12	26.25	25.95
110201	23.967	0.216	0.216	-0.000	-0.02	39.17	39.20
110202	23.098	0.255	0.253	0.001	0.58	37.00	36.80
110301	55.268	0.190	0.188	0.002	1.10	28.58	28.26
110302	57.555	0.222	0.222	-0.000	-0.08	25.12	25.16
110401	30.564	0.185	0.185	-0.001	-0.30	40.41	40.55
110402	34.636	0.186	0.189	-0.003	-1.41	36.22	36.73
110501	19.780	0.251	0.250	0.000	0.20	41.80	41.74
110502	30.515	0.263	0.261	0.003	1.04	30.68	30.36

Results for model-assisted MLGREG poverty rate estimator

domain	size	mean	true value	bias	rel. bias%	rrmse%	cv%
10101	45.879	0.424	0.427	-0.003	-0.78	15.25	15.36
10102	44.554	0.436	0.435	0.002	0.37	14.76	14.71
10201	32.977	0.298	0.300	-0.002	-0.59	27.19	27.36
10202	32.102	0.328	0.331	-0.003	-0.85	24.38	24.58
10301	95.303	0.256	0.258	-0.002	-0.89	16.90	17.04
10302	106.812	0.308	0.306	0.002	0.58	15.65	15.55
10401	55.561	0.226	0.228	-0.002	-0.70	24.36	24.53
10402	59.808	0.228	0.230	-0.003	-1.18	23.61	23.87
10501	41.965	0.179	0.178	0.001	0.32	33.43	33.34
10502	49.458	0.229	0.231	-0.001	-0.62	25.50	25.67
20101	36.945	0.439	0.434	0.005	1.21	16.82	16.58
20102	35.850	0.439	0.440	-0.002	-0.37	15.84	15.90
20201	26.412	0.302	0.305	-0.003	-1.07	30.74	31.07
20202	25.582	0.331	0.331	0.001	0.24	28.95	28.90
20301	76.256	0.264	0.263	0.001	0.38	18.72	18.65
20302	85.446	0.309	0.310	-0.001	-0.19	16.13	16.17
20401	44.080	0.231	0.232	-0.001	-0.49	28.05	28.20
20402	47.521	0.237	0.238	-0.001	-0.26	27.61	27.70
20501	33.505	0.178	0.179	-0.000	-0.11	35.32	35.38
20502	39.638	0.231	0.232	-0.001	-0.47	27.72	27.86
30101	37.561	0.436	0.433	0.003	0.80	15.91	15.77
30102	36.497	0.438	0.437	0.000	0.07	17.01	17.00
30201	26.720	0.297	0.300	-0.004	-1.17	28.60	28.93
30202	26.010	0.325	0.327	-0.001	-0.41	29.52	29.65

30301	77.770	0.258	0.259	-0.000	-0.11	19.60	19.63
30302	87.127	0.307	0.307	-0.000	-0.01	16.38	16.38
30401	45.443	0.229	0.229	0.000	0.05	25.82	25.82
30402	48.418	0.228	0.231	-0.003	-1.42	25.56	25.90
30501	34.013	0.172	0.177	-0.005	-3.07	35.83	36.84
30502	40.191	0.231	0.231	0.000	0.14	29.93	29.91
40101	75.833	0.401	0.401	0.001	0.19	12.34	12.32
40102	72.005	0.404	0.402	0.002	0.40	12.70	12.65
40201	51.753	0.260	0.257	0.002	0.94	23.20	22.98
40202	47.224	0.290	0.290	0.000	0.03	22.70	22.71
40301	141.232	0.236	0.236	0.000	0.14	14.79	14.78
40302	149.290	0.269	0.270	-0.001	-0.26	13.52	13.56
40401	87.969	0.199	0.198	0.000	0.22	21.12	21.08
40402	86.624	0.209	0.211	-0.001	-0.59	20.29	20.41
40501	55.344	0.176	0.175	0.000	0.26	27.75	27.69
40502	61.234	0.214	0.213	0.001	0.40	24.38	24.29
50101	70.762	0.408	0.404	0.003	0.85	12.97	12.84
50102	67.043	0.405	0.407	-0.003	-0.62	13.40	13.47
50201	47.964	0.256	0.259	-0.004	-1.46	23.92	24.24
50202	44.225	0.290	0.294	-0.004	-1.29	23.27	23.55
50301	131.956	0.238	0.239	-0.000	-0.11	14.85	14.87
50302	139.614	0.275	0.275	0.000	0.02	14.54	14.54
50401	82.125	0.200	0.201	-0.001	-0.56	22.09	22.22
50402	80.548	0.209	0.210	-0.001	-0.29	20.68	20.75
50501	51.823	0.175	0.174	0.001	0.64	29.52	29.34
50502	57.213	0.218	0.217	0.002	0.71	23.90	23.74
60101	29.572	0.342	0.343	-0.002	-0.47	22.76	22.87
60102	27.512	0.343	0.343	0.000	0.06	23.80	23.80
60201	22.626	0.199	0.197	0.002	0.83	40.39	40.07
60202	21.358	0.220	0.220	0.001	0.30	39.24	39.14
60301	74.988	0.167	0.166	0.001	0.69	26.78	26.60
60302	77.767	0.210	0.211	-0.001	-0.29	22.56	22.64
60401	39.077	0.152	0.155	-0.003	-1.66	38.03	38.65
60402	41.202	0.172	0.173	-0.001	-0.52	34.83	35.03
60501	35.566	0.193	0.190	0.003	1.48	33.33	32.83
60502	45.945	0.205	0.204	0.001	0.68	31.47	31.26
70101	38.005	0.346	0.344	0.001	0.34	20.05	19.99
70102	35.976	0.341	0.339	0.002	0.57	20.33	20.21
70201	29.277	0.195	0.193	0.002	1.18	37.86	37.42
70202	27.724	0.217	0.222	-0.005	-2.24	36.43	37.21
70301	96.806	0.165	0.166	-0.001	-0.54	23.31	23.44
70302	100.546	0.212	0.211	0.001	0.33	19.48	19.42
70401	50.899	0.158	0.157	0.001	0.53	31.27	31.12
70402	53.430	0.176	0.175	0.001	0.53	29.50	29.35
70501	46.362	0.188	0.192	-0.004	-2.16	29.62	30.21
70502	59.841	0.208	0.204	0.004	1.81	27.20	26.67
80101	27.008	0.343	0.341	0.002	0.49	24.26	24.15
80102	25.461	0.346	0.345	0.002	0.44	24.00	23.90
80201	20.702	0.199	0.199	0.000	0.04	42.80	42.80
80202	19.632	0.228	0.226	0.002	0.84	42.44	42.10
80301	68.595	0.166	0.167	-0.001	-0.58	26.78	26.94
80302	71.562	0.218	0.216	0.002	1.15	23.12	22.84
80401	36.004	0.158	0.159	-0.001	-0.71	38.04	38.33
80402	37.966	0.176	0.178	-0.002	-0.87	35.09	35.41
80501	32.807	0.192	0.191	0.001	0.67	35.78	35.55
80502	42.327	0.201	0.204	-0.003	-1.56	32.50	33.00
90101	45.472	0.366	0.364	0.002	0.44	17.46	17.39
90102	43.167	0.357	0.359	-0.002	-0.51	17.64	17.73
90201	47.175	0.213	0.214	-0.001	-0.36	29.50	29.62
90202	45.269	0.246	0.251	-0.005	-1.99	25.31	25.76
90301	108.744	0.190	0.189	0.001	0.47	21.12	21.02
90302	112.445	0.221	0.223	-0.002	-0.72	18.51	18.64
90401	59.874	0.189	0.186	0.003	1.65	26.58	26.11
90402	67.743	0.188	0.188	-0.000	-0.25	26.38	26.46
90501	38.657	0.244	0.247	-0.003	-1.16	28.90	29.24
90502	59.337	0.263	0.263	0.000	0.16	22.60	22.58
100101	46.385	0.361	0.362	-0.002	-0.48	18.50	18.59
100102	43.912	0.362	0.363	-0.002	-0.42	18.45	18.53
100201	47.829	0.217	0.219	-0.002	-1.10	26.77	27.06
100202	46.166	0.253	0.254	-0.001	-0.56	25.88	26.03
100301	110.165	0.191	0.192	-0.000	-0.22	19.82	19.88
100302	114.501	0.224	0.224	-0.000	-0.07	18.23	18.25

100401	60.475	0.192	0.191	0.002	0.86	26.61	26.38
100402	68.630	0.194	0.194	0.001	0.26	24.33	24.27
100501	39.019	0.251	0.250	0.002	0.66	27.67	27.49
100502	60.517	0.263	0.264	-0.001	-0.29	21.77	21.85
110101	23.190	0.362	0.364	-0.001	-0.41	24.65	24.76
110102	22.209	0.364	0.360	0.004	1.24	25.47	25.14
110201	23.967	0.216	0.216	-0.000	-0.21	37.30	37.40
110202	23.098	0.254	0.253	0.000	0.17	36.65	36.61
110301	55.268	0.190	0.188	0.002	1.13	27.72	27.40
110302	57.555	0.222	0.222	-0.000	-0.21	24.50	24.56
110401	30.564	0.185	0.185	0.000	0.11	38.67	38.65
110402	34.636	0.186	0.189	-0.003	-1.54	34.70	35.23
110501	19.780	0.250	0.250	-0.000	-0.03	40.52	40.55
110502	30.515	0.262	0.261	0.002	0.63	30.01	29.83

Results for model-based EBP poverty rate estimator

domain	size	mean	true value	bias	rel. bias%	rrmse%	cv%
10101	45.879	0.426	0.427	-0.001	-0.30	6.73	6.74
10102	44.554	0.427	0.435	-0.008	-1.73	6.80	6.69
10201	32.977	0.288	0.300	-0.012	-4.03	10.64	10.26
10202	32.102	0.313	0.331	-0.018	-5.47	10.58	9.58
10301	95.303	0.245	0.258	-0.013	-5.17	9.22	8.05
10302	106.812	0.287	0.306	-0.018	-6.01	9.45	7.76
10401	55.561	0.219	0.228	-0.009	-3.90	10.51	10.16
10402	59.808	0.229	0.230	-0.001	-0.43	9.69	9.73
10501	41.965	0.225	0.178	0.047	26.24	29.80	11.20
10502	49.458	0.244	0.231	0.014	5.88	11.83	9.70
20101	36.945	0.430	0.434	-0.004	-0.90	6.66	6.66
20102	35.850	0.431	0.440	-0.010	-2.17	6.79	6.58
20201	26.412	0.292	0.305	-0.014	-4.50	10.43	9.86
20202	25.582	0.314	0.331	-0.017	-5.08	10.32	9.47
20301	76.256	0.247	0.263	-0.017	-6.31	9.69	7.84
20302	85.446	0.290	0.310	-0.020	-6.52	9.66	7.63
20401	44.080	0.221	0.232	-0.011	-4.67	10.45	9.81
20402	47.521	0.231	0.238	-0.006	-2.65	9.97	9.88
20501	33.505	0.227	0.179	0.049	27.30	30.82	11.23
20502	39.638	0.246	0.232	0.014	6.03	11.88	9.67
30101	37.561	0.426	0.433	-0.007	-1.58	6.63	6.55
30102	36.497	0.427	0.437	-0.010	-2.34	6.99	6.75
30201	26.720	0.289	0.300	-0.011	-3.78	10.52	10.21
30202	26.010	0.311	0.327	-0.016	-4.77	10.42	9.73
30301	77.770	0.245	0.259	-0.014	-5.29	9.17	7.92
30302	87.127	0.287	0.307	-0.020	-6.65	9.54	7.34
30401	45.443	0.219	0.229	-0.010	-4.17	10.63	10.20
30402	48.418	0.230	0.231	-0.002	-0.81	9.41	9.45
30501	34.013	0.224	0.177	0.047	26.24	29.82	11.22
30502	40.191	0.244	0.231	0.013	5.63	11.92	9.96
40101	75.833	0.402	0.401	0.001	0.25	5.97	5.95
40102	72.005	0.402	0.402	-0.000	-0.03	5.97	5.98
40201	51.753	0.246	0.257	-0.011	-4.44	10.30	9.73
40202	47.224	0.275	0.290	-0.015	-5.22	10.12	9.15
40301	141.232	0.230	0.236	-0.006	-2.74	7.16	6.80
40302	149.290	0.268	0.270	-0.002	-0.62	6.42	6.43
40401	87.969	0.213	0.198	0.015	7.63	12.34	9.01
40402	86.624	0.215	0.211	0.005	2.21	9.36	8.90
40501	55.344	0.228	0.175	0.052	29.91	32.51	9.83
40502	61.234	0.246	0.213	0.033	15.51	18.37	8.53
50101	70.762	0.405	0.404	0.000	0.06	5.94	5.93
50102	67.043	0.405	0.407	-0.002	-0.61	6.20	6.21
50201	47.964	0.247	0.259	-0.012	-4.69	10.27	9.59
50202	44.225	0.279	0.294	-0.014	-4.90	10.22	9.44
50301	131.956	0.232	0.239	-0.007	-2.87	7.25	6.86
50302	139.614	0.271	0.275	-0.005	-1.70	6.63	6.52
50401	82.125	0.215	0.201	0.014	6.73	11.69	8.96
50402	80.548	0.217	0.210	0.007	3.43	10.12	9.21
50501	51.823	0.230	0.174	0.056	31.91	34.63	10.22
50502	57.213	0.246	0.217	0.029	13.59	16.83	8.75
60101	29.572	0.341	0.343	-0.002	-0.58	8.46	8.49
60102	27.512	0.342	0.343	-0.002	-0.45	8.38	8.41
60201	22.626	0.212	0.197	0.014	7.36	14.66	11.81
60202	21.358	0.245	0.220	0.026	11.62	16.99	11.11

60301	74.988	0.183	0.166	0.017	10.40	14.65	9.36
60302	77.767	0.246	0.211	0.035	16.76	19.45	8.45
60401	39.077	0.160	0.155	0.005	3.25	12.59	11.79
60402	41.202	0.209	0.173	0.036	20.94	24.42	10.40
60501	35.566	0.172	0.190	-0.018	-9.56	14.77	12.45
60502	45.945	0.258	0.204	0.054	26.51	29.32	9.91
70101	38.005	0.339	0.344	-0.006	-1.71	7.83	7.78
70102	35.976	0.339	0.339	-0.000	-0.02	8.11	8.12
70201	29.277	0.210	0.193	0.017	8.93	15.00	11.07
70202	27.724	0.241	0.222	0.019	8.61	14.41	10.65
70301	96.806	0.182	0.166	0.016	9.69	13.48	8.55
70302	100.546	0.245	0.211	0.033	15.66	18.11	7.87
70401	50.899	0.159	0.157	0.001	0.71	11.02	10.93
70402	53.430	0.207	0.175	0.032	18.46	21.75	9.72
70501	46.362	0.170	0.192	-0.022	-11.41	15.29	11.49
70502	59.841	0.257	0.204	0.053	25.98	28.46	9.22
80101	27.008	0.346	0.341	0.005	1.37	8.67	8.45
80102	25.461	0.346	0.345	0.002	0.47	8.83	8.78
80201	20.702	0.215	0.199	0.016	8.12	15.53	12.25
80202	19.632	0.247	0.226	0.021	9.12	15.25	11.21
80301	68.595	0.185	0.167	0.018	11.08	15.26	9.46
80302	71.562	0.250	0.216	0.034	15.71	18.55	8.52
80401	36.004	0.162	0.159	0.003	1.94	12.17	11.79
80402	37.966	0.213	0.178	0.035	19.73	23.41	10.53
80501	32.807	0.174	0.191	-0.017	-9.06	14.61	12.60
80502	42.327	0.262	0.204	0.058	28.33	30.95	9.72
90101	45.472	0.378	0.364	0.014	3.87	8.13	6.89
90102	43.167	0.379	0.359	0.020	5.55	9.32	7.10
90201	47.175	0.246	0.214	0.031	14.60	18.87	10.43
90202	45.269	0.279	0.251	0.028	11.22	15.32	9.38
90301	108.744	0.219	0.189	0.030	16.01	18.11	7.31
90302	112.445	0.242	0.223	0.019	8.54	11.85	7.57
90401	59.874	0.199	0.186	0.014	7.33	12.71	9.68
90402	67.743	0.180	0.188	-0.008	-4.46	10.68	10.17
90501	38.657	0.195	0.247	-0.052	-21.02	22.78	11.11
90502	59.337	0.195	0.263	-0.067	-25.71	26.83	10.32
100101	46.385	0.382	0.362	0.019	5.34	9.12	7.01
100102	43.912	0.382	0.363	0.019	5.17	8.99	6.99
100201	47.829	0.248	0.219	0.029	13.23	17.55	10.20
100202	46.166	0.282	0.254	0.027	10.66	15.10	9.67
100301	110.165	0.222	0.192	0.030	15.80	18.15	7.71
100302	114.501	0.244	0.224	0.020	8.83	11.97	7.43
100401	60.475	0.202	0.191	0.012	6.05	12.02	9.80
100402	68.630	0.182	0.194	-0.012	-6.20	11.41	10.21
100501	39.019	0.198	0.250	-0.051	-20.57	22.45	11.35
100502	60.517	0.197	0.264	-0.067	-25.24	26.44	10.52
110101	23.190	0.380	0.364	0.016	4.48	9.02	7.50
110102	22.209	0.381	0.360	0.021	5.75	9.69	7.37
110201	23.967	0.247	0.216	0.030	14.11	18.73	10.80
110202	23.098	0.280	0.253	0.027	10.63	15.45	10.14
110301	55.268	0.220	0.188	0.032	16.80	19.43	8.36
110302	57.555	0.243	0.222	0.021	9.36	12.77	7.95
110401	30.564	0.200	0.185	0.015	7.84	13.53	10.23
110402	34.636	0.181	0.189	-0.008	-4.40	11.01	10.56
110501	19.780	0.197	0.250	-0.053	-21.37	23.25	11.64
110502	30.515	0.196	0.261	-0.065	-24.84	26.16	10.93

C.4.2. Poverty rate in Amelia, no weights in model fitting but ISCED in model

Results for model-assisted MLGREG poverty rate estimator

domain	size	mean	true value	bias	rel. bias%	rrmse%	cv%
10101	45.879	0.424	0.427	-0.003	-0.78	15.20	15.31
10102	44.554	0.436	0.435	0.001	0.32	14.71	14.67
10201	32.977	0.299	0.300	-0.002	-0.54	26.98	27.14
10202	32.102	0.328	0.331	-0.003	-0.84	24.34	24.54
10301	95.303	0.256	0.258	-0.002	-0.91	16.84	16.98
10302	106.812	0.308	0.306	0.002	0.56	15.71	15.62
10401	55.561	0.226	0.228	-0.001	-0.58	24.14	24.29
10402	59.808	0.228	0.230	-0.003	-1.15	23.45	23.71

10501	41.965	0.179	0.178	0.001	0.30	32.79	32.71
10502	49.458	0.229	0.231	-0.001	-0.65	25.09	25.26
20101	36.945	0.439	0.434	0.005	1.17	16.79	16.56
20102	35.850	0.439	0.440	-0.002	-0.36	15.75	15.81
20201	26.412	0.303	0.305	-0.003	-0.86	30.69	30.96
20202	25.582	0.331	0.331	0.000	0.04	28.78	28.78
20301	76.256	0.264	0.263	0.001	0.35	18.62	18.56
20302	85.446	0.309	0.310	-0.001	-0.19	16.06	16.09
20401	44.080	0.231	0.232	-0.001	-0.41	27.79	27.92
20402	47.521	0.237	0.238	-0.001	-0.33	27.37	27.47
20501	33.505	0.178	0.179	-0.000	-0.22	34.66	34.75
20502	39.638	0.231	0.232	-0.001	-0.57	27.32	27.49
30101	37.561	0.436	0.433	0.003	0.80	15.95	15.81
30102	36.497	0.438	0.437	0.001	0.13	16.94	16.93
30201	26.720	0.296	0.300	-0.004	-1.47	28.00	28.39
30202	26.010	0.326	0.327	-0.001	-0.24	29.64	29.72
30301	77.770	0.258	0.259	-0.000	-0.09	19.41	19.43
30302	87.127	0.307	0.307	0.000	0.00	16.31	16.32
30401	45.443	0.229	0.229	0.000	0.13	25.79	25.77
30402	48.418	0.228	0.231	-0.003	-1.45	25.42	25.76
30501	34.013	0.172	0.177	-0.005	-3.01	35.20	36.18
30502	40.191	0.231	0.231	0.000	0.08	29.55	29.54
40101	75.833	0.401	0.401	0.001	0.18	12.36	12.34
40102	72.005	0.404	0.402	0.002	0.45	12.70	12.64
40201	51.753	0.260	0.257	0.002	0.95	23.07	22.84
40202	47.224	0.290	0.290	0.000	0.02	22.50	22.51
40301	141.232	0.236	0.236	0.000	0.14	14.64	14.62
40302	149.290	0.269	0.270	-0.001	-0.26	13.38	13.42
40401	87.969	0.199	0.198	0.000	0.21	20.95	20.91
40402	86.624	0.209	0.211	-0.001	-0.62	20.08	20.21
40501	55.344	0.176	0.175	0.001	0.34	27.22	27.13
40502	61.234	0.214	0.213	0.001	0.41	24.08	23.99
50101	70.762	0.408	0.404	0.003	0.85	12.95	12.82
50102	67.043	0.405	0.407	-0.002	-0.56	13.39	13.46
50201	47.964	0.256	0.259	-0.003	-1.31	23.77	24.06
50202	44.225	0.290	0.294	-0.003	-1.14	23.28	23.53
50301	131.956	0.238	0.239	-0.000	-0.11	14.82	14.84
50302	139.614	0.275	0.275	0.000	0.01	14.52	14.52
50401	82.125	0.200	0.201	-0.001	-0.55	21.82	21.94
50402	80.548	0.209	0.210	-0.001	-0.39	20.37	20.45
50501	51.823	0.175	0.174	0.001	0.60	28.64	28.47
50502	57.213	0.218	0.217	0.001	0.60	23.79	23.65
60101	29.572	0.342	0.343	-0.002	-0.48	22.70	22.81
60102	27.512	0.344	0.343	0.000	0.06	23.88	23.88
60201	22.626	0.199	0.197	0.002	0.88	39.58	39.25
60202	21.358	0.220	0.220	0.001	0.35	38.27	38.15
60301	74.988	0.167	0.166	0.001	0.58	26.77	26.62
60302	77.767	0.211	0.211	-0.000	-0.08	22.24	22.27
60401	39.077	0.152	0.155	-0.003	-1.72	37.54	38.18
60402	41.202	0.172	0.173	-0.001	-0.47	34.38	34.56
60501	35.566	0.193	0.190	0.003	1.47	33.32	32.83
60502	45.945	0.205	0.204	0.001	0.63	30.77	30.59
70101	38.005	0.346	0.344	0.001	0.39	19.99	19.92
70102	35.976	0.342	0.339	0.002	0.65	20.28	20.15
70201	29.277	0.195	0.193	0.002	1.21	37.46	37.01
70202	27.724	0.217	0.222	-0.005	-2.16	35.93	36.67
70301	96.806	0.165	0.166	-0.001	-0.52	23.03	23.16
70302	100.546	0.212	0.211	0.001	0.33	19.10	19.05
70401	50.899	0.158	0.157	0.001	0.51	31.25	31.11
70402	53.430	0.176	0.175	0.001	0.62	29.00	28.83
70501	46.362	0.188	0.192	-0.004	-2.14	29.35	29.93
70502	59.841	0.208	0.204	0.004	1.77	26.97	26.45
80101	27.008	0.343	0.341	0.002	0.54	24.19	24.06
80102	25.461	0.347	0.345	0.002	0.56	23.89	23.76
80201	20.702	0.199	0.199	0.000	0.14	41.91	41.87
80202	19.632	0.228	0.226	0.002	0.88	41.37	41.02
80301	68.595	0.166	0.167	-0.001	-0.44	26.62	26.75
80302	71.562	0.218	0.216	0.003	1.19	22.79	22.50
80401	36.004	0.158	0.159	-0.001	-0.82	37.55	37.87
80402	37.966	0.176	0.178	-0.001	-0.67	34.69	34.93
80501	32.807	0.193	0.191	0.002	0.87	35.49	35.20
80502	42.327	0.201	0.204	-0.003	-1.32	31.73	32.15

90101	45.472	0.366	0.364	0.002	0.50	17.50	17.41
90102	43.167	0.357	0.359	-0.002	-0.47	17.59	17.68
90201	47.175	0.213	0.214	-0.001	-0.49	29.03	29.19
90202	45.269	0.246	0.251	-0.005	-2.00	25.16	25.60
90301	108.744	0.190	0.189	0.001	0.50	20.99	20.89
90302	112.445	0.221	0.223	-0.002	-0.76	18.28	18.41
90401	59.874	0.189	0.186	0.003	1.61	26.28	25.83
90402	67.743	0.187	0.188	-0.000	-0.26	26.23	26.31
90501	38.657	0.244	0.247	-0.003	-1.07	28.74	29.04
90502	59.337	0.263	0.263	0.000	0.16	22.60	22.57
100101	46.385	0.361	0.362	-0.002	-0.43	18.43	18.51
100102	43.912	0.362	0.363	-0.001	-0.35	18.38	18.45
100201	47.829	0.217	0.219	-0.002	-1.12	26.47	26.76
100202	46.166	0.253	0.254	-0.002	-0.64	25.77	25.94
100301	110.165	0.191	0.192	-0.000	-0.24	19.51	19.56
100302	114.501	0.224	0.224	-0.000	-0.03	18.02	18.03
100401	60.475	0.192	0.191	0.002	0.83	26.45	26.24
100402	68.630	0.194	0.194	0.000	0.20	24.16	24.13
100501	39.019	0.251	0.250	0.002	0.65	27.54	27.37
100502	60.517	0.263	0.264	-0.001	-0.34	21.80	21.88
110101	23.190	0.363	0.364	-0.001	-0.33	24.62	24.71
110102	22.209	0.365	0.360	0.005	1.28	25.34	25.00
110201	23.967	0.215	0.216	-0.001	-0.29	36.96	37.09
110202	23.098	0.253	0.253	0.000	0.07	36.68	36.67
110301	55.268	0.191	0.188	0.002	1.24	27.63	27.28
110302	57.555	0.222	0.222	-0.000	-0.15	24.28	24.33
110401	30.564	0.185	0.185	0.000	0.04	38.44	38.45
110402	34.636	0.186	0.189	-0.003	-1.61	34.37	34.92
110501	19.780	0.250	0.250	0.000	0.02	40.38	40.39
110502	30.515	0.262	0.261	0.001	0.57	30.02	29.86

Results for model-based EBP poverty rate estimator

domain	size	mean	true value	bias	rel. bias%	rrmse%	cv%
10101	45.879	0.427	0.427	-0.001	-0.14	6.72	6.73
10102	44.554	0.428	0.435	-0.007	-1.61	6.81	6.73
10201	32.977	0.275	0.300	-0.025	-8.30	12.66	10.44
10202	32.102	0.303	0.331	-0.028	-8.48	12.23	9.63
10301	95.303	0.235	0.258	-0.023	-8.89	11.60	8.18
10302	106.812	0.278	0.306	-0.028	-9.22	11.70	7.94
10401	55.561	0.211	0.228	-0.017	-7.34	11.95	10.18
10402	59.808	0.222	0.230	-0.008	-3.67	10.16	9.84
10501	41.965	0.219	0.178	0.041	22.88	26.67	11.16
10502	49.458	0.243	0.231	0.012	5.40	11.48	9.62
20101	36.945	0.430	0.434	-0.003	-0.76	6.60	6.61
20102	35.850	0.431	0.440	-0.009	-2.05	6.82	6.64
20201	26.412	0.279	0.305	-0.026	-8.65	12.59	10.03
20202	25.582	0.304	0.331	-0.027	-8.16	11.98	9.56
20301	76.256	0.237	0.263	-0.026	-10.00	12.29	7.95
20302	85.446	0.280	0.310	-0.030	-9.69	11.96	7.76
20401	44.080	0.214	0.232	-0.019	-8.01	12.15	9.93
20402	47.521	0.224	0.238	-0.014	-5.79	11.01	9.94
20501	33.505	0.221	0.179	0.043	23.93	27.62	11.13
20502	39.638	0.245	0.232	0.013	5.61	11.49	9.50
30101	37.561	0.427	0.433	-0.006	-1.39	6.57	6.51
30102	36.497	0.428	0.437	-0.010	-2.19	6.95	6.75
30201	26.720	0.276	0.300	-0.024	-7.86	12.31	10.29
30202	26.010	0.302	0.327	-0.025	-7.61	11.79	9.76
30301	77.770	0.235	0.259	-0.023	-9.07	11.61	7.98
30302	87.127	0.277	0.307	-0.030	-9.84	11.89	7.41
30401	45.443	0.211	0.229	-0.018	-7.70	12.20	10.25
30402	48.418	0.222	0.231	-0.009	-4.05	9.96	9.49
30501	34.013	0.218	0.177	0.041	22.99	26.74	11.10
30502	40.191	0.243	0.231	0.012	5.21	11.59	9.85
40101	75.833	0.401	0.401	0.001	0.19	5.96	5.95
40102	72.005	0.402	0.402	-0.000	-0.00	5.99	6.00
40201	51.753	0.237	0.257	-0.020	-7.79	11.95	9.83
40202	47.224	0.266	0.290	-0.024	-8.18	11.77	9.23
40301	141.232	0.222	0.236	-0.014	-6.12	8.89	6.88
40302	149.290	0.261	0.270	-0.009	-3.43	7.15	6.50
40401	87.969	0.206	0.198	0.008	3.92	10.18	9.05
40402	86.624	0.209	0.211	-0.001	-0.66	8.86	8.89

40501	55.344	0.221	0.175	0.046	26.01	28.79	9.81
40502	61.234	0.240	0.213	0.027	12.63	15.80	8.43
50101	70.762	0.404	0.404	-0.000	-0.02	5.95	5.95
50102	67.043	0.405	0.407	-0.002	-0.59	6.24	6.25
50201	47.964	0.239	0.259	-0.020	-7.84	11.90	9.72
50202	44.225	0.270	0.294	-0.024	-8.12	11.94	9.53
50301	131.956	0.224	0.239	-0.015	-6.19	8.98	6.94
50302	139.614	0.263	0.275	-0.012	-4.44	7.73	6.62
50401	82.125	0.208	0.201	0.007	3.23	9.84	9.01
50402	80.548	0.211	0.210	0.001	0.47	9.21	9.16
50501	51.823	0.223	0.174	0.049	27.89	30.76	10.15
50502	57.213	0.240	0.217	0.023	10.68	14.34	8.65
60101	29.572	0.341	0.343	-0.002	-0.72	8.49	8.53
60102	27.512	0.341	0.343	-0.002	-0.53	8.38	8.41
60201	22.626	0.208	0.197	0.011	5.69	13.72	11.82
60202	21.358	0.238	0.220	0.018	8.39	14.73	11.17
60301	74.988	0.180	0.166	0.014	8.52	13.19	9.28
60302	77.767	0.240	0.211	0.029	13.64	16.71	8.50
60401	39.077	0.157	0.155	0.002	1.47	12.01	11.75
60402	41.202	0.201	0.173	0.028	16.47	20.46	10.43
60501	35.566	0.166	0.190	-0.024	-12.58	16.67	12.53
60502	45.945	0.242	0.204	0.039	18.99	22.51	10.17
70101	38.005	0.338	0.344	-0.006	-1.87	7.91	7.83
70102	35.976	0.339	0.339	-0.001	-0.15	8.11	8.12
70201	29.277	0.208	0.193	0.015	7.54	14.08	11.06
70202	27.724	0.234	0.222	0.012	5.53	12.53	10.66
70301	96.806	0.179	0.166	0.013	7.89	12.11	8.52
70302	100.546	0.238	0.211	0.027	12.54	15.39	7.93
70401	50.899	0.156	0.157	-0.002	-1.04	10.84	10.91
70402	53.430	0.200	0.175	0.025	14.13	17.97	9.73
70501	46.362	0.164	0.192	-0.028	-14.50	17.54	11.55
70502	59.841	0.242	0.204	0.038	18.61	21.74	9.48
80101	27.008	0.346	0.341	0.004	1.29	8.72	8.51
80102	25.461	0.346	0.345	0.002	0.54	8.83	8.77
80201	20.702	0.212	0.199	0.013	6.66	14.65	12.24
80202	19.632	0.240	0.226	0.014	6.13	13.44	11.27
80301	68.595	0.182	0.167	0.015	9.11	13.77	9.47
80302	71.562	0.243	0.216	0.027	12.70	15.93	8.54
80401	36.004	0.160	0.159	0.000	0.28	11.80	11.77
80402	37.966	0.205	0.178	0.027	15.22	19.50	10.59
80501	32.807	0.168	0.191	-0.023	-12.13	16.44	12.64
80502	42.327	0.246	0.204	0.043	20.90	24.15	10.01
90101	45.472	0.377	0.364	0.012	3.39	7.97	6.98
90102	43.167	0.377	0.359	0.018	5.06	9.09	7.19
90201	47.175	0.235	0.214	0.021	9.58	15.01	10.55
90202	45.269	0.267	0.251	0.016	6.52	12.03	9.50
90301	108.744	0.212	0.189	0.023	12.18	14.74	7.41
90302	112.445	0.236	0.223	0.013	5.71	9.90	7.65
90401	59.874	0.193	0.186	0.007	3.74	10.77	9.74
90402	67.743	0.175	0.188	-0.013	-7.02	11.83	10.25
90501	38.657	0.189	0.247	-0.058	-23.47	24.96	11.10
90502	59.337	0.192	0.263	-0.071	-26.97	28.01	10.35
100101	46.385	0.380	0.362	0.018	4.88	8.87	7.06
100102	43.912	0.380	0.363	0.017	4.69	8.73	7.03
100201	47.829	0.238	0.219	0.018	8.38	13.92	10.26
100202	46.166	0.270	0.254	0.015	6.00	11.96	9.76
100301	110.165	0.215	0.192	0.023	11.99	14.80	7.75
100302	114.501	0.237	0.224	0.013	5.97	9.91	7.47
100401	60.475	0.195	0.191	0.005	2.45	10.37	9.84
100402	68.630	0.177	0.194	-0.017	-8.67	12.71	10.17
100501	39.019	0.192	0.250	-0.057	-22.99	24.57	11.27
100502	60.517	0.194	0.264	-0.070	-26.55	27.64	10.45
110101	23.190	0.378	0.364	0.014	3.97	8.77	7.53
110102	22.209	0.379	0.360	0.019	5.17	9.38	7.44
110201	23.967	0.235	0.216	0.019	8.93	14.85	10.90
110202	23.098	0.269	0.253	0.015	6.10	12.47	10.25
110301	55.268	0.213	0.188	0.024	13.00	16.11	8.42
110302	57.555	0.237	0.222	0.014	6.49	10.72	8.01
110401	30.564	0.193	0.185	0.008	4.32	11.63	10.35
110402	34.636	0.176	0.189	-0.013	-7.02	12.10	10.60
110501	19.780	0.191	0.250	-0.059	-23.66	25.25	11.56
110502	30.515	0.193	0.261	-0.068	-26.14	27.35	10.93

C.4.3. Poverty rate in Amelia, weights in model fitting but no ISCED in model

Results for model-assisted MLGREG poverty rate estimator

domain	size	mean	true value	bias	rel. bias%	rrmse%	cv%
10101	45.879	0.424	0.427	-0.003	-0.79	15.21	15.31
10102	44.554	0.436	0.435	0.001	0.32	14.71	14.67
10201	32.977	0.299	0.300	-0.002	-0.50	26.92	27.07
10202	32.102	0.328	0.331	-0.003	-0.84	24.28	24.48
10301	95.303	0.256	0.258	-0.002	-0.92	16.88	17.02
10302	106.812	0.308	0.306	0.002	0.54	15.69	15.60
10401	55.561	0.226	0.228	-0.001	-0.58	24.13	24.27
10402	59.808	0.228	0.230	-0.003	-1.13	23.44	23.69
10501	41.965	0.179	0.178	0.001	0.32	32.82	32.73
10502	49.458	0.229	0.231	-0.002	-0.66	25.10	25.27
20101	36.945	0.439	0.434	0.005	1.17	16.80	16.58
20102	35.850	0.439	0.440	-0.002	-0.37	15.73	15.79
20201	26.412	0.303	0.305	-0.003	-0.88	30.66	30.93
20202	25.582	0.331	0.331	0.000	0.03	28.74	28.75
20301	76.256	0.264	0.263	0.001	0.32	18.64	18.59
20302	85.446	0.309	0.310	-0.001	-0.21	16.05	16.09
20401	44.080	0.231	0.232	-0.001	-0.41	27.83	27.95
20402	47.521	0.237	0.238	-0.001	-0.34	27.35	27.46
20501	33.505	0.178	0.179	-0.000	-0.21	34.71	34.79
20502	39.638	0.231	0.232	-0.001	-0.58	27.33	27.49
30101	37.561	0.436	0.433	0.003	0.80	15.95	15.81
30102	36.497	0.438	0.437	0.001	0.13	16.94	16.93
30201	26.720	0.296	0.300	-0.004	-1.47	27.95	28.34
30202	26.010	0.326	0.327	-0.001	-0.25	29.59	29.68
30301	77.770	0.258	0.259	-0.000	-0.07	19.40	19.43
30302	87.127	0.307	0.307	0.000	0.00	16.29	16.30
30401	45.443	0.229	0.229	0.000	0.14	25.81	25.79
30402	48.418	0.228	0.231	-0.003	-1.42	25.36	25.70
30501	34.013	0.172	0.177	-0.005	-3.01	35.29	36.27
30502	40.191	0.231	0.231	0.000	0.11	29.59	29.57
40101	75.833	0.401	0.401	0.001	0.18	12.35	12.34
40102	72.005	0.404	0.402	0.002	0.46	12.70	12.64
40201	51.753	0.260	0.257	0.002	0.93	23.06	22.84
40202	47.224	0.290	0.290	0.000	0.05	22.47	22.47
40301	141.232	0.236	0.236	0.000	0.13	14.65	14.63
40302	149.290	0.269	0.270	-0.001	-0.26	13.37	13.41
40401	87.969	0.199	0.198	0.000	0.20	20.97	20.94
40402	86.624	0.209	0.211	-0.001	-0.58	20.03	20.15
40501	55.344	0.176	0.175	0.001	0.31	27.19	27.12
40502	61.234	0.214	0.213	0.001	0.42	24.05	23.96
50101	70.762	0.408	0.404	0.003	0.83	12.95	12.82
50102	67.043	0.405	0.407	-0.002	-0.57	13.38	13.45
50201	47.964	0.256	0.259	-0.003	-1.34	23.74	24.04
50202	44.225	0.290	0.294	-0.003	-1.12	23.25	23.50
50301	131.956	0.238	0.239	-0.000	-0.12	14.83	14.85
50302	139.614	0.275	0.275	-0.000	-0.00	14.47	14.48
50401	82.125	0.200	0.201	-0.001	-0.56	21.85	21.98
50402	80.548	0.209	0.210	-0.001	-0.41	20.35	20.44
50501	51.823	0.175	0.174	0.001	0.61	28.69	28.52
50502	57.213	0.218	0.217	0.001	0.61	23.79	23.65
60101	29.572	0.342	0.343	-0.002	-0.50	22.72	22.84
60102	27.512	0.343	0.343	0.000	0.06	23.91	23.91
60201	22.626	0.199	0.197	0.002	0.94	39.54	39.18
60202	21.358	0.220	0.220	0.001	0.33	38.16	38.05
60301	74.988	0.167	0.166	0.001	0.58	26.78	26.64
60302	77.767	0.211	0.211	-0.000	-0.10	22.18	22.21
60401	39.077	0.152	0.155	-0.003	-1.70	37.55	38.18
60402	41.202	0.172	0.173	-0.001	-0.49	34.34	34.52
60501	35.566	0.193	0.190	0.003	1.48	33.37	32.86
60502	45.945	0.205	0.204	0.001	0.62	30.70	30.52
70101	38.005	0.346	0.344	0.001	0.40	19.99	19.92
70102	35.976	0.342	0.339	0.002	0.66	20.28	20.15
70201	29.277	0.195	0.193	0.002	1.21	37.53	37.08
70202	27.724	0.217	0.222	-0.005	-2.16	35.88	36.62
70301	96.806	0.165	0.166	-0.001	-0.52	23.03	23.15
70302	100.546	0.212	0.211	0.001	0.33	19.05	19.00

70401	50.899	0.158	0.157	0.001	0.49	31.27	31.13
70402	53.430	0.176	0.175	0.001	0.62	28.99	28.82
70501	46.362	0.188	0.192	-0.004	-2.16	29.40	29.99
70502	59.841	0.208	0.204	0.004	1.75	26.89	26.39
80101	27.008	0.343	0.341	0.002	0.54	24.18	24.05
80102	25.461	0.347	0.345	0.002	0.57	23.88	23.75
80201	20.702	0.199	0.199	0.000	0.12	41.91	41.88
80202	19.632	0.228	0.226	0.002	0.96	41.31	40.93
80301	68.595	0.166	0.167	-0.001	-0.45	26.66	26.79
80302	71.562	0.218	0.216	0.003	1.17	22.71	22.43
80401	36.004	0.158	0.159	-0.001	-0.82	37.63	37.95
80402	37.966	0.176	0.178	-0.001	-0.68	34.61	34.86
80501	32.807	0.193	0.191	0.002	0.83	35.51	35.23
80502	42.327	0.201	0.204	-0.003	-1.29	31.58	31.98
90101	45.472	0.366	0.364	0.002	0.50	17.50	17.41
90102	43.167	0.357	0.359	-0.002	-0.45	17.59	17.67
90201	47.175	0.213	0.214	-0.001	-0.48	29.00	29.15
90202	45.269	0.246	0.251	-0.005	-1.99	25.10	25.54
90301	108.744	0.190	0.189	0.001	0.51	20.98	20.88
90302	112.445	0.221	0.223	-0.002	-0.75	18.28	18.42
90401	59.874	0.189	0.186	0.003	1.60	26.29	25.84
90402	67.743	0.187	0.188	-0.001	-0.27	26.29	26.38
90501	38.657	0.245	0.247	-0.003	-1.07	28.79	29.10
90502	59.337	0.263	0.263	0.000	0.16	22.55	22.52
100101	46.385	0.361	0.362	-0.002	-0.43	18.43	18.52
100102	43.912	0.362	0.363	-0.001	-0.36	18.38	18.45
100201	47.829	0.217	0.219	-0.002	-1.11	26.46	26.75
100202	46.166	0.253	0.254	-0.002	-0.64	25.70	25.87
100301	110.165	0.191	0.192	-0.000	-0.24	19.49	19.55
100302	114.501	0.224	0.224	-0.000	-0.02	18.04	18.05
100401	60.475	0.192	0.191	0.002	0.84	26.52	26.30
100402	68.630	0.194	0.194	0.000	0.19	24.17	24.14
100501	39.019	0.251	0.250	0.002	0.64	27.57	27.40
100502	60.517	0.263	0.264	-0.001	-0.33	21.75	21.83
110101	23.190	0.363	0.364	-0.001	-0.32	24.63	24.72
110102	22.209	0.365	0.360	0.005	1.30	25.34	24.99
110201	23.967	0.216	0.216	-0.001	-0.24	36.99	37.10
110202	23.098	0.253	0.253	0.000	0.08	36.63	36.62
110301	55.268	0.191	0.188	0.002	1.24	27.62	27.26
110302	57.555	0.222	0.222	-0.000	-0.15	24.31	24.35
110401	30.564	0.185	0.185	0.000	0.01	38.47	38.49
110402	34.636	0.186	0.189	-0.003	-1.62	34.38	34.92
110501	19.780	0.250	0.250	0.000	0.02	40.45	40.46
110502	30.515	0.262	0.261	0.001	0.56	29.99	29.83

Results for model-based EBP poverty rate estimator

domain	size	mean	true value	bias	rel. bias%	rrmse%	cv%
10101	45.879	0.425	0.427	-0.002	-0.51	6.81	6.83
10102	44.554	0.426	0.435	-0.009	-1.97	6.92	6.77
10201	32.977	0.276	0.300	-0.025	-8.18	12.81	10.74
10202	32.102	0.305	0.331	-0.026	-7.80	11.96	9.85
10301	95.303	0.235	0.258	-0.023	-8.87	11.76	8.47
10302	106.812	0.278	0.306	-0.028	-8.99	11.64	8.12
10401	55.561	0.212	0.228	-0.016	-6.99	11.95	10.42
10402	59.808	0.222	0.230	-0.008	-3.60	10.42	10.15
10501	41.965	0.216	0.178	0.038	21.21	25.37	11.48
10502	49.458	0.245	0.231	0.014	6.16	12.16	9.88
20101	36.945	0.429	0.434	-0.005	-1.08	6.68	6.67
20102	35.850	0.430	0.440	-0.010	-2.36	6.98	6.73
20201	26.412	0.279	0.305	-0.026	-8.48	12.69	10.32
20202	25.582	0.306	0.331	-0.024	-7.35	11.63	9.74
20301	76.256	0.237	0.263	-0.026	-9.90	12.38	8.26
20302	85.446	0.281	0.310	-0.029	-9.37	11.83	7.96
20401	44.080	0.215	0.232	-0.018	-7.60	12.12	10.23
20402	47.521	0.224	0.238	-0.013	-5.63	11.30	10.39
20501	33.505	0.218	0.179	0.040	22.36	26.34	11.39
20502	39.638	0.247	0.232	0.015	6.46	12.13	9.65
30101	37.561	0.425	0.433	-0.008	-1.77	6.72	6.60
30102	36.497	0.426	0.437	-0.011	-2.57	7.13	6.83
30201	26.720	0.277	0.300	-0.023	-7.78	12.45	10.55
30202	26.010	0.304	0.327	-0.022	-6.87	11.52	9.94

30301	77.770	0.235	0.259	-0.024	-9.09	11.77	8.23
30302	87.127	0.277	0.307	-0.029	-9.61	11.79	7.56
30401	45.443	0.212	0.229	-0.017	-7.39	12.20	10.49
30402	48.418	0.222	0.231	-0.009	-4.04	10.14	9.69
30501	34.013	0.215	0.177	0.038	21.33	25.44	11.44
30502	40.191	0.244	0.231	0.014	5.96	12.30	10.16
40101	75.833	0.399	0.401	-0.001	-0.28	6.02	6.03
40102	72.005	0.400	0.402	-0.002	-0.47	6.02	6.03
40201	51.753	0.239	0.257	-0.018	-7.14	11.79	10.10
40202	47.224	0.269	0.290	-0.021	-7.12	11.26	9.39
40301	141.232	0.221	0.236	-0.015	-6.38	9.21	7.10
40302	149.290	0.261	0.270	-0.009	-3.42	7.27	6.65
40401	87.969	0.206	0.198	0.007	3.70	10.33	9.31
40402	86.624	0.209	0.211	-0.002	-0.94	9.11	9.16
40501	55.344	0.216	0.175	0.041	23.50	26.59	10.09
40502	61.234	0.240	0.213	0.027	12.59	15.88	8.61
50101	70.762	0.402	0.404	-0.002	-0.48	5.99	6.00
50102	67.043	0.403	0.407	-0.004	-1.03	6.27	6.25
50201	47.964	0.241	0.259	-0.019	-7.13	11.67	9.95
50202	44.225	0.273	0.294	-0.021	-7.10	11.41	9.62
50301	131.956	0.223	0.239	-0.015	-6.41	9.24	7.12
50302	139.614	0.263	0.275	-0.012	-4.39	7.82	6.77
50401	82.125	0.207	0.201	0.006	3.08	10.09	9.33
50402	80.548	0.210	0.210	0.000	0.23	9.43	9.41
50501	51.823	0.218	0.174	0.044	25.39	28.57	10.46
50502	57.213	0.240	0.217	0.023	10.72	14.51	8.83
60101	29.572	0.341	0.343	-0.003	-0.85	8.53	8.57
60102	27.512	0.341	0.343	-0.002	-0.65	8.41	8.44
60201	22.626	0.211	0.197	0.013	6.82	14.45	11.93
60202	21.358	0.241	0.220	0.021	9.75	15.73	11.25
60301	74.988	0.181	0.166	0.015	9.08	13.70	9.42
60302	77.767	0.239	0.211	0.028	13.30	16.51	8.64
60401	39.077	0.159	0.155	0.004	2.49	12.66	12.12
60402	41.202	0.199	0.173	0.026	15.02	19.43	10.72
60501	35.566	0.164	0.190	-0.026	-13.53	17.51	12.87
60502	45.945	0.240	0.204	0.036	17.53	21.33	10.34
70101	38.005	0.337	0.344	-0.007	-2.03	7.93	7.83
70102	35.976	0.338	0.339	-0.001	-0.30	8.11	8.14
70201	29.277	0.210	0.193	0.017	8.60	14.95	11.26
70202	27.724	0.237	0.222	0.015	6.88	13.34	10.69
70301	96.806	0.180	0.166	0.014	8.41	12.63	8.70
70302	100.546	0.237	0.211	0.026	12.15	15.17	8.10
70401	50.899	0.157	0.157	-0.000	-0.09	11.15	11.17
70402	53.430	0.197	0.175	0.022	12.65	16.94	10.01
70501	46.362	0.163	0.192	-0.030	-15.50	18.43	11.82
70502	59.841	0.239	0.204	0.035	17.08	20.56	9.78
80101	27.008	0.345	0.341	0.004	1.14	8.75	8.59
80102	25.461	0.346	0.345	0.001	0.42	8.79	8.74
80201	20.702	0.214	0.199	0.015	7.75	15.32	12.27
80202	19.632	0.243	0.226	0.017	7.51	14.35	11.38
80301	68.595	0.183	0.167	0.016	9.70	14.41	9.72
80302	71.562	0.242	0.216	0.027	12.38	15.75	8.68
80401	36.004	0.161	0.159	0.002	1.30	12.22	12.00
80402	37.966	0.202	0.178	0.024	13.75	18.45	10.82
80501	32.807	0.166	0.191	-0.025	-13.07	17.25	12.97
80502	42.327	0.243	0.204	0.040	19.43	22.91	10.17
90101	45.472	0.375	0.364	0.011	2.97	7.86	7.07
90102	43.167	0.376	0.359	0.017	4.65	8.95	7.31
90201	47.175	0.236	0.214	0.022	10.11	15.57	10.75
90202	45.269	0.269	0.251	0.019	7.41	12.72	9.63
90301	108.744	0.212	0.189	0.023	12.07	14.84	7.70
90302	112.445	0.237	0.223	0.014	6.48	10.54	7.81
90401	59.874	0.193	0.186	0.007	3.81	11.16	10.11
90402	67.743	0.176	0.188	-0.012	-6.15	11.66	10.56
90501	38.657	0.187	0.247	-0.061	-24.49	25.97	11.45
90502	59.337	0.194	0.263	-0.068	-25.94	27.09	10.54
100101	46.385	0.379	0.362	0.017	4.58	8.71	7.09
100102	43.912	0.379	0.363	0.016	4.40	8.58	7.06
100201	47.829	0.239	0.219	0.020	9.05	14.47	10.35
100202	46.166	0.272	0.254	0.018	7.02	12.68	9.87
100301	110.165	0.215	0.192	0.023	12.04	14.97	7.94
100302	114.501	0.240	0.224	0.015	6.91	10.63	7.56

100401	60.475	0.196	0.191	0.005	2.65	10.64	10.04
100402	68.630	0.179	0.194	-0.015	-7.70	12.32	10.42
100501	39.019	0.190	0.250	-0.060	-23.91	25.49	11.60
100502	60.517	0.197	0.264	-0.067	-25.40	26.61	10.64
110101	23.190	0.377	0.364	0.013	3.59	8.71	7.67
110102	22.209	0.377	0.360	0.017	4.78	9.21	7.52
110201	23.967	0.237	0.216	0.021	9.54	15.51	11.18
110202	23.098	0.271	0.253	0.018	7.05	13.20	10.43
110301	55.268	0.213	0.188	0.024	12.98	16.30	8.73
110302	57.555	0.239	0.222	0.016	7.30	11.40	8.16
110401	30.564	0.194	0.185	0.008	4.48	11.98	10.64
110402	34.636	0.177	0.189	-0.012	-6.12	11.89	10.86
110501	19.780	0.189	0.250	-0.062	-24.64	26.22	11.91
110502	30.515	0.195	0.261	-0.065	-25.04	26.40	11.16

C.5. Results for Gini coefficient

In this section, we compare results (bias and accuracy) for Gini coefficient. Estimators are Direct (Default) estimator and the following Indirect model-based estimators: - Prediction estimator - Expanded prediction estimator - Composite estimator (Default and expanded prediction estimator) - Calibrated expanded prediction estimator - Composite estimator (Default and calibrated expanded prediction estimator) Underlying model: Linear mixed model with domain-specific random intercepts. Unequal probability sampling design (PPS). Contamination: OCAR-CCAR / None.

C.5.1. Gini coefficient in Amelia

Results for Direct (default) Gini estimator

No contamination

domain	size	mean	true value	bias	rel. bias%	rrmse%	cv%
1	38.866	0.362	0.372	-0.010	-2.75	13.14	13.22
2	53.670	0.363	0.369	-0.006	-1.72	11.18	11.24
3	39.183	0.360	0.371	-0.010	-2.83	12.23	12.25
4	46.460	0.364	0.372	-0.008	-2.16	11.45	11.49
5	54.658	0.366	0.371	-0.006	-1.56	10.91	10.98
6	57.760	0.367	0.374	-0.006	-1.69	10.93	10.99
7	40.296	0.363	0.372	-0.009	-2.44	12.09	12.15
8	50.901	0.364	0.371	-0.007	-1.79	11.19	11.25
9	53.119	0.365	0.370	-0.004	-1.17	11.59	11.67
10	56.887	0.366	0.374	-0.008	-2.09	10.34	10.35
11	48.582	0.367	0.375	-0.008	-2.11	11.66	11.72
12	53.683	0.365	0.374	-0.009	-2.32	11.14	11.16
13	55.992	0.367	0.374	-0.007	-1.79	10.47	10.51
14	64.189	0.368	0.374	-0.007	-1.75	10.06	10.09
15	63.945	0.370	0.374	-0.005	-1.23	10.46	10.52
16	62.841	0.369	0.374	-0.005	-1.32	10.37	10.43
17	49.620	0.367	0.375	-0.008	-2.12	11.61	11.67
18	48.614	0.366	0.375	-0.009	-2.40	11.53	11.56
19	49.848	0.370	0.377	-0.007	-1.84	12.26	12.36
20	36.612	0.364	0.372	-0.008	-2.12	13.61	13.74
21	34.919	0.350	0.360	-0.010	-2.91	13.96	14.07
22	43.118	0.349	0.359	-0.010	-2.86	12.98	13.04
23	48.053	0.348	0.357	-0.009	-2.53	11.59	11.61
24	42.391	0.346	0.355	-0.009	-2.45	12.76	12.84
25	43.645	0.348	0.356	-0.008	-2.34	12.07	12.13
26	37.406	0.350	0.359	-0.010	-2.70	14.04	14.17
27	49.547	0.354	0.362	-0.008	-2.16	12.38	12.47
28	44.615	0.348	0.356	-0.008	-2.28	11.58	11.62
29	51.774	0.348	0.357	-0.010	-2.71	11.65	11.65
30	50.045	0.351	0.360	-0.009	-2.55	11.92	11.95
31	73.783	0.353	0.357	-0.004	-1.12	9.46	9.50
32	48.158	0.347	0.355	-0.008	-2.22	11.54	11.58
33	44.595	0.346	0.356	-0.010	-2.75	12.29	12.32
34	45.940	0.350	0.357	-0.007	-2.09	12.21	12.30
35	57.855	0.349	0.355	-0.005	-1.53	10.66	10.72
36	34.653	0.347	0.356	-0.010	-2.73	13.90	14.02
37	58.770	0.350	0.357	-0.006	-1.76	10.42	10.46
38	60.905	0.349	0.356	-0.006	-1.83	10.93	10.98
39	47.157	0.350	0.357	-0.008	-2.23	12.07	12.14
40	56.941	0.351	0.357	-0.006	-1.62	10.64	10.69

Results for Gini prediction estimator

OCAR - CCAR

domain	size	mean	true value	bias	rel. bias%	rrmse%	cv%
1	38.866	0.272	0.372	-0.100	-26.84	27.38	7.45
2	53.670	0.271	0.369	-0.099	-26.68	27.23	7.45
3	39.183	0.276	0.371	-0.095	-25.63	26.21	7.39
4	46.460	0.276	0.372	-0.095	-25.66	26.24	7.39
5	54.658	0.275	0.371	-0.096	-25.89	26.46	7.38
6	57.760	0.277	0.374	-0.096	-25.81	26.38	7.37
7	40.296	0.277	0.372	-0.095	-25.45	26.04	7.38
8	50.901	0.277	0.371	-0.094	-25.36	25.95	7.40
9	53.119	0.275	0.370	-0.095	-25.60	26.18	7.40
10	56.887	0.277	0.374	-0.097	-25.94	26.51	7.37
11	48.582	0.286	0.375	-0.088	-23.60	24.29	7.51
12	53.683	0.284	0.374	-0.090	-24.09	24.75	7.51
13	55.992	0.287	0.374	-0.087	-23.26	23.97	7.55
14	64.189	0.287	0.374	-0.088	-23.49	24.18	7.52
15	63.945	0.287	0.374	-0.087	-23.29	24.00	7.53
16	62.841	0.286	0.374	-0.088	-23.56	24.25	7.53
17	49.620	0.286	0.375	-0.089	-23.79	24.47	7.52
18	48.614	0.287	0.375	-0.088	-23.44	24.14	7.54
19	49.848	0.285	0.377	-0.092	-24.48	25.14	7.54
20	36.612	0.288	0.372	-0.084	-22.59	23.33	7.56
21	34.919	0.287	0.360	-0.073	-20.25	21.19	7.81
22	43.118	0.289	0.359	-0.070	-19.56	20.54	7.79
23	48.053	0.291	0.357	-0.066	-18.45	19.51	7.79
24	42.391	0.289	0.355	-0.066	-18.46	19.53	7.82
25	43.645	0.289	0.356	-0.067	-18.81	19.85	7.78
26	37.406	0.291	0.359	-0.068	-18.97	19.99	7.81
27	49.547	0.289	0.362	-0.073	-20.18	21.12	7.80
28	44.615	0.291	0.356	-0.065	-18.36	19.43	7.81
29	51.774	0.290	0.357	-0.067	-18.87	19.90	7.80
30	50.045	0.289	0.360	-0.071	-19.74	20.71	7.81
31	73.783	0.273	0.357	-0.083	-23.38	24.11	7.72
32	48.158	0.272	0.355	-0.083	-23.32	24.06	7.77
33	44.595	0.274	0.356	-0.082	-22.94	23.70	7.73
34	45.940	0.274	0.357	-0.083	-23.29	24.04	7.74
35	57.855	0.273	0.355	-0.082	-23.07	23.83	7.74
36	34.653	0.274	0.356	-0.082	-23.12	23.87	7.72
37	58.770	0.274	0.357	-0.083	-23.22	23.96	7.72
38	60.905	0.274	0.356	-0.082	-23.12	23.87	7.72
39	47.157	0.275	0.357	-0.082	-23.08	23.83	7.75
40	56.941	0.275	0.357	-0.082	-23.03	23.78	7.70

Results for Gini expanded prediction estimator

OCAR - CCAR

domain	size	mean	true value	bias	rel. bias%	rrmse%	cv%
1	38.866	0.382	0.372	0.010	2.76	4.55	3.52
2	53.670	0.380	0.369	0.011	2.94	4.68	3.54
3	39.183	0.388	0.371	0.017	4.69	5.93	3.47
4	46.460	0.389	0.372	0.017	4.63	5.88	3.46
5	54.658	0.387	0.371	0.016	4.29	5.60	3.46
6	57.760	0.390	0.374	0.017	4.48	5.83	3.57
7	40.296	0.390	0.372	0.018	4.94	6.19	3.56
8	50.901	0.390	0.371	0.019	5.06	6.30	3.57
9	53.119	0.387	0.370	0.017	4.69	5.98	3.54
10	56.887	0.390	0.374	0.016	4.25	5.65	3.57
11	48.582	0.403	0.375	0.029	7.68	8.55	3.49
12	53.683	0.400	0.374	0.026	6.98	7.89	3.45
13	55.992	0.404	0.374	0.030	8.15	8.97	3.46
14	64.189	0.404	0.374	0.030	7.88	8.73	3.48
15	63.945	0.405	0.374	0.030	8.11	8.96	3.52
16	62.841	0.403	0.374	0.029	7.69	8.54	3.45
17	49.620	0.403	0.375	0.028	7.43	8.30	3.45
18	48.614	0.404	0.375	0.030	7.88	8.74	3.51
19	49.848	0.401	0.377	0.024	6.41	7.39	3.47
20	36.612	0.405	0.372	0.034	9.02	9.79	3.49
21	34.919	0.407	0.360	0.047	13.06	13.58	3.30
22	43.118	0.410	0.359	0.051	14.13	14.63	3.31

23	48.053	0.413	0.357	0.056	15.66	16.16	3.44
24	42.391	0.411	0.355	0.056	15.67	16.16	3.39
25	43.645	0.410	0.356	0.054	15.15	15.63	3.36
26	37.406	0.413	0.359	0.054	14.95	15.46	3.41
27	49.547	0.410	0.362	0.048	13.25	13.78	3.32
28	44.615	0.412	0.356	0.056	15.76	16.24	3.39
29	51.774	0.411	0.357	0.054	15.12	15.61	3.40
30	50.045	0.410	0.360	0.050	13.96	14.48	3.37
31	73.783	0.387	0.357	0.031	8.56	9.50	3.80
32	48.158	0.386	0.355	0.030	8.58	9.58	3.94
33	44.595	0.389	0.356	0.033	9.19	10.09	3.81
34	45.940	0.388	0.357	0.031	8.68	9.62	3.81
35	57.855	0.387	0.355	0.032	8.98	9.93	3.90
36	34.653	0.388	0.356	0.032	8.97	9.92	3.91
37	58.770	0.388	0.357	0.031	8.78	9.71	3.81
38	60.905	0.387	0.356	0.032	8.88	9.84	3.88
39	47.157	0.390	0.357	0.033	9.09	10.05	3.93
40	56.941	0.389	0.357	0.032	9.05	9.98	3.85

Results for Gini expanded prediction composite estimator

OCAR - CCAR

domain	size	mean	true value	bias	rel. bias%	rrmse%	cv%
1	38.866	0.374	0.372	0.002	0.59	5.71	5.64
2	53.670	0.373	0.369	0.004	1.05	5.02	4.86
3	39.183	0.377	0.371	0.006	1.62	5.43	5.11
4	46.460	0.379	0.372	0.007	1.94	5.33	4.87
5	54.658	0.378	0.371	0.007	1.81	4.97	4.55
6	57.760	0.381	0.374	0.007	1.97	5.16	4.68
7	40.296	0.379	0.372	0.007	1.94	5.53	5.08
8	50.901	0.379	0.371	0.008	2.27	5.42	4.81
9	53.119	0.378	0.370	0.009	2.33	5.61	4.99
10	56.887	0.380	0.374	0.006	1.71	4.77	4.38
11	48.582	0.389	0.375	0.014	3.80	6.28	4.82
12	53.683	0.386	0.374	0.012	3.28	5.77	4.60
13	55.992	0.389	0.374	0.016	4.23	6.19	4.33
14	64.189	0.390	0.374	0.015	4.09	5.98	4.20
15	63.945	0.391	0.374	0.017	4.45	6.45	4.48
16	62.841	0.389	0.374	0.015	4.09	6.06	4.29
17	49.620	0.389	0.375	0.014	3.60	6.11	4.77
18	48.614	0.389	0.375	0.014	3.83	6.29	4.81
19	49.848	0.389	0.377	0.012	3.09	6.21	5.22
20	36.612	0.389	0.372	0.017	4.58	7.40	5.56
21	34.919	0.385	0.360	0.025	6.83	8.91	5.37
22	43.118	0.386	0.359	0.027	7.45	9.31	5.19
23	48.053	0.388	0.357	0.031	8.56	9.93	4.64
24	42.391	0.386	0.355	0.031	8.62	10.21	5.05
25	43.645	0.386	0.356	0.030	8.32	9.79	4.76
26	37.406	0.388	0.359	0.029	8.06	10.02	5.50
27	49.547	0.388	0.362	0.026	7.19	8.93	4.95
28	44.615	0.387	0.356	0.031	8.79	10.16	4.70
29	51.774	0.386	0.357	0.029	8.08	9.49	4.60
30	50.045	0.387	0.360	0.027	7.52	9.09	4.75
31	73.783	0.374	0.357	0.017	4.70	6.42	4.18
32	48.158	0.370	0.355	0.015	4.21	6.54	4.81
33	44.595	0.372	0.356	0.016	4.48	6.94	5.07
34	45.940	0.373	0.357	0.016	4.37	6.91	5.12
35	57.855	0.372	0.355	0.017	4.80	6.71	4.49
36	34.653	0.371	0.356	0.015	4.27	7.21	5.57
37	58.770	0.373	0.357	0.016	4.51	6.35	4.29
38	60.905	0.372	0.356	0.017	4.68	6.68	4.55
39	47.157	0.374	0.357	0.016	4.55	7.09	5.20
40	56.941	0.374	0.357	0.017	4.85	6.82	4.58

Results for Gini calibrated expanded prediction estimator

OCAR - CCAR

domain	size	mean	true value	bias	rel. bias%	rrmse%	cv%
1	38.866	0.367	0.372	-0.005	-1.36	8.47	8.48
2	53.670	0.367	0.369	-0.003	-0.69	6.63	6.64

3	39.183	0.371	0.371	0.000	0.01	8.54	8.55
4	46.460	0.373	0.372	0.001	0.19	7.57	7.56
5	54.658	0.373	0.371	0.001	0.39	6.80	6.77
6	57.760	0.376	0.374	0.002	0.52	6.17	6.12
7	40.296	0.374	0.372	0.002	0.41	8.60	8.55
8	50.901	0.375	0.371	0.005	1.23	7.25	7.06
9	53.119	0.372	0.370	0.003	0.71	7.04	6.96
10	56.887	0.376	0.374	0.003	0.68	6.74	6.66
11	48.582	0.389	0.375	0.014	3.71	8.46	7.33
12	53.683	0.384	0.374	0.010	2.71	7.79	7.11
13	55.992	0.388	0.374	0.015	3.95	7.86	6.55
14	64.189	0.388	0.374	0.014	3.62	7.55	6.40
15	63.945	0.390	0.374	0.016	4.16	7.80	6.34
16	62.841	0.387	0.374	0.013	3.48	7.23	6.12
17	49.620	0.388	0.375	0.013	3.47	7.97	6.94
18	48.614	0.390	0.375	0.015	4.07	8.30	6.95
19	49.848	0.385	0.377	0.008	2.20	7.80	7.32
20	36.612	0.388	0.372	0.016	4.28	10.13	8.81
21	34.919	0.387	0.360	0.027	7.55	12.36	9.10
22	43.118	0.393	0.359	0.034	9.45	12.42	7.37
23	48.053	0.397	0.357	0.040	11.31	13.85	7.18
24	42.391	0.393	0.355	0.038	10.63	13.55	7.60
25	43.645	0.395	0.356	0.039	10.86	13.75	7.62
26	37.406	0.396	0.359	0.036	10.14	13.44	8.01
27	49.547	0.395	0.362	0.033	9.15	11.77	6.78
28	44.615	0.396	0.356	0.040	11.32	13.87	7.20
29	51.774	0.396	0.357	0.039	10.85	13.16	6.71
30	50.045	0.393	0.360	0.034	9.32	11.82	6.65
31	73.783	0.374	0.357	0.017	4.72	8.06	6.24
32	48.158	0.371	0.355	0.016	4.50	9.28	7.77
33	44.595	0.373	0.356	0.017	4.65	9.60	8.03
34	45.940	0.372	0.357	0.014	4.04	9.01	7.74
35	57.855	0.373	0.355	0.018	5.00	8.66	6.74
36	34.653	0.370	0.356	0.014	3.96	11.14	10.02
37	58.770	0.374	0.357	0.018	4.95	8.68	6.79
38	60.905	0.373	0.356	0.018	4.93	8.58	6.70
39	47.157	0.374	0.357	0.017	4.63	9.48	7.91
40	56.941	0.375	0.357	0.018	5.18	8.86	6.84

Results for Gini calibrated expanded prediction composite estimator

OCAR - CCAR

domain	size	mean	true value	bias	rel. bias%	rrmse%	cv%
1	38.866	0.365	0.372	-0.007	-1.79	7.33	7.24
2	53.670	0.365	0.369	-0.004	-1.10	6.01	5.97
3	39.183	0.367	0.371	-0.004	-0.98	7.27	7.28
4	46.460	0.369	0.372	-0.002	-0.64	6.68	6.70
5	54.658	0.370	0.371	-0.001	-0.32	5.99	6.01
6	57.760	0.373	0.374	-0.001	-0.29	5.47	5.48
7	40.296	0.370	0.372	-0.002	-0.65	7.36	7.38
8	50.901	0.371	0.371	0.000	0.13	6.27	6.26
9	53.119	0.370	0.370	-0.000	-0.03	6.16	6.16
10	56.887	0.373	0.374	-0.001	-0.27	5.82	5.83
11	48.582	0.381	0.375	0.006	1.73	6.65	6.32
12	53.683	0.378	0.374	0.004	0.95	6.37	6.25
13	55.992	0.381	0.374	0.008	2.02	6.15	5.69
14	64.189	0.381	0.374	0.007	1.78	5.81	5.43
15	63.945	0.383	0.374	0.009	2.31	6.29	5.72
16	62.841	0.381	0.374	0.007	1.84	5.80	5.41
17	49.620	0.381	0.375	0.006	1.54	6.51	6.23
18	48.614	0.382	0.375	0.007	1.92	6.59	6.18
19	49.848	0.380	0.377	0.003	0.81	6.74	6.64
20	36.612	0.380	0.372	0.008	2.09	8.23	7.80
21	34.919	0.375	0.360	0.015	4.10	9.35	8.08
22	43.118	0.378	0.359	0.019	5.31	8.88	6.76
23	48.053	0.381	0.357	0.024	6.77	9.43	6.15
24	42.391	0.377	0.355	0.022	6.32	9.57	6.76
25	43.645	0.380	0.356	0.023	6.53	9.62	6.63
26	37.406	0.381	0.359	0.021	5.85	9.74	7.36
27	49.547	0.381	0.362	0.020	5.41	8.36	6.06
28	44.615	0.381	0.356	0.025	6.94	9.69	6.33

29	51.774	0.380	0.357	0.023	6.41	8.99	5.92
30	50.045	0.379	0.360	0.020	5.44	8.31	5.96
31	73.783	0.367	0.357	0.010	2.71	6.05	5.27
32	48.158	0.363	0.355	0.008	2.15	7.13	6.65
33	44.595	0.364	0.356	0.008	2.20	7.24	6.75
34	45.940	0.364	0.357	0.007	1.97	7.16	6.75
35	57.855	0.365	0.355	0.010	2.80	6.59	5.81
36	34.653	0.362	0.356	0.006	1.62	8.67	8.38
37	58.770	0.366	0.357	0.009	2.64	6.47	5.76
38	60.905	0.365	0.356	0.010	2.70	6.55	5.81
39	47.157	0.366	0.357	0.008	2.25	7.39	6.89
40	56.941	0.367	0.357	0.010	2.94	6.68	5.83

C.6. Results for QSR

In this section, we compare results (bias and accuracy) for QSR. Estimators are Direct (Default) estimator and the following Indirect model-based estimators: - log expanded prediction estimator - Composite estimator (Default and log expanded prediction estimator) - Calibrated expanded prediction estimator - Composite estimator (Default and calibrated expanded prediction estimator) Underlying model: Linear mixed model with domain-specific random intercepts. Unequal probability sampling design (PPS). Contamination: OCAR-CCAR / None.

C.6.1. QSR in Amelia

Results for Direct (default) QSR estimator

domain	size	mean	true value	bias	rel. bias%	rrmse%	cv%
1	38.866	0.102	0.095	0.007	6.87	48.49	44.94
2	53.670	0.102	0.098	0.005	4.68	39.50	37.49
3	39.183	0.103	0.096	0.007	7.02	46.12	42.62
4	46.460	0.101	0.097	0.005	4.71	40.75	38.68
5	54.658	0.101	0.097	0.004	4.42	40.04	38.13
6	57.760	0.099	0.094	0.005	4.87	39.20	37.11
7	40.296	0.100	0.095	0.005	5.06	45.38	42.95
8	50.901	0.100	0.096	0.004	4.32	41.55	39.63
9	53.119	0.100	0.098	0.002	2.35	40.76	39.77
10	56.887	0.099	0.094	0.004	4.45	37.44	35.61
11	48.582	0.094	0.090	0.004	4.86	46.48	44.10
12	53.683	0.095	0.090	0.004	4.65	44.47	42.28
13	55.992	0.093	0.090	0.003	3.56	42.17	40.60
14	64.189	0.094	0.090	0.005	5.04	40.76	38.53
15	63.945	0.092	0.090	0.002	2.46	39.10	38.11
16	62.841	0.094	0.091	0.003	3.47	40.21	38.74
17	49.620	0.093	0.088	0.005	5.31	47.22	44.57
18	48.614	0.096	0.090	0.006	6.45	44.87	41.73
19	49.848	0.092	0.087	0.005	6.00	49.87	46.73
20	36.612	0.096	0.090	0.006	6.28	53.56	50.07
21	34.919	0.120	0.115	0.005	4.11	44.56	42.63
22	43.118	0.124	0.117	0.007	5.63	39.96	37.47
23	48.053	0.125	0.120	0.005	4.14	35.06	33.45
24	42.391	0.127	0.122	0.005	4.14	39.35	37.60
25	43.645	0.124	0.120	0.004	3.27	35.95	34.68
26	37.406	0.123	0.119	0.005	3.95	40.92	39.20
27	49.547	0.121	0.116	0.005	4.52	36.89	35.05
28	44.615	0.124	0.120	0.003	2.89	35.20	34.11
29	51.774	0.125	0.119	0.006	5.16	35.36	33.28
30	50.045	0.122	0.117	0.005	4.45	36.69	34.89
31	73.783	0.110	0.109	0.001	1.06	33.14	32.79
32	48.158	0.116	0.111	0.005	4.53	41.84	39.81
33	44.595	0.117	0.111	0.006	5.40	43.37	40.85
34	45.940	0.113	0.109	0.004	3.26	44.32	42.82
35	57.855	0.115	0.113	0.003	2.35	37.34	36.43
36	34.653	0.117	0.112	0.005	4.71	49.16	46.75
37	58.770	0.114	0.110	0.004	3.48	37.43	36.03
38	60.905	0.115	0.111	0.005	4.10	38.97	37.24
39	47.157	0.116	0.111	0.005	4.86	42.70	40.47
40	56.941	0.113	0.111	0.003	2.43	37.80	36.84

Results for log expanded prediction QSR estimator

OCAR - CCAR

domain	size	mean	true value	bias	rel. bias%	rrmse%	cv%
1	38.866	0.104	0.095	0.008	8.75	13.47	9.42
2	53.670	0.105	0.098	0.007	6.95	12.27	9.46
3	39.183	0.100	0.096	0.004	4.25	10.57	9.30
4	46.460	0.100	0.097	0.003	3.51	10.25	9.31
5	54.658	0.101	0.097	0.004	4.16	10.53	9.29
6	57.760	0.099	0.094	0.005	4.99	11.18	9.53
7	40.296	0.099	0.095	0.004	3.71	10.53	9.50
8	50.901	0.099	0.096	0.003	2.93	10.18	9.48
9	53.119	0.100	0.098	0.003	2.80	10.04	9.38
10	56.887	0.099	0.094	0.004	4.76	11.00	9.48
11	48.582	0.095	0.090	0.005	5.11	11.82	10.15
12	53.683	0.097	0.090	0.006	7.07	12.86	10.04
13	55.992	0.095	0.090	0.005	5.76	12.16	10.13
14	64.189	0.095	0.090	0.005	5.59	12.07	10.13
15	63.945	0.094	0.090	0.004	4.41	11.54	10.22
16	62.841	0.095	0.091	0.004	4.51	11.47	10.09
17	49.620	0.095	0.088	0.007	7.76	13.34	10.07
18	48.614	0.094	0.090	0.004	4.56	11.56	10.17
19	49.848	0.097	0.087	0.010	11.27	15.96	10.15
20	36.612	0.094	0.090	0.003	3.62	11.19	10.23
21	34.919	0.099	0.115	-0.016	-14.30	16.62	9.90
22	43.118	0.097	0.117	-0.019	-16.63	18.57	9.93
23	48.053	0.095	0.120	-0.025	-20.69	22.26	10.35
24	42.391	0.097	0.122	-0.025	-20.76	22.25	10.12
25	43.645	0.096	0.120	-0.024	-19.70	21.28	10.04
26	37.406	0.095	0.119	-0.024	-19.99	21.60	10.23
27	49.547	0.098	0.116	-0.018	-15.65	17.75	9.95
28	44.615	0.095	0.120	-0.025	-20.81	22.33	10.23
29	51.774	0.096	0.119	-0.023	-19.11	20.80	10.17
30	50.045	0.097	0.117	-0.020	-16.75	18.72	10.05
31	73.783	0.104	0.109	-0.005	-4.93	10.28	9.49
32	48.158	0.104	0.111	-0.006	-5.82	10.85	9.73
33	44.595	0.103	0.111	-0.008	-7.13	11.34	9.50
34	45.940	0.103	0.109	-0.006	-5.42	10.48	9.49
35	57.855	0.104	0.113	-0.009	-7.73	11.81	9.68
36	34.653	0.103	0.112	-0.008	-7.57	11.72	9.68
37	58.770	0.103	0.110	-0.006	-5.78	10.64	9.48
38	60.905	0.103	0.111	-0.007	-6.72	11.22	9.64
39	47.157	0.103	0.111	-0.008	-7.20	11.55	9.74
40	56.941	0.102	0.111	-0.008	-7.42	11.59	9.63

Results for log expanded prediction composite QSR estimator

OCAR - CCAR

domain	size	mean	true value	bias	rel. bias%	rrmse%	cv%
1	38.866	0.103	0.095	0.008	8.44	15.88	12.42
2	53.670	0.104	0.098	0.006	6.51	14.20	11.85
3	39.183	0.101	0.096	0.004	4.56	13.51	12.17
4	46.460	0.100	0.097	0.003	3.54	12.37	11.45
5	54.658	0.101	0.097	0.004	4.23	12.47	11.26
6	57.760	0.099	0.094	0.005	4.99	12.94	11.38
7	40.296	0.099	0.095	0.004	4.00	13.15	12.05
8	50.901	0.099	0.096	0.003	3.19	12.86	12.08
9	53.119	0.100	0.098	0.003	2.58	12.25	11.68
10	56.887	0.099	0.094	0.004	4.63	12.45	11.05
11	48.582	0.095	0.090	0.005	5.10	14.64	13.06
12	53.683	0.096	0.090	0.006	6.66	14.89	12.49
13	55.992	0.094	0.090	0.005	5.14	13.79	12.18
14	64.189	0.095	0.090	0.005	5.47	13.67	11.89
15	63.945	0.094	0.090	0.004	3.99	13.43	12.34
16	62.841	0.095	0.091	0.004	4.24	13.09	11.88
17	49.620	0.095	0.088	0.007	7.38	15.69	12.90
18	48.614	0.094	0.090	0.004	4.93	14.13	12.62
19	49.848	0.096	0.087	0.009	10.16	17.73	13.20
20	36.612	0.094	0.090	0.004	4.06	15.01	13.89
21	34.919	0.103	0.115	-0.012	-10.79	16.10	13.40
22	43.118	0.103	0.117	-0.014	-12.34	16.50	12.50
23	48.053	0.101	0.120	-0.019	-15.70	18.88	12.44
24	42.391	0.103	0.122	-0.019	-15.80	19.14	12.85
25	43.645	0.102	0.120	-0.018	-15.33	18.50	12.23

26	37.406	0.100	0.119	-0.018	-15.31	19.01	13.32
27	49.547	0.102	0.116	-0.013	-11.58	15.88	12.29
28	44.615	0.101	0.120	-0.019	-16.21	19.18	12.25
29	51.774	0.102	0.119	-0.017	-14.20	17.55	12.04
30	50.045	0.102	0.117	-0.015	-12.52	16.53	12.35
31	73.783	0.105	0.109	-0.004	-3.79	10.85	10.57
32	48.158	0.107	0.111	-0.004	-3.69	12.49	12.39
33	44.595	0.106	0.111	-0.005	-4.90	12.83	12.48
34	45.940	0.105	0.109	-0.004	-3.66	12.66	12.58
35	57.855	0.106	0.113	-0.006	-5.64	12.36	11.66
36	34.653	0.106	0.112	-0.006	-5.39	13.52	13.11
37	58.770	0.105	0.110	-0.004	-3.93	11.64	11.41
38	60.905	0.106	0.111	-0.005	-4.45	12.24	11.94
39	47.157	0.105	0.111	-0.005	-4.70	13.01	12.73
40	56.941	0.104	0.111	-0.006	-5.53	12.26	11.59

Results for calibrated expanded prediction QSR estimator

OCAR - CCAR

domain	size	mean	true value	bias	rel. bias%	rrmse%	cv%
1	38.866	0.116	0.095	0.021	22.19	42.11	29.31
2	53.670	0.115	0.098	0.017	17.62	31.48	22.19
3	39.183	0.114	0.096	0.018	18.84	37.98	27.76
4	46.460	0.113	0.097	0.016	16.85	34.52	25.79
5	54.658	0.113	0.097	0.016	17.06	31.17	22.30
6	57.760	0.110	0.094	0.016	16.89	28.96	20.14
7	40.296	0.112	0.095	0.017	17.55	37.33	28.05
8	50.901	0.109	0.096	0.013	13.46	29.78	23.42
9	53.119	0.112	0.098	0.014	14.72	29.76	22.56
10	56.887	0.110	0.094	0.015	16.36	30.18	21.80
11	48.582	0.106	0.090	0.016	17.89	35.54	26.06
12	53.683	0.109	0.090	0.019	20.83	35.49	23.80
13	55.992	0.106	0.090	0.016	18.09	32.31	22.68
14	64.189	0.106	0.090	0.016	17.94	30.38	20.79
15	63.945	0.105	0.090	0.015	16.36	28.90	20.49
16	62.841	0.106	0.091	0.015	16.21	29.34	21.06
17	49.620	0.106	0.088	0.017	19.53	34.56	23.86
18	48.614	0.104	0.090	0.014	16.12	33.24	25.05
19	49.848	0.107	0.087	0.020	23.51	38.63	24.83
20	36.612	0.106	0.090	0.016	17.23	40.20	30.99
21	34.919	0.113	0.115	-0.002	-2.10	29.41	29.98
22	43.118	0.110	0.117	-0.007	-5.70	24.60	25.39
23	48.053	0.106	0.120	-0.013	-11.23	24.61	24.68
24	42.391	0.110	0.122	-0.012	-9.94	25.51	26.10
25	43.645	0.108	0.120	-0.012	-10.24	26.14	26.81
26	37.406	0.107	0.119	-0.011	-9.46	28.02	29.14
27	49.547	0.108	0.116	-0.008	-6.52	22.80	23.39
28	44.615	0.107	0.120	-0.014	-11.41	24.95	25.06
29	51.774	0.107	0.119	-0.012	-10.45	22.74	22.57
30	50.045	0.110	0.117	-0.007	-6.28	23.02	23.64
31	73.783	0.115	0.109	0.005	4.85	20.06	18.57
32	48.158	0.115	0.111	0.004	3.68	23.60	22.50
33	44.595	0.115	0.111	0.004	3.39	25.90	24.85
34	45.940	0.116	0.109	0.007	6.47	26.63	24.28
35	57.855	0.114	0.113	0.002	1.45	20.64	20.30
36	34.653	0.117	0.112	0.005	4.85	33.44	31.57
37	58.770	0.114	0.110	0.004	3.70	21.10	20.04
38	60.905	0.114	0.111	0.003	2.78	20.78	20.04
39	47.157	0.115	0.111	0.004	3.81	25.96	24.74
40	56.941	0.112	0.111	0.002	1.64	21.89	21.48

Results for calibrated expanded prediction composite QSR estimator

OCAR - CCAR

domain	size	mean	true value	bias	rel. bias%	rrmse%	cv%
1	38.866	0.113	0.095	0.018	18.83	36.78	26.60
2	53.670	0.112	0.098	0.015	14.84	28.44	21.13
3	39.183	0.112	0.096	0.015	16.08	33.54	25.37
4	46.460	0.110	0.097	0.014	13.99	30.37	23.67
5	54.658	0.110	0.097	0.014	14.02	27.57	20.84

6	57.760	0.107	0.094	0.013	14.16	26.14	19.25
7	40.296	0.109	0.095	0.014	14.76	33.02	25.75
8	50.901	0.107	0.096	0.011	11.24	27.01	22.09
9	53.119	0.109	0.098	0.011	11.73	26.51	21.29
10	56.887	0.107	0.094	0.013	13.51	26.59	20.18
11	48.582	0.104	0.090	0.013	14.97	31.50	24.12
12	53.683	0.106	0.090	0.015	17.06	31.72	22.85
13	55.992	0.103	0.090	0.013	14.65	28.51	21.35
14	64.189	0.103	0.090	0.013	14.90	27.43	20.06
15	63.945	0.102	0.090	0.012	13.24	25.93	19.70
16	62.841	0.103	0.091	0.012	13.18	26.52	20.34
17	49.620	0.103	0.088	0.014	16.38	31.11	22.73
18	48.614	0.103	0.090	0.013	13.95	29.90	23.22
19	49.848	0.104	0.087	0.017	19.54	34.80	24.10
20	36.612	0.104	0.090	0.013	14.67	36.30	28.97
21	34.919	0.114	0.115	-0.001	-0.81	26.53	26.75
22	43.118	0.113	0.117	-0.004	-3.34	22.21	22.73
23	48.053	0.110	0.120	-0.009	-7.77	21.56	21.81
24	42.391	0.113	0.122	-0.008	-6.84	22.91	23.48
25	43.645	0.111	0.120	-0.009	-7.32	22.99	23.53
26	37.406	0.111	0.119	-0.008	-6.53	24.85	25.67
27	49.547	0.111	0.116	-0.005	-4.16	20.41	20.86
28	44.615	0.110	0.120	-0.010	-8.34	21.84	22.03
29	51.774	0.111	0.119	-0.008	-6.98	20.07	20.24
30	50.045	0.112	0.117	-0.005	-3.92	20.82	21.29
31	73.783	0.113	0.109	0.004	3.84	17.89	16.83
32	48.158	0.115	0.111	0.004	3.94	22.27	21.10
33	44.595	0.115	0.111	0.004	3.52	23.76	22.71
34	45.940	0.116	0.109	0.006	5.82	24.34	22.35
35	57.855	0.114	0.113	0.002	1.64	19.37	19.00
36	34.653	0.117	0.112	0.005	4.47	30.33	28.72
37	58.770	0.114	0.110	0.004	3.57	19.88	18.90
38	60.905	0.114	0.111	0.003	3.09	19.83	19.01
39	47.157	0.115	0.111	0.004	4.06	23.92	22.66
40	56.941	0.112	0.111	0.002	1.78	20.29	19.87

Appendix D.

Appendix UT

D.1. AMELI Simulation: ARPR, RMPG, QSR, GINI and MEAN @ AMELIA for Design 1.2

D.1.1. Estimator Specifications

`Specifications:` Design based estimators of Laeken indicators: ARPR, RMPG, QSR, GINI and MEAN. Variance estimators based on linearization and resampling methods.

`Comments:`

D.1.2. Sampling Designs, Statistics and Variance Estimation Methods

Design 1.2

Scope of statistic and vest.methods

statistic	vest.methods	vest.methods	vest.methods
ARPR	naive	boot	dgjk
RMPG	naive	boot	dgjk
QSR	naive	boot	dgjk
GINI	naive	boot	dgjk
MEAN	naive	boot	dgjk

D.1.3. Results

In this section, we summarize the performance of the estimators due to numerical criteria.

D.1.4. Point Estimator

Table D.1.: Criteria Point and Variance Estimates

tmp1	biasT	relbiasT%	madT	medeT
ARPR	$3.0056e-06*$	$1.0905e-03*$	$4.9769e-03$	$-2.9534e-06*$
RMPG	$1.1487e-04$	$2.3146e-02$	$1.5089e-02$	$1.6690e-04$
QSR	$2.0875e-02$	$1.6061e-01$	$5.9261e-01$	$1.9239e-03$
GINI	$2.3083e-04$	$5.8431e-02$	$4.2935e-03*$	$1.4299e-04$
MEAN	$1.6818e+00$	$5.9067e-03$	$3.0541e+02$	$-3.5813e+00$

	rmseT	relrmseT%	medaeT	relmaxeT%
ARPR	$5.0030e-03$	$6.5861e+00$	$4.9754e-03$	$7.4309e+01$
RMPG	$1.5020e-02$	$6.0980e+00$	$1.5102e-02$	$5.5572e+01*$
QSR	$5.8576e-01$	$3.4675e-01$	$5.9254e-01$	$1.4338e+03$
GINI	$4.3300e-03*$	$2.7746e+00$	$4.2909e-03*$	$6.2037e+01$
MEAN	$3.1147e+02$	$3.8422e-05*$	$3.0528e+02$	$2.9790e+06$

D.1.5. Direct Variance Estimation Methods

Naive

Table D.2.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$-7.5861e-08*$	$-3.0305e-01*$	$3.4165e-07*$	$-1.0525e-07*$
RMPG	$-6.1346e-06$	$-2.7191e+00$	$1.3401e-05$	$-6.8439e-06$
QSR	$-3.1532e-03$	$-9.2006e-01$	$6.1266e-02$	$-1.0559e-02$
GINI	$-3.2500e-07$	$-1.7382e+00$	$2.0445e-06$	$-7.1796e-07$
MEAN	$-1.0850e+03$	$-1.1183e+00$	$6.9305e+03$	$-2.0359e+03$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$3.6664e-07*$	$5.8510e+04$	$3.6972e-07*$	$7.4013e+00*$
RMPG	$1.4816e-05$	$2.9107e+04$	$1.5444e-05$	$3.2047e+01$
QSR	$6.4029e-02$	$5.4514e+01$	$6.3424e-02$	$1.2092e+02$
GINI	$2.4054e-06$	$6.8804e+05$	$2.3454e-06$	$1.1470e+02$
MEAN	$7.7654e+03$	$8.2501e-05*$	$7.5990e+03$	$6.7479e+01$

Table D.3.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$1.9583e-02$	$9.5070e-01$
RMPG	$5.8047e-02$	$9.4640e-01$
QSR	$2.2745e+00$	$9.4620e-01$
GINI	$1.6770e-02*$	$9.4440e-01*$
MEAN	$1.2132e+03$	$9.4850e-01$

Resampling Methods

Boot

Table D.4.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$8.5536e-07$	$3.4170e+00$	$3.8154e-06$	$6.1996e-07*$
RMPG	$1.1127e-05$	$4.9318e+00$	$6.4392e-05$	$3.3863e-06$
QSR	$1.2917e-03$	$3.7710e-01*$	$7.9398e-02$	$-9.1162e-03$
GINI	$-2.8272e-07*$	$-1.5121e+00$	$3.3259e-06*$	$-6.7598e-07$
MEAN	$-9.9296e+02$	$-1.0235e+00$	$1.4967e+04$	$-2.2665e+03$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$4.0368e-06$	$6.4421e+05$	$3.7735e-06$	$1.1434e+02*$
RMPG	$6.6833e-05$	$1.3130e+05$	$6.3549e-05$	$1.6237e+02$
QSR	$8.4367e-02$	$7.1903e+01$	$8.2198e-02$	$1.4572e+02$
GINI	$3.6085e-06*$	$1.0322e+06$	$3.4639e-06*$	$1.5180e+02$
MEAN	$1.5630e+04$	$1.6606e-04*$	$1.5414e+04$	$1.3497e+02$

Table D.5.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$1.9888e-02$	$9.5100e-01$
RMPG	$5.9744e-02$	$9.4410e-01$
QSR	$2.2820e+00$	$9.4280e-01$
GINI	$1.6745e-02*$	$9.4240e-01*$
MEAN	$1.2108e+03$	$9.4620e-01$

Dgjk

Table D.6.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$4.2549e-07*$	$1.6997e+00*$	$5.4072e-06$	$-3.2138e-06*$
RMPG	$4.6792e-05$	$2.0740e+01$	$1.5087e-04$	$-2.8064e-05$
QSR	$-8.8862e-02$	$-2.5942e+01$	$5.7090e-02$	$-9.6367e-02$
GINI	$-6.2721e-06$	$-3.3545e+01$	$2.1647e-06*$	$-6.5451e-06$
MEAN	$-3.0674e+04$	$-3.1617e+01$	$1.0245e+04$	$-3.1529e+04$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$1.2914e-05$	$2.0608e+06$	$8.0674e-06*$	$6.9680e+02$
RMPG	$2.5561e-04$	$5.0217e+05$	$1.6900e-04$	$1.5159e+03$
QSR	$1.0723e-01$	$9.1384e+01$	$1.4428e-01$	$1.0782e+02$
GINI	$6.7025e-06*$	$1.9172e+06$	$9.7058e-06$	$6.4673e+01$
MEAN	$3.2449e+04$	$3.4474e-04*$	$4.6745e+04$	$6.2680e+01*$

Table D.7.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$1.9369e-02$	$9.3310e-01$
RMPG	$5.9716e-02$	$8.8990e-01$
QSR	$1.9610e+00$	$9.0430e-01$
GINI	$1.3758e-02*$	$8.8480e-01*$
MEAN	$1.0065e+03$	$8.9210e-01$

D.1.6. Comments, Notation and Specifications

`Notation: (1) stars (i.e., *) in the tables denote the minimum/minima; (2) "Inf" denotes infinity`

D.1.7. Nomenclatura

Criteria

`avgT:` average of the point estimate

`varT:` variance of the point estimate

`biasT:` bias of the point estimate

`relbiasT:` relative bias of the point estimate

`medT:` median of the point estimate

`mad:` median absolute deviation about the median point-estimate (with consistency correction for the normal)

`mede:` median error of the point estimate (with consistency correction for the normal)

`rmseT:` root mean square errof of the point estimate

`relrmseT:` relative root mean square error of the point estimate

`medaeT:` maximum absolute error of the point estimate (with consistency correction for the normal)

`relmaxeT:` maximum absoulte relative error of the point estimate

Note that all criteria also pertain to the variance estimates. In this respect, one has to subsitute a "V" for the "T" in the name of the respective criterion.

D.2. AMELI Simulation: ARPR, RMPG, QSR, GINI and MEAN @ AMELIA for Design 1.4a

D.2.1. Estimator Specifications

`Specifications:` Design based estimators of Laeken indicators: ARPR, RMPG, QSR, GINI and MEAN. Variance estimators based on linearization and resampling methods.

`Comments:`

D.2.2. Sampling Designs, Statistics and Variance Estimation Methods

Design 1.4a

Scope of statistic and vest.methods

statistic	vest.methods	vest.methods	vest.methods	vest.methods
ARPR	naive	boot	dgjk	rbrr
RMPG	naive	boot	dgjk	rbrr
QSR	naive	boot	dgjk	rbrr
GINI	naive	boot	dgjk	rbrr
MEAN	naive	boot	dgjk	rbrr

D.2.3. Results

In this section, we summarize the performance of the estimators due to numerical criteria.

D.2.4. Point Estimator

Table D.8.: Criteria Point and Variance Estimates

tmp1	biasT	relbiasT%	madT	medeT
ARPR	$-1.1669e-04$	$-4.2337e-02$	$5.0126e-03$	$-1.3105e-04$
RMPG	$-7.7166e-06*$	$-1.5548e-03*$	$1.4771e-02$	$1.9035e-05*$
QSR	$5.0312e-03$	$3.8709e-02$	$5.6790e-01$	$-1.7848e-02$
GINI	$1.6361e-04$	$4.1415e-02$	$4.2830e-03*$	$1.0579e-04$
MEAN	$7.2469e-01$	$2.5453e-03$	$2.8705e+02$	$-4.5760e+00$
	rmseT	relrmseT%	medaeT	relmaxeT%
ARPR	$5.0159e-03$	$6.6030e+00$	$5.0110e-03$	$7.4506e+01$
RMPG	$1.4850e-02$	$6.0290e+00$	$1.4770e-02$	$5.6411e+01*$
QSR	$5.7113e-01$	$3.3809e-01$	$5.6948e-01$	$1.4818e+03$
GINI	$4.2209e-03*$	$2.7047e+00$	$4.2720e-03*$	$6.1942e+01$
MEAN	$2.8912e+02$	$3.5664e-05*$	$2.8782e+02$	$2.9554e+06$

D.2.5. Direct Variance Estimation Methods

Naive

Table D.9.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$-4.5763e-07$	$-1.8197e+00$	$3.9556e-07*$	$-4.8776e-07$
RMPG	$-1.6186e-06$	$-7.3391e-01$	$1.2989e-05$	$-2.3928e-06$
QSR	$2.9675e-03$	$9.0976e-01$	$5.7225e-02$	$-3.9997e-03$
GINI	$1.1747e-07*$	$6.6028e-01*$	$2.1295e-06$	$-2.9853e-07*$
MEAN	$1.0468e+03$	$1.2522e+00$	$6.8243e+03$	$-9.5826e+00$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$6.1718e-07*$	$9.7588e+04$	$7.5122e-07*$	$1.0122e+01*$
RMPG	$1.3372e-05$	$2.7492e+04$	$1.3516e-05$	$2.7526e+01$
QSR	$6.0395e-02$	$5.6762e+01$	$5.8026e-02$	$1.2074e+02$
GINI	$2.4385e-06$	$7.7045e+05$	$2.2154e-06$	$1.2136e+02$
MEAN	$7.6348e+03$	$1.0925e-04*$	$6.8250e+03$	$7.7992e+01$

Table D.10.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$1.9478e-02$	$9.4700e-01*$
RMPG	$5.7975e-02$	$9.4790e-01$
QSR	$2.2399e+00$	$9.5260e-01$
GINI	$1.6553e-02*$	$9.5090e-01$
MEAN	$1.1394e+03$	$9.5070e-01$

Resampling Methods

Boot

Table D.11.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$4.2908e-07$	$1.7062e+00$	$3.8421e-06$	$1.7172e-07$
RMPG	$1.5270e-05$	$6.9235e+00$	$6.3356e-05$	$8.7375e-06$
QSR	$9.5023e-03$	$2.9131e+00$	$7.5783e-02$	$6.6664e-04$
GINI	$2.6674e-07*$	$1.4993e+00*$	$3.3078e-06*$	$-8.0760e-08*$
MEAN	$4.1123e+03$	$4.9193e+00$	$1.4188e+04$	$2.9434e+03$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$3.9462e-06$	$6.2397e+05$	$3.8384e-06$	$8.7764e+01*$
RMPG	$6.6638e-05$	$1.3700e+05$	$6.2011e-05$	$1.6492e+02$
QSR	$8.0108e-02$	$7.5289e+01$	$7.5582e-02$	$1.5027e+02$
GINI	$3.5504e-06*$	$1.1218e+06$	$3.3285e-06*$	$1.4481e+02$
MEAN	$1.5196e+04$	$2.1745e-04*$	$1.4003e+04$	$1.1483e+02$

Table D.12.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$1.9767e-02$	$9.4910e-01$
RMPG	$5.9640e-02$	$9.4750e-01*$
QSR	$2.2558e+00$	$9.5180e-01$
GINI	$1.6581e-02*$	$9.4770e-01$
MEAN	$1.1570e+03$	$9.5260e-01$

Dgjk

Table D.13.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$2.5431e-07*$	$1.0113e+00*$	$5.4359e-06$	$-3.3266e-06*$
RMPG	$4.7929e-05$	$2.1732e+01$	$1.5084e-04$	$-2.6432e-05$
QSR	$-7.3325e-02$	$-2.2479e+01$	$5.5522e-02$	$-8.0533e-02$
GINI	$-5.3456e-06$	$-3.0047e+01$	$2.1777e-06*$	$-5.6323e-06$
MEAN	$-1.7297e+04$	$-2.0691e+01$	$1.0654e+04$	$-1.8069e+04$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$1.2636e-05$	$1.9979e+06$	$8.1507e-06*$	$8.7301e+02$
RMPG	$2.5071e-04$	$5.1543e+05$	$1.6898e-04$	$1.3227e+03$
QSR	$9.4023e-02$	$8.8367e+01$	$1.2228e-01$	$8.4417e+01$
GINI	$5.8562e-06*$	$1.8503e+06$	$8.3645e-06$	$6.8929e+01$
MEAN	$2.0425e+04$	$2.9228e-04*$	$2.6976e+04$	$5.7646e+01*$

Table D.14.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$1.9357e-02$	$9.3050e-01$
RMPG	$5.9240e-02$	$8.9470e-01*$
QSR	$1.9583e+00$	$9.1220e-01$
GINI	$1.3768e-02*$	$8.9940e-01$
MEAN	$1.0060e+03$	$9.1670e-01$

Rbrr

Table D.15.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$7.5944e-07$	$3.0199e+00$	$3.4582e-06$	$4.9003e-07$
RMPG	$1.8252e-05$	$8.2757e+00$	$6.2923e-05$	$1.0665e-05$
QSR	$6.0647e-03$	$1.8593e+00$	$7.0980e-02$	$-3.7911e-03$
GINI	$1.5051e-07*$	$8.4603e-01*$	$2.8797e-06*$	$-2.3403e-07*$
MEAN	$9.5144e+02$	$1.1381e+00$	$1.2378e+04$	$4.2865e+01$

	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$3.6366e-06$	$5.7502e+05$	$3.4370e-06$	$9.9964e+01$
RMPG	$6.7851e-05$	$1.3950e+05$	$6.1821e-05$	$1.9838e+02$
QSR	$7.5871e-02$	$7.1307e+01$	$7.2488e-02$	$1.3607e+02$
GINI	$3.2023e-06*$	$1.0118e+06$	$2.9332e-06*$	$1.2960e+02$
MEAN	$1.2847e+04$	$1.8384e-04*$	$1.2369e+04$	$8.3168e+01*$

Table D.16.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$1.9906e-02$	$9.5080e-01$
RMPG	$6.0024e-02$	$9.4880e-01$
QSR	$2.2455e+00$	$9.5110e-01$
GINI	$1.6542e-02*$	$9.4870e-01*$
MEAN	$1.1366e+03$	$9.4910e-01$

D.2.6. Comments, Notation and Specifications

`Notation: (1) stars (i.e., *) in the tables denote the minimum/minima; (2) "Inf" denotes infinity`

D.2.7. Nomenclatura

Criteria

`avgT:` average of the point estimate

`varT:` variance of the point estimate

`biasT:` bias of the point estimate

`relbiasT:` relative bias of the point estimate

`medT:` median of the point estimate

`mad:` median absolute deviation about the median point-estimate (with consistency correction for the normal)

`mede:` median error of the point estimate (with consistency correction for the normal)

`rmseT:` root mean square errof of the point estimate

`relrmseT:` relative root mean square error of the point estimate

`medaeT:` maximum absolute error of the point estimate (with consistency correction for the normal)

`relmaxeT:` maximum absoulte relative error of the point estimate

Note that all criteria also pertain to the variance estimates. In this respect, one has to subsitute a "V" for the "T" in the name of the respective criterion.

D.3. AMELI Simulation: ARPR, RMPG, QSR, GINI and MEAN @ AMELIA for Design 1.5a

D.3.1. Estimator Specifications

`Specifications:` Design based estimators of Laeken indicators: ARPR, RMPG, QSR, GINI and MEAN. Variance estimators based on linearization and resampling methods.

`Comments:`

D.3.2. Sampling Designs, Statistics and Variance Estimation Methods

Design 1.5a

Scope of statistic and vest.methods

statistic	vest.methods	vest.methods	vest.methods	vest.methods	vest.methods
ARPR	naive	approx1	approx2	approx3	approx4
RMPG	naive	approx1	approx2	approx3	approx4
QSR	naive	approx1	approx2	approx3	approx4
GINI	naive	approx1	approx2	approx3	approx4
MEAN	naive	approx1	approx2	approx3	approx4

statistic	vest.methods	vest.methods	vest.methods	vest.methods	vest.methods
ARPR	approx5	berger	brewer1	brewer2	brewer3
RMPG	approx5	berger	brewer1	brewer2	brewer3
QSR	approx5	berger	brewer1	brewer2	brewer3
GINI	approx5	berger	brewer1	brewer2	brewer3
MEAN	approx5	berger	brewer1	brewer2	brewer3

statistic	vest.methods	vest.methods	vest.methods	vest.methods	vest.methods
ARPR	brewer4	deville1	deville2	deville3	fix
RMPG	brewer4	deville1	deville2	deville3	fix
QSR	brewer4	deville1	deville2	deville3	fix
GINI	brewer4	deville1	deville2	deville3	fix
MEAN	brewer4	deville1	deville2	deville3	fix

statistic	vest.methods	vest.methods	vest.methods	vest.methods
ARPR	rose	boot	dgjk	rbrr
RMPG	rose	boot	dgjk	rbrr
QSR	rose	boot	dgjk	rbrr
GINI	rose	boot	dgjk	rbrr
MEAN	rose	boot	dgjk	rbrr

D.3.3. Results

In this section, we summarize the performance of the estimators due to numerical criteria.

D.3.4. Point Estimator

Table D.17.: Criteria Point and Variance Estimates

tmp1	biasT	relbiasT%	madT	medeT
ARPR	$-6.2239e-05$	$-2.2582e-02$	$4.4584e-03$	$-7.3575e-05$
RMPG	$2.4651e-06*$	$4.9671e-04$	$1.4490e-02$	$1.5332e-04$
QSR	$8.5432e-03$	$6.5731e-02$	$5.8267e-01$	$-1.0908e-02$
GINI	$7.5486e-05$	$1.9109e-02$	$4.0621e-03*$	$3.5037e-05*$
MEAN	$-3.9503e-02$	$-1.3874e-04*$	$2.5980e+02$	$-1.9852e-02$
	rmseT	relrmseT%	medaeT	relmaxeT%
ARPR	$4.4705e-03$	$5.8850e+00$	$4.4667e-03$	$7.4244e+01$
RMPG	$1.4567e-02$	$5.9139e+00$	$1.4505e-02$	$5.6130e+01*$
QSR	$5.8299e-01$	$3.4511e-01$	$5.8257e-01$	$1.4484e+03$
GINI	$4.0410e-03*$	$2.5895e+00$	$4.0690e-03*$	$6.1890e+01$
MEAN	$2.6116e+02$	$3.2216e-05*$	$2.5980e+02$	$2.9462e+06$

D.3.5. Direct Variance Estimation Methods

Naive

Table D.18.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$9.6438e-08*$	$4.8260e-01*$	$1.7779e-07*$	$7.9585e-08*$
RMPG	$-5.0912e-06$	$-2.3992e+00$	$1.3418e-05$	$-5.7437e-06$
QSR	$4.5618e-03$	$1.3423e+00$	$5.9532e-02$	$-1.7045e-03$
GINI	$1.2526e-07$	$7.6728e-01$	$1.7692e-06$	$-4.8950e-07$
MEAN	$2.4409e+03$	$3.5785e+00$	$5.4390e+03$	$1.0404e+03$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.1341e-07*$	$5.3443e+04$	$1.9151e-07*$	$5.2550e+00*$
RMPG	$1.4543e-05$	$3.2295e+04$	$1.5155e-05$	$2.6031e+01$
QSR	$6.2680e-02$	$5.4272e+01$	$6.0031e-02$	$1.0296e+02$
GINI	$2.8816e-06$	$1.0812e+06$	$2.0191e-06$	$1.7974e+02$
MEAN	$8.1086e+03$	$1.7428e-04*$	$5.2432e+03$	$1.1079e+02$

Table D.19.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$1.7565e-02$	$9.4950e-01$
RMPG	$5.6384e-02$	$9.4550e-01*$
QSR	$2.2913e+00$	$9.4850e-01$
GINI	$1.5850e-02*$	$9.5140e-01$
MEAN	$1.0406e+03$	$9.5320e-01$

Approximations Type 1: sample length

Brewer2

Table D.20.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$8.9135e-08*$	$4.4605e-01*$	$1.7768e-07*$	$7.2360e-08*$
RMPG	$-5.1129e-06$	$-2.4094e+00$	$1.3418e-05$	$-5.7680e-06$
QSR	$4.5843e-03$	$1.3490e+00$	$5.9531e-02$	$-1.6719e-03$
GINI	$1.2318e-07$	$7.5450e-01$	$1.7691e-06$	$-4.9191e-07$
MEAN	$2.4254e+03$	$3.5557e+00$	$5.4325e+03$	$1.0197e+03$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.1006e-07*$	$5.2604e+04$	$1.8893e-07*$	$5.2139e+00*$
RMPG	$1.4550e-05$	$3.2312e+04$	$1.5166e-05$	$2.6016e+01$
QSR	$6.2688e-02$	$5.4278e+01$	$6.0050e-02$	$1.0297e+02$
GINI	$2.8832e-06$	$1.0818e+06$	$2.0224e-06$	$1.7991e+02$
MEAN	$8.1074e+03$	$1.7426e-04*$	$5.2417e+03$	$1.1088e+02$

Table D.21.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$1.7562e-02$	$9.4950e-01$
RMPG	$5.6381e-02$	$9.4550e-01*$
QSR	$2.2914e+00$	$9.4850e-01$
GINI	$1.5849e-02*$	$9.5140e-01$
MEAN	$1.0404e+03$	$9.5320e-01$

Deville1

Table D.22.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$8.9134e-08*$	$4.4605e-01*$	$1.7768e-07*$	$7.2359e-08*$
RMPG	$-5.1129e-06$	$-2.4094e+00$	$1.3418e-05$	$-5.7680e-06$
QSR	$4.5843e-03$	$1.3490e+00$	$5.9531e-02$	$-1.6719e-03$
GINI	$1.2318e-07$	$7.5450e-01$	$1.7691e-06$	$-4.9191e-07$
MEAN	$2.4254e+03$	$3.5557e+00$	$5.4325e+03$	$1.0197e+03$

	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.1006e-07*$	$5.2604e+04$	$1.8893e-07*$	$5.2139e+00*$
RMPG	$1.4550e-05$	$3.2312e+04$	$1.5166e-05$	$2.6016e+01$
QSR	$6.2688e-02$	$5.4278e+01$	$6.0050e-02$	$1.0297e+02$
GINI	$2.8832e-06$	$1.0818e+06$	$2.0224e-06$	$1.7991e+02$
MEAN	$8.1074e+03$	$1.7426e-04*$	$5.2417e+03$	$1.1088e+02$

Table D.23.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$1.7562e-02$	$9.4950e-01$
RMPG	$5.6381e-02$	$9.4550e-01*$
QSR	$2.2914e+00$	$9.4850e-01$
GINI	$1.5849e-02*$	$9.5140e-01$
MEAN	$1.0404e+03$	$9.5320e-01$

Deville2

Table D.24.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$8.9134e-08*$	$4.4605e-01*$	$1.7768e-07*$	$7.2360e-08*$
RMPG	$-5.1129e-06$	$-2.4094e+00$	$1.3418e-05$	$-5.7680e-06$
QSR	$4.5843e-03$	$1.3490e+00$	$5.9531e-02$	$-1.6719e-03$
GINI	$1.2318e-07$	$7.5450e-01$	$1.7691e-06$	$-4.9191e-07$
MEAN	$2.4254e+03$	$3.5557e+00$	$5.4325e+03$	$1.0197e+03$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.1006e-07*$	$5.2604e+04$	$1.8893e-07*$	$5.2139e+00*$
RMPG	$1.4550e-05$	$3.2312e+04$	$1.5166e-05$	$2.6016e+01$
QSR	$6.2688e-02$	$5.4278e+01$	$6.0050e-02$	$1.0297e+02$
GINI	$2.8832e-06$	$1.0818e+06$	$2.0224e-06$	$1.7991e+02$
MEAN	$8.1074e+03$	$1.7426e-04*$	$5.2417e+03$	$1.1088e+02$

Table D.25.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$1.7562e-02$	$9.4950e-01$
RMPG	$5.6381e-02$	$9.4550e-01*$
QSR	$2.2914e+00$	$9.4850e-01$
GINI	$1.5849e-02*$	$9.5140e-01$
MEAN	$1.0404e+03$	$9.5320e-01$

Deville3

Table D.26.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$8.9135e-08*$	$4.4605e-01*$	$1.7768e-07*$	$7.2360e-08*$
RMPG	$-5.1129e-06$	$-2.4094e+00$	$1.3418e-05$	$-5.7680e-06$
QSR	$4.5843e-03$	$1.3490e+00$	$5.9531e-02$	$-1.6719e-03$
GINI	$1.2318e-07$	$7.5450e-01$	$1.7691e-06$	$-4.9191e-07$
MEAN	$2.4254e+03$	$3.5557e+00$	$5.4325e+03$	$1.0197e+03$

	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.1006e-07*$	$5.2604e+04$	$1.8893e-07*$	$5.2139e+00*$
RMPG	$1.4550e-05$	$3.2312e+04$	$1.5166e-05$	$2.6016e+01$
QSR	$6.2688e-02$	$5.4278e+01$	$6.0050e-02$	$1.0297e+02$
GINI	$2.8832e-06$	$1.0818e+06$	$2.0224e-06$	$1.7991e+02$
MEAN	$8.1074e+03$	$1.7426e-04*$	$5.2417e+03$	$1.1088e+02$

Table D.27.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$1.7562e-02$	$9.4950e-01$
RMPG	$5.6381e-02$	$9.4550e-01*$
QSR	$2.2914e+00$	$9.4850e-01$
GINI	$1.5849e-02*$	$9.5140e-01$
MEAN	$1.0404e+03$	$9.5320e-01$

Fix

Table D.28.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$8.9138e-08*$	$4.4607e-01*$	$1.7768e-07*$	$7.2363e-08*$
RMPG	$-5.1127e-06$	$-2.4093e+00$	$1.3418e-05$	$-5.7679e-06$
QSR	$4.5847e-03$	$1.3491e+00$	$5.9531e-02$	$-1.6716e-03$
GINI	$1.2319e-07$	$7.5456e-01$	$1.7691e-06$	$-4.9190e-07$
MEAN	$2.4254e+03$	$3.5558e+00$	$5.4325e+03$	$1.0197e+03$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.1006e-07*$	$5.2604e+04$	$1.8893e-07*$	$5.2139e+00*$
RMPG	$1.4550e-05$	$3.2311e+04$	$1.5166e-05$	$2.6016e+01$
QSR	$6.2688e-02$	$5.4278e+01$	$6.0050e-02$	$1.0297e+02$
GINI	$2.8832e-06$	$1.0818e+06$	$2.0224e-06$	$1.7992e+02$
MEAN	$8.1074e+03$	$1.7426e-04*$	$5.2417e+03$	$1.1088e+02$

Table D.29.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$1.7562e-02$	$9.4950e-01$
RMPG	$5.6381e-02$	$9.4550e-01*$
QSR	$2.2914e+00$	$9.4850e-01$
GINI	$1.5849e-02*$	$9.5140e-01$
MEAN	$1.0404e+03$	$9.5320e-01$

Rose

Table D.30.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$8.9134e-08*$	$4.4605e-01*$	$1.7768e-07*$	$7.2360e-08*$
RMPG	$-5.1129e-06$	$-2.4094e+00$	$1.3418e-05$	$-5.7680e-06$
QSR	$4.5843e-03$	$1.3490e+00$	$5.9531e-02$	$-1.6719e-03$
GINI	$1.2318e-07$	$7.5450e-01$	$1.7691e-06$	$-4.9191e-07$
MEAN	$2.4254e+03$	$3.5557e+00$	$5.4325e+03$	$1.0197e+03$

	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.1006e-07*$	$5.2604e+04$	$1.8893e-07*$	$5.2139e+00*$
RMPG	$1.4550e-05$	$3.2312e+04$	$1.5166e-05$	$2.6016e+01$
QSR	$6.2688e-02$	$5.4278e+01$	$6.0050e-02$	$1.0297e+02$
GINI	$2.8832e-06$	$1.0818e+06$	$2.0224e-06$	$1.7991e+02$
MEAN	$8.1074e+03$	$1.7426e-04*$	$5.2417e+03$	$1.1088e+02$

Table D.31.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$1.7562e-02$	$9.4950e-01$
RMPG	$5.6381e-02$	$9.4550e-01*$
QSR	$2.2914e+00$	$9.4850e-01$
GINI	$1.5849e-02*$	$9.5140e-01$
MEAN	$1.0404e+03$	$9.5320e-01$

Approximations Type 2: universe length

Approx1

Table D.32.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$6.5101e-06*$	$3.2578e+01*$	$3.7541e-07*$	$6.5074e-06*$
RMPG	$1.1094e-04$	$5.2278e+01$	$2.2800e-05$	$1.0991e-04$
QSR	$2.5400e-01$	$7.4740e+01$	$1.0533e-01$	$2.4165e-01$
GINI	$8.9785e-06$	$5.4996e+01$	$2.7555e-06$	$6.9775e-06$
MEAN	$3.3829e+04$	$4.9596e+01$	$9.0199e+03$	$2.9057e+04$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$6.5209e-06*$	$1.6330e+06$	$9.6479e-06*$	$4.0074e+01*$
RMPG	$1.1336e-04$	$2.5173e+05$	$1.6296e-04$	$9.9636e+01$
QSR	$2.7775e-01$	$2.4049e+02$	$3.5826e-01$	$3.0101e+02$
GINI	$1.2886e-05$	$4.8346e+06$	$1.0345e-05$	$1.4421e+03$
MEAN	$4.1104e+04$	$8.8346e-04*$	$4.3080e+04$	$8.2506e+02$

Table D.33.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$2.0176e-02$	$9.7410e-01*$
RMPG	$7.0421e-02$	$9.8220e-01$
QSR	$3.0077e+00$	$9.8710e-01$
GINI	$1.9545e-02*$	$9.8300e-01$
MEAN	$1.2469e+03$	$9.8150e-01$

Approx2

Table D.34.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$8.9135e-08*$	$4.4605e-01*$	$1.7768e-07*$	$7.2360e-08*$
RMPG	$-5.1129e-06$	$-2.4094e+00$	$1.3418e-05$	$-5.7680e-06$
QSR	$4.5843e-03$	$1.3490e+00$	$5.9531e-02$	$-1.6719e-03$
GINI	$1.2318e-07$	$7.5450e-01$	$1.7691e-06$	$-4.9191e-07$
MEAN	$2.4254e+03$	$3.5557e+00$	$5.4325e+03$	$1.0197e+03$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.1006e-07*$	$5.2604e+04$	$1.8893e-07*$	$5.2139e+00*$
RMPG	$1.4550e-05$	$3.2312e+04$	$1.5166e-05$	$2.6016e+01$
QSR	$6.2688e-02$	$5.4278e+01$	$6.0050e-02$	$1.0297e+02$
GINI	$2.8832e-06$	$1.0818e+06$	$2.0224e-06$	$1.7991e+02$
MEAN	$8.1074e+03$	$1.7426e-04*$	$5.2417e+03$	$1.1088e+02$

Table D.35.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$1.7562e-02$	$9.4950e-01$
RMPG	$5.6381e-02$	$9.4550e-01*$
QSR	$2.2914e+00$	$9.4850e-01$
GINI	$1.5849e-02*$	$9.5140e-01$
MEAN	$1.0404e+03$	$9.5320e-01$

Approx3

Table D.36.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$8.9134e-08*$	$4.4605e-01*$	$1.7768e-07*$	$7.2360e-08*$
RMPG	$-5.1129e-06$	$-2.4094e+00$	$1.3418e-05$	$-5.7680e-06$
QSR	$4.5843e-03$	$1.3490e+00$	$5.9531e-02$	$-1.6719e-03$
GINI	$1.2318e-07$	$7.5450e-01$	$1.7691e-06$	$-4.9191e-07$
MEAN	$2.4254e+03$	$3.5557e+00$	$5.4325e+03$	$1.0197e+03$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.1006e-07*$	$5.2604e+04$	$1.8893e-07*$	$5.2139e+00*$
RMPG	$1.4550e-05$	$3.2312e+04$	$1.5166e-05$	$2.6016e+01$
QSR	$6.2688e-02$	$5.4278e+01$	$6.0050e-02$	$1.0297e+02$
GINI	$2.8832e-06$	$1.0818e+06$	$2.0224e-06$	$1.7991e+02$
MEAN	$8.1074e+03$	$1.7426e-04*$	$5.2417e+03$	$1.1088e+02$

Table D.37.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$1.7562e-02$	$9.4950e-01$
RMPG	$5.6381e-02$	$9.4550e-01*$
QSR	$2.2914e+00$	$9.4850e-01$
GINI	$1.5849e-02*$	$9.5140e-01$
MEAN	$1.0404e+03$	$9.5320e-01$

Approx4

Table D.38.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$8.9119e-08*$	$4.4597e-01*$	$1.7768e-07*$	$7.2344e-08*$
RMPG	$-5.1130e-06$	$-2.4095e+00$	$1.3418e-05$	$-5.7682e-06$
QSR	$4.5841e-03$	$1.3489e+00$	$5.9531e-02$	$-1.6722e-03$
GINI	$1.2316e-07$	$7.5441e-01$	$1.7691e-06$	$-4.9192e-07$
MEAN	$2.4253e+03$	$3.5557e+00$	$5.4325e+03$	$1.0197e+03$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.1005e-07*$	$5.2602e+04$	$1.8893e-07*$	$5.2138e+00*$
RMPG	$1.4550e-05$	$3.2312e+04$	$1.5166e-05$	$2.6016e+01$
QSR	$6.2687e-02$	$5.4278e+01$	$6.0050e-02$	$1.0297e+02$
GINI	$2.8832e-06$	$1.0818e+06$	$2.0224e-06$	$1.7991e+02$
MEAN	$8.1074e+03$	$1.7426e-04*$	$5.2416e+03$	$1.1088e+02$

Table D.39.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$1.7562e-02$	$9.4950e-01$
RMPG	$5.6381e-02$	$9.4550e-01*$
QSR	$2.2914e+00$	$9.4850e-01$
GINI	$1.5849e-02*$	$9.5140e-01$
MEAN	$1.0404e+03$	$9.5320e-01$

Approx5

Table D.40.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$6.5100e-06*$	$3.2578e+01*$	$3.7541e-07*$	$6.5074e-06*$
RMPG	$1.1094e-04$	$5.2278e+01$	$2.2800e-05$	$1.0991e-04$
QSR	$2.5400e-01$	$7.4740e+01$	$1.0533e-01$	$2.4164e-01$
GINI	$8.9785e-06$	$5.4996e+01$	$2.7555e-06$	$6.9775e-06$
MEAN	$3.3829e+04$	$4.9595e+01$	$9.0199e+03$	$2.9057e+04$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$6.5209e-06*$	$1.6330e+06$	$9.6479e-06*$	$4.0074e+01*$
RMPG	$1.1336e-04$	$2.5173e+05$	$1.6296e-04$	$9.9636e+01$
QSR	$2.7775e-01$	$2.4049e+02$	$3.5826e-01$	$3.0100e+02$
GINI	$1.2886e-05$	$4.8346e+06$	$1.0345e-05$	$1.4421e+03$
MEAN	$4.1104e+04$	$8.8346e-04*$	$4.3080e+04$	$8.2506e+02$

Table D.41.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$2.0176e-02$	$9.7410e-01*$
RMPG	$7.0421e-02$	$9.8220e-01$
QSR	$3.0077e+00$	$9.8710e-01$
GINI	$1.9545e-02*$	$9.8300e-01$
MEAN	$1.2469e+03$	$9.8150e-01$

Berger

Table D.42.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$8.9167e-08*$	$4.4621e-01*$	$1.7780e-07*$	$7.2424e-08*$
RMPG	$-5.1125e-06$	$-2.4092e+00$	$1.3419e-05$	$-5.7679e-06$
QSR	$4.5852e-03$	$1.3492e+00$	$5.9533e-02$	$-1.6752e-03$
GINI	$1.2321e-07$	$7.5469e-01$	$1.7689e-06$	$-4.9185e-07$
MEAN	$2.4255e+03$	$3.5559e+00$	$5.4320e+03$	$1.0197e+03$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.1006e-07*$	$5.2604e+04$	$1.8887e-07*$	$5.2134e+00*$
RMPG	$1.4550e-05$	$3.2311e+04$	$1.5167e-05$	$2.6017e+01$
QSR	$6.2688e-02$	$5.4279e+01$	$6.0050e-02$	$1.0298e+02$
GINI	$2.8832e-06$	$1.0818e+06$	$2.0224e-06$	$1.7992e+02$
MEAN	$8.1075e+03$	$1.7426e-04*$	$5.2420e+03$	$1.1089e+02$

Table D.43.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$1.7562e-02$	$9.4950e-01$
RMPG	$5.6381e-02$	$9.4550e-01*$
QSR	$2.2914e+00$	$9.4850e-01$
GINI	$1.5849e-02*$	$9.5140e-01$
MEAN	$1.0404e+03$	$9.5320e-01$

Brewer1

Table D.44.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$8.9132e-08*$	$4.4604e-01*$	$1.7768e-07*$	$7.2357e-08*$
RMPG	$-5.1130e-06$	$-2.4095e+00$	$1.3418e-05$	$-5.7681e-06$
QSR	$4.5840e-03$	$1.3489e+00$	$5.9531e-02$	$-1.6723e-03$
GINI	$1.2317e-07$	$7.5444e-01$	$1.7691e-06$	$-4.9192e-07$
MEAN	$2.4253e+03$	$3.5557e+00$	$5.4325e+03$	$1.0197e+03$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.1006e-07*$	$5.2604e+04$	$1.8893e-07*$	$5.2138e+00*$
RMPG	$1.4550e-05$	$3.2312e+04$	$1.5166e-05$	$2.6016e+01$
QSR	$6.2687e-02$	$5.4278e+01$	$6.0050e-02$	$1.0297e+02$
GINI	$2.8832e-06$	$1.0818e+06$	$2.0224e-06$	$1.7991e+02$
MEAN	$8.1074e+03$	$1.7426e-04*$	$5.2416e+03$	$1.1088e+02$

Table D.45.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$1.7562e-02$	$9.4950e-01$
RMPG	$5.6381e-02$	$9.4550e-01*$
QSR	$2.2914e+00$	$9.4850e-01$
GINI	$1.5849e-02*$	$9.5140e-01$
MEAN	$1.0404e+03$	$9.5320e-01$

Brewer3

Table D.46.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$8.9138e-08*$	$4.4607e-01*$	$1.7768e-07*$	$7.2363e-08*$
RMPG	$-5.1127e-06$	$-2.4093e+00$	$1.3418e-05$	$-5.7679e-06$
QSR	$4.5847e-03$	$1.3491e+00$	$5.9531e-02$	$-1.6716e-03$
GINI	$1.2319e-07$	$7.5456e-01$	$1.7691e-06$	$-4.9190e-07$
MEAN	$2.4254e+03$	$3.5558e+00$	$5.4325e+03$	$1.0197e+03$

	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.1006e-07*$	$5.2604e+04$	$1.8893e-07*$	$5.2139e+00*$
RMPG	$1.4550e-05$	$3.2311e+04$	$1.5166e-05$	$2.6016e+01$
QSR	$6.2688e-02$	$5.4278e+01$	$6.0050e-02$	$1.0297e+02$
GINI	$2.8832e-06$	$1.0818e+06$	$2.0224e-06$	$1.7992e+02$
MEAN	$8.1074e+03$	$1.7426e-04*$	$5.2417e+03$	$1.1088e+02$

Table D.47.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$1.7562e-02$	$9.4950e-01$
RMPG	$5.6381e-02$	$9.4550e-01*$
QSR	$2.2914e+00$	$9.4850e-01$
GINI	$1.5849e-02*$	$9.5140e-01$
MEAN	$1.0404e+03$	$9.5320e-01$

Brewer4

Table D.48.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$8.9138e-08*$	$4.4607e-01*$	$1.7768e-07*$	$7.2363e-08*$
RMPG	$-5.1127e-06$	$-2.4093e+00$	$1.3418e-05$	$-5.7679e-06$
QSR	$4.5847e-03$	$1.3491e+00$	$5.9531e-02$	$-1.6716e-03$
GINI	$1.2319e-07$	$7.5456e-01$	$1.7691e-06$	$-4.9190e-07$
MEAN	$2.4254e+03$	$3.5558e+00$	$5.4325e+03$	$1.0197e+03$

	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.1006e-07*$	$5.2604e+04$	$1.8893e-07*$	$5.2139e+00*$
RMPG	$1.4550e-05$	$3.2311e+04$	$1.5166e-05$	$2.6016e+01$
QSR	$6.2688e-02$	$5.4278e+01$	$6.0050e-02$	$1.0297e+02$
GINI	$2.8832e-06$	$1.0818e+06$	$2.0224e-06$	$1.7992e+02$
MEAN	$8.1074e+03$	$1.7426e-04*$	$5.2417e+03$	$1.1088e+02$

Table D.49.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$1.7562e-02$	$9.4950e-01$
RMPG	$5.6381e-02$	$9.4550e-01*$
QSR	$2.2914e+00$	$9.4850e-01$
GINI	$1.5849e-02*$	$9.5140e-01$
MEAN	$1.0404e+03$	$9.5320e-01$

Resampling Methods

Boot

Table D.50.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$6.0799e-07$	$3.0425e+00$	$2.9985e-06$	$4.6179e-07*$
RMPG	$7.7258e-06$	$3.6407e+00$	$5.6457e-05$	$4.9362e-07$
QSR	$6.7487e-03$	$1.9858e+00$	$7.8474e-02$	$-2.7673e-03$
GINI	$7.0445e-08*$	$4.3150e-01*$	$2.8799e-06*$	$-5.0158e-07$
MEAN	$2.5441e+03$	$3.7298e+00$	$1.1376e+04$	$1.2596e+03$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$3.1029e-06*$	$7.7704e+05$	$2.9826e-06*$	$8.2725e+01*$
RMPG	$6.0191e-05$	$1.3367e+05$	$5.6400e-05$	$1.3873e+02$
QSR	$8.1965e-02$	$7.0970e+01$	$7.8638e-02$	$1.7131e+02$
GINI	$3.7067e-06$	$1.3907e+06$	$2.9930e-06$	$2.3188e+02$
MEAN	$1.2969e+04$	$2.7874e-04*$	$1.1361e+04$	$1.8103e+02$

Table D.51.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$1.7740e-02$	$9.4810e-01$
RMPG	$5.7613e-02$	$9.4600e-01$
QSR	$2.2922e+00$	$9.4220e-01*$
GINI	$1.5785e-02*$	$9.4660e-01$
MEAN	$1.0387e+03$	$9.5090e-01$

Dgjk

Table D.52.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$5.0590e-06*$	$2.5317e+01$	$5.3608e-06$	$7.9311e-07*$
RMPG	$2.0473e-05$	$9.6478e+00*$	$1.2760e-04$	$-5.2186e-05$
QSR	$-2.7294e-01$	$-8.0313e+01$	$1.3613e-02$	$-2.7444e-01$
GINI	$-6.0883e-06$	$-3.7293e+01$	$1.8013e-06*$	$-6.3316e-06$
MEAN	$-1.2341e+04$	$-1.8092e+01$	$8.6075e+03$	$-1.3028e+04$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$1.5023e-05$	$3.7622e+06$	$4.9831e-06*$	$1.0926e+03$
RMPG	$2.2999e-04$	$5.1074e+05$	$1.6916e-04$	$1.2149e+03$
QSR	$2.7331e-01$	$2.3665e+02$	$4.0688e-01$	$9.1412e+01$
GINI	$6.4139e-06*$	$2.4065e+06$	$9.3916e-06$	$9.2106e+01$
MEAN	$1.5265e+04$	$3.2809e-04*$	$1.9585e+04$	$6.3982e+01*$

Table D.53.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$1.9129e-02$	$9.5070e-01$
RMPG	$5.4645e-02$	$8.7330e-01$
QSR	$1.0083e+00$	$6.1750e-01*$
GINI	$1.2486e-02*$	$8.7540e-01$
MEAN	$9.2361e+02$	$9.2070e-01$

Rbrr

Table D.54.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$8.5697e-07$	$4.2885e+00$	$2.5815e-06$	$7.0693e-07$
RMPG	$1.1554e-05$	$5.4446e+00$	$5.6573e-05$	$3.9870e-06$
QSR	$8.2363e-03$	$2.4236e+00$	$7.2004e-02$	$-7.4844e-04$
GINI	$1.7044e-07*$	$1.0440e+00*$	$2.5365e-06*$	$-3.7797e-07*$
MEAN	$2.3821e+03$	$3.4923e+00$	$1.0186e+04$	$1.1037e+03$

	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.7728e-06*$	$6.9437e+05$	$2.6537e-06*$	$7.3325e+01*$
RMPG	$6.0921e-05$	$1.3529e+05$	$5.5855e-05$	$1.8381e+02$
QSR	$7.7798e-02$	$6.7362e+01$	$7.2054e-02$	$1.8158e+02$
GINI	$3.4105e-06$	$1.2796e+06$	$2.6558e-06$	$2.1160e+02$
MEAN	$1.1637e+04$	$2.5011e-04*$	$1.0080e+04$	$1.3435e+02$

Table D.55.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$1.7860e-02$	$9.5190e-01$
RMPG	$5.8131e-02$	$9.4850e-01$
QSR	$2.2990e+00$	$9.4670e-01*$
GINI	$1.5848e-02*$	$9.4910e-01$
MEAN	$1.0383e+03$	$9.5130e-01$

D.3.6. Comments, Notation and Specifications

`Notation: (1) stars (i.e., *) in the tables denote the minimum/minima; (2) "Inf" denotes infinity`

D.3.7. Nomenclatura

Criteria

`avgT:` average of the point estimate

`varT:` variance of the point estimate

`biasT:` bias of the point estimate

`relbiasT:` relative bias of the point estimate

`medT:` median of the point estimate

`mad:` median absolute deviation about the median point-estimate (with consistency correction for the normal)

`mede:` median error of the point estimate (with consistency correction for the normal)

`rmseT:` root mean square errof of the point estimate

`relrmseT:` relative root mean square error of the point estimate

`medaeT:` maximum absolute error of the point estimate (with consistency correction for the normal)

`relmaxeT:` maximum absoulte relative error of the point estimate

Note that all criteria also pertain to the variance estimates. In this respect, one has to subsitute a "V" for the "T" in the name of the respective criterion.

D.4. AMELI Simulation: ARPR, RMPG, QSR, GINI and MEAN @ AMELIA for Design 2.6

D.4.1. Estimator Specifications

`Specifications:` Design based estimators of Laeken indicators: ARPR, RMPG, QSR, GINI and MEAN. Variance estimators based on linearization and resampling methods.

`Comments:`

D.4.2. Sampling Designs, Statistics and Variance Estimation Methods

Design 2.6

Scope of statistic and vest.methods

statistic	vest.methods	vest.methods	vest.methods	vest.methods	vest.methods
ARPR	naive	approx1	approx2	approx3	approx4
RMPG	naive	approx1	approx2	approx3	approx4
QSR	naive	approx1	approx2	approx3	approx4
GINI	naive	approx1	approx2	approx3	approx4
MEAN	naive	approx1	approx2	approx3	approx4

statistic	vest.methods	vest.methods	vest.methods	vest.methods	vest.methods
ARPR	approx5	berger	brewer1	brewer2	brewer3
RMPG	approx5	berger	brewer1	brewer2	brewer3
QSR	approx5	berger	brewer1	brewer2	brewer3
GINI	approx5	berger	brewer1	brewer2	brewer3
MEAN	approx5	berger	brewer1	brewer2	brewer3

statistic	vest.methods	vest.methods	vest.methods	vest.methods	vest.methods
ARPR	brewer4	deville1	deville2	deville3	fix
RMPG	brewer4	deville1	deville2	deville3	fix
QSR	brewer4	deville1	deville2	deville3	fix
GINI	brewer4	deville1	deville2	deville3	fix
MEAN	brewer4	deville1	deville2	deville3	fix

statistic	vest.methods	vest.methods	vest.methods	vest.methods
ARPR	rose	boot	dgjk	rbrr
RMPG	rose	boot	dgjk	rbrr
QSR	rose	boot	dgjk	rbrr
GINI	rose	boot	dgjk	rbrr
MEAN	rose	boot	dgjk	rbrr

D.4.3. Results

In this section, we summarize the performance of the estimators due to numerical criteria.

D.4.4. Point Estimator

Table D.56.: Criteria Point and Variance Estimates

tmp1	biasT	relbiasT%	madT	medeT
ARPR	$-7.9317e-04$	$-2.8778e-01$	$6.5781e-03*$	$-1.3707e-03$
RMPG	$-9.0322e-04$	$-1.8199e-01$	$1.5653e-02$	$-6.2704e-04*$
QSR	$-4.2528e-02$	$-3.2721e-01$	$9.9886e-01$	$-2.6315e-01$
GINI	$-6.0021e-04*$	$-1.5194e-01*$	$7.7124e-03$	$-2.2186e-03$
MEAN	$5.1126e+01$	$1.7957e-01$	$7.4425e+02$	$2.7027e+02$
	rmseT	relrmseT%	medaeT	relmaxeT%
ARPR	$6.6293e-03*$	$8.7269e+00$	$6.9875e-03*$	$7.4773e+01$
RMPG	$1.5617e-02$	$6.3403e+00$	$1.5582e-02$	$5.6005e+01*$
QSR	$1.0775e+00$	$6.3785e-01$	$1.1361e+00$	$1.6708e+03$
GINI	$8.0247e-03$	$5.1422e+00$	$8.8777e-03$	$6.2481e+01$
MEAN	$8.2822e+02$	$1.0217e-04*$	$9.2439e+02$	$3.0579e+06$

D.4.5. Direct Variance Estimation Methods

Naive

Table D.57.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$-7.4906e-06*$	$-1.7290e+01$	$5.3326e-06*$	$-1.9390e-05*$
RMPG	$-2.2645e-05$	$-9.3152e+00*$	$3.3250e-05$	$-3.0144e-05$
QSR	$-1.3862e-01$	$-1.1957e+01$	$2.0167e-01$	$-7.5454e-01$
GINI	$-1.3129e-05$	$-2.0500e+01$	$8.4811e-06$	$-4.1912e-05$
MEAN	$-1.1842e+05$	$-1.7328e+01$	$4.8549e+04$	$-5.3070e+05$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.4205e-05*$	$1.2896e+06$	$3.0737e-05*$	$3.8907e+02$
RMPG	$5.5559e-05$	$9.4018e+04$	$5.3977e-05$	$2.4619e+02*$
QSR	$1.1317e+00$	$8.4200e+01$	$1.2270e+00$	$5.9572e+02$
GINI	$4.8786e-05$	$1.1895e+06$	$6.6331e-05$	$3.1904e+02$
MEAN	$6.4506e+05$	$1.3811e-04*$	$8.0856e+05$	$3.0106e+02$

Table D.58.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$2.2565e-02*$	$8.9340e-01$
RMPG	$5.7880e-02$	$9.2930e-01$
QSR	$3.5092e+00$	$8.3880e-01$
GINI	$2.5487e-02$	$8.4230e-01$
MEAN	$2.5422e+03$	$7.8720e-01*$

Approximations Type 1: sample length

Brewer2

Table D.59.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$-7.4977e-06*$	$-1.7307e+01$	$5.3324e-06*$	$-1.9397e-05*$
RMPG	$-2.2668e-05$	$-9.3250e+00*$	$3.3244e-05$	$-3.0165e-05$
QSR	$-1.3861e-01$	$-1.1956e+01$	$2.0167e-01$	$-7.5453e-01$
GINI	$-1.3131e-05$	$-2.0504e+01$	$8.4814e-06$	$-4.1914e-05$
MEAN	$-1.1843e+05$	$-1.7330e+01$	$4.8545e+04$	$-5.3072e+05$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.4207e-05*$	$1.2898e+06$	$3.0747e-05*$	$3.8906e+02$
RMPG	$5.5569e-05$	$9.4035e+04$	$5.4004e-05$	$2.4619e+02*$
QSR	$1.1317e+00$	$8.4200e+01$	$1.2269e+00$	$5.9572e+02$
GINI	$4.8787e-05$	$1.1895e+06$	$6.6336e-05$	$3.1904e+02$
MEAN	$6.4507e+05$	$1.3811e-04*$	$8.0858e+05$	$3.0106e+02$

Table D.60.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$2.2563e-02*$	$8.9340e-01$
RMPG	$5.7877e-02$	$9.2930e-01$
QSR	$3.5092e+00$	$8.3880e-01$
GINI	$2.5486e-02$	$8.4230e-01$
MEAN	$2.5421e+03$	$7.8720e-01*$

Deville1

Table D.61.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$-7.4977e-06*$	$-1.7307e+01$	$5.3324e-06*$	$-1.9397e-05*$
RMPG	$-2.2669e-05$	$-9.3251e+00*$	$3.3244e-05$	$-3.0165e-05$
QSR	$-1.3861e-01$	$-1.1956e+01$	$2.0167e-01$	$-7.5453e-01$
GINI	$-1.3131e-05$	$-2.0504e+01$	$8.4814e-06$	$-4.1914e-05$
MEAN	$-1.1843e+05$	$-1.7330e+01$	$4.8545e+04$	$-5.3072e+05$

	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.4207e-05*$	$1.2898e+06$	$3.0747e-05*$	$3.8906e+02$
RMPG	$5.5569e-05$	$9.4035e+04$	$5.4005e-05$	$2.4619e+02*$
QSR	$1.1317e+00$	$8.4200e+01$	$1.2269e+00$	$5.9572e+02$
GINI	$4.8787e-05$	$1.1895e+06$	$6.6336e-05$	$3.1904e+02$
MEAN	$6.4507e+05$	$1.3811e-04*$	$8.0858e+05$	$3.0106e+02$

Table D.62.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$2.2563e-02*$	$8.9340e-01$
RMPG	$5.7877e-02$	$9.2930e-01$
QSR	$3.5092e+00$	$8.3880e-01$
GINI	$2.5486e-02$	$8.4230e-01$
MEAN	$2.5421e+03$	$7.8720e-01*$

Deville2

Table D.63.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$-7.4977e-06*$	$-1.7307e+01$	$5.3324e-06*$	$-1.9397e-05*$
RMPG	$-2.2669e-05$	$-9.3250e+00*$	$3.3244e-05$	$-3.0165e-05$
QSR	$-1.3861e-01$	$-1.1956e+01$	$2.0167e-01$	$-7.5453e-01$
GINI	$-1.3131e-05$	$-2.0504e+01$	$8.4814e-06$	$-4.1914e-05$
MEAN	$-1.1843e+05$	$-1.7330e+01$	$4.8545e+04$	$-5.3072e+05$

	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.4207e-05*$	$1.2898e+06$	$3.0747e-05*$	$3.8906e+02$
RMPG	$5.5569e-05$	$9.4035e+04$	$5.4004e-05$	$2.4619e+02*$
QSR	$1.1317e+00$	$8.4200e+01$	$1.2269e+00$	$5.9572e+02$
GINI	$4.8787e-05$	$1.1895e+06$	$6.6336e-05$	$3.1904e+02$
MEAN	$6.4507e+05$	$1.3811e-04*$	$8.0858e+05$	$3.0106e+02$

Table D.64.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$2.2563e-02*$	$8.9340e-01$
RMPG	$5.7877e-02$	$9.2930e-01$
QSR	$3.5092e+00$	$8.3880e-01$
GINI	$2.5486e-02$	$8.4230e-01$
MEAN	$2.5421e+03$	$7.8720e-01*$

Deville3

Table D.65.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$-7.4977e-06*$	$-1.7307e+01$	$5.3324e-06*$	$-1.9397e-05*$
RMPG	$-2.2668e-05$	$-9.3250e+00*$	$3.3244e-05$	$-3.0165e-05$
QSR	$-1.3861e-01$	$-1.1956e+01$	$2.0167e-01$	$-7.5453e-01$
GINI	$-1.3131e-05$	$-2.0504e+01$	$8.4814e-06$	$-4.1914e-05$
MEAN	$-1.1843e+05$	$-1.7330e+01$	$4.8545e+04$	$-5.3072e+05$

	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.4207e-05*$	$1.2898e+06$	$3.0747e-05*$	$3.8906e+02$
RMPG	$5.5569e-05$	$9.4034e+04$	$5.4004e-05$	$2.4619e+02*$
QSR	$1.1317e+00$	$8.4200e+01$	$1.2269e+00$	$5.9572e+02$
GINI	$4.8787e-05$	$1.1895e+06$	$6.6336e-05$	$3.1904e+02$
MEAN	$6.4507e+05$	$1.3811e-04*$	$8.0858e+05$	$3.0106e+02$

Table D.66.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$2.2563e-02*$	$8.9340e-01$
RMPG	$5.7877e-02$	$9.2930e-01$
QSR	$3.5092e+00$	$8.3880e-01$
GINI	$2.5486e-02$	$8.4230e-01$
MEAN	$2.5421e+03$	$7.8720e-01*$

Fix

Table D.67.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$-7.4976e-06*$	$-1.7307e+01$	$5.3324e-06*$	$-1.9397e-05*$
RMPG	$-2.2665e-05$	$-9.3238e+00*$	$3.3243e-05$	$-3.0162e-05$
QSR	$-1.3860e-01$	$-1.1955e+01$	$2.0167e-01$	$-7.5452e-01$
GINI	$-1.3131e-05$	$-2.0504e+01$	$8.4816e-06$	$-4.1914e-05$
MEAN	$-1.1843e+05$	$-1.7330e+01$	$4.8545e+04$	$-5.3072e+05$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.4207e-05*$	$1.2898e+06$	$3.0747e-05*$	$3.8906e+02$
RMPG	$5.5568e-05$	$9.4032e+04$	$5.4000e-05$	$2.4619e+02*$
QSR	$1.1317e+00$	$8.4200e+01$	$1.2269e+00$	$5.9572e+02$
GINI	$4.8787e-05$	$1.1895e+06$	$6.6336e-05$	$3.1904e+02$
MEAN	$6.4507e+05$	$1.3811e-04*$	$8.0858e+05$	$3.0106e+02$

Table D.68.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$2.2563e-02*$	$8.9340e-01$
RMPG	$5.7877e-02$	$9.2930e-01$
QSR	$3.5092e+00$	$8.3880e-01$
GINI	$2.5486e-02$	$8.4230e-01$
MEAN	$2.5421e+03$	$7.8720e-01*$

Rose

Table D.69.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$-7.4977e-06*$	$-1.7307e+01$	$5.3324e-06*$	$-1.9397e-05*$
RMPG	$-2.2669e-05$	$-9.3251e+00*$	$3.3244e-05$	$-3.0165e-05$
QSR	$-1.3861e-01$	$-1.1956e+01$	$2.0167e-01$	$-7.5453e-01$
GINI	$-1.3131e-05$	$-2.0504e+01$	$8.4814e-06$	$-4.1914e-05$
MEAN	$-1.1843e+05$	$-1.7330e+01$	$4.8545e+04$	$-5.3072e+05$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.4207e-05*$	$1.2898e+06$	$3.0747e-05*$	$3.8906e+02$
RMPG	$5.5569e-05$	$9.4035e+04$	$5.4004e-05$	$2.4619e+02*$
QSR	$1.1317e+00$	$8.4200e+01$	$1.2269e+00$	$5.9572e+02$
GINI	$4.8787e-05$	$1.1895e+06$	$6.6336e-05$	$3.1904e+02$
MEAN	$6.4507e+05$	$1.3811e-04*$	$8.0858e+05$	$3.0106e+02$

Table D.70.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$2.2563e-02*$	$8.9340e-01$
RMPG	$5.7877e-02$	$9.2930e-01$
QSR	$3.5092e+00$	$8.3880e-01$
GINI	$2.5486e-02$	$8.4230e-01$
MEAN	$2.5421e+03$	$7.8720e-01*$

Approximations Type 2: universe length

Approx1

Table D.71.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$-6.7581e-06*$	$-1.5599e+01$	$5.3426e-06*$	$-1.8648e-05$
RMPG	$-9.1256e-06$	$-3.7539e+00*$	$3.3850e-05$	$-1.6433e-05*$
QSR	$-1.0917e-01$	$-9.4164e+00$	$2.1194e-01$	$-7.2661e-01$
GINI	$-1.2140e-05$	$-1.8956e+01$	$8.8905e-06$	$-4.0837e-05$
MEAN	$-1.1500e+05$	$-1.6827e+01$	$4.9554e+04$	$-5.2704e+05$

	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.3982e-05*$	$1.2778e+06$	$2.9747e-05*$	$3.9069e+02$
RMPG	$5.1909e-05$	$8.7841e+04$	$4.1548e-05$	$2.5231e+02*$
QSR	$1.1361e+00$	$8.4528e+01$	$1.1951e+00$	$6.0514e+02$
GINI	$4.8572e-05$	$1.1843e+06$	$6.5131e-05$	$3.2036e+02$
MEAN	$6.4436e+05$	$1.3796e-04*$	$8.0356e+05$	$3.0166e+02$

Table D.72.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$2.2830e-02*$	$8.9910e-01$
RMPG	$5.9658e-02$	$9.3750e-01$
QSR	$3.5796e+00$	$8.5300e-01$
GINI	$2.5826e-02$	$8.5210e-01$
MEAN	$2.5558e+03$	$7.9370e-01*$

Approx2

Table D.73.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$-7.4977e-06*$	$-1.7307e+01$	$5.3324e-06*$	$-1.9397e-05*$
RMPG	$-2.2668e-05$	$-9.3250e+00*$	$3.3244e-05$	$-3.0165e-05$
QSR	$-1.3861e-01$	$-1.1956e+01$	$2.0167e-01$	$-7.5453e-01$
GINI	$-1.3131e-05$	$-2.0504e+01$	$8.4814e-06$	$-4.1914e-05$
MEAN	$-1.1843e+05$	$-1.7330e+01$	$4.8545e+04$	$-5.3072e+05$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.4207e-05*$	$1.2898e+06$	$3.0747e-05*$	$3.8906e+02$
RMPG	$5.5569e-05$	$9.4034e+04$	$5.4004e-05$	$2.4619e+02*$
QSR	$1.1317e+00$	$8.4200e+01$	$1.2269e+00$	$5.9572e+02$
GINI	$4.8787e-05$	$1.1895e+06$	$6.6336e-05$	$3.1904e+02$
MEAN	$6.4507e+05$	$1.3811e-04*$	$8.0858e+05$	$3.0106e+02$

Table D.74.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$2.2563e-02*$	$8.9340e-01$
RMPG	$5.7877e-02$	$9.2930e-01$
QSR	$3.5092e+00$	$8.3880e-01$
GINI	$2.5486e-02$	$8.4230e-01$
MEAN	$2.5421e+03$	$7.8720e-01*$

Approx3

Table D.75.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$-7.4977e-06*$	$-1.7307e+01$	$5.3324e-06*$	$-1.9397e-05*$
RMPG	$-2.2669e-05$	$-9.3250e+00*$	$3.3244e-05$	$-3.0165e-05$
QSR	$-1.3861e-01$	$-1.1956e+01$	$2.0167e-01$	$-7.5453e-01$
GINI	$-1.3131e-05$	$-2.0504e+01$	$8.4814e-06$	$-4.1914e-05$
MEAN	$-1.1843e+05$	$-1.7330e+01$	$4.8545e+04$	$-5.3072e+05$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.4207e-05*$	$1.2898e+06$	$3.0747e-05*$	$3.8906e+02$
RMPG	$5.5569e-05$	$9.4035e+04$	$5.4004e-05$	$2.4619e+02*$
QSR	$1.1317e+00$	$8.4200e+01$	$1.2269e+00$	$5.9572e+02$
GINI	$4.8787e-05$	$1.1895e+06$	$6.6336e-05$	$3.1904e+02$
MEAN	$6.4507e+05$	$1.3811e-04*$	$8.0858e+05$	$3.0106e+02$

Table D.76.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$2.2563e-02*$	$8.9340e-01$
RMPG	$5.7877e-02$	$9.2930e-01$
QSR	$3.5092e+00$	$8.3880e-01$
GINI	$2.5486e-02$	$8.4230e-01$
MEAN	$2.5421e+03$	$7.8720e-01*$

Approx4

Table D.77.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$-7.4981e-06*$	$-1.7308e+01$	$5.3325e-06*$	$-1.9398e-05*$
RMPG	$-2.2673e-05$	$-9.3268e+00*$	$3.3243e-05$	$-3.0170e-05$
QSR	$-1.3861e-01$	$-1.1956e+01$	$2.0167e-01$	$-7.5454e-01$
GINI	$-1.3132e-05$	$-2.0505e+01$	$8.4810e-06$	$-4.1915e-05$
MEAN	$-1.1844e+05$	$-1.7330e+01$	$4.8544e+04$	$-5.3072e+05$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.4207e-05*$	$1.2898e+06$	$3.0747e-05*$	$3.8906e+02$
RMPG	$5.5571e-05$	$9.4037e+04$	$5.4009e-05$	$2.4618e+02*$
QSR	$1.1317e+00$	$8.4200e+01$	$1.2270e+00$	$5.9572e+02$
GINI	$4.8787e-05$	$1.1895e+06$	$6.6336e-05$	$3.1904e+02$
MEAN	$6.4507e+05$	$1.3811e-04*$	$8.0858e+05$	$3.0106e+02$

Table D.78.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$2.2563e-02*$	$8.9340e-01$
RMPG	$5.7876e-02$	$9.2930e-01$
QSR	$3.5092e+00$	$8.3880e-01$
GINI	$2.5486e-02$	$8.4230e-01$
MEAN	$2.5421e+03$	$7.8720e-01*$

Approx5

Table D.79.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$-6.7585e-06*$	$-1.5601e+01$	$5.3426e-06*$	$-1.8648e-05$
RMPG	$-9.1306e-06$	$-3.7560e+00*$	$3.3850e-05$	$-1.6437e-05*$
QSR	$-1.0918e-01$	$-9.4172e+00$	$2.1194e-01$	$-7.2662e-01$
GINI	$-1.2140e-05$	$-1.8956e+01$	$8.8905e-06$	$-4.0837e-05$
MEAN	$-1.1500e+05$	$-1.6828e+01$	$4.9553e+04$	$-5.2704e+05$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.3982e-05*$	$1.2778e+06$	$2.9748e-05*$	$3.9069e+02$
RMPG	$5.1910e-05$	$8.7843e+04$	$4.1547e-05$	$2.5231e+02*$
QSR	$1.1361e+00$	$8.4528e+01$	$1.1951e+00$	$6.0514e+02$
GINI	$4.8572e-05$	$1.1843e+06$	$6.5132e-05$	$3.2036e+02$
MEAN	$6.4436e+05$	$1.3796e-04*$	$8.0356e+05$	$3.0166e+02$

Table D.80.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$2.2829e-02*$	$8.9910e-01$
RMPG	$5.9658e-02$	$9.3750e-01$
QSR	$3.5796e+00$	$8.5300e-01$
GINI	$2.5826e-02$	$8.5210e-01$
MEAN	$2.5557e+03$	$7.9370e-01*$

Berger

Table D.81.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$-7.4977e-06*$	$-1.7307e+01$	$5.3325e-06*$	$-1.9398e-05*$
RMPG	$-2.2666e-05$	$-9.3242e+00*$	$3.3241e-05$	$-3.0161e-05$
QSR	$-1.3860e-01$	$-1.1955e+01$	$2.0167e-01$	$-7.5452e-01$
GINI	$-1.3131e-05$	$-2.0504e+01$	$8.4820e-06$	$-4.1914e-05$
MEAN	$-1.1843e+05$	$-1.7330e+01$	$4.8543e+04$	$-5.3072e+05$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.4207e-05*$	$1.2898e+06$	$3.0748e-05*$	$3.8906e+02$
RMPG	$5.5568e-05$	$9.4033e+04$	$5.4001e-05$	$2.4619e+02*$
QSR	$1.1317e+00$	$8.4200e+01$	$1.2269e+00$	$5.9572e+02$
GINI	$4.8787e-05$	$1.1895e+06$	$6.6335e-05$	$3.1904e+02$
MEAN	$6.4507e+05$	$1.3811e-04*$	$8.0858e+05$	$3.0106e+02$

Table D.82.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$2.2563e-02*$	$8.9340e-01$
RMPG	$5.7877e-02$	$9.2930e-01$
QSR	$3.5092e+00$	$8.3880e-01$
GINI	$2.5486e-02$	$8.4230e-01$
MEAN	$2.5421e+03$	$7.8720e-01*$

Brewer1

Table D.83.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$-7.4978e-06*$	$-1.7307e+01$	$5.3324e-06*$	$-1.9397e-05*$
RMPG	$-2.2671e-05$	$-9.3262e+00*$	$3.3244e-05$	$-3.0168e-05$
QSR	$-1.3861e-01$	$-1.1956e+01$	$2.0167e-01$	$-7.5454e-01$
GINI	$-1.3131e-05$	$-2.0504e+01$	$8.4812e-06$	$-4.1915e-05$
MEAN	$-1.1844e+05$	$-1.7330e+01$	$4.8545e+04$	$-5.3072e+05$

	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.4207e-05*$	$1.2898e+06$	$3.0747e-05*$	$3.8906e+02$
RMPG	$5.5570e-05$	$9.4036e+04$	$5.4008e-05$	$2.4619e+02*$
QSR	$1.1317e+00$	$8.4200e+01$	$1.2269e+00$	$5.9572e+02$
GINI	$4.8787e-05$	$1.1895e+06$	$6.6336e-05$	$3.1904e+02$
MEAN	$6.4507e+05$	$1.3811e-04*$	$8.0858e+05$	$3.0106e+02$

Table D.84.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$2.2563e-02*$	$8.9340e-01$
RMPG	$5.7876e-02$	$9.2930e-01$
QSR	$3.5092e+00$	$8.3880e-01$
GINI	$2.5486e-02$	$8.4230e-01$
MEAN	$2.5421e+03$	$7.8720e-01*$

Brewer3

Table D.85.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$-7.4976e-06*$	$-1.7307e+01$	$5.3324e-06*$	$-1.9397e-05*$
RMPG	$-2.2666e-05$	$-9.3239e+00*$	$3.3243e-05$	$-3.0162e-05$
QSR	$-1.3860e-01$	$-1.1955e+01$	$2.0167e-01$	$-7.5452e-01$
GINI	$-1.3131e-05$	$-2.0504e+01$	$8.4815e-06$	$-4.1914e-05$
MEAN	$-1.1843e+05$	$-1.7330e+01$	$4.8545e+04$	$-5.3072e+05$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.4207e-05*$	$1.2898e+06$	$3.0747e-05*$	$3.8906e+02$
RMPG	$5.5568e-05$	$9.4033e+04$	$5.4001e-05$	$2.4619e+02*$
QSR	$1.1317e+00$	$8.4200e+01$	$1.2269e+00$	$5.9572e+02$
GINI	$4.8787e-05$	$1.1895e+06$	$6.6336e-05$	$3.1904e+02$
MEAN	$6.4507e+05$	$1.3811e-04*$	$8.0858e+05$	$3.0106e+02$

Table D.86.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$2.2563e-02*$	$8.9340e-01$
RMPG	$5.7877e-02$	$9.2930e-01$
QSR	$3.5092e+00$	$8.3880e-01$
GINI	$2.5486e-02$	$8.4230e-01$
MEAN	$2.5421e+03$	$7.8720e-01*$

Brewer4

Table D.87.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$-7.4976e-06*$	$-1.7307e+01$	$5.3324e-06*$	$-1.9397e-05*$
RMPG	$-2.2665e-05$	$-9.3238e+00*$	$3.3243e-05$	$-3.0162e-05$
QSR	$-1.3860e-01$	$-1.1955e+01$	$2.0167e-01$	$-7.5452e-01$
GINI	$-1.3131e-05$	$-2.0504e+01$	$8.4816e-06$	$-4.1914e-05$
MEAN	$-1.1843e+05$	$-1.7330e+01$	$4.8545e+04$	$-5.3072e+05$

	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.4207e-05*$	$1.2898e+06$	$3.0747e-05*$	$3.8906e+02$
RMPG	$5.5568e-05$	$9.4032e+04$	$5.4000e-05$	$2.4619e+02*$
QSR	$1.1317e+00$	$8.4200e+01$	$1.2269e+00$	$5.9572e+02$
GINI	$4.8787e-05$	$1.1895e+06$	$6.6336e-05$	$3.1904e+02$
MEAN	$6.4507e+05$	$1.3811e-04*$	$8.0858e+05$	$3.0106e+02$

Table D.88.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$2.2563e-02*$	$8.9340e-01$
RMPG	$5.7877e-02$	$9.2930e-01$
QSR	$3.5092e+00$	$8.3880e-01$
GINI	$2.5486e-02$	$8.4230e-01$
MEAN	$2.5421e+03$	$7.8720e-01*$

Resampling Methods

Boot

Table D.89.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$-1.0004e-05*$	$-2.3091e+01$	$8.2202e-06*$	$-1.9970e-05*$
RMPG	$-2.2360e-05$	$-9.1982e+00*$	$6.5775e-05$	$-3.8021e-05$
QSR	$-2.1897e-01$	$-1.8887e+01$	$2.2043e-01$	$-7.8051e-01$
GINI	$-1.7152e-05$	$-2.6783e+01$	$1.0876e-05$	$-4.2828e-05$
MEAN	$-1.5068e+05$	$-2.2048e+01$	$7.9732e+04$	$-5.2447e+05$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.4595e-05*$	$1.3104e+06$	$3.2402e-05*$	$3.5495e+02$
RMPG	$8.5484e-05$	$1.4466e+05$	$8.7765e-05$	$3.5386e+02$
QSR	$1.0965e+00$	$8.1577e+01$	$1.2589e+00$	$6.6880e+02$
GINI	$4.7924e-05$	$1.1685e+06$	$6.7750e-05$	$3.1063e+02*$
MEAN	$6.2456e+05$	$1.3373e-04*$	$8.1299e+05$	$3.5713e+02$

Table D.90.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$2.1677e-02*$	$8.7850e-01$
RMPG	$5.7357e-02$	$9.2390e-01$
QSR	$3.3492e+00$	$8.2210e-01$
GINI	$2.4345e-02$	$8.1890e-01$
MEAN	$2.4697e+03$	$7.7630e-01*$

Dgjk

Table D.91.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$3.0358e-05$	$7.0084e+01$	$2.2914e-05$	$2.0620e-05*$
RMPG	$2.5885e-04$	$1.0627e+02$	$2.5706e-04$	$1.3359e-04$
QSR	$-7.5675e-01$	$-6.5167e+01$	$8.5644e-02$	$-9.4821e-01$
GINI	$1.0341e-05*$	$1.6112e+01*$	$1.3477e-05*$	$-2.0940e-05$
MEAN	$2.4353e+05$	$3.5449e+01$	$2.0344e+05$	$-1.2017e+05$

	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$4.6310e-05*$	$2.4680e+06$	$3.0570e-05*$	$1.4731e+03$
RMPG	$4.8633e-04$	$8.1967e+05$	$2.1038e-04$	$2.2752e+03$
QSR	$8.4949e-01$	$6.2996e+01$	$1.4066e+00$	$1.3695e+02*$
GINI	$6.2523e-05$	$1.5177e+06$	$4.1097e-05$	$4.9442e+02$
MEAN	$6.9165e+05$	$1.4656e-04*$	$3.5169e+05$	$5.5674e+02$

Table D.92.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$3.2908e-02$	$9.8590e-01$
RMPG	$8.2454e-02$	$9.6030e-01$
QSR	$2.2887e+00$	$6.8630e-01*$
GINI	$3.1687e-02*$	$9.5240e-01$
MEAN	$3.5882e+03$	$9.8880e-01$

Rbrr

Table D.93.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$-7.0965e-06*$	$-1.6374e+01$	$6.4096e-06*$	$-2.1403e-05*$
RMPG	$-2.0412e-05$	$-8.3269e+00*$	$6.3261e-05$	$-4.0284e-05$
QSR	$-1.7150e-01$	$-1.4850e+01$	$1.8775e-01$	$-8.0167e-01$
GINI	$-1.3164e-05$	$-2.0591e+01$	$8.3601e-06$	$-4.4482e-05$
MEAN	$-1.0498e+05$	$-1.5421e+01$	$5.4204e+04$	$-5.3759e+05$

	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.9591e-05*$	$1.5753e+06$	$3.4378e-05*$	$4.1187e+02$
RMPG	$9.5456e-05$	$1.5886e+05$	$8.9031e-05$	$4.0745e+02$
QSR	$1.1555e+00$	$8.6636e+01$	$1.2856e+00$	$6.5378e+02$
GINI	$5.3160e-05$	$1.3006e+06$	$7.0144e-05$	$3.5281e+02$
MEAN	$6.8426e+05$	$1.4766e-04*$	$8.2170e+05$	$3.2481e+02*$

Table D.94.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$2.2286e-02*$	$8.8240e-01$
RMPG	$5.7769e-02$	$9.2390e-01$
QSR	$3.3900e+00$	$8.1440e-01$
GINI	$2.4939e-02$	$8.1650e-01$
MEAN	$2.5274e+03$	$7.6710e-01*$

D.4.6. Comments, Notation and Specifications

`Notation: (1) stars (i.e., *) in the tables denote the minimum/minima; (2) "Inf" denotes infinity`

D.4.7. Nomenclatura

Criteria

`avgT:` average of the point estimate

`varT:` variance of the point estimate

`biasT:` bias of the point estimate

`relbiasT:` relative bias of the point estimate

`medT:` median of the point estimate

`mad:` median absolute deviation about the median point-estimate (with consistency correction for the normal)

`mede:` median error of the point estimate (with consistency correction for the normal)

`rmseT:` root mean square errof of the point estimate

`relrmseT:` relative root mean square error of the point estimate

`medaeT:` maximum absolute error of the point estimate (with consistency correction for the normal)

`relmaxeT:` maximum absoulte relative error of the point estimate

Note that all criteria also pertain to the variance estimates. In this respect, one has to subsitute a "V" for the "T" in the name of the respective criterion.

D.5. AMELI Simulation: ARPR, RMPG, QSR, GINI and MEAN @ AMELIA for Design 2.7

D.5.1. Estimator Specifications

`Specifications:` Design based estimators of Laeken indicators: ARPR, RMPG, QSR, GINI and MEAN. Variance estimators based on linearization and resampling methods.

`Comments:`

D.5.2. Sampling Designs, Statistics and Variance Estimation Methods

Design 2.7

Scope of statistic and vest.methods

statistic	vest.methods	vest.methods	vest.methods	vest.methods
ARPR	naive	boot	dgjk	rbrr
RMPG	naive	boot	dgjk	rbrr
QSR	naive	boot	dgjk	rbrr
GINI	naive	boot	dgjk	rbrr
MEAN	naive	boot	dgjk	rbrr

D.5.3. Results

In this section, we summarize the performance of the estimators due to numerical criteria.

D.5.4. Point Estimator

Table D.95.: Criteria Point and Variance Estimates

tmp1	biasT	relbiasT%	madT	medeT
ARPR	$-7.3278e-04$	$-2.6587e-01$	$7.0073e-03*$	$-1.1913e-03$
RMPG	$-1.1055e-03$	$-2.2275e-01$	$1.6009e-02$	$-1.1209e-03*$
QSR	$-4.0086e-02$	$-3.0842e-01$	$9.9701e-01$	$-2.7799e-01$
GINI	$-4.7155e-04*$	$-1.1937e-01*$	$8.0599e-03$	$-1.9329e-03$
MEAN	$4.9430e+01$	$1.7361e-01$	$7.7278e+02$	$2.7117e+02$
	rmseT	relrmseT%	medaeT	relmaxeT%
ARPR	$6.9657e-03*$	$9.1698e+00$	$7.2881e-03*$	$7.4659e+01$
RMPG	$1.6127e-02$	$6.5476e+00$	$1.5942e-02$	$5.6832e+01*$
QSR	$1.0740e+00$	$6.3576e-01$	$1.1302e+00$	$1.7218e+03$
GINI	$8.0806e-03$	$5.1780e+00$	$8.8754e-03$	$6.2618e+01$
MEAN	$8.3816e+02$	$1.0339e-04*$	$9.4284e+02$	$3.0678e+06$

D.5.5. Direct Variance Estimation Methods

Naive

Table D.96.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$-7.3064e-06*$	$-1.5225e+01$	$6.0160e-06*$	$-1.9140e-05*$
RMPG	$-2.6674e-05$	$-1.0303e+01*$	$3.4638e-05$	$-3.3969e-05$
QSR	$-1.3493e-01$	$-1.1714e+01$	$1.9456e-01$	$-7.5895e-01$
GINI	$-1.2232e-05$	$-1.8795e+01$	$9.1263e-06$	$-4.1038e-05$
MEAN	$-1.1950e+05$	$-1.7069e+01$	$5.1325e+04$	$-5.3244e+05$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.5276e-05*$	$1.0975e+06$	$3.0717e-05*$	$3.4678e+02$
RMPG	$5.8913e-05$	$8.7895e+04$	$5.8411e-05$	$2.5607e+02*$
QSR	$1.1458e+00$	$8.6348e+01$	$1.2314e+00$	$6.7176e+02$
GINI	$4.9456e-05$	$1.1677e+06$	$6.5189e-05$	$3.0077e+02$
MEAN	$6.4825e+05$	$1.3225e-04*$	$8.1225e+05$	$2.9272e+02$

Table D.97.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$2.4187e-02*$	$9.0640e-01$
RMPG	$5.9414e-02$	$9.2650e-01$
QSR	$3.4899e+00$	$8.3690e-01$
GINI	$2.6089e-02$	$8.5550e-01$
MEAN	$2.5984e+03$	$7.9960e-01*$

Resampling Methods

Boot

Table D.98.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$-1.4972e-06*$	$-3.1199e+00$	$1.1313e-05*$	$-1.1089e-05*$
RMPG	$3.6018e-05$	$1.3912e+01$	$8.4930e-05$	$1.8316e-05$
QSR	$5.0979e-02$	$4.4255e+00$	$3.0634e-01$	$-6.1322e-01$
GINI	$-5.2009e-06$	$-7.9915e+00$	$1.5068e-05$	$-3.2315e-05$
MEAN	$1.1128e+04$	$1.5894e+00*$	$1.3869e+05$	$-4.0119e+05$
	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$2.5016e-05*$	$1.0863e+06$	$2.3036e-05*$	$3.7537e+02$
RMPG	$1.0690e-04$	$1.5949e+05$	$8.2666e-05$	$2.8297e+02*$
QSR	$1.3308e+00$	$1.0029e+02$	$1.1071e+00$	$9.8567e+02$
GINI	$4.9989e-05$	$1.1803e+06$	$5.6692e-05$	$3.8750e+02$
MEAN	$6.9047e+05$	$1.4086e-04*$	$6.8199e+05$	$4.2799e+02$

Table D.99.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$2.5999e-02*$	$9.3070e-01$
RMPG	$6.6431e-02$	$9.4940e-01$
QSR	$3.8332e+00$	$8.8260e-01*$
GINI	$2.8208e-02$	$9.0070e-01$
MEAN	$2.9813e+03$	$9.0340e-01$

Dgjk

Table D.100.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$1.9788e-05$	$4.1234e+01$	$2.0801e-05$	$1.0540e-05*$
RMPG	$2.4021e-04$	$9.2781e+01$	$2.4512e-04$	$1.2070e-04$
QSR	$1.2102e-01$	$1.0506e+01*$	$2.8502e-01$	$-4.9545e-01$
GINI	$1.4370e-05*$	$2.2081e+01$	$1.4040e-05*$	$-1.9659e-05$
MEAN	$1.9326e+05$	$2.7603e+01$	$1.9602e+05$	$-1.5159e+05$

	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$3.7610e-05*$	$1.6331e+06$	$1.9021e-05*$	$6.2005e+02$
RMPG	$4.7057e-04$	$7.0206e+05$	$2.0468e-04$	$2.1622e+03$
QSR	$1.3020e+00$	$9.8122e+01$	$9.2697e-01$	$8.8043e+02$
GINI	$6.8129e-05$	$1.6085e+06$	$4.0374e-05$	$5.5556e+02$
MEAN	$6.3930e+05$	$1.3042e-04*$	$3.8879e+05$	$4.0459e+02*$

Table D.101.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$3.1559e-02*$	$9.7360e-01$
RMPG	$8.2390e-02$	$9.6110e-01$
QSR	$4.0292e+00$	$9.2360e-01*$
GINI	$3.2651e-02$	$9.5760e-01$
MEAN	$3.5225e+03$	$9.8350e-01$

Rbrr

Table D.102.: Criteria Point and Variance Estimates

tmp1	biasV	relbiasV%	madV	medeV
ARPR	$-6.8652e-06*$	$-1.4306e+01$	$7.3442e-06*$	$-2.1370e-05*$
RMPG	$-1.7041e-05$	$-6.5820e+00*$	$6.7972e-05$	$-3.9493e-05$
QSR	$-1.6385e-01$	$-1.4224e+01$	$1.8807e-01$	$-8.0351e-01$
GINI	$-1.2430e-05$	$-1.9099e+01$	$9.0868e-06$	$-4.3883e-05$
MEAN	$-1.0793e+05$	$-1.5416e+01$	$5.9278e+04$	$-5.4341e+05$

	rmseV	relrmseV%	medaeV	relmaxeV%
ARPR	$3.1226e-05*$	$1.3559e+06$	$3.4856e-05*$	$4.9233e+02$
RMPG	$1.0273e-04$	$1.5327e+05$	$9.2766e-05$	$4.4104e+02$
QSR	$1.1731e+00$	$8.8407e+01$	$1.2922e+00$	$7.0594e+02$
GINI	$5.3932e-05$	$1.2734e+06$	$6.9324e-05$	$3.3154e+02$
MEAN	$6.9044e+05$	$1.4085e-04*$	$8.3251e+05$	$3.1306e+02*$

Table D.103.: Criteria Confidence Intervals

XC	avglCI	covprobCI
ARPR	$2.3930e-02*$	$8.9430e-01$
RMPG	$5.9904e-02$	$9.2250e-01$
QSR	$3.3873e+00$	$8.1250e-01$
GINI	$2.5542e-02$	$8.3070e-01$
MEAN	$2.5836e+03$	$7.8240e-01*$

D.5.6. Comments, Notation and Specifications

`Notation: (1) stars (i.e., *) in the tables denote the minimum/minima; (2) "Inf" denotes infinity`

D.5.7. Nomenclatura

Criteria

`avgT:` average of the point estimate

`varT:` variance of the point estimate

`biasT:` bias of the point estimate

`relbiasT:` relative bias of the point estimate

`medT:` median of the point estimate

`mad:` median absolute deviation about the median point-estimate (with consistency correction for the normal)

`mede:` median error of the point estimate (with consistency correction for the normal)

`rmseT:` root mean square errof of the point estimate

`relrmseT:` relative root mean square error of the point estimate

`medaeT:` maximum absolute error of the point estimate (with consistency correction for the normal)

`relmaxeT:` maximum absoulte relative error of the point estimate

Note that all criteria also pertain to the variance estimates. In this respect, one has to subsitute a ”V” for the ”T” in the name of the respective criterion.

Appendix E.

Appendix FHNW

E.1. Synthesis of QSR estimators for AMELIA with simple random sampling

AMELI Simulation: ANALYSIS: QSR @ AMELIA: hhsrs1kx6k

E.1.1. Simulation Setup

Target Indicator:	QSR
Domains:	[none] (default)
Population:	AMELIA
Sample:	hhsrs1kx6k
MonteCarlo Replicates:	1,000 (default)
Criteria Set:	Univariate criteria (default)
Method:	SQSR,TQSR
Outlyingness:	OAR,OCAR,uncontaminated
Contamination:	CCAR,NCAR,uncontaminated
Missingness:	[none] (default)
Simulation Environment:	DBsim
Host:	FHNW
Author:	Beat Hulliger and Tobias Schoch
ID:	AggTQSR_hhsrs1kx6k and AggSQSR_hhsrs1kx6k
Date:	September 5, 2011

E.1.2. This Document

Note that this is an analysis paper; not to be confused with the standard simulation output. The main difference is that an analysis paper compares several estimators, while the standard output reports the benchmark figures of one single estimator. Hence, if you need details concerning a specific estimator, study the respective standard simulation output.

E.1.3. Estimator Specifications

`Specifications:` Trimmed quintile share ratio estimator; trims only at the top right end of the distribution. Variance estimates based on linearization.

`Comments:`

E.1.4. Results

In this section, we compare the results of TQSR and SQSR. Therefore, we compute the numerical criteria for each estimator separately and for each combination of the tuple (OType, CType, OTypeEpsilon). This section is partitioned along the OType-CType mechanisms. (At the current stage, we have only results for OTypeEpsilon=0.001)

OCAR – CCAR

OTypeEpsilon=0.001 and TQSR

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	4.8689	6.1819	10.3033	0.7066	0.1402	18.5971	0.1967	40.3189	44.0561
2	0.0005	3.2153	4.9431	10.1408	0.5057	0.1362	16.7472	0.1879	37.9415	41.75
3	0.0010	1.9432	4.1876	10.0158	0.4123	0.133	15.2578	0.1808	35.9508	39.8941
4	0.0015	0.8467	3.7486	9.9081	0.3547*	0.1289	13.3756	0.1748	35.6568	39.5581
5	0.0020	-0.1376*	3.6125*	9.8114	0.355	0.1259	12.3639	0.1697	34.796	38.7219
6	0.0025	-1.0521	3.7234	9.7215	0.3776	0.1233	11.305	0.1652	34.0274	37.9849
7	0.0030	-1.898	4.017	9.6384	0.4102	0.1211	10.046	0.161	32.8937	36.9667

8	0.0035	-2.6794	4.4146	9.5616	0.4635	0.1189	9.2706	0.1568	31.855	36.024
9	0.0040	-3.409	4.8708	9.49	0.5318	0.1169	8.5145	0.1529	30.7374	34.9645
10	0.0045	-4.08	5.3385	9.424	0.6082	0.1145	7.6455	0.1494	30.413	34.6716
11	0.0050	-4.704	5.8142	9.3627	0.7007	0.1128	7.003	0.1463	29.6254	33.913
12	0.0055	-5.2826	6.2743	9.3059	0.7853	0.1107	6.2811	0.1435	29.6139	33.8879
13	0.0060	-5.8261	6.7288	9.2525	0.8572	0.1095	5.6441	0.1412	28.935	33.2615
14	0.0065	-6.3394	7.1677	9.202	0.9314	0.1081	5.0464	0.1391	28.6817	33.0175
15	0.0070	-6.8398	7.6045	9.1529	1.0047	0.1067	4.7468	0.1372	28.513	32.8551
16	0.0075	-7.3248	8.0349	9.1052	1.079	0.1054	3.9657	0.1354	28.4411	32.7859
17	0.0080	-7.7898	8.4529	9.0596	1.141	0.1041	3.4695	0.1337	28.4829	32.8274
18	0.0085	-8.243	8.8675	9.015	1.2132	0.1032	2.8867	0.1322	28.0145	32.4022
19	0.0090	-8.6883	9.2759	8.9713	1.2777	0.102	2.418	0.1307	28.0958	32.4755
20	0.0095	-9.1206	9.6765	8.9288	1.3383	0.101	1.9099	0.1292	27.9907	32.3811
21	0.0100	-9.5441	10.0711	8.8872	1.3993	0.0999	1.4566	0.1279	27.9977	32.3838
22	0.0105	-9.9597	10.4612	8.8464	1.4617	0.099	0.927	0.1265	27.8667	32.2635
23	0.0110	-10.3721	10.851	8.8058	1.521	0.0982	0.498	0.1252	27.5233	31.9539
24	0.0115	-10.7778	11.2348	8.766	1.5778	0.0972	0.0409*	0.124	27.5468	31.9767
25	0.0120	-11.1771	11.6151	8.7268	1.6419	0.0964	-0.3312	0.1228	27.2924	31.7474
26	0.0125	-11.568	11.9874	8.6883	1.7005	0.0954	-0.9016	0.1216	27.3922	31.8407
27	0.0130	-11.9574	12.3593	8.6501	1.7548	0.0944	-1.3443	0.1204	27.5054	31.9469
28	0.0135	-12.348	12.7347	8.6117	1.8131	0.0937	-1.5902	0.1193	27.2445	31.7117
29	0.0140	-12.7255	13.0969	8.5746	1.8658	0.0927	-2.1803	0.1182	27.5195	31.9605
30	0.0145	-13.1026	13.4605	8.5376	1.922	0.0919	-2.6109	0.1171	27.4232	31.8738
31	0.0150	-13.4736	13.8189	8.5011	1.9759	0.0911	-3.0004	0.116	27.3781	31.8347
32	0.0155	-13.8432	14.177	8.4648	2.0297	0.0904	-3.4589	0.1149	27.1837	31.6605
33	0.0160	-14.2115	14.5336	8.4286	2.0834	0.0895	-3.8414	0.1139	27.2669	31.7344
34	0.0165	-14.5731	14.8848	8.3931	2.1371	0.0887	-4.293	0.1129	27.198	31.6749
35	0.0170	-14.9342	15.2356	8.3576	2.191	0.0879	-4.669	0.1118	27.2986	31.7665
36	0.0175	-15.2914	15.5837	8.3225	2.2364	0.0872	-5.0424	0.1109	27.131	31.615
37	0.0180	-15.645	15.9283	8.2878	2.2918	0.0864	-5.4833	0.1099	27.1166	31.6032
38	0.0185	-15.9977	16.2729	8.2531	2.3435	0.0858	-5.8524	0.1089	26.9493	31.4519
39	0.0190	-16.3464	16.6136	8.2189	2.3926	0.0851	-6.1502	0.108	26.8374	31.3547
40	0.0195	-16.6936	16.9528	8.1848	2.4452	0.0843	-6.6463	0.107	26.9702	31.4746
41	0.0200	-17.0363	17.2883	8.1511	2.4901	0.0836	-7.0396	0.1061	26.9464	31.4524
42	0.0205	-17.3798	17.6248	8.1173	2.5434	0.0828	-7.3983	0.1052	26.9676	31.4719
43	0.0210	-17.72	17.9579	8.0839	2.5876	0.082	-7.7549	0.1043	27.1367	31.6256
44	0.0215	-18.0587	18.2906	8.0506	2.6358	0.0815	-8.2033	0.1034	26.9275	31.433
45	0.0220	-18.3954	18.6212	8.0176	2.6896	0.0808	-8.5521	0.1025	26.9001	31.4104
46	0.0225	-18.7279	18.9477	7.9849	2.7385	0.08	-8.9625	0.1016	27.01	31.5092
47	0.0230	-19.0605	19.2747	7.9522	2.7869	0.0794	-9.2145	0.1008	26.9715	31.476
48	0.0235	-19.3897	19.5988	7.9199	2.8352	0.0788	-9.6532	0.0999	26.8324	31.3506
49	0.0240	-19.7189	19.9227	7.8875	2.879	0.078	-10.0283	0.0991	26.9309	31.4386
50	0.0245	-20.046	20.2448	7.8554	2.9281	0.0774	-10.4329	0.0982	26.9482	31.4545
51	0.0250	-20.37	20.5639	7.8236	2.9747	0.0767	-10.7727	0.0974	26.988	31.4906
52	0.0255	-20.6936	20.883	7.7918	3.0227	0.0761	-11.17	0.0966	26.9299	31.4373
53	0.0260	-21.0156	21.2008	7.7601	3.07	0.0755	-11.5059	0.0958	26.7822	31.3036
54	0.0265	-21.3364	21.5172	7.7286	3.1168	0.0748	-11.8692	0.095	26.8728	31.3853
55	0.0270	-21.6535	21.8302	7.6975	3.1615	0.0742	-12.2298	0.0942	26.846	31.3609
56	0.0275	-21.971	22.1437	7.6663	3.2092	0.0736	-12.5884	0.0934	26.8727	31.3833
57	0.0280	-22.2858	22.4548	7.6353	3.2519	0.073	-12.8853	0.0926	26.7961	31.3162
58	0.0285	-22.6012	22.7665	7.6044	3.2972	0.0725	-13.2381	0.0918	26.7022	31.232
59	0.0290	-22.9126	23.0744	7.5738	3.3427	0.0719	-13.646	0.0911	26.7099	31.2397
60	0.0295	-23.2231	23.3815	7.5433*	3.3898	0.0714*	-13.9681	0.0903*	26.5874*	31.1315*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.001 and SQSR

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	4.8689	6.1819	10.3033	0.7066	0.1402	18.5971	0.1967	40.3189	44.0561
2	0.0005	3.9266	5.4552	10.2107	0.5858	0.1386	17.4568	0.1917	38.3158	42.1201
3	0.0010	3.3515	5.0477	10.1542	0.5297	0.1377	16.7575	0.1881	36.6246	40.5697
4	0.0015	2.9442	4.7598	10.1142	0.4875	0.1351	15.6004	0.1856	37.3251	41.1908
5	0.0020	2.6455	4.5729	10.0848	0.4603	0.1344	15.2746	0.1839	36.7999	40.6684
6	0.0025	2.4127	4.4338	10.0619	0.4419	0.1337	15.0312	0.1827	36.633	40.5036
7	0.0030	2.2491	4.343	10.0459	0.4287	0.1334	14.3296	0.1817	36.2455	40.1794
8	0.0035	2.1472	4.2901	10.0359	0.4206	0.1333	14.1799	0.1808	35.6729	39.6808
9	0.0040	2.099*	4.267	10.0311*	0.4209	0.1334	14.0869	0.18	35.0131	39.0491
10	0.0045	2.1032	4.2639*	10.0315	0.4102*	0.1329*	13.7333*	0.1797*	35.1744	39.2276
11	0.0050	2.1639	4.2979	10.0375	0.4135	0.1332	14.0399	0.1797*	34.8806	38.9231
12	0.0055	2.2654	4.3504	10.0475	0.4235	0.1333	14.1825	0.1802	35.1968	39.2132
13	0.0060	2.4125	4.4384	10.0619	0.4307	0.1341	13.9729	0.1811	35.0584	39.0944
14	0.0065	2.5884	4.5475	10.0792	0.4467	0.1351	14.4205	0.1824	35.0149	39.0443

15	0.0070	2.7786	4.6653	10.0979	0.4628	0.1357	14.4087	0.1838	35.4173	39.4262
16	0.0075	2.9902	4.8067	10.1187	0.4872	0.1368	14.8826	0.1853	35.4365	39.4475
17	0.0080	3.2211	4.9634	10.1414	0.5013	0.1378	14.9789	0.1871	35.7831	39.7984
18	0.0085	3.4675	5.1427	10.1656	0.5265	0.1394	15.4589	0.189	35.607	39.6339
19	0.0090	3.7243	5.33	10.1908	0.5595	0.1405	15.6873	0.191	35.9427	39.9519
20	0.0095	4.0028	5.5392	10.2182	0.5927	0.1417	16.2843	0.1931	36.3276	40.3325
21	0.0100	4.2888	5.7645	10.2463	0.6245	0.1434	16.321	0.1953	36.2513	40.2658
22	0.0105	4.5839	5.9987	10.2753	0.6591	0.1447	16.672	0.1976	36.604	40.5994
23	0.0110	4.8895	6.254	10.3053	0.6964	0.1469	17.036	0.2	36.1343	40.1768
24	0.0115	5.2029	6.5141	10.3361	0.7437	0.1485	17.3635	0.2024	36.3738	40.4108
25	0.0120	5.527	6.7926	10.3679	0.7793	0.1507	17.5941	0.205	36.0697	40.1269
26	0.0125	5.8556	7.0746	10.4002	0.8294	0.1523	18.2107	0.2076	36.3048	40.3559
27	0.0130	6.2006	7.3766	10.4341	0.8744	0.1543	18.4946	0.2103	36.3411	40.4118
28	0.0135	6.5401	7.6791	10.4674	0.9253	0.1565	19.0283	0.213	36.1417	40.2291
29	0.0140	6.9003	7.9992	10.5028	0.9738	0.1582	19.531	0.2159	36.4582	40.5466
30	0.0145	7.2636	8.3301	10.5385	1.0279	0.1607	20.1225	0.2188	36.1613	40.2766
31	0.0150	7.6376	8.6713	10.5753	1.0832	0.1629	20.6497	0.2218	36.1761	40.3077
32	0.0155	8.022	9.0288	10.613	1.1353	0.1659	21.2781	0.225	35.6467	39.8373
33	0.0160	8.4035	9.3797	10.6505	1.2015	0.1677	21.8873	0.2281	35.9884	40.169
34	0.0165	8.7988	9.7531	10.6894	1.2476	0.1711	22.3154	0.2314	35.2773	39.5198
35	0.0170	9.2	10.1307	10.7288	1.3048	0.1738	22.977	0.2348	35.053	39.3328
36	0.0175	9.6136	10.5215	10.7694	1.3701	0.1766	23.544	0.2382	34.878	39.1759
37	0.0180	10.0285	10.918	10.8102	1.4281	0.18	24.209	0.2418	34.3012	38.6614
38	0.0185	10.4525	11.3215	10.8518	1.485	0.1828	24.77	0.2453	34.1817	38.5782
39	0.0190	10.8796	11.7329	10.8938	1.5491	0.1864	25.3664	0.249	33.5703	38.0344
40	0.0195	11.3182	12.1533	10.9369	1.6106	0.1894	26.0597	0.2528	33.4986	37.9871
41	0.0200	11.7689	12.5898	10.9812	1.6755	0.1932	26.7014	0.2567	32.8811	37.4399
42	0.0205	12.2195	13.0252	11.0254	1.7505	0.1965	27.3931	0.2607	32.6598	37.2301
43	0.0210	12.6798	13.4714	11.0707	1.8175	0.2	28.1403	0.2648	32.3839	37.0035
44	0.0215	13.1445	13.9259	11.1163	1.8832	0.2044	28.7894	0.269	31.614	36.3038
45	0.0220	13.6252	14.3933	11.1636	1.9575	0.2079	29.514	0.2734	31.4672	36.178
46	0.0225	14.0993	14.8584	11.2101	2.0347	0.2124	30.3393	0.2777	30.747	35.5274
47	0.0230	14.593	15.342	11.2586	2.1021	0.2166	30.7148	0.2823	30.3056	35.1551
48	0.0235	15.0946	15.8357	11.3079	2.1613	0.2215	31.6582	0.2869	29.5619	34.4724
49	0.0240	15.5973	16.3293	11.3573	2.2474	0.2258	32.4908	0.2916	29.1476	34.0994
50	0.0245	16.1071	16.833	11.4074	2.313	0.2311	33.296	0.2964	28.2999	33.3676
51	0.0250	16.6311	17.3481	11.4589	2.3912	0.2354	33.7473	0.3014	28.0328	33.1317
52	0.0255	17.1651	17.8769	11.5113	2.4757	0.241	34.4299	0.3064	27.1528	32.3694
53	0.0260	17.6919	18.399	11.5631	2.5538	0.2466	35.491	0.3116	26.3517	31.6678
54	0.0265	18.2402	18.9418	11.617	2.6336	0.2521	36.3594	0.3169	25.7279	31.1358
55	0.0270	18.7959	19.4931	11.6716	2.7174	0.2579	36.9904	0.3225	25.0254	30.5654
56	0.0275	19.3607	20.0547	11.7271	2.7934	0.2643	38.0892	0.3281	24.1429	29.8304
57	0.0280	19.9296	20.6189	11.783	2.8854	0.2701	38.7935	0.3338	23.6061	29.4064
58	0.0285	20.5051	21.1925	11.8395	2.9622	0.2769	39.6847	0.3397	22.6703	28.6638
59	0.0290	21.0943	21.7799	11.8974	3.0499	0.284	40.5505	0.3457	21.7273	27.8859
60	0.0295	21.6918	22.376	11.9561	3.1404	0.2913	41.556	0.3518	20.7618*	27.0993*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01 and TQSR

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	48.3709	48.6499	14.5773	7.0151	0.2616	68.0185	0.4982	90.437	92.768
2	0.0005	46.1518	46.4374	14.3593	6.6955	0.2555	65.4735	0.4873	90.7178	93.0415
3	0.0010	44.2804	44.5712	14.1754	6.4312	0.2497	63.0254	0.4728	89.3893	91.7359
4	0.0015	42.6432	42.9379	14.0145	6.1944	0.2437	60.9388	0.4609	89.1022	91.4113
5	0.0020	41.0966	41.3957	13.8626	5.9725	0.2384	59.1002	0.4517	89.4487	91.749
6	0.0025	39.6155	39.9198	13.7171	5.7581	0.2338	57.3562	0.4439	89.8323	92.1154
7	0.0030	38.1711	38.4806	13.5752	5.5495	0.2292	55.7165	0.4369	90.6064	92.8795
8	0.0035	36.7479	37.063	13.4353	5.3461	0.2247	54.0995	0.4302	91.4748	93.7406
9	0.0040	35.352	35.6731	13.2982	5.1422	0.2204	52.8753	0.4236	92.1866	94.4491
10	0.0045	33.9728	34.3009	13.1627	4.9457	0.2165	51.156	0.4166	92.4729	94.7389
11	0.0050	32.6255	32.9616	13.0303	4.7465	0.2129	49.713	0.4093	92.2251	94.5082
12	0.0055	31.3084	31.6506	12.9009	4.5524	0.2082	48.2128	0.4012	92.7334	95.041
13	0.0060	30.0348	30.3868	12.7758	4.3695	0.2055	47.2105	0.3919	90.7032	93.0494
14	0.0065	28.8011	29.1609	12.6546	4.1868	0.2015	45.8236	0.3822	89.6595	92.0241
15	0.0070	27.6212	27.9903	12.5386	4.0215	0.1983	44.8512	0.3732	88.1473	90.4825
16	0.0075	26.4792	26.8586	12.4264	3.8587	0.1955	43.4814	0.3652	86.7573	89.066
17	0.0080	25.353	25.7413	12.3158	3.6902	0.1917	42.5241	0.3582	86.8464	89.1302
18	0.0085	24.254	24.6541	12.2078	3.5385	0.1891	40.9042	0.3521	86.2189	88.4766
19	0.0090	23.1676	23.5809	12.1011	3.3768	0.1867	39.9576	0.3465	85.606	87.8587
20	0.0095	22.1018	22.5281	11.9964	3.2252	0.1838	38.6241	0.3413	85.6496	87.8974
21	0.0100	21.0507	21.4897	11.8931	3.0679	0.1805	37.6916	0.3362	86.3163	88.5516

22	0.0105	20.0077	20.4627	11.7906	2.9203	0.1779	36.251	0.3312	86.129	88.3705
23	0.0110	18.9675	19.4406	11.6884	2.7602	0.1756	35.338	0.3261	85.7341	87.9948
24	0.0115	17.9569	18.4464	11.5891	2.6132	0.1722	34.0564	0.321	86.4461	88.7054
25	0.0120	16.9434	17.4542	11.4896	2.4684	0.1698	33.1555	0.3157	85.9228	88.2105
26	0.0125	15.9556	16.4873	11.3925	2.319	0.1667	31.7671	0.3103	86.194	88.4829
27	0.0130	14.9811	15.5359	11.2968	2.1765	0.1636	30.7751	0.3048	86.2687	88.565
28	0.0135	14.0224	14.6063	11.2026	2.0394	0.1615	29.6821	0.2992	85.2196	87.512
29	0.0140	13.0776	13.693	11.1098	1.9075	0.1592	28.611	0.2937	84.4859	86.7876
30	0.0145	12.1471	12.7999	11.0183	1.7706	0.1573	27.5427	0.2884	83.3235	85.624
31	0.0150	11.2292	11.9217	10.9282	1.6363	0.1549	26.3788	0.2834	82.9282	85.2239
32	0.0155	10.3128	11.0499	10.8381	1.5004	0.1521	25.3399	0.2786	83.1021	85.3893
33	0.0160	9.4128	10.2039	10.7497	1.3727	0.15	24.3107	0.274	82.7375	85.0201
34	0.0165	8.5241	9.3788	10.6624	1.2389	0.1479	23.2925	0.2696	82.3543	84.6161
35	0.0170	7.6483	8.5777	10.5763	1.1133	0.1457	22.4973	0.2656	82.2598	84.5218
36	0.0175	6.7774	7.7976	10.4908	0.9863	0.1437	21.4867	0.2617	82.1566	84.4134
37	0.0180	5.9072	7.0402	10.4053	0.8583	0.1417	20.3748	0.2579	81.9765	84.2268
38	0.0185	5.0479	6.3185	10.3208	0.7292	0.1396	19.3732	0.2543	82.2174	84.4705
39	0.0190	4.1966	5.6433	10.2372	0.6153	0.1375	18.3737	0.2507	82.268	84.5212
40	0.0195	3.3506	5.0218	10.1541	0.5311	0.1352	17.3839	0.2471	82.7762	85.0184
41	0.0200	2.51	4.4819	10.0715	0.4491	0.1332	16.8218	0.2436	82.8744	85.1173
42	0.0205	1.6754	4.0508	9.9895	0.3899	0.1314	15.841	0.2401	82.6985	84.9524
43	0.0210	0.8493	3.7524	9.9083	0.3595	0.1291	14.8645	0.2365	83.2493	85.503
44	0.0215	0.027*	3.6313*	9.8275	0.3413*	0.1274	13.8967	0.233	82.8623	85.1313
45	0.0220	-0.7849	3.6915	9.7478	0.3698	0.1257	12.9364	0.2294	82.4551	84.7408
46	0.0225	-1.5978	3.918	9.6679	0.3946	0.1237	11.9867	0.2256	82.4376	84.7396
47	0.0230	-2.3965	4.288	9.5894	0.4492	0.1222	10.941	0.2217	81.5015	83.8386
48	0.0235	-3.1907	4.7581	9.5114	0.5046	0.1204	10.0039	0.2178	80.9177	83.2893
49	0.0240	-3.9717	5.2904	9.4347	0.5999	0.118	9.0706	0.2137	81.0376	83.423
50	0.0245	-4.7481	5.8854	9.3584	0.705	0.1169	8.4407	0.2093	79.0961	81.5277
51	0.0250	-5.5078	6.4948	9.2838	0.8115	0.1145	7.3424	0.205	79.0565	81.5151
52	0.0255	-6.2536	7.1259	9.2105	0.9218	0.1128	6.3693	0.2008	78.0591	80.5234
53	0.0260	-6.997	7.7773	9.1374	1.022	0.1114	5.5948	0.1966	76.4728	78.9533
54	0.0265	-7.731	8.4307	9.0653	1.1356	0.1093	4.5624	0.1926	76.2722	78.7459
55	0.0270	-8.4588	9.0966	8.9938	1.2403	0.1082	3.9797	0.1887	74.4259	76.9417
56	0.0275	-9.1658	9.7441	8.9244	1.3405	0.1057	2.9524	0.185	75.067	77.5511
57	0.0280	-9.8785	10.4118	8.8543	1.4518	0.1045	2.3807	0.1814	73.4738	75.995
58	0.0285	-10.5716	11.0665	8.7862	1.5499	0.1035	1.3201	0.1777	71.7033	74.2922
59	0.0290	-11.2608	11.7171	8.7185	1.6433	0.1013	0.602	0.174	71.727	74.3331
60	0.0295	-11.9398	12.3659	8.6518*	1.7508	0.1001*	0.0565*	0.17*	69.845*	72.5242*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01 and SQSR

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	48.3709	48.6499	14.5773	7.0151	0.2616	68.0185	0.4982	90.437	92.768
2	0.0005	47.2941	47.5771	14.4715	6.8633	0.2594	66.7912	0.4974	91.7413	94.0631
3	0.0010	46.5493	46.835	14.3983	6.7553	0.2578	65.4355	0.4928	91.1804	93.5254
4	0.0015	46.0259	46.3132	14.3469	6.6846	0.2564	64.8997	0.4905*	91.3426	93.6548
5	0.0020	45.5787	45.8674	14.303	6.6126	0.2551	64.1936	0.4908	92.3873	94.6915
6	0.0025	45.1988	45.4901	14.2656	6.562	0.2553	63.7081	0.4926	92.977	95.2766
7	0.0030	44.8429	45.1351	14.2307	6.511	0.254*	63.4552	0.4951	94.9029	97.1995
8	0.0035	44.5027	44.7971	14.1972	6.4663	0.254*	62.9421	0.498	96.0495	98.3545
9	0.0040	44.1847	44.4815	14.166	6.4184	0.2543	63.0438	0.5007	96.9101	99.2213
10	0.0045	43.8646	44.1639	14.1345	6.3768	0.2546	62.4731	0.5031	97.6267	99.9512
11	0.0050	43.5826	43.8844	14.1068	6.3239	0.2551	62.12	0.505	97.9992	100.3368
12	0.0055	43.3142	43.6178	14.0805	6.2927	0.255	62.0476	0.5059	98.3837	100.745
13	0.0060	43.0941	43.4007	14.0588	6.2648	0.2563	62.3046	0.5051	97.0835	99.4766
14	0.0065	42.9119	43.2212	14.0409	6.2382	0.2574	62.1364	0.5037	95.6766	98.092
15	0.0070	42.7747	43.086	14.0275	6.2155	0.2583	62.4239	0.5029	94.709	97.1068
16	0.0075	42.6881	43.002	14.019	6.2073	0.2599	62.1899	0.5034	93.6813	96.0643
17	0.0080	42.5979	42.9135	14.0101	6.1927	0.2607	62.4161	0.5049	93.643	96.0125
18	0.0085	42.5442	42.8627	14.0048	6.1849	0.2628	61.9518	0.5076	93.1332	95.4914
19	0.0090	42.4952	42.8173	14	6.1882	0.2656	62.2561	0.5109	92.3802	94.7528
20	0.0095	42.471	42.7966	13.9976	6.1843	0.2682	62.1813	0.5147	91.9023	94.2889
21	0.0100	42.4553	42.782	13.9961	6.1845	0.2691	62.4235	0.5185	92.7113	95.0893
22	0.0105	42.4471	42.7773	13.9953	6.1835	0.2719	62.2103	0.5224	92.1194	94.5039
23	0.0110	42.4346*	42.7673*	13.9941*	6.177*	0.2739	62.2453	0.5262	92.1344	94.5387
24	0.0115	42.4539	42.7883	13.9959	6.1797	0.2755	61.8325*	0.5299	92.3597	94.7754
25	0.0120	42.4704	42.8088	13.9976	6.1802	0.2789	62.5506	0.5333	91.203	93.6554
26	0.0125	42.5098	42.8495	14.0014	6.1907	0.2802	62.4499	0.5366	91.5294	93.9835
27	0.0130	42.5604	42.9031	14.0064	6.2015	0.283	62.6824	0.5395	90.6571	93.1423
28	0.0135	42.6265	42.9719	14.0129	6.2206	0.2857	62.7098	0.5424	89.8307	92.3123

29	0.0140	42.7155	43.0655	14.0216	6.2171	0.2901	62.9159	0.5453	87.9977	90.5017
30	0.0145	42.8167	43.17	14.0316	6.246	0.2935	63.0444	0.5485	86.8685	89.3829
31	0.0150	42.9268	43.2831	14.0424	6.2551	0.2968	63.1962	0.552	85.9999	88.5305
32	0.0155	43.0324	43.3909	14.0528	6.2832	0.2993	62.7562	0.5559	85.7096	88.2491
33	0.0160	43.1655	43.5281	14.0659	6.2926	0.3038	63.2201	0.5603	84.4582	87.0165
34	0.0165	43.3049	43.6715	14.0796	6.3152	0.3081	63.4831	0.5649	83.3527	85.9271
35	0.0170	43.4653	43.8365	14.0953	6.3374	0.3131	63.7162	0.5703	82.1396	84.7441
36	0.0175	43.6323	44.0064	14.1117	6.3525	0.3168	64.1559	0.5758	81.7527	84.3724
37	0.0180	43.7896	44.168	14.1272	6.3879	0.3216	64.2103	0.5815	80.8194	83.4539
38	0.0185	43.9614	44.3427	14.1441	6.4123	0.3253	64.1591	0.5874	80.5516	83.2081
39	0.0190	44.1447	44.5299	14.1621	6.434	0.3301	64.1849	0.5936	79.8362	82.5301
40	0.0195	44.3316	44.7202	14.1804	6.4687	0.3344	64.7321	0.5998	79.3791	82.0875
41	0.0200	44.5344	44.9284	14.2003	6.5049	0.3406	65.4608	0.6064	78.0394	80.7893
42	0.0205	44.7295	45.1291	14.2195	6.5361	0.347	65.5933	0.6128	76.6004	79.3931
43	0.0210	44.9397	45.3422	14.2402	6.5623	0.3511	65.8989	0.6191	76.3363	79.144
44	0.0215	45.1601	45.5672	14.2618	6.5865	0.3569	66.1326	0.6255	75.2485	78.0868
45	0.0220	45.3869	45.7997	14.2841	6.6169	0.3637	66.465	0.632	73.7567	76.6423
46	0.0225	45.6213	46.0385	14.3071	6.6601	0.3695	66.2235	0.6381	72.7267	75.6533
47	0.0230	45.8545	46.2772	14.33	6.7	0.3763	67.0836	0.6439	71.1006	74.0861
48	0.0235	46.1132	46.5417	14.3555	6.723	0.3836	67.2789	0.6496	69.3433	72.3945
49	0.0240	46.3823	46.8141	14.3819	6.771	0.3888	67.3896	0.6548	68.4105	71.4921
50	0.0245	46.6662	47.1049	14.4098	6.8027	0.3975	67.8499	0.6596	65.9191	69.0678
51	0.0250	46.9706	47.4134	14.4397	6.8514	0.4039	68.0571	0.6643	64.4754	67.6965
52	0.0255	47.295	47.7434	14.4716	6.8881	0.4118	68.4266	0.6694	62.5813	65.859
53	0.0260	47.6174	48.0703	14.5032	6.9522	0.4188	69.3189	0.6743	61.0026	64.3391
54	0.0265	47.9651	48.4233	14.5374	6.9883	0.4268	69.6793	0.6799	59.3215	62.7132
55	0.0270	48.321	48.7863	14.5724	7.0492	0.4366	70.1951	0.6857	57.0675	60.5662
56	0.0275	48.7037	49.1727	14.61	7.098	0.4435	70.6245	0.692	56.0108	59.5429
57	0.0280	49.09	49.5668	14.6479	7.1517	0.4545	71.5112	0.6986	53.7102	57.3445
58	0.0285	49.5054	49.9884	14.6887	7.2189	0.4643	72.0357	0.7051	51.8428	55.5907
59	0.0290	49.9247	50.4131	14.7299	7.2887	0.4735	72.1194	0.7114	50.2446	54.0942
60	0.0295	50.369	50.8654	14.7736	7.3362	0.4856	73.407	0.717	47.6543*	51.6682*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OCAR – NCAR

OTypeEpsilon=0.001 and TQSR

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	2.8609	4.7756	10.106	0.4711	0.1413	17.2484	0.1833	29.7675	35.0402
2	0.0005	1.2622	3.9402	9.9489	0.3795	0.1346	15.139	0.1725	28.1646	32.903
3	0.0010	0.1259*	3.6576*	9.8373	0.3601*	0.1291	13.5155	0.1661	28.6781	33.2467
4	0.0015	-0.8101	3.6992	9.7453	0.3752	0.1259	12.7417	0.1612	28.0705	32.6346
5	0.0020	-1.6275	3.9124	9.665	0.3947	0.1223	10.834	0.1571	28.4798	32.9569
6	0.0025	-2.3498	4.2366	9.594	0.4358	0.1201	9.8124	0.1537	28.0036	32.4901
7	0.0030	-3.0141	4.6077	9.5288	0.486	0.1174	8.8946	0.1508	28.4531	32.8611
8	0.0035	-3.627	5.0133	9.4685	0.5546	0.1157	8.2203	0.1481	27.9941	32.4241
9	0.0040	-4.206	5.4281	9.4117	0.6333	0.1138	7.6325	0.1458	28.152	32.5532
10	0.0045	-4.7498	5.8448	9.3582	0.7088	0.1121	7.1243	0.1437	28.1653	32.5593
11	0.0050	-5.2715	6.2664	9.307	0.7778	0.1109	6.3839	0.1417	27.7699	32.1997
12	0.0055	-5.7728	6.682	9.2577	0.85	0.1094	5.8003	0.1399	27.8845	32.2975
13	0.0060	-6.2639	7.0995	9.2095	0.9196	0.1079	5.1736	0.1382	28.0668	32.4594
14	0.0065	-6.735	7.5109	9.1632	0.9856	0.1068	4.6106	0.1366	27.8636	32.2751
15	0.0070	-7.1963	7.9202	9.1179	1.0527	0.1057	4.2171	0.135	27.6827	32.1108
16	0.0075	-7.6472	8.3258	9.0736	1.1252	0.1047	3.5765	0.1335	27.489	31.9355
17	0.0080	-8.0883	8.7247	9.0302	1.1868	0.1034	3.0576	0.1321	27.7447	32.1668
18	0.0085	-8.5209	9.1215	8.9877	1.2479	0.1024	2.6412	0.1307	27.653	32.0813
19	0.0090	-8.9449	9.5138	8.9461	1.3091	0.1015	2.0484	0.1293	27.4734	31.9159
20	0.0095	-9.3597	9.8997	8.9053*	1.3692	0.1005*	1.6484*	0.128*	27.4062*	31.858*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.001 and SQSR

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	2.8609	4.7756	10.106	0.4711	0.1413	17.2484	0.1833	29.7675	35.0402
2	0.0005	1.9575	4.2415	10.0172	0.4136	0.1368	15.8365	0.176	28.6662*	33.3835*
3	0.0010	1.5055	4.0094	9.9728	0.3749	0.1334	14.9878	0.173	29.6262	34.1628
4	0.0015	1.2484	3.9014	9.9476	0.3686	0.132	14.947	0.1713	29.7708	34.2497
5	0.0020	1.109	3.8406	9.9338	0.3684	0.1306	13.6958	0.1704	30.4676	34.849
6	0.0025	1.0654*	3.8218	9.9296*	0.3599	0.1302	13.4769	0.1702*	30.761	35.0931

7	0.0030	1.0761	3.8132*	9.9306	0.3596	0.1293*	13.0497	0.1704	31.7995	36.0277
8	0.0035	1.1427	3.8377	9.9372	0.3562*	0.1297	13.0863	0.1711	31.8964	36.115
9	0.0040	1.2446	3.8719	9.9472	0.361	0.1299	12.9906*	0.1719	32.3458	36.5384
10	0.0045	1.3788	3.9194	9.9604	0.3666	0.1301	13.1761	0.173	33.0377	37.1913
11	0.0050	1.542	3.9943	9.9764	0.3751	0.1312	13.3237	0.1743	32.8811	37.0491
12	0.0055	1.723	4.071	9.9942	0.3836	0.1315	13.3005	0.1758	33.7178	37.8246
13	0.0060	1.9189	4.1681	10.0134	0.3927	0.1323	13.5127	0.1774	34.0701	38.1767
14	0.0065	2.137	4.2861	10.0349	0.4144	0.1334	14.0154	0.1791	34.2907	38.3799
15	0.0070	2.3683	4.4179	10.0576	0.4229	0.1344	13.9951	0.1809	34.6431	38.7222
16	0.0075	2.6099	4.5703	10.0813	0.4387	0.136	14.5482	0.1828	34.4164	38.5174
17	0.0080	2.8638	4.73	10.1063	0.4605	0.1369	14.726	0.1848	34.9692	39.0589
18	0.0085	3.1297	4.909	10.1324	0.489	0.1382	15.4167	0.1869	35.2137	39.2803
19	0.0090	3.4071	5.1051	10.1596	0.5159	0.1397	15.4524	0.189	35.3297	39.3888
20	0.0095	3.6971	5.3185	10.1881	0.5592	0.1412	15.8002	0.1913	35.4241	39.5034

% denotes numbers in percent; * denotes the column-specific minimum/minima

OAR – CCAR

OTypeEpsilon=0.001 and TQSR

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	4.8612	6.1776	10.3025	0.6993	0.1404	18.9062	0.1964	39.8838	43.6732
2	0.0005	3.2175	4.9383	10.141	0.5087	0.1356	17.1512	0.1877	38.3939	42.1658
3	0.0010	1.9565	4.1771	10.0171	0.4092	0.1316	15.3922	0.1806	37.247	41.0757
4	0.0015	0.8676	3.7588	9.9101	0.3589	0.1292	14.3202	0.1747	35.2068	39.1196
5	0.0020	-0.1087*	3.6145*	9.8142	0.3452*	0.1261	13.1462	0.1697	34.586	38.5182
6	0.0025	-1.0113	3.7118	9.7255	0.3778	0.1232	11.8585	0.1653	34.1498	38.0912
7	0.0030	-1.8519	3.9912	9.643	0.4152	0.1208	10.9179	0.1612	33.4313	37.4613
8	0.0035	-2.634	4.3852	9.5661	0.4612	0.1188	10.3261	0.157	32.1949	36.3126
9	0.0040	-3.357	4.8311	9.4951	0.5261	0.1166	9.3274	0.1532	31.3493	35.5433
10	0.0045	-4.0324	5.3028	9.4287	0.6026	0.1146	8.7835	0.1497	30.6072	34.8521
11	0.0050	-4.6552	5.7755	9.3675	0.6891	0.1129	7.7969	0.1465	29.7673	34.0632
12	0.0055	-5.2291	6.2326	9.3111	0.7726	0.1111	7.0979	0.1439	29.4703	33.7614
13	0.0060	-5.7749	6.6844	9.2575	0.8486	0.1095	6.3747	0.1415	29.2474	33.5477
14	0.0065	-6.2956	7.1298	9.2064	0.9225	0.1082	5.7366	0.1394	28.7961	33.1196
15	0.0070	-6.7903	7.5615	9.1578	1.0018	0.1069	5.4212	0.1375	28.5289	32.8742
16	0.0075	-7.2704	7.9873	9.1106	1.0686	0.1057	4.8377	0.1357	28.3779	32.7282
17	0.0080	-7.737	8.407	9.0647	1.1415	0.1045	4.0552	0.134	28.2526	32.6236
18	0.0085	-8.1899	8.8187	9.0202	1.1987	0.1033	3.558	0.1325	28.1931	32.5646
19	0.0090	-8.6315	9.2252	8.9769	1.261	0.1024	2.9742	0.131	27.8776	32.2808
20	0.0095	-9.0661	9.6276	8.9342*	1.3309	0.1014*	2.5048*	0.1295*	27.7265*	32.1455*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.001 and SQSR

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	4.8612	6.1776	10.3025	0.6993	0.1404	18.9062	0.1964	39.8838	43.6732
2	0.0005	3.9283	5.4486	10.2108	0.5864	0.1377	17.8655	0.1914	38.9892	42.7483
3	0.0010	3.3641	5.0329	10.1554	0.5236	0.1354	16.8982	0.1879	38.8027	42.5931
4	0.0015	2.9707	4.7811	10.1168	0.4868	0.1356	16.5704	0.1856	36.8525	40.737
5	0.0020	2.676	4.5876	10.0878	0.4629	0.1342	16.2703	0.1839	37.086	40.9441
6	0.0025	2.4588	4.4565	10.0665	0.4452	0.1335	15.6146	0.1829	36.9885	40.8332
7	0.0030	2.2962	4.3645	10.0505	0.4307	0.1331	15.3904	0.182	36.6948	40.6127
8	0.0035	2.1926	4.3107	10.0403	0.4309	0.1331	15.3229	0.181	35.9907	39.9689
9	0.0040	2.1515*	4.2892*	10.0363*	0.4208*	0.133	15.1573	0.1804	35.5805	39.6126
10	0.0045	2.1587	4.2906	10.037	0.4263	0.1329*	15.0284*	0.1801*	35.5242	39.5522
11	0.0050	2.2189	4.3278	10.0429	0.4308	0.1334	15.3077	0.1801*	34.9883*	39.0516*
12	0.0055	2.3267	4.3882	10.0535	0.4351	0.1338	15.186	0.1807	35.063	39.0983
13	0.0060	2.4653	4.466	10.0671	0.4401	0.134	15.1581	0.1815	35.4844	39.5006
14	0.0065	2.6375	4.5738	10.084	0.4564	0.1349	15.3402	0.1828	35.4498	39.4646
15	0.0070	2.8372	4.7045	10.1036	0.4719	0.1361	15.3695	0.1842	35.3791	39.4028
16	0.0075	3.0504	4.8433	10.1246	0.4958	0.1367	15.6463	0.1858	35.8372	39.8392
17	0.0080	3.282	5.0044	10.1473	0.5138	0.1379	16.0218	0.1875	35.973	39.9737
18	0.0085	3.5316	5.1856	10.1719	0.5396	0.1393	15.9583	0.1895	35.9926	40.0072
19	0.0090	3.7933	5.3823	10.1976	0.5691	0.1409	16.2881	0.1915	35.9067	39.9359
20	0.0095	4.0647	5.5902	10.2242	0.6031	0.1423	16.6318	0.1936	36.0044	40.0353

% denotes numbers in percent; * denotes the column-specific minimum/minima

OAR – NCAR

OTypeEpsilon=0.001 and TQSR

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	3.2775	5.0426	10.1469	0.5127	0.1419	17.0854	0.187	31.7634	36.8138
2	0.0005	1.5957	4.0638	9.9817	0.3902	0.135	15.4636	0.1754	29.9355	34.5307
3	0.0010	0.4236*	3.6981	9.8665	0.3544*	0.1304	14.0806	0.1686	29.2747	33.818
4	0.0015	-0.5529	3.6496*	9.7706	0.3562	0.1257	12.4836	0.1632	29.8137	34.2357
5	0.0020	-1.3931	3.8201	9.688	0.3755	0.1223	11.4616	0.1589	29.9902	34.3325
6	0.0025	-2.1503	4.1282	9.6136	0.4227	0.12	10.4636	0.1552	29.3465	33.7068
7	0.0030	-2.8316	4.4882	9.5467	0.4692	0.1172	9.7468	0.152	29.7493	34.0363
8	0.0035	-3.4687	4.8974	9.4841	0.5401	0.1155	8.9705	0.1492	29.2109	33.5176
9	0.0040	-4.0605	5.3117	9.426	0.6093	0.1133	8.1115	0.1468	29.5111	33.7936
10	0.0045	-4.6205	5.738	9.3709	0.6888	0.1118	7.5876	0.1445	29.1977	33.4846
11	0.0050	-5.1518	6.1638	9.3187	0.756	0.1107	6.8985	0.1424	28.7316	33.0558
12	0.0055	-5.6645	6.5872	9.2684	0.8367	0.1092	6.3329	0.1405	28.6668	32.9955
13	0.0060	-6.1553	7.0027	9.2201	0.9046	0.1077	5.6567	0.1388	28.8204	33.1328
14	0.0065	-6.6341	7.4188	9.1731	0.9748	0.1066	5.2152	0.1371	28.6697	32.9929
15	0.0070	-7.1012	7.8316	9.1272	1.0411	0.1054	4.5802	0.1355	28.5701	32.9101
16	0.0075	-7.5532	8.2367	9.0828	1.1084	0.1043	4.1047	0.134	28.4993	32.844
17	0.0080	-7.9984	8.6402	9.0391	1.1757	0.1032	3.6424	0.1325	28.4437	32.7955
18	0.0085	-8.4336	9.0388	8.9963	1.2358	0.1022	3.0486	0.1311	28.34	32.7005
19	0.0090	-8.8645	9.4371	8.954	1.2975	0.1013	2.5514	0.1297	28.1344	32.5128
20	0.0095	-9.2822	9.8252	8.9129*	1.357	0.1002*	2.1966*	0.1284*	28.1048*	32.4826*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.001 and SQSR

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	3.2775	5.0426	10.1469	0.5127	0.1419	17.0854	0.187	31.7634	36.8138
2	0.0005	2.2959	4.4099	10.0505	0.4358	0.137	16.1677	0.1789	30.6259*	35.1815
3	0.0010	1.8085	4.1433	10.0026	0.407	0.1343	15.5695	0.1755	30.6995	35.1736*
4	0.0015	1.5183	3.995	9.9741	0.3817	0.1319	14.6977	0.1735	31.4795	35.8436
5	0.0020	1.3526	3.9103	9.9578	0.3723	0.1301	14.5392	0.1724	32.5132	36.7399
6	0.0025	1.2752	3.883	9.9502	0.3679	0.13	14.1729	0.1719*	32.2229	36.4379
7	0.0030	1.2695*	3.8661*	9.9496*	0.3678	0.1289*	14.1844	0.1719*	33.3864	37.4977
8	0.0035	1.3099	3.8865	9.9536	0.3657*	0.1294	14.2705	0.1723	33.1658	37.2873
9	0.0040	1.4007	3.9165	9.9625	0.3688	0.1293	13.9444*	0.173	33.8607	37.9464
10	0.0045	1.5221	3.9668	9.9744	0.3686	0.1297	14.1028	0.174	34.2166	38.2612
11	0.0050	1.6756	4.0423	9.9895	0.3869	0.1308	14.3693	0.1752	34.0023	38.0733
12	0.0055	1.8461	4.122	10.0063	0.396	0.1312	14.6382	0.1766	34.5467	38.5853
13	0.0060	2.0383	4.2189	10.0252	0.415	0.1318	14.6404	0.1781	35.1168	39.1346
14	0.0065	2.2537	4.3412	10.0463	0.4252	0.133	15.042	0.1799	35.2201	39.2399
15	0.0070	2.4783	4.4728	10.0684	0.44	0.134	15.0861	0.1816	35.5891	39.598
16	0.0075	2.7166	4.6211	10.0918	0.4553	0.135	15.4508	0.1835	35.8645	39.868
17	0.0080	2.9706	4.7867	10.1168	0.4791	0.1361	15.6851	0.1855	36.2323	40.2181
18	0.0085	3.2365	4.9735	10.1429	0.5001	0.1378	15.7701	0.1875	36.1039	40.1147
19	0.0090	3.5068	5.1681	10.1694	0.5323	0.1392	16.0591	0.1896	36.173	40.1822
20	0.0095	3.7949	5.3791	10.1977	0.5687	0.1404	16.463	0.1918	36.61	40.6003

% denotes numbers in percent; * denotes the column-specific minimum/minima

No Contamination

TQSR

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	-0.0372*	3.6745*	9.8212	0.3564*	0.1304	13.7907	0.1632	25.1971	30.2283
2	0.0005	-1.2338	3.8182	9.7037	0.3854	0.1261	12.5923	0.1567	24.2543*	29.23*
3	0.0010	-2.1095	4.1275	9.6176	0.4211	0.1216	10.6049	0.1525	25.4844	30.2363
4	0.0015	-2.8165	4.4965	9.5482	0.4733	0.1187	9.4371	0.1495	25.9912	30.6642
5	0.0020	-3.4503	4.8958	9.4859	0.5391	0.1165	8.7917	0.1469	26.0984	30.7363
6	0.0025	-4.0255	5.2964	9.4294	0.611	0.1144	8.0018	0.1448	26.5197	31.0908
7	0.0030	-4.5656	5.7043	9.3763	0.6823	0.1129	7.4268	0.1428	26.4365	31.0161
8	0.0035	-5.0812	6.1128	9.3257	0.7522	0.1115	6.8264	0.141	26.4268	31.0026
9	0.0040	-5.5677	6.5137	9.2779	0.8245	0.1104	6.5255	0.1393	26.2361	30.8278
10	0.0045	-6.0486	6.9177	9.2306	0.8907	0.1088	5.7409	0.1377	26.5703	31.1285
11	0.0050	-6.5133	7.3208	9.185	0.9612	0.1079	5.2425	0.1362	26.262	30.8548
12	0.0055	-6.961	7.7149	9.141	1.0223	0.1069	4.6571	0.1348	26.1394	30.7435
13	0.0060	-7.4	8.105	9.0978	1.0853	0.1056	4.1864	0.1334	26.3547	30.9367
14	0.0065	-7.8316	8.4959	9.0554	1.1539	0.1048	3.6761	0.132	26.0487	30.6607

15	0.0070	-8.2568	8.8823	9.0137	1.2156	0.1035	3.13	0.1307	26.2354	30.8296
16	0.0075	-8.6721	9.2633	8.9729	1.2768	0.1024	2.6888	0.1294	26.3914	30.9675
17	0.0080	-9.0834	9.6448	8.9325	1.3359	0.1015	2.175	0.1282	26.2393	30.8326
18	0.0085	-9.4874	10.0217	8.8928	1.3973	0.1007	1.7174	0.127	26.1296	30.7354
19	0.0090	-9.8869	10.3966	8.8535	1.4539	0.0999	1.2638	0.1258	25.9734	30.5952
20	0.0095	-10.2776	10.7642	8.8151	1.5137	0.0989	0.852	0.1246	26.0141	30.6344
21	0.0100	-10.6663	11.1327	8.7769	1.5685	0.0982	0.4074	0.1235	25.7601	30.4093
22	0.0105	-11.0526	11.4979	8.739	1.6259	0.097	-0.0338*	0.1224	26.181	30.785
23	0.0110	-11.4328	11.8606	8.7016	1.6805	0.0962	-0.4323	0.1213	25.9982	30.6234
24	0.0115	-11.8089	12.2195	8.6647	1.7335	0.0953	-0.8648	0.1202	26.1073	30.7207
25	0.0120	-12.1816	12.5768	8.6281	1.7917	0.0945	-1.3297	0.1191	26.0282	30.6481
26	0.0125	-12.5488	12.9297	8.592	1.8448	0.0937	-1.7532	0.1181	25.9753	30.6017
27	0.0130	-12.9161	13.2837	8.5559	1.8969	0.093	-2.173	0.117	25.8143	30.4593
28	0.0135	-13.2785	13.6328	8.5203	1.9501	0.0921	-2.5544	0.116	25.9831	30.6088
29	0.0140	-13.6385	13.9807	8.4849	2.0027	0.0913	-2.9673	0.115	25.9742	30.6009
30	0.0145	-13.9946	14.3258	8.4499	2.0516	0.0906	-3.3071	0.114	25.8719	30.5103
31	0.0150	-14.3508	14.671	8.4149	2.1043	0.0898	-3.75	0.113	25.9284	30.5635
32	0.0155	-14.7025	15.0125	8.3804	2.1555	0.089	-4.1207	0.1121	25.9792	30.6111
33	0.0160	-15.0531	15.3537	8.3459	2.2087	0.0883	-4.4198	0.1111	25.8558	30.4994
34	0.0165	-15.3995	15.6911	8.3119	2.2583	0.0876	-4.9848	0.1102	25.7906	30.4415
35	0.0170	-15.7424	16.0251	8.2782	2.306	0.0867	-5.3131	0.1092	25.9363	30.5739
36	0.0175	-16.0866	16.3607	8.2444	2.3564	0.0859	-5.6735	0.1083	26.0966	30.7154
37	0.0180	-16.4283	16.695	8.2108	2.4066	0.0853	-6.1291	0.1074	25.8833	30.5245
38	0.0185	-16.7643	17.0234	8.1778	2.457	0.0846	-6.5138	0.1065	25.9752	30.6063
39	0.0190	-17.1002	17.3524	8.1448	2.5044	0.0839	-6.8323	0.1056	25.873	30.516
40	0.0195	-17.4335	17.6788	8.1121	2.5522	0.0832	-7.2446	0.1047	25.9141	30.5495
41	0.0200	-17.7675	18.0062	8.0793	2.6036	0.0825	-7.4977	0.1039	25.957	30.5894
42	0.0205	-18.0963	18.3289	8.0469	2.6478	0.0818	-7.9384	0.103	25.9178	30.5544
43	0.0210	-18.426	18.6524	8.0146	2.694	0.0811	-8.3151	0.1022	25.9691	30.6017
44	0.0215	-18.7518	18.9727	7.9825	2.7443	0.0805	-8.7215	0.1013	25.9191	30.5564
45	0.0220	-19.0754	19.2906	7.9508	2.7889	0.0797	-9.0628	0.1005	26.0275	30.6528
46	0.0225	-19.4015	19.6116	7.9187	2.8397	0.0792	-9.4619	0.0997	25.9023	30.54
47	0.0230	-19.7219	19.9267	7.8872	2.8852	0.0784	-9.859	0.0988	26.06	30.6809
48	0.0235	-20.044	20.2445	7.8556	2.9322	0.078	-10.1944	0.098	25.695	30.3536
49	0.0240	-20.3615	20.5571	7.8244	2.9812	0.0773	-10.4984	0.0972	25.8014	30.4487
50	0.0245	-20.6792	20.8704	7.7932	3.0259	0.0767	-10.8597	0.0964	25.7319	30.3853
51	0.0250	-20.9947	21.1813	7.7622	3.0713	0.076	-11.2744	0.0956	25.894	30.5333
52	0.0255	-21.3096	21.4917	7.7312	3.1171	0.0753	-11.6289	0.0949	26	30.6284
53	0.0260	-21.6241	21.8022	7.7004	3.1604	0.0747	-11.9254	0.0941	25.9313	30.5655
54	0.0265	-21.9366	22.1113	7.6696	3.2053	0.0743	-12.3061	0.0933	25.61	30.2785
55	0.0270	-22.2463	22.417	7.6392	3.2509	0.0736	-12.6287	0.0926	25.6915	30.3532
56	0.0275	-22.5575	22.7245	7.6086	3.299	0.073	-12.9509	0.0918	25.6932	30.3541
57	0.0280	-22.865	23.0283	7.5784	3.3398	0.0724	-13.355	0.0911	25.8227	30.4708
58	0.0285	-23.171	23.3312	7.5484	3.3872	0.0719	-13.6469	0.0903	25.5414	30.2211
59	0.0290	-23.4766	23.6333	7.5183	3.4302	0.0713	-13.9658	0.0896	25.6657	30.3334
60	0.0295	-23.7805	23.9341	7.4885*	3.4735	0.0707*	-14.3394	0.0889*	25.6022	30.2753

% denotes numbers in percent; * denotes the column-specific minimum/minima

SQSR

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	-0.0372*	3.6745	9.8212	0.3564	0.1304	13.7907	0.1632	25.1971	30.2283
2	0.0005	-0.5574	3.6798	9.7701	0.3625	0.1278	13.3158	0.1599	25.1301	30.0259
3	0.0010	-0.7651	3.6785	9.7497	0.3615	0.125	12.0343	0.1589*	27.0708	31.7147
4	0.0015	-0.8058	3.675	9.7457*	0.3587	0.1242	11.5615	0.1589*	28.0021	32.5404
5	0.0020	-0.778	3.6627	9.7485	0.3544	0.1237	11.3149	0.1594	28.8629	33.3029
6	0.0025	-0.6866	3.6425	9.7574	0.3555	0.1236*	11.2053*	0.1604	29.7535	34.1088
7	0.0030	-0.5617	3.6255	9.7697	0.3564	0.1239	11.307	0.1615	30.3476	34.6657
8	0.0035	-0.4079	3.6141	9.7848	0.3524	0.1245	11.441	0.1628	30.7293	35.0269
9	0.0040	-0.2261	3.6117	9.8027	0.3466	0.1255	11.567	0.1643	30.9442	35.2359
10	0.0045	-0.0401	3.6103*	9.821	0.3412	0.1259	11.7074	0.1658	31.7578	35.9885
11	0.0050	0.1717	3.6299	9.8418	0.3405*	0.127	12.0378	0.1675	31.9309	36.1638
12	0.0055	0.3976	3.6617	9.864	0.3435	0.128	12.2931	0.1693	32.2945	36.507
13	0.0060	0.6347	3.7087	9.8873	0.3459	0.1289	12.5617	0.1712	32.7293	36.9322
14	0.0065	0.8797	3.7751	9.9113	0.3553	0.1302	12.7849	0.1731	32.9672	37.1487
15	0.0070	1.1405	3.8563	9.9369	0.3649	0.1311	13.0049	0.175	33.5596	37.7121
16	0.0075	1.4016	3.9595	9.9626	0.3706	0.1324	13.1891	0.177	33.675	37.8343
17	0.0080	1.6844	4.0845	9.9904	0.3811	0.1337	13.4337	0.1792	33.9976	38.1552
18	0.0085	1.9686	4.2287	10.0183	0.3989	0.1353	13.737	0.1813	34.0398	38.1802
19	0.0090	2.2591	4.3901	10.0468	0.4238	0.1368	13.9889	0.1835	34.1153	38.2713
20	0.0095	2.5597	4.5667	10.0764	0.439	0.1381	14.4338	0.1858	34.5343	38.6711
21	0.0100	2.8743	4.7758	10.1073	0.4623	0.1405	14.9096	0.1883	34.0078	38.1881

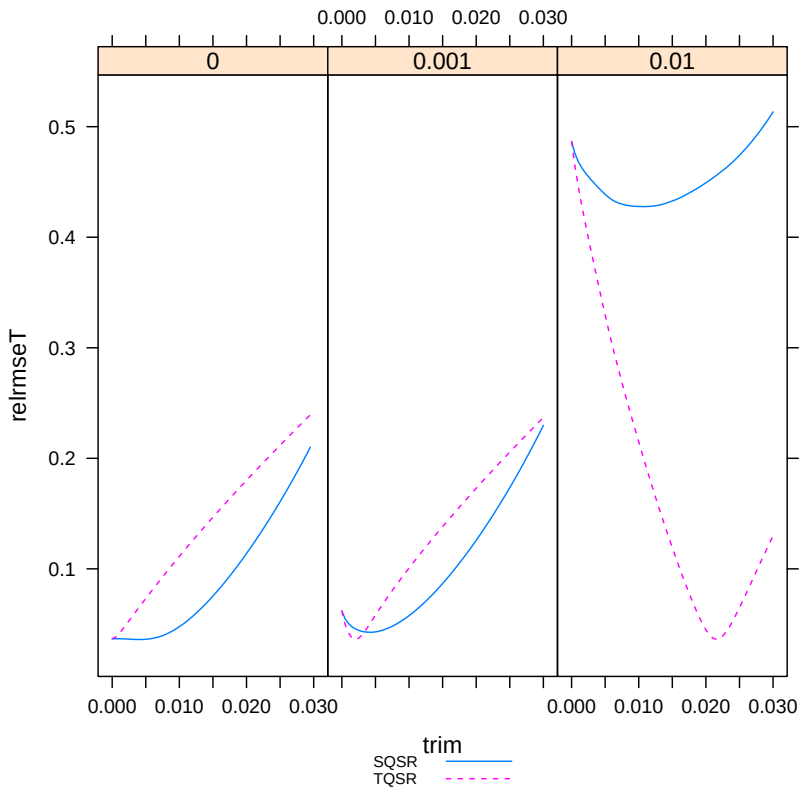
22	0.0105	3.192	4.98	10.1385	0.4895	0.1411	15.1068	0.1907	35.1216	39.2396
23	0.0110	3.5114	5.2095	10.1699	0.523	0.143	15.3526	0.1931	35.0317	39.1728
24	0.0115	3.8465	5.4575	10.2028	0.5637	0.1448	15.7498	0.1957	35.2027	39.3331
25	0.0120	4.1776	5.7151	10.2353	0.6048	0.1469	16.304	0.1982	34.9605	39.1127
26	0.0125	4.5272	5.9929	10.2697	0.6427	0.1489	16.8296	0.2009	34.9443	39.1218
27	0.0130	4.8781	6.2787	10.3042	0.6936	0.1509	17.268	0.2037	34.964	39.1428
28	0.0135	5.2352	6.5736	10.3392	0.7423	0.1526	17.6751	0.2065	35.2612	39.4292
29	0.0140	5.6013	6.8861	10.3752	0.7932	0.1549	18.2317	0.2093	35.0903	39.2955
30	0.0145	5.9718	7.2069	10.4116	0.8522	0.1572	18.7636	0.2122	35.0132	39.2377
31	0.0150	6.353	7.5439	10.4491	0.9054	0.1598	19.3699	0.2153	34.6881	38.9427
32	0.0155	6.7381	7.8864	10.4869	0.9548	0.1622	19.8302	0.2184	34.6419	38.9346
33	0.0160	7.1236	8.2362	10.5248	1.0138	0.1651	20.3971	0.2215	34.2243	38.5584
34	0.0165	7.5216	8.5999	10.5639	1.0794	0.1679	20.9405	0.2248	33.8966	38.2755
35	0.0170	7.9233	8.968	10.6034	1.1313	0.1704	21.5759	0.2281	33.8286	38.2271
36	0.0175	8.3379	9.3498	10.6441	1.1936	0.1729	21.9965	0.2315	33.9151	38.3129
37	0.0180	8.7542	9.7423	10.685	1.2528	0.1765	22.7261	0.2349	33.0913	37.5657
38	0.0185	9.1771	10.137	10.7265	1.3173	0.179	23.3192	0.2385	33.187	37.6791
39	0.0190	9.6073	10.5473	10.7688	1.3824	0.183	23.9381	0.2421	32.3144	36.9018
40	0.0195	10.0504	10.9657	10.8123	1.4469	0.1858	24.3512	0.2458	32.3243	36.9231
41	0.0200	10.491	11.3869	10.8556	1.5158	0.1893	24.9896	0.2496	31.8814	36.5417
42	0.0205	10.9423	11.8204	10.9	1.5803	0.193	25.7085	0.2536	31.376	36.0976
43	0.0210	11.4037	12.2633	10.9453	1.6457	0.1965	26.4351	0.2576	31.1168	35.8685
44	0.0215	11.8712	12.7175	10.9912	1.718	0.201	26.9551	0.2617	30.2391	35.0816
45	0.0220	12.338	13.1675	11.0371	1.7804	0.2043	27.5079	0.2659	30.1441	35.0066
46	0.0225	12.812	13.6306	11.0837	1.8537	0.209	28.4576	0.2702	29.2533	34.2241
47	0.0230	13.3005	14.1067	11.1317	1.9271	0.2134	29.1223	0.2747	28.7294	33.7534
48	0.0235	13.792	14.5872	11.1799	2.0048	0.218	29.827	0.2792	28.1002	33.1984
49	0.0240	14.2889	15.0744	11.2288	2.0653	0.2227	30.4624	0.2836	27.3443	32.5255
50	0.0245	14.802	15.5777	11.2792	2.1451	0.2276	31.3179	0.2884	26.733	32.0022
51	0.0250	15.3156	16.0794	11.3296	2.2191	0.2316	32.1158	0.2932	26.6279	31.917
52	0.0255	15.836	16.5932	11.3808	2.2978	0.2371	32.6873	0.2982	25.7498	31.1496
53	0.0260	16.3626	17.113	11.4325	2.3774	0.2426	33.5059	0.3032	24.9919	30.5195
54	0.0265	16.904	17.6483	11.4857	2.4534	0.2484	34.3358	0.3084	24.1826	29.836
55	0.0270	17.4458	18.1841	11.5389	2.534	0.2541	35.0624	0.3138	23.493	29.2781
56	0.0275	18.0002	18.7323	11.5934	2.6105	0.2597	35.9562	0.3192	22.9043	28.8033
57	0.0280	18.5576	19.2855	11.6482	2.6943	0.2661	36.7042	0.3247	22.0623	28.1389
58	0.0285	19.1258	19.8504	11.704	2.7748	0.2727	37.4854	0.3304	21.147	27.4169
59	0.0290	19.7004	20.4206	11.7604	2.8542	0.2791	38.3972	0.3362	20.471	26.8801
60	0.0295	20.2895	21.0076	11.8183	2.9383	0.2864	39.2073	0.3421	19.4535*	26.0606*

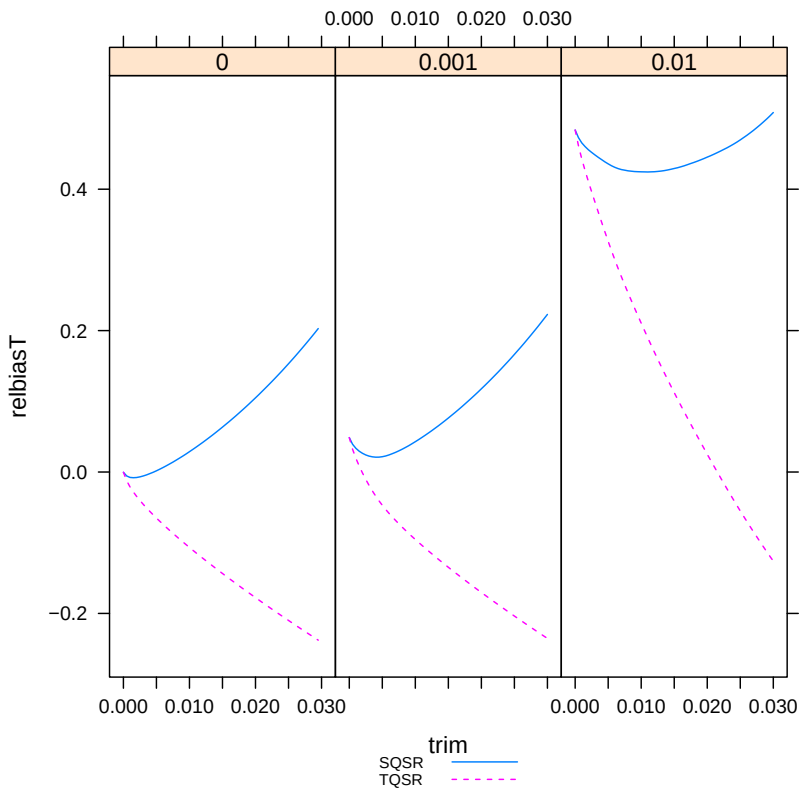
% denotes numbers in percent; * denotes the column-specific minimum/minima

E.1.5. Plots

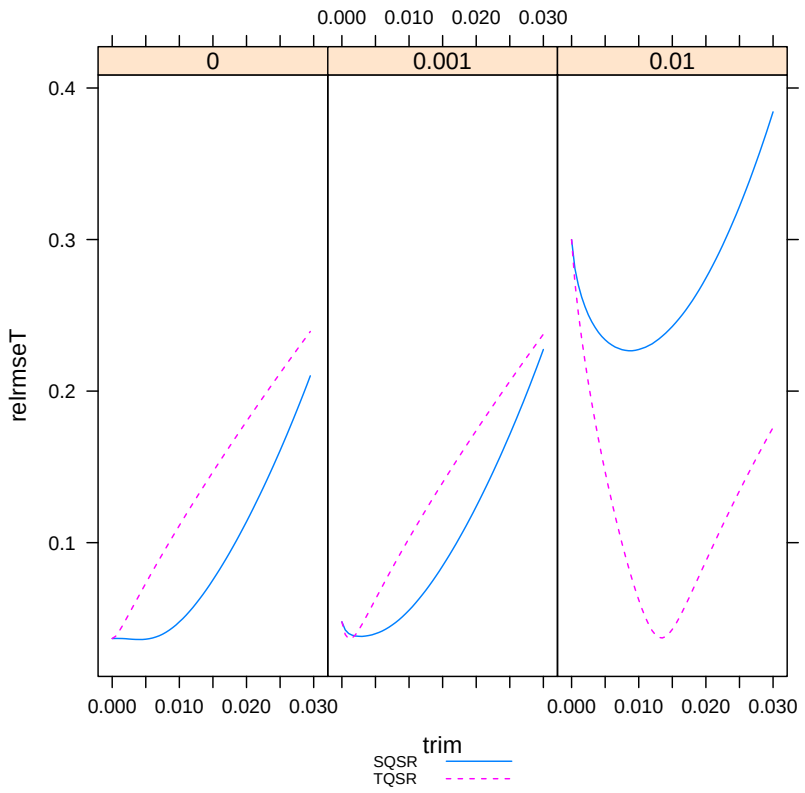
In this section, we report graphical displays of certain numerical criteria for the estimators. The lattice-type plots are partitioned into panels for SQSR and TQSR.

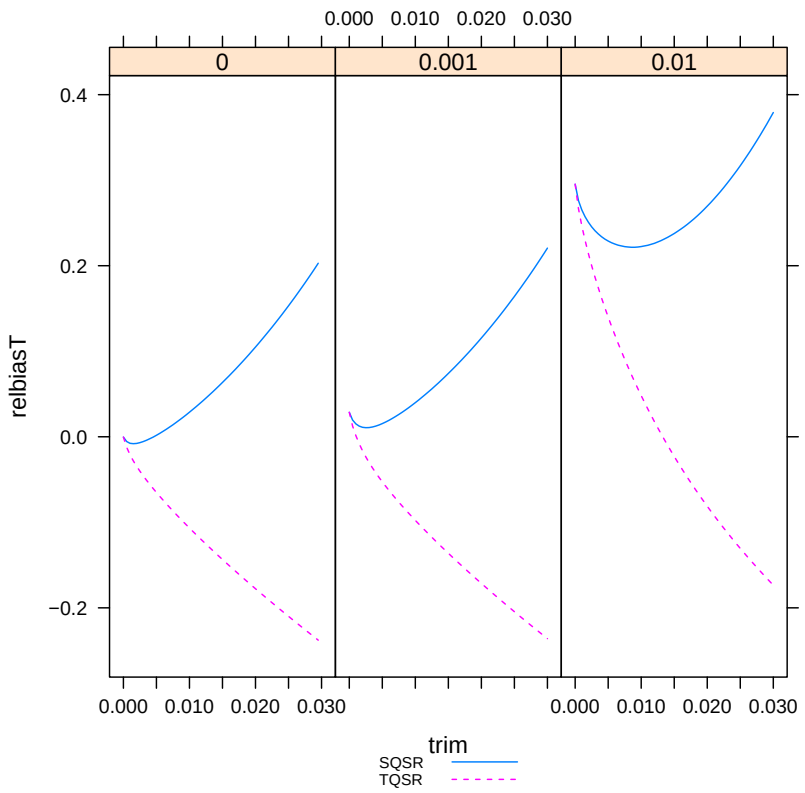
OCAR – CCAR


0
0.001
0.01
relrmseT
0.5
0.4
0.3
0.2
0.1
0.000 0.010 0.020 0.030
trim
SQSR
TQSR

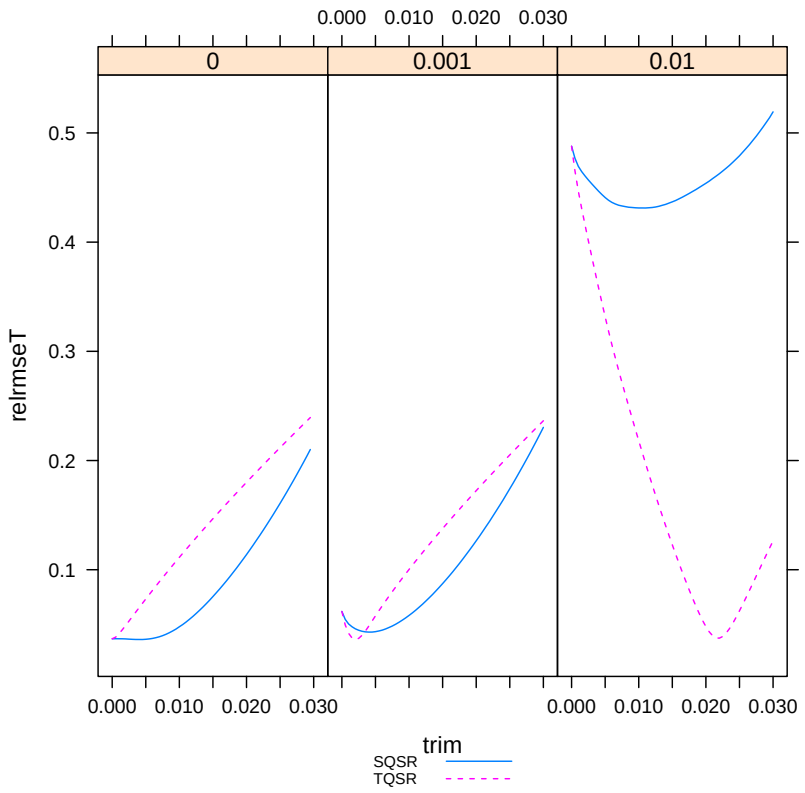

0
0.001
0.01
relbiasT
0.4
0.2
0.0
−0.2
0.000 0.010 0.020 0.030
trim
SQSR
TQSR

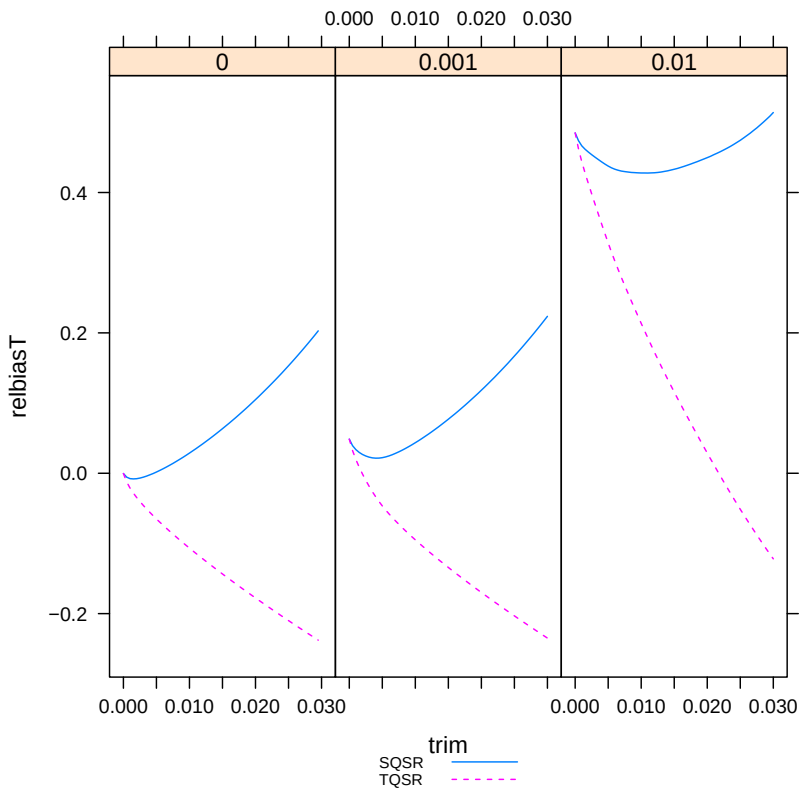
OCAR – NCAR


0
0.001
0.01
relrmseT
0.4
0.3
0.2
0.1
0.000 0.010 0.020 0.030
trim
SQSR
TQSR

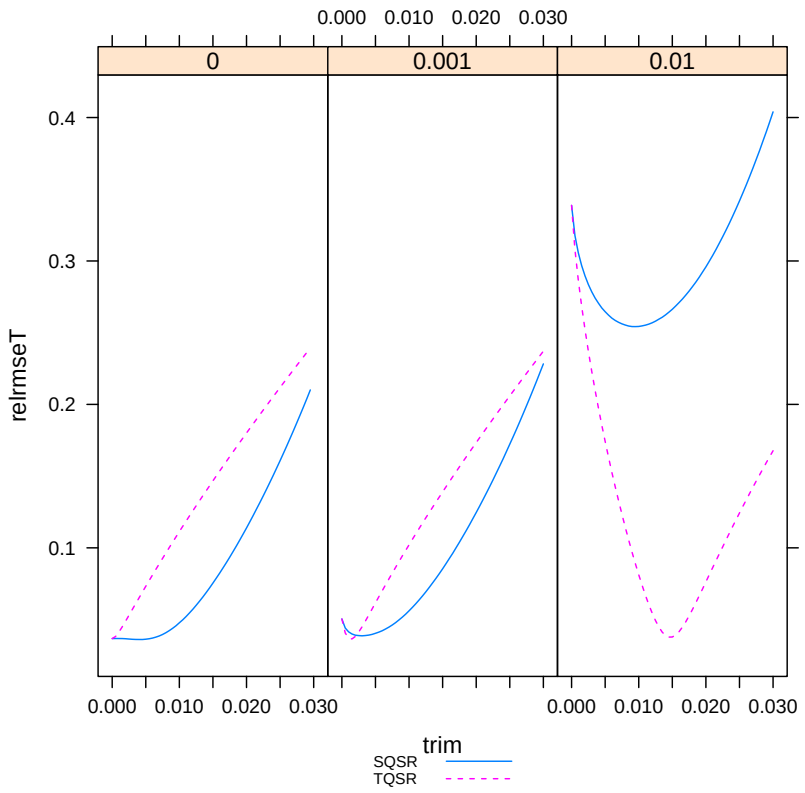

0
0.001
0.01
relbiasT
0.4
0.2
0.0
−0.2
0.000 0.010 0.020 0.030
trim
SQSR
TQSR

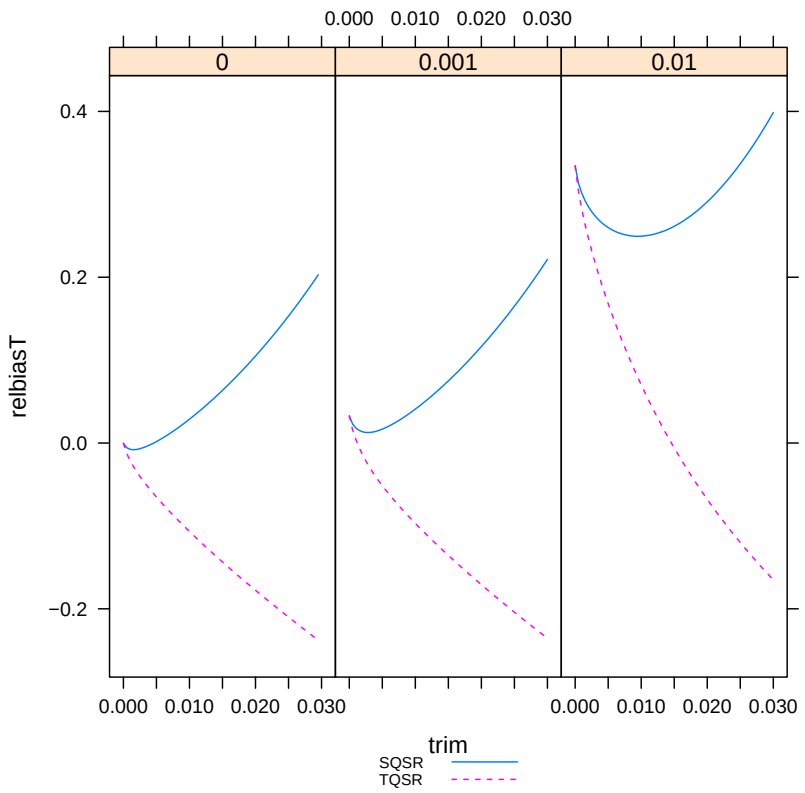
OAR – CCAR


0
0.001
0.01
relrmseT
0.5
0.4
0.3
0.2
0.1
0.000 0.010 0.020 0.030
trim
SQSR
TQSR


0
0.001
0.01
relbiasT
0.4
0.2
0.0
−0.2
0.000 0.010 0.020 0.030
trim
SQSR
TQSR

OAR – NCAR


0
0.001
0.01
relrmseT
0.1
0.2
0.3
0.4
0.000 0.010 0.020 0.030
trim
SQSR
TQSR


0
0.001
0.01
relbiasT
−0.2
0.0
0.2
0.4
0.000 0.010 0.020 0.030
trim
SQSR
TQSR

E.1.6. Comments, Notation and Specifications

It is evident from the visual displays that the compensation (i.e., SQSR) has an effect. The findings are as follows. (1) The relative mean square error (of the point estimate) of the SQSR does not touch such low values like TQSR, irrespective of the OType-CType mechanism. (2) We expected that the particular OType-CType mechanism has no effect on the estimators. In particular, the OAR-mechanism cannot unfold its effect, since it is not reflected in the estimation process (i.e., the outlier-probability-generating variable "rb170" is irrelevant). (3) Even though SQSR does not feature a global minimum w.r.t. to relrmseT that is lower than TQSR, it exhibits a broder range where the curve is "flat". Thus, the loss associated with "a not ideally chosen" trimming proportion is considerably smaller than in case of TQSR. Clearly, a player with perfect insight (i.e., equipped with complete information) will choose TQSR in this game because he chooses the relrmseT-minimizing (equivalent to payoff-maximizing strategy) trimming proportion. For him, the SQSR is no rational strategy. For a player with imcomplete information, on the other hand, SQSR is a good choice. It reflects that it is reasonale for this player to cooperate in some kind with nature (the antagonist). He chooses the broader range of reasonable trimming proportions (where the curve is "flat") for the price of not touching at the global minimum.

`Notation: (1) stars (i.e., *) in the tables denote the minimum/minima; (2) "Inf" denotes infinity`

E.1.7. Nomenclatura

Sampling Design

`hhsrs1kx6k` refers to ref 1.2; simple random cluster sample of households

`sthhsrs1kx6k` refers to ref 1.4a; stratified simple random cluster sample of households with proportional allocation

`sthhpps1kx6k` refers to ref 1.5a; stratified pps cluster sample of households, Stampford sampling

`2sthhsrs1kx6k` refers to ref 2.6; 2-stage stratified simple random cluster sample; PSU=municipalities, SSU=households

`2sthhpps1kx6k` refers to ref 2.7 2-stage stratified pps cluster sample; PSU=municipalities, SSU=households

Outlyingness and Contamination

`OCAR` outlying completely at random

`OAR` outyling at random (conditional on realizations of the variable rb170)

`CCAR` contamination completely at random (outliers drawn from the Normal with mean=5e05 and sd=2e04)

`CCAR` not contaminated at random (shift outliers by a factor of 12)

Criteria

`avgT:` average of the point estimate

`varT:` variance of the point estimate

`biasT:` bias of the point estimate

`relbiasT:` relative bias of the point estimate

`medT:` median of the point estimate

`mad:` median absolute deviation about the median point-estimate (with consistency correction for the normal)

`mede:` median error of the point estimate (with consistency correction for the normal)

`rmseT:` root mean square errof of the point estimate

`relrmseT:` relative root mean square error of the point estimate

`medaeT:` maximum absolute error of the point estimate (with consistency correction for the normal)

`relmaxeT:` maximum absoulte relative error of the point estimate

Note that all criteria also pertain to the variance estimates. In this respect, one has to subsitute a "V" for the "T" in the name of the respective criterion.

E.2. Preliminaries for AMELIA universe

E.2.1. Comments, Notation and Specifications

`Notation: (1) stars (i.e., *) in the tables denote the minimum/minima; (2) "Inf" denotes infinity`

E.2.2. Nomenclatura

Sampling Design

`hhsrs1kx6k` refers to ref 1.2; simple random cluster sample of households

`sthhsrs1kx6k` refers to ref 1.4a; stratified simple random cluster sample of households with proportional allocation

`sthhpps1kx6k` refers to ref 1.5a; stratified pps cluster sample of households, Stampford sampling

`2sthhsrs1kx6k` refers to ref 2.6; 2-stage stratified simple random cluster sample; PSU=municipalities, SSU=households

`2sthhpps1kx6k` refers to ref 2.7 2-stage stratified pps cluster sample; PSU=municipalities, SSU=households

Outlyingness and Contamination

`OCAR` outlying completely at random

`OAR` outyling at random (conditional on realizations of the variable rb170)

`CCAR` contamination completely at random (outliers drawn from the Normal with mean=5e05 and sd=2e04)

`CCAR` not contaminated at random (shift outliers by a factor of 12)

Criteria

`avgT:` average of the point estimate

`varT:` variance of the point estimate

`biasT:` bias of the point estimate

`relbiasT:` relative bias of the point estimate

`medT:` median of the point estimate

`mad:` median absolute deviation about the median point-estimate (with consistency correction for the normal)

`mede:` median error of the point estimate (with consistency correction for the normal)

`rmseT:` root mean square errof of the point estimate

`relrmseT:` relative root mean square error of the point estimate

`medaeT:` maximum absolute error of the point estimate (with consistency correction for the normal)

`relmaxeT:` maximum absoulte relative error of the point estimate

Note that all criteria also pertain to the variance estimates. In this respect, one has to subsitute a ”V” for the ”T” in the name of the respective criterion.

E.3. N0012: SQSR @ AMELIA: sthhsrs1kx6k

Sample Design Ref 1.2

E.3.1. Simulation Setup

Target Indicator:	QSR
Domains:	[none] (default)
Population:	AMELIA
Sample:	sthhsrs1kx6k
MonteCarlo Replicates:	1,000 (default)
Criteria Set:	Univariate criteria (default)
Method:	SQSR
Outlyingness:	OAR,OCAR,uncontaminated
Contamination:	CCAR,NCAR,uncontaminated
Missingness:	[none] (default)
Simulation Environment:	DBsim
Host:	FHNW
Author:	Beat Hulliger and Tobias Schoch
ID:	AggSQSR_sthhsrs1kx6k
Date:	September 5, 2011

E.3.2. Estimator Specifications

`Specifications:` Trimmed quintile share ratio estimator; trims only at the top right end of the distribution. Variance estimates based on linearization.

`Comments:`

E.3.3. Robustness Parameters

This section gives some summary statistics of the robustness tuning parameters and the relative number of outliers (OType-Epsilon).

OCAR – CCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

OCAR – NCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

OAR – CCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

OAR – NCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

No Contamination

```
Range of  trim
    Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
0.000000 0.007375 0.014750 0.014750 0.022120 0.029500
Range of OTypeEpsilon

 0
60
```

E.3.4. Results

In this section, we summarize the performance of the estimators due to numerical criteria. The section is split into the different subsections for the respective combination of the outlyingness and contamination mechanisms. In addition, each subsection is further partitioned for the different values of OTypeEpsilon.

OCAR – CCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	5.0173	6.2194	10.3178	0.7323	0.1305	17.1491	0.2006	53.7225	56.7972
2	0.0005	4.082	5.4877	10.2259	0.5931	0.13	16.6602	0.1959	50.7119	53.8727
3	0.0010	3.5094	5.0593	10.1697	0.5271	0.1283	15.9079	0.1928	50.2744	53.4611
4	0.0015	3.0976	4.7599	10.1292	0.4752	0.1262	15.5178	0.1906	50.9981	54.155
5	0.0020	2.8057	4.5702	10.1006	0.4509	0.1258	15.1494	0.1893	50.4937	53.6542
6	0.0025	2.5805	4.4327	10.0784	0.4337	0.1255	15.1497	0.1883	50.0499	53.2194
7	0.0030	2.4197	4.3403	10.0626	0.4185	0.1255	14.9543	0.1876	49.5204	52.7428
8	0.0035	2.3052	4.2693	10.0514	0.4125	0.1248*	14.8166	0.1868	49.7253	52.9675
9	0.0040	2.2616*	4.2501*	10.0471*	0.4113	0.1251	14.5773*	0.1864	48.9913	52.2563
10	0.0045	2.2668	4.2511	10.0476	0.4068*	0.125	14.6387	0.1863*	49.0369	52.3079
11	0.0050	2.3307	4.2862	10.0539	0.4082	0.125	14.6631	0.1866	49.2536	52.5138
12	0.0055	2.4248	4.3462	10.0631	0.4139	0.1257	14.7525	0.1872	48.9446*	52.2143*
13	0.0060	2.565	4.428	10.0769	0.4264	0.1259	14.887	0.1883	49.5713	52.8285
14	0.0065	2.7273	4.5368	10.0928	0.4505	0.127	15.3226	0.1896	49.2578	52.5484
15	0.0070	2.928	4.6636	10.1126	0.4598	0.1273	15.5209	0.1912	50.1638	53.433
16	0.0075	3.1363	4.8052	10.133	0.4677	0.1281	15.6422	0.1929	50.6367	53.9105
17	0.0080	3.3576	4.9613	10.1548	0.4955	0.1289	15.9403	0.1947	51.0775	54.3326
18	0.0085	3.6057	5.1438	10.1792	0.5286	0.13	16.4539	0.1968	51.3346	54.5948
19	0.0090	3.8612	5.3364	10.2042	0.5586	0.1311	16.672	0.1989	51.7019	54.95
20	0.0095	4.134	5.5503	10.2311	0.5966	0.1325	16.8018	0.2011	51.7704	55.0181

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.011	42.7245	43.0438	14.0225	6.2042	0.2646*	60.77	0.5233*	97.7606	100.1147
2	0.011	42.7155*	43.0388*	14.0216*	6.2049	0.2679	60.5961	0.5272	96.786	99.1584
3	0.011	42.7278	43.0531	14.0229	6.1969*	0.2696	60.503*	0.5311	96.9862	99.3635
4	0.012	42.7497	43.077	14.025	6.2075	0.2715	60.9833	0.5348	97.0184	99.4112
5	0.013	42.7795	43.1111	14.0279	6.2016	0.2752	60.9737	0.5382	95.6058	98.0205
6	0.013	42.8373	43.1721	14.0336	6.2194	0.2783	61.2255	0.5415	94.5656	96.9913
7	0.013	42.8971	43.2355	14.0395	6.2239	0.2816	61.147	0.5446	93.3664	95.8163
8	0.014	42.9799	43.3218	14.0476	6.2424	0.2851	61.0883	0.5479	92.2287	94.6948
9	0.015	43.07	43.4147	14.0565	6.2344	0.2881	61.5422	0.5514	91.4299	93.9104
10	0.015	43.1807	43.5295	14.0674	6.2571	0.2922	61.5097	0.5554	90.0584	92.5465
11	0.015	43.3109	43.6639	14.0801	6.2864	0.2967	61.6543	0.5596	88.6196	91.124
12	0.016	43.435	43.791	14.0923	6.2896	0.3001	62.0819	0.5639	87.9374	90.4629
13	0.017	43.5791	43.9378	14.1065	6.3114	0.3034	62.4403	0.5689	87.5536	90.101
14	0.017	43.7343	44.0984	14.1217	6.3341	0.309	62.9634	0.5743	85.8506	88.423
15	0.018	43.8846	44.252	14.1365	6.3627	0.3129	62.9785	0.5799	85.3521	87.9488
16	0.018	44.0475	44.4181	14.1525	6.3857	0.3168	63.4149	0.5858	84.9092	87.5288
17	0.018	44.2254	44.6017	14.17	6.4116	0.3229	63.7152	0.5919	83.2913	85.9445
18	0.019	44.4083	44.7884	14.188	6.4415	0.3276	64.1798	0.5983	82.628	85.2983
19	0.019	44.596	44.981	14.2064	6.4631	0.3332	64.7366	0.6049	81.5156	84.2117
20	0.020	44.7879	45.1756	14.2253	6.4979	0.3371	64.8396	0.6115	81.408	84.12
21	0.021	44.9839	45.3766	14.2445	6.5272	0.3429	65.5016	0.618	80.2013	82.9565
22	0.021	45.1974	45.5958	14.2655	6.5551	0.3495	65.7464	0.6247	78.7275	81.534
23	0.021	45.4122	45.8157	14.2866	6.5957	0.3557	66.1969	0.6313	77.4927	80.3277
24	0.022	45.6227	46.0311	14.3073	6.6222	0.3617	66.6405	0.6375	76.2556	79.1308
25	0.022	45.8479	46.262	14.3294	6.6696	0.3686	66.58	0.6439	74.6944	77.6113

26	0.023	46.0854	46.5029	14.3527	6.6977	0.3735	67.6632	0.65	74.0443	77.0085
27	0.024	46.3446	46.7667	14.3782	6.7374	0.3798	68.4934	0.6561	72.7322	75.7581
28	0.024	46.6137	47.043	14.4046	6.7791	0.3885	68.8086	0.6618	70.3702	73.4587
29	0.025	46.9008	47.3366	14.4328	6.8185	0.3969	69.1038	0.6674	68.1637	71.3321
30	0.025	47.1885	47.6281	14.4611	6.857	0.4027	69.7531	0.6725	66.9911	70.205
31	0.025	47.4974	47.9435	14.4915	6.9006	0.4113	70.6054	0.6778	64.7742	68.0482
32	0.026	47.8334	48.2849	14.5245	6.9467	0.4193	70.9436	0.6834	62.9667	66.2836
33	0.026	48.17	48.627	14.5575	6.9977	0.4274	72.0903	0.689	61.222	64.5742
34	0.027	48.5219	48.9854	14.5921	7.0463	0.4367	72.341	0.6953	59.2239	62.6343
35	0.028	48.8906	49.361	14.6283	7.0967	0.4466	72.9506	0.702	57.1922	60.6769
36	0.028	49.3037	49.7798	14.6689	7.1618	0.4558	73.5504	0.709	55.5418	59.0913
37	0.029	49.6884	50.1695	14.7067	7.2318	0.4641	74.6988	0.7157	54.2004	57.8422
38	0.029	50.1238	50.6121	14.7495	7.2806	0.4753	74.7044	0.7227	52.0536	55.8111
39	0.029	50.5568	51.0513	14.792	7.3449	0.4855	75.4249	0.7292	50.1947	54.0543
40	0.030	51.031	51.5322	14.8386	7.4009	0.4967	76.7906	0.7354	48.0412*	52.0419*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OCAR – NCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	3.0718	4.8255	10.1267	0.4933	0.1338	15.5501	0.1882	40.6664	44.8092
2	0.0005	2.1784	4.2678	10.0389	0.4102	0.1301	15.224	0.182	39.8419*	43.5524*
3	0.0010	1.7119	4.0157	9.9931	0.3839	0.1275	14.5218	0.1791	40.4507	44.0777
4	0.0015	1.4423	3.8815	9.9666	0.3696	0.1255	14.1762	0.1776	41.5154	45.1113
5	0.0020	1.3042	3.8224	9.953	0.3661	0.1247	14.1955	0.1769*	41.8346	45.3902
6	0.0025	1.2574*	3.7845*	9.9484*	0.3627	0.1231	13.8592	0.1769*	43.6779	47.1406
7	0.0030	1.2621	3.7855	9.9489	0.362*	0.1231	13.9681	0.1772	43.9796	47.4155
8	0.0035	1.3194	3.7951	9.9545	0.3685	0.1223*	13.6966*	0.1779	45.4102	48.785
9	0.0040	1.4185	3.8322	9.9643	0.3713	0.1225	13.8461	0.1789	46.0544	49.3939
10	0.0045	1.5463	3.8903	9.9768	0.3791	0.1231	14.0653	0.1801	46.2436	49.5944

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0055	23.0896	23.5563	12.0934	3.3675	0.2103	38.1685	0.3245	54.2656	57.5092
2	0.0060	22.9274	23.3957	12.0775	3.3348	0.2096	37.886	0.3242	54.6608	57.9024
3	0.0065	22.8034	23.2721	12.0653	3.308	0.2087	37.8258	0.3241*	55.3481	58.5761
4	0.0070	22.6997	23.1703	12.0551	3.2962	0.2086	37.8234*	0.3242	55.3957	58.6271
5	0.0075	22.6182	23.0897	12.0471	3.2783	0.2082	37.9616	0.3245	55.839	59.0662
6	0.0080	22.565	23.0355	12.0419	3.2741	0.2073*	37.9925	0.3249	56.7363	59.9338
7	0.0085	22.5466*	23.0194*	12.0401*	3.264*	0.2082	38.0506	0.3256	56.4287	59.6508
8	0.0090	22.5489	23.0251	12.0403	3.2644	0.2097	38.6837	0.3265	55.692	58.9522
9	0.0095	22.5553	23.0299	12.0409	3.2682	0.2091	38.3609	0.3273	56.518	59.751
10	0.0100	22.5986	23.0744	12.0452	3.2713	0.21	38.7189	0.3283	56.3145	59.5589
11	0.0105	22.6582	23.1328	12.051	3.2817	0.21	39.0466	0.3295	56.9514	60.1636
12	0.0110	22.747	23.2239	12.0598	3.2968	0.2119	39.1589	0.331	56.2248	59.437
13	0.0115	22.8501	23.3284	12.0699	3.3046	0.2134	39.3928	0.3325	55.8093	59.056
14	0.0120	22.9644	23.4419	12.0811	3.3263	0.2141	39.8338	0.3341	56.0261	59.2636
15	0.0125	23.1093	23.5876	12.0954	3.3482	0.2158	40.1542	0.336	55.7057	58.9705
16	0.0130	23.2576	23.7367	12.1099	3.3623	0.2176	40.2344	0.3379	55.2947	58.5746
17	0.0135	23.4287	23.9068	12.1267	3.3885	0.2187	40.6654	0.3401	55.5106	58.7825
18	0.0140	23.6277	24.1078	12.1463	3.4151	0.2215	40.8659	0.3423	54.5705	57.8803
19	0.0145	23.8319	24.3109	12.1664	3.4537	0.2228	41.0541	0.3446	54.6463	57.9446
20	0.0150	24.0627	24.5405	12.189	3.4835	0.2244	41.7879	0.3472	54.7073	58.0233
21	0.0155	24.3048	24.7854	12.2128	3.5222	0.228	41.9792	0.3498	53.4316	56.7949
22	0.0160	24.5666	25.047	12.2385	3.5549	0.2303	42.424	0.3527	53.1566	56.54
23	0.0165	24.8369	25.3158	12.2651	3.601	0.2321	43.064	0.3557	53.2937	56.6979
24	0.0170	25.1247	25.6042	12.2934	3.6371	0.235	43.3005	0.3589	52.6987	56.1559
25	0.0175	25.4321	25.9113	12.3236	3.6907	0.2377	43.8618	0.3621	52.3165	55.8006
26	0.0180	25.7578	26.2376	12.3556	3.7364	0.2411	44.3078	0.3656	51.6385	55.147
27	0.0185	26.0933	26.572	12.3885	3.7869	0.2436	44.7031	0.3692	51.5424	55.0754
28	0.0190	26.447	26.9274	12.4233	3.8373	0.2478	45.5053	0.373	50.5362	54.1139
29	0.0195	26.8128	27.2936	12.4592	3.8862	0.2513	46.0172	0.377	49.9927	53.5948
30	0.0200	27.2078	27.6896	12.498	3.9425	0.2555	46.4889	0.3814	49.2405	52.8833
31	0.0205	27.6009	28.0841	12.5367	3.995	0.26	47.3833	0.3857	48.352	52.047
32	0.0210	28.0175	28.5002	12.5776	4.0633	0.2636	48.239	0.3902	48.0484	51.7858
33	0.0215	28.4503	28.9332	12.6201	4.125	0.2677	48.7691	0.3949	47.4807	51.2487

34	0.0220	28.8965	29.3814	12.6639	4.1861	0.273	49.3557	0.3998	46.4178	50.2427
35	0.0225	29.3441	29.8303	12.7079	4.2567	0.278	50.3697	0.4047	45.5793	49.4425
36	0.0230	29.826	30.3151	12.7553	4.3108	0.2842	51.0081	0.4101	44.2912	48.2169
37	0.0235	30.3183	30.8074	12.8036	4.3811	0.2889	51.5816	0.4157	43.905	47.8702
38	0.0240	30.8238	31.3161	12.8533	4.4563	0.2956	52.9692	0.4214	42.5458	46.5917
39	0.0245	31.3487	31.8413	12.9049	4.5325	0.3007	53.5779	0.4275	42.1428	46.2346
40	0.0250	31.8818	32.3757	12.9572	4.6096	0.3067	54.366	0.4339	41.4648	45.6056
41	0.0255	32.4181	32.9154	13.0099	4.6849	0.314	55.0796	0.4403	40.2404	44.4807
42	0.0260	32.9916	33.4921	13.0663	4.767	0.3216	56.1166	0.4471	39.0357	43.3597
43	0.0265	33.5769	34.0794	13.1238	4.8558	0.3285	56.8976	0.4539	38.1674	42.5503
44	0.0270	34.1662	34.6705	13.1817	4.935	0.3354	57.5999	0.461	37.4369	41.8749
45	0.0275	34.7789	35.2863	13.2419	5.0191	0.3435	58.7337	0.4682	36.2884	40.819
46	0.0280	35.4	35.9097	13.3029	5.1227	0.3512	59.9557	0.4758	35.4928	40.0918
47	0.0285	36.0422	36.5558	13.366	5.2051	0.3603	60.7251	0.4837	34.2407	38.9437
48	0.0290	36.6945	37.2107	13.4301	5.3098	0.3687	61.9348	0.4918	33.3984	38.1918
49	0.0295	37.3671	37.8874	13.4962	5.405	0.3784	62.8174	0.5003	32.2216	37.1674
50	0.0300	38.0519	38.5763	13.5635	5.5002	0.3882	64.0816	0.5089	31.0821*	36.125*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OAR – CCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	5.0228	6.2213	10.3184	0.7262	0.1302	17.0704	0.2005	53.9567	57.0283
2	0.0005	4.0939	5.4869	10.2271	0.5907	0.129	15.9206	0.1959	51.9458	55.0597
3	0.0010	3.5309	5.0761	10.1718	0.5257	0.1285	15.471	0.1928	50.0343	53.2169
4	0.0015	3.1327	4.7863	10.1327	0.4833	0.1265	15.5389	0.1907	50.7341	53.8858
5	0.0020	2.8489	4.5987	10.1048	0.4509	0.1259	15.1346	0.1894	50.445	53.6074
6	0.0025	2.6264	4.4596	10.0829	0.4271	0.1255	14.9131	0.1886	50.2579	53.4293
7	0.0030	2.4554	4.355	10.0661	0.4264	0.125*	14.7045	0.1878	50.1971	53.4096
8	0.0035	2.3539	4.304	10.0562	0.4136	0.1255	14.7273	0.1871	49.1399	52.4132
9	0.0040	2.3138*	4.2771*	10.0522*	0.4121*	0.125*	14.5818	0.1867	49.2861	52.5513
10	0.0045	2.3189	4.2805	10.0527	0.4181	0.1251	14.2897*	0.1865*	49.1274	52.4026
11	0.0050	2.3805	4.3148	10.0588	0.4227	0.1251	14.3356	0.1869	49.3263	52.5787
12	0.0055	2.4818	4.3742	10.0687	0.4279	0.1254	14.3455	0.1876	49.6355	52.897
13	0.0060	2.6265	4.4716	10.0829	0.4438	0.1265	14.5463	0.1887	49.0885*	52.3865*
14	0.0065	2.7943	4.5744	10.0994	0.4495	0.1267	14.5328	0.19	49.893	53.1749
15	0.0070	2.9915	4.7042	10.1188	0.4673	0.1274	14.8575	0.1916	50.4635	53.7449
16	0.0075	3.1959	4.8505	10.1389	0.4793	0.1286	15.1928	0.1933	50.2923	53.5895
17	0.0080	3.429	5.0104	10.1618	0.5124	0.129	15.339	0.1953	51.4155	54.6707
18	0.0085	3.6721	5.1927	10.1857	0.5393	0.1302	15.5481	0.1972	51.4275	54.6916
19	0.0090	3.9319	5.3935	10.2112	0.5683	0.1317	15.9649	0.1994	51.3899	54.6538
20	0.0095	4.2025	5.6026	10.2378	0.5992	0.1326	16.1887	0.2016	52.0009	55.2527

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.011	42.9232*	43.2507*	14.0421*	6.2362	0.2727*	60.7961*	0.5271*	93.31	95.7394
2	0.011	42.93	43.2613	14.0427	6.2309*	0.2758	61.3125	0.531	92.5048	94.9592
3	0.011	42.9263	43.259	14.0424	6.2368	0.277	61.2148	0.5346	92.9837	95.4406
4	0.012	42.9527	43.2889	14.0449	6.2513	0.2802	61.1964	0.538	92.0227	94.4995
5	0.013	42.9987	43.3393	14.0495	6.2489	0.2841	61.5097	0.541	90.4413	92.9496
6	0.013	43.0505	43.3941	14.0546	6.2539	0.287	62.0588	0.5439	89.5301	92.0589
7	0.013	43.1251	43.4736	14.0619	6.2642	0.2916	62.4907	0.5469	87.5235	90.0716
8	0.014	43.2073	43.5587	14.07	6.2757	0.2946	62.7348	0.5501	86.7339	89.276
9	0.015	43.3266	43.6831	14.0817	6.2888	0.2998	63.0055	0.5538	84.765	87.3308
10	0.015	43.4391	43.7988	14.0927	6.3121	0.3032	62.9936	0.5579	84.0116	86.5955
11	0.015	43.5657	43.9301	14.1052	6.3233	0.3081	63.2144	0.5625	82.5805	85.1857
12	0.016	43.7052	44.0741	14.1189	6.3472	0.3128	63.3687	0.5674	81.37	84.0177
13	0.017	43.8556	44.2289	14.1337	6.3625	0.3177	63.856	0.5729	80.3435	83.0171
14	0.017	44.006	44.384	14.1484	6.3831	0.3229	64.2675	0.5785	79.1858	81.8954
15	0.018	44.1652	44.5476	14.1641	6.4118	0.3278	64.6017	0.5845	78.3382	81.0718
16	0.018	44.3302	44.7186	14.1803	6.4256	0.3341	64.6075	0.5908	76.8211	79.5832
17	0.018	44.5084	44.8997	14.1978	6.4583	0.3381	65.2018	0.5973	76.7001	79.4748
18	0.019	44.6758	45.0727	14.2142	6.4762	0.3442	65.3939	0.6036	75.3649	78.1773
19	0.019	44.8624	45.2635	14.2326	6.5095	0.3493	66.0181	0.6102	74.7029	77.5436
20	0.020	45.0507	45.4574	14.2511	6.5363	0.3557	65.9653	0.6168	73.4174	76.2969
21	0.021	45.2417	45.6523	14.2698	6.564	0.3607	66.7778	0.6234	72.8375	75.7437

22	0.021	45.4504	45.8671	14.2903	6.5925	0.3677	67.3517	0.6298	71.2848	74.2361
23	0.021	45.662	46.0845	14.3111	6.6224	0.3745	67.7541	0.6364	69.9382	72.9344
24	0.022	45.8811	46.3101	14.3327	6.6526	0.3822	68.2928	0.6428	68.1908	71.2587
25	0.022	46.1039	46.54	14.3546	6.6866	0.3904	69.0278	0.6491	66.2695	69.4007
26	0.023	46.3395	46.7787	14.3777	6.7172	0.3952	68.9144	0.6547	65.6554	68.8269
27	0.024	46.5965	47.0425	14.4029	6.759	0.4036	70.0172	0.6603	63.6078	66.8271
28	0.024	46.8781	47.3291	14.4306	6.7955	0.4105	70.3928	0.666	62.216	65.4998
29	0.025	47.1507	47.608	14.4574	6.836	0.4187	70.9727	0.6708	60.2105	63.5718
30	0.025	47.4486	47.9124	14.4867	6.8712	0.4273	71.9817	0.6761	58.2112	61.6727
31	0.025	47.7698	48.2416	14.5182	6.924	0.4377	72.0661	0.6814	55.6844	59.2418
32	0.026	48.1017	48.579	14.5508	6.9763	0.4459	73.0137	0.6869	54.0472	57.6738
33	0.026	48.4501	48.9332	14.5851	7.0342	0.4546	73.3118	0.6931	52.4595	56.1318
34	0.027	48.7924	49.283	14.6187	7.0782	0.4649	74.378	0.6994	50.4453	54.2167
35	0.028	49.1933	49.6916	14.6581	7.1323	0.4761	74.4452	0.7065	48.4063	52.2881
36	0.028	49.5685	50.0742	14.6949	7.1975	0.4869	75.5077	0.7132	46.4799	50.4713
37	0.029	49.9789	50.4894	14.7353	7.2548	0.4956	76.2322	0.7198	45.2261	49.3048
38	0.029	50.4195	50.9374	14.7786	7.3103	0.5071	77.1897	0.7269	43.3424	47.5807
39	0.029	50.8401	51.3641	14.8199	7.3768	0.5175	77.6429	0.7328	41.592	45.9553
40	0.030	51.3287	51.8604	14.8679	7.4593	0.5301	78.5215	0.7387	39.3525*	43.9061*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OAR – NCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	3.531	5.0808	10.1718	0.5298	0.129	16.064	0.1924	49.2187	53.2479
2	0.0005	2.5247	4.4109	10.0729	0.4316	0.1264	14.6742	0.1846	46.0388*	49.4346*
3	0.0010	2.0323	4.1157	10.0246	0.3935	0.1238	14.2377	0.1815	46.6316	49.9551
4	0.0015	1.7303	3.9574	9.9949	0.3808	0.1224	14.024	0.1797	46.8484	50.1823
5	0.0020	1.5523	3.8743	9.9774	0.3703	0.1218	13.8697	0.1787	46.8089	50.1244
6	0.0025	1.4782	3.842	9.9701	0.3649	0.1215	13.7738	0.1785*	46.8912	50.2128
7	0.0030	1.4592*	3.824*	9.9683*	0.364*	0.1207*	13.8811	0.1786	47.9772	51.2491
8	0.0035	1.4984	3.8455	9.9721	0.3718	0.1212	13.8729	0.1792	47.8199	51.0889
9	0.0040	1.5793	3.8795	9.9801	0.3662	0.1213	13.4574*	0.18	48.3263	51.586
10	0.0045	1.7036	3.9408	9.9923	0.3708	0.122	13.5923	0.1811	48.4123	51.6795

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0055	25.8498	26.2694	12.3646	3.7692	0.2113	40.6771	0.3502	65.7019	68.6021
2	0.0060	25.6454	26.0683	12.3445	3.7336	0.2113	40.1963*	0.3495	65.3895	68.3015
3	0.0065	25.4784	25.9039	12.3281	3.7115	0.2113	40.5397	0.3491	65.2558	68.172
4	0.0070	25.3297	25.7586	12.3135	3.6952	0.2117	40.6822	0.3489	64.79	67.7234
5	0.0075	25.1978	25.6278	12.3006	3.6727	0.2112	40.5081	0.3488*	65.1821	68.1259
6	0.0080	25.1164	25.5477	12.2926	3.672	0.2111*	40.8874	0.3491	65.3251	68.2662
7	0.0085	25.0523	25.4868	12.2863	3.6582	0.2122	40.8167	0.3493	64.6187	67.585
8	0.0090	25.0173	25.4564	12.2828	3.6507	0.2141	41.0437	0.35	63.4659	66.4591
9	0.0095	24.9976*	25.4371*	12.2809*	3.6391*	0.2142	41.157	0.3507	63.6841	66.6877
10	0.0100	25.0148	25.4576	12.2826	3.6439	0.216	41.4826	0.3516	62.8148	65.8429
11	0.0105	25.0347	25.4785	12.2845	3.6398	0.2166	41.6171	0.3526	62.7729	65.8199
12	0.0110	25.0763	25.5206	12.2886	3.6471	0.2172	41.6407	0.3537	62.8163	65.8662
13	0.0115	25.1485	25.5956	12.2957	3.6517	0.2192	41.9939	0.3551	61.9945	65.0653
14	0.0120	25.2356	25.6857	12.3043	3.6611	0.2214	42.1711	0.3565	61.0041	64.1104
15	0.0125	25.3424	25.7924	12.3148	3.6796	0.2223	42.0836	0.3581	61.0618	64.165
16	0.0130	25.4734	25.9228	12.3276	3.7019	0.2232	42.3567	0.3599	61.2487	64.3526
17	0.0135	25.6097	26.0606	12.341	3.7212	0.2251	42.8508	0.3617	60.6664	63.8094
18	0.0140	25.7836	26.2359	12.3581	3.7422	0.2273	43.4875	0.3638	60.0396	63.2012
19	0.0145	25.9584	26.4117	12.3753	3.7692	0.2294	43.8006	0.366	59.5467	62.7395
20	0.0150	26.168	26.6233	12.3959	3.7988	0.2323	43.9502	0.3683	58.5751	61.8004
21	0.0155	26.381	26.8362	12.4168	3.8373	0.2341	44.6186	0.3708	58.402	61.6374
22	0.0160	26.6154	27.0713	12.4398	3.8684	0.2365	45.2402	0.3735	57.941	61.2168
23	0.0165	26.8646	27.322	12.4643	3.904	0.2395	45.2434	0.3764	57.1811	60.488
24	0.0170	27.1344	27.5924	12.4908	3.9413	0.2422	45.3493	0.3794	56.6591	60.0087
25	0.0175	27.4167	27.8753	12.5186	3.9792	0.245	46.5856	0.3825	56.1314	59.5032
26	0.0180	27.7115	28.1718	12.5475	4.0346	0.2485	46.8448	0.3858	55.2225	58.6294
27	0.0185	28.0496	28.5096	12.5807	4.0768	0.2514	47.2274	0.3895	54.8983	58.3159
28	0.0190	28.3736	28.8353	12.6126	4.1201	0.2552	47.9036	0.3931	54.01	57.4654
29	0.0195	28.7205	29.1847	12.6467	4.1728	0.2597	48.0942	0.397	52.8409	56.3465

30	0.0200	29.0843	29.5498	12.6824	4.2182	0.2638	49.1307	0.401	52.0189	55.5674
31	0.0205	29.4687	29.9355	12.7202	4.2854	0.268	49.6433	0.4054	51.2854	54.8894
32	0.0210	29.8678	30.3353	12.7594	4.3349	0.2719	50.3933	0.4096	50.6364	54.2618
33	0.0215	30.2903	30.7616	12.8009	4.3912	0.2781	51.0369	0.4142	48.9669	52.6826
34	0.0220	30.7127	31.1849	12.8424	4.4555	0.2824	51.6581	0.4189	48.3442	52.1141
35	0.0225	31.162	31.636	12.8865	4.5212	0.2876	52.4525	0.424	47.3985	51.2079
36	0.0230	31.6298	32.1062	12.9325	4.5911	0.2934	53.3628	0.4293	46.3298	50.1926
37	0.0235	32.0994	32.578	12.9786	4.6662	0.2991	53.8867	0.4349	45.3957	49.3214
38	0.0240	32.599	33.0783	13.0277	4.727	0.3042	54.9155	0.4407	44.8969	48.8401
39	0.0245	33.1088	33.5907	13.0778	4.81	0.3106	55.7224	0.4467	43.8086	47.8209
40	0.0250	33.6493	34.1342	13.1309	4.8864	0.3176	56.3785	0.4529	42.592	46.6615
41	0.0255	34.1873	34.6744	13.1838	4.9667	0.3241	57.1203	0.4593	41.7084	45.8312
42	0.0260	34.7502	35.2399	13.2391	5.0431	0.3312	58.1468	0.4659	40.6878	44.8878
43	0.0265	35.3199	35.8122	13.295	5.1286	0.3384	59.2799	0.4728	39.7231	43.9944
44	0.0270	35.9101	36.4073	13.353	5.2043	0.3474	60.3561	0.48	38.1449	42.5259
45	0.0275	36.5207	37.0207	13.413	5.294	0.3553	61.0327	0.4874	37.174	41.6397
46	0.0280	37.138	37.6404	13.4737	5.3822	0.3631	61.7352	0.4952	36.3843	40.9401
47	0.0285	37.7848	38.2905	13.5372	5.4716	0.3717	63.0475	0.5031	35.3367	39.9957
48	0.0290	38.4429	38.9523	13.6019	5.5606	0.3809	63.8784	0.5114	34.2622	39.0338
49	0.0295	39.117	39.6304	13.6681	5.6578	0.3906	64.9803	0.52	33.1138	37.9823
50	0.0300	39.8004	40.3174	13.7352	5.7538	0.4002	66.0705	0.5288	32.1276*	37.1027*

% denotes numbers in percent; * denotes the column-specific minimum/minima

No Contamination

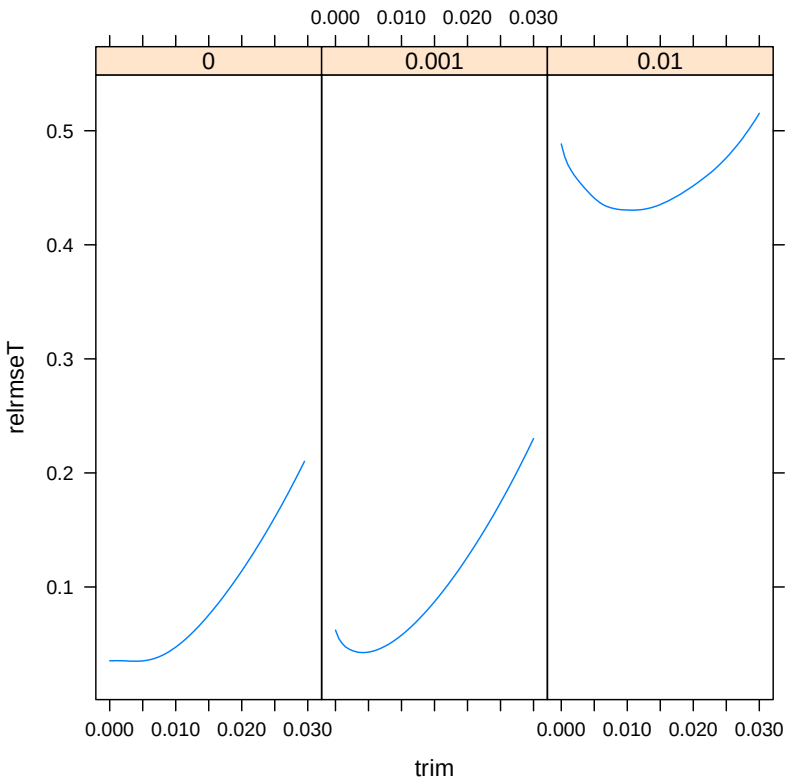
	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	0.1109	3.5325	9.8358	0.3542	0.1205	11.7866	0.1679	39.3857	43.044
2	0.0005	-0.424	3.53	9.7832	0.3549	0.1187	11.4908	0.1649	38.9486*	42.6068*
3	0.0010	-0.6273	3.5411	9.7633	0.3641	0.1174	11.4035	0.164*	39.7728	43.3851
4	0.0015	-0.6803	3.5342	9.7581*	0.3679	0.1162*	11.2737	0.1642	41.2465	44.7762
5	0.0020	-0.6451	3.5273	9.7615	0.3586	0.1162*	11.1636	0.1649	41.8836	45.375
6	0.0025	-0.5624	3.5203	9.7696	0.3615	0.1167	11.107*	0.1658	42.1244	45.6114
7	0.0030	-0.4384	3.4981	9.7818	0.3605	0.1164	11.2034	0.1671	43.5398	46.974
8	0.0035	-0.2873	3.4937	9.7967	0.3604	0.1171	11.514	0.1684	43.7834	47.2092
9	0.0040	-0.111	3.4887*	9.814	0.3525	0.1175	11.5734	0.17	44.6643	48.0702
10	0.0045	0.0828*	3.4997	9.833	0.356	0.1183	11.793	0.1716	45.1174	48.5137
11	0.0050	0.2905	3.522	9.8534	0.347*	0.119	12.2188	0.1734	45.6369	49.0164
12	0.0055	0.5112	3.5561	9.8751	0.3501	0.1197	12.4138	0.1752	46.4104	49.7742
13	0.0060	0.746	3.6129	9.8982	0.3611	0.1207	12.7168	0.1771	46.6616	50.0251
14	0.0065	0.9917	3.6822	9.9223	0.3628	0.1215	12.9796	0.1791	47.406	50.7622
15	0.0070	1.2551	3.7774	9.9482	0.3662	0.1227	13.4399	0.1812	47.7422	51.0948
16	0.0075	1.5192	3.8876	9.9741	0.3784	0.1237	13.5813	0.1834	48.1882	51.5424
17	0.0080	1.7939	4.0162	10.0011	0.3888	0.1248	13.8673	0.1856	48.7378	52.0666
18	0.0085	2.0792	4.1661	10.0292	0.398	0.1259	14.298	0.1878	49.1335	52.4618
19	0.0090	2.3692	4.3343	10.0577	0.4156	0.1273	14.5905	0.1902	49.3899	52.7183
20	0.0095	2.6743	4.5292	10.0876	0.4404	0.1291	14.869	0.1926	49.1838	52.5279

% denotes numbers in percent; * denotes the column-specific minimum/minima

E.3.5. Plots

In this section, we report graphical displays of certain numerical criteria for the estimators. The lattice-type plots are partitioned into panels for different values of OTypeEpsilon.

OCAR – CCAR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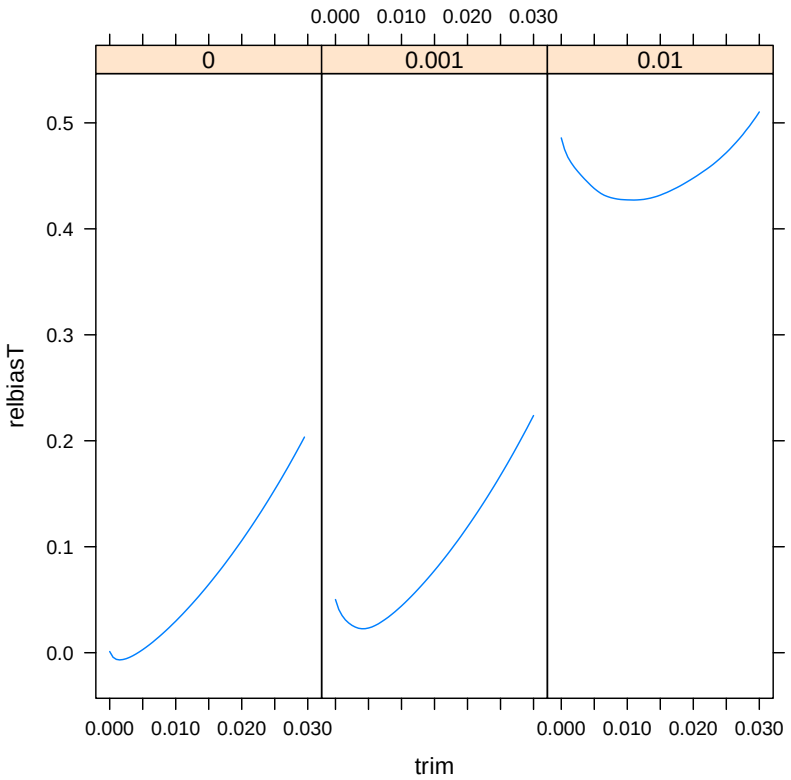
0
0.001
0.01
0.5
0.4
0.3
0.2
0.1
relrmseT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim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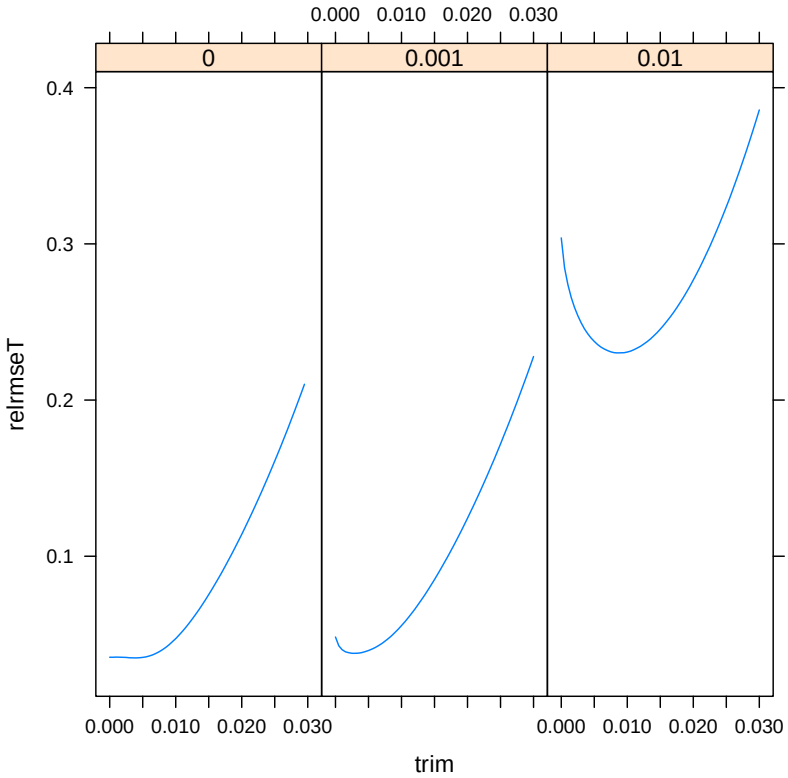
0
0.001
0.01
0.5
0.4
0.3
0.2
0.1
0.0
relbiasT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim

OCAR – NCAR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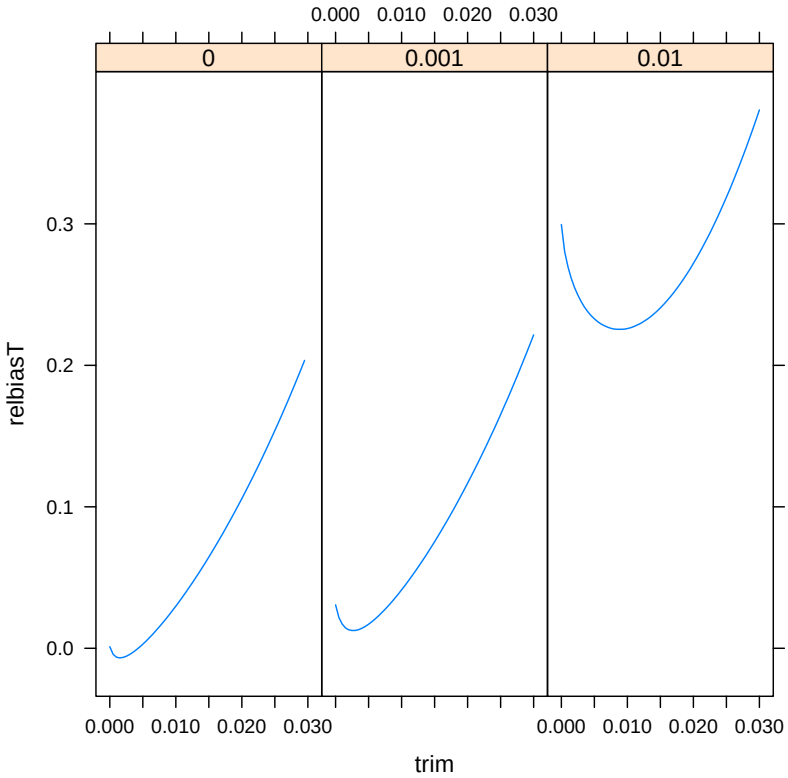
0
0.001
0.01
0.4
0.3
0.2
0.1
relrmseT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim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0.01
0.3
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0.1
0.0
relbiasT
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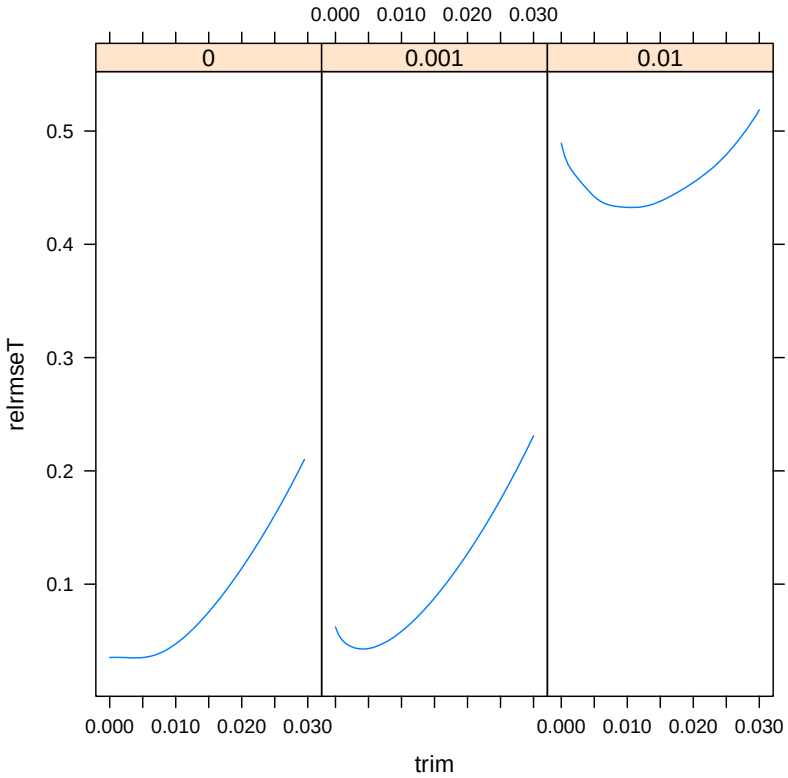
0.000 0.010 0.020 0.030
trim

OAR – CCAR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0.01
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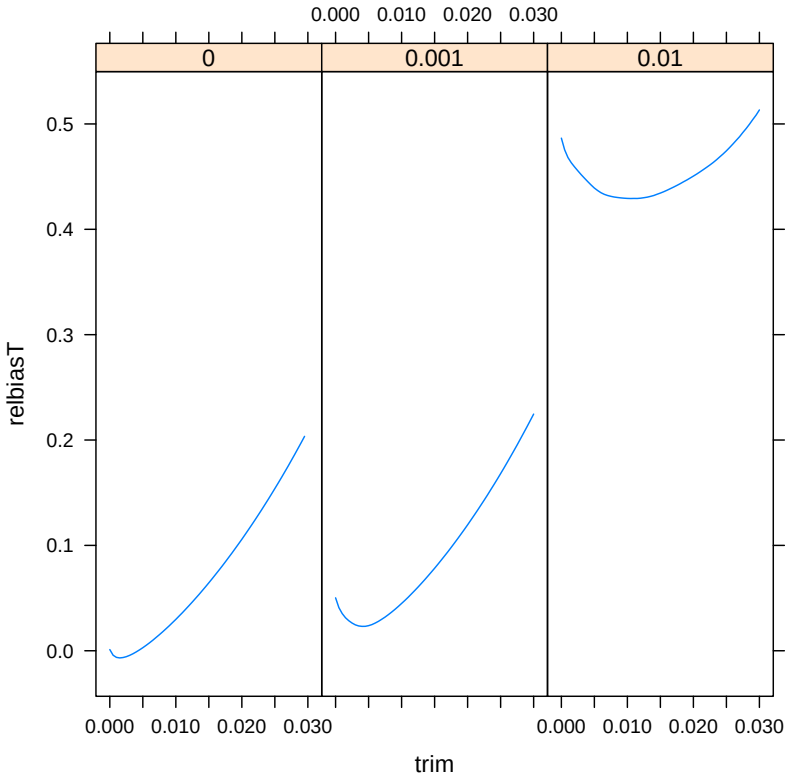
0.1
relrmseT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim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0.001
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0.5
0.4
0.3
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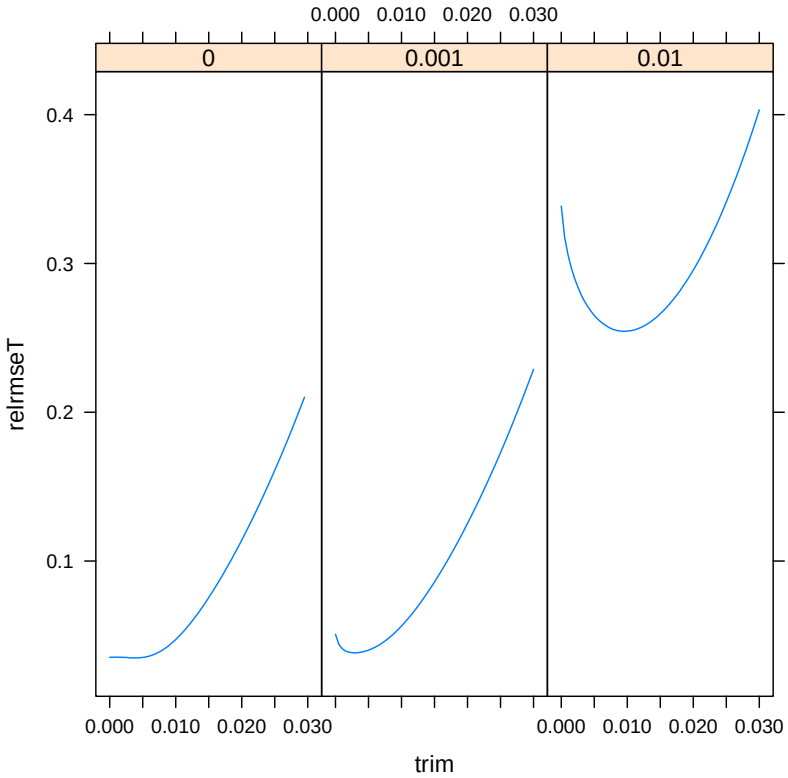
0.1
0.0
relbiasT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim

OAR – NCAR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0
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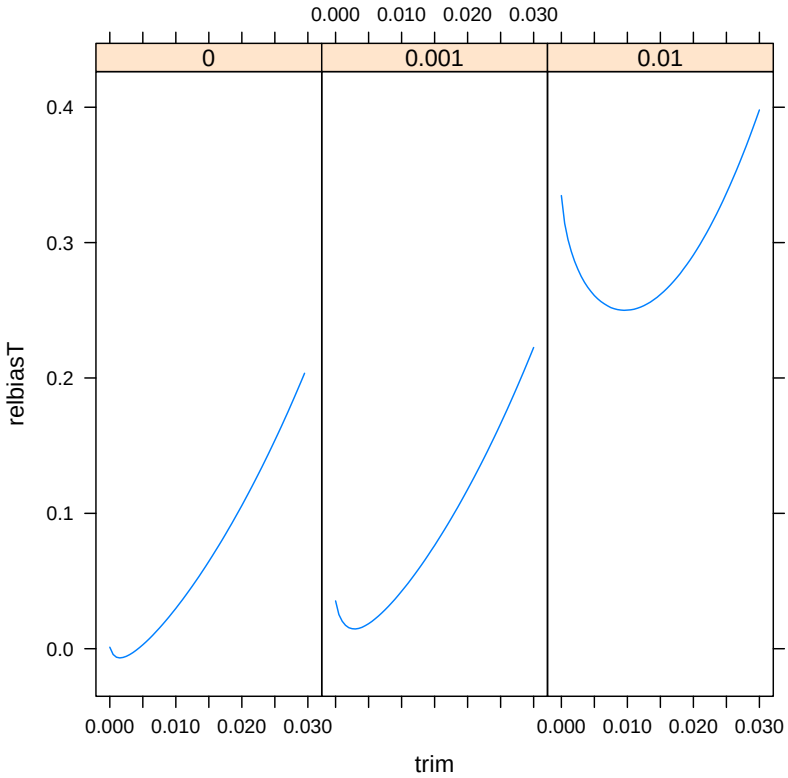
0.2
0.1
relrmseT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim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0
0.001
0.01
0.4
0.3
0.2
0.1
0.0
relbiasT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim

E.4. N0011: TQSR @ AMELIA: hhsrs1kx6k

Sample Design Ref 1.2

E.4.1. Simulation Setup

Target Indicator:	QSR
Domains:	[none] (default)
Population:	AMELIA
Sample:	hhsrs1kx6k
MonteCarlo Replicates:	1,000 (default)
Criteria Set:	Univariate criteria (default)
Method:	TQSR
Outlyingness:	OAR,OCAR,uncontaminated
Contamination:	CCAR,NCAR,uncontaminated
Missingness:	[none] (default)
Simulation Environment:	DBsim
Host:	FHNW
Author:	Beat Hulliger and Tobias Schoch
ID:	AggTQSR_hhsrs1kx6k
Date:	September 5, 2011

E.4.2. Estimator Specifications

`Specifications:` Trimmed quintile share ratio estimator; trims only at the top right end of the distribution. Variance estimates based on linearization.

`Comments:`

E.4.3. Robustness Parameters

This section gives some summary statistics of the robustness tuning parameters and the relative number of outliers (OType-Epsilon).

No contamination

```
Range of  trim
    Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
0.000000 0.007375 0.014750 0.014750 0.022120 0.029500
Range of OTypeEpsilon

 0
60
```

OCAR – CCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

OCAR – NCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

OAR – CCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

OAR – NCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

E.4.4. Results

In this section, we summarize the performance of the estimators due to numerical criteria. The section is split into the different subsections for the respective combination of the outlyingness and contamination mechanisms. In addition, each subsection is further partitioned for the different values of OTypeEpsilon.

OCAR – CCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	4.8689	6.1819	10.3033	0.7066	0.1402	18.5971	0.1967	40.3189	44.0561
2	0.0005	3.2153	4.9431	10.1408	0.5057	0.1362	16.7472	0.1879	37.9415	41.75
3	0.0010	1.9432	4.1876	10.0158	0.4123	0.133	15.2578	0.1808	35.9508	39.8941
4	0.0015	0.8467	3.7486	9.9081	0.3547*	0.1289	13.3756	0.1748	35.6568	39.5581
5	0.0020	-0.1376*	3.6125*	9.8114	0.355	0.1259	12.3639	0.1697	34.796	38.7219
6	0.0025	-1.0521	3.7234	9.7215	0.3776	0.1233	11.305	0.1652	34.0274	37.9849
7	0.0030	-1.898	4.017	9.6384	0.4102	0.1211	10.046	0.161	32.8937	36.9667
8	0.0035	-2.6794	4.4146	9.5616	0.4635	0.1189	9.2706	0.1568	31.855	36.024
9	0.0040	-3.409	4.8708	9.49	0.5318	0.1169	8.5145	0.1529	30.7374	34.9645
10	0.0045	-4.08	5.3385	9.424	0.6082	0.1145	7.6455	0.1494	30.413	34.6716
11	0.0050	-4.704	5.8142	9.3627	0.7007	0.1128	7.003	0.1463	29.6254	33.913
12	0.0055	-5.2826	6.2743	9.3059	0.7853	0.1107	6.2811	0.1435	29.6139	33.8879
13	0.0060	-5.8261	6.7288	9.2525	0.8572	0.1095	5.6441	0.1412	28.935	33.2615
14	0.0065	-6.3394	7.1677	9.202	0.9314	0.1081	5.0464	0.1391	28.6817	33.0175
15	0.0070	-6.8398	7.6045	9.1529	1.0047	0.1067	4.7468	0.1372	28.513	32.8551
16	0.0075	-7.3248	8.0349	9.1052	1.079	0.1054	3.9657	0.1354	28.4411	32.7859
17	0.0080	-7.7898	8.4529	9.0596	1.141	0.1041	3.4695	0.1337	28.4829	32.8274
18	0.0085	-8.243	8.8675	9.015	1.2132	0.1032	2.8867	0.1322	28.0145	32.4022
19	0.0090	-8.6883	9.2759	8.9713	1.2777	0.102	2.418	0.1307	28.0958	32.4755
20	0.0095	-9.1206	9.6765	8.9288*	1.3383	0.101*	1.9099*	0.1292*	27.9907*	32.3811*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.011	20.0077	20.4627	11.7906	2.9203	0.1779	36.251	0.3312	86.129	88.3705
2	0.011	18.9675	19.4406	11.6884	2.7602	0.1756	35.338	0.3261	85.7341	87.9948
3	0.011	17.9569	18.4464	11.5891	2.6132	0.1722	34.0564	0.321	86.4461	88.7054
4	0.012	16.9434	17.4542	11.4896	2.4684	0.1698	33.1555	0.3157	85.9228	88.2105
5	0.013	15.9556	16.4873	11.3925	2.319	0.1667	31.7671	0.3103	86.194	88.4829
6	0.013	14.9811	15.5359	11.2968	2.1765	0.1636	30.7751	0.3048	86.2687	88.565
7	0.013	14.0224	14.6063	11.2026	2.0394	0.1615	29.6821	0.2992	85.2196	87.512
8	0.014	13.0776	13.693	11.1098	1.9075	0.1592	28.611	0.2937	84.4859	86.7876
9	0.015	12.1471	12.7999	11.0183	1.7706	0.1573	27.5427	0.2884	83.3235	85.624
10	0.015	11.2292	11.9217	10.9282	1.6363	0.1549	26.3788	0.2834	82.9282	85.2239
11	0.015	10.3128	11.0499	10.8381	1.5004	0.1521	25.3399	0.2786	83.1021	85.3893
12	0.016	9.4128	10.2039	10.7497	1.3727	0.15	24.3107	0.274	82.7375	85.0201
13	0.017	8.5241	9.3788	10.6624	1.2389	0.1479	23.2925	0.2696	82.3543	84.6161
14	0.017	7.6483	8.5777	10.5763	1.1133	0.1457	22.4973	0.2656	82.2598	84.5218
15	0.018	6.7774	7.7976	10.4908	0.9863	0.1437	21.4867	0.2617	82.1566	84.4134
16	0.018	5.9072	7.0402	10.4053	0.8583	0.1417	20.3748	0.2579	81.9765	84.2268
17	0.018	5.0479	6.3185	10.3208	0.7292	0.1396	19.3732	0.2543	82.2174	84.4705
18	0.019	4.1966	5.6433	10.2372	0.6153	0.1375	18.3737	0.2507	82.268	84.5212
19	0.019	3.3506	5.0218	10.1541	0.5311	0.1352	17.3839	0.2471	82.7762	85.0184
20	0.020	2.51	4.4819	10.0715	0.4491	0.1332	16.8218	0.2436	82.8744	85.1173
21	0.021	1.6754	4.0508	9.9895	0.3899	0.1314	15.841	0.2401	82.6985	84.9524
22	0.021	0.8493	3.7524	9.9083	0.3595	0.1291	14.8645	0.2365	83.2493	85.503
23	0.021	0.027*	3.6313*	9.8275	0.3413*	0.1274	13.8967	0.233	82.8623	85.1313
24	0.022	-0.7849	3.6915	9.7478	0.3698	0.1257	12.9364	0.2294	82.4551	84.7408
25	0.022	-1.5978	3.918	9.6679	0.3946	0.1237	11.9867	0.2256	82.4376	84.7396

26	0.023	-2.3965	4.288	9.5894	0.4492	0.1222	10.941	0.2217	81.5015	83.8386
27	0.024	-3.1907	4.7581	9.5114	0.5046	0.1204	10.0039	0.2178	80.9177	83.2893
28	0.024	-3.9717	5.2904	9.4347	0.5999	0.118	9.0706	0.2137	81.0376	83.423
29	0.025	-4.7481	5.8854	9.3584	0.705	0.1169	8.4407	0.2093	79.0961	81.5277
30	0.025	-5.5078	6.4948	9.2838	0.8115	0.1145	7.3424	0.205	79.0565	81.5151
31	0.025	-6.2536	7.1259	9.2105	0.9218	0.1128	6.3693	0.2008	78.0591	80.5234
32	0.026	-6.997	7.7773	9.1374	1.022	0.1114	5.5948	0.1966	76.4728	78.9533
33	0.026	-7.731	8.4307	9.0653	1.1356	0.1093	4.5624	0.1926	76.2722	78.7459
34	0.027	-8.4588	9.0966	8.9938	1.2403	0.1082	3.9797	0.1887	74.4259	76.9417
35	0.028	-9.1658	9.7441	8.9244	1.3405	0.1057	2.9524	0.185	75.067	77.5511
36	0.028	-9.8785	10.4118	8.8543	1.4518	0.1045	2.3807	0.1814	73.4738	75.995
37	0.029	-10.5716	11.0665	8.7862	1.5499	0.1035	1.3201	0.1777	71.7033	74.2922
38	0.029	-11.2608	11.7171	8.7185	1.6433	0.1013	0.602	0.174	71.727	74.3331
39	0.029	-11.9398	12.3659	8.6518	1.7508	0.1001	0.0565*	0.17	69.845	72.5242
40	0.030	-12.6037	13.0007	8.5866*	1.8399	0.0982*	-0.8039	0.1659*	68.9346*	71.7132*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OCAR – NCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	2.8609	4.7756	10.106	0.4711	0.1413	17.2484	0.1833	29.7675	35.0402
2	0.0005	1.2622	3.9402	9.9489	0.3795	0.1346	15.139	0.1725	28.1646	32.903
3	0.0010	0.1259*	3.6576*	9.8373	0.3601*	0.1291	13.5155	0.1661	28.6781	33.2467
4	0.0015	-0.8101	3.6992	9.7453	0.3752	0.1259	12.7417	0.1612	28.0705	32.6346
5	0.0020	-1.6275	3.9124	9.665	0.3947	0.1223	10.834	0.1571	28.4798	32.9569
6	0.0025	-2.3498	4.2366	9.594	0.4358	0.1201	9.8124	0.1537	28.0036	32.4901
7	0.0030	-3.0141	4.6077	9.5288	0.486	0.1174	8.8946	0.1508	28.4531	32.8611
8	0.0035	-3.627	5.0133	9.4685	0.5546	0.1157	8.2203	0.1481	27.9941*	32.4241*
9	0.0040	-4.206	5.4281	9.4117	0.6333	0.1138	7.6325	0.1458	28.152	32.5532
10	0.0045	-4.7498	5.8448	9.3582*	0.7088	0.1121*	7.1243*	0.1437*	28.1653	32.5593

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0055	12.9413	13.6513	11.0964	1.8816	0.1824	27.5528	0.2539	39.1547	43.1241
2	0.0060	11.9302	12.6783	10.997	1.737	0.1779	26.6893	0.248	39.403	43.3437
3	0.0065	10.9414	11.7363	10.8999	1.596	0.1742	25.1805	0.2422	39.0499	42.9938
4	0.0070	9.9978	10.8447	10.8072	1.4607	0.1706	23.9974	0.2368	38.8228	42.7464
5	0.0075	9.0626	9.9684	10.7153	1.3273	0.1666	23.0884	0.2316	39.0227	42.9031
6	0.0080	8.169	9.1407	10.6275	1.1953	0.1625	21.9323	0.2266	39.4059	43.2282
7	0.0085	7.2908	8.3495	10.5412	1.059	0.16	20.6686	0.2217	38.5784	42.429
8	0.0090	6.4387	7.5938	10.4575	0.9413	0.1566	19.659	0.2171	38.5986	42.4575
9	0.0095	5.6163	6.885	10.3767	0.8327	0.1533	18.4284	0.2127	38.7591	42.5912
10	0.0100	4.8132	6.2236	10.2978	0.7093	0.1504	17.5311	0.2083	38.5119	42.3547
11	0.0105	4.0295	5.6118	10.2208	0.6175	0.1474	16.3923	0.2041	38.4474	42.287
12	0.0110	3.2545	5.0603	10.1446	0.5216	0.1451	15.4448	0.2	37.8301	41.7096
13	0.0115	2.5077	4.5846	10.0713	0.4542	0.1423	14.8699	0.196	37.7297	41.6071
14	0.0120	1.7682	4.1897	9.9986	0.4013	0.1394	13.8759	0.1922	37.8723	41.7333
15	0.0125	1.0566	3.9134	9.9287	0.3685	0.1372	12.9996	0.1886	37.4708	41.3426
16	0.0130	0.3544	3.7479	9.8597	0.3594*	0.1345	12.2337	0.1851	37.5994	41.4768
17	0.0135	-0.3239*	3.7121*	9.7931	0.3637	0.1321	11.7882	0.1817	37.5147	41.3888
18	0.0140	-0.9992	3.7971	9.7267	0.3877	0.1297	10.8373	0.1784	37.5902	41.4524
19	0.0145	-1.6551	3.9985	9.6623	0.413	0.128	10.1111	0.1752	36.8709	40.7524
20	0.0150	-2.3017	4.2769	9.5987	0.4466	0.1256	9.4649	0.1721	37.0933	40.9498
21	0.0155	-2.9333	4.623	9.5367	0.4828	0.1234	8.695	0.1691	37.065	40.9215
22	0.0160	-3.554	5.017	9.4757	0.541	0.1212	8.1479	0.1662	37.1398	40.9787
23	0.0165	-4.165	5.4489	9.4157	0.6154	0.1193	7.4982	0.1633	36.9211	40.7579
24	0.0170	-4.7647	5.9067	9.3568	0.7022	0.1178	6.8625	0.1605	36.3353	40.1999
25	0.0175	-5.3476	6.369	9.2995	0.7876	0.1156	6.3587	0.1579	36.5281	40.3822
26	0.0180	-5.9283	6.848	9.2424	0.8671	0.1135	5.6136	0.1552	36.7314	40.5725
27	0.0185	-6.4902	7.3304	9.1872	0.9502	0.1122	5.0618	0.1527	36.1365	40.0127
28	0.0190	-7.045	7.8141	9.1327	1.0309	0.1104	4.4065	0.1503	36.0803	39.9598
29	0.0195	-7.5897	8.2978	9.0792	1.1071	0.1087	3.7598	0.1479	36.0362	39.9083
30	0.0200	-8.1238	8.7785	9.0267	1.1883	0.1069	3.2891	0.1456	36.1754	40.0135
31	0.0205	-8.6537	9.2642	8.9747	1.2689	0.1057	2.7108	0.1434	35.6258	39.4925
32	0.0210	-9.1691	9.7379	8.924	1.3418	0.1039	2.1917	0.1412	35.8814	39.719
33	0.0215	-9.6828	10.2146	8.8736	1.4154	0.1022	1.5204	0.1391	36.0387	39.8526

34	0.0220	-10.1883	10.6897	8.8239	1.4916	0.1011	0.9697	0.1371	35.5081	39.3458
35	0.0225	-10.6817	11.1549	8.7754	1.5643	0.0998	0.4302	0.1351	35.2824	39.1323
36	0.0230	-11.1658	11.6133	8.7279	1.6314	0.0985	0.0509*	0.1331	35.1651	39.0106
37	0.0235	-11.6466	12.0706	8.6806	1.6991	0.0971	-0.3716	0.1312	35.1004	38.9481
38	0.0240	-12.1226	12.5249	8.6339	1.777	0.0958	-0.9365	0.1294	35.0684	38.9048
39	0.0245	-12.591	12.9744	8.5878	1.8383	0.0947	-1.5918	0.1276	34.7526	38.5933
40	0.0250	-13.0549	13.4212	8.5423	1.9096	0.0937	-1.9577	0.1259	34.31	38.1735
41	0.0255	-13.5055	13.8547	8.498	1.9718	0.0923	-2.5483	0.1242	34.5259	38.3751
42	0.0260	-13.954	14.288	8.4539	2.0356	0.0911	-3.0005	0.1226	34.4877	38.3376
43	0.0265	-14.3987	14.7184	8.4102	2.1003	0.09	-3.5823	0.121	34.4876	38.3227
44	0.0270	-14.8364	15.1431	8.3672	2.1657	0.0889	-4.0252	0.1194	34.391	38.2353
45	0.0275	-15.2658	15.5613	8.325	2.2279	0.088	-4.3328	0.1179	33.9393	37.8011
46	0.0280	-15.6944	15.9787	8.2829	2.289	0.087	-4.8558	0.1164	33.8245	37.6752
47	0.0285	-16.1151	16.389	8.2416	2.3505	0.086	-5.3724	0.115	33.6683	37.524
48	0.0290	-16.5342	16.7981	8.2004	2.4126	0.085	-5.9261	0.1136	33.654	37.5041
49	0.0295	-16.9447	17.2003	8.1601	2.4733	0.0843	-6.2235	0.1122	33.1161*	36.9983*
50	0.0300	-17.3511	17.5978	8.1202*	2.535	0.0833*	-6.7643	0.1109*	33.144	37.0289

% denotes numbers in percent; * denotes the column-specific minimum/minima

OAR – CCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	4.8612	6.1776	10.3025	0.6993	0.1404	18.9062	0.1964	39.8838	43.6732
2	0.0005	3.2175	4.9383	10.141	0.5087	0.1356	17.1512	0.1877	38.3939	42.1658
3	0.0010	1.9565	4.1771	10.0171	0.4092	0.1316	15.3922	0.1806	37.247	41.0757
4	0.0015	0.8676	3.7588	9.9101	0.3589	0.1292	14.3202	0.1747	35.2068	39.1196
5	0.0020	-0.1087*	3.6145*	9.8142	0.3452*	0.1261	13.1462	0.1697	34.586	38.5182
6	0.0025	-1.0113	3.7118	9.7255	0.3778	0.1232	11.8585	0.1653	34.1498	38.0912
7	0.0030	-1.8519	3.9912	9.643	0.4152	0.1208	10.9179	0.1612	33.4313	37.4613
8	0.0035	-2.634	4.3852	9.5661	0.4612	0.1188	10.3261	0.157	32.1949	36.3126
9	0.0040	-3.357	4.8311	9.4951	0.5261	0.1166	9.3274	0.1532	31.3493	35.5433
10	0.0045	-4.0324	5.3028	9.4287	0.6026	0.1146	8.7835	0.1497	30.6072	34.8521
11	0.0050	-4.6552	5.7755	9.3675	0.6891	0.1129	7.7969	0.1465	29.7673	34.0632
12	0.0055	-5.2291	6.2326	9.3111	0.7726	0.1111	7.0979	0.1439	29.4703	33.7614
13	0.0060	-5.7749	6.6844	9.2575	0.8486	0.1095	6.3747	0.1415	29.2474	33.5477
14	0.0065	-6.2956	7.1298	9.2064	0.9225	0.1082	5.7366	0.1394	28.7961	33.1196
15	0.0070	-6.7903	7.5615	9.1578	1.0018	0.1069	5.4212	0.1375	28.5289	32.8742
16	0.0075	-7.2704	7.9873	9.1106	1.0686	0.1057	4.8377	0.1357	28.3779	32.7282
17	0.0080	-7.737	8.407	9.0647	1.1415	0.1045	4.0552	0.134	28.2526	32.6236
18	0.0085	-8.1899	8.8187	9.0202	1.1987	0.1033	3.558	0.1325	28.1931	32.5646
19	0.0090	-8.6315	9.2252	8.9769	1.261	0.1024	2.9742	0.131	27.8776	32.2808
20	0.0095	-9.0661	9.6276	8.9342*	1.3309	0.1014*	2.5048*	0.1295*	27.7265*	32.1455*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.011	20.315	20.7858	11.8208	2.9507	0.187	35.0353	0.3338	78.5142	80.8536
2	0.011	19.2766	19.7644	11.7188	2.8011	0.184	34.1252	0.3285	78.5091	80.8661
3	0.011	18.2644	18.7729	11.6194	2.6541	0.182	32.8421	0.3232	77.6394	80.0238
4	0.012	17.2544	17.7823	11.5201	2.5074	0.1787	31.6801	0.3175	77.6912	80.0958
5	0.013	16.2703	16.8194	11.4234	2.3626	0.1756	30.6721	0.3118	77.6	80.0202
6	0.013	15.3022	15.8767	11.3283	2.2224	0.1731	29.5733	0.3061	76.8578	79.2841
7	0.013	14.3556	14.958	11.2353	2.0837	0.1706	28.6765	0.3004	76.0366	78.475
8	0.014	13.4084	14.0405	11.1423	1.9462	0.1677	27.4594	0.2948	75.8175	78.2446
9	0.015	12.4858	13.1532	11.0516	1.8131	0.1653	26.4307	0.2894	75.0638	77.4873
10	0.015	11.5708	12.2776	10.9617	1.6722	0.1629	25.4621	0.2846	74.7018	77.1081
11	0.015	10.6603	11.4144	10.8723	1.5439	0.1608	24.4236	0.28	74.0518	76.4539
12	0.016	9.7728	10.5788	10.7851	1.4199	0.1585	23.4277	0.2757	73.9148	76.3134
13	0.017	8.8844	9.7533	10.6978	1.286	0.1565	22.4423	0.2716	73.5451	75.9381
14	0.017	8.0127	8.955	10.6121	1.1648	0.1545	21.4617	0.2677	73.3071	75.6902
15	0.018	7.1421	8.1712	10.5266	1.0386	0.1523	20.4851	0.264	73.3823	75.7655
16	0.018	6.2805	7.414	10.4419	0.9189	0.15	19.5128	0.2604	73.613	75.9934
17	0.018	5.4209	6.6854	10.3575	0.7954	0.1479	18.5451	0.2568	73.6344	76.0116
18	0.019	4.5684	5.9968	10.2737	0.6743	0.1458	17.5863	0.2533	73.7015	76.0817
19	0.019	3.7207	5.3573	10.1904	0.578	0.1436	16.638	0.2498	73.9984	76.3739
20	0.020	2.8773	4.788	10.1076	0.482	0.1415	15.7454	0.2462	73.9893	76.3649
21	0.021	2.039	4.3104	10.0252	0.4329	0.1394	14.7943	0.2427	74.1389	76.5207

22	0.021	1.2188	3.9575	9.9446	0.3912	0.137	13.8403	0.2391	74.575	76.9678
23	0.021	0.3897*	3.7585	9.8632	0.3648*	0.135	12.9255	0.2354	74.3253	76.7348
24	0.022	-0.4256	3.7337*	9.7831	0.3651	0.133	12.019	0.2316	74.1726	76.608
25	0.022	-1.2307	3.8824	9.704	0.3905	0.131	11.1166	0.2276	73.7604	76.2285
26	0.023	-2.034	4.1872	9.6251	0.4269	0.1294	10.2974	0.2235	72.6343	75.1561
27	0.024	-2.8227	4.596	9.5476	0.4792	0.1271	9.6128	0.2192	72.4344	74.9878
28	0.024	-3.6014	5.0897	9.4711	0.553	0.125	8.7276	0.2149	71.9524	74.5374
29	0.025	-4.3691	5.6451	9.3956	0.6508	0.1235	7.8472	0.2105	70.5216	73.1279
30	0.025	-5.1344	6.239	9.3204	0.7458	0.1214	6.8318	0.2061	69.753	72.3858
31	0.025	-5.8795	6.853	9.2472	0.8562	0.1198	5.9261	0.2017	68.4355	71.0834
32	0.026	-6.615	7.4801	9.175	0.9662	0.1178	5.3447	0.1976	67.7108	70.3211
33	0.026	-7.3499	8.1263	9.1028	1.0674	0.1161	4.3414	0.1937	66.8599	69.4713
34	0.027	-8.0665	8.7688	9.0324	1.1758	0.1142	3.7785	0.19	66.3226	68.9377
35	0.028	-8.7851	9.4249	8.9618	1.2701	0.1126	2.7909	0.1863	65.4576	68.0995
36	0.028	-9.4818	10.0699	8.8933	1.3852	0.1111	1.8092	0.1827	64.4682	67.1366
37	0.029	-10.1817	10.7247	8.8246	1.4756	0.1097	1.2548	0.179	63.1529	65.8833
38	0.029	-10.8656	11.3672	8.7574	1.5834	0.1077	0.3027*	0.1751	62.4966	65.2844
39	0.029	-11.5451	12.0113	8.6906	1.6814	0.1061	-0.3539	0.171	61.1865	64.0526
40	0.030	-12.1933	12.6314	8.6269*	1.7757	0.1051*	-1.04	0.167*	58.9248*	61.9082*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OAR – NCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	3.2775	5.0426	10.1469	0.5127	0.1419	17.0854	0.187	31.7634	36.8138
2	0.0005	1.5957	4.0638	9.9817	0.3902	0.135	15.4636	0.1754	29.9355	34.5307
3	0.0010	0.4236*	3.6981	9.8665	0.3544*	0.1304	14.0806	0.1686	29.2747	33.818
4	0.0015	-0.5529	3.6496*	9.7706	0.3562	0.1257	12.4836	0.1632	29.8137	34.2357
5	0.0020	-1.3931	3.8201	9.688	0.3755	0.1223	11.4616	0.1589	29.9902	34.3325
6	0.0025	-2.1503	4.1282	9.6136	0.4227	0.12	10.4636	0.1552	29.3465	33.7068
7	0.0030	-2.8316	4.4882	9.5467	0.4692	0.1172	9.7468	0.152	29.7493	34.0363
8	0.0035	-3.4687	4.8974	9.4841	0.5401	0.1155	8.9705	0.1492	29.2109	33.5176
9	0.0040	-4.0605	5.3117	9.426	0.6093	0.1133	8.1115	0.1468	29.5111	33.7936
10	0.0045	-4.6205	5.738	9.3709*	0.6888	0.1118*	7.5876*	0.1445*	29.1977*	33.4846*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0055	15.6966	16.3248	11.3671	2.2796	0.1944	30.6854	0.2766	42.2941	46.0079
2	0.0060	14.6049	15.2618	11.2598	2.1231	0.1896	29.4843	0.2698	42.3394	46.0326
3	0.0065	13.5642	14.2539	11.1576	1.9707	0.1854	28.0762	0.2635	42.1281	45.8178
4	0.0070	12.5526	13.2806	11.0582	1.8231	0.1817	26.8674	0.2574	41.6721	45.3687
5	0.0075	11.5696	12.3405	10.9616	1.6861	0.1781	25.6831	0.2518	41.3501	45.0626
6	0.0080	10.6098	11.4293	10.8673	1.5313	0.1745	24.7805	0.2462	41.0483	44.7529
7	0.0085	9.671	10.549	10.7751	1.4093	0.1715	23.7753	0.2407	40.2938	44.0444
8	0.0090	8.7625	9.7016	10.6858	1.2769	0.1675	22.6694	0.2355	40.5441	44.2724
9	0.0095	7.8827	8.8953	10.5994	1.1506	0.1642	21.8326	0.2304	40.3656	44.0906
10	0.0100	7.0202	8.1218	10.5146	1.0243	0.1612	20.351	0.2255	39.928	43.6506
11	0.0105	6.1871	7.3909	10.4328	0.9082	0.1579	19.5837	0.2208	39.8066	43.5387
12	0.0110	5.3606	6.6898	10.3516	0.7858	0.1548	18.4146	0.2162	39.7221	43.4356
13	0.0115	4.5568	6.0408	10.2726	0.6812	0.152	17.5816	0.2119	39.4369	43.1442
14	0.0120	3.7736	5.4511	10.1956	0.5837	0.1495	16.8649	0.2076	38.8539	42.5846
15	0.0125	3.0062	4.9268	10.1202	0.4982	0.1472	15.7757	0.2034	38.1847	41.9497
16	0.0130	2.2634	4.4789	10.0473	0.4342	0.1443	15.0715	0.1995	38.2522	41.991
17	0.0135	1.522	4.1202	9.9744	0.3969	0.1417	14.1021	0.1956	38.09	41.8486
18	0.0140	0.8014	3.8872	9.9036	0.371	0.1398	13.3274	0.1919	37.249	41.0361
19	0.0145	0.1012*	3.7776*	9.8348	0.3693*	0.1378	12.3002	0.1883	36.6387	40.4642
20	0.0150	-0.5923	3.7834	9.7667	0.3822	0.1349	11.6449	0.1847	36.8663	40.684
21	0.0155	-1.2628	3.9265	9.7008	0.3946	0.1336	10.9132	0.1812	35.6871	39.5774
22	0.0160	-1.9241	4.1536	9.6359	0.4154	0.1309	9.9538	0.1779	35.9054	39.7779
23	0.0165	-2.5798	4.4691	9.5714	0.4574	0.1287	9.1896	0.1746	35.7175	39.6129
24	0.0170	-3.2168	4.8421	9.5088	0.5116	0.1266	8.675	0.1715	35.498	39.4187
25	0.0175	-3.8435	5.2618	9.4473	0.5687	0.1248	7.7958	0.1684	34.9923	38.9363
26	0.0180	-4.4518	5.7032	9.3875	0.6414	0.1228	7.152	0.1655	34.7943	38.7545
27	0.0185	-5.0576	6.171	9.328	0.7334	0.1208	6.3974	0.1626	34.5866	38.5389
28	0.0190	-5.6492	6.6525	9.2699	0.8045	0.1193	5.793	0.1598	33.9637	37.954
29	0.0195	-6.2235	7.1331	9.2134	0.8934	0.1174	5.0608	0.1571	33.7993	37.7886

30	0.0200	-6.7993	7.6282	9.1569	0.9759	0.1156	4.4727	0.1544	33.6169	37.6117
31	0.0205	-7.3594	8.122	9.1018	1.058	0.1141	3.7026	0.1518	33.0945	37.1217
32	0.0210	-7.9107	8.6121	9.0477	1.1366	0.112	3.127	0.1494	33.385	37.3894
33	0.0215	-8.449	9.1006	8.9948	1.2152	0.1105	2.5003	0.147	33	37.0319
34	0.0220	-8.9795	9.5881	8.9427	1.2925	0.1092	1.8973	0.1446	32.4602	36.529
35	0.0225	-9.5021	10.0691	8.8913	1.3748	0.1072	1.4751	0.1424	32.7798	36.8179
36	0.0230	-10.0188	10.5521	8.8406	1.4465	0.106	0.7729	0.1402	32.2686	36.3239
37	0.0235	-10.5297	11.0316	8.7904	1.5228	0.1046	0.3579	0.1381	32.0477	36.0984
38	0.0240	-11.0291	11.5034	8.7413	1.5985	0.1033	-0.3279*	0.136	31.667	35.7501
39	0.0245	-11.5163	11.9654	8.6934	1.6647	0.1019	-0.9423	0.134	31.4755	35.563
40	0.0250	-12.004	12.4307	8.6455	1.7386	0.1007	-1.2879	0.132	31.0239	35.151
41	0.0255	-12.481	12.8866	8.5986	1.8108	0.0994	-2.0505	0.1301	30.871	35.0223
42	0.0260	-12.9504	13.3358	8.5525	1.882	0.0979	-2.4933	0.1282	30.9928	35.145
43	0.0265	-13.4158	13.7833	8.5068	1.9495	0.0966	-3.1425	0.1264	30.9237	35.0676
44	0.0270	-13.8736	14.2247	8.4618	2.0149	0.0953	-3.6763	0.1247	30.7894	34.9415
45	0.0275	-14.3246	14.6606	8.4175	2.0737	0.0941	-4.1513	0.123	30.6699	34.8225
46	0.0280	-14.7724	15.0946	8.3735	2.1453	0.093	-4.6654	0.1213	30.4545	34.6211
47	0.0285	-15.207	15.5167	8.3308	2.2062	0.0919	-5.0773	0.1198	30.2448	34.4257
48	0.0290	-15.6477	15.9449	8.2875	2.2718	0.0907	-5.5309	0.1182	30.2418	34.4178
49	0.0295	-16.0716	16.3579	8.2459	2.331	0.0897	-5.8907	0.1166	29.9976	34.1906
50	0.0300	-16.4944	16.7702	8.2043*	2.3947	0.0886*	-6.5225	0.1152*	29.9328*	34.1125*

% denotes numbers in percent; * denotes the column-specific minimum/minima

No contamination, OTypeEpsilon=0

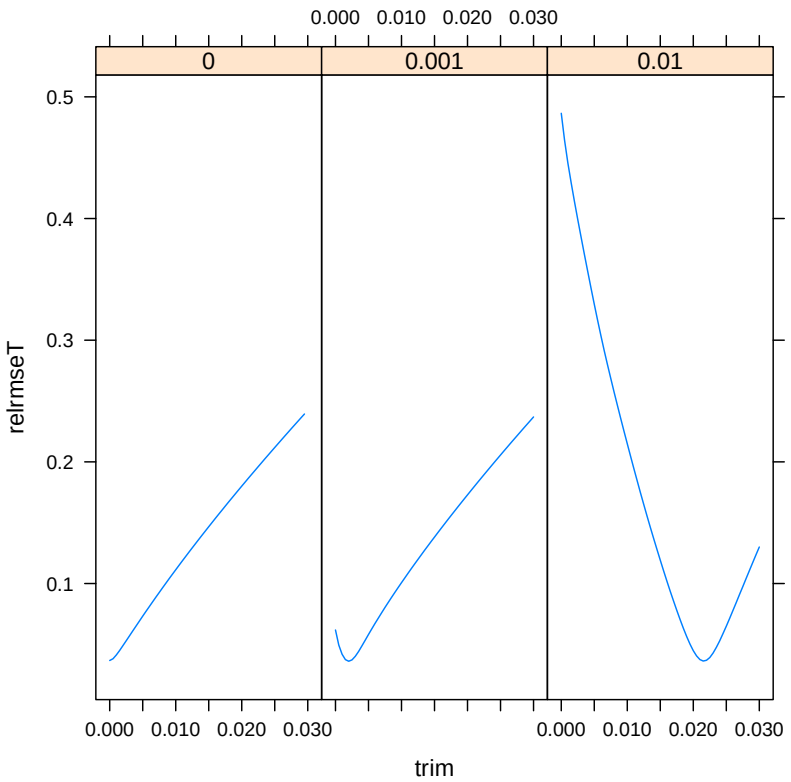
	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	-0.0372*	3.6745*	9.8212	0.3564*	0.1304	13.7907	0.1632	25.1971	30.2283
2	0.0005	-1.2338	3.8182	9.7037	0.3854	0.1261	12.5923	0.1567	24.2543*	29.23*
3	0.0010	-2.1095	4.1275	9.6176	0.4211	0.1216	10.6049	0.1525	25.4844	30.2363
4	0.0015	-2.8165	4.4965	9.5482	0.4733	0.1187	9.4371	0.1495	25.9912	30.6642
5	0.0020	-3.4503	4.8958	9.4859	0.5391	0.1165	8.7917	0.1469	26.0984	30.7363
6	0.0025	-4.0255	5.2964	9.4294	0.611	0.1144	8.0018	0.1448	26.5197	31.0908
7	0.0030	-4.5656	5.7043	9.3763	0.6823	0.1129	7.4268	0.1428	26.4365	31.0161
8	0.0035	-5.0812	6.1128	9.3257	0.7522	0.1115	6.8264	0.141	26.4268	31.0026
9	0.0040	-5.5677	6.5137	9.2779	0.8245	0.1104	6.5255	0.1393	26.2361	30.8278
10	0.0045	-6.0486	6.9177	9.2306	0.8907	0.1088	5.7409	0.1377	26.5703	31.1285
11	0.0050	-6.5133	7.3208	9.185	0.9612	0.1079	5.2425	0.1362	26.262	30.8548
12	0.0055	-6.961	7.7149	9.141	1.0223	0.1069	4.6571	0.1348	26.1394	30.7435
13	0.0060	-7.4	8.105	9.0978	1.0853	0.1056	4.1864	0.1334	26.3547	30.9367
14	0.0065	-7.8316	8.4959	9.0554	1.1539	0.1048	3.6761	0.132	26.0487	30.6607
15	0.0070	-8.2568	8.8823	9.0137	1.2156	0.1035	3.13	0.1307	26.2354	30.8296
16	0.0075	-8.6721	9.2633	8.9729	1.2768	0.1024	2.6888	0.1294	26.3914	30.9675
17	0.0080	-9.0834	9.6448	8.9325	1.3359	0.1015	2.175	0.1282	26.2393	30.8326
18	0.0085	-9.4874	10.0217	8.8928	1.3973	0.1007	1.7174	0.127	26.1296	30.7354
19	0.0090	-9.8869	10.3966	8.8535	1.4539	0.0999	1.2638	0.1258	25.9734	30.5952
20	0.0095	-10.2776	10.7642	8.8151*	1.5137	0.0989*	0.852*	0.1246*	26.0141	30.6344

% denotes numbers in percent; * denotes the column-specific minimum/minima

E.4.5. Plots

In this section, we report graphical displays of certain numerical criteria for the estimators. The lattice-type plots are partitioned into panels for different values of OTypeEpsilon.

OCAR – CCAR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0.01
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0.3
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0.1
relrmseT
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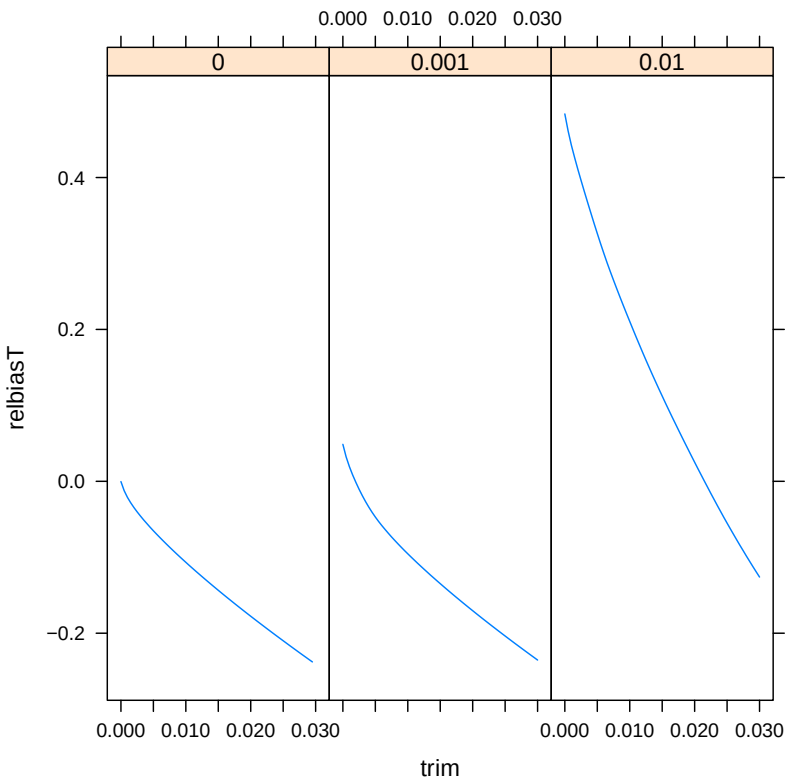
0.000 0.010 0.020 0.030
trim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0.4
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0.0
−0.2
relbiasT
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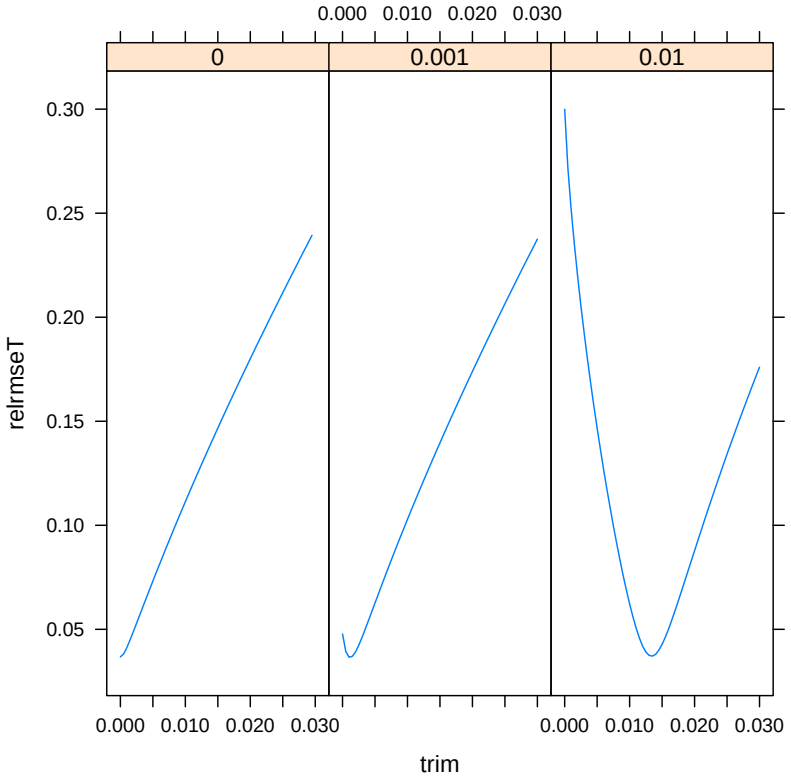
0.000 0.010 0.020 0.030
trim

OCAR – NCAR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0.000 0.010 0.020 0.030
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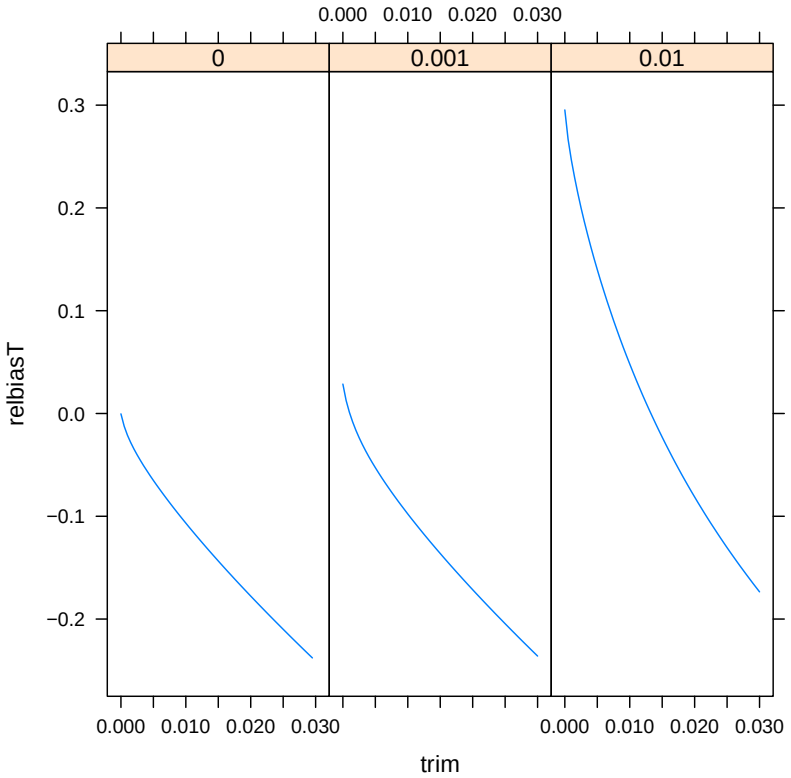
0.20
0.15
0.10
0.05
relrmseT
trim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0.01
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0.1
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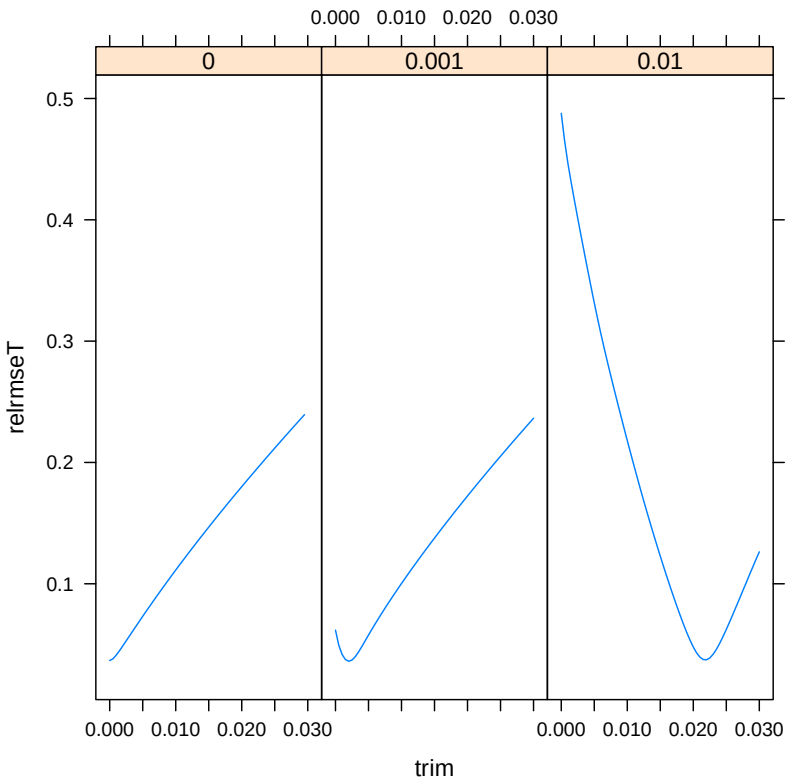
−0.1
−0.2
relbiasT
trim

OAR – CCAR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0.001
0.01
0.5
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0.1
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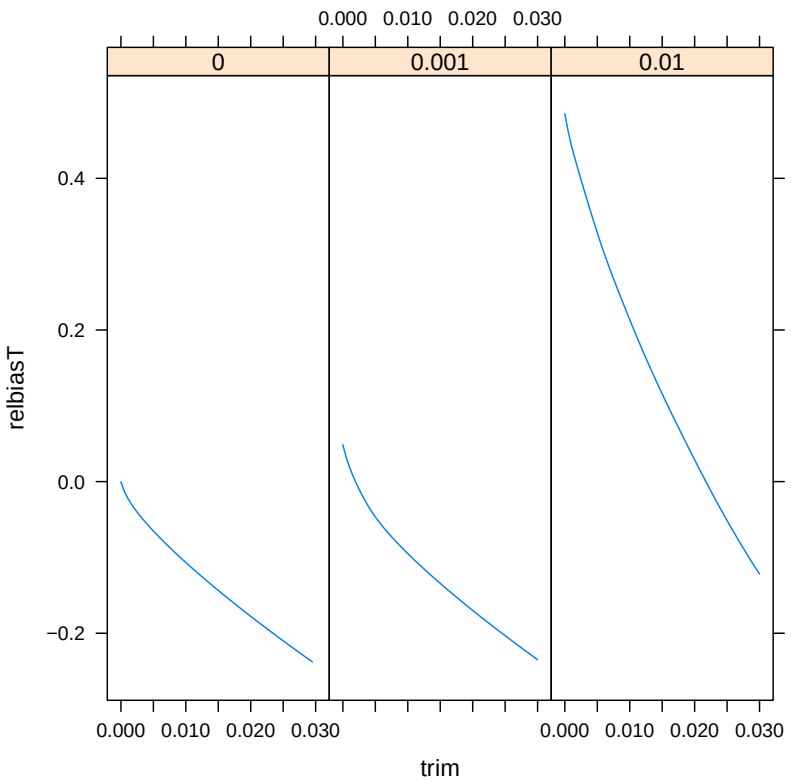
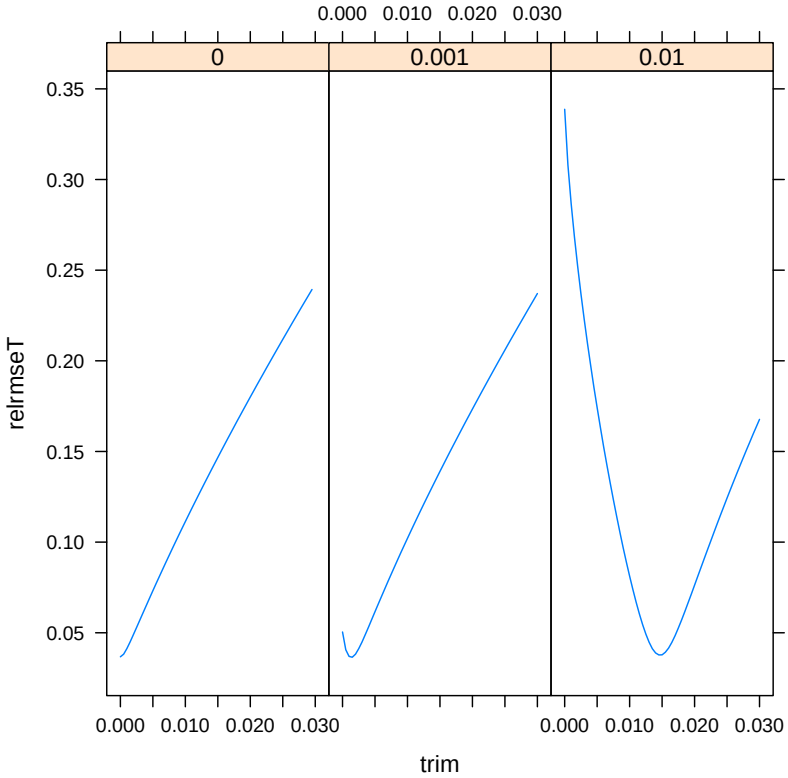
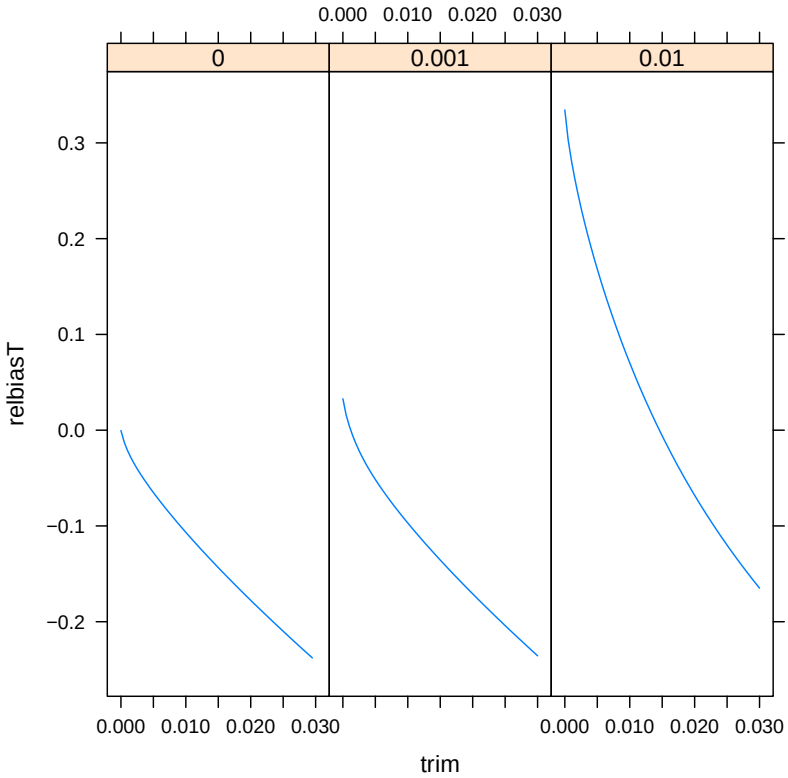
trim


0.000 0.010 0.020 0.030
0
0.001
0.01
0.4
0.2
0.0
−0.2
relbiasT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim

OAR – NCAR


0
0.001
0.01
relrmseT
trim
0.000 0.010 0.020 0.030
0.05
0.10
0.15
0.20
0.25
0.30
0.35


0
0.001
0.01
relbiasT
trim
0.000 0.010 0.020 0.030
−0.2
−0.1
0.0
0.1
0.2
0.3

E.5. N0012: SQSR @ AMELIA: sthhsrs1kx6k

Sample Design Ref 1.4a

E.5.1. Simulation Setup

Target Indicator:	QSR
Domains:	[none] (default)
Population:	AMELIA
Sample:	sthhsrs1kx6k
MonteCarlo Replicates:	1,000 (default)
Criteria Set:	Univariate criteria (default)
Method:	SQSR
Outlyingness:	OAR,OCAR,uncontaminated
Contamination:	CCAR,NCAR,uncontaminated
Missingness:	[none] (default)
Simulation Environment:	DBsim
Host:	FHNW
Author:	Beat Hulliger and Tobias Schoch
ID:	AggSQSR_sthhsrs1kx6k
Date:	September 5, 2011

E.5.2. Estimator Specifications

`Specifications:` Trimmed quintile share ratio estimator; trims only at the top right end of the distribution. Variance estimates based on linearization.

`Comments:`

E.5.3. Robustness Parameters

This section gives some summary statistics of the robustness tuning parameters and the relative number of outliers (OType-Epsilon).

OCAR – CCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

OCAR – NCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

OAR – CCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

OAR – NCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

No Contamination

```
Range of  trim
    Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
0.000000 0.007375 0.014750 0.014750 0.022120 0.029500
Range of OTypeEpsilon

 0
60
```

E.5.4. Results

In this section, we summarize the performance of the estimators due to numerical criteria. The section is split into the different subsections for the respective combination of the outlyingness and contamination mechanisms. In addition, each subsection is further partitioned for the different values of OTypeEpsilon.

OCAR – CCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	5.0173	6.2194	10.3178	0.7323	0.1305	17.1491	0.2006	53.7225	56.7972
2	0.0005	4.082	5.4877	10.2259	0.5931	0.13	16.6602	0.1959	50.7119	53.8727
3	0.0010	3.5094	5.0593	10.1697	0.5271	0.1283	15.9079	0.1928	50.2744	53.4611
4	0.0015	3.0976	4.7599	10.1292	0.4752	0.1262	15.5178	0.1906	50.9981	54.155
5	0.0020	2.8057	4.5702	10.1006	0.4509	0.1258	15.1494	0.1893	50.4937	53.6542
6	0.0025	2.5805	4.4327	10.0784	0.4337	0.1255	15.1497	0.1883	50.0499	53.2194
7	0.0030	2.4197	4.3403	10.0626	0.4185	0.1255	14.9543	0.1876	49.5204	52.7428
8	0.0035	2.3052	4.2693	10.0514	0.4125	0.1248*	14.8166	0.1868	49.7253	52.9675
9	0.0040	2.2616*	4.2501*	10.0471*	0.4113	0.1251	14.5773*	0.1864	48.9913	52.2563
10	0.0045	2.2668	4.2511	10.0476	0.4068*	0.125	14.6387	0.1863*	49.0369	52.3079
11	0.0050	2.3307	4.2862	10.0539	0.4082	0.125	14.6631	0.1866	49.2536	52.5138
12	0.0055	2.4248	4.3462	10.0631	0.4139	0.1257	14.7525	0.1872	48.9446*	52.2143*
13	0.0060	2.565	4.428	10.0769	0.4264	0.1259	14.887	0.1883	49.5713	52.8285
14	0.0065	2.7273	4.5368	10.0928	0.4505	0.127	15.3226	0.1896	49.2578	52.5484
15	0.0070	2.928	4.6636	10.1126	0.4598	0.1273	15.5209	0.1912	50.1638	53.433
16	0.0075	3.1363	4.8052	10.133	0.4677	0.1281	15.6422	0.1929	50.6367	53.9105
17	0.0080	3.3576	4.9613	10.1548	0.4955	0.1289	15.9403	0.1947	51.0775	54.3326
18	0.0085	3.6057	5.1438	10.1792	0.5286	0.13	16.4539	0.1968	51.3346	54.5948
19	0.0090	3.8612	5.3364	10.2042	0.5586	0.1311	16.672	0.1989	51.7019	54.95
20	0.0095	4.134	5.5503	10.2311	0.5966	0.1325	16.8018	0.2011	51.7704	55.0181

```
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
```

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.011	42.7245	43.0438	14.0225	6.2042	0.2646*	60.77	0.5233*	97.7606	100.1147
2	0.011	42.7155*	43.0388*	14.0216*	6.2049	0.2679	60.5961	0.5272	96.786	99.1584
3	0.011	42.7278	43.0531	14.0229	6.1969*	0.2696	60.503*	0.5311	96.9862	99.3635
4	0.012	42.7497	43.077	14.025	6.2075	0.2715	60.9833	0.5348	97.0184	99.4112
5	0.013	42.7795	43.1111	14.0279	6.2016	0.2752	60.9737	0.5382	95.6058	98.0205
6	0.013	42.8373	43.1721	14.0336	6.2194	0.2783	61.2255	0.5415	94.5656	96.9913
7	0.013	42.8971	43.2355	14.0395	6.2239	0.2816	61.147	0.5446	93.3664	95.8163
8	0.014	42.9799	43.3218	14.0476	6.2424	0.2851	61.0883	0.5479	92.2287	94.6948
9	0.015	43.07	43.4147	14.0565	6.2344	0.2881	61.5422	0.5514	91.4299	93.9104
10	0.015	43.1807	43.5295	14.0674	6.2571	0.2922	61.5097	0.5554	90.0584	92.5465
11	0.015	43.3109	43.6639	14.0801	6.2864	0.2967	61.6543	0.5596	88.6196	91.124
12	0.016	43.435	43.791	14.0923	6.2896	0.3001	62.0819	0.5639	87.9374	90.4629
13	0.017	43.5791	43.9378	14.1065	6.3114	0.3034	62.4403	0.5689	87.5536	90.101
14	0.017	43.7343	44.0984	14.1217	6.3341	0.309	62.9634	0.5743	85.8506	88.423
15	0.018	43.8846	44.252	14.1365	6.3627	0.3129	62.9785	0.5799	85.3521	87.9488
16	0.018	44.0475	44.4181	14.1525	6.3857	0.3168	63.4149	0.5858	84.9092	87.5288
17	0.018	44.2254	44.6017	14.17	6.4116	0.3229	63.7152	0.5919	83.2913	85.9445
18	0.019	44.4083	44.7884	14.188	6.4415	0.3276	64.1798	0.5983	82.628	85.2983
19	0.019	44.596	44.981	14.2064	6.4631	0.3332	64.7366	0.6049	81.5156	84.2117
20	0.020	44.7879	45.1756	14.2253	6.4979	0.3371	64.8396	0.6115	81.408	84.12
21	0.021	44.9839	45.3766	14.2445	6.5272	0.3429	65.5016	0.618	80.2013	82.9565
22	0.021	45.1974	45.5958	14.2655	6.5551	0.3495	65.7464	0.6247	78.7275	81.534
23	0.021	45.4122	45.8157	14.2866	6.5957	0.3557	66.1969	0.6313	77.4927	80.3277
24	0.022	45.6227	46.0311	14.3073	6.6222	0.3617	66.6405	0.6375	76.2556	79.1308
25	0.022	45.8479	46.262	14.3294	6.6696	0.3686	66.58	0.6439	74.6944	77.6113

26	0.023	46.0854	46.5029	14.3527	6.6977	0.3735	67.6632	0.65	74.0443	77.0085
27	0.024	46.3446	46.7667	14.3782	6.7374	0.3798	68.4934	0.6561	72.7322	75.7581
28	0.024	46.6137	47.043	14.4046	6.7791	0.3885	68.8086	0.6618	70.3702	73.4587
29	0.025	46.9008	47.3366	14.4328	6.8185	0.3969	69.1038	0.6674	68.1637	71.3321
30	0.025	47.1885	47.6281	14.4611	6.857	0.4027	69.7531	0.6725	66.9911	70.205
31	0.025	47.4974	47.9435	14.4915	6.9006	0.4113	70.6054	0.6778	64.7742	68.0482
32	0.026	47.8334	48.2849	14.5245	6.9467	0.4193	70.9436	0.6834	62.9667	66.2836
33	0.026	48.17	48.627	14.5575	6.9977	0.4274	72.0903	0.689	61.222	64.5742
34	0.027	48.5219	48.9854	14.5921	7.0463	0.4367	72.341	0.6953	59.2239	62.6343
35	0.028	48.8906	49.361	14.6283	7.0967	0.4466	72.9506	0.702	57.1922	60.6769
36	0.028	49.3037	49.7798	14.6689	7.1618	0.4558	73.5504	0.709	55.5418	59.0913
37	0.029	49.6884	50.1695	14.7067	7.2318	0.4641	74.6988	0.7157	54.2004	57.8422
38	0.029	50.1238	50.6121	14.7495	7.2806	0.4753	74.7044	0.7227	52.0536	55.8111
39	0.029	50.5568	51.0513	14.792	7.3449	0.4855	75.4249	0.7292	50.1947	54.0543
40	0.030	51.031	51.5322	14.8386	7.4009	0.4967	76.7906	0.7354	48.0412*	52.0419*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OCAR – NCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	3.0718	4.8255	10.1267	0.4933	0.1338	15.5501	0.1882	40.6664	44.8092
2	0.0005	2.1784	4.2678	10.0389	0.4102	0.1301	15.224	0.182	39.8419*	43.5524*
3	0.0010	1.7119	4.0157	9.9931	0.3839	0.1275	14.5218	0.1791	40.4507	44.0777
4	0.0015	1.4423	3.8815	9.9666	0.3696	0.1255	14.1762	0.1776	41.5154	45.1113
5	0.0020	1.3042	3.8224	9.953	0.3661	0.1247	14.1955	0.1769*	41.8346	45.3902
6	0.0025	1.2574*	3.7845*	9.9484*	0.3627	0.1231	13.8592	0.1769*	43.6779	47.1406
7	0.0030	1.2621	3.7855	9.9489	0.362*	0.1231	13.9681	0.1772	43.9796	47.4155
8	0.0035	1.3194	3.7951	9.9545	0.3685	0.1223*	13.6966*	0.1779	45.4102	48.785
9	0.0040	1.4185	3.8322	9.9643	0.3713	0.1225	13.8461	0.1789	46.0544	49.3939
10	0.0045	1.5463	3.8903	9.9768	0.3791	0.1231	14.0653	0.1801	46.2436	49.5944

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0055	23.0896	23.5563	12.0934	3.3675	0.2103	38.1685	0.3245	54.2656	57.5092
2	0.0060	22.9274	23.3957	12.0775	3.3348	0.2096	37.886	0.3242	54.6608	57.9024
3	0.0065	22.8034	23.2721	12.0653	3.308	0.2087	37.8258	0.3241*	55.3481	58.5761
4	0.0070	22.6997	23.1703	12.0551	3.2962	0.2086	37.8234*	0.3242	55.3957	58.6271
5	0.0075	22.6182	23.0897	12.0471	3.2783	0.2082	37.9616	0.3245	55.839	59.0662
6	0.0080	22.565	23.0355	12.0419	3.2741	0.2073*	37.9925	0.3249	56.7363	59.9338
7	0.0085	22.5466*	23.0194*	12.0401*	3.264*	0.2082	38.0506	0.3256	56.4287	59.6508
8	0.0090	22.5489	23.0251	12.0403	3.2644	0.2097	38.6837	0.3265	55.692	58.9522
9	0.0095	22.5553	23.0299	12.0409	3.2682	0.2091	38.3609	0.3273	56.518	59.751
10	0.0100	22.5986	23.0744	12.0452	3.2713	0.21	38.7189	0.3283	56.3145	59.5589
11	0.0105	22.6582	23.1328	12.051	3.2817	0.21	39.0466	0.3295	56.9514	60.1636
12	0.0110	22.747	23.2239	12.0598	3.2968	0.2119	39.1589	0.331	56.2248	59.437
13	0.0115	22.8501	23.3284	12.0699	3.3046	0.2134	39.3928	0.3325	55.8093	59.056
14	0.0120	22.9644	23.4419	12.0811	3.3263	0.2141	39.8338	0.3341	56.0261	59.2636
15	0.0125	23.1093	23.5876	12.0954	3.3482	0.2158	40.1542	0.336	55.7057	58.9705
16	0.0130	23.2576	23.7367	12.1099	3.3623	0.2176	40.2344	0.3379	55.2947	58.5746
17	0.0135	23.4287	23.9068	12.1267	3.3885	0.2187	40.6654	0.3401	55.5106	58.7825
18	0.0140	23.6277	24.1078	12.1463	3.4151	0.2215	40.8659	0.3423	54.5705	57.8803
19	0.0145	23.8319	24.3109	12.1664	3.4537	0.2228	41.0541	0.3446	54.6463	57.9446
20	0.0150	24.0627	24.5405	12.189	3.4835	0.2244	41.7879	0.3472	54.7073	58.0233
21	0.0155	24.3048	24.7854	12.2128	3.5222	0.228	41.9792	0.3498	53.4316	56.7949
22	0.0160	24.5666	25.047	12.2385	3.5549	0.2303	42.424	0.3527	53.1566	56.54
23	0.0165	24.8369	25.3158	12.2651	3.601	0.2321	43.064	0.3557	53.2937	56.6979
24	0.0170	25.1247	25.6042	12.2934	3.6371	0.235	43.3005	0.3589	52.6987	56.1559
25	0.0175	25.4321	25.9113	12.3236	3.6907	0.2377	43.8618	0.3621	52.3165	55.8006
26	0.0180	25.7578	26.2376	12.3556	3.7364	0.2411	44.3078	0.3656	51.6385	55.147
27	0.0185	26.0933	26.572	12.3885	3.7869	0.2436	44.7031	0.3692	51.5424	55.0754
28	0.0190	26.447	26.9274	12.4233	3.8373	0.2478	45.5053	0.373	50.5362	54.1139
29	0.0195	26.8128	27.2936	12.4592	3.8862	0.2513	46.0172	0.377	49.9927	53.5948
30	0.0200	27.2078	27.6896	12.498	3.9425	0.2555	46.4889	0.3814	49.2405	52.8833
31	0.0205	27.6009	28.0841	12.5367	3.995	0.26	47.3833	0.3857	48.352	52.047
32	0.0210	28.0175	28.5002	12.5776	4.0633	0.2636	48.239	0.3902	48.0484	51.7858
33	0.0215	28.4503	28.9332	12.6201	4.125	0.2677	48.7691	0.3949	47.4807	51.2487

34	0.0220	28.8965	29.3814	12.6639	4.1861	0.273	49.3557	0.3998	46.4178	50.2427
35	0.0225	29.3441	29.8303	12.7079	4.2567	0.278	50.3697	0.4047	45.5793	49.4425
36	0.0230	29.826	30.3151	12.7553	4.3108	0.2842	51.0081	0.4101	44.2912	48.2169
37	0.0235	30.3183	30.8074	12.8036	4.3811	0.2889	51.5816	0.4157	43.905	47.8702
38	0.0240	30.8238	31.3161	12.8533	4.4563	0.2956	52.9692	0.4214	42.5458	46.5917
39	0.0245	31.3487	31.8413	12.9049	4.5325	0.3007	53.5779	0.4275	42.1428	46.2346
40	0.0250	31.8818	32.3757	12.9572	4.6096	0.3067	54.366	0.4339	41.4648	45.6056
41	0.0255	32.4181	32.9154	13.0099	4.6849	0.314	55.0796	0.4403	40.2404	44.4807
42	0.0260	32.9916	33.4921	13.0663	4.767	0.3216	56.1166	0.4471	39.0357	43.3597
43	0.0265	33.5769	34.0794	13.1238	4.8558	0.3285	56.8976	0.4539	38.1674	42.5503
44	0.0270	34.1662	34.6705	13.1817	4.935	0.3354	57.5999	0.461	37.4369	41.8749
45	0.0275	34.7789	35.2863	13.2419	5.0191	0.3435	58.7337	0.4682	36.2884	40.819
46	0.0280	35.4	35.9097	13.3029	5.1227	0.3512	59.9557	0.4758	35.4928	40.0918
47	0.0285	36.0422	36.5558	13.366	5.2051	0.3603	60.7251	0.4837	34.2407	38.9437
48	0.0290	36.6945	37.2107	13.4301	5.3098	0.3687	61.9348	0.4918	33.3984	38.1918
49	0.0295	37.3671	37.8874	13.4962	5.405	0.3784	62.8174	0.5003	32.2216	37.1674
50	0.0300	38.0519	38.5763	13.5635	5.5002	0.3882	64.0816	0.5089	31.0821*	36.125*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OAR – CCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	5.0228	6.2213	10.3184	0.7262	0.1302	17.0704	0.2005	53.9567	57.0283
2	0.0005	4.0939	5.4869	10.2271	0.5907	0.129	15.9206	0.1959	51.9458	55.0597
3	0.0010	3.5309	5.0761	10.1718	0.5257	0.1285	15.471	0.1928	50.0343	53.2169
4	0.0015	3.1327	4.7863	10.1327	0.4833	0.1265	15.5389	0.1907	50.7341	53.8858
5	0.0020	2.8489	4.5987	10.1048	0.4509	0.1259	15.1346	0.1894	50.445	53.6074
6	0.0025	2.6264	4.4596	10.0829	0.4271	0.1255	14.9131	0.1886	50.2579	53.4293
7	0.0030	2.4554	4.355	10.0661	0.4264	0.125*	14.7045	0.1878	50.1971	53.4096
8	0.0035	2.3539	4.304	10.0562	0.4136	0.1255	14.7273	0.1871	49.1399	52.4132
9	0.0040	2.3138*	4.2771*	10.0522*	0.4121*	0.125*	14.5818	0.1867	49.2861	52.5513
10	0.0045	2.3189	4.2805	10.0527	0.4181	0.1251	14.2897*	0.1865*	49.1274	52.4026
11	0.0050	2.3805	4.3148	10.0588	0.4227	0.1251	14.3356	0.1869	49.3263	52.5787
12	0.0055	2.4818	4.3742	10.0687	0.4279	0.1254	14.3455	0.1876	49.6355	52.897
13	0.0060	2.6265	4.4716	10.0829	0.4438	0.1265	14.5463	0.1887	49.0885*	52.3865*
14	0.0065	2.7943	4.5744	10.0994	0.4495	0.1267	14.5328	0.19	49.893	53.1749
15	0.0070	2.9915	4.7042	10.1188	0.4673	0.1274	14.8575	0.1916	50.4635	53.7449
16	0.0075	3.1959	4.8505	10.1389	0.4793	0.1286	15.1928	0.1933	50.2923	53.5895
17	0.0080	3.429	5.0104	10.1618	0.5124	0.129	15.339	0.1953	51.4155	54.6707
18	0.0085	3.6721	5.1927	10.1857	0.5393	0.1302	15.5481	0.1972	51.4275	54.6916
19	0.0090	3.9319	5.3935	10.2112	0.5683	0.1317	15.9649	0.1994	51.3899	54.6538
20	0.0095	4.2025	5.6026	10.2378	0.5992	0.1326	16.1887	0.2016	52.0009	55.2527

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.011	42.9232*	43.2507*	14.0421*	6.2362	0.2727*	60.7961*	0.5271*	93.31	95.7394
2	0.011	42.93	43.2613	14.0427	6.2309*	0.2758	61.3125	0.531	92.5048	94.9592
3	0.011	42.9263	43.259	14.0424	6.2368	0.277	61.2148	0.5346	92.9837	95.4406
4	0.012	42.9527	43.2889	14.0449	6.2513	0.2802	61.1964	0.538	92.0227	94.4995
5	0.013	42.9987	43.3393	14.0495	6.2489	0.2841	61.5097	0.541	90.4413	92.9496
6	0.013	43.0505	43.3941	14.0546	6.2539	0.287	62.0588	0.5439	89.5301	92.0589
7	0.013	43.1251	43.4736	14.0619	6.2642	0.2916	62.4907	0.5469	87.5235	90.0716
8	0.014	43.2073	43.5587	14.07	6.2757	0.2946	62.7348	0.5501	86.7339	89.276
9	0.015	43.3266	43.6831	14.0817	6.2888	0.2998	63.0055	0.5538	84.765	87.3308
10	0.015	43.4391	43.7988	14.0927	6.3121	0.3032	62.9936	0.5579	84.0116	86.5955
11	0.015	43.5657	43.9301	14.1052	6.3233	0.3081	63.2144	0.5625	82.5805	85.1857
12	0.016	43.7052	44.0741	14.1189	6.3472	0.3128	63.3687	0.5674	81.37	84.0177
13	0.017	43.8556	44.2289	14.1337	6.3625	0.3177	63.856	0.5729	80.3435	83.0171
14	0.017	44.006	44.384	14.1484	6.3831	0.3229	64.2675	0.5785	79.1858	81.8954
15	0.018	44.1652	44.5476	14.1641	6.4118	0.3278	64.6017	0.5845	78.3382	81.0718
16	0.018	44.3302	44.7186	14.1803	6.4256	0.3341	64.6075	0.5908	76.8211	79.5832
17	0.018	44.5084	44.8997	14.1978	6.4583	0.3381	65.2018	0.5973	76.7001	79.4748
18	0.019	44.6758	45.0727	14.2142	6.4762	0.3442	65.3939	0.6036	75.3649	78.1773
19	0.019	44.8624	45.2635	14.2326	6.5095	0.3493	66.0181	0.6102	74.7029	77.5436
20	0.020	45.0507	45.4574	14.2511	6.5363	0.3557	65.9653	0.6168	73.4174	76.2969
21	0.021	45.2417	45.6523	14.2698	6.564	0.3607	66.7778	0.6234	72.8375	75.7437

22	0.021	45.4504	45.8671	14.2903	6.5925	0.3677	67.3517	0.6298	71.2848	74.2361
23	0.021	45.662	46.0845	14.3111	6.6224	0.3745	67.7541	0.6364	69.9382	72.9344
24	0.022	45.8811	46.3101	14.3327	6.6526	0.3822	68.2928	0.6428	68.1908	71.2587
25	0.022	46.1039	46.54	14.3546	6.6866	0.3904	69.0278	0.6491	66.2695	69.4007
26	0.023	46.3395	46.7787	14.3777	6.7172	0.3952	68.9144	0.6547	65.6554	68.8269
27	0.024	46.5965	47.0425	14.4029	6.759	0.4036	70.0172	0.6603	63.6078	66.8271
28	0.024	46.8781	47.3291	14.4306	6.7955	0.4105	70.3928	0.666	62.216	65.4998
29	0.025	47.1507	47.608	14.4574	6.836	0.4187	70.9727	0.6708	60.2105	63.5718
30	0.025	47.4486	47.9124	14.4867	6.8712	0.4273	71.9817	0.6761	58.2112	61.6727
31	0.025	47.7698	48.2416	14.5182	6.924	0.4377	72.0661	0.6814	55.6844	59.2418
32	0.026	48.1017	48.579	14.5508	6.9763	0.4459	73.0137	0.6869	54.0472	57.6738
33	0.026	48.4501	48.9332	14.5851	7.0342	0.4546	73.3118	0.6931	52.4595	56.1318
34	0.027	48.7924	49.283	14.6187	7.0782	0.4649	74.378	0.6994	50.4453	54.2167
35	0.028	49.1933	49.6916	14.6581	7.1323	0.4761	74.4452	0.7065	48.4063	52.2881
36	0.028	49.5685	50.0742	14.6949	7.1975	0.4869	75.5077	0.7132	46.4799	50.4713
37	0.029	49.9789	50.4894	14.7353	7.2548	0.4956	76.2322	0.7198	45.2261	49.3048
38	0.029	50.4195	50.9374	14.7786	7.3103	0.5071	77.1897	0.7269	43.3424	47.5807
39	0.029	50.8401	51.3641	14.8199	7.3768	0.5175	77.6429	0.7328	41.592	45.9553
40	0.030	51.3287	51.8604	14.8679	7.4593	0.5301	78.5215	0.7387	39.3525*	43.9061*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OAR – NCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	3.531	5.0808	10.1718	0.5298	0.129	16.064	0.1924	49.2187	53.2479
2	0.0005	2.5247	4.4109	10.0729	0.4316	0.1264	14.6742	0.1846	46.0388*	49.4346*
3	0.0010	2.0323	4.1157	10.0246	0.3935	0.1238	14.2377	0.1815	46.6316	49.9551
4	0.0015	1.7303	3.9574	9.9949	0.3808	0.1224	14.024	0.1797	46.8484	50.1823
5	0.0020	1.5523	3.8743	9.9774	0.3703	0.1218	13.8697	0.1787	46.8089	50.1244
6	0.0025	1.4782	3.842	9.9701	0.3649	0.1215	13.7738	0.1785*	46.8912	50.2128
7	0.0030	1.4592*	3.824*	9.9683*	0.364*	0.1207*	13.8811	0.1786	47.9772	51.2491
8	0.0035	1.4984	3.8455	9.9721	0.3718	0.1212	13.8729	0.1792	47.8199	51.0889
9	0.0040	1.5793	3.8795	9.9801	0.3662	0.1213	13.4574*	0.18	48.3263	51.586
10	0.0045	1.7036	3.9408	9.9923	0.3708	0.122	13.5923	0.1811	48.4123	51.6795

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0055	25.8498	26.2694	12.3646	3.7692	0.2113	40.6771	0.3502	65.7019	68.6021
2	0.0060	25.6454	26.0683	12.3445	3.7336	0.2113	40.1963*	0.3495	65.3895	68.3015
3	0.0065	25.4784	25.9039	12.3281	3.7115	0.2113	40.5397	0.3491	65.2558	68.172
4	0.0070	25.3297	25.7586	12.3135	3.6952	0.2117	40.6822	0.3489	64.79	67.7234
5	0.0075	25.1978	25.6278	12.3006	3.6727	0.2112	40.5081	0.3488*	65.1821	68.1259
6	0.0080	25.1164	25.5477	12.2926	3.672	0.2111*	40.8874	0.3491	65.3251	68.2662
7	0.0085	25.0523	25.4868	12.2863	3.6582	0.2122	40.8167	0.3493	64.6187	67.585
8	0.0090	25.0173	25.4564	12.2828	3.6507	0.2141	41.0437	0.35	63.4659	66.4591
9	0.0095	24.9976*	25.4371*	12.2809*	3.6391*	0.2142	41.157	0.3507	63.6841	66.6877
10	0.0100	25.0148	25.4576	12.2826	3.6439	0.216	41.4826	0.3516	62.8148	65.8429
11	0.0105	25.0347	25.4785	12.2845	3.6398	0.2166	41.6171	0.3526	62.7729	65.8199
12	0.0110	25.0763	25.5206	12.2886	3.6471	0.2172	41.6407	0.3537	62.8163	65.8662
13	0.0115	25.1485	25.5956	12.2957	3.6517	0.2192	41.9939	0.3551	61.9945	65.0653
14	0.0120	25.2356	25.6857	12.3043	3.6611	0.2214	42.1711	0.3565	61.0041	64.1104
15	0.0125	25.3424	25.7924	12.3148	3.6796	0.2223	42.0836	0.3581	61.0618	64.165
16	0.0130	25.4734	25.9228	12.3276	3.7019	0.2232	42.3567	0.3599	61.2487	64.3526
17	0.0135	25.6097	26.0606	12.341	3.7212	0.2251	42.8508	0.3617	60.6664	63.8094
18	0.0140	25.7836	26.2359	12.3581	3.7422	0.2273	43.4875	0.3638	60.0396	63.2012
19	0.0145	25.9584	26.4117	12.3753	3.7692	0.2294	43.8006	0.366	59.5467	62.7395
20	0.0150	26.168	26.6233	12.3959	3.7988	0.2323	43.9502	0.3683	58.5751	61.8004
21	0.0155	26.381	26.8362	12.4168	3.8373	0.2341	44.6186	0.3708	58.402	61.6374
22	0.0160	26.6154	27.0713	12.4398	3.8684	0.2365	45.2402	0.3735	57.941	61.2168
23	0.0165	26.8646	27.322	12.4643	3.904	0.2395	45.2434	0.3764	57.1811	60.488
24	0.0170	27.1344	27.5924	12.4908	3.9413	0.2422	45.3493	0.3794	56.6591	60.0087
25	0.0175	27.4167	27.8753	12.5186	3.9792	0.245	46.5856	0.3825	56.1314	59.5032
26	0.0180	27.7115	28.1718	12.5475	4.0346	0.2485	46.8448	0.3858	55.2225	58.6294
27	0.0185	28.0496	28.5096	12.5807	4.0768	0.2514	47.2274	0.3895	54.8983	58.3159
28	0.0190	28.3736	28.8353	12.6126	4.1201	0.2552	47.9036	0.3931	54.01	57.4654
29	0.0195	28.7205	29.1847	12.6467	4.1728	0.2597	48.0942	0.397	52.8409	56.3465

30	0.0200	29.0843	29.5498	12.6824	4.2182	0.2638	49.1307	0.401	52.0189	55.5674
31	0.0205	29.4687	29.9355	12.7202	4.2854	0.268	49.6433	0.4054	51.2854	54.8894
32	0.0210	29.8678	30.3353	12.7594	4.3349	0.2719	50.3933	0.4096	50.6364	54.2618
33	0.0215	30.2903	30.7616	12.8009	4.3912	0.2781	51.0369	0.4142	48.9669	52.6826
34	0.0220	30.7127	31.1849	12.8424	4.4555	0.2824	51.6581	0.4189	48.3442	52.1141
35	0.0225	31.162	31.636	12.8865	4.5212	0.2876	52.4525	0.424	47.3985	51.2079
36	0.0230	31.6298	32.1062	12.9325	4.5911	0.2934	53.3628	0.4293	46.3298	50.1926
37	0.0235	32.0994	32.578	12.9786	4.6662	0.2991	53.8867	0.4349	45.3957	49.3214
38	0.0240	32.599	33.0783	13.0277	4.727	0.3042	54.9155	0.4407	44.8969	48.8401
39	0.0245	33.1088	33.5907	13.0778	4.81	0.3106	55.7224	0.4467	43.8086	47.8209
40	0.0250	33.6493	34.1342	13.1309	4.8864	0.3176	56.3785	0.4529	42.592	46.6615
41	0.0255	34.1873	34.6744	13.1838	4.9667	0.3241	57.1203	0.4593	41.7084	45.8312
42	0.0260	34.7502	35.2399	13.2391	5.0431	0.3312	58.1468	0.4659	40.6878	44.8878
43	0.0265	35.3199	35.8122	13.295	5.1286	0.3384	59.2799	0.4728	39.7231	43.9944
44	0.0270	35.9101	36.4073	13.353	5.2043	0.3474	60.3561	0.48	38.1449	42.5259
45	0.0275	36.5207	37.0207	13.413	5.294	0.3553	61.0327	0.4874	37.174	41.6397
46	0.0280	37.138	37.6404	13.4737	5.3822	0.3631	61.7352	0.4952	36.3843	40.9401
47	0.0285	37.7848	38.2905	13.5372	5.4716	0.3717	63.0475	0.5031	35.3367	39.9957
48	0.0290	38.4429	38.9523	13.6019	5.5606	0.3809	63.8784	0.5114	34.2622	39.0338
49	0.0295	39.117	39.6304	13.6681	5.6578	0.3906	64.9803	0.52	33.1138	37.9823
50	0.0300	39.8004	40.3174	13.7352	5.7538	0.4002	66.0705	0.5288	32.1276*	37.1027*

% denotes numbers in percent; * denotes the column-specific minimum/minima

No Contamination

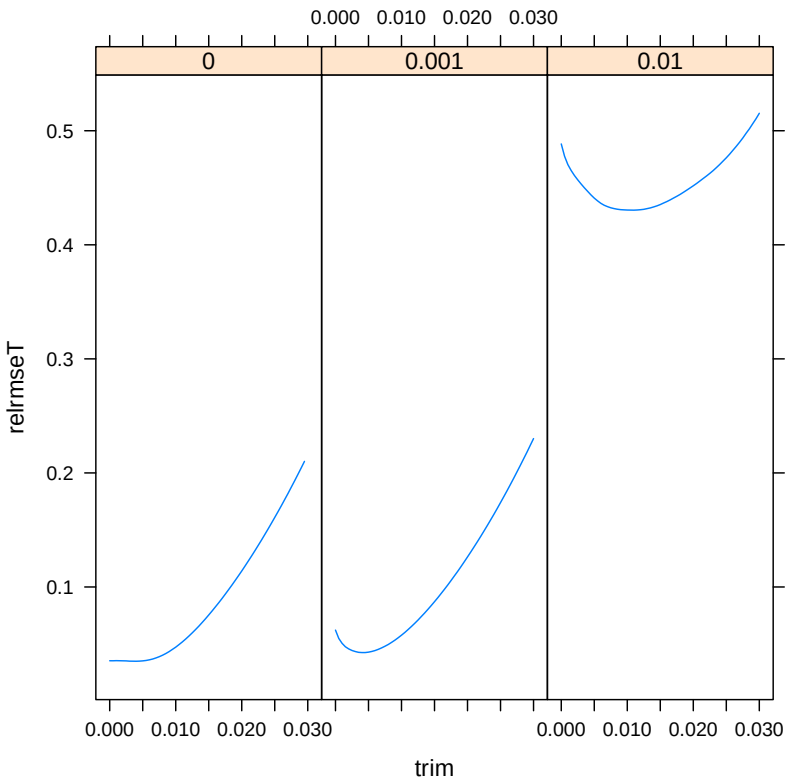
	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	0.1109	3.5325	9.8358	0.3542	0.1205	11.7866	0.1679	39.3857	43.044
2	0.0005	-0.424	3.53	9.7832	0.3549	0.1187	11.4908	0.1649	38.9486*	42.6068*
3	0.0010	-0.6273	3.5411	9.7633	0.3641	0.1174	11.4035	0.164*	39.7728	43.3851
4	0.0015	-0.6803	3.5342	9.7581*	0.3679	0.1162*	11.2737	0.1642	41.2465	44.7762
5	0.0020	-0.6451	3.5273	9.7615	0.3586	0.1162*	11.1636	0.1649	41.8836	45.375
6	0.0025	-0.5624	3.5203	9.7696	0.3615	0.1167	11.107*	0.1658	42.1244	45.6114
7	0.0030	-0.4384	3.4981	9.7818	0.3605	0.1164	11.2034	0.1671	43.5398	46.974
8	0.0035	-0.2873	3.4937	9.7967	0.3604	0.1171	11.514	0.1684	43.7834	47.2092
9	0.0040	-0.111	3.4887*	9.814	0.3525	0.1175	11.5734	0.17	44.6643	48.0702
10	0.0045	0.0828*	3.4997	9.833	0.356	0.1183	11.793	0.1716	45.1174	48.5137
11	0.0050	0.2905	3.522	9.8534	0.347*	0.119	12.2188	0.1734	45.6369	49.0164
12	0.0055	0.5112	3.5561	9.8751	0.3501	0.1197	12.4138	0.1752	46.4104	49.7742
13	0.0060	0.746	3.6129	9.8982	0.3611	0.1207	12.7168	0.1771	46.6616	50.0251
14	0.0065	0.9917	3.6822	9.9223	0.3628	0.1215	12.9796	0.1791	47.406	50.7622
15	0.0070	1.2551	3.7774	9.9482	0.3662	0.1227	13.4399	0.1812	47.7422	51.0948
16	0.0075	1.5192	3.8876	9.9741	0.3784	0.1237	13.5813	0.1834	48.1882	51.5424
17	0.0080	1.7939	4.0162	10.0011	0.3888	0.1248	13.8673	0.1856	48.7378	52.0666
18	0.0085	2.0792	4.1661	10.0292	0.398	0.1259	14.298	0.1878	49.1335	52.4618
19	0.0090	2.3692	4.3343	10.0577	0.4156	0.1273	14.5905	0.1902	49.3899	52.7183
20	0.0095	2.6743	4.5292	10.0876	0.4404	0.1291	14.869	0.1926	49.1838	52.5279

% denotes numbers in percent; * denotes the column-specific minimum/minima

E.5.5. Plots

In this section, we report graphical displays of certain numerical criteria for the estimators. The lattice-type plots are partitioned into panels for different values of OTypeEpsilon.

OCAR – CCAR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0
0.001
0.01
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0.4
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0.2
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relrmseT
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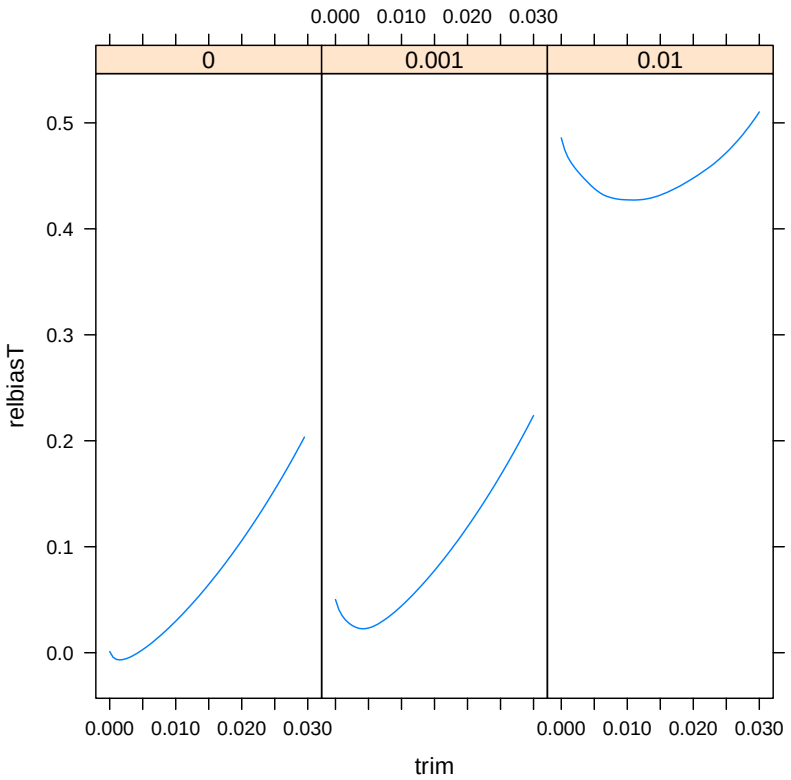
0.000 0.010 0.020 0.030
trim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0.5
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0.3
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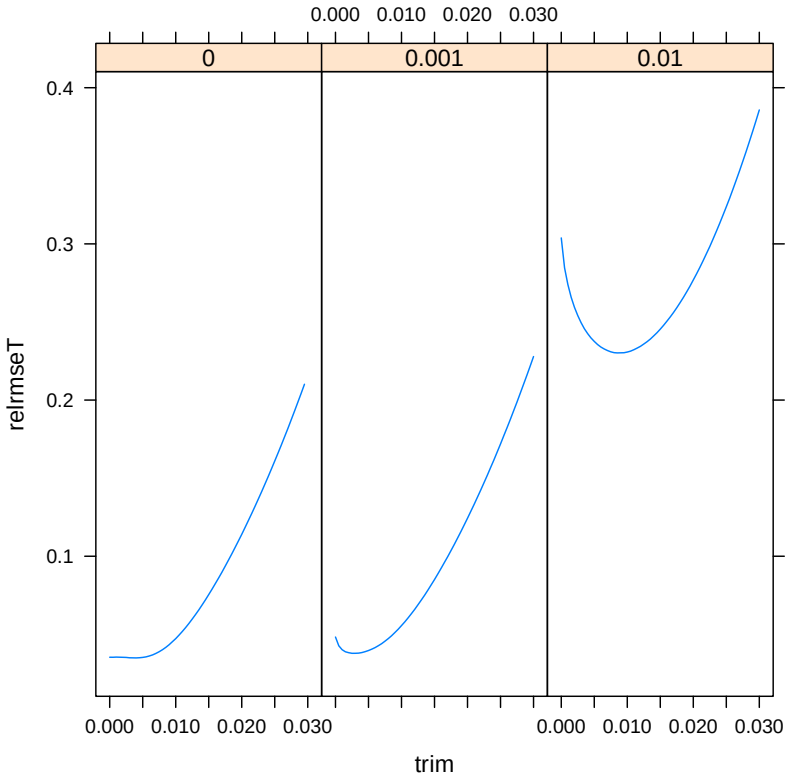
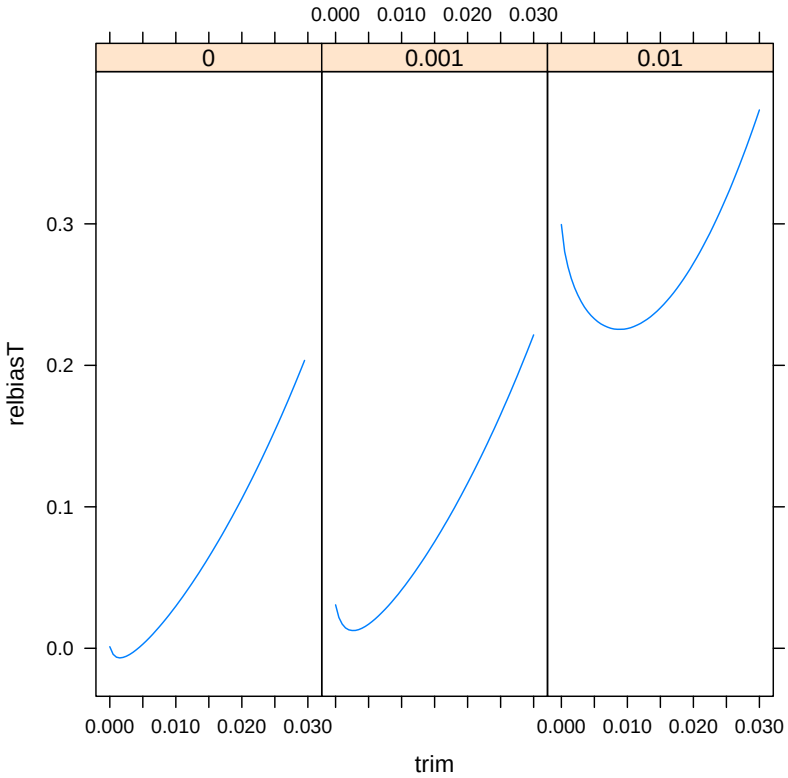
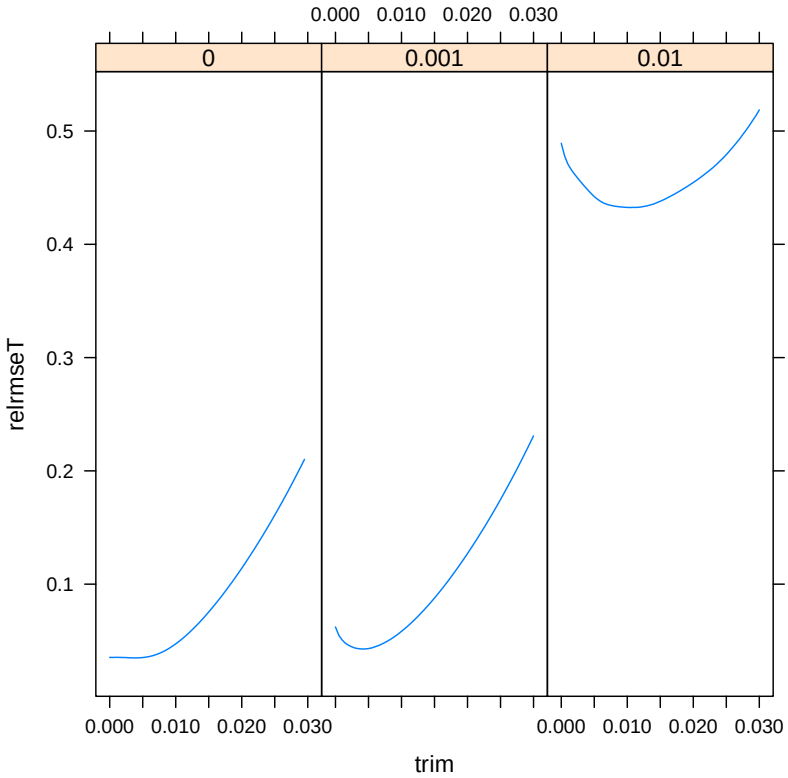
0.1
0.0
relbiasT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim

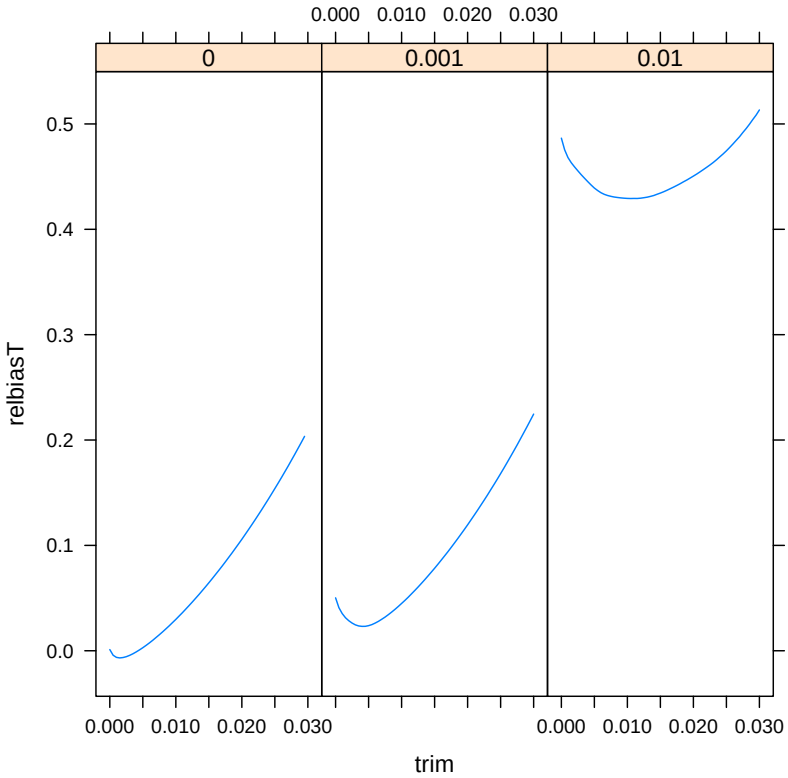
OCAR – NCAR


0.000 0.010 0.020 0.030
0
0.001
0.01
0.4
0.3
0.2
0.1
relrmseT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim

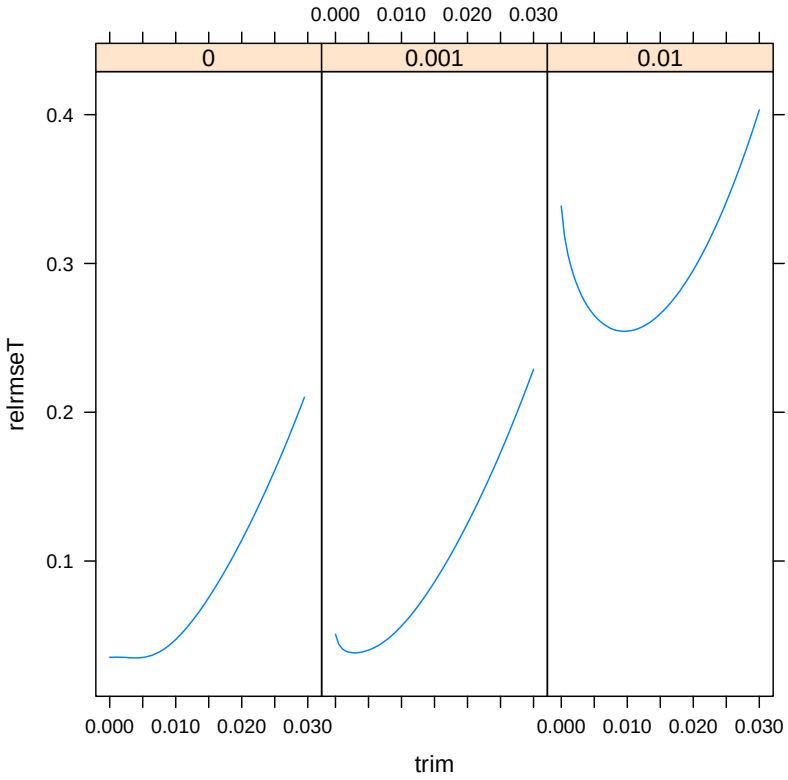

0.000 0.010 0.020 0.030
0
0.001
0.01
0.3
0.2
0.1
0.0
relbiasT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim

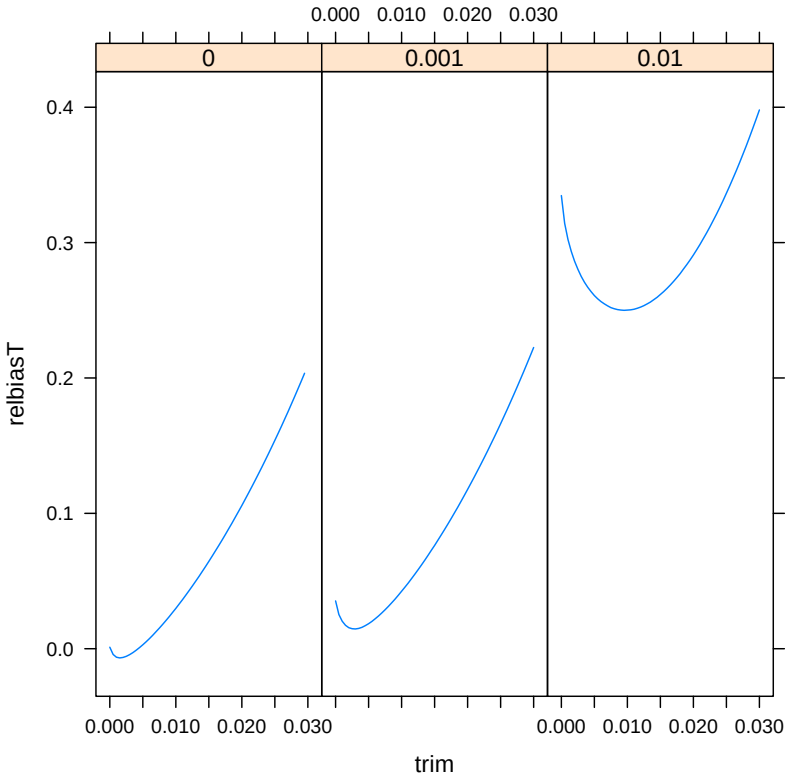
OAR – CCAR


0.000 0.010 0.020 0.030
0
0.001
0.01
0.5
0.4
0.3
0.2
0.1
relrmseT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim


0.000 0.010 0.020 0.030
0
0.001
0.01
0.5
0.4
0.3
0.2
0.1
0.0
relbiasT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim

OAR – NCAR


0.000 0.010 0.020 0.030
0
0.001
0.01
0.4
0.3
0.2
0.1
relrmseT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim


0.000 0.010 0.020 0.030
0
0.001
0.01
0.4
0.3
0.2
0.1
0.0
relbiasT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim

E.6. N0009: TQSR @ AMELIA: sthhsrs1kx6k

Sample Design Ref 1.4a

E.6.1. Simulation Setup

Target Indicator:	QSR
Domains:	[none] (default)
Population:	AMELIA
Sample:	sthhsrs1kx6k
MonteCarlo Replicates:	1,000 (default)
Criteria Set:	Univariate criteria (default)
Method:	TQSR
Outlyingness:	OAR,OCAR,uncontaminated
Contamination:	CCAR,NCAR,uncontaminated
Missingness:	[none] (default)
Simulation Environment:	DBsim
Host:	FHNW
Author:	Beat Hulliger and Tobias Schoch
ID:	AggTQSR_sthhsrs1kx6k
Date:	September 5, 2011

E.6.2. Estimator Specifications

`Specifications:` Trimmed quintile share ratio estimator; trims only at the top right end of the distribution. Variance estimates based on linearization.

`Comments:`

E.6.3. Robustness Parameters

This section gives some summary statistics of the robustness tuning parameters and the relative number of outliers (OType-Epsilon).

OCAR – CCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

OCAR – NCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

OAR – CCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

OAR – NCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

No Contamination

```
Range of  trim
    Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
0.000000 0.007375 0.014750 0.014750 0.022120 0.029500
Range of OTypeEpsilon

 0
60
```

E.6.4. Results

In this section, we summarize the performance of the estimators due to numerical criteria. The section is split into the different subsections for the respective combination of the outlyingness and contamination mechanisms. In addition, each subsection is further partitioned for the different values of OTypeEpsilon.

OCAR – CCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	5.0173	6.2194	10.3178	0.7323	0.1305	17.1491	0.2006	53.7225	56.7972
2	0.0005	3.3814	4.9679	10.1571	0.5065	0.128	15.8527	0.1921	50.1106	53.2832
3	0.0010	2.1075	4.1643	10.0319	0.412	0.1246	14.4033	0.1854	48.7039	51.9335
4	0.0015	1.0092	3.6764	9.924	0.3622	0.1208	13.2619	0.1796	48.7101	51.9153
5	0.0020	0.0276*	3.5007*	9.8276	0.3543*	0.1184	12.0789	0.1747	47.5449	50.778
6	0.0025	-0.8821	3.5808	9.7382	0.368	0.1164	11.322	0.1703	46.3433	49.6144
7	0.0030	-1.7256	3.8478	9.6554	0.3844	0.1143	10.3491	0.1662	45.4209	48.7647
8	0.0035	-2.5154	4.2309	9.5778	0.4308	0.1118	9.525	0.1622	45.0077	48.377
9	0.0040	-3.2409	4.6812	9.5065	0.5114	0.1103	8.5664	0.1584	43.6862	47.1046
10	0.0045	-3.915	5.1513	9.4402	0.5909	0.1083	7.7985	0.155	43.0941	46.5319
11	0.0050	-4.5361	5.6217	9.3792	0.6741	0.1066	7.112	0.152	42.634	46.0714
12	0.0055	-5.1254	6.0939	9.3213	0.7629	0.105	6.5322	0.1493	42.1921	45.6418
13	0.0060	-5.6712	6.5479	9.2677	0.8397	0.1035	5.9285	0.1469	41.9341	45.3922
14	0.0065	-6.1945	6.9986	9.2163	0.9119	0.1025	5.4647	0.1448	41.2489*	44.741*
15	0.0070	-6.6907	7.4309	9.1675	0.9809	0.101	4.9608	0.1428	41.4313	44.91
16	0.0075	-7.173	7.8584	9.1201	1.0526	0.0996	4.2532	0.1411	41.69	45.156
17	0.0080	-7.6478	8.2864	9.0735	1.1206	0.0983	3.7504	0.1393	41.7203	45.1848
18	0.0085	-8.1003	8.6996	9.029	1.1903	0.0973	3.4381	0.1377	41.6004	45.0678
19	0.0090	-8.5467	9.1109	8.9852	1.2555	0.0963	2.9062	0.1362	41.4995	44.9693
20	0.0095	-8.9807	9.5142	8.9425*	1.3169	0.0953*	2.3847*	0.1347*	41.3514	44.8269

```
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
```

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.011	20.2853	20.7143	11.8179	2.9361	0.17	33.9917	0.3301	94.2143	96.4067
2	0.011	19.2532	19.6995	11.7165	2.7857	0.168	33.1037	0.325	93.4719	95.6757
3	0.011	18.2312	18.6936	11.6161	2.6383	0.165	31.9746	0.3199	93.9042	96.1085
4	0.012	17.2266	17.7065	11.5174	2.4964	0.162	30.6176	0.3147	94.3067	96.5157
5	0.013	16.2293	16.7306	11.4194	2.3482	0.1597	29.7679	0.3094	93.7671	95.9839
6	0.013	15.2557	15.7802	11.3238	2.2139	0.1573	28.7213	0.3039	93.2391	95.4638
7	0.013	14.2934	14.8448	11.2292	2.0645	0.1552	27.8104	0.2984	92.2171	94.4525
8	0.014	13.345	13.9261	11.136	1.9272	0.1531	26.7983	0.293	91.3649	93.6109
9	0.015	12.405	13.0184	11.0437	1.7954	0.1507	25.7963	0.2879	91.0357	93.2815
10	0.015	11.488	12.1393	10.9536	1.662	0.1487	24.8059	0.2829	90.2819	92.5151
11	0.015	10.5805	11.2749	10.8644	1.5288	0.1466	23.8314	0.2782	89.6907	91.9208
12	0.016	9.6809	10.4245	10.776	1.3927	0.1444	22.6577	0.2736	89.387	91.6093
13	0.017	8.7904	9.5911	10.6885	1.2602	0.1422	21.6935	0.2693	89.3495	91.5663
14	0.017	7.913	8.7826	10.6023	1.1314	0.1403	20.7323	0.2652	89.0702	91.2813
15	0.018	7.0353	7.9878	10.5161	1.0052	0.1383	20.0803	0.2614	89.0299	91.2408
16	0.018	6.1685	7.2204	10.4309	0.8787	0.1361	19.1257	0.2576	89.2881	91.491
17	0.018	5.3117	6.4897	10.3468	0.7573	0.1343	18.1764	0.2539	89.0506	91.2556
18	0.019	4.4597	5.7948	10.2631	0.6366	0.1323	17.2286	0.2504	89.2491	91.4481
19	0.019	3.6104	5.1514	10.1796	0.5383	0.1305	16.2886	0.2468	89.1965	91.3966
20	0.020	2.7683	4.576	10.0969	0.4601	0.1283	15.3611	0.2433	89.6739	91.8769
21	0.021	1.9305	4.1017	10.0146	0.4016	0.1265	14.4404	0.2398	89.4819	91.6961
22	0.021	1.1029	3.754	9.9333	0.3621	0.1244	13.5262	0.2363	89.9011	92.1197
23	0.021	0.2794*	3.5761*	9.8523	0.3602*	0.1228	12.62	0.2327	89.4907	91.7212
24	0.022	-0.5462	3.5807	9.7712	0.366	0.121	11.7235	0.229	89.2759	91.518
25	0.022	-1.3566	3.7656	9.6916	0.4012	0.1192	10.8345	0.2253	88.9819	91.2405

26	0.023	-2.163	4.1014	9.6124	0.4447	0.1173	9.9496	0.2215	88.7909	91.0797
27	0.024	-2.9503	4.5405	9.535	0.5024	0.1151	8.9784	0.2176	89.0575	91.3708
28	0.024	-3.7331	5.0694	9.4581	0.5889	0.1137	8.1076	0.2135	87.8787	90.2061
29	0.025	-4.5066	5.6486	9.3821	0.6856	0.1121	7.5204	0.2094	86.8576	89.2324
30	0.025	-5.2767	6.2643	9.3065	0.7832	0.1101	6.6637	0.2051	86.2199	88.627
31	0.025	-6.0313	6.8978	9.2323	0.8918	0.1083	5.7222	0.2009	85.5562	87.9681
32	0.026	-6.7709	7.5443	9.1597	0.9942	0.107	4.8809	0.1968	83.952	86.3728
33	0.026	-7.5096	8.2005	9.0871	1.104	0.1049	3.8817	0.1928	83.8249	86.219
34	0.027	-8.2361	8.8632	9.0157	1.2065	0.1036	3.3171	0.1891	82.4614	84.8664
35	0.028	-8.9569	9.5283	8.9449	1.3171	0.1021	2.3251	0.1854	81.6511	84.06
36	0.028	-9.651	10.1756	8.8767	1.4212	0.1005	1.7706	0.1818	80.9064	83.325
37	0.029	-10.3633	10.8442	8.8067	1.5227	0.0985	0.7265	0.1781	80.7465	83.1886
38	0.029	-11.0405	11.4875	8.7402	1.6188	0.0973	0.1857*	0.1745	79.3686	81.8642
39	0.029	-11.7274	12.142	8.6727	1.7161	0.0956	-0.7555	0.1708	78.5914	81.1375
40	0.030	-12.3902	12.7777	8.6076*	1.8182	0.0942*	-1.4429	0.1669*	77.1067*	79.7236*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OCAR – NCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	3.0718	4.8255	10.1267	0.4933	0.1338	15.5501	0.1882	40.6664	44.8092
2	0.0005	1.4896	3.9347	9.9712	0.3885	0.1282	14.4269	0.1784	39.2409	42.9802
3	0.0010	0.3374*	3.5959	9.858	0.3644*	0.1238	13.0299	0.1721	38.9268*	42.6241*
4	0.0015	-0.6081	3.5797*	9.7652	0.3772	0.1202	11.9477	0.1672	39.0511	42.7446
5	0.0020	-1.4254	3.7657	9.6848	0.3648	0.1174	11.1505	0.1632	39.0171	42.6861
6	0.0025	-2.1558	4.0572	9.6131	0.402	0.1141	10.1404	0.1598	39.9866	43.5913
7	0.0030	-2.8268	4.4266	9.5472	0.4547	0.1121	9.5193	0.1568	39.8624	43.4479
8	0.0035	-3.4452	4.8211	9.4864	0.536	0.1099	8.5224	0.1542	40.3266	43.8677
9	0.0040	-4.0276	5.2337	9.4292	0.6076	0.1079	7.7876	0.1518	40.6899	44.1994
10	0.0045	-4.5796	5.6577	9.3749*	0.6796	0.1066*	7.2624*	0.1497*	40.3569	43.8857

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0055	13.3337	13.9865	11.1349	1.9423	0.1723	27.5579	0.2576	49.4879	52.8126
2	0.0060	12.3139	13.0023	11.0347	1.7855	0.1684	26.2856	0.2518	49.5177	52.841
3	0.0065	11.3313	12.0586	10.9382	1.643	0.1644	24.7828	0.2463	49.829	53.143
4	0.0070	10.3735	11.1473	10.8441	1.509	0.1609	23.973	0.2409	49.7193	53.0385
5	0.0075	9.4422	10.2681	10.7526	1.367	0.1573	22.4051	0.2358	49.9116	53.2123
6	0.0080	8.5404	9.4234	10.664	1.2353	0.1533	21.5537	0.2309	50.6272	53.8878
7	0.0085	7.6613	8.6212	10.5776	1.1069	0.151	20.3967	0.2261	49.7397	53.0305
8	0.0090	6.8137	7.8583	10.4943	0.9891	0.1481	19.7059	0.2217	49.6814	52.9751
9	0.0095	5.9721	7.116	10.4116	0.8613	0.1447	18.5954	0.2171	50.0837	53.3464
10	0.0100	5.1619	6.4298	10.332	0.7447	0.142	17.4076	0.2128	49.8357	53.1004
11	0.0105	4.3683	5.7841	10.2541	0.628	0.1389	16.4579	0.2087	50.2534	53.4817
12	0.0110	3.5987	5.2069	10.1785	0.5367	0.1368	15.6371	0.2047	49.6006	52.8171
13	0.0115	2.8468	4.6948	10.1046	0.4544	0.1347	14.7859	0.2009	49.1525	52.3884
14	0.0120	2.1025	4.2512	10.0315	0.4111	0.1319	13.8584	0.1971	49.3918	52.6108
15	0.0125	1.3838	3.9165	9.9609	0.3817	0.1297	13.0538	0.1935	49.1651	52.4096
16	0.0130	0.6704	3.6956	9.8908	0.3712	0.1276	12.2583	0.1899	48.8243	52.0791
17	0.0135	-0.0197*	3.5997*	9.823	0.3648	0.1252	11.8819	0.1866	49.0423	52.2711
18	0.0140	-0.6946	3.6412	9.7567	0.3622*	0.1234	10.8729	0.1833	48.4723	51.7201
19	0.0145	-1.3622	3.7971	9.6911	0.3823	0.1214	10.0302	0.1801	48.3398	51.5847
20	0.0150	-2.0053	4.0433	9.6279	0.4085	0.1191	9.2766	0.177	48.5826	51.8237
21	0.0155	-2.646	4.379	9.5649	0.4638	0.1176	8.9166	0.1739	47.8441	51.1072
22	0.0160	-3.2681	4.7596	9.5038	0.5155	0.1157	7.8198	0.171	47.8074	51.0714
23	0.0165	-3.8853	5.1842	9.4432	0.5926	0.1138	7.1808	0.1682	47.7297	50.9985
24	0.0170	-4.489	5.6347	9.3839	0.6766	0.1121	6.5623	0.1654	47.5542	50.8265
25	0.0175	-5.0778	6.0964	9.326	0.753	0.11	5.7579	0.1627	47.935	51.1912
26	0.0180	-5.659	6.5774	9.2689	0.8374	0.1086	5.0992	0.1601	47.4512	50.719
27	0.0185	-6.2296	7.0598	9.2128	0.9194	0.1066	4.5151	0.1576	47.7976	51.0539
28	0.0190	-6.7844	7.5439	9.1583	1.0034	0.1052	3.9405	0.1551	47.5307	50.7886
29	0.0195	-7.339	8.0365	9.1038	1.0789	0.1036	3.2562	0.1527	47.3831	50.6319
30	0.0200	-7.8751	8.5216	9.0512	1.1593	0.1024	2.6404	0.1505	46.8932	50.1549
31	0.0205	-8.4095	9.0099	8.9987	1.2364	0.1011	2.1489	0.1482	46.6208	49.8868
32	0.0210	-8.931	9.4893	8.9474	1.3075	0.0994	1.4308	0.146	46.9139	50.1633
33	0.0215	-9.4453	9.9684	8.8969	1.387	0.0981	0.8921	0.1439	46.5996	49.8523

34	0.0220	-9.9541	10.4452	8.8469	1.4583	0.0968	0.3581	0.1418	46.4502	49.7048
35	0.0225	-10.4588	10.9211	8.7973	1.533	0.0955	-0.3379*	0.1397	46.3269	49.5939
36	0.0230	-10.9444	11.3823	8.7496	1.6031	0.0945	-0.8617	0.1378	45.8691	49.1489
37	0.0235	-11.4267	11.841	8.7022	1.6757	0.0931	-1.2701	0.1359	45.8844	49.1558
38	0.0240	-11.9058	12.2995	8.6552	1.7482	0.0921	-1.9499	0.134	45.5523	48.8327
39	0.0245	-12.3714	12.7453	8.6094	1.8103	0.0907	-2.5633	0.1322	45.7063	48.9784
40	0.0250	-12.8363	13.1919	8.5637	1.8807	0.0894	-3.0082	0.1305	45.907	49.1678
41	0.0255	-13.2989	13.6391	8.5183	1.9497	0.0885	-3.6546	0.1288	45.4341	48.7111
42	0.0260	-13.7475	14.0731	8.4742	2.0122	0.0875	-4.1382	0.1271	45.2243	48.5118
43	0.0265	-14.1919	14.504	8.4306	2.0812	0.0866	-4.6189	0.1255	44.9603	48.2516
44	0.0270	-14.6338	14.9332	8.3871	2.1485	0.0855	-5.1436	0.1239	44.7952	48.088
45	0.0275	-15.0656	15.3522	8.3447	2.2025	0.0842	-5.6517	0.1223	45.2117	48.4901
46	0.0280	-15.4934	15.7695	8.3027	2.2698	0.0834	-6.1508	0.1208	44.8596	48.1463
47	0.0285	-15.9186	16.1845	8.2609	2.3303	0.0825	-6.6374	0.1194	44.7062	47.9895
48	0.0290	-16.3388	16.5951	8.2196	2.3895	0.0816	-7.0743	0.1179	44.5912	47.8764
49	0.0295	-16.7513	16.9978	8.1791	2.4475	0.0804	-7.5908	0.1165	44.9285	48.1995
50	0.0300	-17.1597	17.3986	8.139*	2.5108	0.0798*	-8.0985	0.1152*	44.3311*	47.6227*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OAR – CCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	5.0228	6.2213	10.3184	0.7262	0.1302	17.0704	0.2005	53.9567	57.0283
2	0.0005	3.3919	4.9618	10.1581	0.5021	0.1267	15.259	0.1921	51.6242	54.7302
3	0.0010	2.127	4.1702	10.0339	0.4041	0.1243	13.9831	0.1853	49.0488	52.2467
4	0.0015	1.0393	3.6845	9.927	0.3639	0.1207	13.2897	0.1797	48.8027	51.9901
5	0.0020	0.0681*	3.4969*	9.8316	0.3621*	0.1181	12.1978	0.1748	48.0107	51.2173
6	0.0025	-0.8367	3.5658	9.7427	0.3678	0.1161	11.2458	0.1705	46.8971	50.1471
7	0.0030	-1.6891	3.8239	9.6589	0.3915	0.1137	10.311	0.1663	46.2672	49.5757
8	0.0035	-2.4709	4.2067	9.5821	0.4364	0.112	9.5576	0.1623	44.9504	48.3258
9	0.0040	-3.195	4.6448	9.511	0.5051	0.1098	8.8267	0.1586	44.4048	47.792
10	0.0045	-3.8673	5.1131	9.4449	0.5914	0.1081	7.7817	0.1552	43.5366	46.9505
11	0.0050	-4.4904	5.5831	9.3837	0.6702	0.1064	7.0125	0.1522	43.0632	46.4871
12	0.0055	-5.0723	6.0474	9.3265	0.7542	0.1048	6.3466	0.1495	42.7066	46.1326
13	0.0060	-5.6167	6.5022	9.2731	0.8268	0.1037	5.5774	0.1472	41.9405	45.4093
14	0.0065	-6.1341	6.9426	9.2222	0.9021	0.1022	4.9402	0.1451	42.0168	45.4801
15	0.0070	-6.634	7.3781	9.1731	0.9772	0.1007	4.3892	0.1431	42.0921	45.5482
16	0.0075	-7.1204	7.8116	9.1253	1.0438	0.0997	3.8017	0.1413	41.7382*	45.2101*
17	0.0080	-7.5857	8.2286	9.0796	1.1101	0.0982	3.291	0.1397	42.1653	45.6137
18	0.0085	-8.0418	8.6453	9.0348	1.1778	0.0973	2.7571	0.1381	41.8793	45.3413
19	0.0090	-8.4841	9.0525	8.9913	1.2427	0.0963	2.3186	0.1365	41.7632	45.2278
20	0.0095	-8.9206	9.457	8.9485*	1.3036	0.0952*	1.9301*	0.1351*	41.7887	45.2521

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.011	20.5023	20.9306	11.8392	2.9752	0.1715	34.0798	0.3326	93.9781	96.2309
2	0.011	19.4781	19.9221	11.7386	2.8287	0.169	33.1655	0.3275	93.729	95.9941
3	0.011	18.4509	18.9095	11.6377	2.685	0.1656	31.7512	0.3222	94.5878	96.858
4	0.012	17.4503	17.9274	11.5394	2.5318	0.1631	30.8529	0.3167	94.1361	96.4174
5	0.013	16.4637	16.9615	11.4424	2.3919	0.1608	29.7177	0.311	93.4394	95.7401
6	0.013	15.4899	16.0088	11.3468	2.2474	0.1579	28.6668	0.3052	93.2652	95.5697
7	0.013	14.5387	15.0838	11.2533	2.1086	0.156	27.7505	0.2996	92.0199	94.3265
8	0.014	13.5933	14.1663	11.1604	1.9812	0.1537	26.7354	0.2942	91.4143	93.7012
9	0.015	12.6735	13.2785	11.0701	1.8352	0.1517	25.6302	0.289	90.5173	92.8024
10	0.015	11.7611	12.4011	10.9804	1.7013	0.1494	24.6364	0.2842	90.2013	92.479
11	0.015	10.8539	11.5364	10.8913	1.5783	0.1477	23.6492	0.2796	89.3846	91.6553
12	0.016	9.9612	10.6901	10.8036	1.4468	0.1455	22.6683	0.2753	89.2844	91.5519
13	0.017	9.074	9.857	10.7164	1.3224	0.1432	21.6915	0.2713	89.4034	91.6584
14	0.017	8.198	9.0467	10.6303	1.1935	0.1414	20.8223	0.2674	89.1012	91.3573
15	0.018	7.3257	8.2504	10.5446	1.0651	0.1392	19.8587	0.2637	89.4565	91.7067
16	0.018	6.4609	7.4808	10.4597	0.9376	0.1374	18.9107	0.26	89.2495	91.4958
17	0.018	5.6009	6.7361	10.3752	0.815	0.1353	17.9689	0.2564	89.5172	91.7612
18	0.019	4.7445	6.0258	10.291	0.6922	0.1333	17.0347	0.2529	89.6495	91.8946
19	0.019	3.8927	5.3617	10.2073	0.574	0.1314	16.1102	0.2493	89.7735	92.0223
20	0.020	3.0485	4.7632	10.1244	0.4825	0.1294	15.1886	0.2457	89.8587	92.1165
21	0.021	2.208	4.244	10.0418	0.4163	0.1269	14.272	0.2422	90.7849	93.0389

22	0.021	1.3816	3.8555	9.9606	0.3796	0.1252	13.267	0.2386	90.5865	92.8505
23	0.021	0.5526	3.6173	9.8792	0.3579*	0.1235	12.6679	0.2349	90.2345	92.5152
24	0.022	-0.2623*	3.5604*	9.7991	0.363	0.1218	11.8024	0.2312	89.7795	92.0857
25	0.022	-1.0767	3.6881	9.7191	0.3848	0.1202	10.8504	0.2273	89.0771	91.4016
26	0.023	-1.8826	3.9626	9.6399	0.4228	0.1175	10.2647	0.2233	90.0458	92.3844
27	0.024	-2.6729	4.3749	9.5623	0.4726	0.1159	9.4125	0.2191	89.0452	91.4018
28	0.024	-3.4518	4.8705	9.4858	0.536	0.1141	8.3988	0.2149	88.396	90.7838
29	0.025	-4.2311	5.4321	9.4092	0.6327	0.1121	7.4926	0.2105	87.735	90.1409
30	0.025	-4.9899	6.0312	9.3346	0.7331	0.1109	6.7743	0.2063	85.9938	88.4392
31	0.025	-5.7405	6.6546	9.2609	0.8459	0.1095	5.8125	0.202	84.5557	87.0232
32	0.026	-6.479	7.2876	9.1883	0.9507	0.1076	5.2662	0.198	84.0209	86.488
33	0.026	-7.2078	7.9301	9.1167	1.0502	0.1056	4.3142	0.1941	83.7225	86.1525
34	0.027	-7.943	8.5968	9.0445	1.1636	0.1045	3.7714	0.1903	82.1628	84.6052
35	0.028	-8.6453	9.2388	8.9755	1.2653	0.1026	2.8227	0.1867	82.0723	84.5099
36	0.028	-9.3557	9.9005	8.9057	1.373	0.1014	2.2833	0.1831	80.5968	83.0577
37	0.029	-10.0505	10.5506	8.8374	1.4738	0.0995	1.4303	0.1794	80.2511	82.7502
38	0.029	-10.7309	11.1938	8.7706	1.5691	0.0981	0.5932	0.1758	79.2405	81.8006
39	0.029	-11.4213	11.848	8.7028	1.6747	0.0959	-0.238*	0.1718	79.0382	81.6221
40	0.030	-12.0775	12.477	8.6383*	1.7661	0.0948*	-0.8332	0.1677*	76.9657*	79.6361*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OAR – NCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	3.531	5.0808	10.1718	0.5298	0.129	16.064	0.1924	49.2187	53.2479
2	0.0005	1.8352	4.0283	10.0052	0.3954	0.1243	14.0197	0.181	45.6577	49.0565
3	0.0010	0.6526	3.5819	9.889	0.3619	0.1199	12.8444	0.1744	45.481	48.8362
4	0.0015	-0.3276*	3.4934*	9.7927	0.3626	0.1169	11.8043	0.1692	44.7884	48.1796
5	0.0020	-1.1885	3.6367	9.7081	0.3588*	0.1141	10.9652	0.1648	44.4051	47.781
6	0.0025	-1.9411	3.9236	9.6342	0.4065	0.1123	10.1428	0.1613	43.5339	46.9518
7	0.0030	-2.6391	4.2811	9.5656	0.4497	0.1098	9.5191	0.1581	43.9807	47.3587
8	0.0035	-3.2784	4.6844	9.5028	0.5174	0.1082	8.7417	0.1553	43.5452	46.9215
9	0.0040	-3.8782	5.1061	9.4439	0.5897	0.1066	7.7588	0.1528	43.3046	46.6969
10	0.0045	-4.4372	5.5328	9.3889*	0.6647	0.1055*	7.124*	0.1505*	42.5933*	46.0122*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0055	15.8129	16.3639	11.3785	2.3095	0.1713	27.812	0.2781	62.3477	65.2407
2	0.0060	14.7296	15.3078	11.2721	2.1453	0.1678	26.7737	0.2715	61.8048	64.7063
3	0.0065	13.6831	14.2899	11.1692	1.9951	0.164	25.7451	0.2654	61.7929	64.6917
4	0.0070	12.6635	13.3041	11.0691	1.8468	0.1607	24.73	0.2594	61.3974	64.2968
5	0.0075	11.6592	12.3367	10.9704	1.6959	0.1571	23.9469	0.2536	61.4464	64.3574
6	0.0080	10.7049	11.4231	10.8766	1.5531	0.1536	22.5542	0.2481	61.5686	64.4612
7	0.0085	9.771	10.5405	10.7849	1.4274	0.151	21.91	0.2427	60.7433	63.6565
8	0.0090	8.8673	9.6974	10.6961	1.3011	0.1489	20.8093	0.2377	59.6528	62.5885
9	0.0095	7.9809	8.8765	10.609	1.1711	0.1459	20.0168	0.2328	59.586	62.5323
10	0.0100	7.12	8.095	10.5244	1.0477	0.1433	19.1547	0.228	59.0782	62.031
11	0.0105	6.2767	7.3441	10.4416	0.9248	0.1405	18.2232	0.2234	59.0374	61.9977
12	0.0110	5.4475	6.6273	10.3601	0.8047	0.1377	17.3823	0.2189	59.0263	61.9841
13	0.0115	4.6429	5.9651	10.2811	0.6828	0.1355	16.7251	0.2146	58.3716	61.3368
14	0.0120	3.8594	5.359	10.2041	0.5811	0.1336	16.0067	0.2104	57.5188	60.5054
15	0.0125	3.0909	4.8064	10.1286	0.4928	0.1309	15.0459	0.2063	57.5964	60.5699
16	0.0130	2.3445	4.3332	10.0552	0.4457	0.1283	14.2584	0.2024	57.7268	60.6989
17	0.0135	1.6011	3.9519	9.9822	0.4044	0.1261	13.3946	0.1985	57.3939	60.3816
18	0.0140	0.8866	3.6944	9.912	0.3619	0.1243	12.7108	0.1948	56.7663	59.77
19	0.0145	0.1809*	3.5605*	9.8427	0.352*	0.1222	11.9747	0.1912	56.523	59.5312
20	0.0150	-0.507	3.5644	9.7751	0.3709	0.1203	11.4699	0.1878	56.1073	59.1292
21	0.0155	-1.1854	3.694	9.7084	0.3802	0.1183	10.6212	0.1844	55.8843	58.9039
22	0.0160	-1.8453	3.9286	9.6436	0.4125	0.1162	9.9295	0.1811	55.8334	58.863
23	0.0165	-2.4988	4.2538	9.5794	0.4511	0.1145	9.263	0.1779	55.3879	58.413
24	0.0170	-3.1329	4.6345	9.5171	0.5084	0.1127	8.8053	0.1749	55.1609	58.1986
25	0.0175	-3.7614	5.0619	9.4553	0.5803	0.1109	7.9717	0.1719	55.0079	58.0327
26	0.0180	-4.3777	5.52	9.3948	0.6549	0.1092	7.3329	0.1689	54.6394	57.6677
27	0.0185	-4.9717	5.9854	9.3364	0.7306	0.1073	6.6454	0.1661	54.7905	57.8024
28	0.0190	-5.567	6.4772	9.2779	0.8246	0.1059	6.5091	0.1634	54.2292	57.261
29	0.0195	-6.1509	6.9758	9.2206	0.9058	0.1046	5.4827	0.1607	53.5864	56.6279

30	0.0200	-6.7203	7.4721	9.1646	0.9908	0.1031	4.8808	0.1581	53.3164	56.3647
31	0.0205	-7.2845	7.9734	9.1092	1.0696	0.1016	4.2322	0.1555	53.158	56.2138
32	0.0210	-7.8344	8.4698	9.0552	1.1572	0.1001	3.7611	0.1531	52.9296	55.9877
33	0.0215	-8.3734	8.9636	9.0022	1.2302	0.0989	3.2408	0.1507	52.403	55.4902
34	0.0220	-8.9073	9.4558	8.9498	1.3028	0.0973	2.5145	0.1483	52.3889	55.4819
35	0.0225	-9.4321	9.9454	8.8982	1.3911	0.0961	2.0693	0.146	51.9598	55.0472
36	0.0230	-9.9448	10.4269	8.8478	1.4604	0.0949	1.4301	0.1439	51.5849	54.679
37	0.0235	-10.4557	10.9097	8.7976	1.5348	0.0937	1.0968	0.1417	51.2153	54.3285
38	0.0240	-10.9578	11.3858	8.7483	1.6076	0.0924	0.4219	0.1397	51.1659	54.2696
39	0.0245	-11.4482	11.8539	8.7001	1.6831	0.0913	-0.0022*	0.1377	50.7218	53.8364
40	0.0250	-11.9284	12.3134	8.6529	1.7502	0.0902	-0.6548	0.1357	50.5028	53.6152
41	0.0255	-12.4087	12.7742	8.6058	1.8242	0.089	-1.0215	0.1338	50.4458	53.5538
42	0.0260	-12.8786	13.2266	8.5596	1.8898	0.0878	-1.6157	0.132	50.3109	53.4272
43	0.0265	-13.3418	13.6746	8.5141	1.9586	0.0869	-1.8853	0.1302	49.8519	52.9752
44	0.0270	-13.7973	14.1162	8.4693	2.0212	0.086	-2.5578	0.1284	49.3396	52.4743
45	0.0275	-14.2515	14.5558	8.4247	2.0881	0.0847	-3.0917	0.1268	49.6234	52.7432
46	0.0280	-14.6952	14.9879	8.3811	2.1552	0.084	-3.5336	0.1251	49.0089	52.1507
47	0.0285	-15.1354	15.4159	8.3379	2.2183	0.0828	-3.9723	0.1235	49.1419	52.2769
48	0.0290	-15.5667	15.8364	8.2955	2.2798	0.0818	-4.4932	0.1219	49.044	52.1815
49	0.0295	-15.996	16.2553	8.2533	2.3418	0.0808	-4.9256	0.1204	49.0478	52.194
50	0.0300	-16.4185	16.6693	8.2118*	2.4069	0.0802*	-5.4376	0.119*	48.3564*	51.5228*

% denotes numbers in percent; * denotes the column-specific minimum/minima

No Contamination

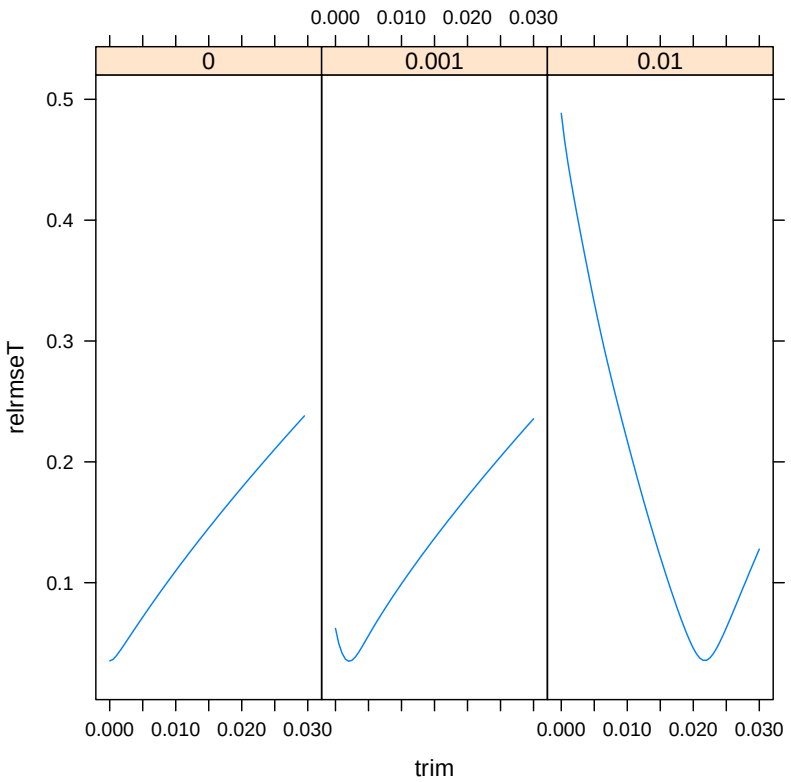
	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	0.1109*	3.5325*	9.8358	0.3542*	0.1205	11.7866	0.1679	39.3857	43.044
2	0.0005	-1.0875	3.6467	9.718	0.3697	0.1171	10.6854	0.1616	38.0603*	41.7571*
3	0.0010	-1.9589	3.9513	9.6324	0.4007	0.1138	9.9323	0.1576	38.4896	42.1501
4	0.0015	-2.6759	4.3215	9.562	0.4482	0.1113	9.1402	0.1545	38.8608	42.4825
5	0.0020	-3.3037	4.7147	9.5003	0.518	0.1093	8.3714	0.152	39.0542	42.6521
6	0.0025	-3.8898	5.1286	9.4427	0.5897	0.1079	7.5554	0.1498	38.7728	42.3864
7	0.0030	-4.4293	5.5322	9.3897	0.656	0.1062	6.8726	0.1478	39.2725	42.8636
8	0.0035	-4.9449	5.9429	9.3391	0.7332	0.105	6.2906	0.146	39.0824	42.679
9	0.0040	-5.4361	6.3464	9.2908	0.8055	0.1036	5.7496	0.1443	39.2694	42.8583
10	0.0045	-5.9151	6.7526	9.2437	0.8747	0.1025	5.1701	0.1427	39.2235	42.8134
11	0.0050	-6.3758	7.1519	9.1985	0.9434	0.1014	4.767	0.1412	39.1926	42.785
12	0.0055	-6.8306	7.5518	9.1538	1.0074	0.1002	4.2348	0.1397	39.3859	42.9661
13	0.0060	-7.2702	7.9451	9.1106	1.0694	0.0992	3.7131	0.1383	39.3556	42.9373
14	0.0065	-7.7035	8.3368	9.068	1.1329	0.0982	3.2835	0.1369	39.4633	43.038
15	0.0070	-8.1232	8.7213	9.0268	1.1936	0.0973	2.9001	0.1356	39.2584	42.8436
16	0.0075	-8.5431	9.1078	8.9855	1.2556	0.0963	2.314	0.1342	39.3847	42.9641
17	0.0080	-8.9546	9.4895	8.9451	1.3143	0.0953	1.8586	0.133	39.4893	43.0631
18	0.0085	-9.3576	9.8655	8.9055	1.3726	0.0943	1.4869	0.1317	39.6229	43.1901
19	0.0090	-9.7563	10.2403	8.8664	1.4288	0.0935	1.0784	0.1305	39.542	43.1151
20	0.0095	-10.1492	10.6119	8.8277*	1.4869	0.0928*	0.5668*	0.1293*	39.2997	42.8838

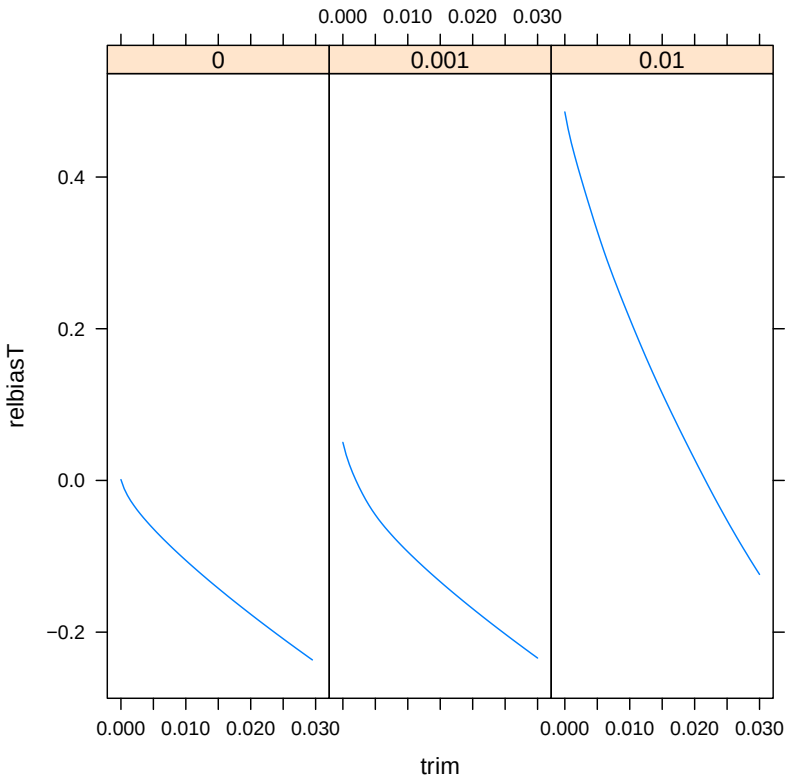
% denotes numbers in percent; * denotes the column-specific minimum/minima

E.6.5. Plots

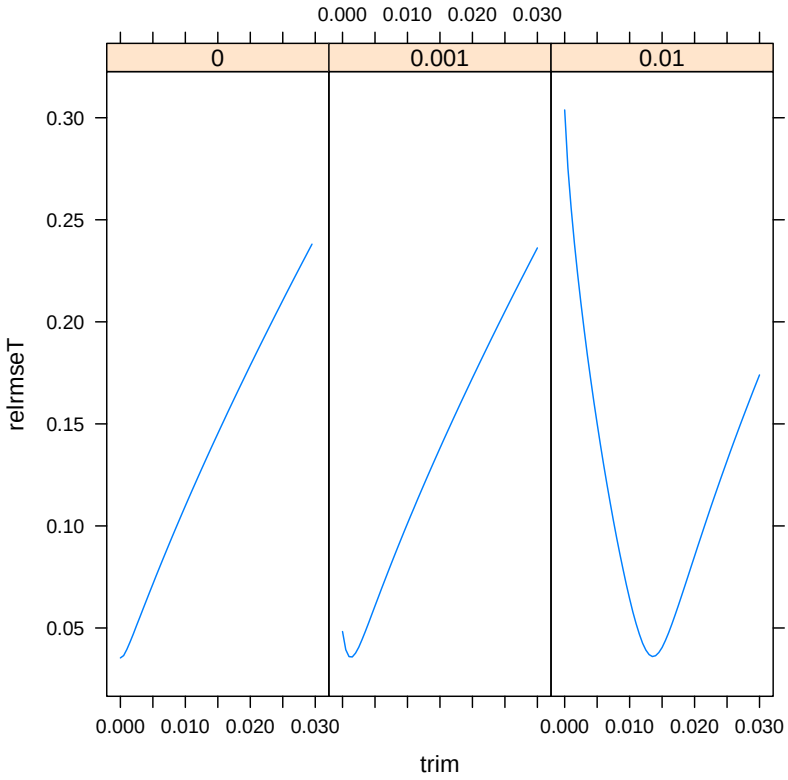
In this section, we report graphical displays of certain numerical criteria for the estimators. The lattice-type plots are partitioned into panels for different values of OTypeEpsilon.

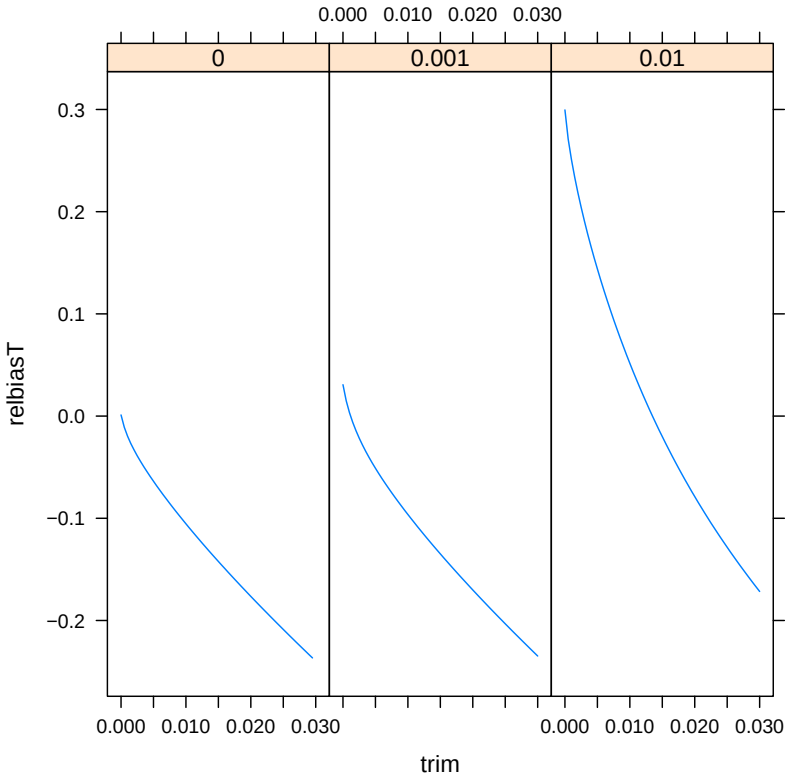
OCAR – CCAR


0.000 0.010 0.020 0.030
0
0.001
0.01
0.5
0.4
0.3
0.2
0.1
relrmseT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim

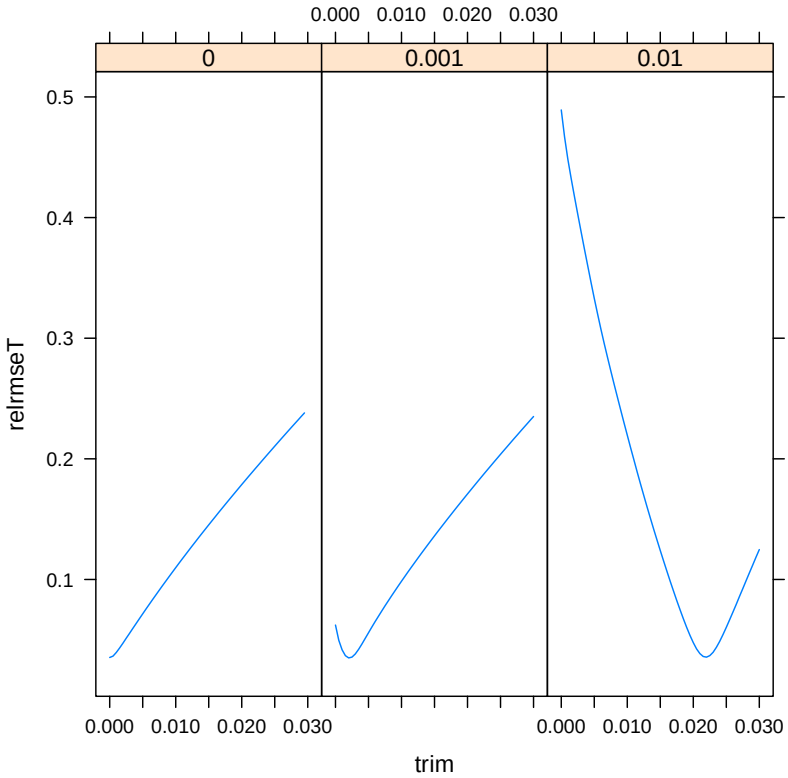

0.000 0.010 0.020 0.030
0
0.001
0.01
0.4
0.2
0.0
−0.2
relbiasT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim

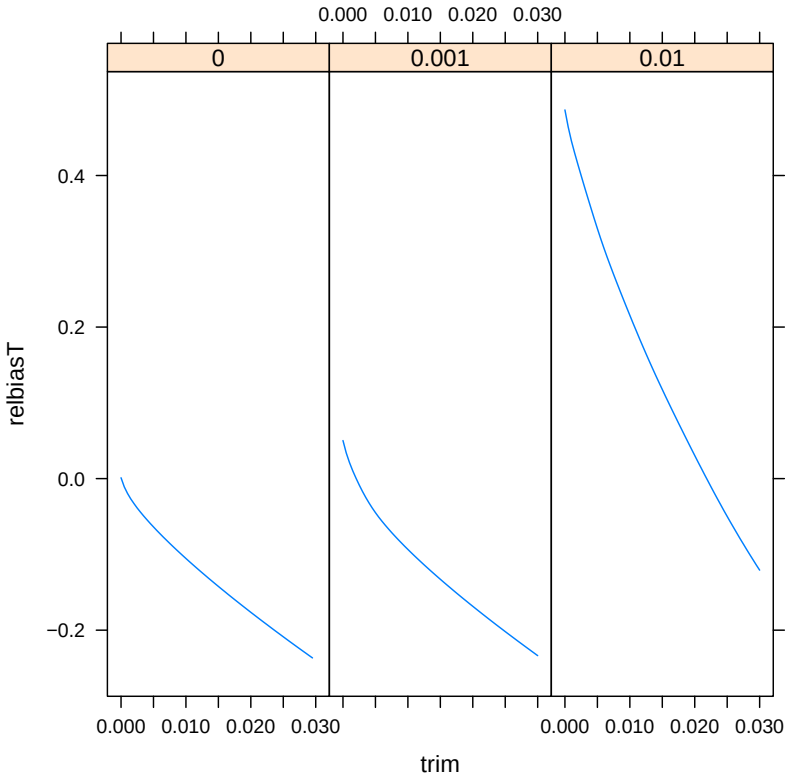
OCAR – NCAR


0
0.001
0.01
relrmseT
trim
0.000 0.010 0.020 0.030
0.05
0.10
0.15
0.20
0.25
0.30

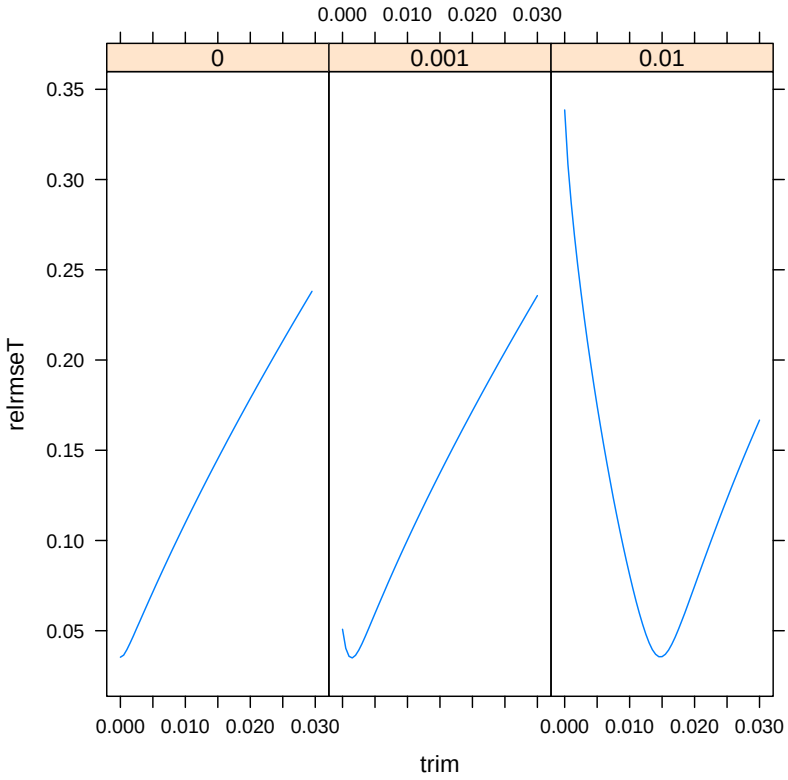

0
0.001
0.01
relbiasT
trim
0.000 0.010 0.020 0.030
−0.2
−0.1
0.0
0.1
0.2
0.3

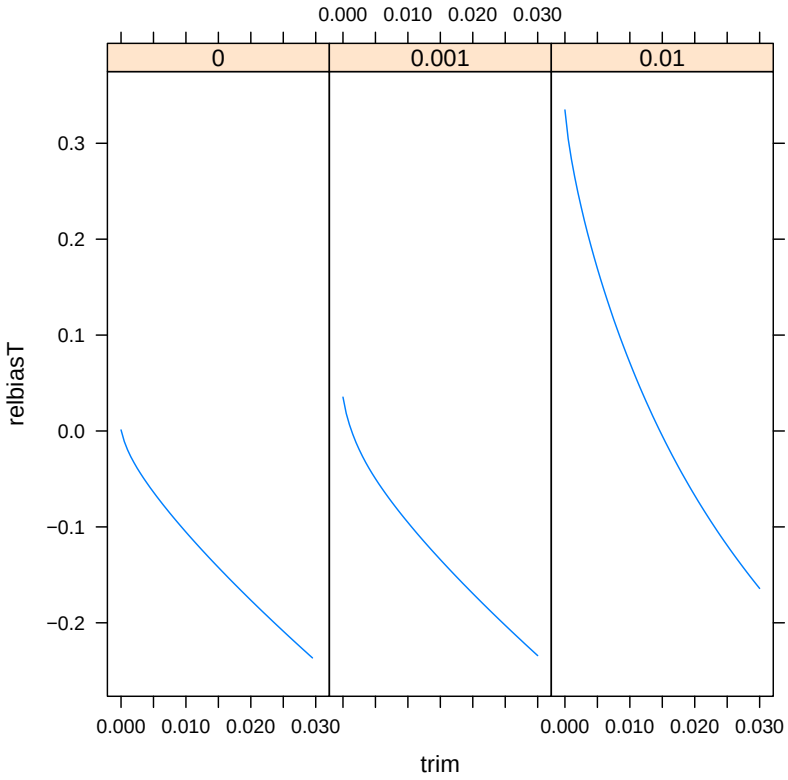
OAR – CCAR


0
0.001
0.01
relrmseT
trim
0.000 0.010 0.020 0.030
0.1
0.2
0.3
0.4
0.5


0
0.001
0.01
relbiasT
trim
0.000 0.010 0.020 0.030
−0.2
0.0
0.2
0.4

OAR – NCAR


0
0.001
0.01
relrmseT
trim
0.000 0.010 0.020 0.030
0.05
0.10
0.15
0.20
0.25
0.30
0.35


0
0.001
0.01
relbiasT
trim
0.000 0.010 0.020 0.030
−0.2
−0.1
0.0
0.1
0.2
0.3

E.7. N0014: SQSR @ AMELIA: sthhpps1kx6k

Sample Design Ref 1.5

E.7.1. Simulation Setup

Target Indicator:	QSR
Domains:	[none] (default)
Population:	AMELIA
Sample:	sthhpps1kx6k
MonteCarlo Replicates:	1,000 (default)
Criteria Set:	Univariate criteria (default)
Method:	SQSR
Outlyingness:	OAR,OCAR
Contamination:	CCAR,NCAR
Missingness:	[none] (default)
Simulation Environment:	DBsim
Host:	FHNW
Author:	Beat Hulliger and Tobias Schoch
ID:	AggSQSR_sthhpps1kx6k
Date:	September 5, 2011

E.7.2. Estimator Specifications

`Specifications:` Trimmed quintile share ratio estimator; trims only at the top right end of the distribution. Variance estimates based on linearization.

`Comments:`

E.7.3. Robustness Parameters

This section gives some summary statistics of the robustness tuning parameters and the relative number of outliers (OType-Epsilon).

OCAR – CCAR

```
Range of  trim
    Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
0.000000 0.007375 0.014750 0.014750 0.022120 0.029500
Range of OTypeEpsilon

0.001  0.01
   60    60
```

OCAR – NCAR

```
Range of  trim
    Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
0.000000 0.007375 0.014750 0.014750 0.022120 0.029500
Range of OTypeEpsilon

0.001  0.01
   60    60
```

OAR – CCAR

```
Range of  trim
    Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
0.000000 0.007375 0.014750 0.014750 0.022120 0.029500
Range of OTypeEpsilon

0.001  0.01
   60    60
```

OAR – NCAR

```
Range of  trim
    Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
0.000000 0.007375 0.014750 0.014750 0.022120 0.029500
Range of OTypeEpsilon

0.001  0.01
   60    60
```

E.7.4. Results

In this section, we summarize the performance of the estimators due to numerical criteria. The section is split into the different subsections for the respective combination of the outlyingness and contamination mechanisms. In addition, each subsection is further partitioned for the different values of OTypeEpsilon.

OCAR – CCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	5.1731	6.45	10.3331	0.7275	0.1434	20.3943	0.1111	-22.5223	24.5888
2	0.0005	4.1678	5.6323	10.2344	0.5854	0.1387	19.4607	0.1085	-21.7894	23.8613
3	0.0010	3.5742	5.1806	10.1761	0.5167	0.1359	18.979	0.1067	-21.5112*	23.5927*
4	0.0015	3.165	4.9007	10.1359	0.484	0.1353	18.687	0.1052	-22.2308	24.2086
5	0.0020	2.8578	4.7029	10.1057	0.4621	0.1348*	18.4553	0.104	-22.8402	24.7551
6	0.0025	2.6413	4.5745	10.0844	0.4377	0.1348*	18.2809	0.1032	-23.4603	25.3163
7	0.0030	2.4783	4.4861	10.0684	0.4222*	0.1351	18.4982	0.1022	-24.3499	26.1221
8	0.0035	2.3787	4.4346	10.0586	0.4231	0.1353	18.1446*	0.1012	-25.197	26.9096
9	0.0040	2.3345*	4.4158*	10.0543*	0.4261	0.1358	18.3881	0.1004	-26.0649	27.7132
10	0.0045	2.3471	4.4278	10.0555	0.4305	0.1362	18.4704	0.0997	-26.8283	28.4302
11	0.0050	2.4118	4.467	10.0618	0.4347	0.1366	18.3304	0.0993	-27.3295	28.8818
12	0.0055	2.5192	4.5335	10.0724	0.4432	0.1373	18.6588	0.0991*	-27.7828	29.3012
13	0.0060	2.6579	4.6235	10.086	0.4489	0.1383	18.6651	0.0992	-28.2486	29.7324
14	0.0065	2.8287	4.7331	10.1028	0.4752	0.1391	19.1245	0.0995	-28.4641	29.9269
15	0.0070	3.0215	4.8634	10.1218	0.4852	0.1403	19.308	0.1001	-28.6838	30.1326
16	0.0075	3.2332	5.0112	10.1425	0.5031	0.1416	19.5918	0.1007	-28.8906	30.3261
17	0.0080	3.4629	5.1773	10.1651	0.5277	0.1431	19.9297	0.1015	-29.0897	30.5115
18	0.0085	3.7085	5.3574	10.1893	0.5476	0.1444	20.2461	0.1023	-29.1409	30.5668
19	0.0090	3.9698	5.5527	10.2149	0.5805	0.1456	20.4667	0.1032	-29.108	30.542
20	0.0095	4.241	5.7705	10.2416	0.6052	0.148	20.9441	0.1042	-29.5656	30.9734

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.011	42.5387	42.8707	14.0043	6.173	0.2739*	64.7937	0.3243*	18.383	22.3153
2	0.011	42.5337*	42.8683*	14.0038*	6.1713	0.2761	64.7778*	0.327	18.4121	22.3723
3	0.011	42.5386	42.8764	14.0043	6.1705	0.2788	64.9179	0.3296	18.1921	22.219
4	0.012	42.5494	42.89	14.0053	6.1624*	0.2812	65.0044	0.3319	18.0611	22.1409
5	0.013	42.567	42.9105	14.0071	6.1733	0.2837	65.4468	0.3341	17.7957	21.9514
6	0.013	42.6082	42.9538	14.0111	6.1823	0.2857	65.5244	0.3363	17.7042	21.9163
7	0.013	42.6626	43.0117	14.0164	6.1849	0.289	65.6039	0.3384	17.0861	21.4377
8	0.014	42.7321	43.0843	14.0233	6.1928	0.2921	65.8806	0.3404	16.558	21.0078
9	0.015	42.8134	43.1686	14.0313	6.206	0.2952	65.671	0.3426	16.0771	20.6137
10	0.015	42.9134	43.2722	14.0411	6.215	0.2988	66.3403	0.3449	15.4569	20.1138
11	0.015	43.0206	43.3826	14.0516	6.2305	0.3022	66.4406	0.3473	14.9138	19.6932
12	0.016	43.144	43.5087	14.0637	6.2479	0.3054	66.8354	0.35	14.6096	19.4609
13	0.017	43.2778	43.6465	14.0769	6.2608	0.3097	67.1857	0.353	13.9616	18.9417
14	0.017	43.4161	43.7888	14.0905	6.2933	0.314	67.332	0.3561	13.3921	18.5188
15	0.018	43.5696	43.9457	14.1056	6.3125	0.318	67.733	0.3595	13.0347	18.2612
16	0.018	43.7244	44.1039	14.1208	6.3424	0.3221	68.1696	0.363	12.6991	18.0212
17	0.018	43.893	44.2756	14.1373	6.3731	0.326	68.3543	0.3667	12.4753	17.8724
18	0.019	44.0632	44.4507	14.1541	6.3961	0.3314	68.8387	0.3704	11.7542	17.3396
19	0.019	44.2373	44.6294	14.1712	6.4046	0.3367	69.0577	0.3741	11.1332	16.9019
20	0.020	44.4212	44.8179	14.1892	6.4181	0.342	69.6054	0.378	10.5057	16.4754
21	0.021	44.6162	45.0179	14.2084	6.4445	0.3479	69.8571	0.3819	9.7724	15.9978
22	0.021	44.8132	45.22	14.2277	6.4671	0.3539	70.2312	0.3857	8.992	15.5134
23	0.021	45.0297	45.4411	14.249	6.5096	0.3597	70.8451	0.3896	8.3346	15.1558
24	0.022	45.2353	45.6518	14.2692	6.5185	0.3658	71.3451	0.3932	7.4895	14.6897
25	0.022	45.4641	45.8858	14.2917	6.5638	0.3722	71.7452	0.3968	6.599	14.2372
26	0.023	45.6887	46.1155	14.3138	6.5945	0.3786	72.1771	0.4	5.6391	13.7861
27	0.024	45.9288	46.3607	14.3373	6.6312	0.3851	72.8563	0.4028	4.5737	13.3929
28	0.024	46.1946	46.6323	14.3635	6.6746	0.3927	73.3347	0.4055	3.2592	12.9669
29	0.025	46.4698	46.9133	14.3905	6.7224	0.4002	73.8975	0.4078	1.894	12.6562
30	0.025	46.7528	47.2033	14.4183	6.7514	0.4089	74.5815	0.4098	0.2221*	12.4348*
31	0.025	47.0588	47.5154	14.4484	6.7888	0.4172	75.2756	0.4118	-1.304	12.4375
32	0.026	47.3778	47.8401	14.4797	6.8518	0.4254	75.4918	0.4138	-2.7143	12.5516
33	0.026	47.7116	48.1803	14.5125	6.9025	0.4342	76.214	0.416	-4.1854	12.8685
34	0.027	48.0731	48.5469	14.548	6.9507	0.4423	76.9565	0.4187	-5.3357	13.2173
35	0.028	48.4319	48.9127	14.5833	6.9939	0.4523	77.51	0.4214	-6.8323	13.7976
36	0.028	48.8198	49.3072	14.6214	7.0589	0.4621	77.8347	0.4243	-8.1802	14.44

37	0.029	49.2244	49.7197	14.6611	7.1099	0.4735	79.1875	0.4271	-9.79	15.348
38	0.029	49.6344	50.1355	14.7014	7.1829	0.483	79.7016	0.4296	-11.0636	16.1713
39	0.029	50.0665	50.5751	14.7439	7.2418	0.4945	80.5517	0.4317	-12.7013	17.2799

% denotes numbers in percent; * denotes the column-specific minimum/minima

OCAR – NCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	3.1696	5.0034	10.1363	0.4923	0.1448	19.4011	0.104	-28.2031	30.8532
2	0.0005	2.1114	4.3097	10.0323	0.4144	0.1364	18.2764	0.0985	-27.7713*	29.3481*
3	0.0010	1.6818	4.0883	9.9901	0.3966	0.1342	17.7255	0.0964	-28.1374	29.6497
4	0.0015	1.4427	3.983	9.9666	0.3913	0.1332	17.3919	0.0951	-28.5831	30.0399
5	0.0020	1.3192	3.9331	9.9545	0.3849	0.1327	17.1595	0.0943	-28.9244	30.3508
6	0.0025	1.2825*	3.9219*	9.9509*	0.3771*	0.1327	17.098	0.0938	-29.2995	30.6881
7	0.0030	1.3	3.9233	9.9526	0.3877	0.1324*	17.1367	0.0937*	-29.2446	30.6297
8	0.0035	1.366	3.9566	9.9591	0.3833	0.1332	17.1369	0.0937*	-29.6366	30.9971
9	0.0040	1.4717	3.9967	9.9695	0.3919	0.1334	17.0964*	0.094	-29.5447	30.9156
10	0.0045	1.6083	4.0582	9.9829	0.4039	0.1341	17.5449	0.0944	-29.6219	30.9936

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0055	22.9238	23.3974	12.0771	3.3037	0.212	41.1732	0.1929	-8.9859*	14.4118*
2	0.0060	22.761	23.2374	12.0611	3.2813	0.2118	41.467	0.1923	-9.1855	14.5513
3	0.0065	22.6314	23.1099	12.0484	3.26	0.2115*	40.7943	0.1918	-9.3006	14.6226
4	0.0070	22.5176	23.0004	12.0372	3.2379	0.2123	40.8591	0.1913	-9.8922	14.9664
5	0.0075	22.4464	22.93	12.0302	3.2276	0.212	40.8082	0.191	-9.9401	14.9906
6	0.0080	22.4001	22.8868	12.0257	3.2254	0.2129	40.6625*	0.1906	-10.4776	15.3183
7	0.0085	22.3704*	22.8585*	12.0228*	3.2165*	0.2133	40.6903	0.1905	-10.6965	15.447
8	0.0090	22.3725	22.8619	12.023	3.2229	0.2139	40.7443	0.1904	-11.0177	15.6306
9	0.0095	22.39	22.8824	12.0247	3.2172	0.2154	40.9892	0.1903*	-11.6548	16.0447
10	0.0100	22.4257	22.9196	12.0282	3.2283	0.2164	41.1231	0.1904	-12.0335	16.3105
11	0.0105	22.4948	22.9897	12.035	3.2441	0.2175	41.2459	0.1905	-12.4006	16.5878
12	0.0110	22.579	23.0764	12.0433	3.257	0.2194	41.3659	0.1907	-13.1013	17.0881
13	0.0115	22.6812	23.179	12.0533	3.2769	0.2206	41.5036	0.1909	-13.4333	17.3495
14	0.0120	22.7983	23.2976	12.0648	3.2974	0.2224	41.7748	0.1912	-13.9978	17.7622
15	0.0125	22.9384	23.439	12.0786	3.3062	0.2243	41.968	0.1916	-14.6077	18.232
16	0.0130	23.0994	23.5998	12.0944	3.3416	0.2258	42.3408	0.1921	-14.9444	18.5099
17	0.0135	23.266	23.7678	12.1108	3.3627	0.228	42.3726	0.1926	-15.5477	18.9806
18	0.0140	23.4645	23.9668	12.1303	3.3857	0.2302	42.7689	0.1932	-16.0549	19.3869
19	0.0145	23.6766	24.1803	12.1511	3.4205	0.2329	43.0739	0.194	-16.726	19.9277
20	0.0150	23.9036	24.4064	12.1734	3.4497	0.2347	43.3546	0.1947	-17.0401	20.1574
21	0.0155	24.1505	24.6538	12.1977	3.4853	0.2373	43.6394	0.1956	-17.5898	20.6084
22	0.0160	24.4086	24.9126	12.223	3.5161	0.2402	43.9147	0.1964	-18.2185	21.1194
23	0.0165	24.6862	25.1906	12.2503	3.5572	0.2431	44.2326	0.1974	-18.7897	21.5885
24	0.0170	24.9765	25.4832	12.2788	3.598	0.247	44.7537	0.1986	-19.6218	22.2917
25	0.0175	25.2896	25.7963	12.3096	3.6373	0.2501	45.0896	0.1997	-20.153	22.7447
26	0.0180	25.6145	26.1222	12.3415	3.6805	0.2538	45.6701	0.2009	-20.8516	23.3347
27	0.0185	25.9487	26.4576	12.3743	3.7305	0.2577	46.3126	0.2022	-21.536	23.9284
28	0.0190	26.3045	26.8141	12.4093	3.7863	0.2615	46.5773	0.2036	-22.146	24.4602
29	0.0195	26.6735	27.1836	12.4455	3.8319	0.2654	47.0915	0.2051	-22.7331	24.9852
30	0.0200	27.0588	27.5702	12.4834	3.8896	0.2699	47.8062	0.2067	-23.4233	25.5922
31	0.0205	27.4588	27.9702	12.5227	3.9493	0.2739	48.3204	0.2083	-23.944	26.0563
32	0.0210	27.8777	28.3903	12.5638	4.0061	0.2787	48.8587	0.2101	-24.6137	26.6629
33	0.0215	28.3152	28.8288	12.6068	4.0663	0.2836	49.4582	0.2119	-25.2718	27.2489
34	0.0220	28.7612	29.2761	12.6506	4.1361	0.2888	50.0491	0.2139	-25.9268	27.8388
35	0.0225	29.219	29.736	12.6956	4.2004	0.2945	50.7167	0.2159	-26.697	28.5411
36	0.0230	29.6967	30.214	12.7426	4.2737	0.2995	51.3504	0.2181	-27.1784	28.9832
37	0.0235	30.1903	30.7094	12.7911	4.3374	0.3054	51.9844	0.2204	-27.8398	29.5889
38	0.0240	30.6987	31.2194	12.841	4.4157	0.3116	52.6619	0.2228	-28.4918	30.187
39	0.0245	31.2214	31.744	12.8924	4.4909	0.3179	53.3697	0.2253	-29.1297	30.77
40	0.0250	31.7535	32.2777	12.9446	4.571	0.3243	54.0815	0.2279	-29.7229	31.3166
41	0.0255	32.3103	32.8366	12.9993	4.6498	0.3313	55.0255	0.2307	-30.3682	31.9186
42	0.0260	32.8772	33.405	13.055	4.7322	0.338	55.6797	0.2335	-30.9168	32.429
43	0.0265	33.4538	33.984	13.1117	4.8165	0.3455	56.3534	0.2364	-31.5855	33.0563
44	0.0270	34.0546	34.5874	13.1707	4.9014	0.3534	57.1263	0.2395	-32.2412	33.6648
45	0.0275	34.6639	35.1985	13.2306	4.99	0.3609	57.9065	0.2426	-32.7673	34.1559

46	0.0280	35.2852	35.8231	13.2916	5.0921	0.3696	58.6867	0.246	-33.4452	34.7993
47	0.0285	35.9272	36.4679	13.3547	5.1775	0.3783	59.5165	0.2494	-34.0684	35.3862
48	0.0290	36.5882	37.1325	13.4196	5.2735	0.3877	60.2981	0.253	-34.7395	36.0191
49	0.0295	37.2593	37.8075	13.4856	5.3795	0.3976	61.4552	0.2568	-35.4285	36.6679

% denotes numbers in percent; * denotes the column-specific minimum/minima

OAR – CCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	5.1664	6.4555	10.3325	0.7259	0.1448	21.6973	0.1108	-23.4577	25.4236
2	0.0005	4.1788	5.6526	10.2355	0.6029	0.14	20.3886	0.1082	-22.7207	24.6895
3	0.0010	3.6055	5.2199	10.1791	0.5371	0.1377	19.5913	0.1064	-22.6796*	24.6484*
4	0.0015	3.207	4.9419	10.14	0.4932	0.1366	19.4254	0.1051	-23.0593	24.9803
5	0.0020	2.917	4.7513	10.1115	0.4791	0.1359	19.0548	0.1041	-23.4218	25.3034
6	0.0025	2.7053	4.6194	10.0907	0.4598	0.1355	18.653	0.1032	-23.8311	25.6639
7	0.0030	2.5476	4.5266	10.0752	0.4425	0.1353*	18.3043	0.1024	-24.2956	26.0894
8	0.0035	2.445	4.4726	10.0651	0.4328	0.1355	18.1929	0.1015	-25.1319	26.8649
9	0.0040	2.4018*	4.4471*	10.0609*	0.4323*	0.1354	18.1144*	0.1006	-25.7065	27.4016
10	0.0045	2.418	4.4591	10.0625	0.4367	0.1356	18.2059	0.0999	-26.3324	27.9774
11	0.0050	2.4832	4.5035	10.0689	0.4409	0.1364	18.4277	0.0995	-27.0299	28.6137
12	0.0055	2.5858	4.5663	10.0789	0.4515	0.1369	18.6062	0.0993*	-27.4119	28.9576
13	0.0060	2.7257	4.6566	10.0927	0.459	0.1377	18.5102	0.0995	-27.7869	29.304
14	0.0065	2.8987	4.7712	10.1097	0.4741	0.1388	18.9713	0.0998	-28.0904	29.5865
15	0.0070	3.09	4.9031	10.1285	0.4893	0.14	19.1477	0.1003	-28.3646	29.8375
16	0.0075	3.3058	5.0538	10.1497	0.5107	0.1412	19.462	0.101	-28.5011	29.9655
17	0.0080	3.538	5.2203	10.1725	0.5374	0.1424	19.8133	0.1018	-28.5246	29.9912
18	0.0085	3.7808	5.405	10.1964	0.5554	0.1442	20.1294	0.1026	-28.8391	30.2857
19	0.0090	4.0445	5.6056	10.2223	0.5814	0.1456	20.4835	0.1035	-28.8959	30.3467
20	0.0095	4.3166	5.8188	10.249	0.6084	0.1471	20.8264	0.1045	-28.9749	30.4259

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.011	43.0547	43.3993	14.055	6.2684	0.2879*	66.4753	0.3262*	13.3276	18.1684
2	0.011	43.0469*	43.3938*	14.0542*	6.2647	0.2897	66.6307	0.3288	13.5069	18.3679
3	0.011	43.0583	43.4077	14.0553	6.2615	0.2919	66.4867	0.3314	13.5191	18.4183
4	0.012	43.0805	43.4325	14.0575	6.255*	0.2943	66.2618*	0.3336	13.3557	18.3389
5	0.013	43.119	43.4736	14.0613	6.2619	0.2967	66.5085	0.3357	13.1388	18.238
6	0.013	43.1655	43.5233	14.0659	6.2617	0.2997	66.9699	0.3376	12.6701	17.9161
7	0.013	43.2295	43.5901	14.0721	6.2714	0.3025	66.7675	0.3396	12.2516	17.6378
8	0.014	43.3196	43.6826	14.081	6.2782	0.3052	66.8961	0.3417	11.9882	17.451
9	0.015	43.4235	43.7893	14.0912	6.2841	0.3083	66.9869	0.344	11.5828	17.1672
10	0.015	43.5428	43.9114	14.1029	6.307	0.3115	67.2485	0.3465	11.2386	16.8955
11	0.015	43.6709	44.0428	14.1155	6.3229	0.3152	67.3509	0.3493	10.8088	16.5771
12	0.016	43.7999	44.1747	14.1282	6.3397	0.3186	68.0633	0.3523	10.576	16.3977
13	0.017	43.9425	44.3212	14.1422	6.3718	0.323	67.8141	0.3555	10.0521	16.0435
14	0.017	44.1041	44.4867	14.1581	6.3881	0.3274	68.1894	0.359	9.6433	15.7787
15	0.018	44.2633	44.649	14.1737	6.4084	0.3313	68.3912	0.3626	9.4574	15.6669
16	0.018	44.4297	44.8191	14.1901	6.4224	0.3359	68.553	0.3664	9.0972	15.4332
17	0.018	44.5992	44.9927	14.2067	6.4506	0.3406	68.9818	0.3703	8.7091	15.2099
18	0.019	44.7805	45.1784	14.2245	6.4788	0.3459	69.1998	0.3742	8.1858	14.9097
19	0.019	44.9625	45.3645	14.2424	6.5119	0.3509	69.5487	0.3781	7.7644	14.6825
20	0.020	45.1579	45.5639	14.2616	6.5331	0.3558	69.7251	0.3822	7.3931	14.4974
21	0.021	45.356	45.7667	14.2811	6.5578	0.3617	70.1898	0.3861	6.7558	14.1684
22	0.021	45.5566	45.9719	14.3008	6.5842	0.3673	70.6033	0.3901	6.2014	13.936
23	0.021	45.7571	46.1777	14.3205	6.618	0.3736	70.5754	0.3939	5.4266	13.6126
24	0.022	45.9803	46.4045	14.3424	6.6451	0.3787	71.3108	0.3975	4.9631	13.464
25	0.022	46.2172	46.6488	14.3657	6.68	0.3873	71.5376	0.4008	3.4876	12.9639
26	0.023	46.4569	46.8918	14.3892	6.7143	0.3923	72.1053	0.4039	2.9579	12.8595
27	0.024	46.7027	47.1431	14.4134	6.7508	0.3993	72.1988	0.4067	1.8426	12.6269
28	0.024	46.9753	47.4216	14.4402	6.788	0.407	72.7095	0.409	0.4927*	12.4557
29	0.025	47.2445	47.6958	14.4666	6.8331	0.4141	73.0318	0.4111	-0.7166	12.3925*
30	0.025	47.5439	48.0006	14.496	6.8741	0.4216	73.3108	0.4133	-1.9705	12.4541
31	0.025	47.8589	48.3209	14.527	6.9202	0.4294	73.2729	0.4154	-3.258	12.6165
32	0.026	48.1855	48.6541	14.5591	6.9695	0.4384	74.3471	0.4174	-4.7889	12.9816
33	0.026	48.5346	49.0089	14.5934	7.0226	0.447	74.6852	0.4202	-6.0031	13.4017
34	0.027	48.8982	49.3779	14.6291	7.0703	0.4555	75.4157	0.4231	-7.12	13.8726

35	0.028	49.2764	49.763	14.6662	7.1191	0.4657	75.5299	0.4262	-8.4762	14.5183
36	0.028	49.6582	50.1509	14.7038	7.1794	0.4752	76.0442	0.4291	-9.6891	15.2246
37	0.029	50.0682	50.5673	14.744	7.2352	0.4853	77.0574	0.432	-10.969	16.0336
38	0.029	50.4847	50.9914	14.785	7.2983	0.4968	77.4578	0.4346	-12.5227	17.1064
39	0.029	50.9326	51.4439	14.829	7.3572	0.5058	77.8665	0.4365	-13.7088	17.9611

% denotes numbers in percent; * denotes the column-specific minimum/minima

OAR – NCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	3.4757	5.2287	10.1664	0.5343	0.1474	19.8978	0.1059	-28.2063	30.7747
2	0.0005	2.3479	4.4468	10.0556	0.4296	0.1378	18.2642	0.0998	-27.553*	29.2187*
3	0.0010	1.8766	4.1813	10.0093	0.3966	0.1349	17.765	0.0974	-27.7635	29.35
4	0.0015	1.6185	4.0497	9.9839	0.3919	0.1332	17.3158	0.096	-27.933	29.4671
5	0.0020	1.4776	3.9887	9.9701	0.3872	0.1326	17.3719	0.095	-28.3597	29.8352
6	0.0025	1.4286*	3.9666*	9.9652*	0.387	0.1323*	17.1291	0.0945	-28.6033	30.0431
7	0.0030	1.441	3.9708	9.9665	0.3862*	0.1323*	16.9795	0.0943*	-28.7438	30.1683
8	0.0035	1.5024	3.9958	9.9725	0.3864	0.1325	16.9607*	0.0943*	-28.8228	30.2411
9	0.0040	1.5975	4.0394	9.9818	0.3913	0.133	17.2898	0.0945	-28.9495	30.3664
10	0.0045	1.7289	4.1018	9.9948	0.3998	0.1337	17.4527	0.0949	-29.049	30.4554

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0055	25.6743	26.117	12.3474	3.7143	0.2215	45.0774	0.2092	-5.5676*	12.7389*
2	0.0060	25.4711	25.9169	12.3274	3.6781	0.2213*	44.8415	0.2085	-5.7909	12.8168
3	0.0065	25.3003	25.7494	12.3106	3.6563	0.2216	44.6409	0.2078	-6.2063	12.9802
4	0.0070	25.1588	25.6104	12.2967	3.6326	0.2215	44.4786	0.2073	-6.4274	13.0649
5	0.0075	25.056	25.5113	12.2866	3.6237	0.2225	44.2922	0.2069	-6.9971	13.3191
6	0.0080	24.9661	25.4236	12.2778	3.6017	0.2228	44.3218	0.2064	-7.3374	13.446
7	0.0085	24.9009	25.3615	12.2714	3.5908	0.2237	43.7081*	0.2061	-7.8629	13.715
8	0.0090	24.874	25.3382	12.2687	3.5898	0.2252	44.1574	0.2059*	-8.561	14.0951
9	0.0095	24.8547*	25.3196*	12.2668*	3.5897*	0.2254	43.7823	0.2059*	-8.6562	14.1469
10	0.0100	24.8741	25.3412	12.2687	3.5941	0.2267	44.0531	0.2059*	-9.1499	14.4419
11	0.0105	24.8999	25.3705	12.2713	3.597	0.2286	44.0848	0.2059*	-9.9125	14.9
12	0.0110	24.957	25.4299	12.2769	3.6054	0.2303	44.1359	0.206	-10.517	15.3154
13	0.0115	25.0236	25.4982	12.2834	3.6205	0.2317	44.175	0.2062	-11.0041	15.6295
14	0.0120	25.1162	25.5922	12.2925	3.6317	0.2332	44.2746	0.2063	-11.5306	15.9989
15	0.0125	25.2259	25.7025	12.3033	3.6503	0.2345	44.3774	0.2066	-11.9199	16.2831
16	0.0130	25.3656	25.8453	12.317	3.6584	0.2374	44.4971	0.207	-12.8149	16.9248
17	0.0135	25.5131	25.9929	12.3315	3.6819	0.2388	44.6518	0.2074	-13.1334	17.1691
18	0.0140	25.6804	26.1618	12.348	3.7038	0.2411	44.9785	0.2079	-13.7705	17.6256
19	0.0145	25.858	26.3403	12.3654	3.728	0.2432	45.4394	0.2085	-14.2908	18.0349
20	0.0150	26.0682	26.5526	12.3861	3.7468	0.2463	45.674	0.2092	-15.0874	18.6417
21	0.0155	26.2905	26.7749	12.4079	3.7835	0.2483	45.9007	0.2099	-15.4739	18.9535
22	0.0160	26.5248	27.0105	12.4309	3.8086	0.2513	46.1189	0.2106	-16.167	19.491
23	0.0165	26.7799	27.267	12.456	3.8421	0.2544	46.2383	0.2115	-16.8401	20.0332
24	0.0170	27.0497	27.5376	12.4825	3.8758	0.2573	46.7311	0.2124	-17.4358	20.4959
25	0.0175	27.3455	27.8339	12.5116	3.916	0.2604	47.0138	0.2136	-17.9587	20.936
26	0.0180	27.6426	28.1307	12.5407	3.9573	0.2631	47.4472	0.2147	-18.392	21.3041
27	0.0185	27.9648	28.4553	12.5724	4.0012	0.2674	47.8023	0.216	-19.2337	22.0157
28	0.0190	28.3054	28.7969	12.6059	4.054	0.2712	48.1627	0.2172	-19.9032	22.5765
29	0.0195	28.6559	29.1482	12.6403	4.1063	0.275	48.3705	0.2186	-20.5067	23.0805
30	0.0200	29.0242	29.5179	12.6765	4.1587	0.2793	49.0735	0.22	-21.2227	23.6856
31	0.0205	29.4102	29.9056	12.7144	4.2139	0.284	49.5607	0.2215	-22.0013	24.3617
32	0.0210	29.8123	30.3082	12.7539	4.2704	0.288	49.8537	0.2232	-22.5148	24.8104
33	0.0215	30.23	30.7271	12.795	4.3225	0.2928	50.4174	0.2249	-23.1959	25.4048
34	0.0220	30.668	31.1674	12.838	4.3891	0.2984	51.2236	0.2267	-24.0171	26.136
35	0.0225	31.1129	31.6142	12.8817	4.4529	0.3039	51.6591	0.2287	-24.7396	26.7857
36	0.0230	31.5873	32.089	12.9283	4.5284	0.3087	52.2449	0.2307	-25.2636	27.2579
37	0.0235	32.0643	32.5691	12.9752	4.6024	0.3153	52.8118	0.2328	-26.1576	28.0612
38	0.0240	32.5635	33.069	13.0242	4.6767	0.3206	53.4279	0.2351	-26.6729	28.5263
39	0.0245	33.08	33.5887	13.075	4.745	0.3277	54.0838	0.2376	-27.519	29.2986
40	0.0250	33.6064	34.1175	13.1267	4.8247	0.3344	55.015	0.2401	-28.1997	29.9243
41	0.0255	34.1649	34.6776	13.1816	4.9082	0.341	55.4614	0.2428	-28.8056	30.4767
42	0.0260	34.72	35.2345	13.2361	4.9815	0.3478	56.0824	0.2455	-29.3962	31.0143
43	0.0265	35.2967	35.8136	13.2928	5.0682	0.3552	56.563	0.2484	-30.0613	31.6276

```
44 0.0270  35.8921   36.4124  13.3512  5.1541  0.3635   57.44    0.2515   -30.8092  32.3302
45 0.0275  36.4965   37.0205  13.4106  5.2382  0.3722   57.9919  0.2547   -31.57    33.0455
46 0.0280  37.1208   37.6473  13.472   5.3312  0.3804   58.7576  0.258    -32.1838  33.619
47 0.0285  37.7736   38.3033  13.5361  5.4229  0.3894   59.6925  0.2615   -32.8414  34.2378
48 0.0290  38.4246   38.958   13.6001  5.5269  0.3988   60.4849  0.2651   -33.5243  34.8729
49 0.0295  39.1022   39.6393  13.6666  5.6257  0.4087   61.2902  0.2688   -34.2214  35.5246
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% denotes numbers in percent; * denotes the column-specific minimum/minima
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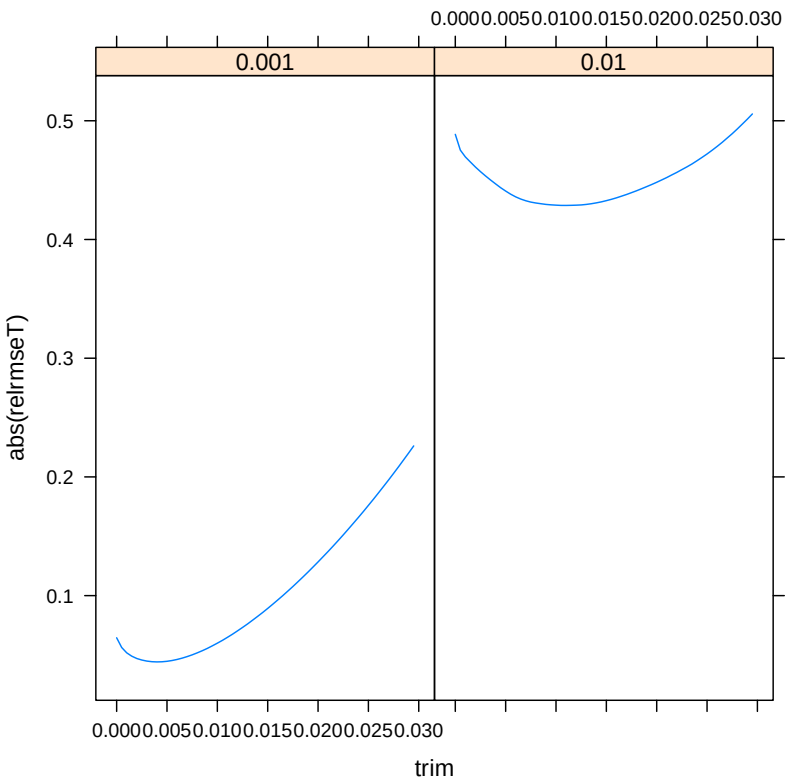
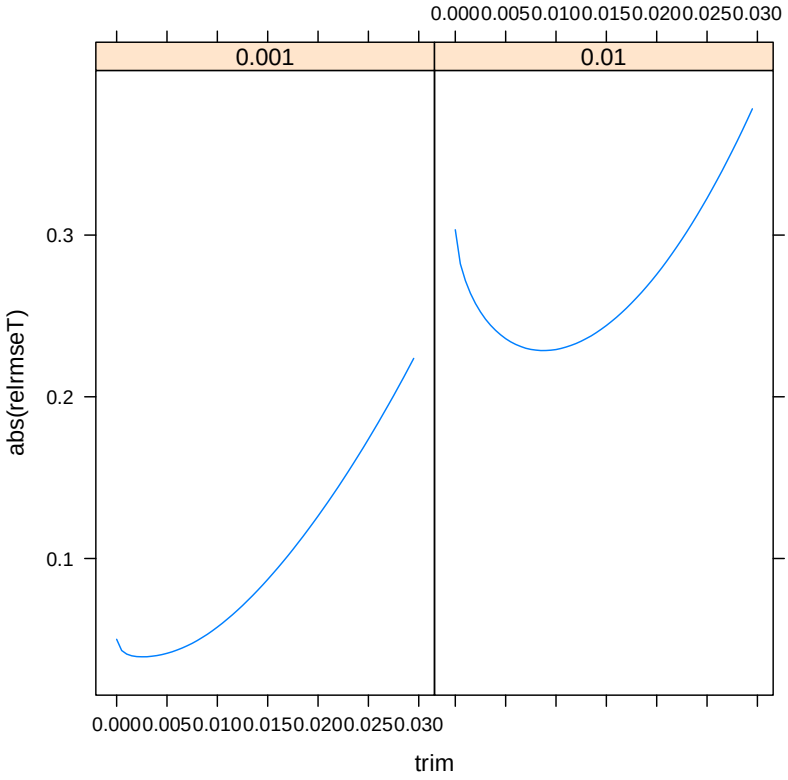
E.7.5. Plots

In this section, we report graphical displays of certain numerical criteria for the estimators. The lattice-type plots are partitioned into panels for different values of OTypeEpsilon.

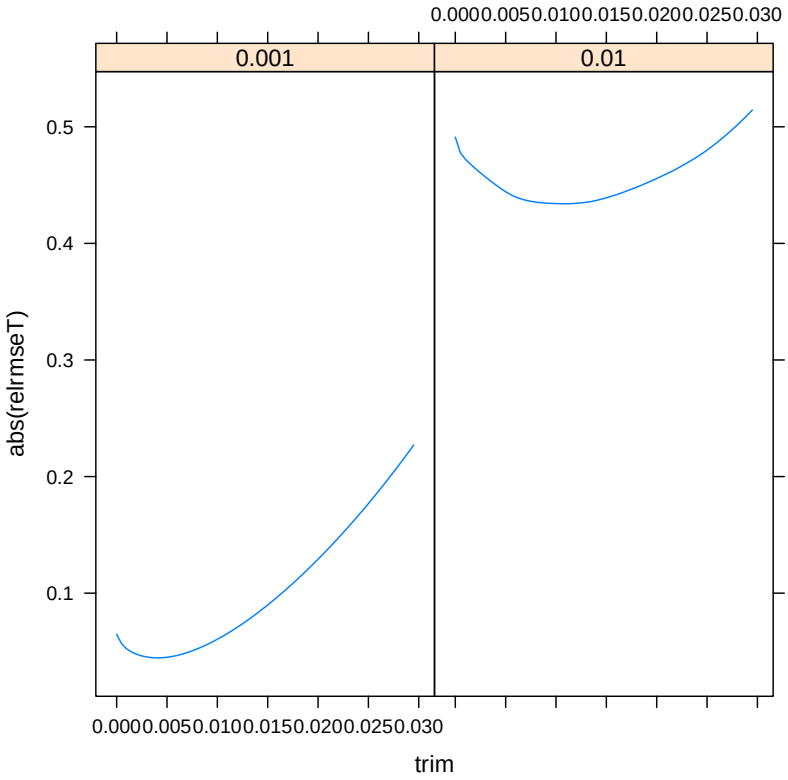
OCAR – CCAR



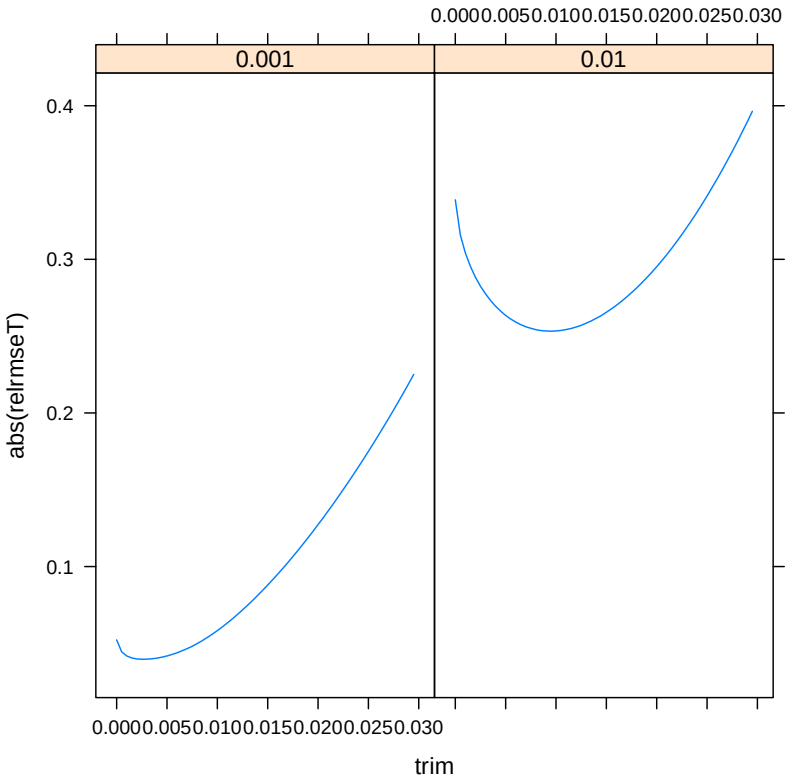
OCAR – NCAR



OAR – CCAR



OAR – NCAR



E.8. N0015: TQSR @ AMELIA: sthhpps1kx6k

Sample Design Ref 1.5

E.8.1. Simulation Setup

Target Indicator:	QSR
Domains:	[none] (default)
Population:	AMELIA
Sample:	sthhpps1kx6k
MonteCarlo Replicates:	1,000 (default)
Criteria Set:	Univariate criteria (default)
Method:	TQSR
Outlyingness:	OAR,OCAR
Contamination:	CCAR,NCAR
Missingness:	[none] (default)
Simulation Environment:	DBsim
Host:	FHNW
Author:	Beat Hulliger and Tobias Schoch
ID:	AggTQSR_sthhpps1kx6k
Date:	September 5, 2011

E.8.2. Estimator Specifications

`Specifications:` Trimmed quintile share ratio estimator; trims only at the top right end of the distribution. Variance estimates based on linearization.

`Comments:`

E.8.3. Robustness Parameters

This section gives some summary statistics of the robustness tuning parameters and the relative number of outliers (OType-Epsilon).

OCAR – CCAR

```
Range of  trim
    Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
0.000000 0.007375 0.014750 0.014750 0.022120 0.029500
Range of OTypeEpsilon

0.001  0.01
   60    60
```

OCAR – NCAR

```
Range of  trim
    Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
0.000000 0.007375 0.014750 0.014750 0.022120 0.029500
Range of OTypeEpsilon

0.001  0.01
   60    60
```

OAR – CCAR

```
Range of  trim
    Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
0.000000 0.007375 0.014750 0.014750 0.022120 0.029500
Range of OTypeEpsilon

0.001  0.01
   60    60
```

OAR – NCAR

```
Range of  trim
    Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
0.000000 0.007375 0.014750 0.014750 0.022120 0.029500
Range of OTypeEpsilon

0.001  0.01
   60    60
```

E.8.4. Results

In this section, we summarize the performance of the estimators due to numerical criteria. The section is split into the different subsections for the respective combination of the outlyingness and contamination mechanisms. In addition, each subsection is further partitioned for the different values of OTypeEpsilon.

OCAR – CCAR

OTypeEpsilon=0.001

```
     trim relbiasT% relrmseT%    avgT  medaeT    varT relmaxeT%    avgV relbiasV% relrmseV%
1  0.0000   5.1731    6.45    10.3331 0.7275  0.1434    20.3943 0.1111  -22.5223   24.5888
2  0.0005   3.4599    5.1056  10.1648 0.5112  0.1362    18.5686 0.1064  -21.8491*  23.9116
3  0.0010   2.1688    4.2791  10.038  0.415   0.1315    17.1882 0.1027  -21.8735   23.9052*
4  0.0015   1.0662    3.7982  9.9296  0.3772  0.1284    16.0268 0.0994  -22.5939   24.5134
5  0.0020   0.0757*   3.6092* 9.8323  0.3733* 0.1258    14.9191 0.0964  -23.3692   25.2046
6  0.0025   -0.8261   3.6707  9.7437  0.3766  0.1236    13.9085 0.0938  -24.1303   25.8903
7  0.0030   -1.6701   3.9212  9.6608  0.4195  0.1216    13.2408 0.0911  -25.0895   26.7606
8  0.0035   -2.4517   4.2874  9.584   0.4626  0.1195    12.0499 0.0884  -26.0119   27.6161
9  0.0040   -3.1719   4.7164  9.5133  0.5225  0.1177    11.4218 0.0859  -27.0027   28.5292
10 0.0045   -3.8416   5.1722  9.4475  0.6125  0.1159    10.6375 0.0836  -27.8495   29.3207
11 0.0050   -4.4622   5.6321  9.3865  0.6911  0.1141    9.662   0.0816  -28.506    29.9189
12 0.0055   -5.0375   6.0825  9.33    0.766   0.1123    9.1258  0.0798  -28.9264   30.3056
13 0.0060   -5.5874   6.5343  9.2759  0.8436  0.1109    8.2669  0.0782  -29.447    30.7882
14 0.0065   -6.105    6.9716  9.2251  0.9168  0.1095    7.828   0.0769  -29.7733   31.0844
15 0.0070   -6.6051   7.4039  9.1759  0.9847  0.1081    7.2588  0.0757  -29.981    31.2752
16 0.0075   -7.0867   7.8284  9.1286  1.0525  0.1069    6.5723  0.0746  -30.208    31.4835
17 0.0080   -7.5541   8.2471  9.0827  1.1178  0.1058    6.0262  0.0736  -30.4357   31.6957
18 0.0085   -8.011    8.6596  9.0378  1.1916  0.1045    5.4706  0.0727  -30.4612   31.7197
19 0.0090   -8.4543   9.0647  8.9943  1.2536  0.1033    4.9204  0.0718  -30.5469   31.7994
20 0.0095   -8.8898   9.4673  8.9515* 1.313   0.1024*   4.3898* 0.0709* -30.7649   32.0025
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
```

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.011	20.1653	20.6057	11.8061	2.9203	0.1735	36.6356	0.2115	21.9101	25.1367
2	0.011	19.1333	19.5892	11.7047	2.7701	0.1706	35.4548	0.2088	22.397	25.5918
3	0.011	18.1102	18.5832	11.6042	2.6217	0.1677	34.2556	0.206	22.8325	26.0046
4	0.012	17.0992	17.5911	11.5049	2.4756	0.1649	33.1307	0.2031	23.1694	26.3259
5	0.013	16.0955	16.6077	11.4063	2.335	0.1618	31.9987	0.2001	23.6177	26.7528
6	0.013	15.1158	15.6505	11.31	2.1966	0.159	30.9203	0.197	23.9461	27.0728
7	0.013	14.1472	14.7086	11.2148	2.0587	0.1565	29.8517	0.1939	23.8631	27.0179
8	0.014	13.1938	13.784	11.1212	1.9136	0.1538	28.7529	0.1908	24.0063	27.1451
9	0.015	12.2562	12.8791	11.029	1.7833	0.1513	27.4078	0.1878	24.1083	27.2237
10	0.015	11.3275	11.9872	10.9378	1.6469	0.1486	26.6152	0.1848	24.3642	27.4451
11	0.015	10.4117	11.1146	10.8478	1.5142	0.1462	25.5558	0.182	24.4607	27.5219
12	0.016	9.5086	10.2611	10.7591	1.3847	0.1437	24.5753	0.1793	24.7372	27.7603
13	0.017	8.6185	9.4295	10.6717	1.2484	0.1414	23.5487	0.1768	24.9881	27.977
14	0.017	7.7314	8.612	10.5845	1.1203	0.1391	22.5302	0.1744	25.3953	28.3429
15	0.018	6.8557	7.8196	10.4985	0.9915	0.1367	21.5409	0.1721	25.8749	28.7813
16	0.018	5.9863	7.053	10.413	0.8663	0.1344	20.5737	0.1698	26.3475	29.2146
17	0.018	5.1235	6.3185	10.3283	0.739	0.1321	19.5687	0.1676	26.8827	29.7163
18	0.019	4.2689	5.6287	10.2443	0.6261	0.13	18.6077	0.1655	27.2803	30.0816
19	0.019	3.4175	4.9943	10.1607	0.5131	0.1282	17.6192	0.1634	27.5024	30.2872
20	0.020	2.5715	4.4347	10.0775	0.4316	0.1261	16.6936	0.1613	27.8717	30.6226
21	0.021	1.7364	3.9835	9.9955	0.3833	0.1242	15.7331	0.1592	28.1902	30.9215
22	0.021	0.9014	3.6713	9.9135	0.3622	0.1224	14.835	0.1571	28.346	31.0817
23	0.021	0.08*	3.5305*	9.8328	0.3498*	0.1204	13.9318	0.1549	28.7188	31.4454
24	0.022	-0.7409	3.5771	9.7521	0.3604	0.1183	12.9997	0.1527	29.0516	31.7738
25	0.022	-1.5504	3.804	9.6726	0.3847	0.1166	12.1211	0.1504	29.0166	31.7679
26	0.023	-2.356	4.1726	9.5934	0.4383	0.1146	11.251	0.1479	29.0895	31.8537
27	0.024	-3.153	4.6487	9.5151	0.5042	0.1128	10.3718	0.1453	28.8583	31.6644
28	0.024	-3.9376	5.196	9.438	0.6037	0.1111	9.5434	0.1426	28.4032	31.2753
29	0.025	-4.7155	5.7932	9.3616	0.7067	0.1094	8.6579	0.1398	27.721	30.6678
30	0.025	-5.4813	6.4189	9.2864	0.8164	0.1078	7.8051	0.1369	26.9615	29.9883
31	0.025	-6.2371	7.0629	9.2121	0.9258	0.1061	6.9738	0.134	26.2134	29.3041
32	0.026	-6.9818	7.7165	9.1389	1.0351	0.1043	6.1172	0.1311	25.6454	28.7591
33	0.026	-7.7151	8.3761	9.0669	1.1416	0.1028	5.2955	0.1283	24.8282	27.9832
34	0.027	-8.4394	9.0376	8.9957	1.2496	0.101	4.4796	0.1257	24.4232	27.6012
35	0.028	-9.1564	9.7027	8.9253	1.3541	0.0995	3.6894	0.1231	23.6764	26.9051
36	0.028	-9.8607	10.3626	8.8561	1.4546	0.0981	2.9063	0.1206	23.0216	26.3055
37	0.029	-10.5595	11.0233	8.7874	1.5571	0.0967	2.134	0.1181	22.1248	25.5189
38	0.029	-11.2484	11.6778	8.7198	1.6567	0.0951	1.3421	0.1155	21.4618	24.9749
39	0.029	-11.9287	12.3292	8.6529*	1.7547	0.0939*	0.593*	0.1128*	20.1825*	23.8866*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OCAR – NCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	3.1696	5.0034	10.1363	0.4923	0.1448	19.4011	0.104	-28.2031	30.8532
2	0.0005	1.4178	3.9837	9.9642	0.3904	0.1339	17.3937	0.0967	-27.8213*	29.3928*
3	0.0010	0.3036*	3.6765	9.8547	0.374*	0.1297	15.9549	0.0928	-28.4626	29.9439
4	0.0015	-0.6157	3.6698*	9.7644	0.3822	0.1265	14.7626	0.0898	-29.0075	30.4204
5	0.0020	-1.417	3.8499	9.6857	0.4026	0.1238	13.6644	0.0873	-29.521	30.8882
6	0.0025	-2.1336	4.1405	9.6153	0.4409	0.1217	12.7725	0.0851	-30.0239	31.3416
7	0.0030	-2.7921	4.4871	9.5506	0.4886	0.1192	11.9435	0.0833	-30.1088	31.4113
8	0.0035	-3.4049	4.876	9.4904	0.5595	0.1177	11.0986	0.0817	-30.5712	31.8383
9	0.0040	-3.9799	5.2761	9.4339	0.6288	0.1159	10.3277	0.0803	-30.7218	31.9753
10	0.0045	-4.5231	5.6814	9.3805*	0.6958	0.1142*	9.7789*	0.0791*	-30.7836	32.0344

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0055	13.1834	13.8404	11.1201	1.8764	0.1716	29.3226	0.1556	-9.3124*	14.4828*
2	0.0060	12.163	12.858	11.0199	1.7309	0.168	28.4304	0.1519	-9.5763	14.6444
3	0.0065	11.1785	11.9146	10.9232	1.5899	0.1642	26.9355	0.1485	-9.6068	14.6463
4	0.0070	10.214	11.0001	10.8284	1.4429	0.1611	25.831	0.145	-9.9859	14.8676
5	0.0075	9.2903	10.1315	10.7377	1.3073	0.1578	24.7803	0.1418	-10.1865	14.9733
6	0.0080	8.3908	9.2979	10.6493	1.1834	0.155	23.6567	0.1386	-10.6133	15.2287

7	0.0085	7.5139	8.4949	10.5631	1.0493	0.1517	22.6438	0.1356	-10.6496	15.2275
8	0.0090	6.6629	7.7361	10.4795	0.9277	0.1493	21.6972	0.1326	-11.1906	15.5389
9	0.0095	5.8326	7.013	10.3979	0.7994	0.1465	20.7809	0.1297	-11.4563	15.6998
10	0.0100	5.019	6.3303	10.318	0.6912	0.1438	19.8941	0.127	-11.6918	15.8561
11	0.0105	4.2337	5.7047	10.2408	0.5893	0.1413	19.0196	0.1243	-11.9981	16.0874
12	0.0110	3.4623	5.1361	10.1651	0.5042	0.1391	18.1104	0.1217	-12.506	16.436
13	0.0115	2.7107	4.6344	10.0912	0.4498	0.1365	17.2505	0.1192	-12.7147	16.5797
14	0.0120	1.9702	4.2175	10.0185	0.4	0.1344	16.3794	0.1167	-13.1213	16.8585
15	0.0125	1.2516	3.9069	9.9479	0.3669	0.1324	15.5406	0.1143	-13.6295	17.2315
16	0.0130	0.5514	3.71	9.8791	0.3434*	0.1301	14.7206	0.112	-13.8745	17.4205
17	0.0135	-0.1418*	3.642*	9.811	0.3618	0.128	13.9281	0.1098	-14.2392	17.6939
18	0.0140	-0.8164	3.7014	9.7447	0.3817	0.1259	13.1664	0.1076	-14.5618	17.9334
19	0.0145	-1.475	3.876	9.68	0.4126	0.1241	12.434	0.1055	-15.0193	18.2787
20	0.0150	-2.122	4.139	9.6164	0.434	0.122	11.6777	0.1034	-15.2384	18.4136
21	0.0155	-2.7546	4.4742	9.5543	0.479	0.1201	10.9271	0.1015	-15.5341	18.649
22	0.0160	-3.3803	4.8678	9.4928	0.5495	0.1185	10.1761	0.0995	-16.0599	19.0497
23	0.0165	-3.9894	5.2911	9.4329	0.6226	0.1167	9.4622	0.0976	-16.3644	19.282
24	0.0170	-4.5888	5.742	9.374	0.7051	0.1151	8.7686	0.0958	-16.7488	19.5893
25	0.0175	-5.1759	6.2081	9.3164	0.784	0.1135	8.0714	0.0941	-17.1418	19.8978
26	0.0180	-5.7537	6.6855	9.2596	0.8639	0.112	7.4138	0.0923	-17.5749	20.2474
27	0.0185	-6.3231	7.1709	9.2037	0.9485	0.1105	6.9373	0.0906	-18.0098	20.6064
28	0.0190	-6.8788	7.655	9.1491	1.0259	0.109	6.1745	0.089	-18.3339	20.8732
29	0.0195	-7.4278	8.1426	9.0951	1.1072	0.1075	5.582	0.0874	-18.6873	21.1832
30	0.0200	-7.965	8.6272	9.0423	1.183	0.1062	4.9797	0.0859	-19.0621	21.4959
31	0.0205	-8.4955	9.1108	8.9902	1.2616	0.1047	4.3664	0.0844	-19.3438	21.7399
32	0.0210	-9.0155	9.5898	8.9391	1.3389	0.1032	3.7815	0.083	-19.6313	21.9823
33	0.0215	-9.5271	10.0649	8.8889	1.4109	0.1018	3.2058	0.0816	-19.8778	22.1839
34	0.0220	-10.0294	10.5361	8.8395	1.4852	0.1007	2.6549	0.0802	-20.3392	22.572
35	0.0225	-10.5275	11.0063	8.7906	1.5565	0.0996	2.1001	0.0789	-20.8361	23.0039
36	0.0230	-11.0156	11.4671	8.7426	1.6258	0.0981	1.557	0.0776	-20.8871	23.0475
37	0.0235	-11.4981	11.9268	8.6952	1.697	0.097	1.02	0.0764	-21.3253	23.4284
38	0.0240	-11.9709	12.3781	8.6488	1.767	0.0958	0.4832	0.0752	-21.5563	23.6246
39	0.0245	-12.4397	12.8271	8.6027	1.8353	0.0946	-0.049*	0.074	-21.754	23.7938
40	0.0250	-12.9005	13.2698	8.5574	1.8993	0.0934	-0.6005	0.0729	-21.9502	23.961
41	0.0255	-13.3561	13.7093	8.5127	1.9695	0.0923	-1.1119	0.0718	-22.2707	24.2401
42	0.0260	-13.8033	14.141	8.4687	2.0331	0.0912	-1.6464	0.0707	-22.4557	24.396
43	0.0265	-14.2477	14.5713	8.4251	2.0998	0.0901	-2.1912	0.0697	-22.6943	24.6018
44	0.0270	-14.6832	14.994	8.3823	2.1626	0.0891	-2.6784	0.0687	-22.9365	24.8154
45	0.0275	-15.1155	15.4138	8.3398	2.2249	0.088	-3.1819	0.0677	-23.0918	24.9487
46	0.0280	-15.5438	15.8309	8.2977	2.2874	0.087	-3.6822	0.0667	-23.332	25.1619
47	0.0285	-15.9676	16.244	8.2561	2.3446	0.086	-4.2891	0.0658	-23.4739	25.2839
48	0.0290	-16.3835	16.6502	8.2152	2.4048	0.0851	-4.6589	0.0649	-23.743	25.5263
49	0.0295	-16.796	17.0536	8.1747*	2.4662	0.0843*	-5.1148	0.0641*	-23.9638	25.7191

% denotes numbers in percent; * denotes the column-specific minimum/minima

OAR – CCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	5.1664	6.4555	10.3325	0.7259	0.1448	21.6973	0.1108	-23.4577	25.4236
2	0.0005	3.4673	5.1267	10.1655	0.524	0.1378	19.4888	0.1062	-22.9567*	24.8981*
3	0.0010	2.1984	4.3154	10.0409	0.4164	0.1332	17.791	0.1025	-23.0759	24.9884
4	0.0015	1.1085	3.8312	9.9338	0.3809	0.13	16.7482	0.0993	-23.5916	25.4355
5	0.0020	0.1327*	3.6263*	9.8379	0.3749*	0.1269	15.4833	0.0964	-23.9945	25.7882
6	0.0025	-0.7673	3.6673	9.7495	0.3804	0.1243	14.2458	0.0938	-24.5289	26.2639
7	0.0030	-1.6039	3.8963	9.6673	0.4056	0.1218	13.1722	0.0913	-25.0899	26.7739
8	0.0035	-2.3881	4.2558	9.5903	0.4547	0.1199	12.2087	0.0886	-26.0792	27.6894
9	0.0040	-3.1098	4.6733	9.5194	0.5129	0.1176	11.147	0.0861	-26.7784	28.3323
10	0.0045	-3.7776	5.1213	9.4538	0.5952	0.1155	10.3808	0.0838	-27.4649	28.9648
11	0.0050	-4.3969	5.5801	9.3929	0.6759	0.1141	9.8489	0.0818	-28.3113	29.7421
12	0.0055	-4.9775	6.0319	9.3359	0.7542	0.1122	9.0566	0.08	-28.703	30.094
13	0.0060	-5.5261	6.4806	9.282	0.8245	0.1107	8.2489	0.0784	-29.1901	30.5442
14	0.0065	-6.0447	6.9167	9.231	0.9068	0.1092	7.68	0.0771	-29.4362	30.77
15	0.0070	-6.5447	7.3485	9.1819	0.9777	0.1079	7.1137	0.0759	-29.6889	31.0004
16	0.0075	-7.0239	7.7707	9.1348	1.0477	0.1068	6.5561	0.0748	-29.9697	31.2601
17	0.0080	-7.4919	8.188	9.0888	1.1139	0.1055	6.0201	0.0738	-30.057	31.3391
18	0.0085	-7.9489	8.6017	9.0439	1.1812	0.1044	5.4649	0.0728	-30.254	31.5236
19	0.0090	-8.3914	9.0056	9.0005	1.2399	0.1033	4.9149	0.0719	-30.3351	31.5999
20	0.0095	-8.8272	9.4067	8.9576*	1.306	0.1021*	4.3847*	0.0711*	-30.379	31.6391

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.011	20.5863	21.0383	11.8475	2.9782	0.1818	39.1883	0.2125	16.8978	20.7618*
2	0.011	19.5513	20.0176	11.7458	2.8275	0.1783	37.994	0.2097	17.6357	21.4232
3	0.011	18.5311	19.0139	11.6456	2.6755	0.1752	36.5359	0.2068	18.0848	21.8329
4	0.012	17.5234	18.0247	11.5465	2.5302	0.1722	35.3388	0.2038	18.3679	22.102
5	0.013	16.532	17.0529	11.4491	2.3891	0.1691	34.1992	0.2006	18.6692	22.3999
6	0.013	15.5511	16.0939	11.3528	2.2503	0.166	33.4316	0.1974	18.9333	22.6532
7	0.013	14.5897	15.1572	11.2583	2.1082	0.1631	31.9743	0.1942	19.0463	22.7654
8	0.014	13.6494	14.2435	11.1659	1.9715	0.1601	30.9054	0.1911	19.3369	23.0127
9	0.015	12.7205	13.3454	11.0747	1.8371	0.1574	29.8162	0.1881	19.5101	23.1524
10	0.015	11.8043	12.4643	10.9847	1.7035	0.1548	28.7231	0.1852	19.6883	23.2633
11	0.015	10.8959	11.5963	10.8954	1.5699	0.1522	27.6664	0.1826	19.9516	23.46
12	0.016	9.9979	10.7445	10.8072	1.4413	0.1496	26.9194	0.1801	20.343	23.7826
13	0.017	9.1103	9.9115	10.72	1.3159	0.1473	25.6086	0.1777	20.6537	24.0396
14	0.017	8.2333	9.0983	10.6338	1.1857	0.1449	24.6055	0.1754	21.0835	24.4111
15	0.018	7.3588	8.3001	10.5479	1.0548	0.1424	23.6373	0.1732	21.623	24.887
16	0.018	6.4922	7.5272	10.4627	0.929	0.1402	22.6326	0.1711	22.0341	25.2535
17	0.018	5.6289	6.7788	10.3779	0.8059	0.1379	21.6567	0.169	22.5809	25.7527
18	0.019	4.7753	6.0707	10.2941	0.6867	0.1358	20.6678	0.1669	22.9465	26.0889
19	0.019	3.9238	5.4048	10.2104	0.5797	0.1335	19.624	0.1648	23.4744	26.5711
20	0.020	3.0807	4.8052	10.1276	0.4852	0.1314	18.6217	0.1627	23.8574	26.929
21	0.021	2.2424	4.2891	10.0452	0.4207	0.1292	17.642	0.1607	24.3844	27.414
22	0.021	1.4096	3.8937	9.9634	0.3769	0.1273	16.9357	0.1586	24.5677	27.6001
23	0.021	0.5771	3.6478	9.8816	0.3638*	0.1254	15.9359	0.1563	24.711	27.7544
24	0.022	-0.2437*	3.579*	9.801	0.3732	0.1232	14.9947	0.154	25.0051	28.0548
25	0.022	-1.0521	3.6996	9.7215	0.3837	0.1216	14.0389	0.1516	24.701	27.8116
26	0.023	-1.8563	3.9737	9.6425	0.4181	0.1193	13.0954	0.149	24.9255	28.0597
27	0.024	-2.6538	4.3816	9.5642	0.4798	0.1175	12.1627	0.1463	24.5656	27.754
28	0.024	-3.4406	4.878	9.4869	0.5479	0.1155	11.2228	0.1434	24.1447	27.3941
29	0.025	-4.2187	5.4375	9.4104	0.6416	0.1137	10.3496	0.1405	23.5772	26.8981
30	0.025	-4.9838	6.0365	9.3352	0.7496	0.1121	9.4289	0.1376	22.7683	26.1783
31	0.025	-5.7343	6.6533	9.2615	0.8573	0.11	8.3169	0.1347	22.4671	25.8829
32	0.026	-6.4779	7.2938	9.1884	0.966	0.1086	7.6984	0.1318	21.4312	24.9012
33	0.026	-7.2097	7.9396	9.1165	1.0709	0.1069	6.8386	0.1292	20.9234	24.4095
34	0.027	-7.9335	8.5919	9.0454	1.1726	0.1051	6.0357	0.1266	20.4475	23.9536
35	0.028	-8.649	9.2482	8.9751	1.2751	0.1036	5.0072	0.1242	19.8509	23.392
36	0.028	-9.359	9.9067	8.9054	1.3795	0.102	4.194	0.1217	19.3533	22.9731
37	0.029	-10.0569	10.5611	8.8368	1.4842	0.1004	3.5756	0.1192	18.6462	22.4035
38	0.029	-10.7486	11.2158	8.7688	1.5844	0.0991	2.7317	0.1165	17.5376	21.5411
39	0.029	-11.4267	11.8595	8.7022*	1.681	0.0974*	1.8887*	0.1137*	16.7309*	20.9104

% denotes numbers in percent; * denotes the column-specific minimum/minima

OAR – NCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	3.4757	5.2287	10.1664	0.5343	0.1474	19.8978	0.1059	-28.2063	30.7747
2	0.0005	1.6521	4.0956	9.9872	0.3944	0.1357	17.38	0.0979	-27.8255*	29.4679*
3	0.0010	0.4946	3.7069	9.8735	0.3683*	0.1304	15.9917	0.0938	-28.0903	29.6407
4	0.0015	-0.4428*	3.6473*	9.7814	0.382	0.1266	14.6851	0.0906	-28.4781	29.9542
5	0.0020	-1.2644	3.7939	9.7007	0.3928	0.1236	13.8498	0.0879	-28.877	30.2917
6	0.0025	-1.9951	4.0676	9.6289	0.422	0.1214	12.7772	0.0857	-29.4019	30.7613
7	0.0030	-2.6607	4.4055	9.5635	0.4773	0.1191	11.9033	0.0838	-29.632	30.9654
8	0.0035	-3.2809	4.7833	9.5026	0.5319	0.1171	10.9046	0.0822	-29.7984	31.1154
9	0.0040	-3.8637	5.1847	9.4453	0.6069	0.1155	10.3689	0.0807	-30.0915	31.3862
10	0.0045	-4.4157	5.5915	9.3911*	0.6804	0.1137*	9.6751*	0.0794*	-30.1561	31.4392

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0055	15.6459	16.2287	11.3621	2.2539	0.1795	33.1129	0.1688	-5.9872*	12.7605*
2	0.0060	14.5679	15.1791	11.2562	2.0998	0.1757	31.8498	0.1648	-6.1854	12.8147
3	0.0065	13.5208	14.1643	11.1533	1.9485	0.1722	30.6017	0.1609	-6.5318	12.9485
4	0.0070	12.5081	13.1867	11.0538	1.799	0.1685	29.4323	0.1572	-6.6665	12.9812
5	0.0075	11.5289	12.2498	10.9576	1.654	0.1656	28.2401	0.1537	-7.1986	13.2169
6	0.0080	10.5712	11.3379	10.8635	1.5123	0.1623	27.0994	0.1502	-7.4761	13.3194

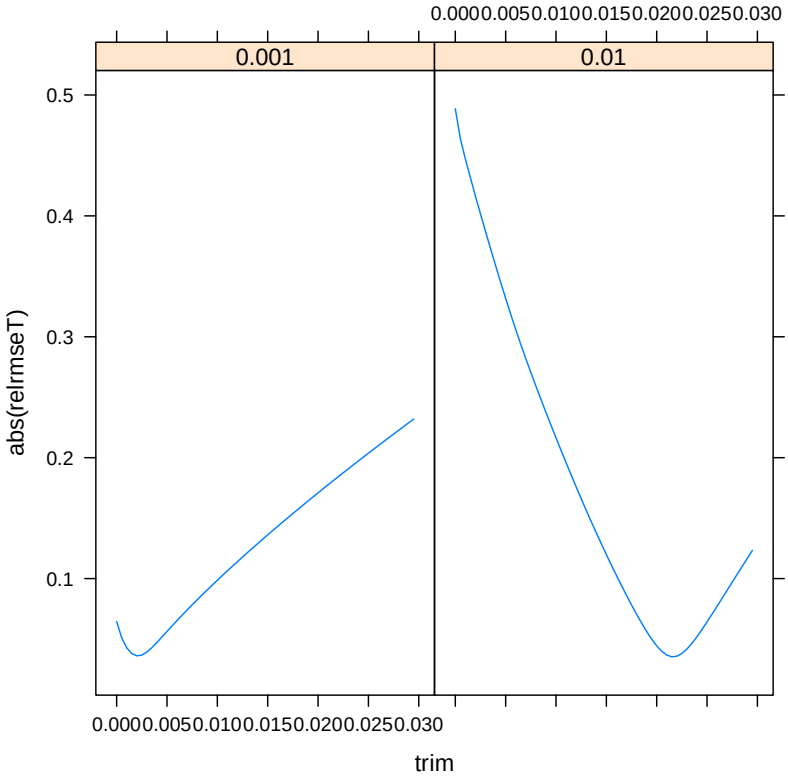
7	0.0085	9.6368	10.4577	10.7717	1.3787	0.1594	25.6442	0.1468	-7.8995	13.5281
8	0.0090	8.7404	9.624	10.6836	1.251	0.1568	24.8829	0.1436	-8.4236	13.8079
9	0.0095	7.8517	8.8051	10.5963	1.1211	0.1534	23.5499	0.1405	-8.4515	13.8025
10	0.0100	6.9993	8.0376	10.5126	0.9912	0.1509	22.7646	0.1375	-8.8694	14.0431
11	0.0105	6.1579	7.301	10.4299	0.8695	0.1487	21.7934	0.1345	-9.526	14.4259
12	0.0110	5.3424	6.6101	10.3498	0.7548	0.1464	20.81	0.1316	-10.0893	14.7893
13	0.0115	4.5407	5.958	10.271	0.6453	0.1438	19.8579	0.1288	-10.4086	14.9699
14	0.0120	3.7581	5.3626	10.1941	0.5515	0.1414	18.9629	0.1261	-10.8511	15.2734
15	0.0125	2.9941	4.8307	10.1191	0.4813	0.1389	18.0367	0.1234	-11.1493	15.4732
16	0.0130	2.2501	4.3879	10.046	0.4277	0.1371	17.1565	0.1208	-11.8853	15.9746
17	0.0135	1.5195	4.0286	9.9742	0.395	0.1345	16.2962	0.1184	-12.01	16.0721
18	0.0140	0.8022	3.7863	9.9037	0.37	0.1323	15.4654	0.1159	-12.378	16.3177
19	0.0145	0.0966*	3.6712*	9.8344	0.3693*	0.1301	14.8506	0.1135	-12.7637	16.6099
20	0.0150	-0.5863	3.6941	9.7673	0.3818	0.1285	14.0292	0.1112	-13.4653	17.1134
21	0.0155	-1.2567	3.828	9.7014	0.3967	0.1263	13.2463	0.109	-13.7021	17.2838
22	0.0160	-1.9177	4.0667	9.6365	0.4248	0.1243	12.4426	0.1068	-14.0366	17.5227
23	0.0165	-2.5641	4.3888	9.573	0.4746	0.1226	11.7012	0.1047	-14.5653	17.9218
24	0.0170	-3.1992	4.7663	9.5106	0.5281	0.1206	10.9772	0.1027	-14.8901	18.1454
25	0.0175	-3.8193	5.1846	9.4497	0.5979	0.1188	10.2337	0.1007	-15.2211	18.4113
26	0.0180	-4.4344	5.6353	9.3892	0.6731	0.1168	9.4586	0.0987	-15.4973	18.6222
27	0.0185	-5.0331	6.1058	9.3304	0.7555	0.1154	8.7669	0.0969	-16.0679	19.0995
28	0.0190	-5.6218	6.5867	9.2726	0.8361	0.1138	8.07	0.0951	-16.4826	19.43
29	0.0195	-6.2019	7.0759	9.2156	0.9203	0.1121	7.2526	0.0933	-16.8279	19.6849
30	0.0200	-6.7697	7.5666	9.1598	1.0042	0.1104	6.7753	0.0915	-17.0934	19.887
31	0.0205	-7.3269	8.06	9.105	1.0864	0.109	6.1379	0.0898	-17.6093	20.3058
32	0.0210	-7.8757	8.5527	9.0511	1.1676	0.1075	5.38	0.0882	-17.9478	20.5763
33	0.0215	-8.415	9.043	8.9981	1.2456	0.1059	4.8016	0.0866	-18.2686	20.8334
34	0.0220	-8.9467	9.5328	8.9459	1.3254	0.1047	4.2356	0.085	-18.7631	21.2461
35	0.0225	-9.4695	10.018	8.8945	1.3984	0.1033	3.6692	0.0835	-19.1343	21.5523
36	0.0230	-9.981	10.4955	8.8443	1.4729	0.1018	3.0958	0.082	-19.4004	21.7712
37	0.0235	-10.4884	10.9736	8.7944	1.5479	0.1006	2.5162	0.0806	-19.8914	22.185
38	0.0240	-10.9846	11.4421	8.7457	1.618	0.0992	1.9414	0.0792	-20.0843	22.3366
39	0.0245	-11.4737	11.9086	8.6976	1.6911	0.0982	1.3782	0.0779	-20.6822	22.8572
40	0.0250	-11.9576	12.3698	8.6501	1.7582	0.0969	0.8384	0.0767	-20.8877	23.0249
41	0.0255	-12.4291	12.8214	8.6037	1.8309	0.0957	0.2925	0.0755	-21.1647	23.2616
42	0.0260	-12.9004	13.2739	8.5574	1.9009	0.0945	-0.2566*	0.0742	-21.411	23.476
43	0.0265	-13.3613	13.7177	8.5122	1.9709	0.0933	-0.9171	0.0731	-21.6448	23.6697
44	0.0270	-13.8144	14.156	8.4676	2.0381	0.0923	-1.3259	0.072	-22.0644	24.0358
45	0.0275	-14.2661	14.5934	8.4233	2.099	0.0913	-1.8275	0.0708	-22.3683	24.3059
46	0.0280	-14.71	15.024	8.3796	2.1658	0.0902	-2.4618	0.0698	-22.6406	24.545
47	0.0285	-15.1447	15.4464	8.3369	2.2258	0.0892	-2.8593	0.0688	-22.8969	24.7707
48	0.0290	-15.5805	15.8702	8.2941	2.2939	0.088	-3.3517	0.0678	-23.0247	24.8807
49	0.0295	-16.0053	16.2845	8.2524*	2.3579	0.0871*	-3.8404	0.0668*	-23.3301	25.1474

% denotes numbers in percent; * denotes the column-specific minimum/minima

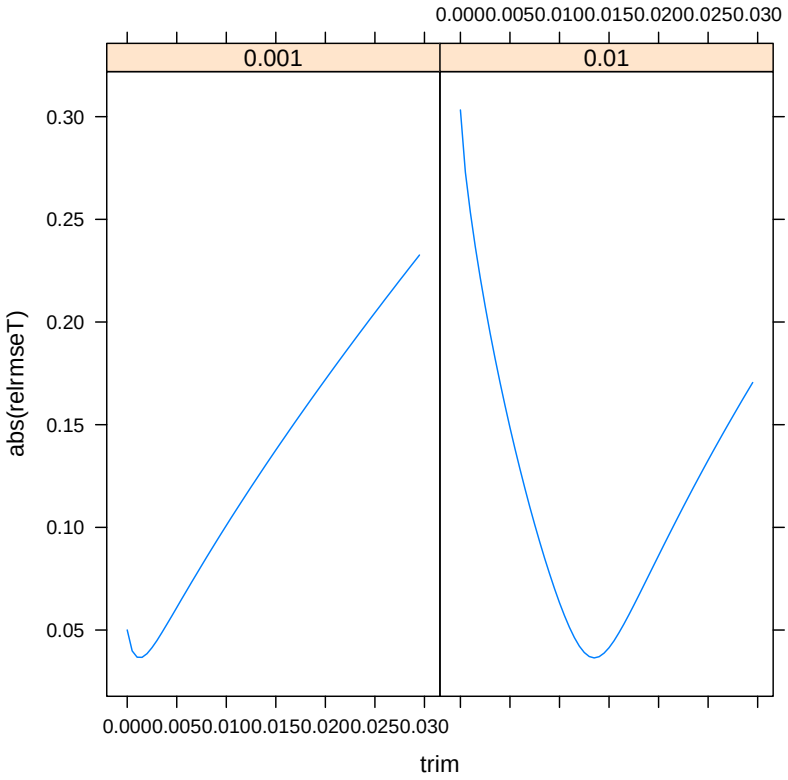
E.8.5. Plots

In this section, we report graphical displays of certain numerical criteria for the estimators. The lattice-type plots are partitioned into panels for different values of OTypeEpsilon.

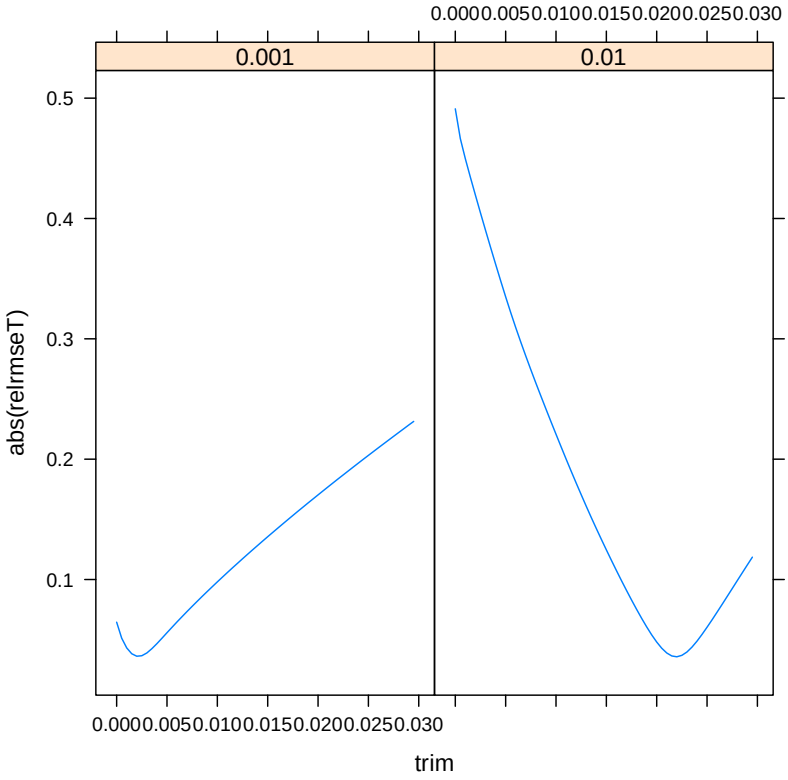
OCAR – CCAR



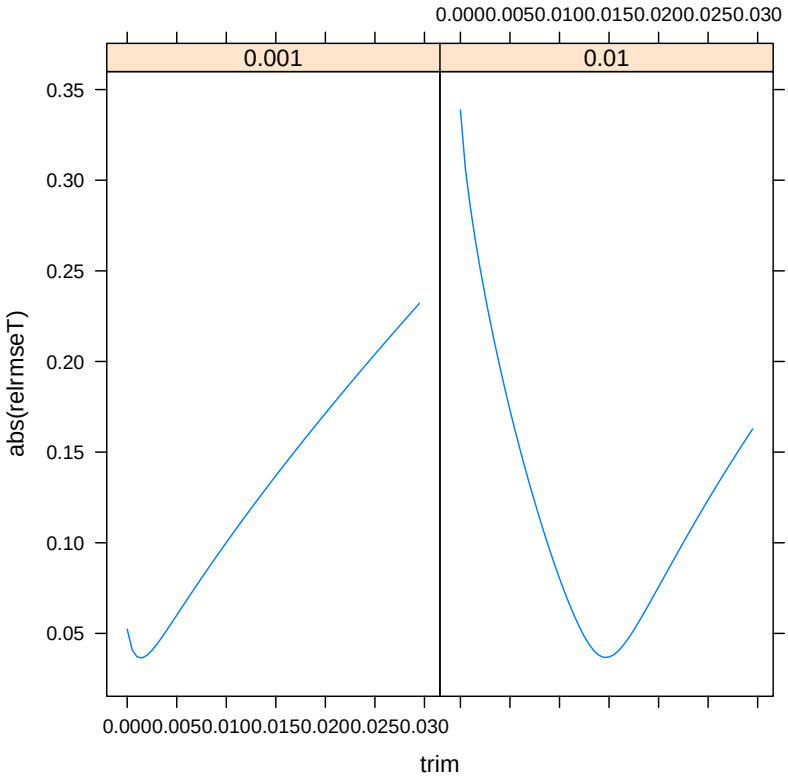
OCAR – NCAR



OAR – CCAR



OAR – NCAR



E.9. Preliminaries for AAT-SILC universe

E.9.1. Comments, Notation and Specifications

`Notation: (1) stars (i.e., *) in the tables denote the minimum/minima; (2) "Inf" denotes infinity`

E.9.2. Nomenclatura

Sampling Design

`hhsrs1kx6k` refers to ref 1.2; simple random cluster sample of households

`sthhsrs1kx6k` refers to ref 1.4a; stratified simple random cluster sample of households with proportional allocation

`sthhpps1kx6k` refers to ref 1.5a; stratified pps cluster sample of households, Stampford sampling

`2sthhsrs1kx6k` refers to ref 2.6; 2-stage stratified simple random cluster sample; PSU=municipalities, SSU=households

`2sthhpps1kx6k` refers to ref 2.7 2-stage stratified pps cluster sample; PSU=municipalities, SSU=households

Outlyingness and Contamination

`OCAR` outlying completely at random

`OAR` outyling at random (conditional on realizations of the variable rb170)

`CCAR` contamination completely at random (outliers drawn from the Normal with mean=5e05 and sd=2e04)

`CCAR` not contaminated at random (shift outliers by a factor of 12)

Criteria

`avgT:` average of the point estimate

`varT:` variance of the point estimate

`biasT:` bias of the point estimate

`relbiasT:` relative bias of the point estimate

`medT:` median of the point estimate

`mad:` median absolute deviation about the median point-estimate (with consistency correction for the normal)

`mede:` median error of the point estimate (with consistency correction for the normal)

`rmseT:` root mean square errof of the point estimate

`relrmseT:` relative root mean square error of the point estimate

`medaeT:` maximum absolute error of the point estimate (with consistency correction for the normal)

`relmaxeT:` maximum absoulte relative error of the point estimate

Note that all criteria also pertain to the variance estimates. In this respect, one has to subsitute a ”V” for the ”T” in the name of the respective criterion.

E.10. N0001-a): RHT @ A-ATSILC: hhsrs1kx6k

Sample Design Ref 1.2

E.10.1. Simulation Setup

Target Indicator:	mean (default)
Domains:	[none] (default)
Population:	A-AT-SILC
Sample:	hhsrs1kx6k
MonteCarlo Replicates:	1,000 (default)
Criteria Set:	Univariate criteria (default)
Method:	rht
Outlyingness:	29,116
Contamination:	29,116
Missingness:	[none] (default)
Simulation Environment:	DBsim
Host:	FHNW
Author:	Beat Hulliger and Tobias Schoch
ID:	AggRHT_hhsrs1kx6k
Date:	September 5, 2011

E.10.2. Estimator Specifications

`Specifications: (1) Robust Horvitz-Thompson estimator with Huber's psi-function; (2) Variance estimates from linearization variance estimation ignoring the contribution of the unknown scale-estimator to the influence function (underestimation of the variance); (3) algorithm: IRWLS, restricted to a maximum of 50 iterations`

`Comments:` Note that for this sample design (i.e, stratified simple random sample with proportional allocation) the estimators RWM and RHT are identical. Thus, we confine ourselves to study only RHT.

E.10.3. Robustness Parameters

This section gives some summary statistics of the robustness tuning parameters and the relative number of outliers (OType-Epsilon).

OCAR – CCAR

```
Range of  k
     Min.   1st Qu.    Median      Mean   3rd Qu.      Max.
    1.000     6.571    16.470   364.100    34.530 10000.000
Range of OTypeEpsilon

0.001  0.01
   29    29
```

OCAR – NCAR

```
Range of  k
     Min.   1st Qu.    Median      Mean   3rd Qu.      Max.
    1.000     6.571    16.470   364.100    34.530 10000.000
Range of OTypeEpsilon

0.001  0.01
   29    29
```

OAR – CCAR

```
Range of  k
     Min.   1st Qu.    Median      Mean   3rd Qu.      Max.
    1.000     6.571    16.470   364.100    34.530 10000.000
Range of OTypeEpsilon

0.001  0.01
   29    29
```

OAR – NCAR

```
Range of  k
     Min.   1st Qu.    Median      Mean   3rd Qu.      Max.
    1.000     6.571    16.470   364.100    34.530 10000.000
Range of OTypeEpsilon

0.001  0.01
   29    29
```

No Contamination

```
Range of  k
     Min.   1st Qu.    Median      Mean   3rd Qu.      Max.
    1.000     6.571    16.470   364.100    34.530 10000.000
Range of OTypeEpsilon

 0
29
```

E.10.4. Results

In this section, we summarize the performance of the estimators due to numerical criteria. The section is split into the different subsections for the respective combination of the outlyingness and contamination mechanisms. In addition, each subsection is further partitioned for the different values of OTypeEpsilon.

OCAR – CCAR

OTypeEpsilon=0.001

```
      k relbiasT% relrmseT%      avgT  medaeT      varT relmaxeT%      avgV relbiasV% relrmseV%
1   3.1    -1.31      1.49  19823.87* 395.92  19768.72*     1.52* 18798.04*    -4.91     6.16
2   3.6    -0.81      1.08  19925.4   247.96  20314.13      2.08  19956.22     -1.76*    4.36*
3   4.3    -0.21*     0.75* 20045.05  149.54* 21032.15      2.7   21583.73     2.62      5.1
4   5.4    0.43       0.85  20173.84  177.97  21923.13      3.4   23785.16     8.49      9.8
5   6.2    0.72       1.03  20231.82  221.79  22253.49      3.72  24995.36     12.32     13.36
6   6.6    0.85       1.13  20259.59  260.72  22423.97      3.87  25644.39     14.36     15.32
7   7.7    1.17       1.39  20323.39  350.77  22806.65      4.19  27374.99     20.03     20.86
8   8.7    1.41       1.6   20370.19  419.56  23056.04      4.43  28929.75     25.48     26.25
9   8.9    1.43       1.62  20375.26  427.02  23083.33      4.46  29115.96     26.13     26.9
10 10.0    1.65       1.82  20420.06  495.8   23308.77      4.69  30934.72     32.72     33.46
11 11.3    1.88       2.03  20466.07  565.02  23511.48      4.95  33150.75     41        41.71
12 13.9    2.29       2.41  20547.3   685.07  23821.62      5.36  37938.1      59.26     59.9
13  Inf    3.82       3.89  20854.44  1142    22646.76      6.71  63390.79     179.91    180.22
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
Inf is defined as  k = 10000
```

OTypeEpsilon=0.01

```
    k relbiasT% relrmseT%      avgT  medaeT      varT relmaxeT%      avgV relbiasV% relrmseV%
1 1.0    -5.1       5.14  19063.57* 1521.43 16739.37*     -3.13 10637.79*   -36.45    36.52
2 2.0    -0.61*     0.94* 19965.74  206.19* 20428.93      2.49* 18548.09    -9.21*    9.77*
3 3.1    3.23       3.33  20737.47  956.42  24350.52      6.67  26927.28    10.58     11.51
4 3.6    4.35       4.43  20962.61  1295.6  25833.83      7.91  30434.05    17.81     18.5
5 4.3    5.99       6.05  21291.96  1786.49 28070.3       9.74  36695.12    30.73     31.28
6 5.4    8.43       8.48  21781.19  2511.53 31507.45      12.5  48800.05    54.88     55.38
7 Inf    34.95      34.96 27109.41  10411.5 27243.91      37.78 375852.26   1279.58   1279.83
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
Inf is defined as  k = 10000
```

OCAR – NCAR

OTypeEpsilon=0.001

```
      k relbiasT% relrmseT%     avgT  medaeT      varT relmaxeT%      avgV relbiasV% relrmseV%
1   3.1    -1.33      1.51  19820.1* 400.13  19759.47*     1.49* 18719.19*     -5.26     6.43
2   3.6    -0.83      1.1   19920.28 253.64  20309.13      2.03  19845.52      -2.28     4.57*
3   4.3    -0.25*     0.76* 20037.05 150.44* 21037.7       2.63  21398.71      1.72*     4.66
4   5.4    0.35       0.82  20158.89 169.95  21911.56      3.25  23390.11      6.75      8.28
5   6.2    0.61       0.96  20210.81 202.38  22219.1       3.49  24391.43      9.78      10.99
6   6.6    0.73       1.04  20234.58 226.98  22364.88      3.59  24891.64      11.3      12.42
7   7.7    0.98       1.23  20285.02 294.76  22682.91      3.79  26076.17      14.96     15.93
8   8.7    1.14       1.37  20316.92 344.39  22849.52      3.89  26948.68      17.94     18.85
9   8.9    1.16       1.38  20320.08 349.2   22865.38      3.9   27041.98      18.27     19.17
10 10.0    1.28       1.49  20345.02 386.72  23009.92      3.97  27838.24      20.98     21.87
11 11.3    1.38       1.57  20365.23 415.8   23154.15      4.03  28592.76      23.49     24.4
12 13.9    1.5        1.68  20389.41 451.25  23342.95      4.09  29706.63      27.26     28.27
13  Inf    1.75       1.92  20439.52 525.79  25080.11      4.66  33510.37      33.61     37.37
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
Inf is defined as  k = 50
```

OTypeEpsilon=0.01

```
    k relbiasT% relrmseT%      avgT  medaeT      varT relmaxeT%      avgV relbiasV% relrmseV%
1 1.0    -5.14      5.18  19055.05* 1534.54 16749.43*     -3.22 10530.73*    -37.13    37.19
2 2.0    -0.71*     1.01* 19945.18  229.21* 20478.51      2.35* 18164.23     -11.3     11.75
3 3.1    2.97       3.07  20684.42  881.85  24352.73      6.38  25733.56     5.67*     7.14*
4 3.6    3.99       4.07  20889.05  1188.14 25644.53      7.49  28670.78     11.8      12.72
5 4.3    5.4        5.46  21172.73  1613.82 27498.5       9.03  33531.44     21.94     22.6
6 5.4    7.26       7.31  21546.67  2173.46 29813.1       10.9  41516.5      39.26     39.8
7 Inf    15.18      15.22 23138     4520.36 47626.47      19.13 112500.65    136.21    138.53
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
Inf is defined as  k = 50
```

OAR – CCAR

OTypeEpsilon=0.001

```
      k relbiasT% relrmseT%      avgT  medaeT      varT relmaxeT%      avgV relbiasV% relrmseV%
1   3.1    -1.36      1.53  19815.41* 406.88  19897.79*     1.43* 18746.39*    -5.79     6.86
2   3.6    -0.85      1.11  19916.57  258.76  20456.53      1.98  19889.94     -2.77     4.82
3   4.3    -0.26*     0.77* 20035.55  153.01* 21161.35      2.62  21488.91     1.55*     4.59*
4   5.4    0.37       0.83  20163.21  169.38  22032.01      3.32  23632.66     7.27      8.71
5   6.2    0.66       0.99  20220.46  215.77  22369.39      3.64  24798.55     10.86     11.97
6   6.6    0.8        1.09  20247.8   245.54  22540.81      3.8   25419.83     12.77     13.78
7   7.7    1.11       1.34  20310.37  335.6   22917.87      4.13  27062.33     18.08     18.93
8   8.7    1.33       1.53  20356.02  401.39  23158.19      4.37  28523.94     23.17     23.93
9   8.9    1.36       1.56  20360.95  406.99  23183.7       4.39  28698.46     23.79     24.54
10 10.0    1.58       1.75  20404.56  472.94  23422.82      4.63  30403.3      29.8      30.52
11 11.3    1.8        1.96  20449.41  540.38  23632.72      4.86  32500.35     37.52     38.22
12 13.9    2.2        2.33  20529     661.67  23935.66      5.25  37083        54.93     55.59
13  Inf    3.71       3.79  20833.72  1106.65 22329.5       6.59  61534.27     175.57    175.86
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
Inf is defined as  k = 10000
```

OTypeEpsilon=0.01

```
    k relbiasT% relrmseT%      avgT   medaeT      varT relmaxeT%      avgV relbiasV% relrmseV%
1 1.0     -5.42     5.46  18999.38* 1610.52  16813.18*     -3.66 10538.59*   -37.32    37.38
2 2.0     -1*       1.23* 19887.24  303.73*  20656.1       1.91* 18247.27    -11.66    12.1
3 3.1     2.74      2.85  20637.95  813.85   24794.92      5.88  26167.59    5.54*     7.1*
4 3.6     3.81      3.9   20854.06  1135.45  26305.92      7.04  29421.7     11.84     12.83
5 4.3     5.38      5.44  21167.71  1602.15  28519.17      8.77  35169.4     23.32     24.02
6 5.4     7.67      7.72  21629.01  2285.74  32222.85      11.26 46133.09    43.17     43.78
7 Inf     33.54     33.55 26825.95  10000.64 27530.62      35.91 351788.95   1177.81   1178.06
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
Inf is defined as  k = 10000
```

OAR – NCAR

OTypeEpsilon=0.001

```
      k relbiasT% relrmseT%      avgT  medaeT      varT relmaxeT%      avgV relbiasV% relrmseV%
1   3.1    -1.36      1.53  19813.86* 410.01  19854.75*     1.43* 18698.08*    -5.83     6.89
2   3.6    -0.86      1.12  19914.36  262.99  20413.75      1.98  19823.31     -2.89     4.89
3   4.3    -0.28*     0.78* 20031.67  156.26* 21112.7       2.62  21376.42     1.25*     4.49*
4   5.4    0.33       0.81  20154.96  163.38  21955.46      3.32  23385.19     6.51      8.08
5   6.2    0.6        0.95  20208.13  199.56  22259.66      3.6   24410.82     9.66      10.89
6   6.6    0.72       1.04  20232.61  225.03  22433.07      3.74  24927.33     11.12     12.25
7   7.7    0.98       1.24  20285.3   296.52  22810.29      4.01  26171.55     14.74     15.72
8   8.7    1.15       1.38  20319.34  344.5   23046.64      4.18  27110.41     17.63     18.56
9   8.9    1.17       1.39  20322.7   349.44  23072.26      4.2   27210.37     17.94     18.86
10 10.0    1.3        1.51  20349.53  392.14  23265.27      4.36  28069.42     20.65     21.56
11 11.3    1.41       1.6   20371.61  425.56  23370.26      4.47  28890.89     23.62     24.54
12 13.9    1.55       1.73  20399.12  472.12  23459.72      4.59  30140.31     28.48     29.47
13  Inf    1.83       1.99  20455.32  553.66  24449.49      4.8   34185.96     39.82     43.25
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
Inf is defined as  k = 10000
```

OTypeEpsilon=0.01

	k	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	1.0	-5.44	5.48	18995.27*	1616.36	16858.47*	-3.73	10463.33*	-37.93	37.99
2	2.0	-1.05*	1.27*	19876.66	314.56*	20530.93	1.77*	17980.11	-12.42	12.82
3	3.1	2.59	2.7	20607.77	770.88	24312.65	5.47	25347.02	4.25*	6.04*
4	3.6	3.6	3.68	20810.16	1069.64	25487.75	6.51	28195.8	10.62	11.61
5	4.3	5	5.06	21091.85	1484.43	27043.83	7.91	32910.92	21.69	22.34
6	5.4	6.86	6.92	21466.83	2043.5	28841.69	9.77	40685.84	41.07	41.54
7	Inf	15.67	15.71	23236.46	4671.12	44151.62	19.57	118995.14	169.51	172.13

% denotes numbers in percent; * denotes the column-specific minimum/minima
Inf is defined as k = 10000

No Contamination

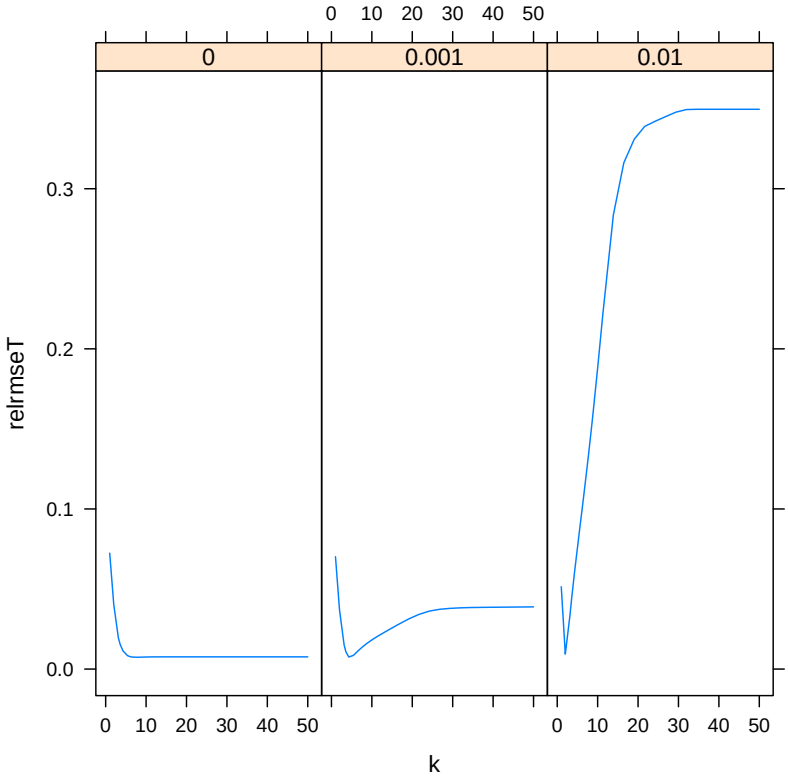
	k	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	3.1	-1.82	1.95	19722.39*	545.09	19486.73*	0.87*	17960.93*	-7.83	8.62
2	3.6	-1.38	1.54	19811.68	410.52	20001.44	1.36	18903.68	-5.49	6.7
3	4.3	-0.88	1.13	19910.9	264.7	20657.78	1.89	20120.91	-2.6	4.92
4	5.4	-0.41	0.83	20006.11	169.35	21408.88	2.39	21505.14	0.45*	4.59*
5	6.2	-0.23	0.77	20042.45	155.08	21654.25	2.59	22091.89	2.02	5.13
6	6.6	-0.15	0.75	20057.92	150.7	21763.38	2.68	22351.68	2.7	5.5
7	7.7	0*	0.74*	20087.47	150.01*	21997.18	2.81	22865.56	3.95	6.33
8	8.7	0.08	0.74*	20103.39	157.24	22100.92	2.87	23156.62	4.78	6.96
9	8.9	0.08	0.74*	20104.81	155.96	22109.76	2.88	23183.06	4.85	7.02
10	10.0	0.13	0.75	20114.95	155.47	22169.96	2.91	23375.54	5.44	7.48
11	11.3	0.17	0.76	20121.13	158.25	22175.77	2.93	23495.26	5.95	7.89
12	13.9	0.19	0.76	20125.09	158.23	22136.73	2.94	23577.93	6.51	8.34
13	Inf	0*	0.74*	20126.05	151.5	22078.47	2.75	23601.07	6.9	8.65

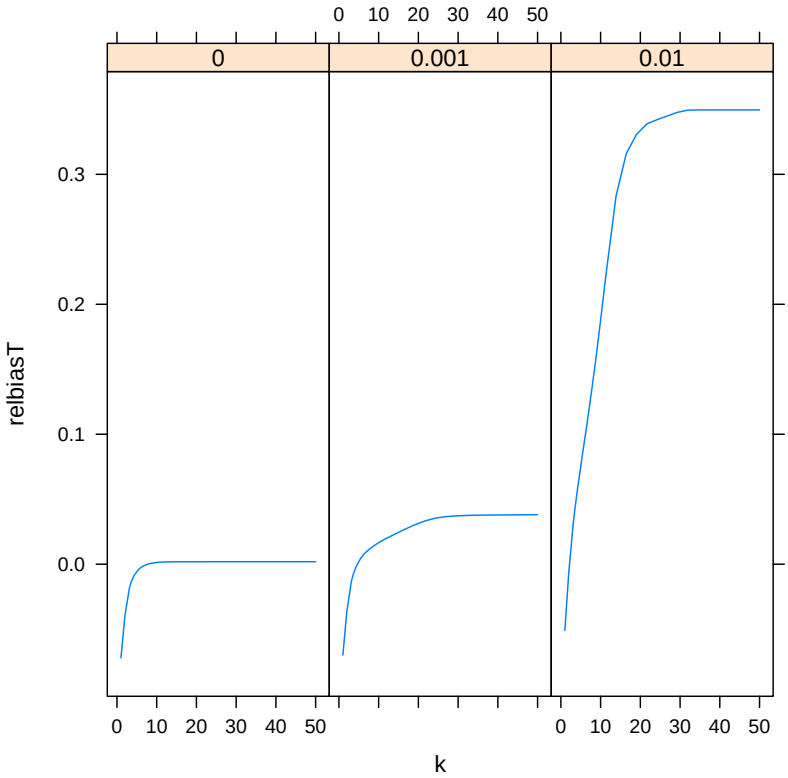
% denotes numbers in percent; * denotes the column-specific minimum/minima
Inf is defined as k = 10000

E.10.5. Plots

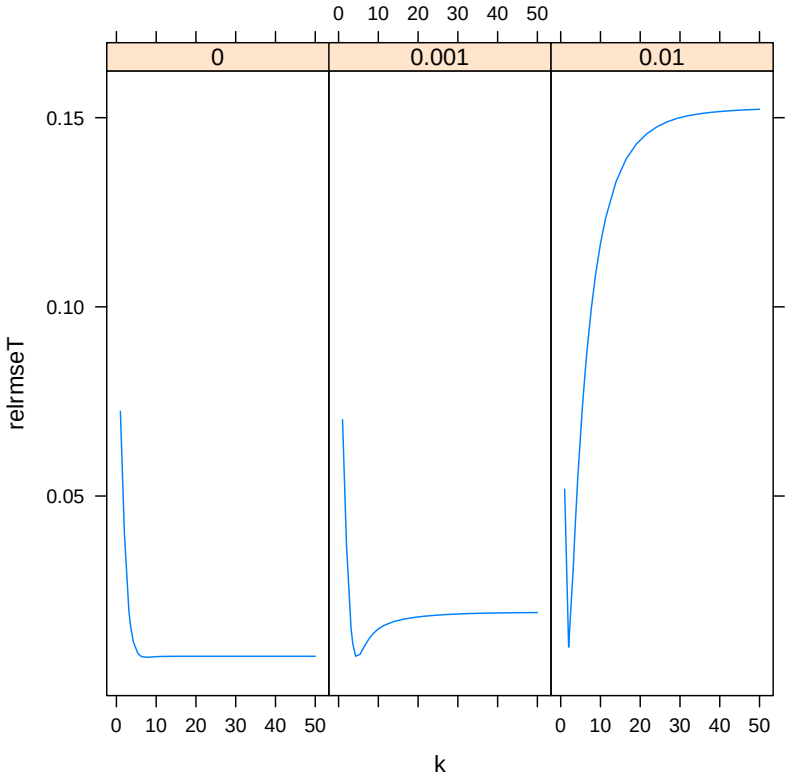
In this section, we report graphical displays of certain numerical criteria for the estimators. The lattice-type plots are partitioned into panels for different values of OTypeEpsilon.

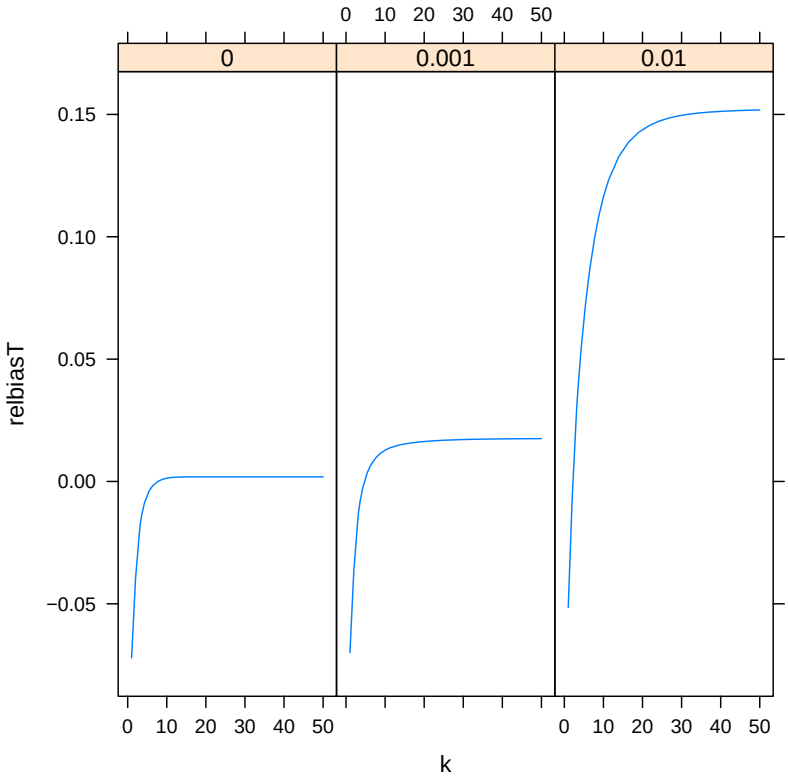
OCAR – CCAR


0
0.001
0.01
relrmseT
0.0
0.1
0.2
0.3
0 10 20 30 40 50
k

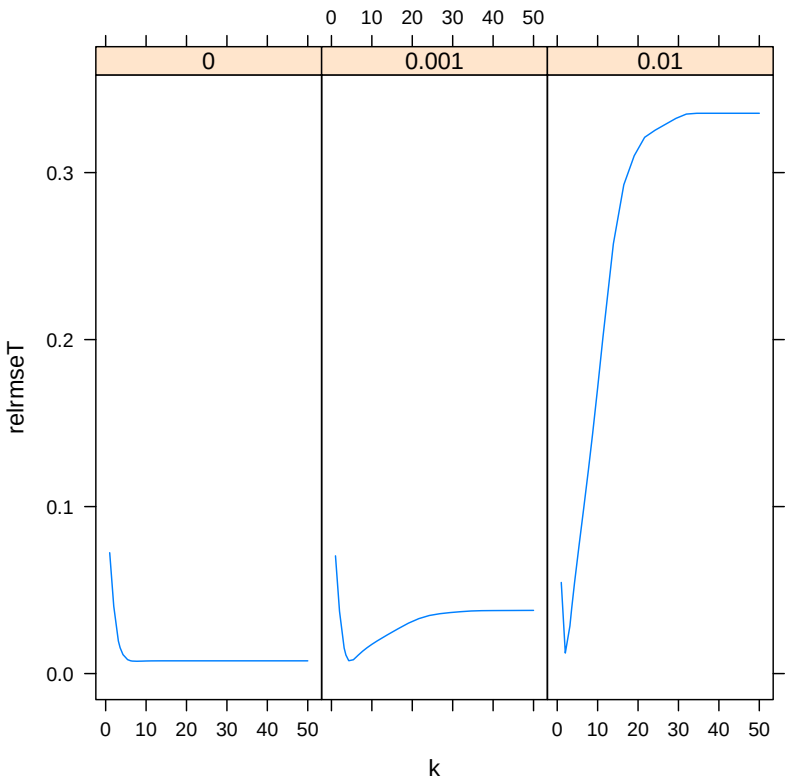

0
0.001
0.01
relbiasT
0.0
0.1
0.2
0.3
0 10 20 30 40 50
k

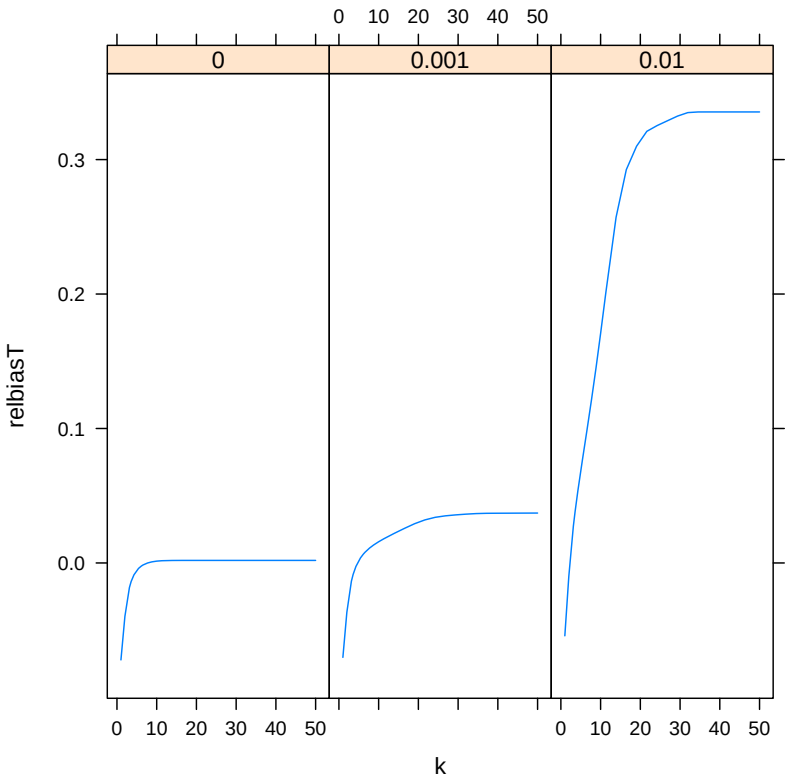
OCAR – NCAR


0
0.001
0.01
relrmseT
0.15
0.10
0.05
0 10 20 30 40 50
k

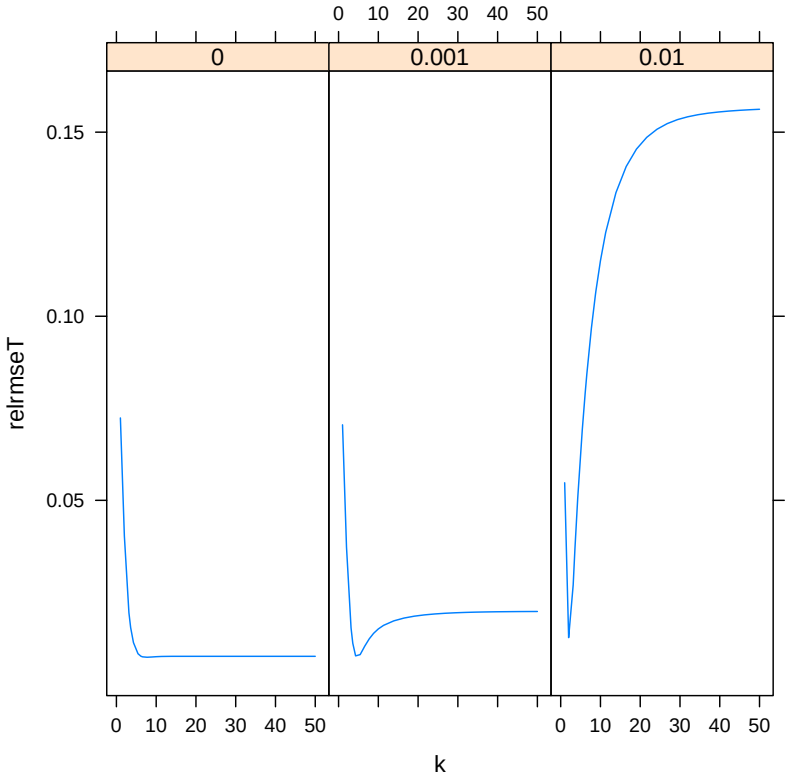

0
0.001
0.01
relbiasT
0.15
0.10
0.05
0.00
−0.05
0 10 20 30 40 50
k

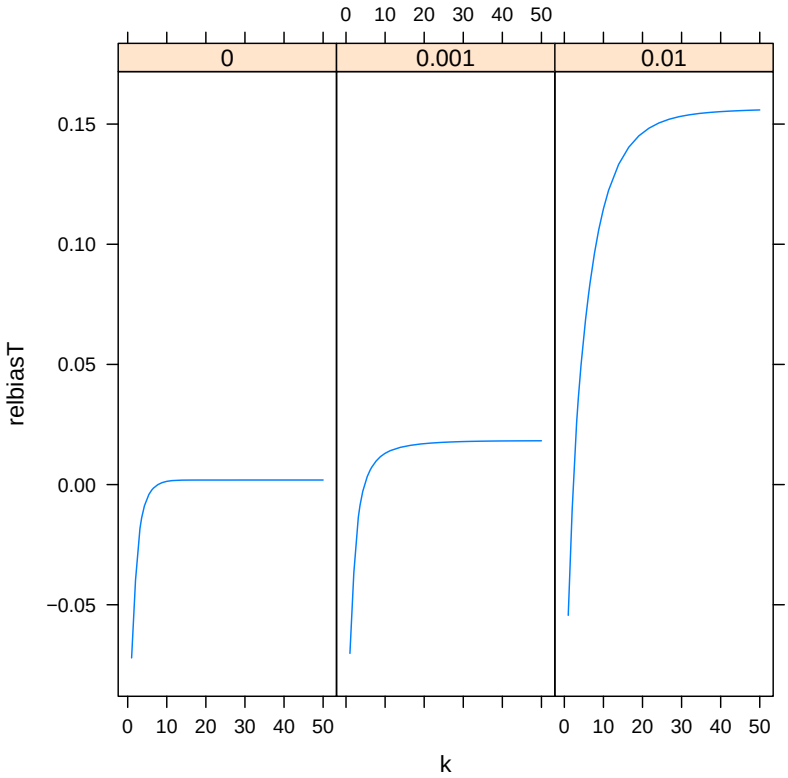
OAR – CCAR


0
0.001
0.01
relrmseT
0.0
0.1
0.2
0.3
0 10 20 30 40 50
k


0
0.001
0.01
relbiasT
0.0
0.1
0.2
0.3
0 10 20 30 40 50
k

OAR – NCAR


0
0.001
0.01
relrmseT
0.15
0.10
0.05
0 10 20 30 40 50
k


0
0.001
0.01
relbiasT
0.15
0.10
0.05
0.00
−0.05
0 10 20 30 40 50
k

E.11. N0001-b): TM @ A-ATSILC: hhsrs1kx6k

Sample Design Ref 1.2

E.11.1. Simulation Setup

Target Indicator:	mean (default)
Domains:	[none] (default)
Population:	A-AT-SILC
Sample:	hhsrs1kx6k
MonteCarlo Replicates:	1,000 (default)
Criteria Set:	Univariate criteria (default)
Method:	tm
Outlyingness:	40,160
Contamination:	40,160
Missingness:	[none] (default)
Simulation Environment:	DBsim
Host:	FHNW
Author:	Beat Hulliger and Tobias Schoch
ID:	AggRHT_hhsrs1kx6k
Date:	September 5, 2011

E.11.2. Estimator Specifications

`Specifications:` one-sided weighted trimmed mean

`Variance:` linearization variance estimates

E.11.3. Robustness Parameters

This section gives some summary statistics of the robustness tuning parameters and the relative number of outliers (OType-Epsilon).

OCAR – CCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  0.900   0.925   0.950   0.950   0.975   1.000
Range of OTypeEpsilon

0.001  0.01
   40    40
```

OCAR – NCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  0.900   0.925   0.950   0.950   0.975   1.000
Range of OTypeEpsilon

0.001  0.01
   40    40
```

OAR – CCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  0.900   0.925   0.950   0.950   0.975   1.000
Range of OTypeEpsilon

0.001  0.01
   40    40
```

OAR – NCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  0.900   0.925   0.950   0.950   0.975   1.000
Range of OTypeEpsilon

0.001  0.01
   40    40
```

No Contamination

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  0.900   0.925   0.950   0.950   0.975   1.000
Range of OTypeEpsilon

 0
40
```

E.11.4. Results

In this section, we summarize the performance of the estimators due to numerical criteria. The section is split into the different subsections for the respective combination of the outlyingness and contamination mechanisms. In addition, each subsection is further partitioned for the different values of OTypeEpsilon.

OCAR – CCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.90	-12.68	12.7	17572.73*	3781.92	14552.83*	-10.91	17932.07*	23.22	23.58
2	0.90	-12.47	12.49	17615.08	3718.27	14624.97	-10.68	18000.92	23.08	23.45
3	0.91	-12.26	12.28	17657.82	3655.35	14693.79	-10.45	18076.53	23.02	23.4
4	0.91	-12.05	12.06	17701.09	3591.73	14767.57	-10.21	18153.17	22.93	23.3
5	0.91	-11.83	11.84	17744.89	3525.62	14850.43	-9.97	18237.51	22.81	23.19
6	0.91	-11.61	11.62	17789.21	3459.66	14905.89	-9.74	18321.91	22.92	23.3
7	0.92	-11.39	11.4	17834.08	3393.36	15006.02	-9.47	18411.74	22.7*	23.09*
8	0.92	-11.16	11.18	17879.34	3326.06	15068.88	-9.22	18506.56	22.81	23.21
9	0.92	-10.93	10.95	17925.23	3259.05	15134.78	-9.01	18603.08	22.92	23.31
10	0.92	-10.7	10.72	17971.74	3189.28	15207.64	-8.76	18704.55	22.99	23.39
11	0.93	-10.47	10.48	18018.91	3121.49	15284.47	-8.49	18812.23	23.08	23.47
12	0.93	-10.23	10.25	18066.77	3049.61	15380.74	-8.23	18920.52	23.01	23.41
13	0.93	-9.99	10.01	18115.25	2978.44	15455.57	-8	19034.15	23.15	23.56
14	0.93	-9.74	9.76	18164.42	2905.49	15537.38	-7.73	19153.69	23.27	23.69
15	0.94	-9.5	9.52	18214.44	2831.38	15630.12	-7.45	19291.76	23.43	23.86
16	0.94	-9.24	9.26	18265.32	2755.51	15730.02	-7.18	19442.62	23.6	24.05
17	0.94	-8.98	9.01	18317.19	2678.14	15847.02	-6.91	19609.9	23.75	24.2
18	0.94	-8.72	8.74	18370.11	2600.74	15965.81	-6.63	19782.82	23.91	24.38
19	0.95	-8.45	8.48	18424.08	2519.78	16107.62	-6.35	19964.84	23.95	24.43
20	0.95	-8.18	8.2	18479.39	2438.46	16246.08	-6.02	20152.94	24.05	24.53
21	0.95	-7.9	7.92	18536.02	2355.29	16355.07	-5.76	20353.01	24.44	24.94
22	0.95	-7.61	7.64	18594	2270.95	16532.35	-5.45	20548.46	24.29	24.79
23	0.96	-7.31	7.34	18653.58	2178.52	16656.94	-5.14	20749.77	24.57	25.08
24	0.96	-7.01	7.04	18714.74	2091.12	16843.6	-4.82	20974.71	24.53	25.04
25	0.96	-6.7	6.73	18777.63	1996.88	17062.77	-4.47	21229.58	24.42	24.95
26	0.96	-6.38	6.41	18842.37	1900.8	17210.77	-4.09	21518.88	25.03	25.57
27	0.97	-6.04	6.08	18909.56	1801.6	17447.19	-3.76	21865.23	25.32	25.89
28	0.97	-5.7	5.73	18978.89	1697.38	17723.92	-3.37	22265.72	25.63	26.21
29	0.97	-5.34	5.38	19051.23	1590.7	17931.94	-2.99	22724.08	26.72	27.31
30	0.97	-4.96	5.01	19126.64	1478.97	18209.24	-2.57	23248.95	27.68	28.28
31	0.98	-4.57	4.62	19205.64	1363.88	18468.63	-2.15	23849.48	29.14	29.75
32	0.98	-4.16	4.21	19288.93	1234.9	18769.45	-1.67	24547.25	30.78	31.43
33	0.98	-3.72	3.78	19377.31	1108.78	19155.41	-1.19	25394.49	32.57	33.26
34	0.98	-3.25	3.32	19472.06	964.4	19597.78	-0.68	26449.98	34.96	35.7
35	0.99	-2.73	2.82	19575.19	813.78	20052.7	-0.11*	27799.04	38.63	39.41
36	0.99	-2.16	2.28	19689.81	645.62	20536.17	0.53	29516.04	43.73	44.53
37	0.99	-1.52	1.68	19820.15	451.07	21118.09	1.26	32058.3	51.8	52.71
38	0.99	-0.73*	1.03*	19978.51	225.69*	21834.87	2.06	36852.29	68.78	69.94
39	1.00	0.74	1.05	20274.83	239.72	22701.32	3.53	74646.3	228.82	230.09
40	1.00	3.62	3.7	20854.44	1086.49	22646.76	6.52	99372.61	338.79	339.69

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.90	-10.46	10.48	18020.02*	3117.55	15780.35*	-8.44	21668.11*	37.31*	37.64*
2	0.90	-10.22	10.24	18069.14	3044.37	15860.09	-8.16	21853.55	37.79	38.12
3	0.91	-9.97	9.99	18119.01	2971.63	15924.88	-7.87	22055.66	38.5	38.84
4	0.91	-9.72	9.74	18169.55	2895.85	16043.68	-7.63	22270.92	38.81	39.17
5	0.91	-9.46	9.48	18221.1	2819.57	16130.81	-7.36	22523.11	39.63	40

6	0.91	-9.2	9.22	18273.43	2743	16249.89	-7.08	22806.59	40.35	40.74
7	0.92	-8.94	8.96	18326.88	2664.55	16400.84	-6.8	23122.09	40.98	41.38
8	0.92	-8.67	8.69	18381.44	2583.11	16525.36	-6.48	23465.5	42	42.4
9	0.92	-8.39	8.41	18437.13	2500.53	16657.8	-6.2	23838.9	43.11	43.54
10	0.92	-8.1	8.13	18494.24	2416.58	16795.97	-5.91	24249.97	44.38	44.81
11	0.93	-7.81	7.84	18552.68	2330.35	16977.87	-5.59	24696.74	45.46	45.91
12	0.93	-7.52	7.54	18612.55	2241.3	17135.59	-5.27	25163.11	46.85	47.3
13	0.93	-7.21	7.24	18674.24	2150	17331.12	-4.95	25668.56	48.11	48.57
14	0.93	-6.9	6.93	18737.58	2057.61	17521.23	-4.59	26226.83	49.69	50.16
15	0.94	-6.57	6.6	18802.87	1960.86	17711.28	-4.26	26824.87	51.46	51.94
16	0.94	-6.24	6.27	18870.18	1861.21	17966.02	-3.86	27499.81	53.07	53.56
17	0.94	-5.89	5.93	18939.94	1755.47	18180.74	-3.51	28266.7	55.48	56
18	0.94	-5.53	5.57	19012.57	1650.71	18531.01	-3.12	29141.77	57.26	57.8
19	0.95	-5.15	5.2	19088.01	1536.18	18725.96	-2.71	30125.89	60.88	61.44
20	0.95	-4.76	4.81	19167.28	1418.95	19121.76	-2.27	31231.22	63.33	63.91
21	0.95	-4.35	4.4	19250.47	1297.07	19453.77	-1.79	32500.7	67.07	67.71
22	0.95	-3.91	3.97	19338.7	1169.02	19898.81	-1.34	34041.75	71.07	71.78
23	0.96	-3.44	3.51	19432.84	1028.88	20360.63	-0.85	36061.83	77.12	77.94
24	0.96	-2.93	3.02	19534.95	873.66	20910.05	-0.26*	38834.88	85.72	86.69
25	0.96	-2.37	2.48	19647.44	712.74	21655.14	0.34	42881.27	98.02	99.23
26	0.96	-1.74	1.9	19774.34	525.6	22409	1.03	49508.5	120.93	122.81
27	0.97	-1	1.26	19924.99	302.53	23714.47	1.85	64251.49	170.94	176.19
28	0.97	0.11*	0.84*	20147.44	166.24*	28189.87	2.87	123886.52	339.47	355.74
29	0.97	1.77	1.98	20482.53	526.43	30631.4	4.64	212503.45	593.74	598.91
30	0.97	3.78	3.88	20886.67	1129.83	31471.9	6.5	269569.75	756.54	759.72
31	0.98	6.01	6.07	21334.28	1792.11	31571.74	8.87	307003.16	872.4	874.14
32	0.98	8.38	8.43	21812.07	2504.27	31557.92	11.09	331360.99	950.01	951.84
33	0.98	10.88	10.92	22315.92	3248.08	31794.68	13.71	363787.84	1044.18	1046.09
34	0.98	13.55	13.58	22852.76	4046.51	32322.38	16.41	392899.36	1115.56	1117.06
35	0.99	16.34	16.37	23414.21	4873.18	32052.1	19.11	409086.35	1176.32	1177.54
36	0.99	19.21	19.23	23990.83	5731.74	31718.63	22	424273.54	1237.62	1238.88
37	0.99	22.26	22.27	24604.65	6642.33	31389.76	25.08	452072.44	1340.19	1341.64
38	0.99	25.62	25.64	25282.27	7643.47	30540.63	28.51	505043.26	1553.68	1555.25
39	1.00	29.52	29.53	26066.23	8807.42	29754.96	32.41	526256.77	1668.64	1670.01
40	1.00	34.7	34.71	27109.41	10355.99	27243.91	37.53	603438.72	2114.95	2116.61

% denotes numbers in percent; * denotes the column-specific minimum/minima

OCAR – NCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.90	-12.69	12.7	17571.74*	3782.54	14553.66*	-10.91	17920.91*	23.14	23.5
2	0.90	-12.48	12.49	17614.05	3720.54	14637.64	-10.69	17989.14	22.9	23.27
3	0.91	-12.27	12.28	17656.85	3656.55	14696.6	-10.45	18065.22	22.92	23.3
4	0.91	-12.05	12.07	17700	3593.44	14778.53	-10.23	18139.76	22.74	23.12
5	0.91	-11.83	11.85	17743.75	3527.26	14850.11	-9.99	18223.95	22.72	23.1
6	0.91	-11.61	11.63	17788.08	3462.27	14911.22	-9.75	18308.16	22.78	23.17
7	0.92	-11.39	11.41	17832.9	3395.3	15003.46	-9.51	18396.55	22.62*	23.01*
8	0.92	-11.17	11.18	17878.17	3327.89	15048.97	-9.27	18491.41	22.87	23.27
9	0.92	-10.94	10.96	17924.02	3260.16	15137.37	-9.01	18586.44	22.79	23.18
10	0.92	-10.71	10.72	17970.55	3191.21	15218.17	-8.77	18688.36	22.8	23.2
11	0.93	-10.47	10.49	18017.67	3122.64	15288.02	-8.52	18794.74	22.94	23.33
12	0.93	-10.24	10.25	18065.37	3052.22	15369.18	-8.27	18901.96	22.99	23.38
13	0.93	-9.99	10.01	18113.86	2980.8	15450.57	-8	19014.95	23.07	23.48
14	0.93	-9.75	9.77	18162.99	2907.03	15543.95	-7.75	19131.93	23.08	23.5
15	0.94	-9.5	9.52	18212.94	2832.2	15625.28	-7.49	19267.64	23.31	23.74
16	0.94	-9.25	9.27	18263.7	2756.9	15711.35	-7.21	19417.17	23.59	24.03
17	0.94	-8.99	9.01	18315.64	2680.69	15857.21	-6.94	19582.3	23.49	23.95
18	0.94	-8.73	8.75	18368.48	2603.75	15972.75	-6.65	19753.52	23.67	24.14
19	0.95	-8.46	8.49	18422.33	2524.96	16117.37	-6.37	19932.66	23.67	24.16
20	0.95	-8.19	8.21	18477.47	2443.12	16226.81	-6.07	20118.28	23.98	24.47
21	0.95	-7.91	7.93	18534.12	2358.17	16375.23	-5.78	20313.76	24.05	24.55
22	0.95	-7.62	7.65	18591.89	2273.47	16536.01	-5.46	20506.54	24.01	24.52
23	0.96	-7.32	7.35	18651.31	2182.85	16685.91	-5.16	20704.47	24.08	24.6
24	0.96	-7.02	7.05	18712.35	2094.8	16860.33	-4.84	20925.78	24.11	24.63
25	0.96	-6.71	6.74	18775.12	2001.5	17047.04	-4.5	21175.69	24.22	24.75
26	0.96	-6.39	6.42	18839.66	1905.23	17212.75	-4.15	21456.83	24.66	25.2
27	0.97	-6.06	6.09	18906.62	1807.16	17442.58	-3.8	21791.42	24.93	25.5
28	0.97	-5.71	5.75	18975.64	1705.13	17707.96	-3.41	22178.56	25.25	25.83
29	0.97	-5.36	5.4	19047.51	1598.23	17944.22	-3.02	22616.4	26.04	26.63

30	0.97	-4.98	5.03	19122.47	1486.19	18221.19	-2.59	23123.88	26.91	27.51
31	0.98	-4.59	4.64	19200.96	1370.38	18491.96	-2.19	23700.95	28.17	28.79
32	0.98	-4.18	4.24	19283.69	1246.55	18745.25	-1.72	24351.1	29.91	30.55
33	0.98	-3.75	3.81	19370.81	1117.5	19139.68	-1.23	25130.23	31.3	31.98
34	0.98	-3.28	3.36	19464.36	977.27	19538.66	-0.75	26090.51	33.53	34.26
35	0.99	-2.78	2.87	19565.59	830.66	20027.39	-0.2*	27280.78	36.22	36.99
36	0.99	-2.23	2.34	19676.63	665.33	20548.12	0.43	28699.13	39.67	40.46
37	0.99	-1.61	1.77	19800.75	482.61	21084.26	1.02	30542.7	44.86	45.68
38	0.99	-0.9	1.16	19944.85	271.07	21651.03	1.79	33065.48	52.72	53.62
39	1.00	0*	0.74*	20125.56	155.44*	22283.72	2.64	37021.63	66.14	67.09
40	1.00	1.57	1.76	20440.95	472.32	25297.32	4.63	50134.35	98.18	103.86

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.90	-10.53	10.55	18006.17*	3139.76	15842.78*	-8.52	21457.52*	35.44*	35.78*
2	0.90	-10.29	10.31	18054.8	3067.48	15918.16	-8.27	21632.39	35.9	36.24
3	0.91	-10.04	10.06	18104.21	2995.52	16017.17	-8.01	21813.33	36.19	36.53
4	0.91	-9.79	9.81	18154.24	2922.25	16095.92	-7.73	22014.41	36.77	37.12
5	0.91	-9.54	9.56	18205.18	2846.88	16201.26	-7.47	22234.66	37.24	37.61
6	0.91	-9.28	9.31	18256.94	2769.49	16296.25	-7.2	22491.34	38.02	38.4
7	0.92	-9.02	9.04	18309.7	2691.49	16429.19	-6.92	22768.97	38.59	38.99
8	0.92	-8.75	8.78	18363.49	2612.41	16569.43	-6.61	23082.29	39.31	39.72
9	0.92	-8.48	8.51	18418.22	2528.5	16722.43	-6.32	23416.23	40.03	40.46
10	0.92	-8.2	8.23	18474.47	2443.54	16871.91	-6.03	23777.98	40.93	41.37
11	0.93	-7.92	7.94	18531.73	2361.2	16990.53	-5.73	24170.75	42.26	42.71
12	0.93	-7.63	7.65	18590.52	2272.84	17158.24	-5.4	24581.75	43.27	43.73
13	0.93	-7.33	7.36	18650.79	2184.86	17350.98	-5.09	25020.32	44.2	44.67
14	0.93	-7.02	7.05	18712.68	2093.6	17577.24	-4.76	25486.79	45	45.47
15	0.94	-6.7	6.74	18776.11	2000.03	17787.04	-4.39	26004.34	46.2	46.68
16	0.94	-6.38	6.41	18841.64	1904.66	17997.4	-4.04	26546.18	47.5	47.99
17	0.94	-6.04	6.08	18908.93	1805.1	18227.91	-3.68	27138.75	48.89	49.39
18	0.94	-5.7	5.74	18978.66	1699.53	18473.91	-3.3	27808.88	50.53	51.06
19	0.95	-5.34	5.38	19050.7	1591.6	18740.13	-2.91	28551.76	52.36	52.91
20	0.95	-4.97	5.01	19125.84	1480.54	19049.34	-2.5	29341.17	54.03	54.58
21	0.95	-4.58	4.63	19203.98	1364.17	19366.02	-2.09	30213.91	56.02	56.58
22	0.95	-4.17	4.23	19285.68	1242.98	19678.79	-1.6	31167.53	58.38	58.97
23	0.96	-3.75	3.81	19371.15	1115.55	20081.83	-1.17	32243.09	60.56	61.19
24	0.96	-3.3	3.37	19461.52	980.59	20473.53	-0.7	33553.02	63.88	64.56
25	0.96	-2.82	2.91	19557.57	838.78	20980.23	-0.2*	35175.79	67.66	68.42
26	0.96	-2.31	2.43	19659.65	687.82	21476.22	0.37	37180.44	73.12	73.97
27	0.97	-1.77	1.92	19769.29	524.49	22010.68	1.01	39576.64	79.81	80.7
28	0.97	-1.18	1.4	19887.41	348.15	22704.17	1.63	42447.68	86.96	87.89
29	0.97	-0.55	0.93	20015.32	191.21	23309.54	2.21	45891.33	96.88	97.89
30	0.97	0.15*	0.78*	20154.55	162.25*	24007.06	2.98	49938.61	108.02	109.1
31	0.98	0.9	1.19	20306.82	278.41	24736.12	3.73	54842.2	121.71	122.91
32	0.98	1.74	1.91	20474.54	523.28	25500.6	4.56	60522.65	137.34	138.65
33	0.98	2.66	2.78	20659.82	794.83	26302.7	5.49	67014.69	154.78	156.19
34	0.98	3.67	3.76	20864.19	1098.79	27179.66	6.5	74439.04	173.88	175.33
35	0.99	4.81	4.88	21093.04	1444.22	28335.79	7.48	83064.39	193.14	194.76
36	0.99	6.09	6.15	21350.15	1822.06	29948.01	8.71	93534.93	212.32	214.14
37	0.99	7.55	7.61	21645.53	2258.65	31744.07	10.53	106250.89	234.71	236.68
38	0.99	9.29	9.33	21994.09	2775.34	34286.93	12.33	123156.64	259.19	261.59
39	1.00	11.46	11.5	22431.4	3424.54	38623.14	15.09	146919.04	280.39	283.21
40	1.00	15.04	15.08	23152.76	4482.89	49079.3	18.97	203545.44	314.73	320.79

% denotes numbers in percent; * denotes the column-specific minimum/minima

OAR – CCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.90	-12.72	12.73	17565.96*	3794.75	14655.79*	-10.91	17917.69*	22.26	22.63
2	0.90	-12.51	12.52	17608.2	3732.11	14722.36	-10.68	17987.44	22.18	22.56
3	0.91	-12.29	12.31	17651	3670.01	14803.56	-10.47	18063.97	22.02	22.41
4	0.91	-12.08	12.1	17694.18	3604.88	14863.22	-10.25	18139.41	22.04	22.43
5	0.91	-11.86	11.88	17737.99	3539.76	14945.37	-10.03	18222.65	21.93	22.32
6	0.91	-11.64	11.66	17782.3	3473.96	15024.22	-9.8	18307.82	21.86	22.26
7	0.92	-11.42	11.44	17827.05	3408.06	15095.16	-9.56	18395.7	21.86	22.27

8	0.92	-11.19	11.21	17872.34	3340.71	15193.05	-9.34	18489.74	21.7*	22.11*
9	0.92	-10.97	10.98	17918.3	3273.02	15247.62	-9.12	18588.24	21.91	22.32
10	0.92	-10.74	10.75	17964.78	3203.67	15325.06	-8.86	18688.9	21.95	22.36
11	0.93	-10.5	10.52	18011.73	3134.91	15390.79	-8.63	18795.45	22.12	22.53
12	0.93	-10.26	10.28	18059.7	3062.82	15465.68	-8.38	18904.01	22.23	22.64
13	0.93	-10.02	10.04	18108.1	2990.83	15573.58	-8.11	19017.09	22.11	22.53
14	0.93	-9.78	9.8	18157.25	2918.12	15655.64	-7.85	19136.35	22.23	22.66
15	0.94	-9.53	9.55	18207.24	2843.26	15764.66	-7.57	19272.28	22.25	22.7
16	0.94	-9.28	9.3	18258.09	2769.35	15850.13	-7.31	19423.05	22.54	23
17	0.94	-9.02	9.04	18310	2692.98	15968.15	-7.04	19590.17	22.68	23.15
18	0.94	-8.76	8.78	18362.85	2612.81	16085.5	-6.74	19760.46	22.85	23.33
19	0.95	-8.49	8.51	18416.83	2533.04	16208.69	-6.45	19943.08	23.04	23.53
20	0.95	-8.22	8.24	18472.04	2451.77	16331.13	-6.16	20129.23	23.26	23.75
21	0.95	-7.93	7.96	18528.56	2366.34	16474.18	-5.87	20325.86	23.38	23.89
22	0.95	-7.65	7.67	18586.54	2278.36	16678.44	-5.54	20521.87	23.04	23.57
23	0.96	-7.35	7.38	18645.87	2191.01	16805.04	-5.23	20722.6	23.31	23.83
24	0.96	-7.05	7.08	18707.02	2101.56	16997.89	-4.92	20946.57	23.23	23.76
25	0.96	-6.73	6.77	18769.95	2008.68	17163.64	-4.58	21198.5	23.51	24.05
26	0.96	-6.41	6.45	18834.62	1912.39	17364.55	-4.23	21487.98	23.75	24.3
27	0.97	-6.08	6.12	18901.53	1813.48	17565.05	-3.86	21827.22	24.27	24.84
28	0.97	-5.74	5.77	18970.91	1708.77	17848.67	-3.45	22225.49	24.52	25.12
29	0.97	-5.38	5.42	19043.09	1601.28	18085.37	-3.09	22679.56	25.4	26
30	0.97	-5	5.05	19118.3	1491.08	18333.64	-2.62	23198.34	26.53	27.14
31	0.98	-4.61	4.66	19197.2	1373.11	18594.36	-2.21	23793.49	27.96	28.59
32	0.98	-4.2	4.25	19280.11	1251.92	18877.82	-1.74	24484.59	29.7	30.36
33	0.98	-3.76	3.82	19368.45	1119.51	19310.39	-1.3	25315.83	31.1	31.8
34	0.98	-3.29	3.37	19462.82	975.65	19689.09	-0.77	26357.12	33.87	34.62
35	0.99	-2.78	2.87	19565.69	827.47	20098.33	-0.15*	27681.83	37.73	38.5
36	0.99	-2.22	2.33	19679.55	657.63	20629.51	0.41	29358.83	42.31	43.11
37	0.99	-1.57	1.73	19808.68	467.52	21161.8	1.14	31815.83	50.35	51.23
38	0.99	-0.79	1.08	19965.64	241.62	21893.88	2	36323.03	65.9	67.04
39	1.00	0.63*	0.98*	20251.94	213.57*	22770.95	3.46	72214.95	217.14	218.23
40	1.00	3.52	3.6	20833.72	1051.14	22329.5	6.39	99618.44	346.13	347.01

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.90	-10.8	10.82	17952*	3220.02	16041.77*	-8.88	21374.34*	33.24*	33.6*
2	0.90	-10.56	10.58	18000.58	3146.62	16140.31	-8.61	21555.75	33.55	33.9
3	0.91	-10.31	10.33	18050.01	3074.53	16217.44	-8.37	21742.46	34.07	34.43
4	0.91	-10.06	10.08	18100.01	2999.89	16353.11	-8.1	21944.39	34.19	34.56
5	0.91	-9.81	9.83	18150.92	2924.83	16446.02	-7.84	22167.89	34.79	35.18
6	0.91	-9.55	9.58	18202.61	2847.45	16556.12	-7.56	22426.5	35.46	35.86
7	0.92	-9.29	9.31	18255.35	2770.23	16681.68	-7.28	22717.1	36.18	36.6
8	0.92	-9.02	9.05	18309.14	2688.51	16815.54	-7.01	23039.06	37.01	37.44
9	0.92	-8.75	8.78	18364.1	2608.94	16966.5	-6.68	23383.5	37.82	38.27
10	0.92	-8.47	8.5	18420.28	2523.76	17174.44	-6.4	23759.52	38.34	38.8
11	0.93	-8.19	8.21	18477.69	2439.06	17283.08	-6.11	24173.26	39.87	40.33
12	0.93	-7.89	7.92	18536.68	2352.5	17455.82	-5.76	24615.16	41.01	41.49
13	0.93	-7.59	7.62	18597.15	2263.18	17685.24	-5.48	25082.1	41.83	42.31
14	0.93	-7.28	7.31	18659.41	2170.79	17865.17	-5.14	25587.66	43.23	43.72
15	0.94	-6.97	7	18723.5	2075.97	18083.82	-4.8	26144.06	44.57	45.07
16	0.94	-6.64	6.67	18789.39	1977.64	18316.72	-4.45	26746.13	46.02	46.54
17	0.94	-6.3	6.34	18857.45	1876.13	18591.98	-4.09	27435.92	47.57	48.12
18	0.94	-5.95	5.99	18928.36	1770.43	18860.43	-3.69	28199.4	49.52	50.09
19	0.95	-5.58	5.63	19001.75	1661.97	19157.92	-3.31	29066.11	51.72	52.3
20	0.95	-5.2	5.25	19078.48	1547.19	19466.87	-2.91	30049.07	54.36	54.97
21	0.95	-4.8	4.85	19159.12	1426.78	19813.83	-2.46	31151.6	57.22	57.87
22	0.95	-4.38	4.44	19243.97	1301.67	20224.32	-2.01	32451.74	60.46	61.19
23	0.96	-3.93	4	19334.1	1169.76	20695.89	-1.52	34032.12	64.44	65.25
24	0.96	-3.45	3.53	19430.9	1027.74	21238.65	-1.04	36246.16	70.66	71.58
25	0.96	-2.93	3.02	19536.43	872.75	21852.32	-0.49	39368.49	80.16	81.26
26	0.96	-2.34	2.46	19653.42	699.62	22634.05	0.15*	43979.37	94.31	95.74
27	0.97	-1.68	1.85	19787.35	496.02	23680.63	0.83	52215.89	120.5	122.91
28	0.97	-0.85	1.17	19953.91	259.21	26025.13	1.7	74294	185.47	193.16
29	0.97	0.43*	0.96*	20211.53	201.51*	30108.73	2.83	144138.93	378.73	388.8
30	0.97	2.18	2.35	20564.28	658.66	31113.99	4.52	219814.61	606.48	609.61
31	0.98	4.25	4.33	20979.8	1275.43	31070.2	6.61	270624.22	771.01	773.24
32	0.98	6.52	6.58	21438.18	1957.45	30858.53	8.97	302491.73	880.25	881.62
33	0.98	8.94	8.98	21924.79	2680.55	31213.98	11.45	330256.19	958.04	960.35
34	0.98	11.54	11.58	22448.37	3452.63	31057.63	14.16	370682.42	1093.53	1095.61

35	0.99	14.33	14.35	23008.8	4283.15	31108.26	17.07	394916.19	1169.49	1170.72
36	0.99	17.23	17.26	23593.56	5152.83	31123.35	19.89	413941.43	1230	1231.28
37	0.99	20.35	20.36	24219.94	6083.2	30966.48	22.67	448700.74	1348.99	1350.53
38	0.99	23.87	23.89	24930.07	7131.74	30692.18	26.2	509147.08	1558.88	1560.19
39	1.00	27.84	27.85	25727.71	8317.84	30376.76	30.22	526410.52	1632.94	1634.27
40	1.00	33.29	33.3	26825.95	9945.13	27530.62	35.66	617079.25	2141.43	2143.33

% denotes numbers in percent; * denotes the column-specific minimum/minima

OAR – NCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.90	-12.72	12.73	17565.62*	3795.41	14641.65*	-10.92	17914.14*	22.35	22.73
2	0.90	-12.51	12.52	17607.85	3733.15	14713.2	-10.7	17983.88	22.23	22.61
3	0.91	-12.3	12.31	17650.66	3670.55	14789.22	-10.47	18059.57	22.11	22.5
4	0.91	-12.08	12.1	17693.83	3604.88	14852.37	-10.25	18135	22.1	22.49
5	0.91	-11.86	11.88	17737.62	3539.73	14935.48	-10.04	18217.86	21.98	22.37
6	0.91	-11.64	11.66	17781.91	3476.34	15007.23	-9.79	18303.07	21.96	22.36
7	0.92	-11.42	11.44	17826.65	3408.5	15071.13	-9.59	18390.63	22.03	22.43
8	0.92	-11.2	11.21	17871.98	3341.98	15177.86	-9.35	18484.47	21.79*	22.19*
9	0.92	-10.97	10.99	17917.89	3274.4	15243.73	-9.11	18582.14	21.9	22.31
10	0.92	-10.74	10.76	17964.34	3204.62	15315.01	-8.86	18683.58	22	22.4
11	0.93	-10.5	10.52	18011.33	3135.32	15370.46	-8.63	18788.66	22.24	22.64
12	0.93	-10.27	10.28	18059.28	3063.26	15449.19	-8.38	18897.64	22.32	22.73
13	0.93	-10.03	10.04	18107.64	2991.56	15560.93	-8.11	19009.68	22.16	22.58
14	0.93	-9.78	9.8	18156.8	2918.8	15644.06	-7.85	19128.1	22.27	22.7
15	0.94	-9.53	9.55	18206.72	2844.31	15741.69	-7.57	19263.84	22.37	22.82
16	0.94	-9.28	9.3	18257.54	2770.42	15831.18	-7.31	19414	22.63	23.09
17	0.94	-9.02	9.05	18309.41	2694.81	15957.75	-7.04	19578.38	22.69	23.16
18	0.94	-8.76	8.78	18362.24	2613.85	16059.81	-6.74	19748.74	22.97	23.45
19	0.95	-8.49	8.52	18416.22	2534.5	16181.89	-6.45	19930.12	23.16	23.66
20	0.95	-8.22	8.24	18471.42	2452.63	16331.64	-6.16	20115.45	23.17	23.67
21	0.95	-7.94	7.96	18527.78	2368.28	16455.73	-5.87	20309.77	23.42	23.93
22	0.95	-7.65	7.68	18585.77	2280.48	16647.06	-5.54	20504.32	23.17	23.69
23	0.96	-7.36	7.38	18645	2191.67	16762.11	-5.23	20702.64	23.51	24.03
24	0.96	-7.05	7.08	18706.15	2104.06	16955.92	-4.92	20925.16	23.41	23.94
25	0.96	-6.74	6.77	18768.9	2011.71	17120.26	-4.58	21172.92	23.67	24.21
26	0.96	-6.42	6.45	18833.58	1915.51	17329.53	-4.23	21459.86	23.83	24.39
27	0.97	-6.09	6.12	18900.35	1816.94	17556.49	-3.86	21792.68	24.13	24.7
28	0.97	-5.74	5.78	18969.59	1712.42	17791.69	-3.45	22185.37	24.7	25.28
29	0.97	-5.38	5.43	19041.61	1604.31	18062.38	-3.09	22631	25.29	25.9
30	0.97	-5.01	5.06	19116.73	1493.15	18296.2	-2.62	23137.71	26.46	27.07
31	0.98	-4.62	4.67	19195.15	1379.57	18534.25	-2.21	23719.45	27.98	28.6
32	0.98	-4.21	4.27	19277.77	1254.92	18843.5	-1.74	24381.76	29.39	30.05
33	0.98	-3.78	3.84	19365.46	1123.08	19223.11	-1.3	25176.15	30.97	31.66
34	0.98	-3.31	3.38	19459.01	984.31	19576	-0.77	26147.16	33.57	34.31
35	0.99	-2.81	2.89	19560.77	834.86	20076.98	-0.15*	27367.84	36.31	37.09
36	0.99	-2.25	2.36	19672.49	668.92	20569.76	0.41	28852.34	40.27	41.06
37	0.99	-1.63	1.78	19797.76	484.86	21090.21	1.12	30775.23	45.92	46.75
38	0.99	-0.9	1.16	19943.88	271.96	21730.77	1.91	33533.82	54.31	55.28
39	1.00	0.02*	0.75*	20129.09	152.6*	22605.55	2.91	37830	67.35	68.4
40	1.00	1.64	1.81	20455.32	498.15	24449.49	4.6	51585.05	110.99	115.37

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.90	-10.83	10.85	17945.17*	3229.41	16020.15*	-8.99	21264.42*	32.74*	33.09*
2	0.90	-10.59	10.61	17993.44	3156.54	16073.64	-8.74	21437.06	33.37	33.72
3	0.91	-10.35	10.37	18042.6	3085.94	16177.91	-8.47	21617.17	33.62	33.97
4	0.91	-10.1	10.12	18092.31	3010	16275.02	-8.22	21810.82	34.01	34.38
5	0.91	-9.85	9.87	18142.89	2934.91	16364.19	-7.94	22022.03	34.57	34.95
6	0.91	-9.6	9.62	18194.27	2856.84	16486.87	-7.66	22260.6	35.02	35.41
7	0.92	-9.33	9.36	18246.72	2778.4	16597.24	-7.39	22531.97	35.76	36.16
8	0.92	-9.07	9.09	18300.16	2698.08	16745.57	-7.11	22833.37	36.35	36.77
9	0.92	-8.8	8.82	18354.51	2618.36	16878.77	-6.85	23155.16	37.19	37.62
10	0.92	-8.52	8.55	18410.19	2536.58	16993.96	-6.55	23502.45	38.3	38.74
11	0.93	-8.24	8.27	18466.97	2452.46	17164.62	-6.24	23880.47	39.13	39.57
12	0.93	-7.95	7.98	18525.35	2365.78	17309.88	-5.95	24293.82	40.35	40.81

13	0.93	-7.65	7.68	18585.14	2280.33	17537.74	-5.63	24724.19	40.98	41.44
14	0.93	-7.35	7.38	18646.39	2186.92	17703.83	-5.3	25184.01	42.25	42.73
15	0.94	-7.04	7.07	18709.34	2091.08	17904.26	-5	25673.61	43.39	43.87
16	0.94	-6.71	6.75	18774.3	1998.52	18116.52	-4.67	26208.07	44.66	45.15
17	0.94	-6.38	6.42	18841.09	1899.73	18336.03	-4.31	26795.18	46.13	46.64
18	0.94	-6.04	6.08	18910.17	1798.63	18607.97	-3.94	27452.39	47.53	48.05
19	0.95	-5.68	5.72	18981.75	1690.67	18810.56	-3.56	28165.37	49.73	50.28
20	0.95	-5.31	5.36	19056.03	1581.23	19094.54	-3.19	28947.32	51.6	52.15
21	0.95	-4.93	4.98	19133.31	1463.9	19350.9	-2.78	29798.78	53.99	54.55
22	0.95	-4.53	4.58	19214.41	1344.35	19709.33	-2.37	30738.47	55.96	56.53
23	0.96	-4.1	4.16	19299.35	1219.47	19997.6	-1.95	31810.31	59.07	59.67
24	0.96	-3.66	3.73	19388.98	1087.92	20431.47	-1.47	33097.52	61.99	62.64
25	0.96	-3.19	3.27	19483.94	944.91	20872.84	-1	34709.48	66.29	66.99
26	0.96	-2.68	2.78	19585.64	797.4	21305.1	-0.5	36722.53	72.36	73.11
27	0.97	-2.14	2.26	19695.09	632.71	21753.62	0.06*	39190.22	80.15	80.94
28	0.97	-1.55	1.72	19812.64	463	22131.37	0.67	42148.4	90.45	91.26
29	0.97	-0.92	1.18	19940.9	274.88	22656.81	1.29	45856.53	102.4	103.31
30	0.97	-0.22*	0.79*	20081.11	162.21*	23124.83	1.97	50450.39	118.17	119.26
31	0.98	0.55	0.94	20236.86	201.43	23625.57	2.76	55996.97	137.02	138.2
32	0.98	1.41	1.61	20408.53	427.71	24246.56	3.61	62449.99	157.56	158.81
33	0.98	2.36	2.48	20599.75	711.12	24790.95	4.58	69919.15	182.03	183.43
34	0.98	3.42	3.51	20813.27	1028.49	25698.81	5.82	78433.84	205.2	206.67
35	0.99	4.61	4.68	21052.17	1378.66	26646.13	6.96	88288.57	231.34	232.93
36	0.99	5.95	6.01	21322.92	1782.69	27807.53	8.37	100387.09	261.01	262.83
37	0.99	7.5	7.55	21634.77	2247.01	29143.83	10.07	115344.07	295.78	297.77
38	0.99	9.34	9.38	22005.51	2796.55	30507.56	12.09	135122.01	342.91	345.29
39	1.00	11.67	11.71	22473.79	3485.67	34199.36	14.77	162389.18	374.83	377.93
40	1.00	15.46	15.49	23236.46	4615.61	44151.62	19.34	223961.02	407.25	414.49

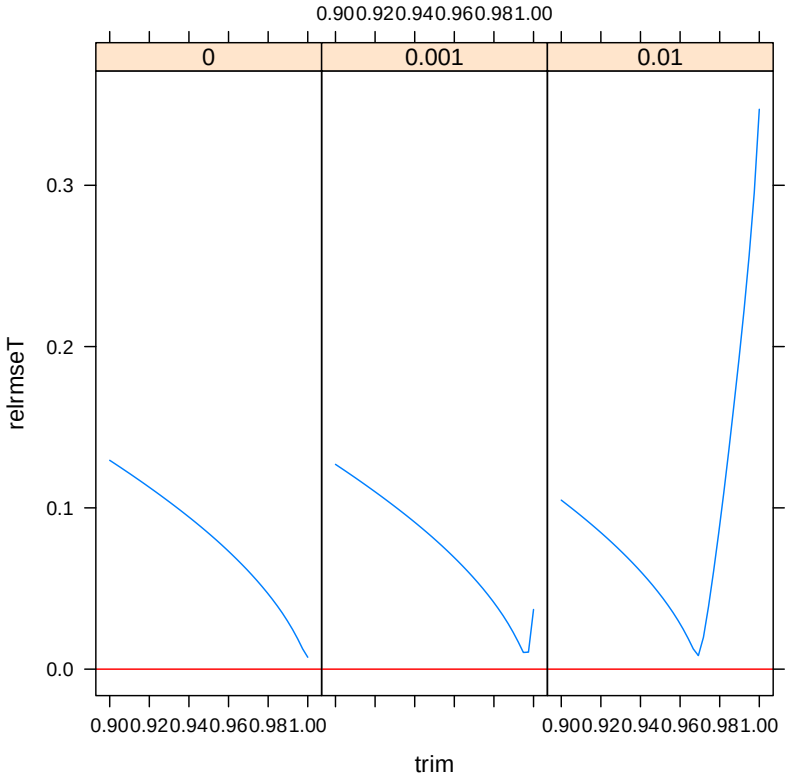
% denotes numbers in percent; * denotes the column-specific minimum/minima

No Contamination

E.11.5. Plots

In this section, we report graphical displays of certain numerical criteria for the estimators. The lattice-type plots are partitioned into panels for different values of OTypeEpsilon.

OCAR – CCAR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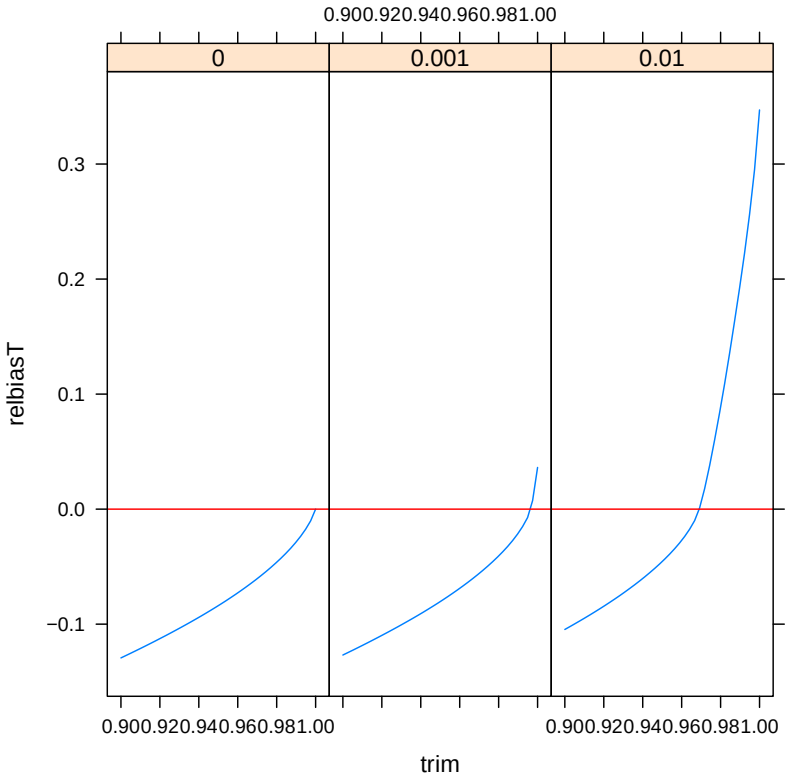
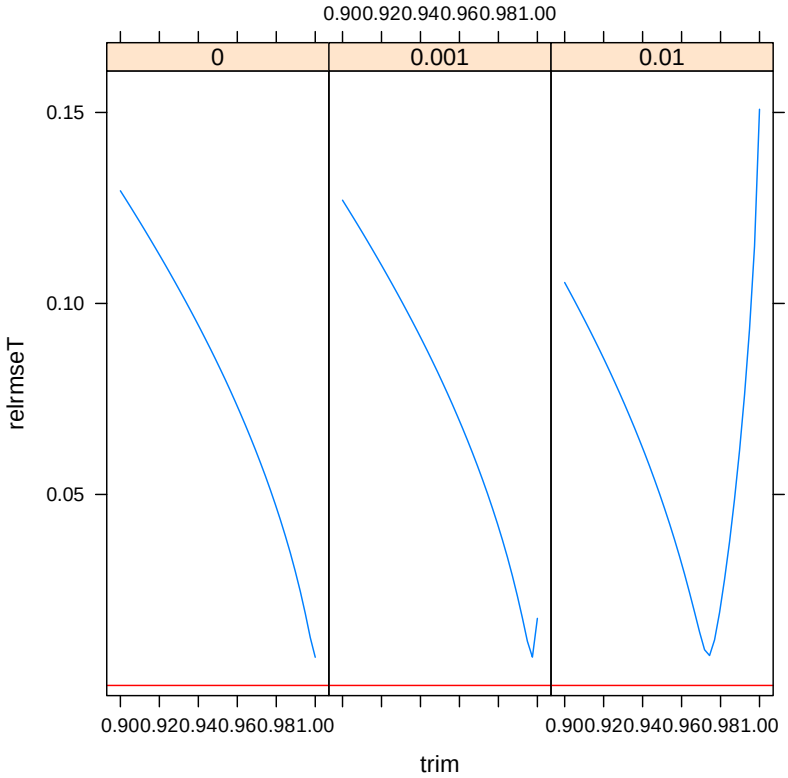
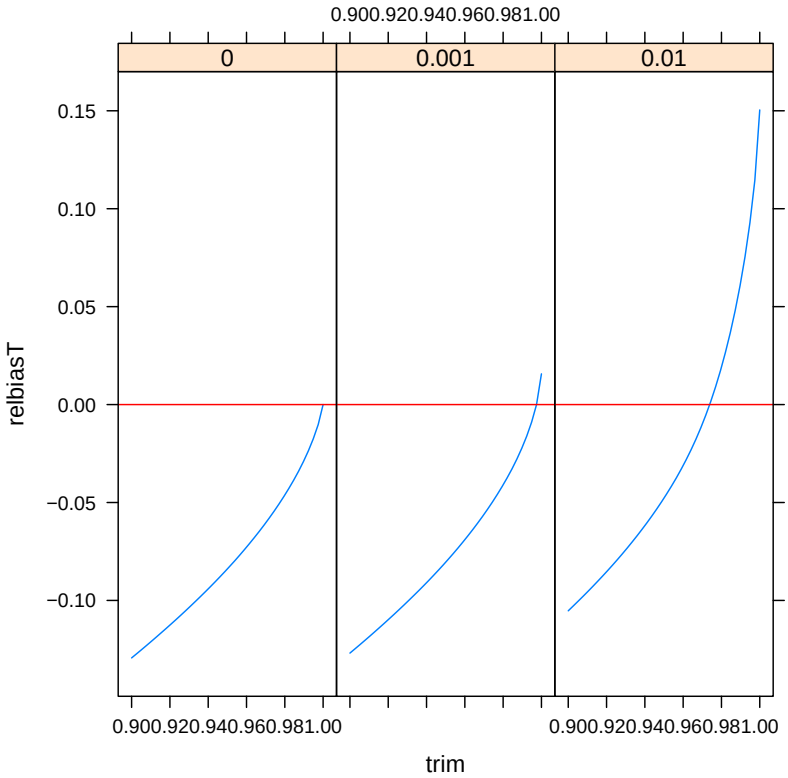
trim

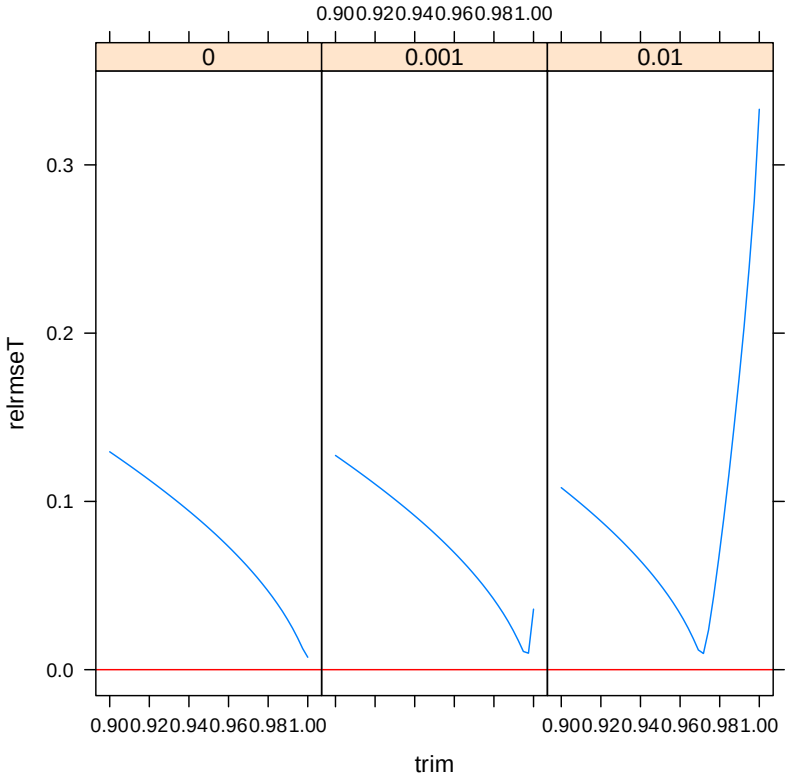

0.900.920.940.960.981.00
0
0.001
0.01
relbiasT
−0.1
0.0
0.1
0.2
0.3
0.900.920.940.960.981.00
0.900.920.940.960.981.00
trim

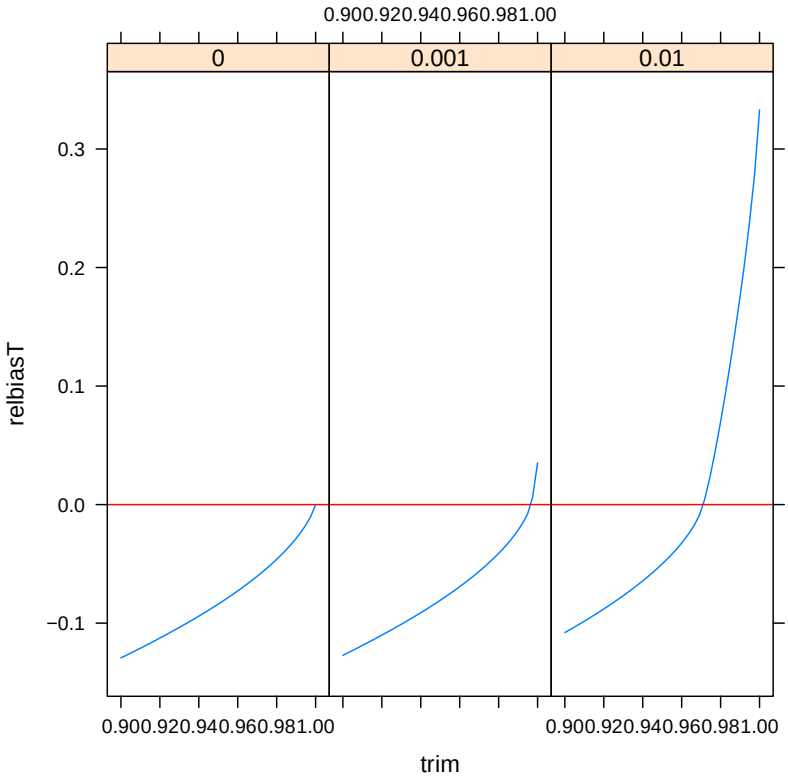
OCAR – NCAR


0.900.920.940.960.981.00
0
0.001
0.01
0.15
0.10
0.05
relrmseT
0.900.920.940.960.981.00
0.900.920.940.960.981.00
trim

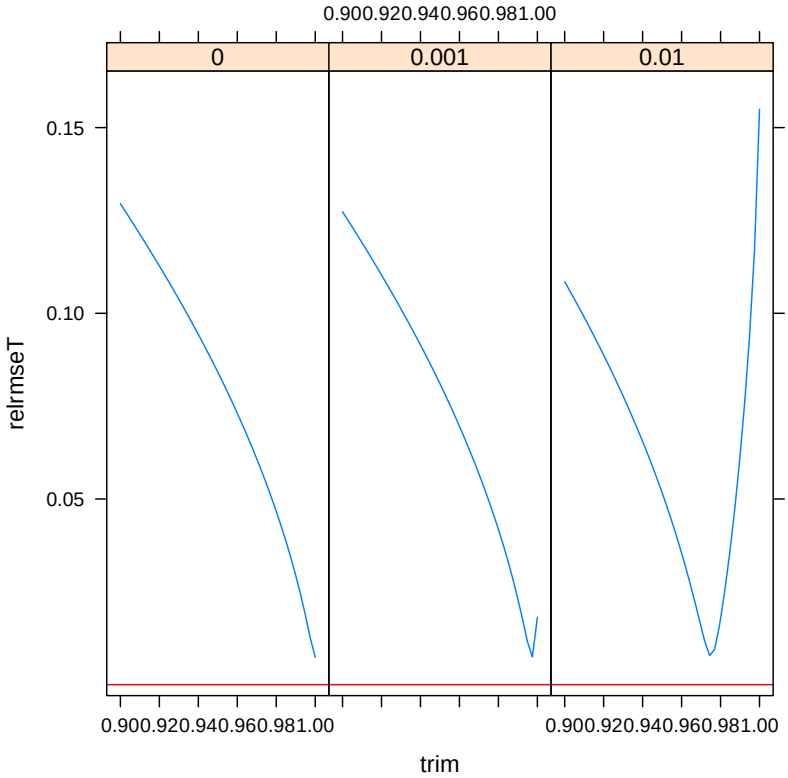

0.900.920.940.960.981.00
0
0.001
0.01
0.15
0.10
0.05
0.00
−0.05
−0.10
relbiasT
0.900.920.940.960.981.00
0.900.920.940.960.981.00
trim

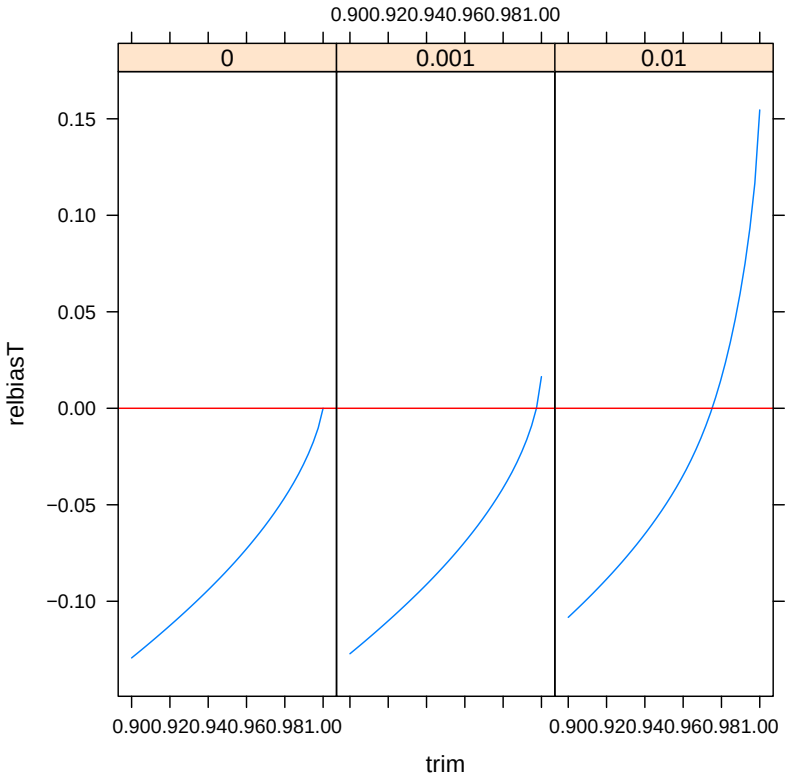
OAR – CCAR


0.900.920.940.960.981.00
0
0.001
0.01
0.3
0.2
0.1
0.0
relrmseT
0.900.920.940.960.981.00
0.900.920.940.960.981.00
trim


0.900.920.940.960.981.00
0
0.001
0.01
0.3
0.2
0.1
0.0
−0.1
relbiasT
0.900.920.940.960.981.00
0.900.920.940.960.981.00
trim

OAR – NCAR


0.900.920.940.960.981.00
0
0.001
0.01
0.15
0.10
0.05
relrmseT
0.900.920.940.960.981.00
0.900.920.940.960.981.00
trim


0.900.920.940.960.981.00
0
0.001
0.01
0.15
0.10
0.05
0.00
−0.05
−0.10
relbiasT
0.900.920.940.960.981.00
0.900.920.940.960.981.00
trim

E.12. N0002: BQSR @ A-ATSILC: hhsrs1kx6k

Sample Design Ref 1.2

E.12.1. Simulation Setup

Target Indicator:	QSR
Domains:	[none] (default)
Population:	A-AT-SILC
Sample:	hhsrs1kx6k
MonteCarlo Replicates:	1,000 (default)
Criteria Set:	Univariate criteria (default)
Method:	BQSR
Outlyingness:	OAR,OCAR,uncontaminated
Contamination:	CCAR,NCAR,uncontaminated
Missingness:	[none] (default)
Simulation Environment:	DBsim
Host:	FHNW
Author:	Beat Hulliger and Tobias Schoch
ID:	AggBQSR_hhsrs1kx6k
Date:	September 5, 2011

E.12.2. Estimator Specifications

`Specifications:` Trimmed quintile share ratio estimator; trims only at the top right end of the distribution. Variance estimates based on linearization.

`Comments:`

E.12.3. Robustness Parameters

This section gives some summary statistics of the robustness tuning parameters and the relative number of outliers (OType-Epsilon).

OCAR – CCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   31    30
```

OCAR – NCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   31    30
```

OAR – CCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   31    30
```

OAR – NCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   31    30
```

No Contamination

```
Range of  trim
    Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
0.000000 0.007375 0.014750 0.014750 0.022120 0.029500
Range of OTypeEpsilon

 0
60
```

E.12.4. Results

In this section, we summarize the performance of the estimators due to numerical criteria. The section is split into the different subsections for the respective combination of the outlyingness and contamination mechanisms. In addition, each subsection is further partitioned for the different values of OTypeEpsilon.

OCAR – CCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	9.5767	9.7796	4.4706	0.5824	0.0065	16.9387	0.0271	313.6843	314.9659
2	0.0005	8.2315	8.4677	4.4157	0.499	0.0066	15.6516	0.0253	284.8657	286.2409
3	0.0010	7.1725	7.4442	4.3725	0.4348	0.0066	14.8807	0.0244	268.6984	270.0115
4	0.0015	6.2608	6.5688	4.3353	0.3784	0.0066	13.6617	0.0235	256.28	257.8178
5	0.0020	5.4081	5.7554	4.3005	0.3284	0.0065	12.6469	0.0222	243.0027	244.973
6	0.0025	4.6354	5.0371	4.269	0.2803	0.0065	12.4634	0.0207	219.4734	221.2475
7	0.0030	3.947	4.4195	4.2409	0.2383	0.0066	11.569	0.0169	156.3293	163.3631
8	0.0035	3.4787	4.009	4.2218	0.2089	0.0066	11.0008	0.0121	83.0203	87.8167
9	0.0040	3.2934	3.8335	4.2142	0.2006	0.0064*	10.8437	0.0104	62.2442	64.8498
10	0.0045	3.2717*	3.8163*	4.2133*	0.1982*	0.0064*	10.7721*	0.0097	50.4621	53.0963
11	0.0050	3.3066	3.8426	4.2148	0.1991	0.0064*	10.9908	0.0092	44.0383	46.5309
12	0.0055	3.3941	3.9181	4.2183	0.2054	0.0064*	11.1186	0.0088	38.5848	41.066
13	0.0060	3.5141	4.0252	4.2232	0.213	0.0064*	11.1451	0.0086	33.816	36.3335
14	0.0065	3.6609	4.1546	4.2292	0.2219	0.0064*	11.3691	0.0084	30.6079	33.1355
15	0.0070	3.8352	4.3091	4.2363	0.2313	0.0064*	11.5966	0.0082	28.29	30.8528
16	0.0075	4.0267	4.4839	4.2442	0.2437	0.0065	12.0412	0.0081	25.377	27.9882
17	0.0080	4.2331	4.6721	4.2526	0.2549	0.0065	12.0744	0.008	23.2344	25.8957
18	0.0085	4.4585	4.8789	4.2618	0.2678	0.0065	12.4046	0.0079	21.4409	24.1914
19	0.0090	4.6969	5.1002	4.2715	0.2838	0.0066	12.5783	0.0079	19.681	22.557
20	0.0095	4.9536	5.3397	4.282	0.2989	0.0066	13.0242	0.0078*	18.2053*	21.1392*

```
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
```

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.015	60.8415	60.9259	6.5621	3.6783	0.0171*	71.1196	0.1677	878.9883	880.9115
2	0.016	60.1534	60.2395	6.534	3.6355	0.0173	71.2665	0.1681	873.7552	875.7618
3	0.017	59.4676	59.5547	6.5061	3.5939	0.0173	70.2272	0.1682	873.5769	875.7052
4	0.017	58.7834	58.8713	6.4782	3.5572	0.0172	69.2896	0.168	875.1834	877.3896
5	0.018	58.0786	58.1681	6.4494	3.5125	0.0173	68.2774	0.1674	866.0039	868.3208
6	0.018	57.4462	57.5372	6.4236	3.4755	0.0174	68.378	0.167	858.0105	860.4207
7	0.018	56.7684	56.8611	6.3959	3.4317	0.0176	67.5257	0.1663	847.6304	850.1423
8	0.019	56.1343	56.2276	6.3701	3.3976	0.0175	66.5683	0.1656	848.7113	851.2818
9	0.019	55.5042	55.5993	6.3444	3.3585	0.0176	65.809	0.165	837.1513	839.7005
10	0.020	54.8661	54.9629	6.3183	3.3214	0.0177	65.4954	0.1643	826.6452	829.091
11	0.021	54.2452	54.3443	6.293	3.2863	0.0179	64.8691	0.1639	814.0946	816.4501
12	0.021	53.6363	53.7353	6.2682	3.2445	0.0177	63.4802	0.1639	825.7219	827.998
13	0.021	53.0068	53.1091	6.2425	3.2097	0.0181	63.5273	0.164	807.108	809.2502
14	0.022	52.403	52.5068	6.2178	3.1752	0.0181	62.5382	0.1642	804.7632	806.9373
15	0.022	51.818	51.9237	6.194	3.1368	0.0183	62.8255	0.1643	798.4895	800.6931
16	0.023	51.2132	51.3199	6.1693	3.1038	0.0182	61.4593	0.1642	801.0009	803.3263
17	0.024	50.6495	50.7594	6.1463	3.0657	0.0186	61.7461	0.1637	781.7983	784.2149
18	0.024	50.0437	50.1556	6.1216	3.0292	0.0187	60.789	0.1626	770.0625	772.732
19	0.025	49.4777	49.5908	6.0985	2.9961	0.0187	60.7069	0.1611	762.7707	765.7035
20	0.025	48.9394	49.055	6.0765	2.966	0.0189	59.5475	0.1591	742.6663	746.1023
21	0.025	48.4104	48.5286	6.0549	2.9283	0.0191	59.6717	0.1563	718.6447	722.6011
22	0.026	47.9051	48.0251	6.0343	2.9013	0.0192	59.807	0.1532	698.5447	702.8766
23	0.026	47.4282	47.5492	6.0149	2.8693	0.0191	58.6789	0.1494	680.3181	684.7861
24	0.027	46.9733	47.0978	5.9963	2.8447	0.0195	58.8398	0.1448	642.597	647.2956
25	0.028	46.5647	46.6896	5.9796	2.8194	0.0194	57.7559	0.14	621.3618	626.5982

```
26 0.028  46.1628   46.2904  5.9632  2.7935 0.0197   57.9031  0.1339  581.3362  587.1549
27 0.029  45.8436   45.9726  5.9502  2.7744 0.0197   58.094   0.1275  546.3315  553.2669
28 0.029  45.5631   45.6927  5.9388  2.7566 0.0197   57.3102* 0.119   504.2038  512.8506
29 0.029  45.3122   45.4419  5.9285  2.7385 0.0196   57.43    0.1092  457.112   468.2822
30 0.030  45.1469*  45.2772* 5.9218* 2.732* 0.0196   57.3117  0.0982* 400.3615* 414.8269*
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
```

OCAR – NCAR

OTypeEpsilon=0.001

```
     trim relbiasT% relrmseT%    avgT  medaeT    varT relmaxeT%   avgV relbiasV% relrmseV%
1  0.0000   3.8678    4.3736  4.2377  0.2295  0.0069   11.4307  0.0122  75.366    84.4464
2  0.0005   3.0702    3.6556  4.2051  0.1846  0.0066   10.6662  0.0104  58.9487   63.7873
3  0.0010   2.7083    3.3352  4.1904  0.1641  0.0063   10.712   0.0096  52.7345   55.6587
4  0.0015   2.5359    3.1914  4.1833  0.1515  0.0063   10.2894  0.0092  47.2383   49.5801
5  0.0020   2.4372    3.1108  4.1793  0.1474  0.0062*  10.2337* 0.0089  43.1615   45.3665
6  0.0025   2.4147*   3.0933* 4.1784* 0.1454* 0.0062*  10.2714  0.0087  39.3993   41.5462
7  0.0030   2.4273    3.1056  4.1789  0.1465  0.0063   10.5259  0.0085  35.68     37.8899
8  0.0035   2.4778    3.1452  4.181   0.1488  0.0063   10.2507  0.0083  33.0449   35.2735
9  0.0040   2.5617    3.2103  4.1844  0.1547  0.0062*  10.2588  0.0082  31.0787   33.3579
10 0.0045   2.6667    3.2983  4.1887  0.1623  0.0063   10.4878  0.008*  28.2056*  30.6134*
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
```

OTypeEpsilon=0.01

```
    trim relbiasT% relrmseT%    avgT  medaeT    varT relmaxeT%   avgV relbiasV% relrmseV%
1  0.015  27.4189*  27.5464* 5.1985* 1.6549* 0.0117*  37.8212* 0.0262  124.4284  126.5969
2  0.016  27.5889   27.716   5.2055  1.6668  0.0117*  37.9666  0.0259  121.4714  123.6569
3  0.017  27.7572   27.884   5.2123  1.6753  0.0118   38.1719  0.0257  118.3996  120.5954
4  0.017  27.9528   28.0795  5.2203  1.689   0.0118   38.5618  0.0254  115.0077  117.1948
5  0.018  28.1579   28.2838  5.2287  1.7005  0.0118   38.5535  0.0252  112.6924  114.8779
6  0.018  28.3929   28.5188  5.2383  1.7169  0.0119   38.904   0.025   109.132   111.3323
7  0.018  28.6277   28.7537  5.2478  1.7288  0.012    39.405   0.0248  105.5699  107.748
8  0.019  28.8789   29.0044  5.2581  1.7418  0.0121   39.6398  0.0245  102.6407  104.8234
9  0.019  29.15     29.2752  5.2691  1.7609  0.0122   39.9032  0.0243  99.3469   101.5271
10 0.020  29.4261   29.5507  5.2804  1.7782  0.0122   40.2991  0.0241  96.6305   98.8149
11 0.021  29.7306   29.8547  5.2928  1.796   0.0123   40.9003  0.0239  94.053    96.2458
12 0.021  30.0428   30.1665  5.3056  1.8177  0.0124   41.0859  0.0237  90.9217   93.0813
13 0.021  30.3806   30.5041  5.3194  1.8378  0.0125   41.7195  0.0235  87.7292   89.8886
14 0.022  30.7134   30.8357  5.3329  1.8571  0.0125   42.2417  0.0233  86.1307   88.3111
15 0.022  31.0861   31.2084  5.3481  1.8787  0.0127   42.4111  0.0232  82.616    84.7651
16 0.023  31.4584   31.5793  5.3633  1.9021  0.0127   42.9897  0.023   81.4192   83.572
17 0.024  31.8557   31.9771  5.3795  1.9255  0.0129   43.3988  0.0229  77.2949   79.4808
18 0.024  32.2634   32.3845  5.3962  1.9506  0.013    44.171   0.0227  74.4121   76.575
19 0.025  32.6888   32.8091  5.4135  1.9752  0.0131   44.3726  0.0226  72.2535   74.4029
20 0.025  33.1342   33.2538  5.4317  2.0005  0.0132   45.1658  0.0225  70.0212   72.1608
21 0.025  33.5856   33.7052  5.4501  2.031   0.0134   45.7879  0.0224  67.0948   69.2429
22 0.026  34.06     34.1794  5.4695  2.0596  0.0136   45.9685  0.0223  64.2794   66.4554
23 0.026  34.5514   34.6703  5.4895  2.0884  0.0137   46.56    0.0222  61.9505   64.1363
24 0.027  35.0607   35.1787  5.5103  2.1201  0.0138   47.0854  0.0222  60.478    62.6559
25 0.028  35.5792   35.6973  5.5315  2.151   0.014    47.7481  0.0221  57.5859   59.7876
26 0.028  36.1257   36.2432  5.5537  2.1838  0.0142   48.3684  0.0221  55.7937   58.0094
27 0.029  36.6855   36.8024  5.5766  2.2169  0.0143   49.0341  0.022*  54.0153   56.2295
28 0.029  37.2565   37.3733  5.5999  2.2524  0.0145   49.5552  0.022*  51.637    53.8793
29 0.029  37.8446   37.9612  5.6239  2.2882  0.0147   50.2531  0.022*  49.287    51.5432
30 0.030  38.4575   38.5741  5.6489  2.3242  0.015    51.1995  0.022*  47.0639*  49.3432*
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
```

OAR – CCAR

OTypeEpsilon=0.001

```
     trim relbiasT% relrmseT%   avgT  medaeT    varT relmaxeT%    avgV relbiasV% relrmseV%
1  0.0000   9.4254    9.6285  4.4644 0.5705  0.0064   17.244   0.0272   321.936   323.2292
2  0.0005   7.9228    8.1656  4.4031 0.4792  0.0065   15.4227  0.0249   282.8807  284.3979
3  0.0010   6.9331    7.2095  4.3627 0.4187  0.0065   14.256   0.0236   261.8507  263.2918
4  0.0015   6.0144    6.3299  4.3252 0.361   0.0065   13.9835  0.0225   247.3384  249.0535
5  0.0020   5.1891    5.5497  4.2916 0.3143  0.0065   12.7717  0.0212   228.9406  230.721
```

6	0.0025	4.4227	4.8433	4.2603	0.268	0.0065	11.6818	0.0199	206.2436	207.7947
7	0.0030	3.8064	4.2897	4.2352	0.2311	0.0065	10.7927	0.0161	146.2966	152.5482
8	0.0035	3.3365	3.8738	4.216	0.1997	0.0065	10.6806	0.0115	78.5411	82.4416
9	0.0040	3.1938	3.7439	4.2102	0.1934	0.0064	10.5714*	0.0101	59.4284	62.0578
10	0.0045	3.1899*	3.7397*	4.21*	0.1926*	0.0063*	10.5752	0.0095	49.2264	51.7489
11	0.0050	3.2483	3.7882	4.2124	0.1957	0.0063*	10.7872	0.009	42.5676	44.9858
12	0.0055	3.3438	3.8731	4.2163	0.202	0.0064	10.8479	0.0087	36.8885	39.3639
13	0.0060	3.4655	3.9788	4.2213	0.2086	0.0064	11.0387	0.0085	33.3179	35.805
14	0.0065	3.6256	4.1231	4.2278	0.2191	0.0064	11.3085	0.0083	29.4146	31.9207
15	0.0070	3.7987	4.2754	4.2348	0.228	0.0064	11.5387	0.0082	27.4655	29.9795
16	0.0075	3.9946	4.4535	4.2428	0.24	0.0065	11.6842	0.0081	24.7661	27.3632
17	0.0080	4.2047	4.6455	4.2514	0.2536	0.0065	11.9283	0.008	22.565	25.2509
18	0.0085	4.4315	4.8527	4.2607	0.2662	0.0065	12.1961	0.0079	21.1154	23.8616
19	0.0090	4.6756	5.0781	4.2706	0.2813	0.0065	12.6232	0.0078*	19.7176	22.5231
20	0.0095	4.9318	5.3181	4.2811	0.2962	0.0066	12.8183	0.0078*	17.9849*	20.8811*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.015	55.468	55.5608	6.3429	3.3581	0.0172	69.0465	0.1589	825.518	828.079
2	0.016	54.7538	54.8481	6.3137	3.3154	0.0172	68.2789	0.1578	816.6511	819.4077
3	0.017	54.0421	54.136	6.2847	3.2704	0.0169*	67.2187	0.1564	824.0233	826.8981
4	0.017	53.3628	53.4586	6.257	3.2289	0.017	66.3089	0.1549	808.9141	811.7571
5	0.018	52.7034	52.8026	6.2301	3.1908	0.0174	66.091	0.1534	780.0553	782.9647
6	0.018	52.0221	52.1224	6.2023	3.1497	0.0174	65.1652	0.152	773.0677	775.8256
7	0.018	51.3688	51.4703	6.1756	3.1081	0.0174	65.0941	0.1509	767.4056	769.9538
8	0.019	50.7556	50.8582	6.1506	3.0707	0.0174	64.2339	0.1502	764.3644	766.6058
9	0.019	50.1439	50.2481	6.1257	3.0393	0.0174	63.2966	0.15	760.9018	762.9367
10	0.020	49.5122	49.6195	6.0999	2.9977	0.0177	63.556	0.15	746.7331	748.6221
11	0.021	48.8816	48.9903	6.0742	2.9581	0.0177	62.6752	0.1501	746.7884	748.6375
12	0.021	48.302	48.4138	6.0505	2.9235	0.018	61.8605	0.1501	733.1609	735.0574
13	0.021	47.6824	47.796	6.0252	2.8876	0.0181	61.0365	0.1496	728.2738	730.3772
14	0.022	47.0949	47.2112	6.0013	2.8509	0.0183	61.2526	0.1487	713.7894	716.1712
15	0.022	46.5141	46.6318	5.9776	2.8172	0.0183	60.0696	0.1471	705.4566	708.0661
16	0.023	45.9715	46.0911	5.9554	2.7865	0.0183	60.0019	0.1452	691.3153	694.1399
17	0.024	45.4301	45.5524	5.9334	2.7501	0.0185	59.7721	0.1425	668.453	671.5693
18	0.024	44.905	45.0305	5.9119	2.7205	0.0188	58.6827	0.1392	640.0048	643.4684
19	0.025	44.4202	44.5472	5.8922	2.6884	0.0188	57.8582	0.1356	620.4794	624.2415
20	0.025	43.9536	44.0829	5.8731	2.6641	0.019	57.984	0.1314	592.1961	595.9374
21	0.025	43.5235	43.654	5.8556	2.6374	0.019	57.0165	0.1271	570.8144	574.717
22	0.026	43.1077	43.2425	5.8386	2.6102	0.0194	57.0616	0.1226	531.9633	536.27
23	0.026	42.7762	42.9128	5.8251	2.5909	0.0195	55.926	0.1171	500.3236	505.8539
24	0.027	42.461	42.5978	5.8122	2.5738	0.0194	56.0968	0.1096	465.5006	472.6518
25	0.028	42.2065	42.3446	5.8018	2.5573	0.0194	56.2071	0.1006	417.3837	426.8084
26	0.028	41.9859	42.1251	5.7928	2.5466	0.0195	56.3228	0.0904	363.1302	374.5733
27	0.029	41.8423	41.984	5.787	2.5344	0.0198	55.0454	0.079	299.007	312.9036
28	0.029	41.8157*	41.9544*	5.7859*	2.534	0.0194	54.5216	0.0688	255.5556	270.2524
29	0.029	41.8769	42.0151	5.7884	2.531*	0.0193	54.3254*	0.06	210.5107	224.3605
30	0.030	42.0025	42.1368	5.7935	2.5405	0.0188	54.3479	0.0526*	179.2233*	192.2723*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OAR – NCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	4.1924	4.6526	4.2509	0.2502	0.0068	11.1782	0.0126	86.0629	92.9552
2	0.0005	3.3525	3.893	4.2166	0.201	0.0065	10.6448	0.0109	67.0287	71.1403
3	0.0010	2.9709	3.5614	4.2011	0.178	0.0064	10.3121	0.0101	56.3939	59.3773
4	0.0015	2.7574	3.3768	4.1924	0.1682	0.0063*	9.8987	0.0095	50.7785	53.32
5	0.0020	2.637	3.2743	4.1875	0.1596	0.0063*	9.7601*	0.0092	46.5981	48.865
6	0.0025	2.5969	3.2429	4.1858	0.1589	0.0063*	9.8616	0.0089	42.2103	44.4671
7	0.0030	2.5894*	3.2339*	4.1855*	0.1573*	0.0063*	9.8351	0.0087	39.4694	41.7797
8	0.0035	2.6273	3.268	4.1871	0.1585	0.0063*	9.9336	0.0085	35.6731	38.0644
9	0.0040	2.7001	3.3269	4.19	0.1642	0.0063*	10.2121	0.0084	33.063	35.5037
10	0.0045	2.7964	3.4057	4.194	0.1693	0.0063*	10.3113	0.0082*	30.8434*	33.3182*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.015	27.8173*	27.944*	5.2148*	1.6816*	0.0118*	38.7302*	0.0282	139.3878	141.5504
2	0.016	27.9491	28.0762	5.2202	1.6902	0.0119	39.0058	0.0278	134.535	136.6971
3	0.017	28.0974	28.2241	5.2262	1.6999	0.0119	39.1298	0.0275	131.2873	133.4533
4	0.017	28.2662	28.3923	5.2331	1.7085	0.0119	39.4583	0.0272	128.2747	130.441
5	0.018	28.4465	28.5729	5.2404	1.7183	0.012	39.582	0.0269	123.6753	125.9025
6	0.018	28.6435	28.7698	5.2485	1.7329	0.0121	39.796	0.0266	119.7055	121.8928
7	0.018	28.8541	28.9805	5.2571	1.7455	0.0122	39.9321	0.0263	115.5015	117.6648
8	0.019	29.0906	29.2162	5.2667	1.7602	0.0122	40.2072	0.0259	112.6483	114.7673
9	0.019	29.3353	29.4606	5.2767	1.7731	0.0123	40.4154	0.0257	109.1198	111.214
10	0.020	29.5943	29.7191	5.2873	1.791	0.0123	40.8803	0.0254	105.7006	107.772
11	0.021	29.8706	29.9957	5.2985	1.8041	0.0125	41.1686	0.0251	101.1975	103.2977
12	0.021	30.18	30.3049	5.3112	1.8205	0.0126	41.6346	0.0248	97.4225	99.5142
13	0.021	30.4841	30.6089	5.3236	1.8413	0.0127	41.8832	0.0246	93.6511	95.7787
14	0.022	30.8067	30.931	5.3367	1.8608	0.0128	42.2736	0.0243	90.3388	92.4944
15	0.022	31.1531	31.2768	5.3509	1.884	0.0129	42.4859	0.0241	87.2987	89.4618
16	0.023	31.5206	31.6438	5.3659	1.9085	0.013	43.2673	0.0239	84.3421	86.4938
17	0.024	31.9043	32.028	5.3815	1.9302	0.0132	43.6431	0.0237	79.9183	82.1063
18	0.024	32.2922	32.4151	5.3973	1.9522	0.0132	43.879	0.0235	77.4385	79.6646
19	0.025	32.7009	32.8237	5.414	1.9757	0.0134	44.8303	0.0233	73.7991	76.0215
20	0.025	33.1358	33.258	5.4318	2.0051	0.0135	44.7198	0.0231	71.131	73.3607
21	0.025	33.5754	33.6973	5.4497	2.0313	0.0137	45.4639	0.023	68.1427	70.3706
22	0.026	34.0458	34.1674	5.4689	2.0602	0.0138	46.143	0.0228	65.0966	67.3352
23	0.026	34.526	34.6474	5.4885	2.0858	0.014	46.3706	0.0227	62.0134	64.2233
24	0.027	35.0234	35.1439	5.5088	2.1184	0.0141	47.0876	0.0225	59.7982	61.9885
25	0.028	35.5483	35.6691	5.5302	2.1494	0.0143	47.4775	0.0224	56.3962	58.5701
26	0.028	36.0812	36.2016	5.5519	2.1802	0.0145	48.4471	0.0223	54.0593	56.2505
27	0.029	36.6362	36.7559	5.5746	2.2161	0.0146	48.801	0.0223	51.9943	54.1517
28	0.029	37.2037	37.3233	5.5977	2.2507	0.0149	49.4066	0.0222	49.4912	51.6828
29	0.029	37.7937	37.9131	5.6218	2.2871	0.0151	50.1217	0.0222	47.0623	49.2656
30	0.030	38.3969	38.5167	5.6464	2.3213	0.0154	50.7939	0.0221*	44.1746*	46.4335*

% denotes numbers in percent; * denotes the column-specific minimum/minima

No Contamination

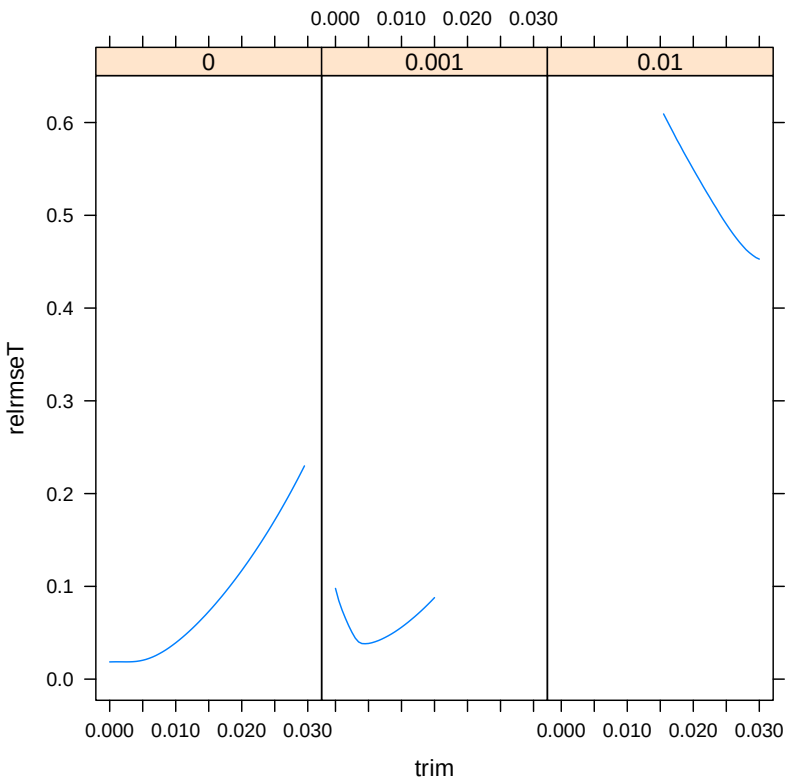
	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	0.0107*	1.855*	4.0803	0.0763	0.0057*	7.3522	0.0072	25.4161	27.5329
2	0.0005	-0.1793	1.8647	4.0726	0.0765	0.0057*	7.2327	0.0071	23.1232	25.4012
3	0.0010	-0.2124	1.869	4.0712*	0.0764	0.0057*	7.1151	0.007	21.2236	23.7076
4	0.0015	-0.1892	1.8669	4.0721	0.0766	0.0057*	7.1056*	0.0069	19.5072	22.1523
5	0.0020	-0.1231	1.8639	4.0748	0.0756	0.0058	7.259	0.0068	17.8229	20.6307
6	0.0025	-0.0286	1.8608	4.0787	0.0753	0.0058	7.2828	0.0067	16.5344	19.474
7	0.0030	0.0921	1.8632	4.0836	0.0755	0.0058	7.3269	0.0067	15.5764	18.58
8	0.0035	0.2421	1.8794	4.0897	0.0747*	0.0058	7.5465	0.0066	14.5218	17.6547
9	0.0040	0.4006	1.9086	4.0962	0.0771	0.0058	7.6876	0.0066	13.595	16.7956
10	0.0045	0.5817	1.9616	4.1036	0.0777	0.0058	8.0059	0.0066	12.2372	15.6223
11	0.0050	0.7814	2.0339	4.1117	0.0821	0.0059	8.22	0.0065*	11.2918	14.8245
12	0.0055	0.9903	2.1268	4.1203	0.0869	0.0059	8.4208	0.0065*	10.5536	14.2484
13	0.0060	1.2128	2.2469	4.1293	0.0947	0.006	8.8638	0.0065*	9.3006	13.2255
14	0.0065	1.4477	2.3865	4.1389	0.0987	0.006	9.0313	0.0065*	8.5231	12.6106
15	0.0070	1.6945	2.5466	4.149	0.1093	0.006	9.3564	0.0065*	8.0872	12.2841
16	0.0075	1.9543	2.7338	4.1596	0.1206	0.0061	9.5351	0.0065*	6.9603	11.4977
17	0.0080	2.2171	2.9328	4.1703	0.1355	0.0061	9.8488	0.0065*	6.1783	10.9912
18	0.0085	2.4999	3.1535	4.1819	0.1507	0.0062	10.139	0.0065*	6.055	10.8992
19	0.0090	2.7882	3.3922	4.1936	0.1684	0.0062	10.4492	0.0065*	5.1486	10.3996
20	0.0095	3.0877	3.6469	4.2058	0.1852	0.0063	10.9129	0.0066	4.4858	10.0681
21	0.0100	3.3979	3.9165	4.2185	0.2054	0.0063	11.2348	0.0066	4.0246	9.8525
22	0.0105	3.7178	4.1994	4.2315	0.2243	0.0064	11.6493	0.0066	3.7914	9.7266
23	0.0110	4.0436	4.4958	4.2448	0.2431	0.0064	12.1349	0.0066	2.8614	9.3155
24	0.0115	4.381	4.8047	4.2586	0.2641	0.0065	12.5809	0.0066	2.388	9.1333
25	0.0120	4.7256	5.1249	4.2727	0.2858	0.0066	12.7357	0.0067	1.7207	8.9307
26	0.0125	5.0809	5.4568	4.2872	0.3057	0.0066	13.0683	0.0067	1.518	8.8657
27	0.0130	5.4468	5.8032	4.3021	0.3286	0.0067	13.4468	0.0067	0.81	8.6979
28	0.0135	5.8213	6.1597	4.3174	0.3499	0.0068	14.0777	0.0068	0.2366	8.6014
29	0.0140	6.2078	6.5285	4.3331	0.3756	0.0068	14.3504	0.0068	0.1084*	8.5855
30	0.0145	6.595	6.9012	4.3489	0.3981	0.0069	14.9285	0.0069	-0.4369	8.5671*

% denotes numbers in percent; * denotes the column-specific minimum/minima

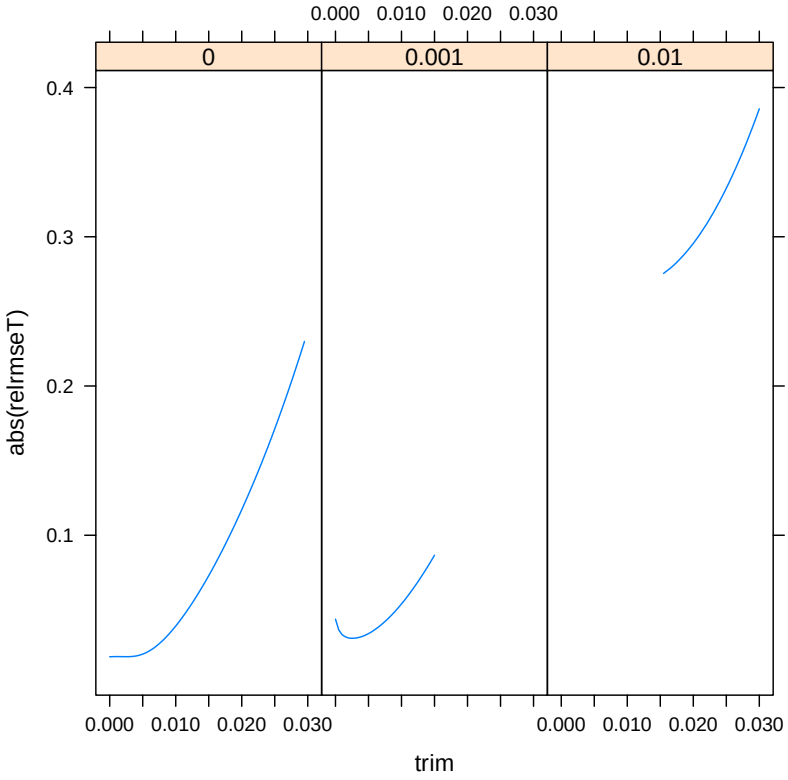
E.12.5. Plots

In this section, we report graphical displays of certain numerical criteria for the estimators. The lattice-type plots are partitioned into panels for different values of OTypeEpsilon.

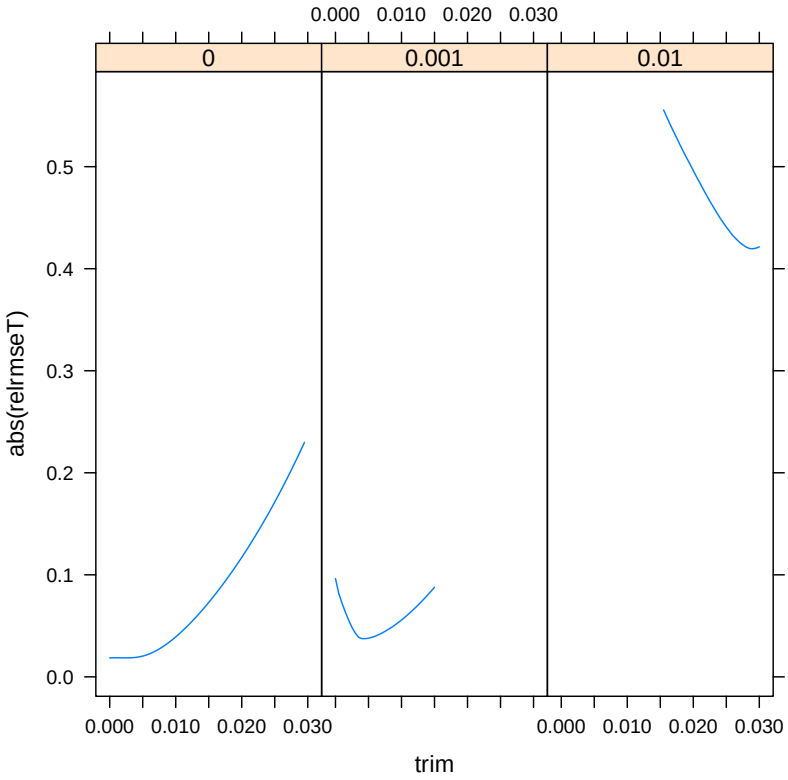
OCAR – CCAR



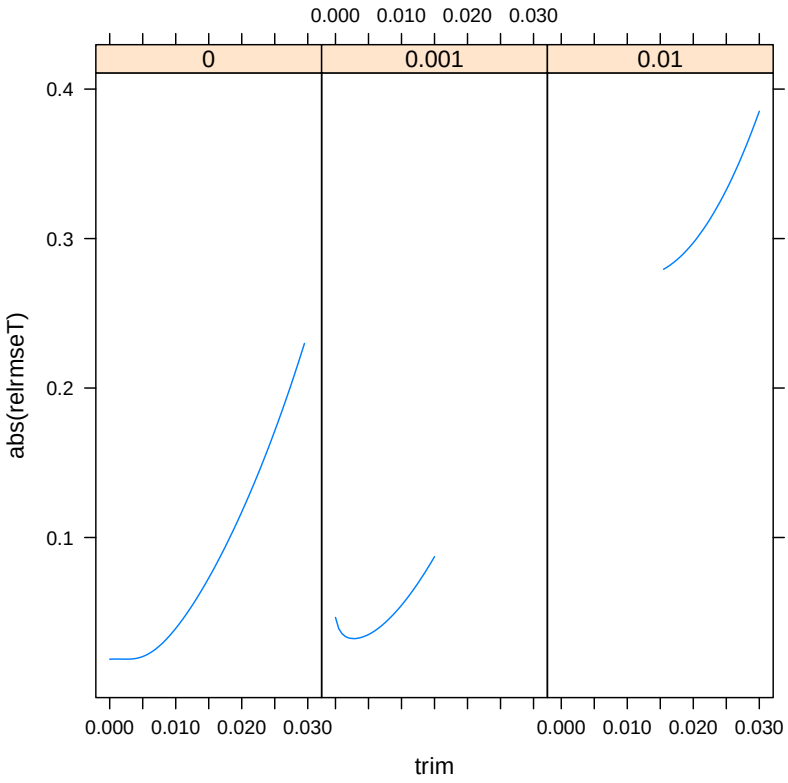
OCAR – NCAR



OAR – CCAR



OAR – NCAR



E.13. N0003: SQSR @ A-ATSILC: hhsrs1kx6k

Sample Design Ref 1.2

E.13.1. Simulation Setup

Target Indicator:	QSR
Domains:	[none] (default)
Population:	A-AT-SILC
Sample:	hhsrs1kx6k
MonteCarlo Replicates:	1,000 (default)
Criteria Set:	Univariate criteria (default)
Method:	SQSR
Outlyingness:	OAR,OCAR,uncontaminated
Contamination:	CCAR,NCAR,uncontaminated
Missingness:	[none] (default)
Simulation Environment:	DBsim
Host:	FHNW
Author:	Beat Hulliger and Tobias Schoch
ID:	AggSQSR_hhsrs1kx6k
Date:	September 5, 2011

E.13.2. Estimator Specifications

`Specifications:` Trimmed quintile share ratio estimator; trims only at the top right end of the distribution. Variance estimates based on linearization.

`Comments:`

E.13.3. Robustness Parameters

This section gives some summary statistics of the robustness tuning parameters and the relative number of outliers (OType-Epsilon).

OCAR – CCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

OCAR – NCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

OAR – CCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

OAR – NCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

No Contamination

```
Range of  trim
    Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
0.000000 0.007375 0.014750 0.014750 0.022120 0.029500
Range of OTypeEpsilon

 0
60
```

E.13.4. Results

In this section, we summarize the performance of the estimators due to numerical criteria. The section is split into the different subsections for the respective combination of the outlyingness and contamination mechanisms. In addition, each subsection is further partitioned for the different values of OTypeEpsilon.

OCAR – CCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	9.5767	9.7796	4.4706	0.5824	0.0065*	16.9387	0.0271	313.6843	314.9659
2	0.0005	8.1086	8.3492	4.4107	0.4915	0.0066	15.5663	0.0252	282.5612	283.9354
3	0.0010	6.9299	7.2125	4.3626	0.4185	0.0067	14.7284	0.0243	264.624	265.9366
4	0.0015	5.8985	6.2284	4.3205	0.3558	0.0067	13.4435	0.0233	249.4134	250.945
5	0.0020	4.9284	5.3137	4.2809	0.2981	0.0066	12.381	0.0219	233.7647	235.7244
6	0.0025	4.0368	4.5026	4.2446	0.2449	0.0066	12.1132	0.0204	208.225	209.9858
7	0.0030	3.2296	3.8083	4.2116	0.1955	0.0068	11.2056	0.0166	145.0849	152.0427
8	0.0035	2.6412	3.3306	4.1876	0.1607	0.0069	10.5193	0.0119	73.336	78.238
9	0.0040	2.3369	3.0812	4.1752	0.1468	0.0067	10.2767	0.0102	51.6715	54.4482
10	0.0045	2.1888	2.9792	4.1692	0.1373	0.0068	10.1179*	0.0094	38.7997	41.7575

11	0.0050	2.1004	2.9169	4.1656	0.1331	0.0068	10.2997	0.009	31.1288	34.1038
12	0.0055	2.0601	2.8964*	4.1639	0.1312	0.0069	10.3026	0.0086	24.3106	27.5214
13	0.0060	2.0507*	2.9003	4.1635*	0.1312	0.007	10.3273	0.0083	18.582	22.168
14	0.0065	2.0661	2.9209	4.1642	0.1291*	0.0071	10.4228	0.0081	14.0058	18.0752
15	0.0070	2.1098	2.9613	4.1659	0.1311	0.0072	10.5918	0.0079	10.2281	14.9854
16	0.0075	2.1659	3.0176	4.1682	0.137	0.0074	10.9386	0.0078	5.901	11.9291
17	0.0080	2.237	3.0809	4.1711	0.1398	0.0075	10.8594	0.0077	2.5523	10.2585
18	0.0085	2.3239	3.1586	4.1747	0.1423	0.0076	11.1275	0.0076	-0.8074*	9.6432*
19	0.0090	2.4223	3.2476	4.1787	0.1508	0.0078	11.2228	0.0075	-4.0843	10.1767
20	0.0095	2.5351	3.3474	4.1833	0.1585	0.008	11.6234	0.0074*	-6.9905	11.3662

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.021	51.3734	51.5858	6.1758	3.1009	0.0364*	65.9111	0.1578	333.1061	335.0509
2	0.021	50.693	50.9128	6.1481	3.0579	0.0372	66.0416	0.1576	323.6545	325.542
3	0.021	49.9912	50.2196	6.1194	3.0197	0.0381	64.9366	0.1575	313.1451	314.9687
4	0.022	49.309	49.5485	6.0916	2.978	0.0394	64.5528	0.1575	299.342	301.1891
5	0.022	48.652	48.901	6.0648	2.9336	0.0405	64.6539	0.1575	288.9371	290.8076
6	0.023	47.9703	48.2273	6.037	2.8864	0.0412	63.9351	0.1572	281.585	283.5181
7	0.024	47.3302	47.5998	6.0109	2.8495	0.0426	63.8949	0.1566	267.1688	269.1911
8	0.024	46.6506	46.9317	5.9831	2.8108	0.0438	63.3259	0.1553	254.4315	256.5757
9	0.025	46.0048	46.2971	5.9568	2.7648	0.045	62.6431	0.1537	241.9278	244.2006
10	0.025	45.3914	45.6942	5.9318	2.7268	0.046	62.9185	0.1516	229.8403	232.4093
11	0.025	44.7829	45.0997	5.9069	2.6986	0.0474	63.2827	0.1487	213.5081	216.3489
12	0.026	44.1971	44.5265	5.8831	2.6539	0.0487	62.4305	0.1456	199.0423	202.1366
13	0.026	43.6401	43.9802	5.8603	2.6262	0.0496	62.5305	0.1418	185.645	188.8319
14	0.027	43.1033	43.4587	5.8384	2.5926	0.0513	61.7866*	0.1373	167.8611	171.2592
15	0.028	42.6114	42.9789	5.8184	2.5605	0.0524	61.9667	0.1325	152.8217	156.529
16	0.028	42.1254	42.5073	5.7985	2.5331	0.0539	61.9384	0.1266	135.1513	139.2676
17	0.029	41.7185	42.1152	5.7819	2.5069	0.0554	62.4113	0.1204	117.274	122.018
18	0.029	41.3464	41.7565	5.7667	2.4841	0.0568	62.5728	0.1122	97.5644	103.3418
19	0.029	41.0091	41.4327	5.753	2.4629	0.0582	61.9406	0.1028	76.6194	84.2011
20	0.030	40.75*	41.1876*	5.7424*	2.435*	0.0597	62.4157	0.0923*	54.4788*	65.1579*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OCAR – NCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	3.8678	4.3736	4.2377	0.2295	0.0069	11.4307	0.0122	75.366	84.4464
2	0.0005	2.9528	3.5594	4.2003	0.1791	0.0066	10.5846	0.0104	58.0439	62.9026
3	0.0010	2.4747	3.152	4.1808	0.1509	0.0063*	10.5653	0.0096	51.0619	54.0249
4	0.0015	2.1848	2.9277	4.169	0.1332	0.0063*	10.0777	0.0091	44.3872	46.798
5	0.0020	1.9686	2.7702	4.1602	0.1207	0.0063*	9.9735	0.0088	39.3707	41.6823
6	0.0025	1.8254	2.676	4.1543	0.1139	0.0064	9.928	0.0086	34.2786	36.5928
7	0.0030	1.7165	2.6105	4.1499	0.11	0.0064	10.1659	0.0083	29.5238	31.9854
8	0.0035	1.6449	2.5698	4.147	0.1075	0.0065	9.7725	0.0082	25.6519	28.2363
9	0.0040	1.6068	2.5493	4.1454	0.1075	0.0065	9.6948*	0.008	22.5745	25.3455
10	0.0045	1.5853*	2.5483*	4.1445*	0.1069	0.0066	9.8354	0.0079	18.358	21.507
11	0.0050	1.5905	2.5636	4.1448	0.1063*	0.0067	9.9789	0.0077	14.7827	18.3783
12	0.0055	1.6152	2.5847	4.1458	0.108	0.0068	9.9878	0.0076	12.3816	16.2885
13	0.0060	1.6583	2.6299	4.1475	0.1101	0.0069	10.2318	0.0075	8.4059	13.2288
14	0.0065	1.7146	2.672	4.1498	0.112	0.007	10.3065	0.0074	6.3597	11.834
15	0.0070	1.7885	2.7354	4.1528	0.1159	0.0071	10.4988	0.0074	3.2048	10.2506
16	0.0075	1.8697	2.8042	4.1561	0.1204	0.0073	10.7252	0.0073	0.3379*	9.4884*
17	0.0080	1.9649	2.8822	4.16	0.1238	0.0074	10.7754	0.0072	-2.2509	9.4971
18	0.0085	2.0663	2.969	4.1642	0.1284	0.0076	11.0504	0.0072	-5.1457	10.302
19	0.0090	2.1856	3.0696	4.169	0.1361	0.0077	11.2135	0.0071*	-7.7511	11.6388
20	0.0095	2.3096	3.177	4.1741	0.1452	0.0079	11.6788	0.0071*	-10.4098	13.3901

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0055	27.351	27.4989	5.1958	1.6484	0.0135*	37.4052	0.0349	158.3382	161.1455
2	0.0060	27.0034	27.1537	5.1816	1.6287	0.0136	37.3972	0.0341	151.3425	154.0948

3	0.0065	26.6871	26.8384	5.1687	1.6042	0.0135*	36.9875	0.0334	147.3423	150.0337
4	0.0070	26.4134	26.5681	5.1575	1.5901	0.0137	36.2738	0.0327	139.1682	141.8472
5	0.0075	26.1488	26.3052	5.1467	1.5775	0.0137	36.0305	0.032	134.1211	136.715
6	0.0080	25.9273	26.0849	5.1377	1.5618	0.0137	36.0406	0.0314	129.8949	132.4445
7	0.0085	25.728	25.8901	5.1295	1.5477	0.0139	35.4805	0.0309	121.4193	123.9752
8	0.0090	25.5522	25.7173	5.1224	1.5384	0.0141	35.5803	0.0303	115.1397	117.6754
9	0.0095	25.3892	25.5564	5.1157	1.5251	0.0142	35.2166	0.0298	110.1589	112.6841
10	0.0100	25.2534	25.4227	5.1102	1.5182	0.0143	35.2034	0.0293	104.9975	107.5002
11	0.0105	25.1364	25.3097	5.1054	1.5109	0.0146	35.1342	0.0288	97.9893	100.4664
12	0.0110	25.0375	25.2147	5.1014	1.5055	0.0148	35.0379	0.0284	91.3651	93.7911
13	0.0115	24.958	25.1386	5.0981	1.5025	0.0151	35.1239	0.028	85.5128	87.9818
14	0.0120	24.8981	25.083	5.0957	1.4957	0.0154	35.0896	0.0276	78.9533	81.4505
15	0.0125	24.8561	25.0448	5.094	1.4977	0.0157	34.8732*	0.0271	72.9667	75.4599
16	0.0130	24.8318	25.0255	5.093	1.4943	0.0161	35.2921	0.0268	66.4551	69.018
17	0.0135	24.8184*	25.0153*	5.0924*	1.4938	0.0163	34.9936	0.0264	61.6939	64.2651
18	0.0140	24.8274	25.028	5.0928	1.4917*	0.0167	35.3173	0.0261	56.5811	59.2015
19	0.0145	24.8343	25.0396	5.0931	1.4956	0.0171	35.413	0.0258	51.0382	53.701
20	0.0150	24.8688	25.0798	5.0945	1.4957	0.0176	35.2976	0.0254	44.8677	47.67
21	0.0155	24.9202	25.1356	5.0966	1.4985	0.018	35.7259	0.0251	39.7871	42.7287
22	0.0160	24.9934	25.2139	5.0996	1.5031	0.0184	35.7868	0.0248	34.4731	37.6464
23	0.0165	25.0617	25.2875	5.1024	1.5072	0.0189	35.9486	0.0245	29.3924	32.8473
24	0.0170	25.1582	25.3898	5.1063	1.5121	0.0195	36.2436	0.0242	24.2706	28.0908
25	0.0175	25.2626	25.4992	5.1105	1.5218	0.02	36.8601	0.024	19.7827	24.0746
26	0.0180	25.3922	25.6344	5.1158	1.5283	0.0206	37.2599	0.0237	15.1107	20.1413
27	0.0185	25.5218	25.7708	5.1211	1.538	0.0213	37.9188	0.0235	10.2982	16.4087
28	0.0190	25.6656	25.9207	5.127	1.5469	0.0219	38.364	0.0232	5.8368	13.6473
29	0.0195	25.827	26.0883	5.1336	1.555	0.0226	38.8049	0.0229*	1.5224*	11.9854*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OAR – CCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	9.4254	9.6285	4.4644	0.5705	0.0064*	17.244	0.0272	321.936	323.2292
2	0.0005	7.8011	8.0486	4.3981	0.4721	0.0065	15.3734	0.0249	280.344	281.8588
3	0.0010	6.6914	6.9794	4.3529	0.4038	0.0066	14.1229	0.0235	257.534	258.9722
4	0.0015	5.6529	5.9909	4.3105	0.3385	0.0066	13.7657	0.0224	241.3779	243.0868
5	0.0020	4.7105	5.1108	4.272	0.2836	0.0066	12.5243	0.021	220.8279	222.6015
6	0.0025	3.8258	4.3146	4.236	0.232	0.0066	11.3357	0.0196	196.3272	197.8749
7	0.0030	3.0932	3.688	4.2061	0.1856	0.0067	10.4167	0.0158	135.3756	141.5828
8	0.0035	2.5035	3.205	4.182	0.1521	0.0067	10.203	0.0113	69.6108	73.627
9	0.0040	2.2366	2.9978	4.1711	0.1375	0.0066	10.0086	0.0099	49.5128	52.3244
10	0.0045	2.1101	2.9108	4.166	0.1308	0.0067	9.9951*	0.0092	38.0629	40.9033
11	0.0050	2.0433	2.8676	4.1632	0.1285	0.0067	10.1008	0.0088	30.2181	33.1105
12	0.0055	2.0096	2.8533*	4.1619	0.1265*	0.0068	10.0377	0.0085	23.6784	26.8604
13	0.0060	2.0039*	2.8587	4.1616*	0.1267	0.0069	10.2083	0.0082	18.5865	22.1095
14	0.0065	2.0335	2.8935	4.1628	0.1269	0.0071	10.4034	0.008	13.5547	17.5919
15	0.0070	2.0741	2.9307	4.1645	0.1291	0.0071	10.4858	0.0079	10.0178	14.6859
16	0.0075	2.1356	2.9893	4.167	0.1341	0.0073	10.5907	0.0077	5.9559	11.8606
17	0.0080	2.2093	3.0565	4.17	0.1357	0.0074	10.7207	0.0076	2.3706	10.1612
18	0.0085	2.297	3.1329	4.1736	0.1406	0.0076	10.9275	0.0075	-0.6478*	9.5803*
19	0.0090	2.4021	3.2235	4.1779	0.1475	0.0077	11.2737	0.0074*	-3.4722	9.8657
20	0.0095	2.516	3.3261	4.1825	0.1536	0.0079	11.3899	0.0074*	-6.6467	11.0904

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.021	45.7722	46.0098	5.9473	2.7671	0.0363*	62.499	0.1438	295.8485	297.4172
2	0.021	45.105	45.3538	5.9201	2.7221	0.0375	61.6424	0.1436	283.0962	284.7051
3	0.021	44.4073	44.6658	5.8916	2.6761	0.0384	62.1373	0.143	272.7163	274.4602
4	0.022	43.7407	44.0112	5.8644	2.646	0.0395	61.6388	0.1419	258.8319	260.7332
5	0.022	43.08	43.3622	5.8375	2.6008	0.0407	61.1188	0.1402	244.8095	246.8053
6	0.023	42.4524	42.7455	5.8119	2.5589	0.0416	60.5533	0.1382	232.0224	234.1543
7	0.024	41.8304	42.1367	5.7865	2.5211	0.0428	60.9372	0.1355	216.182	218.4686
8	0.024	41.2226	41.5437	5.7617	2.4834	0.0443	60.2727	0.1321	198.3849	200.8304
9	0.025	40.6524	40.9847	5.7384	2.4536	0.0452	60.7613	0.1285	184.3579	187.0444
10	0.025	40.0979	40.4452	5.7158	2.4147	0.0466	59.9144*	0.1243	166.7438	169.4664
11	0.025	39.5801	39.941	5.6947	2.3799	0.0478	60.4255	0.1202	151.2785	154.1636

12	0.026	39.076	39.4524	5.6741	2.3567	0.0493	60.8901	0.1157	134.8292	137.9909
13	0.026	38.6533	39.0434	5.6569	2.3237	0.0505	60.9164	0.1104	118.5659	122.5681
14	0.027	38.246	38.651	5.6403	2.3053	0.0519	61.0791	0.1032	98.8216	103.9949
15	0.028	37.8948	38.3124	5.6259	2.2799	0.053	61.1168	0.0946	78.3426	85.3497
16	0.028	37.5785	38.0093	5.613	2.2652	0.0542	61.418	0.0848	56.2643	65.5128
17	0.029	37.3333	37.783	5.603	2.2467	0.0563	61.4174	0.074	31.3794	45.1741
18	0.029	37.2058	37.6691	5.5978	2.2369	0.0578	61.7117	0.0644	11.349	31.5222
19	0.029	37.1557*	37.6299*	5.5958*	2.2345	0.0591	61.8465	0.0559	-5.3285*	25.7532*
20	0.030	37.1702	37.6535	5.5964	2.2294*	0.0603	62.9913	0.049*	-18.7598	28.6583

% denotes numbers in percent; * denotes the column-specific minimum/minima

OAR – NCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	4.1924	4.6526	4.2509	0.2502	0.0068	11.1782	0.0126	86.0629	92.9552
2	0.0005	3.2355	3.7948	4.2119	0.1936	0.0066	10.5976	0.0109	65.9408	70.0682
3	0.0010	2.7376	3.3728	4.1916	0.1644	0.0065	10.1836	0.01	54.6465	57.6646
4	0.0015	2.406	3.1016	4.178	0.148	0.0064*	9.6888	0.0095	48.3915	50.9839
5	0.0020	2.1683	2.9198	4.1683	0.1344	0.0064*	9.5193	0.0091	42.9263	45.2805
6	0.0025	2.0087	2.8083	4.1618	0.1261	0.0064*	9.5211	0.0088	37.4597	39.8554
7	0.0030	1.8822	2.7223	4.1567	0.1191	0.0064*	9.4624	0.0086	33.177	35.7075
8	0.0035	1.7978	2.6725	4.1532	0.1148	0.0065	9.4592*	0.0084	28.6229	31.3269
9	0.0040	1.7447	2.6436	4.151	0.1122	0.0066	9.6511	0.0082	24.6965	27.5883
10	0.0045	1.718	2.6344*	4.15	0.1106*	0.0066	9.7326	0.008	20.9556	24.078
11	0.0050	1.7117*	2.6376	4.1497*	0.1118	0.0067	9.7434	0.0079	17.5426	20.9585
12	0.0055	1.7257	2.6578	4.1503	0.1124	0.0068	9.8794	0.0078	13.9739	17.7863
13	0.0060	1.7626	2.6911	4.1518	0.1142	0.0069	10.1053	0.0077	11.0335	15.353
14	0.0065	1.8146	2.7391	4.1539	0.1181	0.007	10.1974	0.0076	7.761	12.9197
15	0.0070	1.8794	2.7946	4.1565	0.1219	0.0071	10.2994	0.0075	4.7448	11.0347
16	0.0075	1.9586	2.8636	4.1598	0.1247	0.0073	10.5973	0.0074	1.6182*	9.7433
17	0.0080	2.0525	2.9464	4.1636	0.1292	0.0074	10.6654	0.0073	-1.6639	9.491*
18	0.0085	2.1534	3.0295	4.1677	0.1351	0.0076	10.94	0.0073	-3.9441	9.9424
19	0.0090	2.2654	3.1242	4.1723	0.1398	0.0077	10.9798	0.0072*	-6.4856	10.9766
20	0.0095	2.3893	3.2322	4.1773	0.1487	0.0079	11.2905	0.0072*	-9.2615	12.6015

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0055	28.6359	28.7736	5.2482	1.7281	0.0132*	40.191	0.0391	196.5328	199.1407
2	0.0060	28.234	28.3744	5.2318	1.7044	0.0132*	39.9048	0.0381	187.6955	190.2083
3	0.0065	27.8549	27.9974	5.2163	1.6806	0.0133	39.2159	0.0372	180.3051	182.8215
4	0.0070	27.525	27.6705	5.2029	1.6625	0.0134	38.8625	0.0364	172.0565	174.5173
5	0.0075	27.2075	27.3563	5.1899	1.6391	0.0135	39.0314	0.0356	162.8094	165.2359
6	0.0080	26.9321	27.0835	5.1787	1.6276	0.0136	38.364	0.0348	155.29	157.6889
7	0.0085	26.6809	26.8366	5.1684	1.6129	0.0139	37.8521	0.034	145.1547	147.4865
8	0.0090	26.4529	26.6127	5.1591	1.6	0.0141	37.6734	0.0334	136.3122	138.618
9	0.0095	26.2587	26.4209	5.1512	1.5906	0.0142	37.5282	0.0328	130.1958	132.4795
10	0.0100	26.0747	26.2423	5.1437	1.577	0.0146	37.3671	0.0322	120.3538	122.6513
11	0.0105	25.925	26.0974	5.1376	1.5683	0.0149	37.1605	0.0316	111.5181	113.8169
12	0.0110	25.7845	25.961	5.1318	1.5652	0.0152	37.119	0.031	104.0029	106.2779
13	0.0115	25.6709	25.8529	5.1272	1.5557	0.0156	37.2298	0.0305	95.2262	97.4965
14	0.0120	25.5777	25.7643	5.1234	1.552	0.016	37.053	0.03	87.9395	90.2233
15	0.0125	25.4887	25.6815	5.1198	1.5449	0.0164	36.8643	0.0295	79.5362	81.8749
16	0.0130	25.4288	25.6249	5.1173	1.5441	0.0167	36.8181	0.0291	74.2696	76.6189
17	0.0135	25.3926	25.5952	5.1159	1.5393	0.0172	36.8048*	0.0286	66.3244	68.7053
18	0.0140	25.3569	25.5649	5.1144	1.5361	0.0176	36.9531	0.0282	59.6613	62.1227
19	0.0145	25.3447*	25.5579*	5.1139*	1.535	0.0181	37.034	0.0278	53.6306	56.1973
20	0.0150	25.3545	25.5735	5.1143	1.5332*	0.0186	37.3189	0.0274	47.5681	50.2399
21	0.0155	25.3661	25.5912	5.1148	1.5338	0.0191	37.1722	0.027	41.4493	44.3004
22	0.0160	25.4032	25.635	5.1163	1.5372	0.0197	37.1308	0.0266	35.2287	38.3121
23	0.0165	25.4544	25.6921	5.1184	1.5403	0.0203	37.395	0.0263	29.7056	33.0908
24	0.0170	25.5267	25.7701	5.1213	1.5464	0.0208	37.8085	0.0259	24.6643	28.4368
25	0.0175	25.6076	25.8585	5.1246	1.5508	0.0215	38.0955	0.0256	18.936	23.4469
26	0.0180	25.7023	25.9597	5.1285	1.5554	0.0222	38.3742	0.0253	13.9502	19.2428
27	0.0185	25.8116	26.0756	5.1329	1.5628	0.0228	38.8317	0.0249	9.219	15.725
28	0.0190	25.9428	26.214	5.1383	1.5723	0.0236	39.2104	0.0246	4.3229	12.9079
29	0.0195	26.0835	26.3613	5.144	1.5798	0.0243	39.5328	0.0243	-0.0027*	11.6569*

30	0.0200	26.2335	26.5187	5.1502	1.5884	0.0251	39.9433	0.024	-4.4112	11.9803
31	0.0205	26.4013	26.6945	5.157	1.5973	0.0259	40.4601	0.0237	-8.7808	13.8769
32	0.0210	26.5989	26.9002	5.1651	1.6096	0.0269	41.2353	0.0234	-12.9935	16.5893
33	0.0215	26.7884	27.0986	5.1728	1.6203	0.0279	41.5297	0.0231	-17.1025	19.7989
34	0.0220	26.9967	27.3147	5.1813	1.6308	0.0288	41.9445	0.0228	-20.707	22.8674
35	0.0225	27.2249	27.551	5.1906	1.6451	0.0298	42.6729	0.0225	-24.2809	26.0258
36	0.0230	27.4727	27.806	5.2007	1.6603	0.0307	43.2822	0.0223	-27.3352	28.7812
37	0.0235	27.7327	28.0763	5.2113	1.6742	0.0319	44.0091	0.0221	-30.8553	32.065
38	0.0240	27.997	28.3486	5.2221	1.6888	0.033	44.8927	0.0218	-33.8181	34.8638
39	0.0245	28.2797	28.6408	5.2336	1.7051	0.0343	45.7258	0.0216	-36.9361	37.8188
40	0.0250	28.5817	28.9518	5.246	1.7223	0.0355	46.4366	0.0214	-39.6909	40.4622
41	0.0255	28.8897	29.2692	5.2585	1.7417	0.0368	47.4067	0.0212	-42.3558	43.0237
42	0.0260	29.2213	29.6118	5.2721	1.7624	0.0383	48.1956	0.021	-45.1023	45.6836
43	0.0265	29.5647	29.9645	5.2861	1.78	0.0397	49.2194	0.0208	-47.4874	47.9961
44	0.0270	29.9208	30.3295	5.3006	1.8018	0.041	49.8807	0.0206	-49.6766	50.1283
45	0.0275	30.2998	30.7197	5.3161	1.8191	0.0427	50.8327	0.0205	-51.9765	52.3744
46	0.0280	30.6876	31.1179	5.3319	1.8461	0.0443	51.8037	0.0204	-53.9957	54.3546
47	0.0285	31.0902	31.5317	5.3483	1.8672	0.0461	52.7908	0.0203	-55.999	56.3223
48	0.0290	31.5041	31.9579	5.3652	1.8889	0.048	54.0067	0.0202	-57.9594	58.2536
49	0.0295	31.9388	32.405	5.3829	1.9123	0.05	54.9844	0.0201	-59.8251	60.0906
50	0.0300	32.3817	32.8587	5.401	1.9398	0.0518	56.129	0.02*	-61.4045	61.6481

% denotes numbers in percent; * denotes the column-specific minimum/minima

No Contamination

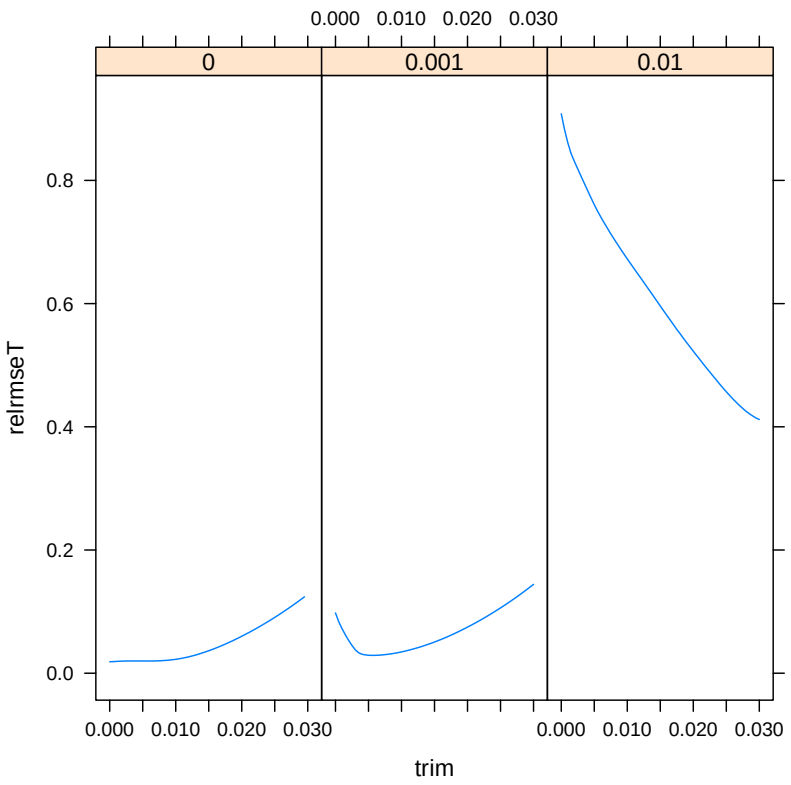
	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	0.0107*	1.855*	4.0803	0.0763*	0.0057*	7.3522	0.0072	25.5103	27.6229
2	0.0005	-0.2969	1.8808	4.0678	0.0773	0.0057*	7.1635	0.007	22.7247	25.0327
3	0.0010	-0.4497	1.915	4.0615	0.0782	0.0058	6.9598	0.0069	20.0582	22.6387
4	0.0015	-0.5482	1.9428	4.0575	0.0783	0.0058	6.8635*	0.0068	17.7403	20.5608
5	0.0020	-0.6036	1.967	4.0552	0.0804	0.0058	6.9793	0.0067	15.0513	18.1924
6	0.0025	-0.6329	1.9805	4.054	0.0802	0.0059	6.9149	0.0066	12.9933	16.4431
7	0.0030	-0.6354	1.9886	4.0539*	0.0812	0.0059	6.9034	0.0066	10.8546	14.6458
8	0.0035	-0.611	1.9882	4.0549	0.0811	0.006	6.9988	0.0065	8.9514	13.1935
9	0.0040	-0.5805	1.9901	4.0562	0.0811	0.006	7.1322	0.0064	6.7019	11.5751
10	0.0045	-0.528	1.9892	4.0583	0.0806	0.0061	7.323	0.0064	4.3513	10.1912
11	0.0050	-0.4598	1.9845	4.0611	0.0793	0.0062	7.4428	0.0063	2.276	9.3249
12	0.0055	-0.383	1.9802	4.0642	0.0785	0.0063	7.5997	0.0063	0.4572*	8.9491
13	0.0060	-0.2946	1.9828	4.0678	0.0781	0.0064	7.9262	0.0063	-1.8424	8.9131*
14	0.0065	-0.195	1.9896	4.0719	0.0788	0.0065	7.9779	0.0063	-4.1578	9.4651
15	0.0070	-0.086	1.9991	4.0764	0.0798	0.0066	8.219	0.0062*	-6.1161	10.3464
16	0.0075	0.032	2.0188	4.0812	0.0789	0.0068	8.2964	0.0062*	-8.3384	11.6752
17	0.0080	0.1552	2.0463	4.0862	0.0794	0.0069	8.4715	0.0062*	-10.4871	13.1962
18	0.0085	0.2939	2.0783	4.0919	0.0808	0.007	8.6743	0.0062*	-12.1377	14.4762
19	0.0090	0.4357	2.1267	4.0976	0.082	0.0072	8.9703	0.0062*	-14.3234	16.2914
20	0.0095	0.5846	2.1862	4.1037	0.086	0.0074	9.3069	0.0062*	-16.4443	18.1244

% denotes numbers in percent; * denotes the column-specific minimum/minima

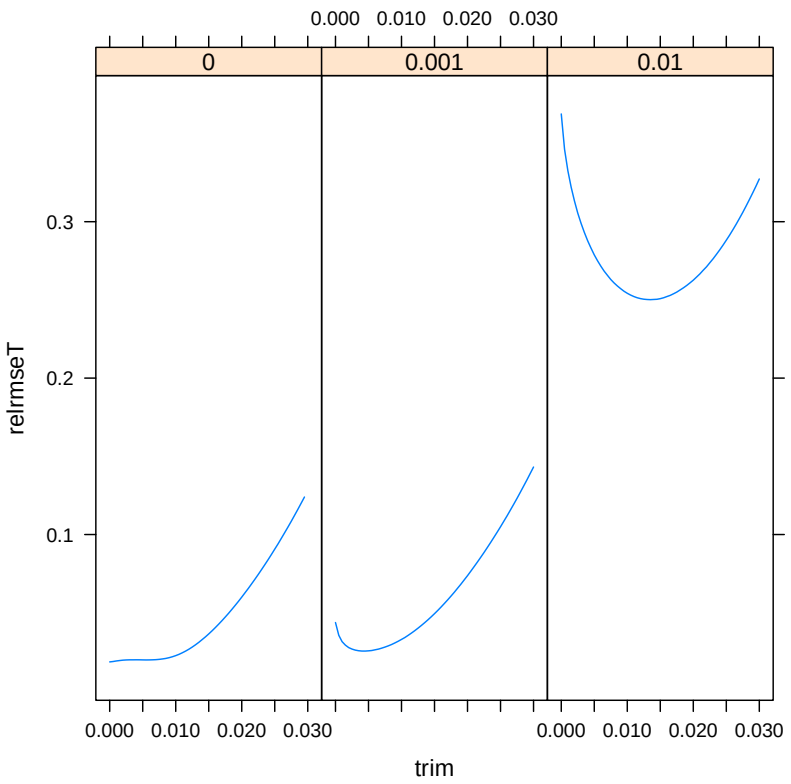
E.13.5. Plots

In this section, we report graphical displays of certain numerical criteria for the estimators. The lattice-type plots are partitioned into panels for different values of OTypeEpsilon.

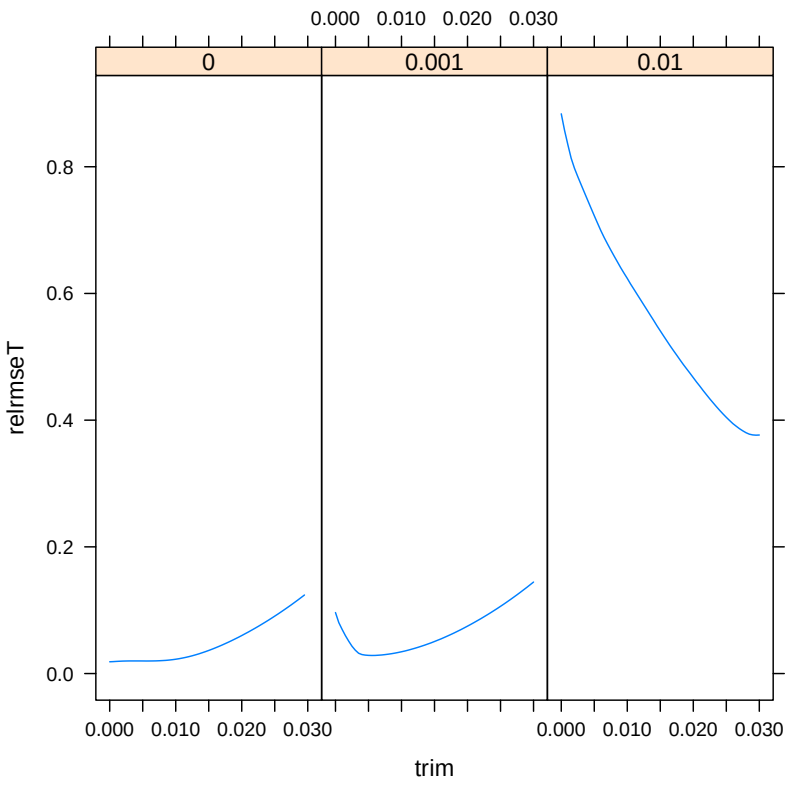
OCAR – CCAR



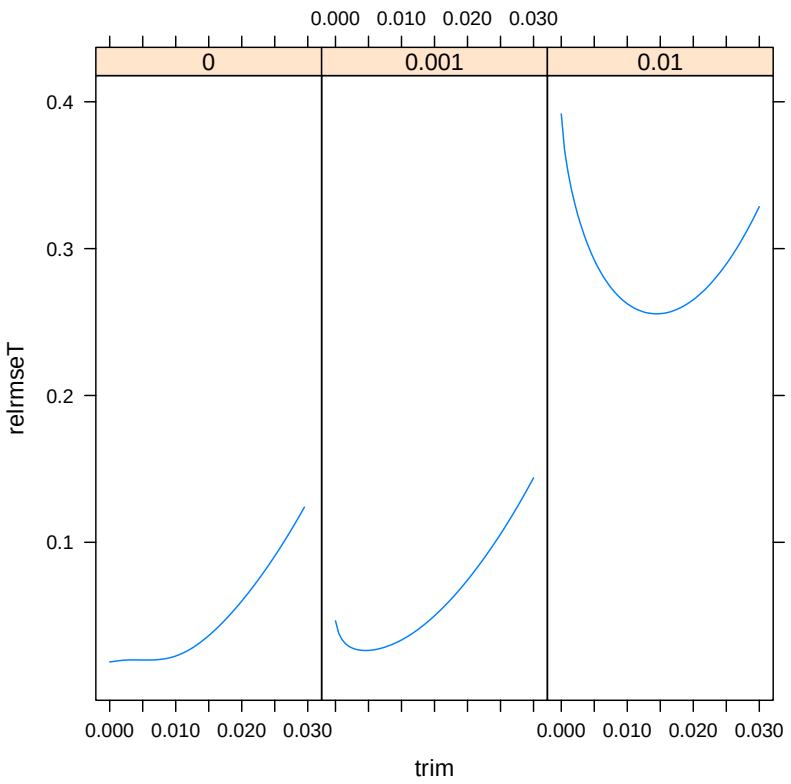
OCAR – NCAR



OAR – CCAR



OAR – NCAR



E.14. N0004: TQSR @ A-ATSILC: hhsrs1kx6k

Sample Design Ref 1.2

E.14.1. Simulation Setup

Target Indicator:	QSR
Domains:	[none] (default)
Population:	A-AT-SILC
Sample:	hhsrs1kx6k
MonteCarlo Replicates:	1,000 (default)
Criteria Set:	Univariate criteria (default)
Method:	TQSR
Outlyingness:	OAR,OCAR,uncontaminated
Contamination:	CCAR,NCAR,uncontaminated
Missingness:	[none] (default)
Simulation Environment:	DBsim
Host:	FHNW
Author:	Beat Hulliger and Tobias Schoch
ID:	AggTQSR_hhsrs1kx6k
Date:	September 5, 2011

E.14.2. Estimator Specifications

`Specifications:` Trimmed quintile share ratio estimator; trims only at the top right end of the distribution. Variance estimates based on linearization.

`Comments:`

E.14.3. Robustness Parameters

This section gives some summary statistics of the robustness tuning parameters and the relative number of outliers (OType-Epsilon).

OCAR – CCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

OCAR – NCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

OAR – CCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

OAR – NCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

No Contamination

```
Range of  trim
    Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
0.000000 0.007375 0.014750 0.014750 0.022120 0.029500
Range of OTypeEpsilon

 0
60
```

E.14.4. Results

In this section, we summarize the performance of the estimators due to numerical criteria. The section is split into the different subsections for the respective combination of the outlyingness and contamination mechanisms. In addition, each subsection is further partitioned for the different values of OTypeEpsilon.

OCAR – CCAR

OTypeEpsilon=0.001

```
     trim relbiasT% relrmseT%    avgT  medaeT    varT relmaxeT%    avgV relbiasV% relrmseV%
1  0.0000  9.5767     9.7796  4.4706  0.5824  0.0065    16.9387 0.0271   313.6843  314.9659
2  0.0005  7.4817     7.7368  4.3851  0.4532  0.0065    14.8091 0.0249   285.3597  286.7356
3  0.0010  5.6891     6.017   4.312   0.3457  0.0064    13.2263 0.0237   270.3521  271.6666
4  0.0015  4.0562     4.4951  4.2454  0.2463  0.0063    11.2524 0.0224   258.8692  260.4109
5  0.0020  2.4963     3.1382  4.1817  0.1527  0.006     9.4447  0.0209   246.3572  248.3388
6  0.0025  1.0255     2.1485  4.1217  0.0855  0.0059    8.5077  0.0192   223.0447  224.8292
7  0.0030  -0.3531*   1.9191* 4.0655  0.0775* 0.0059    6.8771  0.0154   159.8586  167.0089
8  0.0035  -1.5096    2.407   4.0183  0.1022  0.0059    5.5541  0.0108   85.1377   90.0036
9  0.0040  -2.3927    3.0116  3.9822  0.1444  0.0056    4.6286  0.0092   64.2151   66.836
10 0.0045  -3.1179    3.6071  3.9527* 0.1887  0.0055*   3.7536* 0.0084*  52.5046*  55.1378*
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
```

OTypeEpsilon=0.01

```
    trim relbiasT% relrmseT%    avgT  medaeT    varT relmaxeT%    avgV relbiasV% relrmseV%
1  0.000  90.7545    90.8072 7.7825  5.4906  0.0159   101.3996 0.1758  1002.9447 1004.3894
2  0.020  13.6382    13.8188 4.6363  0.8232  0.0083   21.3355  0.0872  955.5187  958.1183
3  0.021  12.202     12.4015 4.5777  0.7403  0.0082   19.5375  0.0855  944.8977  947.3933
4  0.021  10.7858    11.0032 4.5199  0.6534  0.0079   17.7617  0.0839  963.5097  965.9197
5  0.021  9.3646     9.6147  4.4619  0.5665  0.0079   16.8155  0.0825  943.0746  945.335
6  0.022  7.9703     8.2589  4.405   0.4829  0.0078   14.8885  0.0811  939.1773  941.4709
7  0.022  6.6013     6.941   4.3492  0.3998  0.0077   13.9615  0.0797  939.7011  942.0375
8  0.023  5.2257     5.64    4.2931  0.3182  0.0075   11.8946  0.0782  942.9301  945.4122
9  0.024  3.8896     4.4301  4.2386  0.2349  0.0075   10.9843  0.0766  921.9021  924.4989
10 0.024  2.5344     3.2941  4.1833  0.1573  0.0074   9.1479   0.0747  911.8642  914.7541
11 0.025  1.2167     2.4106  4.1295  0.0978  0.0072   7.6652   0.0726  905.8649  909.0725
12 0.025  -0.0736*   2.0721* 4.0769  0.0789* 0.0071   6.4365   0.0703  883.9271  887.734
13 0.025  -1.3504    2.4641  4.0248  0.1045  0.0071   4.945    0.0678  857.3062  861.7216
14 0.026  -2.602     3.3086  3.9737  0.1603  0.007    4.0237   0.0651  836.0396  840.9144
15 0.026  -3.8264    4.3262  3.9238  0.2304  0.0068   2.332    0.0623  817.2111  822.2966
16 0.027  -5.0275    5.4164  3.8748  0.3047  0.0068   1.416    0.0592  774.1936  779.565
17 0.028  -6.1921    6.5024  3.8272  0.372   0.0066   -0.2391* 0.056   753.5692  759.6205
18 0.028  -7.3449    7.6064  3.7802  0.4446  0.0065   -1.1336  0.0525  706.1624  712.9367
19 0.029  -8.4408    8.6645  3.7355  0.5108  0.0064   -2.0192  0.049   667.6538  675.7884
20 0.029  -9.5032    9.697   3.6921  0.5744  0.0062   -3.3969  0.0447  620.8487  631.1341
21 0.029  -10.5424   10.7125 3.6498  0.6396  0.006    -4.3188  0.0401  565.2874  578.73
22 0.030  -11.524    11.6761 3.6097* 0.6978  0.0059*  -5.3616  0.0352* 498.6162* 516.182*
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
```

OCAR – NCAR

OTypeEpsilon=0.001

```
     trim relbiasT% relrmseT%    avgT  medaeT    varT relmaxeT%    avgV relbiasV% relrmseV%
1  0.0000  3.8678     4.3736  4.2377  0.2295  0.0069    11.4307 0.0122   75.366    84.4464
2  0.0005  2.3561     3.0704  4.176   0.1435  0.0065    9.86    0.0103   58.9565   63.803
3  0.0010  1.2867     2.3067  4.1324  0.0935  0.0061    9.1177  0.0093   52.9443   55.874
4  0.0015  0.4087     1.9322  4.0965  0.0769* 0.0059    7.9516  0.0088   47.7081   50.045
5  0.0020  -0.3927*   1.9085* 4.0638  0.0772  0.0058    7.1001  0.0084   43.8106   46.0072
```

```
6  0.0025  -1.1185    2.1634  4.0342  0.0906  0.0057    6.3928  0.008    40.0832   42.2179
7  0.0030  -1.8103    2.5792  4.006   0.1182  0.0056    5.8778  0.0077   36.7727   38.9563
8  0.0035  -2.4623    3.063   3.9794  0.1521  0.0055    4.8409  0.0074   34.0595   36.2573
9  0.0040  -3.0842    3.5725  3.954   0.1882  0.0054    4.0765  0.0072   32.2309   34.4733
10 0.0045  -3.6856    4.0979  3.9295* 0.224   0.0053*   3.4873* 0.0069*  29.5248*  31.8761*
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
```

OTypeEpsilon=0.01

```
    trim relbiasT% relrmseT%    avgT  medaeT    varT relmaxeT%    avgV relbiasV% relrmseV%
1  0.000   36.7485   36.8889 5.5792  2.2206  0.0172    49.3154 0.0563   226.6151 233.0587
2  0.010   9.5345    9.7858  4.4689  0.5733  0.0081    17.5176 0.022    171.4358 173.981
3  0.011   8.6611    8.9322  4.4332  0.5208  0.0079    16.5985 0.0213   167.7245 170.222
4  0.011   7.8071    8.1013  4.3984  0.469   0.0078    15.6914 0.0206   164.2453 166.6565
5  0.011   6.9742    7.2958  4.3644  0.4174  0.0076    14.5903 0.02     161.555  163.9869
6  0.012   6.1581    6.5129  4.3311  0.3706  0.0075    13.7268 0.0194   158.7868 161.2083
7  0.013   5.3614    5.7582  4.2986  0.3204  0.0074    12.9829 0.0188   155.5214 157.8898
8  0.013   4.5795    5.0312  4.2667  0.2741  0.0072    12.0599 0.0182   152.1837 154.5598
9  0.013   3.8098    4.3281  4.2353  0.229   0.007     11.3501 0.0177   151.9992 154.3202
10 0.014   3.0586    3.6731  4.2047  0.1815  0.0069    10.8339 0.0172   149.6303 151.9281
11 0.015   2.3109    3.066   4.1741  0.1381  0.0068    9.7771  0.0167   146.9562 149.2046
12 0.015   1.5825    2.551   4.1444  0.1049  0.0067    9.0884  0.0162   143.1426 145.3926
13 0.015   0.8707    2.1628  4.1154  0.0851  0.0065    8.4152  0.0157   140.9553 143.1959
14 0.016   0.1769*   1.9703* 4.0871  0.0785* 0.0064    7.6722  0.0153   138.1898 140.4474
15 0.017   -0.5184   2.0143  4.0587  0.0829  0.0063    6.8579  0.0148   135.1545 137.4247
16 0.017   -1.1938   2.2689  4.0312  0.0953  0.0062    6.3027  0.0144   132.6329 134.892
17 0.018   -1.8605   2.6679  4.004   0.1182  0.0061    5.362   0.014    130.0374 132.2993
18 0.018   -2.507    3.1439  3.9776  0.1529  0.006     4.7527  0.0136   127.1298 129.4053
19 0.018   -3.1538   3.6742  3.9512  0.1913  0.0059    4.1538  0.0132   123.7581 126.0049
20 0.019   -3.7909   4.2264  3.9252  0.2292  0.0058    3.4122  0.0129   121.118  123.3652
21 0.019   -4.414    4.7881  3.8998  0.2684  0.0057    2.7509  0.0125   117.7153 119.9595
22 0.020   -5.0337   5.3591  3.8745* 0.3045  0.0056*   2.1056* 0.0121*  115.162* 117.4064*
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
```

OAR – CCAR

OTypeEpsilon=0.001

```
     trim relbiasT% relrmseT%    avgT  medaeT    varT relmaxeT%    avgV relbiasV% relrmseV%
1  0.0000  9.4254     9.6285  4.4644  0.5705  0.0064    17.244  0.0272   321.936   323.2292
2  0.0005  7.1771     7.44    4.3727  0.4348  0.0064    14.6172 0.0246   283.4556  284.9744
3  0.0010  5.4547     5.7904  4.3024  0.3301  0.0063    12.6628 0.0229   263.688   265.132
4  0.0015  3.816      4.2726  4.2356  0.2284  0.0062    11.5675 0.0216   250.4007  252.1233
5  0.0020  2.2838     2.9703  4.173   0.1411  0.006     9.6     0.02     232.5881  234.3792
6  0.0025  0.8205     2.059   4.1133  0.0828  0.0059    7.7539  0.0184   210.4622  212.0242
7  0.0030  -0.4853*   1.9386* 4.0601  0.0809* 0.0059    6.1337  0.0146   149.5273  155.8744
8  0.0035  -1.6449    2.4749  4.0128  0.1089  0.0057    5.2501  0.0103   81.0254   84.9617
9  0.0040  -2.4868    3.0806  3.9784  0.152   0.0055    4.372   0.0089   61.7742   64.4063
10 0.0045  -3.1937    3.6668  3.9496* 0.193   0.0054*   3.6354* 0.0082*  51.2519*  53.7662*
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
```

OTypeEpsilon=0.01

```
    trim relbiasT% relrmseT%    avgT  medaeT    varT relmaxeT%    avgV relbiasV% relrmseV%
1  0.000  88.3037    88.3578 7.6825  5.3484  0.0159   100.4966 0.1816  1042.5627 1044.1277
2  0.020  9.6855     9.9352  4.475   0.5847  0.0082   19.0261  0.0795  874.472   876.4652
3  0.021  8.2779     8.563   4.4176  0.5016  0.008    17.3481  0.0782  877.3926  879.341
4  0.021  6.9127     7.2507  4.3619  0.4183  0.008    15.6852  0.0768  863.1448  865.1441
5  0.021  5.5318     5.941   4.3056  0.335   0.0078   14.0516  0.0752  861.5196  863.7705
6  0.022  4.1841     4.7079  4.2506  0.2539  0.0078   13.1612  0.0734  845.7948  848.3742
7  0.022  2.8503     3.5614  4.1962  0.1734  0.0076   11.3653  0.0713  838.1427  840.9939
8  0.023  1.5528     2.6269  4.1432  0.1099  0.0075   10.3115  0.069   823.0433  826.1463
9  0.024  0.2638*    2.1224* 4.0906  0.0847* 0.0074   9.084    0.0665  800.2403  803.7015
10 0.024  -1.0034    2.3271  4.0389  0.0897  0.0073   7.3262   0.0637  767.7844  771.6599
11 0.025  -2.236     3.0519  3.9886  0.1394  0.0072   5.761    0.0609  747.3944  751.6295
12 0.025  -3.4484    4.0193  3.9392  0.2071  0.0071   4.9058   0.0579  714.7211  718.9532
13 0.025  -4.6282    5.0571  3.891   0.28    0.0069   3.2234   0.0549  693.2898  697.7382
14 0.026  -5.791     6.1407  3.8436  0.3492  0.007    2.2803   0.0519  646.0803  650.9955
15 0.026  -6.891     7.1825  3.7987  0.413   0.0068   0.5775   0.0486  610.6491  617.041
```

16	0.027	-7.9749	8.2207	3.7545	0.4803	0.0066	-0.3381*	0.0445	570.8106	579.1978
17	0.028	-9.013	9.227	3.7121	0.5422	0.0065	-1.247	0.04	514.3867	525.5348
18	0.028	-10.0239	10.2127	3.6709	0.6018	0.0064	-2.1522	0.035	450.427	464.083
19	0.029	-10.9837	11.1546	3.6317	0.6633	0.0063	-3.9194	0.0299	373.9072	390.4989
20	0.029	-11.865	12.0154	3.5958	0.7161	0.006	-5.1847	0.0253	323.3611	341.0659
21	0.029	-12.6905	12.8267	3.5621	0.7654	0.0058	-6.2422	0.0215	270.7817	287.5185
22	0.030	-13.4741	13.5952	3.5301*	0.8153	0.0055*	-7.1829	0.0183*	234.4472*	250.2583*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OAR – NCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	4.1924	4.6526	4.2509	0.2502	0.0068	11.1782	0.0126	86.0629	92.9552
2	0.0005	2.6383	3.2885	4.1875	0.1585	0.0064	9.8727	0.0107	67.1194	71.2376
3	0.0010	1.5472	2.474	4.143	0.1038	0.0062	8.7739	0.0097	56.8289	59.8151
4	0.0015	0.6263	1.9991	4.1054	0.0801	0.006	7.5694	0.0091	51.5367	54.0727
5	0.0020	-0.198*	1.8841*	4.0718	0.077*	0.0058	6.6732	0.0086	47.5157	49.7715
6	0.0025	-0.9424	2.0832	4.0414	0.0849	0.0058	5.9976	0.0082	43.356	45.5936
7	0.0030	-1.6523	2.4713	4.0125	0.1082	0.0056	5.2164	0.0079	40.5564	42.8482
8	0.0035	-2.32	2.9524	3.9852	0.1434	0.0056	4.5397	0.0076	37.0254	39.3848
9	0.0040	-2.9534	3.4634	3.9594	0.1778	0.0055	4.0329	0.0073	34.5877	36.9848
10	0.0045	-3.5629	3.9892	3.9345*	0.2159	0.0054*	3.388*	0.0071*	32.2619*	34.6887*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.000	39.0449	39.1714	5.6728	2.356	0.0165	51.2677	0.0629	281.6611	288.8258
2	0.011	9.307	9.557	4.4596	0.5631	0.0079	18.1849	0.0233	196.9557	199.4231
3	0.011	8.4118	8.6811	4.4231	0.5065	0.0077	17.181	0.0226	194.1454	196.5711
4	0.011	7.5402	7.8351	4.3875	0.4528	0.0076	16.432	0.0218	188.8807	191.2665
5	0.012	6.6891	7.0127	4.3528	0.4032	0.0074	15.3602	0.0211	185.9164	188.2737
6	0.013	5.847	6.2098	4.3184	0.3529	0.0073	14.3023	0.0204	180.4791	182.8154
7	0.013	5.0313	5.4385	4.2851	0.304	0.0071	13.3876	0.0198	178.9777	181.2881
8	0.013	4.2355	4.707	4.2527	0.2559	0.007	12.5029	0.0192	173.2712	175.5215
9	0.014	3.4442	3.9999	4.2204	0.208	0.0069	11.8329	0.0186	169.6332	171.8854
10	0.015	2.6716	3.3425	4.1889	0.1628	0.0067	10.9703	0.018	168.2243	170.4872
11	0.015	1.92	2.7665	4.1582	0.1245	0.0066	10.313	0.0175	164.7321	166.9727
12	0.015	1.1712	2.2971	4.1277	0.0939	0.0065	9.1797	0.017	160.6335	162.8706
13	0.016	0.4445	2.0128	4.098	0.0821	0.0064	8.4521	0.0164	155.978	158.2157
14	0.017	-0.2691*	1.962*	4.0689	0.077*	0.0063	7.6454	0.0159	153.1508	155.3913
15	0.017	-0.9683	2.1548	4.0404	0.0892	0.0062	6.955	0.0155	150.2437	152.4827
16	0.018	-1.6559	2.5296	4.0123	0.1091	0.0061	6.1861	0.015	145.7919	148.0975
17	0.018	-2.334	3.0081	3.9846	0.1442	0.006	5.4251	0.0145	141.9866	144.2453
18	0.018	-3.0011	3.5434	3.9574	0.1823	0.0059	4.5851	0.0141	138.1032	140.3354
19	0.019	-3.6509	4.0992	3.9309	0.2204	0.0058	3.8495	0.0136	135.5997	137.784
20	0.019	-4.294	4.6748	3.9047	0.2608	0.0057	3.1431	0.0132	132.356	134.5046
21	0.020	-4.9289	5.2587	3.8788*	0.2955	0.0056*	2.5241*	0.0128*	128.8169*	130.9443*

% denotes numbers in percent; * denotes the column-specific minimum/minima

No Contamination

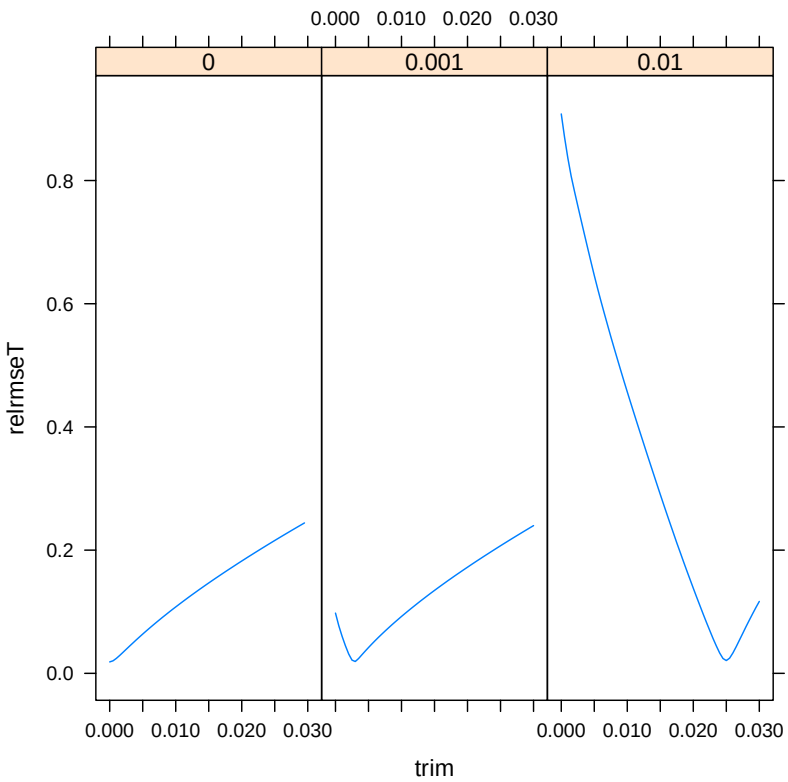
	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	0.0107*	1.855*	4.0803	0.0763*	0.0057	7.3522	0.0072	25.4161	27.5329
2	0.0005	-0.8697	2.0354	4.0444	0.0824	0.0056	6.468	0.007	23.2201	25.4887
3	0.0010	-1.5927	2.4227	4.0149	0.1069	0.0056	5.5895	0.0067	21.3588	23.8308
4	0.0015	-2.2591	2.8938	3.9877	0.1423	0.0054	4.8524	0.0065	19.9252	22.5302
5	0.0020	-2.8819	3.3956	3.9623	0.1765	0.0054	4.2444	0.0064	18.2483	21.0085
6	0.0025	-3.4777	3.9066	3.938	0.2135	0.0053	3.5118	0.0062	17.1438	20.0113
7	0.0030	-4.0472	4.4152	3.9147	0.2465	0.0052	2.8163	0.006	16.1717	19.0951
8	0.0035	-4.59	4.9123	3.8926	0.2808	0.0051	2.2405	0.0059	15.328	18.3398
9	0.0040	-5.1255	5.4119	3.8708	0.311	0.005	1.6846	0.0058	14.3772	17.4452
10	0.0045	-5.6397	5.8985	3.8498	0.3444	0.005	1.1981	0.0056	13.0621	16.2788
11	0.0050	-6.1387	6.3741	3.8294	0.3741	0.0049	0.6595	0.0055	12.2027	15.5323
12	0.0055	-6.6307	6.8459	3.8093	0.4045	0.0048	0.1232*	0.0054	11.6624	15.0925
13	0.0060	-7.1111	7.3103	3.7897	0.4333	0.0048	-0.2412	0.0053	10.5481	14.1449
14	0.0065	-7.5807	7.7655	3.7706	0.4608	0.0047	-0.8773	0.0052	9.8201	13.532

```
15 0.0070  -8.0422    8.2144  3.7518  0.4884  0.0047    -1.3402 0.0051   9.2424    13.0644
16 0.0075  -8.4949    8.6565  3.7333  0.5166  0.0046    -1.9374 0.005    8.3223    12.3623
17 0.0080  -8.9445    9.0964  3.7149  0.5431  0.0046    -2.3665 0.0049   7.7155    11.9109
18 0.0085  -9.3812    9.5237  3.6971  0.5697  0.0045    -2.8843 0.0048   7.6391    11.8354
19 0.0090  -9.8143    9.9494  3.6795  0.5958  0.0044    -3.3528 0.0047   6.736     11.2445
20 0.0095  -10.2401   10.3681 3.6621  0.6226  0.0044    -3.7235 0.0047   6.1523    10.8774
21 0.0100  -10.6577   10.7793 3.645   0.6469  0.0043    -4.2215 0.0046   5.6371    10.5592
22 0.0105  -11.072    11.1873 3.6281  0.6709  0.0043    -4.6262 0.0045   5.5751    10.4868
23 0.0110  -11.4831   11.5934 3.6114  0.6952  0.0042    -4.9415 0.0044   4.7035    9.9584
24 0.0115  -11.8867   11.992  3.5949  0.7201  0.0042    -5.3428 0.0044   4.2882    9.7215
25 0.0120  -12.2882   12.3891 3.5785  0.7437  0.0041    -5.9575 0.0043   3.609     9.378
26 0.0125  -12.6823   12.7788 3.5624  0.7685  0.0041    -6.4416 0.0042   3.434     9.2718
27 0.0130  -13.0728   13.1656 3.5465  0.7922  0.0041    -6.8745 0.0042   2.7392    8.9451
28 0.0135  -13.4594   13.5485 3.5307  0.8145  0.004     -7.1387 0.0041   2.3502    8.7477
29 0.0140  -13.8376   13.9234 3.5153  0.8375  0.004     -7.6829 0.004*   2.0445    8.6115
30 0.0145  -14.2199   14.3026 3.4997* 0.8606  0.0039*   -7.984  0.004*   1.5532*   8.4596*
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
```

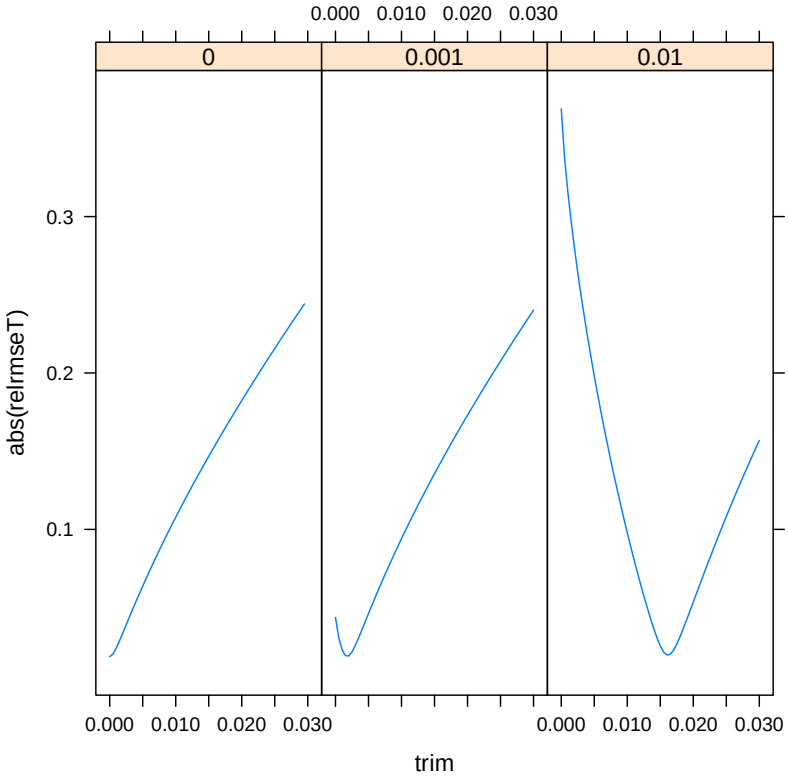
E.14.5. Plots

In this section, we report graphical displays of certain numerical criteria for the estimators. The lattice-type plots are partitioned into panels for different values of OTypeEpsilon.

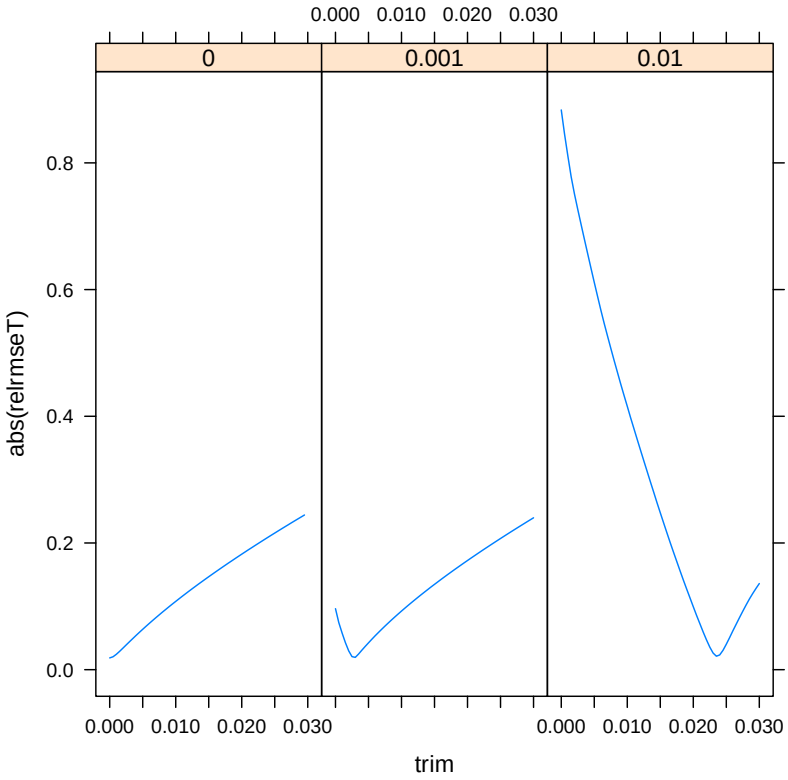
OCAR – CCAR



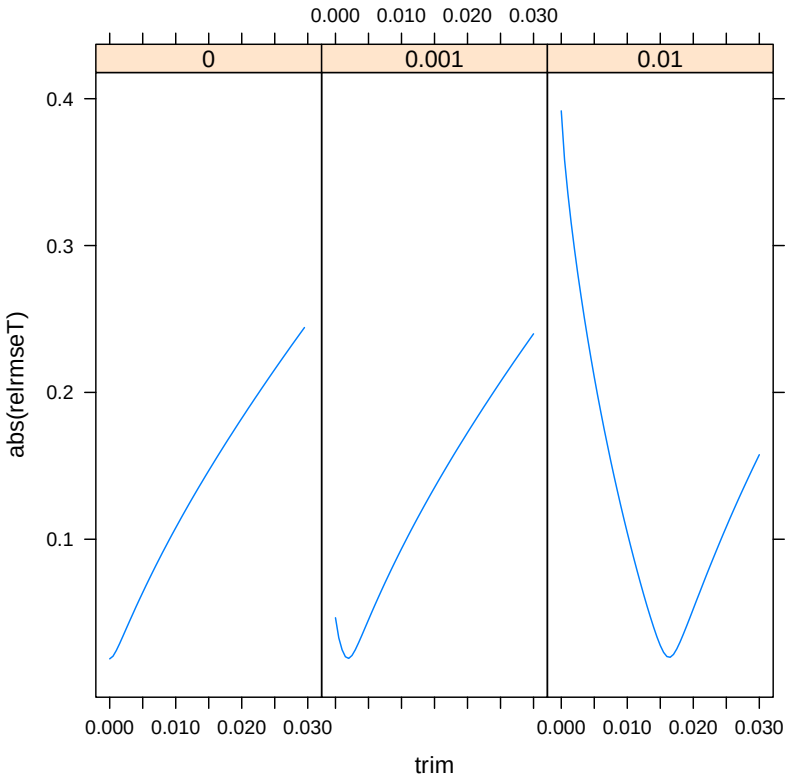
OCAR – NCAR



OAR – CCAR



OAR – NCAR



E.15. N0005: RHT @ A-ATSILC: sthhsrs1kx6k

Sample Design Ref 1.4a

E.15.1. Simulation Setup

Target Indicator:	mean (default)
Domains:	[none] (default)
Population:	A-AT-SILC
Sample:	sthhsrs1kx6k
MonteCarlo Replicates:	1,000 (default)
Criteria Set:	Univariate criteria (default)
Method:	rht
Outlyingness:	28,116
Contamination:	28,116
Missingness:	[none] (default)
Simulation Environment:	DBsim
Host:	FHNW
Author:	Beat Hulliger and Tobias Schoch
ID:	AggRHT_sthhsrs1kx6k
Date:	September 5, 2011

E.15.2. Estimator Specifications

`Specifications:` `(1) Robust Horvitz-Thompson estimator with Huber's psi-function; (2) Variance estimates from linearization variance estimation ignoring the contribution of the unknown scale-estimator to the influence function (underestimation of the variance); (3) algorithm: IRWLS, restricted to a maximum of 50 iterations`

`Comments:` Note that for this sample design (i.e, stratified simple random sample with proportional allocation) the estimators RWM and RHT are identical. Thus, we confine ourselves to study only RHT.

E.15.3. Robustness Parameters

This section gives some summary statistics of the robustness tuning parameters and the relative number of outliers (OType-Epsilon).

OCAR – CCAR

```
Range of  k
     Min.   1st Qu.    Median      Mean   3rd Qu.      Max.
    1.000     6.571    16.470   364.100    34.530 10000.000
Range of OTypeEpsilon

0.001  0.01
   29    29
```

OCAR – NCAR

```
Range of  k
     Min.   1st Qu.    Median      Mean   3rd Qu.      Max.
    1.000     6.571    16.470   364.100    34.530 10000.000
Range of OTypeEpsilon

0.001  0.01
   29    29
```

OAR – CCAR

```
Range of  k
     Min.   1st Qu.    Median      Mean   3rd Qu.      Max.
    1.000     6.571    16.470   364.100    34.530 10000.000
Range of OTypeEpsilon

0.001  0.01
   29    29
```

OAR – NCAR

```
Range of  k
     Min.   1st Qu.    Median      Mean   3rd Qu.      Max.
    1.000     6.571    16.470   364.100    34.530 10000.000
Range of OTypeEpsilon

0.001  0.01
   29    29
```

No Contamination

```
Range of  k
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  1.000   6.468  15.180  19.930  32.590  50.000
Range of OTypeEpsilon

uncontaminated
            28
```

E.15.4. Results

In this section, we summarize the performance of the estimators due to numerical criteria. The section is split into the different subsections for the respective combination of the outlyingness and contamination mechanisms. In addition, each subsection is further partitioned for the different values of OTypeEpsilon.

OCAR – CCAR

OTypeEpsilon=0.001

```
      k relbiasT% relrmseT%      avgT  medaeT      varT relmaxeT%      avgV relbiasV% relrmseV%
1   3.1     -1.49     1.65  19825.63* 455.52  20434.79*     1.21* 18767.64*    -8.16     8.96
2   3.6     -0.99     1.22  19926.76  304.49  21135.51      1.79  19922.33     -5.74     6.98
3   4.3     -0.39     0.84  20045.94  173.2   22041.02      2.51  21546.13     -2.25*    4.88*
4   5.4     0.24*     0.79* 20174.61  159.92* 22902.79      3.31  23748.87     3.69      6.09
```

```
5   6.2     0.53      0.93  20232.77  185.66  23251.16      3.65  24967.75     7.38      8.97
6   6.6     0.67      1.01  20260.46  219.17  23427         3.81  25618.2      9.35      10.71
7   7.7     0.99      1.25  20324.15  295.81  23804.13      4.17  27354.51     14.91     15.9
8   8.7     1.22      1.44  20370.74  361.12  24094.55      4.42  28909.86     19.99     20.81
9   8.9     1.24      1.46  20375.78  368.69  24124.11      4.44  29095.71     20.61     21.42
10 10.0     1.47      1.66  20420.25  434.43  24366.25      4.66  30913.9      26.87     27.58
11 11.3     1.69      1.87  20466.43  503.64  24599.65      4.88  33166.47     34.82     35.46
12 13.9     2.1       2.24  20547.76  623.16  24789.64      5.31  37987.52     53.24     53.75
13  Inf     3.62      3.7   20853.56  1081.55 23863.38      6.83  63276.35     165.16    165.45
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
Inf is defined as  k = 10000
```

OTypeEpsilon=0.01

```
    k relbiasT% relrmseT%      avgT   medaeT     varT relmaxeT%      avgV relbiasV% relrmseV%
1 1.0     -5.28     5.32  19063.21* 1578.22  17422.7*     -3.09 10613.55*   -39.08     39.14
2 2.0     -0.8*     1.06* 19964.78  250.96*  19969.91     1.82* 18478.2     -7.47*     8.21*
3 3.1     3.03      3.13  20735.09  900.86   24501.3      6     26822.61    9.47       10.54
4 3.6     4.15      4.22  20959.56  1235.2   25924.61     7.29  30310.09    16.92      17.67
5 4.3     5.78      5.84  21288.1   1723.58  28132.87     9.05  36537.17    29.87      30.46
6 5.4     8.2       8.25  21775.98  2446.71  31478.51     11.66 48573.38    54.31      54.82
7 Inf     34.66     34.67 27101.02  10332.48 28150.48     38.09 374702.89   1231.07    1231.3
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
Inf is defined as  k = 10000
```

OCAR – NCAR

OTypeEpsilon=0.001

```
      k relbiasT% relrmseT%      avgT  medaeT      varT relmaxeT%      avgV relbiasV% relrmseV%
1   3.1     -1.51     1.67  19821.76* 459.51  20305.77*     1.21* 18688.33*    -7.97      8.79
2   3.6     -1.01     1.24  19921.57  313.07  20972.18      1.78  19811.37     -5.53      6.81
3   4.3     -0.43     0.85  20037.86  173.8   21828.64      2.49  21360.15     -2.15*     4.84*
4   5.4     0.17*     0.77* 20159.58  156.36* 22593.8       3.24  23353.8      3.36       5.9
5   6.2     0.43      0.86  20211.54  171.26  22885.74      3.54  24359.73     6.44       8.22
6   6.6     0.55      0.93  20235.14  191.27  23021.44      3.69  24858.81     7.98       9.54
7   7.7     0.8       1.1   20285.37  243.41  23337.17      3.98  26046.36     11.61      12.85
8   8.7     0.95      1.22  20317.3   281.74  23595.59      4.12  26927.28     14.12      15.26
9   8.9     0.97      1.23  20320.43  286.55  23625.26      4.14  27020.8      14.37      15.51
10 10.0     1.09      1.33  20345.12  319.64  23898.25      4.22  27819.27     16.41      17.53
11 11.3     1.19      1.42  20365.27  350.56  24151.24      4.28  28581.22     18.34      19.5
12 13.9     1.32      1.53  20390.06  386.8   24539.11      4.38  29744.47     21.21      22.54
13  Inf     1.58      1.77  20443.15  464.29  26517.4       4.49  33818.75     27.53      32.19
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
Inf is defined as  k = 50
```

OTypeEpsilon=0.01

```
    k relbiasT% relrmseT%      avgT  medaeT      varT relmaxeT%      avgV relbiasV% relrmseV%
1 1.0     -5.32     5.36  19054.56* 1594.92 17321.91*     -3.16 10507.58*   -39.34     39.4
2 2.0     -0.9*     1.14* 19944.26  278.6*  19761.02      1.64* 18100.6     -8.4       9.04
3 3.1     2.77      2.87  20682.81  822.4   23948.56      5.63  25651.8     7.11*      8.39*
4 3.6     3.79      3.87  20887.29  1130.52 25222.18      6.79  28583.76    13.33      14.19
5 4.3     5.2       5.26  21171.14  1551.96 27057.79      8.38  33446.24    23.61      24.26
6 5.4     7.06      7.11  21545.8   2110.23 29489.26      10.37 41457.85    40.59      41.13
7 Inf     15.01     15.05 23146.3   4468.73 51685.83      18.62 113074.14   118.77     121.21
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
Inf is defined as  k = 50
```

OAR – CCAR

OTypeEpsilon=0.001

```
      k relbiasT% relrmseT%      avgT  medaeT     varT relmaxeT%     avgV relbiasV% relrmseV%
1   3.1     -1.52     1.68  19819.87* 462.91  20485.7*     1.07* 18750*     -8.47      9.24
2   3.6     -1.02     1.25  19920.8   316.96  21200.64     1.65  19896.74   -6.15      7.31
3   4.3     -0.43     0.85  20039.64  171.67  22089.9      2.35  21504.68   -2.65*     5.07*
4   5.4     0.21*     0.78* 20167.69  158.51* 22935.22     3.14  23673.34   3.22       5.8
```

```
5   6.2     0.5       0.91  20225.39  179.76  23276.87     3.47  24864.58    6.82      8.51
6   6.6     0.63      0.99  20252.84  207.91  23437.37     3.63  25498.47    8.79      10.23
7   7.7     0.95      1.22  20315.79  284.11  23787.79     4     27180.46    14.26     15.3
8   8.7     1.17      1.4   20361.74  347.75  24059.28     4.24  28680.01    19.21     20.09
9   8.9     1.2       1.43  20366.7   355     24086.05     4.26  28858.61    19.81     20.69
10 10.0     1.42      1.61  20410.4   417.76  24326.88     4.46  30603.52    25.8      26.58
11 11.3     1.64      1.82  20455.67  482.7   24538.46     4.68  32757.84    33.5      34.22
12 13.9     2.04      2.19  20536.06  603.11  24809.85     5.09  37443.63    50.92     51.57
13  Inf     3.52      3.6   20834.19  1049.72 23379.78     6.42  61455.77    162.86    163.15
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
Inf is defined as  k = 10000
```

OTypeEpsilon=0.01

```
    k relbiasT% relrmseT%      avgT  medaeT      varT relmaxeT%      avgV relbiasV% relrmseV%
1 1.0    -5.58      5.62  19002.17* 1669.6  17998.88*     -3.53 10525.1*     -41.52   41.58
2 2.0    -1.17*     1.37* 19890.68  354.03* 20754.5       1.22* 18209.89     -12.26   12.7
3 3.1    2.56       2.68  20640.73  762.6   25673.95      5.33  26132.39     1.79*    4.86*
4 3.6    3.63       3.72  20856.45  1086.3  27208.15      6.54  29384.58     8        9.45
5 4.3    5.19       5.26  21170.17  1557.9  29602.69      8.34  35141.42     18.71    19.62
6 5.4    7.48       7.54  21631.16  2238.23 33459.62      10.87 46119.31     37.84    38.57
7 Inf    33.25      33.26 26817.95  9922.38 28288.76      36.1  350696.93    1139.7   1139.96
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
Inf is defined as  k = 10000
```

OAR – NCAR

OTypeEpsilon=0.001

```
      k relbiasT% relrmseT%      avgT  medaeT      varT relmaxeT%      avgV relbiasV% relrmseV%
1   3.1     -1.53     1.68  19818.18* 463.68  20479.75*     1.07* 18697.79*     -8.7      9.45
2   3.6     -1.03     1.26  19918.33  318.93  21182.15      1.65  19823.61      -6.41     7.53
3   4.3     -0.45     0.86  20035.42  175.26  22065.09      2.35  21381.83      -3.1      5.3
4   5.4     0.17*     0.77* 20158.82  157.25* 22896.47      3.14  23405.37      2.22*     5.28*
5   6.2     0.43      0.87  20212.13  171.03  23216.3       3.47  24442.77      5.28      7.3
6   6.6     0.55      0.94  20236.53  190.67  23371.29      3.62  24962.8       6.81      8.55
7   7.7     0.81      1.12  20288.98  247.78  23670.54      3.95  26212.93      10.74     12.05
8   8.7     0.98      1.25  20322.64  292.47  23927.44      4.15  27148.26      13.46     14.63
9   8.9     1         1.26  20325.96  297.94  23958.55      4.16  27247.65      13.73     14.89
10 10.0     1.13      1.37  20352.22  335.27  24166.37      4.32  28096.68      16.26     17.36
11 11.3     1.24      1.46  20373.98  366.06  24304.33      4.43  28913.94      18.97     20.05
12 13.9     1.37      1.57  20400.55  402.38  24445.17      4.54  30119.33      23.21     24.35
13  Inf     1.63      1.81  20453.37  484.37  25429.73      5.08  33982.83      33.63     37.18
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
Inf is defined as  k = 10000
```

OTypeEpsilon=0.01

```
    k relbiasT% relrmseT%      avgT  medaeT      varT relmaxeT%      avgV relbiasV% relrmseV%
1 1.0    -5.6       5.64  18997.69* 1674.22 17911.35*     -3.53 10448.92*    -41.66    41.71
2 2.0    -1.22*     1.41* 19879.38  369.02* 20574.76      1.22* 17938.2      -12.81    13.22
3 3.1    2.4        2.53  20609.18  717.79  24981.2       5.3   25295.39     1.26*     4.53*
4 3.6    3.41       3.5   20811.16  1013.43 26216.9       6.46  28138.49     7.33      8.74
5 4.3    4.81       4.88  21092.53  1439.32 27896.92      8.09  32849.24     17.75     18.57
6 5.4    6.66       6.72  21466.53  1990.94 29862.96      9.97  40604.05     35.97     36.55
7 Inf    15.43      15.46 23229.71  4593.77 46791.24      19.18 118979.46    154.28    156.82
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
Inf is defined as  k = 10000
```

No Contamination

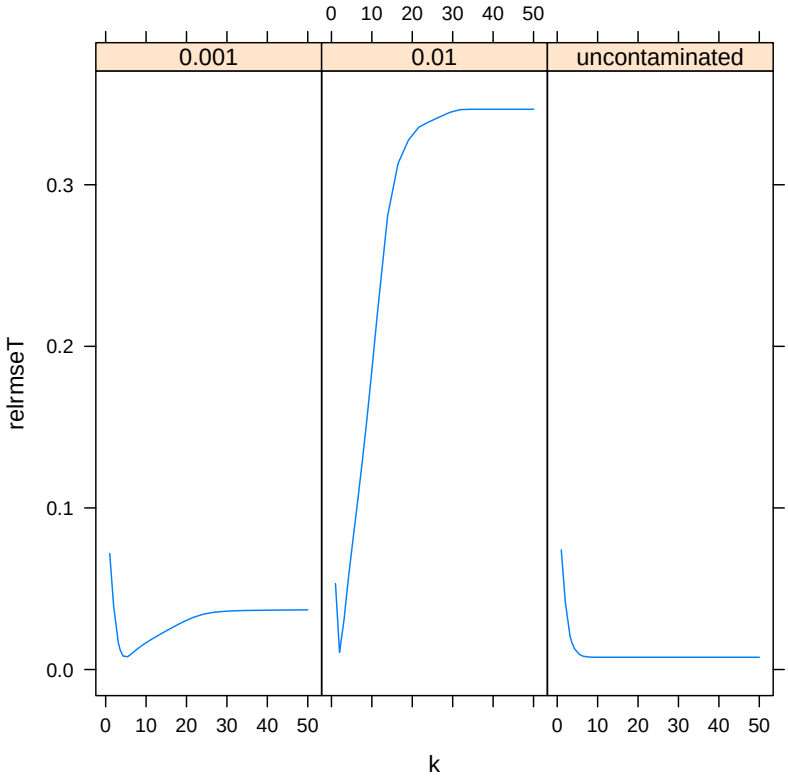
```
      k relbiasT% relrmseT%      avgT  medaeT      varT relmaxeT%      avgV relbiasV% relrmseV%
1   3.1     -1.99     2.11  19724.97* 600.55  20160.67*     0.64* 17940.86*    -11.01     11.59
2   3.6     -1.55     1.71  19813.8   467.53  20808.41      1.15  18880.68     -9.26      10.03
3   4.3     -1.06     1.28  19912.63  323.62  21623.21      1.76  20096.42     -7.06      8.21
4   5.4     -0.59     0.95  20007.61  199.84  22354.61      2.37  21480.92     -3.91      6.02
5   6.2     -0.4      0.85  20044.15  173.5   22638.1       2.59  22076.18     -2.48      5.37
6   6.6     -0.33     0.82  20059.58  166.02  22763.83      2.69  22338.27     -1.87      5.18
```

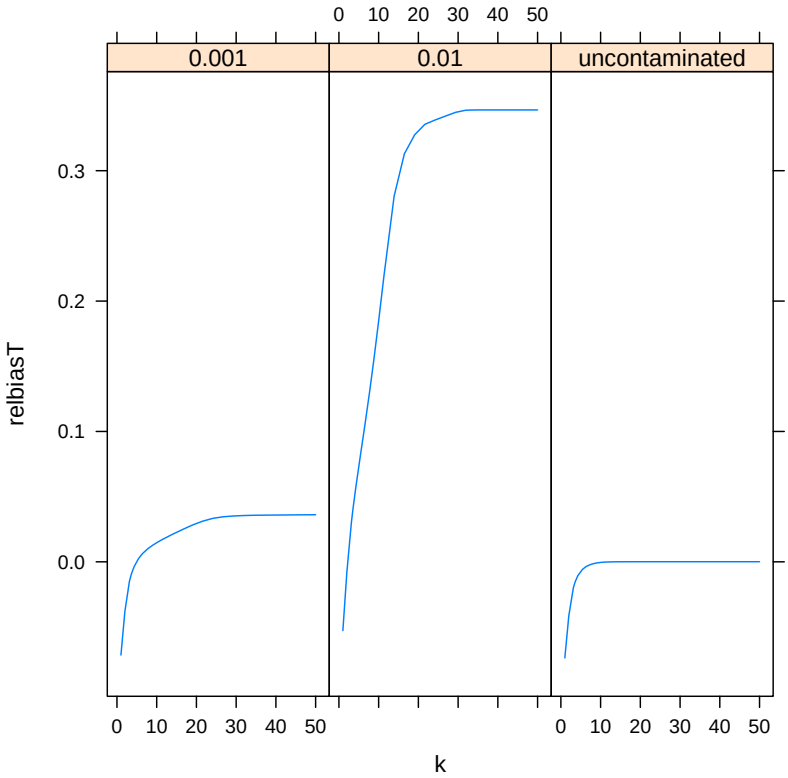
```
7   7.7     -0.18     0.77  20088.99  154.46  23003.38      2.89  22856.41     -0.64      4.99*
8   8.7     -0.1      0.76* 20104.8   153.41  23167.8       2.97  23149.59     -0.08      5.02
9   8.9     -0.1      0.76* 20106.2   155.18  23181.59      2.98  23176.08     -0.02*     5.02
10 10.0     -0.05     0.76* 20115.98  151.96  23296.47      3.01  23362.18     0.28       5.07
11 11.3     -0.02     0.76* 20121.95  151.73  23356.7       3.02  23478.9      0.52       5.11
12 13.9     0*        0.76* 20125.9   152.01  23361.31      3.02  23561.99     0.86       5.18
13 16.5     0.01      0.76* 20126.58  151.39  23355.11      3.02  23578.28     0.96       5.2
14 19.1     0.01      0.76* 20126.73  150.22  23355.16      3.02  23581.65     0.97       5.21
15  Inf     0.01      0.76* 20126.78  149.71* 23359.77      3.02  23583.01     0.96       5.2
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
Inf is defined as  k = 50
```

E.15.5. Plots

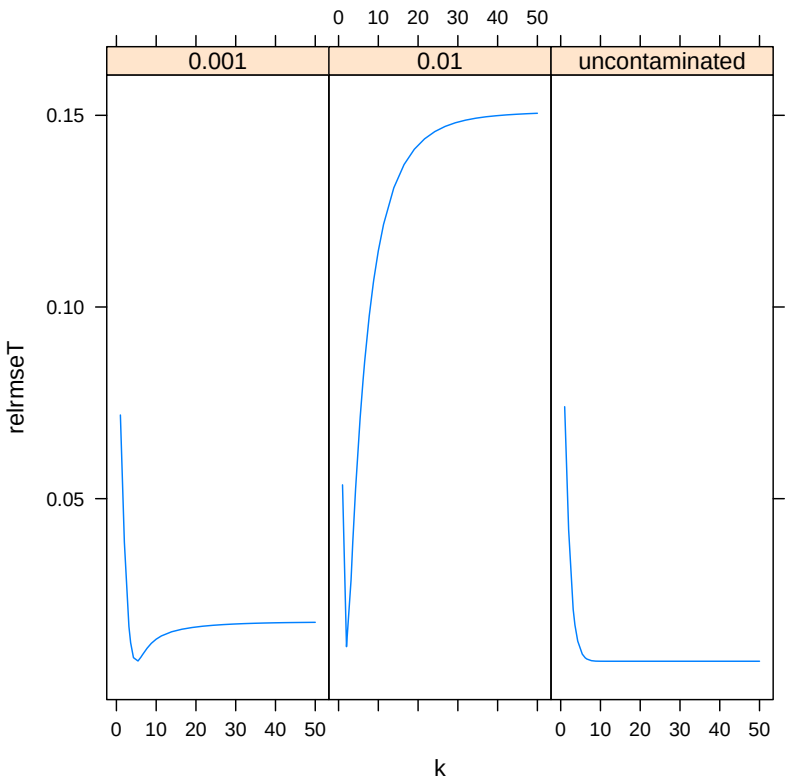
In this section, we report graphical displays of certain numerical criteria for the estimators. The lattice-type plots are partitioned into panels for different values of OTypeEpsilon.

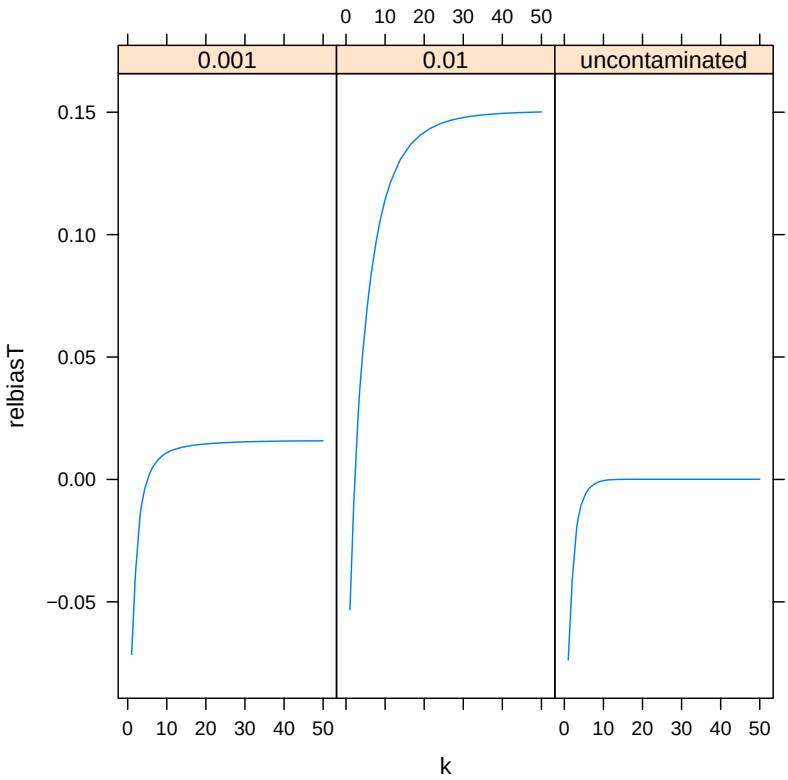
OCAR – CCAR


0.001
0.01
uncontaminated
relrmseT
0.0
0.1
0.2
0.3
0 10 20 30 40 50
k

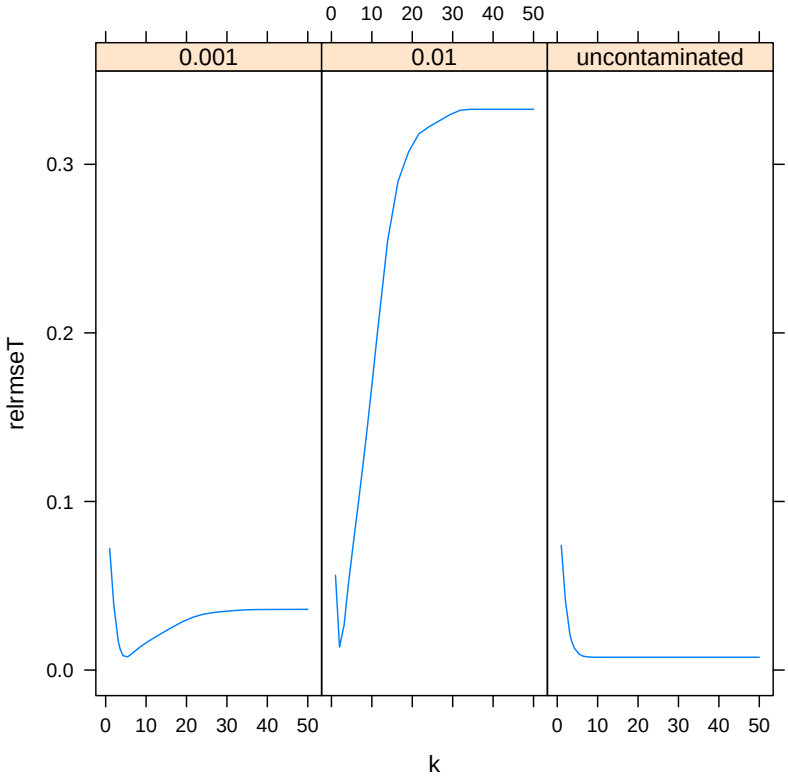

0.001
0.01
uncontaminated
relbiasT
0.0
0.1
0.2
0.3
0 10 20 30 40 50
k

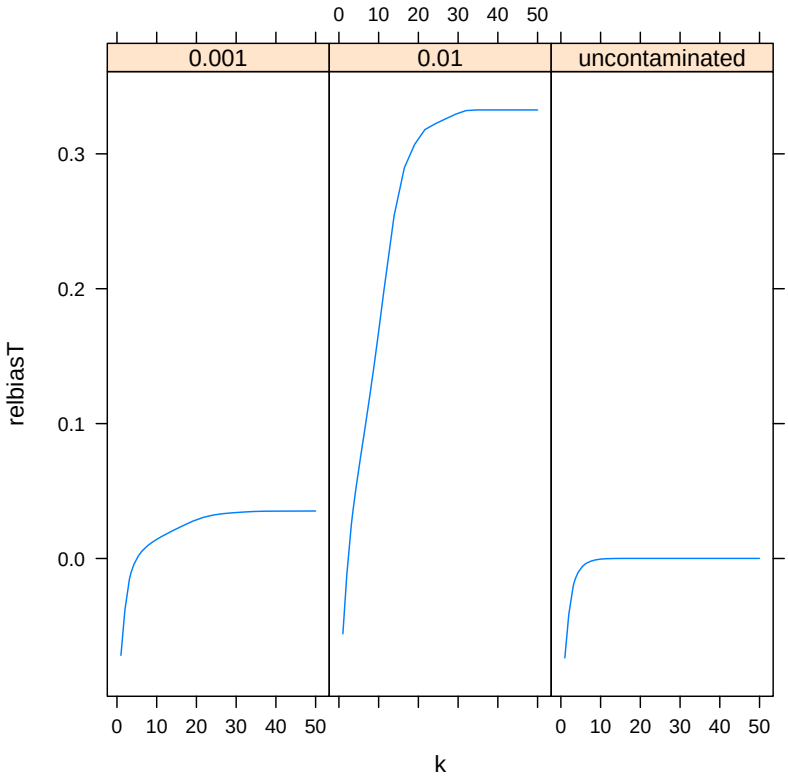
OCAR – NCAR


0.001
0.01
uncontaminated
relrmseT
0.15
0.10
0.05
0 10 20 30 40 50
k

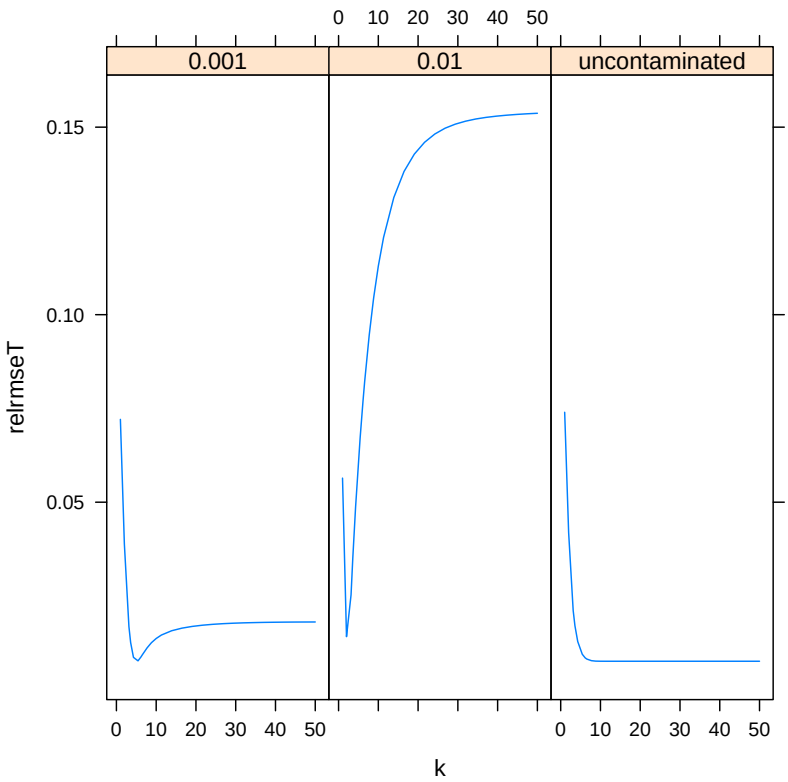

0.001
0.01
uncontaminated
relbiasT
0.15
0.10
0.05
0.00
−0.05
0 10 20 30 40 50
k

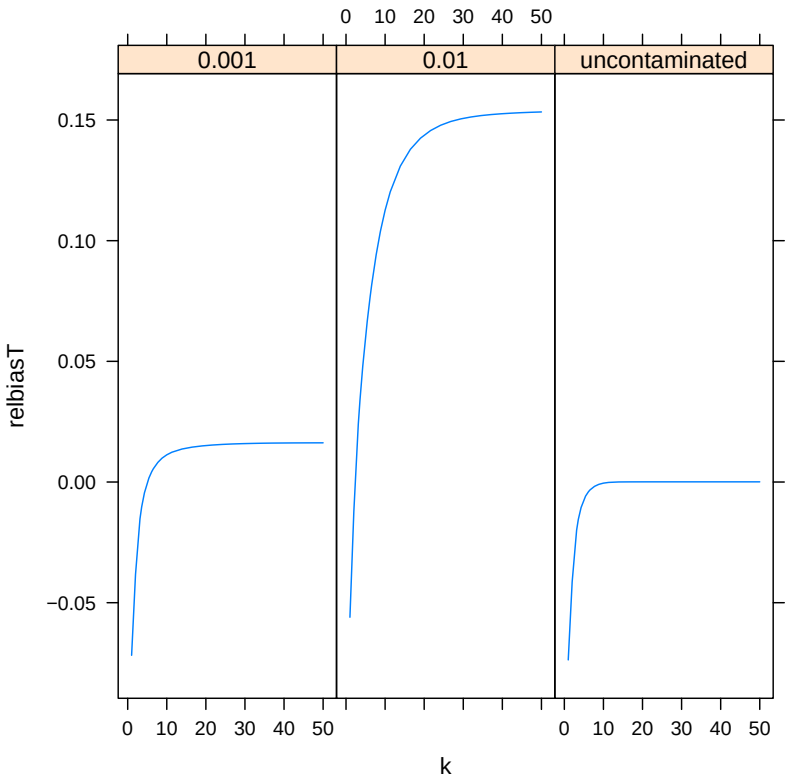
OAR – CCAR


0.001
0.01
uncontaminated
relrmseT
0.0
0.1
0.2
0.3
0 10 20 30 40 50
k


0.001
0.01
uncontaminated
relbiasT
0.0
0.1
0.2
0.3
0 10 20 30 40 50
k

OAR – NCAR


0.001
0.01
uncontaminated
relrmseT
0.15
0.10
0.05
0 10 20 30 40 50
k


0.001
0.01
uncontaminated
relbiasT
0.15
0.10
0.05
0.00
−0.05
0 10 20 30 40 50
k

E.16. N0008: SQSR @ A-ATSILC: sthhsrs1kx6k

Sample Design Ref 1.4a

E.16.1. Simulation Setup

Target Indicator:	QSR
Domains:	[none] (default)
Population:	A-AT-SILC
Sample:	sthhsrs1kx6k
MonteCarlo Replicates:	1,000 (default)
Criteria Set:	Univariate criteria (default)
Method:	SQSR
Outlyingness:	OAR,OCAR,uncontaminated
Contamination:	CCAR,NCAR,uncontaminated
Missingness:	[none] (default)
Simulation Environment:	DBsim
Host:	FHNW
Author:	Beat Hulliger and Tobias Schoch
ID:	AggSQSR_sthhsrs1kx6k
Date:	September 5, 2011

E.16.2. Estimator Specifications

`Specifications:` Trimmed quintile share ratio estimator; trims only at the top right end of the distribution. Variance estimates based on linearization.

`Comments:`

E.16.3. Robustness Parameters

This section gives some summary statistics of the robustness tuning parameters and the relative number of outliers (OType-Epsilon).

OCAR – CCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

OCAR – NCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

OAR – CCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

OAR – NCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

No Contamination

```
Range of  trim
    Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
0.000000 0.007375 0.014750 0.014750 0.022120 0.029500
Range of OTypeEpsilon

 0
60
```

E.16.4. Results

In this section, we summarize the performance of the estimators due to numerical criteria. The section is split into the different subsections for the respective combination of the outlyingness and contamination mechanisms. In addition, each subsection is further partitioned for the different values of OTypeEpsilon.

OCAR – CCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	9.5029	9.7115	4.4676	0.5759	0.0067	16.8835	0.0208	210.8183	212.0206
2	0.0005	8.0458	8.2926	4.4081	0.4882	0.0067	15.2426	0.019	182.7822	184.2834
3	0.0010	6.8422	7.127	4.359	0.4116	0.0066*	14.303	0.0181	172.7188	174.131
4	0.0015	5.848	6.1873	4.3185	0.3538	0.0068	12.9674	0.0172	152.5347	154.3347
5	0.0020	4.8023	5.2122	4.2758	0.2888	0.0068	12.5877	0.016	133.2792	135.8154
6	0.0025	3.9684	4.4485	4.2418	0.2375	0.0067	11.1993	0.0145	115.0931	117.2016
7	0.0030	3.1244	3.7231	4.2073	0.186	0.0068	10.1812	0.0105	53.1027	65.4703
8	0.0035	2.6111	3.3175	4.1864	0.1592	0.007	9.6063	0.0068	-2.3431*	19.1324*
9	0.0040	2.2673	3.0492	4.1724	0.1382	0.0069	9.4366	0.0053	-23.1799	26.0594
10	0.0045	2.1211	2.9488	4.1664	0.1288	0.007	9.2579	0.0046	-33.6669	34.9643
11	0.0050	2.0456	2.9093	4.1633	0.1274	0.0071	9.1945*	0.0042	-40.6466	41.4536
12	0.0055	2.0062	2.8898*	4.1617	0.1252	0.0072	9.2275	0.0039	-45.6097	46.1691
13	0.0060	1.9991*	2.8987	4.1614*	0.1246*	0.0073	9.283	0.0037	-49.7571	50.1791
14	0.0065	2.0158	2.9238	4.1621	0.1251	0.0075	9.2779	0.0035	-53.2342	53.5552
15	0.0070	2.0523	2.9616	4.1636	0.1279	0.0076	9.3475	0.0033	-56.0352	56.2937
16	0.0075	2.1166	3.0214	4.1662	0.1285	0.0077	9.4483	0.0032	-58.5148	58.7349
17	0.0080	2.1834	3.0847	4.1689	0.1345	0.0079	9.5363	0.0031	-60.7565	60.9478
18	0.0085	2.277	3.1663	4.1728	0.1387	0.0081	9.6524	0.003	-62.676	62.8395
19	0.0090	2.3707	3.2474	4.1766	0.1452	0.0082	9.7916	0.0029	-64.3613	64.5037
20	0.0095	2.4797	3.3424	4.181	0.1516	0.0084	10.1278	0.0028*	-65.9646	66.0893

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.000	90.5982	90.654	7.7762	5.4818	0.0169*	103.2116	0.1086	544.0892	545.5058
2	0.021	51.0933	51.3299	6.1644	3.08	0.0404	66.6432	0.0807	99.9287	101.7506
3	0.021	50.3916	50.6372	6.1358	3.0408	0.0413	65.9788	0.0803	94.1606	95.9654
4	0.021	49.6929	49.95	6.1073	2.9931	0.0427	66.4978	0.08	87.4196	89.2363
5	0.022	49.0188	49.2844	6.0798	2.9545	0.0435	65.9002	0.0798	83.5092	85.3335
6	0.022	48.3312	48.6057	6.0517	2.9159	0.0443	65.0271	0.0796	79.4187	81.3071
7	0.023	47.6597	47.9467	6.0243	2.8708	0.0457	65.4068	0.0792	73.3208	75.2715
8	0.024	47.0022	47.3023	5.9975	2.8303	0.0472	64.873	0.0787	66.9719	69.0616
9	0.024	46.3112	46.622	5.9693	2.7914	0.0481	64.3776	0.0779	61.8457	64.1243
10	0.025	45.6878	46.0134	5.9439	2.7545	0.0498	63.8214	0.0768	54.3085	56.8174
11	0.025	45.0291	45.366	5.917	2.7146	0.0507	63.1749	0.0754	48.557	51.3797
12	0.025	44.4288	44.78	5.8925	2.6752	0.0522	63.6968	0.0733	40.473	43.7817
13	0.026	43.8419	44.2081	5.8686	2.6393	0.0537	62.8162	0.071	32.1596	36.2643
14	0.026	43.2671	43.6479	5.8451	2.6072	0.0551	63.1029	0.0682	23.7173	28.8514
15	0.027	42.7369	43.132	5.8235	2.5739	0.0565	63.2418	0.0653	15.5755	22.2504
16	0.028	42.227	42.6402	5.8027	2.5407	0.0584	62.3566	0.0621	6.2625	16.1015
17	0.028	41.7632	42.1873	5.7838	2.5146	0.0593	62.7413	0.0585	-1.3849*	14.5778*
18	0.029	41.3412	41.7827	5.7665	2.4865	0.0612	63.2048	0.0547	-10.5097	17.6387
19	0.029	40.9563	41.4179	5.7508	2.4629	0.0634	62.289*	0.05	-21.0397	24.9469
20	0.029	40.6698	41.1478	5.7391	2.4489	0.0652	62.4843	0.0453	-30.5116	33.1141
21	0.030	40.4067*	40.906*	5.7284*	2.4336*	0.0676	62.6054	0.0397*	-41.2893	43.1754

% denotes numbers in percent; * denotes the column-specific minimum/minima

OCAR – NCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	3.8688	4.3885	4.2377	0.2345	0.0072	10.5351	0.0078	8.4184*	37.2215
2	0.0005	2.911	3.5484	4.1986	0.178	0.0069	9.6534	0.0059	-13.8921	25.1468*
3	0.0010	2.4403	3.1603	4.1794	0.1484	0.0067*	9.3926	0.0051	-23.5324	27.3821
4	0.0015	2.1276	2.92	4.1667	0.1308	0.0067*	9.0585	0.0047	-29.9074	31.8395
5	0.0020	1.9206	2.7729	4.1582	0.1207	0.0067*	9.0338	0.0044	-34.4017	35.7147
6	0.0025	1.7704	2.6777	4.1521	0.1154	0.0067*	8.9184	0.0041	-38.6906	39.5768
7	0.0030	1.6666	2.6106	4.1479	0.1113	0.0067*	8.7771	0.0039	-41.6659	42.3384
8	0.0035	1.5943	2.5776	4.1449	0.1088	0.0068	8.8451	0.0037	-45.1901	45.7218
9	0.0040	1.5542	2.5629	4.1433	0.107	0.0069	8.6899	0.0036	-48.1075	48.5454
10	0.0045	1.5346*	2.5619*	4.1425*	0.1076	0.007	8.6395*	0.0035	-50.7457	51.1191
11	0.0050	1.5391	2.5753	4.1427	0.1059*	0.0071	8.731	0.0033	-53.1871	53.5018
12	0.0055	1.5672	2.6059	4.1438	0.1078	0.0072	8.8448	0.0032	-55.438	55.7021
13	0.0060	1.607	2.6439	4.1454	0.1086	0.0073	8.8909	0.0031	-57.5114	57.7398
14	0.0065	1.6633	2.6932	4.1477	0.1119	0.0075	9.0044	0.003	-59.3913	59.594
15	0.0070	1.7304	2.75	4.1505	0.1143	0.0076	9.0264	0.003	-61.1836	61.3615
16	0.0075	1.8187	2.8222	4.1541	0.118	0.0078	9.3172	0.0029	-62.7945	62.9535
17	0.0080	1.9138	2.8988	4.1579	0.1218	0.0079	9.295	0.0028	-64.2677	64.4053
18	0.0085	2.016	2.9814	4.1621	0.129	0.008	9.4093	0.0028	-65.6136	65.7384
19	0.0090	2.1351	3.0804	4.167	0.1334	0.0082	9.6272	0.0027*	-67.0118	67.1223
20	0.0095	2.2575	3.1832	4.172	0.1387	0.0084	9.8532	0.0027*	-68.3021	68.402

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.000	36.8087	36.9557	5.5816	2.2221	0.0181*	48.5448	0.0395	118.7085	127.323
2	0.021	26.1258*	26.4365*	5.1458*	1.5849*	0.0272	40.6141*	0.0088	-67.6128*	67.7615*
3	0.021	26.3172	26.6362	5.1536	1.5913	0.0281	40.9741	0.0086	-69.4038	69.5344
4	0.021	26.5253	26.8511	5.1621	1.6029	0.029	41.3544	0.0084	-70.9173	71.0334
5	0.022	26.7591	27.0933	5.1716	1.62	0.03	41.8659	0.0082	-72.5095	72.612
6	0.022	26.9937	27.3352	5.1812	1.6337	0.0309	42.5874	0.0081	-73.906	73.9952
7	0.023	27.2459	27.596	5.1915	1.6478	0.032	42.9075	0.0079	-75.2944	75.3725
8	0.024	27.5096	27.8681	5.2022	1.6633	0.0331	43.5367	0.0078	-76.5619	76.6334
9	0.024	27.7865	28.1544	5.2135	1.6807	0.0343	44.0903	0.0076	-77.8521	77.9153
10	0.025	28.0857	28.4613	5.2257	1.6962	0.0354	44.8866	0.0075	-78.9438	79.0006
11	0.025	28.3853	28.7697	5.2379	1.7133	0.0366	45.2874	0.0073	-80.0058	80.0552
12	0.025	28.712	29.1065	5.2513	1.7303	0.038	46.0431	0.0072	-81.0891	81.133
13	0.026	29.0411	29.4456	5.2647	1.7525	0.0394	46.8271	0.0071	-82.0717	82.1109
14	0.026	29.3889	29.8027	5.2789	1.7746	0.0408	47.3159	0.0069	-82.9799	83.0139
15	0.027	29.7513	30.1748	5.2937	1.7965	0.0423	48.1648	0.0068	-83.8446	83.8747
16	0.028	30.1269	30.5607	5.309	1.8189	0.0439	48.8484	0.0067	-84.6346	84.6622
17	0.028	30.5158	30.9599	5.3249	1.8415	0.0455	49.6395	0.0066	-85.3817	85.4066
18	0.029	30.9136	31.3701	5.3411	1.8627	0.0474	50.4369	0.0066	-86.1464	86.169
19	0.029	31.3308	31.7975	5.3581	1.89	0.0491	51.3609	0.0065	-86.7947	86.8156
20	0.029	31.7512	32.2294	5.3753	1.9118	0.051	52.1145	0.0064	-87.4332	87.4521
21	0.030	32.1933	32.6827	5.3933	1.9368	0.0529	52.9248	0.0063*	-88.0392	88.0564

% denotes numbers in percent; * denotes the column-specific minimum/minima

OAR – CCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	9.3601	9.5727	4.4617	0.5662	0.0067*	16.1249	0.0206	207.2341	208.5779
2	0.0005	7.7778	8.0353	4.3972	0.4722	0.0068	14.8538	0.0184	171.8604	173.5088
3	0.0010	6.671	6.972	4.352	0.4056	0.0068	13.6352	0.0172	150.8604	152.4016
4	0.0015	5.6594	6.0107	4.3108	0.3426	0.0068	12.7931	0.0161	136.4111	138.4636
5	0.0020	4.7353	5.1476	4.2731	0.2894	0.0068	11.5231	0.015	120.9458	122.8283
6	0.0025	3.8516	4.3576	4.237	0.233	0.0069	10.5927	0.0139	100.3043	101.9267
7	0.0030	3.1062	3.7225	4.2066	0.1861	0.007	10.1797	0.0102	46.1082	57.4045
8	0.0035	2.5438	3.2675	4.1837	0.155	0.007	9.3303	0.0065	-7.0294*	20.2564*
9	0.0040	2.2451	3.0366	4.1715	0.1371	0.007	9.1068	0.0052	-25.7975	28.3538
10	0.0045	2.1174	2.9505	4.1663	0.1302	0.007	9.0535	0.0046	-35.3068	36.4927
11	0.0050	2.0433	2.909	4.1632	0.1258	0.0071	8.9639	0.0042	-41.7766	42.5186
12	0.0055	2.01	2.8954*	4.1619	0.1239*	0.0072	8.942*	0.0039	-46.5311	47.0609
13	0.0060	2.0047*	2.9061	4.1617*	0.1255	0.0074	9.0661	0.0036	-50.5338	50.9356

14	0.0065	2.0228	2.9293	4.1624	0.1255	0.0075	9.1008	0.0035	-53.7258	54.0327
15	0.0070	2.0615	2.9708	4.164	0.1279	0.0076	9.3923	0.0033	-56.5469	56.7944
16	0.0075	2.1219	3.0297	4.1664	0.1315	0.0078	9.4136	0.0032	-59.0781	59.2888
17	0.0080	2.2	3.1003	4.1696	0.1358	0.008	9.4948	0.0031	-61.2258	61.4101
18	0.0085	2.288	3.1785	4.1732	0.1404	0.0081	9.6314	0.003	-63.1149	63.2724
19	0.0090	2.3875	3.2643	4.1773	0.1451	0.0083	9.7832	0.0029	-64.7731	64.9109
20	0.0095	2.4998	3.361	4.1819	0.1501	0.0084	10.089	0.0028*	-66.2821	66.4026

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.000	88.0775	88.1362	7.6733	5.3305	0.0172*	100.7633	0.1169	578.936	580.5996
2	0.021	45.4808	45.734	5.9354	2.743	0.0385	62.7947	0.0758	96.9088	98.5866
3	0.021	44.8011	45.0641	5.9077	2.6979	0.0394	61.9326	0.0755	91.8491	93.61
4	0.021	44.1246	44.4008	5.8801	2.6584	0.0407	62.3557	0.0751	84.3046	86.2284
5	0.022	43.4469	43.7323	5.8524	2.6178	0.0415	61.1456	0.0741	78.6477	80.7883
6	0.022	42.7883	43.0863	5.8256	2.5716	0.0426	61.5944	0.0727	70.5418	72.9349
7	0.023	42.142	42.4515	5.7992	2.5391	0.0436	60.6714	0.0712	63.1175	65.7315
8	0.024	41.5133	41.8359	5.7736	2.4945	0.0448	59.8661	0.0693	54.7323	57.6753
9	0.024	40.9498	41.285	5.7506	2.4639	0.0459	60.2888	0.0673	46.5159	49.8902
10	0.025	40.3419	40.6934	5.7258	2.4302	0.0475	59.3858	0.0647	36.2835	40.2291
11	0.025	39.8001	40.1613	5.7037	2.392	0.0481	59.4041	0.0619	28.5919	33.0403
12	0.025	39.2814	39.6601	5.6825	2.3612	0.0498	59.5383	0.0592	18.766	24.5596
13	0.026	38.8023	39.1942	5.6629	2.331	0.0509	59.2682	0.0562	10.3785	18.5322
14	0.026	38.3374	38.7413	5.644	2.3079	0.0519	59.1488*	0.0525	1.2158*	15.8954*
15	0.027	37.965	38.3875	5.6288	2.282	0.0537	59.5565	0.0482	-10.3956	19.8692
16	0.028	37.6257	38.0627	5.6149	2.2606	0.0551	59.722	0.0429	-22.1532	27.4739
17	0.028	37.3492	37.8038	5.6037	2.2406	0.0569	60.0283	0.0373	-34.5233	37.9734
18	0.029	37.1525	37.6159	5.5956	2.2285	0.0577	60.17	0.032	-44.542	47.042
19	0.029	36.979	37.4602	5.5886	2.2117	0.0597	60.6608	0.0267	-55.1882	56.8063
20	0.029	36.9485*	37.4401*	5.5873*	2.2114*	0.0609	60.97	0.0224	-63.1788	64.2237
21	0.030	36.9739	37.4752	5.5884	2.2158	0.0622	60.6108	0.0189*	-69.5638	70.2037

% denotes numbers in percent; * denotes the column-specific minimum/minima

OAR – NCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	4.0958	4.571	4.247	0.251	0.0069	10.5989	0.0077	12.2067	33.0605
2	0.0005	3.1701	3.7508	4.2092	0.1901	0.0067	10.2157	0.0061	-9.0174*	21.1005*
3	0.0010	2.692	3.3458	4.1897	0.1598	0.0066*	9.5708	0.0053	-18.8508	23.4892
4	0.0015	2.371	3.0971	4.1766	0.1425	0.0066*	9.4334	0.0049	-26.121	28.2851
5	0.0020	2.1378	2.9205	4.1671	0.1315	0.0066*	9.0271	0.0046	-30.9931	32.3863
6	0.0025	1.9771	2.8107	4.1605	0.1212	0.0067	8.9249	0.0043	-35.3461	36.3729
7	0.0030	1.8598	2.7419	4.1557	0.1178	0.0068	8.714	0.0041	-39.7488	40.5028
8	0.0035	1.7754	2.6887	4.1523	0.1139	0.0068	8.7504	0.0039	-42.8186	43.4447
9	0.0040	1.721	2.6624*	4.1501	0.1133	0.0069	8.6674*	0.0037	-45.8559	46.3626
10	0.0045	1.6991	2.6632	4.1492	0.1127	0.007	8.8087	0.0036	-48.9546	49.3695
11	0.0050	1.6908*	2.6672	4.1488*	0.1126*	0.0071	8.8159	0.0034	-51.4859	51.8381
12	0.0055	1.7113	2.6902	4.1497	0.1126*	0.0072	8.7655	0.0033	-53.7776	54.0752
13	0.0060	1.7422	2.7268	4.1509	0.1142	0.0073	9.0558	0.0032	-56.2276	56.4772
14	0.0065	1.7929	2.7732	4.153	0.117	0.0075	8.9377	0.0031	-58.2364	58.4536
15	0.0070	1.862	2.8315	4.1558	0.1191	0.0076	9.095	0.003	-60.0043	60.1936
16	0.0075	1.9396	2.9022	4.159	0.1229	0.0078	9.2663	0.003	-61.9867	62.1508
17	0.0080	2.0316	2.9777	4.1628	0.1286	0.0079	9.4307	0.0029	-63.5283	63.6755
18	0.0085	2.1355	3.0643	4.167	0.1323	0.008	9.5944	0.0028	-64.9714	65.1005
19	0.0090	2.2413	3.156	4.1713	0.1373	0.0082	9.7744	0.0028	-66.4686	66.5845
20	0.0095	2.3653	3.2601	4.1764	0.142	0.0084	9.9784	0.0027*	-67.7648	67.8664

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.000	38.8683	39.0012	5.6656	2.3491	0.0172*	49.8766	0.0448	159.6872	168.6295
2	0.021	26.253*	26.5583*	5.151*	1.5805*	0.0269	42.6487*	0.0093	-65.203*	65.3821*
3	0.021	26.4382	26.7511	5.1585	1.5878	0.0277	43.1425	0.0091	-67.1545	67.3086
4	0.021	26.6381	26.9584	5.1667	1.5983	0.0286	43.6265	0.0089	-68.9168	69.0528

5	0.022	26.8438	27.1731	5.1751	1.613	0.0296	44.2572	0.0087	-70.7347	70.8495
6	0.022	27.0765	27.4133	5.1846	1.6278	0.0306	44.9804	0.0085	-72.2973	72.3989
7	0.023	27.319	27.6662	5.1944	1.6409	0.0318	45.2823	0.0083	-74.0071	74.0966
8	0.024	27.5756	27.9302	5.2049	1.6561	0.0328	45.8702	0.0081	-75.3666	75.4469
9	0.024	27.8399	28.2038	5.2157	1.6712	0.034	46.2531	0.0079	-76.793	76.8646
10	0.025	28.1301	28.5026	5.2275	1.6884	0.0351	47.0176	0.0077	-78.0592	78.1211
11	0.025	28.4279	28.8115	5.2397	1.7078	0.0366	47.5591	0.0075	-79.386	79.4397
12	0.025	28.7432	29.1343	5.2526	1.7255	0.0377	48.2804	0.0074	-80.4447	80.4919
13	0.026	29.0673	29.4688	5.2658	1.7421	0.0392	49.0331	0.0072	-81.5425	81.5834
14	0.026	29.4102	29.8215	5.2798	1.7633	0.0406	49.6612	0.0071	-82.5426	82.5788
15	0.027	29.7687	30.1915	5.2944	1.7844	0.0422	50.3586	0.007	-83.5223	83.5552
16	0.028	30.1457	30.5777	5.3098	1.8047	0.0437	51.2049	0.0068	-84.3419	84.371
17	0.028	30.5303	30.9725	5.3255	1.8261	0.0453	51.9056	0.0067	-85.1315	85.1581
18	0.029	30.9283	31.3817	5.3417	1.8513	0.0471	52.5018	0.0066	-85.9229	85.9466
19	0.029	31.3491	31.814	5.3589	1.8772	0.0489	53.5186	0.0065	-86.6519	86.673
20	0.029	31.7795	32.2552	5.3764	1.905	0.0508	54.4312	0.0064*	-87.2979	87.3168
21	0.030	32.2181	32.7069	5.3943	1.9281	0.0529	55.2122	0.0064*	-87.9772	87.9944

% denotes numbers in percent; * denotes the column-specific minimum/minima

No Contamination

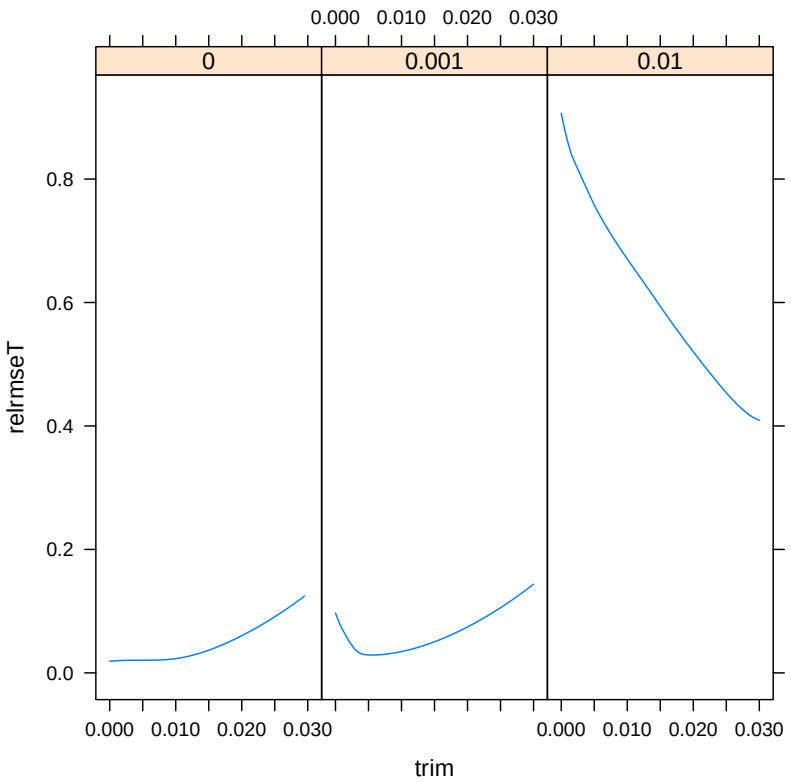
	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	-0.0396	1.8858*	4.0783	0.0752	0.0059*	6.6015	0.0034	-43.1984*	43.6258*
2	0.0005	-0.339	1.9229	4.066	0.0747*	0.006	6.3779	0.0032	-46.0073	46.39
3	0.0010	-0.4957	1.9635	4.0596	0.0765	0.006	6.3198	0.0031	-48.4724	48.8089
4	0.0015	-0.5837	1.996	4.0561	0.0775	0.0061	6.1431	0.003	-50.7364	51.0372
5	0.0020	-0.6397	2.0196	4.0538	0.0785	0.0061	6.17	0.0029	-52.6926	52.9651
6	0.0025	-0.6676	2.0364	4.0526	0.0793	0.0062	6.0579*	0.0028	-54.5597	54.7991
7	0.0030	-0.6699	2.0481	4.0525*	0.08	0.0062	6.0775	0.0027	-56.4194	56.6272
8	0.0035	-0.649	2.0552	4.0534	0.0796	0.0063	6.197	0.0026	-58.2256	58.4095
9	0.0040	-0.6153	2.0581	4.0548	0.0802	0.0064	6.2655	0.0026	-59.7965	59.9623
10	0.0045	-0.5599	2.0549	4.057	0.078	0.0065	6.4562	0.0025	-61.157	61.311
11	0.0050	-0.4959	2.0554	4.0596	0.0798	0.0066	6.4512	0.0025	-62.6088	62.7481
12	0.0055	-0.4159	2.0505	4.0629	0.0792	0.0067	6.4768	0.0024	-63.7702	63.8968
13	0.0060	-0.331	2.053	4.0664	0.0792	0.0068	6.6968	0.0024	-65.0481	65.163
14	0.0065	-0.2292	2.0552	4.0705	0.0791	0.0069	6.7857	0.0024	-66.1291	66.2343
15	0.0070	-0.1225	2.0646	4.0749	0.0793	0.0071	6.7616	0.0023	-67.261	67.3577
16	0.0075	-0.0025*	2.0856	4.0798	0.0809	0.0072	6.8844	0.0023	-68.5243	68.6102
17	0.0080	0.121	2.1105	4.0848	0.0811	0.0074	7.0904	0.0022*	-69.6246	69.7031
18	0.0085	0.2607	2.1441	4.0905	0.083	0.0075	7.3827	0.0022*	-70.6349	70.7072
19	0.0090	0.4057	2.1869	4.0964	0.0853	0.0077	7.5841	0.0022*	-71.5812	71.6484
20	0.0095	0.5539	2.2427	4.1025	0.0866	0.0079	7.7629	0.0022*	-72.5442	72.6063

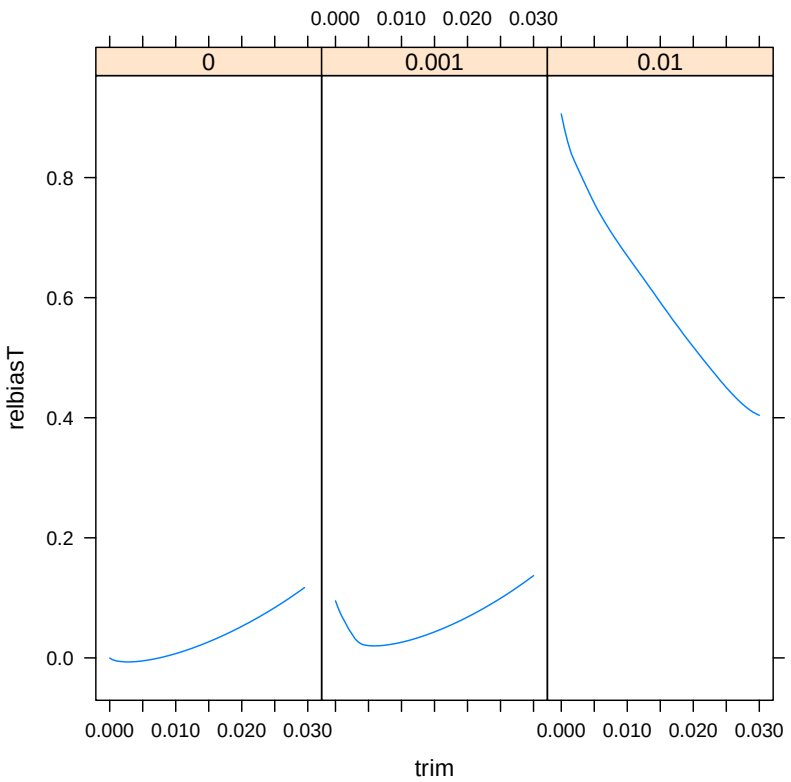
% denotes numbers in percent; * denotes the column-specific minimum/minima

E.16.5. Plots

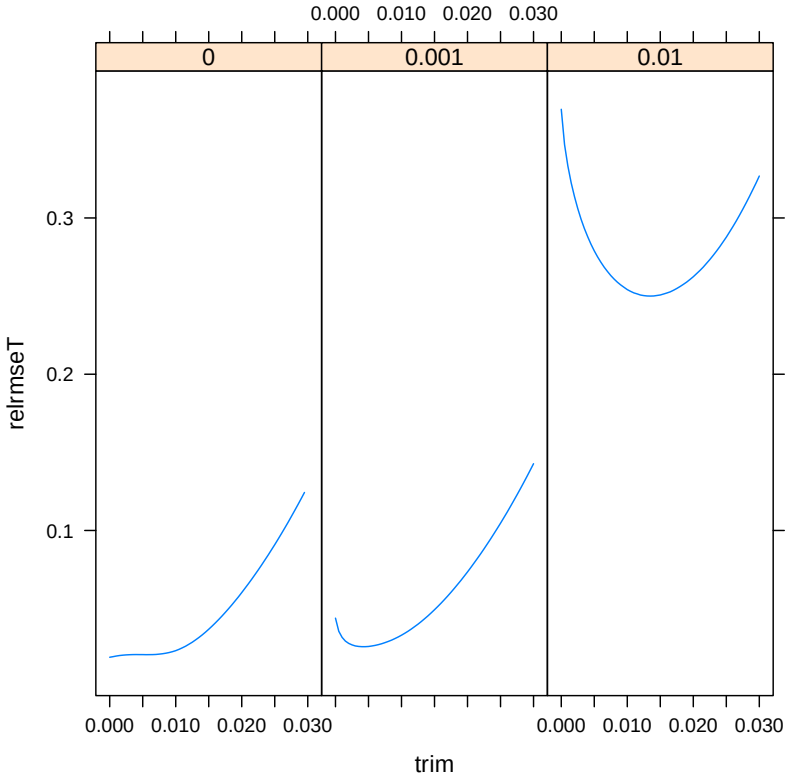
In this section, we report graphical displays of certain numerical criteria for the estimators. The lattice-type plots are partitioned into panels for different values of OTypeEpsilon.

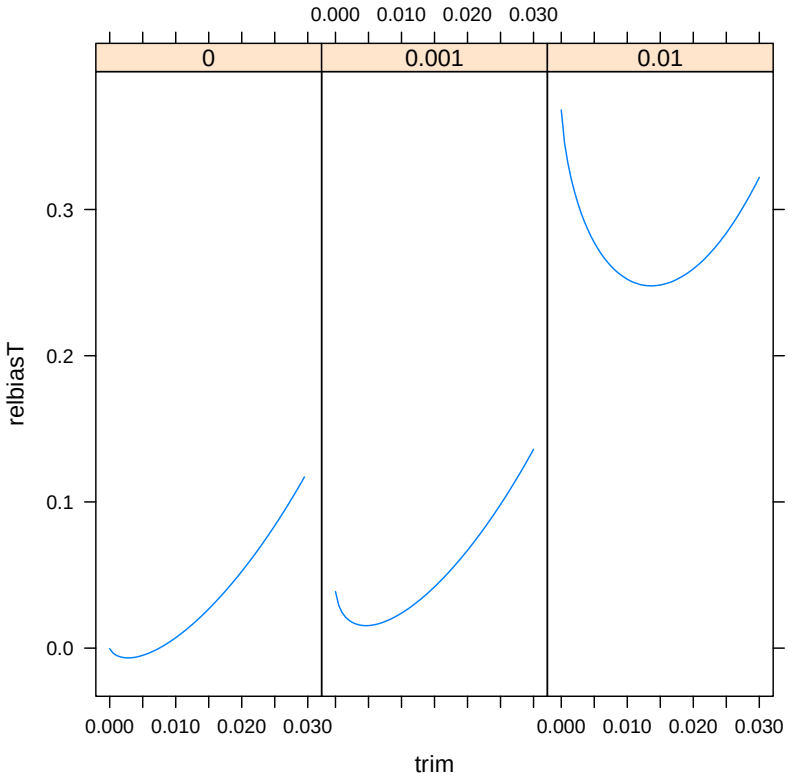
OCAR – CCAR


0.000 0.010 0.020 0.030
0
0.001
0.01
0.8
0.6
0.4
0.2
0.0
relrmseT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim

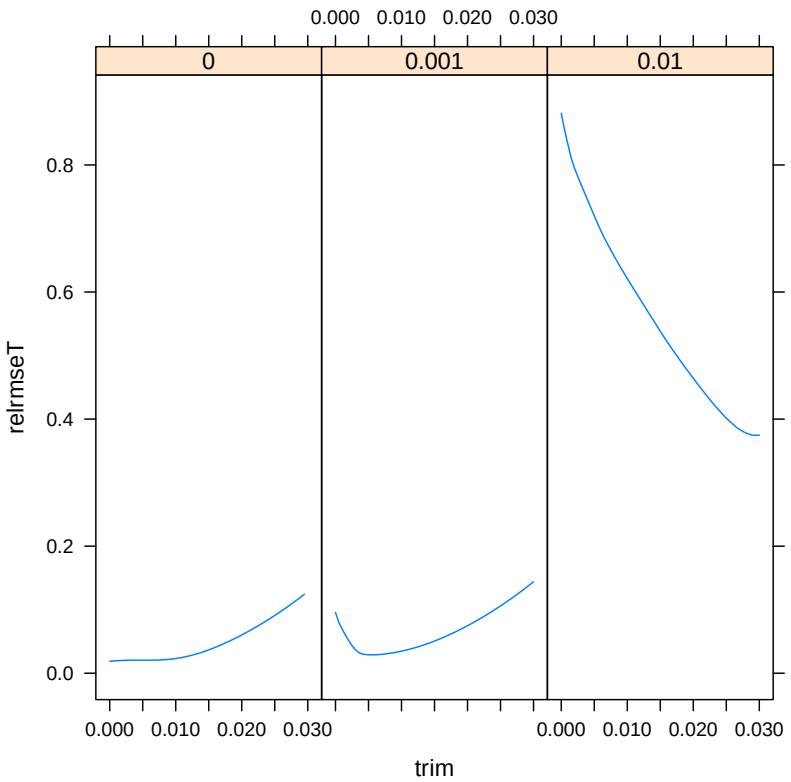

0.000 0.010 0.020 0.030
0
0.001
0.01
0.8
0.6
0.4
0.2
0.0
relbiasT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim

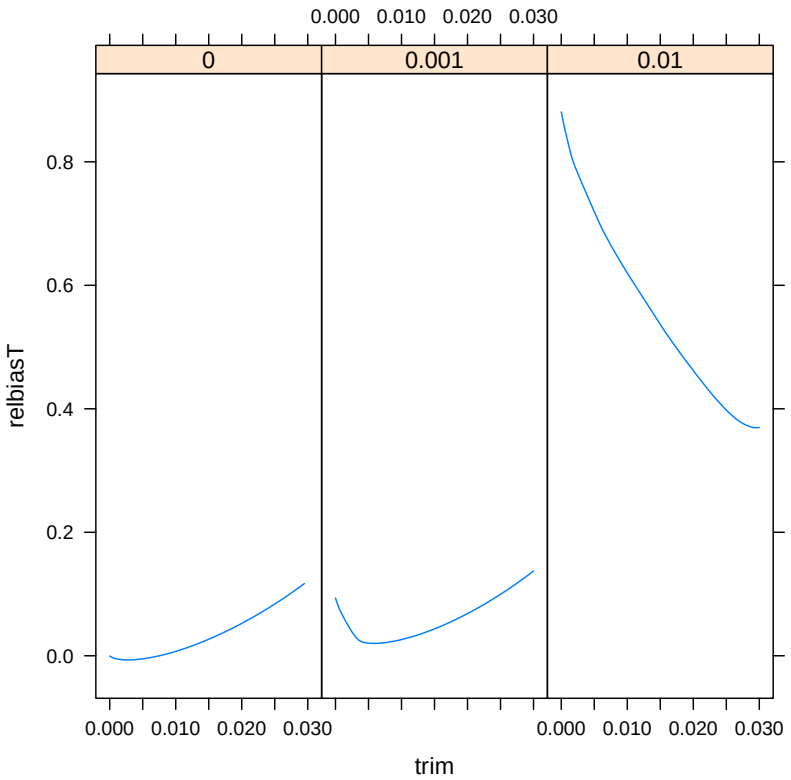
OCAR – NCAR


0.000 0.010 0.020 0.030
0
0.001
0.01
0.3
0.2
0.1
relrmseT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim

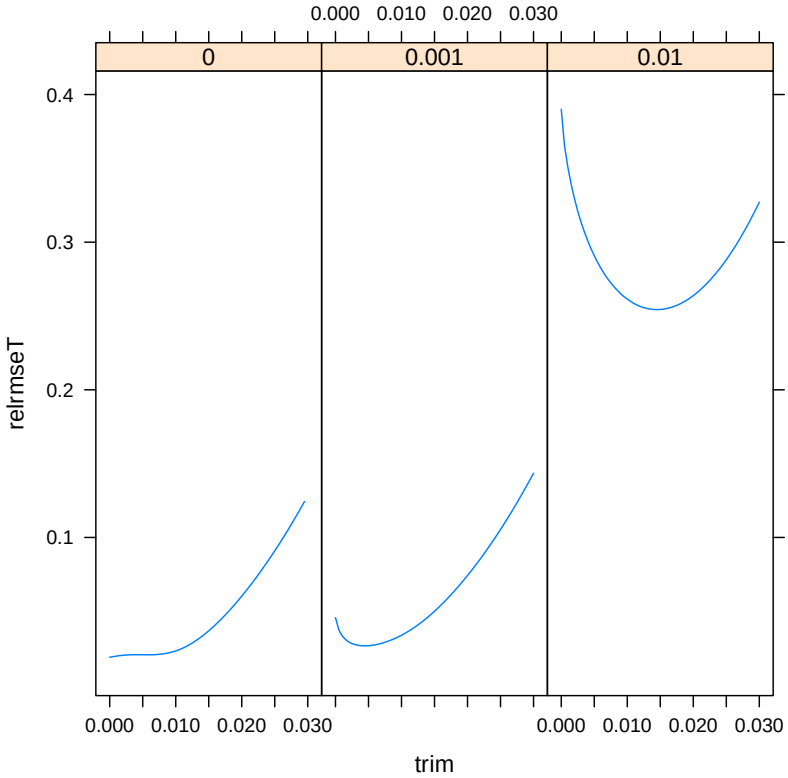

0.000 0.010 0.020 0.030
0
0.001
0.01
0.3
0.2
0.1
0.0
relbiasT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim

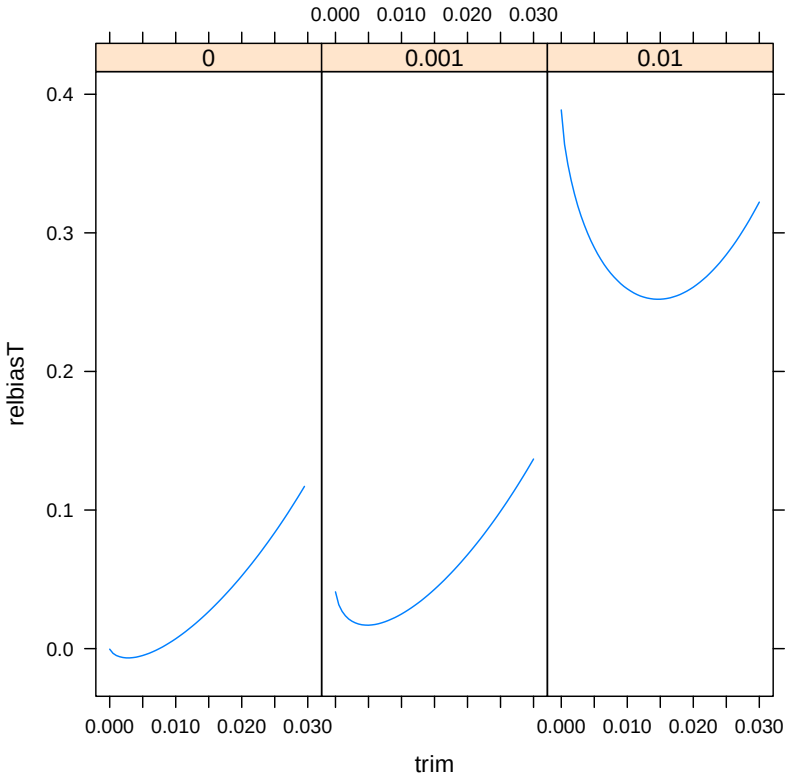
OAR – CCAR


0.000 0.010 0.020 0.030
0
0.001
0.01
0.8
0.6
0.4
0.2
0.0
relrmseT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim


0.000 0.010 0.020 0.030
0
0.001
0.01
0.8
0.6
0.4
0.2
0.0
relbiasT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim

OAR – NCAR


0.000 0.010 0.020 0.030
0
0.001
0.01
0.4
0.3
0.2
0.1
relrmseT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim


0.000 0.010 0.020 0.030
0
0.001
0.01
0.4
0.3
0.2
0.1
0.0
relbiasT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim

E.17. N0009: TQSR @ A-ATSILC: sthhsrs1kx6k

Sample Design Ref 1.4a

E.17.1. Simulation Setup

Target Indicator:	QSR
Domains:	[none] (default)
Population:	A-AT-SILC
Sample:	sthhsrs1kx6k
MonteCarlo Replicates:	1,000 (default)
Criteria Set:	Univariate criteria (default)
Method:	TQSR
Outlyingness:	OAR,OCAR,uncontaminated
Contamination:	CCAR,NCAR,uncontaminated
Missingness:	[none] (default)
Simulation Environment:	DBsim
Host:	FHNW
Author:	Beat Hulliger and Tobias Schoch
ID:	AggTQSR_sthhsrs1kx6k
Date:	September 5, 2011

E.17.2. Estimator Specifications

`Specifications:` Trimmed quintile share ratio estimator; trims only at the top right end of the distribution. Variance estimates based on linearization.

`Comments:`

E.17.3. Robustness Parameters

This section gives some summary statistics of the robustness tuning parameters and the relative number of outliers (OType-Epsilon).

OCAR – CCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

OCAR – NCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

OAR – CCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

OAR – NCAR

```
Range of  trim
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0000  0.0075  0.0150  0.0150  0.0225  0.0300
Range of OTypeEpsilon

0.001  0.01
   61    61
```

No Contamination

```
Range of  trim
    Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
0.000000 0.007375 0.014750 0.014750 0.022120 0.029500
Range of OTypeEpsilon

 0
60
```

E.17.4. Results

In this section, we summarize the performance of the estimators due to numerical criteria. The section is split into the different subsections for the respective combination of the outlyingness and contamination mechanisms. In addition, each subsection is further partitioned for the different values of OTypeEpsilon.

OCAR – CCAR

OTypeEpsilon=0.001

```
     trim relbiasT% relrmseT%    avgT  medaeT    varT relmaxeT%    avgV relbiasV% relrmseV%
1  0.0000  9.5029     9.7115  4.4676  0.5759  0.0067   16.8835  0.0208   210.8183  212.0206
2  0.0005  7.4183     7.6799  4.3825  0.4496  0.0066   14.6078  0.0188   185.2305  186.7361
3  0.0010  5.6032     5.9331  4.3085  0.337   0.0063   12.9927  0.0176   178.2993  179.7214
4  0.0015  4.0067     4.4587  4.2433  0.2434  0.0064   10.967   0.0166   159.9712  161.7871
5  0.0020  2.3753     3.0657  4.1768  0.1456  0.0063   9.927    0.0152   142.9114  145.4728
6  0.0025  0.9597     2.1257  4.119   0.0879  0.006    7.9471   0.0136   127.4348  129.5582
7  0.0030  -0.4552*   1.9431* 4.0613  0.0756* 0.0059   6.3088   0.0097   63.4021   75.4869
8  0.0035  -1.5397    2.4369  4.017   0.1045  0.0059   5.1576   0.0062   4.9986*   21.0867
9  0.0040  -2.4574    3.0779  3.9796  0.1518  0.0057   4.3184   0.0048   -16.0779  20.7011*
10 0.0045  -3.1821    3.6746  3.95    0.1961  0.0056   3.5546   0.0041   -26.6322  28.6133
11 0.0050  -3.8377    4.2512  3.9233  0.2341  0.0056   2.8538   0.0037   -33.3646  34.599
12 0.0055  -4.4579    4.8117  3.898   0.2726  0.0055   2.1955   0.0034   -37.9476  38.8233
13 0.0060  -5.046     5.3581  3.874   0.3086  0.0054   1.6394   0.0031   -41.8788  42.5489
14 0.0065  -5.6128    5.8913  3.8509  0.3436  0.0053   0.9795   0.0029   -44.9868  45.509
15 0.0070  -6.1584    6.4096  3.8286  0.3752  0.0053   0.4239   0.0028   -47.4464  47.8785
16 0.0075  -6.6793    6.9088  3.8074  0.4079  0.0052   -0.1192* 0.0026   -49.5463  49.9261
17 0.0080  -7.197     7.4079  3.7862  0.4384  0.0051   -0.6569  0.0025   -51.4092  51.7494
18 0.0085  -7.6907    7.8861  3.7661  0.4686  0.0051   -1.1855  0.0024   -53.0089  53.309
19 0.0090  -8.1835    8.364   3.746   0.499   0.005    -1.7064  0.0023   -54.1788  54.4503
20 0.0095  -8.6636    8.832   3.7264* 0.528   0.0049*  -2.0105  0.0022*  -55.4651  55.7107
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
```

OTypeEpsilon=0.01

```
    trim relbiasT% relrmseT%    avgT  medaeT    varT relmaxeT%    avgV relbiasV% relrmseV%
1  0.000  90.5982    90.654  7.7762  5.4818  0.0169   103.2116 0.1086  544.0892  545.5058
2  0.021  12.0517    12.2644 4.5716  0.7257  0.0086   20.0956  0.044   410.9142  413.1126
3  0.021  10.624     10.8618 4.5133  0.6438  0.0085   18.7545  0.0431  405.9101  408.0202
4  0.021  9.2092     9.4775  4.4556  0.5555  0.0084   17.0311  0.0422  405.1755  407.2362
5  0.022  7.8191     8.1268  4.3989  0.4728  0.0082   15.134   0.0414  406.7873  408.8166
6  0.022  6.4342     6.7975  4.3424  0.3875  0.008    14.0753  0.0406  406.8985  408.991
7  0.023  5.0686     5.5151  4.2867  0.3075  0.0079   12.22    0.0398  404.905   407.0221
8  0.024  3.7212     4.3054  4.2317  0.2213  0.0078   10.8855  0.0388  397.0276  399.2361
9  0.024  2.3626     3.1889  4.1763  0.1474  0.0076   9.4939   0.0378  394.0228  396.3846
10 0.025  1.0598     2.3825  4.1231  0.0957  0.0076   8.1505   0.0366  382.1056  384.598
11 0.025  -0.2558*   2.1303* 4.0694  0.0827* 0.0075   6.7004   0.0353  373.5156  376.2501
12 0.025  -1.5247    2.5968  4.0177  0.1089  0.0074   5.3686   0.0337  358.1406  361.1911
13 0.026  -2.7752    3.4698  3.9666  0.1703  0.0072   3.8687   0.0321  343.8369  347.3295
14 0.026  -4.0088    4.5086  3.9163  0.2422  0.0071   2.7622   0.0303  326.7504  330.5555
15 0.027  -5.2012    5.5903  3.8677  0.3182  0.007    1.6479   0.0285  306.8748  310.8633
16 0.028  -6.377     6.6921  3.8197  0.3859  0.0069   0.135*   0.0266  287.2013  291.2017
17 0.028  -7.5115    7.7697  3.7734  0.4542  0.0066   -1.2032  0.0246  273.4872  277.9118
18 0.029  -8.6151    8.8373  3.7284  0.5218  0.0065   -2.1331  0.0225  248.7045  253.7104
19 0.029  -9.6834    9.8834  3.6848  0.5866  0.0065   -3.6337  0.0202  209.9419  215.4146
20 0.029  -10.686    10.8633 3.6439  0.6481  0.0064   -4.6277  0.0179  181.7149  188.1102
21 0.030  -11.6663   11.827  3.6039* 0.7065  0.0063*  -5.794   0.0154* 144.8137* 153.1291*
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
```

OCAR – NCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	3.8688	4.3885	4.2377	0.2345	0.0072	10.5351	0.0078	8.4184*	37.2215
2	0.0005	2.314	3.0646	4.1743	0.1426	0.0067	9.0494	0.0058	-13.2654	24.9484*
3	0.0010	1.2536	2.331	4.131	0.0967	0.0064	8.1386	0.005	-22.1478	26.3474
4	0.0015	0.3528*	1.9678	4.0943	0.0788	0.0062	7.1274	0.0045	-28.0042	30.1736
5	0.0020	-0.4377	1.9623*	4.062	0.0769*	0.0061	6.4571	0.0042	-31.8885	33.4128
6	0.0025	-1.1723	2.2297	4.032	0.0931	0.006	5.733	0.0039	-35.5337	36.5981
7	0.0030	-1.8592	2.6401	4.004	0.1171	0.0059	4.9542	0.0036	-38.0065	38.8383
8	0.0035	-2.5114	3.1283	3.9774	0.1535	0.0058	4.4272	0.0034	-41.0431	41.7194
9	0.0040	-3.1337	3.6402	3.952	0.1909	0.0057	3.6067	0.0032	-43.4792	44.0525
10	0.0045	-3.7337	4.1618	3.9275	0.2275	0.0056	2.9685	0.0031	-45.5849	46.0907
11	0.0050	-4.3099	4.6798	3.904	0.2626	0.0055	2.4172	0.0029	-47.4857	47.9265
12	0.0055	-4.8634	5.1893	3.8814	0.2956	0.0055	1.8374	0.0028	-49.1558	49.5403
13	0.0060	-5.4043	5.6962	3.8594	0.3297	0.0054	1.2746	0.0027	-50.8621	51.2036
14	0.0065	-5.9317	6.1957	3.8379	0.361	0.0053	0.7269	0.0025	-52.3216	52.6347
15	0.0070	-6.4467	6.6872	3.8169	0.3924	0.0053	0.129*	0.0024	-53.6359	53.9201
16	0.0075	-6.9438	7.1649	3.7966	0.4224	0.0052	-0.2389	0.0023	-54.7958	55.0595
17	0.0080	-7.4345	7.638	3.7766	0.4527	0.0051	-0.8759	0.0023	-55.7228	55.9601
18	0.0085	-7.9175	8.1061	3.7568	0.4817	0.005	-1.4493	0.0022	-56.6463	56.8686
19	0.0090	-8.3852	8.5611	3.7378	0.5094	0.005	-1.9668	0.0021	-57.5461	57.7504
20	0.0095	-8.8518	9.0167	3.7187*	0.5388	0.0049*	-2.4812	0.002*	-58.4743	58.6649

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.000	36.8087	36.9557	5.5816	2.2221	0.0181	48.5448	0.0395	118.7085	127.323
2	0.021	-5.6608*	5.9732*	3.8489	0.344*	0.0061	0.9963	0.0047	-22.0282*	24.2329*
3	0.021	-6.2626	6.5422	3.8244	0.3806	0.006	0.4674	0.0045	-24.0239	25.9635
4	0.021	-6.8523	7.1045	3.8003	0.4168	0.0059	-0.383*	0.0044	-25.7419	27.4681
5	0.022	-7.4246	7.6546	3.777	0.4495	0.0058	-0.9088	0.0042	-27.6308	29.1594
6	0.022	-7.9968	8.2071	3.7536	0.4849	0.0057	-1.5532	0.004	-29.2154	30.576
7	0.023	-8.5579	8.7528	3.7307	0.5183	0.0056	-2.0896	0.0039	-31.2412	32.4191
8	0.024	-9.112	9.2918	3.7081	0.553	0.0055	-2.6772	0.0037	-32.5434	33.6497
9	0.024	-9.6576	9.8259	3.6859	0.5858	0.0055	-3.0719	0.0036	-34.6259	35.5979
10	0.025	-10.1916	10.3481	3.6641	0.6183	0.0054	-3.8898	0.0034	-35.7886	36.6937
11	0.025	-10.7238	10.8705	3.6424	0.6492	0.0053	-4.509	0.0033	-37.2269	38.0252
12	0.025	-11.2428	11.3816	3.6212	0.6806	0.0052	-4.9483	0.0032	-39.0232	39.7297
13	0.026	-11.7604	11.8911	3.6001	0.7118	0.0052	-5.4996	0.0031	-40.3104	40.9656
14	0.026	-12.2685	12.3918	3.5793	0.7432	0.0051	-6.1551	0.003	-41.5498	42.1254
15	0.027	-12.7681	12.8845	3.5589	0.7735	0.005	-6.6339	0.0029	-42.62	43.1441
16	0.028	-13.2605	13.3712	3.5389	0.8023	0.0049	-7.2178	0.0028	-43.7693	44.2621
17	0.028	-13.7487	13.8544	3.5189	0.8326	0.0049	-7.7395	0.0027	-45.0901	45.5446
18	0.029	-14.2347	14.3358	3.4991	0.8625	0.0048	-8.2553	0.0026	-46.3955	46.815
19	0.029	-14.7097	14.8063	3.4797	0.8903	0.0048	-8.5573	0.0025	-47.4726	47.8655
20	0.029	-15.1846	15.2765	3.4604	0.9195	0.0047	-9.0697	0.0024	-48.2038	48.5703
21	0.030	-15.6495	15.7376	3.4414*	0.946	0.0046*	-9.6828	0.0023*	-49.2494	49.5878

% denotes numbers in percent; * denotes the column-specific minimum/minima

OAR – CCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	9.3601	9.5727	4.4617	0.5662	0.0067	16.1249	0.0206	207.2341	208.5779
2	0.0005	7.1529	7.4258	4.3717	0.433	0.0066	14.1572	0.0182	174.9325	176.5867
3	0.0010	5.4327	5.7831	4.3015	0.3302	0.0065	12.1704	0.0168	155.895	157.4428
4	0.0015	3.8222	4.2941	4.2358	0.2316	0.0064	10.7611	0.0156	144.0423	146.1091
5	0.0020	2.309	3.0073	4.1741	0.1427	0.0062	8.8753	0.0143	131.0317	132.9232
6	0.0025	0.8463	2.1005	4.1144	0.0845	0.0062	7.2477	0.013	111.8532	113.4627
7	0.0030	-0.4714*	1.9696*	4.0606	0.0775*	0.0061	6.3058	0.0095	56.1761	67.0207
8	0.0035	-1.6032	2.4776	4.0145	0.106	0.0059	4.8476	0.006	0.333*	20.5581*
9	0.0040	-2.4774	3.0951	3.9788	0.1542	0.0057	4.0612	0.0047	-18.6578	22.6877
10	0.0045	-3.1853	3.678	3.9499	0.1956	0.0056	3.3259	0.004	-28.1317	29.9441
11	0.0050	-3.8395	4.2529	3.9232	0.2352	0.0056	2.6389	0.0036	-34.5381	35.6674
12	0.0055	-4.4533	4.8082	3.8982	0.2724	0.0055	2.0005	0.0033	-38.8959	39.7206
13	0.0060	-5.0393	5.3522	3.8743	0.3074	0.0054	1.4491	0.0031	-42.6085	43.2462

14	0.0065	-5.6035	5.8819	3.8513	0.3427	0.0053	0.8691	0.0029	-45.4515	45.9506
15	0.0070	-6.1483	6.4003	3.829	0.3758	0.0053	0.3212	0.0027	-47.9594	48.3714
16	0.0075	-6.6729	6.9031	3.8076	0.4071	0.0052	-0.2769*	0.0026	-50.062	50.4256
17	0.0080	-7.1803	7.3927	3.7869	0.4368	0.0052	-0.6448	0.0025	-51.9755	52.3009
18	0.0085	-7.6793	7.8754	3.7666	0.4685	0.0051	-1.2821	0.0024	-53.4066	53.6952
19	0.0090	-8.1668	8.3485	3.7467	0.4977	0.005	-1.8558	0.0023	-54.652	54.9137
20	0.0095	-8.6448	8.814	3.7272*	0.5262	0.0049*	-2.3735	0.0022*	-55.7649	56.0014

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.000	88.0775	88.1362	7.6733	5.3305	0.0172	100.7633	0.1169	578.936	580.5996
2	0.021	8.1045	8.438	4.4105	0.4936	0.0092	16.5949	0.0415	351.3615	353.2084
3	0.021	6.7295	7.1222	4.3544	0.4081	0.0091	15.7326	0.0407	348.993	350.9357
4	0.021	5.3676	5.848	4.2989	0.3265	0.009	14.1743	0.0398	343.0728	345.1808
5	0.022	4.015	4.6222	4.2437	0.2459	0.0087	12.6497	0.0386	341.7637	344.1587
6	0.022	2.6846	3.5215	4.1894	0.1658	0.0087	11.0392	0.0373	330.6561	333.2799
7	0.023	1.3736	2.648	4.1359	0.1144	0.0085	9.9943	0.0359	319.9964	322.768
8	0.024	0.0853*	2.2458*	4.0833	0.0912*	0.0084	8.5238	0.0343	309.3201	312.3501
9	0.024	-1.1488	2.5008	4.033	0.1	0.0082	7.5545	0.0328	298.6204	301.8933
10	0.025	-2.4061	3.274	3.9817	0.1503	0.0082	5.7777	0.0309	276.7787	280.192
11	0.025	-3.6085	4.2221	3.9326	0.2187	0.008	4.8275	0.0291	263.4445	266.8997
12	0.025	-4.7855	5.2551	3.8846	0.291	0.0079	3.8959	0.0273	247.7816	251.2966
13	0.026	-5.9277	6.307	3.838	0.3588	0.0077	2.096	0.0255	229.8439	233.5952
14	0.026	-7.0541	7.3718	3.7921	0.4264	0.0076	1.0636	0.0234	206.4002	211.248
15	0.027	-8.1128	8.3854	3.7489	0.4902	0.0075	0.1984*	0.021	180.8292	187.7717
16	0.028	-9.1409	9.3769	3.7069	0.5516	0.0073	-0.6599	0.0184	152.6153	160.8075
17	0.028	-10.1241	10.3367	3.6668	0.6129	0.0072	-1.7269	0.0157	116.0046	126.6981
18	0.029	-11.0496	11.2365	3.6291	0.6671	0.0069	-2.753	0.0132	89.7365	103.2457
19	0.029	-11.9576	12.1245	3.592	0.7256	0.0067	-4.4988	0.0108	60.5715	77.007
20	0.029	-12.7703	12.9199	3.5589	0.7735	0.0064	-5.4632	0.0088	37.5908	56.8365
21	0.030	-13.5435	13.6768	3.5273*	0.8208	0.006*	-6.1242	0.0073*	19.8642*	41.5857*

% denotes numbers in percent; * denotes the column-specific minimum/minima

OAR – NCAR

OTypeEpsilon=0.001

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.0000	4.0958	4.571	4.247	0.251	0.0069	10.5989	0.0077	12.2067	33.0605
2	0.0005	2.5721	3.2472	4.1848	0.1553	0.0065	9.5472	0.006	-8.0761*	20.9003*
3	0.0010	1.5006	2.456	4.1411	0.1	0.0063	8.2589	0.0052	-17.3728	22.4899
4	0.0015	0.592	2.0157	4.104	0.0829	0.0062	7.4619	0.0047	-23.9499	26.4295
5	0.0020	-0.227*	1.9143*	4.0706	0.0742*	0.006	6.423	0.0043	-28.1697	29.8211
6	0.0025	-0.9725	2.122	4.0402	0.0867	0.0059	5.7325	0.004	-31.9941	33.2439
7	0.0030	-1.6729	2.5146	4.0116	0.11	0.0059	4.8917	0.0038	-35.8167	36.7637
8	0.0035	-2.3388	2.9874	3.9844	0.1457	0.0058	4.1906	0.0035	-38.4247	39.2321
9	0.0040	-2.9751	3.4999	3.9585	0.1827	0.0057	3.5321	0.0034	-40.824	41.5016
10	0.0045	-3.5797	4.023	3.9338	0.2185	0.0056	2.9758	0.0032	-43.4683	44.0405
11	0.0050	-4.169	4.5494	3.9098	0.2531	0.0055	2.301	0.003	-45.5272	46.0275
12	0.0055	-4.7296	5.0629	3.8869	0.2876	0.0054	1.7202	0.0029	-47.3495	47.7854
13	0.0060	-5.2804	5.5782	3.8644	0.3203	0.0054	1.1644	0.0027	-49.3377	49.7152
14	0.0065	-5.8118	6.08	3.8428	0.3538	0.0053	0.6211	0.0026	-50.8733	51.2135
15	0.0070	-6.3279	6.5715	3.8217	0.3849	0.0052	0.0832*	0.0025	-52.1448	52.4513
16	0.0075	-6.8356	7.06	3.801	0.4152	0.0052	-0.4456	0.0024	-53.7401	54.0147
17	0.0080	-7.3287	7.5352	3.7809	0.4447	0.0051	-0.9666	0.0023	-54.8298	55.0846
18	0.0085	-7.8115	8.0027	3.7612	0.4739	0.005	-1.2709	0.0022	-55.787	56.0186
19	0.0090	-8.2926	8.4709	3.7415	0.5034	0.005	-1.7884	0.0021*	-56.8916	57.107
20	0.0095	-8.7592	8.9258	3.7225*	0.533	0.0049*	-2.4082	0.0021*	-57.7866	57.9819

% denotes numbers in percent; * denotes the column-specific minimum/minima

OTypeEpsilon=0.01

	trim	relbiasT%	relrmseT%	avgT	medaeT	varT	relmaxeT%	avgV	relbiasV%	relrmseV%
1	0.000	38.8683	39.0012	5.6656	2.3491	0.0172	49.8766	0.0448	159.6872	168.6295
2	0.021	-5.6376*	5.9498*	3.8499	0.3386*	0.006	1.6783	0.005	-16.8645*	20.086*
3	0.021	-6.2477	6.5267	3.825	0.3761	0.0059	1.1674	0.0048	-19.2368	21.9569
4	0.021	-6.8457	7.0963	3.8006	0.4111	0.0058	0.3108*	0.0046	-21.0227	23.4426

```
5  0.022  -7.4385    7.6677  3.7764  0.4483  0.0058    -0.3193 0.0044  -23.6509   25.6141
6  0.022  -8.0169    8.2268  3.7528  0.4833  0.0057    -0.8732 0.0042  -25.688    27.4007
7  0.023  -8.5877    8.7825  3.7295  0.5178  0.0056    -1.5538 0.004   -28.3246   29.7968
8  0.024  -9.1471    9.3263  3.7067  0.5497  0.0055    -2.1612 0.0039  -29.7646   31.1179
9  0.024  -9.7047    9.8718  3.6839  0.5855  0.0054    -2.7456 0.0037  -31.9085   33.1041
10 0.025  -10.2458   10.4018 3.6619  0.6182  0.0054    -3.1396 0.0036  -33.7165   34.7571
11 0.025  -10.7838   10.9312 3.6399  0.65    0.0053    -3.9006 0.0034  -36.0046   36.8973
12 0.025  -11.3107   11.4487 3.6184  0.6833  0.0052    -4.4015 0.0033  -37.4758   38.2794
13 0.026  -11.8341   11.9637 3.5971  0.7148  0.0051    -4.9484 0.0031  -38.8444   39.5552
14 0.026  -12.3468   12.4698 3.5761  0.7466  0.0051    -5.4346 0.003   -40.6522   41.2787
15 0.027  -12.8499   12.9668 3.5556  0.7764  0.005     -5.9157 0.0029  -42.2451   42.8269
16 0.028  -13.3464   13.4567 3.5354  0.8068  0.0049    -6.558  0.0028  -43.1923   43.7236
17 0.028  -13.8382   13.9434 3.5153  0.8366  0.0049    -7.141  0.0027  -44.574    45.0647
18 0.029  -14.3256   14.4257 3.4954  0.8666  0.0048    -7.5543 0.0026  -45.8183   46.2655
19 0.029  -14.8008   14.8967 3.476   0.8964  0.0047    -8.1249 0.0025  -47.1408   47.5373
20 0.029  -15.2715   15.3628 3.4568  0.9234  0.0047    -8.6399 0.0024  -47.981    48.3482
21 0.030  -15.7424   15.8303 3.4376* 0.9525  0.0046*   -8.9947 0.0023* -49.4119   49.7483
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
```

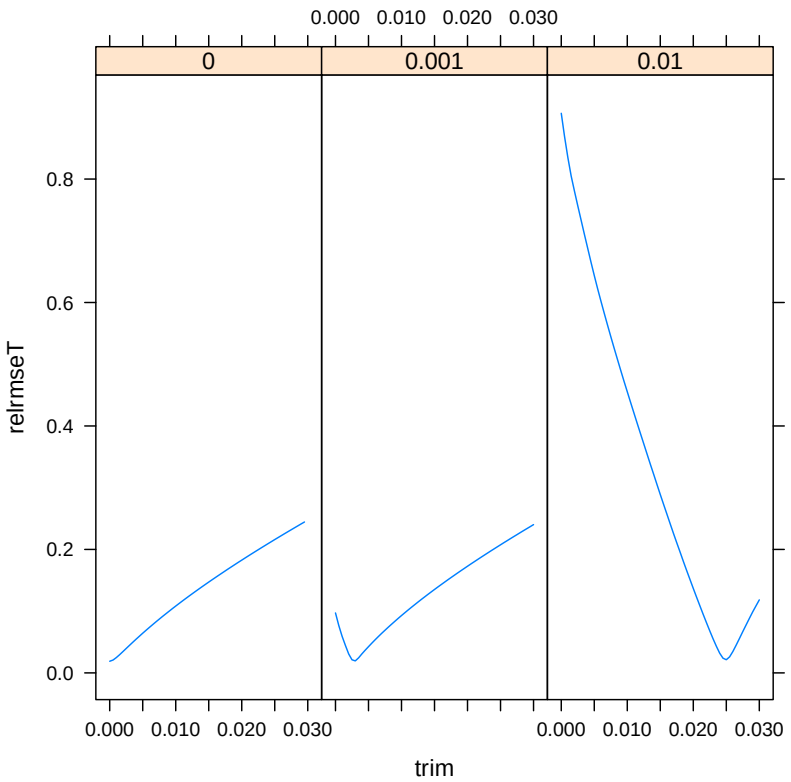
No Contamination

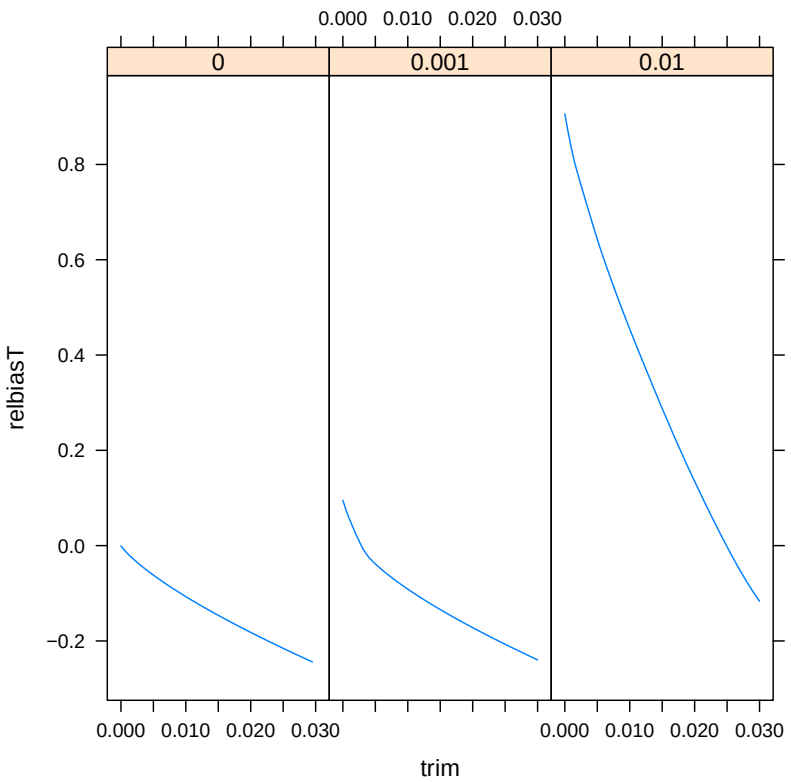
```
     trim relbiasT% relrmseT%    avgT  medaeT    varT relmaxeT%    avgV relbiasV% relrmseV%
1  0.0000  -0.0396*   1.8858* 4.0783  0.0752* 0.0059   6.6015   0.0034  -43.1984*  43.6258*
2  0.0005  -0.9111    2.0815  4.0427  0.0836  0.0058   5.7358   0.0032  -45.4828   45.8772
3  0.0010  -1.6379    2.4788  4.013   0.1102  0.0058   5.0529   0.003   -47.6547   48.008
4  0.0015  -2.296     2.9469  3.9862  0.1452  0.0057   4.2559   0.0029  -49.4449   49.77
5  0.0020  -2.92      3.4478  3.9607  0.1806  0.0056   3.6614   0.0027  -51.0069   51.309
6  0.0025  -3.515     3.9578  3.9365  0.2162  0.0055   2.9647   0.0026  -52.4407   52.7134
7  0.0030  -4.0846    4.4666  3.9132  0.2508  0.0054   2.366    0.0025  -53.8822   54.1252
8  0.0035  -4.6307    4.9675  3.8909  0.2838  0.0054   1.8639   0.0024  -55.2765   55.4972
9  0.0040  -5.1635    5.4638  3.8692  0.3161  0.0053   1.3754   0.0023  -56.3934   56.5989
10 0.0045  -5.6757    5.9468  3.8483  0.3462  0.0052   0.8921   0.0022  -57.358    57.5541
11 0.0050  -6.1798    6.4271  3.8277  0.3765  0.0052   0.3021   0.0022  -58.379    58.5619
12 0.0055  -6.6682    6.8946  3.8078  0.4062  0.0051   -0.2747* 0.0021  -59.1144   59.2855
13 0.0060  -7.1505    7.3596  3.7881  0.435   0.0051   -0.6865  0.002   -59.9209   60.0814
14 0.0065  -7.62      7.8138  3.769   0.463   0.005    -1.2041  0.002   -60.558    60.7098
15 0.0070  -8.0832    8.2637  3.7501  0.4918  0.0049   -1.8239  0.0019  -61.2225   61.3669
16 0.0075  -8.5362    8.706   3.7316  0.5202  0.0049   -2.3773  0.0018  -62.0918   62.2245
17 0.0080  -8.9846    9.1442  3.7133  0.5478  0.0048   -2.8222  0.0018  -62.774    62.8998
18 0.0085  -9.4201    9.5704  3.6955  0.5725  0.0048   -3.1657  0.0017  -63.3383   63.4583
19 0.0090  -9.8515    9.9935  3.6779  0.5996  0.0047   -3.8522  0.0017  -63.9046   64.0201
20 0.0095  -10.2788   10.4131 3.6605* 0.6247  0.0046*  -4.2805  0.0016* -64.4038   64.5148
---
% denotes numbers in percent; * denotes the column-specific minimum/minima
```

E.17.5. Plots

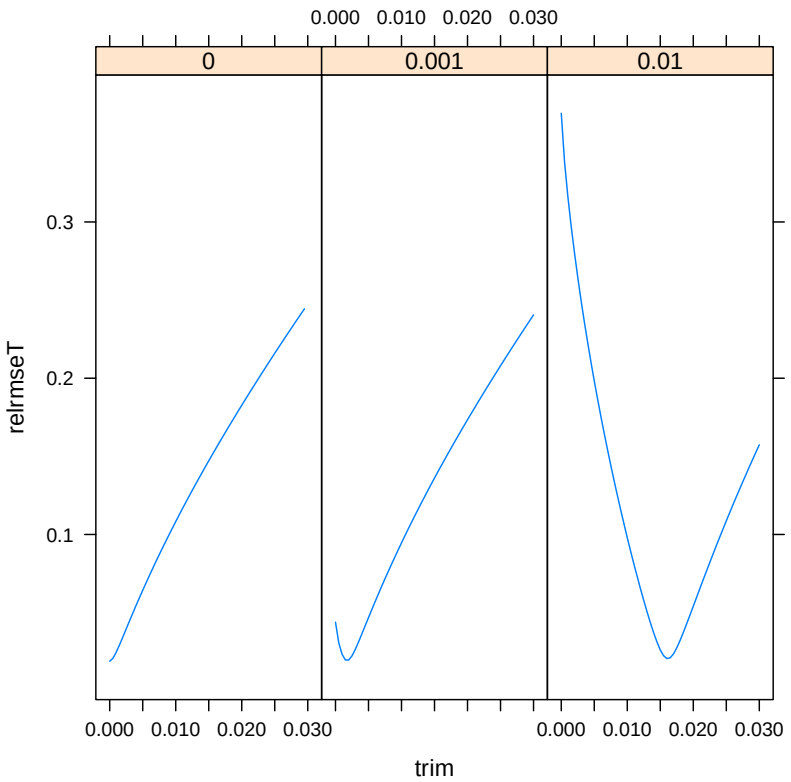
In this section, we report graphical displays of certain numerical criteria for the estimators. The lattice-type plots are partitioned into panels for different values of OTypeEpsilon.

OCAR – CCAR


0
0.001
0.01
relrmseT
trim
0.000 0.010 0.020 0.030
0.0
0.2
0.4
0.6
0.8


0
0.001
0.01
relbiasT
trim
0.000 0.010 0.020 0.030
−0.2
0.0
0.2
0.4
0.6
0.8

OCAR – NCAR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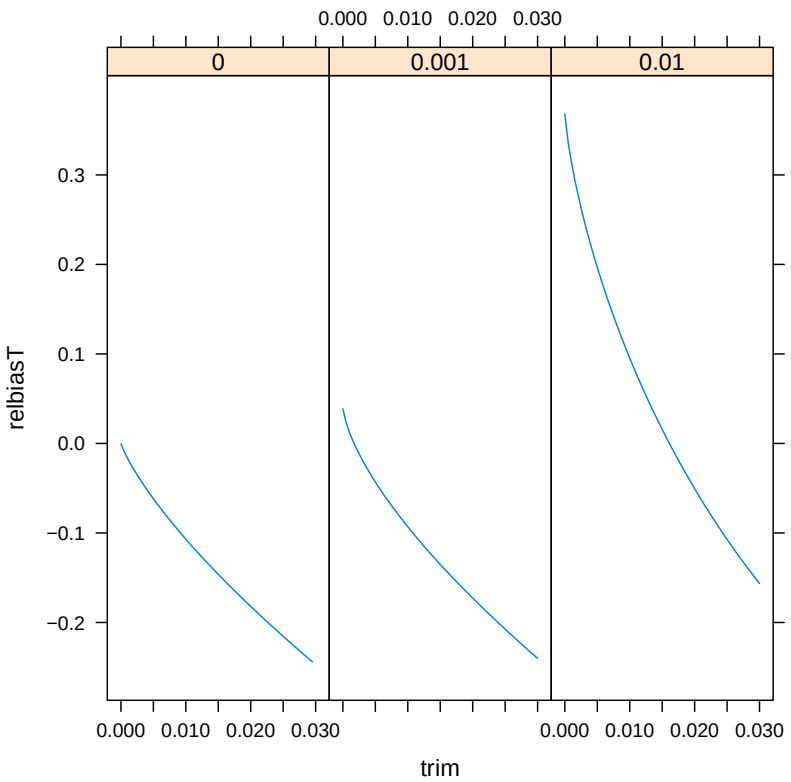
0
0.001
0.01
0.3
0.2
0.1
relrmseT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim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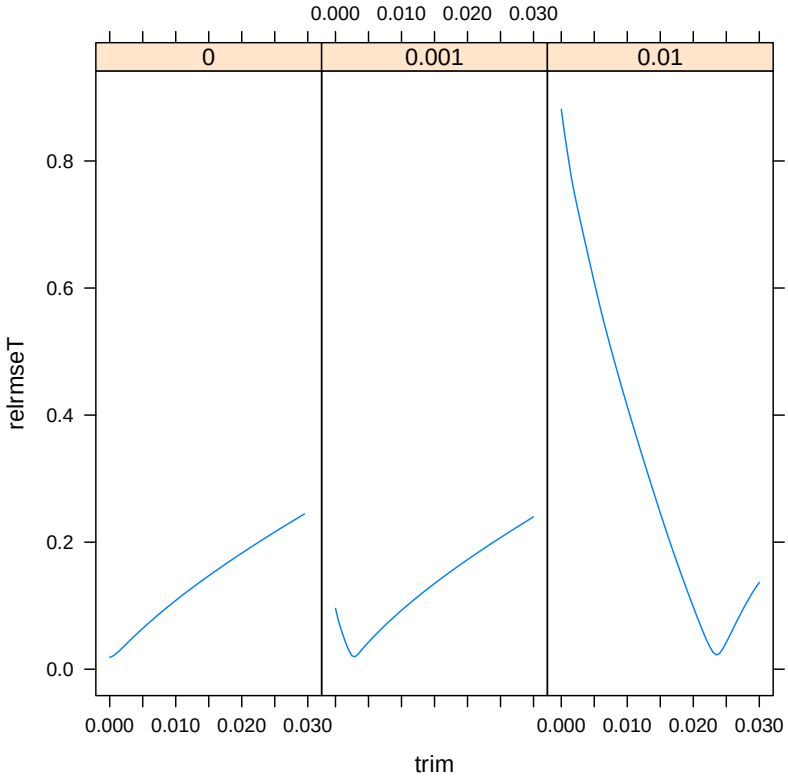
0
0.001
0.01
0.3
0.2
0.1
0.0
−0.1
−0.2
relbiasT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim

OAR – CCAR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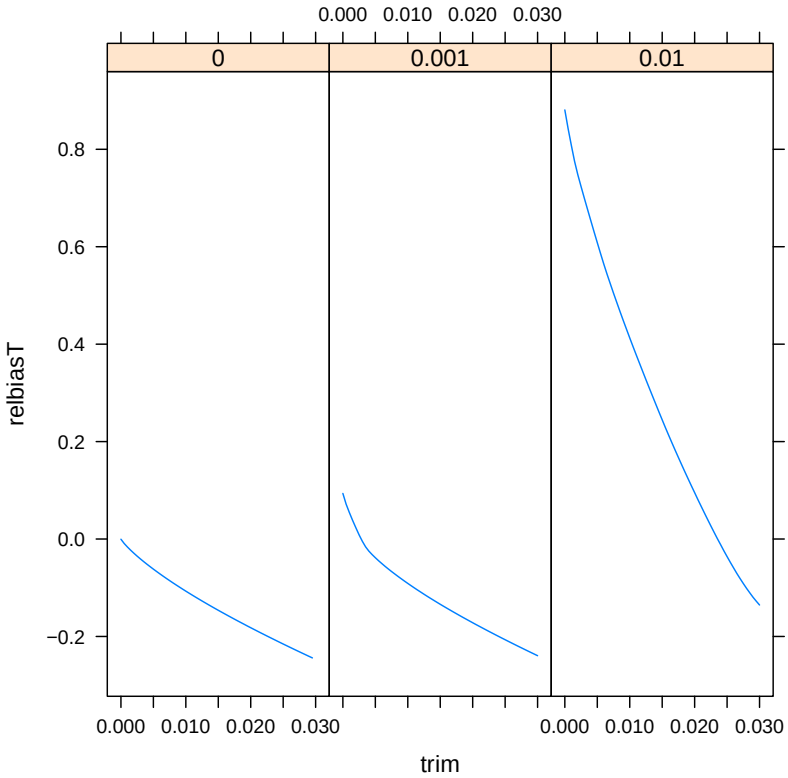
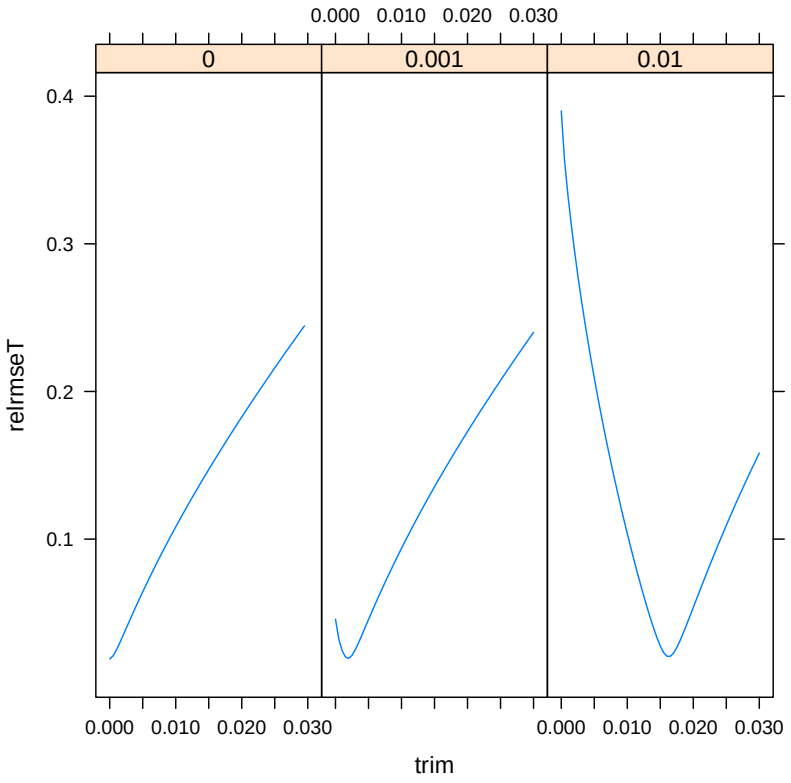
0.01
relrmseT
trim
0.0
0.2
0.4
0.6
0.8
0.000
0.010
0.020
0.030


0
0.001
0.01
relbiasT
trim
−0.2
0.0
0.2
0.4
0.6
0.8
0.000
0.010
0.020
0.030

OAR – NCAR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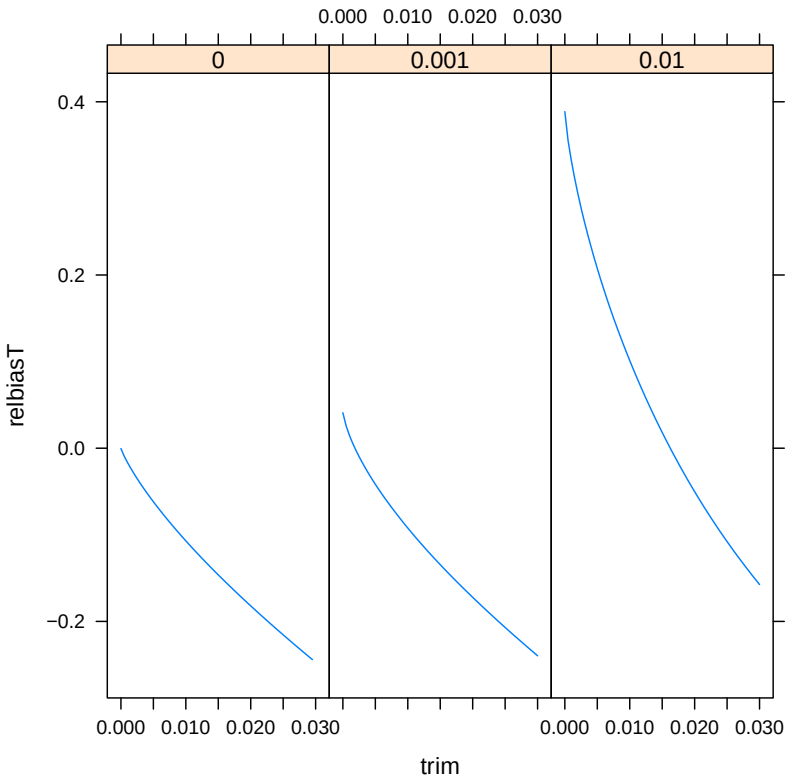
0
0.001
0.01
0.4
0.3
0.2
0.1
relrmseT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim


0.000 0.010 0.020 0.030
0
0.001
0.01
0.4
0.2
0.0
−0.2
relbiasT
0.000 0.010 0.020 0.030
0.000 0.010 0.020 0.030
trim

Appendix F.

Appendix TUW

F.1. Description of methods

This chapter describes the semiparametric methods for the estimation of social inclusion indicators that are investigated in the simulation study. In the statistical environment R (R Development Core Team, 2010), the social inclusion indicators are implemented in the add-on package `laeken` (Alfons et al., 2011b) along with functionality for semiparametric estimation.

F.2. Social inclusion indicators

The focus of this report lies on the inequality indicators *quintile share ratio* (QSR) and *Gini coefficient*, which are both highly influenced by outliers in the upper tail of the distribution. Note that for the estimation of the social inclusion indicators, each person in a household is assigned the same *eqivalized disposable income*. For reference, the *mean equivalized disposable income* is evaluated as well.

For the following definitions, let $\boldsymbol{x} := (x_1, \ldots, x_n)'$ be the equivalized disposable income with $x_1 \leq \ldots \leq x_n$ and let $\boldsymbol{w} := (w_i, \ldots, w_n)'$ be the corresponding personal sample weights, where n denotes the number of observations.

F.2.1. Quintile share ratio (QSR)

The income *quintile share ratio* (QSR) is defined as the ratio of the sum of the equivalized disposable income received by the 20% of the population with the highest equivalized disposable income to that received by the 20% of the population with the lowest equivalized disposable income (Eurostat, 2004, 2009).

For the estimation of the quintile share ratio from a sample, let $\hat{q}_{0.2}$ and $\hat{q}_{0.8}$ denote the weighted 20% and 80% quantiles, respectively. With $0 \leq p \leq 1$, these weighted quantiles are given by

$$\hat{q}_p = \hat{q}_p(\boldsymbol{x}, \boldsymbol{w}) := \begin{cases} \frac{1}{2}(x_j + x_{j+1}), & \text{if } \sum_{i=1}^{j} w_i = p \sum_{i=1}^{n} w_i, \\ x_{j+1}, & \text{if } \sum_{i=1}^{j} w_i < p \sum_{i=1}^{n} w_i < \sum_{i=1}^{j+1} w_i. \end{cases} \tag{F.1}$$

Using index sets $I_{\leq \hat{q}_{0.2}} := \{i \in \{1, \ldots, n\} : x_i \leq \hat{q}_{0.2}\}$ and $I_{> \hat{q}_{0.8}} := \{i \in \{1, \ldots, n\} : x_i > \hat{q}_{0.8}\}$, the quintile share ratio is estimated by

$$\widehat{QSR} := \frac{\sum_{i \in I_{> \hat{q}_{0.8}}} w_i x_i}{\sum_{i \in I_{\leq \hat{q}_{0.2}}} w_i x_i}. \tag{F.2}$$

F.2.2. Gini coefficient

The *Gini coefficient* is defined as the relationship of cumulative shares of the population arranged according to the level of equivalized disposable income, to the cumulative share of the equivalized total disposable income received by them (Eurostat, 2004, 2009).

For the estimation of the Gini coefficient from a sample, the sample weights need to be taken into account. In mathematical terms, the Gini coefficient is estimated by

$$\widehat{Gini} := 100 \left[\frac{2 \sum_{i=1}^{n} \left(w_i x_i \sum_{j=1}^{i} w_j \right) - \sum_{i=1}^{n} {w_i}^2 x_i}{\left(\sum_{i=1}^{n} w_i \right) \sum_{i=1}^{n} (w_i x_i)} - 1 \right]. \tag{F.3}$$

F.3. Pareto tail modeling

The *Pareto distribution* is well studied in the literature and is defined in terms of its cumulative distribution function

$$F_\theta(x) = 1 - \left(\frac{x}{x_0} \right)^{-\theta}, \qquad x \geq x_0, \tag{F.4}$$

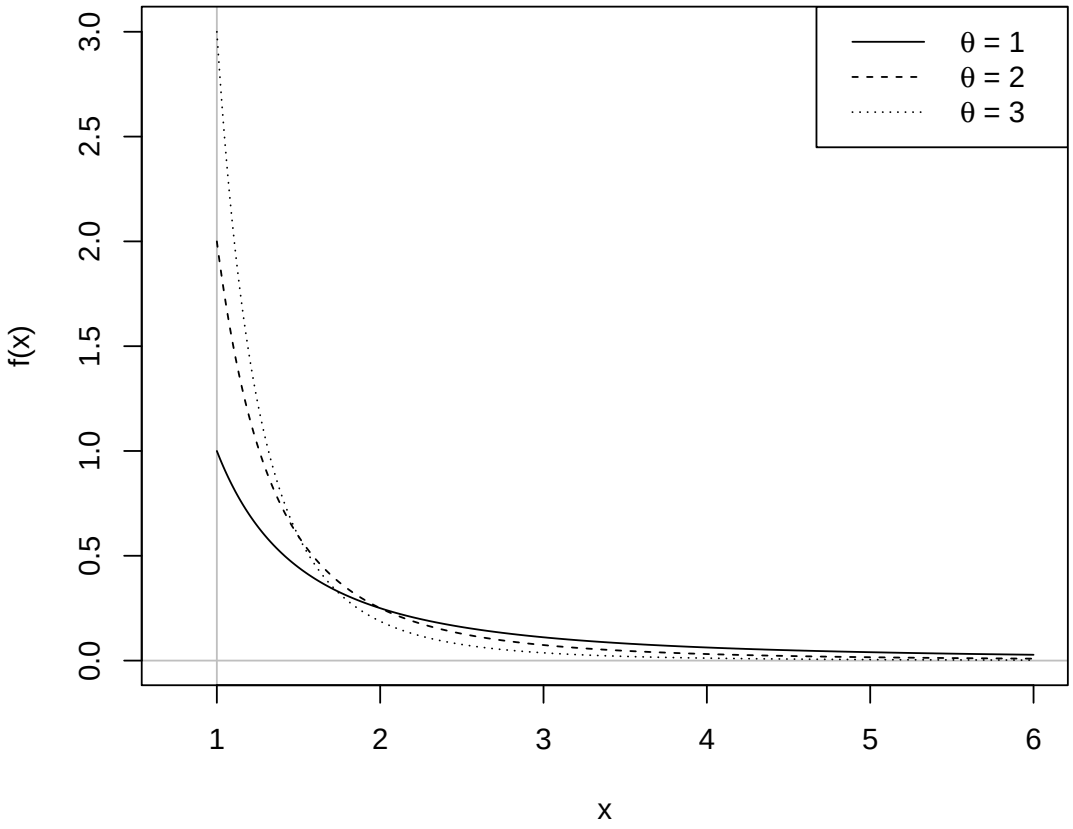


Figure F.1.: Pareto probability density functions with parameters $x_0 = 1$ and $\theta = 1, 2, 3$.

where $x_0 > 0$ is the scale parameter and $\theta > 0$ is the shape parameter (KLEIBER and KOTZ, 2003). Furthermore, its density function is given by

$$f_\theta(x) = \frac{\theta x_0^\theta}{x^{\theta+1}}, \qquad x \geq x_0. \tag{F.5}$$

Figure F.1 visualizes the Pareto probability density function with scale parameter $x_0 = 1$ and different values of the shape parameter θ. Clearly, the Pareto distribution is a highly right-skewed distribution with a heavy tail. It is therefore reasonable to assume that a random variable following a Pareto distribution contains extreme values. Furthermore, the effect of changing the shape parameter θ is visible in the probability mass at the scale parameter x_0: the higher θ, the higher the probability mass at x_0.

In Pareto tail modeling, the cumulative distribution function on the whole range of x is modeled as

$$F(x) = \begin{cases} G(x), & \text{if } x \leq x_0, \\ G(x_0) + (1 - G(x_0))F_\theta(x), & \text{if } x > x_0, \end{cases} \tag{F.6}$$

where G is an unknown distribution function (DUPUIS and VICTORIA-FESER, 2006).

Let n be the number of observations and let $\boldsymbol{x} = (x_1, \ldots, x_n)'$ denote the observed values with $x_1 \leq \ldots \leq x_n$. In addition, let k be the number of observations to be used for tail modeling. In this scenario, the threshold x_0 is estimated by

$$\hat{x}_0 := x_{n-k}. \tag{F.7}$$

If an estimate $\hat{x}_0$ for the scale parameter of the Pareto distribution has been obtained, k is given by the number of observations larger than $\hat{x}_0$. Various methods for the estimation of x_0 or k have been proposed (BEIRLANT et al., 1996b,a; DUPUIS and VICTORIA-FESER, 2006; VAN KERM, 2007). However, the simulation study is focused on evaluating robust estimation the shape parameter θ with respect to their influence on the selected Laeken indicators for different values of k.

To be more specific, three approaches based on Pareto tail modeling for reducing the influence of outliers on the social inclusion indicators are investigated:

Replacement of the tail (RT): All values above the threshold are replaced by values drawn from the fitted distribution. The order of the original values is preserved.

Replacement of nonrepresentative outliers (RN): Values larger than a certain α-quantile of the fitted distribution (with α close to 1) are declared as nonrepresentative outliers. Only these nonrepresentative outliers are replaced by

values drawn from the fitted distribution, thereby preserving the order of the original values. For the results in this report, $\alpha = 0.99$ is used.

Calibration for nonrepresentative outliers (CN): Values larger than a certain α-quantile of the fitted distribution (with α close to 1) are declared as nonrepresentative outliers. Since these are considered to be unique to the population data, the sample weights of the corresponding observations are set to 1 and the weights of the remaining observations are adjusted accordingly by calibration. For the results in this report, α is set to 0.99 and the variable giving the NUTS2 regions is used as auxiliary information for calibration.

F.3.1. Estimation of the shape parameter

This section is focused on methods for estimating the shape parameter θ once the threshold x_0 is fixed.

Hill estimator

The maximum likelihood estimator for the shape parameter of the Pareto distribution was introduced by Hill (1975) and is referred to as the *Hill* estimator. If the data do not contain sample weights, it is given by

$$\hat{\theta}_{\text{Hill}} = \frac{k}{\sum_{i=1}^{k} \log x_{n-k+i} - k \log x_{n-k}}. \tag{F.8}$$

In the case of sample weights, the *weighted Hill* (wHill) estimator is given by generalizing Equation F.8 to

$$\hat{\theta}_{\text{wHill}} = \frac{\sum_{i=1}^{k} w_{n-k+i}}{\sum_{i=1}^{k} w_{n-k+i} \left(\log x_{n-k+i} - k \log x_{n-k}\right)}. \tag{F.9}$$

Integrated squared error (ISE) estimator

For the *integrated squared error* (ISE) estimator (Vandewalle et al., 2007), the Pareto distribution is modeled in terms of the relative excesses

$$y_i := \frac{x_{n-k+i}}{x_{n-k}}, \qquad i = 1, \ldots, k. \tag{F.10}$$

The density function of the Pareto distribution for the relative excesses is approximated by

$$f_\theta(y) = \theta y^{-(1+\theta)}. \tag{F.11}$$

The ISE estimator is then given by minimizing the integrated squared error criterion (Terrell, 1990):

$$\hat{\theta} = \arg\min_\theta \left[\int f_\theta^2(y) dy - 2\mathbb{E}(f_\theta(Y)) \right]. \tag{F.12}$$

If there are no sample weights in the data, the mean is used as an unbiased estimator of $\mathbb{E}(f_\theta(Y))$ in order to obtain the ISE estimate

$$\hat{\theta}_{\text{ISE}} = \arg\min_\theta \left[\int f_\theta^2(y) dy - \frac{2}{k} \sum_{i=1}^{k} f_\theta(y_i) \right]. \tag{F.13}$$

See Vandewalle et al. (2007) for more information on the ISE estimator for the case without sample weights.

If sample weights are available in the data, the mean in Equation F.13 is simply replaced by a weighted mean to obtain the *weighted integrated squared error* (wISE) estimator:

$$\hat{\theta}_{\text{wISE}} = \arg\min_\theta \left[\int f_\theta^2(y) dy - \frac{2}{\sum_{i=1}^{k} w_{n-k+i}} \sum_{i=1}^{k} w_{n-k+i} f_\theta(y_i) \right]. \tag{F.14}$$

Partial density component (PDC) estimator

For the *partial density component* (PDC) estimator (Vandewalle et al., 2007) minimizes the integrated squared error criterion using an incomplete density mixture model uf_θ. If the data do not contain sample weights, the PDC estimator in is thus given by

$$\hat{\theta}_{\text{PDC}} = \arg\min_\theta \left[u^2 \int f_\theta^2(y) dy - \frac{2u}{k} \sum_{i=1}^{k} f_\theta(y_i) \right]. \tag{F.15}$$

The parameter u can be interpreted as a measure of the uncontaminated part of the sample and is estimated by

$$\hat{u} = \frac{\frac{1}{k} \sum_{i=1}^{k} f_{\hat{\theta}}(y_i)}{\int f_{\hat{\theta}}^2(y) dy}. \tag{F.16}$$

See VANDEWALLE et al. (2007) and references therein for more information on the PDC estimator for the case without sample weights.

Taking sample weights into account, the *weighted partial density component* (wPDC) estimator is obtained by generalizing Equations F.15 and F.16 to

$$\hat{\theta}_{\text{wPDC}} = \arg\min_{\theta} \left[u^2 \int f_\theta^2(y)dy - \frac{2u}{\sum_{i=1}^k w_{n-k+i}} \sum_{i=1}^k w_{n-k+i} f_\theta(y_i) \right], \tag{F.17}$$

$$\hat{u} = \frac{\frac{1}{\sum_{i=1}^k w_{n-k+i}} \sum_{i=1}^k w_{n-k+i} f_{\hat{\theta}}(y_i)}{\int f_{\hat{\theta}}^2(y)dy}. \tag{F.18}$$

F.4. Parametric estimation

For comparison, parametric estimation of the social inclusion indicators using a *generalized Beta distribution of the second kind* (GB2; e.g. KLEIBER and KOTZ, 2003) is also investigated. Due to much faster computation times, the profile log-likelihood approach is favored over the full log-likelihood approach. A description of these methods can be found in AMELI-D2.1 (2011). In the simulation study, the implementation in the R package `GB2` (GRAF and NEDYALKOVA, 2011) is used.

F.5. Simulation results: AAT-SILC

The simulation setup for the AAT-SILC population data (ALFONS et al., 2011d) is briefly described in the following. AAT-SILC was generated from Austrian EU-SILC sample data from 2006 using the data simulation framework introduced by (ALFONS et al., 2011c) and implemented in the R package `simPopulation` (ALFONS and KRAFT, 2010). Note that the simulations are carried out in the statistical environment R (R DEVELOPMENT CORE TEAM, 2010) using the add-on package `simFrame` (ALFONS et al., 2010; ALFONS, 2011).

Sampling designs (for details, see ALFONS et al., 2011a)

1. Simple random sampling
2. Stratified simple random sampling with sample sizes proportional to strata
3. Stratified Midzuno sampling with sample sizes proportional to strata and inclusion probabilities given by household sizes

In all three cases, the sample size is set to 6 000 households.

Contamination settings (for details, see ALFONS et al., 2011a)

1. Selection of outliers:
   - *Outlying completely at random* (OCAR)
   - *Outlying at random* (OAR): outliers are drawn by stratified sampling by main activity status
2. Modeling the distribution of the selected outliers:
   - *Contaminated completely at random* (CCAR): outliers are drawn from a normal distribution and equivalized
   - *Not contaminated at random* (NCAR): values are multiplied by a scaling factor and equivalized

F.5.1. Quintile share ratio (QSR)

Simple random sampling

No contamination

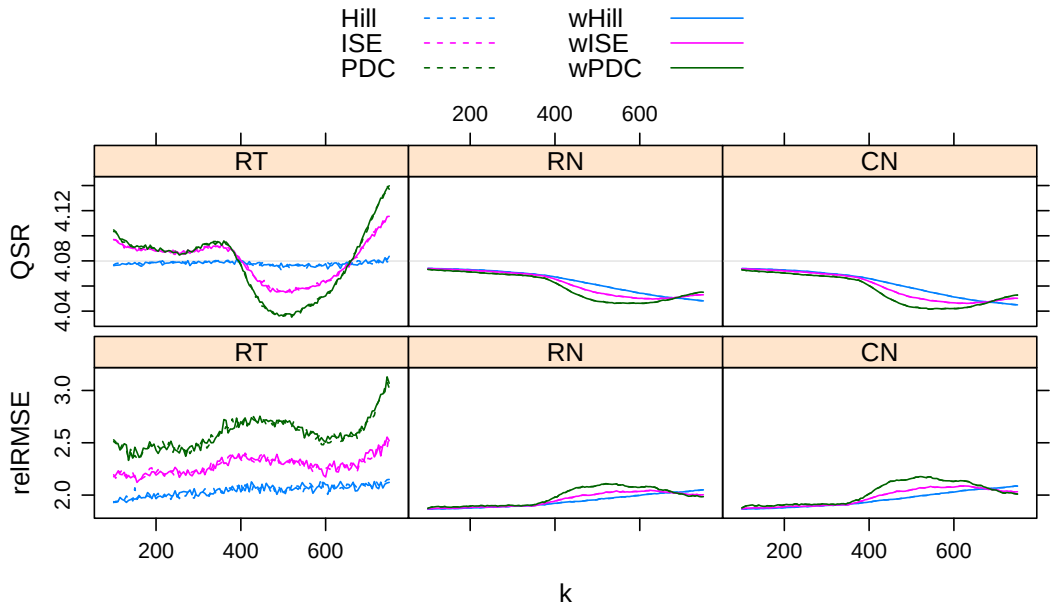


Figure F.2.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 100 and 750.

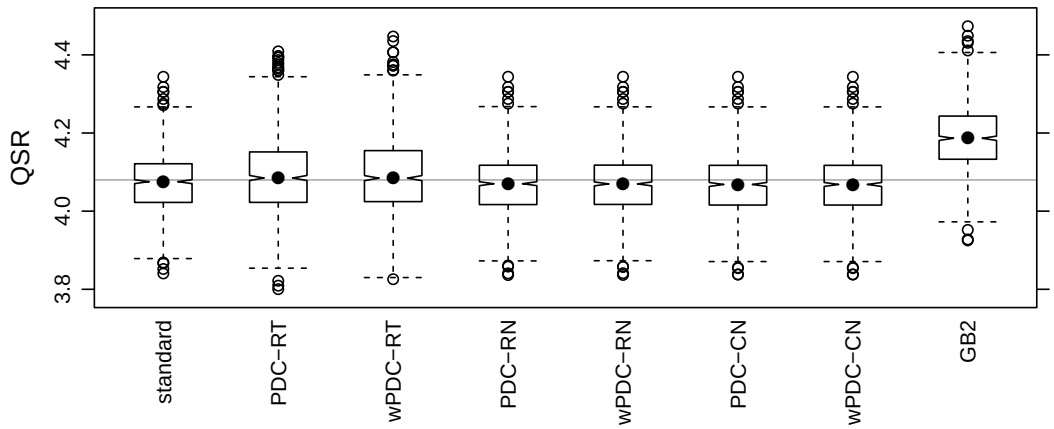


Figure F.3.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 300$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.1.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.07	0.01	−0.01	−0.14	4.08	0.07	−0.00	0.08	1.87	0.07	0.06
wHill	RT	300	4.08	0.01	−0.00	−0.00	4.08	0.08	0.00	0.08	1.99	0.08	0.07
wHill	RT	500	4.07	0.01	−0.00	−0.12	4.08	0.08	−0.00	0.08	2.02	0.08	0.07
wHill	RT	700	4.08	0.01	−0.00	−0.04	4.08	0.09	−0.00	0.09	2.09	0.08	0.07
wHill	RN	300	4.07	0.01	−0.01	−0.22	4.07	0.07	−0.01	0.08	1.89	0.07	0.06
wHill	RN	500	4.06	0.01	−0.02	−0.47	4.06	0.08	−0.02	0.08	1.96	0.08	0.06
wHill	RN	700	4.05	0.01	−0.03	−0.73	4.05	0.08	−0.03	0.08	2.03	0.08	0.07
wHill	CN	300	4.07	0.01	−0.01	−0.24	4.07	0.07	−0.01	0.08	1.90	0.07	0.06
wHill	CN	500	4.06	0.01	−0.02	−0.52	4.06	0.08	−0.02	0.08	1.98	0.08	0.06
wHill	CN	700	4.05	0.01	−0.03	−0.81	4.05	0.08	−0.03	0.08	2.07	0.08	0.07
wISE	RT	300	4.09	0.01	0.01	0.18	4.08	0.09	0.00	0.09	2.20	0.09	0.08
wISE	RT	500	4.06	0.01	−0.02	−0.59	4.05	0.09	−0.03	0.09	2.29	0.09	0.10
wISE	RT	700	4.10	0.01	0.02	0.43	4.09	0.09	0.01	0.10	2.40	0.10	0.08
wISE	RN	300	4.07	0.01	−0.01	−0.23	4.07	0.07	−0.01	0.08	1.90	0.07	0.06
wISE	RN	500	4.05	0.01	−0.03	−0.62	4.05	0.08	−0.03	0.08	2.01	0.08	0.07
wISE	RN	700	4.05	0.01	−0.03	−0.70	4.05	0.08	−0.03	0.08	2.01	0.08	0.06
wISE	CN	300	4.07	0.01	−0.01	−0.25	4.07	0.08	−0.01	0.08	1.90	0.07	0.06
wISE	CN	500	4.05	0.01	−0.03	−0.71	4.05	0.08	−0.03	0.08	2.05	0.08	0.07
wISE	CN	700	4.05	0.01	−0.03	−0.77	4.05	0.07	−0.03	0.08	2.05	0.08	0.07
wPDC	RT	300	4.09	0.01	0.01	0.28	4.08	0.09	0.00	0.10	2.48	0.09	0.09
wPDC	RT	500	4.04	0.01	−0.04	−1.06	4.03	0.10	−0.05	0.11	2.68	0.11	0.09
wPDC	RT	700	4.11	0.01	0.03	0.67	4.10	0.11	0.02	0.11	2.74	0.11	0.11
wPDC	RN	300	4.07	0.01	−0.01	−0.27	4.07	0.08	−0.01	0.08	1.90	0.07	0.06
wPDC	RN	500	4.05	0.01	−0.03	−0.79	4.05	0.08	−0.03	0.09	2.09	0.09	0.07
wPDC	RN	700	4.05	0.01	−0.03	−0.68	4.05	0.07	−0.03	0.08	2.01	0.08	0.07
wPDC	CN	300	4.07	0.01	−0.01	−0.30	4.07	0.07	−0.01	0.08	1.91	0.07	0.06
wPDC	CN	500	4.04	0.01	−0.04	−0.90	4.04	0.08	−0.04	0.09	2.16	0.09	0.07
wPDC	CN	700	4.05	0.01	−0.03	−0.75	4.05	0.08	−0.03	0.08	2.05	0.08	0.07
GB2			4.19	0.01	0.11	2.65	4.19	0.08	0.11	0.14	3.32	0.16	0.10

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OCAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

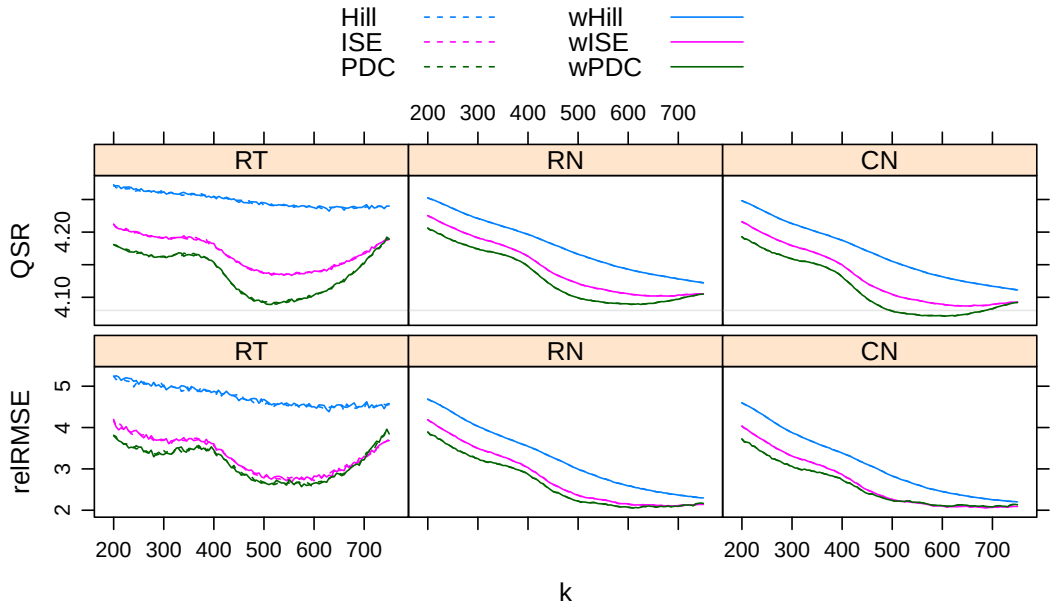

Figure F.4.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

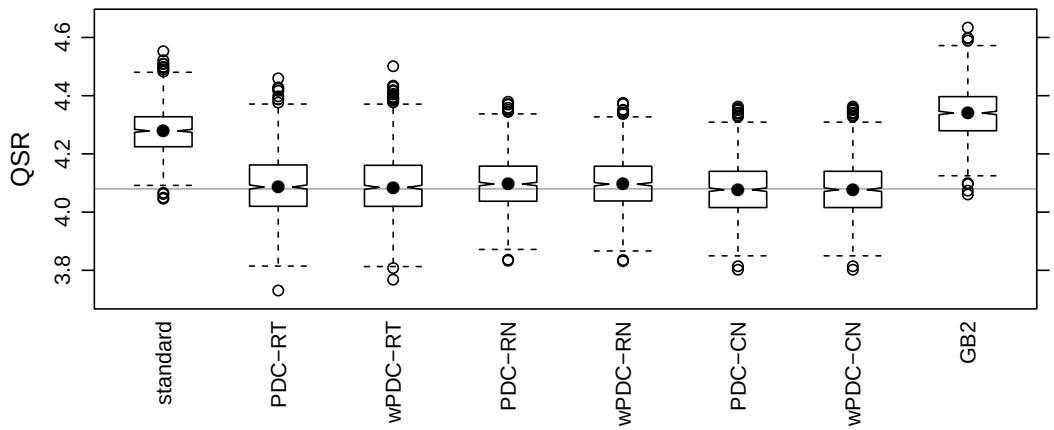

Figure F.5.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.2.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.28	0.01	0.20	4.88	4.28	0.08	0.20	0.21	5.25	0.30	0.12
wHill	RT	300	4.26	0.01	0.18	4.46	4.26	0.09	0.18	0.21	5.03	0.27	0.13
wHill	RT	500	4.25	0.01	0.17	4.05	4.24	0.09	0.16	0.19	4.68	0.24	0.12
wHill	RT	700	4.24	0.01	0.16	3.92	4.24	0.10	0.16	0.19	4.55	0.24	0.12
wHill	RN	300	4.22	0.01	0.14	3.46	4.23	0.08	0.15	0.16	4.03	0.22	0.10
wHill	RN	500	4.17	0.01	0.09	2.11	4.17	0.09	0.09	0.12	2.99	0.13	0.09
wHill	RN	700	4.13	0.01	0.05	1.18	4.13	0.08	0.05	0.10	2.37	0.10	0.08
wHill	CN	300	4.21	0.01	0.13	3.27	4.22	0.08	0.14	0.16	3.88	0.20	0.10
wHill	CN	500	4.16	0.01	0.08	1.84	4.16	0.09	0.08	0.12	2.83	0.12	0.08
wHill	CN	700	4.12	0.01	0.04	0.91	4.12	0.08	0.04	0.09	2.25	0.09	0.08
wISE	RT	300	4.19	0.01	0.11	2.73	4.18	0.10	0.11	0.15	3.70	0.16	0.13
wISE	RT	500	4.14	0.01	0.06	1.41	4.13	0.09	0.05	0.11	2.78	0.11	0.09
wISE	RT	700	4.17	0.01	0.09	2.19	4.17	0.10	0.09	0.13	3.30	0.14	0.12
wISE	RN	300	4.19	0.01	0.11	2.73	4.19	0.09	0.11	0.14	3.50	0.17	0.10
wISE	RN	500	4.12	0.01	0.04	1.01	4.12	0.09	0.04	0.10	2.36	0.10	0.08
wISE	RN	700	4.10	0.01	0.02	0.58	4.11	0.08	0.03	0.09	2.11	0.09	0.08
wISE	CN	300	4.18	0.01	0.10	2.43	4.18	0.09	0.10	0.14	3.31	0.15	0.10
wISE	CN	500	4.10	0.01	0.02	0.60	4.10	0.09	0.02	0.09	2.26	0.09	0.08
wISE	CN	700	4.09	0.01	0.01	0.23	4.09	0.08	0.01	0.08	2.07	0.08	0.07
wPDC	RT	300	4.16	0.01	0.08	2.01	4.16	0.11	0.08	0.14	3.35	0.13	0.12
wPDC	RT	500	4.09	0.01	0.01	0.31	4.09	0.10	0.01	0.11	2.68	0.10	0.10
wPDC	RT	700	4.15	0.01	0.07	1.76	4.15	0.11	0.07	0.13	3.22	0.13	0.10
wPDC	RN	300	4.17	0.01	0.09	2.32	4.17	0.10	0.09	0.13	3.25	0.14	0.10
wPDC	RN	500	4.10	0.01	0.02	0.48	4.10	0.09	0.02	0.09	2.22	0.09	0.07
wPDC	RN	700	4.10	0.01	0.02	0.42	4.10	0.08	0.02	0.09	2.09	0.09	0.08
wPDC	CN	300	4.16	0.01	0.08	1.94	4.16	0.10	0.08	0.12	3.06	0.13	0.10
wPDC	CN	500	4.08	0.01	−0.00	−0.02	4.08	0.09	−0.00	0.09	2.23	0.09	0.07
wPDC	CN	700	4.08	0.01	0.00	0.06	4.08	0.08	0.00	0.08	2.08	0.08	0.07
GB2			4.34	0.01	0.26	6.35	4.34	0.09	0.26	0.27	6.69	0.39	0.14

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OCAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

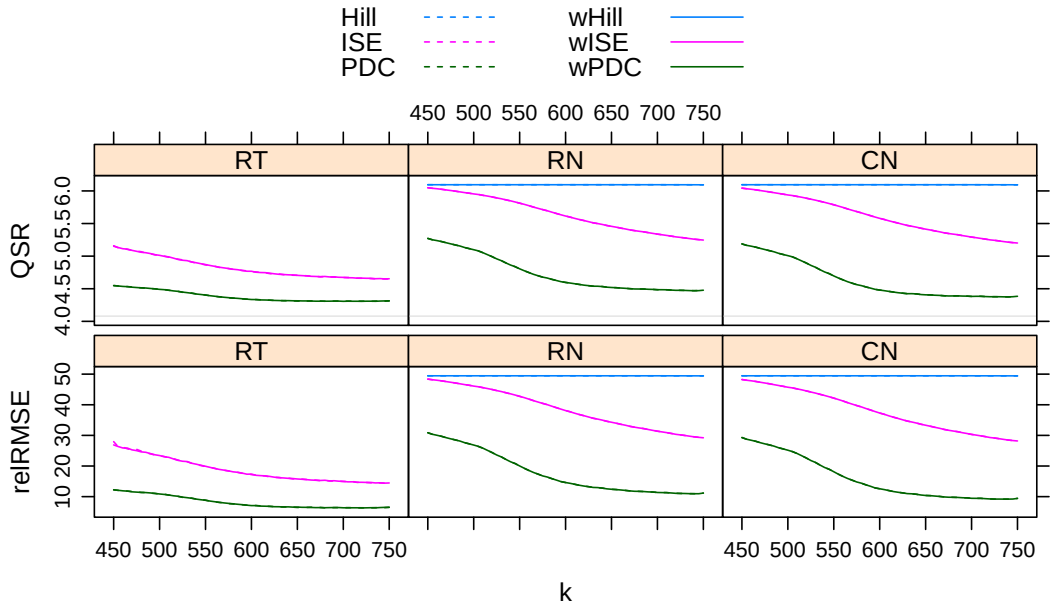

Figure F.6.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

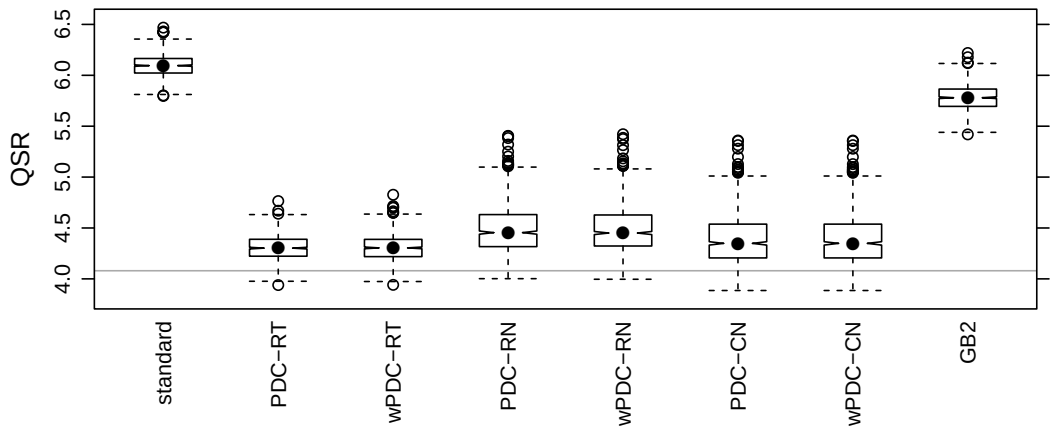

Figure F.7.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.3.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			6.10	0.01	2.02	49.39	6.10	0.11	2.02	2.02	49.46	2.99	0.59
wHill	RT	500	6.06	0.17	1.98	48.57	6.00	0.26	1.92	2.02	49.60	2.84	1.80
wHill	RT	700	5.81	0.06	1.73	42.32	5.78	0.20	1.70	1.74	42.75	2.52	1.01
wHill	RN	300	6.10	0.01	2.02	49.39	6.10	0.11	2.02	2.02	49.46	2.99	0.59
wHill	RN	500	6.10	0.01	2.02	49.39	6.10	0.11	2.02	2.02	49.46	2.99	0.59
wHill	RN	700	6.09	0.01	2.02	49.39	6.10	0.11	2.02	2.02	49.46	2.99	0.59
wHill	CN	300	6.10	0.01	2.02	49.39	6.10	0.11	2.02	2.02	49.46	2.99	0.59
wHill	CN	500	6.10	0.01	2.02	49.39	6.10	0.11	2.02	2.02	49.46	2.99	0.59
wHill	CN	700	6.09	0.01	2.02	49.39	6.10	0.11	2.02	2.02	49.46	2.99	0.59
wISE	RT	500	5.01	0.04	0.93	22.85	4.99	0.20	0.91	0.96	23.42	1.35	0.45
wISE	RT	700	4.67	0.02	0.59	14.57	4.66	0.15	0.58	0.61	14.99	0.87	0.28
wISE	RN	300	6.10	0.01	2.02	49.39	6.10	0.11	2.02	2.02	49.46	2.99	0.59
wISE	RN	500	5.95	0.02	1.87	45.93	5.95	0.16	1.87	1.88	46.09	2.77	0.57
wISE	RN	700	5.34	0.06	1.26	30.82	5.35	0.23	1.27	1.28	31.36	1.88	0.47
wISE	CN	300	6.10	0.01	2.02	49.39	6.10	0.11	2.02	2.02	49.46	2.99	0.59
wISE	CN	500	5.94	0.03	1.86	45.54	5.93	0.16	1.85	1.87	45.72	2.75	0.57
wISE	CN	700	5.29	0.06	1.21	29.71	5.30	0.24	1.22	1.24	30.32	1.81	0.46
wPDC	RT	500	4.49	0.03	0.41	10.06	4.48	0.17	0.40	0.44	10.87	0.59	0.30
wPDC	RT	700	4.31	0.02	0.23	5.57	4.30	0.13	0.22	0.26	6.36	0.33	0.18
wPDC	RN	300	5.97	0.09	1.89	46.27	6.05	0.16	1.97	1.91	46.83	2.92	0.59
wPDC	RN	500	5.10	0.16	1.02	24.97	5.10	0.43	1.02	1.10	26.85	1.51	0.50
wPDC	RN	700	4.49	0.05	0.41	9.93	4.45	0.22	0.37	0.46	11.36	0.55	0.33
wPDC	CN	300	5.95	0.11	1.87	45.78	6.05	0.16	1.97	1.90	46.51	2.92	0.59
wPDC	CN	500	5.01	0.19	0.93	22.74	5.01	0.47	0.93	1.03	25.16	1.38	0.50
wPDC	CN	700	4.38	0.06	0.30	7.41	4.35	0.24	0.27	0.39	9.46	0.40	0.31
GB2			5.78	0.02	1.70	41.65	5.78	0.13	1.70	1.70	41.77	2.52	0.52

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OCAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

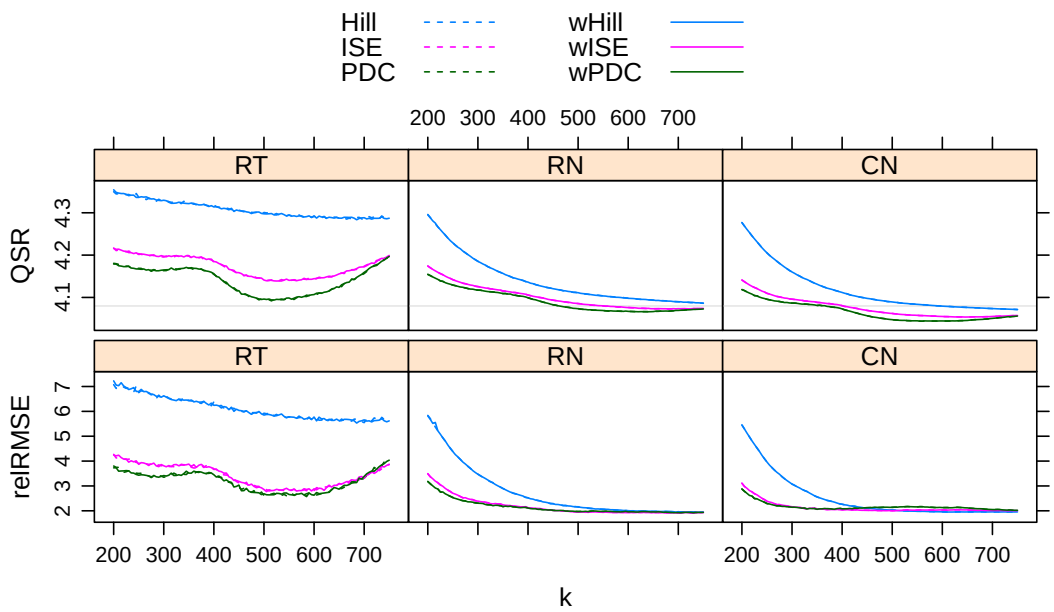

Figure F.8.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

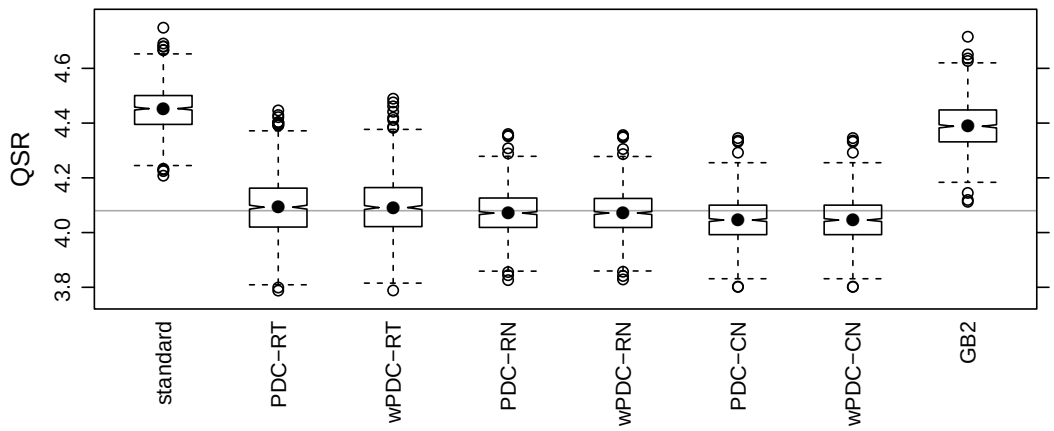

Figure F.9.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.4.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.45	0.01	0.37	9.10	4.45	0.08	0.37	0.38	9.31	0.55	0.16
wHill	RT	300	4.33	0.01	0.25	6.12	4.33	0.10	0.25	0.27	6.63	0.37	0.23
wHill	RT	500	4.30	0.01	0.22	5.33	4.30	0.10	0.22	0.24	5.85	0.32	0.13
wHill	RT	700	4.29	0.01	0.21	5.11	4.29	0.10	0.21	0.23	5.66	0.30	0.13
wHill	RN	300	4.19	0.01	0.11	2.58	4.19	0.10	0.11	0.14	3.47	0.16	0.11
wHill	RN	500	4.11	0.01	0.03	0.77	4.11	0.08	0.03	0.09	2.16	0.08	0.08
wHill	RN	700	4.09	0.01	0.01	0.24	4.09	0.08	0.01	0.08	1.96	0.08	0.07
wHill	CN	300	4.16	0.01	0.08	1.97	4.16	0.10	0.08	0.13	3.08	0.13	0.11
wHill	CN	500	4.09	0.01	0.01	0.23	4.09	0.08	0.01	0.08	2.03	0.08	0.08
wHill	CN	700	4.07	0.01	−0.01	−0.15	4.07	0.08	−0.01	0.08	1.96	0.08	0.07
wISE	RT	300	4.20	0.01	0.12	2.88	4.19	0.10	0.11	0.16	3.81	0.17	0.13
wISE	RT	500	4.14	0.01	0.06	1.50	4.14	0.10	0.06	0.12	2.86	0.12	0.09
wISE	RT	700	4.17	0.01	0.09	2.26	4.17	0.10	0.09	0.13	3.31	0.14	0.09
wISE	RN	300	4.13	0.01	0.05	1.12	4.12	0.08	0.04	0.10	2.39	0.09	0.09
wISE	RN	500	4.09	0.01	0.01	0.14	4.08	0.08	0.00	0.08	1.95	0.08	0.07
wISE	RN	700	4.07	0.01	−0.01	−0.16	4.07	0.08	−0.01	0.08	1.91	0.08	0.07
wISE	CN	300	4.10	0.01	0.02	0.39	4.09	0.08	0.01	0.09	2.16	0.09	0.08
wISE	CN	500	4.06	0.01	−0.02	−0.44	4.06	0.08	−0.02	0.08	2.00	0.08	0.07
wISE	CN	700	4.06	0.01	−0.02	−0.61	4.05	0.08	−0.03	0.08	2.01	0.08	0.07
wPDC	RT	300	4.16	0.01	0.09	2.09	4.16	0.11	0.08	0.14	3.42	0.13	0.11
wPDC	RT	500	4.10	0.01	0.02	0.40	4.09	0.10	0.01	0.11	2.69	0.11	0.10
wPDC	RT	700	4.16	0.01	0.08	1.94	4.15	0.11	0.07	0.14	3.39	0.13	0.13
wPDC	RN	300	4.12	0.01	0.04	0.91	4.11	0.08	0.03	0.09	2.31	0.09	0.09
wPDC	RN	500	4.07	0.01	−0.01	−0.16	4.07	0.08	−0.01	0.08	1.97	0.08	0.07
wPDC	RN	700	4.07	0.01	−0.01	−0.26	4.07	0.08	−0.01	0.08	1.93	0.08	0.07
wPDC	CN	300	4.09	0.01	0.01	0.16	4.08	0.09	0.00	0.09	2.14	0.08	0.08
wPDC	CN	500	4.05	0.01	−0.03	−0.79	4.05	0.08	−0.03	0.09	2.14	0.09	0.07
wPDC	CN	700	4.05	0.01	−0.03	−0.72	4.05	0.08	−0.03	0.08	2.05	0.08	0.07
GB2			4.39	0.01	0.31	7.58	4.39	0.09	0.31	0.32	7.87	0.46	0.16

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OCAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

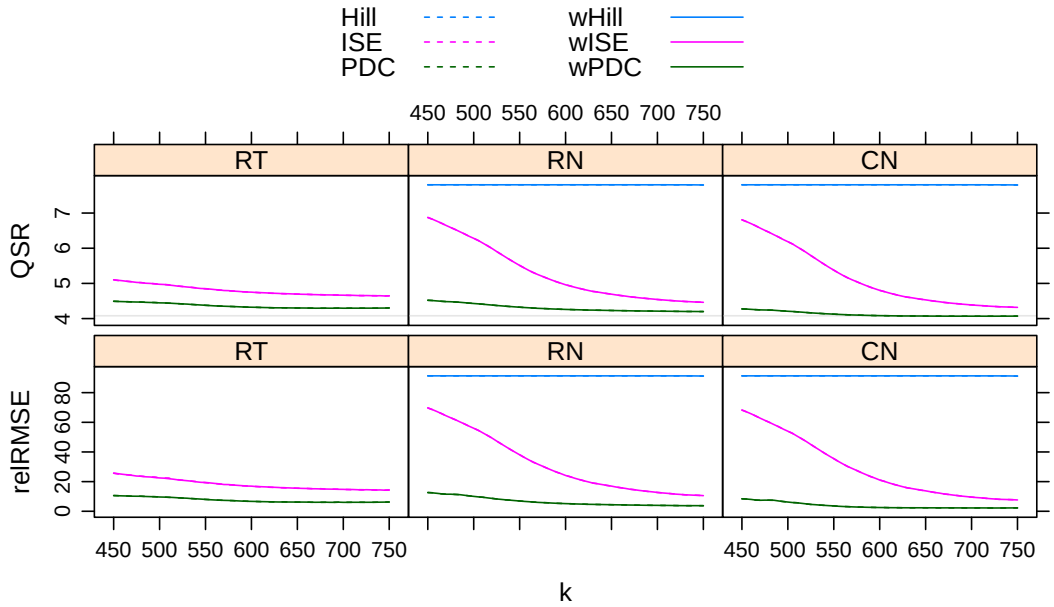

Figure F.10.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

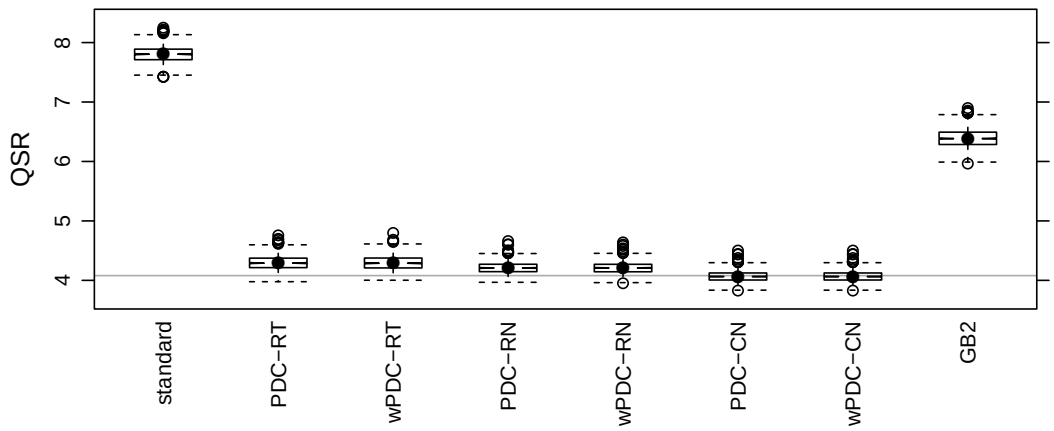

Figure F.11.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.5.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			7.80	0.02	3.72	91.26	7.80	0.13	3.72	3.73	91.32	5.52	1.02
wHill	RT	500	7.56	1.40	3.48	85.31	7.31	0.55	3.23	3.68	90.11	4.78	5.35
wHill	RT	700	6.77	0.21	2.69	65.92	6.72	0.34	2.64	2.73	66.87	3.92	1.71
wHill	RN	300	7.80	0.02	3.72	91.26	7.80	0.13	3.72	3.73	91.32	5.52	1.02
wHill	RN	500	7.80	0.02	3.72	91.26	7.80	0.13	3.72	3.73	91.32	5.52	1.02
wHill	RN	700	7.80	0.02	3.72	91.26	7.80	0.13	3.72	3.73	91.32	5.52	1.02
wHill	CN	300	7.80	0.02	3.72	91.26	7.80	0.13	3.72	3.73	91.32	5.52	1.02
wHill	CN	500	7.80	0.02	3.72	91.26	7.80	0.13	3.72	3.73	91.32	5.52	1.02
wHill	CN	700	7.80	0.02	3.72	91.26	7.80	0.13	3.72	3.73	91.32	5.52	1.02
wISE	RT	500	4.97	0.04	0.89	21.93	4.96	0.20	0.88	0.92	22.48	1.30	0.43
wISE	RT	700	4.66	0.02	0.59	14.34	4.66	0.14	0.58	0.60	14.78	0.86	0.27
wISE	RN	300	7.80	0.02	3.72	91.25	7.80	0.13	3.72	3.73	91.31	5.52	1.02
wISE	RN	500	6.28	0.37	2.20	53.95	6.35	0.58	2.27	2.28	55.99	3.37	0.94
wISE	RN	700	4.54	0.05	0.46	11.33	4.51	0.21	0.43	0.52	12.68	0.63	0.38
wISE	CN	300	7.80	0.02	3.72	91.25	7.80	0.13	3.72	3.73	91.31	5.52	1.02
wISE	CN	500	6.19	0.42	2.11	51.61	6.27	0.60	2.19	2.20	53.99	3.24	0.94
wISE	CN	700	4.39	0.06	0.31	7.53	4.35	0.21	0.27	0.39	9.55	0.39	0.35
wPDC	RT	500	4.45	0.02	0.37	8.98	4.43	0.14	0.35	0.39	9.62	0.51	0.23
wPDC	RT	700	4.29	0.01	0.21	5.27	4.29	0.12	0.21	0.25	6.02	0.31	0.18
wPDC	RN	300	5.60	0.37	1.52	37.14	5.38	0.25	1.30	1.63	39.98	1.92	0.98
wPDC	RN	500	4.43	0.05	0.35	8.54	4.38	0.15	0.30	0.41	10.04	0.45	0.42
wPDC	RN	700	4.21	0.01	0.13	3.22	4.21	0.09	0.13	0.16	3.99	0.19	0.14
wPDC	CN	300	5.35	0.45	1.27	31.16	5.10	0.27	1.02	1.44	35.24	1.51	0.98
wPDC	CN	500	4.21	0.05	0.13	3.14	4.16	0.14	0.08	0.25	6.22	0.15	0.39
wPDC	CN	700	4.07	0.01	−0.01	−0.29	4.06	0.09	−0.02	0.09	2.25	0.09	0.10
GB2			6.39	0.02	2.31	56.57	6.38	0.15	2.31	2.31	56.70	3.42	0.69

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OCAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

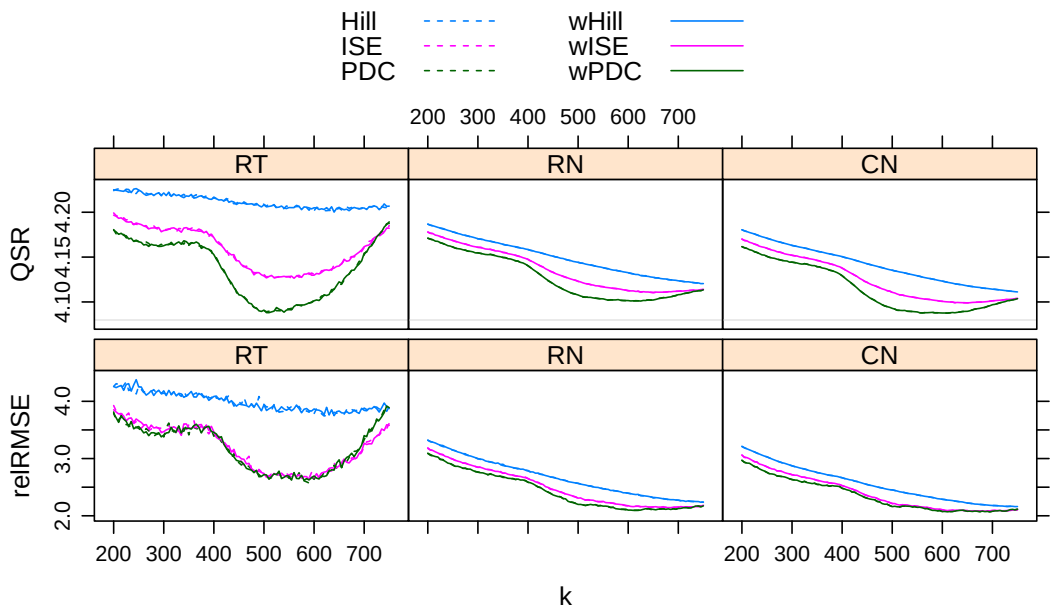

Figure F.12.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

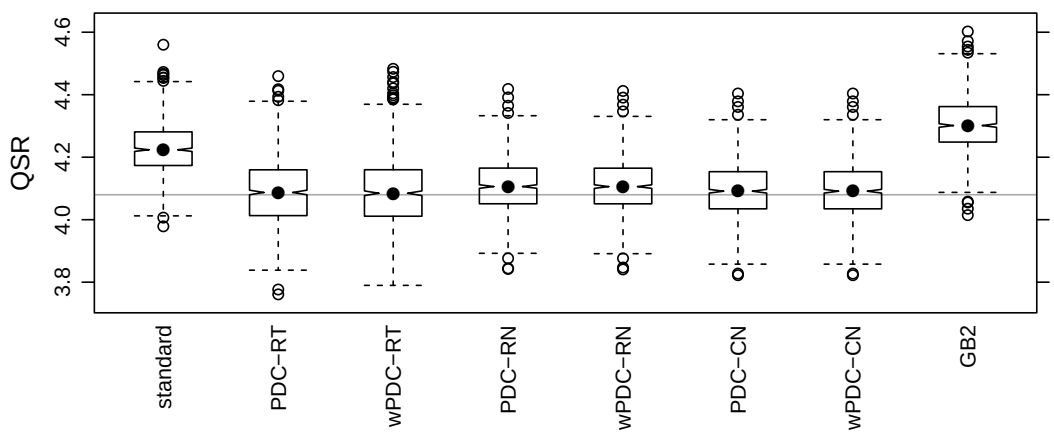

Figure F.13.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.6.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.23	0.01	0.15	3.62	4.22	0.08	0.14	0.17	4.17	0.21	0.12
wHill	RT	300	4.22	0.01	0.14	3.47	4.22	0.09	0.14	0.17	4.18	0.21	0.11
wHill	RT	500	4.21	0.01	0.13	3.15	4.21	0.09	0.13	0.16	3.94	0.19	0.14
wHill	RT	700	4.20	0.01	0.12	3.06	4.20	0.09	0.12	0.16	3.84	0.18	0.11
wHill	RN	300	4.17	0.01	0.09	2.22	4.17	0.08	0.09	0.12	2.99	0.14	0.09
wHill	RN	500	4.14	0.01	0.06	1.58	4.14	0.08	0.06	0.10	2.57	0.11	0.09
wHill	RN	700	4.12	0.01	0.04	1.07	4.13	0.08	0.05	0.09	2.27	0.09	0.08
wHill	CN	300	4.16	0.01	0.08	2.04	4.16	0.08	0.08	0.12	2.87	0.13	0.09
wHill	CN	500	4.14	0.01	0.06	1.36	4.13	0.08	0.05	0.10	2.45	0.10	0.09
wHill	CN	700	4.11	0.01	0.03	0.84	4.12	0.08	0.04	0.09	2.18	0.09	0.08
wISE	RT	300	4.18	0.01	0.10	2.44	4.17	0.10	0.09	0.14	3.47	0.14	0.11
wISE	RT	500	4.13	0.01	0.05	1.20	4.12	0.10	0.04	0.11	2.74	0.11	0.10
wISE	RT	700	4.16	0.01	0.08	2.00	4.16	0.11	0.08	0.13	3.27	0.13	0.11
wISE	RN	300	4.16	0.01	0.08	1.99	4.16	0.08	0.08	0.12	2.85	0.13	0.09
wISE	RN	500	4.12	0.01	0.04	1.06	4.12	0.08	0.04	0.09	2.31	0.09	0.08
wISE	RN	700	4.11	0.01	0.03	0.79	4.11	0.08	0.03	0.09	2.15	0.09	0.08
wISE	CN	300	4.15	0.01	0.07	1.77	4.15	0.08	0.07	0.11	2.72	0.12	0.09
wISE	CN	500	4.11	0.01	0.03	0.76	4.11	0.08	0.03	0.09	2.21	0.09	0.08
wISE	CN	700	4.10	0.01	0.02	0.52	4.10	0.08	0.02	0.09	2.09	0.08	0.08
wPDC	RT	300	4.16	0.01	0.08	2.03	4.15	0.10	0.07	0.14	3.41	0.13	0.12
wPDC	RT	500	4.09	0.01	0.01	0.27	4.08	0.11	0.00	0.11	2.72	0.11	0.10
wPDC	RT	700	4.15	0.01	0.07	1.83	4.15	0.12	0.07	0.14	3.40	0.13	0.12
wPDC	RN	300	4.15	0.01	0.07	1.83	4.15	0.08	0.07	0.11	2.76	0.12	0.09
wPDC	RN	500	4.11	0.01	0.03	0.68	4.11	0.08	0.03	0.09	2.20	0.09	0.08
wPDC	RN	700	4.11	0.01	0.03	0.69	4.11	0.08	0.03	0.09	2.13	0.09	0.08
wPDC	CN	300	4.14	0.01	0.06	1.58	4.14	0.08	0.06	0.11	2.63	0.11	0.09
wPDC	CN	500	4.09	0.01	0.01	0.32	4.09	0.09	0.01	0.09	2.16	0.09	0.08
wPDC	CN	700	4.10	0.01	0.02	0.42	4.10	0.08	0.02	0.08	2.08	0.08	0.08
GB2			4.30	0.01	0.22	5.49	4.30	0.09	0.22	0.24	5.88	0.33	0.13

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OCAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

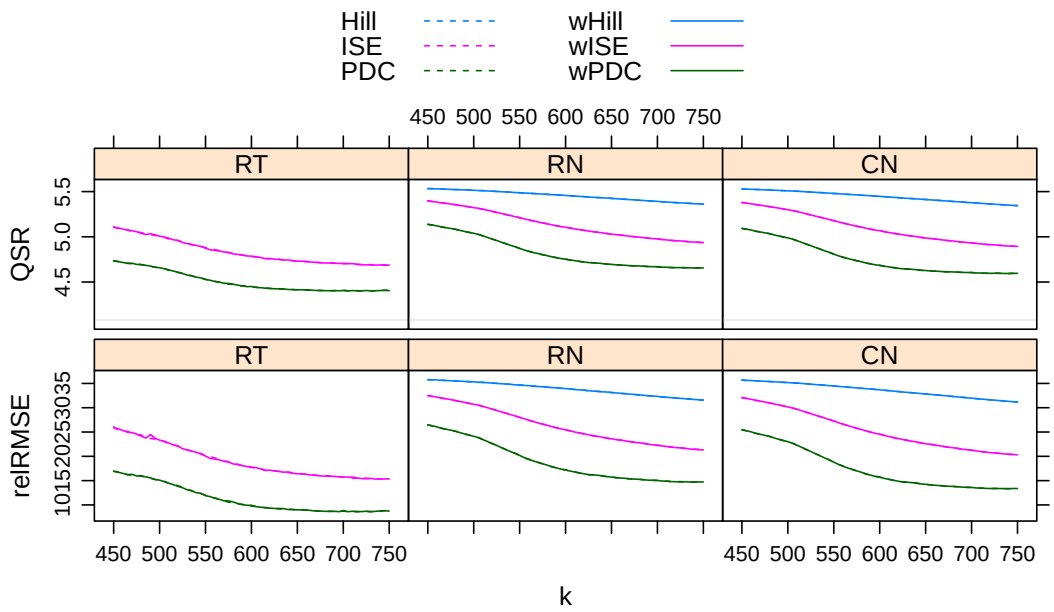

Figure F.14.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

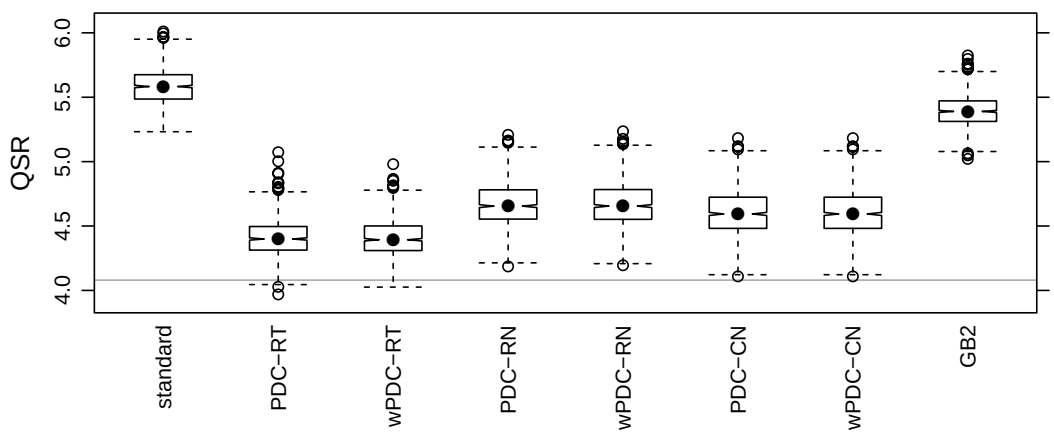

Figure F.15.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.7.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			5.58	0.02	1.50	36.88	5.58	0.14	1.50	1.51	37.03	2.23	0.47
wHill	RT	500	5.62	0.09	1.54	37.65	5.59	0.23	1.51	1.57	38.40	2.23	1.70
wHill	RT	700	5.44	0.06	1.36	33.35	5.41	0.19	1.33	1.38	33.85	1.98	0.87
wHill	RN	300	5.57	0.02	1.49	36.53	5.57	0.14	1.49	1.50	36.68	2.21	0.47
wHill	RN	500	5.51	0.02	1.43	35.17	5.51	0.14	1.43	1.44	35.32	2.12	0.46
wHill	RN	700	5.39	0.02	1.31	32.17	5.39	0.13	1.31	1.32	32.34	1.94	0.47
wHill	CN	300	5.57	0.02	1.49	36.50	5.57	0.14	1.49	1.50	36.65	2.21	0.47
wHill	CN	500	5.51	0.02	1.43	35.02	5.51	0.13	1.43	1.43	35.17	2.12	0.46
wHill	CN	700	5.38	0.02	1.30	31.79	5.37	0.13	1.29	1.30	31.96	1.92	0.44
wISE	RT	500	5.01	0.05	0.93	22.73	4.99	0.21	0.91	0.95	23.33	1.34	0.48
wISE	RT	700	4.70	0.02	0.62	15.32	4.69	0.15	0.61	0.64	15.75	0.91	0.29
wISE	RN	300	5.56	0.02	1.48	36.25	5.56	0.14	1.48	1.49	36.40	2.19	0.47
wISE	RN	500	5.32	0.02	1.24	30.46	5.32	0.15	1.24	1.25	30.70	1.84	0.42
wISE	RN	700	4.98	0.02	0.90	21.96	4.97	0.15	0.89	0.91	22.28	1.32	0.35
wISE	CN	300	5.56	0.02	1.48	36.19	5.56	0.14	1.48	1.48	36.35	2.19	0.47
wISE	CN	500	5.30	0.03	1.22	29.90	5.30	0.16	1.22	1.23	30.16	1.81	0.42
wISE	CN	700	4.93	0.02	0.85	20.90	4.93	0.15	0.85	0.87	21.26	1.25	0.35
wPDC	RT	500	4.66	0.04	0.58	14.17	4.64	0.20	0.56	0.62	15.10	0.82	0.38
wPDC	RT	700	4.41	0.02	0.33	8.00	4.39	0.14	0.31	0.36	8.73	0.46	0.22
wPDC	RN	300	5.48	0.03	1.40	34.38	5.49	0.17	1.41	1.41	34.66	2.09	0.46
wPDC	RN	500	5.04	0.05	0.96	23.51	5.04	0.22	0.96	0.98	24.12	1.42	0.39
wPDC	RN	700	4.67	0.03	0.59	14.44	4.65	0.17	0.57	0.61	15.04	0.85	0.28
wPDC	CN	300	5.47	0.04	1.39	34.09	5.48	0.17	1.40	1.40	34.40	2.08	0.46
wPDC	CN	500	4.99	0.06	0.91	22.26	4.99	0.23	0.91	0.94	23.01	1.35	0.40
wPDC	CN	700	4.60	0.03	0.52	12.87	4.59	0.18	0.51	0.56	13.60	0.76	0.27
GB2			5.39	0.01	1.31	32.18	5.39	0.12	1.31	1.32	32.32	1.94	0.43

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OCAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 20.

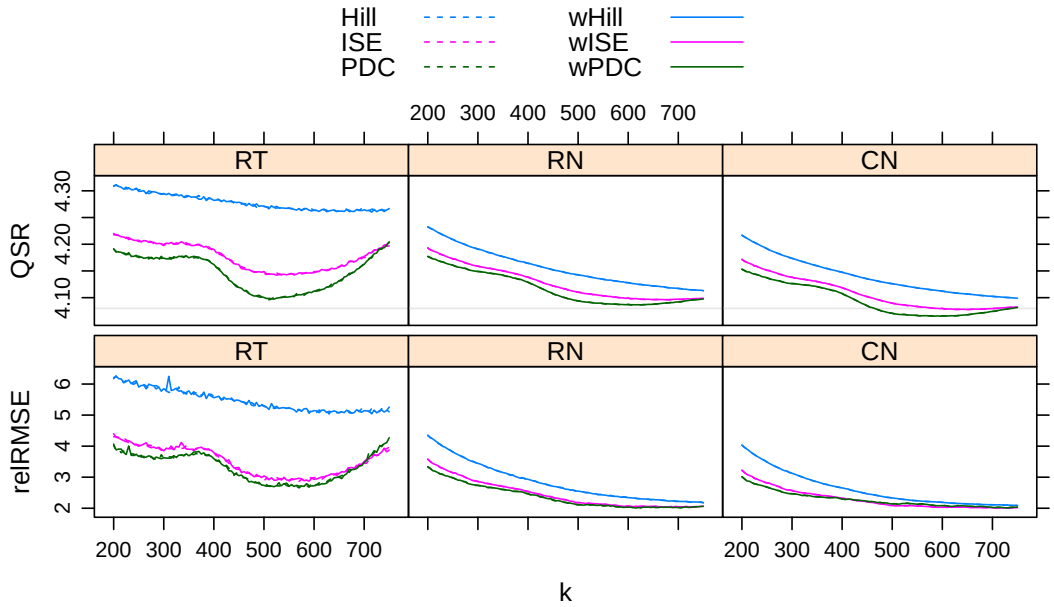

Figure F.16.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

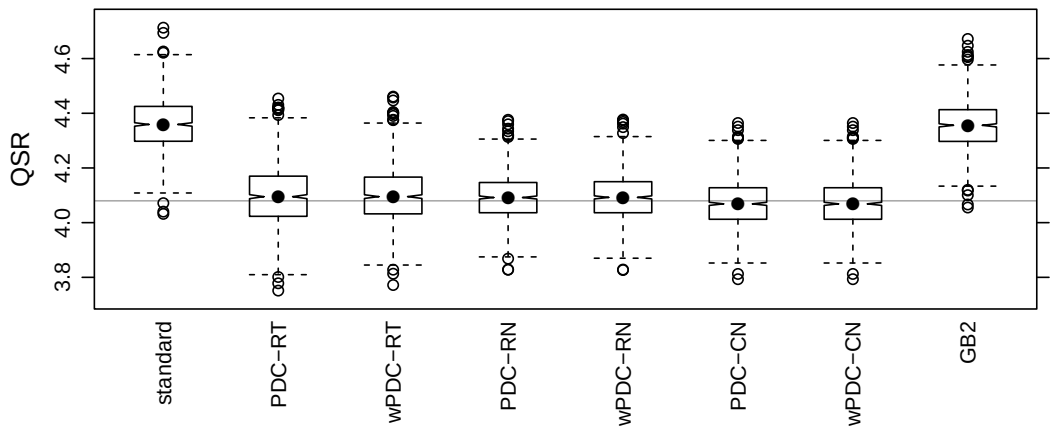

Figure F.17.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.8.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.36	0.01	0.28	6.95	4.36	0.09	0.28	0.30	7.33	0.41	0.16
wHill	RT	300	4.30	0.01	0.22	5.27	4.29	0.10	0.21	0.24	5.85	0.31	0.15
wHill	RT	500	4.27	0.01	0.19	4.69	4.27	0.10	0.19	0.22	5.30	0.28	0.13
wHill	RT	700	4.26	0.01	0.18	4.53	4.26	0.10	0.18	0.21	5.14	0.27	0.14
wHill	RN	300	4.19	0.01	0.11	2.72	4.19	0.08	0.11	0.14	3.45	0.16	0.10
wHill	RN	500	4.14	0.01	0.06	1.54	4.14	0.08	0.06	0.10	2.55	0.11	0.08
wHill	RN	700	4.12	0.01	0.04	0.91	4.12	0.08	0.04	0.09	2.22	0.09	0.08
wHill	CN	300	4.17	0.01	0.09	2.30	4.17	0.08	0.09	0.13	3.13	0.14	0.10
wHill	CN	500	4.13	0.01	0.05	1.13	4.13	0.08	0.05	0.10	2.33	0.09	0.08
wHill	CN	700	4.10	0.01	0.02	0.55	4.10	0.08	0.02	0.09	2.11	0.08	0.08
wISE	RT	300	4.20	0.01	0.12	2.88	4.19	0.10	0.11	0.16	3.85	0.17	0.14
wISE	RT	500	4.15	0.01	0.07	1.69	4.15	0.10	0.07	0.12	3.04	0.12	0.10
wISE	RT	700	4.18	0.01	0.10	2.39	4.17	0.10	0.09	0.14	3.50	0.15	0.12
wISE	RN	300	4.16	0.01	0.08	1.93	4.16	0.08	0.08	0.12	2.85	0.12	0.10
wISE	RN	500	4.11	0.01	0.03	0.75	4.11	0.08	0.03	0.09	2.19	0.09	0.08
wISE	RN	700	4.10	0.01	0.02	0.42	4.10	0.08	0.02	0.08	2.05	0.08	0.08
wISE	CN	300	4.14	0.01	0.06	1.43	4.14	0.08	0.06	0.10	2.57	0.11	0.10
wISE	CN	500	4.09	0.01	0.01	0.24	4.09	0.08	0.01	0.09	2.09	0.08	0.08
wISE	CN	700	4.08	0.01	−0.00	−0.01	4.08	0.08	0.00	0.08	2.01	0.08	0.07
wPDC	RT	300	4.17	0.01	0.09	2.31	4.17	0.11	0.09	0.15	3.62	0.14	0.14
wPDC	RT	500	4.10	0.01	0.02	0.50	4.10	0.10	0.02	0.11	2.74	0.11	0.09
wPDC	RT	700	4.16	0.01	0.08	2.02	4.16	0.12	0.08	0.14	3.47	0.14	0.13
wPDC	RN	300	4.15	0.01	0.07	1.70	4.15	0.09	0.07	0.11	2.74	0.11	0.10
wPDC	RN	500	4.09	0.01	0.01	0.34	4.09	0.08	0.01	0.09	2.11	0.09	0.07
wPDC	RN	700	4.09	0.01	0.01	0.30	4.09	0.08	0.01	0.08	2.02	0.08	0.08
wPDC	CN	300	4.13	0.01	0.05	1.14	4.12	0.09	0.04	0.10	2.47	0.10	0.09
wPDC	CN	500	4.07	0.01	−0.01	−0.23	4.07	0.09	−0.01	0.09	2.14	0.08	0.07
wPDC	CN	700	4.07	0.01	−0.01	−0.14	4.08	0.08	−0.00	0.08	2.03	0.08	0.08
GB2			4.36	0.01	0.28	6.76	4.36	0.09	0.28	0.29	7.10	0.41	0.15

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OCAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 20.

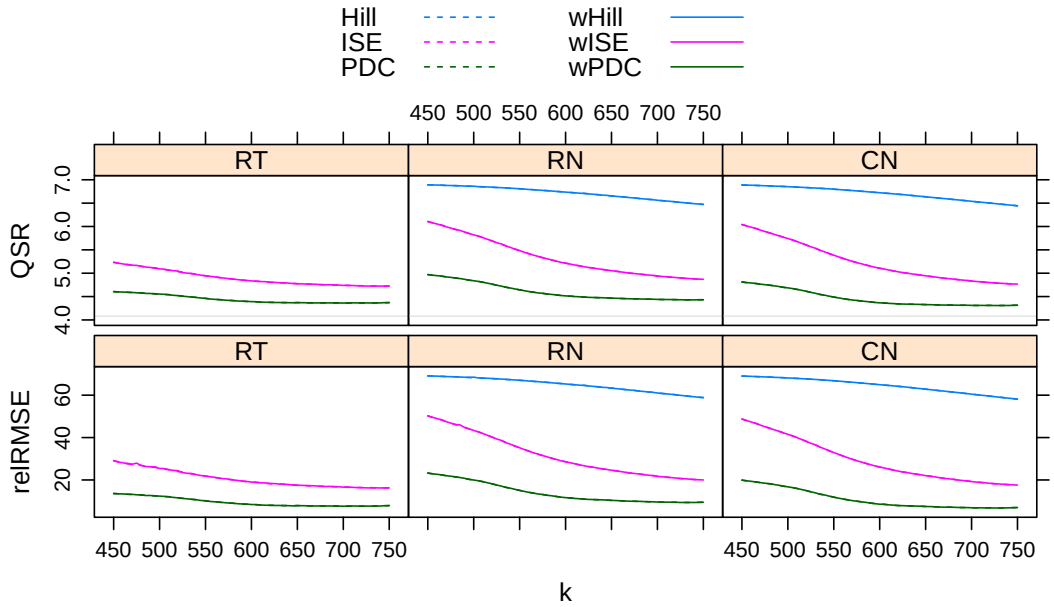

Figure F.18.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

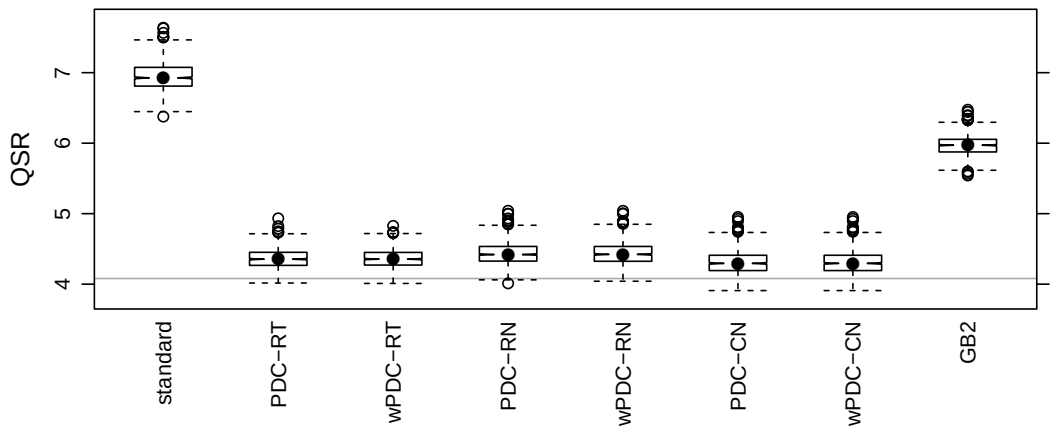

Figure F.19.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.9.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			6.94	0.04	2.86	70.14	6.93	0.20	2.85	2.87	70.30	4.22	0.87
wHill	RT	500	6.99	0.92	2.91	71.41	6.80	0.52	2.72	3.07	75.17	4.04	3.55
wHill	RT	700	6.38	0.36	2.30	56.36	6.31	0.31	2.23	2.38	58.24	3.31	3.90
wHill	RN	300	6.94	0.04	2.86	70.00	6.92	0.19	2.84	2.86	70.17	4.21	0.87
wHill	RN	500	6.86	0.07	2.78	68.21	6.85	0.19	2.77	2.80	68.51	4.10	1.98
wHill	RN	700	6.56	0.04	2.48	60.84	6.56	0.21	2.48	2.49	61.03	3.68	0.79
wHill	CN	300	6.94	0.04	2.86	70.00	6.92	0.19	2.84	2.86	70.16	4.21	0.87
wHill	CN	500	6.85	0.04	2.77	67.96	6.84	0.20	2.76	2.78	68.14	4.10	0.87
wHill	CN	700	6.54	0.04	2.46	60.28	6.54	0.21	2.46	2.47	60.48	3.64	0.79
wISE	RT	500	5.09	0.05	1.01	24.83	5.07	0.21	0.99	1.04	25.46	1.47	0.49
wISE	RT	700	4.74	0.02	0.66	16.15	4.73	0.15	0.65	0.68	16.60	0.96	0.43
wISE	RN	300	6.89	0.04	2.81	68.77	6.88	0.21	2.80	2.81	68.95	4.14	0.87
wISE	RN	500	5.82	0.10	1.74	42.70	5.83	0.31	1.75	1.77	43.38	2.59	0.66
wISE	RN	700	4.94	0.05	0.86	21.09	4.93	0.22	0.85	0.89	21.73	1.26	0.37
wISE	CN	300	6.88	0.04	2.80	68.66	6.87	0.21	2.79	2.81	68.85	4.14	0.87
wISE	CN	500	5.74	0.11	1.66	40.74	5.75	0.32	1.67	1.69	41.53	2.48	0.65
wISE	CN	700	4.83	0.05	0.75	18.46	4.82	0.23	0.74	0.79	19.25	1.10	0.35
wPDC	RT	500	4.55	0.03	0.47	11.62	4.54	0.17	0.46	0.51	12.39	0.69	0.28
wPDC	RT	700	4.36	0.02	0.28	6.90	4.35	0.13	0.28	0.31	7.62	0.41	0.18
wPDC	RN	300	5.91	0.36	1.83	44.76	5.90	0.70	1.82	1.92	47.09	2.70	0.78
wPDC	RN	500	4.84	0.09	0.76	18.60	4.81	0.27	0.73	0.81	19.97	1.09	0.51
wPDC	RN	700	4.44	0.02	0.36	8.82	4.42	0.15	0.34	0.39	9.60	0.51	0.24
wPDC	CN	300	5.79	0.44	1.71	42.00	5.79	0.79	1.71	1.84	45.05	2.54	0.78
wPDC	CN	500	4.69	0.10	0.61	14.86	4.65	0.29	0.57	0.68	16.76	0.85	0.50
wPDC	CN	700	4.31	0.03	0.23	5.66	4.29	0.16	0.21	0.28	6.88	0.32	0.21
GB2			5.97	0.02	1.89	46.33	5.97	0.14	1.89	1.90	46.46	2.80	0.59

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OAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

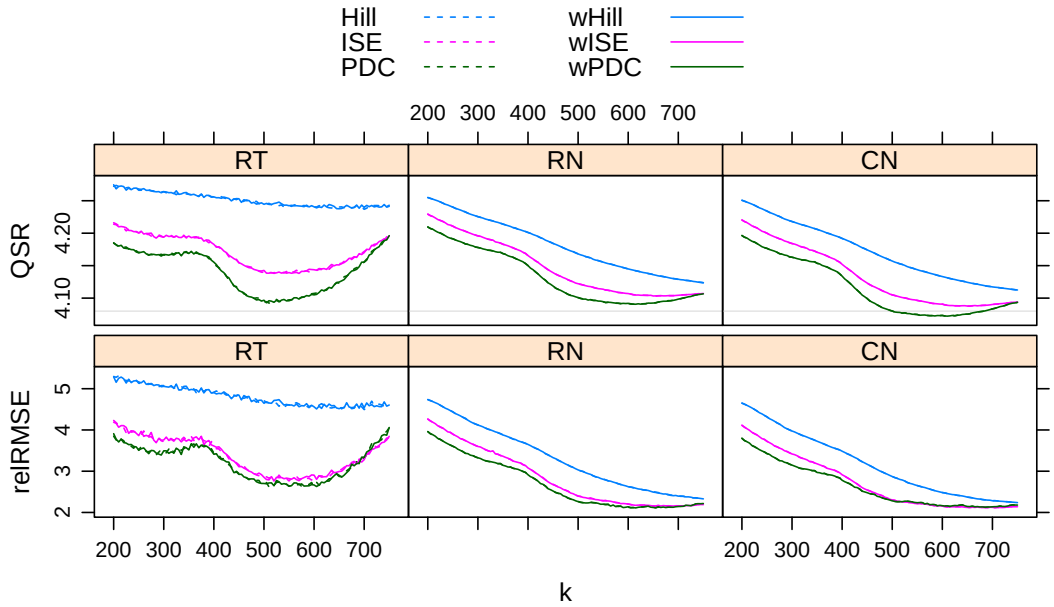

Figure F.20.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

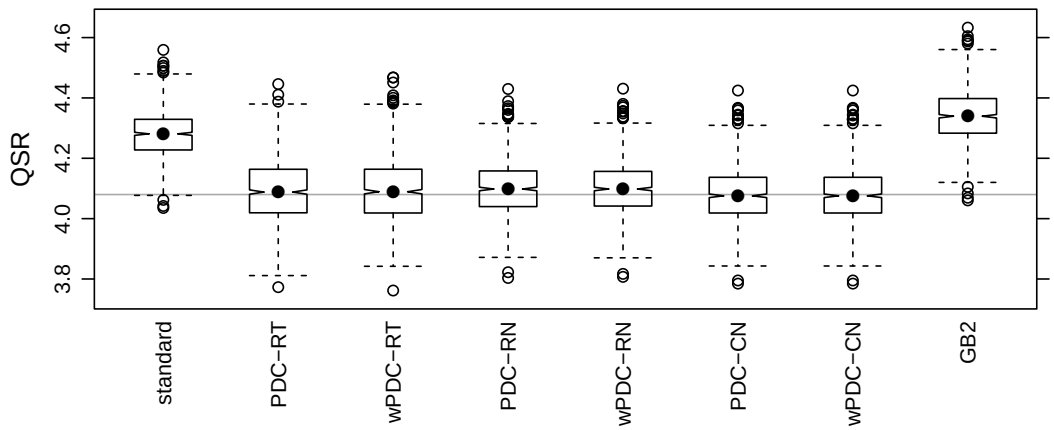

Figure F.21.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.10.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.28	0.01	0.20	4.91	4.28	0.07	0.20	0.22	5.27	0.30	0.12
wHill	RT	300	4.26	0.01	0.18	4.51	4.26	0.09	0.18	0.21	5.06	0.27	0.12
wHill	RT	500	4.24	0.01	0.16	4.03	4.24	0.09	0.16	0.19	4.65	0.24	0.13
wHill	RT	700	4.24	0.01	0.16	3.92	4.24	0.10	0.16	0.19	4.54	0.23	0.14
wHill	RN	300	4.23	0.01	0.15	3.57	4.23	0.08	0.15	0.17	4.12	0.22	0.11
wHill	RN	500	4.17	0.01	0.09	2.16	4.17	0.09	0.09	0.12	3.03	0.13	0.09
wHill	RN	700	4.13	0.01	0.05	1.21	4.13	0.09	0.05	0.10	2.40	0.10	0.08
wHill	CN	300	4.22	0.01	0.14	3.38	4.22	0.08	0.14	0.16	3.97	0.21	0.11
wHill	CN	500	4.16	0.01	0.08	1.89	4.16	0.09	0.08	0.12	2.87	0.12	0.09
wHill	CN	700	4.12	0.01	0.04	0.92	4.12	0.08	0.04	0.09	2.28	0.09	0.08
wISE	RT	300	4.19	0.01	0.11	2.79	4.19	0.10	0.11	0.15	3.76	0.17	0.11
wISE	RT	500	4.14	0.01	0.06	1.54	4.14	0.10	0.06	0.12	2.85	0.12	0.10
wISE	RT	700	4.17	0.01	0.09	2.21	4.17	0.10	0.09	0.13	3.28	0.14	0.10
wISE	RN	300	4.20	0.01	0.12	2.84	4.20	0.09	0.12	0.15	3.60	0.17	0.10
wISE	RN	500	4.12	0.01	0.04	1.04	4.12	0.09	0.04	0.10	2.40	0.09	0.09
wISE	RN	700	4.10	0.01	0.02	0.60	4.10	0.08	0.02	0.09	2.16	0.09	0.07
wISE	CN	300	4.18	0.01	0.10	2.55	4.18	0.09	0.10	0.14	3.42	0.16	0.10
wISE	CN	500	4.11	0.01	0.03	0.62	4.10	0.09	0.02	0.09	2.30	0.09	0.09
wISE	CN	700	4.09	0.01	0.01	0.25	4.09	0.09	0.01	0.09	2.12	0.09	0.07
wPDC	RT	300	4.17	0.01	0.09	2.14	4.16	0.11	0.08	0.14	3.50	0.14	0.13
wPDC	RT	500	4.10	0.01	0.02	0.41	4.09	0.11	0.01	0.11	2.70	0.11	0.10
wPDC	RT	700	4.16	0.01	0.08	1.85	4.15	0.12	0.07	0.14	3.34	0.13	0.12
wPDC	RN	300	4.18	0.01	0.10	2.40	4.18	0.09	0.10	0.14	3.33	0.15	0.10
wPDC	RN	500	4.10	0.01	0.02	0.51	4.10	0.09	0.02	0.09	2.26	0.09	0.09
wPDC	RN	700	4.10	0.01	0.02	0.45	4.10	0.08	0.02	0.09	2.14	0.09	0.07
wPDC	CN	300	4.16	0.01	0.08	2.04	4.16	0.10	0.08	0.13	3.15	0.13	0.10
wPDC	CN	500	4.08	0.01	0.00	0.01	4.08	0.09	−0.00	0.09	2.28	0.09	0.08
wPDC	CN	700	4.08	0.01	0.00	0.09	4.08	0.09	0.00	0.09	2.14	0.09	0.07
GB2			4.34	0.01	0.26	6.40	4.34	0.08	0.26	0.27	6.73	0.38	0.14

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OAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

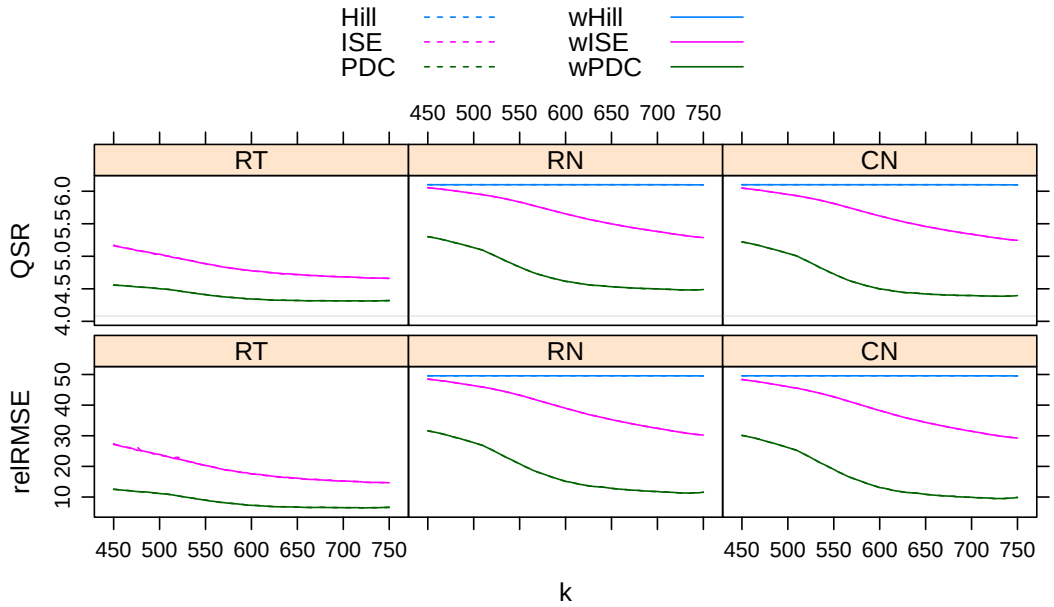

Figure F.22.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

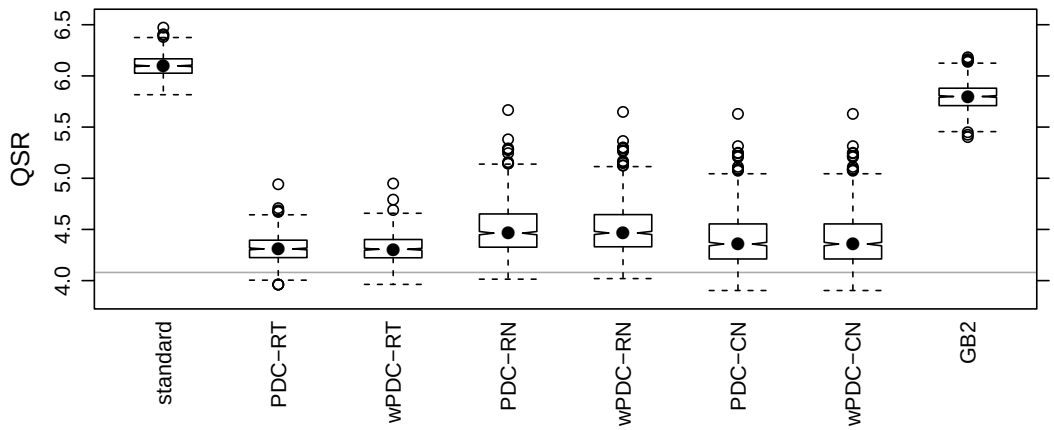

Figure F.23.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.11.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			6.10	0.01	2.02	49.51	6.10	0.10	2.02	2.02	49.57	2.99	0.59
wHill	RT	500	6.09	0.43	2.01	49.16	6.01	0.26	1.93	2.11	51.72	2.86	4.61
wHill	RT	700	5.80	0.07	1.72	42.04	5.76	0.22	1.68	1.74	42.56	2.50	1.17
wHill	RN	300	6.10	0.01	2.02	49.51	6.10	0.10	2.02	2.02	49.57	2.99	0.59
wHill	RN	500	6.10	0.01	2.02	49.51	6.10	0.10	2.02	2.02	49.57	2.99	0.59
wHill	RN	700	6.10	0.01	2.02	49.51	6.10	0.10	2.02	2.02	49.57	2.99	0.59
wHill	CN	300	6.10	0.01	2.02	49.51	6.10	0.10	2.02	2.02	49.57	2.99	0.59
wHill	CN	500	6.10	0.01	2.02	49.51	6.10	0.10	2.02	2.02	49.57	2.99	0.59
wHill	CN	700	6.10	0.01	2.02	49.51	6.10	0.10	2.02	2.02	49.57	2.99	0.59
wISE	RT	500	5.03	0.05	0.95	23.31	5.01	0.20	0.93	0.98	23.92	1.37	0.65
wISE	RT	700	4.68	0.02	0.60	14.78	4.67	0.15	0.59	0.62	15.18	0.88	0.26
wISE	RN	300	6.10	0.01	2.02	49.51	6.10	0.10	2.02	2.02	49.57	2.99	0.59
wISE	RN	500	5.96	0.02	1.89	46.20	5.96	0.15	1.88	1.89	46.35	2.79	0.57
wISE	RN	700	5.38	0.06	1.30	31.91	5.40	0.22	1.32	1.32	32.44	1.95	0.53
wISE	CN	300	6.10	0.01	2.02	49.51	6.10	0.10	2.02	2.02	49.57	2.99	0.59
wISE	CN	500	5.95	0.03	1.87	45.85	5.95	0.16	1.87	1.88	46.01	2.77	0.57
wISE	CN	700	5.34	0.06	1.26	30.88	5.35	0.23	1.27	1.28	31.48	1.89	0.52
wPDC	RT	500	4.50	0.03	0.42	10.31	4.49	0.16	0.41	0.45	11.13	0.60	0.27
wPDC	RT	700	4.31	0.02	0.23	5.73	4.31	0.13	0.23	0.27	6.52	0.34	0.21
wPDC	RN	300	5.98	0.08	1.90	46.63	6.06	0.14	1.98	1.92	47.14	2.94	0.59
wPDC	RN	500	5.13	0.17	1.05	25.80	5.14	0.47	1.06	1.13	27.74	1.57	0.51
wPDC	RN	700	4.50	0.06	0.42	10.29	4.47	0.23	0.39	0.48	11.81	0.57	0.38
wPDC	CN	300	5.96	0.10	1.88	46.18	6.06	0.15	1.98	1.91	46.84	2.94	0.59
wPDC	CN	500	5.04	0.21	0.96	23.64	5.05	0.52	0.97	1.07	26.15	1.44	0.50
wPDC	CN	700	4.40	0.06	0.32	7.78	4.36	0.24	0.28	0.40	9.92	0.41	0.38
GB2			5.80	0.02	1.72	42.09	5.80	0.12	1.72	1.72	42.21	2.55	0.52

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OAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

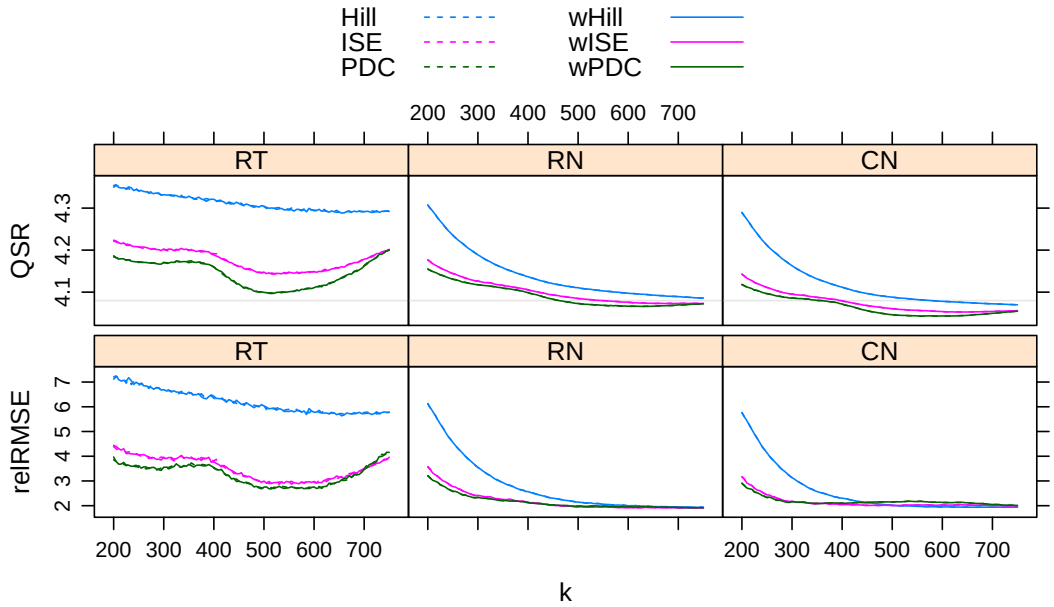

Figure F.24.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

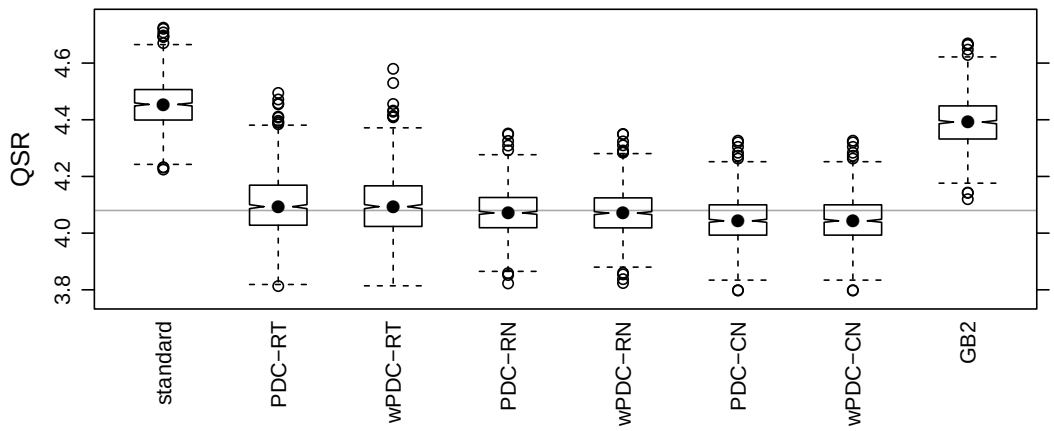

Figure F.25.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.12.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.45	0.01	0.37	9.19	4.45	0.08	0.37	0.38	9.40	0.55	0.16
wHill	RT	300	4.33	0.01	0.25	6.17	4.33	0.10	0.25	0.27	6.69	0.37	0.16
wHill	RT	500	4.30	0.01	0.22	5.50	4.30	0.10	0.22	0.25	6.03	0.33	0.15
wHill	RT	700	4.29	0.01	0.21	5.18	4.29	0.09	0.21	0.23	5.72	0.31	0.12
wHill	RN	300	4.19	0.01	0.11	2.67	4.19	0.10	0.11	0.14	3.54	0.16	0.11
wHill	RN	500	4.11	0.01	0.03	0.75	4.11	0.08	0.03	0.09	2.15	0.08	0.07
wHill	RN	700	4.09	0.01	0.01	0.23	4.09	0.08	0.01	0.08	1.94	0.07	0.07
wHill	CN	300	4.16	0.01	0.08	2.03	4.16	0.10	0.08	0.13	3.13	0.14	0.11
wHill	CN	500	4.09	0.01	0.01	0.20	4.09	0.08	0.01	0.08	2.01	0.08	0.07
wHill	CN	700	4.07	0.01	−0.01	−0.19	4.07	0.08	−0.01	0.08	1.94	0.08	0.06
wISE	RT	300	4.20	0.01	0.12	3.01	4.20	0.10	0.12	0.16	3.95	0.17	0.13
wISE	RT	500	4.15	0.01	0.07	1.66	4.14	0.10	0.06	0.12	3.00	0.11	0.11
wISE	RT	700	4.18	0.01	0.10	2.42	4.17	0.11	0.09	0.14	3.51	0.15	0.11
wISE	RN	300	4.13	0.01	0.05	1.14	4.12	0.08	0.04	0.10	2.42	0.09	0.09
wISE	RN	500	4.08	0.01	0.00	0.12	4.08	0.08	0.00	0.08	1.95	0.08	0.07
wISE	RN	700	4.07	0.01	−0.01	−0.17	4.07	0.08	−0.01	0.08	1.92	0.08	0.07
wISE	CN	300	4.10	0.01	0.02	0.38	4.09	0.09	0.01	0.09	2.17	0.09	0.08
wISE	CN	500	4.06	0.01	−0.02	−0.47	4.06	0.08	−0.02	0.08	2.01	0.08	0.06
wISE	CN	700	4.05	0.01	−0.03	−0.63	4.05	0.08	−0.03	0.08	2.01	0.08	0.07
wPDC	RT	300	4.17	0.01	0.09	2.22	4.16	0.11	0.08	0.15	3.56	0.14	0.13
wPDC	RT	500	4.10	0.01	0.02	0.47	4.09	0.11	0.01	0.11	2.75	0.11	0.12
wPDC	RT	700	4.16	0.01	0.08	2.02	4.16	0.12	0.08	0.14	3.46	0.14	0.11
wPDC	RN	300	4.12	0.01	0.04	0.93	4.11	0.08	0.03	0.10	2.34	0.09	0.09
wPDC	RN	500	4.07	0.01	−0.01	−0.17	4.07	0.08	−0.01	0.08	1.98	0.08	0.07
wPDC	RN	700	4.07	0.01	−0.01	−0.25	4.07	0.08	−0.01	0.08	1.93	0.07	0.07
wPDC	CN	300	4.09	0.01	0.01	0.15	4.08	0.09	0.00	0.09	2.17	0.08	0.08
wPDC	CN	500	4.05	0.01	−0.03	−0.82	4.04	0.08	−0.04	0.09	2.15	0.09	0.07
wPDC	CN	700	4.05	0.01	−0.03	−0.74	4.05	0.08	−0.03	0.08	2.05	0.09	0.07
GB2			4.39	0.01	0.31	7.68	4.39	0.09	0.31	0.33	7.98	0.46	0.14

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OAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

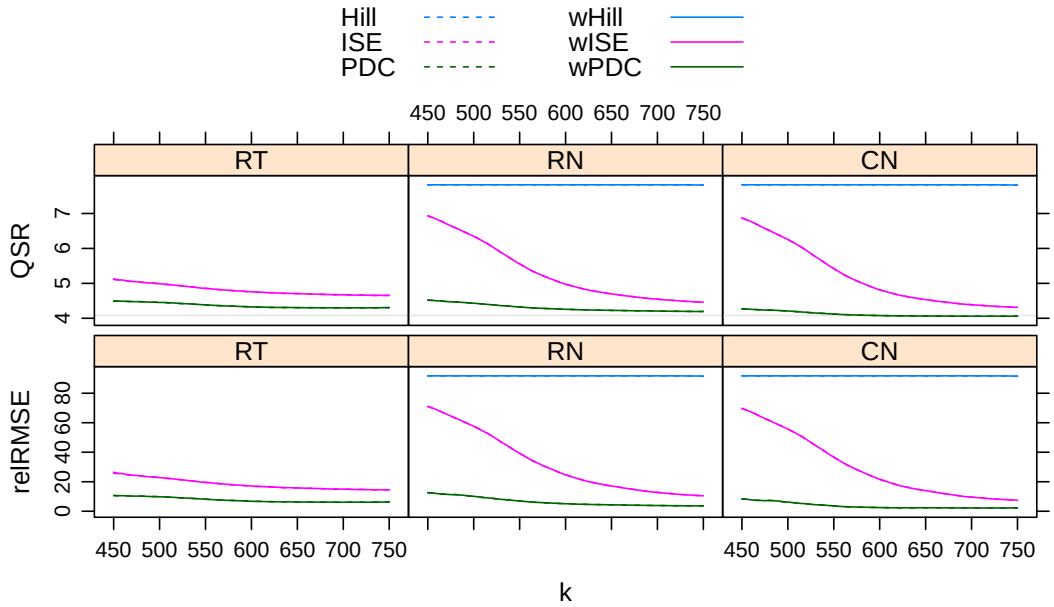

Figure F.26.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

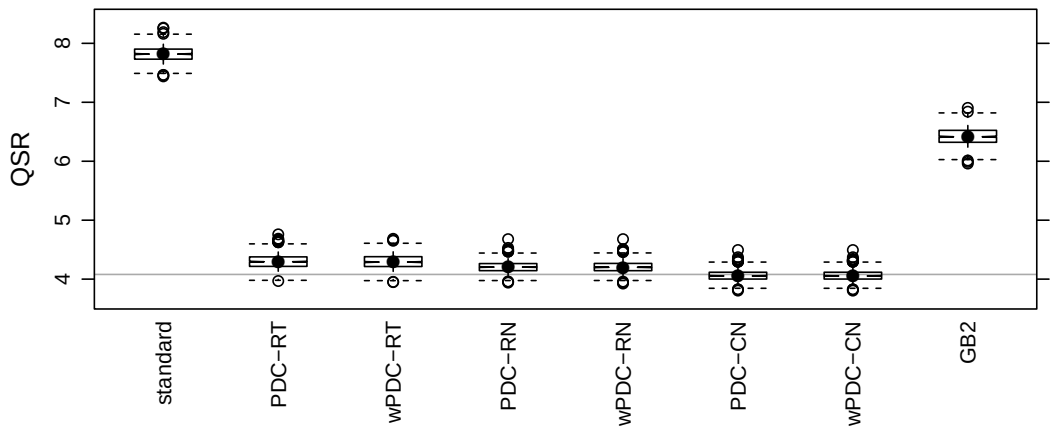

Figure F.27.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.13.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			7.82	0.02	3.74	91.71	7.82	0.13	3.74	3.74	91.77	5.54	1.03
wHill	RT	500	7.62	2.79	3.54	86.74	7.30	0.55	3.22	3.91	95.91	4.78	7.04
wHill	RT	700	6.75	0.29	2.67	65.55	6.69	0.34	2.61	2.73	66.85	3.88	2.49
wHill	RN	300	7.82	0.02	3.74	91.71	7.82	0.13	3.74	3.74	91.77	5.54	1.03
wHill	RN	500	7.82	0.02	3.74	91.71	7.82	0.13	3.74	3.74	91.77	5.54	1.03
wHill	RN	700	7.82	0.02	3.74	91.71	7.82	0.13	3.74	3.74	91.77	5.54	1.03
wHill	CN	300	7.82	0.02	3.74	91.71	7.82	0.13	3.74	3.74	91.77	5.54	1.03
wHill	CN	500	7.82	0.02	3.74	91.71	7.82	0.13	3.74	3.74	91.77	5.54	1.03
wHill	CN	700	7.82	0.02	3.74	91.71	7.82	0.13	3.74	3.74	91.77	5.54	1.03
wISE	RT	500	4.99	0.04	0.91	22.26	4.97	0.20	0.89	0.93	22.80	1.32	0.41
wISE	RT	700	4.67	0.02	0.59	14.55	4.67	0.14	0.59	0.61	14.97	0.87	0.31
wISE	RN	300	7.82	0.02	3.74	91.70	7.82	0.13	3.74	3.74	91.75	5.54	1.03
wISE	RN	500	6.35	0.39	2.27	55.56	6.44	0.58	2.36	2.35	57.62	3.50	0.89
wISE	RN	700	4.55	0.05	0.47	11.44	4.51	0.21	0.43	0.52	12.77	0.64	0.42
wISE	CN	300	7.82	0.02	3.74	91.69	7.82	0.13	3.74	3.74	91.75	5.54	1.03
wISE	CN	500	6.26	0.44	2.18	53.32	6.36	0.62	2.28	2.27	55.73	3.37	0.88
wISE	CN	700	4.39	0.06	0.31	7.57	4.35	0.21	0.27	0.39	9.55	0.40	0.39
wPDC	RT	500	4.45	0.02	0.37	9.14	4.44	0.13	0.36	0.40	9.76	0.53	0.21
wPDC	RT	700	4.30	0.01	0.22	5.36	4.29	0.12	0.21	0.25	6.11	0.31	0.15
wPDC	RN	300	5.61	0.40	1.53	37.46	5.37	0.26	1.29	1.65	40.56	1.91	0.99
wPDC	RN	500	4.43	0.05	0.35	8.64	4.38	0.14	0.30	0.41	10.12	0.45	0.38
wPDC	RN	700	4.21	0.01	0.13	3.11	4.20	0.09	0.12	0.16	3.87	0.18	0.15
wPDC	CN	300	5.36	0.50	1.28	31.39	5.08	0.29	1.01	1.46	35.87	1.49	0.99
wPDC	CN	500	4.21	0.05	0.13	3.15	4.15	0.14	0.08	0.25	6.25	0.15	0.36
wPDC	CN	700	4.06	0.01	−0.02	−0.47	4.05	0.08	−0.03	0.09	2.22	0.09	0.10
GB2			6.42	0.02	2.34	57.31	6.42	0.14	2.34	2.34	57.43	3.46	0.69

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OAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

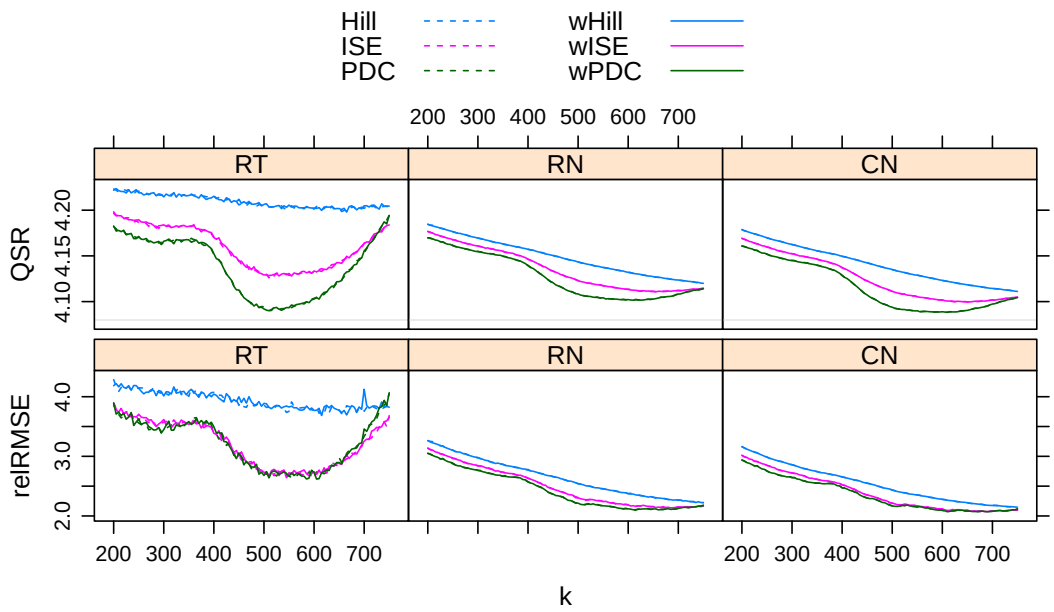

Figure F.28.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

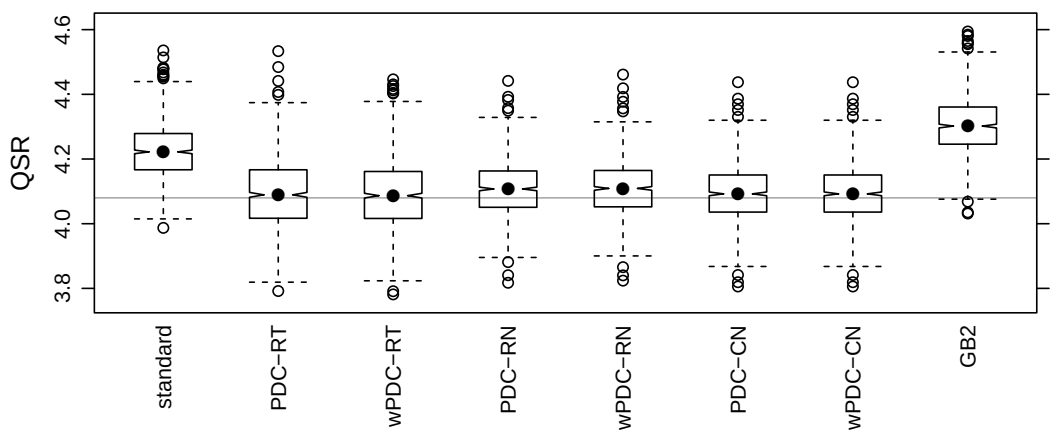

Figure F.29.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.14.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.22	0.01	0.14	3.54	4.22	0.08	0.14	0.17	4.09	0.21	0.11
wHill	RT	300	4.21	0.01	0.13	3.30	4.22	0.09	0.14	0.16	4.01	0.20	0.11
wHill	RT	500	4.21	0.01	0.13	3.10	4.21	0.09	0.13	0.16	3.89	0.19	0.12
wHill	RT	700	4.20	0.01	0.12	3.06	4.20	0.10	0.12	0.17	4.12	0.18	0.49
wHill	RN	300	4.17	0.01	0.09	2.20	4.17	0.08	0.09	0.12	2.98	0.13	0.10
wHill	RN	500	4.14	0.01	0.06	1.55	4.15	0.08	0.07	0.10	2.54	0.11	0.10
wHill	RN	700	4.12	0.01	0.04	1.07	4.13	0.08	0.05	0.09	2.27	0.10	0.09
wHill	CN	300	4.16	0.01	0.08	2.02	4.16	0.08	0.08	0.12	2.86	0.12	0.10
wHill	CN	500	4.14	0.01	0.06	1.35	4.14	0.08	0.06	0.10	2.43	0.11	0.10
wHill	CN	700	4.11	0.01	0.03	0.85	4.12	0.08	0.04	0.09	2.18	0.09	0.09
wISE	RT	300	4.18	0.01	0.10	2.55	4.17	0.10	0.09	0.15	3.62	0.14	0.12
wISE	RT	500	4.13	0.01	0.05	1.21	4.12	0.10	0.04	0.11	2.73	0.11	0.12
wISE	RT	700	4.16	0.01	0.08	2.05	4.16	0.10	0.08	0.13	3.26	0.13	0.13
wISE	RN	300	4.16	0.01	0.08	1.99	4.16	0.08	0.08	0.12	2.84	0.12	0.10
wISE	RN	500	4.12	0.01	0.04	1.06	4.13	0.08	0.05	0.09	2.30	0.10	0.10
wISE	RN	700	4.11	0.01	0.03	0.80	4.11	0.08	0.03	0.09	2.15	0.09	0.07
wISE	CN	300	4.15	0.01	0.07	1.78	4.15	0.08	0.07	0.11	2.72	0.11	0.10
wISE	CN	500	4.11	0.01	0.03	0.77	4.11	0.08	0.03	0.09	2.21	0.09	0.10
wISE	CN	700	4.10	0.01	0.02	0.53	4.10	0.08	0.02	0.08	2.08	0.09	0.07
wPDC	RT	300	4.17	0.01	0.09	2.11	4.16	0.11	0.08	0.14	3.45	0.13	0.12
wPDC	RT	500	4.09	0.01	0.01	0.30	4.09	0.11	0.01	0.11	2.68	0.11	0.09
wPDC	RT	700	4.16	0.01	0.08	1.85	4.15	0.12	0.07	0.14	3.46	0.13	0.17
wPDC	RN	300	4.15	0.01	0.07	1.84	4.15	0.08	0.07	0.11	2.76	0.11	0.10
wPDC	RN	500	4.11	0.01	0.03	0.70	4.11	0.08	0.03	0.09	2.22	0.09	0.09
wPDC	RN	700	4.11	0.01	0.03	0.69	4.11	0.08	0.03	0.09	2.13	0.09	0.08
wPDC	CN	300	4.14	0.01	0.07	1.60	4.14	0.09	0.06	0.11	2.64	0.11	0.10
wPDC	CN	500	4.09	0.01	0.01	0.34	4.09	0.08	0.01	0.09	2.17	0.09	0.09
wPDC	CN	700	4.10	0.01	0.02	0.43	4.10	0.08	0.02	0.08	2.08	0.09	0.07
GB2			4.30	0.01	0.22	5.45	4.30	0.08	0.22	0.24	5.84	0.33	0.13

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OAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

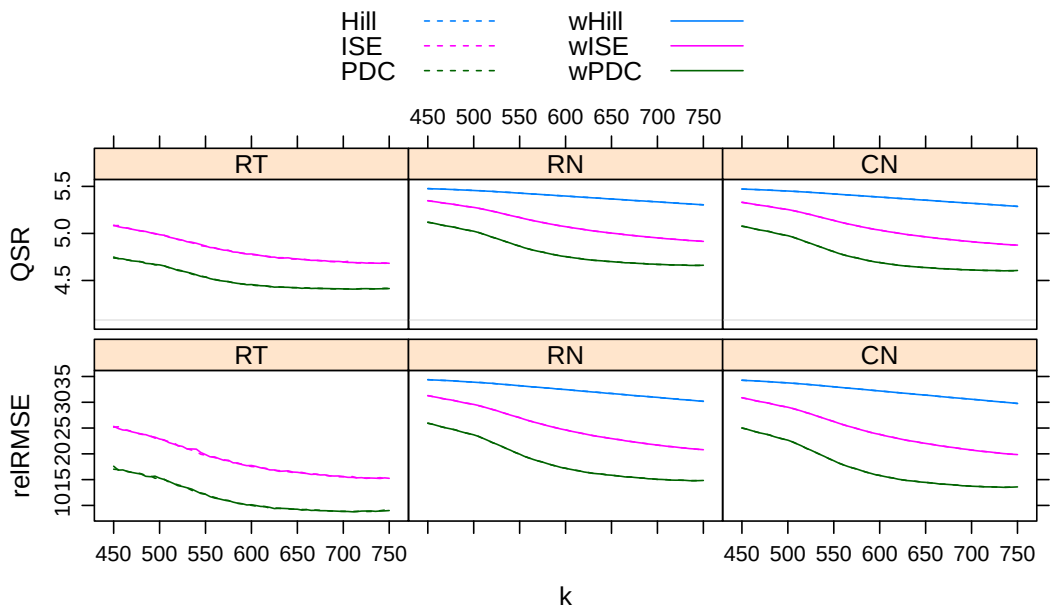

Figure F.30.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

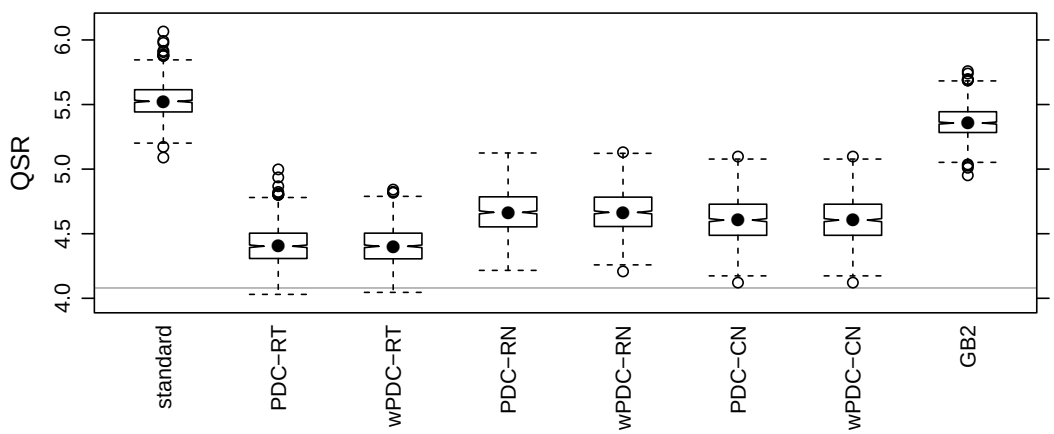

Figure F.31.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.15.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			5.53	0.02	1.45	35.61	5.52	0.13	1.44	1.46	35.75	2.14	0.49
wHill	RT	500	5.56	0.09	1.48	36.23	5.51	0.23	1.43	1.51	37.00	2.11	0.93
wHill	RT	700	5.40	0.04	1.32	32.25	5.38	0.19	1.30	1.33	32.63	1.93	0.64
wHill	RN	300	5.51	0.02	1.44	35.17	5.51	0.13	1.43	1.44	35.32	2.12	0.49
wHill	RN	500	5.46	0.02	1.38	33.74	5.45	0.13	1.37	1.38	33.90	2.03	0.47
wHill	RN	700	5.34	0.02	1.26	30.79	5.33	0.13	1.25	1.26	30.96	1.85	0.43
wHill	CN	300	5.51	0.02	1.43	35.14	5.51	0.13	1.43	1.44	35.28	2.12	0.49
wHill	CN	500	5.45	0.02	1.37	33.60	5.44	0.13	1.36	1.38	33.76	2.02	0.47
wHill	CN	700	5.32	0.02	1.24	30.41	5.32	0.13	1.24	1.25	30.59	1.84	0.43
wISE	RT	500	4.99	0.05	0.91	22.23	4.96	0.19	0.88	0.93	22.87	1.31	0.58
wISE	RT	700	4.70	0.02	0.62	15.14	4.69	0.15	0.61	0.64	15.59	0.90	0.29
wISE	RN	300	5.50	0.02	1.42	34.85	5.49	0.13	1.41	1.43	35.00	2.10	0.49
wISE	RN	500	5.28	0.02	1.20	29.34	5.28	0.15	1.20	1.21	29.58	1.78	0.42
wISE	RN	700	4.95	0.02	0.87	21.40	4.96	0.15	0.88	0.89	21.69	1.30	0.33
wISE	CN	300	5.50	0.02	1.42	34.78	5.49	0.13	1.41	1.43	34.93	2.09	0.49
wISE	CN	500	5.25	0.03	1.17	28.78	5.26	0.16	1.18	1.18	29.04	1.75	0.42
wISE	CN	700	4.91	0.02	0.83	20.41	4.92	0.15	0.84	0.85	20.74	1.24	0.32
wPDC	RT	500	4.67	0.05	0.59	14.36	4.64	0.19	0.56	0.62	15.29	0.84	0.38
wPDC	RT	700	4.41	0.02	0.33	8.10	4.40	0.15	0.32	0.36	8.82	0.48	0.19
wPDC	RN	300	5.43	0.03	1.35	33.15	5.45	0.15	1.37	1.36	33.40	2.03	0.48
wPDC	RN	500	5.02	0.04	0.94	23.13	5.03	0.21	0.95	0.97	23.69	1.41	0.38
wPDC	RN	700	4.67	0.03	0.59	14.49	4.67	0.17	0.59	0.61	15.05	0.87	0.26
wPDC	CN	300	5.42	0.03	1.34	32.85	5.44	0.15	1.36	1.35	33.14	2.01	0.48
wPDC	CN	500	4.98	0.05	0.90	21.98	4.99	0.22	0.91	0.92	22.65	1.34	0.38
wPDC	CN	700	4.61	0.03	0.53	13.04	4.61	0.18	0.53	0.56	13.72	0.78	0.25
GB2			5.36	0.01	1.28	31.46	5.36	0.12	1.28	1.29	31.59	1.89	0.41

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OAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 20.

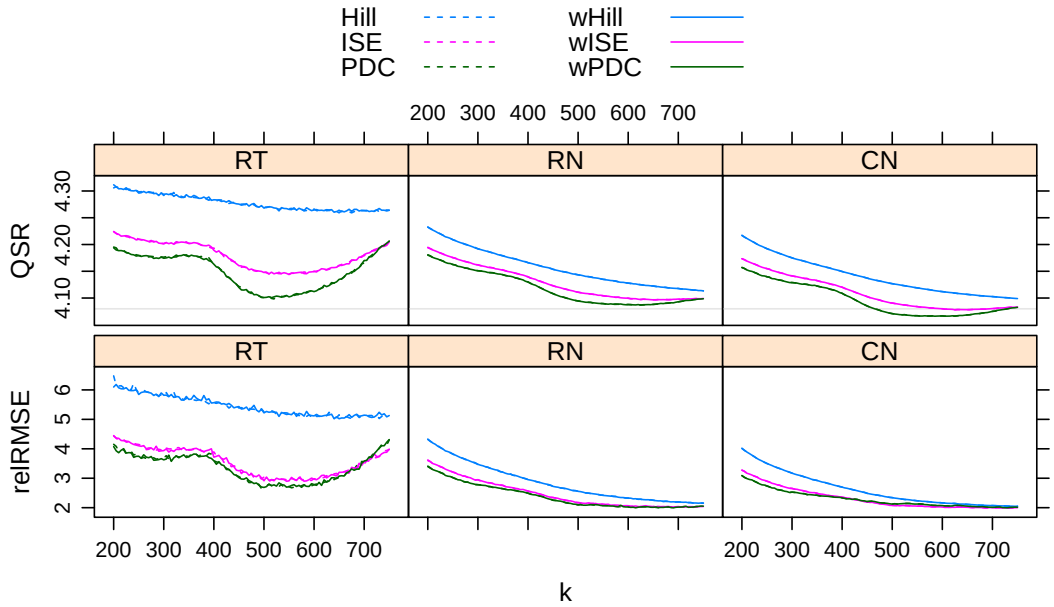

Figure F.32.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

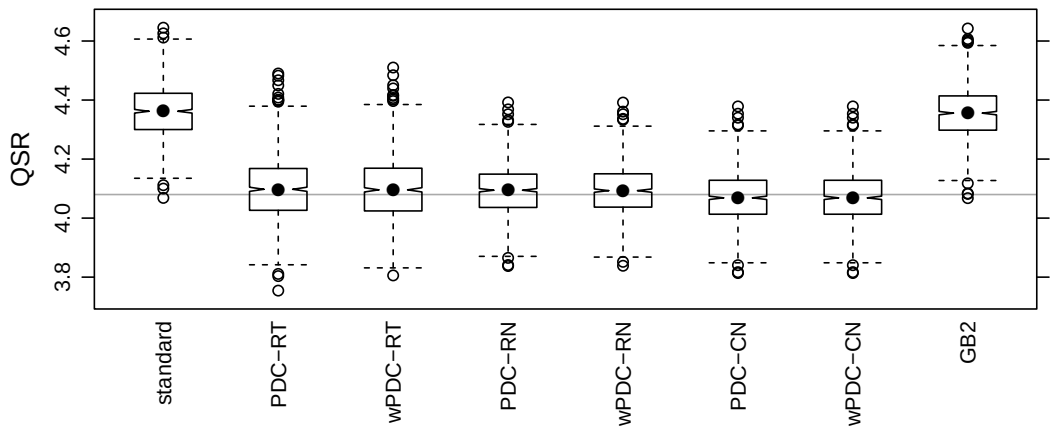

Figure F.33.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.16.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.36	0.01	0.28	6.91	4.36	0.09	0.28	0.30	7.25	0.42	0.14
wHill	RT	300	4.29	0.01	0.21	5.24	4.29	0.10	0.21	0.24	5.82	0.31	0.19
wHill	RT	500	4.27	0.01	0.19	4.61	4.26	0.10	0.18	0.21	5.22	0.27	0.13
wHill	RT	700	4.26	0.01	0.18	4.50	4.26	0.10	0.18	0.21	5.14	0.27	0.19
wHill	RN	300	4.19	0.01	0.11	2.75	4.19	0.08	0.11	0.14	3.47	0.17	0.10
wHill	RN	500	4.14	0.01	0.06	1.56	4.15	0.08	0.07	0.10	2.56	0.11	0.09
wHill	RN	700	4.12	0.01	0.04	0.93	4.12	0.08	0.04	0.09	2.20	0.09	0.07
wHill	CN	300	4.18	0.01	0.10	2.33	4.18	0.08	0.10	0.13	3.17	0.15	0.10
wHill	CN	500	4.13	0.01	0.05	1.15	4.13	0.08	0.05	0.10	2.34	0.10	0.09
wHill	CN	700	4.10	0.01	0.02	0.56	4.10	0.08	0.02	0.08	2.07	0.08	0.07
wISE	RT	300	4.20	0.01	0.12	2.99	4.20	0.10	0.12	0.16	3.94	0.18	0.15
wISE	RT	500	4.15	0.01	0.07	1.66	4.14	0.10	0.06	0.12	2.91	0.11	0.12
wISE	RT	700	4.18	0.01	0.10	2.48	4.18	0.11	0.10	0.15	3.56	0.15	0.12
wISE	RN	300	4.16	0.01	0.08	2.01	4.16	0.09	0.08	0.12	2.95	0.13	0.10
wISE	RN	500	4.11	0.01	0.03	0.76	4.11	0.08	0.03	0.09	2.18	0.09	0.09
wISE	RN	700	4.10	0.01	0.02	0.45	4.10	0.08	0.02	0.08	2.04	0.08	0.07
wISE	CN	300	4.14	0.01	0.06	1.51	4.14	0.09	0.06	0.11	2.65	0.11	0.10
wISE	CN	500	4.09	0.01	0.01	0.26	4.09	0.08	0.01	0.08	2.08	0.08	0.08
wISE	CN	700	4.08	0.01	0.00	0.01	4.08	0.08	−0.00	0.08	2.00	0.08	0.07
wPDC	RT	300	4.17	0.01	0.09	2.32	4.17	0.10	0.09	0.15	3.62	0.14	0.13
wPDC	RT	500	4.10	0.01	0.02	0.52	4.10	0.11	0.02	0.11	2.69	0.11	0.11
wPDC	RT	700	4.17	0.01	0.09	2.21	4.16	0.12	0.09	0.15	3.58	0.15	0.12
wPDC	RN	300	4.15	0.01	0.07	1.75	4.15	0.09	0.07	0.11	2.78	0.12	0.10
wPDC	RN	500	4.09	0.01	0.01	0.35	4.09	0.08	0.01	0.09	2.09	0.09	0.08
wPDC	RN	700	4.09	0.01	0.01	0.32	4.09	0.08	0.01	0.08	2.02	0.08	0.07
wPDC	CN	300	4.13	0.01	0.05	1.20	4.13	0.09	0.05	0.10	2.53	0.10	0.10
wPDC	CN	500	4.07	0.01	−0.01	−0.22	4.07	0.09	−0.01	0.09	2.12	0.08	0.07
wPDC	CN	700	4.08	0.01	−0.00	−0.12	4.07	0.08	−0.01	0.08	2.01	0.08	0.07
GB2			4.36	0.01	0.28	6.75	4.36	0.09	0.28	0.29	7.08	0.41	0.14

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OAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 20.

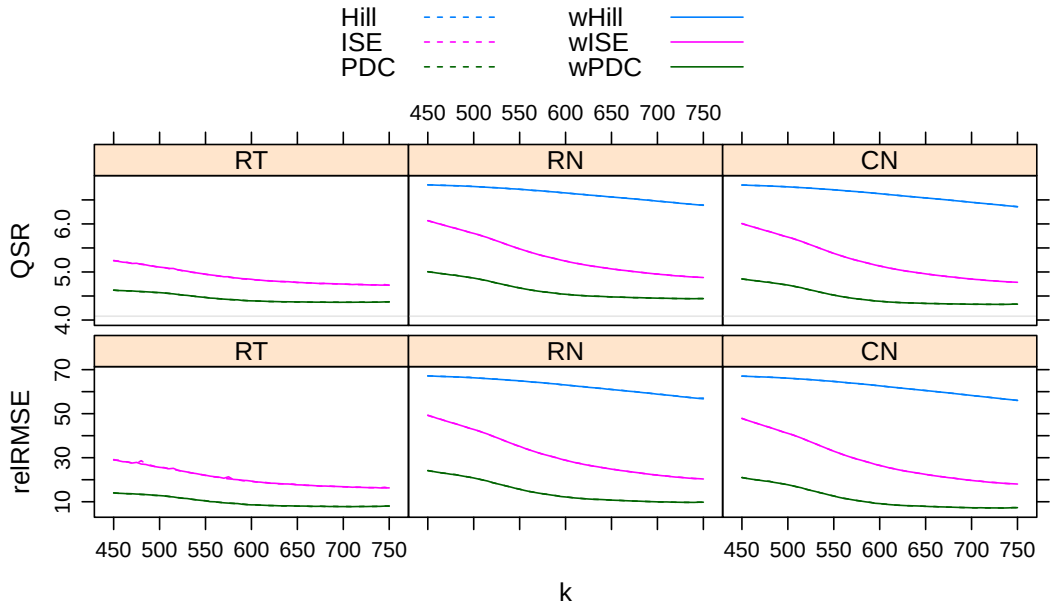

Figure F.34.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

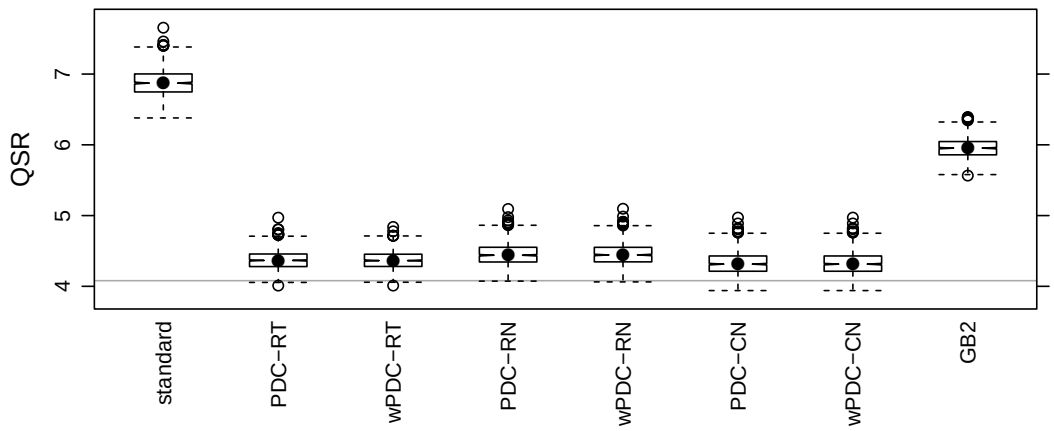

Figure F.35.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.17.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			6.88	0.04	2.80	68.56	6.87	0.19	2.79	2.80	68.72	4.14	0.88
wHill	RT	500	6.94	3.01	2.86	70.11	6.70	0.43	2.62	3.35	82.00	3.89	10.40
wHill	RT	700	6.32	0.18	2.24	54.81	6.27	0.30	2.19	2.28	55.80	3.24	1.85
wHill	RN	300	6.87	0.04	2.79	68.34	6.86	0.19	2.78	2.79	68.49	4.13	0.88
wHill	RN	500	6.78	0.04	2.70	66.14	6.77	0.19	2.69	2.71	66.31	3.99	0.85
wHill	RN	700	6.47	0.03	2.39	58.67	6.47	0.20	2.39	2.40	58.85	3.54	0.71
wHill	CN	300	6.87	0.04	2.79	68.32	6.86	0.19	2.78	2.79	68.47	4.13	0.88
wHill	CN	500	6.77	0.04	2.69	65.96	6.77	0.19	2.69	2.70	66.12	3.98	0.83
wHill	CN	700	6.45	0.04	2.37	58.09	6.44	0.19	2.36	2.38	58.27	3.50	0.71
wISE	RT	500	5.10	0.05	1.02	25.04	5.09	0.20	1.01	1.05	25.62	1.49	0.59
wISE	RT	700	4.75	0.02	0.67	16.40	4.74	0.15	0.66	0.69	16.82	0.98	0.28
wISE	RN	300	6.81	0.04	2.73	66.92	6.81	0.19	2.73	2.74	67.09	4.04	0.83
wISE	RN	500	5.80	0.09	1.72	42.24	5.79	0.29	1.71	1.75	42.85	2.54	0.63
wISE	RN	700	4.96	0.04	0.88	21.49	4.95	0.20	0.87	0.90	22.09	1.29	0.39
wISE	CN	300	6.81	0.04	2.73	66.81	6.80	0.19	2.72	2.73	66.98	4.03	0.83
wISE	CN	500	5.73	0.10	1.65	40.36	5.72	0.31	1.64	1.68	41.07	2.43	0.63
wISE	CN	700	4.85	0.05	0.77	18.95	4.84	0.22	0.76	0.80	19.69	1.12	0.37
wPDC	RT	500	4.57	0.03	0.49	12.03	4.56	0.18	0.48	0.52	12.80	0.71	0.29
wPDC	RT	700	4.37	0.02	0.29	7.12	4.36	0.13	0.28	0.32	7.80	0.42	0.19
wPDC	RN	300	5.93	0.33	1.85	45.32	5.96	0.66	1.88	1.94	47.44	2.79	0.80
wPDC	RN	500	4.87	0.09	0.79	19.45	4.84	0.29	0.76	0.85	20.79	1.12	0.54
wPDC	RN	700	4.45	0.02	0.37	9.19	4.44	0.15	0.36	0.41	9.95	0.54	0.25
wPDC	CN	300	5.83	0.41	1.75	42.83	5.86	0.74	1.78	1.86	45.59	2.65	0.80
wPDC	CN	500	4.73	0.10	0.65	15.88	4.70	0.32	0.62	0.72	17.72	0.91	0.53
wPDC	CN	700	4.33	0.03	0.25	6.11	4.31	0.16	0.23	0.30	7.26	0.35	0.22
GB2			5.95	0.02	1.87	45.92	5.95	0.14	1.87	1.88	46.05	2.78	0.57

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Stratified simple random sampling

No contamination

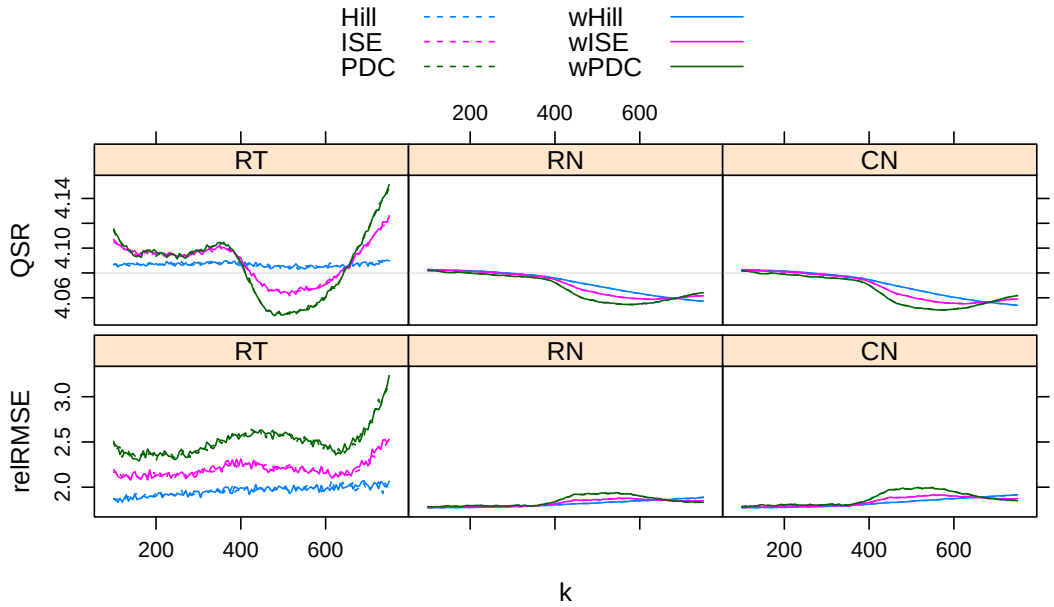

Figure F.36.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 100 and 750.

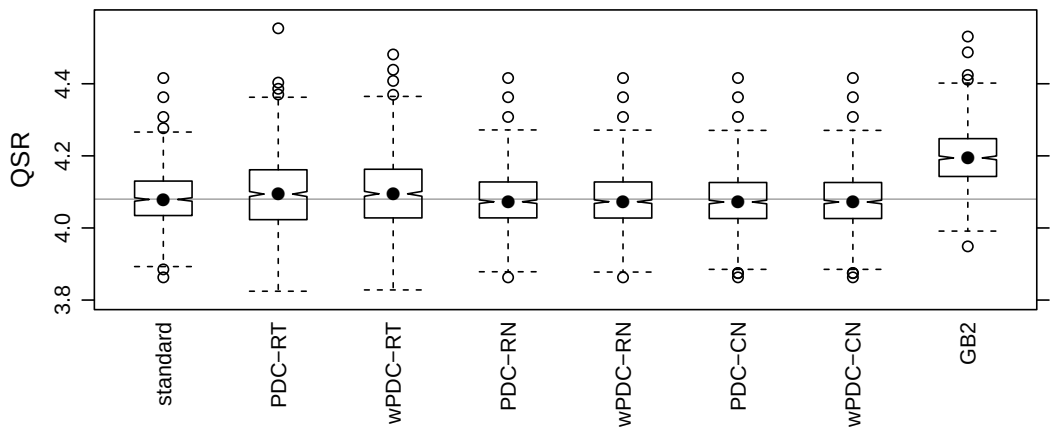

Figure F.37.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 300$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.18.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.08	0.01	0.00	0.07	4.08	0.07	−0.00	0.07	1.77	0.07	0.08
wHill	RT	300	4.09	0.01	0.01	0.20	4.08	0.08	0.00	0.08	1.96	0.08	0.08
wHill	RT	500	4.09	0.01	0.01	0.15	4.08	0.08	0.00	0.08	1.98	0.08	0.09
wHill	RT	700	4.09	0.01	0.01	0.13	4.08	0.08	0.00	0.08	2.02	0.08	0.09
wHill	RN	300	4.08	0.01	−0.00	−0.01	4.08	0.07	−0.00	0.07	1.78	0.07	0.08
wHill	RN	500	4.07	0.01	−0.01	−0.26	4.06	0.07	−0.02	0.07	1.83	0.07	0.08
wHill	RN	700	4.06	0.01	−0.02	−0.52	4.06	0.07	−0.02	0.08	1.87	0.08	0.08
wHill	CN	300	4.08	0.01	−0.00	−0.02	4.08	0.07	−0.00	0.07	1.79	0.07	0.08
wHill	CN	500	4.07	0.01	−0.01	−0.31	4.06	0.07	−0.02	0.08	1.84	0.08	0.08
wHill	CN	700	4.06	0.01	−0.02	−0.59	4.05	0.07	−0.03	0.08	1.90	0.08	0.08
wISE	RT	300	4.10	0.01	0.02	0.46	4.09	0.08	0.01	0.09	2.19	0.09	0.10
wISE	RT	500	4.06	0.01	−0.01	−0.37	4.06	0.09	−0.02	0.09	2.22	0.09	0.11
wISE	RT	700	4.10	0.01	0.02	0.54	4.10	0.09	0.02	0.09	2.23	0.09	0.10
wISE	RN	300	4.08	0.01	−0.00	−0.02	4.07	0.07	−0.00	0.07	1.79	0.07	0.08
wISE	RN	500	4.06	0.01	−0.02	−0.40	4.06	0.07	−0.02	0.08	1.86	0.07	0.08
wISE	RN	700	4.06	0.01	−0.02	−0.48	4.06	0.07	−0.02	0.08	1.85	0.07	0.08
wISE	CN	300	4.08	0.01	−0.00	−0.04	4.07	0.07	−0.01	0.07	1.80	0.07	0.08
wISE	CN	500	4.06	0.01	−0.02	−0.48	4.06	0.07	−0.02	0.08	1.89	0.07	0.08
wISE	CN	700	4.06	0.01	−0.02	−0.55	4.05	0.07	−0.03	0.08	1.87	0.08	0.08
wPDC	RT	300	4.10	0.01	0.02	0.43	4.09	0.10	0.01	0.10	2.40	0.10	0.10
wPDC	RT	500	4.05	0.01	−0.03	−0.83	4.04	0.10	−0.04	0.11	2.59	0.10	0.11
wPDC	RT	700	4.11	0.01	0.03	0.83	4.11	0.10	0.03	0.11	2.63	0.10	0.13
wPDC	RN	300	4.08	0.01	−0.00	−0.06	4.07	0.07	−0.01	0.07	1.80	0.07	0.08
wPDC	RN	500	4.06	0.01	−0.02	−0.56	4.05	0.07	−0.02	0.08	1.92	0.08	0.08
wPDC	RN	700	4.06	0.01	−0.02	−0.47	4.06	0.07	−0.02	0.08	1.85	0.08	0.08
wPDC	CN	300	4.08	0.01	−0.00	−0.10	4.07	0.07	−0.01	0.07	1.81	0.07	0.08
wPDC	CN	500	4.05	0.01	−0.03	−0.67	4.05	0.07	−0.03	0.08	1.98	0.08	0.08
wPDC	CN	700	4.06	0.01	−0.02	−0.54	4.06	0.07	−0.02	0.08	1.87	0.08	0.08
GB2			4.20	0.01	0.12	2.87	4.19	0.08	0.11	0.14	3.45	0.17	0.11

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OCAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

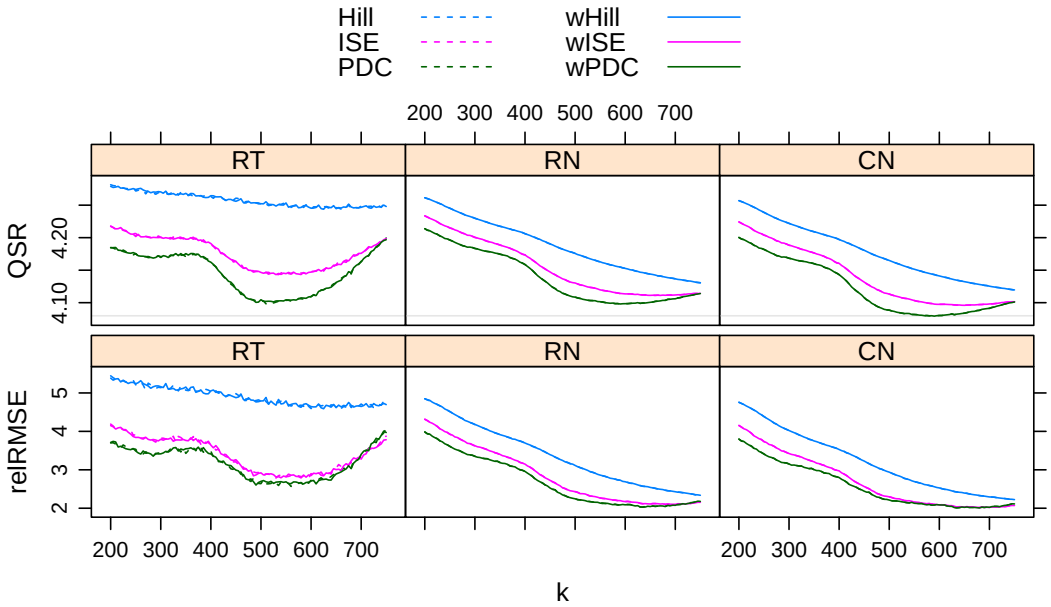

Figure F.38.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

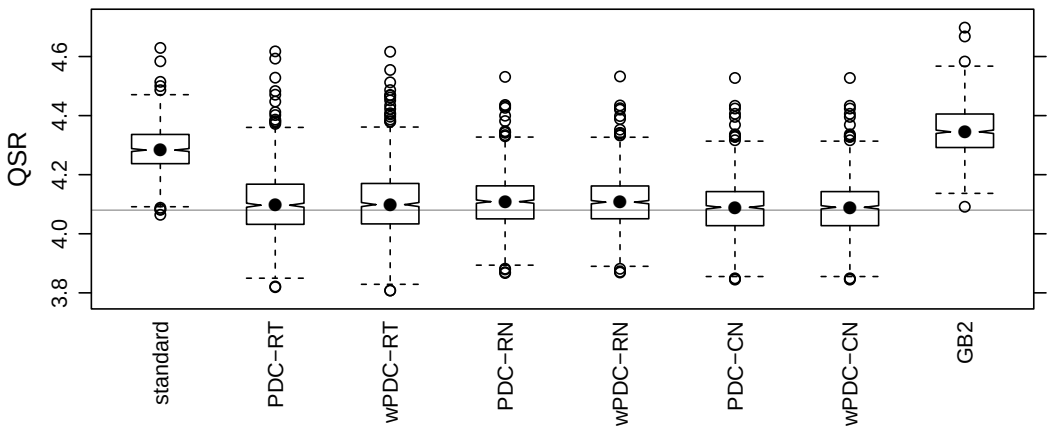

Figure F.39.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.19.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.29	0.01	0.21	5.10	4.28	0.07	0.20	0.22	5.42	0.30	0.13
wHill	RT	300	4.27	0.01	0.19	4.67	4.26	0.09	0.18	0.21	5.16	0.27	0.15
wHill	RT	500	4.25	0.01	0.17	4.22	4.25	0.09	0.17	0.20	4.79	0.25	0.14
wHill	RT	700	4.25	0.01	0.17	4.09	4.24	0.09	0.16	0.19	4.65	0.24	0.12
wHill	RN	300	4.23	0.01	0.15	3.68	4.23	0.08	0.15	0.17	4.18	0.22	0.12
wHill	RN	500	4.18	0.01	0.10	2.35	4.17	0.08	0.09	0.13	3.11	0.14	0.11
wHill	RN	700	4.14	0.01	0.06	1.39	4.13	0.08	0.05	0.10	2.43	0.09	0.10
wHill	CN	300	4.22	0.01	0.14	3.48	4.22	0.08	0.14	0.16	4.02	0.21	0.12
wHill	CN	500	4.16	0.01	0.09	2.09	4.16	0.08	0.08	0.12	2.94	0.12	0.11
wHill	CN	700	4.13	0.01	0.05	1.12	4.12	0.08	0.04	0.09	2.29	0.09	0.10
wISE	RT	300	4.20	0.01	0.12	2.96	4.20	0.10	0.12	0.15	3.79	0.17	0.13
wISE	RT	500	4.15	0.01	0.07	1.63	4.14	0.10	0.06	0.12	2.92	0.12	0.13
wISE	RT	700	4.18	0.01	0.10	2.35	4.18	0.09	0.10	0.13	3.28	0.15	0.12
wISE	RN	300	4.20	0.01	0.12	2.96	4.20	0.08	0.12	0.15	3.63	0.18	0.11
wISE	RN	500	4.13	0.01	0.05	1.24	4.13	0.08	0.05	0.10	2.43	0.09	0.11
wISE	RN	700	4.11	0.01	0.03	0.78	4.11	0.08	0.03	0.09	2.10	0.08	0.10
wISE	CN	300	4.19	0.01	0.11	2.66	4.19	0.09	0.11	0.14	3.42	0.16	0.11
wISE	CN	500	4.11	0.01	0.03	0.82	4.11	0.09	0.03	0.09	2.30	0.09	0.11
wISE	CN	700	4.10	0.01	0.02	0.45	4.10	0.08	0.02	0.08	2.02	0.08	0.10
wPDC	RT	300	4.17	0.01	0.09	2.20	4.17	0.11	0.09	0.14	3.41	0.14	0.11
wPDC	RT	500	4.10	0.01	0.02	0.60	4.10	0.10	0.02	0.11	2.70	0.10	0.13
wPDC	RT	700	4.16	0.01	0.08	2.03	4.16	0.12	0.08	0.14	3.40	0.14	0.15
wPDC	RN	300	4.18	0.01	0.10	2.53	4.18	0.09	0.10	0.14	3.35	0.16	0.11
wPDC	RN	500	4.11	0.01	0.03	0.70	4.11	0.08	0.03	0.09	2.25	0.09	0.11
wPDC	RN	700	4.11	0.01	0.03	0.64	4.11	0.08	0.03	0.08	2.08	0.08	0.11
wPDC	CN	300	4.17	0.01	0.09	2.17	4.17	0.09	0.09	0.13	3.15	0.14	0.11
wPDC	CN	500	4.09	0.01	0.01	0.21	4.09	0.09	0.01	0.09	2.21	0.08	0.11
wPDC	CN	700	4.09	0.01	0.01	0.28	4.09	0.08	0.01	0.08	2.02	0.08	0.10
GB2			4.35	0.01	0.27	6.58	4.35	0.08	0.27	0.28	6.88	0.39	0.15

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OCAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

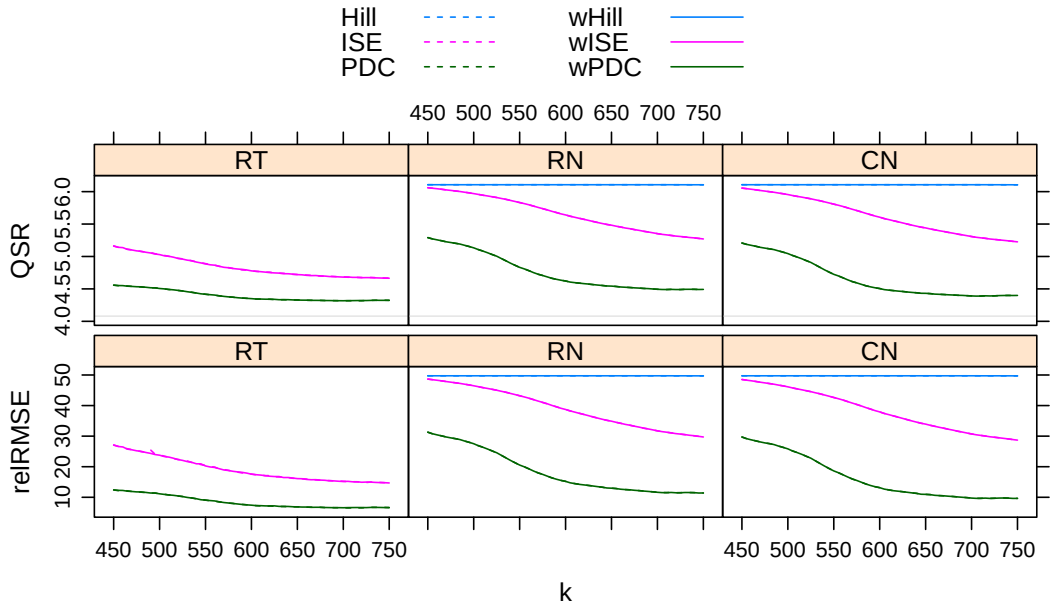

Figure F.40.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

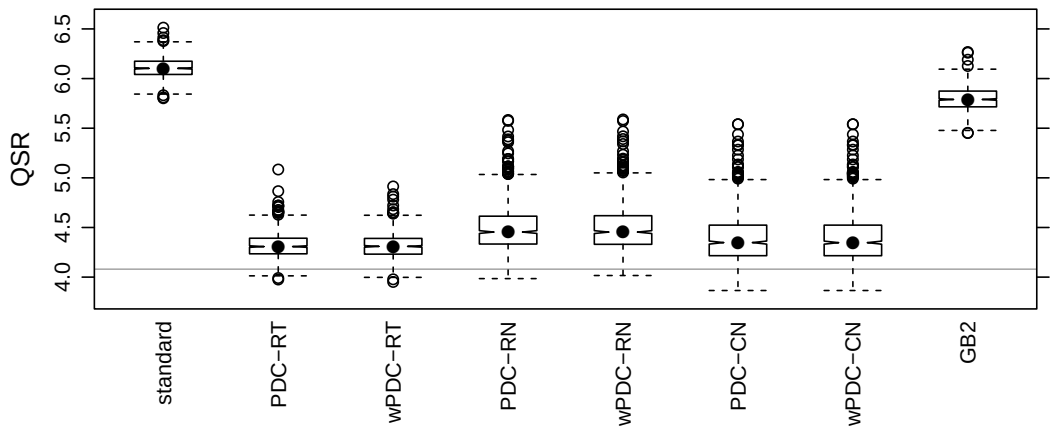

Figure F.41.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.20.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			6.11	0.01	2.03	49.68	6.10	0.10	2.02	2.03	49.73	3.00	0.60
wHill	RT	500	6.14	3.11	2.06	50.45	6.02	0.28	1.94	2.71	66.43	2.88	13.84
wHill	RT	700	5.81	0.07	1.73	42.30	5.79	0.21	1.71	1.75	42.79	2.53	1.28
wHill	RN	300	6.11	0.01	2.03	49.68	6.10	0.10	2.02	2.03	49.73	3.00	0.60
wHill	RN	500	6.11	0.01	2.03	49.68	6.10	0.10	2.02	2.03	49.73	3.00	0.60
wHill	RN	700	6.11	0.01	2.03	49.68	6.10	0.10	2.02	2.03	49.73	3.00	0.60
wHill	CN	300	6.11	0.01	2.03	49.68	6.10	0.10	2.02	2.03	49.73	3.00	0.60
wHill	CN	500	6.11	0.01	2.03	49.68	6.10	0.10	2.02	2.03	49.73	3.00	0.60
wHill	CN	700	6.11	0.01	2.03	49.68	6.10	0.10	2.02	2.03	49.73	3.00	0.60
wISE	RT	500	5.03	0.04	0.95	23.26	5.02	0.19	0.94	0.97	23.77	1.39	0.63
wISE	RT	700	4.68	0.02	0.60	14.75	4.68	0.14	0.60	0.62	15.16	0.88	0.30
wISE	RN	300	6.11	0.01	2.03	49.68	6.10	0.10	2.02	2.03	49.73	3.00	0.60
wISE	RN	500	5.97	0.02	1.89	46.32	5.98	0.15	1.90	1.90	46.47	2.82	0.60
wISE	RN	700	5.35	0.06	1.27	31.18	5.36	0.22	1.28	1.29	31.73	1.90	0.52
wISE	CN	300	6.11	0.01	2.03	49.68	6.10	0.10	2.02	2.03	49.73	3.00	0.60
wISE	CN	500	5.95	0.03	1.88	45.96	5.96	0.16	1.88	1.88	46.12	2.79	0.60
wISE	CN	700	5.31	0.06	1.23	30.09	5.32	0.23	1.24	1.25	30.71	1.84	0.51
wPDC	RT	500	4.51	0.02	0.43	10.45	4.49	0.16	0.41	0.45	11.14	0.61	0.24
wPDC	RT	700	4.32	0.02	0.24	5.81	4.31	0.12	0.23	0.27	6.58	0.34	0.20
wPDC	RN	300	5.97	0.08	1.89	46.40	6.06	0.16	1.98	1.91	46.91	2.93	0.60
wPDC	RN	500	5.13	0.15	1.05	25.82	5.16	0.45	1.08	1.12	27.51	1.60	0.50
wPDC	RN	700	4.49	0.05	0.41	10.16	4.45	0.20	0.37	0.47	11.63	0.55	0.37
wPDC	CN	300	5.95	0.10	1.87	45.88	6.06	0.16	1.98	1.90	46.56	2.93	0.60
wPDC	CN	500	5.04	0.18	0.96	23.64	5.07	0.49	0.99	1.05	25.83	1.47	0.49
wPDC	CN	700	4.39	0.06	0.31	7.63	4.35	0.22	0.27	0.40	9.73	0.40	0.36
GB2			5.79	0.01	1.71	42.01	5.79	0.12	1.71	1.72	42.11	2.53	0.54

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OCAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

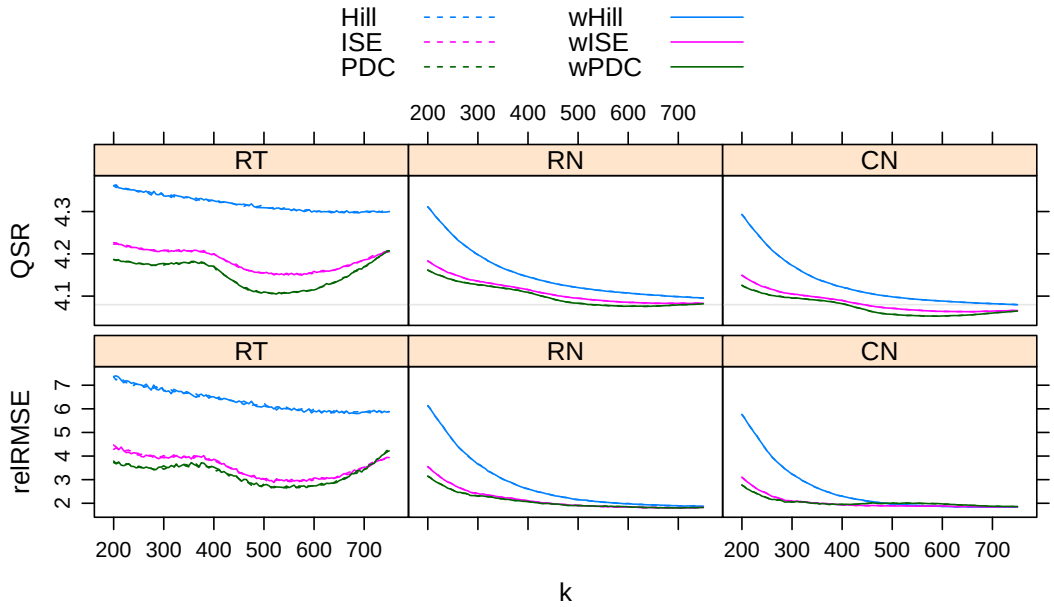

Figure F.42.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

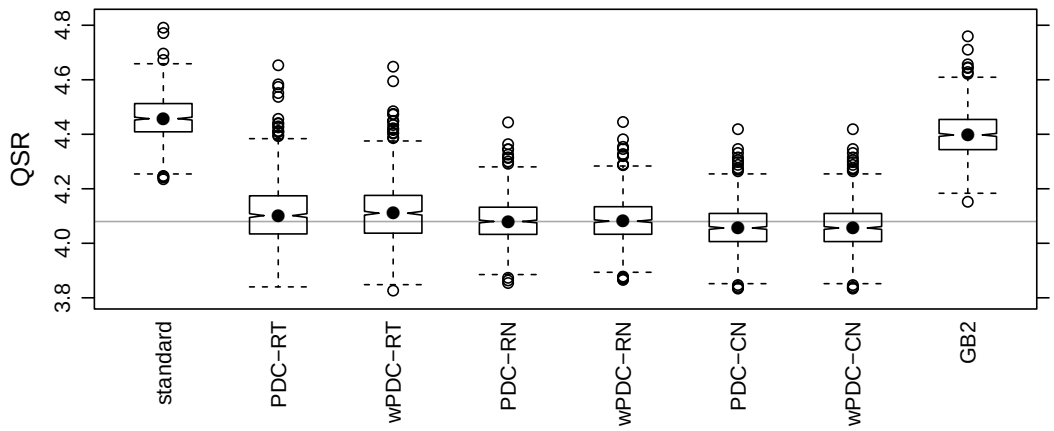

Figure F.43.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.21.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.46	0.01	0.38	9.35	4.46	0.08	0.38	0.39	9.53	0.56	0.17
wHill	RT	300	4.34	0.01	0.26	6.30	4.33	0.10	0.25	0.28	6.77	0.37	0.16
wHill	RT	500	4.31	0.01	0.23	5.62	4.30	0.10	0.22	0.25	6.12	0.33	0.17
wHill	RT	700	4.30	0.01	0.22	5.38	4.30	0.10	0.22	0.24	5.86	0.32	0.14
wHill	RN	300	4.20	0.01	0.12	2.89	4.19	0.09	0.11	0.15	3.65	0.17	0.11
wHill	RN	500	4.12	0.01	0.04	0.99	4.12	0.08	0.04	0.09	2.15	0.09	0.09
wHill	RN	700	4.10	0.01	0.02	0.47	4.09	0.07	0.01	0.08	1.89	0.07	0.09
wHill	CN	300	4.17	0.01	0.09	2.27	4.17	0.10	0.09	0.13	3.23	0.14	0.10
wHill	CN	500	4.10	0.01	0.02	0.45	4.10	0.08	0.02	0.08	1.97	0.08	0.08
wHill	CN	700	4.08	0.01	0.00	0.05	4.08	0.07	−0.00	0.07	1.84	0.07	0.08
wISE	RT	300	4.21	0.01	0.13	3.12	4.21	0.10	0.13	0.16	3.93	0.19	0.11
wISE	RT	500	4.15	0.01	0.07	1.83	4.15	0.09	0.07	0.12	3.02	0.12	0.16
wISE	RT	700	4.19	0.01	0.11	2.60	4.19	0.09	0.11	0.14	3.53	0.16	0.14
wISE	RN	300	4.14	0.01	0.06	1.36	4.13	0.08	0.05	0.10	2.41	0.10	0.09
wISE	RN	500	4.10	0.01	0.02	0.37	4.09	0.08	0.01	0.08	1.91	0.08	0.09
wISE	RN	700	4.08	0.01	0.00	0.07	4.08	0.07	0.00	0.07	1.82	0.07	0.09
wISE	CN	300	4.11	0.01	0.03	0.62	4.10	0.08	0.02	0.09	2.09	0.08	0.08
wISE	CN	500	4.07	0.01	−0.01	−0.22	4.07	0.07	−0.01	0.08	1.90	0.07	0.08
wISE	CN	700	4.06	0.01	−0.02	−0.38	4.06	0.07	−0.02	0.08	1.84	0.08	0.08
wPDC	RT	300	4.18	0.01	0.10	2.39	4.17	0.11	0.09	0.15	3.59	0.14	0.12
wPDC	RT	500	4.11	0.01	0.03	0.73	4.11	0.10	0.03	0.11	2.77	0.11	0.14
wPDC	RT	700	4.17	0.01	0.09	2.21	4.17	0.11	0.09	0.14	3.45	0.14	0.17
wPDC	RN	300	4.13	0.01	0.05	1.14	4.12	0.08	0.04	0.09	2.30	0.09	0.09
wPDC	RN	500	4.08	0.01	0.00	0.08	4.08	0.08	0.00	0.08	1.90	0.08	0.09
wPDC	RN	700	4.08	0.01	−0.00	−0.02	4.08	0.07	−0.00	0.07	1.80	0.07	0.09
wPDC	CN	300	4.10	0.01	0.02	0.37	4.09	0.08	0.01	0.08	2.05	0.08	0.08
wPDC	CN	500	4.06	0.01	−0.02	−0.56	4.06	0.08	−0.02	0.08	2.01	0.08	0.08
wPDC	CN	700	4.06	0.01	−0.02	−0.49	4.06	0.07	−0.02	0.08	1.87	0.08	0.08
GB2			4.40	0.01	0.32	7.85	4.40	0.08	0.32	0.33	8.12	0.47	0.17

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OCAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

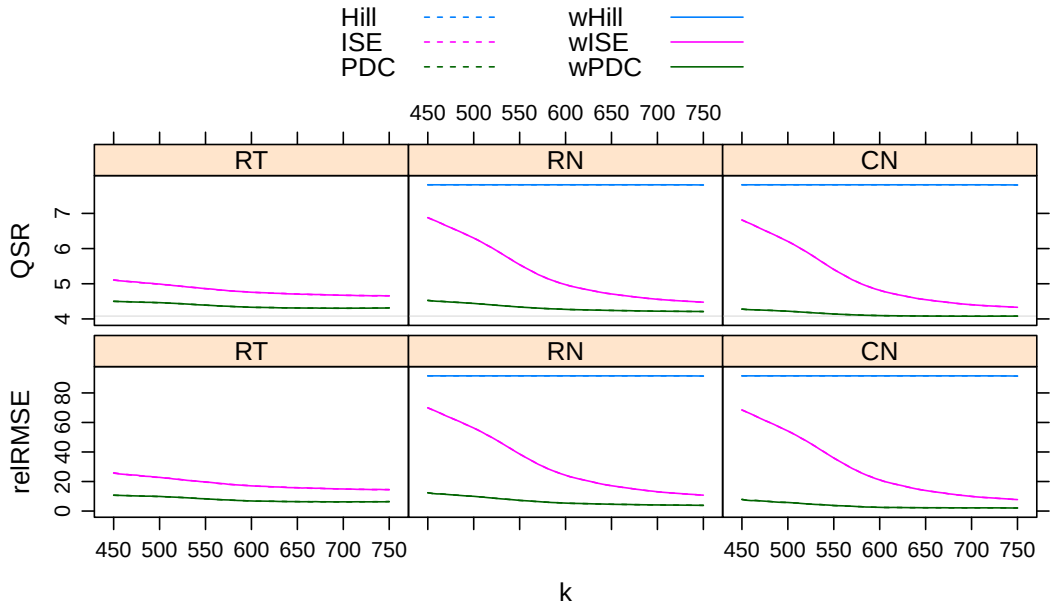

Figure F.44.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

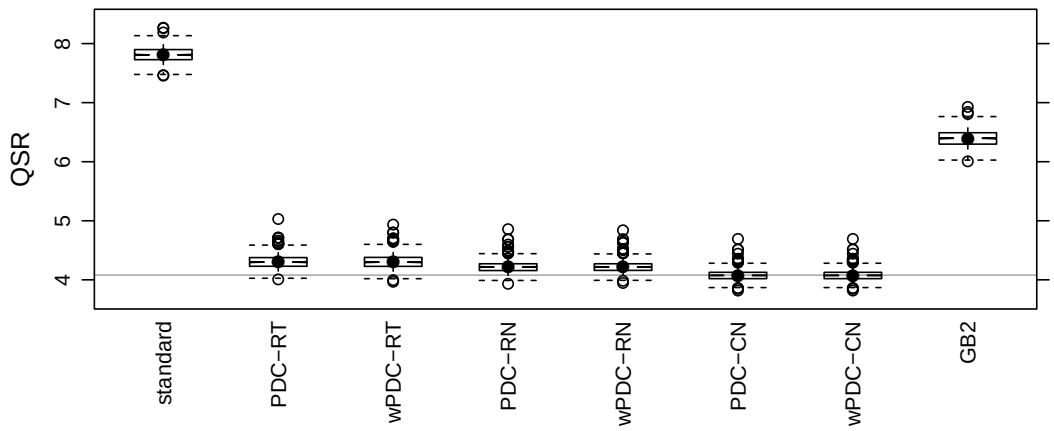

Figure F.45.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.22.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			7.81	0.02	3.73	91.50	7.81	0.13	3.73	3.74	91.55	5.53	1.03
wHill	RT	500	7.66	5.00	3.58	87.86	7.33	0.57	3.25	4.22	103.53	4.83	14.61
wHill	RT	700	6.78	0.25	2.70	66.11	6.70	0.35	2.62	2.74	67.22	3.89	2.17
wHill	RN	300	7.81	0.02	3.73	91.50	7.81	0.13	3.73	3.74	91.55	5.53	1.03
wHill	RN	500	7.81	0.02	3.73	91.50	7.81	0.13	3.73	3.74	91.55	5.53	1.03
wHill	RN	700	7.81	0.02	3.73	91.50	7.81	0.13	3.73	3.74	91.55	5.53	1.03
wHill	CN	300	7.81	0.02	3.73	91.50	7.81	0.13	3.73	3.74	91.55	5.53	1.03
wHill	CN	500	7.81	0.02	3.73	91.50	7.81	0.13	3.73	3.74	91.55	5.53	1.03
wHill	CN	700	7.81	0.02	3.73	91.50	7.81	0.13	3.73	3.74	91.55	5.53	1.03
wISE	RT	500	4.99	0.03	0.91	22.35	4.98	0.18	0.90	0.93	22.81	1.34	0.43
wISE	RT	700	4.67	0.02	0.59	14.56	4.67	0.13	0.59	0.61	14.96	0.87	0.32
wISE	RN	300	7.81	0.02	3.73	91.50	7.81	0.13	3.73	3.73	91.55	5.53	1.03
wISE	RN	500	6.30	0.34	2.22	54.41	6.38	0.54	2.30	2.29	56.24	3.41	0.90
wISE	RN	700	4.56	0.05	0.48	11.69	4.51	0.20	0.43	0.53	13.02	0.64	0.48
wISE	CN	300	7.81	0.02	3.73	91.49	7.81	0.13	3.73	3.73	91.55	5.53	1.03
wISE	CN	500	6.20	0.38	2.12	52.07	6.30	0.56	2.22	2.21	54.23	3.29	0.89
wISE	CN	700	4.40	0.06	0.32	7.93	4.36	0.20	0.28	0.40	9.92	0.41	0.46
wPDC	RT	500	4.46	0.02	0.38	9.40	4.46	0.13	0.38	0.40	9.91	0.56	0.25
wPDC	RT	700	4.31	0.01	0.23	5.52	4.30	0.12	0.22	0.26	6.26	0.32	0.21
wPDC	RN	300	5.58	0.33	1.50	36.78	5.38	0.24	1.30	1.61	39.40	1.93	0.94
wPDC	RN	500	4.44	0.04	0.36	8.85	4.41	0.15	0.33	0.41	9.98	0.48	0.43
wPDC	RN	700	4.22	0.01	0.14	3.45	4.22	0.08	0.14	0.17	4.14	0.20	0.19
wPDC	CN	300	5.33	0.41	1.25	30.70	5.10	0.26	1.02	1.41	34.49	1.52	0.94
wPDC	CN	500	4.22	0.04	0.14	3.44	4.19	0.14	0.11	0.24	5.82	0.17	0.39
wPDC	CN	700	4.08	0.01	−0.00	−0.06	4.07	0.08	−0.01	0.09	2.17	0.08	0.15
GB2			6.40	0.02	2.32	56.82	6.40	0.14	2.32	2.32	56.93	3.43	0.70

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OCAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

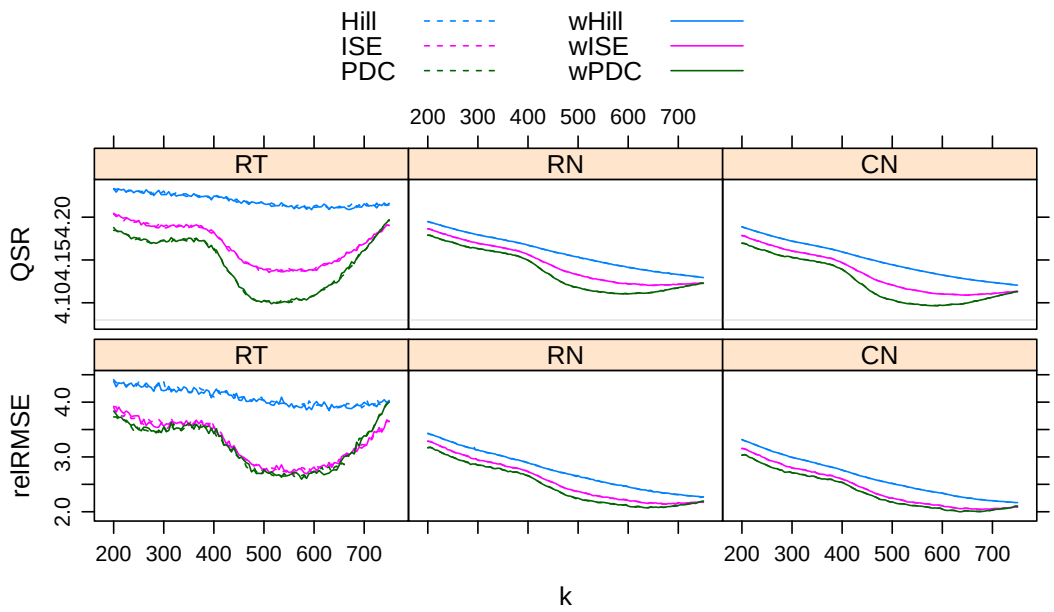

Figure F.46.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

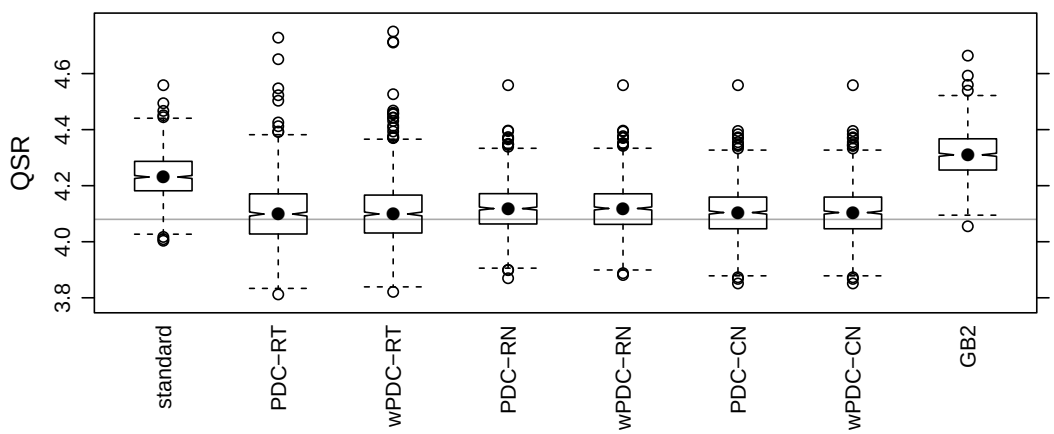

Figure F.47.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.23.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.23	0.01	0.15	3.79	4.23	0.08	0.15	0.17	4.26	0.22	0.12
wHill	RT	300	4.23	0.01	0.15	3.59	4.22	0.08	0.14	0.17	4.21	0.21	0.13
wHill	RT	500	4.22	0.01	0.14	3.33	4.21	0.09	0.13	0.16	4.04	0.20	0.13
wHill	RT	700	4.22	0.01	0.14	3.33	4.21	0.09	0.13	0.16	4.00	0.20	0.12
wHill	RN	300	4.18	0.01	0.10	2.44	4.18	0.08	0.10	0.13	3.13	0.14	0.11
wHill	RN	500	4.15	0.01	0.07	1.80	4.15	0.08	0.07	0.11	2.66	0.11	0.11
wHill	RN	700	4.13	0.01	0.05	1.30	4.13	0.08	0.05	0.09	2.31	0.09	0.11
wHill	CN	300	4.17	0.01	0.09	2.26	4.17	0.08	0.09	0.12	2.99	0.13	0.10
wHill	CN	500	4.14	0.01	0.06	1.59	4.14	0.08	0.06	0.10	2.52	0.10	0.10
wHill	CN	700	4.12	0.01	0.04	1.08	4.12	0.08	0.04	0.09	2.20	0.09	0.10
wISE	RT	300	4.19	0.01	0.11	2.68	4.18	0.09	0.10	0.15	3.56	0.16	0.13
wISE	RT	500	4.14	0.01	0.06	1.44	4.14	0.10	0.06	0.11	2.75	0.12	0.15
wISE	RT	700	4.17	0.01	0.09	2.18	4.16	0.09	0.08	0.13	3.20	0.13	0.15
wISE	RN	300	4.17	0.01	0.09	2.19	4.17	0.08	0.09	0.12	2.94	0.13	0.11
wISE	RN	500	4.13	0.01	0.05	1.30	4.13	0.08	0.05	0.10	2.37	0.10	0.11
wISE	RN	700	4.12	0.01	0.04	1.02	4.12	0.08	0.04	0.09	2.17	0.09	0.11
wISE	CN	300	4.16	0.01	0.08	1.97	4.16	0.08	0.08	0.11	2.80	0.12	0.10
wISE	CN	500	4.12	0.01	0.04	1.01	4.12	0.08	0.04	0.09	2.25	0.09	0.10
wISE	CN	700	4.11	0.01	0.03	0.76	4.11	0.08	0.03	0.08	2.05	0.08	0.10
wPDC	RT	300	4.17	0.01	0.09	2.29	4.17	0.11	0.09	0.14	3.55	0.14	0.15
wPDC	RT	500	4.10	0.01	0.02	0.56	4.10	0.10	0.02	0.11	2.77	0.10	0.16
wPDC	RT	700	4.16	0.01	0.08	1.99	4.16	0.10	0.08	0.14	3.39	0.14	0.15
wPDC	RN	300	4.16	0.01	0.08	2.04	4.16	0.08	0.08	0.12	2.85	0.13	0.11
wPDC	RN	500	4.12	0.01	0.04	0.93	4.12	0.08	0.04	0.09	2.25	0.09	0.12
wPDC	RN	700	4.12	0.01	0.04	0.93	4.12	0.08	0.04	0.09	2.11	0.09	0.10
wPDC	CN	300	4.15	0.01	0.07	1.79	4.15	0.08	0.07	0.11	2.71	0.11	0.10
wPDC	CN	500	4.10	0.01	0.02	0.58	4.10	0.08	0.02	0.09	2.18	0.09	0.12
wPDC	CN	700	4.11	0.01	0.03	0.65	4.11	0.08	0.03	0.08	2.03	0.08	0.10
GB2			4.31	0.01	0.23	5.70	4.31	0.08	0.23	0.25	6.05	0.34	0.14

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OCAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

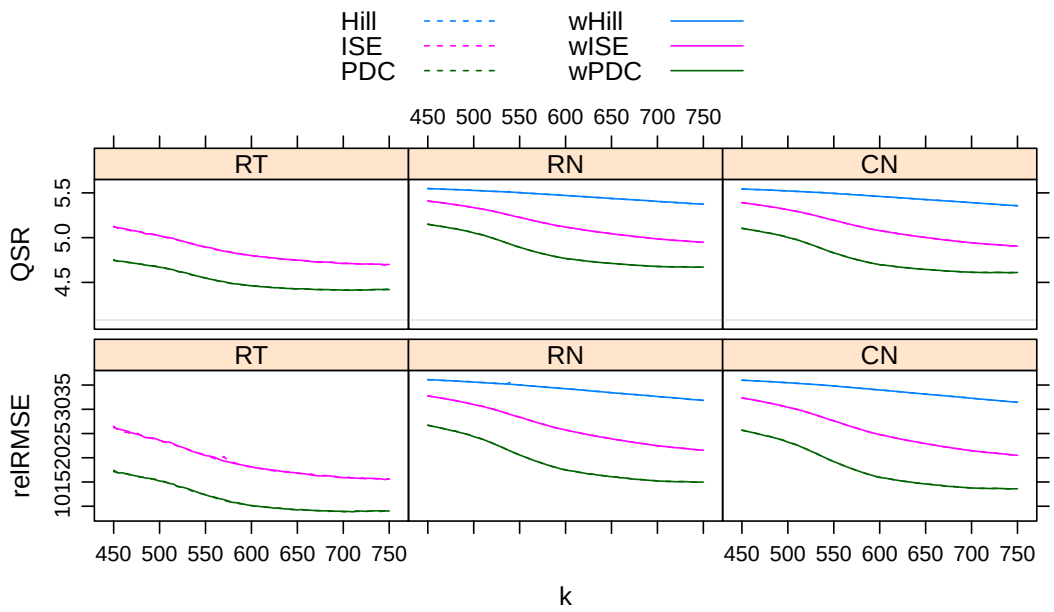

Figure F.48.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

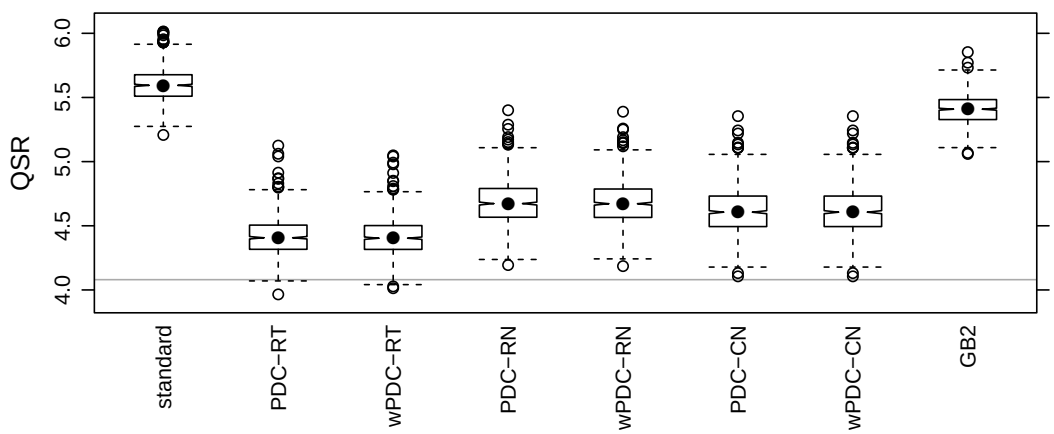

Figure F.49.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.24.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			5.60	0.02	1.52	37.23	5.59	0.12	1.51	1.52	37.36	2.25	0.47
wHill	RT	500	5.63	0.08	1.55	37.97	5.59	0.25	1.51	1.58	38.64	2.24	0.93
wHill	RT	700	5.45	0.05	1.37	33.62	5.44	0.18	1.36	1.39	34.04	2.01	0.86
wHill	RN	300	5.59	0.02	1.51	36.91	5.58	0.13	1.50	1.51	37.04	2.23	0.47
wHill	RN	500	5.53	0.02	1.45	35.48	5.52	0.12	1.44	1.45	35.61	2.14	0.46
wHill	RN	700	5.40	0.02	1.33	32.48	5.41	0.13	1.33	1.33	32.63	1.97	0.46
wHill	CN	300	5.58	0.02	1.50	36.88	5.58	0.13	1.50	1.51	37.01	2.23	0.47
wHill	CN	500	5.52	0.02	1.44	35.34	5.52	0.12	1.44	1.45	35.48	2.13	0.46
wHill	CN	700	5.39	0.02	1.31	32.13	5.40	0.13	1.32	1.32	32.28	1.95	0.45
wISE	RT	500	5.02	0.04	0.94	23.06	5.00	0.19	0.92	0.96	23.62	1.37	0.60
wISE	RT	700	4.71	0.02	0.63	15.47	4.71	0.14	0.63	0.65	15.88	0.93	0.32
wISE	RN	300	5.57	0.02	1.49	36.60	5.57	0.12	1.49	1.50	36.73	2.21	0.47
wISE	RN	500	5.33	0.02	1.26	30.76	5.35	0.15	1.27	1.26	30.98	1.88	0.42
wISE	RN	700	4.99	0.02	0.91	22.19	4.99	0.14	0.91	0.92	22.47	1.35	0.36
wISE	CN	300	5.57	0.02	1.49	36.53	5.57	0.12	1.49	1.50	36.66	2.21	0.47
wISE	CN	500	5.31	0.02	1.23	30.18	5.32	0.15	1.24	1.24	30.42	1.84	0.42
wISE	CN	700	4.94	0.02	0.86	21.13	4.95	0.14	0.87	0.87	21.45	1.28	0.35
wPDC	RT	500	4.67	0.04	0.59	14.44	4.66	0.19	0.58	0.62	15.19	0.85	0.35
wPDC	RT	700	4.41	0.02	0.33	8.16	4.40	0.14	0.32	0.36	8.88	0.48	0.24
wPDC	RN	300	5.50	0.03	1.42	34.78	5.50	0.15	1.42	1.43	35.01	2.11	0.47
wPDC	RN	500	5.05	0.04	0.97	23.84	5.05	0.21	0.97	0.99	24.36	1.44	0.41
wPDC	RN	700	4.68	0.03	0.60	14.65	4.67	0.16	0.59	0.62	15.21	0.88	0.32
wPDC	CN	300	5.49	0.03	1.41	34.49	5.50	0.15	1.42	1.42	34.76	2.10	0.47
wPDC	CN	500	5.00	0.05	0.92	22.59	5.00	0.22	0.92	0.95	23.22	1.37	0.40
wPDC	CN	700	4.61	0.03	0.53	13.06	4.61	0.17	0.53	0.56	13.75	0.78	0.31
GB2			5.41	0.01	1.33	32.52	5.41	0.11	1.33	1.33	32.64	1.97	0.43

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OCAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 20.

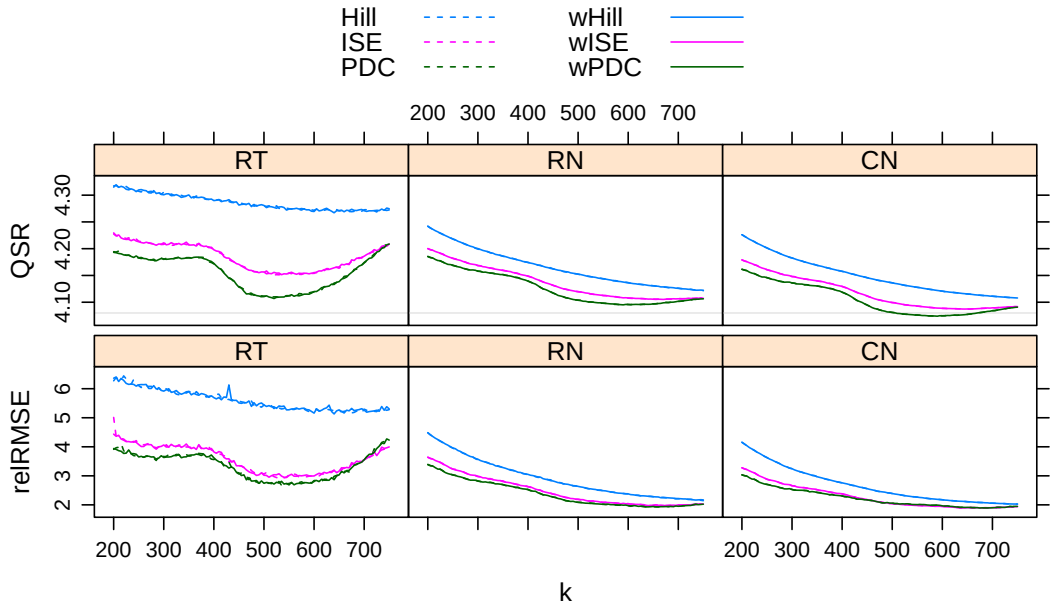

Figure F.50.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

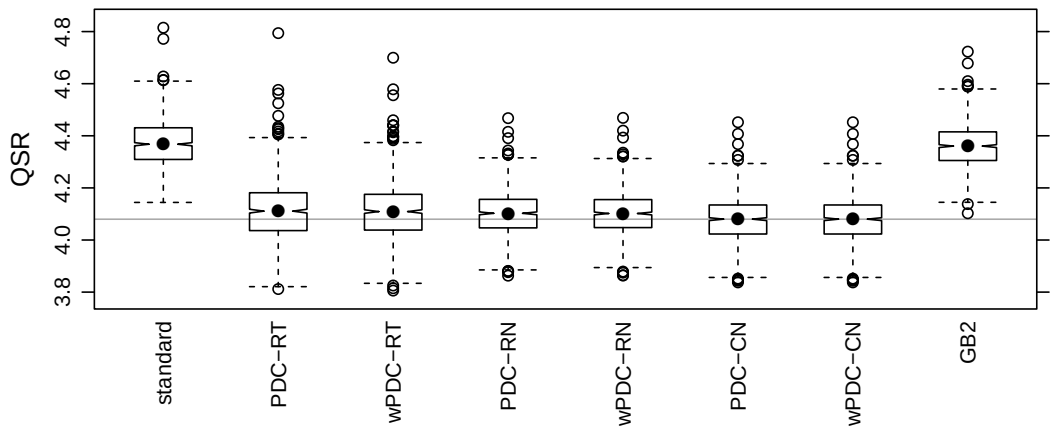

Figure F.51.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.25.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.37	0.01	0.29	7.14	4.37	0.09	0.29	0.30	7.45	0.43	0.18
wHill	RT	300	4.30	0.01	0.22	5.41	4.30	0.10	0.22	0.24	5.92	0.32	0.15
wHill	RT	500	4.28	0.01	0.20	4.92	4.27	0.10	0.19	0.22	5.44	0.29	0.16
wHill	RT	700	4.27	0.01	0.19	4.68	4.26	0.10	0.18	0.21	5.26	0.27	0.13
wHill	RN	300	4.20	0.01	0.12	2.95	4.20	0.08	0.12	0.15	3.57	0.17	0.10
wHill	RN	500	4.15	0.01	0.07	1.78	4.15	0.08	0.07	0.11	2.64	0.11	0.10
wHill	RN	700	4.13	0.01	0.05	1.13	4.12	0.08	0.04	0.09	2.22	0.09	0.10
wHill	CN	300	4.18	0.01	0.10	2.52	4.18	0.08	0.10	0.13	3.25	0.15	0.10
wHill	CN	500	4.14	0.01	0.06	1.38	4.13	0.08	0.05	0.10	2.39	0.10	0.09
wHill	CN	700	4.11	0.01	0.03	0.77	4.11	0.08	0.03	0.08	2.06	0.08	0.09
wISE	RT	300	4.21	0.01	0.13	3.21	4.20	0.10	0.12	0.17	4.06	0.19	0.12
wISE	RT	500	4.16	0.01	0.08	1.88	4.15	0.09	0.07	0.12	3.02	0.12	0.13
wISE	RT	700	4.19	0.01	0.11	2.60	4.18	0.10	0.10	0.14	3.55	0.16	0.14
wISE	RN	300	4.17	0.01	0.09	2.17	4.17	0.08	0.09	0.12	2.98	0.13	0.10
wISE	RN	500	4.12	0.01	0.04	0.98	4.12	0.08	0.04	0.09	2.19	0.09	0.10
wISE	RN	700	4.11	0.01	0.03	0.65	4.11	0.08	0.03	0.08	2.00	0.08	0.10
wISE	CN	300	4.15	0.01	0.07	1.67	4.14	0.09	0.06	0.11	2.66	0.11	0.09
wISE	CN	500	4.10	0.01	0.02	0.48	4.10	0.08	0.02	0.08	2.04	0.08	0.09
wISE	CN	700	4.09	0.01	0.01	0.24	4.09	0.07	0.01	0.08	1.91	0.07	0.09
wPDC	RT	300	4.18	0.01	0.10	2.48	4.17	0.11	0.09	0.15	3.63	0.14	0.15
wPDC	RT	500	4.11	0.01	0.03	0.75	4.11	0.10	0.03	0.11	2.74	0.11	0.15
wPDC	RT	700	4.17	0.01	0.09	2.31	4.17	0.11	0.09	0.14	3.55	0.15	0.13
wPDC	RN	300	4.16	0.01	0.08	1.91	4.15	0.08	0.07	0.11	2.82	0.12	0.10
wPDC	RN	500	4.10	0.01	0.02	0.58	4.10	0.08	0.02	0.09	2.09	0.08	0.10
wPDC	RN	700	4.10	0.01	0.02	0.54	4.10	0.08	0.02	0.08	1.95	0.08	0.09
wPDC	CN	300	4.14	0.01	0.06	1.38	4.13	0.09	0.05	0.10	2.53	0.10	0.09
wPDC	CN	500	4.08	0.01	0.00	0.03	4.08	0.08	0.00	0.08	2.06	0.08	0.09
wPDC	CN	700	4.08	0.01	0.00	0.10	4.08	0.08	0.00	0.08	1.90	0.08	0.09
GB2			4.36	0.01	0.28	6.97	4.36	0.08	0.28	0.30	7.27	0.42	0.16

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OCAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 20.

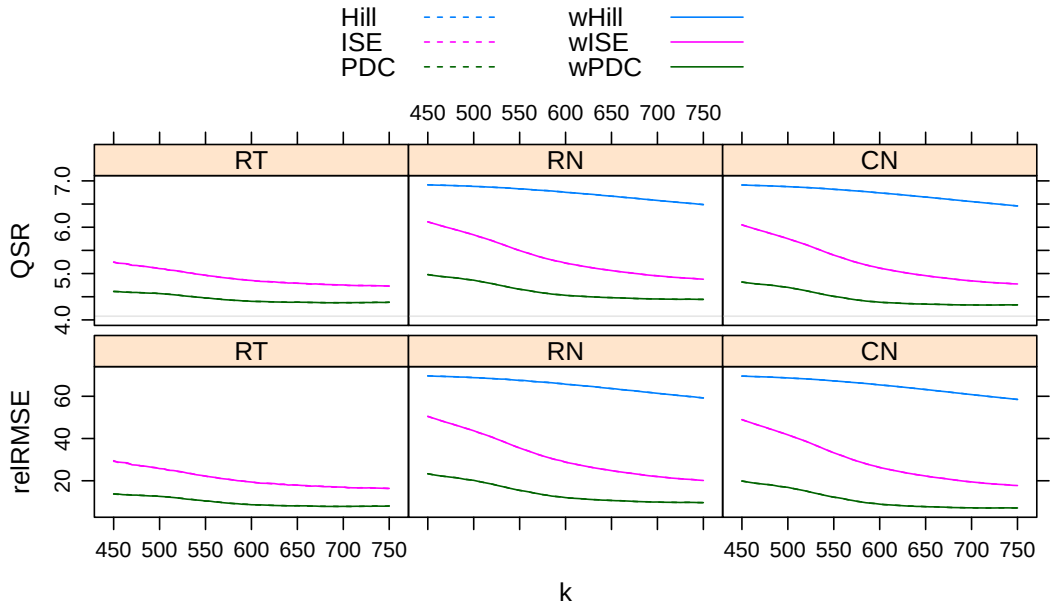

Figure F.52.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

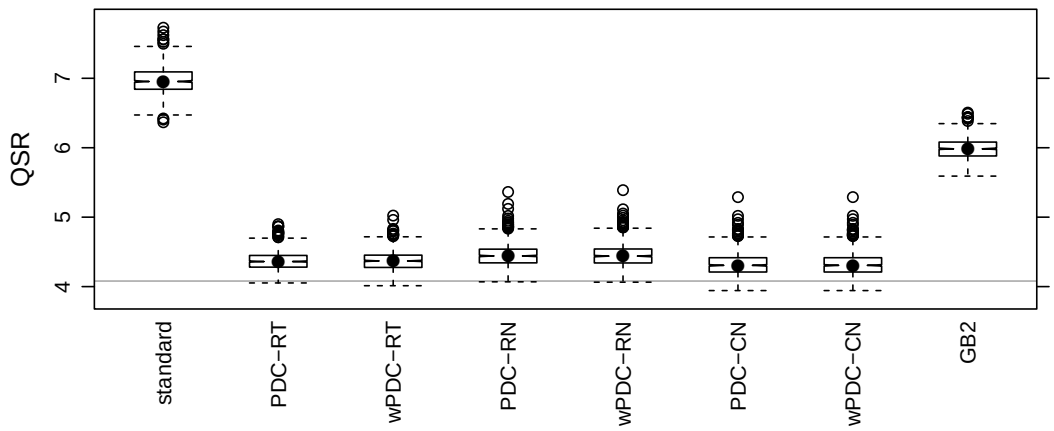

Figure F.53.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.26.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			6.97	0.04	2.89	70.80	6.95	0.18	2.87	2.89	70.95	4.26	0.89
wHill	RT	500	7.02	1.24	2.94	72.12	6.82	0.49	2.74	3.15	77.09	4.07	6.66
wHill	RT	700	6.47	1.58	2.39	58.48	6.34	0.34	2.26	2.70	66.09	3.35	9.21
wHill	RN	300	6.96	0.04	2.88	70.68	6.95	0.19	2.87	2.89	70.83	4.25	0.89
wHill	RN	500	6.88	0.04	2.80	68.65	6.87	0.19	2.79	2.81	68.81	4.14	0.88
wHill	RN	700	6.58	0.04	2.50	61.23	6.58	0.20	2.50	2.51	61.40	3.70	0.76
wHill	CN	300	6.96	0.04	2.88	70.68	6.95	0.19	2.87	2.89	70.83	4.25	0.89
wHill	CN	500	6.88	0.04	2.80	68.52	6.87	0.19	2.79	2.80	68.69	4.14	0.89
wHill	CN	700	6.55	0.04	2.47	60.62	6.55	0.20	2.47	2.48	60.80	3.67	0.74
wISE	RT	500	5.11	0.05	1.03	25.17	5.08	0.20	1.00	1.05	25.75	1.49	0.69
wISE	RT	700	4.75	0.03	0.67	16.54	4.75	0.15	0.67	0.69	16.99	0.99	0.31
wISE	RN	300	6.91	0.04	2.83	69.40	6.91	0.20	2.83	2.84	69.57	4.19	0.89
wISE	RN	500	5.84	0.09	1.76	43.03	5.85	0.31	1.77	1.78	43.68	2.62	0.66
wISE	RN	700	4.95	0.05	0.87	21.35	4.94	0.21	0.86	0.90	21.98	1.27	0.39
wISE	CN	300	6.91	0.04	2.83	69.26	6.90	0.19	2.82	2.83	69.44	4.18	0.89
wISE	CN	500	5.75	0.10	1.67	41.00	5.76	0.33	1.68	1.70	41.75	2.49	0.66
wISE	CN	700	4.84	0.05	0.76	18.70	4.83	0.21	0.75	0.79	19.46	1.11	0.38
wPDC	RT	500	4.57	0.03	0.49	11.96	4.56	0.16	0.48	0.51	12.60	0.71	0.28
wPDC	RT	700	4.37	0.02	0.29	7.15	4.37	0.13	0.29	0.32	7.88	0.43	0.23
wPDC	RN	300	5.89	0.37	1.82	44.49	5.88	0.76	1.80	1.91	46.89	2.67	0.84
wPDC	RN	500	4.86	0.08	0.78	19.04	4.84	0.28	0.76	0.82	20.20	1.12	0.46
wPDC	RN	700	4.45	0.03	0.37	9.12	4.44	0.15	0.36	0.41	9.94	0.53	0.32
wPDC	CN	300	5.78	0.45	1.70	41.61	5.77	0.84	1.69	1.83	44.77	2.50	0.83
wPDC	CN	500	4.70	0.09	0.62	15.27	4.68	0.30	0.60	0.69	16.88	0.89	0.45
wPDC	CN	700	4.32	0.03	0.24	5.96	4.31	0.15	0.23	0.29	7.20	0.33	0.30
GB2			5.99	0.02	1.91	46.71	5.98	0.15	1.90	1.91	46.84	2.82	0.59

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OAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

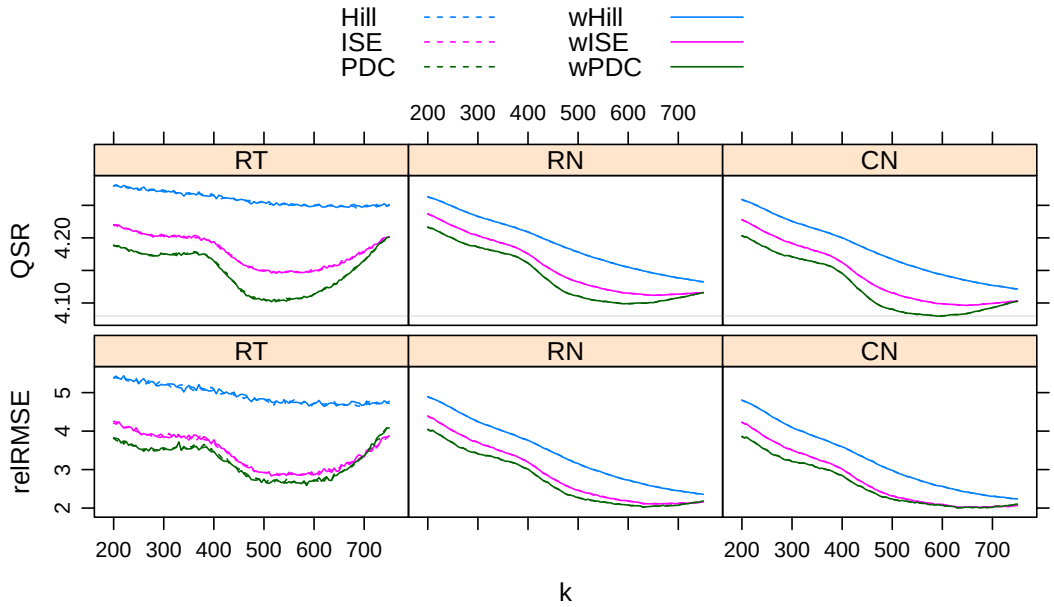

Figure F.54.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

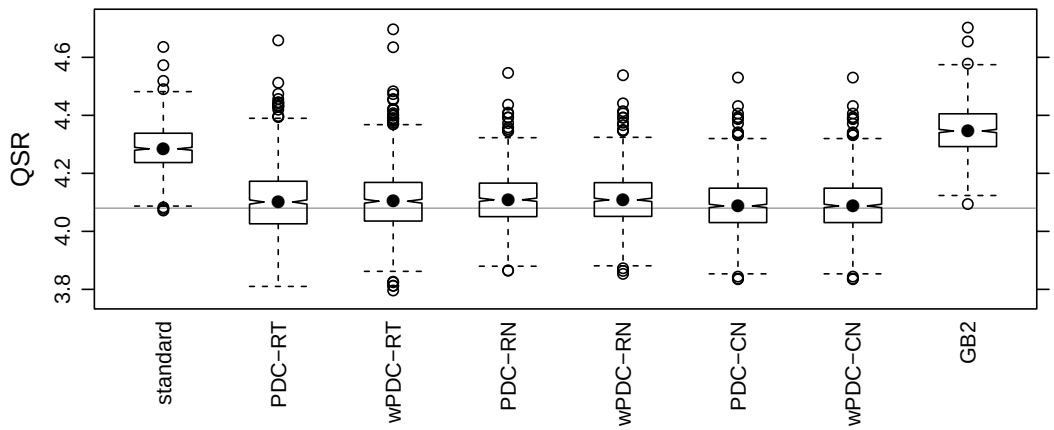

Figure F.55.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.27.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.29	0.01	0.21	5.11	4.28	0.07	0.20	0.22	5.44	0.30	0.14
wHill	RT	300	4.27	0.01	0.19	4.68	4.27	0.09	0.19	0.21	5.20	0.28	0.13
wHill	RT	500	4.25	0.01	0.17	4.28	4.25	0.09	0.17	0.20	4.84	0.25	0.15
wHill	RT	700	4.25	0.01	0.17	4.12	4.24	0.09	0.16	0.19	4.68	0.24	0.13
wHill	RN	300	4.23	0.01	0.15	3.75	4.23	0.08	0.15	0.17	4.24	0.22	0.12
wHill	RN	500	4.18	0.01	0.10	2.42	4.17	0.08	0.09	0.13	3.16	0.14	0.10
wHill	RN	700	4.14	0.01	0.06	1.44	4.14	0.08	0.06	0.10	2.45	0.10	0.10
wHill	CN	300	4.23	0.01	0.15	3.57	4.22	0.08	0.14	0.17	4.09	0.21	0.12
wHill	CN	500	4.17	0.01	0.09	2.15	4.16	0.08	0.08	0.12	2.98	0.13	0.10
wHill	CN	700	4.13	0.01	0.05	1.15	4.12	0.08	0.04	0.09	2.30	0.09	0.09
wISE	RT	300	4.20	0.01	0.12	2.99	4.20	0.10	0.12	0.16	3.84	0.18	0.12
wISE	RT	500	4.15	0.01	0.07	1.73	4.15	0.09	0.07	0.12	2.92	0.12	0.12
wISE	RT	700	4.18	0.01	0.10	2.40	4.18	0.09	0.10	0.14	3.33	0.15	0.14
wISE	RN	300	4.20	0.01	0.12	3.03	4.20	0.09	0.12	0.15	3.70	0.18	0.12
wISE	RN	500	4.13	0.01	0.05	1.29	4.13	0.08	0.05	0.10	2.46	0.10	0.11
wISE	RN	700	4.11	0.01	0.03	0.83	4.11	0.08	0.03	0.09	2.12	0.09	0.10
wISE	CN	300	4.19	0.01	0.11	2.74	4.19	0.09	0.11	0.14	3.51	0.17	0.12
wISE	CN	500	4.12	0.01	0.04	0.87	4.11	0.08	0.03	0.09	2.32	0.09	0.10
wISE	CN	700	4.10	0.01	0.02	0.48	4.10	0.08	0.02	0.08	2.03	0.09	0.10
wPDC	RT	300	4.18	0.01	0.10	2.34	4.17	0.11	0.09	0.15	3.56	0.15	0.12
wPDC	RT	500	4.11	0.01	0.03	0.64	4.10	0.10	0.02	0.11	2.75	0.10	0.15
wPDC	RT	700	4.17	0.01	0.09	2.10	4.16	0.11	0.08	0.14	3.36	0.14	0.15
wPDC	RN	300	4.19	0.01	0.11	2.60	4.18	0.09	0.10	0.14	3.41	0.16	0.12
wPDC	RN	500	4.11	0.01	0.03	0.76	4.11	0.09	0.03	0.09	2.27	0.09	0.11
wPDC	RN	700	4.11	0.01	0.03	0.69	4.11	0.08	0.03	0.08	2.07	0.09	0.10
wPDC	CN	300	4.17	0.01	0.09	2.23	4.17	0.10	0.09	0.13	3.21	0.14	0.12
wPDC	CN	500	4.09	0.01	0.01	0.26	4.09	0.09	0.01	0.09	2.24	0.09	0.11
wPDC	CN	700	4.09	0.01	0.01	0.32	4.10	0.08	0.02	0.08	2.02	0.08	0.10
GB2			4.35	0.01	0.27	6.61	4.35	0.08	0.27	0.28	6.91	0.39	0.15

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OAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

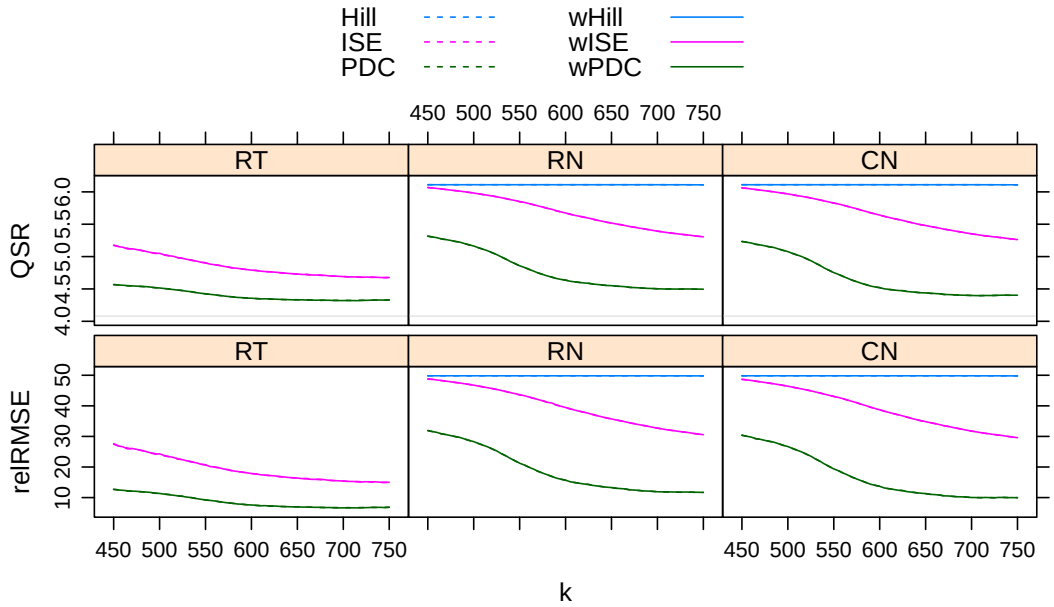

Figure F.56.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

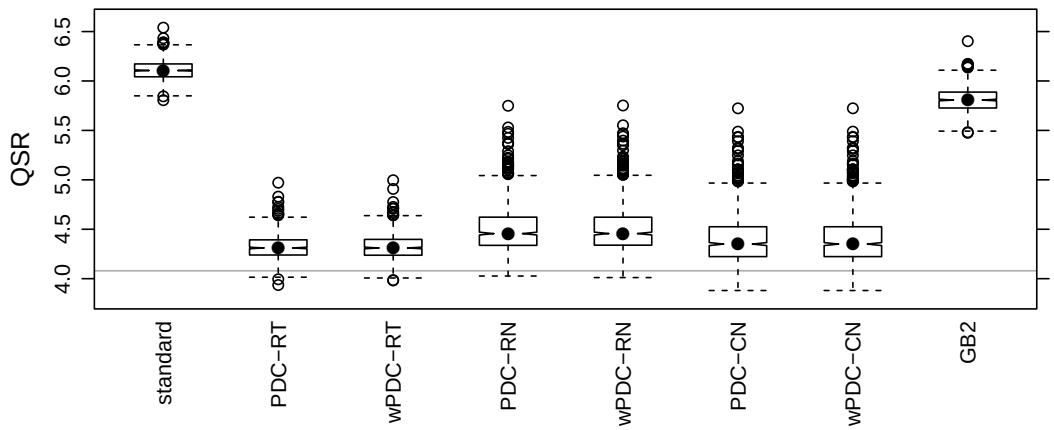

Figure F.57.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.28.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			6.11	0.01	2.03	49.77	6.11	0.10	2.03	2.03	49.82	3.00	0.60
wHill	RT	500	6.07	0.24	1.99	48.89	6.01	0.27	1.93	2.05	50.34	2.87	2.75
wHill	RT	700	5.80	0.05	1.72	42.13	5.78	0.19	1.70	1.73	42.50	2.53	1.01
wHill	RN	300	6.11	0.01	2.03	49.77	6.11	0.10	2.03	2.03	49.82	3.00	0.60
wHill	RN	500	6.11	0.01	2.03	49.77	6.11	0.10	2.03	2.03	49.82	3.00	0.60
wHill	RN	700	6.11	0.01	2.03	49.77	6.11	0.10	2.03	2.03	49.82	3.00	0.60
wHill	CN	300	6.11	0.01	2.03	49.77	6.11	0.10	2.03	2.03	49.82	3.00	0.60
wHill	CN	500	6.11	0.01	2.03	49.77	6.11	0.10	2.03	2.03	49.82	3.00	0.60
wHill	CN	700	6.11	0.01	2.03	49.77	6.11	0.10	2.03	2.03	49.82	3.00	0.60
wISE	RT	500	5.05	0.04	0.97	23.80	5.04	0.20	0.96	0.99	24.29	1.43	0.48
wISE	RT	700	4.69	0.02	0.61	14.97	4.68	0.14	0.60	0.63	15.39	0.89	0.32
wISE	RN	300	6.11	0.01	2.03	49.77	6.11	0.10	2.03	2.03	49.82	3.00	0.60
wISE	RN	500	5.98	0.02	1.90	46.63	5.98	0.15	1.90	1.91	46.76	2.82	0.57
wISE	RN	700	5.39	0.06	1.31	32.18	5.40	0.22	1.32	1.33	32.70	1.96	0.54
wISE	CN	300	6.11	0.01	2.03	49.77	6.11	0.10	2.03	2.03	49.82	3.00	0.60
wISE	CN	500	5.97	0.02	1.89	46.28	5.97	0.16	1.89	1.89	46.42	2.80	0.57
wISE	CN	700	5.35	0.06	1.27	31.16	5.36	0.22	1.28	1.30	31.75	1.90	0.54
wPDC	RT	500	4.51	0.03	0.44	10.66	4.50	0.16	0.42	0.46	11.36	0.63	0.27
wPDC	RT	700	4.32	0.02	0.24	5.89	4.31	0.12	0.23	0.27	6.64	0.34	0.22
wPDC	RN	300	5.99	0.07	1.91	46.92	6.07	0.15	1.99	1.93	47.38	2.94	0.60
wPDC	RN	500	5.16	0.16	1.08	26.56	5.19	0.45	1.11	1.15	28.31	1.65	0.53
wPDC	RN	700	4.50	0.06	0.42	10.36	4.46	0.20	0.38	0.49	11.91	0.56	0.41
wPDC	CN	300	5.98	0.09	1.90	46.48	6.06	0.15	1.98	1.92	47.07	2.94	0.60
wPDC	CN	500	5.08	0.19	1.00	24.44	5.12	0.49	1.04	1.09	26.69	1.54	0.52
wPDC	CN	700	4.40	0.07	0.32	7.82	4.35	0.21	0.27	0.41	10.03	0.40	0.40
GB2			5.81	0.01	1.73	42.42	5.81	0.12	1.73	1.74	42.53	2.56	0.57

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OAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

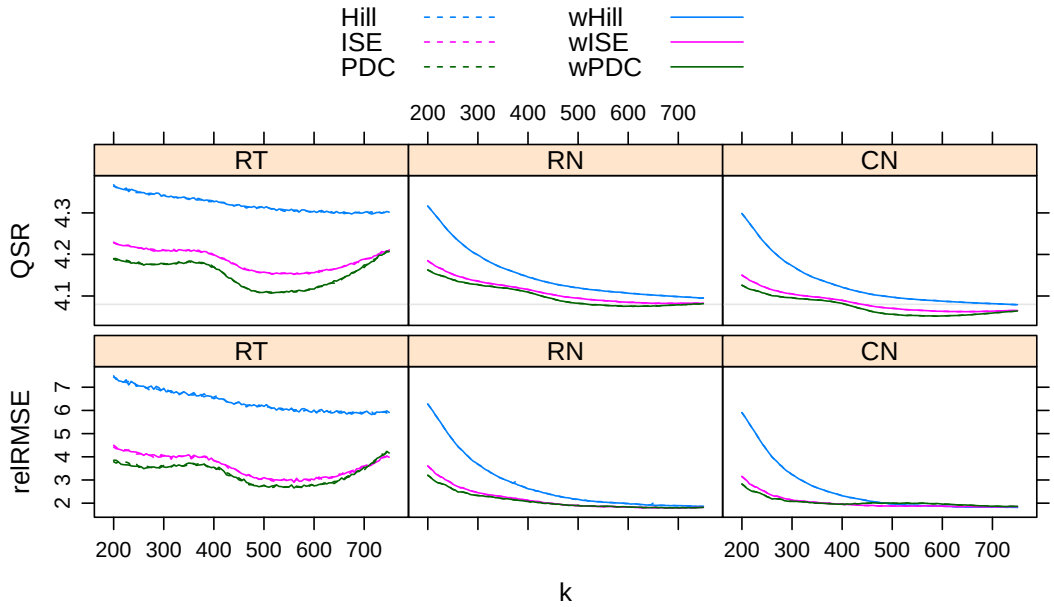

Figure F.58.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

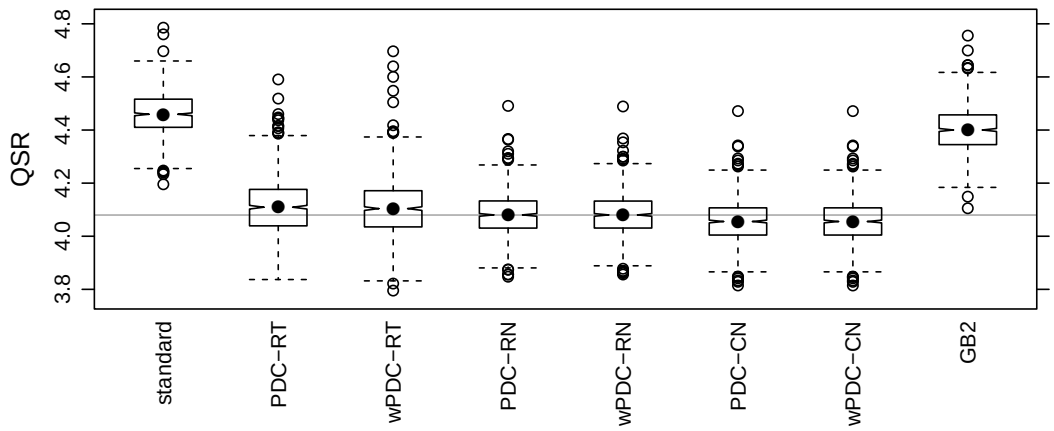

Figure F.59.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.29.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.46	0.01	0.38	9.41	4.46	0.08	0.38	0.39	9.60	0.56	0.17
wHill	RT	300	4.34	0.01	0.26	6.44	4.34	0.10	0.26	0.28	6.95	0.38	0.29
wHill	RT	500	4.31	0.01	0.23	5.69	4.31	0.10	0.23	0.25	6.18	0.34	0.14
wHill	RT	700	4.30	0.01	0.22	5.42	4.30	0.09	0.22	0.24	5.91	0.33	0.19
wHill	RN	300	4.20	0.01	0.12	2.91	4.20	0.09	0.12	0.15	3.68	0.17	0.12
wHill	RN	500	4.12	0.01	0.04	0.98	4.12	0.08	0.04	0.09	2.17	0.08	0.10
wHill	RN	700	4.10	0.01	0.02	0.46	4.10	0.07	0.02	0.08	1.89	0.07	0.09
wHill	CN	300	4.17	0.01	0.09	2.27	4.17	0.10	0.09	0.13	3.23	0.14	0.11
wHill	CN	500	4.10	0.01	0.02	0.43	4.09	0.08	0.01	0.08	1.97	0.08	0.10
wHill	CN	700	4.08	0.01	0.00	0.04	4.08	0.07	−0.00	0.07	1.83	0.07	0.08
wISE	RT	300	4.21	0.01	0.13	3.19	4.21	0.10	0.13	0.17	4.06	0.19	0.13
wISE	RT	500	4.16	0.01	0.08	1.90	4.15	0.09	0.07	0.13	3.10	0.12	0.14
wISE	RT	700	4.19	0.01	0.11	2.67	4.18	0.09	0.10	0.15	3.60	0.15	0.15
wISE	RN	300	4.14	0.01	0.06	1.37	4.13	0.08	0.05	0.10	2.45	0.10	0.09
wISE	RN	500	4.09	0.01	0.01	0.36	4.09	0.07	0.01	0.08	1.90	0.08	0.09
wISE	RN	700	4.08	0.01	0.00	0.07	4.08	0.07	0.00	0.07	1.80	0.07	0.09
wISE	CN	300	4.11	0.01	0.03	0.62	4.10	0.08	0.02	0.09	2.14	0.09	0.08
wISE	CN	500	4.07	0.01	−0.01	−0.24	4.07	0.07	−0.01	0.08	1.88	0.07	0.09
wISE	CN	700	4.06	0.01	−0.02	−0.40	4.06	0.07	−0.02	0.08	1.84	0.08	0.08
wPDC	RT	300	4.18	0.01	0.10	2.37	4.17	0.11	0.09	0.15	3.56	0.14	0.13
wPDC	RT	500	4.11	0.01	0.03	0.71	4.10	0.10	0.02	0.11	2.76	0.10	0.15
wPDC	RT	700	4.17	0.01	0.09	2.33	4.17	0.10	0.09	0.14	3.55	0.14	0.16
wPDC	RN	300	4.13	0.01	0.05	1.17	4.12	0.08	0.04	0.10	2.33	0.09	0.09
wPDC	RN	500	4.08	0.01	0.00	0.06	4.08	0.08	0.00	0.08	1.90	0.08	0.10
wPDC	RN	700	4.08	0.01	−0.00	−0.03	4.08	0.07	−0.00	0.07	1.80	0.07	0.08
wPDC	CN	300	4.10	0.01	0.02	0.39	4.09	0.08	0.01	0.08	2.08	0.08	0.08
wPDC	CN	500	4.06	0.01	−0.02	−0.58	4.06	0.08	−0.02	0.08	2.01	0.08	0.10
wPDC	CN	700	4.06	0.01	−0.02	−0.51	4.06	0.07	−0.02	0.08	1.87	0.08	0.08
GB2			4.40	0.01	0.32	7.91	4.40	0.08	0.32	0.33	8.17	0.47	0.17

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OAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

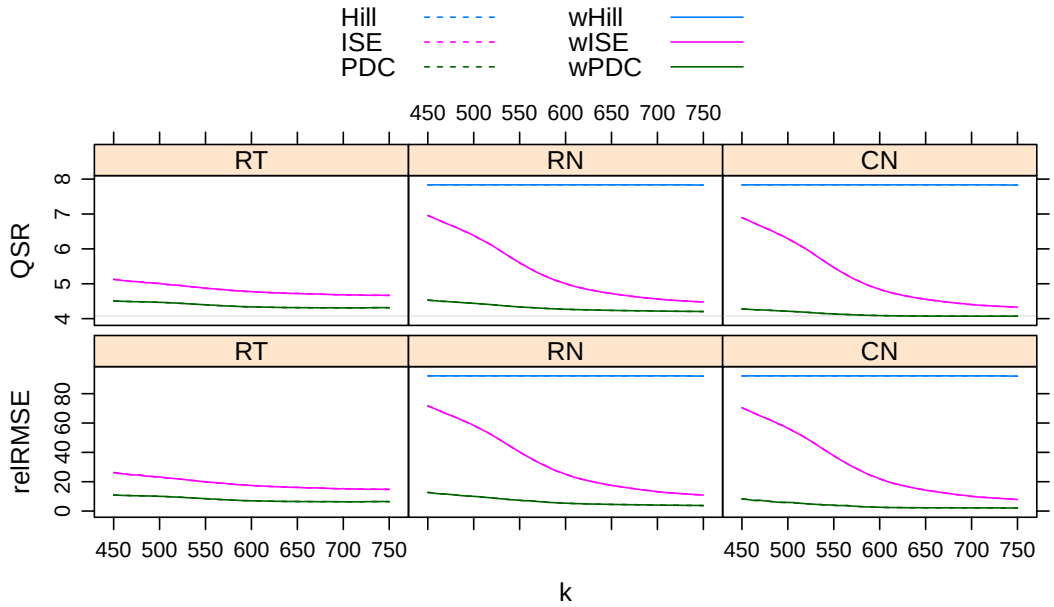

Figure F.60.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

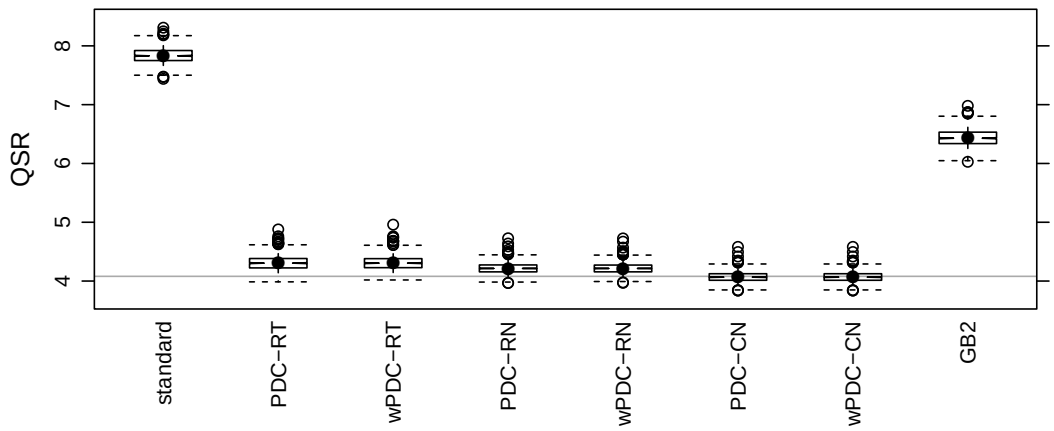

Figure F.61.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.30.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			7.84	0.02	3.76	92.09	7.83	0.13	3.75	3.76	92.14	5.56	1.04
wHill	RT	500	7.62	3.89	3.54	86.73	7.33	0.56	3.25	4.05	99.28	4.82	12.81
wHill	RT	700	6.77	0.28	2.70	66.06	6.70	0.33	2.62	2.75	67.32	3.88	2.98
wHill	RN	300	7.84	0.02	3.76	92.09	7.83	0.13	3.75	3.76	92.14	5.56	1.04
wHill	RN	500	7.84	0.02	3.76	92.09	7.83	0.13	3.75	3.76	92.14	5.56	1.04
wHill	RN	700	7.84	0.02	3.76	92.08	7.83	0.13	3.75	3.76	92.14	5.56	1.04
wHill	CN	300	7.84	0.02	3.76	92.09	7.83	0.13	3.75	3.76	92.14	5.56	1.04
wHill	CN	500	7.84	0.02	3.76	92.09	7.83	0.13	3.75	3.76	92.14	5.56	1.04
wHill	CN	700	7.84	0.02	3.76	92.08	7.83	0.13	3.75	3.76	92.14	5.56	1.04
wISE	RT	500	5.01	0.04	0.93	22.76	4.99	0.18	0.91	0.95	23.34	1.36	0.79
wISE	RT	700	4.69	0.02	0.61	14.88	4.68	0.14	0.60	0.62	15.27	0.89	0.30
wISE	RN	300	7.84	0.02	3.76	92.08	7.83	0.13	3.75	3.76	92.13	5.56	1.04
wISE	RN	500	6.38	0.37	2.30	56.43	6.49	0.54	2.41	2.38	58.34	3.58	0.90
wISE	RN	700	4.56	0.06	0.48	11.80	4.52	0.20	0.44	0.54	13.19	0.65	0.51
wISE	CN	300	7.84	0.02	3.76	92.08	7.83	0.13	3.75	3.76	92.13	5.56	1.04
wISE	CN	500	6.29	0.41	2.21	54.22	6.42	0.56	2.34	2.30	56.44	3.47	0.90
wISE	CN	700	4.40	0.06	0.32	7.92	4.35	0.20	0.27	0.41	10.01	0.41	0.49
wPDC	RT	500	4.47	0.02	0.39	9.48	4.46	0.13	0.38	0.41	10.02	0.56	0.21
wPDC	RT	700	4.31	0.01	0.23	5.61	4.30	0.11	0.22	0.26	6.32	0.33	0.22
wPDC	RN	300	5.60	0.39	1.52	37.22	5.37	0.27	1.29	1.64	40.20	1.92	0.96
wPDC	RN	500	4.44	0.04	0.36	8.81	4.41	0.16	0.33	0.41	10.02	0.48	0.42
wPDC	RN	700	4.22	0.01	0.14	3.37	4.21	0.09	0.13	0.17	4.05	0.20	0.16
wPDC	CN	300	5.35	0.48	1.27	31.04	5.09	0.30	1.01	1.44	35.39	1.50	0.96
wPDC	CN	500	4.21	0.04	0.13	3.27	4.17	0.15	0.09	0.24	5.87	0.16	0.38
wPDC	CN	700	4.07	0.01	−0.01	−0.22	4.07	0.08	−0.01	0.09	2.15	0.08	0.12
GB2			6.43	0.02	2.35	57.72	6.43	0.14	2.35	2.36	57.83	3.48	0.71

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OAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

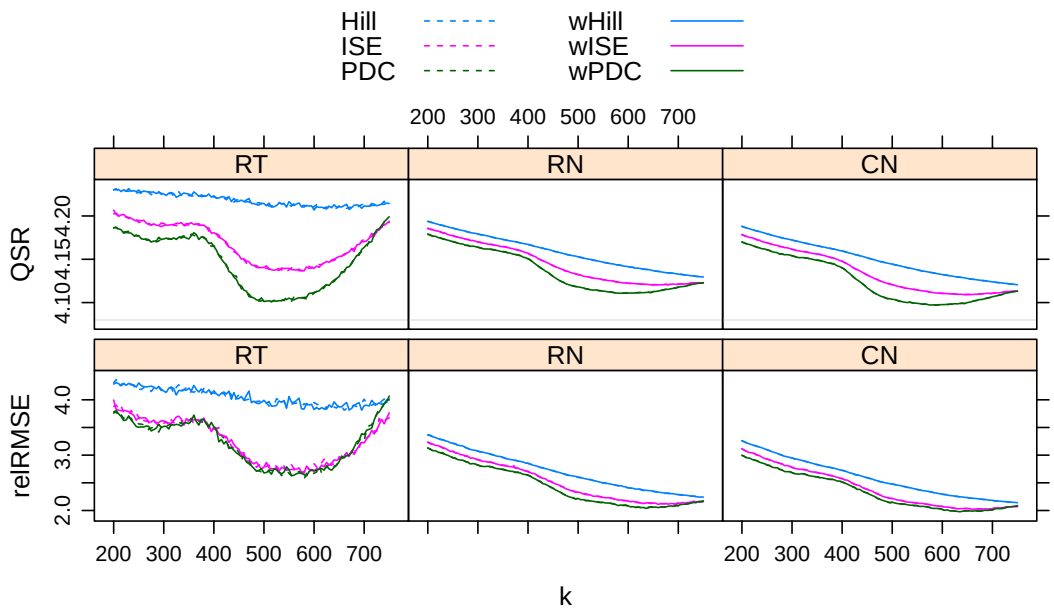

Figure F.62.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

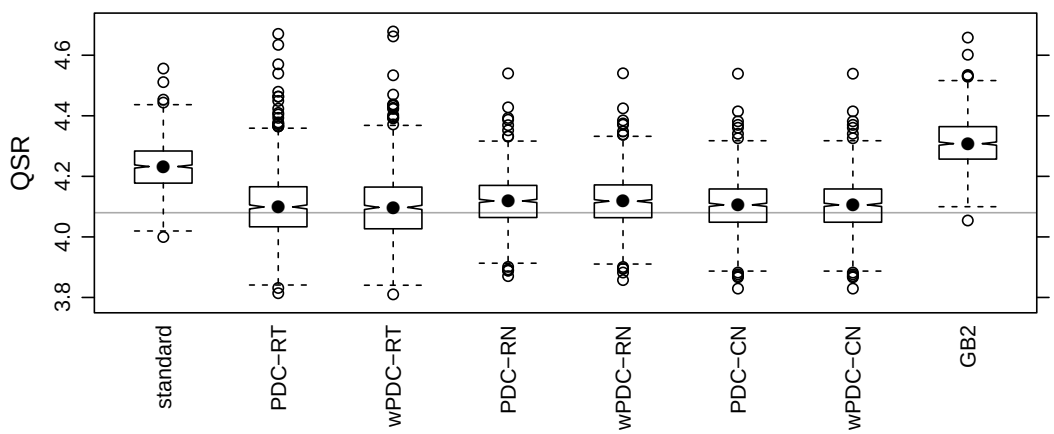

Figure F.63.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.31.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.23	0.01	0.15	3.76	4.23	0.08	0.15	0.17	4.21	0.23	0.12
wHill	RT	300	4.23	0.01	0.15	3.57	4.22	0.08	0.14	0.17	4.16	0.21	0.12
wHill	RT	500	4.21	0.01	0.13	3.30	4.21	0.08	0.13	0.16	3.99	0.19	0.16
wHill	RT	700	4.21	0.01	0.13	3.23	4.21	0.09	0.13	0.16	3.89	0.19	0.14
wHill	RN	300	4.18	0.01	0.10	2.44	4.17	0.07	0.09	0.13	3.08	0.14	0.11
wHill	RN	500	4.15	0.01	0.07	1.79	4.15	0.07	0.07	0.11	2.60	0.11	0.10
wHill	RN	700	4.13	0.01	0.05	1.30	4.13	0.08	0.05	0.09	2.29	0.09	0.10
wHill	CN	300	4.17	0.01	0.09	2.26	4.17	0.07	0.09	0.12	2.95	0.13	0.11
wHill	CN	500	4.14	0.01	0.06	1.58	4.14	0.08	0.06	0.10	2.48	0.10	0.10
wHill	CN	700	4.12	0.01	0.04	1.08	4.12	0.08	0.04	0.09	2.18	0.09	0.10
wISE	RT	300	4.19	0.01	0.11	2.74	4.19	0.09	0.11	0.15	3.62	0.16	0.12
wISE	RT	500	4.14	0.01	0.06	1.49	4.14	0.09	0.06	0.11	2.79	0.11	0.13
wISE	RT	700	4.17	0.01	0.09	2.21	4.17	0.09	0.09	0.13	3.22	0.14	0.12
wISE	RN	300	4.17	0.01	0.09	2.21	4.17	0.07	0.09	0.12	2.92	0.13	0.11
wISE	RN	500	4.13	0.01	0.05	1.29	4.13	0.08	0.05	0.10	2.33	0.10	0.11
wISE	RN	700	4.12	0.01	0.04	1.01	4.12	0.08	0.04	0.09	2.12	0.09	0.10
wISE	CN	300	4.16	0.01	0.08	2.00	4.16	0.07	0.08	0.11	2.78	0.12	0.10
wISE	CN	500	4.12	0.01	0.04	1.00	4.12	0.08	0.04	0.09	2.22	0.09	0.11
wISE	CN	700	4.11	0.01	0.03	0.75	4.11	0.08	0.03	0.08	2.03	0.08	0.10
wPDC	RT	300	4.17	0.01	0.09	2.30	4.17	0.11	0.09	0.14	3.52	0.14	0.15
wPDC	RT	500	4.10	0.01	0.02	0.52	4.10	0.10	0.02	0.11	2.68	0.10	0.15
wPDC	RT	700	4.16	0.01	0.08	2.06	4.16	0.10	0.08	0.14	3.37	0.14	0.16
wPDC	RN	300	4.16	0.01	0.08	2.06	4.16	0.08	0.08	0.12	2.82	0.12	0.10
wPDC	RN	500	4.12	0.01	0.04	0.94	4.12	0.08	0.04	0.09	2.22	0.09	0.11
wPDC	RN	700	4.12	0.01	0.04	0.93	4.12	0.08	0.04	0.09	2.09	0.08	0.10
wPDC	CN	300	4.15	0.01	0.07	1.82	4.15	0.08	0.07	0.11	2.68	0.11	0.10
wPDC	CN	500	4.10	0.01	0.02	0.59	4.11	0.08	0.03	0.09	2.15	0.09	0.11
wPDC	CN	700	4.11	0.01	0.03	0.66	4.11	0.08	0.03	0.08	2.01	0.08	0.10
GB2			4.31	0.01	0.23	5.67	4.31	0.08	0.23	0.25	6.01	0.34	0.14

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OAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

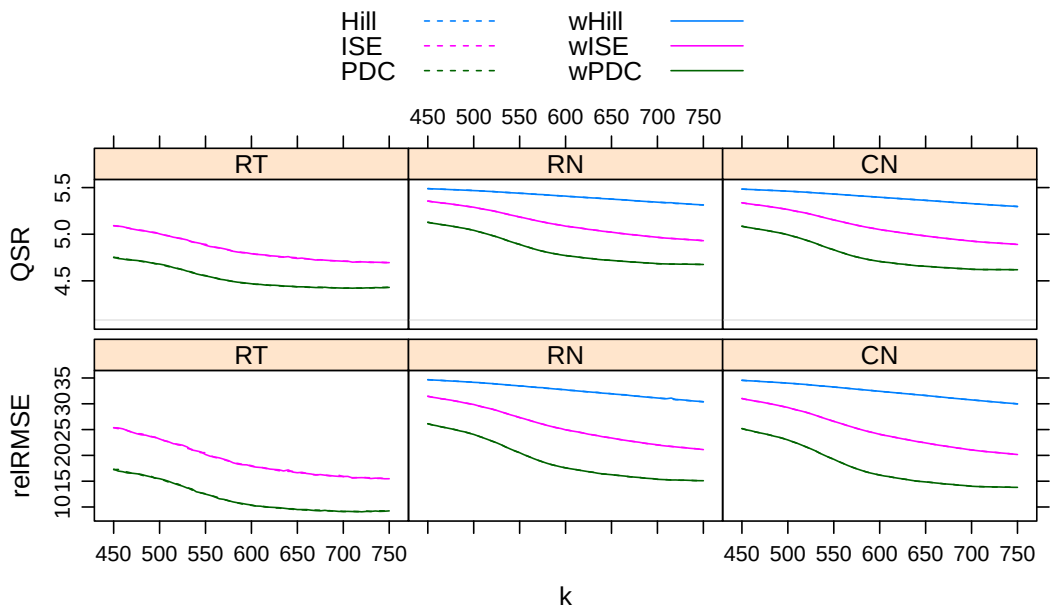

Figure F.64.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

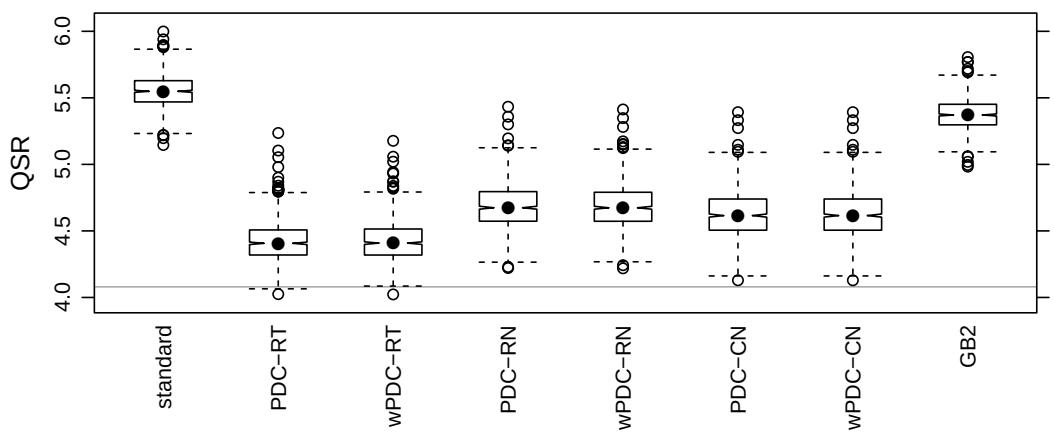

Figure F.65.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.32.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			5.55	0.02	1.47	36.01	5.55	0.12	1.47	1.47	36.14	2.18	0.47
wHill	RT	500	5.58	0.11	1.50	36.69	5.54	0.22	1.46	1.53	37.60	2.16	1.92
wHill	RT	700	5.41	0.04	1.33	32.53	5.39	0.19	1.31	1.34	32.94	1.95	0.68
wHill	RN	300	5.53	0.02	1.45	35.56	5.53	0.13	1.45	1.46	35.69	2.15	0.46
wHill	RN	500	5.47	0.02	1.39	34.01	5.47	0.12	1.39	1.39	34.15	2.06	0.45
wHill	RN	700	5.34	0.02	1.26	30.97	5.34	0.13	1.26	1.27	31.12	1.87	0.42
wHill	CN	300	5.53	0.02	1.45	35.52	5.53	0.13	1.45	1.45	35.65	2.15	0.46
wHill	CN	500	5.46	0.02	1.38	33.86	5.46	0.12	1.38	1.39	34.00	2.05	0.43
wHill	CN	700	5.33	0.02	1.25	30.59	5.32	0.13	1.24	1.25	30.75	1.85	0.42
wISE	RT	500	5.00	0.04	0.92	22.64	4.99	0.19	0.91	0.95	23.18	1.35	0.53
wISE	RT	700	4.71	0.02	0.63	15.45	4.70	0.15	0.62	0.65	15.91	0.92	0.31
wISE	RN	300	5.52	0.02	1.44	35.22	5.51	0.13	1.43	1.44	35.36	2.13	0.47
wISE	RN	500	5.29	0.02	1.21	29.64	5.29	0.14	1.21	1.22	29.86	1.80	0.59
wISE	RN	700	4.97	0.02	0.89	21.75	4.96	0.15	0.88	0.90	22.04	1.31	0.39
wISE	CN	300	5.51	0.02	1.43	35.14	5.51	0.13	1.43	1.44	35.28	2.12	0.46
wISE	CN	500	5.27	0.02	1.19	29.05	5.26	0.15	1.18	1.19	29.28	1.76	0.42
wISE	CN	700	4.93	0.02	0.85	20.73	4.92	0.15	0.84	0.86	21.06	1.25	0.35
wPDC	RT	500	4.68	0.04	0.60	14.70	4.67	0.19	0.59	0.63	15.49	0.87	0.37
wPDC	RT	700	4.42	0.02	0.34	8.38	4.41	0.15	0.33	0.37	9.13	0.49	0.27
wPDC	RN	300	5.45	0.02	1.37	33.51	5.45	0.15	1.37	1.38	33.73	2.04	0.44
wPDC	RN	500	5.04	0.04	0.96	23.57	5.05	0.20	0.97	0.98	24.06	1.43	0.41
wPDC	RN	700	4.68	0.03	0.60	14.80	4.67	0.16	0.59	0.63	15.36	0.88	0.33
wPDC	CN	300	5.44	0.03	1.36	33.23	5.44	0.16	1.36	1.37	33.48	2.02	0.44
wPDC	CN	500	4.99	0.04	0.91	22.40	5.00	0.21	0.92	0.94	22.99	1.37	0.40
wPDC	CN	700	4.62	0.03	0.54	13.33	4.62	0.17	0.54	0.57	14.02	0.79	0.32
GB2			5.38	0.01	1.30	31.80	5.37	0.12	1.29	1.30	31.92	1.91	0.42

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OAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 20.

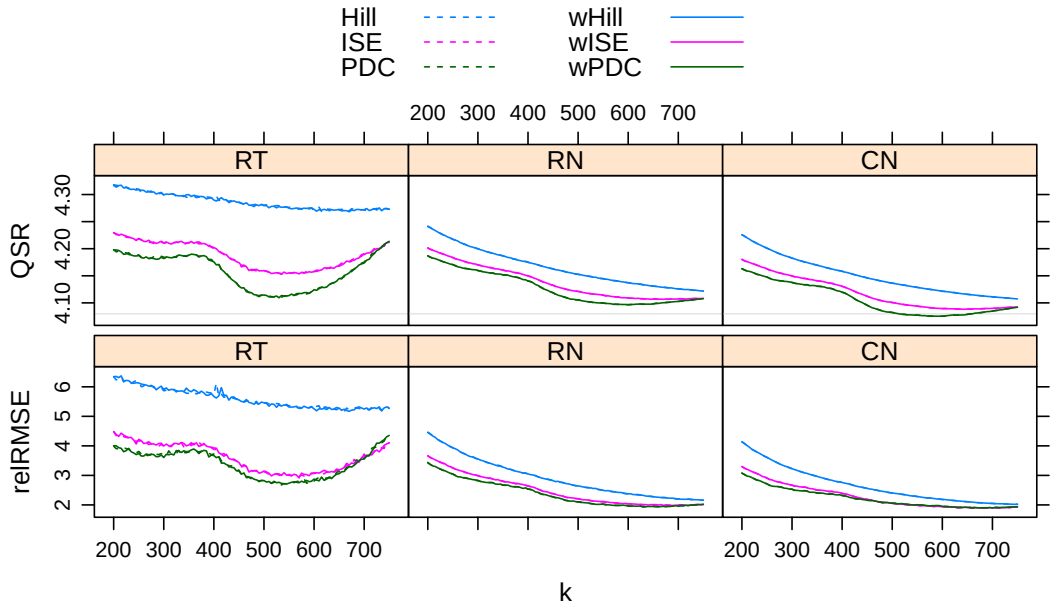

Figure F.66.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

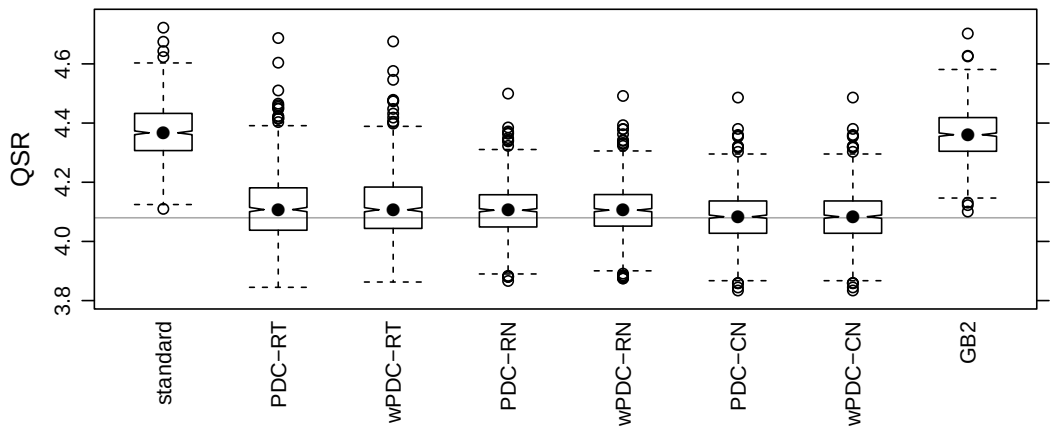

Figure F.67.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.33.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.37	0.01	0.29	7.12	4.37	0.09	0.29	0.30	7.45	0.43	0.16
wHill	RT	300	4.30	0.01	0.22	5.38	4.30	0.10	0.22	0.24	5.91	0.32	0.14
wHill	RT	500	4.28	0.01	0.20	4.89	4.28	0.09	0.20	0.22	5.46	0.29	0.16
wHill	RT	700	4.27	0.01	0.19	4.71	4.27	0.09	0.19	0.21	5.25	0.27	0.13
wHill	RN	300	4.20	0.01	0.12	2.95	4.20	0.08	0.12	0.15	3.56	0.17	0.11
wHill	RN	500	4.15	0.01	0.07	1.78	4.15	0.08	0.07	0.11	2.64	0.11	0.10
wHill	RN	700	4.13	0.01	0.05	1.12	4.12	0.08	0.04	0.09	2.20	0.09	0.09
wHill	CN	300	4.18	0.01	0.10	2.52	4.18	0.08	0.10	0.13	3.23	0.15	0.10
wHill	CN	500	4.14	0.01	0.06	1.39	4.13	0.08	0.05	0.10	2.40	0.10	0.10
wHill	CN	700	4.11	0.01	0.03	0.77	4.11	0.08	0.03	0.08	2.05	0.08	0.09
wISE	RT	300	4.21	0.01	0.13	3.21	4.21	0.10	0.13	0.16	4.00	0.19	0.13
wISE	RT	500	4.16	0.01	0.08	1.96	4.15	0.09	0.07	0.13	3.15	0.13	0.16
wISE	RT	700	4.19	0.01	0.11	2.68	4.18	0.10	0.10	0.15	3.62	0.16	0.14
wISE	RN	300	4.17	0.01	0.09	2.21	4.17	0.08	0.09	0.12	2.99	0.13	0.10
wISE	RN	500	4.12	0.01	0.04	1.01	4.12	0.08	0.04	0.09	2.21	0.09	0.10
wISE	RN	700	4.11	0.01	0.03	0.67	4.11	0.08	0.03	0.08	1.99	0.07	0.10
wISE	CN	300	4.15	0.01	0.07	1.71	4.15	0.08	0.07	0.11	2.67	0.11	0.09
wISE	CN	500	4.10	0.01	0.02	0.51	4.10	0.08	0.02	0.08	2.06	0.08	0.10
wISE	CN	700	4.09	0.01	0.01	0.25	4.09	0.08	0.01	0.08	1.90	0.08	0.09
wPDC	RT	300	4.18	0.01	0.10	2.50	4.17	0.10	0.09	0.15	3.61	0.15	0.15
wPDC	RT	500	4.11	0.01	0.03	0.85	4.11	0.10	0.03	0.12	2.82	0.10	0.15
wPDC	RT	700	4.17	0.01	0.09	2.30	4.17	0.11	0.09	0.15	3.56	0.15	0.17
wPDC	RN	300	4.16	0.01	0.08	1.97	4.16	0.08	0.08	0.12	2.83	0.12	0.10
wPDC	RN	500	4.11	0.01	0.03	0.63	4.11	0.08	0.03	0.09	2.10	0.08	0.10
wPDC	RN	700	4.10	0.01	0.02	0.56	4.10	0.08	0.02	0.08	1.95	0.08	0.09
wPDC	CN	300	4.14	0.01	0.06	1.42	4.14	0.09	0.06	0.10	2.53	0.11	0.09
wPDC	CN	500	4.08	0.01	0.00	0.06	4.08	0.08	0.00	0.08	2.06	0.08	0.10
wPDC	CN	700	4.08	0.01	0.01	0.12	4.08	0.08	0.00	0.08	1.90	0.08	0.09
GB2			4.36	0.01	0.28	6.98	4.36	0.08	0.28	0.30	7.27	0.42	0.15

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OAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 20.

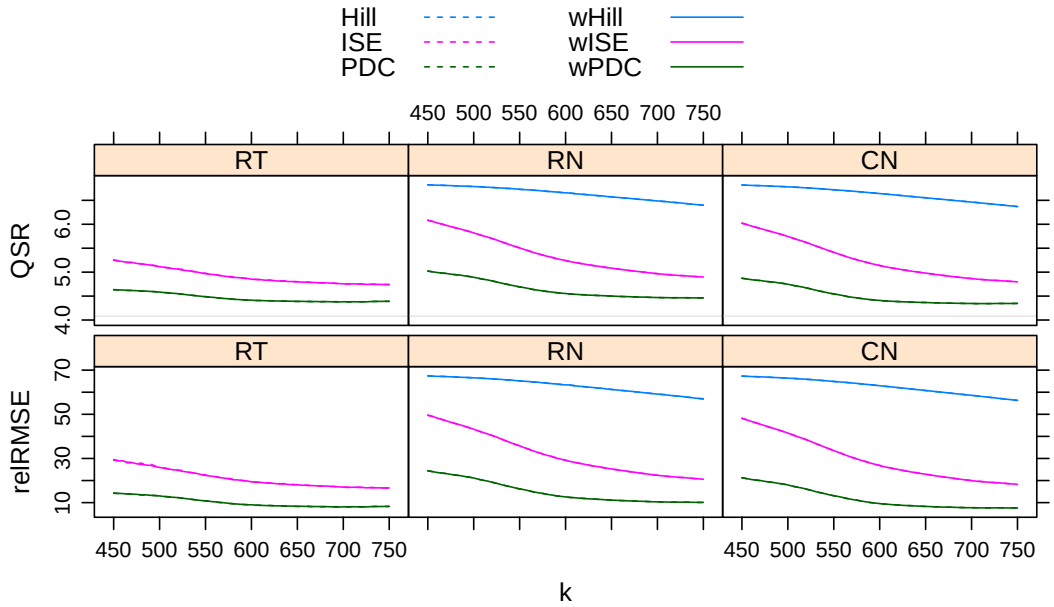

Figure F.68.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

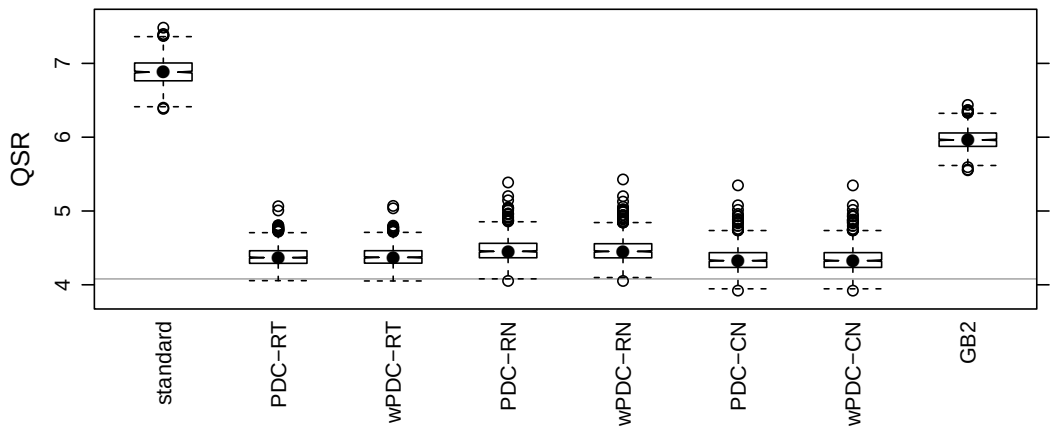

Figure F.69.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.34.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			6.88	0.03	2.80	68.74	6.88	0.18	2.80	2.81	68.88	4.15	0.83
wHill	RT	500	6.86	0.83	2.78	68.12	6.71	0.42	2.63	2.92	71.67	3.90	4.27
wHill	RT	700	6.34	0.22	2.26	55.35	6.28	0.31	2.20	2.31	56.55	3.26	2.12
wHill	RN	300	6.88	0.03	2.80	68.58	6.88	0.18	2.80	2.80	68.72	4.14	0.87
wHill	RN	500	6.79	0.03	2.71	66.38	6.80	0.18	2.72	2.71	66.52	4.03	0.80
wHill	RN	700	6.49	0.03	2.41	59.01	6.48	0.17	2.40	2.41	59.16	3.56	0.73
wHill	CN	300	6.88	0.03	2.80	68.55	6.87	0.17	2.79	2.80	68.69	4.14	0.83
wHill	CN	500	6.78	0.03	2.70	66.23	6.79	0.18	2.71	2.71	66.37	4.02	0.80
wHill	CN	700	6.46	0.03	2.38	58.44	6.46	0.17	2.38	2.39	58.60	3.53	0.72
wISE	RT	500	5.11	0.05	1.03	25.35	5.10	0.21	1.02	1.06	25.94	1.51	0.50
wISE	RT	700	4.76	0.02	0.68	16.59	4.75	0.15	0.67	0.69	17.03	0.99	0.32
wISE	RN	300	6.82	0.03	2.74	67.17	6.83	0.18	2.75	2.75	67.31	4.07	0.81
wISE	RN	500	5.82	0.08	1.74	42.66	5.83	0.30	1.75	1.76	43.24	2.59	0.62
wISE	RN	700	4.97	0.04	0.89	21.77	4.95	0.21	0.87	0.91	22.37	1.29	0.43
wISE	CN	300	6.82	0.03	2.74	67.05	6.82	0.18	2.74	2.74	67.20	4.06	0.81
wISE	CN	500	5.75	0.09	1.67	40.82	5.75	0.31	1.67	1.69	41.49	2.48	0.61
wISE	CN	700	4.87	0.05	0.79	19.26	4.85	0.21	0.77	0.82	19.99	1.14	0.42
wPDC	RT	500	4.58	0.03	0.50	12.35	4.57	0.17	0.49	0.53	13.03	0.73	0.26
wPDC	RT	700	4.38	0.02	0.30	7.40	4.37	0.13	0.29	0.33	8.11	0.43	0.24
wPDC	RN	300	5.93	0.32	1.85	45.46	5.95	0.69	1.87	1.94	47.55	2.78	0.78
wPDC	RN	500	4.89	0.08	0.81	19.95	4.86	0.28	0.78	0.86	21.15	1.16	0.48
wPDC	RN	700	4.47	0.03	0.39	9.56	4.45	0.14	0.37	0.42	10.35	0.55	0.33
wPDC	CN	300	5.83	0.40	1.75	42.93	5.87	0.77	1.79	1.86	45.64	2.65	0.78
wPDC	CN	500	4.75	0.09	0.67	16.36	4.71	0.30	0.63	0.73	18.00	0.93	0.46
wPDC	CN	700	4.35	0.03	0.27	6.51	4.33	0.15	0.25	0.31	7.70	0.37	0.31
GB2			5.97	0.02	1.89	46.24	5.96	0.13	1.88	1.89	46.36	2.79	0.58

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Stratified Midzuno sampling

No contamination

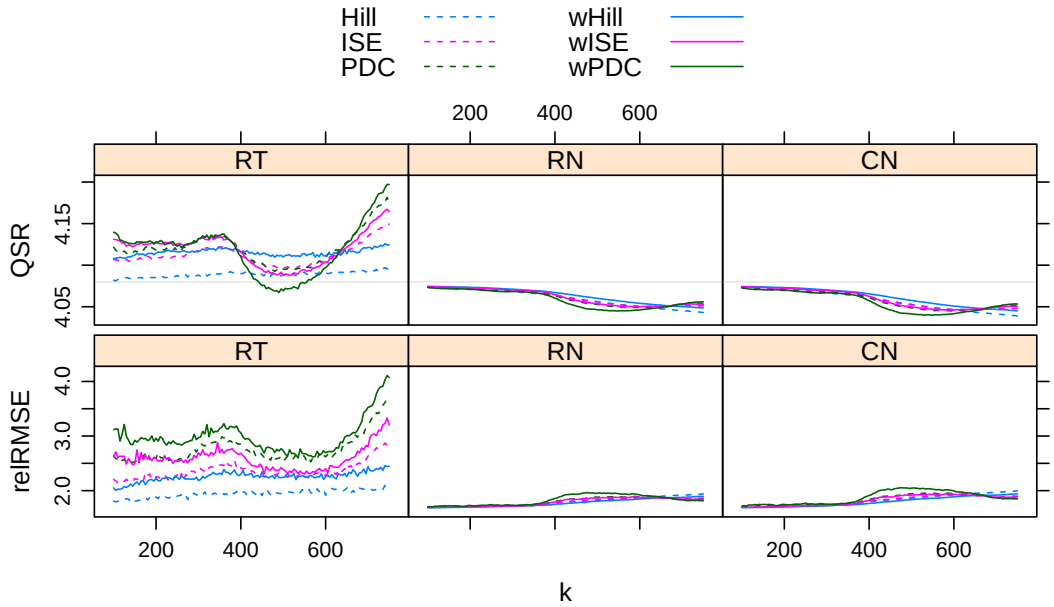

Figure F.70.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 100 and 750.

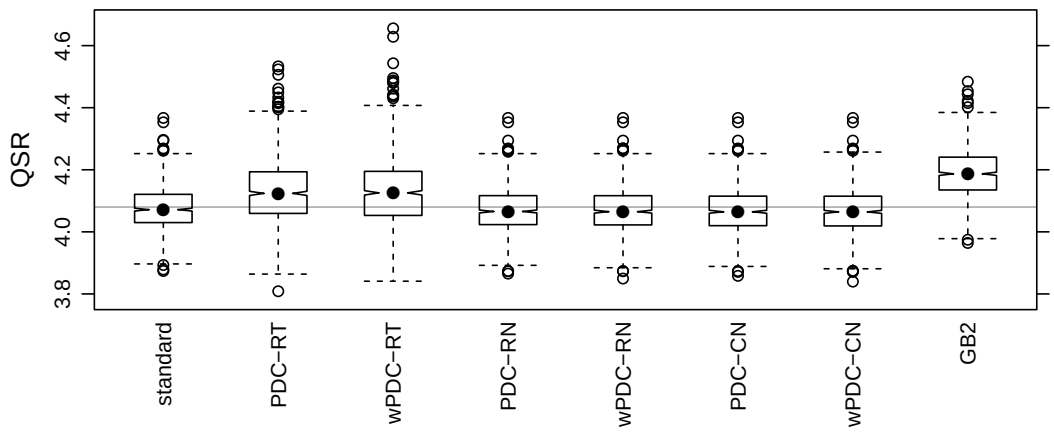

Figure F.71.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 300$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.35.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.07	0.00	−0.01	−0.13	4.07	0.07	−0.01	0.07	1.68	0.07	0.07
wHill	RT	300	4.12	0.01	0.04	0.89	4.11	0.08	0.03	0.09	2.18	0.09	0.09
wHill	RT	500	4.11	0.01	0.03	0.74	4.10	0.09	0.02	0.09	2.25	0.09	0.09
wHill	RT	700	4.12	0.01	0.04	1.02	4.12	0.09	0.04	0.10	2.44	0.09	0.11
wHill	RN	300	4.07	0.00	−0.01	−0.21	4.07	0.07	−0.01	0.07	1.71	0.07	0.07
wHill	RN	500	4.06	0.01	−0.02	−0.48	4.06	0.07	−0.02	0.07	1.81	0.08	0.07
wHill	RN	700	4.05	0.01	−0.03	−0.73	4.05	0.07	−0.03	0.08	1.88	0.08	0.07
wHill	CN	300	4.07	0.00	−0.01	−0.24	4.07	0.07	−0.01	0.07	1.72	0.07	0.07
wHill	CN	500	4.06	0.01	−0.02	−0.55	4.05	0.07	−0.03	0.07	1.83	0.08	0.07
wHill	CN	700	4.05	0.01	−0.03	−0.81	4.04	0.07	−0.03	0.08	1.92	0.08	0.07
wISE	RT	300	4.13	0.01	0.05	1.28	4.13	0.10	0.05	0.11	2.69	0.10	0.10
wISE	RT	500	4.09	0.01	0.01	0.20	4.08	0.09	0.00	0.10	2.39	0.09	0.11
wISE	RT	700	4.14	0.01	0.06	1.59	4.14	0.09	0.06	0.11	2.81	0.11	0.09
wISE	RN	300	4.07	0.00	−0.01	−0.23	4.07	0.07	−0.01	0.07	1.72	0.07	0.07
wISE	RN	500	4.05	0.01	−0.03	−0.64	4.05	0.07	−0.03	0.08	1.86	0.08	0.07
wISE	RN	700	4.05	0.00	−0.03	−0.67	4.05	0.07	−0.03	0.08	1.85	0.08	0.07
wISE	CN	300	4.07	0.00	−0.01	−0.26	4.07	0.07	−0.01	0.07	1.73	0.07	0.07
wISE	CN	500	4.05	0.01	−0.03	−0.74	4.05	0.07	−0.03	0.08	1.92	0.08	0.07
wISE	CN	700	4.05	0.00	−0.03	−0.74	4.05	0.07	−0.03	0.08	1.88	0.08	0.07
wPDC	RT	300	4.13	0.01	0.05	1.28	4.13	0.11	0.05	0.12	2.97	0.11	0.14
wPDC	RT	500	4.07	0.01	−0.01	−0.26	4.06	0.11	−0.02	0.11	2.73	0.11	0.11
wPDC	RT	700	4.17	0.01	0.09	2.09	4.16	0.11	0.08	0.14	3.53	0.14	0.13
wPDC	RN	300	4.07	0.00	−0.01	−0.28	4.07	0.07	−0.01	0.07	1.73	0.07	0.07
wPDC	RN	500	4.05	0.01	−0.03	−0.82	4.05	0.07	−0.03	0.08	1.96	0.08	0.07
wPDC	RN	700	4.05	0.00	−0.03	−0.65	4.05	0.07	−0.03	0.07	1.83	0.07	0.06
wPDC	CN	300	4.07	0.00	−0.01	−0.32	4.06	0.07	−0.02	0.07	1.75	0.07	0.07
wPDC	CN	500	4.04	0.01	−0.04	−0.95	4.04	0.07	−0.04	0.08	2.05	0.09	0.08
wPDC	CN	700	4.05	0.00	−0.03	−0.72	4.05	0.07	−0.03	0.08	1.87	0.08	0.06
GB2			4.19	0.01	0.11	2.64	4.19	0.08	0.11	0.13	3.24	0.16	0.10

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OCAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

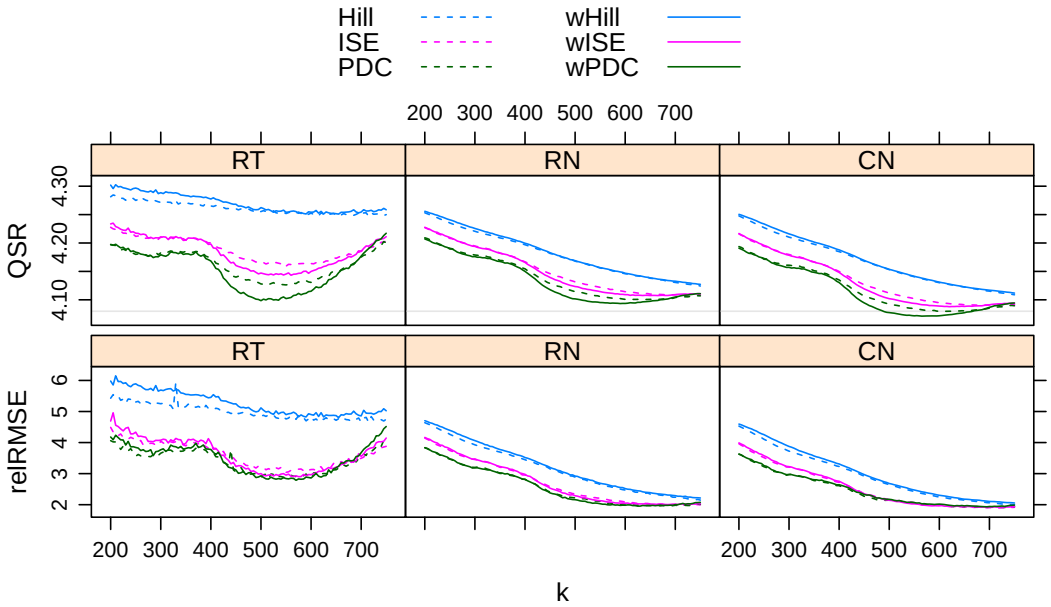

Figure F.72.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

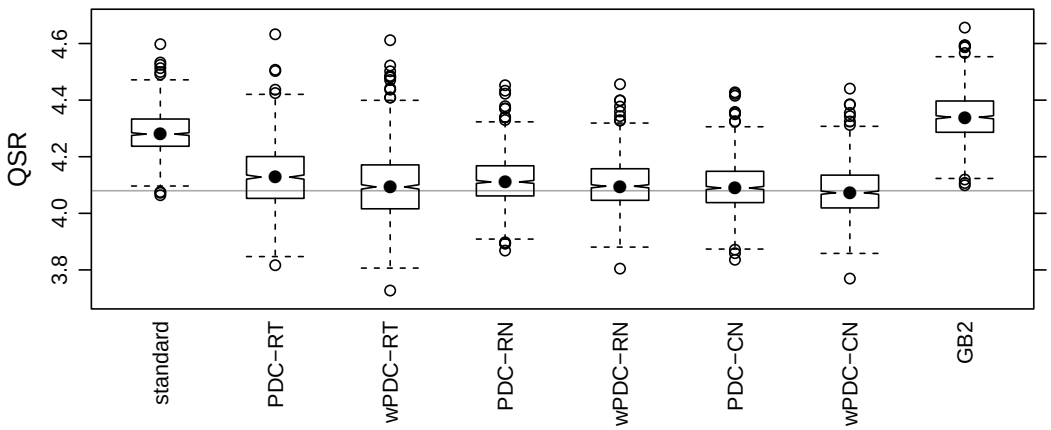

Figure F.73.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.36.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.28	0.01	0.20	5.00	4.28	0.07	0.20	0.22	5.31	0.30	0.13
wHill	RT	300	4.29	0.01	0.21	5.12	4.28	0.10	0.20	0.23	5.69	0.30	0.14
wHill	RT	500	4.26	0.01	0.18	4.47	4.26	0.09	0.18	0.21	5.12	0.26	0.18
wHill	RT	700	4.25	0.01	0.17	4.28	4.25	0.09	0.17	0.20	4.86	0.25	0.12
wHill	RN	300	4.23	0.01	0.15	3.57	4.22	0.08	0.14	0.17	4.06	0.21	0.11
wHill	RN	500	4.17	0.01	0.09	2.18	4.17	0.08	0.09	0.12	2.92	0.13	0.09
wHill	RN	700	4.13	0.01	0.05	1.30	4.13	0.08	0.05	0.09	2.29	0.09	0.09
wHill	CN	300	4.22	0.01	0.14	3.34	4.21	0.08	0.13	0.16	3.87	0.20	0.11
wHill	CN	500	4.15	0.01	0.07	1.81	4.15	0.08	0.07	0.11	2.68	0.11	0.09
wHill	CN	700	4.12	0.01	0.04	0.91	4.11	0.08	0.03	0.09	2.10	0.09	0.09
wISE	RT	300	4.21	0.01	0.13	3.19	4.21	0.10	0.13	0.17	4.08	0.19	0.15
wISE	RT	500	4.15	0.01	0.07	1.65	4.15	0.10	0.07	0.12	3.00	0.12	0.14
wISE	RT	700	4.19	0.01	0.11	2.58	4.18	0.10	0.10	0.15	3.56	0.16	0.12
wISE	RN	300	4.19	0.01	0.11	2.80	4.19	0.09	0.11	0.14	3.47	0.17	0.10
wISE	RN	500	4.12	0.01	0.04	1.07	4.12	0.08	0.04	0.09	2.29	0.09	0.09
wISE	RN	700	4.11	0.01	0.03	0.72	4.11	0.08	0.03	0.08	2.02	0.08	0.08
wISE	CN	300	4.18	0.01	0.10	2.42	4.18	0.09	0.10	0.13	3.22	0.15	0.10
wISE	CN	500	4.10	0.01	0.02	0.54	4.10	0.08	0.02	0.09	2.14	0.08	0.09
wISE	CN	700	4.09	0.01	0.01	0.28	4.09	0.08	0.01	0.08	1.92	0.08	0.08
wPDC	RT	300	4.18	0.01	0.10	2.44	4.17	0.12	0.09	0.15	3.77	0.14	0.16
wPDC	RT	500	4.10	0.01	0.02	0.46	4.09	0.11	0.01	0.12	2.93	0.12	0.13
wPDC	RT	700	4.18	0.01	0.10	2.38	4.17	0.11	0.09	0.15	3.68	0.15	0.12
wPDC	RN	300	4.18	0.01	0.10	2.36	4.17	0.09	0.09	0.13	3.19	0.14	0.10
wPDC	RN	500	4.10	0.01	0.02	0.53	4.10	0.08	0.02	0.09	2.16	0.08	0.09
wPDC	RN	700	4.10	0.01	0.02	0.61	4.10	0.08	0.02	0.08	2.00	0.08	0.08
wPDC	CN	300	4.16	0.01	0.08	1.89	4.15	0.10	0.07	0.12	2.97	0.12	0.10
wPDC	CN	500	4.08	0.01	−0.00	−0.06	4.07	0.09	−0.01	0.09	2.17	0.09	0.09
wPDC	CN	700	4.09	0.01	0.01	0.17	4.08	0.08	0.00	0.08	1.94	0.08	0.08
GB2			4.34	0.01	0.26	6.41	4.34	0.08	0.26	0.27	6.70	0.38	0.14

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OCAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

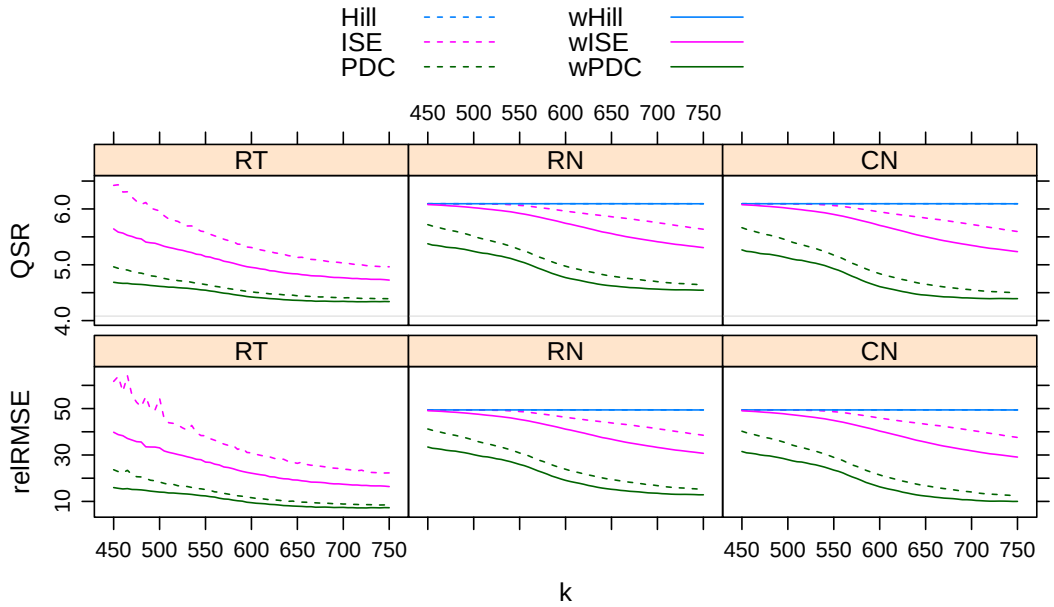

Figure F.74.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

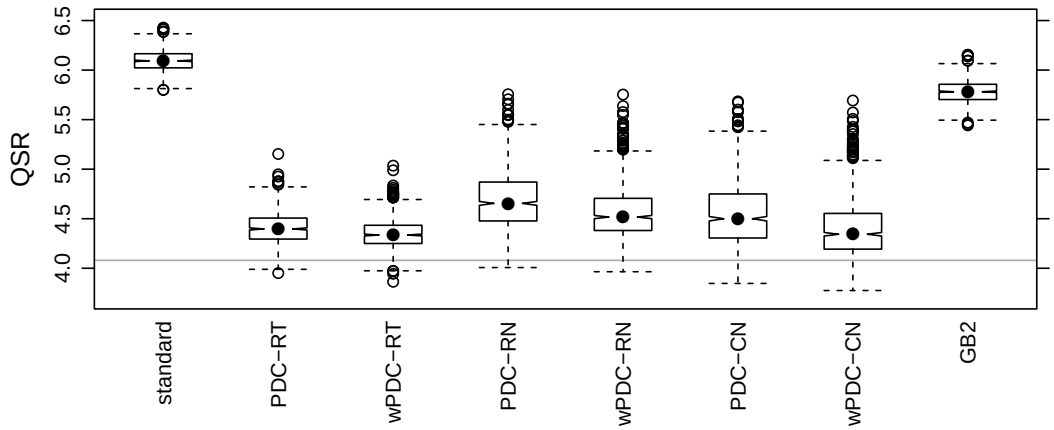

Figure F.75.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.37.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			6.09	0.01	2.01	49.36	6.09	0.11	2.01	2.02	49.42	2.98	0.58
wHill	RT	500	6.93	5.02	2.85	69.86	6.67	0.51	2.59	3.62	88.83	3.85	15.92
wHill	RT	700	6.17	0.27	2.09	51.16	6.07	0.36	1.99	2.15	52.72	2.96	1.91
wHill	RN	300	6.09	0.01	2.01	49.36	6.09	0.11	2.01	2.02	49.42	2.98	0.58
wHill	RN	500	6.09	0.01	2.01	49.36	6.09	0.11	2.01	2.02	49.42	2.98	0.58
wHill	RN	700	6.09	0.01	2.01	49.36	6.09	0.11	2.01	2.02	49.42	2.98	0.58
wHill	CN	300	6.09	0.01	2.01	49.36	6.09	0.11	2.01	2.02	49.42	2.98	0.58
wHill	CN	500	6.09	0.01	2.01	49.36	6.09	0.11	2.01	2.02	49.42	2.98	0.58
wHill	CN	700	6.09	0.01	2.01	49.36	6.09	0.11	2.01	2.02	49.42	2.98	0.58
wISE	RT	500	5.36	0.18	1.28	31.37	5.30	0.29	1.22	1.35	33.07	1.81	1.83
wISE	RT	700	4.77	0.03	0.69	16.84	4.77	0.17	0.69	0.71	17.40	1.02	0.44
wISE	RN	300	6.09	0.01	2.01	49.36	6.09	0.11	2.01	2.02	49.42	2.98	0.58
wISE	RN	500	6.02	0.02	1.94	47.60	6.03	0.15	1.95	1.95	47.73	2.90	0.58
wISE	RN	700	5.41	0.07	1.33	32.67	5.42	0.23	1.34	1.36	33.26	1.99	0.54
wISE	CN	300	6.09	0.01	2.01	49.36	6.09	0.11	2.01	2.02	49.42	2.98	0.58
wISE	CN	500	6.01	0.02	1.93	47.39	6.02	0.16	1.94	1.94	47.53	2.88	0.58
wISE	CN	700	5.35	0.08	1.27	31.05	5.36	0.25	1.28	1.30	31.79	1.90	0.54
wPDC	RT	500	4.61	0.04	0.53	13.08	4.59	0.20	0.51	0.57	14.03	0.76	0.40
wPDC	RT	700	4.35	0.02	0.27	6.50	4.34	0.14	0.26	0.30	7.43	0.38	0.23
wPDC	RN	300	6.07	0.02	1.99	48.87	6.09	0.11	2.01	2.00	49.02	2.98	0.58
wPDC	RN	500	5.24	0.17	1.16	28.44	5.28	0.45	1.20	1.23	30.13	1.77	0.55
wPDC	RN	700	4.56	0.07	0.48	11.87	4.52	0.23	0.44	0.55	13.53	0.65	0.41
wPDC	CN	300	6.07	0.03	1.99	48.77	6.09	0.11	2.01	2.00	48.95	2.98	0.58
wPDC	CN	500	5.12	0.22	1.04	25.53	5.16	0.51	1.08	1.14	27.99	1.60	0.55
wPDC	CN	700	4.40	0.08	0.32	7.93	4.34	0.25	0.26	0.43	10.62	0.39	0.40
GB2			5.78	0.01	1.70	41.65	5.78	0.11	1.70	1.70	41.74	2.52	0.51

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OCAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

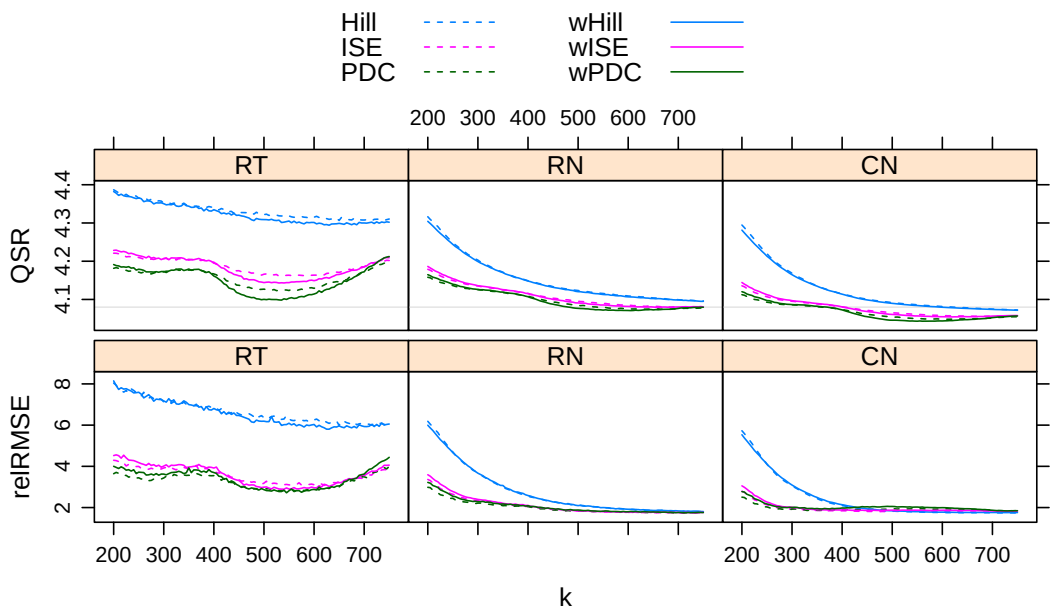

Figure F.76.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

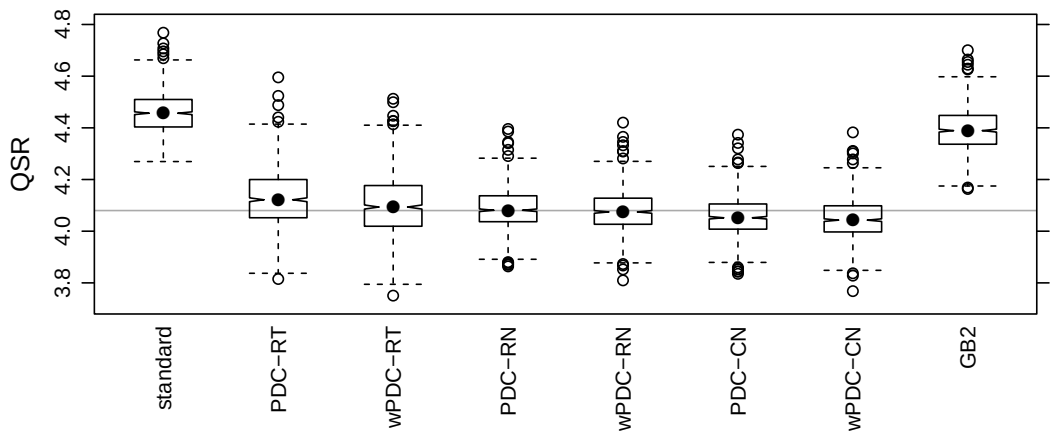

Figure F.77.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.38.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.46	0.01	0.38	9.29	4.46	0.08	0.38	0.39	9.49	0.56	0.17
wHill	RT	300	4.35	0.01	0.27	6.63	4.34	0.11	0.26	0.29	7.18	0.39	0.19
wHill	RT	500	4.31	0.01	0.23	5.61	4.30	0.11	0.22	0.25	6.19	0.33	0.16
wHill	RT	700	4.30	0.01	0.22	5.40	4.30	0.10	0.22	0.24	5.93	0.32	0.15
wHill	RN	300	4.20	0.01	0.12	2.92	4.20	0.09	0.12	0.15	3.67	0.17	0.11
wHill	RN	500	4.12	0.01	0.04	0.99	4.12	0.07	0.04	0.09	2.09	0.09	0.09
wHill	RN	700	4.10	0.01	0.02	0.46	4.10	0.08	0.02	0.07	1.84	0.08	0.08
wHill	CN	300	4.16	0.01	0.08	2.08	4.16	0.10	0.08	0.13	3.09	0.13	0.11
wHill	CN	500	4.09	0.01	0.01	0.24	4.08	0.07	0.00	0.08	1.84	0.07	0.08
wHill	CN	700	4.07	0.01	−0.01	−0.14	4.07	0.07	−0.01	0.07	1.76	0.07	0.07
wISE	RT	300	4.21	0.01	0.13	3.11	4.20	0.10	0.12	0.16	4.01	0.18	0.15
wISE	RT	500	4.14	0.01	0.06	1.57	4.14	0.11	0.06	0.12	2.99	0.12	0.13
wISE	RT	700	4.19	0.01	0.11	2.58	4.19	0.10	0.11	0.14	3.55	0.16	0.13
wISE	RN	300	4.14	0.01	0.06	1.37	4.13	0.08	0.05	0.10	2.39	0.10	0.08
wISE	RN	500	4.09	0.01	0.01	0.27	4.09	0.07	0.01	0.08	1.84	0.07	0.08
wISE	RN	700	4.08	0.01	0.00	0.01	4.08	0.07	0.00	0.07	1.76	0.07	0.07
wISE	CN	300	4.10	0.01	0.02	0.42	4.09	0.08	0.01	0.08	2.01	0.08	0.08
wISE	CN	500	4.06	0.01	−0.02	−0.47	4.06	0.07	−0.02	0.08	1.87	0.08	0.07
wISE	CN	700	4.06	0.01	−0.02	−0.57	4.06	0.07	−0.02	0.07	1.84	0.08	0.07
wPDC	RT	300	4.17	0.01	0.09	2.28	4.16	0.11	0.08	0.15	3.62	0.14	0.14
wPDC	RT	500	4.10	0.01	0.02	0.50	4.09	0.12	0.01	0.12	2.87	0.11	0.11
wPDC	RT	700	4.17	0.01	0.09	2.27	4.17	0.11	0.09	0.15	3.62	0.15	0.13
wPDC	RN	300	4.13	0.01	0.05	1.13	4.12	0.08	0.04	0.09	2.28	0.09	0.09
wPDC	RN	500	4.08	0.01	−0.00	−0.08	4.07	0.07	−0.01	0.08	1.88	0.07	0.08
wPDC	RN	700	4.08	0.01	−0.00	−0.08	4.08	0.07	−0.00	0.07	1.76	0.07	0.08
wPDC	CN	300	4.09	0.01	0.01	0.17	4.08	0.08	0.00	0.08	2.00	0.08	0.08
wPDC	CN	500	4.05	0.01	−0.03	−0.84	4.04	0.07	−0.04	0.08	2.05	0.09	0.08
wPDC	CN	700	4.05	0.01	−0.03	−0.67	4.05	0.07	−0.03	0.08	1.87	0.08	0.06
GB2			4.39	0.01	0.31	7.68	4.39	0.08	0.31	0.32	7.93	0.46	0.15

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OCAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

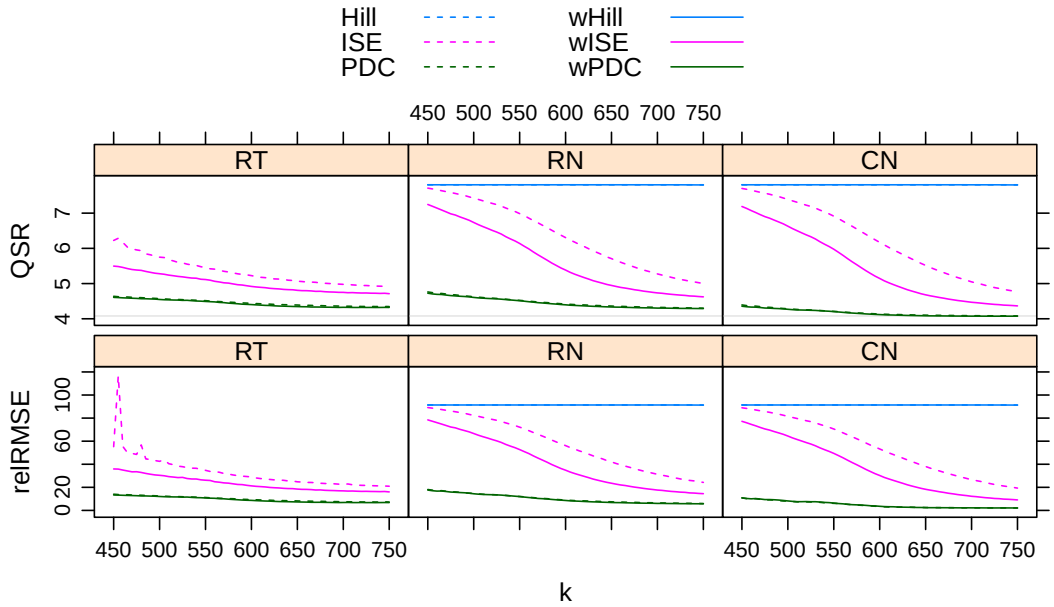

Figure F.78.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

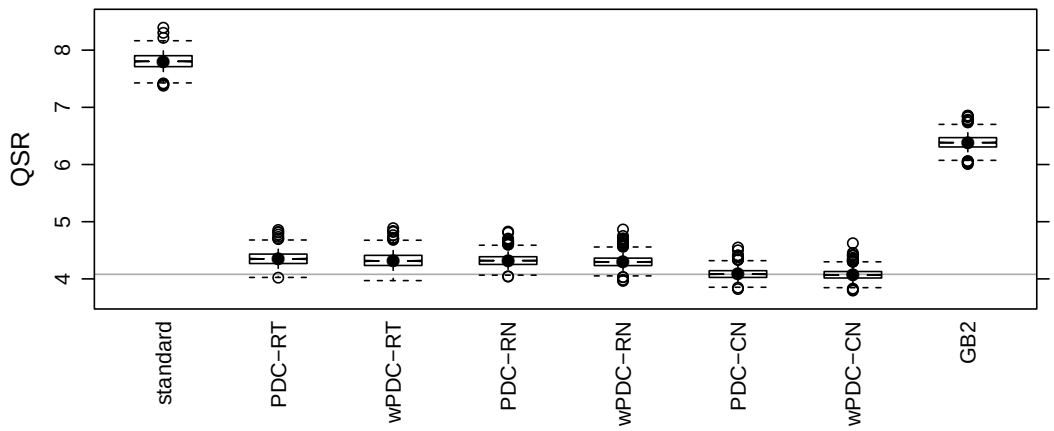

Figure F.79.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.39.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			7.81	0.02	3.73	91.31	7.80	0.14	3.72	3.73	91.37	5.52	1.06
wHill	RT	500	10.20	34.25	6.12	149.97	9.01	1.37	4.93	8.46	207.48	7.31	25.79
wHill	RT	700	7.75	2.33	3.67	89.87	7.43	0.67	3.35	3.97	97.35	4.96	6.29
wHill	RN	300	7.81	0.02	3.73	91.31	7.80	0.14	3.72	3.73	91.37	5.52	1.06
wHill	RN	500	7.81	0.02	3.73	91.31	7.80	0.14	3.72	3.73	91.37	5.52	1.06
wHill	RN	700	7.80	0.02	3.72	91.30	7.80	0.14	3.72	3.73	91.36	5.52	1.06
wHill	CN	300	7.81	0.02	3.73	91.31	7.80	0.14	3.72	3.73	91.37	5.52	1.06
wHill	CN	500	7.81	0.02	3.73	91.31	7.80	0.14	3.72	3.73	91.37	5.52	1.06
wHill	CN	700	7.80	0.02	3.72	91.30	7.80	0.14	3.72	3.73	91.36	5.52	1.06
wISE	RT	500	5.28	0.10	1.20	29.40	5.25	0.30	1.17	1.24	30.41	1.73	1.15
wISE	RT	700	4.75	0.03	0.67	16.42	4.74	0.15	0.66	0.69	16.94	0.98	0.34
wISE	RN	300	7.81	0.02	3.73	91.31	7.80	0.14	3.72	3.73	91.37	5.52	1.06
wISE	RN	500	6.73	0.34	2.66	65.08	6.73	0.62	2.65	2.72	66.63	3.92	1.04
wISE	RN	700	4.73	0.09	0.65	16.04	4.68	0.25	0.60	0.72	17.62	0.89	0.54
wISE	CN	300	7.81	0.02	3.73	91.31	7.80	0.14	3.72	3.73	91.37	5.52	1.06
wISE	CN	500	6.63	0.41	2.55	62.49	6.62	0.67	2.54	2.63	64.45	3.77	1.04
wISE	CN	700	4.47	0.10	0.39	9.54	4.40	0.25	0.32	0.50	12.23	0.48	0.51
wPDC	RT	500	4.55	0.02	0.47	11.48	4.53	0.14	0.45	0.49	12.07	0.67	0.34
wPDC	RT	700	4.33	0.02	0.25	6.03	4.31	0.13	0.23	0.28	6.86	0.35	0.20
wPDC	RN	300	6.63	0.51	2.55	62.45	6.36	0.60	2.28	2.65	64.86	3.38	1.04
wPDC	RN	500	4.61	0.07	0.53	12.90	4.54	0.17	0.46	0.59	14.42	0.68	0.64
wPDC	RN	700	4.30	0.01	0.22	5.47	4.30	0.10	0.22	0.25	6.06	0.32	0.19
wPDC	CN	300	6.44	0.68	2.37	57.97	6.14	0.71	2.06	2.51	61.40	3.05	1.04
wPDC	CN	500	4.27	0.08	0.19	4.65	4.19	0.15	0.11	0.34	8.21	0.17	0.62
wPDC	CN	700	4.07	0.01	−0.01	−0.13	4.07	0.08	−0.01	0.09	2.21	0.08	0.13
GB2			6.39	0.02	2.31	56.56	6.38	0.12	2.30	2.31	56.65	3.41	0.68

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OCAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

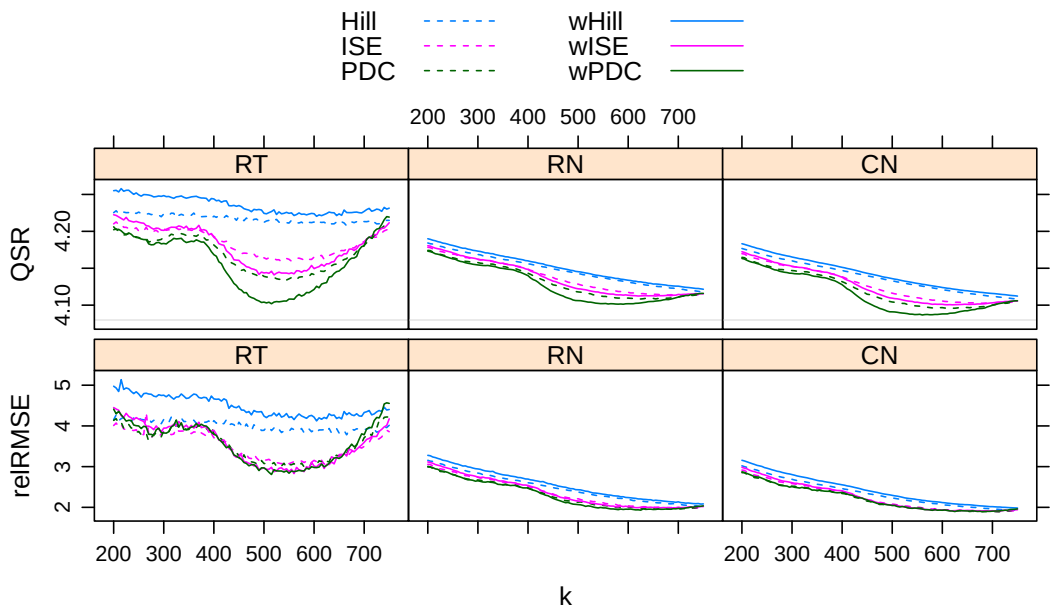

Figure F.80.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

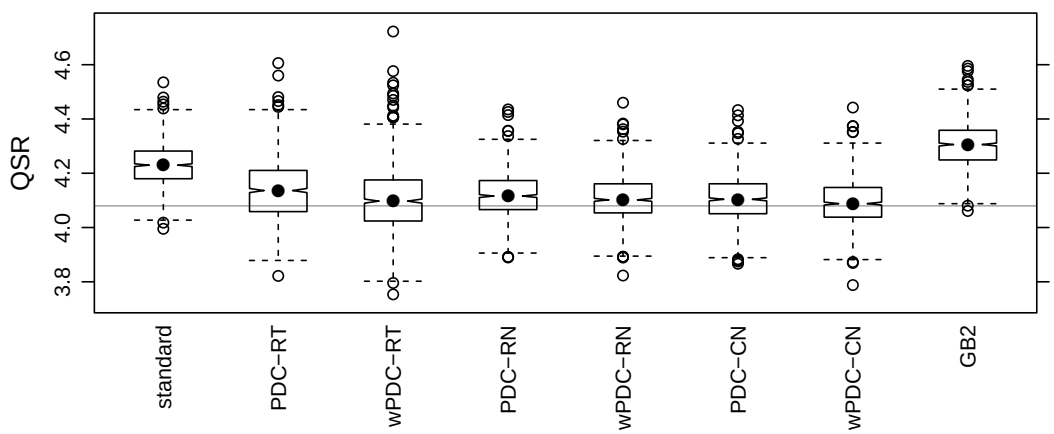

Figure F.81.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.40.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.23	0.01	0.15	3.71	4.23	0.08	0.15	0.17	4.15	0.22	0.11
wHill	RT	300	4.25	0.01	0.17	4.13	4.24	0.09	0.16	0.19	4.75	0.24	0.12
wHill	RT	500	4.22	0.01	0.14	3.54	4.22	0.09	0.14	0.17	4.24	0.21	0.12
wHill	RT	700	4.23	0.01	0.15	3.61	4.23	0.10	0.15	0.18	4.33	0.22	0.12
wHill	RN	300	4.17	0.01	0.09	2.29	4.17	0.07	0.09	0.12	2.94	0.13	0.10
wHill	RN	500	4.15	0.01	0.07	1.60	4.14	0.07	0.06	0.10	2.43	0.10	0.09
wHill	RN	700	4.13	0.01	0.05	1.12	4.12	0.08	0.04	0.09	2.14	0.09	0.09
wHill	CN	300	4.17	0.01	0.09	2.09	4.16	0.07	0.08	0.11	2.80	0.12	0.10
wHill	CN	500	4.14	0.01	0.06	1.37	4.13	0.07	0.05	0.09	2.29	0.09	0.09
wHill	CN	700	4.12	0.01	0.04	0.88	4.11	0.08	0.03	0.08	2.02	0.08	0.09
wISE	RT	300	4.20	0.01	0.12	2.98	4.20	0.11	0.12	0.16	3.95	0.17	0.13
wISE	RT	500	4.14	0.01	0.06	1.56	4.14	0.10	0.06	0.12	2.97	0.12	0.13
wISE	RT	700	4.18	0.01	0.10	2.57	4.18	0.10	0.10	0.15	3.60	0.16	0.11
wISE	RN	300	4.16	0.01	0.08	2.02	4.16	0.08	0.08	0.11	2.74	0.12	0.09
wISE	RN	500	4.12	0.01	0.04	1.04	4.12	0.08	0.04	0.09	2.16	0.09	0.09
wISE	RN	700	4.11	0.01	0.03	0.85	4.11	0.07	0.03	0.08	2.00	0.08	0.09
wISE	CN	300	4.15	0.01	0.07	1.78	4.15	0.08	0.07	0.11	2.60	0.11	0.09
wISE	CN	500	4.11	0.01	0.03	0.73	4.11	0.08	0.03	0.08	2.06	0.08	0.09
wISE	CN	700	4.10	0.01	0.02	0.57	4.10	0.07	0.02	0.08	1.92	0.08	0.09
wPDC	RT	300	4.18	0.01	0.10	2.54	4.17	0.12	0.09	0.16	3.83	0.15	0.14
wPDC	RT	500	4.10	0.01	0.02	0.59	4.10	0.11	0.02	0.12	2.97	0.12	0.16
wPDC	RT	700	4.18	0.01	0.10	2.46	4.18	0.11	0.10	0.15	3.78	0.15	0.13
wPDC	RN	300	4.15	0.01	0.07	1.83	4.15	0.08	0.07	0.11	2.65	0.11	0.09
wPDC	RN	500	4.11	0.01	0.03	0.64	4.10	0.08	0.02	0.08	2.07	0.08	0.09
wPDC	RN	700	4.11	0.01	0.03	0.76	4.11	0.07	0.03	0.08	1.97	0.08	0.08
wPDC	CN	300	4.14	0.01	0.06	1.55	4.14	0.08	0.06	0.10	2.51	0.10	0.09
wPDC	CN	500	4.09	0.01	0.01	0.27	4.09	0.08	0.01	0.08	2.05	0.08	0.09
wPDC	CN	700	4.10	0.01	0.02	0.49	4.10	0.07	0.02	0.08	1.91	0.08	0.08
GB2			4.31	0.01	0.23	5.53	4.31	0.08	0.23	0.24	5.87	0.34	0.13

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OCAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

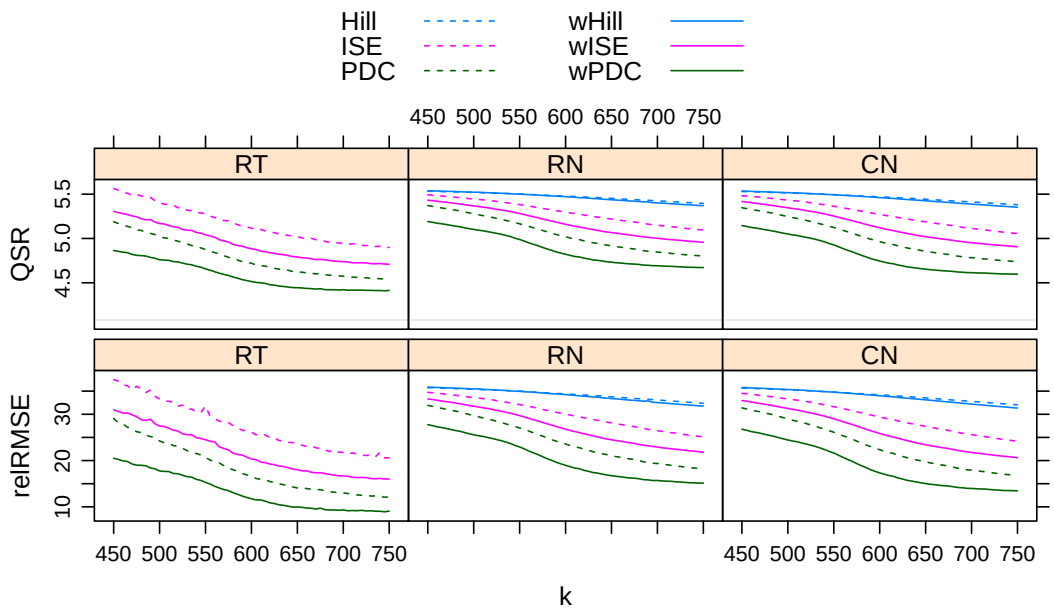

Figure F.82.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

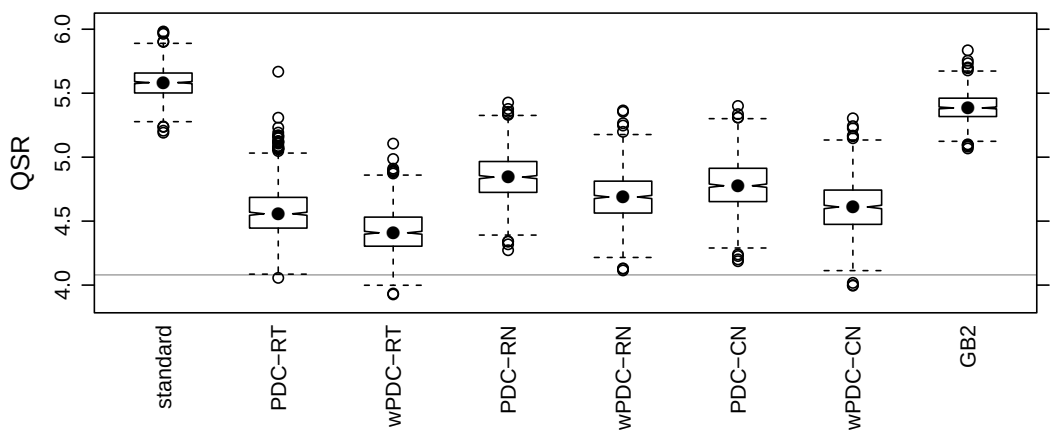

Figure F.83.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.41.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			5.58	0.01	1.50	36.80	5.58	0.12	1.50	1.51	36.92	2.23	0.47
wHill	RT	500	5.87	0.22	1.79	43.90	5.78	0.31	1.70	1.85	45.40	2.53	2.06
wHill	RT	700	5.56	0.71	1.48	36.23	5.51	0.23	1.43	1.70	41.72	2.12	6.53
wHill	RN	300	5.57	0.01	1.49	36.52	5.57	0.11	1.49	1.49	36.63	2.21	0.47
wHill	RN	500	5.52	0.01	1.44	35.34	5.52	0.12	1.44	1.45	35.46	2.13	0.47
wHill	RN	700	5.40	0.02	1.32	32.40	5.40	0.12	1.32	1.33	32.53	1.95	0.45
wHill	CN	300	5.57	0.01	1.49	36.49	5.57	0.11	1.49	1.49	36.60	2.21	0.47
wHill	CN	500	5.52	0.01	1.44	35.22	5.51	0.12	1.43	1.44	35.34	2.12	0.47
wHill	CN	700	5.39	0.02	1.31	32.04	5.38	0.12	1.30	1.31	32.19	1.93	0.45
wISE	RT	500	5.17	0.07	1.09	26.67	5.14	0.24	1.06	1.12	27.45	1.57	0.65
wISE	RT	700	4.74	0.03	0.66	16.13	4.72	0.17	0.64	0.68	16.69	0.95	0.37
wISE	RN	300	5.57	0.01	1.49	36.47	5.57	0.11	1.49	1.49	36.59	2.21	0.47
wISE	RN	500	5.37	0.02	1.29	31.56	5.37	0.14	1.29	1.30	31.75	1.91	0.45
wISE	RN	700	5.00	0.02	0.92	22.62	5.00	0.16	0.92	0.94	22.93	1.37	0.37
wISE	CN	300	5.57	0.01	1.49	36.44	5.57	0.11	1.49	1.49	36.56	2.21	0.47
wISE	CN	500	5.35	0.02	1.27	31.04	5.35	0.14	1.27	1.27	31.25	1.88	0.45
wISE	CN	700	4.95	0.03	0.87	21.39	4.95	0.17	0.87	0.89	21.76	1.30	0.37
wPDC	RT	500	4.76	0.06	0.68	16.67	4.73	0.22	0.65	0.72	17.76	0.96	0.68
wPDC	RT	700	4.42	0.03	0.34	8.38	4.41	0.17	0.33	0.38	9.33	0.49	0.25
wPDC	RN	300	5.53	0.02	1.45	35.57	5.54	0.13	1.46	1.46	35.75	2.16	0.47
wPDC	RN	500	5.10	0.04	1.02	25.06	5.11	0.21	1.03	1.04	25.58	1.53	0.41
wPDC	RN	700	4.69	0.04	0.61	15.01	4.69	0.19	0.61	0.64	15.70	0.90	0.32
wPDC	CN	300	5.52	0.02	1.45	35.42	5.54	0.13	1.46	1.45	35.62	2.16	0.47
wPDC	CN	500	5.05	0.05	0.97	23.79	5.06	0.24	0.98	1.00	24.45	1.45	0.41
wPDC	CN	700	4.61	0.04	0.53	13.09	4.61	0.20	0.53	0.57	13.98	0.79	0.30
GB2			5.39	0.01	1.31	32.09	5.38	0.11	1.30	1.31	32.20	1.93	0.43

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OCAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 20.

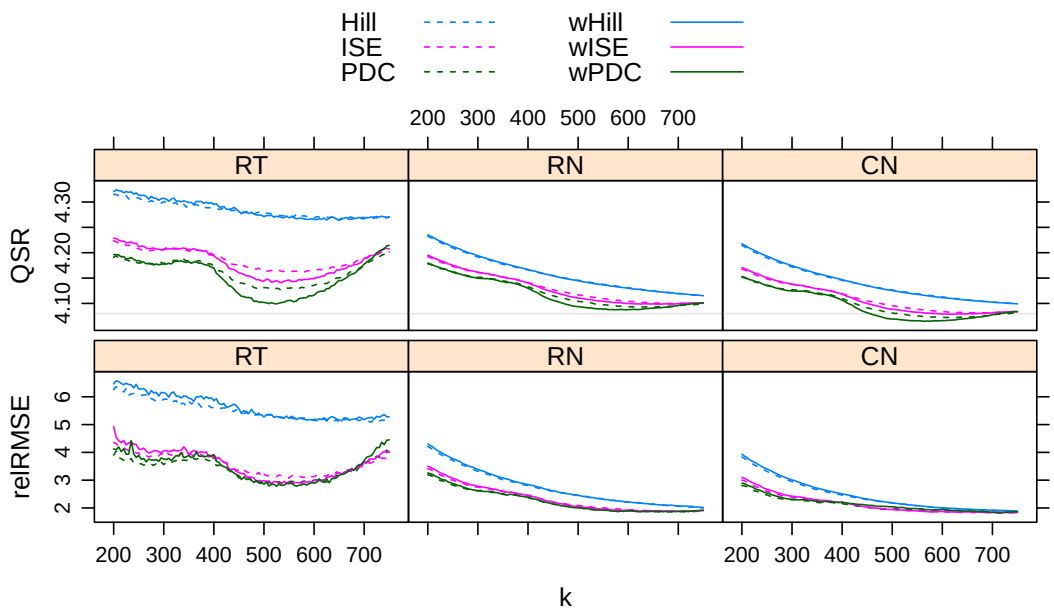

Figure F.84.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

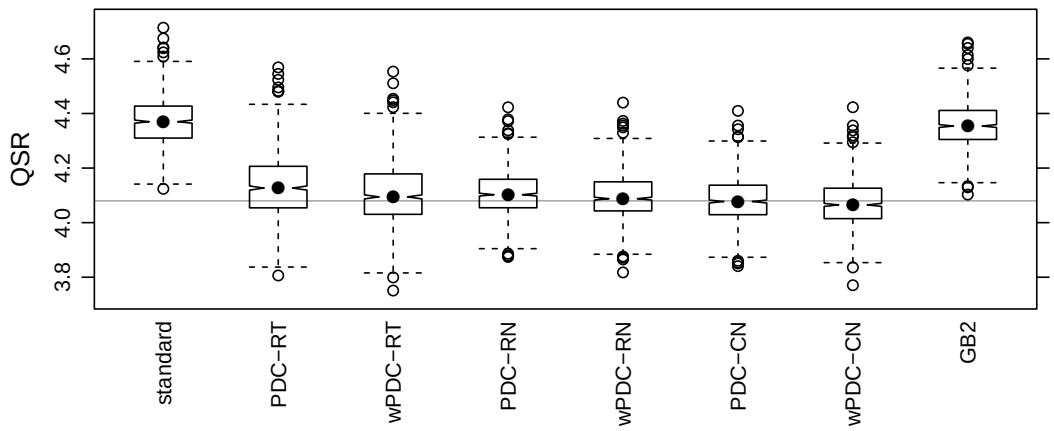

Figure F.85.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.42.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.37	0.01	0.29	7.11	4.37	0.09	0.29	0.30	7.42	0.43	0.16
wHill	RT	300	4.31	0.01	0.23	5.57	4.30	0.10	0.22	0.25	6.15	0.32	0.25
wHill	RT	500	4.27	0.01	0.19	4.69	4.26	0.10	0.18	0.22	5.28	0.27	0.16
wHill	RT	700	4.27	0.01	0.19	4.58	4.27	0.09	0.19	0.21	5.18	0.27	0.14
wHill	RN	300	4.19	0.01	0.11	2.80	4.19	0.08	0.11	0.14	3.38	0.17	0.11
wHill	RN	500	4.14	0.01	0.06	1.59	4.14	0.08	0.06	0.10	2.46	0.11	0.10
wHill	RN	700	4.12	0.01	0.04	0.96	4.12	0.08	0.04	0.08	2.07	0.09	0.09
wHill	CN	300	4.17	0.01	0.09	2.32	4.17	0.08	0.09	0.12	3.01	0.14	0.11
wHill	CN	500	4.13	0.01	0.05	1.12	4.12	0.08	0.04	0.09	2.19	0.09	0.09
wHill	CN	700	4.10	0.01	0.02	0.55	4.10	0.08	0.02	0.08	1.92	0.08	0.08
wISE	RT	300	4.21	0.01	0.13	3.12	4.20	0.10	0.12	0.17	4.05	0.18	0.16
wISE	RT	500	4.14	0.01	0.06	1.57	4.14	0.10	0.06	0.12	2.98	0.12	0.13
wISE	RT	700	4.19	0.01	0.11	2.67	4.19	0.10	0.11	0.15	3.66	0.16	0.14
wISE	RN	300	4.16	0.01	0.08	2.00	4.16	0.08	0.08	0.11	2.78	0.12	0.09
wISE	RN	500	4.11	0.01	0.03	0.75	4.11	0.08	0.03	0.08	2.06	0.09	0.09
wISE	RN	700	4.10	0.01	0.02	0.48	4.10	0.08	0.02	0.08	1.88	0.08	0.08
wISE	CN	300	4.14	0.01	0.06	1.43	4.14	0.08	0.06	0.10	2.42	0.10	0.08
wISE	CN	500	4.09	0.01	0.01	0.21	4.09	0.08	0.01	0.08	1.95	0.08	0.08
wISE	CN	700	4.08	0.01	0.00	0.04	4.08	0.08	−0.00	0.07	1.83	0.08	0.07
wPDC	RT	300	4.18	0.01	0.10	2.40	4.17	0.11	0.09	0.15	3.76	0.14	0.18
wPDC	RT	500	4.10	0.01	0.02	0.54	4.09	0.11	0.01	0.12	2.85	0.11	0.12
wPDC	RT	700	4.18	0.01	0.10	2.39	4.17	0.12	0.09	0.15	3.71	0.15	0.12
wPDC	RN	300	4.15	0.01	0.07	1.71	4.15	0.08	0.07	0.11	2.62	0.11	0.09
wPDC	RN	500	4.09	0.01	0.01	0.34	4.09	0.08	0.01	0.08	2.01	0.08	0.09
wPDC	RN	700	4.10	0.01	0.02	0.39	4.09	0.08	0.01	0.08	1.88	0.08	0.08
wPDC	CN	300	4.12	0.01	0.04	1.10	4.12	0.09	0.04	0.09	2.31	0.09	0.08
wPDC	CN	500	4.07	0.01	−0.01	−0.26	4.07	0.08	−0.01	0.08	2.04	0.08	0.08
wPDC	CN	700	4.08	0.01	−0.00	−0.06	4.08	0.08	−0.00	0.08	1.85	0.08	0.07
GB2			4.36	0.01	0.28	6.81	4.35	0.08	0.27	0.29	7.09	0.41	0.14

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OCAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 20.

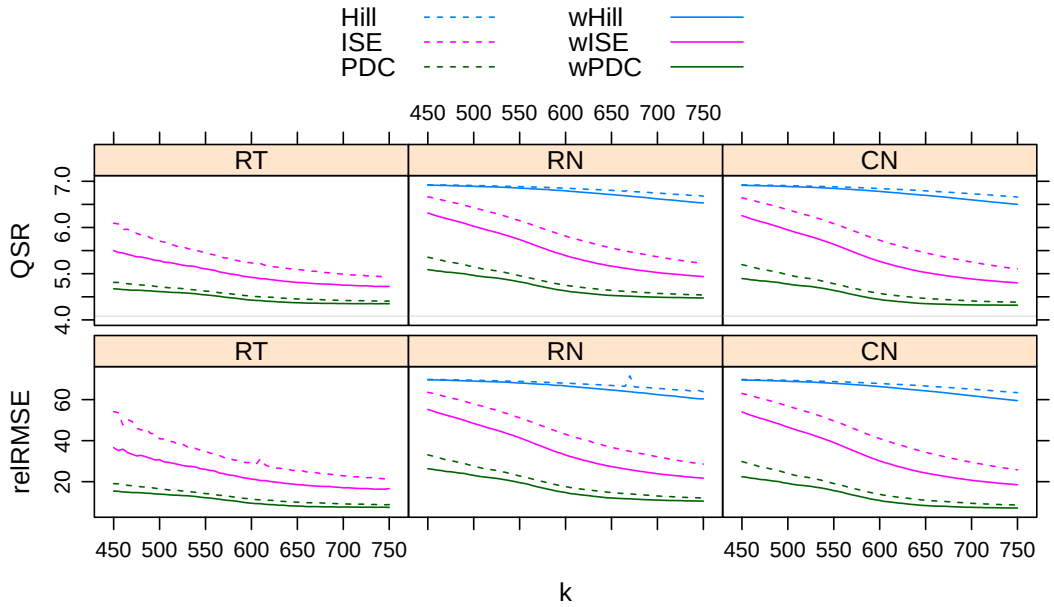

Figure F.86.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

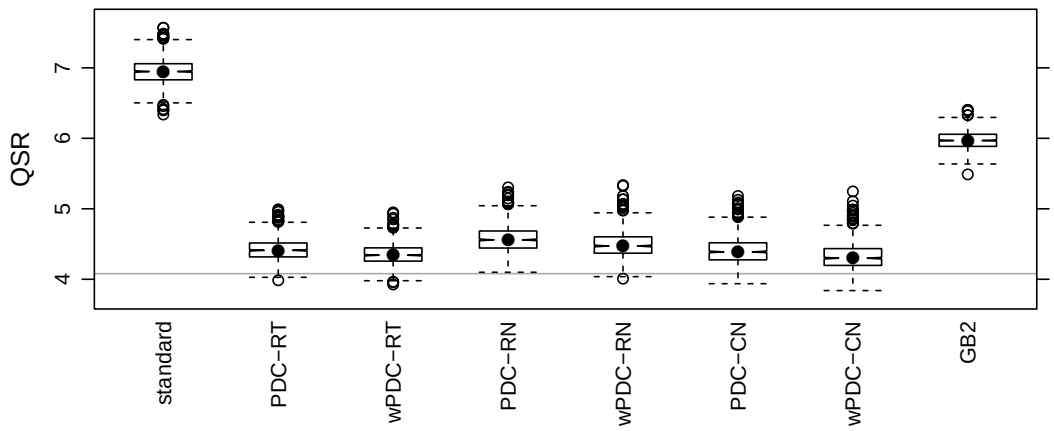

Figure F.87.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.43.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			6.95	0.03	2.87	70.33	6.95	0.17	2.87	2.88	70.47	4.25	0.86
wHill	RT	500	7.78	6.39	3.70	90.79	7.31	0.72	3.23	4.48	109.90	4.79	9.05
wHill	RT	700	6.58	0.39	2.50	61.26	6.48	0.44	2.40	2.58	63.12	3.55	2.03
wHill	RN	300	6.95	0.03	2.87	70.31	6.95	0.17	2.87	2.87	70.45	4.25	0.86
wHill	RN	500	6.89	0.03	2.81	68.92	6.89	0.17	2.81	2.82	69.06	4.17	0.83
wHill	RN	700	6.62	0.04	2.54	62.25	6.62	0.20	2.54	2.55	62.43	3.76	0.77
wHill	CN	300	6.95	0.03	2.87	70.31	6.95	0.17	2.87	2.87	70.45	4.25	0.86
wHill	CN	500	6.89	0.03	2.81	68.80	6.89	0.17	2.81	2.81	68.94	4.16	0.83
wHill	CN	700	6.60	0.04	2.52	61.73	6.60	0.20	2.52	2.53	61.91	3.73	0.77
wISE	RT	500	5.28	0.12	1.20	29.50	5.23	0.28	1.15	1.25	30.69	1.70	1.57
wISE	RT	700	4.75	0.03	0.67	16.41	4.73	0.17	0.65	0.69	16.98	0.97	0.33
wISE	RN	300	6.94	0.03	2.86	70.15	6.94	0.17	2.86	2.87	70.29	4.24	0.86
wISE	RN	500	6.03	0.11	1.95	47.72	6.02	0.35	1.94	1.97	48.38	2.88	0.72
wISE	RN	700	5.02	0.06	0.95	23.16	5.02	0.23	0.94	0.97	23.87	1.39	0.45
wISE	CN	300	6.94	0.03	2.86	70.14	6.94	0.17	2.86	2.87	70.28	4.24	0.86
wISE	CN	500	5.95	0.12	1.87	45.78	5.95	0.38	1.87	1.90	46.58	2.77	0.72
wISE	CN	700	4.89	0.06	0.81	19.78	4.88	0.24	0.80	0.84	20.69	1.19	0.44
wPDC	RT	500	4.61	0.04	0.53	13.05	4.59	0.19	0.51	0.57	13.91	0.76	0.37
wPDC	RT	700	4.35	0.02	0.27	6.71	4.34	0.14	0.26	0.31	7.62	0.39	0.21
wPDC	RN	300	6.45	0.33	2.37	58.18	6.65	0.46	2.57	2.44	59.88	3.81	0.82
wPDC	RN	500	4.96	0.11	0.88	21.67	4.93	0.34	0.85	0.94	23.09	1.26	0.53
wPDC	RN	700	4.49	0.03	0.41	10.10	4.47	0.17	0.39	0.45	11.04	0.58	0.31
wPDC	CN	300	6.39	0.43	2.31	56.62	6.62	0.49	2.54	2.40	58.83	3.77	0.82
wPDC	CN	500	4.78	0.13	0.70	17.09	4.74	0.36	0.66	0.78	19.17	0.98	0.52
wPDC	CN	700	4.32	0.03	0.24	6.00	4.30	0.17	0.22	0.31	7.52	0.33	0.29
GB2			5.97	0.02	1.89	46.38	5.97	0.13	1.89	1.90	46.49	2.80	0.57

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OAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

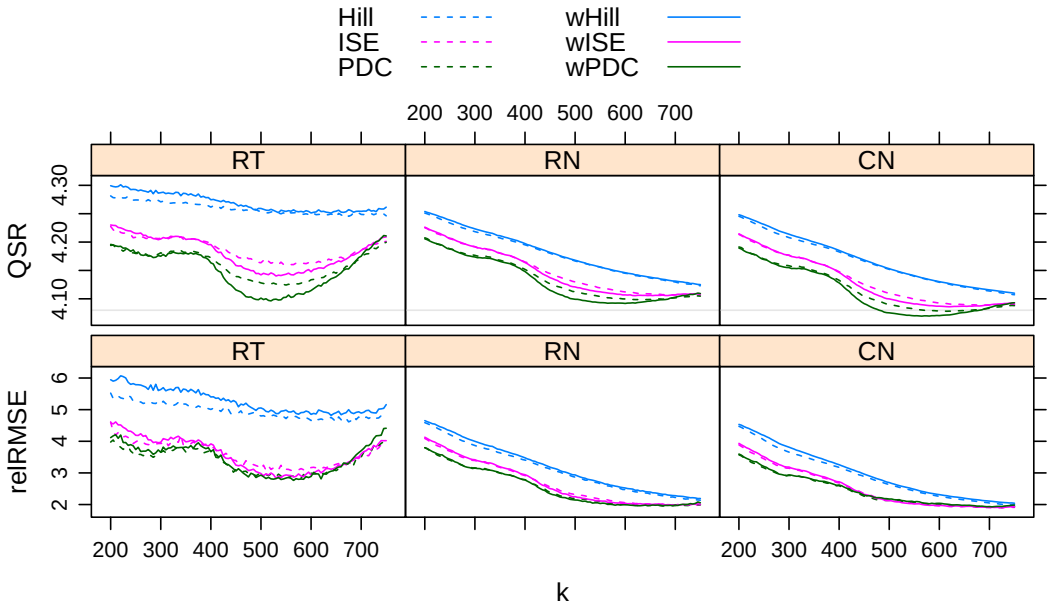

Figure F.88.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

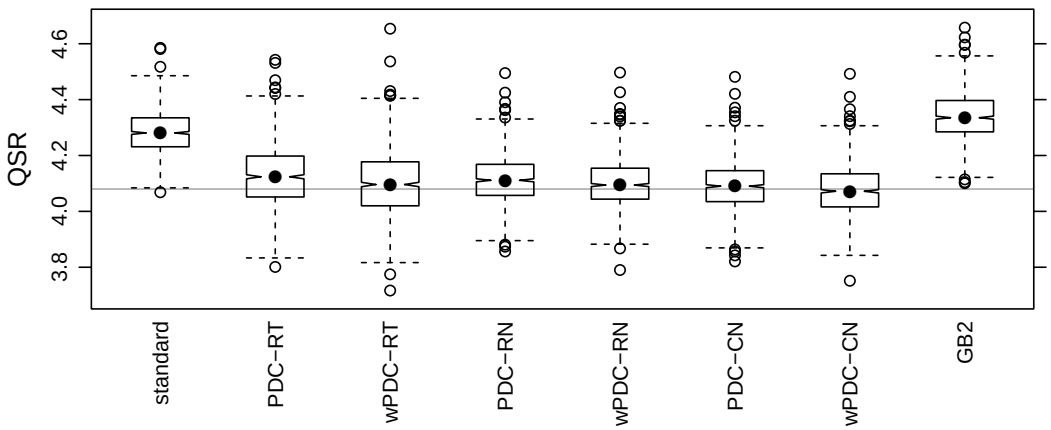

Figure F.89.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.44.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.28	0.01	0.20	4.98	4.28	0.07	0.20	0.22	5.29	0.30	0.12
wHill	RT	300	4.29	0.01	0.21	5.08	4.28	0.10	0.20	0.23	5.64	0.30	0.15
wHill	RT	500	4.26	0.01	0.18	4.40	4.25	0.11	0.17	0.21	5.05	0.25	0.15
wHill	RT	700	4.25	0.01	0.17	4.27	4.25	0.10	0.17	0.20	4.89	0.25	0.13
wHill	RN	300	4.22	0.01	0.14	3.52	4.22	0.08	0.14	0.16	4.00	0.21	0.11
wHill	RN	500	4.17	0.01	0.09	2.16	4.16	0.08	0.08	0.12	2.94	0.13	0.11
wHill	RN	700	4.13	0.01	0.05	1.26	4.13	0.08	0.05	0.09	2.28	0.09	0.10
wHill	CN	300	4.21	0.01	0.13	3.28	4.21	0.08	0.13	0.16	3.81	0.20	0.11
wHill	CN	500	4.15	0.01	0.07	1.80	4.15	0.08	0.07	0.11	2.70	0.11	0.11
wHill	CN	700	4.12	0.01	0.04	0.88	4.11	0.08	0.04	0.09	2.11	0.09	0.09
wISE	RT	300	4.21	0.01	0.13	3.08	4.20	0.11	0.12	0.16	3.97	0.18	0.13
wISE	RT	500	4.14	0.01	0.06	1.53	4.14	0.10	0.06	0.12	2.98	0.12	0.12
wISE	RT	700	4.19	0.01	0.11	2.58	4.18	0.10	0.10	0.15	3.60	0.16	0.12
wISE	RN	300	4.19	0.01	0.11	2.74	4.19	0.09	0.11	0.14	3.42	0.16	0.10
wISE	RN	500	4.12	0.01	0.04	1.01	4.12	0.08	0.04	0.09	2.25	0.09	0.10
wISE	RN	700	4.11	0.01	0.03	0.66	4.11	0.08	0.03	0.08	1.98	0.08	0.08
wISE	CN	300	4.18	0.01	0.10	2.37	4.18	0.09	0.10	0.13	3.18	0.14	0.10
wISE	CN	500	4.10	0.01	0.02	0.49	4.10	0.08	0.02	0.09	2.13	0.09	0.10
wISE	CN	700	4.09	0.01	0.01	0.23	4.09	0.08	0.01	0.08	1.92	0.08	0.07
wPDC	RT	300	4.18	0.01	0.10	2.33	4.17	0.12	0.09	0.15	3.65	0.14	0.14
wPDC	RT	500	4.10	0.01	0.02	0.52	4.10	0.12	0.02	0.12	2.93	0.12	0.14
wPDC	RT	700	4.18	0.01	0.10	2.33	4.17	0.11	0.09	0.15	3.70	0.15	0.14
wPDC	RN	300	4.17	0.01	0.09	2.30	4.17	0.10	0.09	0.13	3.15	0.14	0.10
wPDC	RN	500	4.10	0.01	0.02	0.47	4.09	0.08	0.01	0.09	2.14	0.09	0.10
wPDC	RN	700	4.10	0.01	0.02	0.56	4.10	0.08	0.02	0.08	1.99	0.08	0.07
wPDC	CN	300	4.15	0.01	0.08	1.84	4.16	0.10	0.08	0.12	2.94	0.13	0.09
wPDC	CN	500	4.08	0.01	−0.00	−0.11	4.07	0.09	−0.01	0.09	2.17	0.09	0.10
wPDC	CN	700	4.08	0.01	0.00	0.12	4.08	0.08	0.00	0.08	1.94	0.08	0.07
GB2			4.34	0.01	0.26	6.37	4.34	0.08	0.26	0.27	6.67	0.38	0.14

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OAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

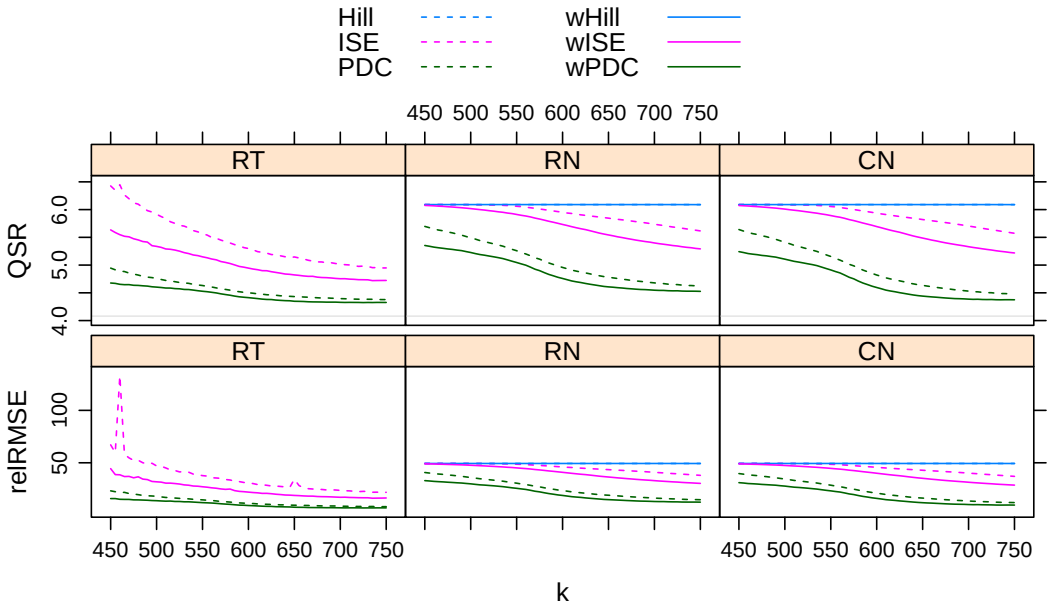

Figure F.90.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

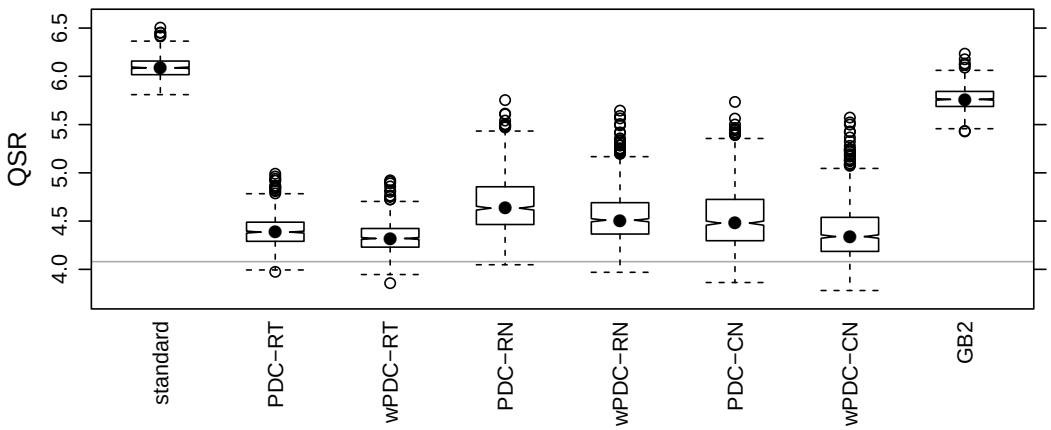

Figure F.91.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.45.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			6.09	0.01	2.01	49.28	6.09	0.10	2.01	2.01	49.34	2.98	0.59
wHill	RT	500	6.94	1.01	2.86	70.08	6.73	0.57	2.65	3.03	74.27	3.93	3.75
wHill	RT	700	6.23	0.41	2.15	52.71	6.14	0.35	2.06	2.24	54.98	3.05	3.38
wHill	RN	300	6.09	0.01	2.01	49.28	6.09	0.10	2.01	2.01	49.34	2.98	0.59
wHill	RN	500	6.09	0.01	2.01	49.28	6.09	0.10	2.01	2.01	49.34	2.98	0.59
wHill	RN	700	6.09	0.01	2.01	49.27	6.09	0.11	2.01	2.01	49.34	2.98	0.59
wHill	CN	300	6.09	0.01	2.01	49.28	6.09	0.10	2.01	2.01	49.34	2.98	0.59
wHill	CN	500	6.09	0.01	2.01	49.28	6.09	0.10	2.01	2.01	49.34	2.98	0.59
wHill	CN	700	6.09	0.01	2.01	49.27	6.09	0.11	2.01	2.01	49.34	2.98	0.59
wISE	RT	500	5.34	0.11	1.26	30.81	5.30	0.30	1.22	1.30	31.85	1.80	0.71
wISE	RT	700	4.75	0.03	0.67	16.52	4.74	0.16	0.66	0.70	17.09	0.98	0.35
wISE	RN	300	6.09	0.01	2.01	49.28	6.09	0.10	2.01	2.01	49.34	2.98	0.59
wISE	RN	500	6.02	0.02	1.94	47.50	6.02	0.16	1.94	1.94	47.63	2.87	0.59
wISE	RN	700	5.40	0.07	1.32	32.33	5.41	0.22	1.33	1.34	32.94	1.97	0.52
wISE	CN	300	6.09	0.01	2.01	49.28	6.09	0.10	2.01	2.01	49.34	2.98	0.59
wISE	CN	500	6.01	0.02	1.93	47.28	6.01	0.17	1.93	1.94	47.43	2.87	0.59
wISE	CN	700	5.33	0.08	1.25	30.66	5.34	0.24	1.26	1.28	31.43	1.87	0.52
wPDC	RT	500	4.60	0.05	0.52	12.81	4.58	0.20	0.50	0.56	13.83	0.74	0.53
wPDC	RT	700	4.33	0.02	0.25	6.09	4.32	0.14	0.24	0.29	7.05	0.36	0.21
wPDC	RN	300	6.07	0.02	1.99	48.75	6.08	0.11	2.00	2.00	48.90	2.97	0.59
wPDC	RN	500	5.23	0.17	1.15	28.10	5.26	0.46	1.18	1.22	29.91	1.74	0.53
wPDC	RN	700	4.55	0.07	0.47	11.46	4.51	0.23	0.43	0.53	13.07	0.64	0.38
wPDC	CN	300	6.06	0.03	1.98	48.64	6.08	0.11	2.00	1.99	48.83	2.97	0.59
wPDC	CN	500	5.11	0.23	1.03	25.16	5.14	0.53	1.06	1.13	27.75	1.57	0.53
wPDC	CN	700	4.39	0.08	0.31	7.50	4.34	0.25	0.26	0.41	10.17	0.39	0.37
GB2			5.77	0.01	1.69	41.34	5.76	0.11	1.68	1.69	41.43	2.49	0.53

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OAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

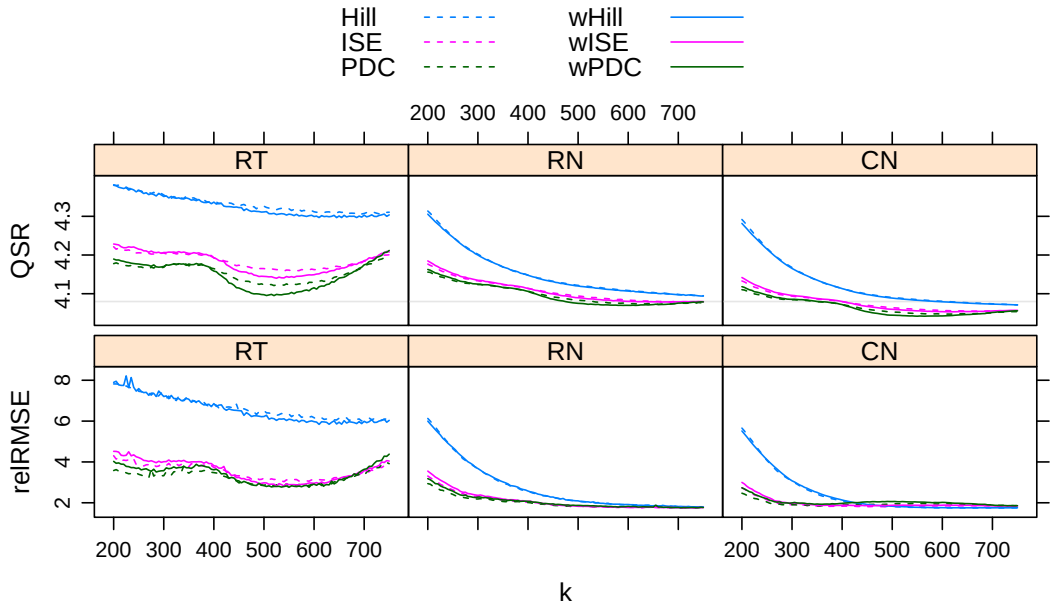

Figure F.92.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

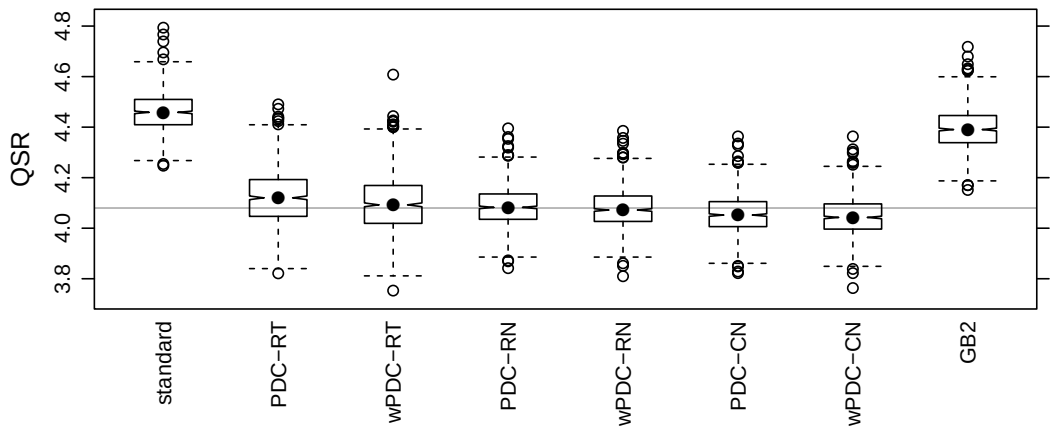

Figure F.93.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.46.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.46	0.01	0.38	9.33	4.46	0.07	0.38	0.39	9.52	0.56	0.17
wHill	RT	300	4.35	0.01	0.27	6.65	4.34	0.10	0.26	0.29	7.20	0.39	0.18
wHill	RT	500	4.31	0.01	0.23	5.67	4.30	0.10	0.23	0.25	6.23	0.33	0.17
wHill	RT	700	4.30	0.01	0.22	5.47	4.30	0.10	0.22	0.24	5.99	0.32	0.15
wHill	RN	300	4.20	0.01	0.12	2.94	4.20	0.09	0.12	0.15	3.68	0.18	0.12
wHill	RN	500	4.12	0.01	0.04	0.99	4.12	0.08	0.04	0.09	2.09	0.08	0.09
wHill	RN	700	4.10	0.01	0.02	0.42	4.10	0.07	0.02	0.07	1.82	0.07	0.08
wHill	CN	300	4.17	0.01	0.09	2.09	4.16	0.09	0.08	0.13	3.08	0.13	0.11
wHill	CN	500	4.09	0.01	0.01	0.22	4.08	0.08	0.00	0.07	1.83	0.07	0.08
wHill	CN	700	4.07	0.01	−0.01	−0.16	4.07	0.07	−0.01	0.07	1.75	0.07	0.07
wISE	RT	300	4.21	0.01	0.13	3.10	4.21	0.11	0.13	0.16	4.01	0.19	0.14
wISE	RT	500	4.14	0.01	0.06	1.59	4.14	0.10	0.06	0.12	2.98	0.12	0.14
wISE	RT	700	4.19	0.01	0.11	2.58	4.18	0.10	0.10	0.15	3.58	0.16	0.11
wISE	RN	300	4.13	0.01	0.05	1.34	4.13	0.08	0.05	0.10	2.36	0.10	0.09
wISE	RN	500	4.09	0.01	0.01	0.24	4.09	0.07	0.01	0.07	1.83	0.08	0.07
wISE	RN	700	4.08	0.01	−0.00	−0.03	4.08	0.07	−0.00	0.07	1.76	0.07	0.07
wISE	CN	300	4.10	0.01	0.02	0.39	4.09	0.08	0.01	0.08	1.98	0.08	0.08
wISE	CN	500	4.06	0.01	−0.02	−0.49	4.06	0.07	−0.02	0.08	1.88	0.08	0.07
wISE	CN	700	4.06	0.01	−0.02	−0.60	4.05	0.07	−0.03	0.08	1.85	0.08	0.07
wPDC	RT	300	4.17	0.01	0.09	2.22	4.16	0.11	0.08	0.15	3.57	0.14	0.15
wPDC	RT	500	4.10	0.01	0.02	0.43	4.09	0.11	0.01	0.12	2.84	0.11	0.13
wPDC	RT	700	4.17	0.01	0.09	2.32	4.17	0.11	0.09	0.15	3.64	0.15	0.13
wPDC	RN	300	4.12	0.01	0.04	1.10	4.12	0.08	0.04	0.09	2.28	0.09	0.09
wPDC	RN	500	4.08	0.01	−0.00	−0.12	4.07	0.07	−0.01	0.08	1.87	0.07	0.07
wPDC	RN	700	4.08	0.01	−0.00	−0.10	4.07	0.07	−0.01	0.07	1.77	0.07	0.07
wPDC	CN	300	4.09	0.01	0.01	0.14	4.08	0.08	−0.00	0.08	1.99	0.08	0.08
wPDC	CN	500	4.04	0.01	−0.04	−0.87	4.04	0.07	−0.04	0.08	2.06	0.09	0.08
wPDC	CN	700	4.05	0.01	−0.03	−0.69	4.05	0.07	−0.03	0.08	1.89	0.08	0.07
GB2			4.39	0.01	0.31	7.66	4.39	0.08	0.31	0.32	7.91	0.46	0.16

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OAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

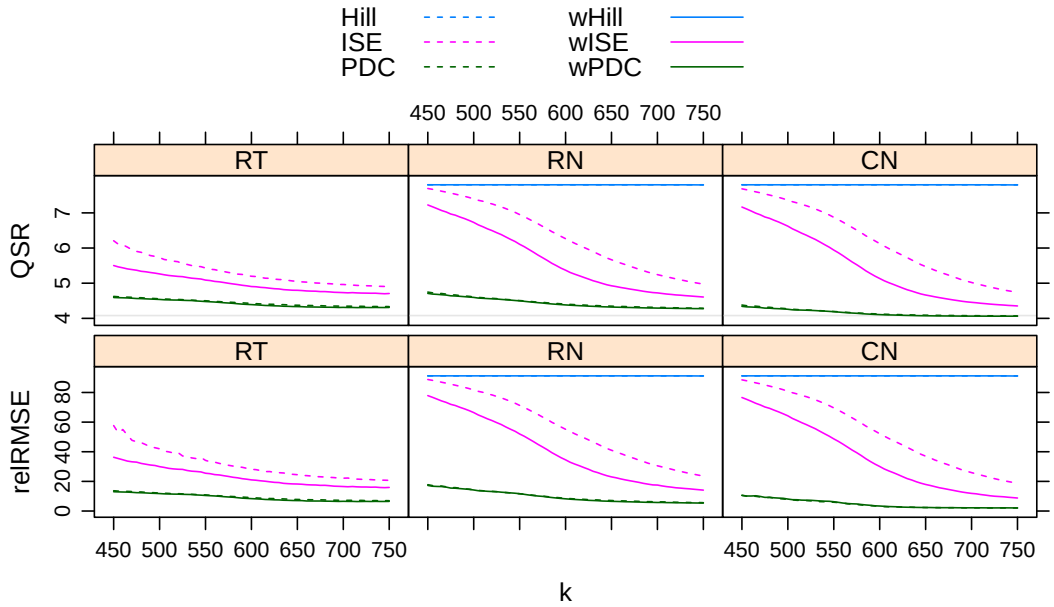

Figure F.94.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

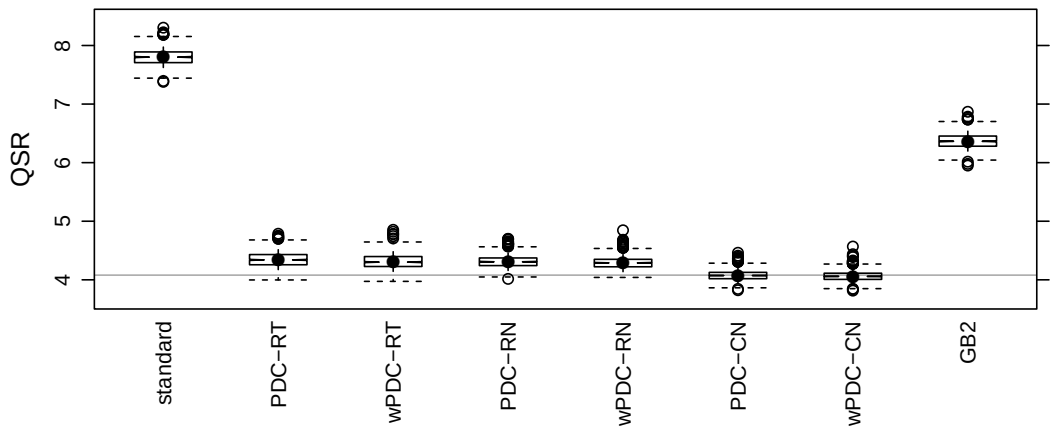

Figure F.95.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.47.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			7.80	0.02	3.72	91.15	7.80	0.14	3.72	3.72	91.21	5.52	1.04
wHill	RT	500	10.55	131.51	6.47	158.62	8.97	1.32	4.89	13.16	322.63	7.25	48.31
wHill	RT	700	7.66	3.93	3.58	87.65	7.40	0.65	3.32	4.09	100.21	4.92	12.12
wHill	RN	300	7.80	0.02	3.72	91.15	7.80	0.14	3.72	3.72	91.21	5.52	1.04
wHill	RN	500	7.80	0.02	3.72	91.15	7.80	0.14	3.72	3.72	91.21	5.52	1.04
wHill	RN	700	7.80	0.02	3.72	91.15	7.80	0.14	3.72	3.72	91.21	5.52	1.04
wHill	CN	300	7.80	0.02	3.72	91.15	7.80	0.14	3.72	3.72	91.21	5.52	1.04
wHill	CN	500	7.80	0.02	3.72	91.15	7.80	0.14	3.72	3.72	91.21	5.52	1.04
wHill	CN	700	7.80	0.02	3.72	91.15	7.80	0.14	3.72	3.72	91.21	5.52	1.04
wISE	RT	500	5.26	0.09	1.18	29.02	5.23	0.28	1.15	1.22	29.95	1.70	0.79
wISE	RT	700	4.73	0.03	0.65	15.99	4.72	0.16	0.64	0.67	16.53	0.95	0.33
wISE	RN	300	7.80	0.02	3.72	91.15	7.80	0.14	3.72	3.72	91.21	5.52	1.04
wISE	RN	500	6.73	0.33	2.65	64.93	6.73	0.60	2.65	2.71	66.45	3.93	1.01
wISE	RN	700	4.72	0.10	0.64	15.79	4.67	0.25	0.59	0.71	17.52	0.87	0.95
wISE	CN	300	7.80	0.02	3.72	91.15	7.80	0.14	3.72	3.72	91.21	5.52	1.04
wISE	CN	500	6.62	0.41	2.54	62.32	6.61	0.64	2.53	2.62	64.25	3.75	1.01
wISE	CN	700	4.46	0.09	0.38	9.21	4.39	0.25	0.31	0.49	11.89	0.46	0.52
wPDC	RT	500	4.54	0.02	0.46	11.23	4.52	0.14	0.44	0.48	11.77	0.65	0.29
wPDC	RT	700	4.31	0.02	0.23	5.71	4.30	0.12	0.22	0.27	6.55	0.33	0.19
wPDC	RN	300	6.59	0.48	2.51	61.56	6.36	0.54	2.28	2.60	63.85	3.38	1.04
wPDC	RN	500	4.60	0.07	0.52	12.64	4.53	0.16	0.45	0.58	14.19	0.67	0.68
wPDC	RN	700	4.29	0.01	0.21	5.19	4.29	0.09	0.21	0.23	5.75	0.31	0.19
wPDC	CN	300	6.40	0.64	2.32	56.93	6.13	0.65	2.05	2.46	60.21	3.04	1.04
wPDC	CN	500	4.26	0.08	0.18	4.38	4.19	0.15	0.11	0.33	8.07	0.17	0.66
wPDC	CN	700	4.06	0.01	−0.02	−0.40	4.06	0.08	−0.02	0.09	2.17	0.08	0.12
GB2			6.37	0.02	2.29	56.06	6.36	0.13	2.28	2.29	56.15	3.39	0.68

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OAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

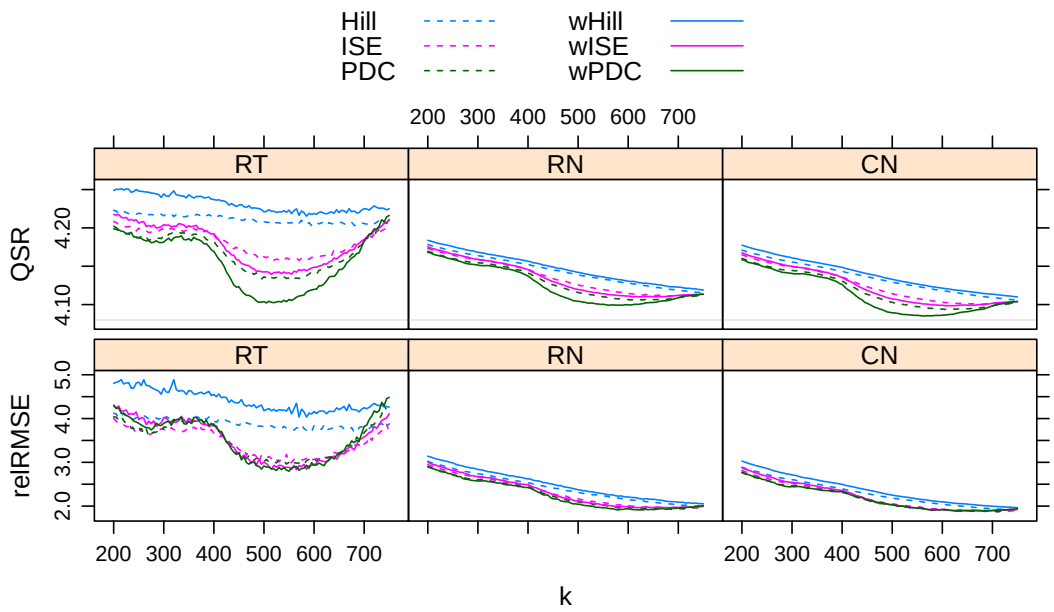

Figure F.96.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

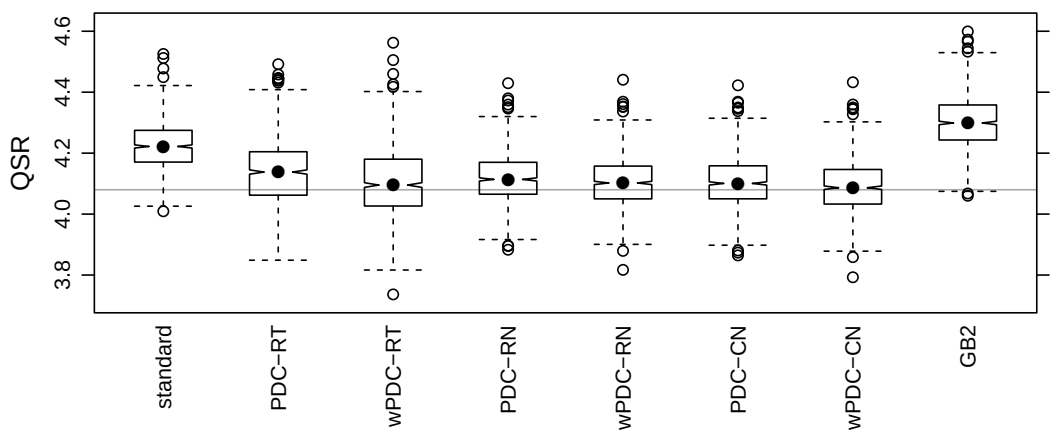

Figure F.97.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.48.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.22	0.01	0.14	3.52	4.22	0.08	0.14	0.16	3.99	0.21	0.11
wHill	RT	300	4.24	0.01	0.16	4.03	4.24	0.09	0.16	0.19	4.69	0.24	0.20
wHill	RT	500	4.22	0.01	0.14	3.46	4.22	0.10	0.14	0.17	4.18	0.20	0.13
wHill	RT	700	4.23	0.01	0.15	3.56	4.22	0.10	0.14	0.17	4.25	0.21	0.13
wHill	RN	300	4.17	0.01	0.09	2.17	4.17	0.07	0.09	0.12	2.84	0.13	0.10
wHill	RN	500	4.14	0.01	0.06	1.52	4.14	0.07	0.06	0.10	2.37	0.10	0.09
wHill	RN	700	4.12	0.01	0.04	1.05	4.12	0.07	0.04	0.09	2.09	0.09	0.08
wHill	CN	300	4.16	0.01	0.08	1.99	4.16	0.08	0.08	0.11	2.72	0.12	0.10
wHill	CN	500	4.13	0.01	0.05	1.30	4.13	0.07	0.05	0.09	2.25	0.10	0.09
wHill	CN	700	4.11	0.01	0.03	0.82	4.11	0.07	0.03	0.08	2.00	0.08	0.08
wISE	RT	300	4.20	0.01	0.12	3.05	4.20	0.11	0.12	0.16	4.03	0.18	0.22
wISE	RT	500	4.14	0.01	0.06	1.54	4.14	0.11	0.06	0.12	3.01	0.11	0.16
wISE	RT	700	4.18	0.01	0.11	2.58	4.18	0.10	0.10	0.15	3.58	0.15	0.11
wISE	RN	300	4.16	0.01	0.08	1.94	4.16	0.08	0.08	0.11	2.68	0.12	0.09
wISE	RN	500	4.12	0.01	0.04	0.98	4.12	0.08	0.04	0.09	2.12	0.09	0.09
wISE	RN	700	4.11	0.01	0.03	0.79	4.11	0.07	0.03	0.08	1.97	0.08	0.08
wISE	CN	300	4.15	0.01	0.07	1.72	4.15	0.08	0.07	0.10	2.54	0.11	0.09
wISE	CN	500	4.11	0.01	0.03	0.68	4.11	0.08	0.03	0.08	2.03	0.08	0.09
wISE	CN	700	4.10	0.01	0.02	0.53	4.10	0.07	0.02	0.08	1.90	0.08	0.08
wPDC	RT	300	4.18	0.01	0.10	2.49	4.17	0.12	0.09	0.16	3.89	0.15	0.18
wPDC	RT	500	4.10	0.01	0.02	0.59	4.10	0.12	0.02	0.12	2.92	0.12	0.12
wPDC	RT	700	4.18	0.01	0.10	2.51	4.18	0.12	0.10	0.16	3.82	0.16	0.13
wPDC	RN	300	4.15	0.01	0.07	1.76	4.15	0.08	0.07	0.11	2.58	0.11	0.09
wPDC	RN	500	4.10	0.01	0.02	0.60	4.10	0.08	0.02	0.08	2.04	0.08	0.09
wPDC	RN	700	4.11	0.01	0.03	0.71	4.11	0.07	0.03	0.08	1.96	0.08	0.07
wPDC	CN	300	4.14	0.01	0.06	1.49	4.14	0.08	0.06	0.10	2.45	0.10	0.08
wPDC	CN	500	4.09	0.01	0.01	0.23	4.09	0.08	0.01	0.08	2.03	0.08	0.09
wPDC	CN	700	4.10	0.01	0.02	0.45	4.10	0.07	0.02	0.08	1.90	0.08	0.07
GB2			4.30	0.01	0.22	5.41	4.30	0.08	0.22	0.23	5.75	0.32	0.13

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OAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

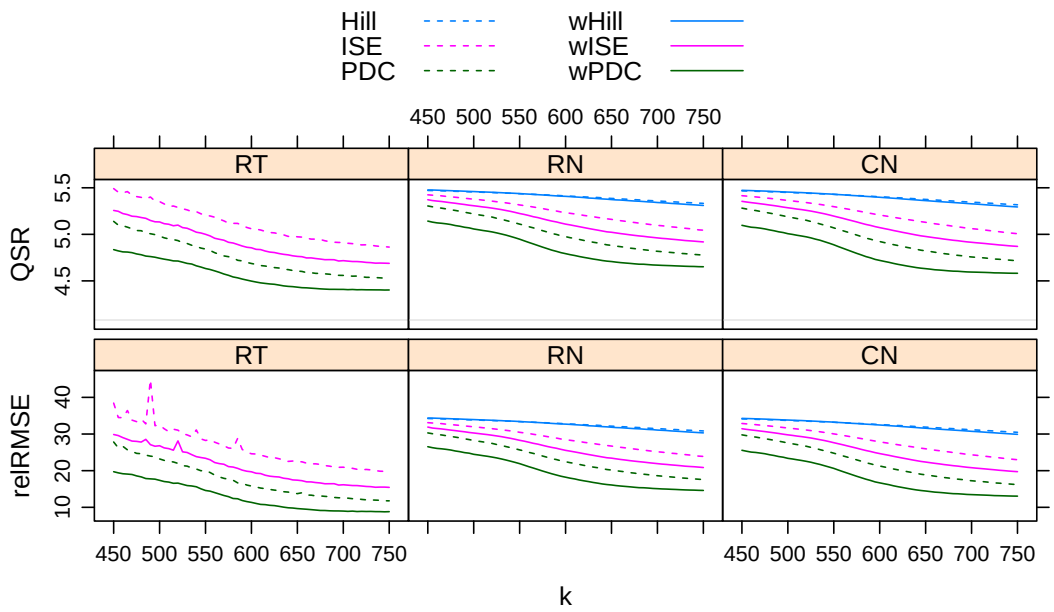

Figure F.98.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

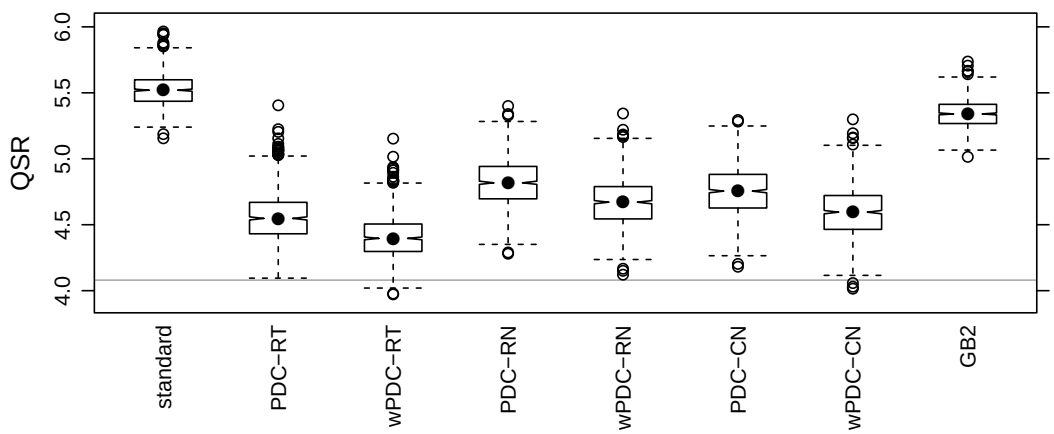

Figure F.99.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.49.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			5.52	0.01	1.44	35.35	5.52	0.12	1.44	1.45	35.47	2.14	0.46
wHill	RT	500	5.76	0.17	1.68	41.30	5.68	0.29	1.60	1.74	42.53	2.38	1.26
wHill	RT	700	5.48	0.07	1.40	34.42	5.45	0.24	1.37	1.43	35.06	2.03	0.80
wHill	RN	300	5.51	0.02	1.43	35.08	5.51	0.12	1.43	1.44	35.21	2.12	0.60
wHill	RN	500	5.46	0.01	1.38	33.81	5.46	0.12	1.38	1.38	33.94	2.05	0.45
wHill	RN	700	5.34	0.02	1.26	30.93	5.34	0.12	1.26	1.27	31.07	1.87	0.42
wHill	CN	300	5.51	0.01	1.43	35.02	5.51	0.12	1.43	1.43	35.15	2.12	0.46
wHill	CN	500	5.45	0.01	1.37	33.69	5.45	0.12	1.37	1.38	33.82	2.04	0.44
wHill	CN	700	5.33	0.02	1.25	30.58	5.33	0.12	1.25	1.25	30.74	1.85	0.42
wISE	RT	500	5.13	0.09	1.05	25.81	5.09	0.24	1.01	1.09	26.80	1.50	1.00
wISE	RT	700	4.72	0.03	0.64	15.62	4.71	0.16	0.63	0.66	16.16	0.93	0.40
wISE	RN	300	5.51	0.01	1.43	34.93	5.50	0.12	1.43	1.43	35.06	2.11	0.46
wISE	RN	500	5.31	0.02	1.23	30.08	5.31	0.14	1.23	1.24	30.28	1.82	0.41
wISE	RN	700	4.96	0.02	0.88	21.61	4.96	0.15	0.88	0.89	21.92	1.31	0.34
wISE	CN	300	5.50	0.02	1.42	34.90	5.50	0.12	1.42	1.43	35.02	2.11	0.46
wISE	CN	500	5.29	0.02	1.21	29.55	5.28	0.15	1.20	1.21	29.77	1.79	0.41
wISE	CN	700	4.91	0.02	0.83	20.46	4.92	0.16	0.84	0.85	20.81	1.25	0.33
wPDC	RT	500	4.74	0.06	0.66	16.26	4.71	0.23	0.63	0.71	17.36	0.94	0.45
wPDC	RT	700	4.41	0.03	0.33	8.06	4.40	0.15	0.32	0.37	8.98	0.47	0.26
wPDC	RN	300	5.46	0.02	1.38	33.86	5.47	0.14	1.39	1.39	34.07	2.06	0.46
wPDC	RN	500	5.06	0.04	0.98	23.96	5.06	0.21	0.98	1.00	24.46	1.46	0.40
wPDC	RN	700	4.67	0.03	0.59	14.44	4.67	0.18	0.59	0.62	15.09	0.88	0.31
wPDC	CN	300	5.45	0.03	1.37	33.68	5.47	0.14	1.39	1.38	33.92	2.05	0.46
wPDC	CN	500	5.01	0.05	0.93	22.72	5.01	0.23	0.93	0.95	23.36	1.38	0.40
wPDC	CN	700	4.59	0.04	0.51	12.62	4.60	0.19	0.52	0.55	13.46	0.76	0.30
GB2			5.34	0.01	1.26	30.92	5.34	0.11	1.26	1.27	31.04	1.87	0.41

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OAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 20.

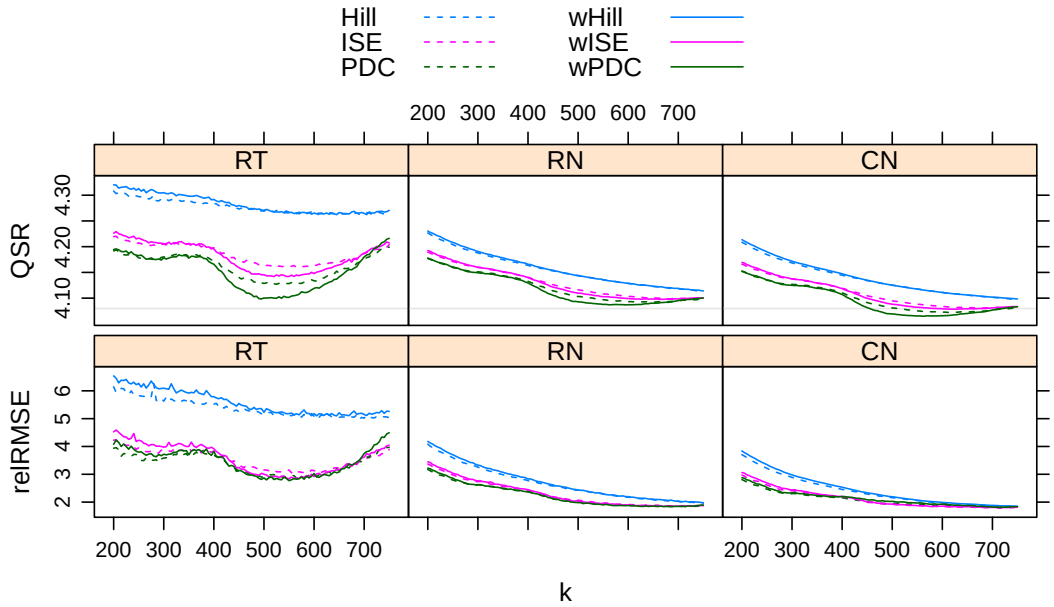

Figure F.100.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

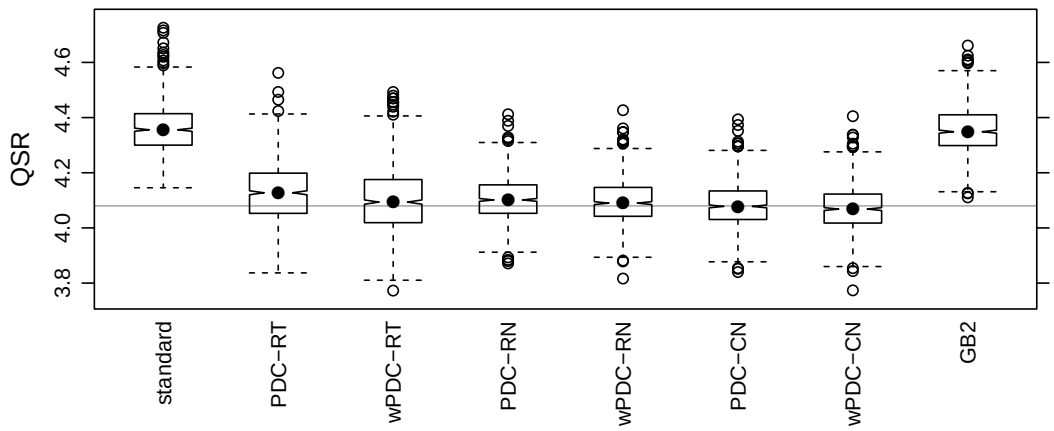

Figure F.101.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.50.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			4.36	0.01	0.28	6.84	4.36	0.08	0.28	0.29	7.18	0.41	0.16
wHill	RT	300	4.30	0.01	0.23	5.52	4.30	0.11	0.22	0.25	6.09	0.32	0.16
wHill	RT	500	4.27	0.01	0.19	4.63	4.26	0.10	0.18	0.21	5.23	0.27	0.14
wHill	RT	700	4.26	0.01	0.18	4.53	4.26	0.09	0.18	0.21	5.15	0.27	0.16
wHill	RN	300	4.19	0.01	0.11	2.72	4.19	0.08	0.11	0.14	3.33	0.16	0.10
wHill	RN	500	4.14	0.01	0.06	1.56	4.14	0.08	0.06	0.10	2.44	0.10	0.09
wHill	RN	700	4.12	0.01	0.04	0.96	4.11	0.07	0.03	0.08	2.04	0.09	0.08
wHill	CN	300	4.17	0.01	0.09	2.25	4.17	0.08	0.09	0.12	2.98	0.14	0.10
wHill	CN	500	4.13	0.01	0.05	1.11	4.12	0.08	0.04	0.09	2.19	0.09	0.09
wHill	CN	700	4.10	0.01	0.02	0.54	4.10	0.07	0.02	0.08	1.88	0.08	0.08
wISE	RT	300	4.21	0.01	0.13	3.08	4.20	0.10	0.12	0.16	3.97	0.18	0.14
wISE	RT	500	4.15	0.01	0.07	1.61	4.14	0.10	0.06	0.12	3.00	0.12	0.12
wISE	RT	700	4.19	0.01	0.11	2.61	4.18	0.10	0.10	0.15	3.62	0.16	0.13
wISE	RN	300	4.16	0.01	0.08	1.96	4.16	0.08	0.08	0.11	2.76	0.12	0.09
wISE	RN	500	4.11	0.01	0.03	0.73	4.11	0.08	0.03	0.08	2.03	0.09	0.09
wISE	RN	700	4.10	0.01	0.02	0.45	4.10	0.07	0.02	0.08	1.85	0.08	0.08
wISE	CN	300	4.14	0.01	0.06	1.41	4.13	0.08	0.06	0.10	2.43	0.10	0.08
wISE	CN	500	4.09	0.01	0.01	0.20	4.09	0.08	0.01	0.08	1.93	0.08	0.08
wISE	CN	700	4.08	0.01	0.00	0.03	4.08	0.07	−0.00	0.07	1.81	0.07	0.07
wPDC	RT	300	4.18	0.01	0.10	2.41	4.17	0.11	0.09	0.15	3.72	0.15	0.14
wPDC	RT	500	4.10	0.01	0.02	0.50	4.09	0.12	0.01	0.12	2.87	0.11	0.10
wPDC	RT	700	4.18	0.01	0.10	2.45	4.17	0.11	0.09	0.15	3.75	0.15	0.12
wPDC	RN	300	4.15	0.01	0.07	1.70	4.15	0.08	0.07	0.11	2.63	0.11	0.08
wPDC	RN	500	4.09	0.01	0.01	0.32	4.09	0.08	0.01	0.08	1.98	0.08	0.08
wPDC	RN	700	4.10	0.01	0.02	0.38	4.09	0.07	0.01	0.08	1.84	0.07	0.07
wPDC	CN	300	4.12	0.01	0.05	1.10	4.12	0.09	0.04	0.10	2.33	0.09	0.08
wPDC	CN	500	4.07	0.01	−0.01	−0.26	4.07	0.08	−0.01	0.08	2.03	0.08	0.08
wPDC	CN	700	4.08	0.01	−0.00	−0.08	4.08	0.07	−0.00	0.07	1.82	0.07	0.07
GB2			4.35	0.01	0.27	6.69	4.35	0.08	0.27	0.28	6.98	0.40	0.14

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OAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 20.

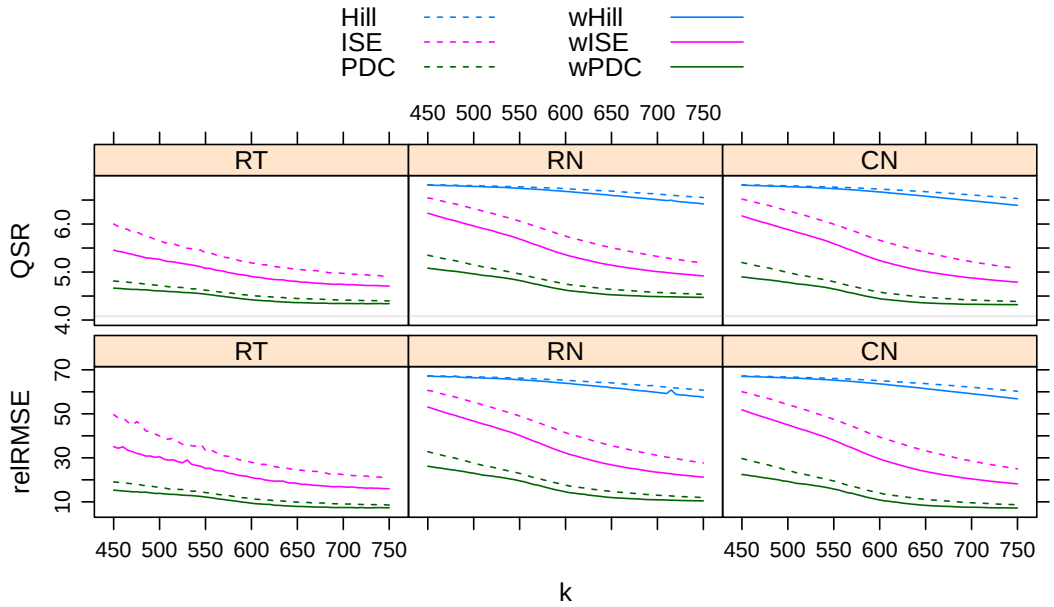

Figure F.102.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

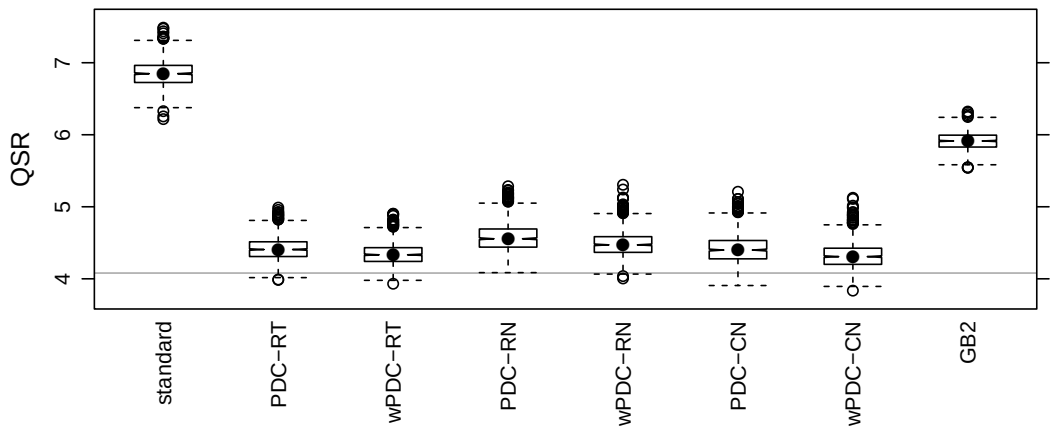

Figure F.103.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.51.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			6.85	0.03	2.77	67.82	6.85	0.18	2.77	2.77	67.97	4.10	0.84
wHill	RT	500	7.50	2.11	3.42	83.85	7.20	0.69	3.12	3.72	91.08	4.62	5.39
wHill	RT	700	6.54	0.49	2.46	60.34	6.44	0.44	2.36	2.56	62.74	3.50	2.90
wHill	RN	300	6.84	0.03	2.77	67.77	6.85	0.18	2.77	2.77	67.92	4.10	0.84
wHill	RN	500	6.78	0.03	2.70	66.27	6.78	0.17	2.70	2.71	66.41	4.01	0.84
wHill	RN	700	6.51	0.04	2.43	59.51	6.50	0.19	2.42	2.44	59.69	3.59	0.80
wHill	CN	300	6.84	0.03	2.76	67.77	6.85	0.18	2.77	2.77	67.92	4.10	0.84
wHill	CN	500	6.78	0.03	2.70	66.16	6.78	0.18	2.70	2.71	66.30	4.00	0.84
wHill	CN	700	6.48	0.04	2.41	58.95	6.48	0.19	2.40	2.41	59.13	3.56	0.75
wISE	RT	500	5.27	0.14	1.19	29.12	5.20	0.27	1.12	1.25	30.54	1.66	1.21
wISE	RT	700	4.74	0.03	0.66	16.25	4.73	0.16	0.65	0.69	16.80	0.96	0.45
wISE	RN	300	6.84	0.03	2.76	67.56	6.83	0.18	2.75	2.76	67.70	4.08	0.84
wISE	RN	500	5.96	0.10	1.88	46.10	5.97	0.31	1.89	1.91	46.72	2.80	0.72
wISE	RN	700	5.01	0.05	0.93	22.74	5.00	0.22	0.92	0.96	23.43	1.36	0.42
wISE	CN	300	6.84	0.03	2.76	67.54	6.83	0.18	2.75	2.76	67.69	4.08	0.84
wISE	CN	500	5.88	0.11	1.80	44.24	5.89	0.33	1.81	1.84	44.98	2.69	0.69
wISE	CN	700	4.88	0.06	0.80	19.53	4.86	0.23	0.78	0.83	20.41	1.16	0.39
wPDC	RT	500	4.61	0.04	0.53	12.94	4.59	0.19	0.51	0.57	13.86	0.75	0.42
wPDC	RT	700	4.34	0.02	0.26	6.48	4.33	0.14	0.25	0.30	7.42	0.38	0.20
wPDC	RN	300	6.38	0.30	2.30	56.32	6.55	0.42	2.47	2.36	57.87	3.66	0.84
wPDC	RN	500	4.96	0.10	0.88	21.62	4.92	0.33	0.84	0.94	23.01	1.24	0.61
wPDC	RN	700	4.49	0.03	0.41	10.01	4.47	0.16	0.39	0.45	10.92	0.58	0.30
wPDC	CN	300	6.32	0.38	2.24	54.84	6.52	0.45	2.44	2.32	56.87	3.62	0.84
wPDC	CN	500	4.78	0.12	0.70	17.27	4.74	0.36	0.66	0.79	19.29	0.98	0.60
wPDC	CN	700	4.33	0.03	0.25	6.08	4.31	0.17	0.23	0.31	7.54	0.34	0.26
GB2			5.91	0.01	1.83	44.96	5.91	0.12	1.83	1.84	45.06	2.72	0.55

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F.5.2. Gini coefficient

Simple random sampling

No contamination

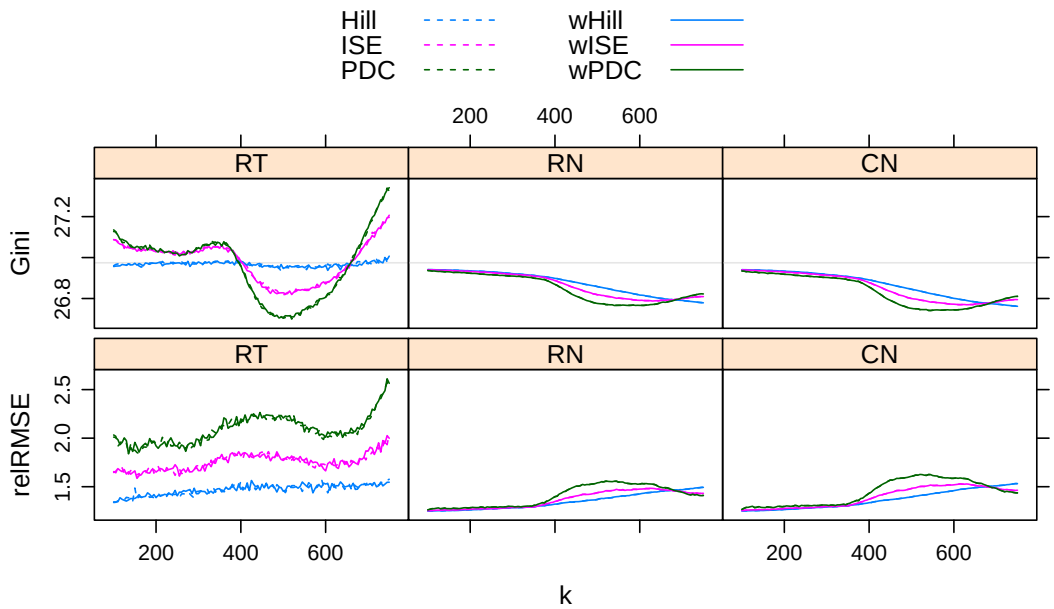

Figure F.104.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 100 and 750.

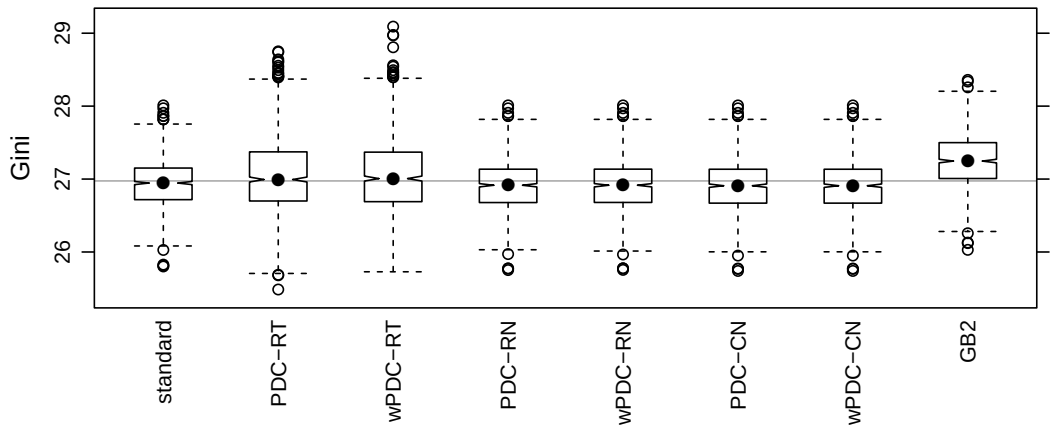

Figure F.105.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 300$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.52.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			26.94	0.11	−0.03	−0.12	26.95	0.33	−0.03	0.34	1.25	0.33	0.04
wHill	RT	300	26.98	0.15	0.00	0.02	26.99	0.38	0.01	0.39	1.43	0.38	0.05
wHill	RT	500	26.95	0.15	−0.03	−0.10	26.96	0.40	−0.01	0.39	1.45	0.40	0.05
wHill	RT	700	26.97	0.17	−0.01	−0.02	26.98	0.40	0.01	0.41	1.52	0.40	0.06
wHill	RN	300	26.92	0.12	−0.05	−0.20	26.93	0.33	−0.05	0.35	1.28	0.33	0.05
wHill	RN	500	26.86	0.12	−0.12	−0.43	26.87	0.34	−0.11	0.37	1.37	0.36	0.05
wHill	RN	700	26.79	0.12	−0.18	−0.68	26.80	0.35	−0.17	0.40	1.47	0.39	0.05
wHill	CN	300	26.92	0.12	−0.06	−0.21	26.92	0.33	−0.05	0.35	1.29	0.33	0.05
wHill	CN	500	26.85	0.12	−0.13	−0.48	26.86	0.35	−0.12	0.38	1.39	0.37	0.05
wHill	CN	700	26.77	0.12	−0.20	−0.75	26.78	0.35	−0.19	0.41	1.51	0.41	0.05
wISE	RT	300	27.03	0.20	0.05	0.19	27.00	0.44	0.03	0.45	1.67	0.44	0.05
wISE	RT	500	26.83	0.21	−0.15	−0.54	26.80	0.43	−0.18	0.48	1.77	0.50	0.08
wISE	RT	700	27.08	0.24	0.11	0.41	27.05	0.48	0.08	0.50	1.87	0.47	0.06
wISE	RN	300	26.92	0.12	−0.06	−0.21	26.92	0.33	−0.05	0.35	1.29	0.34	0.04
wISE	RN	500	26.82	0.13	−0.16	−0.58	26.83	0.35	−0.15	0.39	1.44	0.38	0.05
wISE	RN	700	26.80	0.12	−0.18	−0.65	26.81	0.35	−0.17	0.39	1.45	0.39	0.05
wISE	CN	300	26.91	0.12	−0.06	−0.23	26.92	0.34	−0.05	0.35	1.30	0.34	0.04
wISE	CN	500	26.80	0.13	−0.17	−0.65	26.81	0.35	−0.16	0.40	1.48	0.39	0.05
wISE	CN	700	26.78	0.12	−0.19	−0.71	26.79	0.34	−0.18	0.40	1.49	0.40	0.05
wPDC	RT	300	27.05	0.28	0.07	0.28	27.01	0.50	0.03	0.53	1.98	0.50	0.08
wPDC	RT	500	26.71	0.28	−0.27	−0.99	26.69	0.53	−0.29	0.60	2.21	0.63	0.07
wPDC	RT	700	27.14	0.33	0.17	0.63	27.13	0.60	0.16	0.60	2.23	0.58	0.09
wPDC	RN	300	26.91	0.12	−0.06	−0.24	26.92	0.34	−0.06	0.35	1.30	0.34	0.05
wPDC	RN	500	26.78	0.13	−0.20	−0.74	26.78	0.35	−0.19	0.42	1.54	0.40	0.05
wPDC	RN	700	26.80	0.12	−0.17	−0.63	26.81	0.34	−0.17	0.39	1.44	0.39	0.05
wPDC	CN	300	26.90	0.12	−0.07	−0.27	26.91	0.34	−0.07	0.35	1.31	0.34	0.05
wPDC	CN	500	26.75	0.14	−0.22	−0.83	26.76	0.36	−0.22	0.43	1.61	0.43	0.05
wPDC	CN	700	26.79	0.13	−0.19	−0.69	26.79	0.34	−0.18	0.40	1.48	0.41	0.05
GB2			27.25	0.13	0.27	1.02	27.25	0.36	0.27	0.45	1.68	0.47	0.05

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OCAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

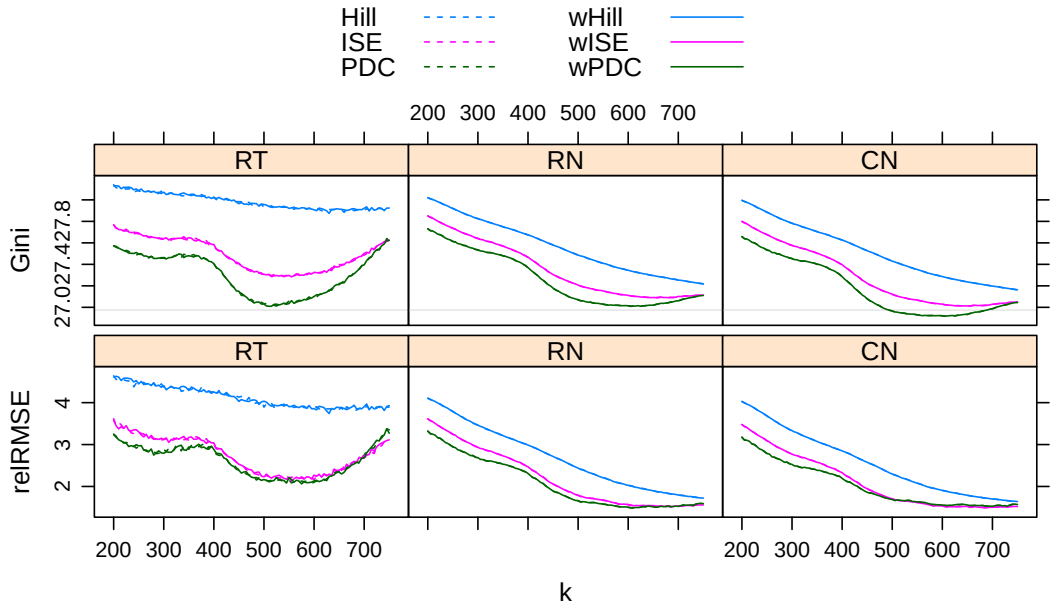

Figure F.106.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

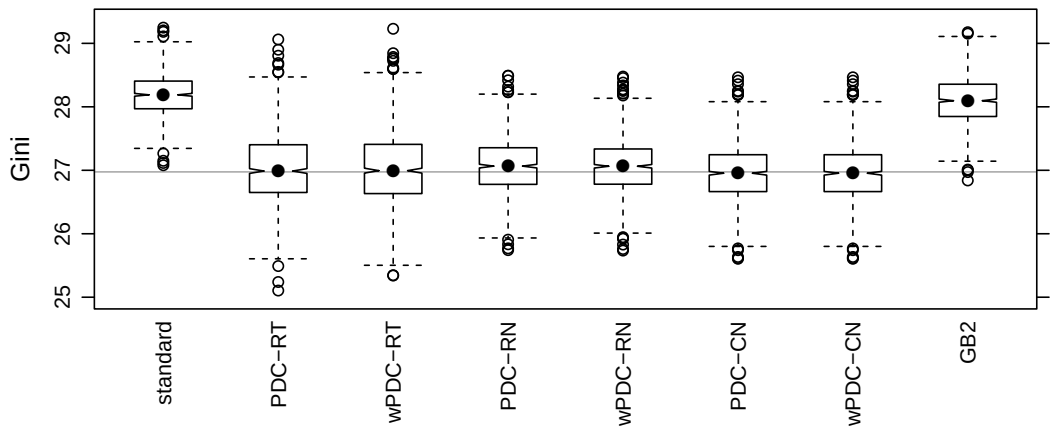

Figure F.107.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.53.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28.18	0.11	1.21	4.49	28.19	0.32	1.21	1.25	4.65	1.80	0.08
wHill	RT	300	28.07	0.21	1.10	4.07	28.09	0.44	1.11	1.19	4.41	1.65	0.10
wHill	RT	500	27.96	0.22	0.98	3.64	27.95	0.45	0.98	1.09	4.03	1.45	0.12
wHill	RT	700	27.92	0.21	0.95	3.51	27.91	0.46	0.94	1.05	3.90	1.39	0.10
wHill	RN	300	27.83	0.15	0.85	3.15	27.83	0.39	0.86	0.93	3.46	1.27	0.08
wHill	RN	500	27.49	0.17	0.51	1.90	27.50	0.40	0.53	0.66	2.44	0.79	0.07
wHill	RN	700	27.25	0.16	0.28	1.03	27.26	0.40	0.28	0.48	1.80	0.52	0.06
wHill	CN	300	27.78	0.15	0.81	3.00	27.79	0.40	0.82	0.90	3.33	1.21	0.08
wHill	CN	500	27.43	0.18	0.46	1.69	27.44	0.42	0.47	0.62	2.30	0.73	0.07
wHill	CN	700	27.20	0.16	0.22	0.83	27.20	0.40	0.22	0.46	1.70	0.48	0.06
wISE	RT	300	27.64	0.27	0.66	2.46	27.60	0.52	0.63	0.84	3.12	0.94	0.10
wISE	RT	500	27.31	0.25	0.33	1.23	27.29	0.48	0.31	0.60	2.23	0.58	0.07
wISE	RT	700	27.50	0.27	0.53	1.96	27.49	0.53	0.52	0.74	2.74	0.79	0.09
wISE	RN	300	27.64	0.18	0.67	2.47	27.64	0.45	0.66	0.79	2.93	0.99	0.07
wISE	RN	500	27.21	0.18	0.23	0.86	27.21	0.41	0.24	0.48	1.79	0.49	0.06
wISE	RN	700	27.10	0.15	0.13	0.47	27.10	0.37	0.13	0.41	1.53	0.41	0.06
wISE	CN	300	27.58	0.20	0.60	2.23	27.58	0.46	0.61	0.75	2.77	0.91	0.07
wISE	CN	500	27.12	0.19	0.15	0.54	27.13	0.42	0.16	0.46	1.70	0.45	0.06
wISE	CN	700	27.03	0.16	0.05	0.20	27.03	0.38	0.05	0.41	1.50	0.38	0.06
wPDC	RT	300	27.46	0.33	0.48	1.79	27.41	0.58	0.43	0.75	2.79	0.73	0.08
wPDC	RT	500	27.03	0.34	0.06	0.21	26.99	0.57	0.02	0.58	2.16	0.56	0.08
wPDC	RT	700	27.40	0.35	0.42	1.56	27.40	0.60	0.43	0.72	2.68	0.74	0.08
wPDC	RN	300	27.54	0.21	0.56	2.08	27.52	0.48	0.54	0.72	2.69	0.82	0.07
wPDC	RN	500	27.07	0.19	0.10	0.36	27.06	0.41	0.09	0.45	1.66	0.44	0.06
wPDC	RN	700	27.06	0.16	0.09	0.32	27.05	0.39	0.08	0.41	1.52	0.41	0.06
wPDC	CN	300	27.45	0.23	0.48	1.78	27.44	0.50	0.47	0.68	2.52	0.74	0.07
wPDC	CN	500	26.97	0.21	−0.01	−0.03	26.95	0.43	−0.02	0.46	1.69	0.44	0.06
wPDC	CN	700	26.99	0.17	0.01	0.05	26.99	0.41	0.01	0.41	1.53	0.41	0.06
GB2			28.09	0.13	1.12	4.15	28.10	0.38	1.12	1.18	4.37	1.66	0.08

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OCAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

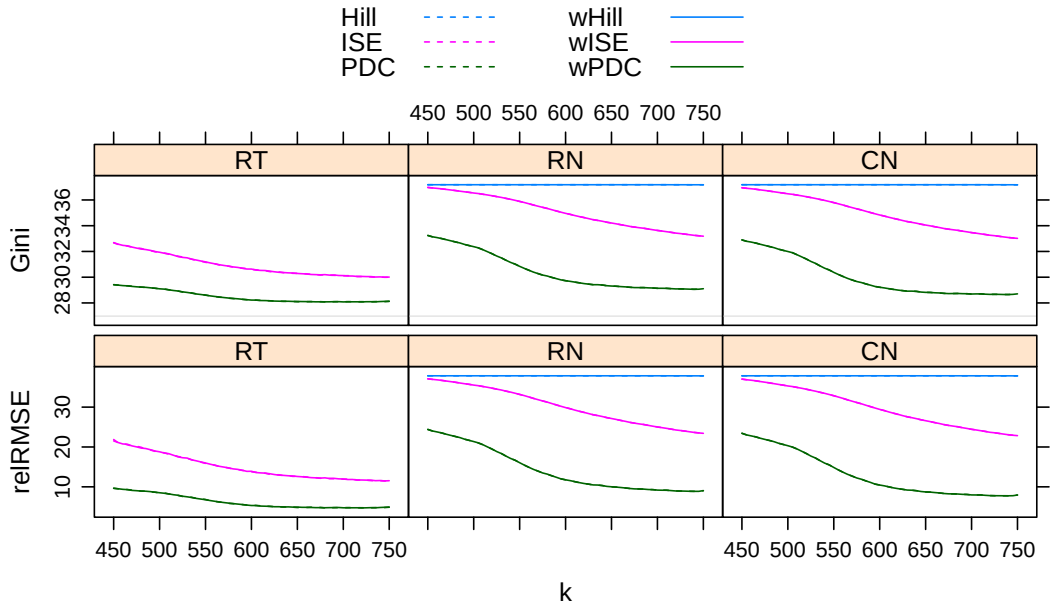

Figure F.108.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

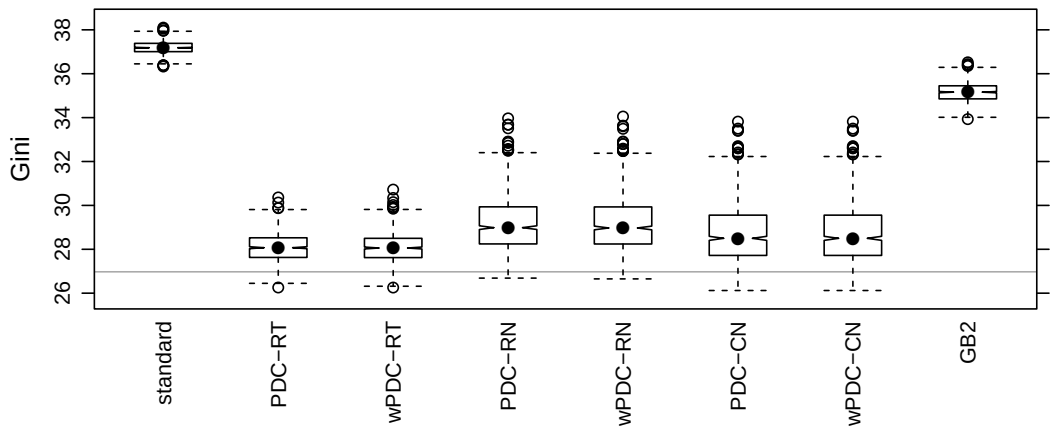

Figure F.109.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.54.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.18	0.08	10.21	37.85	37.18	0.28	10.21	10.21	37.86	15.14	0.41
wHill	RT	500	37.02	2.80	10.05	37.25	36.78	1.14	9.80	10.19	37.76	14.53	1.04
wHill	RT	700	35.78	1.16	8.80	32.63	35.68	0.88	8.70	8.87	32.88	12.90	0.68
wHill	RN	300	37.18	0.08	10.21	37.85	37.18	0.28	10.21	10.21	37.86	15.14	0.41
wHill	RN	500	37.18	0.08	10.21	37.85	37.18	0.28	10.21	10.21	37.86	15.14	0.41
wHill	RN	700	37.18	0.08	10.21	37.85	37.18	0.28	10.21	10.21	37.86	15.14	0.41
wHill	CN	300	37.18	0.08	10.21	37.85	37.18	0.28	10.21	10.21	37.86	15.14	0.41
wHill	CN	500	37.18	0.08	10.21	37.85	37.18	0.28	10.21	10.21	37.86	15.14	0.41
wHill	CN	700	37.18	0.08	10.21	37.85	37.18	0.28	10.21	10.21	37.86	15.14	0.41
wISE	RT	500	31.94	1.05	4.96	18.40	31.86	1.00	4.88	5.07	18.79	7.24	0.34
wISE	RT	700	30.12	0.50	3.15	11.67	30.10	0.71	3.13	3.23	11.96	4.64	0.22
wISE	RN	300	37.18	0.08	10.21	37.85	37.18	0.28	10.21	10.21	37.86	15.14	0.41
wISE	RN	500	36.54	0.35	9.56	35.46	36.51	0.60	9.54	9.58	35.53	14.14	0.41
wISE	RN	700	33.63	1.21	6.66	24.68	33.72	1.03	6.74	6.75	25.02	10.00	0.35
wISE	CN	300	37.18	0.08	10.21	37.85	37.18	0.28	10.21	10.21	37.86	15.14	0.41
wISE	CN	500	36.48	0.39	9.50	35.23	36.45	0.64	9.48	9.52	35.31	14.05	0.41
wISE	CN	700	33.46	1.32	6.49	24.06	33.56	1.08	6.59	6.59	24.43	9.77	0.35
wPDC	RT	500	29.10	0.78	2.12	7.87	29.02	0.83	2.05	2.30	8.52	3.03	0.25
wPDC	RT	700	28.08	0.42	1.10	4.10	28.06	0.65	1.08	1.28	4.74	1.61	0.14
wPDC	RN	300	36.58	1.80	9.61	35.62	37.06	0.51	10.09	9.70	35.96	14.95	0.41
wPDC	RN	500	32.37	4.08	5.40	20.01	32.47	2.16	5.49	5.76	21.36	8.14	0.37
wPDC	RN	700	29.14	1.46	2.16	8.02	28.97	1.20	2.00	2.48	9.18	2.96	0.26
wPDC	CN	300	36.50	2.31	9.52	35.31	37.06	0.51	10.09	9.65	35.76	14.95	0.41
wPDC	CN	500	32.00	4.85	5.02	18.61	32.13	2.35	5.16	5.48	20.32	7.65	0.37
wPDC	CN	700	28.69	1.68	1.72	6.36	28.50	1.32	1.52	2.15	7.97	2.26	0.25
GB2			35.17	0.20	8.19	30.37	35.16	0.44	8.18	8.21	30.42	12.13	0.35

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OCAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

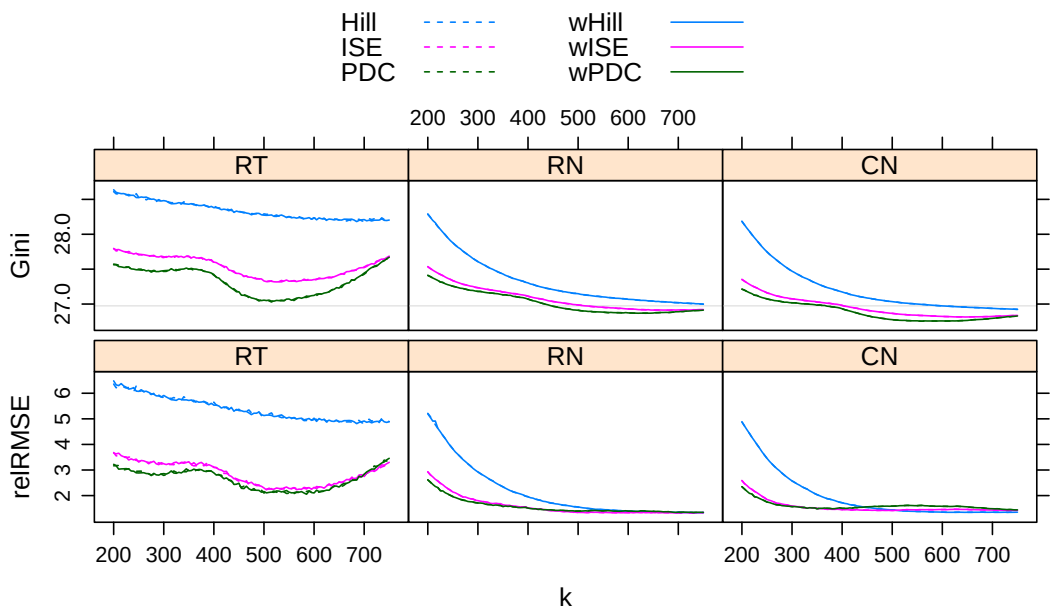

Figure F.110.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

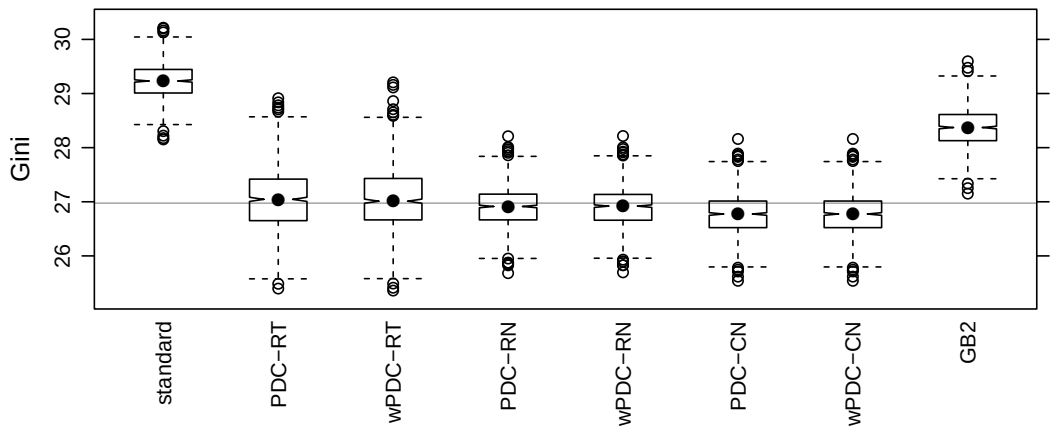

Figure F.111.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.55.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			29.23	0.11	2.26	8.37	29.23	0.32	2.26	2.28	8.46	3.35	0.12
wHill	RT	300	28.48	0.27	1.51	5.59	28.46	0.48	1.49	1.60	5.91	2.21	0.21
wHill	RT	500	28.27	0.23	1.30	4.82	28.27	0.46	1.29	1.38	5.13	1.91	0.11
wHill	RT	700	28.21	0.23	1.24	4.58	28.20	0.48	1.22	1.33	4.92	1.81	0.11
wHill	RN	300	27.61	0.22	0.63	2.34	27.60	0.45	0.63	0.79	2.92	0.94	0.08
wHill	RN	500	27.15	0.15	0.17	0.65	27.15	0.36	0.17	0.42	1.56	0.41	0.06
wHill	RN	700	27.02	0.13	0.04	0.16	27.03	0.35	0.05	0.36	1.35	0.35	0.05
wHill	CN	300	27.47	0.24	0.50	1.84	27.45	0.46	0.48	0.69	2.57	0.74	0.08
wHill	CN	500	27.03	0.15	0.06	0.22	27.03	0.36	0.06	0.39	1.44	0.38	0.06
wHill	CN	700	26.94	0.13	−0.04	−0.14	26.94	0.36	−0.03	0.36	1.35	0.35	0.05
wISE	RT	300	27.68	0.27	0.70	2.60	27.63	0.51	0.65	0.87	3.24	0.97	0.10
wISE	RT	500	27.33	0.26	0.36	1.32	27.30	0.50	0.32	0.62	2.30	0.59	0.08
wISE	RT	700	27.52	0.25	0.55	2.03	27.53	0.49	0.56	0.74	2.75	0.85	0.08
wISE	RN	300	27.24	0.17	0.26	0.97	27.21	0.40	0.24	0.49	1.80	0.47	0.07
wISE	RN	500	26.99	0.13	0.01	0.05	26.99	0.35	0.02	0.36	1.34	0.35	0.05
wISE	RN	700	26.92	0.12	−0.06	−0.22	26.91	0.34	−0.06	0.36	1.32	0.35	0.05
wISE	CN	300	27.07	0.18	0.10	0.37	27.06	0.41	0.08	0.43	1.60	0.40	0.07
wISE	CN	500	26.87	0.13	−0.11	−0.40	26.87	0.35	−0.10	0.38	1.42	0.37	0.05
wISE	CN	700	26.82	0.13	−0.15	−0.56	26.82	0.35	−0.15	0.39	1.44	0.39	0.05
wPDC	RT	300	27.48	0.34	0.50	1.86	27.41	0.55	0.44	0.77	2.86	0.74	0.09
wPDC	RT	500	27.06	0.33	0.08	0.30	27.01	0.57	0.04	0.58	2.16	0.57	0.08
wPDC	RT	700	27.44	0.37	0.47	1.74	27.42	0.58	0.45	0.76	2.84	0.76	0.10
wPDC	RN	300	27.18	0.17	0.21	0.77	27.16	0.38	0.18	0.46	1.71	0.43	0.07
wPDC	RN	500	26.91	0.14	−0.06	−0.24	26.92	0.36	−0.05	0.38	1.39	0.37	0.05
wPDC	RN	700	26.89	0.13	−0.08	−0.31	26.89	0.36	−0.09	0.36	1.35	0.37	0.05
wPDC	CN	300	27.02	0.18	0.04	0.16	26.99	0.39	0.02	0.42	1.57	0.39	0.07
wPDC	CN	500	26.78	0.14	−0.20	−0.73	26.77	0.36	−0.20	0.43	1.59	0.43	0.05
wPDC	CN	700	26.80	0.13	−0.18	−0.66	26.79	0.37	−0.18	0.40	1.49	0.41	0.05
GB2			28.38	0.14	1.40	5.19	28.37	0.36	1.40	1.45	5.37	2.07	0.10

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OCAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

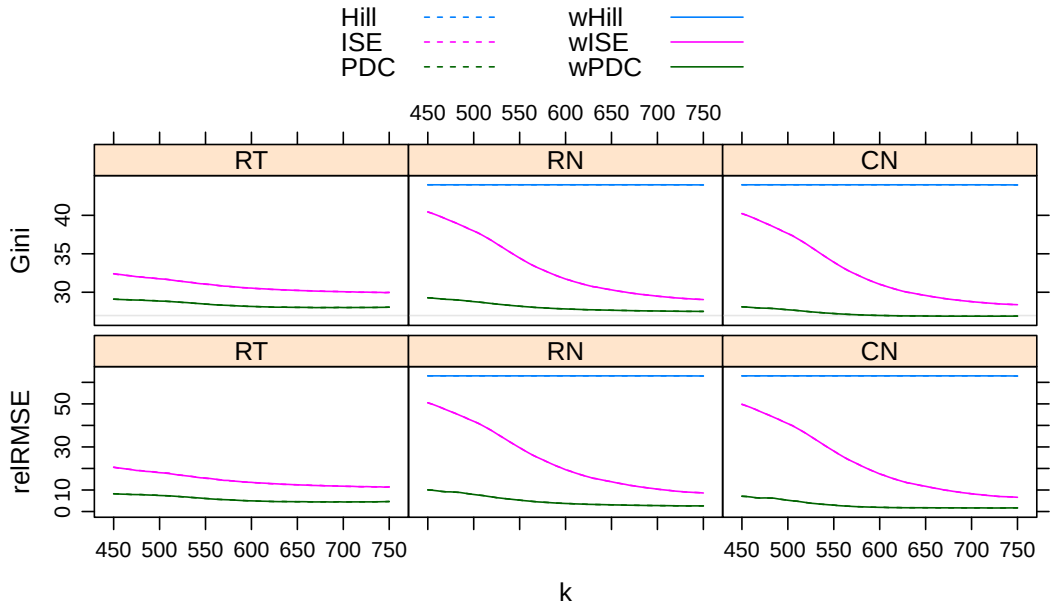

Figure F.112.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

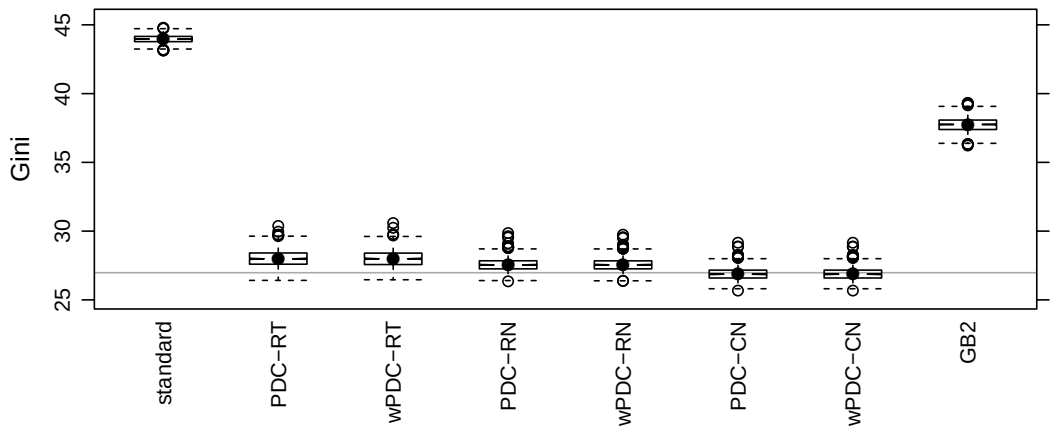

Figure F.113.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.56.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			43.97	0.08	16.99	63.00	43.97	0.28	16.99	17.00	63.01	25.20	0.66
wHill	RT	500	42.95	11.04	15.97	59.21	42.27	2.12	15.30	16.31	60.48	22.68	1.76
wHill	RT	700	39.90	3.15	12.93	47.92	39.65	1.39	12.68	13.05	48.37	18.80	1.00
wHill	RN	300	43.97	0.08	16.99	63.00	43.97	0.28	16.99	17.00	63.01	25.20	0.66
wHill	RN	500	43.97	0.08	16.99	63.00	43.97	0.28	16.99	17.00	63.01	25.20	0.66
wHill	RN	700	43.97	0.08	16.99	63.00	43.97	0.28	16.99	17.00	63.01	25.20	0.66
wHill	CN	300	43.97	0.08	16.99	63.00	43.97	0.28	16.99	17.00	63.01	25.20	0.66
wHill	CN	500	43.97	0.08	16.99	63.00	43.97	0.28	16.99	17.00	63.01	25.20	0.66
wHill	CN	700	43.97	0.08	16.99	63.00	43.97	0.28	16.99	17.00	63.01	25.20	0.66
wISE	RT	500	31.74	0.98	4.77	17.67	31.67	0.96	4.70	4.87	18.05	6.97	0.34
wISE	RT	700	30.07	0.50	3.10	11.48	30.01	0.68	3.04	3.18	11.78	4.51	0.21
wISE	RN	300	43.97	0.08	16.99	62.99	43.97	0.28	16.99	16.99	63.00	25.19	0.66
wISE	RN	500	37.97	6.84	11.00	40.76	38.43	2.37	11.46	11.30	41.90	16.99	0.62
wISE	RN	700	29.49	1.53	2.51	9.32	29.29	1.11	2.32	2.80	10.38	3.44	0.30
wISE	CN	300	43.97	0.08	16.99	62.99	43.97	0.28	16.99	16.99	63.00	25.19	0.66
wISE	CN	500	37.63	7.73	10.66	39.52	38.11	2.45	11.14	11.02	40.84	16.51	0.62
wISE	CN	700	28.78	1.69	1.80	6.69	28.54	1.16	1.56	2.22	8.24	2.32	0.28
wPDC	RT	500	28.85	0.51	1.87	6.95	28.77	0.71	1.79	2.01	7.43	2.66	0.19
wPDC	RT	700	28.01	0.36	1.03	3.84	27.99	0.62	1.01	1.20	4.44	1.50	0.13
wPDC	RN	300	34.82	7.08	7.84	29.08	33.83	1.13	6.86	8.28	30.70	10.17	0.65
wPDC	RN	500	28.78	1.31	1.81	6.69	28.52	0.75	1.55	2.14	7.92	2.29	0.32
wPDC	RN	700	27.57	0.21	0.59	2.19	27.55	0.43	0.58	0.75	2.78	0.86	0.10
wPDC	CN	300	33.79	9.00	6.82	25.27	32.67	1.27	5.69	7.45	27.60	8.44	0.65
wPDC	CN	500	27.72	1.45	0.74	2.76	27.44	0.74	0.47	1.41	5.24	0.79	0.30
wPDC	CN	700	26.89	0.20	−0.08	−0.31	26.87	0.42	−0.11	0.45	1.68	0.44	0.08
GB2			37.74	0.26	10.77	39.92	37.76	0.51	10.78	10.78	39.97	15.98	0.46

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OCAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

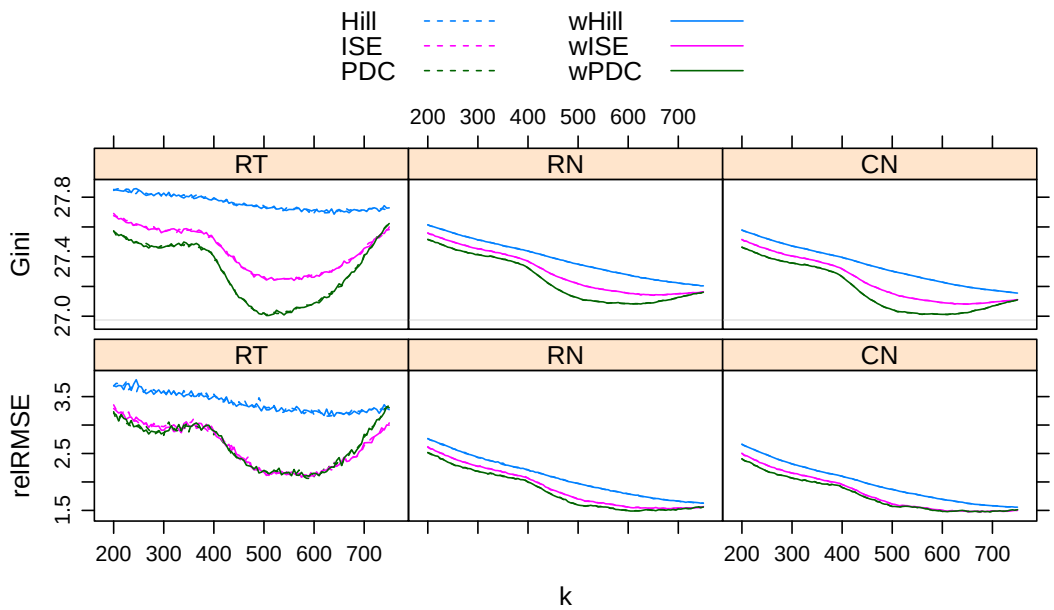

Figure F.114.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

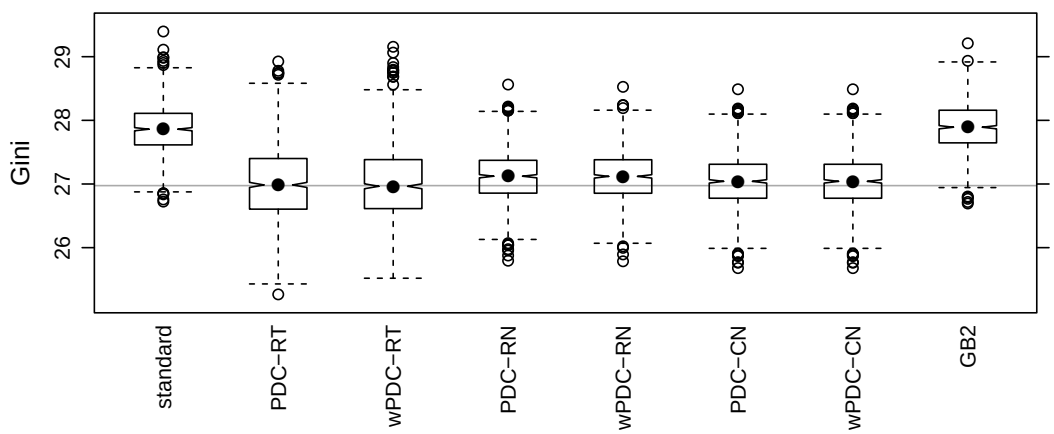

Figure F.115.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.57.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			27.87	0.15	0.90	3.32	27.86	0.37	0.89	0.97	3.61	1.31	0.09
wHill	RT	300	27.83	0.22	0.85	3.16	27.81	0.45	0.84	0.97	3.60	1.25	0.09
wHill	RT	500	27.74	0.23	0.76	2.83	27.70	0.45	0.73	0.90	3.33	1.08	0.11
wHill	RT	700	27.71	0.22	0.74	2.74	27.71	0.45	0.73	0.87	3.24	1.09	0.08
wHill	RN	300	27.51	0.14	0.54	2.00	27.51	0.35	0.54	0.65	2.43	0.80	0.06
wHill	RN	500	27.35	0.14	0.38	1.39	27.35	0.36	0.38	0.53	1.98	0.60	0.06
wHill	RN	700	27.22	0.14	0.25	0.92	27.23	0.35	0.25	0.45	1.66	0.48	0.06
wHill	CN	300	27.47	0.14	0.50	1.84	27.47	0.35	0.50	0.62	2.32	0.74	0.06
wHill	CN	500	27.30	0.15	0.33	1.22	27.31	0.37	0.33	0.50	1.87	0.53	0.06
wHill	CN	700	27.17	0.14	0.20	0.74	27.18	0.36	0.20	0.43	1.58	0.44	0.06
wISE	RT	300	27.57	0.26	0.60	2.21	27.53	0.51	0.56	0.78	2.91	0.82	0.09
wISE	RT	500	27.26	0.26	0.28	1.04	27.22	0.50	0.25	0.59	2.17	0.53	0.07
wISE	RT	700	27.46	0.29	0.48	1.79	27.45	0.55	0.47	0.72	2.69	0.74	0.10
wISE	RN	300	27.45	0.15	0.48	1.78	27.45	0.38	0.48	0.61	2.27	0.72	0.06
wISE	RN	500	27.22	0.15	0.24	0.90	27.22	0.37	0.25	0.46	1.70	0.47	0.06
wISE	RN	700	27.15	0.14	0.18	0.65	27.15	0.37	0.18	0.42	1.54	0.43	0.05
wISE	CN	300	27.40	0.15	0.43	1.59	27.41	0.38	0.43	0.58	2.16	0.66	0.06
wISE	CN	500	27.15	0.16	0.18	0.66	27.15	0.38	0.17	0.43	1.61	0.44	0.06
wISE	CN	700	27.10	0.15	0.12	0.45	27.09	0.37	0.12	0.40	1.49	0.41	0.05
wPDC	RT	300	27.46	0.36	0.49	1.82	27.41	0.58	0.44	0.77	2.87	0.73	0.10
wPDC	RT	500	27.02	0.35	0.05	0.18	26.96	0.58	−0.01	0.59	2.20	0.58	0.08
wPDC	RT	700	27.41	0.39	0.44	1.62	27.39	0.63	0.42	0.77	2.84	0.72	0.10
wPDC	RN	300	27.41	0.15	0.44	1.63	27.41	0.39	0.43	0.59	2.19	0.66	0.06
wPDC	RN	500	27.12	0.16	0.15	0.55	27.12	0.39	0.15	0.43	1.59	0.43	0.06
wPDC	RN	700	27.13	0.15	0.15	0.57	27.12	0.38	0.15	0.41	1.53	0.42	0.05
wPDC	CN	300	27.36	0.16	0.38	1.42	27.35	0.41	0.38	0.56	2.07	0.60	0.06
wPDC	CN	500	27.04	0.17	0.07	0.26	27.04	0.40	0.07	0.42	1.57	0.41	0.06
wPDC	CN	700	27.07	0.15	0.09	0.35	27.07	0.38	0.10	0.40	1.49	0.40	0.05
GB2			27.90	0.14	0.92	3.42	27.89	0.38	0.92	1.00	3.70	1.36	0.08

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OCAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

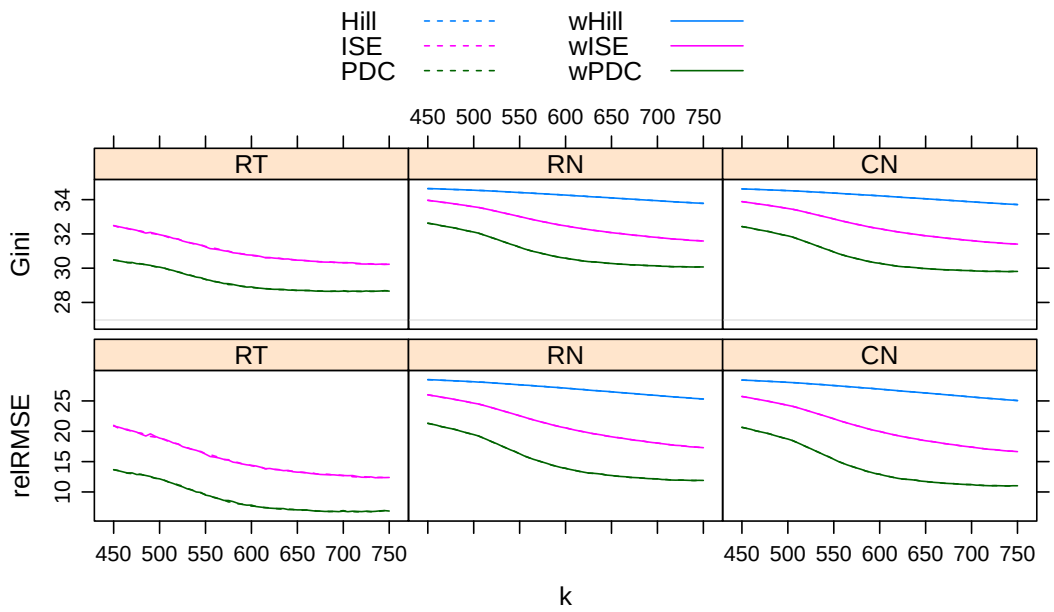

Figure F.116.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

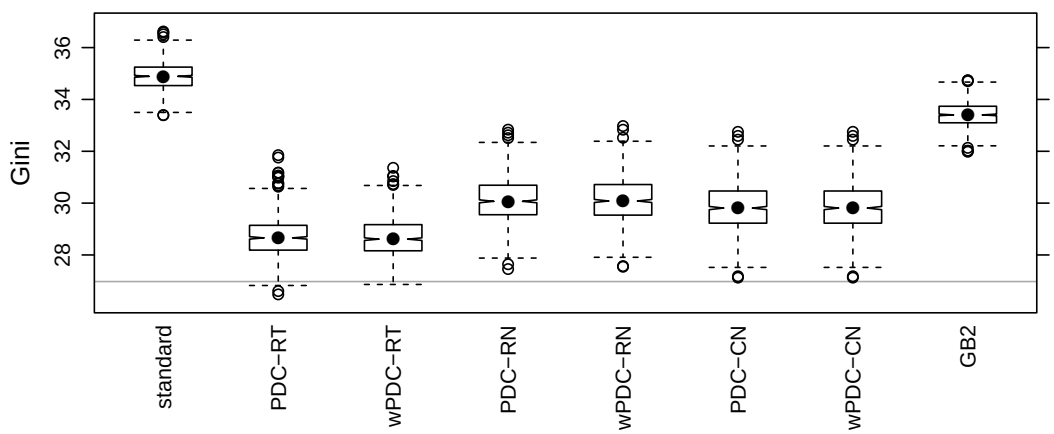

Figure F.117.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.58.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			34.90	0.29	7.93	29.38	34.89	0.53	7.92	7.94	29.45	11.74	0.36
wHill	RT	500	35.02	1.78	8.04	29.82	34.90	1.05	7.93	8.15	30.23	11.75	1.02
wHill	RT	700	34.10	1.18	7.13	26.43	33.99	0.88	7.01	7.21	26.73	10.40	0.62
wHill	RN	300	34.83	0.30	7.85	29.12	34.84	0.53	7.86	7.87	29.19	11.66	0.36
wHill	RN	500	34.55	0.30	7.58	28.09	34.55	0.55	7.57	7.60	28.16	11.23	0.35
wHill	RN	700	33.94	0.31	6.96	25.82	33.94	0.55	6.96	6.99	25.90	10.32	0.37
wHill	CN	300	34.82	0.30	7.85	29.10	34.83	0.53	7.86	7.87	29.17	11.65	0.36
wHill	CN	500	34.53	0.29	7.55	27.99	34.53	0.56	7.55	7.57	28.06	11.20	0.34
wHill	CN	700	33.87	0.31	6.90	25.57	33.87	0.55	6.90	6.92	25.66	10.22	0.33
wISE	RT	500	31.95	1.13	4.98	18.46	31.86	1.02	4.89	5.09	18.87	7.25	0.37
wISE	RT	700	30.32	0.54	3.35	12.41	30.26	0.73	3.29	3.43	12.71	4.88	0.23
wISE	RN	300	34.77	0.30	7.80	28.90	34.78	0.55	7.81	7.82	28.98	11.58	0.36
wISE	RN	500	33.58	0.47	6.61	24.50	33.59	0.67	6.62	6.64	24.63	9.81	0.32
wISE	RN	700	31.79	0.50	4.82	17.87	31.77	0.67	4.79	4.87	18.06	7.10	0.28
wISE	CN	300	34.76	0.31	7.79	28.87	34.77	0.56	7.79	7.81	28.94	11.55	0.36
wISE	CN	500	33.48	0.51	6.51	24.13	33.50	0.70	6.53	6.55	24.28	9.68	0.32
wISE	CN	700	31.61	0.54	4.64	17.18	31.57	0.73	4.60	4.69	17.40	6.82	0.28
wPDC	RT	500	30.06	1.23	3.09	11.45	29.95	1.09	2.97	3.28	12.16	4.41	0.29
wPDC	RT	700	28.67	0.55	1.69	6.27	28.61	0.73	1.64	1.85	6.84	2.43	0.16
wPDC	RN	300	34.39	0.63	7.41	27.48	34.47	0.70	7.50	7.45	27.64	11.12	0.35
wPDC	RN	500	32.11	1.18	5.13	19.03	32.11	1.12	5.13	5.25	19.45	7.61	0.30
wPDC	RN	700	30.14	0.75	3.16	11.73	30.08	0.86	3.11	3.28	12.16	4.61	0.22
wPDC	CN	300	34.33	0.72	7.36	27.28	34.44	0.72	7.46	7.41	27.46	11.07	0.35
wPDC	CN	500	31.89	1.36	4.91	18.21	31.90	1.18	4.92	5.05	18.72	7.30	0.30
wPDC	CN	700	29.86	0.83	2.88	10.69	29.81	0.92	2.83	3.02	11.21	4.20	0.21
GB2			33.41	0.22	6.43	23.85	33.40	0.46	6.43	6.45	23.91	9.53	0.29

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OCAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 20.

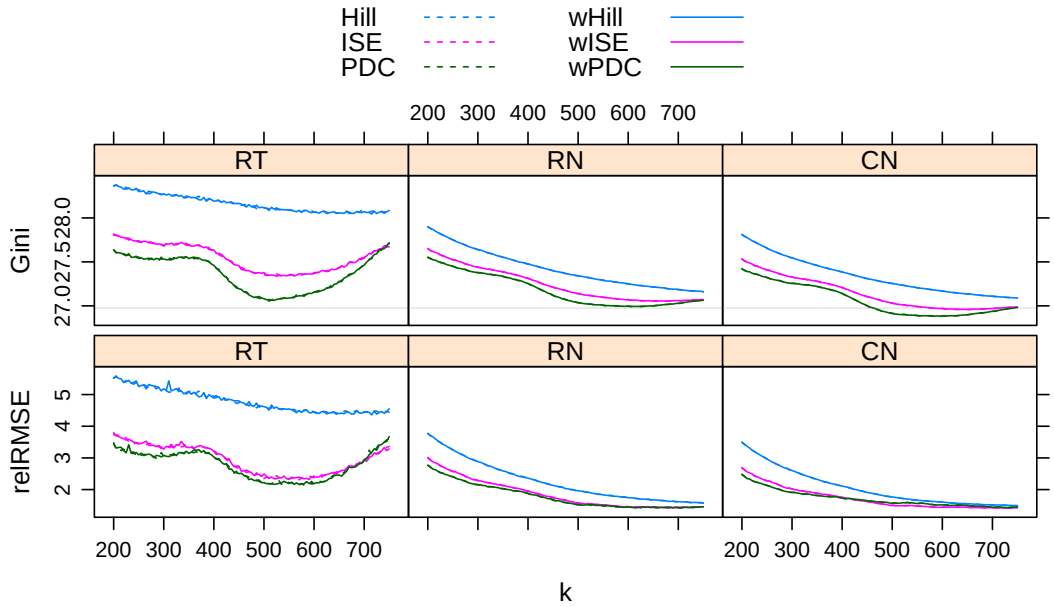

Figure F.118.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

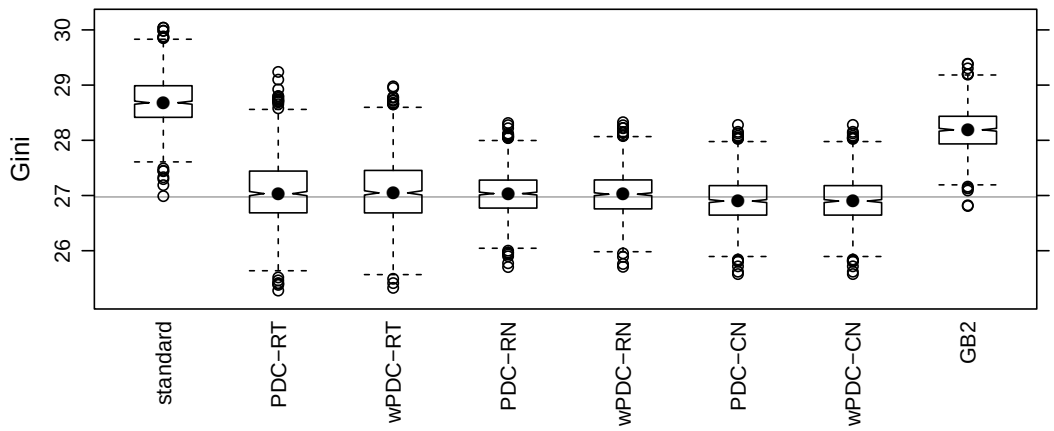

Figure F.119.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.59.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28.70	0.20	1.73	6.41	28.68	0.42	1.71	1.79	6.62	2.53	0.11
wHill	RT	300	28.27	0.27	1.30	4.82	28.25	0.49	1.27	1.40	5.18	1.89	0.13
wHill	RT	500	28.12	0.25	1.14	4.24	28.09	0.48	1.12	1.25	4.62	1.66	0.12
wHill	RT	700	28.07	0.24	1.10	4.07	28.06	0.49	1.09	1.20	4.45	1.61	0.10
wHill	RN	300	27.64	0.16	0.67	2.47	27.64	0.39	0.67	0.78	2.88	0.99	0.08
wHill	RN	500	27.34	0.15	0.37	1.36	27.34	0.36	0.37	0.53	1.97	0.58	0.06
wHill	RN	700	27.19	0.15	0.21	0.78	27.19	0.36	0.22	0.44	1.62	0.44	0.05
wHill	CN	300	27.54	0.17	0.57	2.11	27.54	0.40	0.57	0.70	2.60	0.85	0.07
wHill	CN	500	27.25	0.15	0.28	1.04	27.26	0.37	0.29	0.48	1.77	0.49	0.06
wHill	CN	700	27.11	0.15	0.13	0.50	27.12	0.37	0.15	0.41	1.52	0.40	0.05
wISE	RT	300	27.68	0.29	0.70	2.61	27.63	0.51	0.66	0.88	3.28	0.97	0.12
wISE	RT	500	27.38	0.29	0.40	1.50	27.35	0.52	0.38	0.67	2.49	0.66	0.08
wISE	RT	700	27.55	0.29	0.58	2.14	27.53	0.52	0.55	0.79	2.92	0.83	0.09
wISE	RN	300	27.44	0.16	0.46	1.72	27.43	0.39	0.45	0.61	2.28	0.68	0.06
wISE	RN	500	27.14	0.16	0.16	0.61	27.14	0.38	0.17	0.43	1.58	0.41	0.05
wISE	RN	700	27.06	0.14	0.09	0.32	27.05	0.36	0.08	0.39	1.44	0.38	0.05
wISE	CN	300	27.33	0.17	0.35	1.31	27.31	0.41	0.34	0.55	2.02	0.54	0.06
wISE	CN	500	27.03	0.16	0.06	0.21	27.03	0.39	0.06	0.41	1.50	0.39	0.05
wISE	CN	700	26.97	0.15	−0.00	−0.02	26.97	0.37	−0.01	0.38	1.42	0.37	0.04
wPDC	RT	300	27.53	0.38	0.56	2.07	27.48	0.59	0.50	0.83	3.08	0.79	0.11
wPDC	RT	500	27.08	0.35	0.11	0.39	27.05	0.57	0.07	0.60	2.22	0.58	0.07
wPDC	RT	700	27.46	0.38	0.49	1.81	27.45	0.60	0.47	0.78	2.91	0.81	0.11
wPDC	RN	300	27.38	0.17	0.40	1.50	27.36	0.42	0.38	0.58	2.16	0.61	0.07
wPDC	RN	500	27.04	0.17	0.06	0.23	27.02	0.39	0.05	0.41	1.52	0.40	0.05
wPDC	RN	700	27.03	0.14	0.05	0.20	27.03	0.37	0.05	0.38	1.42	0.38	0.05
wPDC	CN	300	27.26	0.19	0.28	1.04	27.23	0.44	0.26	0.52	1.91	0.50	0.06
wPDC	CN	500	26.91	0.18	−0.06	−0.22	26.90	0.40	−0.08	0.42	1.57	0.41	0.05
wPDC	CN	700	26.94	0.15	−0.04	−0.14	26.93	0.38	−0.04	0.39	1.45	0.40	0.05
GB2			28.19	0.15	1.21	4.49	28.19	0.37	1.22	1.27	4.71	1.80	0.09

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OCAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 20.

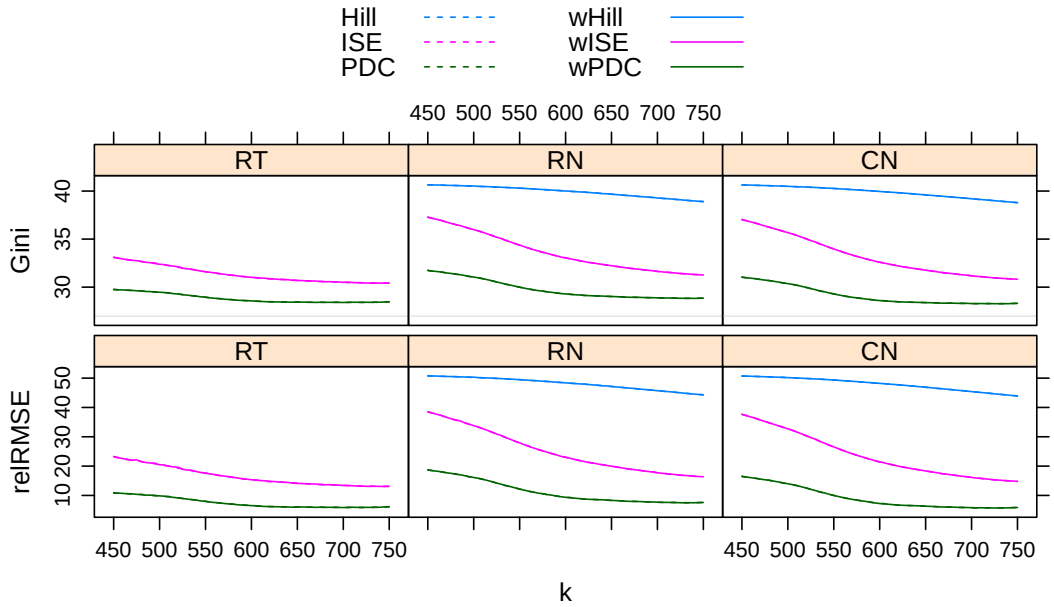

Figure F.120.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

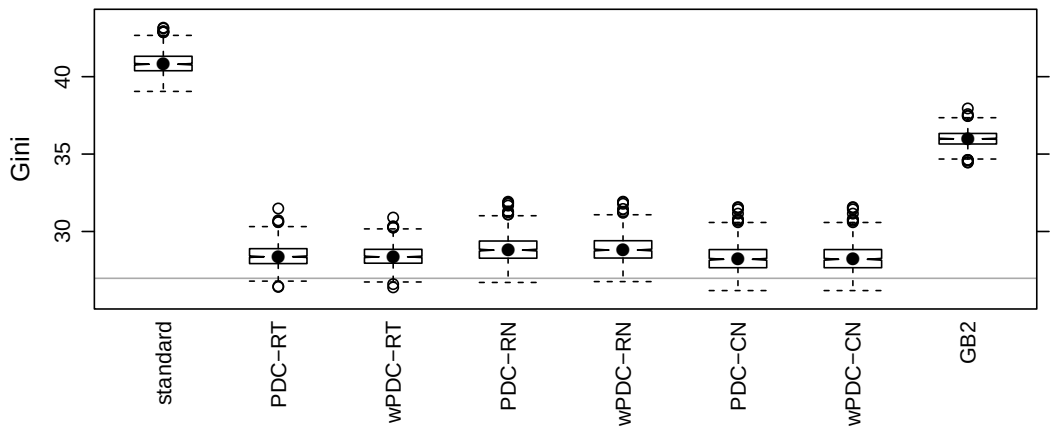

Figure F.121.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.60.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			40.85	0.47	13.88	51.45	40.81	0.71	13.83	13.90	51.51	20.51	0.60
wHill	RT	500	40.87	9.84	13.90	51.53	40.27	2.13	13.30	14.25	52.82	19.71	1.52
wHill	RT	700	38.32	3.87	11.34	42.04	38.08	1.36	11.10	11.51	42.67	16.46	1.57
wHill	RN	300	40.83	0.48	13.85	51.36	40.78	0.71	13.81	13.87	51.43	20.47	0.60
wHill	RN	500	40.52	0.74	13.55	50.23	40.49	0.69	13.51	13.58	50.33	20.03	1.09
wHill	RN	700	39.28	0.54	12.31	45.62	39.27	0.74	12.30	12.33	45.70	18.23	0.55
wHill	CN	300	40.83	0.48	13.85	51.36	40.78	0.71	13.80	13.87	51.42	20.47	0.60
wHill	CN	500	40.49	0.49	13.52	50.11	40.48	0.70	13.50	13.53	50.17	20.02	0.60
wHill	CN	700	39.20	0.55	12.22	45.32	39.20	0.76	12.22	12.25	45.40	18.12	0.55
wISE	RT	500	32.38	1.27	5.41	20.05	32.26	1.10	5.29	5.53	20.48	7.84	0.36
wISE	RT	700	30.50	0.60	3.52	13.06	30.45	0.74	3.48	3.61	13.37	5.16	0.34
wISE	RN	300	40.62	0.53	13.65	50.59	40.61	0.71	13.64	13.67	50.67	20.22	0.60
wISE	RN	500	35.98	1.93	9.01	33.39	36.03	1.35	9.06	9.11	33.79	13.43	0.48
wISE	RN	700	31.64	1.12	4.66	17.29	31.60	1.07	4.63	4.78	17.73	6.86	0.29
wISE	CN	300	40.61	0.54	13.63	50.54	40.60	0.71	13.62	13.65	50.61	20.19	0.60
wISE	CN	500	35.67	2.17	8.70	32.24	35.74	1.44	8.76	8.82	32.70	12.99	0.47
wISE	CN	700	31.18	1.24	4.21	15.59	31.15	1.15	4.18	4.35	16.13	6.19	0.28
wPDC	RT	500	29.47	0.84	2.50	9.25	29.40	0.85	2.43	2.66	9.85	3.60	0.22
wPDC	RT	700	28.40	0.46	1.43	5.30	28.36	0.66	1.39	1.58	5.86	2.05	0.15
wPDC	RN	300	36.27	7.45	9.30	34.47	36.35	3.24	9.38	9.69	35.93	13.90	0.55
wPDC	RN	500	31.05	2.33	4.07	15.10	30.91	1.43	3.94	4.35	16.12	5.84	0.38
wPDC	RN	700	28.88	0.66	1.91	7.07	28.80	0.83	1.83	2.07	7.68	2.71	0.18
wPDC	CN	300	35.80	9.28	8.83	32.73	35.92	3.65	8.94	9.34	34.62	13.26	0.55
wPDC	CN	500	30.37	2.71	3.39	12.57	30.21	1.58	3.24	3.77	13.98	4.80	0.38
wPDC	CN	700	28.29	0.72	1.32	4.88	28.20	0.85	1.23	1.57	5.80	1.82	0.17
GB2			36.00	0.27	9.03	33.46	35.99	0.51	9.01	9.04	33.52	13.36	0.41

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OAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

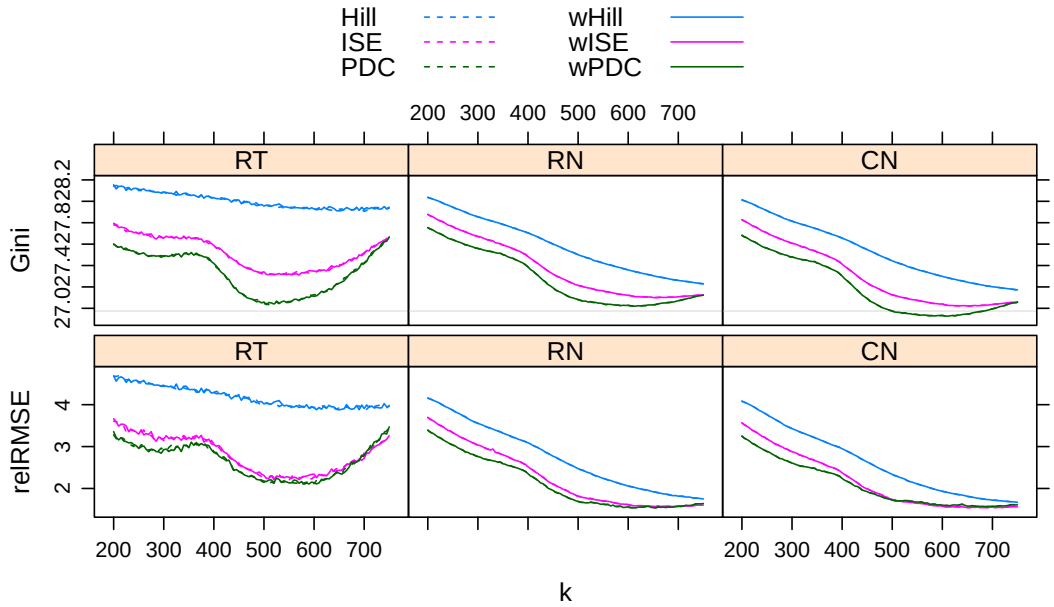

Figure F.122.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

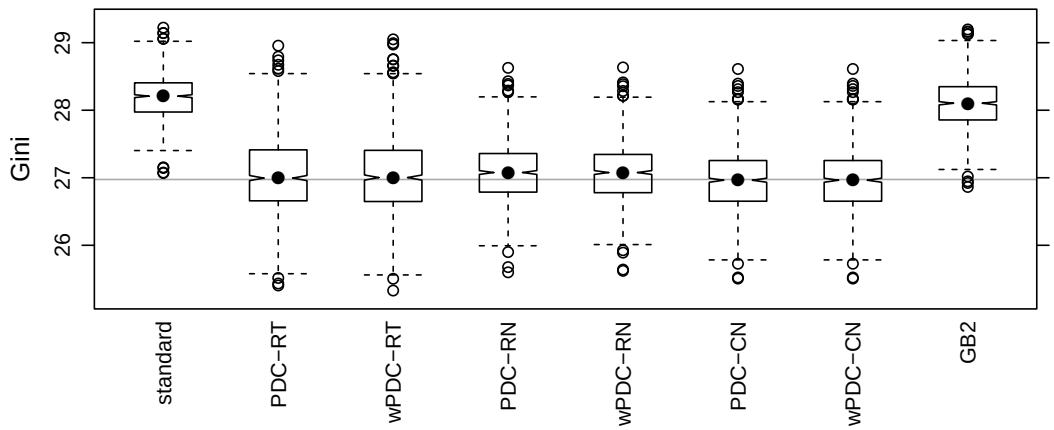

Figure F.123.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.61.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28.19	0.11	1.22	4.52	28.21	0.32	1.23	1.26	4.68	1.83	0.08
wHill	RT	300	28.09	0.20	1.11	4.12	28.07	0.45	1.09	1.20	4.44	1.62	0.10
wHill	RT	500	27.96	0.21	0.98	3.64	27.95	0.44	0.97	1.08	4.02	1.44	0.10
wHill	RT	700	27.92	0.21	0.95	3.52	27.91	0.47	0.93	1.05	3.91	1.38	0.11
wHill	RN	300	27.85	0.14	0.88	3.26	27.86	0.37	0.89	0.96	3.55	1.31	0.08
wHill	RN	500	27.50	0.17	0.53	1.95	27.49	0.40	0.52	0.67	2.47	0.78	0.07
wHill	RN	700	27.26	0.16	0.29	1.06	27.28	0.38	0.30	0.49	1.82	0.52	0.06
wHill	CN	300	27.81	0.15	0.84	3.11	27.82	0.38	0.85	0.92	3.43	1.26	0.07
wHill	CN	500	27.44	0.18	0.47	1.74	27.43	0.42	0.46	0.63	2.34	0.70	0.07
wHill	CN	700	27.20	0.16	0.23	0.84	27.21	0.38	0.24	0.46	1.72	0.47	0.05
wISE	RT	300	27.66	0.27	0.68	2.53	27.64	0.53	0.66	0.86	3.18	0.98	0.11
wISE	RT	500	27.34	0.25	0.37	1.36	27.32	0.52	0.35	0.62	2.31	0.60	0.08
wISE	RT	700	27.51	0.25	0.54	1.98	27.51	0.51	0.53	0.73	2.72	0.81	0.08
wISE	RN	300	27.67	0.19	0.70	2.58	27.67	0.44	0.70	0.82	3.03	1.04	0.07
wISE	RN	500	27.22	0.18	0.24	0.89	27.21	0.40	0.23	0.49	1.82	0.47	0.07
wISE	RN	700	27.11	0.16	0.13	0.49	27.10	0.40	0.13	0.43	1.58	0.42	0.05
wISE	CN	300	27.61	0.20	0.63	2.35	27.62	0.45	0.64	0.78	2.88	0.96	0.07
wISE	CN	500	27.13	0.20	0.15	0.56	27.13	0.42	0.16	0.47	1.73	0.45	0.06
wISE	CN	700	27.04	0.17	0.06	0.23	27.03	0.40	0.05	0.42	1.55	0.41	0.05
wPDC	RT	300	27.49	0.36	0.52	1.92	27.43	0.56	0.46	0.79	2.93	0.73	0.10
wPDC	RT	500	27.06	0.34	0.08	0.31	27.00	0.55	0.03	0.59	2.18	0.56	0.08
wPDC	RT	700	27.42	0.37	0.44	1.65	27.40	0.60	0.42	0.75	2.78	0.73	0.10
wPDC	RN	300	27.56	0.21	0.58	2.17	27.54	0.48	0.57	0.74	2.76	0.85	0.07
wPDC	RN	500	27.08	0.20	0.11	0.40	27.08	0.42	0.10	0.46	1.69	0.43	0.06
wPDC	RN	700	27.07	0.17	0.10	0.36	27.06	0.41	0.09	0.42	1.57	0.43	0.05
wPDC	CN	300	27.48	0.24	0.50	1.87	27.46	0.52	0.48	0.70	2.61	0.76	0.07
wPDC	CN	500	26.97	0.22	0.00	0.00	26.96	0.45	−0.01	0.46	1.72	0.44	0.06
wPDC	CN	700	27.00	0.18	0.02	0.08	26.99	0.43	0.02	0.43	1.58	0.43	0.05
GB2			28.11	0.13	1.13	4.20	28.10	0.36	1.13	1.19	4.41	1.67	0.08

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OAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

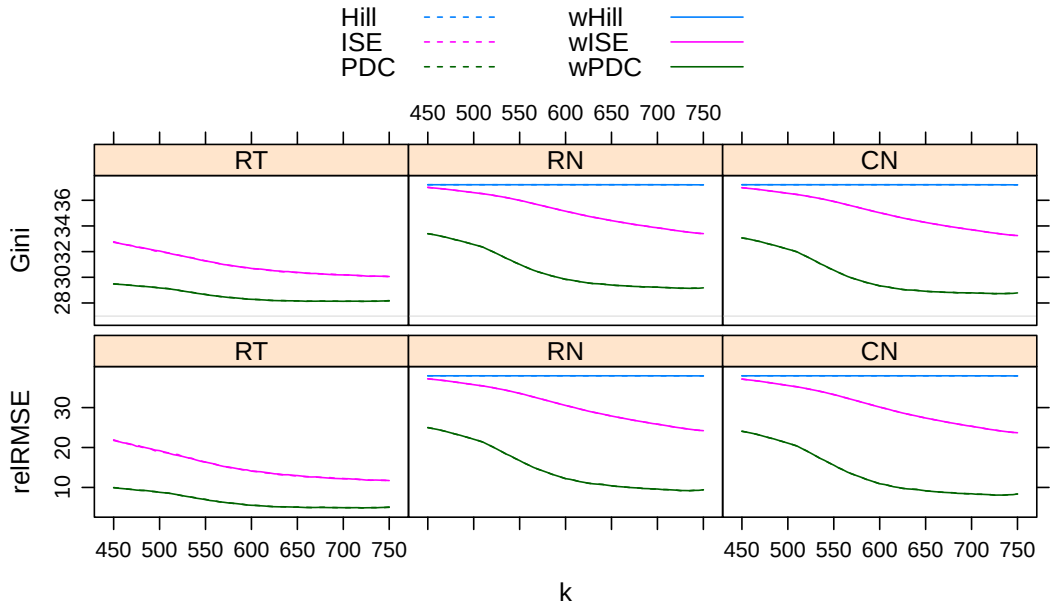

Figure F.124.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

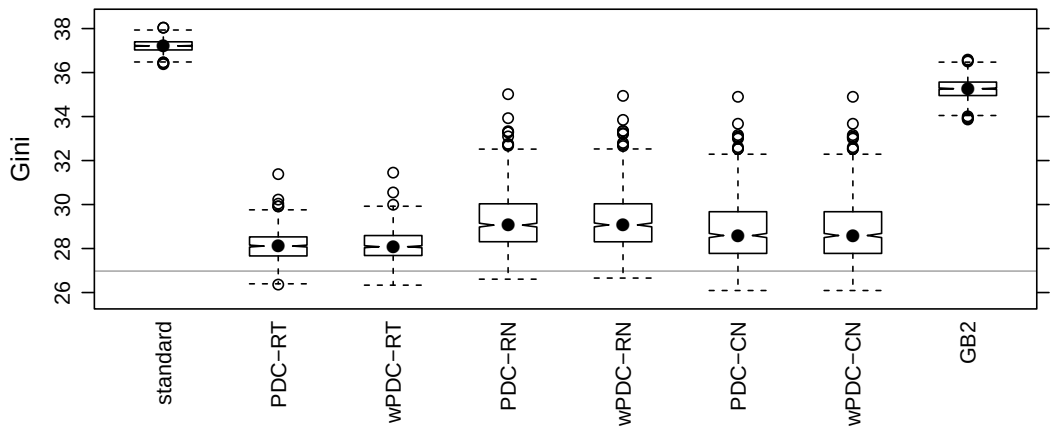

Figure F.125.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.62.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.21	0.08	10.24	37.95	37.21	0.27	10.24	10.24	37.96	15.18	0.41
wHill	RT	500	37.10	3.64	10.13	37.56	36.84	1.18	9.87	10.31	38.22	14.63	1.66
wHill	RT	700	35.73	1.37	8.76	32.47	35.58	0.89	8.60	8.84	32.75	12.75	0.77
wHill	RN	300	37.21	0.08	10.24	37.95	37.21	0.27	10.24	10.24	37.96	15.18	0.41
wHill	RN	500	37.21	0.08	10.24	37.95	37.21	0.27	10.24	10.24	37.96	15.18	0.41
wHill	RN	700	37.21	0.08	10.24	37.95	37.21	0.27	10.24	10.24	37.96	15.18	0.41
wHill	CN	300	37.21	0.08	10.24	37.95	37.21	0.27	10.24	10.24	37.96	15.18	0.41
wHill	CN	500	37.21	0.08	10.24	37.95	37.21	0.27	10.24	10.24	37.96	15.18	0.41
wHill	CN	700	37.21	0.08	10.24	37.95	37.21	0.27	10.24	10.24	37.96	15.18	0.41
wISE	RT	500	32.05	1.14	5.07	18.81	31.94	0.95	4.97	5.18	19.22	7.37	0.48
wISE	RT	700	30.18	0.48	3.21	11.90	30.17	0.70	3.19	3.28	12.17	4.74	0.21
wISE	RN	300	37.21	0.08	10.24	37.95	37.21	0.27	10.24	10.24	37.96	15.18	0.41
wISE	RN	500	36.60	0.33	9.62	35.67	36.60	0.57	9.63	9.64	35.73	14.27	0.41
wISE	RN	700	33.86	1.23	6.88	25.52	33.98	1.00	7.01	6.97	25.85	10.39	0.39
wISE	CN	300	37.21	0.08	10.24	37.95	37.21	0.27	10.24	10.24	37.96	15.18	0.41
wISE	CN	500	36.54	0.37	9.57	35.46	36.54	0.61	9.57	9.59	35.54	14.18	0.41
wISE	CN	700	33.71	1.32	6.73	24.96	33.85	1.01	6.88	6.83	25.32	10.20	0.39
wPDC	RT	500	29.17	0.80	2.19	8.13	29.08	0.85	2.10	2.37	8.78	3.12	0.21
wPDC	RT	700	28.13	0.43	1.16	4.28	28.08	0.68	1.11	1.33	4.92	1.64	0.17
wPDC	RN	300	36.66	1.63	9.68	35.90	37.10	0.45	10.13	9.77	36.21	15.02	0.41
wPDC	RN	500	32.55	4.35	5.58	20.67	32.63	2.33	5.66	5.95	22.07	8.39	0.38
wPDC	RN	700	29.23	1.61	2.26	8.37	29.07	1.24	2.10	2.59	9.60	3.11	0.30
wPDC	CN	300	36.58	2.09	9.61	35.62	37.10	0.46	10.13	9.72	36.02	15.02	0.41
wPDC	CN	500	32.19	5.19	5.21	19.33	32.30	2.54	5.33	5.69	21.09	7.90	0.38
wPDC	CN	700	28.79	1.86	1.81	6.73	28.59	1.33	1.62	2.27	8.41	2.40	0.29
GB2			35.27	0.20	8.29	30.74	35.27	0.46	8.29	8.30	30.78	12.30	0.36

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OAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

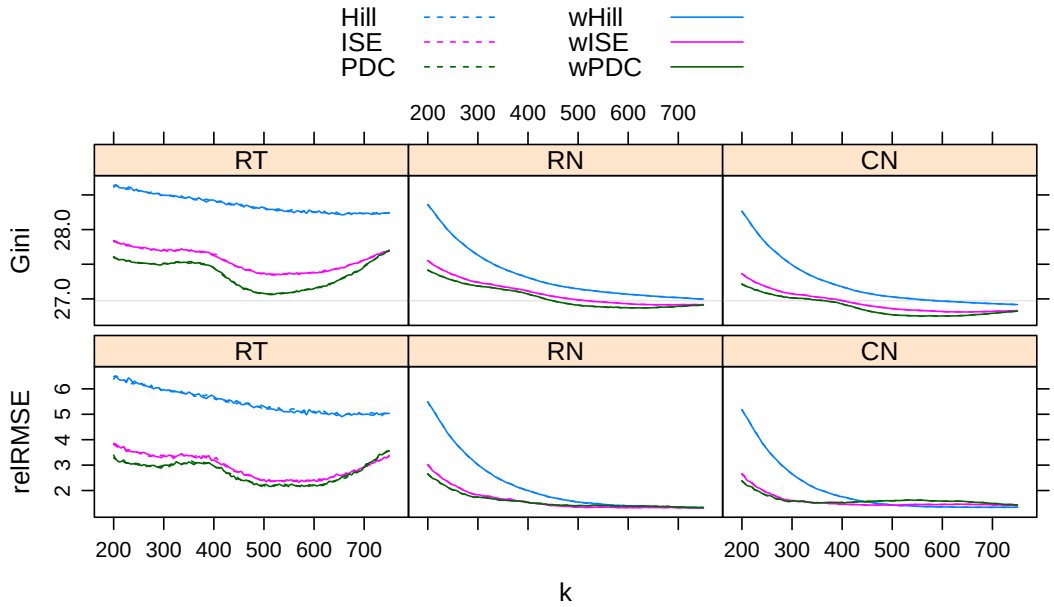

Figure F.126.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

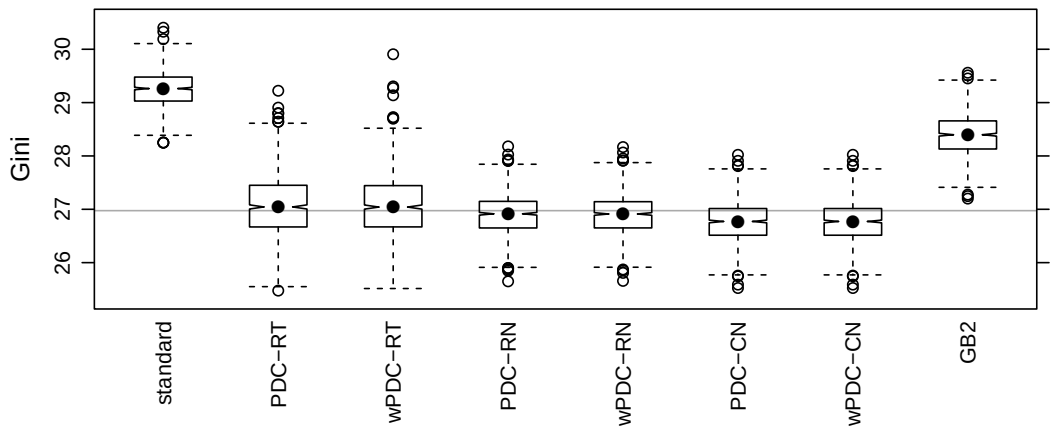

Figure F.127.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.63.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			29.26	0.11	2.28	8.46	29.26	0.33	2.29	2.31	8.55	3.39	0.13
wHill	RT	300	28.50	0.28	1.52	5.64	28.47	0.48	1.49	1.61	5.97	2.21	0.13
wHill	RT	500	28.32	0.25	1.34	4.97	28.30	0.46	1.33	1.43	5.30	1.97	0.12
wHill	RT	700	28.23	0.24	1.26	4.65	28.21	0.47	1.24	1.35	4.99	1.84	0.11
wHill	RN	300	27.63	0.23	0.66	2.43	27.62	0.48	0.64	0.81	3.01	0.95	0.08
wHill	RN	500	27.15	0.14	0.17	0.64	27.15	0.37	0.17	0.42	1.55	0.40	0.05
wHill	RN	700	27.02	0.13	0.04	0.16	27.02	0.34	0.04	0.36	1.33	0.34	0.04
wHill	CN	300	27.49	0.25	0.52	1.91	27.47	0.50	0.50	0.72	2.65	0.77	0.08
wHill	CN	500	27.03	0.15	0.06	0.21	27.02	0.37	0.05	0.39	1.43	0.37	0.05
wHill	CN	700	26.93	0.13	−0.04	−0.16	26.94	0.34	−0.04	0.36	1.34	0.34	0.05
wISE	RT	300	27.71	0.29	0.74	2.73	27.68	0.54	0.70	0.91	3.38	1.04	0.10
wISE	RT	500	27.37	0.27	0.40	1.48	27.35	0.52	0.37	0.66	2.43	0.64	0.08
wISE	RT	700	27.56	0.28	0.59	2.18	27.54	0.54	0.57	0.79	2.93	0.87	0.09
wISE	RN	300	27.24	0.17	0.27	0.99	27.22	0.39	0.24	0.49	1.83	0.47	0.06
wISE	RN	500	26.98	0.13	0.01	0.03	26.99	0.35	0.01	0.36	1.34	0.36	0.04
wISE	RN	700	26.92	0.13	−0.06	−0.22	26.92	0.34	−0.05	0.36	1.33	0.34	0.05
wISE	CN	300	27.07	0.18	0.10	0.37	27.05	0.40	0.08	0.43	1.61	0.41	0.06
wISE	CN	500	26.86	0.13	−0.12	−0.43	26.86	0.36	−0.11	0.38	1.43	0.36	0.05
wISE	CN	700	26.82	0.13	−0.15	−0.57	26.83	0.35	−0.15	0.39	1.44	0.39	0.05
wPDC	RT	300	27.51	0.36	0.54	2.00	27.46	0.56	0.49	0.81	2.99	0.76	0.11
wPDC	RT	500	27.08	0.35	0.10	0.38	27.04	0.57	0.07	0.60	2.23	0.59	0.11
wPDC	RT	700	27.46	0.38	0.49	1.82	27.44	0.62	0.46	0.79	2.92	0.80	0.09
wPDC	RN	300	27.19	0.18	0.21	0.78	27.15	0.41	0.18	0.47	1.74	0.43	0.06
wPDC	RN	500	26.91	0.14	−0.06	−0.24	26.91	0.37	−0.06	0.38	1.40	0.37	0.05
wPDC	RN	700	26.90	0.13	−0.08	−0.29	26.90	0.35	−0.07	0.36	1.35	0.36	0.05
wPDC	CN	300	27.02	0.18	0.04	0.15	26.98	0.41	0.01	0.43	1.59	0.41	0.06
wPDC	CN	500	26.77	0.14	−0.20	−0.75	26.77	0.37	−0.20	0.43	1.60	0.42	0.05
wPDC	CN	700	26.79	0.13	−0.18	−0.67	26.79	0.36	−0.18	0.40	1.49	0.40	0.05
GB2			28.40	0.14	1.42	5.28	28.40	0.39	1.42	1.47	5.46	2.11	0.10

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OAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

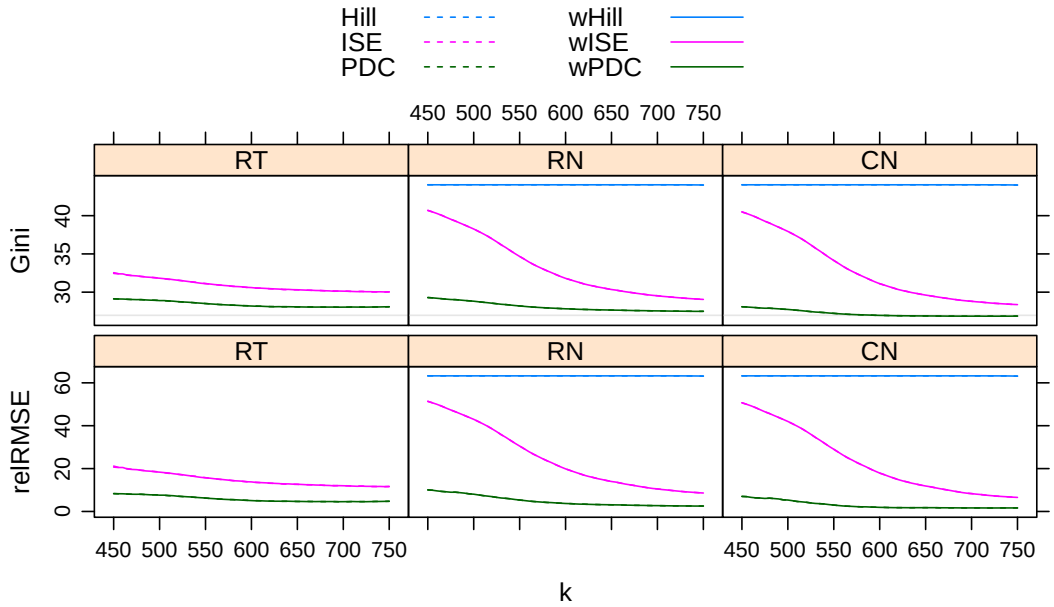

Figure F.128.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

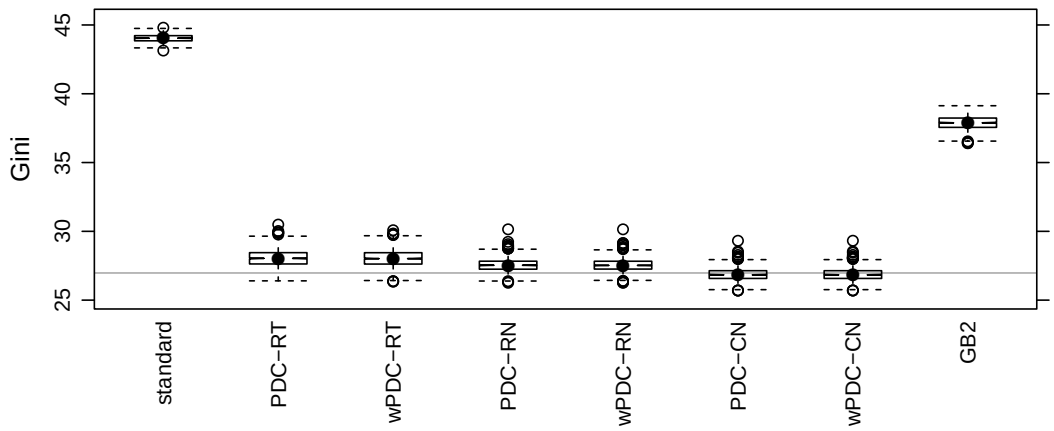

Figure F.129.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.64.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			44.04	0.07	17.06	63.25	44.04	0.28	17.06	17.06	63.26	25.30	0.66
wHill	RT	500	43.02	15.73	16.04	59.47	42.18	2.15	15.21	16.52	61.25	22.54	1.93
wHill	RT	700	39.83	3.47	12.86	47.67	39.58	1.33	12.61	12.99	48.16	18.69	1.24
wHill	RN	300	44.04	0.07	17.06	63.25	44.04	0.28	17.06	17.06	63.26	25.30	0.66
wHill	RN	500	44.04	0.07	17.06	63.25	44.04	0.28	17.06	17.06	63.26	25.30	0.66
wHill	RN	700	44.04	0.07	17.06	63.25	44.04	0.28	17.06	17.06	63.26	25.30	0.66
wHill	CN	300	44.04	0.07	17.06	63.25	44.04	0.28	17.06	17.06	63.26	25.30	0.66
wHill	CN	500	44.04	0.07	17.06	63.25	44.04	0.28	17.06	17.06	63.26	25.30	0.66
wHill	CN	700	44.04	0.07	17.06	63.25	44.04	0.28	17.06	17.06	63.26	25.30	0.66
wISE	RT	500	31.82	0.98	4.85	17.97	31.71	0.96	4.74	4.95	18.34	7.02	0.32
wISE	RT	700	30.13	0.49	3.16	11.71	30.09	0.69	3.11	3.23	11.99	4.61	0.24
wISE	RN	300	44.03	0.07	17.06	63.24	44.04	0.28	17.06	17.06	63.25	25.30	0.66
wISE	RN	500	38.26	7.08	11.28	41.83	38.81	2.37	11.84	11.59	42.98	17.55	0.61
wISE	RN	700	29.53	1.52	2.56	9.48	29.35	1.11	2.37	2.84	10.52	3.52	0.33
wISE	CN	300	44.03	0.07	17.06	63.24	44.04	0.28	17.06	17.06	63.25	25.30	0.66
wISE	CN	500	37.94	8.04	10.97	40.65	38.57	2.44	11.60	11.33	41.99	17.20	0.61
wISE	CN	700	28.81	1.69	1.83	6.79	28.60	1.16	1.63	2.24	8.32	2.42	0.31
wPDC	RT	500	28.90	0.50	1.92	7.13	28.80	0.67	1.83	2.05	7.60	2.71	0.17
wPDC	RT	700	28.04	0.37	1.07	3.97	28.02	0.61	1.04	1.23	4.56	1.54	0.12
wPDC	RN	300	34.88	7.78	7.91	29.31	33.79	1.15	6.82	8.38	31.08	10.11	0.66
wPDC	RN	500	28.82	1.33	1.84	6.83	28.52	0.75	1.55	2.17	8.06	2.30	0.30
wPDC	RN	700	27.55	0.20	0.58	2.14	27.52	0.42	0.55	0.73	2.72	0.83	0.12
wPDC	CN	300	33.84	9.95	6.86	25.44	32.62	1.39	5.64	7.55	28.00	8.37	0.66
wPDC	CN	500	27.74	1.48	0.77	2.84	27.42	0.76	0.45	1.44	5.33	0.76	0.29
wPDC	CN	700	26.86	0.19	−0.11	−0.41	26.84	0.41	−0.13	0.44	1.65	0.45	0.09
GB2			37.89	0.25	10.91	40.45	37.89	0.50	10.92	10.92	40.49	16.18	0.45

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OAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

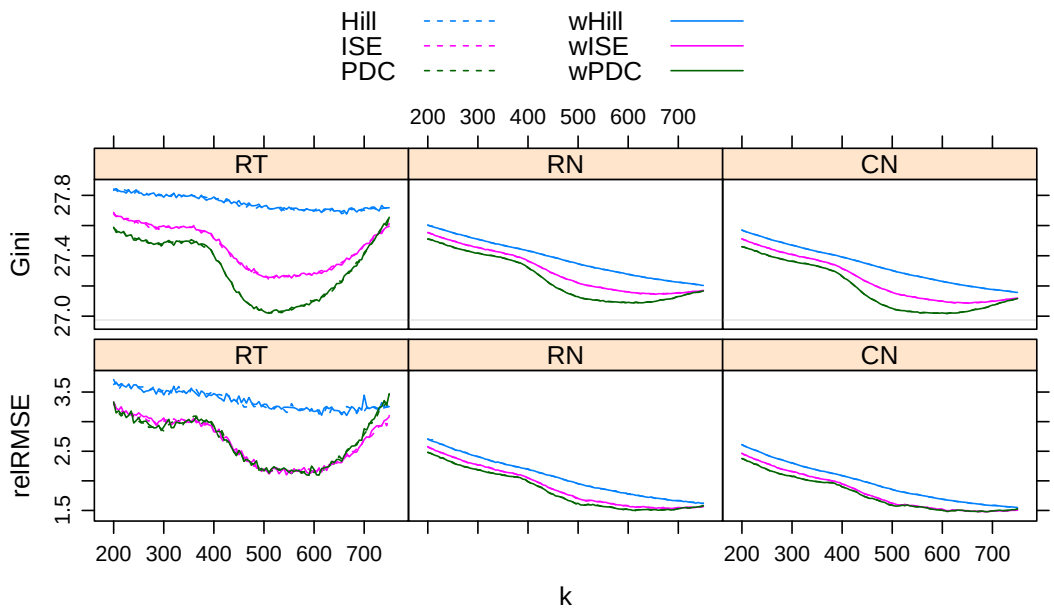

Figure F.130.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

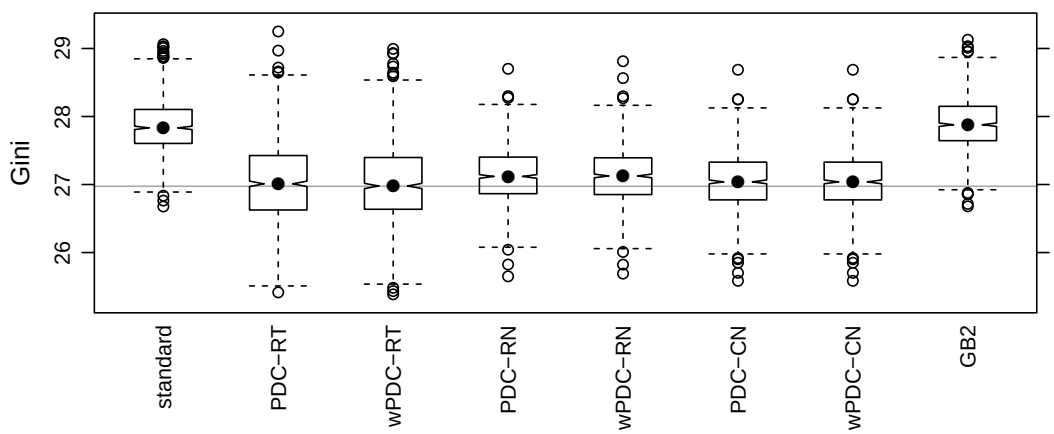

Figure F.131.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.65.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			27.85	0.14	0.88	3.25	27.83	0.37	0.86	0.95	3.54	1.27	0.08
wHill	RT	300	27.79	0.21	0.81	3.01	27.78	0.45	0.80	0.93	3.45	1.19	0.09
wHill	RT	500	27.73	0.22	0.75	2.80	27.73	0.44	0.76	0.89	3.29	1.12	0.09
wHill	RT	700	27.72	0.32	0.74	2.75	27.70	0.46	0.73	0.93	3.45	1.08	0.38
wHill	RN	300	27.51	0.14	0.53	1.98	27.51	0.37	0.53	0.65	2.41	0.79	0.07
wHill	RN	500	27.35	0.14	0.37	1.38	27.36	0.36	0.38	0.53	1.95	0.58	0.07
wHill	RN	700	27.23	0.14	0.25	0.93	27.24	0.38	0.26	0.45	1.67	0.47	0.06
wHill	CN	300	27.47	0.14	0.50	1.84	27.47	0.37	0.50	0.62	2.30	0.74	0.07
wHill	CN	500	27.30	0.14	0.33	1.22	27.31	0.38	0.34	0.50	1.85	0.54	0.07
wHill	CN	700	27.18	0.14	0.20	0.75	27.19	0.38	0.21	0.43	1.58	0.45	0.06
wISE	RT	300	27.60	0.29	0.62	2.31	27.54	0.52	0.57	0.83	3.06	0.84	0.10
wISE	RT	500	27.26	0.27	0.28	1.06	27.23	0.50	0.25	0.59	2.18	0.56	0.09
wISE	RT	700	27.47	0.28	0.50	1.84	27.45	0.54	0.47	0.73	2.70	0.75	0.11
wISE	RN	300	27.46	0.14	0.48	1.78	27.45	0.39	0.48	0.61	2.27	0.72	0.07
wISE	RN	500	27.22	0.15	0.25	0.91	27.22	0.38	0.25	0.46	1.70	0.48	0.07
wISE	RN	700	27.16	0.14	0.18	0.67	27.16	0.38	0.19	0.42	1.55	0.45	0.05
wISE	CN	300	27.41	0.15	0.43	1.61	27.41	0.39	0.43	0.58	2.16	0.65	0.07
wISE	CN	500	27.16	0.16	0.18	0.68	27.16	0.39	0.19	0.44	1.62	0.46	0.07
wISE	CN	700	27.10	0.15	0.12	0.46	27.10	0.39	0.12	0.40	1.49	0.42	0.05
wPDC	RT	300	27.49	0.35	0.51	1.90	27.46	0.62	0.48	0.79	2.91	0.75	0.11
wPDC	RT	500	27.03	0.34	0.06	0.21	26.98	0.55	0.00	0.58	2.17	0.55	0.07
wPDC	RT	700	27.42	0.40	0.45	1.66	27.39	0.62	0.42	0.78	2.88	0.76	0.14
wPDC	RN	300	27.42	0.15	0.44	1.64	27.40	0.39	0.43	0.59	2.18	0.66	0.07
wPDC	RN	500	27.13	0.17	0.15	0.57	27.13	0.40	0.15	0.44	1.62	0.43	0.07
wPDC	RN	700	27.13	0.15	0.16	0.58	27.13	0.38	0.16	0.41	1.53	0.43	0.05
wPDC	CN	300	27.36	0.16	0.39	1.44	27.34	0.41	0.37	0.56	2.07	0.58	0.07
wPDC	CN	500	27.05	0.18	0.08	0.29	27.04	0.41	0.06	0.43	1.59	0.43	0.06
wPDC	CN	700	27.07	0.15	0.10	0.36	27.08	0.39	0.10	0.40	1.49	0.42	0.05
GB2			27.89	0.14	0.92	3.40	27.88	0.37	0.90	0.99	3.67	1.34	0.08

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OAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

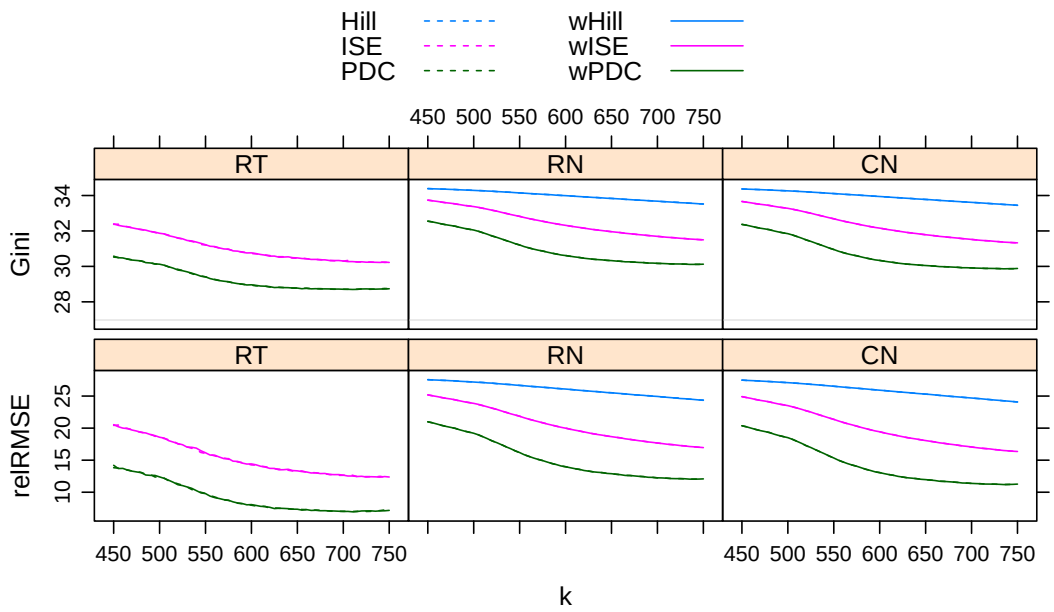

Figure F.132.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

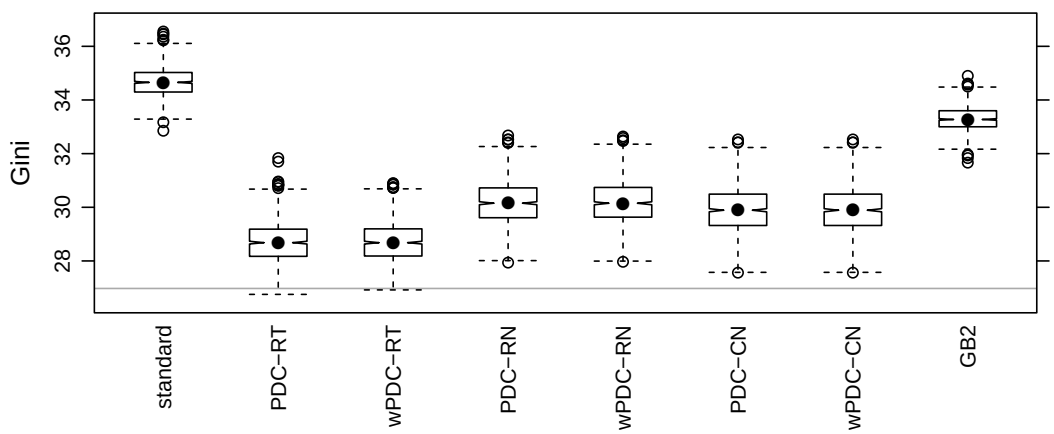

Figure F.133.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.66.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			34.67	0.27	7.70	28.54	34.65	0.54	7.68	7.71	28.60	11.39	0.36
wHill	RT	500	34.76	1.93	7.78	28.86	34.50	1.03	7.52	7.91	29.31	11.16	0.65
wHill	RT	700	33.91	0.89	6.93	25.70	33.83	0.85	6.86	7.00	25.94	10.17	0.48
wHill	RN	300	34.58	0.27	7.61	28.21	34.57	0.53	7.60	7.63	28.27	11.27	0.36
wHill	RN	500	34.29	0.28	7.31	27.12	34.29	0.55	7.31	7.33	27.19	10.84	0.34
wHill	RN	700	33.68	0.30	6.71	24.86	33.70	0.52	6.73	6.73	24.94	9.98	0.32
wHill	CN	300	34.58	0.27	7.60	28.18	34.57	0.54	7.60	7.62	28.25	11.26	0.36
wHill	CN	500	34.26	0.29	7.29	27.02	34.26	0.54	7.28	7.31	27.10	10.80	0.34
wHill	CN	700	33.61	0.30	6.64	24.61	33.64	0.54	6.66	6.66	24.70	9.88	0.32
wISE	RT	500	31.87	1.16	4.89	18.14	31.80	0.97	4.82	5.01	18.58	7.15	0.44
wISE	RT	700	30.30	0.57	3.33	12.35	30.27	0.75	3.30	3.42	12.66	4.89	0.24
wISE	RN	300	34.52	0.28	7.54	27.96	34.52	0.53	7.55	7.56	28.03	11.19	0.36
wISE	RN	500	33.38	0.46	6.40	23.73	33.41	0.68	6.44	6.44	23.86	9.55	0.32
wISE	RN	700	31.69	0.45	4.72	17.49	31.71	0.67	4.74	4.77	17.67	7.03	0.26
wISE	CN	300	34.50	0.29	7.53	27.91	34.51	0.53	7.54	7.55	27.98	11.17	0.36
wISE	CN	500	33.28	0.49	6.30	23.36	33.33	0.68	6.35	6.34	23.51	9.42	0.32
wISE	CN	700	31.52	0.49	4.55	16.86	31.55	0.69	4.57	4.60	17.06	6.78	0.26
wPDC	RT	500	30.12	1.24	3.15	11.68	29.99	1.00	3.02	3.34	12.39	4.47	0.31
wPDC	RT	700	28.71	0.54	1.74	6.43	28.68	0.76	1.71	1.89	6.99	2.53	0.15
wPDC	RN	300	34.16	0.57	7.19	26.65	34.23	0.64	7.26	7.23	26.79	10.76	0.35
wPDC	RN	500	32.05	1.05	5.08	18.82	32.10	1.02	5.13	5.18	19.20	7.60	0.29
wPDC	RN	700	30.17	0.70	3.20	11.85	30.15	0.84	3.17	3.30	12.25	4.71	0.21
wPDC	CN	300	34.11	0.65	7.13	26.45	34.19	0.67	7.22	7.18	26.61	10.70	0.35
wPDC	CN	500	31.85	1.20	4.87	18.06	31.89	1.11	4.92	4.99	18.51	7.29	0.29
wPDC	CN	700	29.91	0.77	2.94	10.90	29.89	0.88	2.92	3.07	11.37	4.32	0.21
GB2			33.29	0.22	6.32	23.42	33.27	0.44	6.30	6.33	23.48	9.34	0.29

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OAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 20.

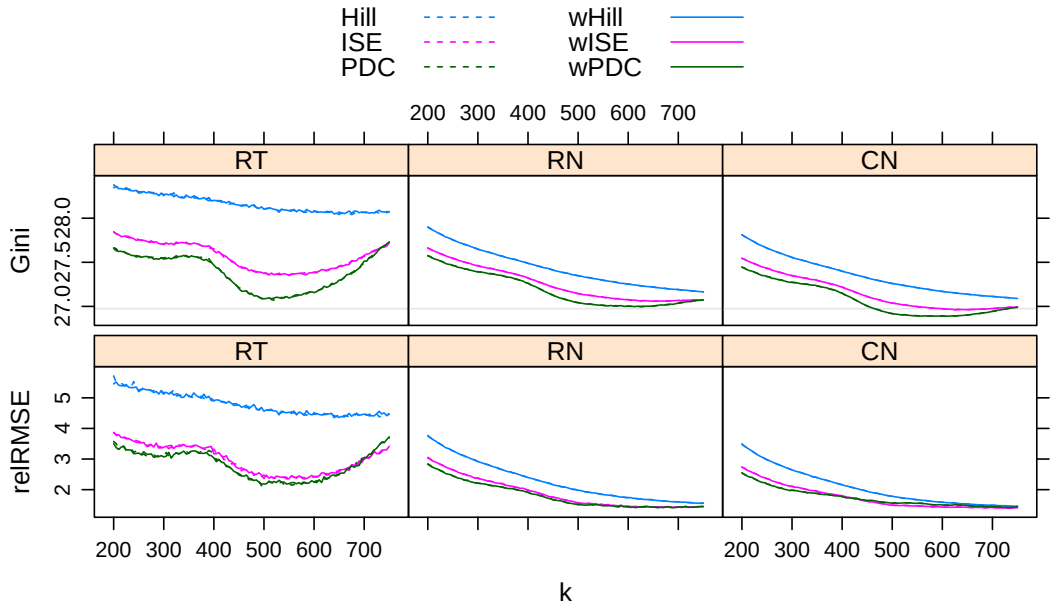

Figure F.134.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

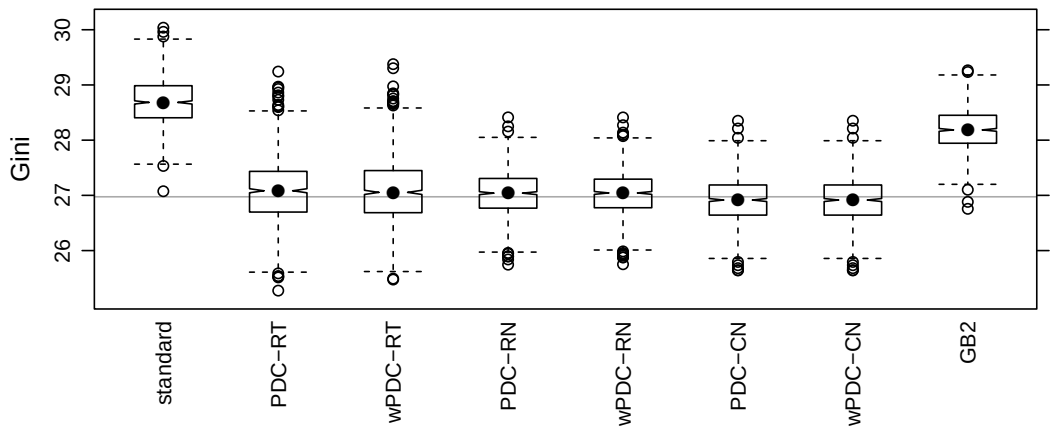

Figure F.135.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.67.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28.69	0.18	1.72	6.38	28.68	0.43	1.71	1.77	6.57	2.53	0.11
wHill	RT	300	28.27	0.27	1.29	4.79	28.23	0.48	1.25	1.39	5.16	1.86	0.16
wHill	RT	500	28.10	0.25	1.13	4.17	28.09	0.51	1.12	1.23	4.56	1.65	0.11
wHill	RT	700	28.07	0.26	1.09	4.05	28.06	0.48	1.09	1.21	4.47	1.62	0.17
wHill	RN	300	27.65	0.16	0.67	2.50	27.66	0.40	0.68	0.79	2.92	1.01	0.08
wHill	RN	500	27.35	0.15	0.37	1.39	27.35	0.37	0.38	0.53	1.98	0.60	0.07
wHill	RN	700	27.19	0.14	0.22	0.80	27.19	0.37	0.22	0.43	1.61	0.44	0.05
wHill	CN	300	27.56	0.17	0.58	2.15	27.55	0.40	0.58	0.71	2.65	0.86	0.08
wHill	CN	500	27.26	0.15	0.29	1.06	27.26	0.37	0.29	0.48	1.78	0.51	0.07
wHill	CN	700	27.11	0.14	0.14	0.51	27.12	0.39	0.15	0.40	1.49	0.39	0.05
wISE	RT	300	27.71	0.29	0.73	2.72	27.67	0.52	0.69	0.91	3.38	1.03	0.13
wISE	RT	500	27.37	0.25	0.40	1.48	27.36	0.50	0.38	0.64	2.36	0.63	0.09
wISE	RT	700	27.58	0.29	0.60	2.24	27.56	0.54	0.58	0.81	3.00	0.89	0.10
wISE	RN	300	27.46	0.17	0.49	1.81	27.45	0.41	0.47	0.64	2.38	0.71	0.07
wISE	RN	500	27.15	0.15	0.17	0.63	27.16	0.38	0.18	0.42	1.57	0.43	0.06
wISE	RN	700	27.07	0.14	0.09	0.35	27.08	0.37	0.11	0.39	1.43	0.38	0.05
wISE	CN	300	27.35	0.18	0.37	1.39	27.34	0.41	0.36	0.57	2.11	0.59	0.07
wISE	CN	500	27.04	0.16	0.06	0.24	27.05	0.39	0.08	0.40	1.49	0.38	0.06
wISE	CN	700	26.98	0.15	0.00	0.01	26.98	0.37	0.00	0.38	1.41	0.37	0.05
wPDC	RT	300	27.54	0.37	0.56	2.09	27.49	0.56	0.52	0.83	3.07	0.81	0.11
wPDC	RT	500	27.09	0.33	0.11	0.42	27.05	0.56	0.08	0.59	2.18	0.57	0.09
wPDC	RT	700	27.51	0.39	0.54	2.00	27.47	0.61	0.49	0.82	3.05	0.81	0.10
wPDC	RN	300	27.39	0.18	0.42	1.55	27.37	0.43	0.40	0.60	2.21	0.63	0.07
wPDC	RN	500	27.04	0.16	0.07	0.25	27.04	0.38	0.07	0.41	1.51	0.40	0.05
wPDC	RN	700	27.04	0.15	0.06	0.23	27.04	0.38	0.07	0.39	1.43	0.39	0.05
wPDC	CN	300	27.27	0.20	0.30	1.11	27.24	0.44	0.27	0.53	1.98	0.50	0.07
wPDC	CN	500	26.92	0.17	−0.06	−0.21	26.92	0.40	−0.06	0.42	1.56	0.40	0.05
wPDC	CN	700	26.94	0.15	−0.03	−0.11	26.93	0.39	−0.04	0.39	1.44	0.37	0.05
GB2			28.19	0.14	1.21	4.50	28.19	0.38	1.21	1.27	4.71	1.80	0.08

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OAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 20.

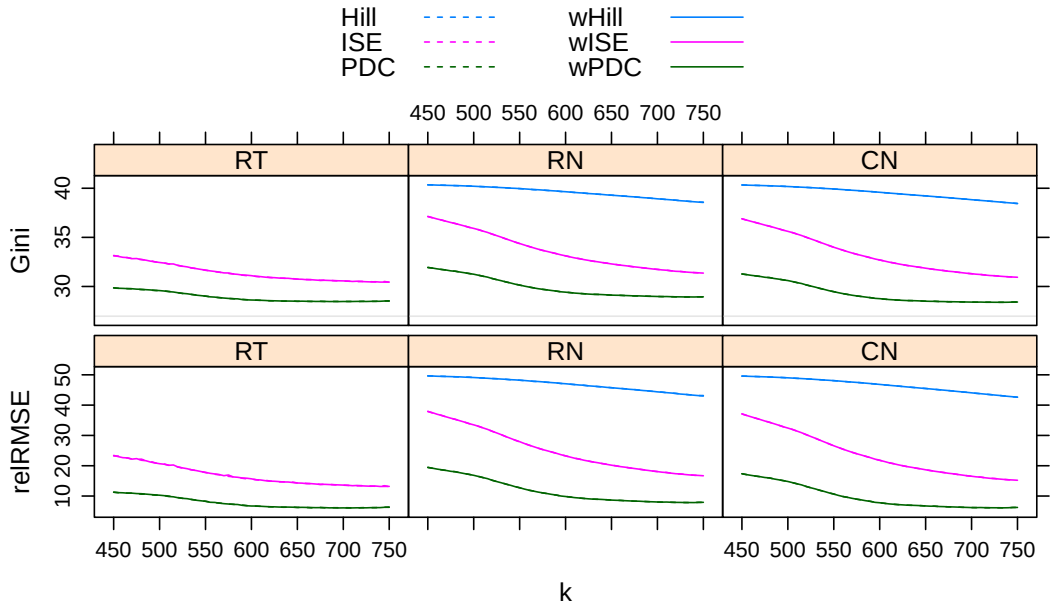

Figure F.136.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

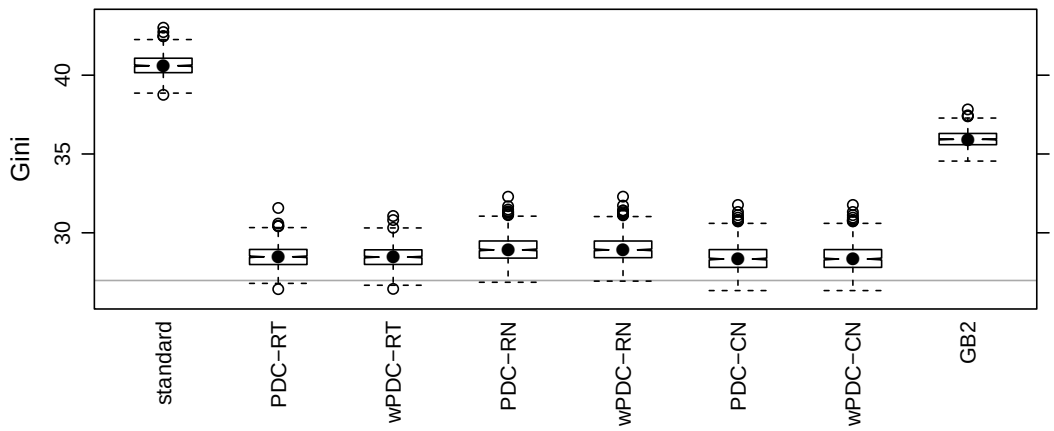

Figure F.137.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.68.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			40.61	0.44	13.64	50.56	40.60	0.68	13.63	13.65	50.62	20.20	0.59
wHill	RT	500	40.52	11.36	13.54	50.21	39.97	1.79	13.00	13.96	51.74	19.27	2.13
wHill	RT	700	38.09	2.88	11.11	41.19	37.90	1.31	10.93	11.24	41.67	16.20	1.04
wHill	RN	300	40.57	0.43	13.60	50.42	40.56	0.66	13.58	13.62	50.48	20.14	0.59
wHill	RN	500	40.20	0.45	13.23	49.04	40.18	0.68	13.20	13.25	49.11	19.58	0.60
wHill	RN	700	38.92	0.49	11.95	44.29	38.93	0.73	11.96	11.97	44.37	17.73	0.51
wHill	CN	300	40.57	0.43	13.60	50.41	40.55	0.66	13.58	13.61	50.47	20.13	0.59
wHill	CN	500	40.18	0.44	13.20	48.94	40.16	0.67	13.18	13.22	49.00	19.54	0.58
wHill	CN	700	38.84	0.49	11.86	43.97	38.84	0.72	11.87	11.88	44.05	17.60	0.51
wISE	RT	500	32.44	1.18	5.47	20.27	32.35	1.01	5.38	5.58	20.67	7.97	0.46
wISE	RT	700	30.57	0.57	3.59	13.32	30.53	0.75	3.56	3.67	13.61	5.27	0.22
wISE	RN	300	40.34	0.47	13.36	49.53	40.34	0.69	13.36	13.38	49.60	19.81	0.58
wISE	RN	500	35.91	1.72	8.94	33.14	35.93	1.30	8.95	9.03	33.49	13.27	0.49
wISE	RN	700	31.74	1.06	4.76	17.66	31.68	1.02	4.70	4.87	18.07	6.97	0.29
wISE	CN	300	40.32	0.47	13.34	49.47	40.32	0.70	13.35	13.36	49.54	19.79	0.58
wISE	CN	500	35.61	1.91	8.64	32.02	35.65	1.37	8.67	8.75	32.43	12.86	0.46
wISE	CN	700	31.30	1.19	4.32	16.03	31.21	1.08	4.24	4.46	16.53	6.28	0.29
wPDC	RT	500	29.58	0.88	2.61	9.66	29.53	0.92	2.55	2.77	10.27	3.78	0.22
wPDC	RT	700	28.47	0.46	1.50	5.55	28.46	0.68	1.49	1.64	6.09	2.20	0.15
wPDC	RN	300	36.40	6.90	9.43	34.95	36.65	2.97	9.68	9.79	36.28	14.35	0.56
wPDC	RN	500	31.25	2.37	4.27	15.84	31.09	1.54	4.11	4.54	16.84	6.10	0.40
wPDC	RN	700	28.98	0.66	2.01	7.44	28.92	0.79	1.94	2.17	8.03	2.88	0.20
wPDC	CN	300	35.98	8.59	9.00	33.38	36.24	3.37	9.26	9.47	35.10	13.74	0.56
wPDC	CN	500	30.60	2.77	3.63	13.45	30.44	1.72	3.47	3.99	14.80	5.15	0.40
wPDC	CN	700	28.41	0.73	1.44	5.32	28.34	0.85	1.36	1.67	6.19	2.02	0.18
GB2			35.95	0.26	8.97	33.26	35.93	0.53	8.96	8.99	33.32	13.28	0.40

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Stratified simple random sampling

No contamination

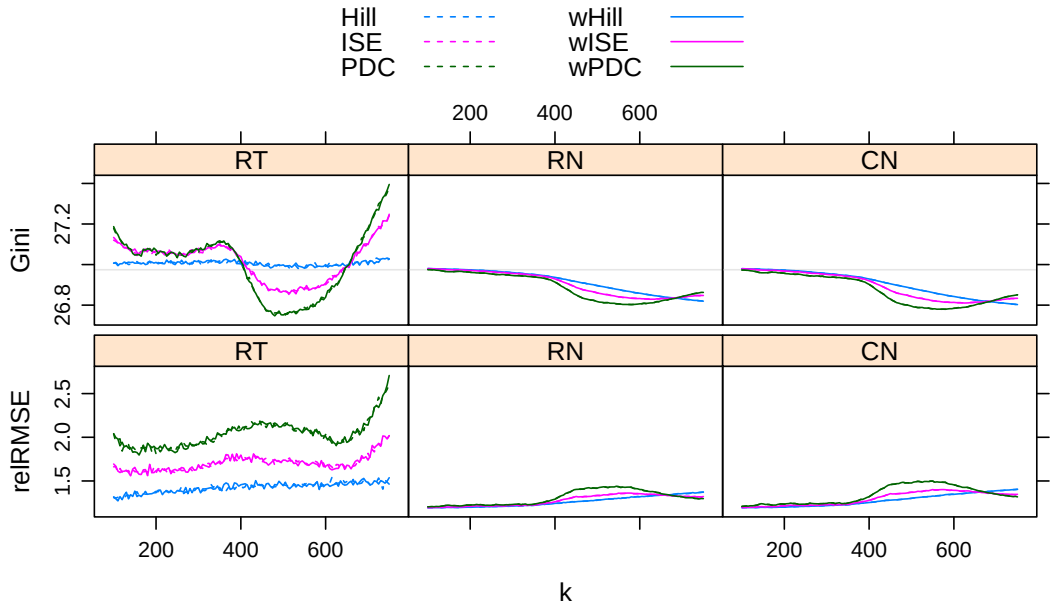

Figure F.138.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 100 and 750.

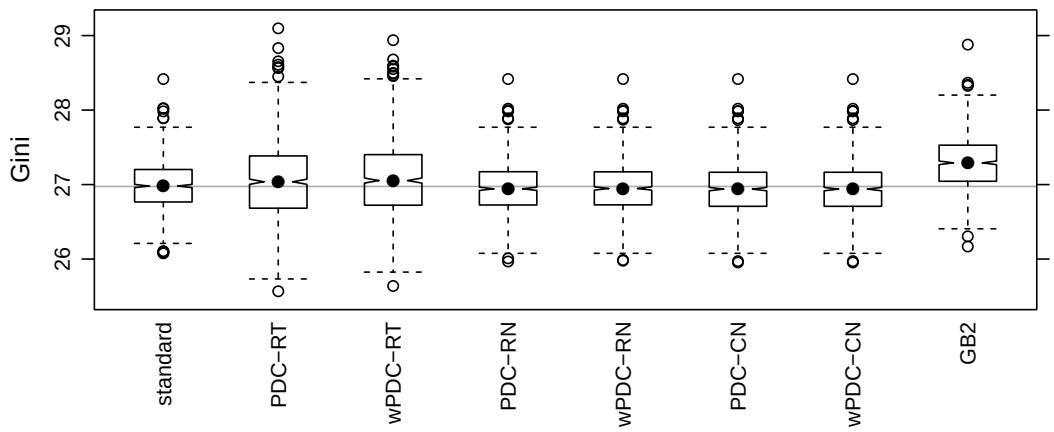

Figure F.139.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 300$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.69.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			26.98	0.10	0.01	0.02	26.98	0.32	0.01	0.32	1.19	0.32	0.05
wHill	RT	300	27.02	0.15	0.04	0.15	27.00	0.39	0.03	0.38	1.42	0.39	0.06
wHill	RT	500	27.00	0.15	0.02	0.09	26.98	0.39	0.01	0.39	1.45	0.39	0.06
wHill	RT	700	27.00	0.16	0.02	0.09	26.99	0.39	0.02	0.40	1.48	0.40	0.06
wHill	RN	300	26.96	0.11	−0.01	−0.05	26.96	0.33	−0.01	0.33	1.21	0.33	0.05
wHill	RN	500	26.90	0.11	−0.08	−0.29	26.90	0.33	−0.08	0.35	1.28	0.35	0.05
wHill	RN	700	26.83	0.11	−0.14	−0.54	26.83	0.32	−0.14	0.37	1.35	0.36	0.05
wHill	CN	300	26.96	0.11	−0.02	−0.07	26.95	0.33	−0.02	0.33	1.22	0.33	0.05
wHill	CN	500	26.88	0.12	−0.09	−0.34	26.88	0.33	−0.09	0.35	1.30	0.36	0.05
wHill	CN	700	26.81	0.11	−0.16	−0.60	26.81	0.33	−0.16	0.37	1.39	0.37	0.05
wISE	RT	300	27.08	0.20	0.11	0.39	27.07	0.43	0.10	0.45	1.69	0.43	0.06
wISE	RT	500	26.87	0.21	−0.11	−0.39	26.86	0.44	−0.12	0.47	1.74	0.45	0.08
wISE	RT	700	27.10	0.20	0.12	0.46	27.08	0.45	0.10	0.47	1.74	0.45	0.07
wISE	RN	300	26.96	0.11	−0.02	−0.07	26.96	0.33	−0.02	0.33	1.22	0.32	0.05
wISE	RN	500	26.86	0.12	−0.11	−0.42	26.87	0.33	−0.11	0.36	1.33	0.35	0.05
wISE	RN	700	26.84	0.11	−0.14	−0.50	26.84	0.32	−0.14	0.36	1.32	0.35	0.05
wISE	CN	300	26.95	0.11	−0.02	−0.09	26.95	0.33	−0.03	0.33	1.23	0.33	0.05
wISE	CN	500	26.84	0.12	−0.13	−0.49	26.85	0.34	−0.12	0.37	1.37	0.36	0.05
wISE	CN	700	26.82	0.11	−0.15	−0.56	26.83	0.33	−0.15	0.37	1.35	0.36	0.05
wPDC	RT	300	27.07	0.26	0.10	0.36	27.05	0.51	0.08	0.52	1.92	0.52	0.07
wPDC	RT	500	26.75	0.29	−0.22	−0.83	26.72	0.51	−0.25	0.58	2.14	0.59	0.08
wPDC	RT	700	27.17	0.29	0.20	0.72	27.16	0.54	0.19	0.58	2.14	0.58	0.09
wPDC	RN	300	26.95	0.11	−0.03	−0.11	26.95	0.33	−0.03	0.33	1.23	0.33	0.05
wPDC	RN	500	26.82	0.12	−0.16	−0.58	26.83	0.34	−0.14	0.38	1.42	0.37	0.05
wPDC	RN	700	26.84	0.11	−0.13	−0.49	26.84	0.33	−0.13	0.36	1.32	0.35	0.05
wPDC	CN	300	26.94	0.11	−0.04	−0.13	26.94	0.34	−0.04	0.34	1.24	0.34	0.05
wPDC	CN	500	26.79	0.13	−0.18	−0.67	26.81	0.35	−0.16	0.40	1.48	0.38	0.05
wPDC	CN	700	26.83	0.11	−0.15	−0.55	26.83	0.33	−0.14	0.36	1.35	0.36	0.05
GB2			27.29	0.12	0.32	1.18	27.29	0.36	0.32	0.47	1.74	0.51	0.07

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OCAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

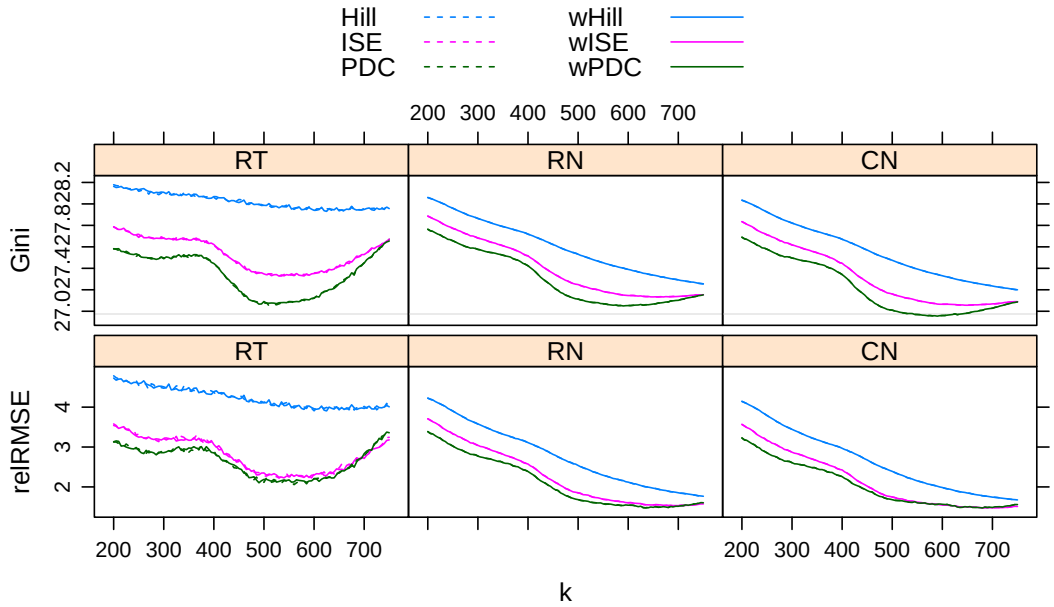

Figure F.140.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

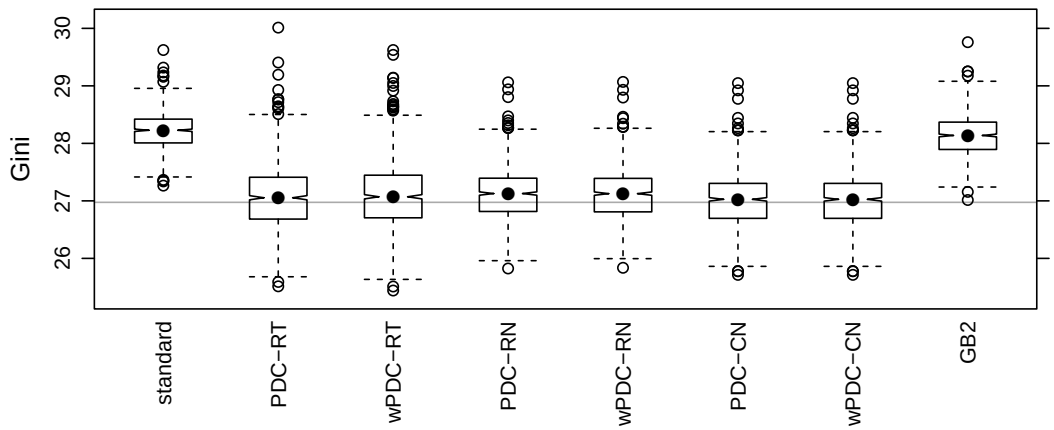

Figure F.141.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.70.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28.22	0.10	1.25	4.63	28.23	0.31	1.25	1.29	4.77	1.86	0.10
wHill	RT	300	28.11	0.19	1.13	4.20	28.09	0.43	1.12	1.22	4.51	1.66	0.11
wHill	RT	500	27.99	0.21	1.01	3.75	27.98	0.44	1.01	1.11	4.12	1.50	0.12
wHill	RT	700	27.95	0.20	0.97	3.61	27.94	0.46	0.97	1.07	3.97	1.43	0.09
wHill	RN	300	27.86	0.14	0.89	3.30	27.86	0.38	0.88	0.97	3.58	1.31	0.09
wHill	RN	500	27.53	0.16	0.56	2.06	27.54	0.40	0.56	0.68	2.54	0.84	0.08
wHill	RN	700	27.29	0.15	0.32	1.18	27.28	0.40	0.31	0.50	1.85	0.52	0.07
wHill	CN	300	27.82	0.15	0.85	3.14	27.81	0.39	0.83	0.93	3.44	1.23	0.08
wHill	CN	500	27.47	0.17	0.50	1.86	27.47	0.41	0.49	0.64	2.39	0.75	0.07
wHill	CN	700	27.24	0.15	0.26	0.97	27.23	0.41	0.25	0.47	1.74	0.48	0.07
wISE	RT	300	27.68	0.25	0.71	2.62	27.67	0.51	0.69	0.87	3.21	1.03	0.10
wISE	RT	500	27.35	0.26	0.37	1.38	27.34	0.49	0.36	0.63	2.35	0.64	0.10
wISE	RT	700	27.53	0.23	0.55	2.05	27.54	0.48	0.56	0.73	2.71	0.84	0.09
wISE	RN	300	27.68	0.17	0.71	2.63	27.70	0.43	0.73	0.82	3.04	1.08	0.08
wISE	RN	500	27.25	0.17	0.27	1.02	27.25	0.41	0.28	0.50	1.85	0.51	0.08
wISE	RN	700	27.14	0.14	0.16	0.61	27.13	0.39	0.16	0.41	1.53	0.41	0.07
wISE	CN	300	27.62	0.19	0.64	2.38	27.63	0.45	0.66	0.77	2.87	0.97	0.07
wISE	CN	500	27.16	0.19	0.19	0.69	27.16	0.43	0.19	0.47	1.75	0.48	0.08
wISE	CN	700	27.07	0.15	0.09	0.35	27.06	0.40	0.09	0.40	1.47	0.40	0.07
wPDC	RT	300	27.49	0.33	0.51	1.91	27.46	0.58	0.48	0.77	2.86	0.77	0.10
wPDC	RT	500	27.09	0.34	0.12	0.43	27.07	0.55	0.10	0.59	2.19	0.57	0.10
wPDC	RT	700	27.45	0.36	0.47	1.76	27.44	0.62	0.46	0.76	2.83	0.76	0.11
wPDC	RN	300	27.58	0.20	0.60	2.23	27.59	0.46	0.62	0.75	2.77	0.92	0.08
wPDC	RN	500	27.11	0.19	0.14	0.51	27.13	0.43	0.15	0.45	1.68	0.44	0.08
wPDC	RN	700	27.10	0.15	0.13	0.47	27.10	0.40	0.12	0.41	1.52	0.42	0.07
wPDC	CN	300	27.50	0.22	0.52	1.93	27.52	0.49	0.54	0.70	2.61	0.83	0.07
wPDC	CN	500	27.01	0.20	0.04	0.13	27.03	0.44	0.05	0.45	1.68	0.45	0.08
wPDC	CN	700	27.03	0.16	0.05	0.20	27.03	0.40	0.05	0.40	1.49	0.41	0.07
GB2			28.14	0.13	1.16	4.31	28.14	0.36	1.16	1.22	4.51	1.72	0.10

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OCAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

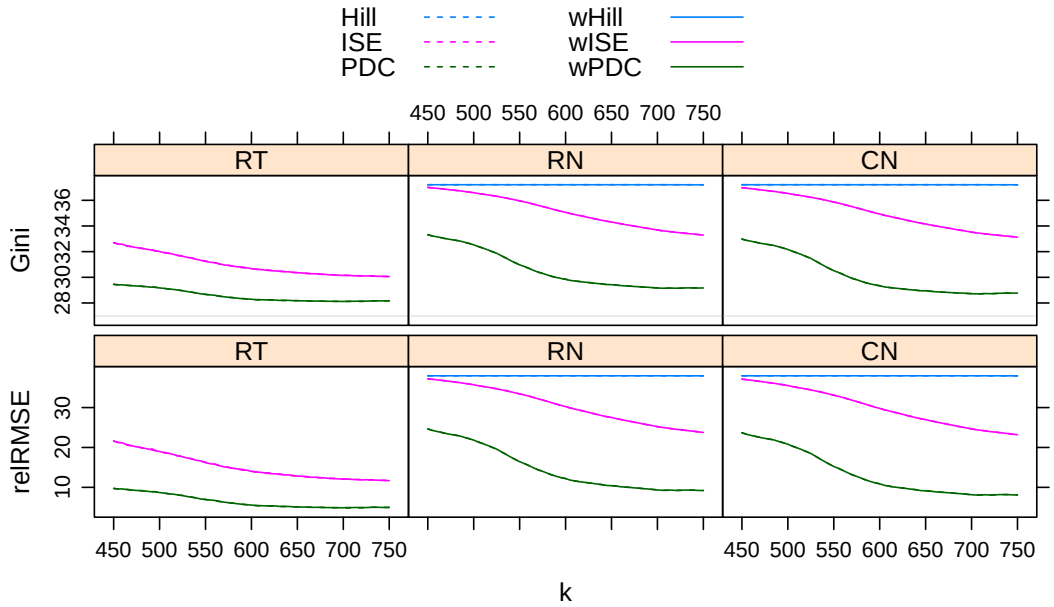

Figure F.142.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

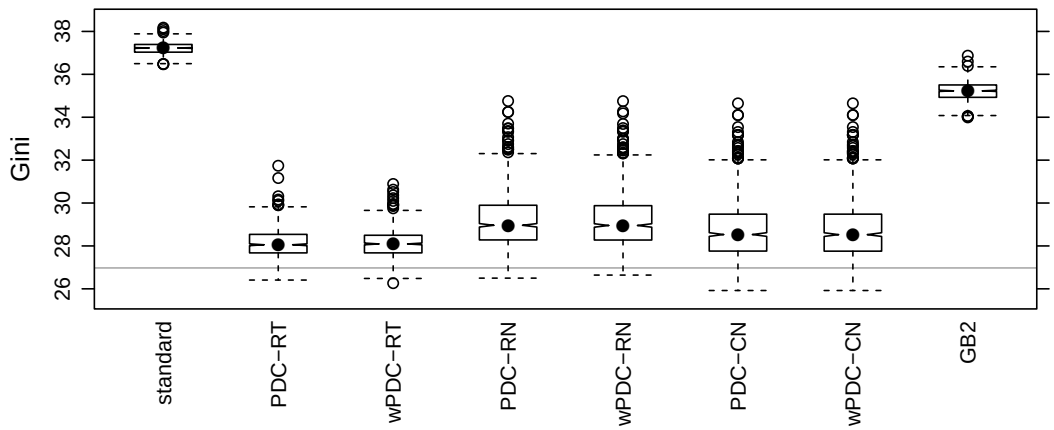

Figure F.143.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.71.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.21	0.07	10.24	37.96	37.23	0.27	10.25	10.24	37.97	15.20	0.42
wHill	RT	500	37.15	5.11	10.18	37.74	36.86	1.20	9.88	10.43	38.66	14.65	2.25
wHill	RT	700	35.75	1.26	8.78	32.54	35.64	0.94	8.67	8.85	32.80	12.85	0.84
wHill	RN	300	37.21	0.07	10.24	37.96	37.23	0.27	10.25	10.24	37.97	15.20	0.42
wHill	RN	500	37.21	0.07	10.24	37.96	37.23	0.27	10.25	10.24	37.97	15.20	0.42
wHill	RN	700	37.21	0.07	10.24	37.96	37.23	0.27	10.25	10.24	37.97	15.20	0.42
wHill	CN	300	37.21	0.07	10.24	37.96	37.23	0.27	10.25	10.24	37.97	15.20	0.42
wHill	CN	500	37.21	0.07	10.24	37.96	37.23	0.27	10.25	10.24	37.97	15.20	0.42
wHill	CN	700	37.21	0.07	10.24	37.96	37.23	0.27	10.25	10.24	37.97	15.20	0.42
wISE	RT	500	32.01	0.97	5.03	18.66	31.98	0.96	5.01	5.13	19.01	7.42	0.45
wISE	RT	700	30.14	0.51	3.17	11.75	30.12	0.67	3.14	3.25	12.04	4.66	0.22
wISE	RN	300	37.21	0.07	10.24	37.96	37.23	0.27	10.25	10.24	37.97	15.20	0.42
wISE	RN	500	36.59	0.35	9.62	35.65	36.61	0.60	9.63	9.63	35.71	14.28	0.41
wISE	RN	700	33.68	1.26	6.71	24.87	33.81	1.05	6.83	6.80	25.22	10.13	0.37
wISE	CN	300	37.21	0.07	10.24	37.96	37.23	0.27	10.25	10.24	37.97	15.20	0.42
wISE	CN	500	36.53	0.38	9.56	35.44	36.55	0.64	9.57	9.58	35.51	14.19	0.41
wISE	CN	700	33.52	1.36	6.55	24.27	33.65	1.09	6.67	6.65	24.65	9.89	0.37
wPDC	RT	500	29.17	0.68	2.20	8.14	29.12	0.83	2.14	2.35	8.69	3.18	0.18
wPDC	RT	700	28.12	0.42	1.14	4.24	28.09	0.61	1.12	1.31	4.87	1.66	0.15
wPDC	RN	300	36.59	1.65	9.61	35.63	37.07	0.49	10.10	9.70	35.95	14.97	0.41
wPDC	RN	500	32.53	3.81	5.56	20.61	32.73	2.26	5.75	5.89	21.84	8.53	0.37
wPDC	RN	700	29.17	1.54	2.19	8.13	28.95	1.12	1.98	2.52	9.35	2.93	0.29
wPDC	CN	300	36.50	2.12	9.53	35.31	37.07	0.50	10.09	9.64	35.72	14.96	0.41
wPDC	CN	500	32.17	4.53	5.20	19.26	32.39	2.44	5.42	5.61	20.81	8.04	0.37
wPDC	CN	700	28.72	1.77	1.75	6.48	28.53	1.22	1.55	2.20	8.14	2.30	0.28
GB2			35.22	0.18	8.25	30.57	35.23	0.43	8.26	8.26	30.61	12.24	0.37

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OCAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

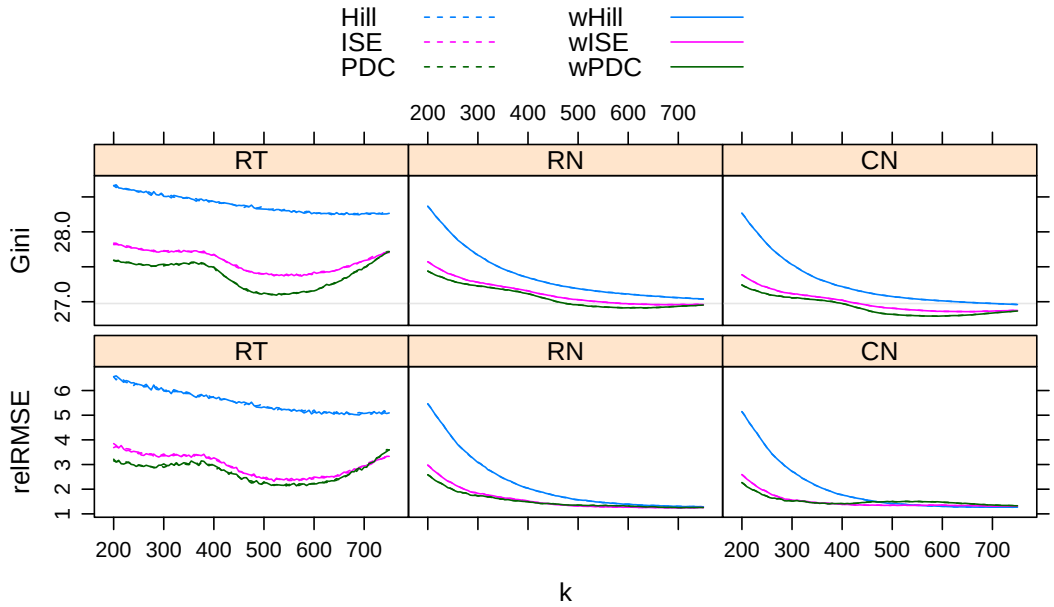

Figure F.144.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

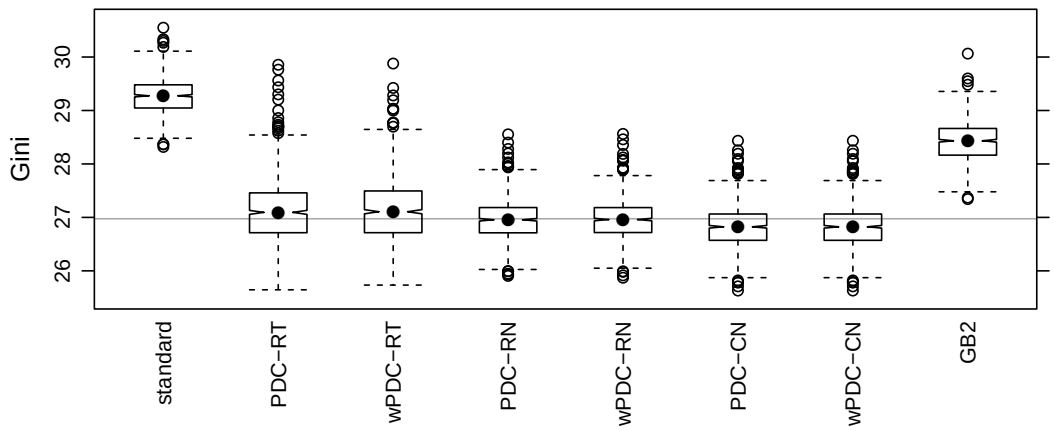

Figure F.145.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.72.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			29.28	0.10	2.30	8.53	29.28	0.32	2.30	2.32	8.61	3.41	0.13
wHill	RT	300	28.51	0.26	1.53	5.68	28.49	0.48	1.51	1.61	5.99	2.25	0.14
wHill	RT	500	28.33	0.25	1.35	5.01	28.30	0.48	1.33	1.44	5.34	1.97	0.15
wHill	RT	700	28.26	0.22	1.28	4.76	28.26	0.49	1.29	1.37	5.07	1.91	0.10
wHill	RN	300	27.67	0.21	0.69	2.56	27.65	0.48	0.67	0.83	3.08	1.00	0.07
wHill	RN	500	27.19	0.13	0.21	0.79	27.19	0.38	0.21	0.42	1.57	0.44	0.06
wHill	RN	700	27.06	0.12	0.08	0.31	27.06	0.33	0.09	0.35	1.30	0.35	0.06
wHill	CN	300	27.53	0.23	0.56	2.06	27.51	0.49	0.54	0.73	2.72	0.82	0.07
wHill	CN	500	27.07	0.14	0.10	0.37	27.07	0.37	0.10	0.38	1.42	0.39	0.06
wHill	CN	700	26.97	0.12	−0.00	−0.00	26.98	0.33	0.01	0.34	1.27	0.33	0.05
wISE	RT	300	27.72	0.26	0.75	2.77	27.73	0.51	0.75	0.90	3.35	1.12	0.09
wISE	RT	500	27.40	0.26	0.42	1.57	27.39	0.48	0.42	0.66	2.45	0.68	0.12
wISE	RT	700	27.59	0.25	0.61	2.28	27.60	0.48	0.62	0.80	2.95	0.93	0.10
wISE	RN	300	27.28	0.15	0.30	1.12	27.27	0.39	0.29	0.49	1.83	0.52	0.07
wISE	RN	500	27.03	0.12	0.06	0.20	27.02	0.34	0.05	0.36	1.32	0.36	0.06
wISE	RN	700	26.96	0.11	−0.02	−0.06	26.96	0.33	−0.02	0.34	1.25	0.34	0.06
wISE	CN	300	27.12	0.16	0.14	0.52	27.10	0.38	0.12	0.42	1.56	0.40	0.06
wISE	CN	500	26.91	0.13	−0.07	−0.25	26.91	0.35	−0.07	0.36	1.35	0.36	0.05
wISE	CN	700	26.87	0.11	−0.11	−0.40	26.87	0.33	−0.10	0.35	1.31	0.35	0.05
wPDC	RT	300	27.54	0.35	0.56	2.08	27.52	0.58	0.54	0.82	3.03	0.83	0.12
wPDC	RT	500	27.12	0.35	0.15	0.55	27.11	0.58	0.13	0.61	2.26	0.58	0.11
wPDC	RT	700	27.49	0.34	0.52	1.93	27.49	0.58	0.52	0.78	2.89	0.82	0.13
wPDC	RN	300	27.22	0.16	0.25	0.92	27.20	0.39	0.23	0.46	1.72	0.46	0.07
wPDC	RN	500	26.95	0.13	−0.02	−0.07	26.96	0.35	−0.01	0.37	1.35	0.35	0.06
wPDC	RN	700	26.94	0.11	−0.04	−0.15	26.93	0.33	−0.04	0.34	1.25	0.32	0.06
wPDC	CN	300	27.05	0.16	0.08	0.30	27.03	0.40	0.06	0.41	1.52	0.40	0.07
wPDC	CN	500	26.82	0.14	−0.15	−0.57	26.82	0.36	−0.15	0.41	1.50	0.38	0.05
wPDC	CN	700	26.84	0.12	−0.14	−0.50	26.84	0.33	−0.14	0.37	1.36	0.36	0.05
GB2			28.43	0.13	1.45	5.39	28.43	0.36	1.46	1.50	5.55	2.16	0.11

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OCAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

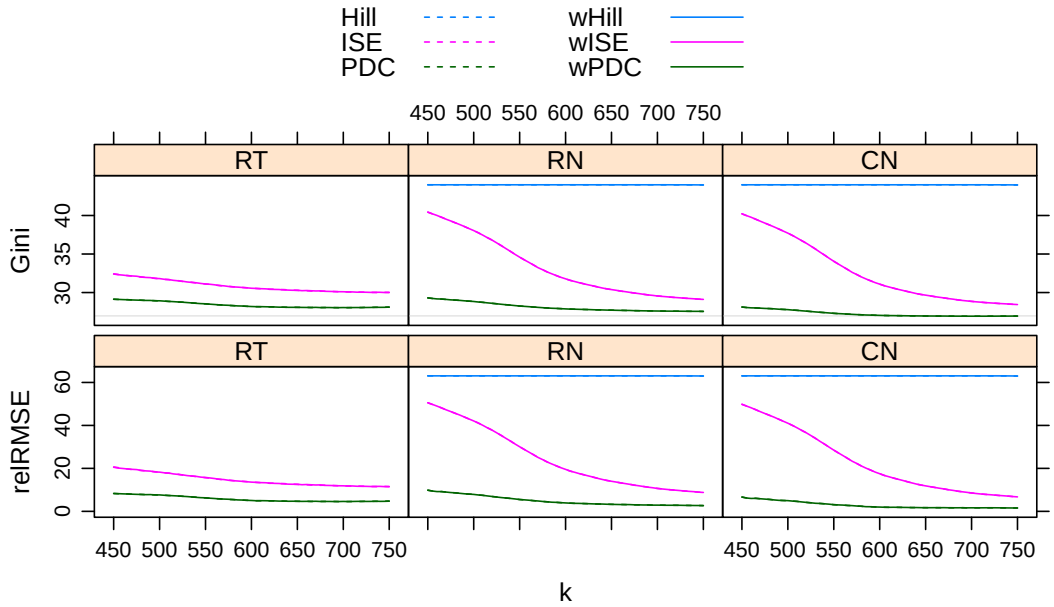

Figure F.146.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

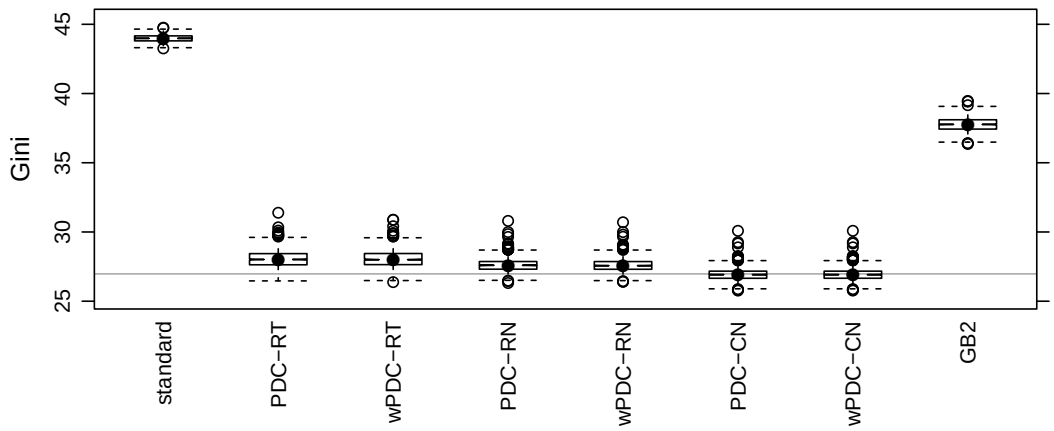

Figure F.147.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.73.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			43.98	0.07	17.01	63.06	43.98	0.27	17.01	17.01	63.07	25.22	0.66
wHill	RT	500	43.08	15.53	16.11	59.72	42.28	2.14	15.31	16.58	61.48	22.69	2.27
wHill	RT	700	39.91	3.45	12.93	47.94	39.61	1.39	12.63	13.06	48.43	18.73	1.16
wHill	RN	300	43.98	0.07	17.01	63.06	43.98	0.27	17.01	17.01	63.07	25.22	0.66
wHill	RN	500	43.98	0.07	17.01	63.06	43.98	0.27	17.01	17.01	63.07	25.22	0.66
wHill	RN	700	43.98	0.07	17.01	63.06	43.98	0.27	17.01	17.01	63.07	25.22	0.66
wHill	CN	300	43.98	0.07	17.01	63.06	43.98	0.27	17.01	17.01	63.07	25.22	0.66
wHill	CN	500	43.98	0.07	17.01	63.06	43.98	0.27	17.01	17.01	63.07	25.22	0.66
wHill	CN	700	43.98	0.07	17.01	63.06	43.98	0.27	17.01	17.01	63.07	25.22	0.66
wISE	RT	500	31.81	0.85	4.84	17.94	31.80	0.93	4.83	4.93	18.26	7.16	0.33
wISE	RT	700	30.10	0.48	3.13	11.60	30.05	0.64	3.07	3.20	11.88	4.56	0.23
wISE	RN	300	43.98	0.07	17.01	63.06	43.98	0.27	17.01	17.01	63.06	25.22	0.66
wISE	RN	500	38.04	6.36	11.07	41.03	38.60	2.05	11.62	11.35	42.08	17.23	0.62
wISE	RN	700	29.55	1.59	2.58	9.56	29.34	1.11	2.37	2.87	10.64	3.51	0.37
wISE	CN	300	43.98	0.07	17.01	63.06	43.98	0.27	17.01	17.01	63.06	25.22	0.66
wISE	CN	500	37.71	7.23	10.73	39.79	38.33	2.14	11.36	11.07	41.02	16.84	0.61
wISE	CN	700	28.85	1.79	1.88	6.97	28.61	1.12	1.63	2.31	8.55	2.42	0.37
wPDC	RT	500	28.93	0.44	1.96	7.25	28.89	0.66	1.91	2.06	7.65	2.83	0.19
wPDC	RT	700	28.05	0.39	1.08	3.99	28.00	0.59	1.03	1.24	4.61	1.52	0.14
wPDC	RN	300	34.74	6.45	7.77	28.80	33.87	1.15	6.90	8.17	30.29	10.23	0.64
wPDC	RN	500	28.84	1.05	1.87	6.91	28.62	0.78	1.64	2.13	7.89	2.44	0.33
wPDC	RN	700	27.60	0.21	0.63	2.33	27.57	0.41	0.59	0.78	2.89	0.88	0.14
wPDC	CN	300	33.70	8.20	6.72	24.92	32.72	1.31	5.75	7.31	27.08	8.52	0.64
wPDC	CN	500	27.78	1.16	0.81	3.00	27.54	0.79	0.57	1.34	4.98	0.88	0.31
wPDC	CN	700	26.93	0.20	−0.04	−0.16	26.92	0.38	−0.05	0.45	1.65	0.40	0.12
GB2			37.77	0.24	10.80	40.03	37.77	0.50	10.79	10.81	40.07	16.00	0.46

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OCAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

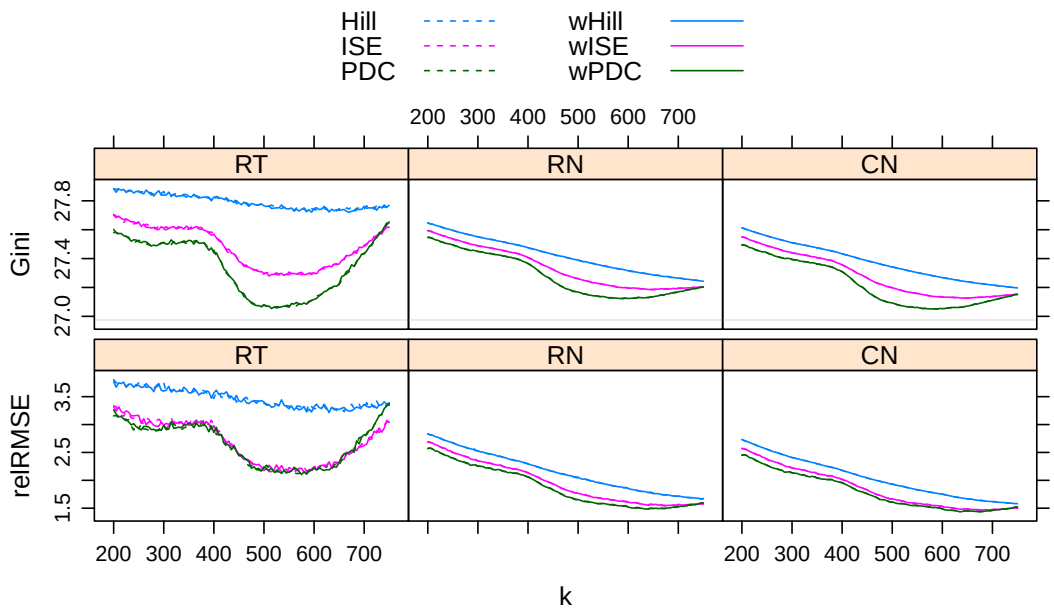

Figure F.148.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

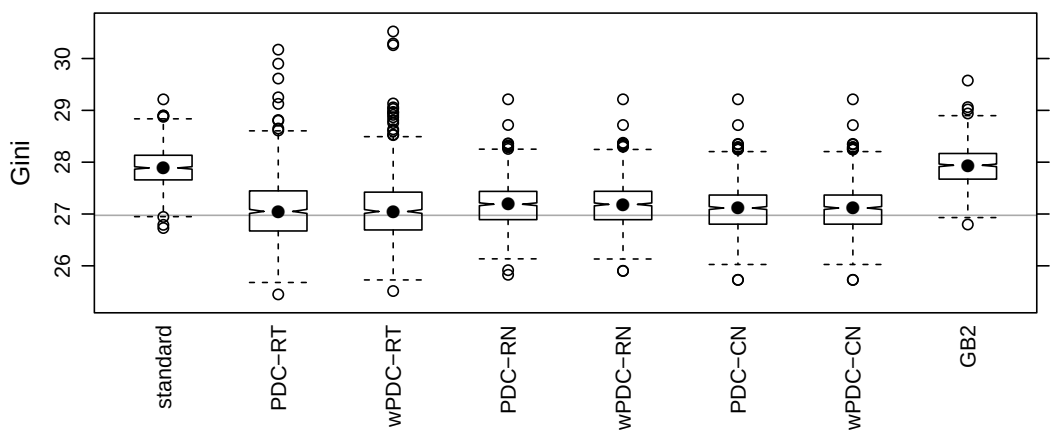

Figure F.149.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.74.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			27.89	0.13	0.92	3.41	27.89	0.35	0.91	0.99	3.66	1.36	0.08
wHill	RT	300	27.84	0.19	0.87	3.21	27.82	0.38	0.84	0.97	3.60	1.25	0.09
wHill	RT	500	27.77	0.22	0.79	2.93	27.75	0.45	0.78	0.92	3.41	1.16	0.11
wHill	RT	700	27.76	0.20	0.79	2.92	27.75	0.47	0.78	0.91	3.36	1.15	0.11
wHill	RN	300	27.55	0.13	0.58	2.14	27.55	0.36	0.58	0.68	2.53	0.86	0.07
wHill	RN	500	27.39	0.13	0.42	1.54	27.39	0.36	0.41	0.55	2.06	0.62	0.07
wHill	RN	700	27.26	0.13	0.29	1.08	27.28	0.35	0.30	0.46	1.71	0.49	0.07
wHill	CN	300	27.51	0.14	0.54	1.98	27.51	0.35	0.54	0.65	2.41	0.80	0.07
wHill	CN	500	27.34	0.14	0.37	1.36	27.34	0.36	0.37	0.52	1.93	0.58	0.07
wHill	CN	700	27.22	0.13	0.24	0.90	27.23	0.36	0.25	0.44	1.62	0.47	0.07
wISE	RT	300	27.61	0.25	0.64	2.36	27.58	0.47	0.61	0.81	2.99	0.90	0.10
wISE	RT	500	27.30	0.24	0.32	1.20	27.29	0.49	0.32	0.59	2.17	0.58	0.11
wISE	RT	700	27.49	0.24	0.51	1.89	27.47	0.48	0.49	0.71	2.63	0.76	0.11
wISE	RN	300	27.49	0.14	0.51	1.90	27.49	0.36	0.52	0.63	2.34	0.77	0.07
wISE	RN	500	27.26	0.14	0.29	1.06	27.27	0.38	0.30	0.48	1.77	0.51	0.07
wISE	RN	700	27.19	0.13	0.22	0.81	27.20	0.36	0.22	0.42	1.57	0.44	0.07
wISE	CN	300	27.44	0.14	0.46	1.72	27.44	0.37	0.47	0.60	2.22	0.70	0.07
wISE	CN	500	27.20	0.15	0.22	0.83	27.22	0.38	0.24	0.45	1.67	0.48	0.07
wISE	CN	700	27.14	0.13	0.16	0.60	27.14	0.37	0.17	0.40	1.48	0.42	0.07
wPDC	RT	300	27.51	0.36	0.54	2.00	27.48	0.60	0.51	0.81	2.99	0.79	0.14
wPDC	RT	500	27.08	0.36	0.10	0.38	27.05	0.54	0.07	0.60	2.24	0.56	0.13
wPDC	RT	700	27.44	0.36	0.46	1.72	27.41	0.54	0.44	0.76	2.82	0.76	0.11
wPDC	RN	300	27.45	0.14	0.47	1.76	27.46	0.37	0.49	0.61	2.25	0.73	0.07
wPDC	RN	500	27.17	0.16	0.19	0.72	27.19	0.40	0.21	0.45	1.65	0.47	0.08
wPDC	RN	700	27.17	0.13	0.20	0.72	27.17	0.36	0.20	0.41	1.53	0.44	0.07
wPDC	CN	300	27.39	0.16	0.42	1.55	27.41	0.38	0.44	0.58	2.13	0.66	0.07
wPDC	CN	500	27.09	0.18	0.12	0.44	27.12	0.42	0.14	0.43	1.61	0.46	0.08
wPDC	CN	700	27.11	0.14	0.14	0.51	27.11	0.37	0.14	0.39	1.46	0.42	0.07
GB2			27.94	0.13	0.96	3.57	27.94	0.36	0.96	1.03	3.81	1.43	0.10

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OCAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

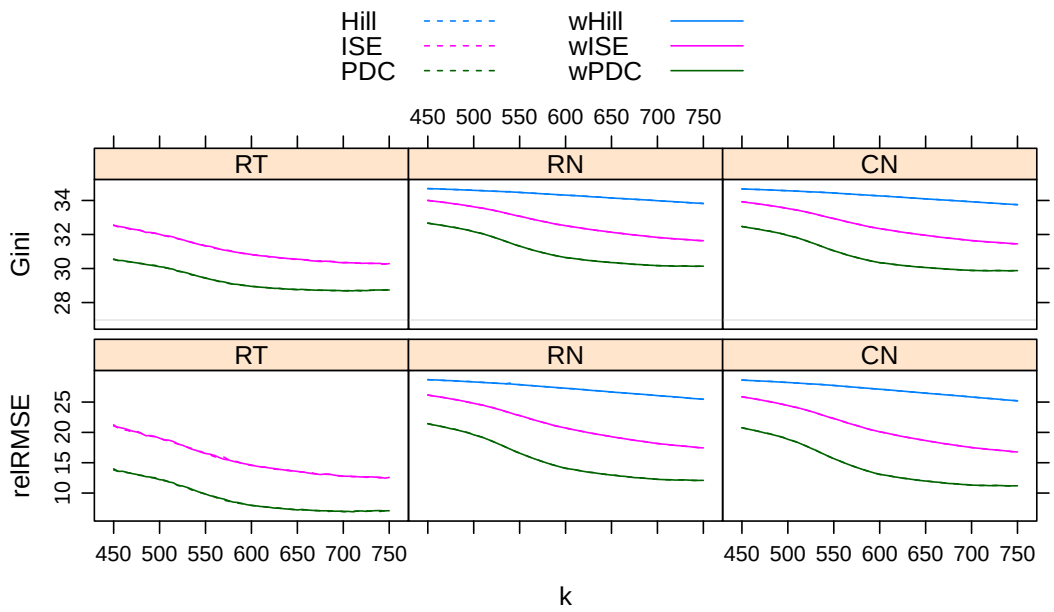

Figure F.150.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

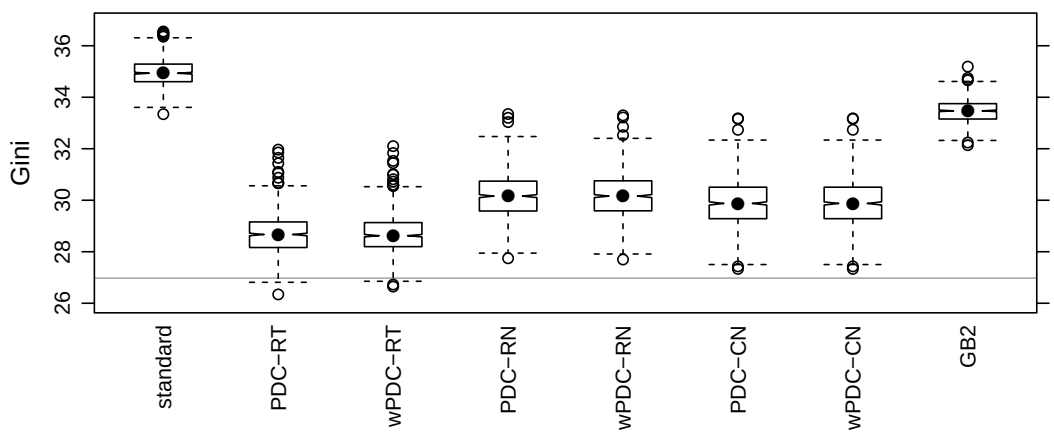

Figure F.151.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.75.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			34.95	0.26	7.98	29.57	34.93	0.51	7.96	7.99	29.63	11.80	0.36
wHill	RT	500	35.06	1.78	8.09	29.98	34.89	1.12	7.92	8.20	30.39	11.74	0.67
wHill	RT	700	34.14	1.01	7.17	26.57	34.07	0.85	7.10	7.24	26.83	10.53	0.61
wHill	RN	300	34.89	0.26	7.91	29.33	34.87	0.51	7.89	7.93	29.39	11.70	0.36
wHill	RN	500	34.59	0.26	7.62	28.25	34.59	0.50	7.61	7.64	28.31	11.28	0.35
wHill	RN	700	33.98	0.29	7.01	25.99	33.99	0.53	7.02	7.03	26.06	10.41	0.33
wHill	CN	300	34.88	0.26	7.91	29.31	34.86	0.52	7.89	7.92	29.37	11.70	0.36
wHill	CN	500	34.57	0.27	7.60	28.17	34.56	0.51	7.59	7.62	28.23	11.25	0.35
wHill	CN	700	33.92	0.29	6.95	25.76	33.94	0.53	6.96	6.97	25.84	10.32	0.33
wISE	RT	500	32.01	1.06	5.03	18.66	31.94	0.96	4.96	5.14	19.05	7.36	0.45
wISE	RT	700	30.34	0.54	3.37	12.48	30.32	0.69	3.35	3.45	12.77	4.97	0.24
wISE	RN	300	34.82	0.27	7.85	29.09	34.82	0.51	7.84	7.87	29.16	11.63	0.36
wISE	RN	500	33.63	0.45	6.65	24.66	33.69	0.62	6.72	6.69	24.78	9.96	0.32
wISE	RN	700	31.83	0.47	4.85	17.99	31.86	0.69	4.88	4.90	18.17	7.24	0.27
wISE	CN	300	34.81	0.27	7.84	29.05	34.81	0.52	7.83	7.85	29.12	11.62	0.36
wISE	CN	500	33.52	0.49	6.55	24.28	33.59	0.66	6.62	6.59	24.42	9.81	0.32
wISE	CN	700	31.64	0.50	4.67	17.30	31.66	0.72	4.69	4.72	17.50	6.95	0.27
wPDC	RT	500	30.11	1.04	3.13	11.61	30.03	0.98	3.06	3.29	12.21	4.53	0.27
wPDC	RT	700	28.69	0.56	1.71	6.35	28.62	0.69	1.65	1.87	6.93	2.45	0.19
wPDC	RN	300	34.45	0.55	7.47	27.71	34.52	0.65	7.54	7.51	27.84	11.18	0.36
wPDC	RN	500	32.16	1.04	5.19	19.24	32.21	0.99	5.24	5.29	19.60	7.77	0.31
wPDC	RN	700	30.17	0.73	3.19	11.84	30.16	0.86	3.19	3.31	12.26	4.72	0.23
wPDC	CN	300	34.40	0.63	7.42	27.52	34.49	0.68	7.51	7.47	27.68	11.14	0.36
wPDC	CN	500	31.94	1.19	4.97	18.42	31.99	1.05	5.01	5.09	18.86	7.43	0.31
wPDC	CN	700	29.89	0.82	2.91	10.80	29.88	0.92	2.90	3.05	11.31	4.30	0.23
GB2			33.46	0.20	6.49	24.05	33.47	0.45	6.50	6.50	24.11	9.63	0.30

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OCAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 20.

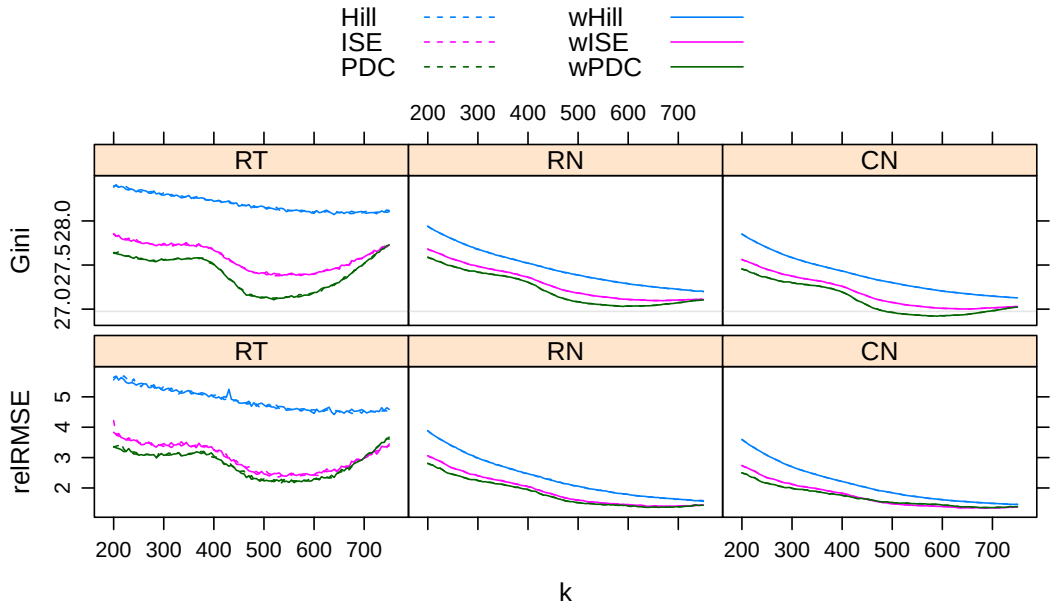

Figure F.152.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

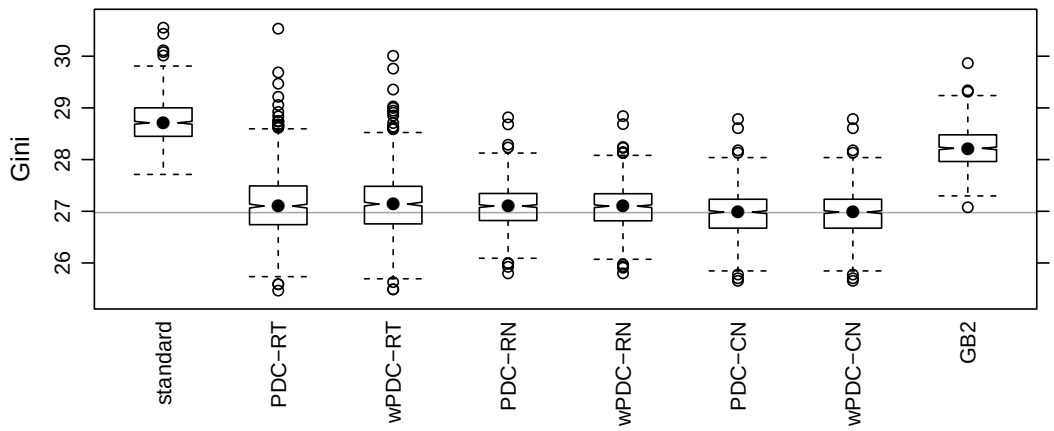

Figure F.153.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.76.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28.73	0.17	1.76	6.52	28.71	0.41	1.74	1.81	6.70	2.58	0.13
wHill	RT	300	28.29	0.24	1.32	4.88	28.27	0.51	1.29	1.41	5.21	1.92	0.11
wHill	RT	500	28.16	0.23	1.18	4.39	28.16	0.45	1.18	1.28	4.73	1.75	0.12
wHill	RT	700	28.09	0.24	1.12	4.15	28.07	0.51	1.09	1.22	4.53	1.62	0.12
wHill	RN	300	27.68	0.15	0.71	2.62	27.66	0.40	0.68	0.81	2.99	1.01	0.07
wHill	RN	500	27.39	0.14	0.41	1.53	27.37	0.37	0.40	0.56	2.06	0.62	0.08
wHill	RN	700	27.22	0.13	0.25	0.93	27.22	0.37	0.25	0.44	1.63	0.45	0.07
wHill	CN	300	27.58	0.16	0.61	2.26	27.56	0.41	0.59	0.73	2.70	0.87	0.07
wHill	CN	500	27.30	0.14	0.33	1.21	27.30	0.39	0.32	0.50	1.84	0.53	0.06
wHill	CN	700	27.15	0.13	0.17	0.64	27.15	0.37	0.17	0.40	1.49	0.41	0.06
wISE	RT	300	27.75	0.28	0.77	2.86	27.71	0.53	0.73	0.93	3.46	1.09	0.10
wISE	RT	500	27.41	0.25	0.44	1.62	27.41	0.48	0.43	0.66	2.46	0.68	0.10
wISE	RT	700	27.59	0.27	0.62	2.29	27.58	0.52	0.60	0.80	2.98	0.91	0.13
wISE	RN	300	27.48	0.16	0.51	1.89	27.47	0.41	0.49	0.65	2.40	0.74	0.07
wISE	RN	500	27.18	0.14	0.21	0.78	27.19	0.38	0.22	0.43	1.61	0.45	0.07
wISE	RN	700	27.10	0.13	0.13	0.48	27.11	0.35	0.13	0.38	1.41	0.38	0.06
wISE	CN	300	27.37	0.17	0.40	1.48	27.36	0.42	0.39	0.57	2.12	0.62	0.06
wISE	CN	500	27.08	0.15	0.10	0.37	27.09	0.38	0.11	0.40	1.48	0.40	0.07
wISE	CN	700	27.02	0.13	0.04	0.15	27.02	0.35	0.05	0.36	1.35	0.36	0.06
wPDC	RT	300	27.56	0.34	0.59	2.17	27.51	0.56	0.54	0.83	3.08	0.85	0.11
wPDC	RT	500	27.13	0.34	0.15	0.57	27.14	0.54	0.16	0.60	2.23	0.59	0.11
wPDC	RT	700	27.52	0.35	0.55	2.02	27.48	0.60	0.51	0.81	2.99	0.83	0.11
wPDC	RN	300	27.42	0.17	0.44	1.64	27.40	0.42	0.42	0.60	2.24	0.64	0.07
wPDC	RN	500	27.08	0.16	0.11	0.40	27.10	0.38	0.12	0.41	1.52	0.42	0.07
wPDC	RN	700	27.07	0.13	0.10	0.37	27.08	0.36	0.10	0.37	1.38	0.38	0.06
wPDC	CN	300	27.30	0.18	0.32	1.20	27.29	0.43	0.32	0.54	1.99	0.55	0.06
wPDC	CN	500	26.96	0.17	−0.01	−0.04	26.98	0.40	0.01	0.41	1.52	0.40	0.07
wPDC	CN	700	26.98	0.13	0.01	0.03	26.99	0.36	0.02	0.36	1.35	0.36	0.06
GB2			28.23	0.13	1.25	4.64	28.22	0.38	1.24	1.30	4.83	1.84	0.11

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OCAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 20.

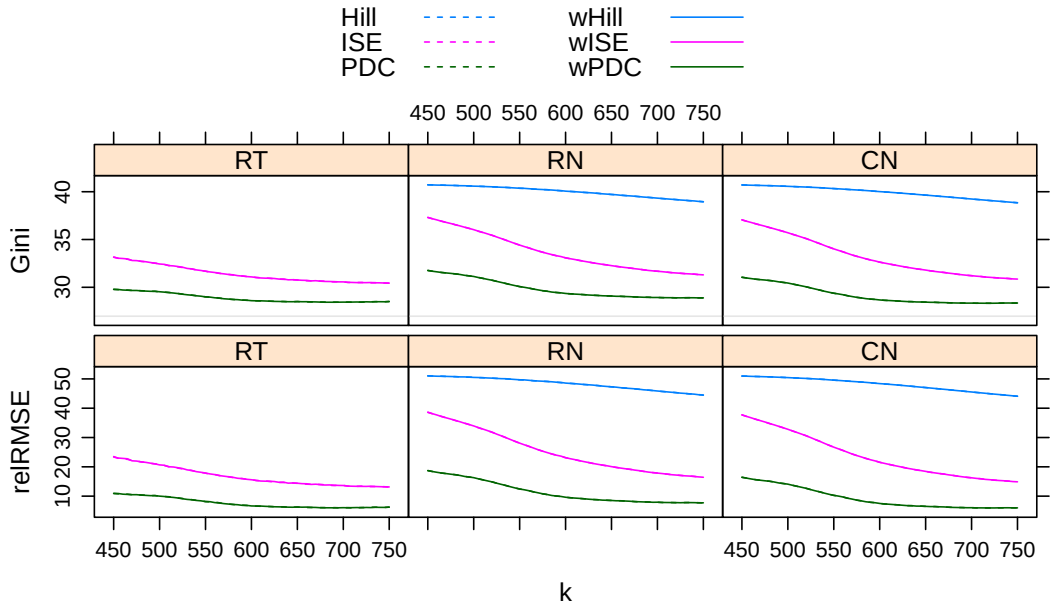

Figure F.154.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

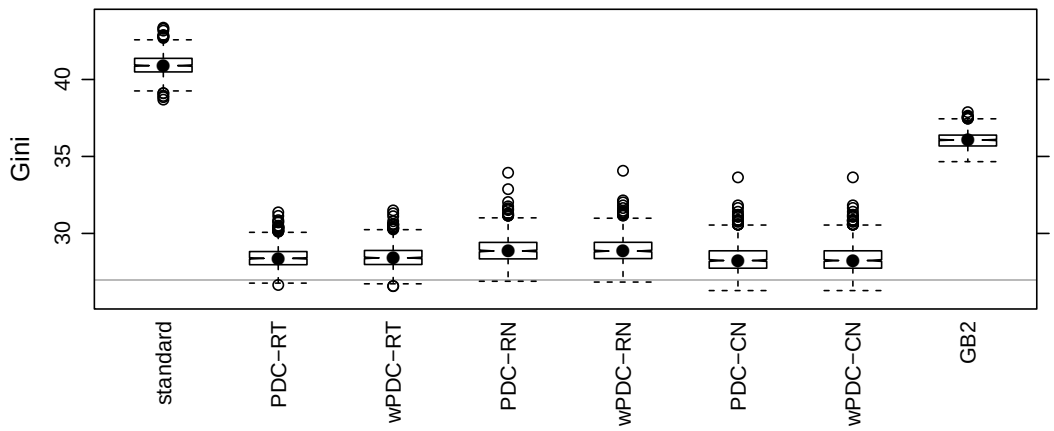

Figure F.155.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.77.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			40.94	0.45	13.97	51.78	40.90	0.65	13.93	13.98	51.84	20.65	0.61
wHill	RT	500	40.95	9.45	13.98	51.83	40.36	2.01	13.38	14.31	53.06	19.84	1.89
wHill	RT	700	38.56	6.29	11.59	42.95	38.20	1.45	11.23	11.85	43.95	16.64	2.07
wHill	RN	300	40.92	0.45	13.95	51.71	40.89	0.67	13.91	13.96	51.76	20.63	0.61
wHill	RN	500	40.58	0.46	13.61	50.45	40.57	0.65	13.59	13.63	50.51	20.15	0.59
wHill	RN	700	39.33	0.50	12.35	45.80	39.32	0.72	12.34	12.37	45.87	18.30	0.53
wHill	CN	300	40.92	0.45	13.95	51.70	40.89	0.67	13.91	13.96	51.76	20.63	0.61
wHill	CN	500	40.56	0.47	13.59	50.38	40.55	0.65	13.58	13.61	50.44	20.13	0.59
wHill	CN	700	39.24	0.51	12.26	45.46	39.24	0.74	12.27	12.28	45.54	18.19	0.53
wISE	RT	500	32.44	1.22	5.46	20.25	32.34	1.00	5.37	5.57	20.66	7.96	0.50
wISE	RT	700	30.56	0.63	3.59	13.31	30.53	0.74	3.55	3.68	13.63	5.26	0.23
wISE	RN	300	40.71	0.52	13.73	50.91	40.69	0.68	13.71	13.75	50.98	20.33	0.61
wISE	RN	500	36.03	1.90	9.05	33.57	36.14	1.39	9.17	9.16	33.95	13.59	0.49
wISE	RN	700	31.68	1.14	4.70	17.43	31.63	1.04	4.66	4.82	17.88	6.91	0.32
wISE	CN	300	40.69	0.52	13.71	50.83	40.67	0.68	13.69	13.73	50.90	20.30	0.61
wISE	CN	500	35.70	2.12	8.73	32.37	35.82	1.48	8.85	8.85	32.81	13.12	0.49
wISE	CN	700	31.21	1.25	4.24	15.72	31.16	1.07	4.19	4.38	16.25	6.21	0.31
wPDC	RT	500	29.53	0.73	2.56	9.49	29.51	0.85	2.54	2.70	10.00	3.76	0.22
wPDC	RT	700	28.45	0.50	1.47	5.46	28.41	0.67	1.44	1.63	6.06	2.13	0.17
wPDC	RN	300	36.20	7.64	9.22	34.19	36.28	3.54	9.31	9.63	35.70	13.80	0.58
wPDC	RN	500	31.13	2.06	4.16	15.41	31.06	1.49	4.08	4.40	16.30	6.06	0.35
wPDC	RN	700	28.93	0.73	1.96	7.26	28.85	0.78	1.88	2.14	7.93	2.79	0.26
wPDC	CN	300	35.71	9.53	8.73	32.37	35.82	3.87	8.85	9.26	34.33	13.12	0.58
wPDC	CN	500	30.44	2.41	3.47	12.87	30.37	1.63	3.40	3.80	14.09	5.04	0.35
wPDC	CN	700	28.34	0.79	1.37	5.07	28.24	0.81	1.27	1.63	6.05	1.88	0.25
GB2			36.05	0.27	9.08	33.66	36.07	0.52	9.09	9.09	33.72	13.48	0.40

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OAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

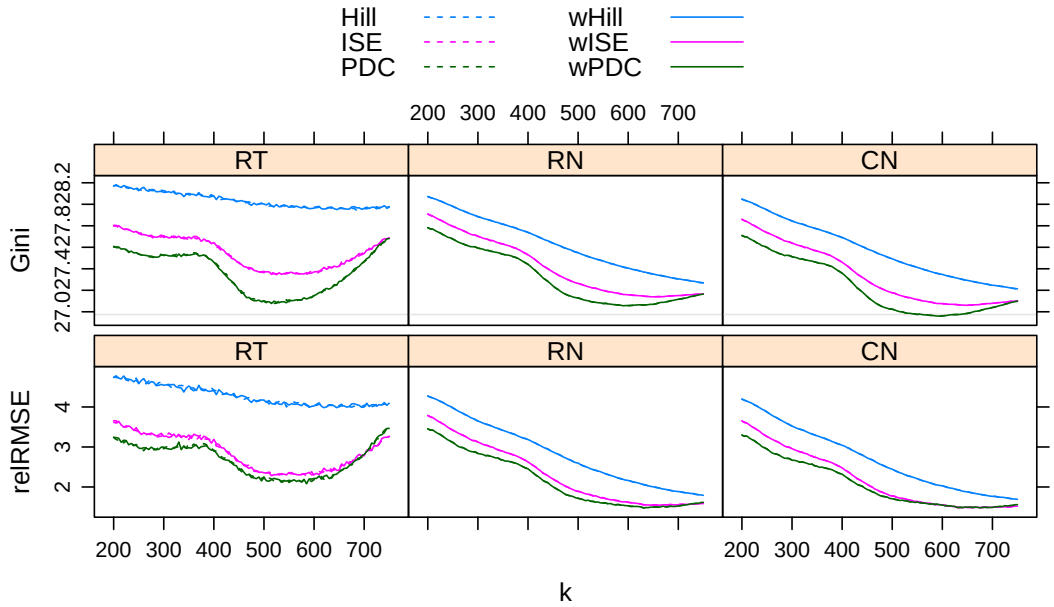

Figure F.156.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

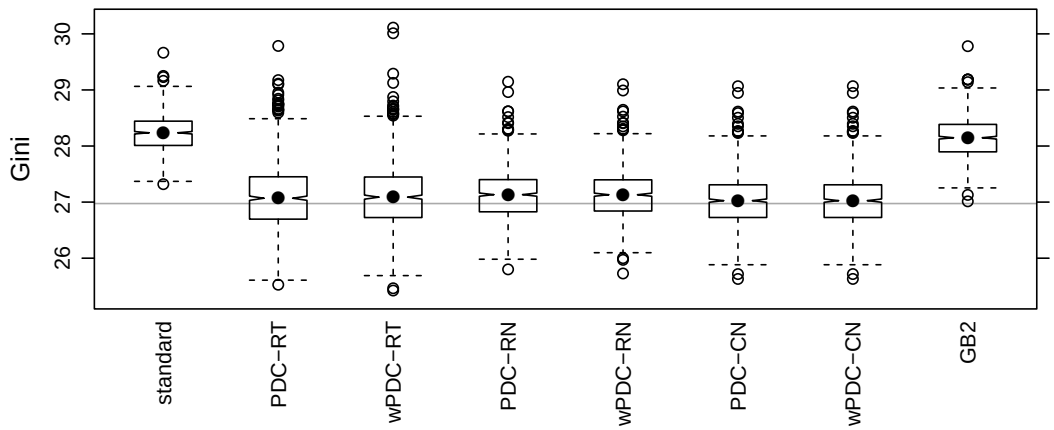

Figure F.157.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.78.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28.23	0.10	1.25	4.65	28.24	0.32	1.26	1.29	4.80	1.87	0.10
wHill	RT	300	28.11	0.21	1.14	4.21	28.10	0.44	1.12	1.23	4.54	1.66	0.10
wHill	RT	500	28.00	0.21	1.03	3.81	27.98	0.45	1.00	1.13	4.17	1.49	0.10
wHill	RT	700	27.96	0.19	0.98	3.65	27.93	0.43	0.96	1.08	4.00	1.42	0.10
wHill	RN	300	27.89	0.14	0.91	3.38	27.88	0.39	0.90	0.98	3.65	1.34	0.08
wHill	RN	500	27.55	0.16	0.58	2.14	27.52	0.41	0.55	0.70	2.60	0.83	0.07
wHill	RN	700	27.31	0.15	0.33	1.23	27.31	0.38	0.34	0.51	1.89	0.55	0.07
wHill	CN	300	27.84	0.15	0.87	3.22	27.84	0.40	0.86	0.95	3.52	1.28	0.08
wHill	CN	500	27.49	0.17	0.52	1.92	27.47	0.43	0.49	0.66	2.44	0.74	0.07
wHill	CN	700	27.25	0.15	0.27	1.01	27.25	0.39	0.27	0.48	1.77	0.50	0.06
wISE	RT	300	27.69	0.26	0.72	2.66	27.66	0.51	0.69	0.88	3.26	1.02	0.11
wISE	RT	500	27.37	0.24	0.40	1.48	27.36	0.48	0.39	0.64	2.35	0.63	0.10
wISE	RT	700	27.54	0.24	0.57	2.11	27.53	0.48	0.55	0.75	2.78	0.83	0.10
wISE	RN	300	27.70	0.18	0.73	2.70	27.70	0.46	0.73	0.84	3.12	1.08	0.08
wISE	RN	500	27.26	0.18	0.29	1.07	27.26	0.41	0.28	0.51	1.89	0.51	0.08
wISE	RN	700	27.15	0.15	0.18	0.65	27.16	0.38	0.19	0.42	1.56	0.43	0.07
wISE	CN	300	27.64	0.20	0.66	2.46	27.64	0.47	0.67	0.80	2.96	0.99	0.08
wISE	CN	500	27.18	0.19	0.20	0.75	27.17	0.43	0.20	0.48	1.78	0.47	0.07
wISE	CN	700	27.08	0.15	0.10	0.39	27.09	0.39	0.11	0.40	1.50	0.42	0.07
wPDC	RT	300	27.53	0.35	0.55	2.04	27.50	0.58	0.52	0.81	3.00	0.83	0.11
wPDC	RT	500	27.10	0.35	0.13	0.47	27.09	0.53	0.11	0.60	2.23	0.54	0.12
wPDC	RT	700	27.47	0.33	0.50	1.84	27.45	0.56	0.47	0.76	2.81	0.78	0.11
wPDC	RN	300	27.59	0.20	0.62	2.29	27.60	0.49	0.63	0.77	2.84	0.94	0.08
wPDC	RN	500	27.13	0.19	0.15	0.57	27.13	0.41	0.16	0.46	1.72	0.47	0.08
wPDC	RN	700	27.12	0.15	0.14	0.53	27.13	0.38	0.16	0.41	1.52	0.42	0.07
wPDC	CN	300	27.51	0.23	0.54	1.99	27.53	0.52	0.56	0.72	2.67	0.85	0.08
wPDC	CN	500	27.02	0.21	0.05	0.18	27.03	0.43	0.05	0.46	1.71	0.45	0.08
wPDC	CN	700	27.04	0.16	0.06	0.24	27.05	0.39	0.07	0.40	1.49	0.40	0.07
GB2			28.15	0.13	1.17	4.35	28.15	0.37	1.17	1.23	4.55	1.74	0.10

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OAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

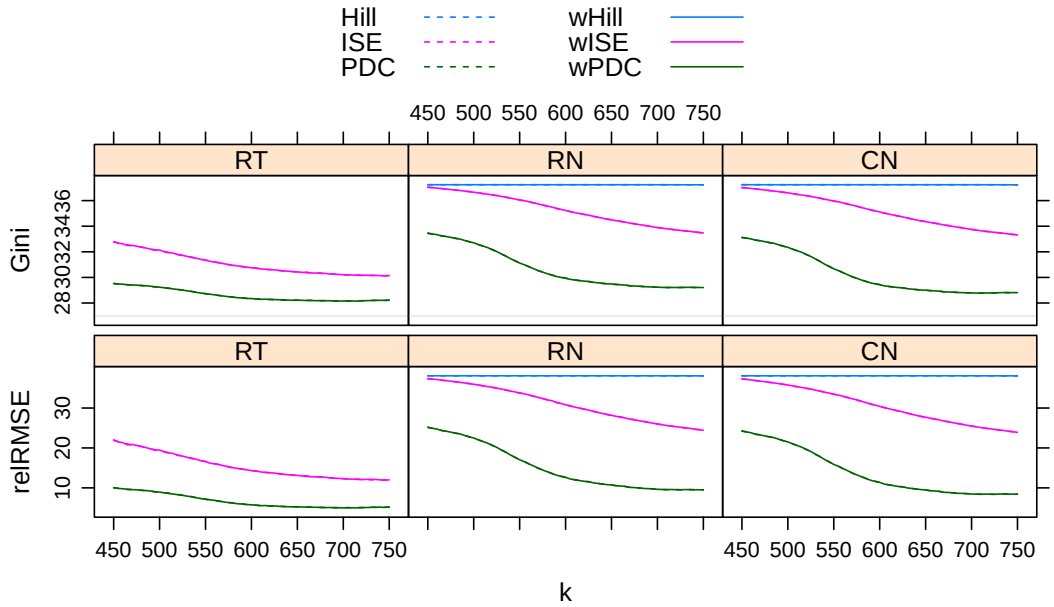

Figure F.158.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

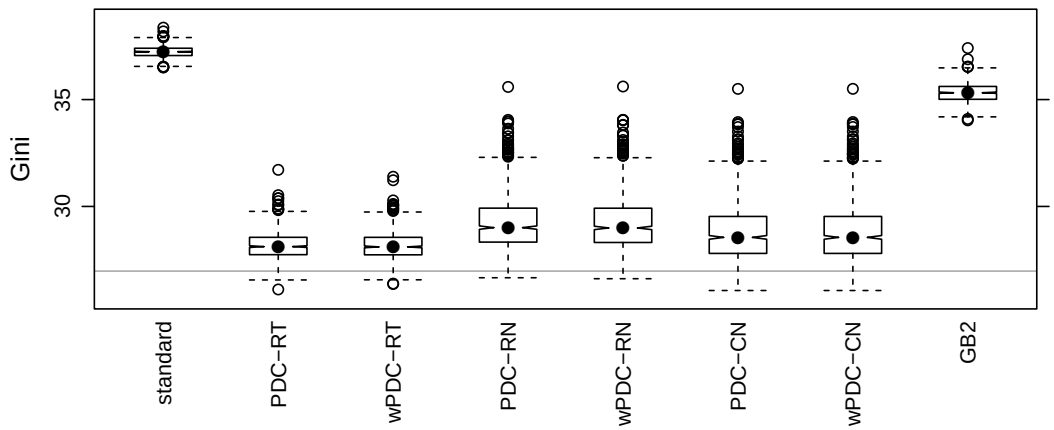

Figure F.159.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.79.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.24	0.07	10.27	38.06	37.24	0.25	10.27	10.27	38.07	15.22	0.42
wHill	RT	500	37.06	3.06	10.09	37.39	36.84	1.18	9.86	10.24	37.94	14.62	1.35
wHill	RT	700	35.74	0.98	8.76	32.49	35.66	0.88	8.69	8.82	32.70	12.88	0.69
wHill	RN	300	37.24	0.07	10.27	38.06	37.24	0.25	10.27	10.27	38.07	15.22	0.42
wHill	RN	500	37.24	0.07	10.27	38.06	37.24	0.25	10.27	10.27	38.07	15.22	0.42
wHill	RN	700	37.24	0.07	10.27	38.06	37.24	0.25	10.27	10.27	38.07	15.22	0.42
wHill	CN	300	37.24	0.07	10.27	38.06	37.24	0.25	10.27	10.27	38.07	15.22	0.42
wHill	CN	500	37.24	0.07	10.27	38.06	37.24	0.25	10.27	10.27	38.07	15.22	0.42
wHill	CN	700	37.24	0.07	10.27	38.06	37.24	0.25	10.27	10.27	38.07	15.22	0.42
wISE	RT	500	32.14	0.97	5.16	19.15	32.10	0.96	5.13	5.26	19.49	7.60	0.36
wISE	RT	700	30.21	0.53	3.24	12.00	30.17	0.70	3.20	3.32	12.30	4.74	0.25
wISE	RN	300	37.24	0.07	10.27	38.06	37.24	0.25	10.27	10.27	38.07	15.22	0.42
wISE	RN	500	36.66	0.30	9.68	35.90	36.67	0.57	9.69	9.70	35.96	14.37	0.42
wISE	RN	700	33.90	1.23	6.92	25.67	33.97	0.96	7.00	7.01	25.99	10.37	0.38
wISE	CN	300	37.24	0.07	10.27	38.06	37.24	0.25	10.27	10.27	38.07	15.22	0.42
wISE	CN	500	36.60	0.33	9.63	35.70	36.61	0.62	9.63	9.65	35.76	14.28	0.42
wISE	CN	700	33.75	1.33	6.77	25.11	33.83	0.99	6.85	6.87	25.48	10.16	0.38
wPDC	RT	500	29.24	0.71	2.26	8.38	29.17	0.82	2.20	2.41	8.94	3.26	0.21
wPDC	RT	700	28.15	0.42	1.18	4.37	28.11	0.61	1.13	1.35	4.99	1.68	0.16
wPDC	RN	300	36.70	1.46	9.72	36.04	37.12	0.44	10.14	9.80	36.32	15.04	0.42
wPDC	RN	500	32.70	4.03	5.73	21.23	32.90	2.23	5.93	6.07	22.49	8.79	0.39
wPDC	RN	700	29.23	1.66	2.26	8.37	28.99	1.13	2.02	2.60	9.63	2.99	0.32
wPDC	CN	300	36.62	1.86	9.65	35.77	37.12	0.45	10.14	9.75	36.13	15.04	0.42
wPDC	CN	500	32.35	4.80	5.37	19.92	32.59	2.39	5.62	5.80	21.51	8.33	0.39
wPDC	CN	700	28.79	1.91	1.81	6.72	28.55	1.24	1.58	2.28	8.45	2.34	0.32
GB2			35.32	0.19	8.34	30.93	35.32	0.44	8.35	8.35	30.97	12.37	0.39

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OAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

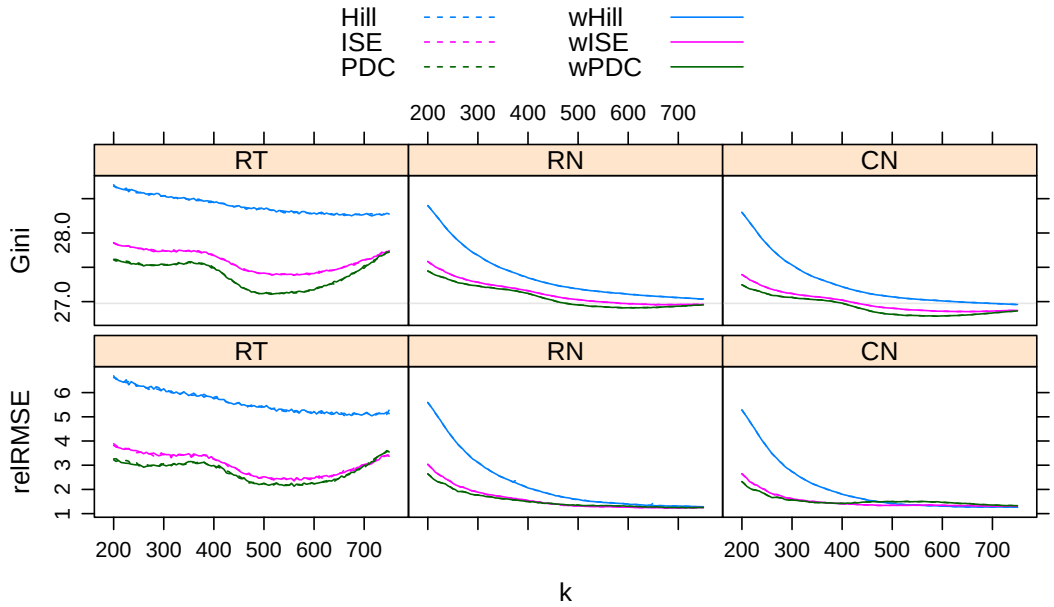

Figure F.160.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

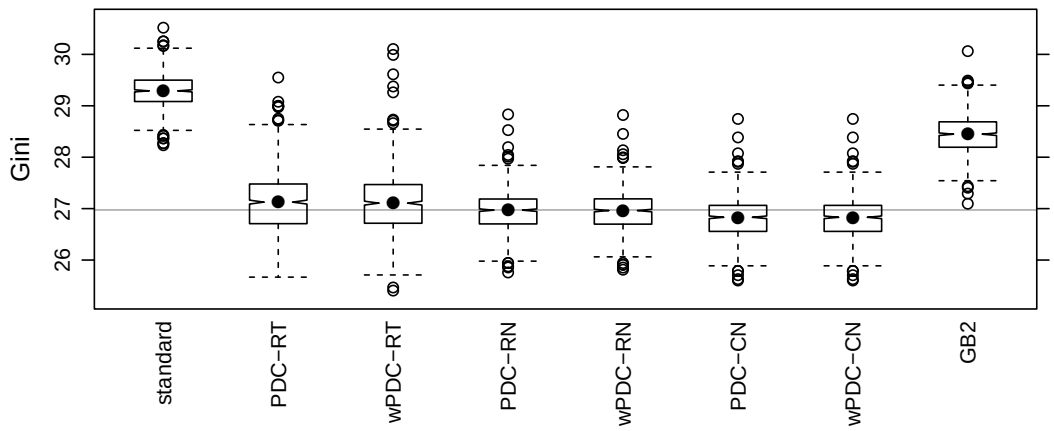

Figure F.161.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.80.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			29.29	0.10	2.32	8.59	29.29	0.31	2.32	2.34	8.67	3.43	0.13
wHill	RT	300	28.55	0.29	1.57	5.82	28.52	0.51	1.54	1.66	6.16	2.29	0.26
wHill	RT	500	28.35	0.24	1.37	5.08	28.32	0.48	1.35	1.46	5.39	2.00	0.11
wHill	RT	700	28.27	0.23	1.30	4.81	28.26	0.47	1.29	1.38	5.12	1.91	0.16
wHill	RN	300	27.68	0.22	0.70	2.60	27.67	0.48	0.70	0.84	3.12	1.03	0.08
wHill	RN	500	27.19	0.14	0.21	0.79	27.19	0.37	0.21	0.43	1.59	0.44	0.07
wHill	RN	700	27.06	0.12	0.08	0.31	27.05	0.33	0.08	0.35	1.31	0.35	0.06
wHill	CN	300	27.53	0.23	0.56	2.07	27.53	0.51	0.56	0.74	2.73	0.83	0.08
wHill	CN	500	27.07	0.14	0.10	0.35	27.07	0.37	0.10	0.38	1.42	0.37	0.07
wHill	CN	700	26.97	0.12	−0.00	−0.00	26.97	0.34	−0.00	0.34	1.27	0.34	0.05
wISE	RT	300	27.74	0.29	0.77	2.84	27.73	0.52	0.75	0.93	3.47	1.11	0.11
wISE	RT	500	27.42	0.27	0.44	1.64	27.39	0.50	0.42	0.68	2.53	0.68	0.11
wISE	RT	700	27.61	0.26	0.63	2.35	27.57	0.48	0.59	0.82	3.03	0.89	0.11
wISE	RN	300	27.28	0.16	0.31	1.14	27.27	0.40	0.29	0.51	1.89	0.51	0.07
wISE	RN	500	27.03	0.12	0.06	0.20	27.03	0.35	0.06	0.36	1.32	0.36	0.06
wISE	RN	700	26.96	0.11	−0.02	−0.06	26.97	0.32	−0.01	0.33	1.24	0.32	0.06
wISE	CN	300	27.12	0.17	0.14	0.53	27.11	0.42	0.13	0.44	1.62	0.41	0.07
wISE	CN	500	26.90	0.13	−0.07	−0.26	26.91	0.35	−0.06	0.36	1.35	0.35	0.06
wISE	CN	700	26.86	0.11	−0.11	−0.42	26.87	0.32	−0.10	0.35	1.31	0.34	0.05
wPDC	RT	300	27.53	0.35	0.56	2.07	27.50	0.57	0.53	0.81	3.01	0.83	0.11
wPDC	RT	500	27.12	0.35	0.14	0.54	27.11	0.56	0.13	0.61	2.25	0.55	0.12
wPDC	RT	700	27.52	0.35	0.55	2.04	27.50	0.56	0.53	0.81	2.99	0.84	0.12
wPDC	RN	300	27.23	0.16	0.26	0.95	27.20	0.40	0.23	0.48	1.77	0.46	0.08
wPDC	RN	500	26.95	0.13	−0.02	−0.09	26.96	0.36	−0.01	0.36	1.35	0.35	0.07
wPDC	RN	700	26.93	0.11	−0.04	−0.15	26.94	0.33	−0.03	0.34	1.25	0.33	0.05
wPDC	CN	300	27.06	0.17	0.09	0.32	27.04	0.40	0.07	0.42	1.57	0.41	0.08
wPDC	CN	500	26.82	0.14	−0.16	−0.59	26.83	0.37	−0.14	0.40	1.50	0.39	0.07
wPDC	CN	700	26.83	0.11	−0.14	−0.52	26.84	0.33	−0.14	0.37	1.35	0.35	0.05
GB2			28.44	0.13	1.47	5.44	28.45	0.37	1.47	1.51	5.60	2.18	0.11

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OAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

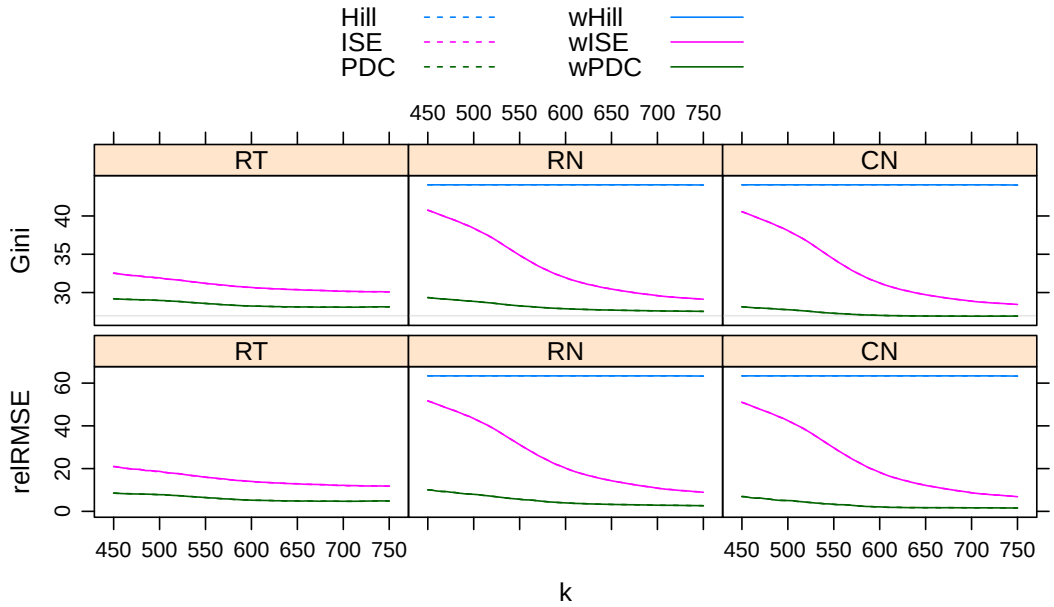

Figure F.162.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

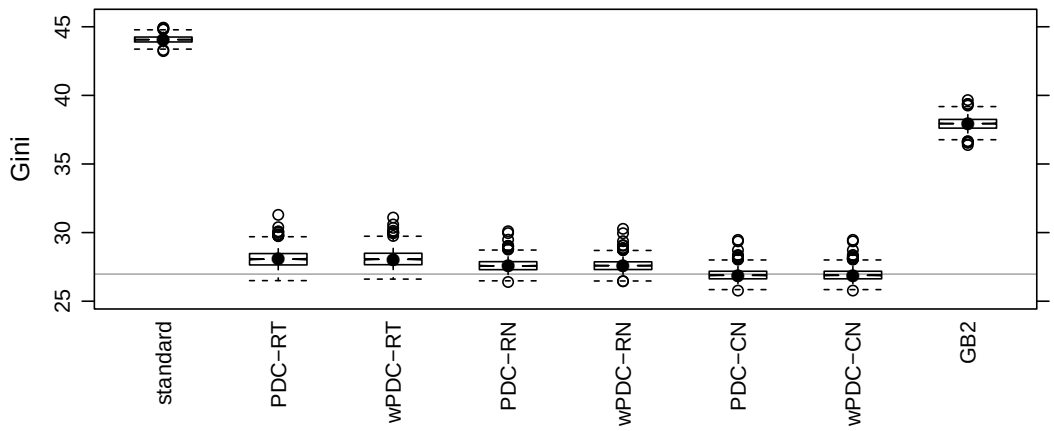

Figure F.163.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.81.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			44.07	0.07	17.10	63.38	44.07	0.26	17.09	17.10	63.39	25.34	0.67
wHill	RT	500	42.99	13.99	16.01	59.36	42.27	2.17	15.29	16.44	60.96	22.67	2.21
wHill	RT	700	39.90	3.45	12.93	47.92	39.65	1.31	12.67	13.06	48.41	18.79	1.37
wHill	RN	300	44.07	0.07	17.10	63.38	44.07	0.26	17.09	17.10	63.39	25.34	0.67
wHill	RN	500	44.07	0.07	17.10	63.38	44.07	0.26	17.09	17.10	63.39	25.34	0.67
wHill	RN	700	44.07	0.07	17.10	63.38	44.07	0.27	17.09	17.10	63.38	25.34	0.67
wHill	CN	300	44.07	0.07	17.10	63.38	44.07	0.26	17.09	17.10	63.39	25.34	0.67
wHill	CN	500	44.07	0.07	17.10	63.38	44.07	0.26	17.09	17.10	63.39	25.34	0.67
wHill	CN	700	44.07	0.07	17.10	63.38	44.07	0.27	17.09	17.10	63.38	25.34	0.67
wISE	RT	500	31.91	1.07	4.94	18.31	31.85	0.89	4.88	5.05	18.71	7.23	0.59
wISE	RT	700	30.19	0.47	3.22	11.93	30.17	0.68	3.19	3.29	12.20	4.73	0.22
wISE	RN	300	44.07	0.07	17.09	63.37	44.06	0.27	17.09	17.10	63.38	25.34	0.67
wISE	RN	500	38.40	6.73	11.42	42.35	39.08	2.10	12.10	11.71	43.43	17.94	0.61
wISE	RN	700	29.60	1.68	2.62	9.72	29.35	1.09	2.38	2.92	10.84	3.52	0.39
wISE	CN	300	44.07	0.07	17.09	63.37	44.06	0.27	17.09	17.10	63.38	25.34	0.67
wISE	CN	500	38.09	7.61	11.11	41.20	38.81	2.18	11.84	11.45	42.45	17.55	0.61
wISE	CN	700	28.87	1.88	1.90	7.03	28.62	1.15	1.65	2.34	8.68	2.44	0.39
wPDC	RT	500	28.96	0.46	1.99	7.38	28.92	0.70	1.94	2.10	7.79	2.88	0.16
wPDC	RT	700	28.09	0.38	1.11	4.13	28.05	0.60	1.08	1.27	4.71	1.60	0.15
wPDC	RN	300	34.82	7.41	7.85	29.09	33.83	1.24	6.85	8.31	30.79	10.16	0.65
wPDC	RN	500	28.84	1.12	1.87	6.93	28.62	0.81	1.65	2.15	7.96	2.45	0.33
wPDC	RN	700	27.60	0.21	0.63	2.32	27.59	0.41	0.62	0.77	2.87	0.92	0.12
wPDC	CN	300	33.76	9.50	6.79	25.16	32.65	1.41	5.67	7.45	27.63	8.41	0.65
wPDC	CN	500	27.76	1.24	0.79	2.91	27.50	0.79	0.53	1.36	5.05	0.84	0.31
wPDC	CN	700	26.91	0.19	−0.06	−0.23	26.89	0.41	−0.09	0.44	1.65	0.41	0.09
GB2			37.94	0.25	10.97	40.66	37.94	0.46	10.97	10.98	40.70	16.26	0.47

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OAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

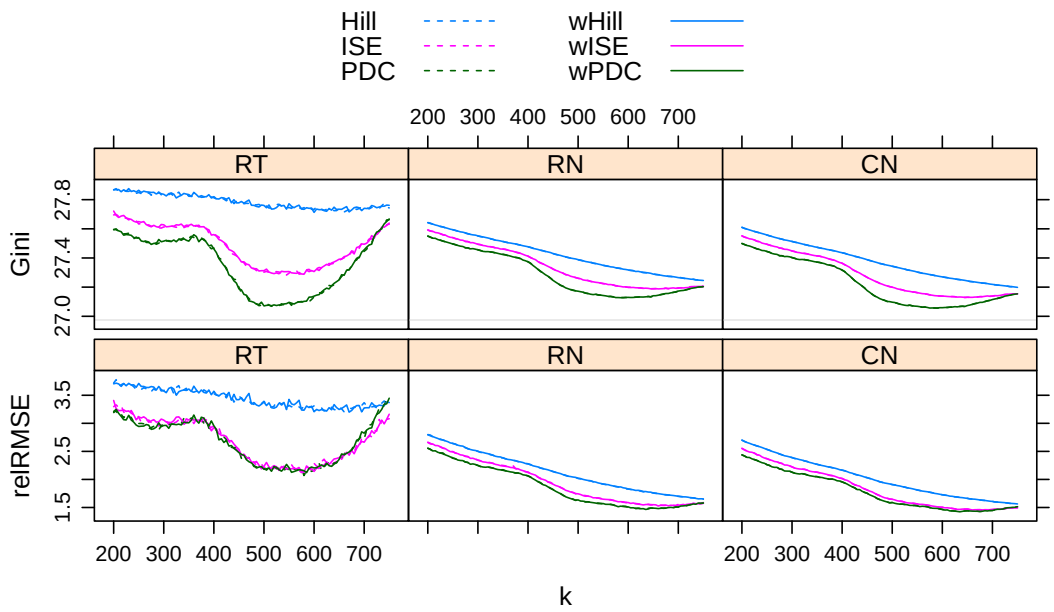

Figure F.164.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

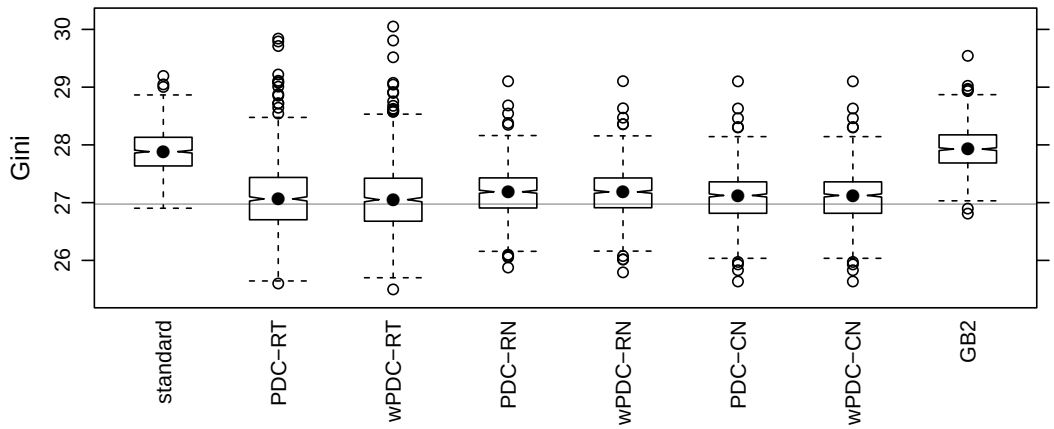

Figure F.165.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.82.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			27.89	0.13	0.91	3.39	27.88	0.37	0.91	0.98	3.64	1.35	0.08
wHill	RT	300	27.84	0.19	0.86	3.20	27.82	0.43	0.84	0.96	3.58	1.25	0.10
wHill	RT	500	27.76	0.21	0.79	2.91	27.73	0.44	0.75	0.91	3.38	1.11	0.13
wHill	RT	700	27.74	0.19	0.77	2.84	27.73	0.42	0.75	0.88	3.27	1.11	0.11
wHill	RN	300	27.55	0.12	0.58	2.14	27.54	0.36	0.57	0.68	2.50	0.84	0.07
wHill	RN	500	27.39	0.13	0.41	1.54	27.38	0.35	0.41	0.55	2.02	0.63	0.07
wHill	RN	700	27.27	0.13	0.29	1.08	27.26	0.35	0.29	0.46	1.70	0.49	0.07
wHill	CN	300	27.51	0.13	0.54	2.00	27.51	0.36	0.54	0.64	2.39	0.80	0.07
wHill	CN	500	27.34	0.13	0.37	1.37	27.34	0.35	0.37	0.51	1.91	0.57	0.07
wHill	CN	700	27.22	0.13	0.24	0.91	27.21	0.35	0.24	0.43	1.61	0.46	0.07
wISE	RT	300	27.63	0.25	0.65	2.42	27.60	0.50	0.63	0.82	3.06	0.93	0.09
wISE	RT	500	27.31	0.25	0.34	1.25	27.30	0.49	0.33	0.60	2.23	0.60	0.10
wISE	RT	700	27.49	0.25	0.52	1.93	27.48	0.48	0.50	0.72	2.66	0.77	0.08
wISE	RN	300	27.49	0.13	0.52	1.92	27.49	0.35	0.52	0.63	2.34	0.77	0.07
wISE	RN	500	27.26	0.14	0.29	1.06	27.27	0.36	0.29	0.47	1.74	0.51	0.07
wISE	RN	700	27.19	0.12	0.22	0.81	27.20	0.35	0.22	0.42	1.54	0.44	0.07
wISE	CN	300	27.45	0.14	0.47	1.76	27.45	0.36	0.48	0.60	2.22	0.71	0.07
wISE	CN	500	27.20	0.15	0.22	0.83	27.21	0.38	0.23	0.44	1.65	0.46	0.07
wISE	CN	700	27.14	0.13	0.16	0.61	27.15	0.35	0.17	0.39	1.46	0.41	0.07
wPDC	RT	300	27.52	0.35	0.54	2.01	27.48	0.55	0.50	0.80	2.96	0.79	0.13
wPDC	RT	500	27.07	0.34	0.10	0.36	27.05	0.55	0.08	0.59	2.18	0.56	0.11
wPDC	RT	700	27.46	0.35	0.48	1.79	27.41	0.56	0.44	0.76	2.82	0.73	0.12
wPDC	RN	300	27.46	0.14	0.48	1.79	27.45	0.37	0.48	0.61	2.25	0.71	0.07
wPDC	RN	500	27.17	0.16	0.20	0.73	27.19	0.38	0.21	0.44	1.63	0.47	0.08
wPDC	RN	700	27.17	0.13	0.20	0.74	27.18	0.35	0.21	0.41	1.51	0.42	0.07
wPDC	CN	300	27.40	0.15	0.43	1.59	27.40	0.38	0.42	0.57	2.13	0.64	0.07
wPDC	CN	500	27.10	0.17	0.12	0.45	27.12	0.40	0.15	0.43	1.59	0.44	0.08
wPDC	CN	700	27.11	0.13	0.14	0.52	27.12	0.37	0.15	0.39	1.45	0.40	0.07
GB2			27.93	0.13	0.96	3.56	27.93	0.36	0.95	1.02	3.79	1.41	0.10

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OAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

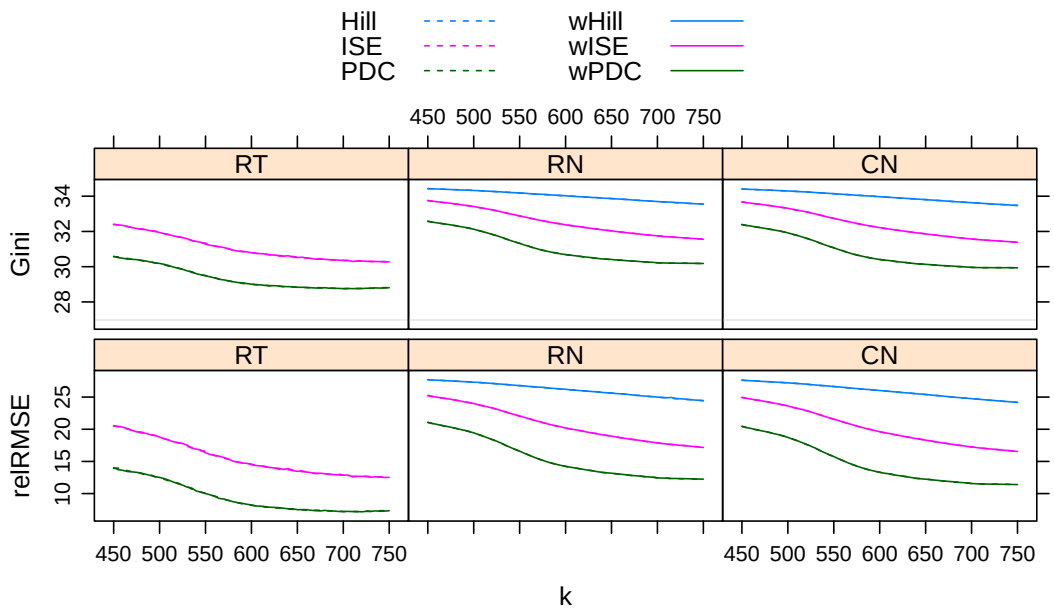

Figure F.166.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

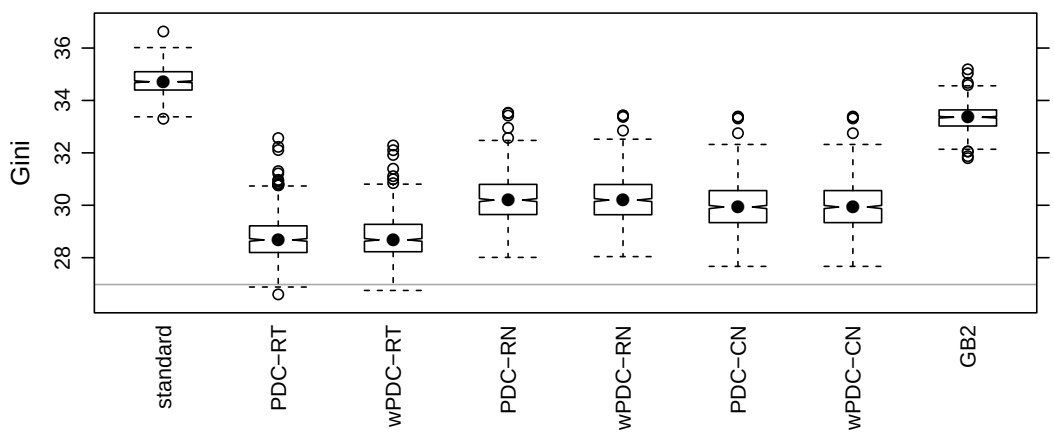

Figure F.167.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.83.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			34.73	0.26	7.76	28.76	34.71	0.52	7.74	7.77	28.82	11.47	0.36
wHill	RT	500	34.82	1.96	7.85	29.10	34.67	1.00	7.69	7.97	29.56	11.40	1.07
wHill	RT	700	33.94	0.95	6.97	25.84	33.89	0.89	6.91	7.04	26.09	10.25	0.50
wHill	RN	300	34.64	0.26	7.67	28.42	34.62	0.52	7.64	7.68	28.48	11.33	0.35
wHill	RN	500	34.32	0.28	7.35	27.24	34.32	0.54	7.35	7.37	27.31	10.89	0.35
wHill	RN	700	33.70	0.28	6.72	24.92	33.70	0.53	6.73	6.74	25.00	9.98	0.32
wHill	CN	300	34.63	0.25	7.66	28.39	34.61	0.52	7.64	7.67	28.45	11.32	0.35
wHill	CN	500	34.29	0.28	7.32	27.14	34.30	0.54	7.32	7.34	27.21	10.86	0.33
wHill	CN	700	33.63	0.29	6.66	24.68	33.63	0.54	6.65	6.68	24.76	9.87	0.32
wISE	RT	500	31.94	1.03	4.96	18.40	31.88	1.00	4.90	5.07	18.78	7.27	0.40
wISE	RT	700	30.35	0.61	3.38	12.53	30.31	0.73	3.34	3.47	12.86	4.95	0.24
wISE	RN	300	34.57	0.27	7.60	28.16	34.54	0.52	7.56	7.61	28.23	11.22	0.35
wISE	RN	500	33.42	0.45	6.44	23.88	33.45	0.64	6.47	6.48	24.01	9.59	0.45
wISE	RN	700	31.75	0.48	4.77	17.70	31.73	0.68	4.75	4.83	17.89	7.04	0.32
wISE	CN	300	34.56	0.28	7.58	28.10	34.53	0.53	7.55	7.60	28.17	11.19	0.35
wISE	CN	500	33.31	0.46	6.34	23.50	33.36	0.67	6.38	6.37	23.63	9.46	0.32
wISE	CN	700	31.57	0.51	4.60	17.04	31.54	0.70	4.57	4.65	17.25	6.77	0.26
wPDC	RT	500	30.19	1.09	3.21	11.90	30.16	1.02	3.18	3.38	12.52	4.72	0.29
wPDC	RT	700	28.76	0.61	1.78	6.61	28.68	0.77	1.70	1.95	7.21	2.53	0.20
wPDC	RN	300	34.22	0.49	7.24	26.84	34.26	0.66	7.28	7.27	26.97	10.80	0.33
wPDC	RN	500	32.13	0.95	5.15	19.11	32.17	0.95	5.20	5.25	19.44	7.70	0.31
wPDC	RN	700	30.22	0.74	3.25	12.03	30.20	0.85	3.22	3.36	12.44	4.78	0.24
wPDC	CN	300	34.17	0.56	7.19	26.66	34.23	0.70	7.26	7.23	26.80	10.76	0.33
wPDC	CN	500	31.92	1.09	4.94	18.33	31.97	1.03	4.99	5.05	18.73	7.40	0.31
wPDC	CN	700	29.96	0.82	2.99	11.07	29.93	0.90	2.96	3.12	11.56	4.39	0.24
GB2			33.35	0.20	6.37	23.62	33.36	0.46	6.38	6.39	23.68	9.47	0.30

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OAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 20.

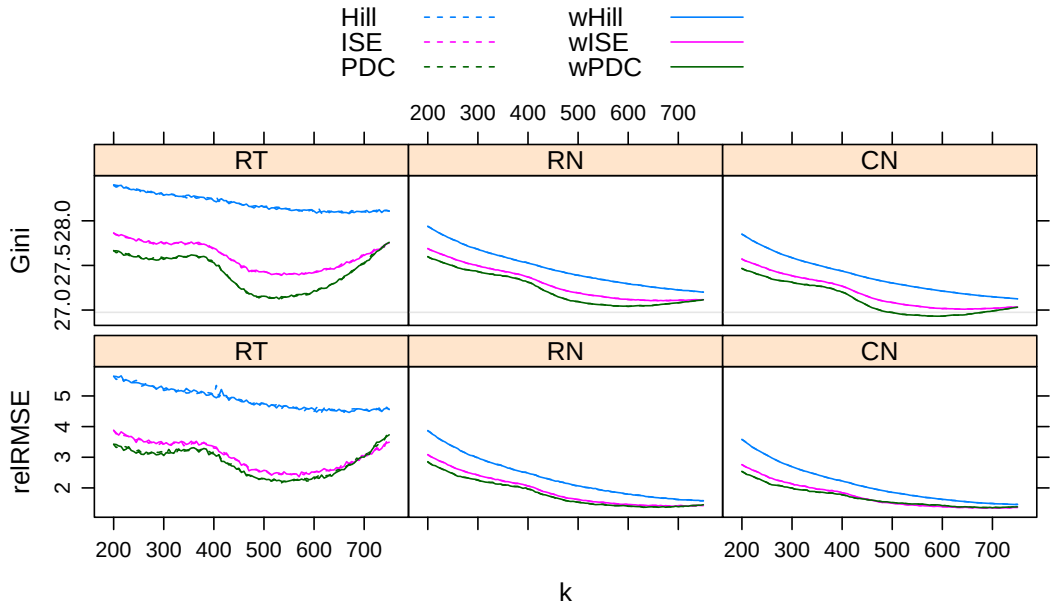

Figure F.168.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

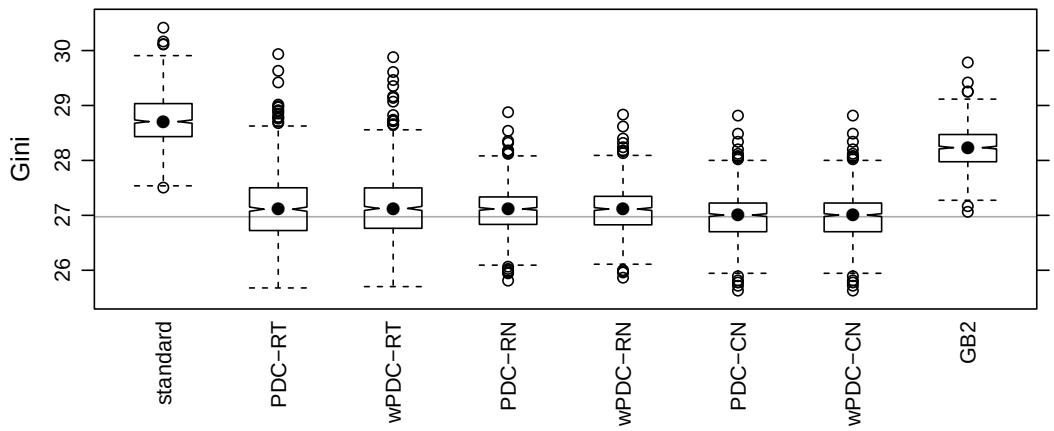

Figure F.169.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.84.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28.73	0.19	1.76	6.51	28.71	0.45	1.73	1.81	6.71	2.57	0.13
wHill	RT	300	28.29	0.26	1.31	4.86	28.25	0.52	1.28	1.41	5.22	1.90	0.11
wHill	RT	500	28.15	0.25	1.18	4.37	28.14	0.47	1.16	1.28	4.74	1.72	0.13
wHill	RT	700	28.10	0.22	1.13	4.19	28.06	0.46	1.09	1.22	4.54	1.61	0.09
wHill	RN	300	27.68	0.15	0.71	2.62	27.67	0.41	0.70	0.81	2.99	1.03	0.07
wHill	RN	500	27.39	0.14	0.41	1.54	27.39	0.37	0.41	0.56	2.07	0.62	0.07
wHill	RN	700	27.22	0.13	0.25	0.93	27.22	0.35	0.24	0.44	1.62	0.45	0.06
wHill	CN	300	27.59	0.15	0.61	2.27	27.57	0.40	0.60	0.73	2.69	0.89	0.07
wHill	CN	500	27.30	0.14	0.33	1.22	27.30	0.38	0.33	0.50	1.85	0.53	0.07
wHill	CN	700	27.15	0.13	0.17	0.65	27.15	0.36	0.17	0.40	1.49	0.40	0.06
wISE	RT	300	27.75	0.26	0.77	2.86	27.73	0.51	0.76	0.92	3.43	1.13	0.11
wISE	RT	500	27.43	0.27	0.46	1.69	27.41	0.50	0.44	0.69	2.57	0.70	0.12
wISE	RT	700	27.61	0.27	0.64	2.36	27.59	0.50	0.61	0.82	3.05	0.92	0.10
wISE	RN	300	27.50	0.15	0.52	1.93	27.49	0.38	0.52	0.65	2.42	0.78	0.08
wISE	RN	500	27.19	0.14	0.22	0.81	27.20	0.36	0.23	0.44	1.62	0.45	0.07
wISE	RN	700	27.11	0.13	0.13	0.50	27.11	0.34	0.13	0.38	1.41	0.37	0.07
wISE	CN	300	27.38	0.16	0.41	1.52	27.38	0.40	0.40	0.58	2.13	0.62	0.06
wISE	CN	500	27.08	0.15	0.11	0.41	27.10	0.38	0.12	0.40	1.50	0.40	0.07
wISE	CN	700	27.02	0.13	0.05	0.17	27.02	0.34	0.04	0.36	1.35	0.35	0.06
wPDC	RT	300	27.57	0.33	0.59	2.20	27.53	0.56	0.56	0.82	3.06	0.87	0.11
wPDC	RT	500	27.16	0.35	0.18	0.67	27.13	0.55	0.15	0.62	2.30	0.56	0.11
wPDC	RT	700	27.52	0.36	0.54	2.02	27.47	0.59	0.49	0.81	3.00	0.81	0.13
wPDC	RN	300	27.43	0.16	0.46	1.70	27.42	0.41	0.45	0.61	2.26	0.67	0.07
wPDC	RN	500	27.09	0.16	0.12	0.44	27.11	0.39	0.14	0.41	1.53	0.41	0.07
wPDC	RN	700	27.08	0.13	0.11	0.40	27.08	0.35	0.11	0.37	1.38	0.37	0.06
wPDC	CN	300	27.31	0.18	0.34	1.25	27.30	0.42	0.33	0.54	2.00	0.55	0.06
wPDC	CN	500	26.97	0.17	−0.00	−0.01	27.00	0.39	0.03	0.41	1.52	0.38	0.07
wPDC	CN	700	26.99	0.13	0.01	0.06	26.99	0.35	0.02	0.36	1.35	0.35	0.06
GB2			28.23	0.13	1.26	4.66	28.23	0.37	1.26	1.31	4.85	1.87	0.10

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OAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 20.

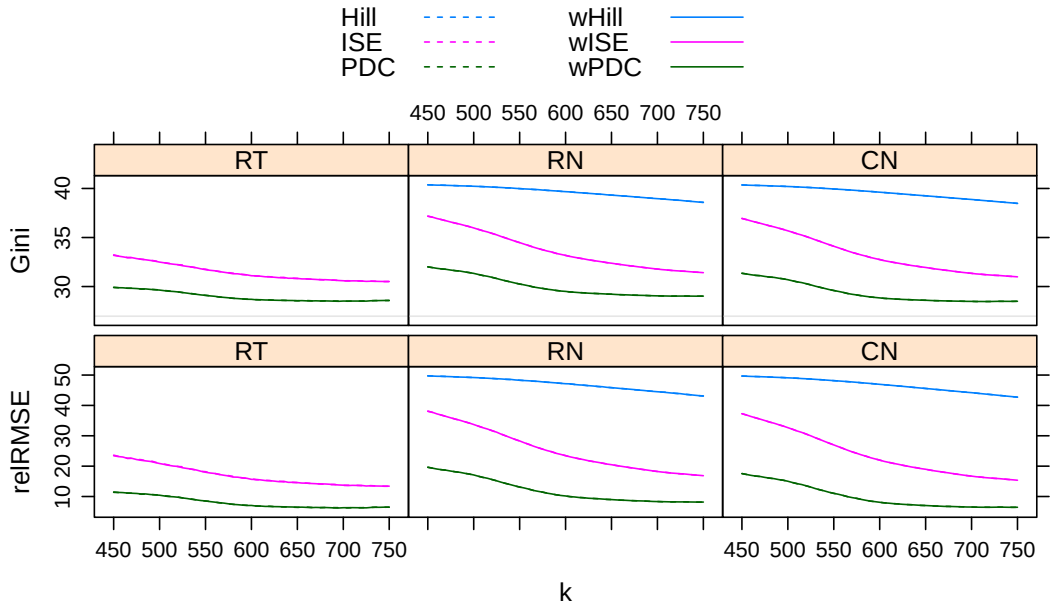

Figure F.170.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

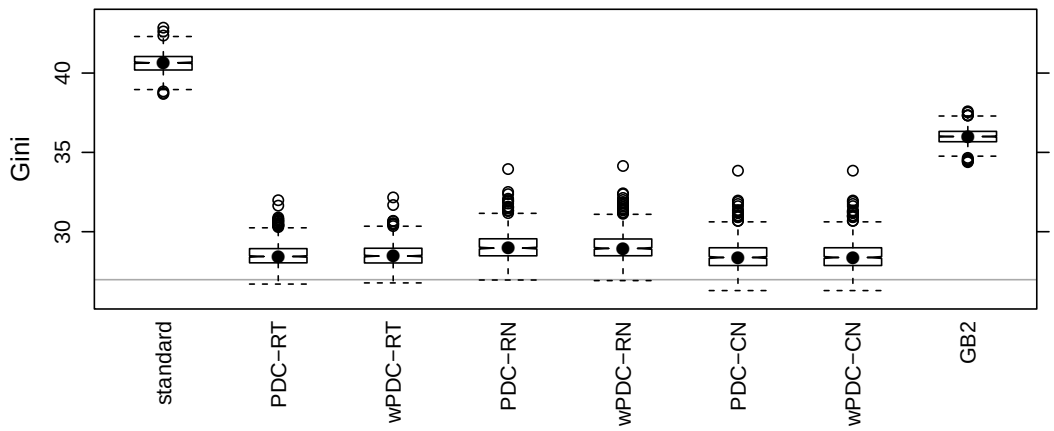

Figure F.171.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.85.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			40.62	0.40	13.65	50.60	40.65	0.62	13.68	13.66	50.65	20.28	0.59
wHill	RT	500	40.36	7.85	13.38	49.61	39.87	1.79	12.89	13.67	50.69	19.12	1.61
wHill	RT	700	38.15	3.27	11.18	41.44	37.92	1.34	10.95	11.32	41.98	16.23	1.14
wHill	RN	300	40.60	0.41	13.62	50.50	40.61	0.63	13.63	13.64	50.55	20.21	0.62
wHill	RN	500	40.22	0.41	13.25	49.12	40.25	0.67	13.27	13.27	49.18	19.68	0.58
wHill	RN	700	38.96	0.42	11.99	44.44	38.98	0.63	12.00	12.01	44.51	17.79	0.52
wHill	CN	300	40.59	0.40	13.62	50.48	40.60	0.63	13.63	13.63	50.53	20.21	0.59
wHill	CN	500	40.20	0.41	13.23	49.03	40.23	0.68	13.26	13.24	49.09	19.65	0.57
wHill	CN	700	38.88	0.43	11.90	44.13	38.88	0.63	11.90	11.92	44.20	17.65	0.52
wISE	RT	500	32.49	1.24	5.52	20.45	32.43	1.05	5.46	5.63	20.86	8.09	0.39
wISE	RT	700	30.59	0.63	3.62	13.41	30.55	0.78	3.58	3.70	13.72	5.30	0.26
wISE	RN	300	40.36	0.42	13.38	49.61	40.37	0.65	13.40	13.40	49.67	19.86	0.58
wISE	RN	500	35.97	1.67	9.00	33.36	36.07	1.32	9.09	9.09	33.71	13.48	0.46
wISE	RN	700	31.78	1.11	4.81	17.82	31.69	1.07	4.72	4.92	18.24	7.00	0.34
wISE	CN	300	40.34	0.44	13.36	49.55	40.36	0.66	13.38	13.38	49.61	19.84	0.58
wISE	CN	500	35.68	1.88	8.71	32.28	35.79	1.41	8.81	8.81	32.68	13.06	0.46
wISE	CN	700	31.35	1.22	4.37	16.21	31.26	1.15	4.29	4.51	16.72	6.36	0.33
wPDC	RT	500	29.64	0.81	2.66	9.87	29.58	0.92	2.60	2.81	10.43	3.86	0.21
wPDC	RT	700	28.52	0.50	1.55	5.73	28.46	0.67	1.49	1.70	6.30	2.21	0.19
wPDC	RN	300	36.41	6.80	9.44	34.98	36.63	3.14	9.65	9.79	36.29	14.31	0.56
wPDC	RN	500	31.34	2.22	4.37	16.19	31.22	1.49	4.24	4.61	17.10	6.29	0.37
wPDC	RN	700	29.05	0.75	2.08	7.69	28.94	0.78	1.97	2.25	8.34	2.92	0.27
wPDC	CN	300	35.98	8.42	9.01	33.39	36.26	3.50	9.29	9.46	35.08	13.77	0.56
wPDC	CN	500	30.70	2.58	3.72	13.80	30.58	1.59	3.60	4.05	15.02	5.34	0.36
wPDC	CN	700	28.49	0.82	1.51	5.61	28.37	0.83	1.40	1.76	6.54	2.08	0.25
GB2			35.99	0.24	9.02	33.44	36.00	0.48	9.02	9.03	33.49	13.38	0.39

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Stratified Midzuno sampling

No contamination

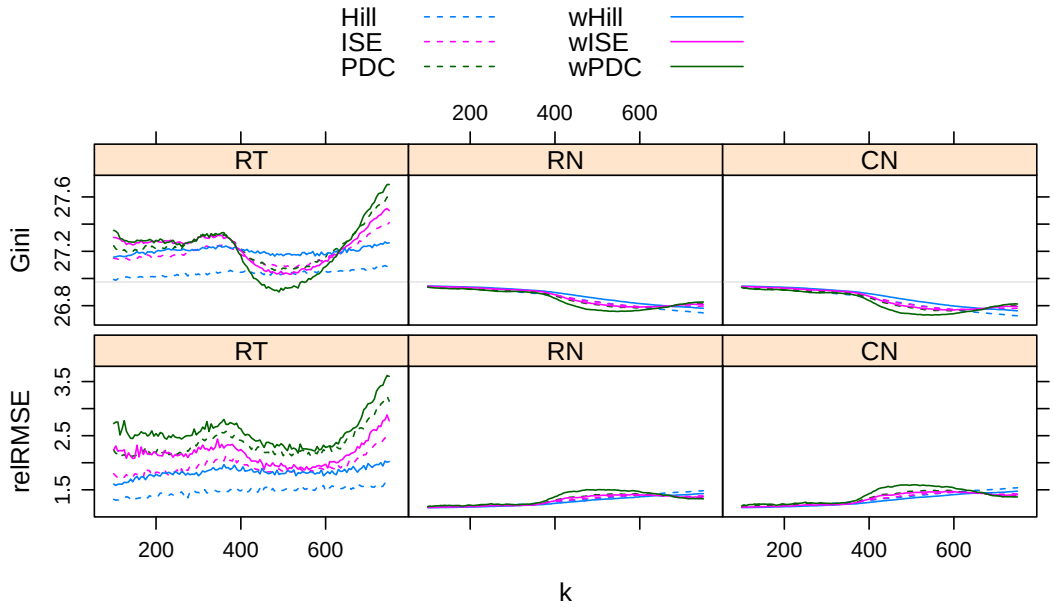

Figure F.172.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 100 and 750.

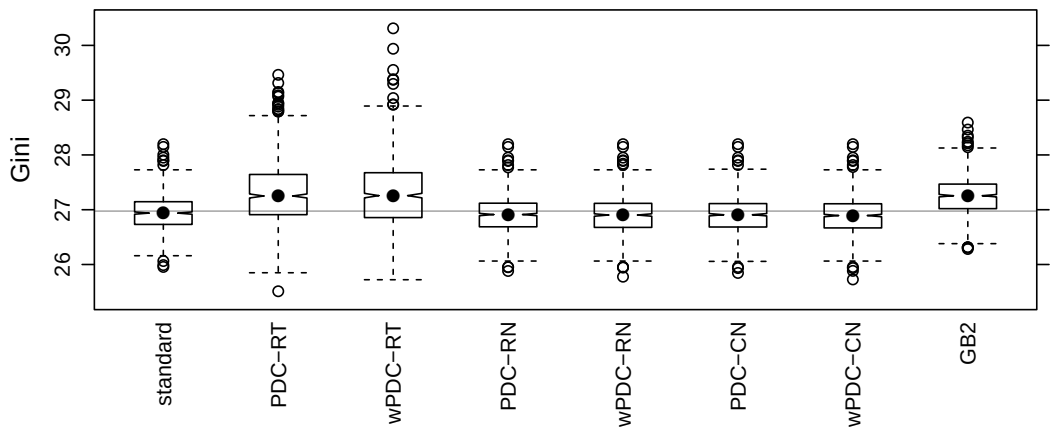

Figure F.173.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 300$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.86.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			26.95	0.10	−0.03	−0.11	26.94	0.31	−0.04	0.31	1.17	0.31	0.05
wHill	RT	300	27.21	0.17	0.23	0.86	27.18	0.42	0.21	0.47	1.76	0.46	0.06
wHill	RT	500	27.17	0.20	0.19	0.71	27.14	0.45	0.16	0.49	1.80	0.46	0.07
wHill	RT	700	27.24	0.22	0.27	0.99	27.22	0.45	0.24	0.54	1.98	0.51	0.09
wHill	RN	300	26.92	0.10	−0.05	−0.19	26.93	0.31	−0.05	0.32	1.20	0.32	0.04
wHill	RN	500	26.85	0.11	−0.12	−0.45	26.86	0.32	−0.12	0.36	1.32	0.36	0.05
wHill	RN	700	26.79	0.11	−0.18	−0.68	26.80	0.33	−0.17	0.38	1.41	0.38	0.05
wHill	CN	300	26.92	0.10	−0.06	−0.21	26.92	0.31	−0.05	0.33	1.21	0.32	0.04
wHill	CN	500	26.84	0.11	−0.14	−0.50	26.84	0.33	−0.13	0.36	1.35	0.37	0.05
wHill	CN	700	26.77	0.11	−0.20	−0.75	26.79	0.33	−0.19	0.39	1.45	0.38	0.05
wISE	RT	300	27.31	0.27	0.33	1.23	27.28	0.49	0.30	0.62	2.29	0.59	0.09
wISE	RT	500	27.03	0.27	0.06	0.21	26.99	0.50	0.02	0.52	1.94	0.49	0.08
wISE	RT	700	27.38	0.26	0.41	1.51	27.37	0.49	0.39	0.65	2.41	0.66	0.07
wISE	RN	300	26.92	0.10	−0.06	−0.21	26.92	0.32	−0.05	0.33	1.21	0.32	0.04
wISE	RN	500	26.81	0.11	−0.16	−0.60	26.82	0.33	−0.15	0.37	1.39	0.38	0.05
wISE	RN	700	26.81	0.11	−0.17	−0.63	26.82	0.32	−0.16	0.37	1.37	0.36	0.05
wISE	CN	300	26.91	0.10	−0.06	−0.23	26.91	0.33	−0.06	0.33	1.22	0.32	0.04
wISE	CN	500	26.79	0.12	−0.18	−0.68	26.80	0.34	−0.18	0.39	1.44	0.39	0.05
wISE	CN	700	26.79	0.11	−0.18	−0.68	26.80	0.33	−0.18	0.38	1.40	0.37	0.05
wPDC	RT	300	27.30	0.37	0.33	1.22	27.26	0.61	0.28	0.69	2.56	0.62	0.12
wPDC	RT	500	26.91	0.39	−0.06	−0.22	26.86	0.61	−0.11	0.63	2.32	0.66	0.10
wPDC	RT	700	27.50	0.42	0.53	1.96	27.48	0.65	0.50	0.83	3.09	0.82	0.11
wPDC	RN	300	26.90	0.11	−0.07	−0.26	26.90	0.32	−0.07	0.33	1.23	0.33	0.05
wPDC	RN	500	26.77	0.12	−0.21	−0.77	26.77	0.33	−0.21	0.40	1.50	0.41	0.06
wPDC	RN	700	26.81	0.11	−0.16	−0.60	26.82	0.32	−0.16	0.36	1.35	0.35	0.05
wPDC	CN	300	26.90	0.11	−0.08	−0.29	26.89	0.33	−0.08	0.34	1.25	0.33	0.05
wPDC	CN	500	26.74	0.13	−0.24	−0.87	26.74	0.34	−0.24	0.43	1.59	0.43	0.07
wPDC	CN	700	26.80	0.11	−0.18	−0.66	26.80	0.33	−0.18	0.37	1.39	0.37	0.05
GB2			27.25	0.11	0.28	1.03	27.26	0.33	0.28	0.43	1.61	0.47	0.06

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OCAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

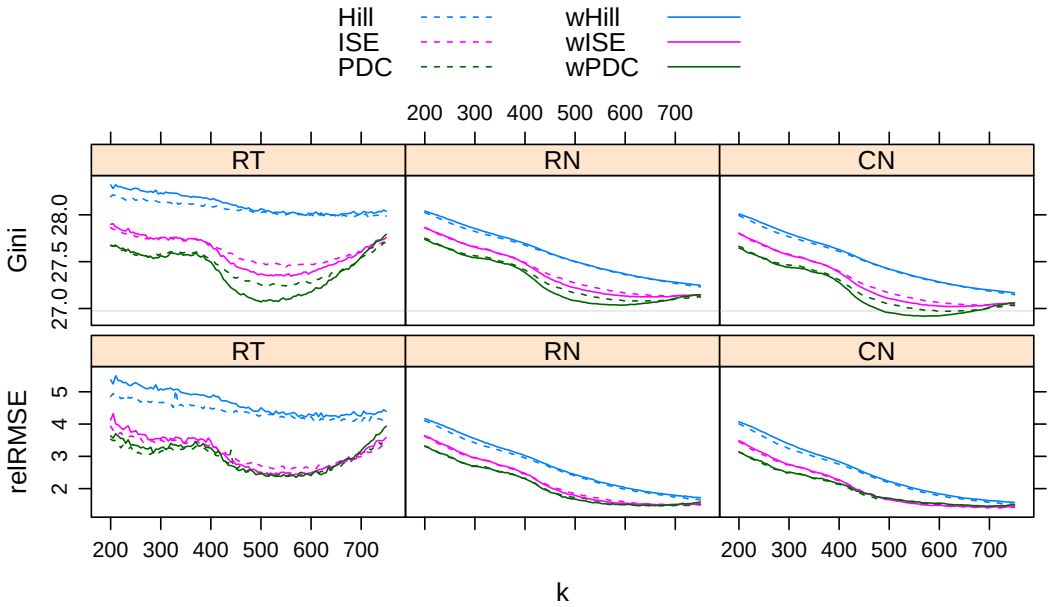

Figure F.174.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

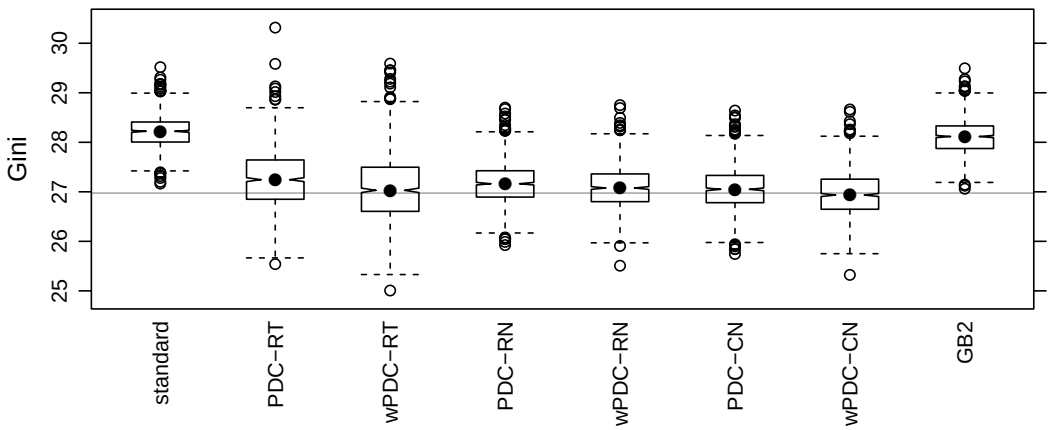

Figure F.175.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.87.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28.21	0.10	1.24	4.60	28.22	0.30	1.25	1.28	4.75	1.85	0.09
wHill	RT	300	28.23	0.30	1.26	4.67	28.21	0.52	1.23	1.37	5.09	1.83	0.12
wHill	RT	500	28.07	0.29	1.09	4.04	28.03	0.49	1.05	1.22	4.51	1.56	0.14
wHill	RT	700	28.01	0.24	1.04	3.85	27.99	0.46	1.02	1.15	4.25	1.51	0.10
wHill	RN	300	27.85	0.14	0.88	3.26	27.86	0.39	0.88	0.96	3.55	1.31	0.08
wHill	RN	500	27.50	0.15	0.53	1.96	27.50	0.38	0.52	0.66	2.43	0.78	0.07
wHill	RN	700	27.28	0.14	0.31	1.14	27.27	0.36	0.29	0.48	1.79	0.51	0.06
wHill	CN	300	27.80	0.15	0.83	3.06	27.79	0.40	0.82	0.91	3.38	1.21	0.08
wHill	CN	500	27.42	0.16	0.45	1.65	27.42	0.40	0.44	0.60	2.22	0.67	0.06
wHill	CN	700	27.20	0.14	0.22	0.82	27.20	0.37	0.22	0.44	1.63	0.45	0.06
wISE	RT	300	27.75	0.31	0.78	2.89	27.73	0.55	0.76	0.96	3.55	1.13	0.12
wISE	RT	500	27.37	0.30	0.39	1.46	27.36	0.52	0.38	0.68	2.51	0.66	0.11
wISE	RT	700	27.60	0.29	0.63	2.32	27.60	0.53	0.63	0.82	3.05	0.94	0.10
wISE	RN	300	27.66	0.17	0.68	2.53	27.67	0.44	0.70	0.80	2.97	1.04	0.08
wISE	RN	500	27.22	0.17	0.25	0.91	27.21	0.41	0.24	0.48	1.78	0.48	0.06
wISE	RN	700	27.13	0.14	0.16	0.59	27.13	0.36	0.16	0.41	1.51	0.40	0.06
wISE	CN	300	27.57	0.19	0.60	2.21	27.58	0.46	0.61	0.74	2.75	0.91	0.08
wISE	CN	500	27.11	0.18	0.13	0.49	27.09	0.41	0.11	0.45	1.66	0.42	0.06
wISE	CN	700	27.04	0.15	0.07	0.24	27.04	0.38	0.07	0.39	1.43	0.39	0.06
wPDC	RT	300	27.56	0.43	0.59	2.19	27.50	0.63	0.52	0.88	3.26	0.82	0.14
wPDC	RT	500	27.07	0.44	0.09	0.35	27.03	0.66	0.06	0.67	2.48	0.66	0.10
wPDC	RT	700	27.55	0.40	0.58	2.14	27.51	0.59	0.53	0.86	3.18	0.85	0.11
wPDC	RN	300	27.55	0.20	0.57	2.12	27.55	0.47	0.58	0.73	2.69	0.86	0.08
wPDC	RN	500	27.08	0.19	0.11	0.41	27.08	0.42	0.10	0.45	1.68	0.42	0.07
wPDC	RN	700	27.11	0.15	0.13	0.50	27.10	0.37	0.13	0.41	1.51	0.42	0.06
wPDC	CN	300	27.44	0.24	0.47	1.73	27.44	0.51	0.47	0.68	2.50	0.74	0.08
wPDC	CN	500	26.96	0.21	−0.02	−0.07	26.94	0.44	−0.04	0.46	1.70	0.45	0.06
wPDC	CN	700	27.01	0.15	0.04	0.14	27.02	0.38	0.04	0.39	1.46	0.39	0.05
GB2			28.11	0.11	1.14	4.22	28.12	0.34	1.14	1.19	4.40	1.69	0.09

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OCAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

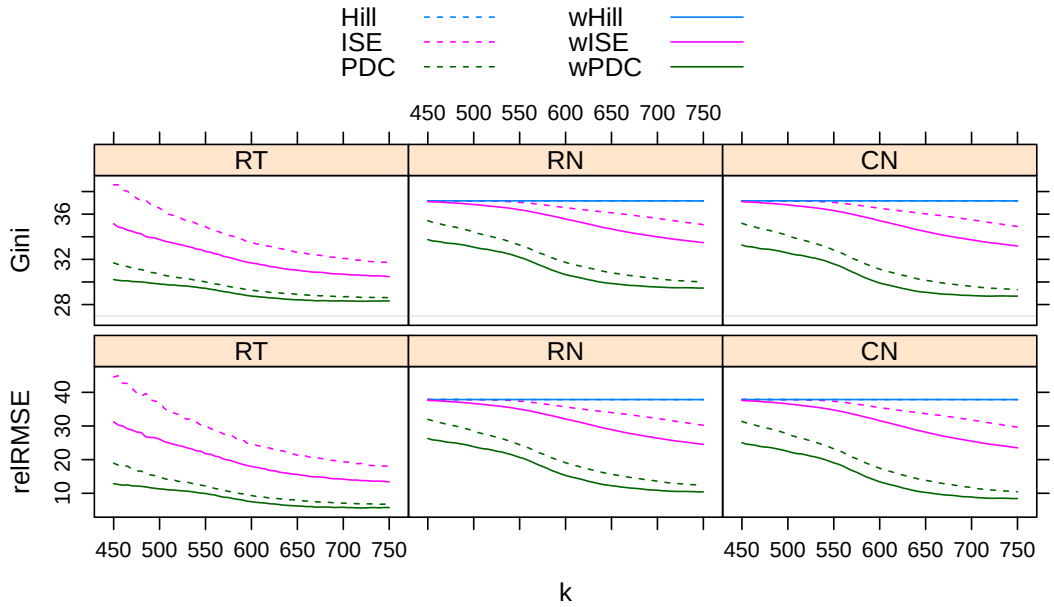

Figure F.176.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

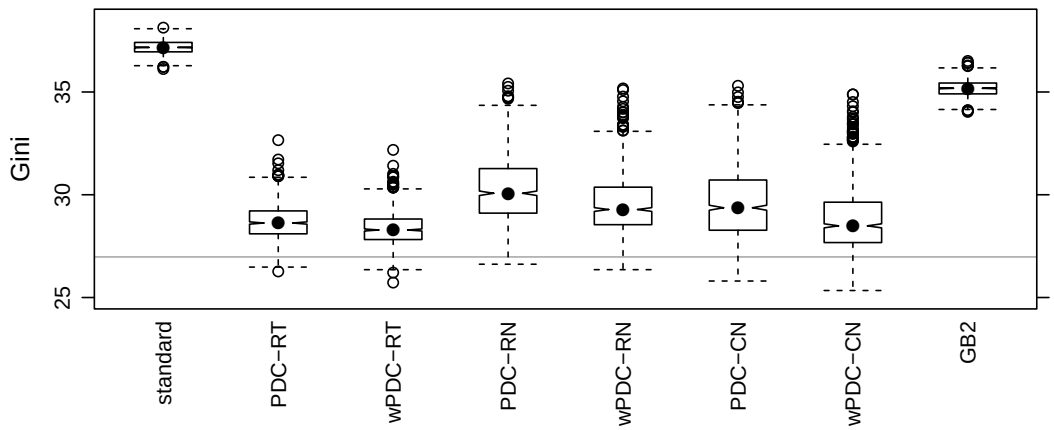

Figure F.177.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.88.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.18	0.12	10.20	37.83	37.17	0.34	10.19	10.21	37.85	15.11	0.41
wHill	RT	500	40.47	13.49	13.49	50.02	39.81	2.19	12.83	13.98	51.84	19.03	2.30
wHill	RT	700	37.50	4.39	10.53	39.02	37.16	1.55	10.18	10.73	39.78	15.10	1.08
wHill	RN	300	37.18	0.12	10.20	37.83	37.17	0.34	10.19	10.21	37.85	15.11	0.41
wHill	RN	500	37.18	0.12	10.20	37.83	37.17	0.34	10.19	10.21	37.85	15.11	0.41
wHill	RN	700	37.18	0.12	10.20	37.83	37.17	0.34	10.19	10.21	37.85	15.11	0.41
wHill	CN	300	37.18	0.12	10.20	37.83	37.17	0.34	10.19	10.21	37.85	15.11	0.41
wHill	CN	500	37.18	0.12	10.20	37.83	37.17	0.34	10.19	10.21	37.85	15.11	0.41
wHill	CN	700	37.18	0.12	10.20	37.83	37.17	0.34	10.19	10.21	37.85	15.11	0.41
wISE	RT	500	33.75	3.43	6.78	25.13	33.57	1.45	6.59	7.03	26.06	9.77	1.04
wISE	RT	700	30.69	0.84	3.71	13.76	30.67	0.91	3.70	3.82	14.18	5.48	0.34
wISE	RN	300	37.18	0.12	10.20	37.83	37.17	0.34	10.19	10.21	37.85	15.11	0.41
wISE	RN	500	36.85	0.33	9.88	36.61	36.91	0.58	9.93	9.89	36.67	14.73	0.41
wISE	RN	700	33.99	1.45	7.01	26.00	34.06	1.01	7.09	7.12	26.38	10.51	0.39
wISE	CN	300	37.18	0.12	10.20	37.83	37.17	0.34	10.19	10.21	37.85	15.11	0.41
wISE	CN	500	36.82	0.37	9.84	36.49	36.89	0.61	9.91	9.86	36.56	14.70	0.41
wISE	CN	700	33.72	1.72	6.75	25.02	33.82	1.08	6.84	6.87	25.49	10.14	0.39
wPDC	RT	500	29.82	1.22	2.84	10.54	29.72	1.05	2.74	3.05	11.30	4.07	0.31
wPDC	RT	700	28.33	0.64	1.36	5.04	28.29	0.75	1.31	1.57	5.84	1.94	0.19
wPDC	RN	300	37.08	0.40	10.11	37.48	37.15	0.36	10.18	10.13	37.56	15.09	0.41
wPDC	RN	500	33.08	4.11	6.10	22.63	33.33	2.18	6.35	6.43	23.84	9.42	0.40
wPDC	RN	700	29.55	2.01	2.58	9.56	29.28	1.27	2.31	2.94	10.91	3.42	0.30
wPDC	CN	300	37.07	0.53	10.09	37.41	37.15	0.36	10.18	10.12	37.51	15.09	0.41
wPDC	CN	500	32.56	5.45	5.58	20.70	32.83	2.48	5.85	6.05	22.44	8.68	0.40
wPDC	CN	700	28.80	2.43	1.82	6.76	28.49	1.39	1.51	2.40	8.89	2.25	0.29
GB2			35.17	0.15	8.20	30.39	35.18	0.40	8.21	8.21	30.43	12.17	0.35

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OCAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

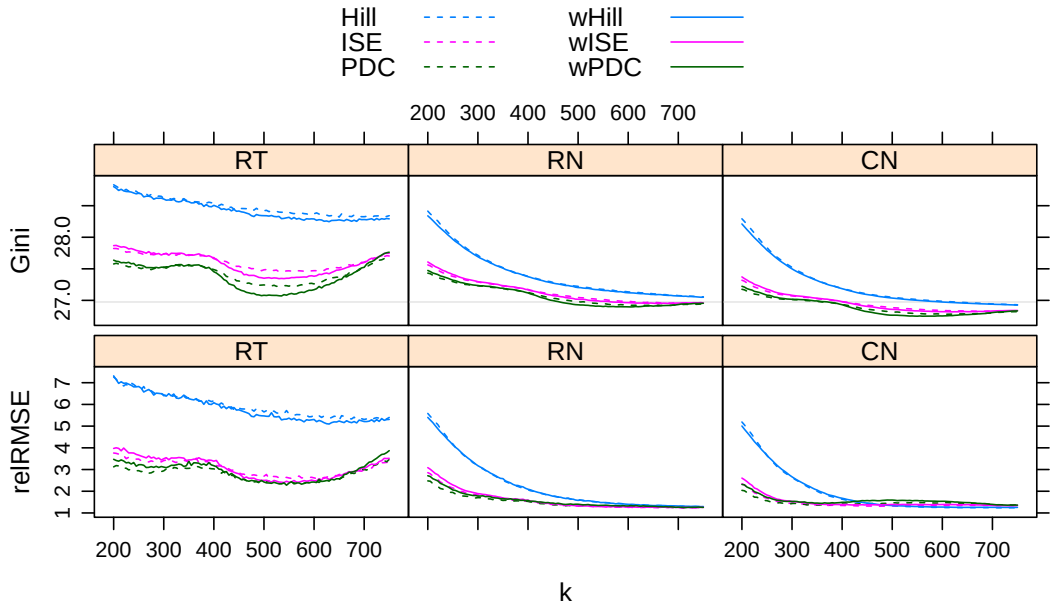

Figure F.178.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

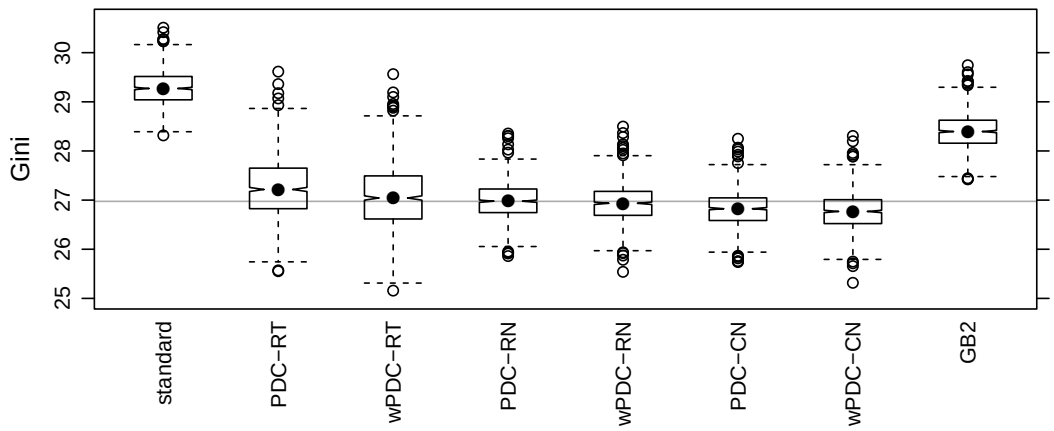

Figure F.179.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.89.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			29.28	0.12	2.30	8.54	29.27	0.35	2.30	2.33	8.64	3.41	0.13
wHill	RT	300	28.61	0.36	1.63	6.05	28.58	0.59	1.60	1.74	6.44	2.38	0.16
wHill	RT	500	28.34	0.31	1.37	5.07	28.31	0.56	1.33	1.48	5.47	1.98	0.14
wHill	RT	700	28.28	0.27	1.31	4.84	28.23	0.52	1.26	1.41	5.21	1.87	0.12
wHill	RN	300	27.69	0.22	0.72	2.66	27.66	0.48	0.68	0.86	3.18	1.02	0.09
wHill	RN	500	27.20	0.13	0.23	0.85	27.19	0.35	0.22	0.43	1.58	0.44	0.06
wHill	RN	700	27.07	0.12	0.10	0.36	27.06	0.35	0.08	0.36	1.32	0.37	0.05
wHill	CN	300	27.50	0.24	0.52	1.94	27.47	0.51	0.50	0.72	2.66	0.77	0.08
wHill	CN	500	27.04	0.13	0.06	0.23	27.03	0.35	0.06	0.36	1.34	0.35	0.06
wHill	CN	700	26.94	0.11	−0.04	−0.13	26.94	0.33	−0.04	0.34	1.26	0.33	0.05
wISE	RT	300	27.74	0.31	0.76	2.82	27.70	0.52	0.72	0.94	3.50	1.07	0.13
wISE	RT	500	27.35	0.31	0.38	1.39	27.31	0.56	0.34	0.67	2.50	0.65	0.10
wISE	RT	700	27.60	0.28	0.63	2.32	27.60	0.52	0.62	0.82	3.04	0.94	0.12
wISE	RN	300	27.30	0.16	0.32	1.19	27.29	0.38	0.31	0.51	1.89	0.51	0.07
wISE	RN	500	27.02	0.13	0.04	0.16	27.02	0.35	0.05	0.36	1.33	0.35	0.05
wISE	RN	700	26.96	0.11	−0.02	−0.07	26.97	0.33	−0.01	0.34	1.25	0.33	0.05
wISE	CN	300	27.08	0.16	0.11	0.39	27.07	0.40	0.09	0.41	1.53	0.40	0.07
wISE	CN	500	26.86	0.13	−0.12	−0.43	26.86	0.35	−0.12	0.37	1.39	0.37	0.05
wISE	CN	700	26.83	0.11	−0.14	−0.53	26.84	0.33	−0.13	0.36	1.35	0.36	0.05
wPDC	RT	300	27.53	0.40	0.55	2.04	27.49	0.59	0.51	0.84	3.11	0.80	0.12
wPDC	RT	500	27.08	0.42	0.11	0.39	27.04	0.65	0.07	0.65	2.43	0.62	0.10
wPDC	RT	700	27.52	0.41	0.55	2.04	27.50	0.63	0.53	0.84	3.12	0.86	0.11
wPDC	RN	300	27.23	0.16	0.26	0.96	27.22	0.40	0.25	0.48	1.78	0.46	0.08
wPDC	RN	500	26.93	0.14	−0.04	−0.17	26.93	0.36	−0.04	0.38	1.40	0.36	0.06
wPDC	RN	700	26.93	0.12	−0.04	−0.15	26.93	0.34	−0.04	0.34	1.27	0.34	0.05
wPDC	CN	300	27.02	0.17	0.04	0.16	26.99	0.40	0.02	0.41	1.53	0.40	0.07
wPDC	CN	500	26.76	0.14	−0.21	−0.78	26.77	0.36	−0.21	0.43	1.59	0.43	0.06
wPDC	CN	700	26.81	0.11	−0.17	−0.62	26.81	0.33	−0.17	0.38	1.39	0.36	0.05
GB2			28.40	0.12	1.43	5.30	28.40	0.35	1.42	1.47	5.44	2.11	0.10

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OCAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

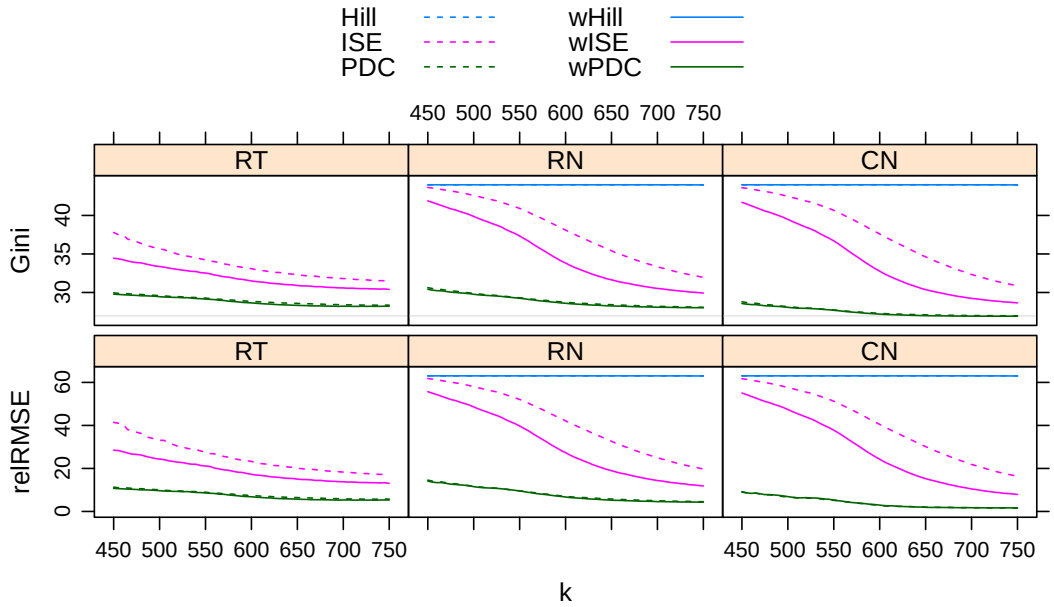

Figure F.180.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

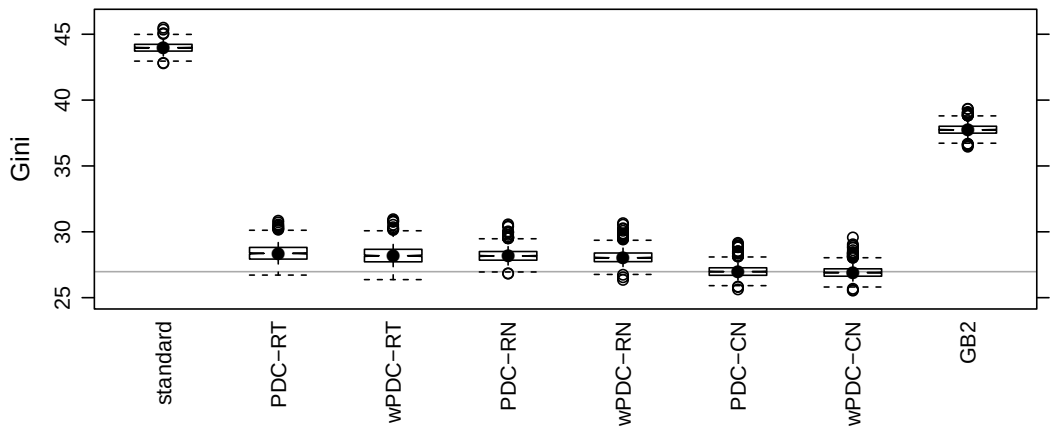

Figure F.181.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.90.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			43.98	0.14	17.00	63.03	43.98	0.38	17.00	17.00	63.04	25.21	0.69
wHill	RT	500	49.95	45.53	22.98	85.19	48.26	4.43	21.29	23.95	88.78	31.56	2.44
wHill	RT	700	43.52	17.06	16.55	61.35	42.72	2.63	15.75	17.06	63.23	23.35	1.86
wHill	RN	300	43.98	0.14	17.00	63.03	43.98	0.38	17.00	17.00	63.04	25.21	0.69
wHill	RN	500	43.98	0.14	17.00	63.03	43.98	0.38	17.00	17.00	63.04	25.21	0.69
wHill	RN	700	43.97	0.14	17.00	63.02	43.98	0.38	17.00	17.00	63.04	25.21	0.69
wHill	CN	300	43.98	0.14	17.00	63.03	43.98	0.38	17.00	17.00	63.04	25.21	0.69
wHill	CN	500	43.98	0.14	17.00	63.03	43.98	0.38	17.00	17.00	63.04	25.21	0.69
wHill	CN	700	43.97	0.14	17.00	63.02	43.98	0.38	17.00	17.00	63.04	25.21	0.69
wISE	RT	500	33.37	2.35	6.39	23.69	33.19	1.49	6.22	6.57	24.37	9.22	0.76
wISE	RT	700	30.59	0.77	3.62	13.41	30.56	0.81	3.59	3.72	13.80	5.32	0.27
wISE	RN	300	43.98	0.14	17.00	63.03	43.98	0.38	17.00	17.00	63.04	25.21	0.69
wISE	RN	500	39.87	5.63	12.89	47.79	39.90	2.52	12.92	13.11	48.59	19.16	0.67
wISE	RN	700	30.52	2.41	3.55	13.16	30.22	1.32	3.25	3.87	14.36	4.81	0.42
wISE	CN	300	43.98	0.14	17.00	63.03	43.98	0.38	17.00	17.00	63.04	25.21	0.69
wISE	CN	500	39.49	6.93	12.51	46.39	39.54	2.67	12.57	12.79	47.40	18.64	0.67
wISE	CN	700	29.23	2.86	2.26	8.37	28.89	1.41	1.91	2.82	10.45	2.83	0.40
wPDC	RT	500	29.45	0.63	2.48	9.19	29.32	0.73	2.34	2.60	9.65	3.47	0.27
wPDC	RT	700	28.22	0.51	1.25	4.62	28.18	0.70	1.21	1.44	5.33	1.79	0.15
wPDC	RN	300	39.37	8.03	12.40	45.96	38.42	2.62	11.44	12.72	47.15	16.96	0.67
wPDC	RN	500	29.76	1.90	2.79	10.34	29.37	0.89	2.40	3.11	11.54	3.56	0.46
wPDC	RN	700	28.08	0.30	1.11	4.10	28.03	0.48	1.06	1.23	4.57	1.56	0.14
wPDC	CN	300	38.67	10.88	11.69	43.35	37.62	3.16	10.64	12.15	45.04	15.78	0.67
wPDC	CN	500	28.07	2.26	1.10	4.07	27.61	0.83	0.64	1.86	6.90	0.95	0.45
wPDC	CN	700	26.93	0.21	−0.05	−0.17	26.90	0.41	−0.07	0.47	1.73	0.45	0.10
GB2			37.75	0.18	10.77	39.94	37.74	0.39	10.77	10.78	39.97	15.97	0.46

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OCAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

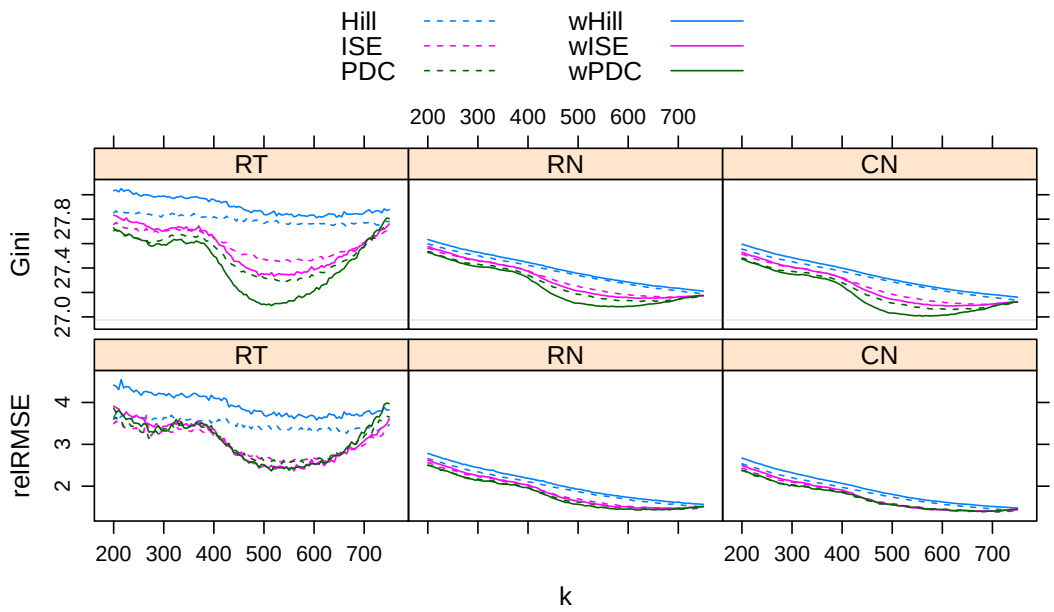

Figure F.182.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

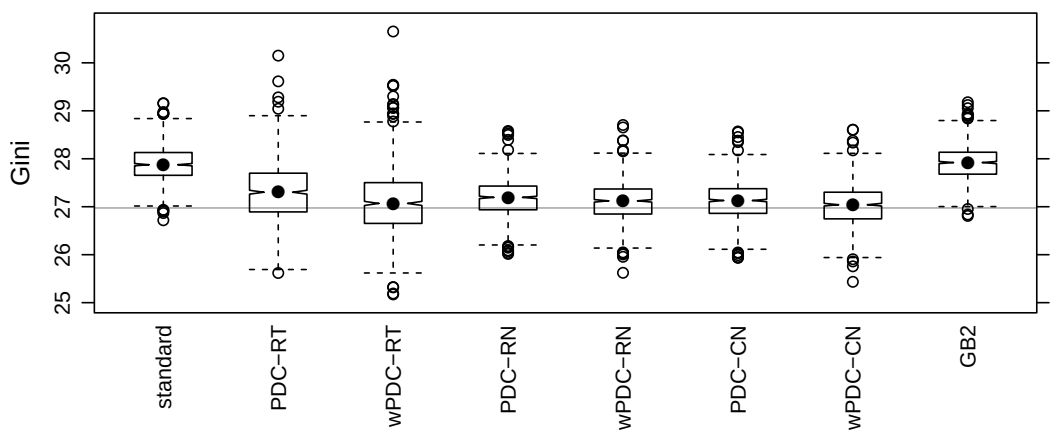

Figure F.183.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.91.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			27.89	0.13	0.92	3.40	27.88	0.35	0.90	0.99	3.65	1.34	0.08
wHill	RT	300	27.99	0.25	1.02	3.77	27.97	0.50	0.99	1.13	4.21	1.47	0.11
wHill	RT	500	27.84	0.25	0.86	3.20	27.80	0.47	0.83	1.00	3.70	1.22	0.11
wHill	RT	700	27.85	0.25	0.88	3.25	27.84	0.47	0.86	1.01	3.75	1.28	0.10
wHill	RN	300	27.53	0.13	0.55	2.05	27.53	0.35	0.55	0.66	2.45	0.82	0.07
wHill	RN	500	27.36	0.12	0.38	1.41	27.35	0.35	0.38	0.52	1.93	0.58	0.06
wHill	RN	700	27.24	0.12	0.26	0.97	27.24	0.34	0.26	0.44	1.62	0.47	0.06
wHill	CN	300	27.48	0.13	0.51	1.89	27.48	0.35	0.51	0.63	2.32	0.76	0.07
wHill	CN	500	27.31	0.13	0.33	1.23	27.30	0.35	0.33	0.49	1.80	0.52	0.06
wHill	CN	700	27.18	0.12	0.21	0.77	27.19	0.34	0.21	0.41	1.52	0.43	0.06
wISE	RT	300	27.70	0.33	0.73	2.70	27.68	0.54	0.71	0.93	3.44	1.05	0.12
wISE	RT	500	27.35	0.31	0.37	1.39	27.32	0.56	0.35	0.67	2.49	0.65	0.10
wISE	RT	700	27.60	0.30	0.63	2.32	27.57	0.53	0.60	0.83	3.08	0.90	0.09
wISE	RN	300	27.46	0.13	0.49	1.80	27.46	0.36	0.48	0.60	2.24	0.72	0.07
wISE	RN	500	27.21	0.14	0.24	0.88	27.21	0.35	0.24	0.44	1.64	0.45	0.06
wISE	RN	700	27.17	0.12	0.19	0.71	27.18	0.34	0.20	0.40	1.49	0.41	0.06
wISE	CN	300	27.41	0.14	0.43	1.61	27.40	0.38	0.43	0.57	2.12	0.65	0.06
wISE	CN	500	27.14	0.15	0.17	0.63	27.14	0.36	0.17	0.42	1.56	0.42	0.06
wISE	CN	700	27.11	0.13	0.13	0.49	27.11	0.34	0.14	0.38	1.41	0.38	0.06
wPDC	RT	300	27.59	0.42	0.62	2.29	27.55	0.63	0.58	0.90	3.32	0.89	0.12
wPDC	RT	500	27.10	0.44	0.13	0.48	27.07	0.63	0.09	0.68	2.51	0.63	0.14
wPDC	RT	700	27.57	0.42	0.60	2.21	27.54	0.61	0.56	0.88	3.27	0.89	0.11
wPDC	RN	300	27.41	0.15	0.44	1.62	27.40	0.40	0.43	0.58	2.15	0.65	0.07
wPDC	RN	500	27.11	0.16	0.14	0.51	27.12	0.38	0.15	0.42	1.57	0.43	0.06
wPDC	RN	700	27.14	0.13	0.17	0.63	27.16	0.34	0.18	0.39	1.46	0.41	0.05
wPDC	CN	300	27.35	0.16	0.38	1.39	27.34	0.41	0.37	0.55	2.02	0.57	0.07
wPDC	CN	500	27.03	0.17	0.06	0.21	27.04	0.41	0.07	0.42	1.56	0.42	0.06
wPDC	CN	700	27.09	0.13	0.11	0.41	27.10	0.35	0.13	0.38	1.40	0.38	0.05
GB2			27.91	0.12	0.94	3.48	27.92	0.34	0.95	1.00	3.71	1.40	0.08

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OCAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

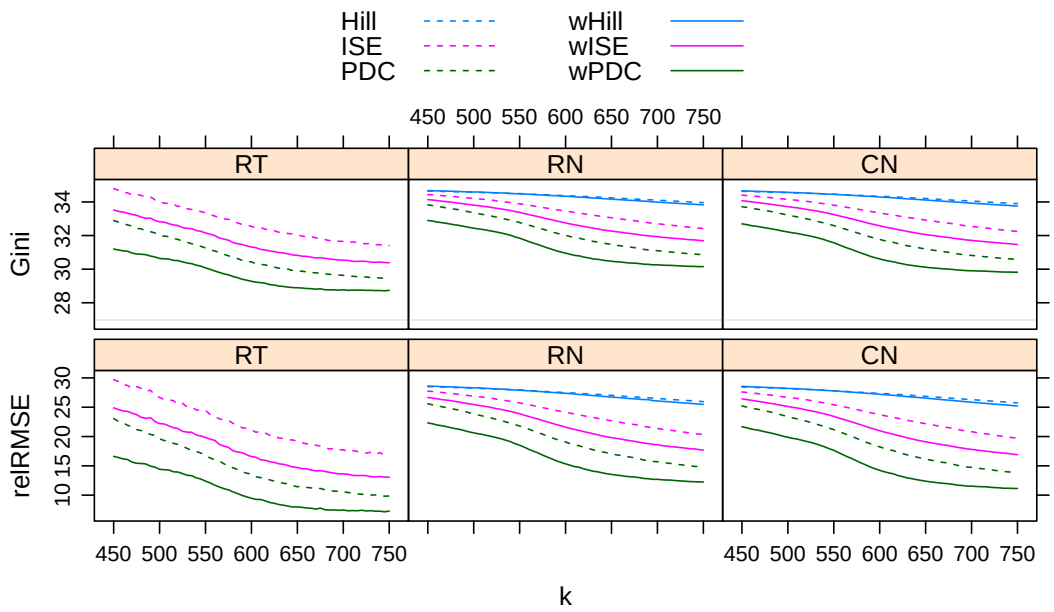

Figure F.184.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

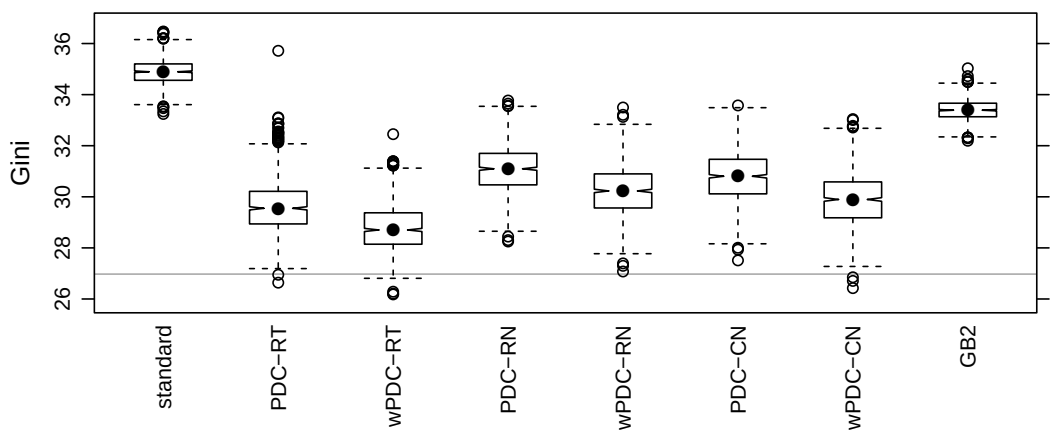

Figure F.185.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.92.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			34.89	0.25	7.91	29.34	34.90	0.47	7.92	7.93	29.40	11.74	0.35
wHill	RT	500	36.25	3.92	9.27	34.38	35.91	1.50	8.93	9.48	35.15	13.24	1.14
wHill	RT	700	34.65	3.55	7.68	28.47	34.50	1.13	7.52	7.91	29.31	11.15	1.89
wHill	RN	300	34.83	0.25	7.86	29.12	34.83	0.50	7.86	7.87	29.18	11.65	0.35
wHill	RN	500	34.59	0.25	7.62	28.23	34.59	0.49	7.62	7.63	28.29	11.29	0.34
wHill	RN	700	33.99	0.28	7.01	26.00	33.97	0.51	6.99	7.03	26.08	10.37	0.33
wHill	CN	300	34.83	0.25	7.85	29.10	34.83	0.49	7.86	7.87	29.16	11.65	0.34
wHill	CN	500	34.57	0.25	7.59	28.15	34.56	0.49	7.59	7.61	28.21	11.25	0.34
wHill	CN	700	33.93	0.28	6.95	25.77	33.90	0.51	6.93	6.97	25.85	10.27	0.33
wISE	RT	500	32.82	1.71	5.84	21.66	32.70	1.22	5.73	5.99	22.20	8.49	0.49
wISE	RT	700	30.54	0.82	3.56	13.20	30.44	0.84	3.47	3.67	13.62	5.14	0.30
wISE	RN	300	34.82	0.25	7.85	29.09	34.83	0.49	7.85	7.86	29.15	11.64	0.35
wISE	RN	500	33.81	0.40	6.84	25.35	33.83	0.62	6.85	6.87	25.46	10.16	0.33
wISE	RN	700	31.93	0.55	4.96	18.38	31.94	0.76	4.97	5.01	18.58	7.37	0.27
wISE	CN	300	34.82	0.26	7.84	29.07	34.82	0.49	7.85	7.86	29.13	11.63	0.35
wISE	CN	500	33.72	0.44	6.75	25.01	33.73	0.67	6.75	6.78	25.13	10.01	0.33
wISE	CN	700	31.71	0.61	4.74	17.57	31.73	0.78	4.75	4.80	17.81	7.05	0.27
wPDC	RT	500	30.64	1.70	3.66	13.58	30.49	1.17	3.52	3.89	14.41	5.22	0.51
wPDC	RT	700	28.77	0.82	1.80	6.67	28.70	0.90	1.73	2.02	7.47	2.56	0.20
wPDC	RN	300	34.64	0.43	7.66	28.40	34.68	0.55	7.71	7.69	28.51	11.43	0.35
wPDC	RN	500	32.44	1.08	5.47	20.26	32.49	1.10	5.52	5.56	20.63	8.18	0.31
wPDC	RN	700	30.26	0.95	3.29	12.18	30.23	0.99	3.26	3.43	12.70	4.83	0.24
wPDC	CN	300	34.61	0.48	7.63	28.30	34.67	0.56	7.70	7.66	28.41	11.41	0.35
wPDC	CN	500	32.21	1.29	5.24	19.42	32.27	1.21	5.29	5.36	19.87	7.84	0.31
wPDC	CN	700	29.91	1.08	2.93	10.87	29.90	1.04	2.92	3.11	11.53	4.33	0.22
GB2			33.40	0.16	6.42	23.82	33.39	0.39	6.41	6.44	23.86	9.51	0.30

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OCAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 20.

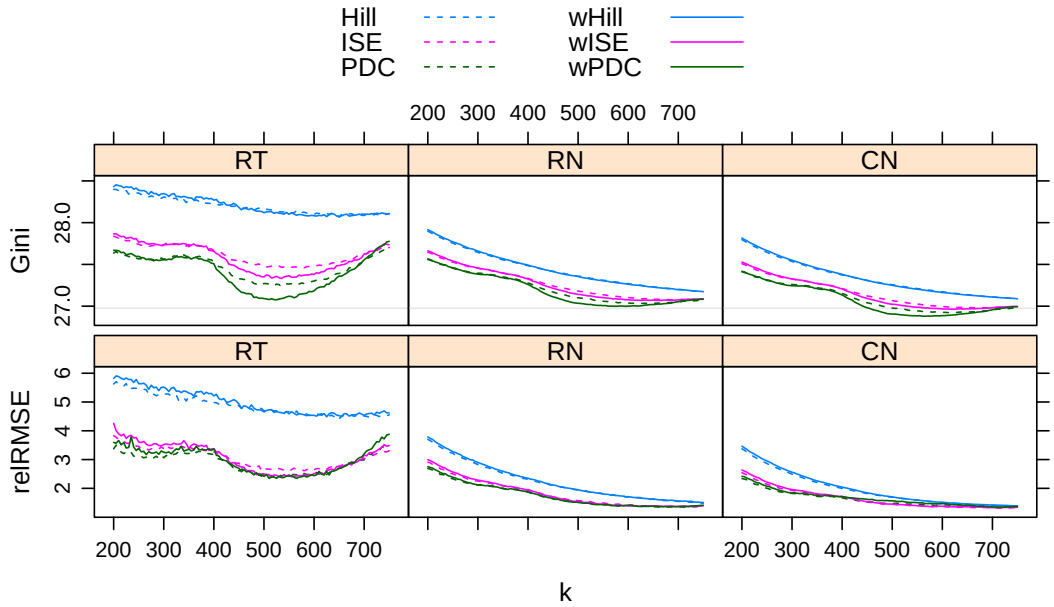

Figure F.186.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

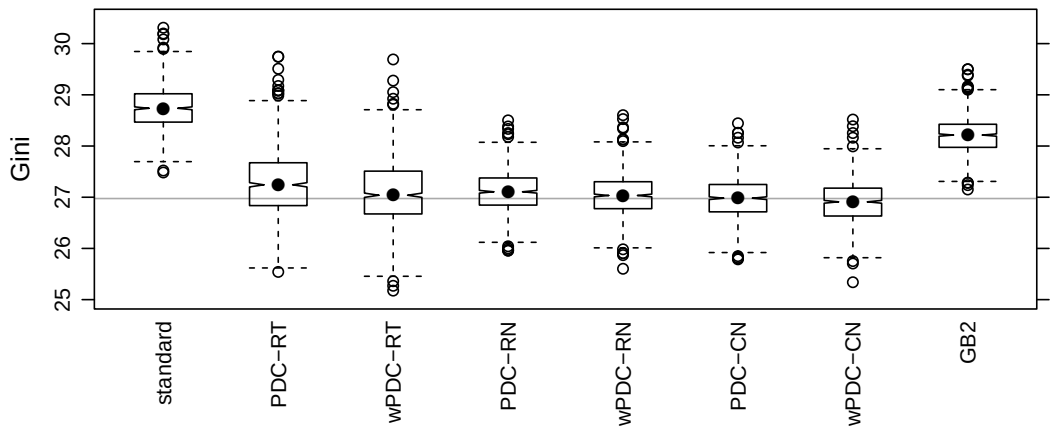

Figure F.187.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.93.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28.74	0.18	1.77	6.56	28.74	0.41	1.76	1.82	6.75	2.61	0.12
wHill	RT	300	28.35	0.33	1.37	5.09	28.29	0.55	1.31	1.49	5.51	1.94	0.22
wHill	RT	500	28.12	0.27	1.14	4.24	28.08	0.50	1.11	1.26	4.66	1.64	0.14
wHill	RT	700	28.09	0.26	1.11	4.12	28.07	0.50	1.09	1.22	4.53	1.62	0.11
wHill	RN	300	27.66	0.14	0.69	2.54	27.65	0.38	0.68	0.78	2.90	1.01	0.08
wHill	RN	500	27.35	0.13	0.38	1.41	27.36	0.37	0.38	0.53	1.95	0.58	0.07
wHill	RN	700	27.20	0.13	0.22	0.83	27.20	0.35	0.23	0.42	1.56	0.43	0.06
wHill	CN	300	27.55	0.15	0.58	2.13	27.55	0.38	0.57	0.69	2.56	0.85	0.08
wHill	CN	500	27.25	0.14	0.28	1.02	27.25	0.37	0.28	0.46	1.70	0.48	0.06
wHill	CN	700	27.11	0.13	0.13	0.50	27.11	0.36	0.14	0.38	1.42	0.40	0.05
wISE	RT	300	27.74	0.32	0.76	2.82	27.71	0.54	0.73	0.95	3.52	1.09	0.14
wISE	RT	500	27.35	0.31	0.38	1.39	27.32	0.54	0.35	0.67	2.50	0.63	0.10
wISE	RT	700	27.62	0.30	0.65	2.41	27.61	0.55	0.64	0.85	3.16	0.97	0.12
wISE	RN	300	27.46	0.15	0.48	1.78	27.45	0.40	0.47	0.62	2.28	0.70	0.07
wISE	RN	500	27.14	0.15	0.17	0.62	27.14	0.37	0.17	0.42	1.54	0.41	0.06
wISE	RN	700	27.08	0.13	0.10	0.37	27.08	0.36	0.11	0.37	1.37	0.38	0.05
wISE	CN	300	27.33	0.15	0.35	1.31	27.31	0.42	0.34	0.53	1.96	0.55	0.06
wISE	CN	500	27.02	0.15	0.05	0.18	27.02	0.39	0.04	0.39	1.45	0.40	0.06
wISE	CN	700	26.98	0.13	0.01	0.02	26.99	0.36	0.01	0.36	1.33	0.36	0.05
wPDC	RT	300	27.56	0.43	0.58	2.15	27.49	0.61	0.51	0.88	3.25	0.82	0.15
wPDC	RT	500	27.09	0.41	0.12	0.43	27.04	0.61	0.06	0.65	2.41	0.61	0.10
wPDC	RT	700	27.56	0.41	0.58	2.15	27.53	0.63	0.56	0.86	3.20	0.89	0.11
wPDC	RN	300	27.38	0.16	0.41	1.51	27.38	0.41	0.41	0.57	2.12	0.62	0.06
wPDC	RN	500	27.03	0.16	0.06	0.22	27.03	0.38	0.06	0.41	1.52	0.39	0.06
wPDC	RN	700	27.05	0.13	0.08	0.29	27.05	0.35	0.07	0.37	1.37	0.37	0.05
wPDC	CN	300	27.24	0.17	0.27	1.00	27.25	0.44	0.27	0.50	1.84	0.49	0.06
wPDC	CN	500	26.91	0.17	−0.07	−0.26	26.91	0.41	−0.06	0.42	1.57	0.43	0.06
wPDC	CN	700	26.96	0.13	−0.02	−0.06	26.96	0.37	−0.02	0.37	1.36	0.36	0.05
GB2			28.21	0.12	1.23	4.56	28.21	0.33	1.24	1.28	4.74	1.84	0.09

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OCAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 20.

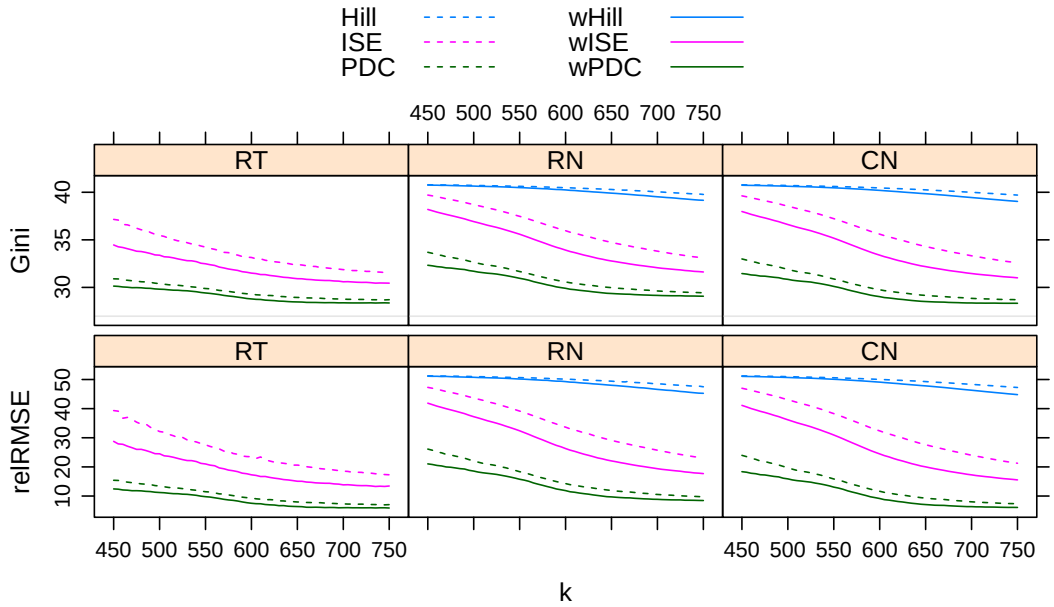

Figure F.188.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

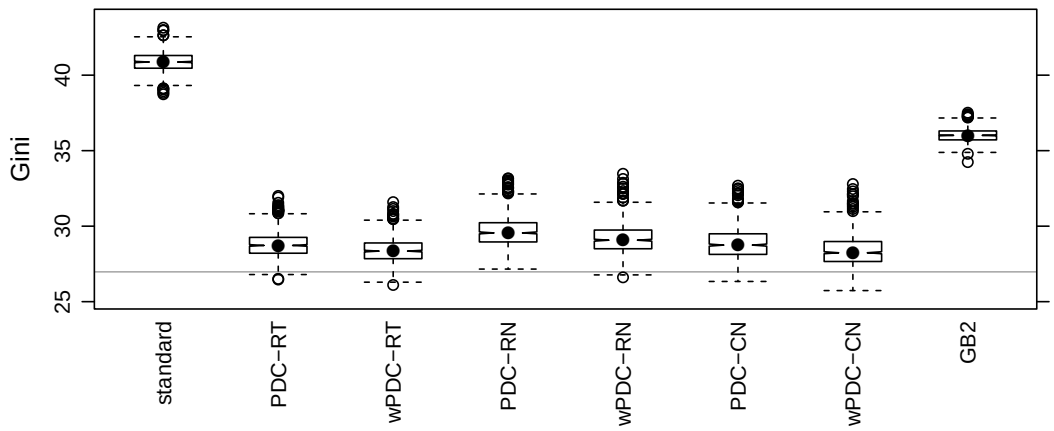

Figure F.189.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.94.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			40.89	0.42	13.91	51.58	40.87	0.63	13.90	13.93	51.63	20.60	0.60
wHill	RT	500	43.45	24.15	16.47	61.07	42.39	2.81	15.42	17.19	63.72	22.86	2.06
wHill	RT	700	39.26	5.73	12.28	45.53	38.90	1.94	11.93	12.51	46.39	17.68	1.12
wHill	RN	300	40.88	0.42	13.91	51.56	40.87	0.64	13.89	13.92	51.62	20.60	0.60
wHill	RN	500	40.65	0.42	13.68	50.70	40.64	0.61	13.66	13.69	50.76	20.26	0.59
wHill	RN	700	39.52	0.53	12.55	46.52	39.55	0.74	12.57	12.57	46.60	18.64	0.54
wHill	CN	300	40.88	0.42	13.91	51.56	40.87	0.64	13.89	13.92	51.62	20.60	0.60
wHill	CN	500	40.63	0.43	13.66	50.63	40.62	0.61	13.64	13.67	50.69	20.23	0.59
wHill	CN	700	39.45	0.55	12.47	46.24	39.45	0.74	12.47	12.49	46.32	18.49	0.54
wISE	RT	500	33.39	2.58	6.41	23.77	33.17	1.35	6.19	6.61	24.50	9.18	0.97
wISE	RT	700	30.59	0.84	3.62	13.41	30.53	0.87	3.55	3.73	13.83	5.27	0.25
wISE	RN	300	40.86	0.42	13.88	51.46	40.84	0.64	13.87	13.90	51.52	20.56	0.60
wISE	RN	500	36.92	2.04	9.94	36.86	36.96	1.54	9.99	10.04	37.24	14.81	0.51
wISE	RN	700	32.07	1.39	5.09	18.88	32.05	1.18	5.07	5.23	19.38	7.52	0.36
wISE	CN	300	40.85	0.42	13.88	51.46	40.84	0.64	13.87	13.90	51.51	20.56	0.60
wISE	CN	500	36.61	2.36	9.63	35.71	36.65	1.63	9.68	9.76	36.17	14.35	0.50
wISE	CN	700	31.46	1.58	4.48	16.63	31.43	1.21	4.46	4.66	17.26	6.61	0.34
wPDC	RT	500	29.81	1.09	2.84	10.52	29.73	1.05	2.76	3.02	11.21	4.09	0.28
wPDC	RT	700	28.38	0.64	1.41	5.22	28.35	0.76	1.37	1.62	5.99	2.04	0.17
wPDC	RN	300	38.73	6.46	11.75	43.57	39.68	1.87	12.71	12.02	44.58	18.84	0.59
wPDC	RN	500	31.70	2.75	4.73	17.52	31.54	1.73	4.57	5.01	18.56	6.77	0.39
wPDC	RN	700	29.16	0.94	2.19	8.11	29.07	0.92	2.10	2.39	8.87	3.11	0.24
wPDC	CN	300	38.46	8.26	11.49	42.59	39.60	1.99	12.63	11.84	43.90	18.72	0.57
wPDC	CN	500	30.85	3.37	3.87	14.36	30.66	1.95	3.69	4.29	15.89	5.47	0.39
wPDC	CN	700	28.37	1.02	1.39	5.16	28.24	0.95	1.27	1.72	6.37	1.88	0.22
GB2			36.02	0.20	9.04	33.52	36.01	0.44	9.04	9.05	33.56	13.40	0.39

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OAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

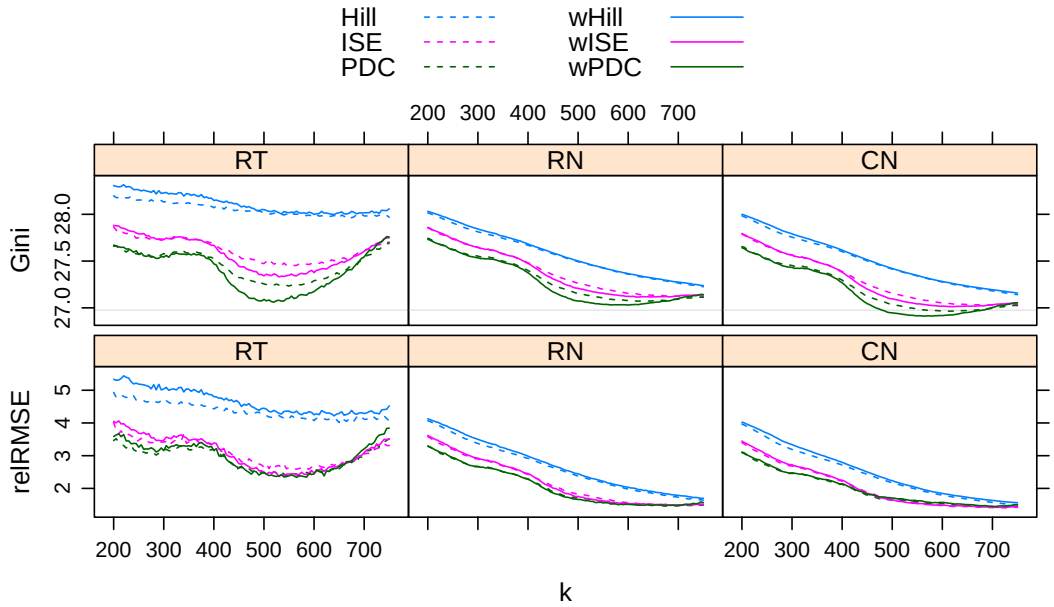

Figure F.190.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

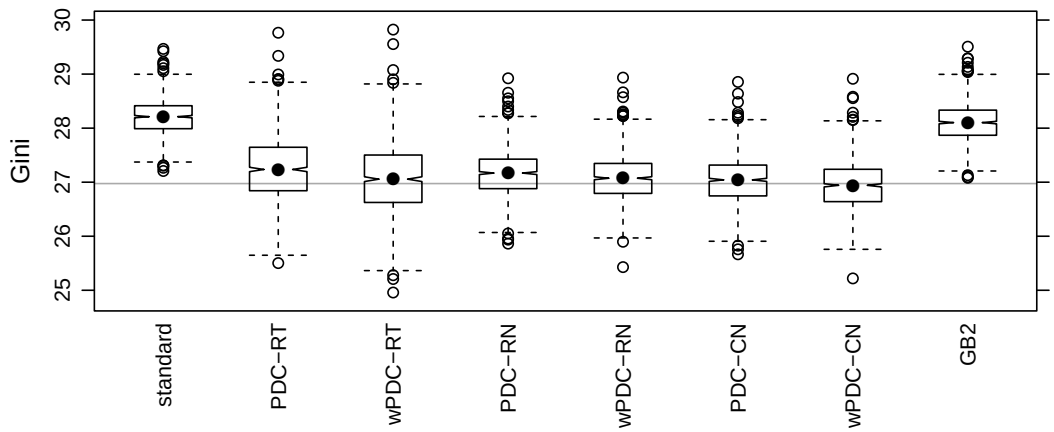

Figure F.191.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.95.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28.21	0.10	1.24	4.59	28.21	0.32	1.24	1.28	4.74	1.84	0.09
wHill	RT	300	28.23	0.27	1.25	4.65	28.19	0.51	1.22	1.36	5.04	1.80	0.12
wHill	RT	500	28.05	0.28	1.08	3.99	28.01	0.54	1.03	1.20	4.45	1.53	0.11
wHill	RT	700	28.02	0.26	1.04	3.86	28.00	0.53	1.02	1.16	4.29	1.51	0.11
wHill	RN	300	27.84	0.14	0.87	3.22	27.84	0.37	0.86	0.94	3.50	1.28	0.08
wHill	RN	500	27.50	0.16	0.53	1.95	27.50	0.39	0.53	0.66	2.45	0.78	0.09
wHill	RN	700	27.28	0.14	0.30	1.12	27.28	0.36	0.31	0.48	1.79	0.50	0.07
wHill	CN	300	27.79	0.14	0.82	3.03	27.79	0.38	0.81	0.90	3.34	1.21	0.08
wHill	CN	500	27.42	0.16	0.45	1.66	27.42	0.40	0.45	0.60	2.24	0.68	0.08
wHill	CN	700	27.19	0.15	0.22	0.81	27.20	0.37	0.23	0.44	1.63	0.45	0.06
wISE	RT	300	27.73	0.30	0.76	2.80	27.70	0.56	0.73	0.94	3.47	1.08	0.12
wISE	RT	500	27.34	0.32	0.37	1.36	27.33	0.52	0.36	0.67	2.50	0.67	0.09
wISE	RT	700	27.61	0.30	0.63	2.34	27.57	0.50	0.59	0.83	3.09	0.89	0.10
wISE	RN	300	27.65	0.17	0.67	2.49	27.65	0.42	0.68	0.79	2.93	1.00	0.08
wISE	RN	500	27.21	0.17	0.23	0.87	27.20	0.41	0.23	0.47	1.76	0.47	0.07
wISE	RN	700	27.13	0.14	0.15	0.56	27.12	0.38	0.15	0.40	1.48	0.40	0.05
wISE	CN	300	27.56	0.19	0.59	2.18	27.57	0.45	0.60	0.73	2.72	0.90	0.07
wISE	CN	500	27.10	0.18	0.12	0.45	27.08	0.42	0.11	0.44	1.65	0.43	0.07
wISE	CN	700	27.03	0.15	0.06	0.21	27.03	0.39	0.05	0.39	1.43	0.39	0.05
wPDC	RT	300	27.54	0.40	0.57	2.10	27.51	0.65	0.54	0.85	3.15	0.85	0.11
wPDC	RT	500	27.09	0.44	0.12	0.43	27.06	0.64	0.08	0.67	2.49	0.66	0.11
wPDC	RT	700	27.54	0.42	0.57	2.11	27.52	0.61	0.55	0.87	3.21	0.88	0.12
wPDC	RN	300	27.53	0.20	0.56	2.08	27.55	0.48	0.57	0.72	2.67	0.86	0.08
wPDC	RN	500	27.07	0.19	0.10	0.36	27.07	0.41	0.10	0.45	1.66	0.44	0.07
wPDC	RN	700	27.10	0.15	0.13	0.46	27.10	0.38	0.13	0.40	1.49	0.41	0.05
wPDC	CN	300	27.43	0.24	0.46	1.70	27.45	0.50	0.47	0.67	2.48	0.75	0.07
wPDC	CN	500	26.95	0.21	−0.03	−0.10	26.94	0.44	−0.03	0.46	1.70	0.45	0.07
wPDC	CN	700	27.00	0.15	0.03	0.11	27.00	0.38	0.03	0.39	1.46	0.39	0.05
GB2			28.11	0.12	1.13	4.20	28.10	0.35	1.13	1.18	4.39	1.67	0.09

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OAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

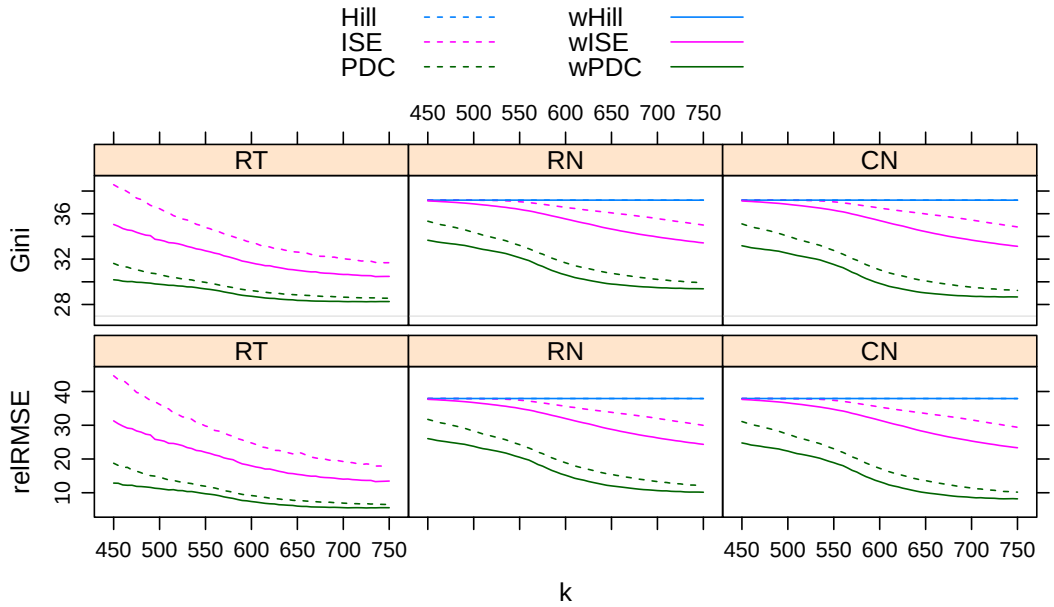

Figure F.192.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

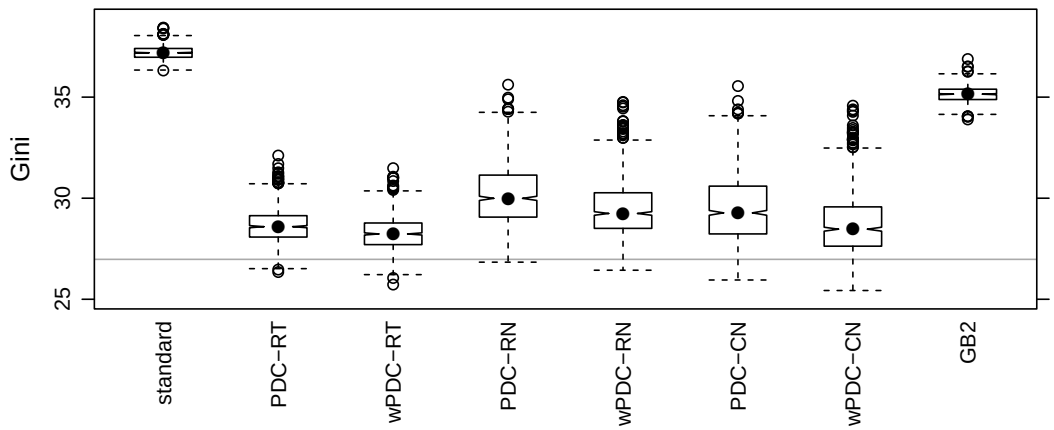

Figure F.193.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.96.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.20	0.11	10.22	37.90	37.19	0.32	10.22	10.23	37.92	15.15	0.43
wHill	RT	500	40.76	11.22	13.78	51.10	40.12	2.38	13.15	14.18	52.58	19.49	1.53
wHill	RT	700	37.79	5.31	10.82	40.11	37.48	1.60	10.51	11.06	41.01	15.58	1.46
wHill	RN	300	37.20	0.11	10.22	37.90	37.19	0.32	10.22	10.23	37.92	15.15	0.43
wHill	RN	500	37.20	0.11	10.22	37.90	37.19	0.32	10.22	10.23	37.92	15.15	0.43
wHill	RN	700	37.20	0.11	10.22	37.90	37.19	0.32	10.22	10.23	37.92	15.15	0.43
wHill	CN	300	37.20	0.11	10.22	37.90	37.19	0.32	10.22	10.23	37.92	15.15	0.43
wHill	CN	500	37.20	0.11	10.22	37.90	37.19	0.32	10.22	10.23	37.92	15.15	0.43
wHill	CN	700	37.20	0.11	10.22	37.90	37.19	0.32	10.22	10.23	37.92	15.15	0.43
wISE	RT	500	33.69	2.57	6.71	24.88	33.48	1.51	6.51	6.90	25.58	9.65	0.52
wISE	RT	700	30.64	0.84	3.67	13.61	30.59	0.82	3.61	3.78	14.02	5.36	0.27
wISE	RN	300	37.20	0.11	10.22	37.90	37.19	0.32	10.22	10.23	37.92	15.15	0.43
wISE	RN	500	36.87	0.34	9.89	36.67	36.96	0.60	9.98	9.91	36.73	14.80	0.43
wISE	RN	700	33.95	1.48	6.98	25.86	34.03	1.02	7.05	7.08	26.25	10.45	0.37
wISE	CN	300	37.20	0.11	10.22	37.90	37.19	0.32	10.22	10.23	37.92	15.15	0.43
wISE	CN	500	36.83	0.38	9.86	36.54	36.93	0.64	9.96	9.88	36.61	14.76	0.43
wISE	CN	700	33.68	1.75	6.70	24.84	33.76	1.12	6.79	6.83	25.32	10.06	0.37
wPDC	RT	500	29.78	1.28	2.81	10.41	29.70	1.07	2.72	3.03	11.22	4.03	0.40
wPDC	RT	700	28.26	0.61	1.29	4.77	28.23	0.79	1.26	1.51	5.58	1.86	0.17
wPDC	RN	300	37.10	0.42	10.12	37.52	37.18	0.34	10.21	10.14	37.60	15.14	0.43
wPDC	RN	500	33.04	4.32	6.06	22.47	33.26	2.27	6.29	6.41	23.76	9.32	0.39
wPDC	RN	700	29.49	1.91	2.51	9.31	29.24	1.24	2.27	2.87	10.63	3.37	0.29
wPDC	CN	300	37.08	0.55	10.10	37.45	37.18	0.34	10.21	10.13	37.55	15.13	0.43
wPDC	CN	500	32.51	5.68	5.54	20.52	32.81	2.59	5.83	6.03	22.34	8.65	0.39
wPDC	CN	700	28.72	2.33	1.75	6.49	28.47	1.40	1.49	2.32	8.60	2.22	0.28
GB2			35.14	0.15	8.17	30.29	35.15	0.38	8.17	8.18	30.32	12.12	0.37

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OAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

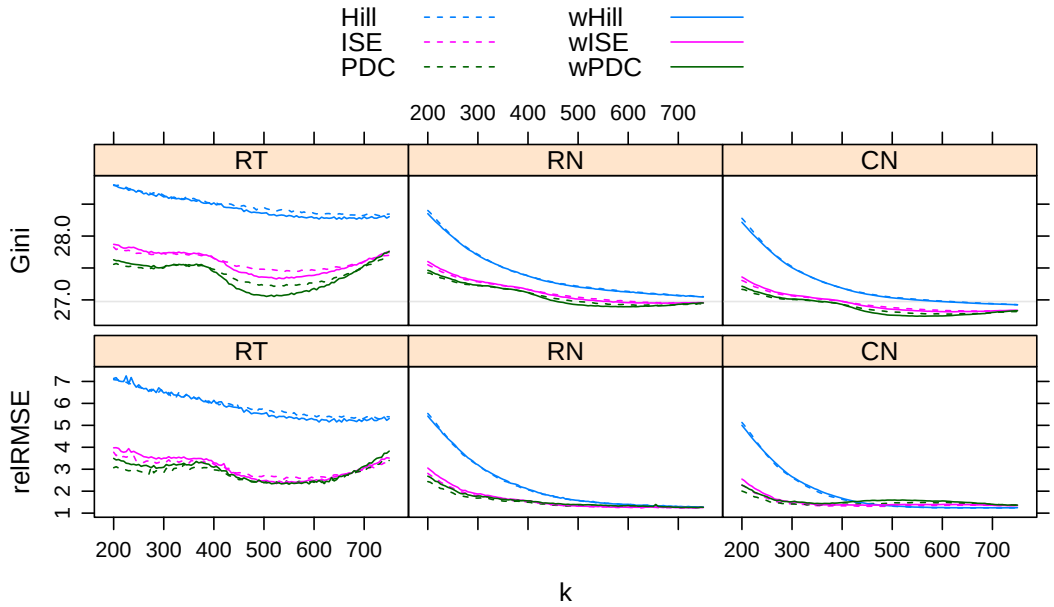

Figure F.194.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

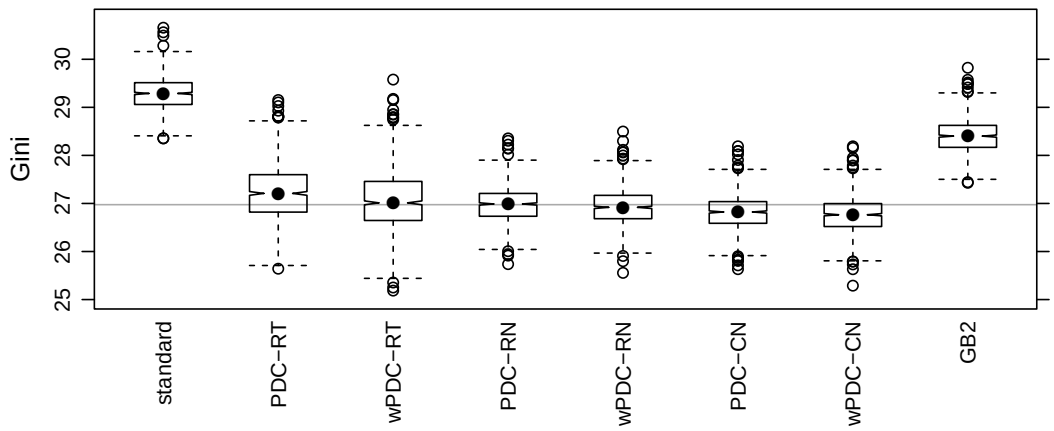

Figure F.195.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.97.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			29.29	0.11	2.32	8.59	29.29	0.34	2.31	2.34	8.68	3.43	0.14
wHill	RT	300	28.61	0.37	1.64	6.08	28.56	0.53	1.59	1.75	6.48	2.36	0.16
wHill	RT	500	28.36	0.31	1.39	5.14	28.31	0.56	1.33	1.49	5.53	1.98	0.13
wHill	RT	700	28.30	0.27	1.33	4.92	28.28	0.49	1.31	1.42	5.28	1.94	0.13
wHill	RN	300	27.70	0.22	0.73	2.69	27.68	0.48	0.71	0.86	3.20	1.05	0.11
wHill	RN	500	27.20	0.13	0.23	0.85	27.21	0.34	0.23	0.43	1.58	0.44	0.06
wHill	RN	700	27.06	0.11	0.09	0.33	27.06	0.33	0.09	0.35	1.30	0.35	0.05
wHill	CN	300	27.50	0.23	0.53	1.97	27.49	0.49	0.52	0.72	2.66	0.77	0.08
wHill	CN	500	27.03	0.13	0.06	0.22	27.03	0.35	0.06	0.36	1.33	0.34	0.06
wHill	CN	700	26.94	0.11	−0.04	−0.14	26.94	0.33	−0.04	0.34	1.24	0.33	0.05
wISE	RT	300	27.74	0.32	0.76	2.82	27.71	0.56	0.74	0.95	3.51	1.09	0.12
wISE	RT	500	27.36	0.30	0.38	1.42	27.33	0.54	0.36	0.67	2.48	0.62	0.11
wISE	RT	700	27.60	0.29	0.63	2.34	27.60	0.52	0.63	0.83	3.07	0.94	0.09
wISE	RN	300	27.29	0.15	0.32	1.17	27.27	0.39	0.30	0.50	1.87	0.50	0.08
wISE	RN	500	27.01	0.12	0.04	0.14	27.03	0.35	0.05	0.35	1.31	0.35	0.05
wISE	RN	700	26.95	0.11	−0.02	−0.09	26.95	0.33	−0.03	0.34	1.25	0.33	0.05
wISE	CN	300	27.08	0.16	0.10	0.37	27.06	0.38	0.08	0.41	1.51	0.39	0.07
wISE	CN	500	26.85	0.13	−0.12	−0.45	26.86	0.34	−0.11	0.37	1.39	0.36	0.05
wISE	CN	700	26.83	0.11	−0.15	−0.55	26.84	0.33	−0.14	0.37	1.36	0.36	0.05
wPDC	RT	300	27.51	0.41	0.54	1.99	27.47	0.61	0.50	0.83	3.09	0.80	0.13
wPDC	RT	500	27.07	0.41	0.09	0.34	27.01	0.61	0.04	0.65	2.40	0.61	0.10
wPDC	RT	700	27.54	0.40	0.57	2.10	27.51	0.63	0.54	0.85	3.14	0.87	0.11
wPDC	RN	300	27.23	0.17	0.26	0.95	27.21	0.40	0.24	0.48	1.78	0.44	0.08
wPDC	RN	500	26.92	0.14	−0.05	−0.19	26.92	0.36	−0.06	0.38	1.39	0.36	0.06
wPDC	RN	700	26.93	0.12	−0.04	−0.16	26.94	0.33	−0.03	0.34	1.27	0.32	0.05
wPDC	CN	300	27.01	0.17	0.04	0.14	26.98	0.39	0.01	0.41	1.52	0.39	0.07
wPDC	CN	500	26.76	0.14	−0.21	−0.80	26.77	0.36	−0.21	0.43	1.59	0.43	0.06
wPDC	CN	700	26.80	0.11	−0.17	−0.63	26.81	0.33	−0.16	0.38	1.40	0.36	0.05
GB2			28.40	0.11	1.43	5.29	28.40	0.34	1.43	1.47	5.44	2.12	0.11

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OAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

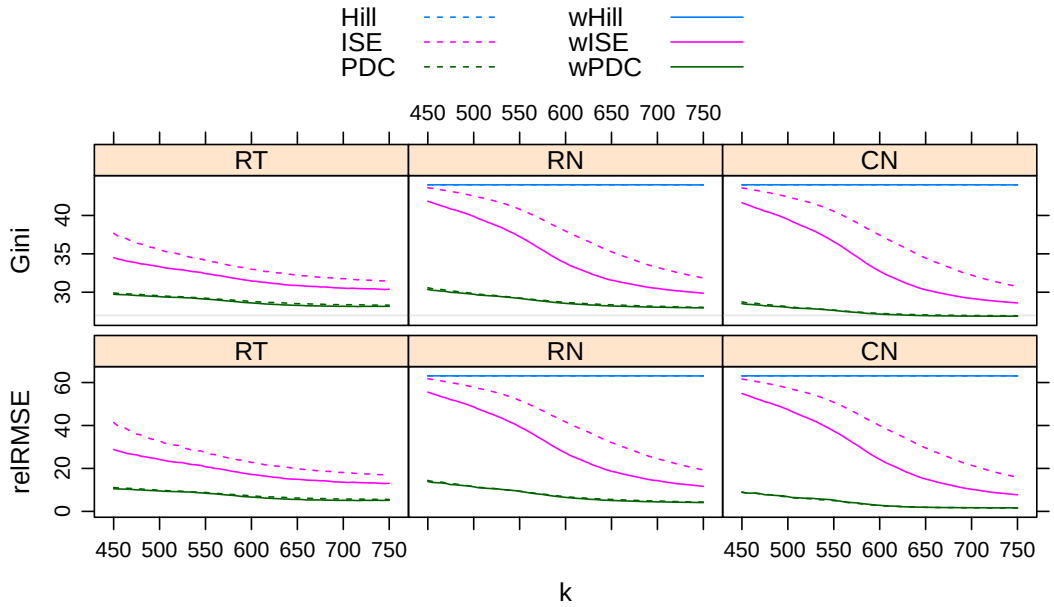

Figure F.196.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

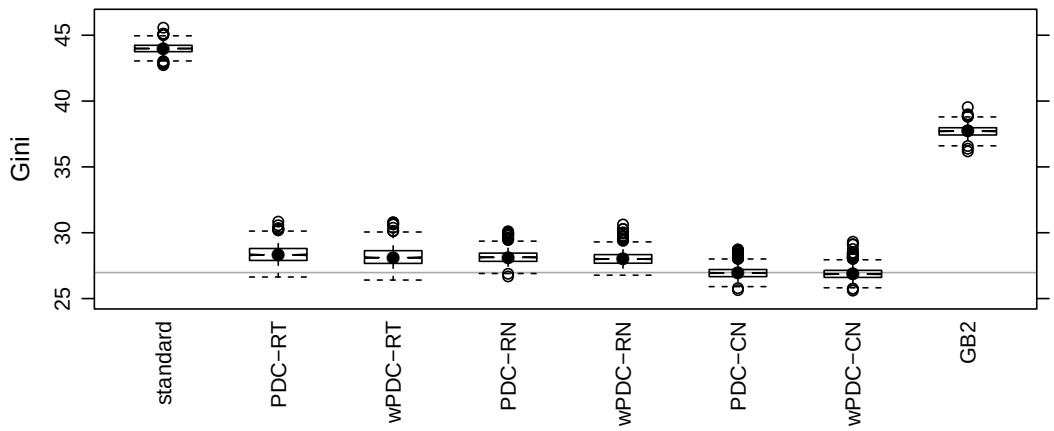

Figure F.197.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.98.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			43.99	0.14	17.02	63.09	43.99	0.36	17.02	17.02	63.11	25.23	0.69
wHill	RT	500	49.62	48.55	22.65	83.96	48.13	4.24	21.16	23.69	87.84	31.37	2.55
wHill	RT	700	43.19	14.17	16.22	60.11	42.63	2.51	15.65	16.65	61.71	23.21	2.20
wHill	RN	300	43.99	0.14	17.02	63.09	43.99	0.36	17.02	17.02	63.11	25.23	0.69
wHill	RN	500	43.99	0.14	17.02	63.09	43.99	0.36	17.02	17.02	63.11	25.23	0.69
wHill	RN	700	43.99	0.14	17.02	63.09	43.99	0.36	17.02	17.02	63.11	25.23	0.69
wHill	CN	300	43.99	0.14	17.02	63.09	43.99	0.36	17.02	17.02	63.11	25.23	0.69
wHill	CN	500	43.99	0.14	17.02	63.09	43.99	0.36	17.02	17.02	63.11	25.23	0.69
wHill	CN	700	43.99	0.14	17.02	63.09	43.99	0.36	17.02	17.02	63.11	25.23	0.69
wISE	RT	500	33.32	2.19	6.35	23.54	33.16	1.38	6.18	6.52	24.17	9.17	0.58
wISE	RT	700	30.53	0.78	3.55	13.18	30.49	0.80	3.51	3.66	13.58	5.21	0.26
wISE	RN	300	43.99	0.14	17.02	63.09	43.99	0.36	17.02	17.02	63.11	25.23	0.69
wISE	RN	500	39.88	5.55	12.91	47.85	39.95	2.36	12.98	13.12	48.64	19.24	0.66
wISE	RN	700	30.50	2.58	3.52	13.06	30.21	1.35	3.24	3.87	14.36	4.80	0.67
wISE	CN	300	43.99	0.14	17.02	63.09	43.99	0.36	17.02	17.02	63.11	25.23	0.69
wISE	CN	500	39.50	6.88	12.52	46.42	39.58	2.61	12.60	12.79	47.43	18.69	0.66
wISE	CN	700	29.18	2.81	2.21	8.19	28.86	1.45	1.88	2.77	10.28	2.79	0.41
wPDC	RT	500	29.43	0.57	2.45	9.09	29.28	0.70	2.30	2.57	9.52	3.41	0.22
wPDC	RT	700	28.17	0.50	1.20	4.45	28.11	0.69	1.13	1.39	5.16	1.68	0.14
wPDC	RN	300	39.27	7.58	12.29	45.58	38.40	2.27	11.42	12.60	46.70	16.94	0.69
wPDC	RN	500	29.74	1.90	2.76	10.24	29.36	0.83	2.39	3.09	11.45	3.54	0.49
wPDC	RN	700	28.04	0.27	1.07	3.96	28.01	0.48	1.03	1.19	4.40	1.53	0.14
wPDC	CN	300	38.54	10.27	11.56	42.87	37.57	2.76	10.60	12.00	44.48	15.71	0.69
wPDC	CN	500	28.04	2.26	1.06	3.93	27.57	0.81	0.60	1.84	6.82	0.91	0.48
wPDC	CN	700	26.89	0.20	−0.09	−0.32	26.86	0.39	−0.12	0.46	1.70	0.43	0.09
GB2			37.70	0.18	10.72	39.75	37.71	0.41	10.74	10.73	39.78	15.92	0.47

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OAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

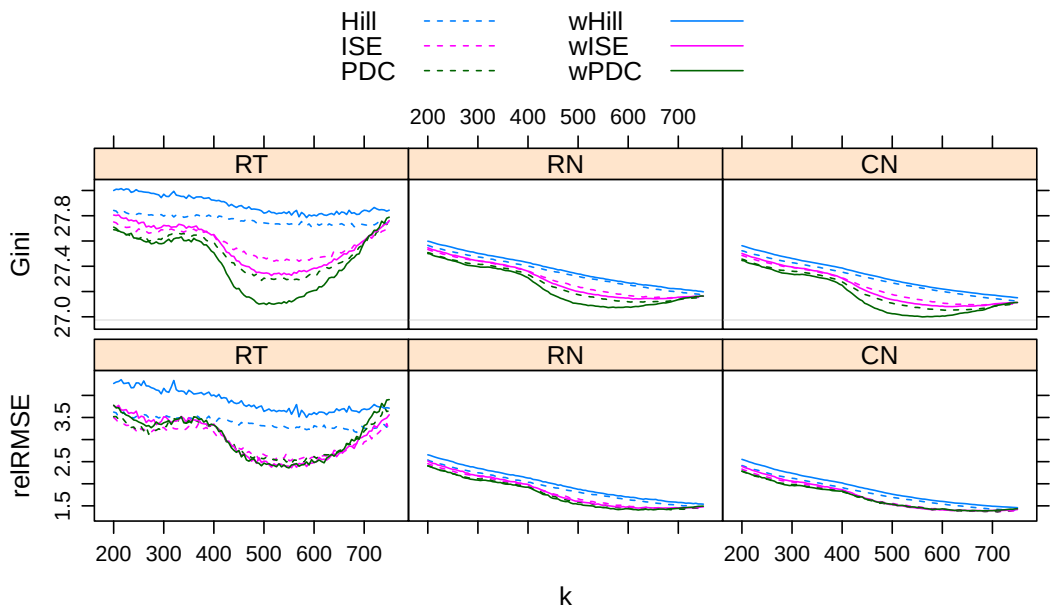

Figure F.198.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

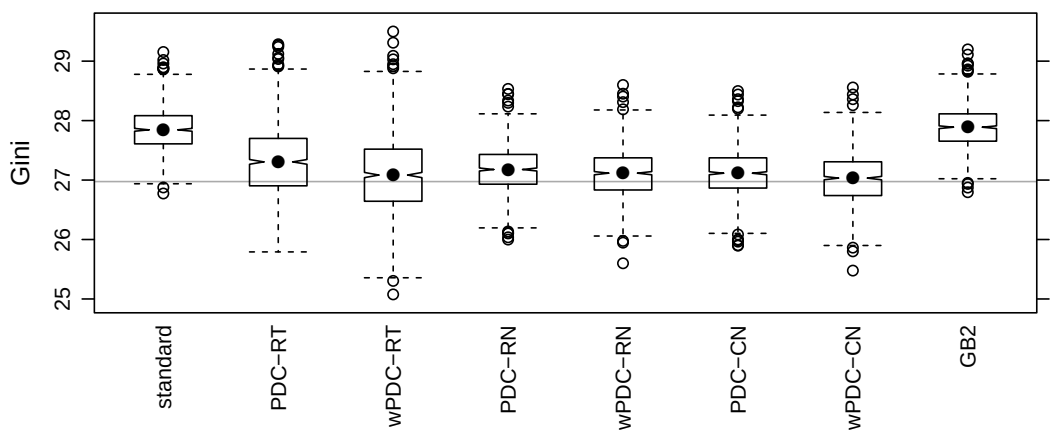

Figure F.199.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.99.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			27.85	0.13	0.87	3.24	27.84	0.35	0.87	0.95	3.50	1.29	0.08
wHill	RT	300	27.97	0.27	1.00	3.69	27.93	0.47	0.95	1.12	4.16	1.41	0.18
wHill	RT	500	27.82	0.25	0.85	3.14	27.81	0.50	0.84	0.98	3.64	1.24	0.10
wHill	RT	700	27.84	0.24	0.87	3.22	27.81	0.50	0.84	1.00	3.69	1.24	0.10
wHill	RN	300	27.50	0.12	0.53	1.96	27.51	0.35	0.54	0.63	2.35	0.79	0.07
wHill	RN	500	27.34	0.12	0.36	1.35	27.35	0.35	0.37	0.51	1.87	0.56	0.06
wHill	RN	700	27.22	0.12	0.25	0.91	27.22	0.33	0.25	0.42	1.58	0.46	0.05
wHill	CN	300	27.46	0.13	0.49	1.81	27.46	0.35	0.49	0.60	2.24	0.73	0.07
wHill	CN	500	27.29	0.13	0.32	1.17	27.30	0.36	0.33	0.48	1.76	0.52	0.06
wHill	CN	700	27.17	0.12	0.20	0.73	27.17	0.34	0.19	0.40	1.49	0.42	0.05
wISE	RT	300	27.72	0.34	0.75	2.78	27.68	0.57	0.71	0.95	3.52	1.05	0.18
wISE	RT	500	27.34	0.32	0.37	1.37	27.30	0.55	0.32	0.68	2.51	0.63	0.14
wISE	RT	700	27.60	0.29	0.63	2.34	27.60	0.52	0.63	0.83	3.08	0.94	0.10
wISE	RN	300	27.44	0.13	0.47	1.74	27.44	0.36	0.47	0.59	2.18	0.71	0.06
wISE	RN	500	27.20	0.14	0.23	0.84	27.20	0.36	0.23	0.43	1.61	0.45	0.06
wISE	RN	700	27.16	0.12	0.18	0.67	27.16	0.34	0.18	0.39	1.45	0.40	0.05
wISE	CN	300	27.39	0.13	0.42	1.56	27.39	0.37	0.42	0.56	2.06	0.63	0.06
wISE	CN	500	27.14	0.14	0.16	0.60	27.13	0.38	0.16	0.41	1.53	0.41	0.06
wISE	CN	700	27.10	0.13	0.13	0.47	27.10	0.35	0.13	0.38	1.39	0.38	0.05
wPDC	RT	300	27.58	0.46	0.61	2.25	27.53	0.66	0.55	0.91	3.38	0.87	0.15
wPDC	RT	500	27.11	0.43	0.13	0.49	27.08	0.65	0.11	0.67	2.47	0.65	0.09
wPDC	RT	700	27.59	0.42	0.61	2.28	27.54	0.62	0.57	0.90	3.32	0.92	0.12
wPDC	RN	300	27.40	0.14	0.42	1.57	27.40	0.38	0.42	0.56	2.08	0.64	0.06
wPDC	RN	500	27.10	0.16	0.13	0.48	27.12	0.39	0.14	0.41	1.54	0.42	0.06
wPDC	RN	700	27.14	0.13	0.16	0.60	27.14	0.34	0.17	0.39	1.44	0.40	0.05
wPDC	CN	300	27.34	0.15	0.36	1.35	27.35	0.38	0.37	0.53	1.96	0.57	0.06
wPDC	CN	500	27.02	0.17	0.05	0.18	27.03	0.42	0.06	0.41	1.54	0.42	0.06
wPDC	CN	700	27.08	0.13	0.11	0.39	27.09	0.35	0.11	0.38	1.39	0.38	0.05
GB2			27.89	0.12	0.91	3.39	27.89	0.34	0.91	0.98	3.62	1.36	0.08

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OAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

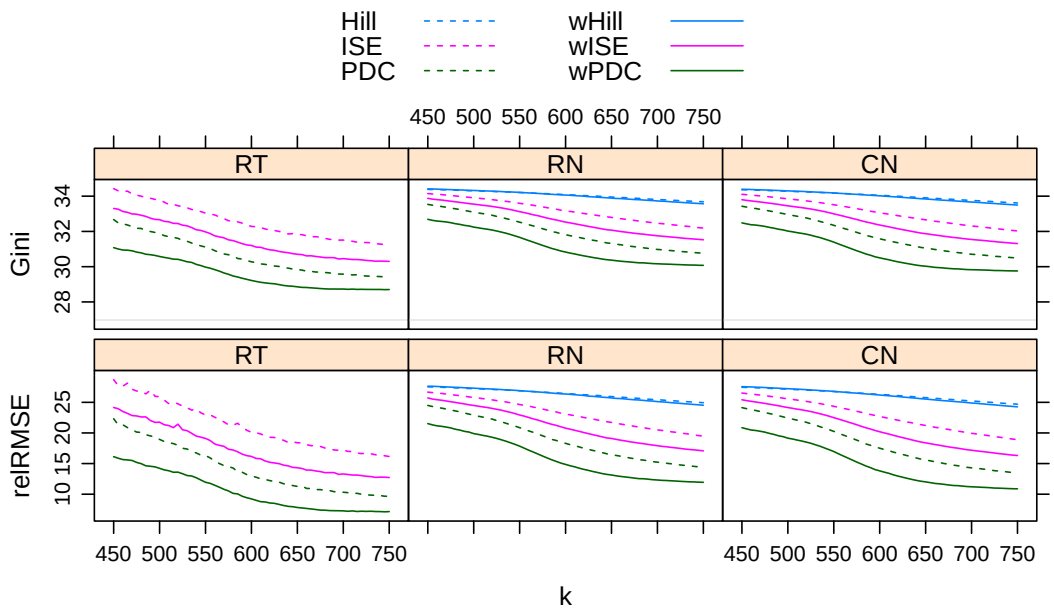

Figure F.200.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

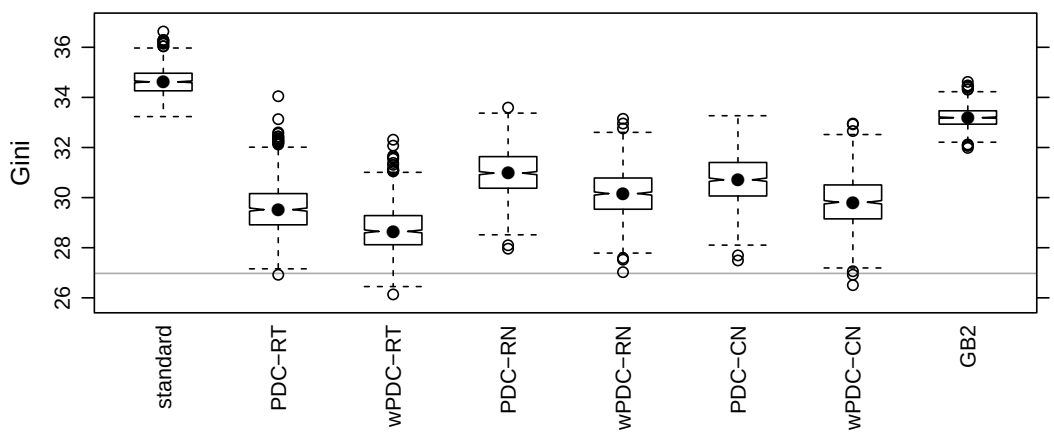

Figure F.201.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.100.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			34.64	0.26	7.67	28.42	34.62	0.52	7.65	7.68	28.48	11.34	0.36
wHill	RT	500	35.79	3.29	8.82	32.69	35.45	1.35	8.48	9.00	33.37	12.57	0.81
wHill	RT	700	34.41	1.63	7.44	27.57	34.28	1.15	7.30	7.54	27.97	10.83	0.58
wHill	RN	300	34.58	0.28	7.61	28.21	34.58	0.51	7.60	7.63	28.28	11.27	0.47
wHill	RN	500	34.32	0.25	7.35	27.24	34.32	0.49	7.35	7.37	27.31	10.89	0.33
wHill	RN	700	33.73	0.28	6.75	25.04	33.72	0.54	6.75	6.77	25.12	10.00	0.32
wHill	CN	300	34.57	0.25	7.60	28.17	34.57	0.50	7.60	7.62	28.23	11.27	0.34
wHill	CN	500	34.30	0.26	7.33	27.16	34.29	0.51	7.32	7.34	27.22	10.85	0.33
wHill	CN	700	33.67	0.29	6.69	24.81	33.66	0.55	6.68	6.71	24.89	9.91	0.32
wISE	RT	500	32.67	2.05	5.69	21.10	32.48	1.20	5.50	5.87	21.76	8.16	0.70
wISE	RT	700	30.46	0.76	3.48	12.91	30.37	0.87	3.40	3.59	13.31	5.04	0.32
wISE	RN	300	34.55	0.26	7.58	28.10	34.55	0.53	7.58	7.60	28.16	11.23	0.34
wISE	RN	500	33.55	0.41	6.57	24.37	33.55	0.62	6.58	6.60	24.49	9.76	0.31
wISE	RN	700	31.75	0.52	4.78	17.72	31.77	0.72	4.79	4.83	17.91	7.10	0.26
wISE	CN	300	34.55	0.27	7.57	28.07	34.54	0.53	7.57	7.59	28.14	11.22	0.34
wISE	CN	500	33.45	0.46	6.48	24.01	33.44	0.68	6.47	6.51	24.14	9.59	0.31
wISE	CN	700	31.55	0.58	4.57	16.94	31.56	0.79	4.59	4.63	17.18	6.80	0.25
wPDC	RT	500	30.58	1.73	3.60	13.36	30.41	1.21	3.43	3.84	14.22	5.09	0.34
wPDC	RT	700	28.73	0.77	1.76	6.51	28.65	0.86	1.68	1.96	7.28	2.49	0.20
wPDC	RN	300	34.33	0.50	7.36	27.27	34.37	0.61	7.40	7.39	27.40	10.97	0.36
wPDC	RN	500	32.25	1.01	5.27	19.54	32.30	1.04	5.33	5.37	19.89	7.89	0.30
wPDC	RN	700	30.16	0.86	3.19	11.83	30.16	0.93	3.19	3.32	12.32	4.73	0.23
wPDC	CN	300	34.30	0.57	7.32	27.15	34.35	0.61	7.38	7.36	27.29	10.94	0.36
wPDC	CN	500	32.02	1.22	5.05	18.71	32.08	1.13	5.11	5.16	19.15	7.57	0.30
wPDC	CN	700	29.83	1.00	2.85	10.58	29.81	1.01	2.84	3.02	11.21	4.21	0.22
GB2			33.20	0.17	6.23	23.09	33.19	0.39	6.22	6.24	23.14	9.22	0.28

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OAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 20.

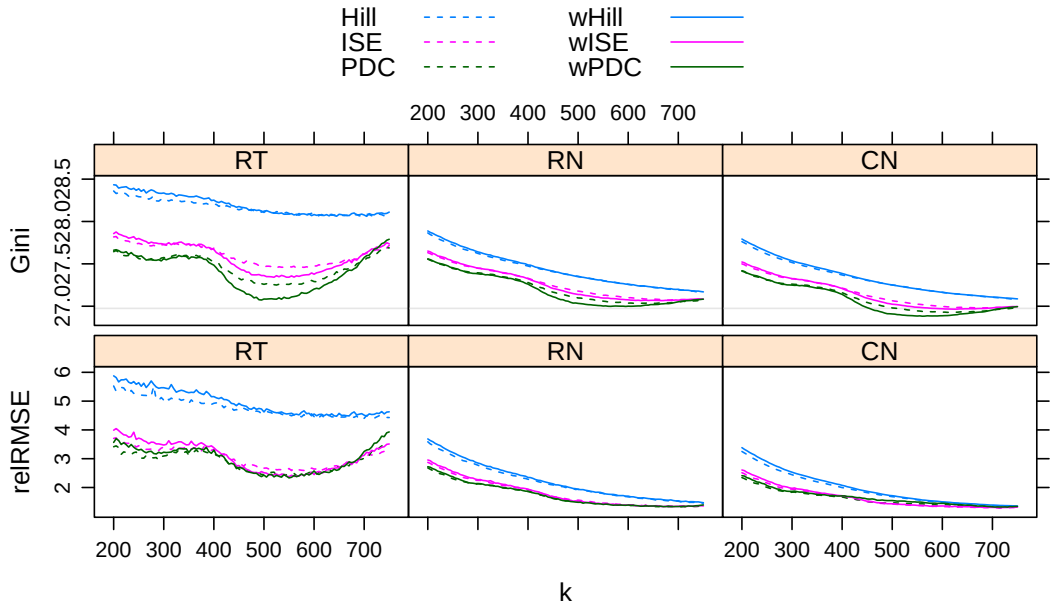

Figure F.202.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

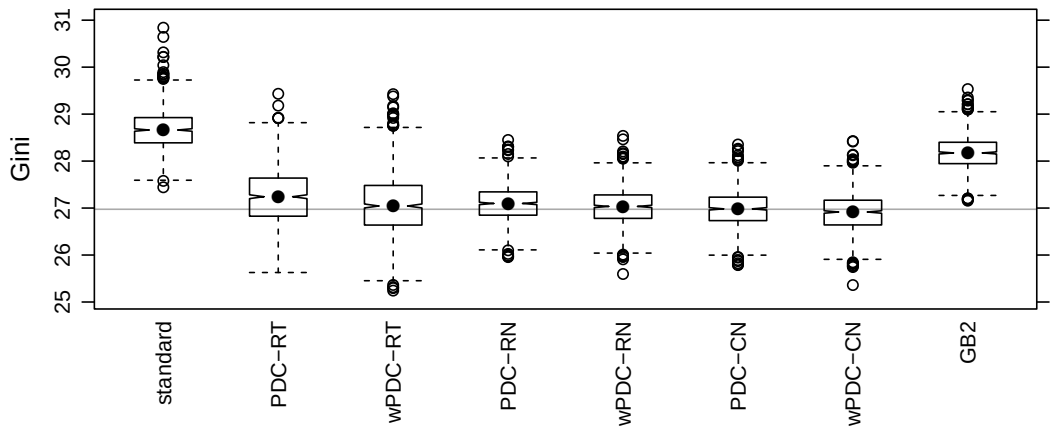

Figure F.203.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.101.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28.68	0.19	1.71	6.32	28.66	0.40	1.69	1.76	6.52	2.50	0.14
wHill	RT	300	28.34	0.32	1.36	5.05	28.27	0.54	1.30	1.47	5.46	1.92	0.13
wHill	RT	500	28.11	0.27	1.13	4.20	28.06	0.52	1.09	1.25	4.62	1.61	0.12
wHill	RT	700	28.08	0.27	1.10	4.08	28.04	0.48	1.07	1.22	4.51	1.58	0.12
wHill	RN	300	27.64	0.15	0.67	2.47	27.64	0.39	0.67	0.77	2.85	0.99	0.07
wHill	RN	500	27.35	0.13	0.37	1.39	27.35	0.36	0.38	0.52	1.94	0.58	0.07
wHill	RN	700	27.20	0.12	0.23	0.84	27.20	0.34	0.23	0.42	1.54	0.42	0.06
wHill	CN	300	27.54	0.15	0.56	2.08	27.54	0.39	0.57	0.68	2.53	0.84	0.07
wHill	CN	500	27.25	0.14	0.28	1.02	27.25	0.36	0.28	0.46	1.72	0.48	0.06
wHill	CN	700	27.11	0.12	0.13	0.50	27.10	0.35	0.13	0.37	1.39	0.37	0.05
wISE	RT	300	27.73	0.30	0.76	2.81	27.70	0.55	0.73	0.94	3.47	1.08	0.12
wISE	RT	500	27.36	0.31	0.39	1.44	27.32	0.53	0.34	0.68	2.51	0.61	0.09
wISE	RT	700	27.61	0.30	0.64	2.37	27.60	0.55	0.63	0.84	3.12	0.94	0.10
wISE	RN	300	27.45	0.15	0.47	1.76	27.44	0.39	0.47	0.61	2.27	0.70	0.06
wISE	RN	500	27.14	0.14	0.16	0.61	27.14	0.36	0.16	0.41	1.52	0.41	0.06
wISE	RN	700	27.07	0.12	0.10	0.36	27.07	0.34	0.10	0.36	1.34	0.38	0.05
wISE	CN	300	27.33	0.16	0.35	1.30	27.32	0.41	0.34	0.53	1.97	0.55	0.06
wISE	CN	500	27.02	0.15	0.05	0.18	27.03	0.37	0.05	0.39	1.44	0.39	0.05
wISE	CN	700	26.98	0.12	0.01	0.02	26.98	0.35	0.01	0.35	1.31	0.36	0.05
wPDC	RT	300	27.56	0.41	0.59	2.18	27.52	0.60	0.55	0.87	3.23	0.85	0.12
wPDC	RT	500	27.08	0.42	0.11	0.41	27.04	0.63	0.07	0.66	2.43	0.64	0.09
wPDC	RT	700	27.57	0.41	0.60	2.22	27.54	0.63	0.56	0.88	3.25	0.89	0.10
wPDC	RN	300	27.38	0.17	0.41	1.51	27.37	0.41	0.40	0.58	2.14	0.62	0.06
wPDC	RN	500	27.03	0.16	0.06	0.22	27.03	0.37	0.06	0.40	1.49	0.38	0.06
wPDC	RN	700	27.05	0.13	0.08	0.29	27.05	0.34	0.07	0.36	1.34	0.36	0.05
wPDC	CN	300	27.25	0.18	0.27	1.02	27.25	0.43	0.27	0.50	1.87	0.50	0.06
wPDC	CN	500	26.91	0.17	−0.07	−0.25	26.92	0.39	−0.06	0.42	1.55	0.40	0.06
wPDC	CN	700	26.95	0.13	−0.02	−0.07	26.96	0.36	−0.02	0.36	1.33	0.36	0.05
GB2			28.18	0.12	1.21	4.47	28.17	0.34	1.20	1.25	4.65	1.78	0.09

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OAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 20.

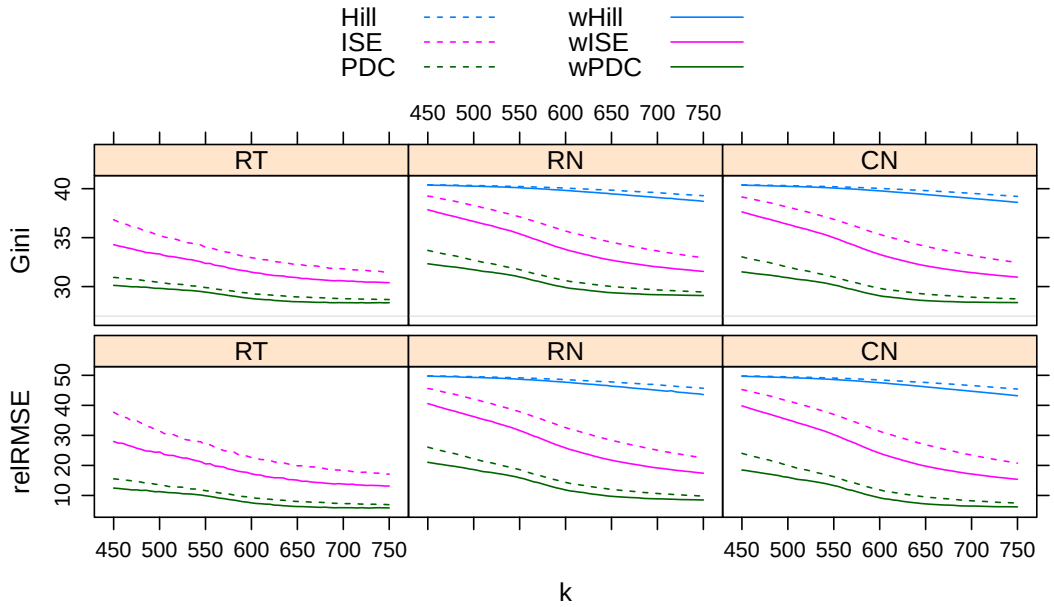

Figure F.204.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

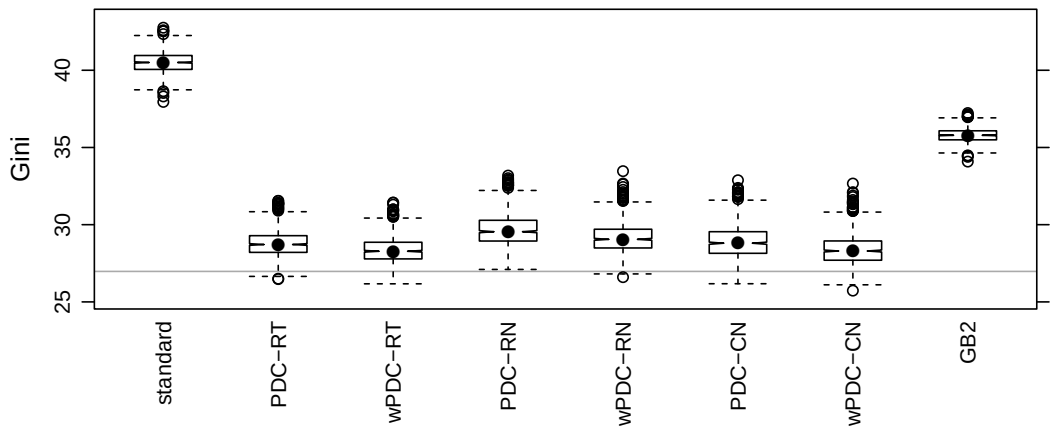

Figure F.205.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.102.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			40.52	0.45	13.54	50.21	40.50	0.67	13.53	13.56	50.27	20.06	0.59
wHill	RT	500	42.80	16.51	15.83	58.68	41.95	2.70	14.98	16.34	60.58	22.21	1.77
wHill	RT	700	39.12	6.46	12.14	45.02	38.81	1.89	11.84	12.41	45.99	17.55	1.36
wHill	RN	300	40.51	0.45	13.54	50.18	40.49	0.67	13.52	13.55	50.24	20.04	0.59
wHill	RN	500	40.26	0.43	13.28	49.23	40.25	0.63	13.27	13.30	49.29	19.68	0.57
wHill	RN	700	39.09	0.55	12.12	44.93	39.09	0.76	12.12	12.14	45.02	17.97	0.58
wHill	CN	300	40.51	0.45	13.54	50.18	40.49	0.67	13.52	13.55	50.24	20.04	0.59
wHill	CN	500	40.24	0.44	13.26	49.17	40.22	0.62	13.25	13.28	49.23	19.65	0.57
wHill	CN	700	39.01	0.55	12.04	44.62	39.01	0.74	12.04	12.06	44.70	17.85	0.53
wISE	RT	500	33.33	3.16	6.36	23.57	33.01	1.34	6.04	6.60	24.48	8.95	0.80
wISE	RT	700	30.59	0.82	3.61	13.39	30.51	0.83	3.53	3.72	13.80	5.24	0.36
wISE	RN	300	40.47	0.45	13.50	50.05	40.46	0.66	13.49	13.52	50.11	20.00	0.59
wISE	RN	500	36.66	1.89	9.68	35.89	36.75	1.35	9.78	9.78	36.25	14.50	0.52
wISE	RN	700	32.01	1.33	5.03	18.66	31.94	1.13	4.97	5.16	19.14	7.37	0.32
wISE	CN	300	40.47	0.45	13.50	50.04	40.46	0.66	13.49	13.51	50.10	20.00	0.59
wISE	CN	500	36.36	2.18	9.38	34.78	36.47	1.46	9.50	9.50	35.21	14.08	0.49
wISE	CN	700	31.43	1.52	4.45	16.51	31.35	1.19	4.38	4.62	17.13	6.49	0.30
wPDC	RT	500	29.82	1.16	2.84	10.54	29.68	1.01	2.71	3.04	11.27	4.01	0.33
wPDC	RT	700	28.36	0.64	1.38	5.12	28.28	0.79	1.30	1.60	5.92	1.93	0.17
wPDC	RN	300	38.45	5.88	11.48	42.55	39.32	1.69	12.35	11.73	43.49	18.31	0.57
wPDC	RN	500	31.72	2.70	4.75	17.59	31.54	1.74	4.56	5.02	18.62	6.76	0.44
wPDC	RN	700	29.17	0.92	2.19	8.13	29.05	0.90	2.08	2.39	8.88	3.08	0.24
wPDC	CN	300	38.20	7.55	11.22	41.61	39.24	1.82	12.27	11.56	42.84	18.19	0.57
wPDC	CN	500	30.91	3.30	3.94	14.59	30.71	1.91	3.73	4.33	16.07	5.53	0.44
wPDC	CN	700	28.40	0.99	1.43	5.30	28.30	0.93	1.32	1.74	6.46	1.96	0.21
GB2			35.79	0.19	8.82	32.69	35.79	0.43	8.81	8.83	32.73	13.07	0.38

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F.5.3. Mean equivalized disposable income

Simple random sampling

No contamination

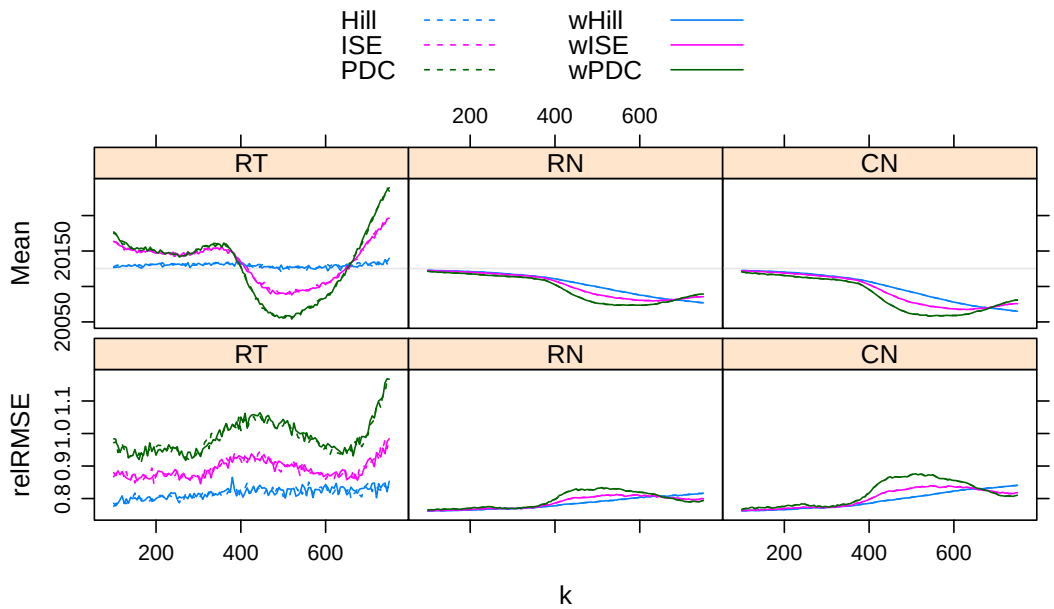

Figure F.206.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 100 and 750.

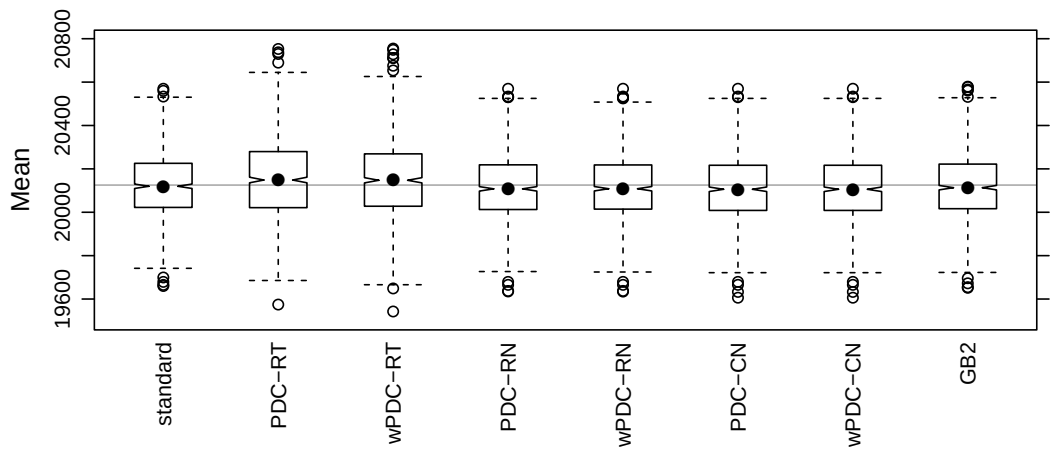

Figure F.207.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 300$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.103.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20122.88	23520.11	−2.49	−0.01	20119.82	150.16	−5.54	153.31	0.76	150.03	0.02
wHill	RT	300	20132.81	26948.88	7.45	0.04	20128.66	161.78	3.30	164.25	0.82	162.06	0.03
wHill	RT	500	20124.49	27677.39	−0.87	−0.00	20119.43	167.16	−5.93	166.28	0.83	164.86	0.03
wHill	RT	700	20129.88	27804.06	4.52	0.02	20127.21	166.04	1.85	166.72	0.83	164.95	0.02
wHill	RN	300	20117.10	23909.77	−8.27	−0.04	20113.25	150.39	−12.12	154.77	0.77	150.60	0.02
wHill	RN	500	20099.46	24675.29	−25.90	−0.13	20094.77	154.70	−30.60	159.13	0.79	154.27	0.03
wHill	RN	700	20080.38	24546.16	−44.98	−0.22	20075.19	153.92	−50.17	162.93	0.81	165.00	0.03
wHill	CN	300	20115.12	24066.45	−10.24	−0.05	20111.70	152.52	−13.66	155.39	0.77	151.36	0.02
wHill	CN	500	20092.18	25091.96	−33.18	−0.16	20089.03	156.21	−36.33	161.76	0.80	159.97	0.03
wHill	CN	700	20068.62	24965.13	−56.75	−0.28	20062.70	157.72	−62.66	167.81	0.83	170.42	0.03
wISE	RT	300	20146.06	30037.33	20.70	0.10	20139.27	176.81	13.91	174.46	0.87	177.89	0.03
wISE	RT	500	20090.61	32014.79	−34.75	−0.17	20082.41	174.26	−42.96	182.18	0.91	186.21	0.03
wISE	RT	700	20163.94	32683.84	38.57	0.19	20152.20	184.28	26.84	184.77	0.92	179.28	0.03
wISE	RN	300	20116.28	23936.72	−9.08	−0.05	20113.29	150.81	−12.07	154.90	0.77	152.98	0.02
wISE	RN	500	20088.34	25055.95	−37.03	−0.18	20086.74	154.43	−38.62	162.49	0.81	166.16	0.03
wISE	RN	700	20082.59	24058.72	−42.78	−0.21	20079.77	153.00	−45.60	160.82	0.80	160.43	0.02
wISE	CN	300	20114.02	24113.13	−11.34	−0.06	20110.07	151.75	−15.29	155.62	0.77	153.42	0.02
wISE	CN	500	20077.38	25755.67	−47.98	−0.24	20075.82	155.88	−49.54	167.43	0.83	172.35	0.03
wISE	CN	700	20071.88	24370.92	−53.48	−0.27	20070.34	156.55	−55.02	164.94	0.82	164.46	0.03
wPDC	RT	300	20153.09	35090.66	27.73	0.14	20147.45	179.94	22.09	189.27	0.94	181.35	0.03
wPDC	RT	500	20056.37	39392.75	−68.99	−0.34	20043.57	195.90	−81.80	210.03	1.04	218.38	0.03
wPDC	RT	700	20181.74	37641.75	56.38	0.28	20176.82	179.67	51.46	201.95	1.00	194.82	0.04
wPDC	RN	300	20113.85	23891.70	−11.52	−0.06	20108.51	149.13	−16.85	154.92	0.77	153.02	0.02
wPDC	RN	500	20076.32	25630.77	−49.04	−0.24	20072.19	157.85	−53.17	167.36	0.83	173.03	0.03
wPDC	RN	700	20084.02	23839.00	−41.35	−0.21	20081.41	155.79	−43.95	159.76	0.79	157.07	0.02
wPDC	CN	300	20110.51	24136.73	−14.85	−0.07	20105.93	151.48	−19.43	155.99	0.78	153.57	0.03
wPDC	CN	500	20061.46	26861.55	−63.90	−0.32	20059.30	164.03	−66.06	175.84	0.87	181.99	0.03
wPDC	CN	700	20073.31	24213.62	−52.05	−0.26	20071.74	157.79	−53.62	164.01	0.81	162.38	0.03
GB2			20117.57	25025.07	−7.79	−0.04	20113.39	151.11	−11.98	158.31	0.79	152.52	0.02

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OCAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

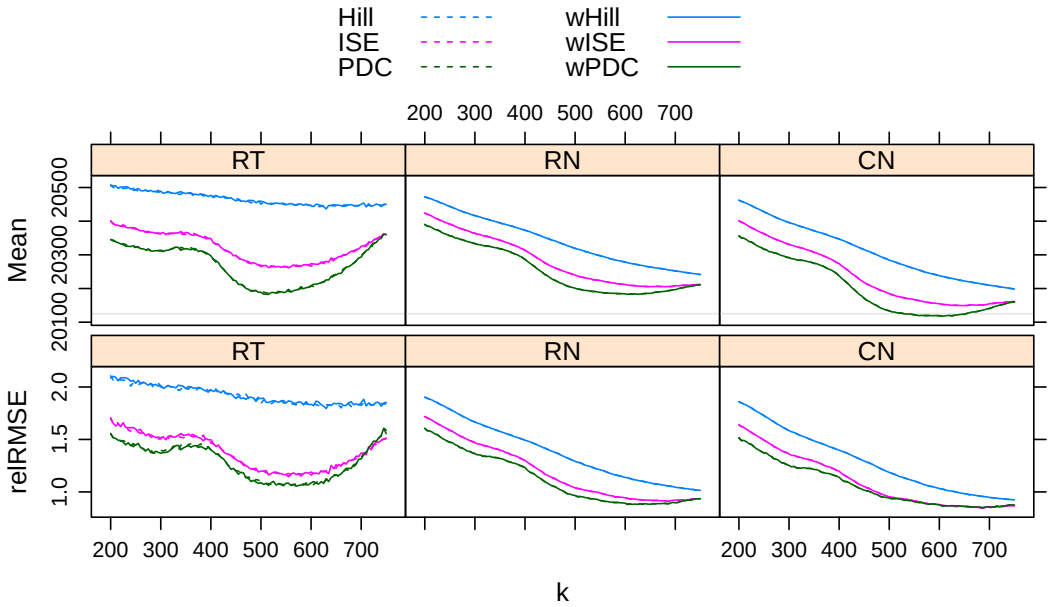

Figure F.208.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

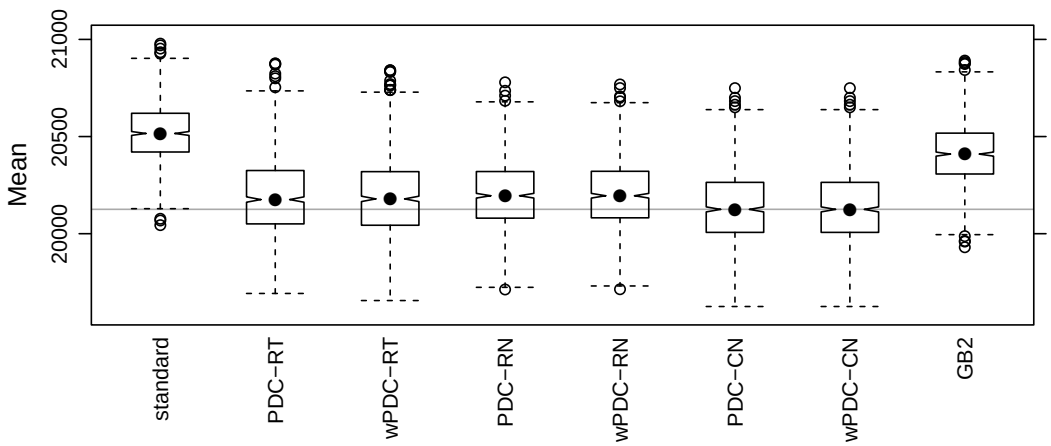

Figure F.209.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.104.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20519.60	24165.35	394.24	1.96	20515.85	148.92	390.49	423.75	2.11	578.94	0.04
wHill	RT	300	20489.28	32191.93	363.92	1.81	20492.29	174.35	366.93	405.70	2.02	544.01	0.05
wHill	RT	500	20459.17	33375.72	333.81	1.66	20454.96	180.17	329.60	380.48	1.89	488.66	0.05
wHill	RT	700	20450.05	33166.25	324.69	1.61	20439.96	182.09	314.60	372.23	1.85	466.43	0.05
wHill	RN	300	20416.48	27653.01	291.12	1.45	20414.83	165.53	289.47	335.23	1.67	429.17	0.04
wHill	RN	500	20319.10	30026.02	193.74	0.96	20316.19	168.20	190.83	259.87	1.29	290.38	0.04
wHill	RN	700	20251.76	28198.40	126.40	0.63	20247.89	167.23	122.53	210.11	1.04	216.50	0.03
wHill	CN	300	20395.98	28570.88	270.62	1.34	20392.70	166.80	267.33	319.03	1.59	396.35	0.04
wHill	CN	500	20284.51	31682.55	159.15	0.79	20283.08	170.95	157.72	238.70	1.19	251.51	0.04
wHill	CN	700	20209.60	29261.98	84.24	0.42	20206.27	169.76	80.91	190.60	0.95	194.91	0.03
wISE	RT	300	20363.87	35779.55	238.51	1.19	20359.41	191.10	234.05	304.35	1.51	348.92	0.05
wISE	RT	500	20268.54	37764.54	143.17	0.71	20264.92	180.67	139.56	241.30	1.20	240.00	0.04
wISE	RT	700	20325.03	36221.43	199.67	0.99	20317.18	192.93	191.82	275.77	1.37	293.70	0.04
wISE	RN	300	20363.62	30585.54	238.26	1.18	20364.02	177.81	238.66	295.50	1.47	354.11	0.04
wISE	RN	500	20239.73	30654.71	114.37	0.57	20234.84	169.67	109.48	209.06	1.04	209.58	0.03
wISE	RN	700	20208.55	27569.12	83.19	0.41	20203.32	170.55	77.96	185.64	0.92	185.84	0.03
wISE	CN	300	20330.91	32812.81	205.54	1.02	20332.27	181.48	206.91	273.91	1.36	311.93	0.04
wISE	CN	500	20184.83	33172.63	59.47	0.30	20176.72	178.91	51.36	191.51	0.95	191.38	0.03
wISE	CN	700	20154.86	28942.97	29.50	0.15	20149.13	176.76	23.77	172.58	0.86	181.28	0.03
wPDC	RT	300	20311.95	41216.52	186.59	0.93	20308.74	206.32	183.38	275.67	1.37	290.21	0.05
wPDC	RT	500	20188.83	43955.74	63.46	0.32	20179.15	204.23	53.79	218.95	1.09	209.54	0.04
wPDC	RT	700	20293.51	41749.48	168.15	0.84	20287.85	204.70	162.49	264.54	1.31	272.39	0.04
wPDC	RN	300	20333.96	32041.06	208.60	1.04	20333.41	175.14	208.05	274.81	1.37	316.14	0.04
wPDC	RN	500	20200.93	32157.89	75.56	0.38	20195.36	177.08	70.00	194.51	0.97	186.33	0.03
wPDC	RN	700	20196.68	27411.03	71.31	0.35	20191.63	168.69	66.27	180.19	0.90	182.17	0.03
wPDC	CN	300	20291.53	35929.65	166.17	0.83	20291.53	184.65	166.17	252.01	1.25	268.05	0.04
wPDC	CN	500	20133.74	35899.73	8.38	0.04	20125.03	192.50	−0.33	189.56	0.94	192.63	0.03
wPDC	CN	700	20140.58	29256.33	15.22	0.08	20135.27	176.96	9.91	171.64	0.85	176.00	0.03
GB2			20412.26	26505.87	286.90	1.43	20409.66	157.48	284.30	329.83	1.64	421.50	0.04

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OCAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

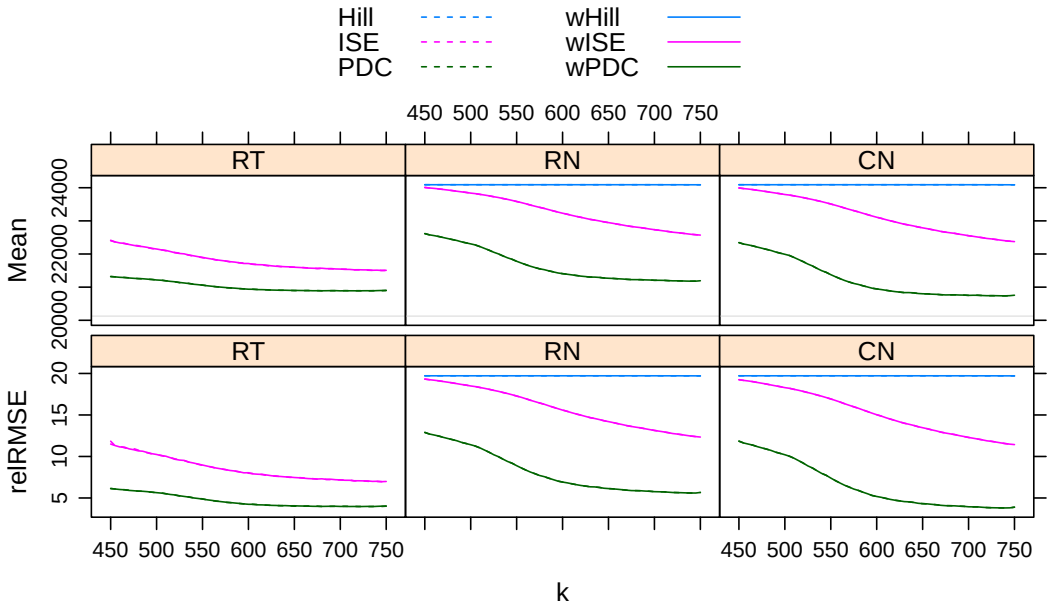

Figure F.210.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

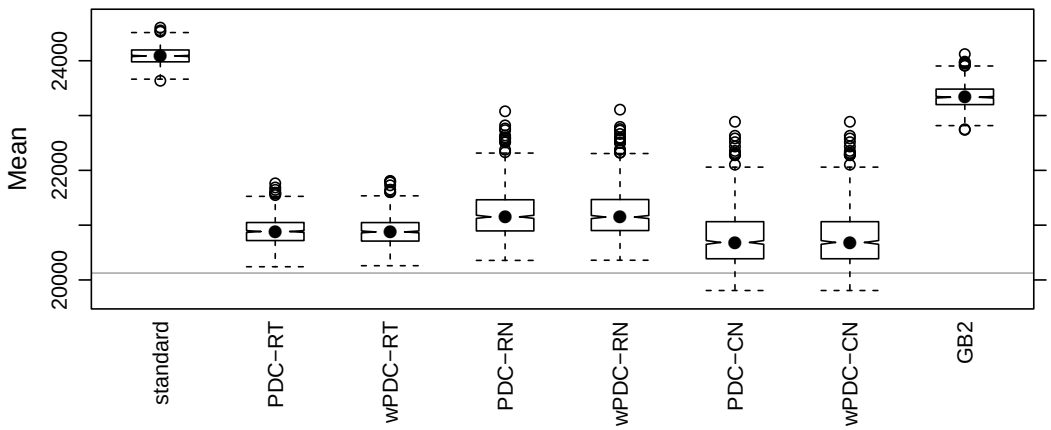

Figure F.211.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.105.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			24090.29	25548.77	3964.93	19.70	24087.12	160.06	3961.76	3968.15	19.72	5873.71	0.22
wHill	RT	500	24030.25	520753.29	3904.89	19.40	23933.30	474.34	3807.94	3970.94	19.73	5645.65	0.67
wHill	RT	700	23573.34	188212.69	3447.98	17.13	23536.32	352.62	3410.96	3475.14	17.27	5057.08	0.38
wHill	RN	300	24090.29	25548.77	3964.93	19.70	24087.12	160.06	3961.76	3968.15	19.72	5873.71	0.22
wHill	RN	500	24090.29	25548.77	3964.93	19.70	24087.12	160.06	3961.76	3968.15	19.72	5873.71	0.22
wHill	RN	700	24090.23	25555.33	3964.87	19.70	24087.12	160.06	3961.76	3968.08	19.72	5873.71	0.22
wHill	CN	300	24090.29	25548.77	3964.93	19.70	24087.12	160.06	3961.76	3968.15	19.72	5873.71	0.22
wHill	CN	500	24090.29	25548.77	3964.93	19.70	24087.12	160.06	3961.76	3968.15	19.72	5873.71	0.22
wHill	CN	700	24090.22	25555.72	3964.86	19.70	24087.12	160.06	3961.76	3968.08	19.72	5873.71	0.22
wISE	RT	500	22151.06	143119.17	2025.69	10.07	22123.18	372.69	1997.82	2060.68	10.24	2961.96	0.18
wISE	RT	700	21545.49	71989.44	1420.13	7.06	21531.93	266.49	1406.56	1445.23	7.18	2085.37	0.13
wISE	RN	300	24090.29	25548.77	3964.93	19.70	24087.12	160.06	3961.76	3968.15	19.72	5873.71	0.22
wISE	RN	500	23837.48	70546.31	3712.11	18.44	23832.77	271.82	3707.41	3721.59	18.49	5496.61	0.22
wISE	RN	700	22733.50	184133.31	2608.14	12.96	22760.03	410.75	2634.67	2643.17	13.13	3906.16	0.20
wISE	CN	300	24090.29	25548.77	3964.93	19.70	24087.12	160.06	3961.76	3968.15	19.72	5873.71	0.22
wISE	CN	500	23795.31	83010.87	3669.95	18.24	23789.23	301.62	3663.87	3681.23	18.29	5432.05	0.22
wISE	CN	700	22551.70	228934.62	2426.34	12.06	22585.37	436.58	2460.00	2473.02	12.29	3647.20	0.19
wPDC	RT	500	21216.19	97685.61	1090.82	5.42	21190.33	301.37	1064.97	1134.67	5.64	1578.92	0.14
wPDC	RT	700	20888.30	58961.31	762.94	3.79	20876.73	248.91	751.36	800.61	3.98	1113.97	0.08
wPDC	RN	300	23862.01	273275.00	3736.65	18.57	24026.57	254.00	3901.21	3773.00	18.75	5783.94	0.22
wPDC	RN	500	22305.55	523109.10	2180.19	10.83	22301.46	808.79	2176.10	2296.91	11.41	3226.29	0.20
wPDC	RN	700	21207.04	172985.47	1081.68	5.37	21147.97	413.75	1022.61	1158.81	5.76	1516.12	0.15
wPDC	CN	300	23808.69	403798.66	3683.33	18.30	24021.97	269.08	3896.61	3737.68	18.57	5777.11	0.22
wPDC	CN	500	21991.13	738602.76	1865.76	9.27	22003.68	959.94	1878.31	2054.00	10.21	2784.79	0.20
wPDC	CN	700	20751.94	235113.48	626.57	3.11	20684.51	486.78	559.15	792.13	3.94	828.99	0.14
GB2			23340.54	43730.12	3215.18	15.98	23333.83	208.42	3208.47	3221.96	16.01	4756.88	0.20

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OCAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

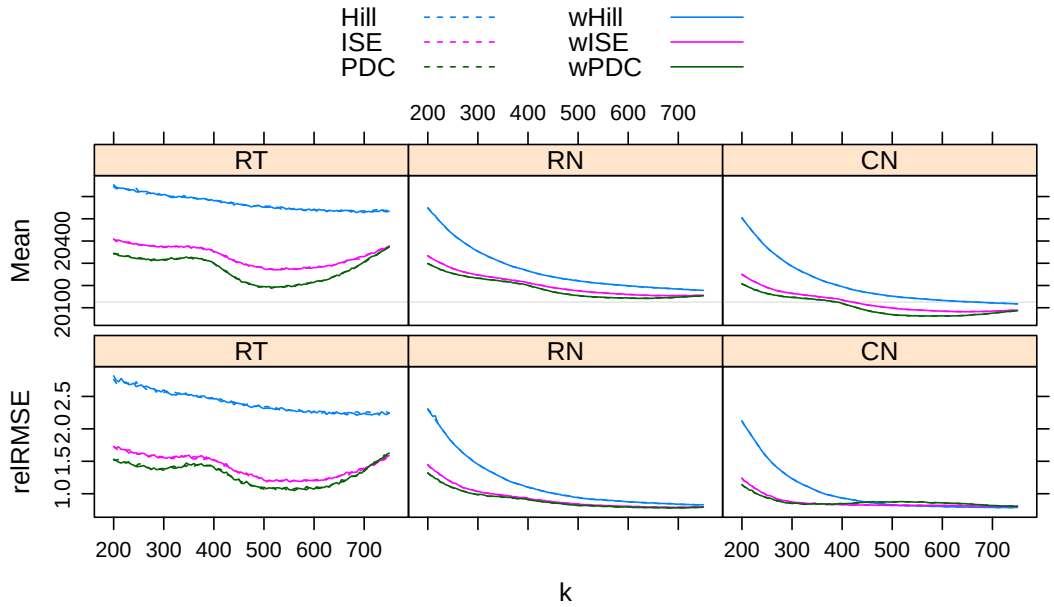

Figure F.212.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

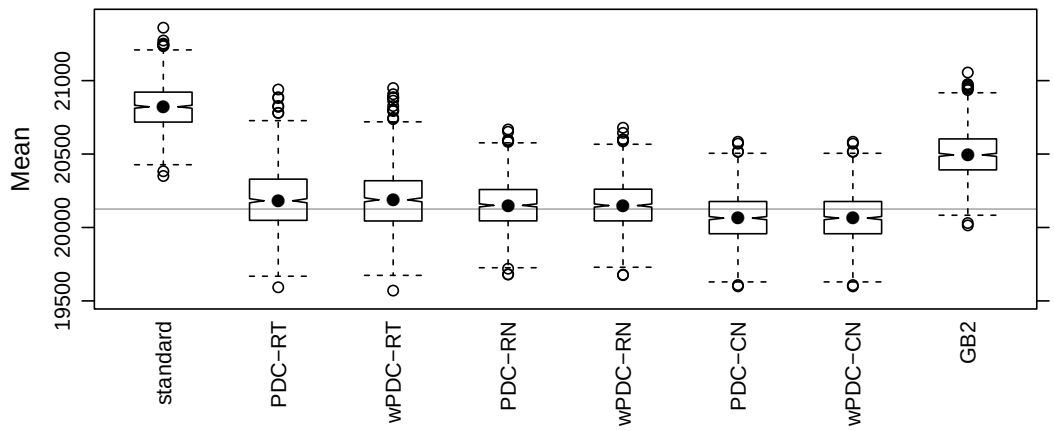

Figure F.213.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.106.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20824.20	24035.60	698.84	3.47	20821.98	150.09	696.62	715.82	3.56	1032.81	0.06
wHill	RT	300	20609.12	40075.69	483.76	2.40	20603.74	196.92	478.38	523.51	2.60	709.24	0.08
wHill	RT	500	20552.18	34761.10	426.82	2.12	20552.21	179.16	426.85	465.72	2.31	632.84	0.05
wHill	RT	700	20535.90	34722.89	410.54	2.04	20518.98	179.46	393.62	450.81	2.24	583.58	0.06
wHill	RN	300	20352.94	33638.83	227.58	1.13	20347.71	177.59	222.34	292.23	1.45	332.98	0.04
wHill	RN	500	20221.81	26744.14	96.45	0.48	20216.02	156.08	90.66	189.79	0.94	181.88	0.03
wHill	RN	700	20183.66	25145.47	58.30	0.29	20181.02	148.37	55.66	168.88	0.84	163.55	0.03
wHill	CN	300	20286.22	35618.28	160.86	0.80	20282.66	178.11	157.29	247.91	1.23	247.60	0.04
wHill	CN	500	20152.12	27017.62	26.76	0.13	20146.98	158.71	21.62	166.45	0.83	156.65	0.03
wHill	CN	700	20121.69	25250.34	−3.67	−0.02	20118.57	151.22	−6.80	158.87	0.79	151.05	0.02
wISE	RT	300	20374.23	36161.20	248.87	1.24	20364.78	187.23	239.42	313.14	1.56	355.78	0.04
wISE	RT	500	20274.72	36797.60	149.36	0.74	20265.64	186.49	140.28	243.04	1.21	242.30	0.04
wISE	RT	700	20330.02	34966.47	204.66	1.02	20322.72	183.46	197.36	277.16	1.38	296.56	0.04
wISE	RN	300	20247.66	28353.34	122.30	0.61	20238.77	161.57	113.41	208.04	1.03	198.26	0.04
wISE	RN	500	20176.38	25983.11	51.02	0.25	20172.66	153.78	47.30	169.00	0.84	163.54	0.03
wISE	RN	700	20154.81	24490.29	29.45	0.15	20149.27	152.41	23.91	159.16	0.79	158.36	0.02
wISE	CN	300	20164.47	29314.20	39.11	0.19	20153.97	163.61	28.61	175.54	0.87	163.71	0.03
wISE	CN	500	20098.70	26545.12	−26.67	−0.13	20096.50	158.40	−28.86	165.01	0.82	164.35	0.03
wISE	CN	700	20084.66	24728.19	−40.70	−0.20	20084.16	156.69	−41.20	162.36	0.81	160.06	0.03
wPDC	RT	300	20317.02	40829.63	191.66	0.95	20309.79	205.59	184.43	278.43	1.38	289.19	0.04
wPDC	RT	500	20195.23	44168.69	69.87	0.35	20188.36	202.39	62.99	221.37	1.10	211.66	0.04
wPDC	RT	700	20306.93	42035.92	181.57	0.90	20297.95	201.50	172.59	273.79	1.36	275.30	0.05
wPDC	RN	300	20232.43	27909.57	107.07	0.53	20225.53	160.34	100.17	198.36	0.99	187.45	0.03
wPDC	RN	500	20154.78	26427.38	29.42	0.15	20149.41	160.14	24.04	165.13	0.82	158.02	0.03
wPDC	RN	700	20147.53	24245.16	22.17	0.11	20144.69	155.32	19.33	157.20	0.78	158.83	0.03
wPDC	CN	300	20146.45	28927.68	21.08	0.10	20140.42	165.41	15.06	171.30	0.85	158.19	0.03
wPDC	CN	500	20069.19	27636.83	−56.17	−0.28	20063.64	160.01	−61.72	175.40	0.87	175.44	0.03
wPDC	CN	700	20075.43	24627.49	−49.93	−0.25	20076.06	163.01	−49.30	164.61	0.82	164.21	0.03
GB2			20500.26	26733.41	374.90	1.86	20494.40	156.67	369.04	408.97	2.03	547.14	0.05

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OCAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

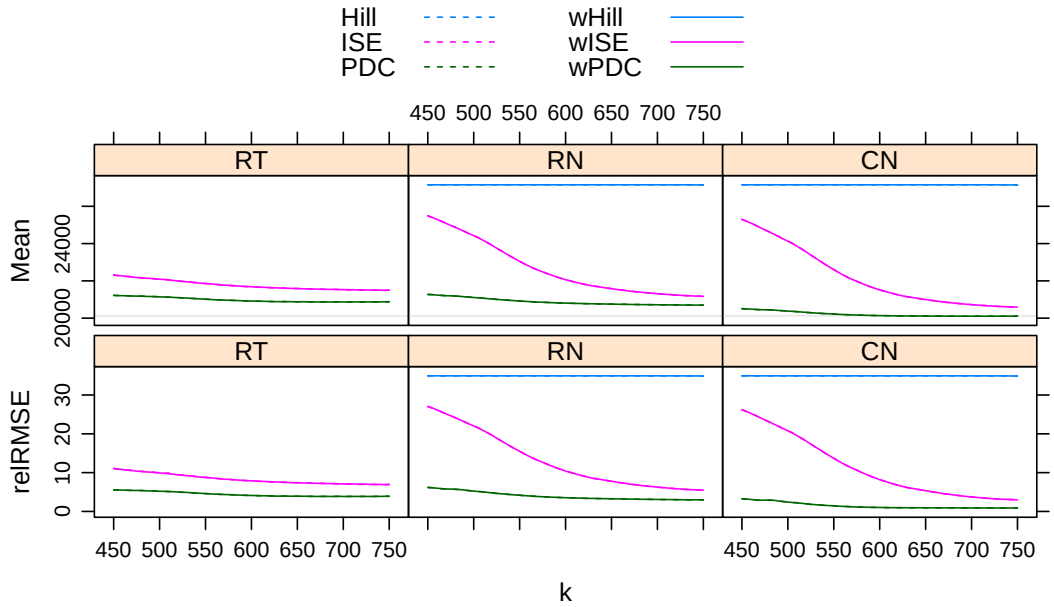

Figure F.214.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

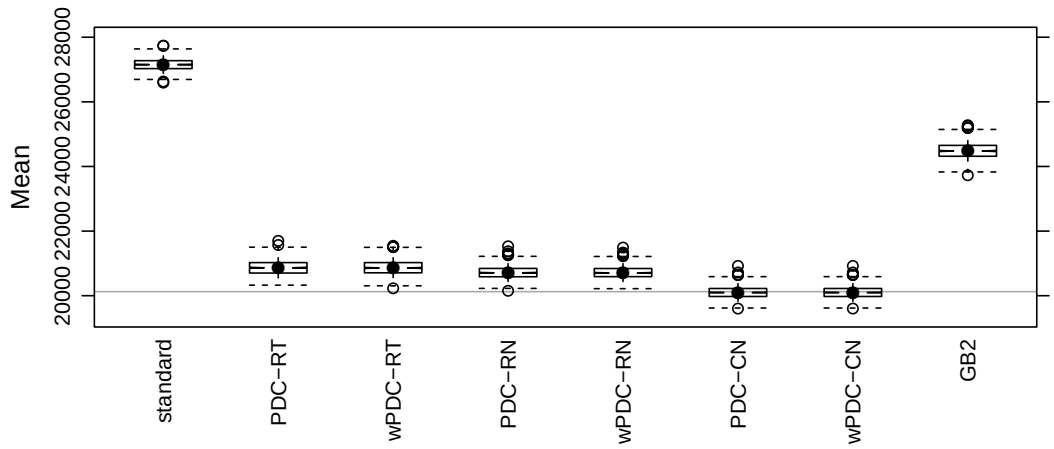

Figure F.215.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.107.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			27153.22	33211.30	7027.86	34.92	27152.82	181.89	7027.46	7030.22	34.93	10418.91	0.38
wHill	RT	500	26717.58	4461219.66	6592.21	32.76	26307.81	965.31	6182.45	6922.00	34.39	9166.10	1.95
wHill	RT	700	25300.96	676765.94	5175.60	25.72	25151.38	593.46	5026.02	5240.50	26.04	7451.57	0.63
wHill	RN	300	27153.22	33211.30	7027.86	34.92	27152.82	181.89	7027.46	7030.22	34.93	10418.91	0.38
wHill	RN	500	27153.22	33211.30	7027.86	34.92	27152.82	181.89	7027.46	7030.22	34.93	10418.91	0.38
wHill	RN	700	27153.15	33202.16	7027.79	34.92	27152.82	181.89	7027.46	7030.15	34.93	10418.91	0.38
wHill	CN	300	27153.22	33211.30	7027.86	34.92	27152.82	181.89	7027.46	7030.22	34.93	10418.91	0.38
wHill	CN	500	27153.22	33211.30	7027.86	34.92	27152.82	181.89	7027.46	7030.22	34.93	10418.91	0.38
wHill	CN	700	27153.15	33201.42	7027.79	34.92	27152.82	181.89	7027.46	7030.15	34.93	10418.91	0.38
wISE	RT	500	22086.39	131903.59	1961.03	9.74	22049.69	349.18	1924.33	1994.34	9.91	2853.01	0.17
wISE	RT	700	21531.43	72939.02	1406.07	6.99	21500.93	265.72	1375.57	1431.75	7.11	2039.42	0.11
wISE	RN	300	27152.38	33662.06	7027.02	34.92	27152.82	181.89	7027.46	7029.41	34.93	10418.91	0.38
wISE	RN	500	24425.67	1183200.28	4300.30	21.37	24533.67	1016.49	4408.31	4435.61	22.04	6535.76	0.36
wISE	RN	700	21311.07	178085.14	1185.71	5.89	21238.09	382.60	1112.73	1258.49	6.25	1649.73	0.16
wISE	CN	300	27152.25	33767.88	7026.89	34.92	27152.82	181.89	7027.46	7029.29	34.93	10418.91	0.38
wISE	CN	500	24129.01	1456284.56	4003.65	19.89	24275.89	1103.07	4150.53	4181.39	20.78	6153.58	0.35
wISE	CN	700	20724.08	205720.41	598.72	2.97	20651.26	401.34	525.90	750.99	3.73	779.70	0.14
wPDC	RT	500	21139.68	65890.18	1014.31	5.04	21115.58	250.22	990.22	1046.26	5.20	1468.10	0.11
wPDC	RT	700	20868.42	51227.87	743.06	3.69	20859.69	234.98	734.33	776.73	3.86	1088.72	0.07
wPDC	RN	300	23197.61	1183668.23	3072.24	15.27	22790.71	452.63	2665.35	3259.01	16.19	3951.64	0.36
wPDC	RN	500	21107.42	151556.30	982.06	4.88	21029.26	281.25	903.90	1056.34	5.25	1340.12	0.16
wPDC	RN	700	20718.88	35065.12	593.51	2.95	20705.01	185.37	579.65	622.33	3.09	859.38	0.07
wPDC	CN	300	22553.83	1613372.84	2428.47	12.07	22082.15	515.83	1956.79	2740.29	13.62	2901.13	0.36
wPDC	CN	500	20378.29	173578.23	252.93	1.26	20284.65	280.23	159.29	487.21	2.42	284.35	0.14
wPDC	CN	700	20105.92	32780.96	−19.44	−0.10	20098.06	184.57	−27.31	182.01	0.90	183.85	0.04
GB2			24487.85	62293.09	4362.49	21.68	24478.89	249.91	4353.53	4369.61	21.71	6454.55	0.26

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OCAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

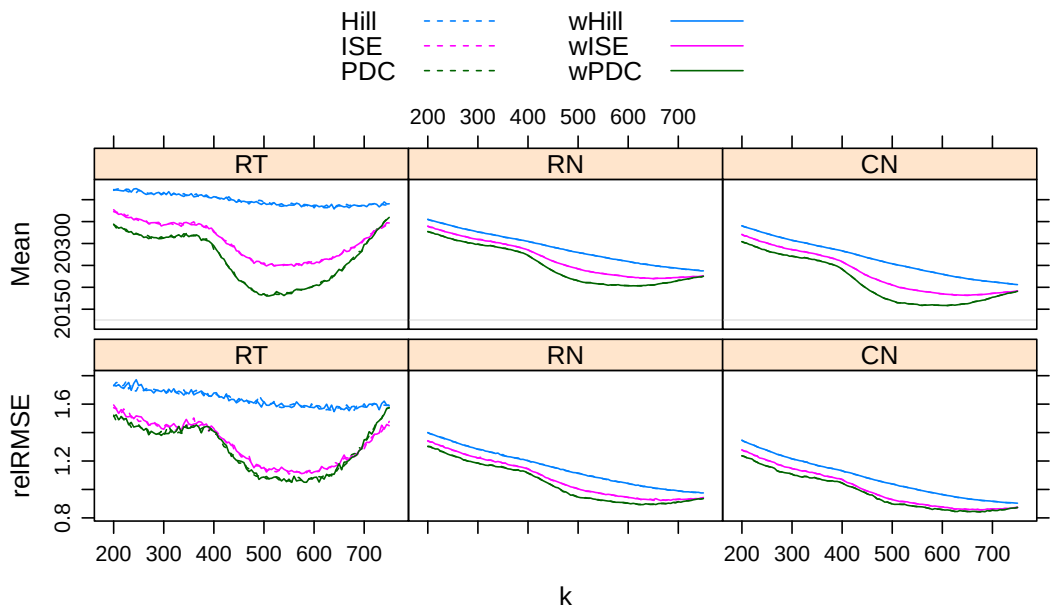

Figure F.216.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

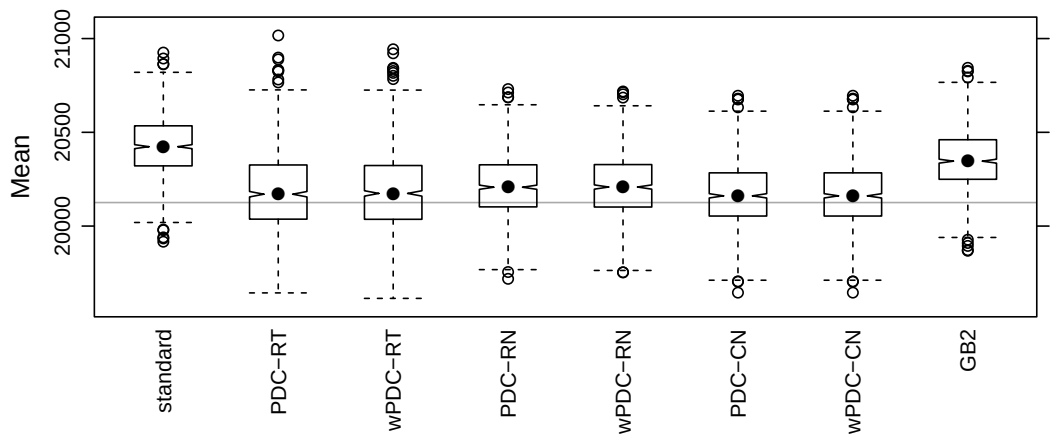

Figure F.217.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.108.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20427.65	26798.30	302.29	1.50	20423.53	158.01	298.17	343.73	1.71	442.07	0.04
wHill	RT	300	20416.58	32390.66	291.22	1.45	20410.42	177.18	285.06	342.29	1.70	423.50	0.04
wHill	RT	500	20393.12	34298.14	267.76	1.33	20389.39	181.48	264.03	325.51	1.62	391.45	0.05
wHill	RT	700	20386.91	32763.77	261.54	1.30	20379.86	185.16	254.50	318.02	1.58	377.80	0.04
wHill	RN	300	20326.17	26385.44	200.80	1.00	20319.40	157.77	194.04	258.23	1.28	290.03	0.03
wHill	RN	500	20279.57	26647.00	154.21	0.77	20273.58	158.42	148.22	224.50	1.12	232.85	0.03
wHill	RN	700	20243.09	25836.13	117.72	0.58	20236.82	158.81	111.46	199.17	0.99	196.90	0.03
wHill	CN	300	20307.17	26769.68	181.81	0.90	20297.94	157.15	172.58	244.53	1.22	266.76	0.03
wHill	CN	500	20253.84	27215.37	128.47	0.64	20250.62	158.74	125.25	209.03	1.04	211.06	0.03
wHill	CN	700	20212.26	26498.18	86.90	0.43	20207.23	157.60	81.87	184.45	0.92	181.09	0.03
wISE	RT	300	20342.37	34984.18	217.01	1.08	20332.54	187.76	207.18	286.43	1.42	317.66	0.04
wISE	RT	500	20252.53	37898.24	127.17	0.63	20247.72	185.94	122.36	232.45	1.15	230.69	0.04
wISE	RT	700	20310.33	35740.58	184.97	0.92	20302.64	193.45	177.28	264.42	1.31	274.83	0.04
wISE	RN	300	20309.34	26536.73	183.98	0.91	20302.07	156.41	176.71	245.68	1.22	267.18	0.03
wISE	RN	500	20242.16	27259.42	116.79	0.58	20238.29	158.63	112.92	202.17	1.00	201.75	0.03
wISE	RN	700	20222.48	25722.29	97.12	0.48	20217.69	164.18	92.33	187.43	0.93	182.50	0.03
wISE	CN	300	20285.98	27485.56	160.62	0.80	20277.89	156.27	152.52	230.77	1.15	241.57	0.03
wISE	CN	500	20205.00	28630.52	79.64	0.40	20200.02	163.83	74.66	186.93	0.93	182.47	0.03
wISE	CN	700	20186.22	26560.16	60.86	0.30	20182.45	170.05	57.08	173.89	0.86	167.70	0.03
wPDC	RT	300	20312.47	43730.68	187.11	0.93	20310.74	216.29	185.38	280.53	1.39	287.06	0.05
wPDC	RT	500	20185.16	44382.11	59.79	0.30	20174.10	211.62	48.74	218.89	1.09	206.84	0.04
wPDC	RT	700	20297.56	44079.98	172.20	0.86	20296.53	217.30	171.17	271.46	1.35	284.67	0.05
wPDC	RN	300	20298.29	27041.86	172.92	0.86	20294.56	160.90	169.20	238.57	1.19	259.75	0.03
wPDC	RN	500	20215.05	28236.50	89.69	0.45	20208.19	164.65	82.83	190.40	0.95	188.49	0.03
wPDC	RN	700	20215.62	25670.96	90.26	0.45	20214.58	164.02	89.22	183.83	0.91	182.21	0.03
wPDC	CN	300	20270.97	28479.64	145.60	0.72	20267.06	166.87	141.70	222.83	1.11	228.22	0.03
wPDC	CN	500	20169.06	30768.53	43.69	0.22	20161.29	173.11	35.92	180.68	0.90	172.45	0.03
wPDC	CN	700	20177.29	26880.87	51.92	0.26	20178.71	170.27	53.35	171.90	0.85	166.82	0.03
GB2			20350.76	26701.08	225.40	1.12	20346.10	159.22	220.74	278.35	1.38	330.35	0.04

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OCAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

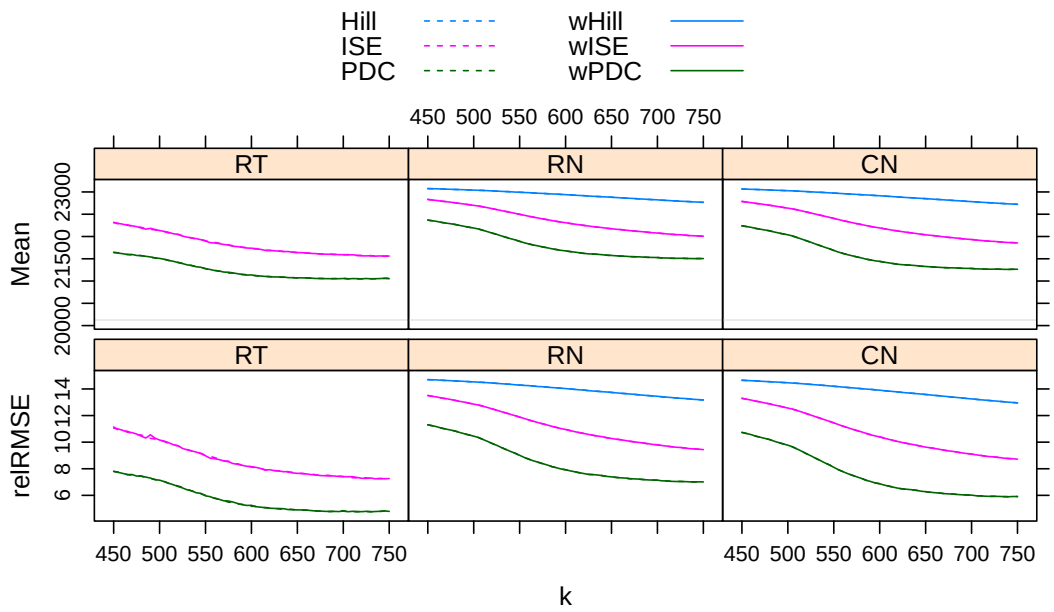

Figure F.218.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

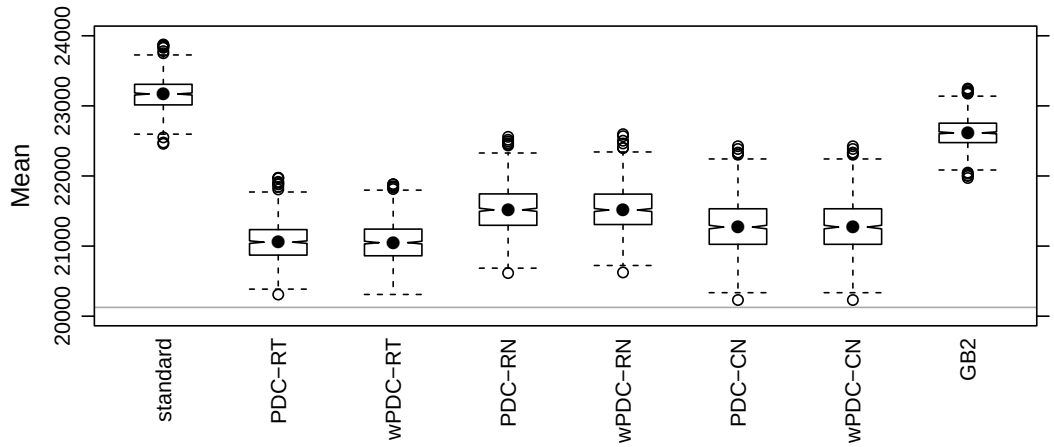

Figure F.219.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.109.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			23166.74	50545.74	3041.38	15.11	23169.83	218.86	3044.47	3049.67	15.15	4513.73	0.19
wHill	RT	500	23223.81	308765.37	3098.45	15.40	23163.18	416.33	3037.82	3147.83	15.64	4503.87	0.66
wHill	RT	700	22909.32	177558.83	2783.96	13.83	22856.36	354.29	2731.00	2815.64	13.99	4048.98	0.35
wHill	RN	300	23141.21	50414.43	3015.84	14.99	23144.21	217.27	3018.85	3024.18	15.03	4475.75	0.19
wHill	RN	500	23041.64	51241.13	2916.28	14.49	23040.26	219.51	2914.90	2925.05	14.53	4321.63	0.20
wHill	RN	700	22822.67	52997.35	2697.31	13.40	22817.35	240.12	2691.99	2707.10	13.45	3991.15	0.19
wHill	CN	300	23138.65	50173.33	3013.28	14.97	23144.06	217.94	3018.70	3021.59	15.01	4475.53	0.19
wHill	CN	500	23027.83	51144.76	2902.46	14.42	23025.26	225.53	2899.89	2911.25	14.47	4299.38	0.18
wHill	CN	700	22782.38	54135.34	2657.02	13.20	22781.54	241.59	2656.18	2667.18	13.25	3938.06	0.17
wISE	RT	500	22133.26	149110.10	2007.90	9.98	22095.98	365.25	1970.62	2044.66	10.16	2921.64	0.18
wISE	RT	700	21591.73	73272.46	1466.37	7.29	21576.52	274.13	1451.16	1491.12	7.41	2151.49	0.12
wISE	RN	300	23120.53	51321.33	2995.17	14.88	23127.13	226.41	3001.76	3003.72	14.93	4450.41	0.19
wISE	RN	500	22698.29	77663.06	2572.93	12.78	22702.95	277.96	2577.59	2587.96	12.86	3821.53	0.17
wISE	RN	700	22077.39	78203.63	1952.03	9.70	22063.46	260.29	1938.10	1971.94	9.80	2873.42	0.15
wISE	CN	300	23115.54	51945.04	2990.18	14.86	23120.30	228.18	2994.94	2998.85	14.90	4440.30	0.19
wISE	CN	500	22636.27	88575.47	2510.91	12.48	22634.70	299.38	2509.34	2528.47	12.56	3720.35	0.17
wISE	CN	700	21932.42	91946.27	1807.05	8.98	21918.82	288.79	1793.46	1832.29	9.10	2658.98	0.15
wPDC	RT	500	21508.40	152517.57	1383.03	6.87	21473.18	358.50	1347.82	1437.06	7.14	1998.27	0.16
wPDC	RT	700	21057.17	71100.58	931.81	4.63	21049.28	280.73	923.92	969.18	4.82	1369.81	0.09
wPDC	RN	300	22984.41	93507.25	2859.04	14.21	23015.17	275.76	2889.81	2875.33	14.29	4284.43	0.19
wPDC	RN	500	22190.15	161292.61	2064.78	10.26	22199.91	408.31	2074.54	2103.44	10.45	3075.72	0.17
wPDC	RN	700	21527.90	98360.29	1402.54	6.97	21514.34	322.49	1388.97	1437.14	7.14	2059.29	0.12
wPDC	CN	300	22955.61	112928.38	2830.25	14.06	22996.68	289.69	2871.32	2850.11	14.16	4257.02	0.19
wPDC	CN	500	22037.91	210730.15	1912.55	9.50	22044.09	464.49	1918.73	1966.81	9.77	2844.71	0.17
wPDC	CN	700	21282.44	128789.79	1157.08	5.75	21271.31	377.11	1145.95	1211.40	6.02	1698.98	0.11
GB2			22617.35	42676.20	2491.99	12.38	22615.78	205.34	2490.42	2500.53	12.42	3692.29	0.16

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OCAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 20.

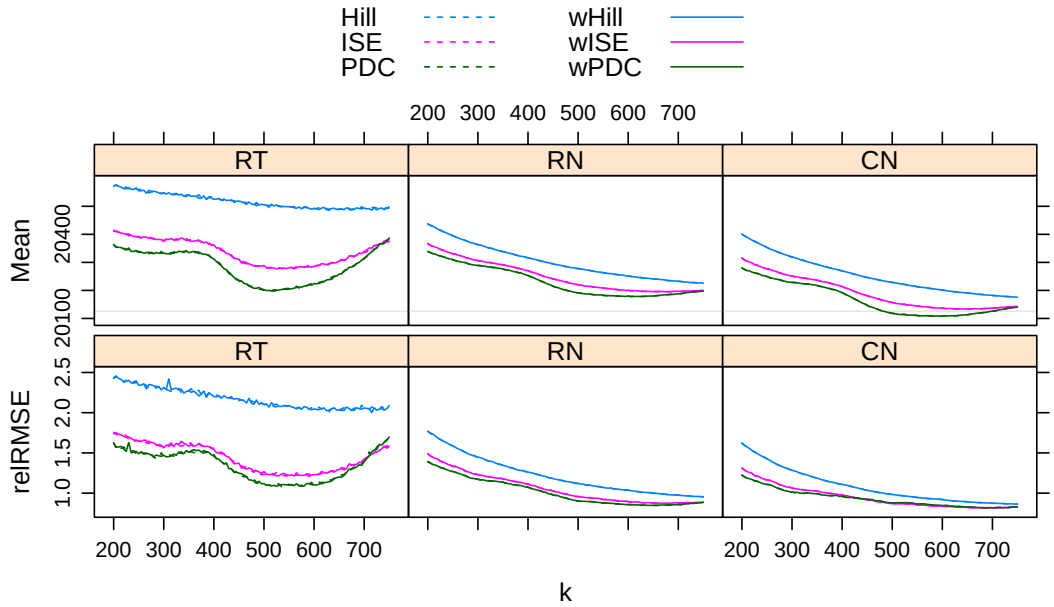

Figure F.220.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

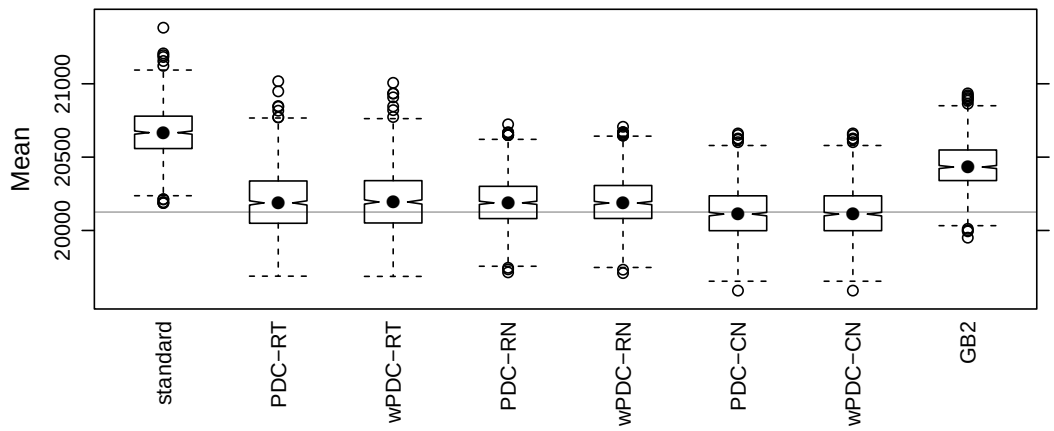

Figure F.221.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.110.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20669.36	30572.40	544.00	2.70	20667.08	162.50	541.72	571.38	2.84	803.15	0.06
wHill	RT	300	20547.90	38146.60	422.53	2.10	20544.23	184.68	418.86	465.45	2.31	621.01	0.06
wHill	RT	500	20505.64	34757.76	380.28	1.89	20501.53	180.08	376.17	423.48	2.10	557.71	0.05
wHill	RT	700	20493.84	35961.20	368.47	1.83	20484.66	190.71	359.29	414.36	2.06	532.69	0.05
wHill	RN	300	20363.44	28182.95	238.08	1.18	20358.59	160.26	233.22	291.27	1.45	347.72	0.04
wHill	RN	500	20277.80	27752.47	152.44	0.76	20272.22	161.27	146.85	225.75	1.12	231.13	0.04
wHill	RN	700	20232.53	26961.94	107.17	0.53	20229.37	159.51	104.01	196.01	0.97	192.37	0.03
wHill	CN	300	20319.23	29318.98	193.87	0.96	20314.70	163.82	189.34	258.60	1.28	285.75	0.04
wHill	CN	500	20228.75	28537.40	103.39	0.51	20224.37	164.40	99.01	197.99	0.98	190.59	0.03
wHill	CN	700	20182.25	27748.76	56.89	0.28	20180.00	162.79	54.64	175.95	0.87	174.52	0.03
wISE	RT	300	20374.66	36902.47	249.30	1.24	20367.48	188.26	242.11	314.67	1.56	359.32	0.06
wISE	RT	500	20288.75	38371.84	163.39	0.81	20280.42	187.48	155.05	255.01	1.27	257.06	0.04
wISE	RT	700	20339.11	36181.32	213.74	1.06	20326.59	183.58	201.23	286.06	1.42	302.74	0.04
wISE	RN	300	20306.28	28460.00	180.92	0.90	20302.16	165.48	176.80	247.31	1.23	270.16	0.04
wISE	RN	500	20220.36	28264.84	95.00	0.47	20215.63	160.91	90.27	193.03	0.96	190.06	0.03
wISE	RN	700	20197.03	25984.13	71.67	0.36	20194.03	158.86	68.67	176.34	0.88	174.81	0.03
wISE	CN	300	20251.71	29924.45	126.35	0.63	20244.47	171.16	119.11	214.14	1.06	209.16	0.03
wISE	CN	500	20156.74	29837.40	31.38	0.16	20154.17	168.70	28.81	175.48	0.87	169.65	0.03
wISE	CN	700	20136.88	27000.16	11.52	0.06	20135.83	164.71	10.47	164.64	0.82	167.49	0.03
wPDC	RT	300	20333.28	44456.93	207.92	1.03	20330.05	217.61	204.69	296.04	1.47	314.13	0.05
wPDC	RT	500	20202.73	44542.13	77.37	0.38	20194.28	214.25	68.92	224.68	1.12	216.23	0.04
wPDC	RT	700	20312.42	43199.08	187.06	0.93	20306.61	199.58	181.25	279.55	1.39	285.96	0.05
wPDC	RN	300	20289.10	28972.84	163.74	0.81	20282.13	168.90	156.76	236.12	1.17	244.78	0.04
wPDC	RN	500	20190.97	28751.55	65.61	0.33	20187.17	164.13	61.81	181.73	0.90	174.40	0.03
wPDC	RN	700	20188.04	25888.56	62.68	0.31	20186.34	161.10	60.98	172.60	0.86	169.32	0.03
wPDC	CN	300	20228.46	31081.13	103.10	0.51	20222.92	178.51	97.55	204.16	1.01	202.04	0.03
wPDC	CN	500	20118.61	31174.85	−6.75	−0.03	20111.43	173.98	−13.93	176.60	0.88	174.36	0.03
wPDC	CN	700	20126.14	27029.33	0.78	0.00	20124.60	167.14	−0.76	164.33	0.82	167.04	0.03
GB2			20441.49	26865.02	316.13	1.57	20432.54	155.84	307.18	356.05	1.77	455.43	0.04

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OCAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 20.

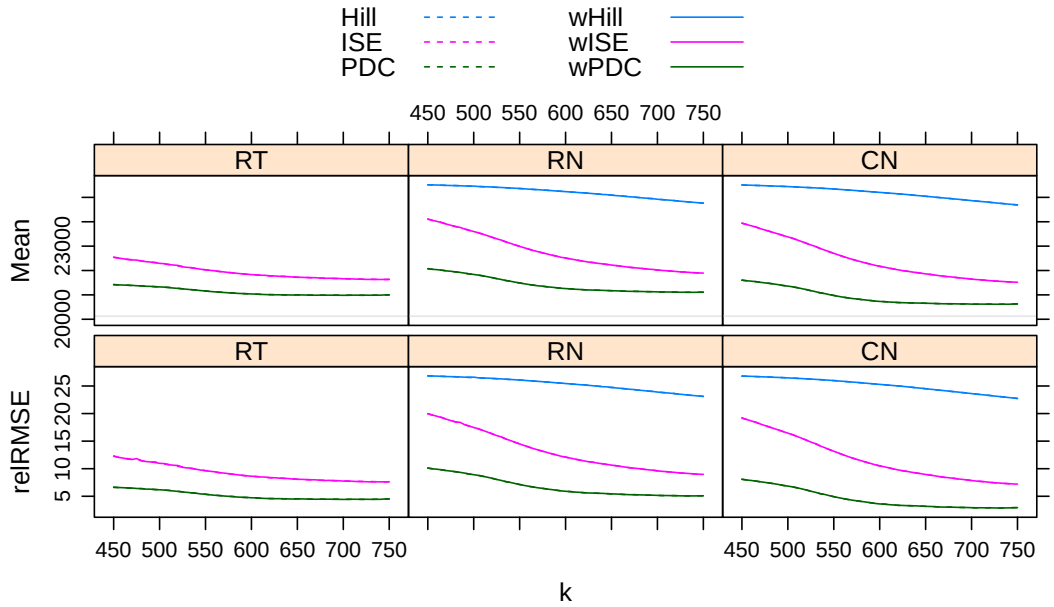

Figure F.222.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

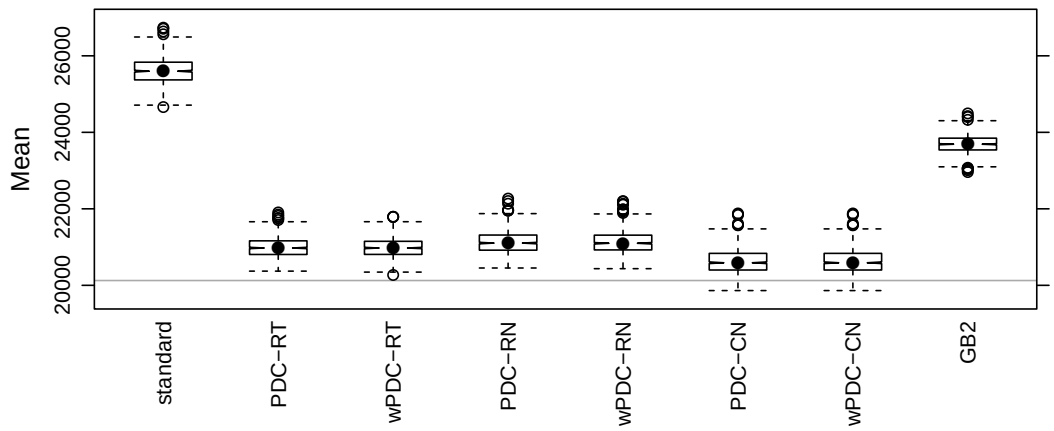

Figure F.223.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.111.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			25603.50	107044.53	5478.14	27.22	25598.44	343.50	5473.08	5487.89	27.27	8114.39	0.33
wHill	RT	500	25695.46	2871892.69	5570.10	27.68	25329.21	932.09	5203.85	5821.94	28.93	7715.23	1.35
wHill	RT	700	24597.41	1182983.87	4472.05	22.22	24468.20	599.99	4342.83	4602.29	22.87	6438.69	1.45
wHill	RN	300	25593.41	108186.91	5468.04	27.17	25588.47	348.72	5463.11	5477.92	27.22	8099.61	0.33
wHill	RN	500	25462.71	191156.36	5337.35	26.52	25450.50	342.86	5325.14	5355.21	26.61	7895.06	0.72
wHill	RN	700	24924.04	112116.75	4798.67	23.84	24921.18	348.85	4795.82	4810.33	23.90	7110.28	0.29
wHill	CN	300	25592.97	108290.09	5467.60	27.17	25588.24	348.33	5462.88	5477.49	27.22	8099.27	0.33
wHill	CN	500	25442.49	107512.97	5317.13	26.42	25441.29	344.38	5315.93	5327.22	26.47	7881.39	0.33
wHill	CN	700	24866.99	115874.51	4741.63	23.56	24868.80	358.17	4743.44	4753.82	23.62	7032.63	0.29
wISE	RT	500	22293.17	177971.68	2167.81	10.77	22246.68	409.37	2121.31	2208.44	10.97	3145.06	0.19
wISE	RT	700	21658.68	83068.04	1533.32	7.62	21646.09	283.99	1520.73	1560.14	7.75	2254.63	0.17
wISE	RN	300	25503.29	116767.02	5377.92	26.72	25496.05	352.86	5370.68	5388.76	26.78	7962.58	0.33
wISE	RN	500	23598.32	312122.83	3472.95	17.26	23603.71	574.73	3478.35	3517.56	17.48	5157.00	0.25
wISE	RN	700	22019.94	151577.25	1894.57	9.41	21990.40	390.18	1865.04	1934.12	9.61	2765.10	0.16
wISE	CN	300	25494.06	118828.38	5368.70	26.68	25491.33	354.23	5365.97	5379.74	26.73	7955.59	0.33
wISE	CN	500	23378.75	376572.83	3253.39	16.17	23387.42	628.32	3262.06	3310.70	16.45	4836.32	0.25
wISE	CN	700	21647.56	182938.89	1522.20	7.56	21618.93	433.34	1493.57	1581.09	7.86	2214.36	0.14
wPDC	RT	500	21327.31	102694.18	1201.95	5.97	21296.58	302.31	1171.22	1243.89	6.18	1736.44	0.12
wPDC	RT	700	20982.72	59285.50	857.36	4.26	20975.57	252.64	850.20	891.23	4.43	1260.51	0.08
wPDC	RN	300	23749.49	1145977.10	3624.13	18.01	23694.45	1310.88	3569.09	3778.77	18.78	5291.53	0.29
wPDC	RN	500	21837.56	287511.76	1712.20	8.51	21769.29	517.97	1643.93	1794.11	8.91	2437.29	0.20
wPDC	RN	700	21122.87	83175.93	997.51	4.96	21099.12	282.40	973.76	1038.32	5.16	1443.69	0.10
wPDC	CN	300	23468.45	1559898.12	3343.09	16.61	23432.31	1540.65	3306.95	3568.55	17.73	4902.88	0.29
wPDC	CN	500	21359.51	375458.29	1234.15	6.13	21281.36	597.46	1156.00	1377.75	6.85	1713.88	0.19
wPDC	CN	700	20620.86	101430.69	495.50	2.46	20589.91	314.93	464.55	588.94	2.93	688.73	0.09
GB2			23696.96	59044.29	3571.60	17.75	23688.61	227.89	3563.25	3579.84	17.79	5282.87	0.22

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OAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

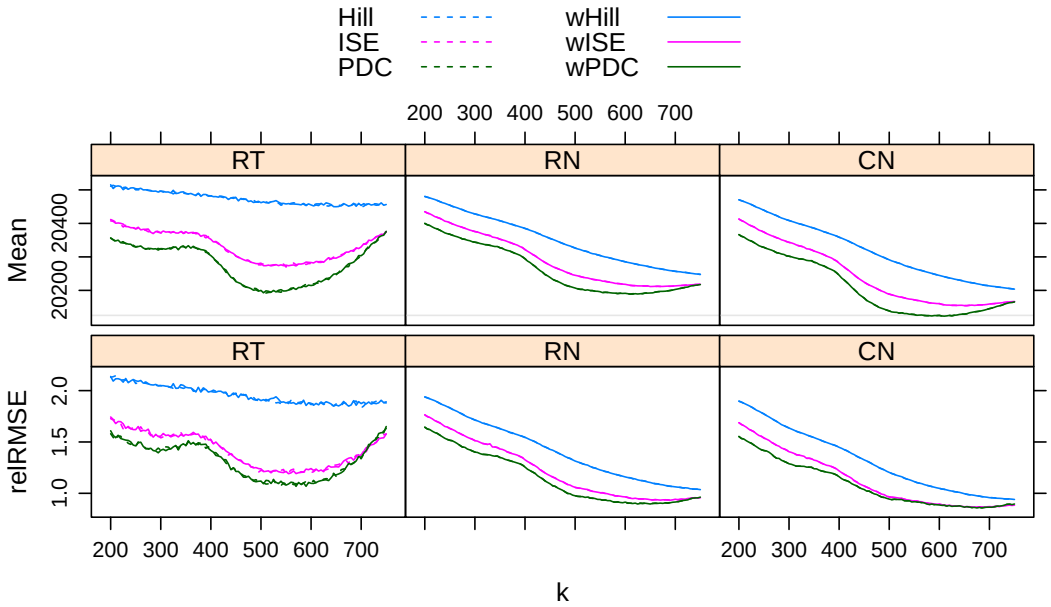

Figure F.224.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

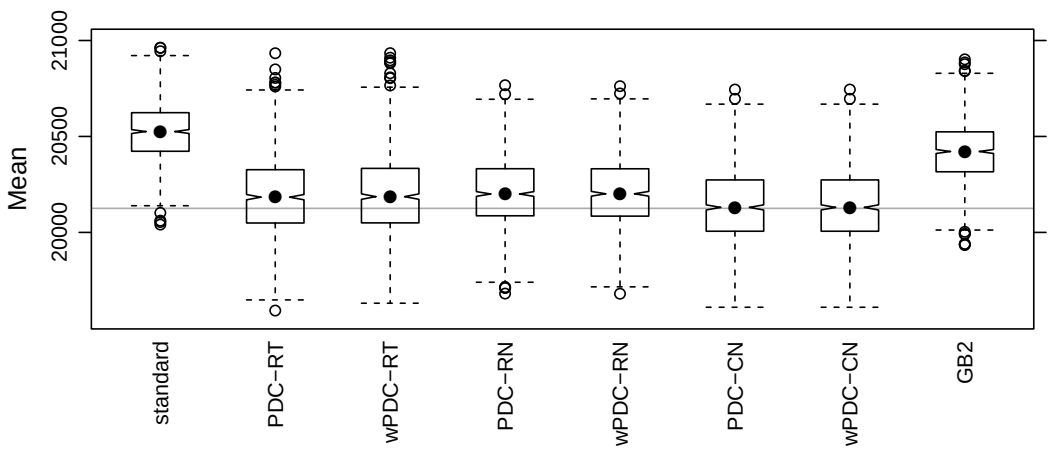

Figure F.225.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.112.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20525.32	24014.15	399.96	1.99	20525.51	149.33	400.15	428.91	2.13	593.27	0.04
wHill	RT	300	20496.29	32255.88	370.93	1.84	20487.23	172.20	361.86	412.08	2.05	536.50	0.05
wHill	RT	500	20461.85	33442.48	336.48	1.67	20455.25	184.87	329.88	382.92	1.90	489.09	0.05
wHill	RT	700	20453.38	34567.91	328.02	1.63	20443.41	187.21	318.04	377.00	1.87	471.53	0.05
wHill	RN	300	20428.17	27223.56	302.81	1.50	20424.50	162.21	299.14	344.80	1.71	443.50	0.04
wHill	RN	500	20326.32	29604.93	200.96	1.00	20320.81	169.92	195.45	264.50	1.31	294.19	0.03
wHill	RN	700	20257.17	28416.91	131.80	0.65	20255.59	160.42	130.23	213.92	1.06	221.68	0.03
wHill	CN	300	20408.63	28178.48	283.27	1.41	20406.63	163.65	281.27	329.23	1.64	417.01	0.04
wHill	CN	500	20291.27	31175.22	165.91	0.82	20285.29	179.82	159.93	242.22	1.20	254.81	0.03
wHill	CN	700	20213.28	29433.36	87.92	0.44	20210.93	164.68	85.57	192.70	0.96	192.69	0.03
wISE	RT	300	20372.08	37336.60	246.72	1.23	20363.47	192.97	238.11	313.32	1.56	354.61	0.05
wISE	RT	500	20281.30	37763.50	155.94	0.77	20279.57	196.33	154.21	249.08	1.24	258.22	0.04
wISE	RT	700	20329.93	34806.09	204.57	1.02	20333.78	185.87	208.42	276.80	1.38	322.69	0.04
wISE	RN	300	20375.63	30117.15	250.27	1.24	20372.21	174.59	246.85	304.51	1.51	367.38	0.04
wISE	RN	500	20245.01	31094.05	119.65	0.59	20243.86	169.73	118.50	213.02	1.06	215.11	0.03
wISE	RN	700	20213.41	28223.07	88.05	0.44	20210.72	167.31	85.36	189.60	0.94	192.93	0.03
wISE	CN	300	20343.34	32425.13	217.98	1.08	20340.31	182.59	214.95	282.68	1.40	324.36	0.03
wISE	CN	500	20188.77	33734.35	63.41	0.32	20189.64	183.34	64.28	194.22	0.97	185.88	0.03
wISE	CN	700	20159.31	29580.89	33.95	0.17	20157.21	171.92	31.85	175.22	0.87	173.51	0.03
wPDC	RT	300	20324.80	41808.69	199.44	0.99	20320.39	217.48	195.03	285.56	1.42	304.36	0.04
wPDC	RT	500	20199.93	45218.27	74.57	0.37	20186.48	213.37	61.12	225.24	1.12	210.99	0.04
wPDC	RT	700	20303.56	41996.79	178.20	0.89	20302.45	199.27	177.09	271.50	1.35	285.07	0.04
wPDC	RN	300	20343.74	31840.65	218.38	1.09	20341.97	178.49	216.61	281.96	1.40	326.93	0.04
wPDC	RN	500	20207.08	31921.87	81.71	0.41	20201.26	181.89	75.90	196.39	0.98	188.12	0.03
wPDC	RN	700	20202.84	27937.51	77.48	0.38	20202.60	168.39	77.24	184.15	0.92	185.37	0.03
wPDC	CN	300	20302.02	35935.75	176.66	0.88	20298.75	182.16	173.38	259.05	1.29	281.22	0.03
wPDC	CN	500	20138.74	35924.22	13.38	0.07	20130.22	195.50	4.85	189.91	0.94	193.84	0.03
wPDC	CN	700	20145.51	29920.48	20.15	0.10	20146.14	174.11	20.78	174.06	0.86	170.92	0.03
GB2			20419.55	26458.73	294.19	1.46	20421.59	154.03	296.23	336.13	1.67	439.19	0.04

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OAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

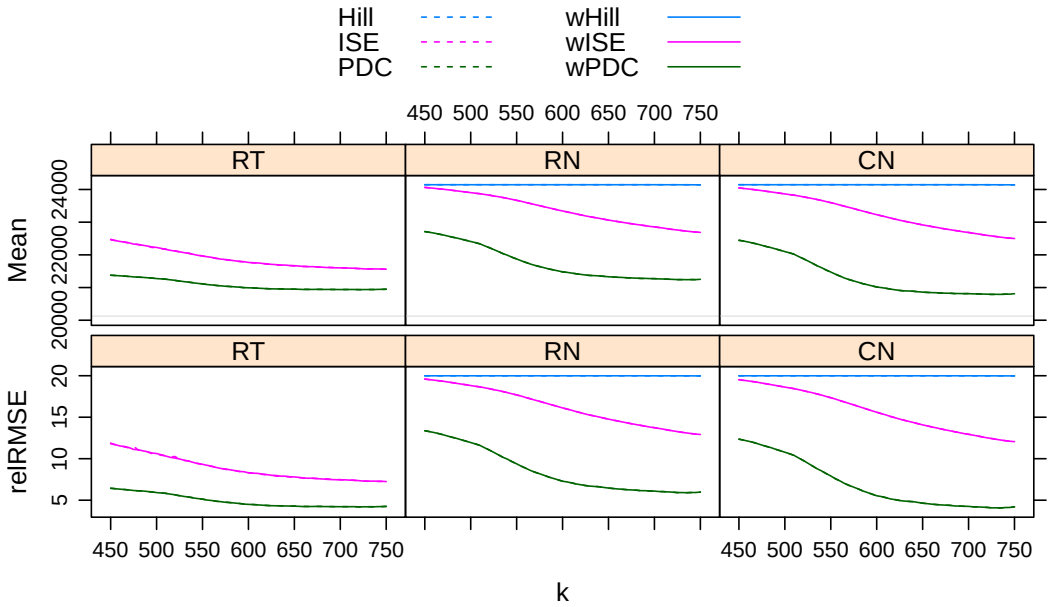

Figure F.226.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

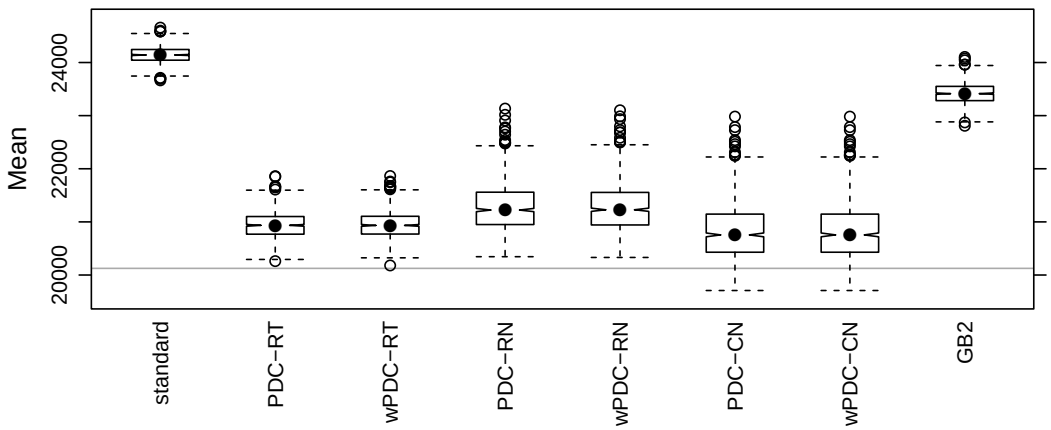

Figure F.227.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.113.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			24145.42	24741.55	4020.05	19.98	24141.64	148.23	4016.28	4023.13	19.99	5954.53	0.23
wHill	RT	500	24119.49	1353013.69	3994.13	19.85	24001.15	456.71	3875.79	4159.90	20.67	5746.25	1.68
wHill	RT	700	23598.47	230247.17	3473.11	17.26	23532.41	362.00	3407.05	3506.07	17.42	5051.29	0.43
wHill	RN	300	24145.42	24741.55	4020.05	19.98	24141.64	148.23	4016.28	4023.13	19.99	5954.53	0.23
wHill	RN	500	24145.42	24741.55	4020.05	19.98	24141.64	148.23	4016.28	4023.13	19.99	5954.53	0.23
wHill	RN	700	24145.30	24734.21	4019.94	19.97	24141.27	148.07	4015.91	4023.02	19.99	5953.99	0.23
wHill	CN	300	24145.42	24741.55	4020.05	19.98	24141.64	148.23	4016.28	4023.13	19.99	5954.53	0.23
wHill	CN	500	24145.42	24741.55	4020.05	19.98	24141.64	148.23	4016.28	4023.13	19.99	5954.53	0.23
wHill	CN	700	24145.29	24732.95	4019.93	19.97	24141.27	148.07	4015.91	4023.00	19.99	5953.99	0.23
wISE	RT	500	22226.41	155934.44	2101.05	10.44	22186.04	366.90	2060.68	2137.80	10.62	3055.16	0.24
wISE	RT	700	21601.34	70350.03	1475.98	7.33	21591.29	268.43	1465.93	1499.60	7.45	2173.39	0.12
wISE	RN	300	24145.42	24741.55	4020.05	19.98	24141.64	148.23	4016.28	4023.13	19.99	5954.53	0.23
wISE	RN	500	23903.38	67106.25	3778.02	18.77	23896.33	264.69	3770.97	3786.88	18.82	5590.83	0.22
wISE	RN	700	22856.21	189187.14	2730.85	13.57	22892.28	399.82	2766.92	2765.24	13.74	4102.23	0.20
wISE	CN	300	24145.42	24741.55	4020.05	19.98	24141.64	148.23	4016.28	4023.13	19.99	5954.53	0.23
wISE	CN	500	23863.76	78550.81	3738.40	18.58	23853.46	290.09	3728.09	3748.88	18.63	5527.27	0.22
wISE	CN	700	22684.73	235126.39	2559.37	12.72	22735.77	444.02	2610.41	2604.85	12.94	3870.19	0.20
wPDC	RT	500	21273.86	99824.76	1148.50	5.71	21250.74	311.00	1125.38	1191.12	5.92	1668.48	0.12
wPDC	RT	700	20938.51	58697.93	813.15	4.04	20933.84	245.49	808.48	848.44	4.22	1198.65	0.09
wPDC	RN	300	23934.38	252294.81	3809.02	18.93	24079.65	231.51	3954.28	3841.96	19.09	5862.62	0.23
wPDC	RN	500	22408.51	567310.95	2283.15	11.34	22414.11	853.15	2288.75	2404.06	11.95	3393.30	0.20
wPDC	RN	700	21272.85	189694.83	1147.49	5.70	21228.16	447.01	1102.80	1227.29	6.10	1635.01	0.15
wPDC	CN	300	23884.92	372531.82	3759.56	18.68	24076.85	241.94	3951.49	3808.74	18.93	5858.48	0.23
wPDC	CN	500	22100.24	808383.05	1974.87	9.81	22119.27	1003.60	1993.90	2169.72	10.78	2956.16	0.20
wPDC	CN	700	20813.97	259491.59	688.61	3.42	20755.03	512.84	629.66	856.39	4.26	933.54	0.14
GB2			23418.84	42415.93	3293.48	16.36	23414.27	200.95	3288.91	3299.90	16.40	4876.13	0.20

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OAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

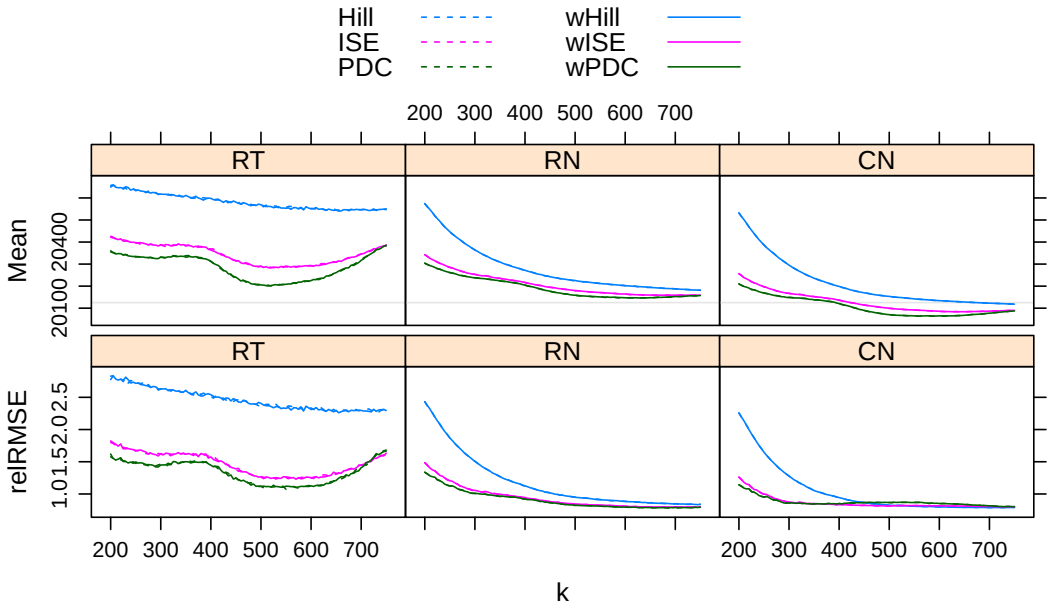

Figure F.228.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

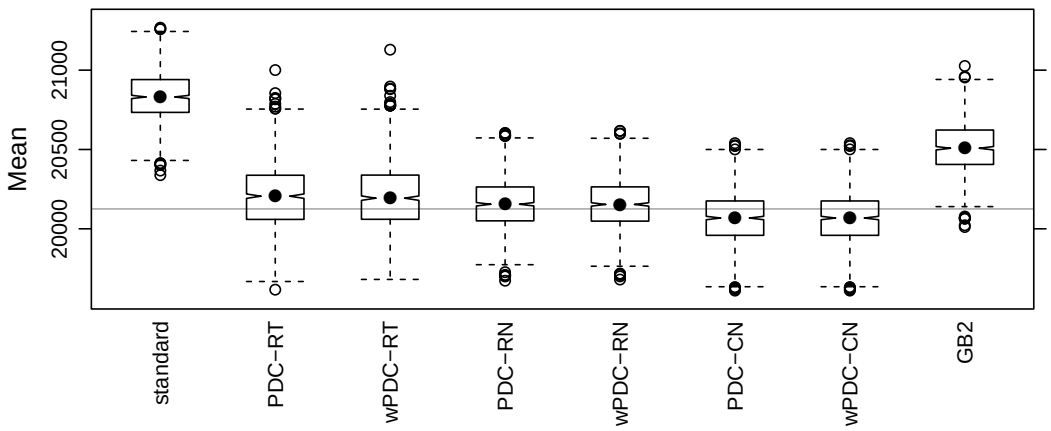

Figure F.229.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.114.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20835.76	24394.28	710.40	3.53	20831.05	154.17	705.69	727.35	3.61	1046.26	0.06
wHill	RT	300	20617.60	38310.80	492.24	2.45	20609.47	197.48	484.11	529.69	2.63	717.73	0.06
wHill	RT	500	20569.01	37600.16	443.65	2.20	20561.36	189.43	436.00	484.13	2.41	646.41	0.05
wHill	RT	700	20545.86	36931.11	420.49	2.09	20551.70	174.69	426.34	462.29	2.30	632.09	0.05
wHill	RN	300	20363.93	34811.52	238.57	1.19	20358.22	184.71	232.86	302.81	1.50	348.53	0.04
wHill	RN	500	20225.46	26502.30	100.09	0.50	20223.44	157.10	98.08	191.04	0.95	193.49	0.03
wHill	RN	700	20187.64	25277.74	62.28	0.31	20183.59	158.61	58.23	170.68	0.85	167.71	0.03
wHill	CN	300	20295.15	37308.56	169.78	0.84	20287.57	192.22	162.21	257.10	1.28	256.11	0.04
wHill	CN	500	20153.46	26915.83	28.09	0.14	20153.00	159.07	27.64	166.37	0.83	156.46	0.03
wHill	CN	700	20122.60	25262.02	−2.76	−0.01	20117.53	158.50	−7.83	158.88	0.79	159.63	0.02
wISE	RT	300	20388.53	38182.15	263.17	1.31	20378.42	191.88	253.05	327.72	1.63	383.17	0.04
wISE	RT	500	20290.94	37426.28	165.57	0.82	20285.31	197.45	159.95	254.57	1.26	262.62	0.04
wISE	RT	700	20345.96	36321.33	220.60	1.10	20338.13	194.55	212.77	291.46	1.45	323.77	0.04
wISE	RN	300	20253.35	28772.68	127.98	0.64	20246.97	167.48	121.61	212.42	1.06	212.68	0.04
wISE	RN	500	20179.47	25936.68	54.11	0.27	20175.91	155.63	50.55	169.82	0.84	162.86	0.02
wISE	RN	700	20159.01	24819.66	33.65	0.17	20154.39	156.13	29.03	161.02	0.80	160.91	0.02
wISE	CN	300	20167.20	29247.75	41.84	0.21	20159.61	166.05	34.25	175.98	0.87	170.54	0.03
wISE	CN	500	20099.38	26228.02	−25.98	−0.13	20096.20	161.14	−29.17	163.94	0.81	163.51	0.03
wISE	CN	700	20086.62	24829.12	−38.74	−0.19	20081.26	160.51	−44.10	162.19	0.81	163.34	0.03
wPDC	RT	300	20331.52	42552.99	206.16	1.02	20320.81	207.98	195.45	291.57	1.45	311.41	0.05
wPDC	RT	500	20205.32	44204.79	79.96	0.40	20193.13	203.60	67.77	224.84	1.12	214.82	0.05
wPDC	RT	700	20316.93	43569.74	191.57	0.95	20306.03	208.97	180.66	283.24	1.41	290.08	0.05
wPDC	RN	300	20237.88	28528.09	112.52	0.56	20231.98	170.58	106.62	202.88	1.01	201.92	0.03
wPDC	RN	500	20158.77	26472.95	33.40	0.17	20153.64	160.88	28.28	166.02	0.82	159.34	0.02
wPDC	RN	700	20153.12	24584.94	27.76	0.14	20147.86	157.51	22.50	159.16	0.79	158.43	0.02
wPDC	CN	300	20148.64	29573.80	23.28	0.12	20143.10	170.21	17.74	173.45	0.86	168.36	0.03
wPDC	CN	500	20070.59	27502.54	−54.77	−0.27	20067.93	160.65	−57.43	174.57	0.87	178.67	0.03
wPDC	CN	700	20077.50	24731.84	−47.87	−0.24	20073.78	164.49	−51.58	164.31	0.82	164.03	0.03
GB2			20511.96	27097.44	386.60	1.92	20507.79	160.69	382.43	420.16	2.09	566.99	0.04

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OAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

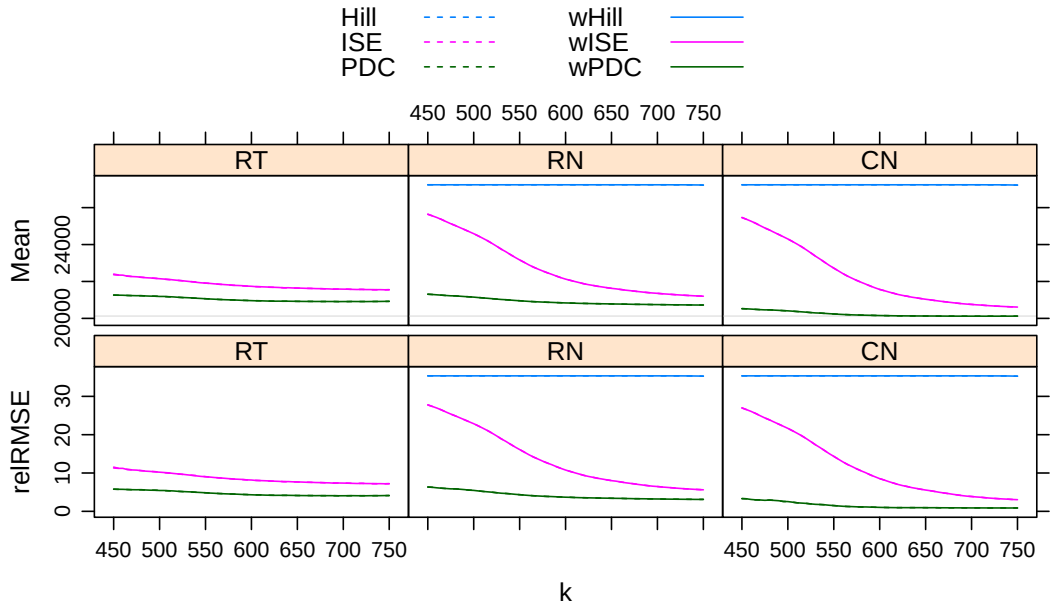

Figure F.230.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

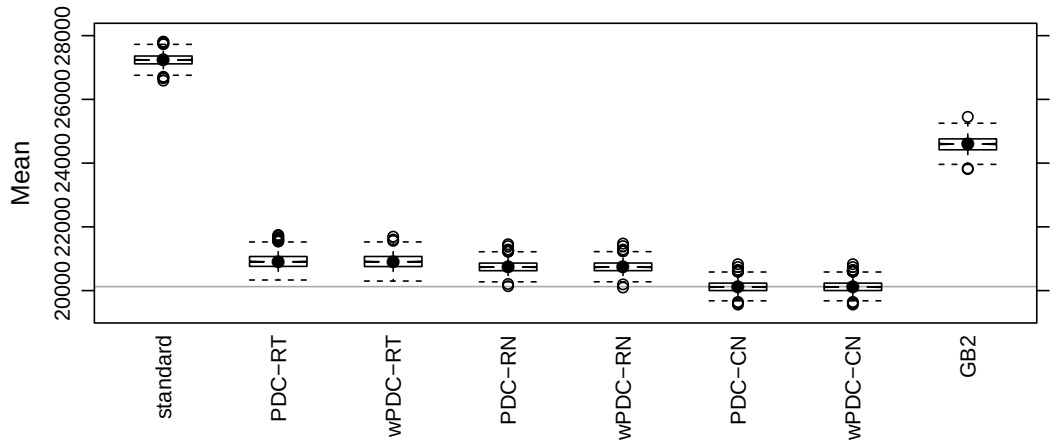

Figure F.231.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.115.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			27237.21	32798.59	7111.84	35.34	27238.35	182.24	7112.99	7114.15	35.35	10545.72	0.38
wHill	RT	500	26876.41	9247811.79	6751.05	33.54	26305.51	1010.58	6180.15	7403.73	36.79	9162.69	2.62
wHill	RT	700	25321.13	919404.18	5195.77	25.82	25200.49	602.81	5075.13	5283.42	26.25	7524.38	0.90
wHill	RN	300	27237.21	32798.59	7111.84	35.34	27238.35	182.24	7112.99	7114.15	35.35	10545.72	0.38
wHill	RN	500	27237.21	32798.59	7111.84	35.34	27238.35	182.24	7112.99	7114.15	35.35	10545.72	0.38
wHill	RN	700	27237.21	32798.59	7111.84	35.34	27238.35	182.24	7112.99	7114.15	35.35	10545.72	0.38
wHill	CN	300	27237.21	32798.59	7111.84	35.34	27238.35	182.24	7112.99	7114.15	35.35	10545.72	0.38
wHill	CN	500	27237.21	32798.59	7111.84	35.34	27238.35	182.24	7112.99	7114.15	35.35	10545.72	0.38
wHill	CN	700	27237.21	32798.59	7111.84	35.34	27238.35	182.24	7112.99	7114.15	35.35	10545.72	0.38
wISE	RT	500	22148.90	132523.66	2023.54	10.05	22131.08	346.99	2005.72	2055.99	10.22	2973.68	0.18
wISE	RT	700	21584.11	70991.58	1458.74	7.25	21575.23	259.61	1449.87	1482.85	7.37	2149.57	0.13
wISE	RN	300	27236.19	33604.92	7110.83	35.33	27238.35	182.44	7112.99	7113.19	35.34	10545.72	0.38
wISE	RN	500	24589.01	1250176.76	4463.64	22.18	24759.77	1025.89	4634.40	4601.42	22.86	6870.97	0.34
wISE	RN	700	21356.85	178639.59	1231.49	6.12	21309.83	378.32	1184.47	1301.93	6.47	1756.09	0.16
wISE	CN	300	27236.04	33816.30	7110.67	35.33	27238.35	182.44	7112.99	7113.05	35.34	10545.72	0.38
wISE	CN	500	24301.11	1548968.47	4175.75	20.75	24514.79	1101.46	4389.43	4357.10	21.65	6507.77	0.34
wISE	CN	700	20756.49	206785.82	631.13	3.14	20689.61	396.44	564.25	777.75	3.86	836.56	0.14
wPDC	RT	500	21187.76	66424.97	1062.39	5.28	21168.44	255.70	1043.08	1093.18	5.43	1546.47	0.10
wPDC	RT	700	20911.28	50790.87	785.92	3.91	20906.18	233.03	780.81	817.57	4.06	1157.64	0.08
wPDC	RN	300	23263.05	1306154.81	3137.68	15.59	22827.21	487.50	2701.85	3339.15	16.59	4005.76	0.38
wPDC	RN	500	21151.40	156590.75	1026.03	5.10	21074.00	281.34	948.64	1099.63	5.46	1406.45	0.17
wPDC	RN	700	20746.18	34524.89	620.81	3.08	20737.36	182.15	612.00	648.00	3.22	907.35	0.07
wPDC	CN	300	22606.33	1798516.61	2480.97	12.33	22080.70	561.69	1955.34	2819.91	14.01	2898.99	0.38
wPDC	CN	500	20408.59	181308.80	283.23	1.41	20312.62	278.82	187.26	511.22	2.54	325.24	0.14
wPDC	CN	700	20120.17	31734.66	−5.19	−0.03	20112.48	172.67	−12.88	178.13	0.89	171.51	0.03
GB2			24590.71	59543.24	4465.34	22.19	24598.62	253.45	4473.25	4472.00	22.22	6632.05	0.26

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OAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

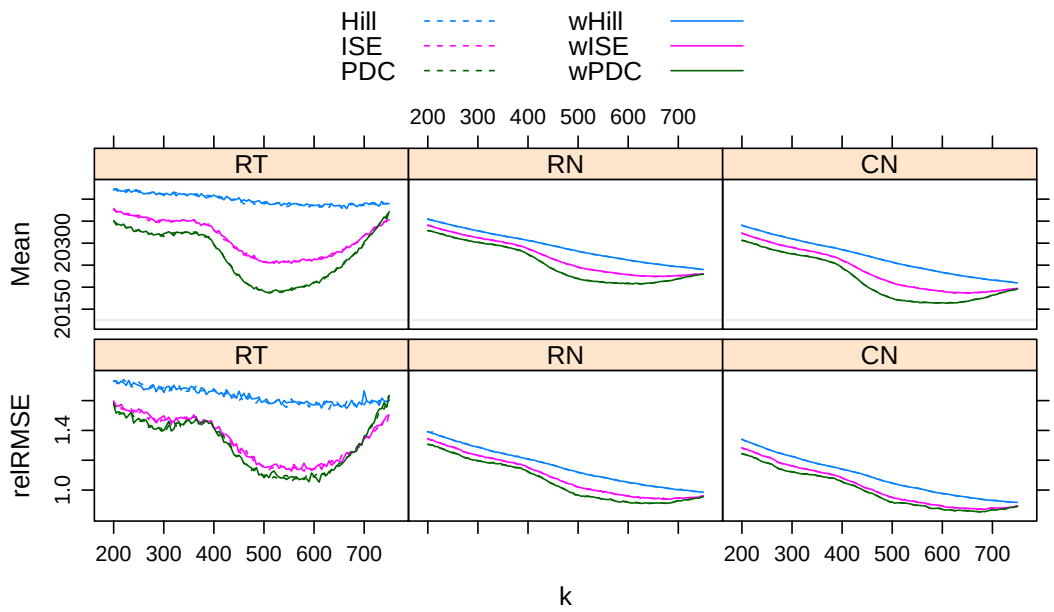

Figure F.232.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

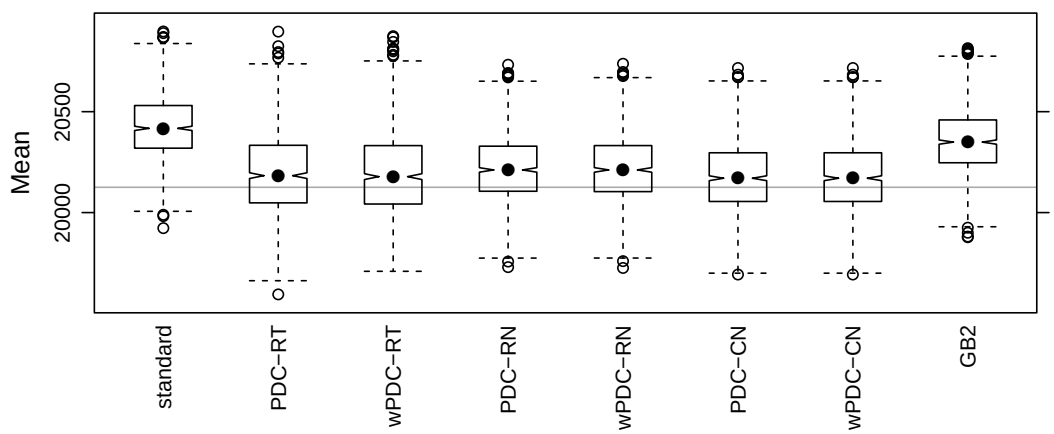

Figure F.233.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.116.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20424.99	26223.73	299.63	1.49	20417.28	159.07	291.92	340.55	1.69	432.80	0.04
wHill	RT	300	20407.96	30931.19	282.60	1.40	20394.72	171.93	269.36	332.81	1.65	399.36	0.04
wHill	RT	500	20393.21	31671.79	267.85	1.33	20388.29	184.92	262.93	321.53	1.60	389.86	0.04
wHill	RT	700	20390.48	42069.00	265.12	1.32	20380.61	178.68	255.25	335.14	1.67	378.43	0.16
wHill	RN	300	20327.91	26212.46	202.55	1.01	20328.20	154.97	202.84	259.25	1.29	305.81	0.03
wHill	RN	500	20281.43	26367.43	156.07	0.78	20280.07	156.50	154.70	225.16	1.12	244.41	0.03
wHill	RN	700	20246.67	26064.39	121.30	0.60	20240.26	159.02	114.90	201.87	1.00	200.75	0.03
wHill	CN	300	20309.93	26797.98	184.57	0.92	20310.59	158.71	185.22	246.65	1.23	280.70	0.03
wHill	CN	500	20256.78	27111.42	131.42	0.65	20255.65	163.72	130.29	210.61	1.05	221.87	0.03
wHill	CN	700	20216.17	26836.50	90.81	0.45	20207.29	160.72	81.93	187.23	0.93	189.61	0.03
wISE	RT	300	20353.71	38814.36	228.35	1.13	20348.56	183.28	223.20	301.53	1.50	334.38	0.04
wISE	RT	500	20256.48	36719.85	131.11	0.65	20245.24	183.70	119.88	232.11	1.15	220.30	0.04
wISE	RT	700	20317.29	36884.59	191.92	0.95	20306.92	194.42	181.56	271.45	1.35	276.95	0.05
wISE	RN	300	20312.71	26502.14	187.35	0.93	20315.31	159.36	189.95	248.14	1.23	285.76	0.03
wISE	RN	500	20245.50	27736.28	120.14	0.60	20239.26	163.66	113.89	205.29	1.02	207.95	0.03
wISE	RN	700	20226.70	25971.31	101.34	0.50	20222.88	165.87	97.52	190.30	0.95	190.79	0.03
wISE	CN	300	20290.54	27435.84	165.18	0.82	20291.50	161.80	166.14	233.86	1.16	261.50	0.03
wISE	CN	500	20209.74	29518.19	84.38	0.42	20205.46	173.52	80.10	191.33	0.95	191.91	0.03
wISE	CN	700	20190.61	27139.39	65.25	0.32	20187.54	171.39	62.18	177.12	0.88	179.90	0.03
wPDC	RT	300	20321.76	40910.67	196.40	0.98	20311.71	210.51	186.35	281.85	1.40	294.49	0.05
wPDC	RT	500	20190.59	43238.20	65.22	0.32	20178.18	212.92	52.82	217.83	1.08	217.97	0.04
wPDC	RT	700	20303.09	43533.60	177.72	0.88	20284.20	212.30	158.83	274.00	1.36	262.89	0.05
wPDC	RN	300	20301.96	26768.92	176.59	0.88	20301.74	159.42	176.38	240.68	1.20	269.51	0.03
wPDC	RN	500	20219.63	29092.65	94.27	0.47	20211.44	164.95	86.08	194.81	0.97	193.43	0.03
wPDC	RN	700	20219.34	26118.82	93.97	0.47	20217.90	163.44	92.54	186.88	0.93	185.73	0.03
wPDC	CN	300	20275.90	28280.65	150.54	0.75	20276.00	167.08	150.64	225.64	1.12	239.33	0.03
wPDC	CN	500	20174.70	31792.67	49.34	0.25	20170.17	175.99	44.80	184.92	0.92	181.77	0.03
wPDC	CN	700	20181.72	27443.68	56.36	0.28	20180.50	170.60	55.13	174.91	0.87	177.90	0.03
GB2			20351.43	26510.47	226.07	1.12	20349.21	156.74	223.85	278.56	1.38	334.97	0.03

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OAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

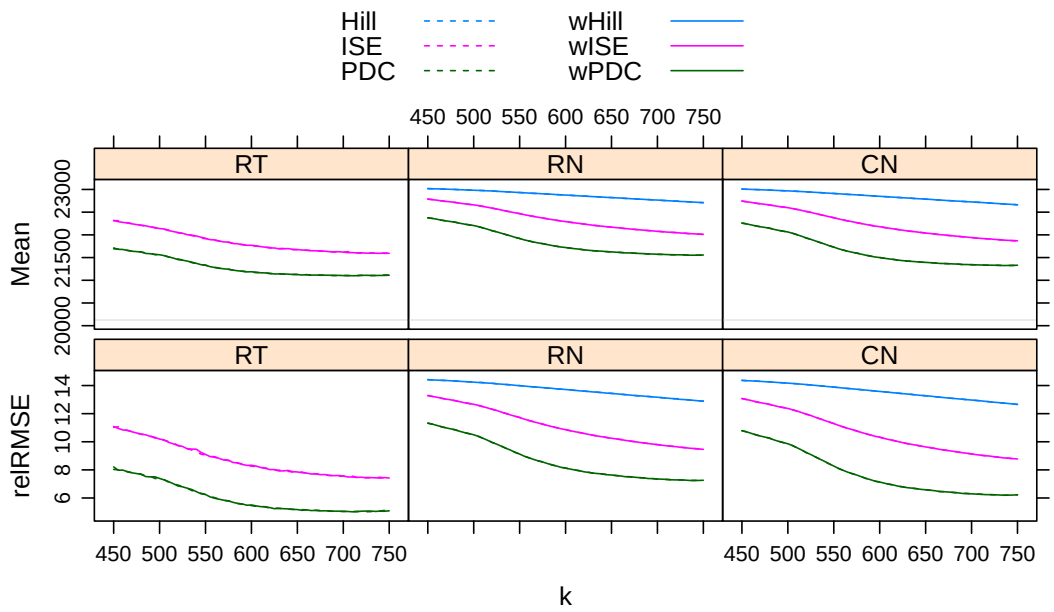

Figure F.234.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

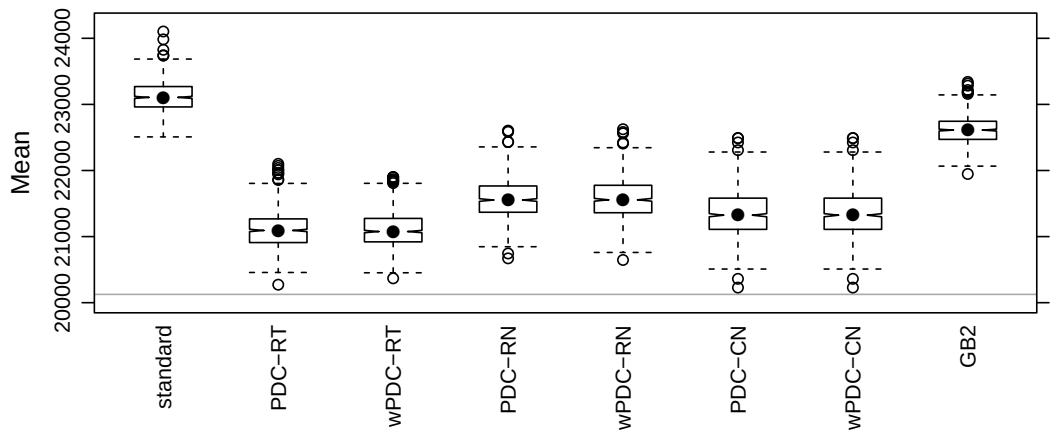

Figure F.235.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.117.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			23118.82	51241.33	2993.46	14.87	23106.11	228.87	2980.75	3002.00	14.92	4419.25	0.20
wHill	RT	500	23164.34	282551.85	3038.97	15.10	23082.62	396.07	2957.26	3085.07	15.33	4384.43	0.35
wHill	RT	700	22872.70	134754.32	2747.34	13.65	22848.24	361.30	2722.88	2771.73	13.77	4036.94	0.26
wHill	RN	300	23087.25	51010.19	2961.89	14.72	23083.47	231.89	2958.11	2970.48	14.76	4385.69	0.19
wHill	RN	500	22982.35	51328.90	2856.99	14.20	22986.69	230.61	2861.33	2865.95	14.24	4242.20	0.19
wHill	RN	700	22766.03	52361.68	2640.66	13.12	22757.43	222.70	2632.07	2650.55	13.17	3902.31	0.17
wHill	CN	300	23084.16	51224.01	2958.80	14.70	23080.39	231.35	2955.03	2967.43	14.74	4381.13	0.19
wHill	CN	500	22968.24	52265.15	2842.88	14.13	22973.93	229.39	2848.57	2852.05	14.17	4223.29	0.19
wHill	CN	700	22724.87	54064.39	2599.51	12.92	22716.12	224.85	2590.76	2609.88	12.97	3841.06	0.17
wISE	RT	500	22138.95	149581.02	2013.59	10.01	22098.62	356.51	1973.26	2050.36	10.19	2925.56	0.23
wISE	RT	700	21620.16	81185.58	1494.80	7.43	21603.68	267.46	1478.32	1521.69	7.56	2191.75	0.14
wISE	RN	300	23063.31	52733.95	2937.95	14.60	23060.98	230.09	2935.62	2946.90	14.64	4352.35	0.19
wISE	RN	500	22660.07	71094.90	2534.71	12.59	22665.97	249.81	2540.60	2548.68	12.66	3766.70	0.18
wISE	RN	700	22077.99	71023.00	1952.63	9.70	22071.70	263.67	1946.34	1970.71	9.79	2885.65	0.15
wISE	CN	300	23057.03	53405.82	2931.67	14.57	23057.13	230.77	2931.77	2940.75	14.61	4346.64	0.19
wISE	CN	500	22598.32	80618.46	2472.95	12.29	22604.09	268.61	2478.73	2489.18	12.37	3674.97	0.17
wISE	CN	700	21940.68	83552.30	1815.32	9.02	21934.48	280.93	1809.12	1838.17	9.13	2682.20	0.15
wPDC	RT	500	21562.25	147500.33	1436.89	7.14	21524.49	353.01	1399.12	1487.28	7.39	2074.34	0.17
wPDC	RT	700	21103.98	70504.24	978.62	4.86	21076.34	261.33	950.98	1013.96	5.04	1409.92	0.09
wPDC	RN	300	22938.63	88913.92	2813.27	13.98	22963.09	276.98	2837.72	2829.01	14.06	4207.21	0.18
wPDC	RN	500	22204.87	139287.47	2079.51	10.33	22209.47	378.87	2084.11	2112.70	10.50	3089.90	0.16
wPDC	RN	700	21572.46	93127.70	1447.10	7.19	21556.47	302.86	1431.11	1478.90	7.35	2121.76	0.12
wPDC	CN	300	22909.80	105612.93	2784.44	13.84	22945.26	286.12	2819.90	2803.32	13.93	4180.78	0.18
wPDC	CN	500	22063.14	181393.71	1937.78	9.63	22078.62	432.51	1953.25	1983.99	9.86	2895.89	0.16
wPDC	CN	700	21343.15	121580.50	1217.79	6.05	21323.46	346.57	1198.10	1266.68	6.29	1776.30	0.12
GB2			22607.27	43093.94	2481.91	12.33	22611.46	203.90	2486.10	2490.56	12.38	3685.89	0.16

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OAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 20.

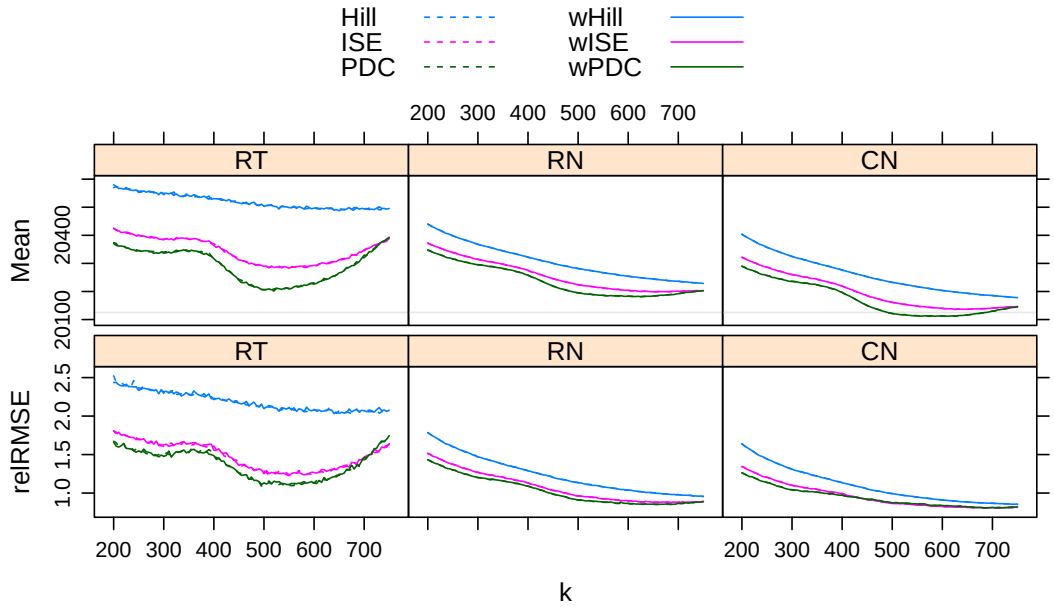

Figure F.236.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

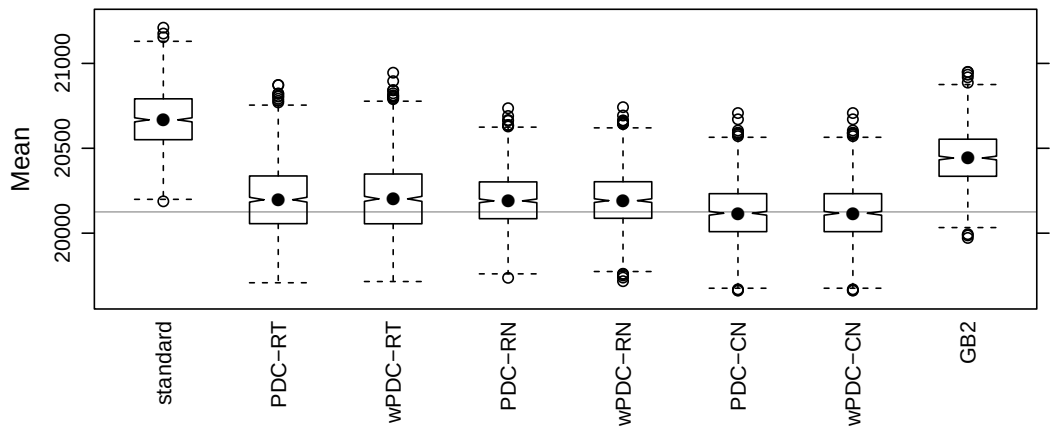

Figure F.237.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.118.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20668.82	31562.15	543.46	2.70	20667.55	179.36	542.19	571.74	2.84	803.85	0.05
wHill	RT	300	20548.11	37856.09	422.74	2.10	20539.97	199.34	414.61	465.33	2.31	614.71	0.05
wHill	RT	500	20502.70	35625.06	377.33	1.87	20499.36	183.34	374.00	421.87	2.10	554.49	0.05
wHill	RT	700	20494.60	37282.22	369.24	1.83	20486.85	190.05	361.49	416.63	2.07	535.95	0.07
wHill	RN	300	20368.18	28562.37	242.81	1.21	20365.39	165.60	240.03	295.79	1.47	356.30	0.04
wHill	RN	500	20281.78	27865.97	156.42	0.78	20276.47	166.04	151.11	228.70	1.14	241.05	0.03
wHill	RN	700	20236.41	26556.92	111.05	0.55	20233.31	159.65	107.94	197.13	0.98	202.42	0.03
wHill	CN	300	20324.71	29736.41	199.35	0.99	20323.32	171.20	197.96	263.53	1.31	300.35	0.04
wHill	CN	500	20232.39	28513.91	107.03	0.53	20229.01	166.50	103.65	199.85	0.99	204.73	0.03
wHill	CN	700	20185.42	26868.01	60.06	0.30	20184.77	162.17	59.41	174.49	0.87	173.20	0.03
wISE	RT	300	20385.69	39320.07	260.33	1.29	20375.94	190.96	250.58	327.19	1.63	372.51	0.05
wISE	RT	500	20289.44	36575.38	164.08	0.82	20286.52	187.58	161.16	251.91	1.25	262.66	0.04
wISE	RT	700	20348.56	36849.36	223.20	1.11	20340.89	193.72	215.53	294.33	1.46	326.76	0.05
wISE	RN	300	20314.78	29589.04	189.42	0.94	20312.71	171.00	187.35	255.81	1.27	285.06	0.04
wISE	RN	500	20224.37	27960.33	99.01	0.49	20225.91	159.58	100.54	194.26	0.97	195.57	0.03
wISE	RN	700	20201.40	25829.23	76.04	0.38	20198.41	160.31	73.04	177.72	0.88	174.91	0.03
wISE	CN	300	20260.33	30981.94	134.97	0.67	20261.77	170.05	136.41	221.74	1.10	234.81	0.04
wISE	CN	500	20161.38	29119.37	36.02	0.18	20159.73	163.38	34.37	174.32	0.87	169.91	0.03
wISE	CN	700	20140.92	26521.10	15.56	0.08	20136.74	164.84	11.37	163.51	0.81	162.02	0.03
wPDC	RT	300	20336.59	43705.00	211.22	1.05	20323.31	199.20	197.94	297.11	1.48	306.27	0.05
wPDC	RT	500	20206.54	45382.76	81.18	0.40	20202.16	217.05	76.80	227.88	1.13	221.76	0.04
wPDC	RT	700	20329.21	45446.24	203.84	1.01	20313.67	209.41	188.31	294.88	1.47	299.29	0.05
wPDC	RN	300	20295.50	29606.63	170.13	0.85	20295.83	169.73	170.47	241.91	1.20	264.76	0.04
wPDC	RN	500	20194.69	28641.40	69.33	0.34	20191.81	159.64	66.44	182.81	0.91	174.90	0.03
wPDC	RN	700	20192.36	25953.88	66.99	0.33	20189.81	160.11	64.45	174.40	0.87	169.59	0.03
wPDC	CN	300	20236.02	31845.34	110.66	0.55	20239.33	175.28	113.97	209.90	1.04	211.61	0.04
wPDC	CN	500	20121.56	30732.07	−3.80	−0.02	20117.27	166.03	−8.10	175.26	0.87	167.62	0.03
wPDC	CN	700	20130.07	26671.63	4.71	0.02	20131.88	166.04	6.51	163.30	0.81	164.48	0.03
GB2			20443.90	27362.52	318.54	1.58	20442.73	161.62	317.37	358.89	1.78	470.53	0.04

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OAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 20.

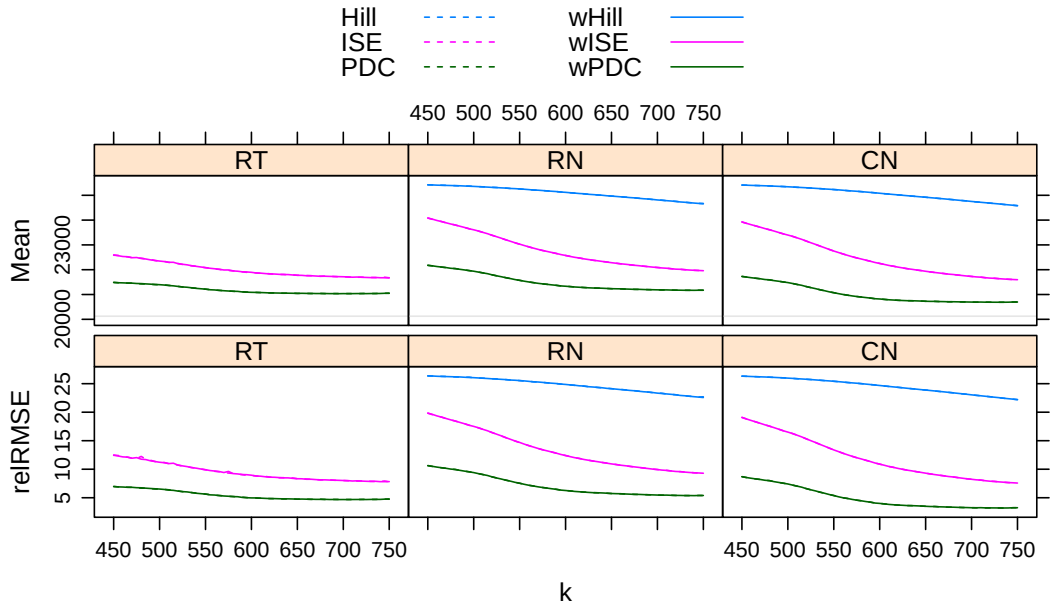

Figure F.238.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

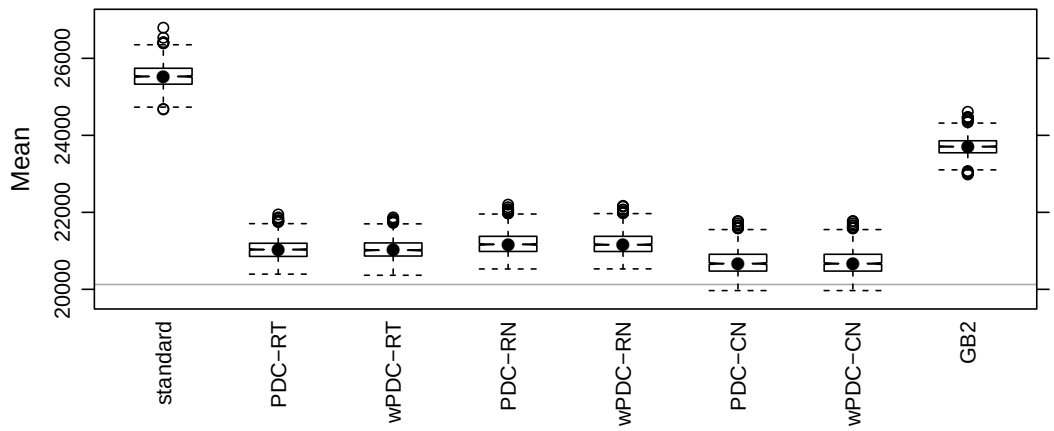

Figure F.239.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.119.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			25536.73	97211.89	5411.37	26.89	25528.96	304.34	5403.60	5420.34	26.93	8011.38	0.33
wHill	RT	500	25649.84	9881371.88	5524.48	27.45	25260.49	768.66	5135.13	6355.42	31.58	7613.34	3.90
wHill	RT	700	24529.38	583421.86	4404.02	21.88	24437.53	554.66	4312.17	4469.70	22.21	6393.23	0.70
wHill	RN	300	25519.96	95649.47	5394.60	26.80	25507.15	292.12	5381.79	5403.45	26.85	7979.04	0.33
wHill	RN	500	25359.50	98166.22	5234.14	26.01	25349.65	289.16	5224.29	5243.50	26.05	7745.54	0.33
wHill	RN	700	24812.14	101106.76	4686.78	23.29	24805.36	313.09	4680.00	4697.54	23.34	6938.57	0.29
wHill	CN	300	25518.56	95685.83	5393.19	26.80	25506.44	292.69	5381.08	5402.05	26.84	7977.99	0.33
wHill	CN	500	25343.60	96601.67	5218.24	25.93	25337.16	288.32	5211.79	5227.47	25.97	7727.01	0.31
wHill	CN	700	24751.67	103848.10	4626.31	22.99	24741.86	310.50	4616.50	4637.51	23.04	6844.43	0.28
wISE	RT	500	22348.83	158208.90	2223.47	11.05	22318.33	397.41	2192.97	2258.73	11.22	3251.30	0.25
wISE	RT	700	21715.96	76645.52	1590.60	7.90	21703.29	269.41	1577.92	1614.49	8.02	2339.43	0.12
wISE	RN	300	25416.59	102648.00	5291.23	26.29	25418.22	298.45	5292.85	5300.91	26.34	7847.19	0.32
wISE	RN	500	23609.00	280801.11	3483.64	17.31	23604.89	533.76	3479.53	3523.68	17.51	5158.75	0.28
wISE	RN	700	22089.04	147044.65	1963.67	9.76	22066.47	387.29	1941.11	2000.73	9.94	2877.89	0.16
wISE	CN	300	25406.66	104666.72	5281.30	26.24	25401.29	300.01	5275.93	5291.19	26.29	7822.10	0.32
wISE	CN	500	23397.35	335125.91	3271.98	16.26	23401.16	588.01	3275.80	3322.75	16.51	4856.70	0.25
wISE	CN	700	21727.76	179276.19	1602.40	7.96	21697.84	412.23	1572.48	1657.34	8.24	2331.36	0.15
wPDC	RT	500	21396.07	108362.03	1270.71	6.31	21367.96	323.72	1242.60	1312.61	6.52	1842.28	0.12
wPDC	RT	700	21036.22	59311.67	910.86	4.53	21015.41	255.37	890.05	942.83	4.68	1319.59	0.09
wPDC	RN	300	23833.93	1049323.70	3708.57	18.43	23848.24	1236.88	3722.88	3847.31	19.12	5519.54	0.30
wPDC	RN	500	21939.34	295202.00	1813.97	9.01	21865.66	528.59	1740.29	1893.52	9.41	2580.16	0.22
wPDC	RN	700	21187.80	82857.15	1062.43	5.28	21160.71	286.82	1035.34	1100.70	5.47	1535.00	0.10
wPDC	CN	300	23579.35	1435805.51	3453.99	17.16	23605.45	1439.12	3480.09	3655.74	18.16	5159.58	0.30
wPDC	CN	500	21481.16	386783.48	1355.80	6.74	21405.29	612.17	1279.93	1491.51	7.41	1897.62	0.21
wPDC	CN	700	20694.73	102778.66	569.37	2.83	20668.56	327.21	543.20	653.34	3.25	805.35	0.08
GB2			23708.81	58052.55	3583.45	17.81	23708.00	231.01	3582.64	3591.53	17.85	5311.62	0.22

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Stratified simple random sampling

No contamination

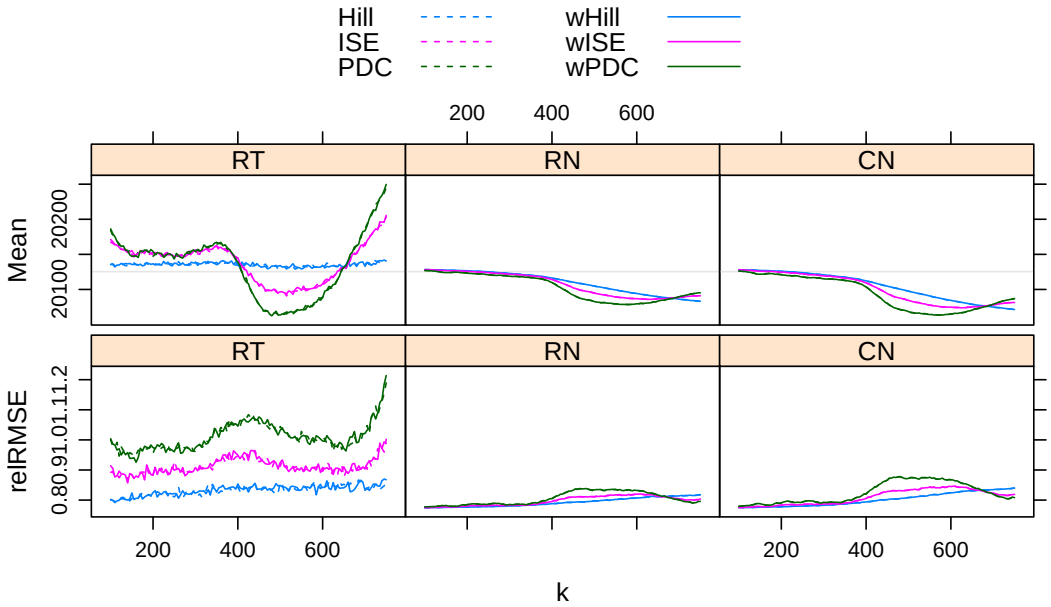

Figure F.240.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 100 and 750.

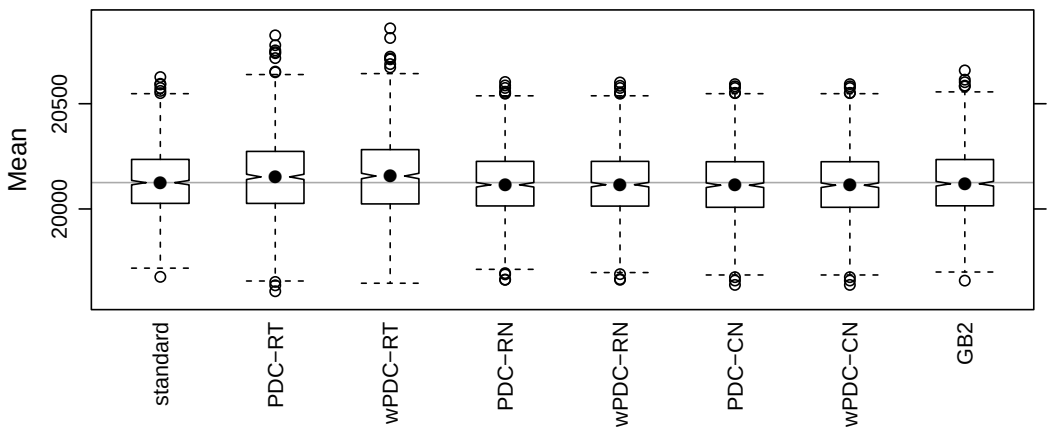

Figure F.241.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 300$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.120.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20128.56	24304.49	3.20	0.02	20125.09	153.61	−0.27	155.85	0.77	154.01	0.02
wHill	RT	300	20137.87	27307.22	12.50	0.06	20135.13	170.90	9.77	165.64	0.82	169.81	0.03
wHill	RT	500	20133.98	29137.01	8.62	0.04	20128.25	174.54	2.89	170.83	0.85	174.32	0.03
wHill	RT	700	20132.94	28021.38	7.58	0.04	20131.79	161.75	6.42	167.48	0.83	161.60	0.03
wHill	RN	300	20122.77	24680.71	−2.59	−0.01	20119.07	156.38	−6.29	157.04	0.78	155.66	0.02
wHill	RN	500	20104.67	25355.87	−20.69	−0.10	20101.00	159.70	−24.36	160.49	0.80	162.15	0.02
wHill	RN	700	20086.09	25311.27	−39.27	−0.20	20083.08	162.02	−42.28	163.79	0.81	165.52	0.02
wHill	CN	300	20120.79	24802.97	−4.57	−0.02	20116.18	157.38	−9.18	157.48	0.78	156.79	0.02
wHill	CN	500	20097.60	25720.18	−27.77	−0.14	20094.36	163.06	−31.00	162.68	0.81	163.31	0.02
wHill	CN	700	20074.89	25688.31	−50.47	−0.25	20073.08	162.40	−52.28	167.96	0.83	171.53	0.02
wISE	RT	300	20156.47	32459.10	31.11	0.15	20159.57	176.55	34.21	182.74	0.91	182.37	0.03
wISE	RT	500	20096.82	33887.28	−28.54	−0.14	20090.12	181.66	−35.24	186.19	0.93	189.11	0.03
wISE	RT	700	20162.26	31719.81	36.90	0.18	20161.46	180.01	36.10	181.80	0.90	182.38	0.03
wISE	RN	300	20121.80	24820.98	−3.56	−0.02	20116.60	158.22	−8.76	157.51	0.78	157.90	0.02
wISE	RN	500	20094.79	25711.19	−30.57	−0.15	20090.60	163.81	−34.76	163.16	0.81	165.28	0.03
wISE	RN	700	20088.68	24881.07	−36.68	−0.18	20086.89	158.87	−38.47	161.87	0.80	162.18	0.02
wISE	CN	300	20119.33	25077.39	−6.03	−0.03	20113.80	158.56	−11.56	158.39	0.79	159.56	0.02
wISE	CN	500	20084.29	26411.55	−41.07	−0.20	20081.37	162.36	−43.99	167.55	0.83	167.84	0.03
wISE	CN	700	20078.20	25207.00	−47.16	−0.23	20073.91	160.51	−51.45	165.55	0.82	165.50	0.02
wPDC	RT	300	20154.13	37678.83	28.77	0.14	20156.59	188.11	31.23	196.13	0.97	196.06	0.04
wPDC	RT	500	20063.60	39386.65	−61.77	−0.31	20052.56	200.43	−72.80	207.76	1.03	211.20	0.03
wPDC	RT	700	20183.47	38946.42	58.11	0.29	20185.31	197.72	59.95	205.63	1.02	205.29	0.04
wPDC	RN	300	20118.83	24986.31	−6.53	−0.03	20115.50	157.13	−9.86	158.13	0.79	158.57	0.02
wPDC	RN	500	20082.69	26371.95	−42.67	−0.21	20079.24	159.29	−46.12	167.83	0.83	168.00	0.03
wPDC	RN	700	20089.60	24718.84	−35.77	−0.18	20086.03	161.68	−39.33	161.16	0.80	162.92	0.02
wPDC	CN	300	20115.13	25393.91	−10.24	−0.05	20112.74	160.14	−12.63	159.60	0.79	159.83	0.02
wPDC	CN	500	20068.46	27590.02	−56.90	−0.28	20065.75	164.13	−59.61	175.50	0.87	179.04	0.03
wPDC	CN	700	20079.14	25075.00	−46.22	−0.23	20073.09	161.38	−52.27	164.88	0.82	165.45	0.02
GB2			20124.28	25947.46	−1.08	−0.01	20119.89	161.91	−5.47	161.01	0.80	163.38	0.03

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OCAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

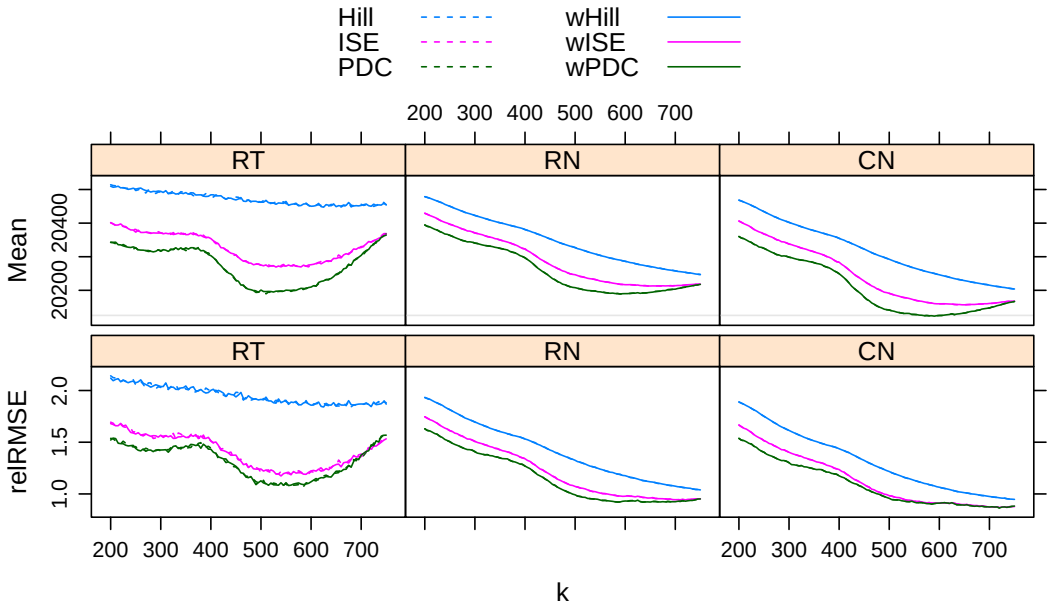

Figure F.242.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

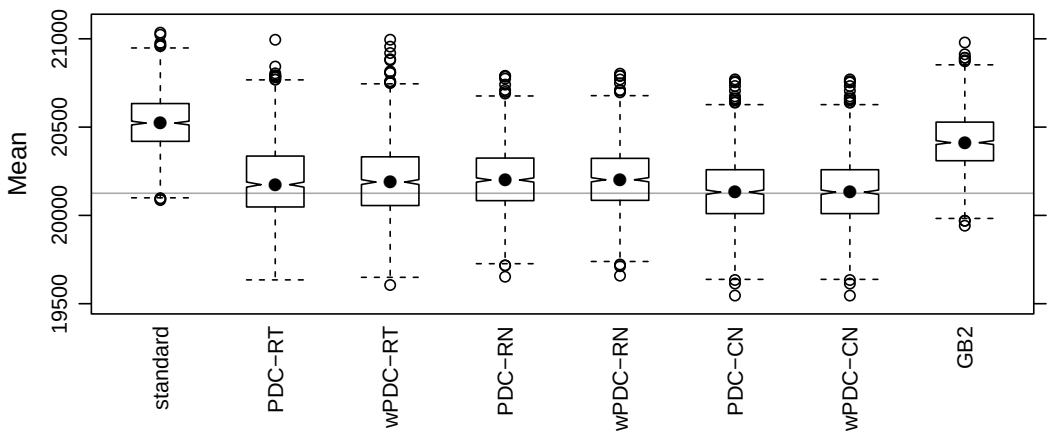

Figure F.243.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.121.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20525.68	24550.67	400.32	1.99	20522.97	157.32	397.61	429.86	2.14	589.49	0.05
wHill	RT	300	20494.63	31983.95	369.27	1.83	20490.23	184.97	364.87	410.26	2.04	540.95	0.05
wHill	RT	500	20462.53	34772.41	337.16	1.68	20452.85	184.22	327.49	385.25	1.91	485.54	0.05
wHill	RT	700	20452.69	34472.27	327.33	1.63	20457.57	181.19	332.21	376.27	1.87	492.53	0.05
wHill	RN	300	20422.93	27985.28	297.57	1.48	20421.75	166.83	296.39	341.33	1.70	439.43	0.04
wHill	RN	500	20326.98	30517.58	201.62	1.00	20324.41	172.44	199.05	266.72	1.33	303.07	0.04
wHill	RN	700	20257.91	29265.81	132.55	0.66	20258.34	169.14	132.97	216.34	1.07	222.21	0.03
wHill	CN	300	20402.15	28953.50	276.78	1.38	20402.42	165.64	277.06	324.86	1.61	410.97	0.04
wHill	CN	500	20292.47	32066.32	167.11	0.83	20289.15	180.93	163.79	244.87	1.22	256.97	0.04
wHill	CN	700	20215.32	30457.59	89.96	0.45	20215.37	174.26	90.01	196.27	0.98	198.22	0.03
wISE	RT	300	20370.82	39372.39	245.46	1.22	20371.01	192.67	245.65	315.57	1.57	371.09	0.04
wISE	RT	500	20275.27	39929.82	149.91	0.74	20266.47	195.55	141.11	249.73	1.24	245.46	0.04
wISE	RT	700	20327.27	34189.21	201.90	1.00	20325.87	185.18	200.51	273.72	1.36	307.00	0.04
wISE	RN	300	20371.05	31927.47	245.68	1.22	20374.27	180.56	248.91	303.74	1.51	370.53	0.04
wISE	RN	500	20246.47	31943.81	121.11	0.60	20244.58	173.59	119.22	215.82	1.07	215.85	0.04
wISE	RN	700	20213.80	28318.85	88.44	0.44	20213.50	168.79	88.14	190.03	0.94	187.06	0.03
wISE	CN	300	20337.73	34633.02	212.37	1.06	20341.14	182.89	215.78	282.31	1.40	327.01	0.04
wISE	CN	500	20191.03	34861.55	65.67	0.33	20187.73	180.44	62.37	197.84	0.98	196.80	0.04
wISE	CN	700	20160.97	29752.57	35.61	0.18	20158.44	168.74	33.08	176.04	0.87	175.36	0.03
wPDC	RT	300	20316.02	45899.99	190.66	0.95	20310.77	206.40	185.41	286.72	1.42	303.16	0.05
wPDC	RT	500	20200.91	45752.98	75.54	0.38	20188.78	206.64	63.42	226.75	1.13	220.66	0.04
wPDC	RT	700	20304.01	44821.66	178.65	0.89	20294.78	209.91	169.42	276.93	1.38	286.28	0.04
wPDC	RN	300	20340.33	33974.41	214.97	1.07	20344.60	180.26	219.24	283.11	1.41	330.73	0.04
wPDC	RN	500	20207.90	33028.94	82.54	0.41	20201.96	178.29	76.59	199.52	0.99	195.54	0.03
wPDC	RN	700	20203.44	28562.12	78.07	0.39	20195.61	170.23	70.25	186.09	0.92	186.10	0.03
wPDC	CN	300	20298.60	38679.46	173.24	0.86	20303.91	191.62	178.55	262.02	1.30	292.68	0.04
wPDC	CN	500	20141.45	36915.24	16.09	0.08	20131.45	185.95	6.08	192.71	0.96	187.59	0.03
wPDC	CN	700	20147.36	30455.17	22.00	0.11	20134.58	171.31	9.22	175.81	0.87	171.71	0.03
GB2			20419.89	27065.52	294.53	1.46	20412.31	162.16	286.94	337.32	1.68	425.42	0.04

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OCAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

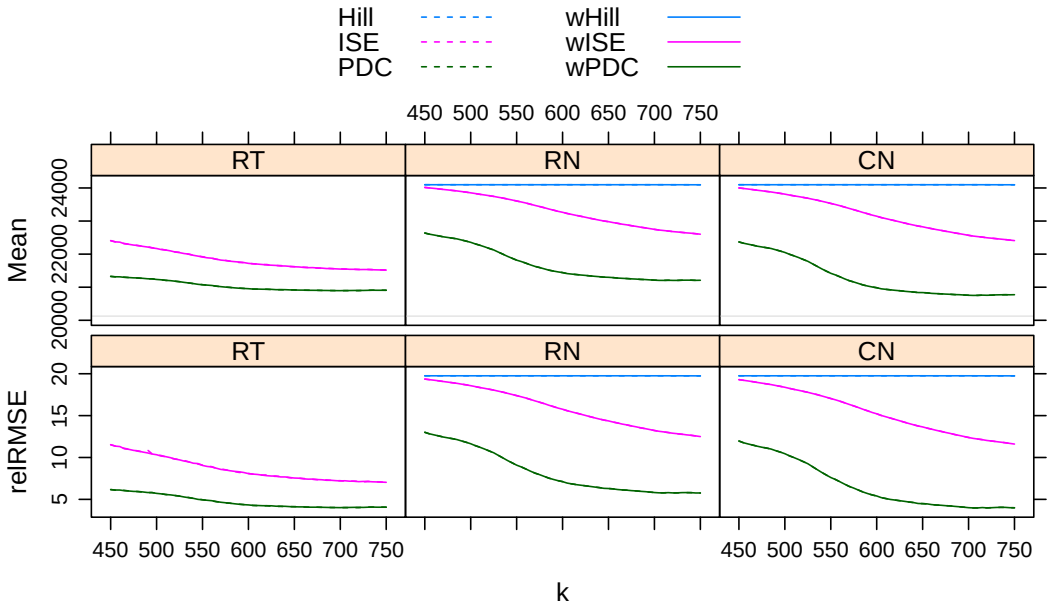

Figure F.244.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

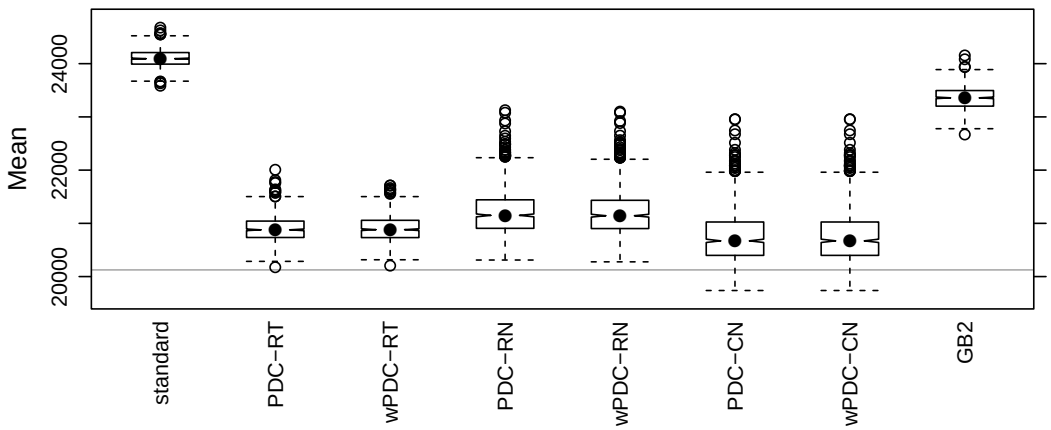

Figure F.245.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.122.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			24097.50	26428.83	3972.14	19.74	24093.83	162.92	3968.47	3975.46	19.75	5883.66	0.23
wHill	RT	500	24152.75	9817644.38	4027.39	20.01	23953.11	491.66	3827.75	5101.73	25.35	5675.02	5.01
wHill	RT	700	23558.94	231149.72	3433.58	17.06	23504.99	359.57	3379.63	3467.05	17.23	5010.64	0.52
wHill	RN	300	24097.50	26428.83	3972.14	19.74	24093.83	162.92	3968.47	3975.46	19.75	5883.66	0.23
wHill	RN	500	24097.50	26428.83	3972.14	19.74	24093.83	162.92	3968.47	3975.46	19.75	5883.66	0.23
wHill	RN	700	24097.48	26429.75	3972.12	19.74	24093.83	162.92	3968.47	3975.44	19.75	5883.66	0.23
wHill	CN	300	24097.50	26428.83	3972.14	19.74	24093.83	162.92	3968.47	3975.46	19.75	5883.66	0.23
wHill	CN	500	24097.50	26428.83	3972.14	19.74	24093.83	162.92	3968.47	3975.46	19.75	5883.66	0.23
wHill	CN	700	24097.48	26429.99	3972.12	19.74	24093.83	162.92	3968.47	3975.44	19.75	5883.66	0.23
wISE	RT	500	22169.51	143565.16	2044.14	10.16	22154.34	367.68	2028.98	2078.93	10.33	3008.16	0.23
wISE	RT	700	21548.00	77501.15	1422.64	7.07	21525.93	276.10	1400.56	1449.60	7.20	2076.48	0.11
wISE	RN	300	24097.50	26428.83	3972.14	19.74	24093.83	162.92	3968.47	3975.46	19.75	5883.66	0.23
wISE	RN	500	23852.98	74808.06	3727.62	18.52	23865.67	267.37	3740.30	3737.63	18.57	5545.38	0.23
wISE	RN	700	22748.01	200276.27	2622.65	13.03	22763.32	420.66	2637.96	2660.52	13.22	3911.04	0.20
wISE	CN	300	24097.50	26428.83	3972.14	19.74	24093.83	162.92	3968.47	3975.46	19.75	5883.66	0.23
wISE	CN	500	23812.80	87064.33	3687.43	18.32	23820.01	290.52	3694.65	3699.21	18.38	5477.68	0.23
wISE	CN	700	22568.28	247012.97	2442.92	12.14	22590.43	464.30	2465.06	2492.91	12.39	3654.70	0.20
wPDC	RT	500	21234.20	92566.50	1108.84	5.51	21215.76	301.23	1090.40	1149.78	5.71	1616.63	0.12
wPDC	RT	700	20895.57	58827.28	770.20	3.83	20881.82	242.23	756.46	807.46	4.01	1121.52	0.08
wPDC	RN	300	23858.29	256724.44	3732.93	18.55	24015.96	267.11	3890.59	3767.13	18.72	5768.20	0.23
wPDC	RN	500	22356.37	510507.76	2231.01	11.09	22408.57	806.02	2283.21	2342.52	11.64	3385.09	0.20
wPDC	RN	700	21212.84	187133.76	1087.47	5.40	21143.86	388.80	1018.50	1170.28	5.81	1510.02	0.15
wPDC	CN	300	23802.75	375855.75	3677.39	18.27	24010.45	284.09	3885.08	3728.09	18.52	5760.03	0.23
wPDC	CN	500	22050.61	717582.59	1925.25	9.57	22114.83	941.74	1989.47	2103.20	10.45	2949.59	0.20
wPDC	CN	700	20756.30	252160.47	630.94	3.14	20671.41	442.21	546.05	806.22	4.01	809.57	0.14
GB2			23355.46	44195.63	3230.10	16.05	23358.08	214.70	3232.72	3236.92	16.08	4792.83	0.20

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OCAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

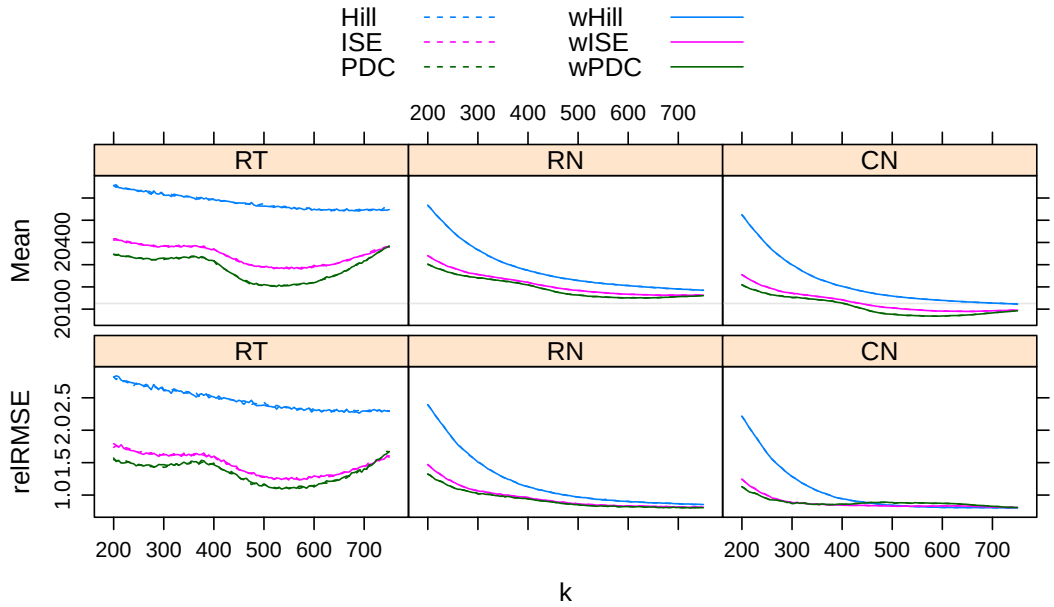

Figure F.246.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

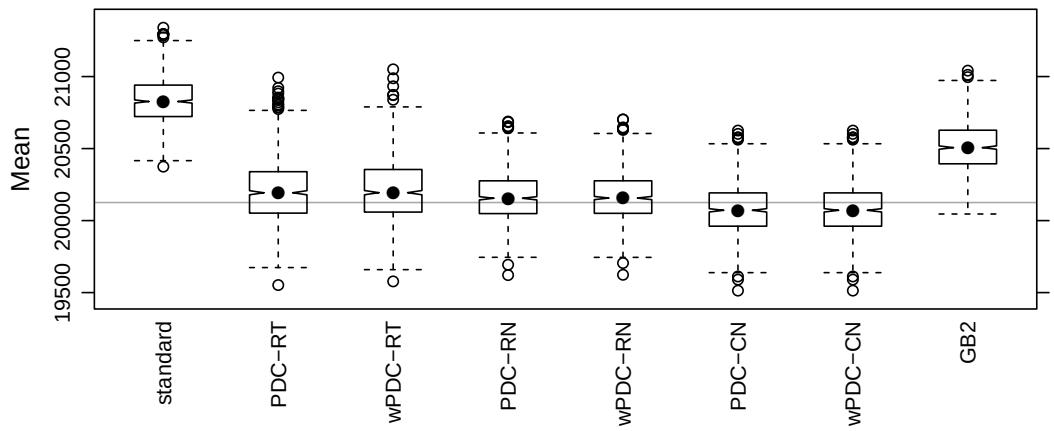

Figure F.247.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.123.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20832.78	25242.35	707.42	3.52	20826.95	163.50	701.58	725.02	3.60	1040.17	0.06
wHill	RT	300	20612.62	38253.73	487.26	2.42	20610.55	195.09	485.19	525.01	2.61	719.34	0.06
wHill	RT	500	20563.38	39320.92	438.02	2.18	20550.08	194.54	424.72	480.77	2.39	629.69	0.07
wHill	RT	700	20546.07	36976.82	420.70	2.09	20539.65	196.81	414.29	462.53	2.30	614.23	0.05
wHill	RN	300	20365.99	34263.47	240.62	1.20	20363.75	186.21	238.39	303.53	1.51	356.48	0.04
wHill	RN	500	20228.77	27223.65	103.41	0.51	20224.09	165.08	98.73	194.65	0.97	193.70	0.03
wHill	RN	700	20191.12	26161.69	65.76	0.33	20186.72	164.48	61.36	174.53	0.87	177.38	0.03
wHill	CN	300	20299.19	36746.54	173.83	0.86	20298.44	199.06	173.08	258.70	1.29	278.86	0.04
wHill	CN	500	20158.85	27627.08	33.49	0.17	20154.51	167.91	29.15	169.47	0.84	173.87	0.03
wHill	CN	700	20127.36	26299.00	1.99	0.01	20125.23	161.96	−0.13	162.10	0.81	161.76	0.03
wISE	RT	300	20383.34	39656.26	257.98	1.28	20383.68	196.91	258.31	325.84	1.62	384.96	0.05
wISE	RT	500	20289.98	38830.35	164.62	0.82	20276.21	187.45	150.85	256.69	1.28	248.12	0.04
wISE	RT	700	20344.99	36926.20	219.63	1.09	20338.07	190.86	212.71	291.76	1.45	319.33	0.04
wISE	RN	300	20255.53	28970.38	130.17	0.65	20256.73	171.19	131.36	214.21	1.06	223.98	0.04
wISE	RN	500	20184.29	26740.39	58.93	0.29	20178.30	166.96	52.94	173.74	0.86	170.44	0.03
wISE	RN	700	20162.83	25397.88	37.47	0.19	20155.44	162.58	30.08	163.64	0.81	163.63	0.03
wISE	CN	300	20171.49	29513.21	46.13	0.23	20168.15	175.25	42.78	177.80	0.88	180.70	0.03
wISE	CN	500	20105.48	27600.61	−19.88	−0.10	20099.45	169.33	−25.91	167.24	0.83	168.81	0.02
wISE	CN	700	20092.47	25763.92	−32.89	−0.16	20088.80	163.25	−36.57	163.77	0.81	163.99	0.02
wPDC	RT	300	20329.95	45660.43	204.59	1.02	20320.25	207.96	194.89	295.75	1.47	306.46	0.05
wPDC	RT	500	20210.53	48401.38	85.17	0.42	20193.94	220.10	68.58	235.81	1.17	222.90	0.05
wPDC	RT	700	20317.35	43114.75	191.99	0.95	20307.01	202.06	181.64	282.72	1.40	287.83	0.05
wPDC	RN	300	20239.74	28794.49	114.38	0.57	20235.60	168.65	110.24	204.57	1.02	211.33	0.04
wPDC	RN	500	20163.30	28195.34	37.94	0.19	20156.58	167.67	31.22	172.06	0.85	168.95	0.03
wPDC	RN	700	20156.23	25551.51	30.87	0.15	20148.59	161.24	23.23	162.72	0.81	162.37	0.03
wPDC	CN	300	20152.16	30016.55	26.80	0.13	20149.26	172.12	23.89	175.23	0.87	175.62	0.03
wPDC	CN	500	20076.96	29507.04	−48.40	−0.24	20071.29	170.54	−54.08	178.38	0.89	178.17	0.03
wPDC	CN	700	20083.13	25932.68	−42.23	−0.21	20077.05	158.80	−48.31	166.40	0.83	163.99	0.02
GB2			20511.82	27932.73	386.45	1.92	20506.79	173.40	381.43	421.01	2.09	565.51	0.05

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OCAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

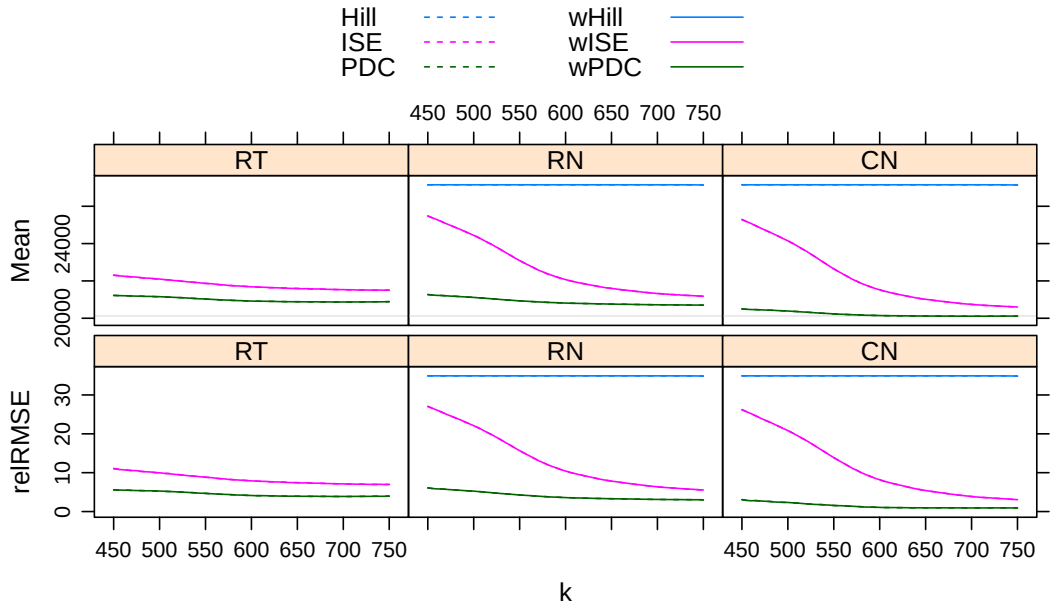

Figure F.248.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

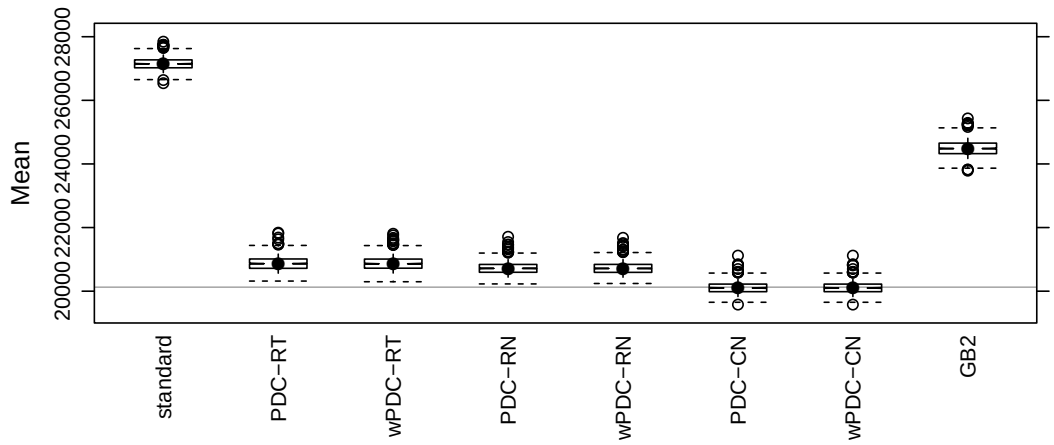

Figure F.249.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.124.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			27149.80	33017.54	7024.44	34.90	27145.55	185.15	7020.18	7026.79	34.92	10408.12	0.38
wHill	RT	500	26886.48	16450711.80	6761.11	33.59	26309.97	1048.93	6184.61	7883.33	39.17	9169.31	5.42
wHill	RT	700	25297.29	808728.47	5171.92	25.70	25149.02	626.31	5023.66	5249.45	26.08	7448.08	0.82
wHill	RN	300	27149.80	33017.54	7024.44	34.90	27145.55	185.15	7020.18	7026.79	34.92	10408.12	0.38
wHill	RN	500	27149.80	33017.54	7024.44	34.90	27145.55	185.15	7020.18	7026.79	34.92	10408.12	0.38
wHill	RN	700	27149.77	33028.52	7024.41	34.90	27145.55	185.15	7020.18	7026.75	34.91	10408.12	0.38
wHill	CN	300	27149.80	33017.54	7024.44	34.90	27145.55	185.15	7020.18	7026.79	34.92	10408.12	0.38
wHill	CN	500	27149.80	33017.54	7024.44	34.90	27145.55	185.15	7020.18	7026.79	34.92	10408.12	0.38
wHill	CN	700	27149.77	33028.84	7024.40	34.90	27145.55	185.15	7020.18	7026.75	34.91	10408.12	0.38
wISE	RT	500	22101.84	122727.26	1976.48	9.82	22093.98	337.09	1968.62	2007.25	9.97	2918.68	0.17
wISE	RT	700	21533.34	71389.58	1407.98	7.00	21518.63	261.03	1393.27	1433.08	7.12	2065.66	0.12
wISE	RN	300	27149.43	33023.69	7024.07	34.90	27145.20	185.19	7019.84	7026.42	34.91	10407.61	0.38
wISE	RN	500	24443.04	1128321.95	4317.68	21.45	24624.07	911.73	4498.70	4446.30	22.09	6669.78	0.35
wISE	RN	700	21323.96	192700.12	1198.60	5.96	21256.19	379.09	1130.83	1276.38	6.34	1676.57	0.19
wISE	CN	300	27149.34	33060.95	7023.98	34.90	27145.20	185.19	7019.84	7026.33	34.91	10407.61	0.38
wISE	CN	500	24148.51	1392818.96	4023.15	19.99	24365.99	992.24	4240.62	4192.51	20.83	6287.15	0.34
wISE	CN	700	20741.39	226023.25	616.03	3.06	20650.07	401.82	524.71	778.00	3.87	777.93	0.18
wPDC	RT	500	21156.43	66841.94	1031.07	5.12	21137.80	246.65	1012.43	1062.96	5.28	1501.03	0.12
wPDC	RT	700	20873.21	53507.74	747.85	3.72	20861.88	213.50	736.51	782.77	3.89	1091.96	0.08
wPDC	RN	300	23155.74	1080497.80	3030.38	15.06	22808.70	467.55	2683.33	3203.53	15.92	3978.31	0.36
wPDC	RN	500	21116.72	134277.30	991.36	4.93	21055.08	284.21	929.72	1056.85	5.25	1378.41	0.18
wPDC	RN	700	20722.10	37106.38	596.73	2.97	20714.41	185.61	589.05	627.03	3.12	873.33	0.08
wPDC	CN	300	22502.78	1473031.35	2377.42	11.81	22084.98	529.25	1959.62	2669.02	13.26	2905.34	0.36
wPDC	CN	500	20389.20	151853.35	263.83	1.31	20315.46	288.16	190.09	470.44	2.34	317.88	0.16
wPDC	CN	700	20110.01	34722.42	−15.35	−0.08	20101.50	174.65	−23.86	186.88	0.93	179.99	0.05
GB2			24489.59	61818.65	4364.23	21.69	24483.50	246.01	4358.14	4371.30	21.72	6461.38	0.26

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OCAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

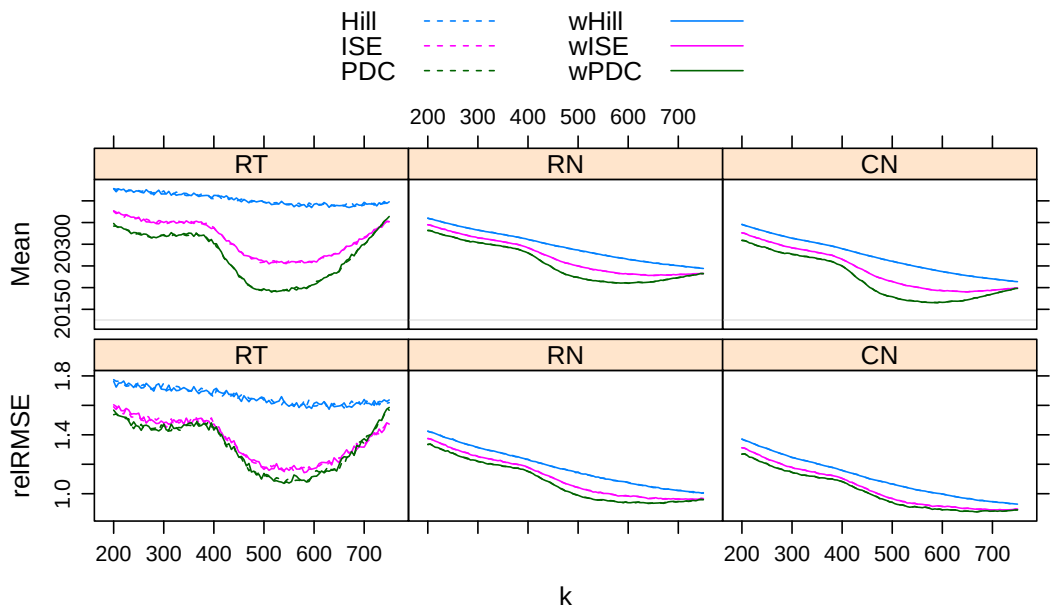

Figure F.250.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

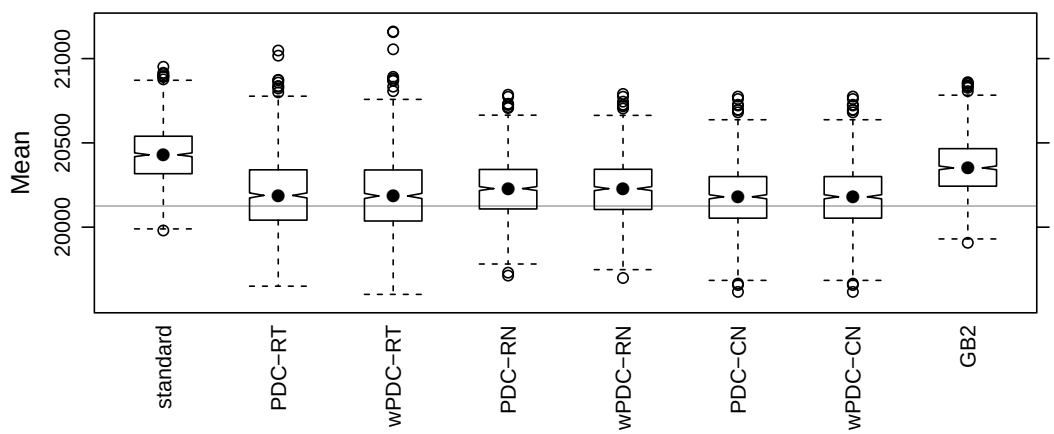

Figure F.251.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.125.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20430.13	27159.88	304.77	1.51	20429.42	165.28	304.05	346.43	1.72	450.79	0.04
wHill	RT	300	20415.97	33748.11	290.61	1.44	20413.47	179.72	288.11	343.76	1.71	427.15	0.05
wHill	RT	500	20396.74	36665.52	271.38	1.35	20392.94	195.42	267.58	332.08	1.65	396.72	0.06
wHill	RT	700	20396.68	35357.80	271.32	1.35	20390.33	181.99	264.97	330.05	1.64	392.85	0.06
wHill	RN	300	20332.65	27086.01	207.29	1.03	20328.80	163.47	203.43	264.62	1.31	308.47	0.04
wHill	RN	500	20286.69	27229.47	161.32	0.80	20282.27	165.07	156.91	230.71	1.15	245.97	0.03
wHill	RN	700	20250.43	26697.58	125.07	0.62	20249.58	161.76	124.22	205.70	1.02	210.64	0.03
wHill	CN	300	20313.77	27410.88	188.41	0.94	20310.23	165.90	184.87	250.76	1.25	280.42	0.04
wHill	CN	500	20260.86	27747.09	135.50	0.67	20259.04	166.65	133.68	214.66	1.07	220.42	0.03
wHill	CN	700	20220.20	27268.02	94.83	0.47	20221.01	162.81	95.65	190.35	0.95	186.31	0.03
wISE	RT	300	20350.03	38395.60	224.67	1.12	20350.52	193.87	225.15	298.05	1.48	337.76	0.04
wISE	RT	500	20260.07	36877.27	134.71	0.67	20257.01	198.56	131.64	234.49	1.17	232.46	0.04
wISE	RT	700	20313.93	34663.99	188.57	0.94	20302.48	180.59	177.12	264.93	1.32	272.58	0.04
wISE	RN	300	20314.62	27746.11	189.26	0.94	20311.41	167.76	186.05	252.07	1.25	283.64	0.03
wISE	RN	500	20250.11	28554.56	124.75	0.62	20249.58	167.30	124.22	209.97	1.04	214.00	0.03
wISE	RN	700	20230.21	26714.57	104.85	0.52	20225.40	164.71	100.03	194.12	0.96	196.22	0.03
wISE	CN	300	20291.57	28663.17	166.20	0.83	20290.34	168.23	164.98	237.19	1.18	256.56	0.03
wISE	CN	500	20214.17	30062.27	88.81	0.44	20215.79	172.63	90.43	194.73	0.97	191.73	0.03
wISE	CN	700	20194.05	27350.47	68.69	0.34	20188.71	170.28	63.35	179.00	0.89	176.42	0.03
wPDC	RT	300	20322.17	49329.68	196.80	0.98	20314.21	205.32	188.85	296.67	1.47	312.72	0.08
wPDC	RT	500	20196.77	47379.66	71.41	0.35	20185.18	224.92	59.81	228.98	1.14	227.67	0.05
wPDC	RT	700	20300.27	45841.45	174.91	0.87	20295.91	207.09	170.55	276.39	1.37	278.04	0.05
wPDC	RN	300	20303.76	28343.27	178.40	0.89	20306.53	163.10	181.17	245.24	1.22	279.13	0.03
wPDC	RN	500	20223.38	30059.88	98.02	0.49	20228.66	175.28	103.30	199.09	0.99	200.44	0.03
wPDC	RN	700	20223.28	26759.94	97.91	0.49	20219.74	165.37	94.38	190.58	0.95	200.45	0.03
wPDC	CN	300	20276.72	30174.52	151.36	0.75	20277.93	167.39	152.57	230.33	1.14	248.49	0.03
wPDC	CN	500	20179.05	33054.70	53.69	0.27	20180.35	184.67	54.98	189.48	0.94	184.44	0.03
wPDC	CN	700	20185.23	27961.41	59.86	0.30	20181.49	168.03	56.13	177.53	0.88	179.85	0.03
GB2			20357.27	27519.16	231.91	1.15	20351.74	163.47	226.38	285.09	1.42	335.63	0.04

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OCAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

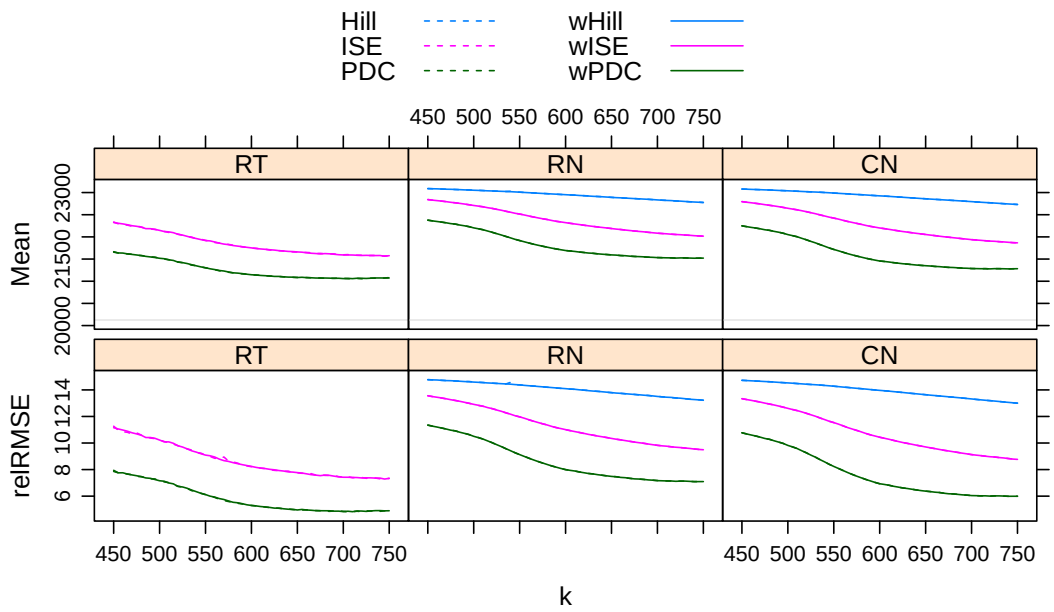

Figure F.252.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

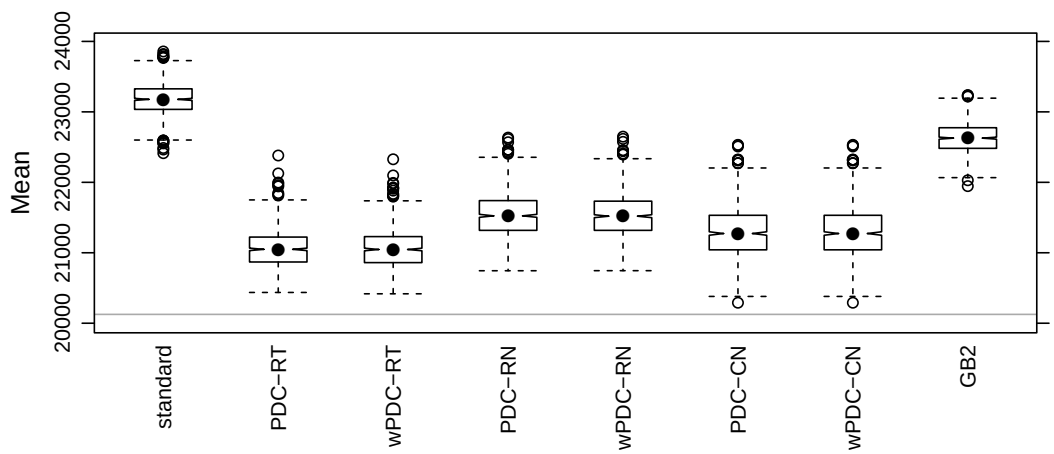

Figure F.253.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.126.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			23180.68	51123.72	3055.32	15.18	23177.07	216.10	3051.71	3063.66	15.22	4524.47	0.19
wHill	RT	500	23234.56	269110.26	3109.20	15.45	23174.00	425.69	3048.64	3152.13	15.66	4519.92	0.37
wHill	RT	700	22917.34	151872.69	2791.98	13.87	22897.05	340.30	2771.68	2819.02	14.01	4109.30	0.31
wHill	RN	300	23157.22	51248.43	3031.85	15.06	23150.96	225.86	3025.59	3040.29	15.11	4485.75	0.19
wHill	RN	500	23052.56	51987.48	2927.20	14.54	23046.22	240.55	2920.85	2936.05	14.59	4330.46	0.18
wHill	RN	700	22833.82	53335.40	2708.46	13.46	22830.58	235.48	2705.21	2718.28	13.51	4010.75	0.17
wHill	CN	300	23154.62	51494.81	3029.26	15.05	23149.93	227.93	3024.57	3037.74	15.09	4484.22	0.19
wHill	CN	500	23039.80	52779.78	2914.44	14.48	23033.08	243.93	2907.72	2923.47	14.53	4310.99	0.18
wHill	CN	700	22795.47	55172.07	2670.11	13.27	22787.32	240.11	2661.96	2680.41	13.32	3946.62	0.17
wISE	RT	500	22146.77	146937.14	2021.41	10.04	22114.47	361.25	1989.11	2057.40	10.22	2949.05	0.22
wISE	RT	700	21592.63	78611.42	1467.27	7.29	21577.76	275.19	1452.40	1493.79	7.42	2153.33	0.13
wISE	RN	300	23134.52	52857.41	3009.16	14.95	23125.55	241.40	3000.19	3017.92	15.00	4448.08	0.19
wISE	RN	500	22708.65	77400.92	2583.29	12.84	22711.21	273.38	2585.85	2598.21	12.91	3833.78	0.17
wISE	RN	700	22083.39	76930.44	1958.02	9.73	22077.15	274.21	1951.79	1977.55	9.83	2893.72	0.15
wISE	CN	300	23128.91	53290.66	3003.55	14.92	23119.49	242.24	2994.13	3012.40	14.97	4439.10	0.19
wISE	CN	500	22645.47	88643.30	2520.11	12.52	22650.61	287.08	2525.25	2537.62	12.61	3743.94	0.17
wISE	CN	700	21937.98	89365.45	1812.62	9.01	21931.72	299.01	1806.36	1837.08	9.13	2678.11	0.14
wPDC	RT	500	21517.51	137245.97	1392.15	6.92	21497.71	365.23	1372.35	1440.55	7.16	2034.64	0.14
wPDC	RT	700	21059.54	74468.13	934.18	4.64	21046.77	273.99	921.41	973.18	4.84	1366.08	0.11
wPDC	RN	300	23001.63	90334.10	2876.26	14.29	23014.27	286.93	2888.90	2891.91	14.37	4283.09	0.18
wPDC	RN	500	22203.59	150121.52	2078.23	10.33	22217.15	381.26	2091.78	2114.00	10.50	3101.28	0.16
wPDC	RN	700	21532.65	99950.86	1407.28	6.99	21519.05	305.21	1393.69	1442.32	7.17	2066.29	0.13
wPDC	CN	300	22974.34	107542.98	2848.98	14.16	23001.63	295.32	2876.27	2867.77	14.25	4264.35	0.18
wPDC	CN	500	22051.97	193848.99	1926.61	9.57	22064.73	427.26	1939.37	1976.23	9.82	2875.31	0.15
wPDC	CN	700	21286.33	130480.90	1160.97	5.77	21273.31	360.66	1147.95	1215.82	6.04	1701.95	0.12
GB2			22631.88	43567.17	2506.52	12.45	22626.91	218.11	2501.54	2515.18	12.50	3708.79	0.15

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OCAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 20.

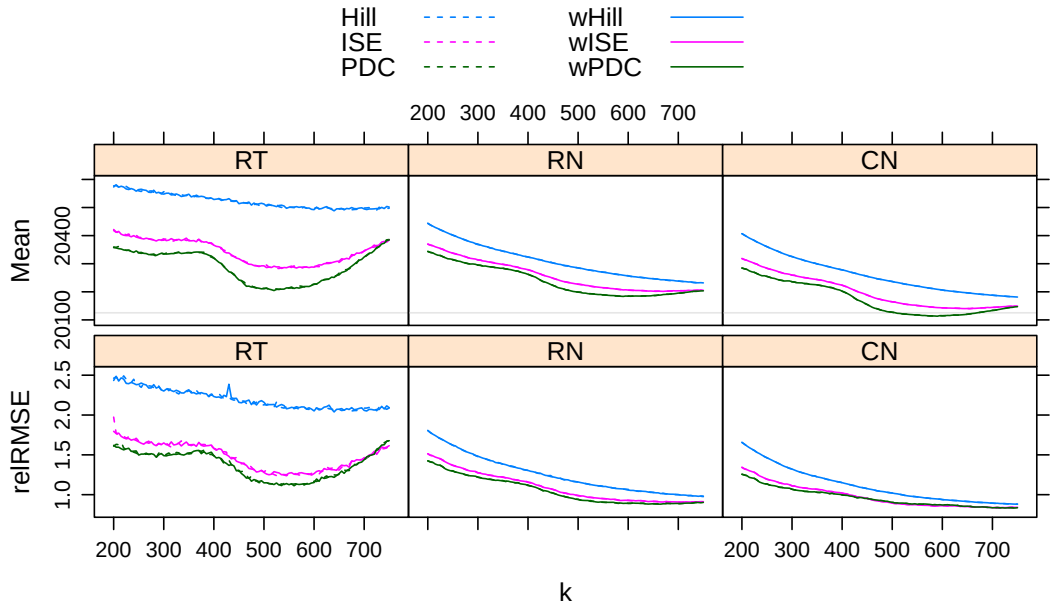

Figure F.254.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

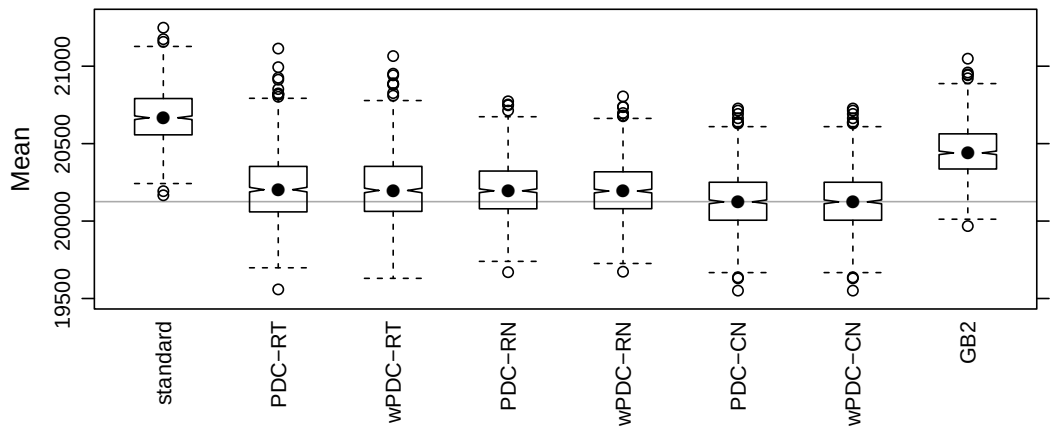

Figure F.255.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.127.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20672.56	30614.78	547.20	2.72	20667.10	174.06	541.74	574.46	2.85	803.18	0.06
wHill	RT	300	20547.74	36056.06	422.38	2.10	20534.20	190.10	408.84	463.06	2.30	606.15	0.06
wHill	RT	500	20512.51	39056.55	387.15	1.92	20504.73	184.97	379.37	434.63	2.16	562.45	0.05
wHill	RT	700	20494.90	35048.77	369.54	1.84	20497.96	193.18	372.59	414.21	2.06	552.41	0.05
wHill	RN	300	20369.82	29388.42	244.46	1.21	20365.91	169.92	240.55	298.53	1.48	356.64	0.04
wHill	RN	500	20285.22	28936.84	159.86	0.79	20279.52	169.60	154.16	233.37	1.16	248.45	0.04
wHill	RN	700	20238.14	27825.33	112.78	0.56	20230.82	170.75	105.46	201.29	1.00	205.50	0.03
wHill	CN	300	20325.41	30757.04	200.05	0.99	20320.45	174.54	195.09	265.98	1.32	297.69	0.04
wHill	CN	500	20236.71	29831.13	111.35	0.55	20232.31	171.30	106.95	205.43	1.02	211.23	0.04
wHill	CN	700	20187.90	28481.36	62.54	0.31	20182.45	176.58	57.08	179.90	0.89	177.76	0.03
wISE	RT	300	20388.85	40878.72	263.49	1.31	20392.31	200.00	266.95	332.06	1.65	396.26	0.05
wISE	RT	500	20292.46	38359.83	167.09	0.83	20291.31	192.95	165.95	257.37	1.28	265.04	0.04
wISE	RT	700	20344.51	37968.71	219.15	1.09	20338.26	189.09	212.90	293.18	1.46	324.26	0.05
wISE	RN	300	20313.77	30541.21	188.41	0.94	20307.95	179.17	182.59	256.92	1.28	283.58	0.04
wISE	RN	500	20227.55	29396.24	102.19	0.51	20217.99	174.74	92.63	199.52	0.99	205.85	0.03
wISE	RN	700	20203.69	27302.02	78.33	0.39	20199.48	172.53	74.12	182.78	0.91	183.04	0.03
wISE	CN	300	20259.21	32091.79	133.84	0.67	20255.22	182.34	129.86	223.55	1.11	229.95	0.04
wISE	CN	500	20164.40	30858.88	39.04	0.19	20158.60	175.03	33.24	179.87	0.89	173.02	0.03
wISE	CN	700	20144.80	28013.78	19.43	0.10	20139.09	169.56	13.73	168.41	0.84	171.18	0.03
wPDC	RT	300	20335.68	45774.66	210.32	1.05	20329.04	203.75	203.68	299.94	1.49	316.78	0.04
wPDC	RT	500	20210.96	46139.44	85.60	0.43	20197.68	218.70	72.31	231.13	1.15	226.07	0.05
wPDC	RT	700	20323.87	44497.37	198.50	0.99	20321.15	217.02	195.78	289.58	1.44	305.75	0.04
wPDC	RN	300	20294.77	31458.36	169.41	0.84	20293.57	180.24	168.21	245.20	1.22	265.64	0.04
wPDC	RN	500	20198.77	30530.85	73.41	0.36	20193.83	175.96	68.47	189.44	0.94	181.37	0.03
wPDC	RN	700	20195.49	27198.81	70.12	0.35	20188.72	168.06	63.35	179.13	0.89	177.57	0.03
wPDC	CN	300	20235.80	34049.91	110.44	0.55	20234.25	180.34	108.89	214.97	1.07	219.21	0.03
wPDC	CN	500	20127.27	33185.95	1.91	0.01	20124.17	181.34	−1.19	182.09	0.90	180.73	0.03
wPDC	CN	700	20133.84	28221.80	8.48	0.04	20125.03	164.05	−0.33	168.12	0.84	163.95	0.03
GB2			20447.42	27849.51	322.06	1.60	20440.48	168.04	315.11	362.69	1.80	467.19	0.05

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OCAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 20.

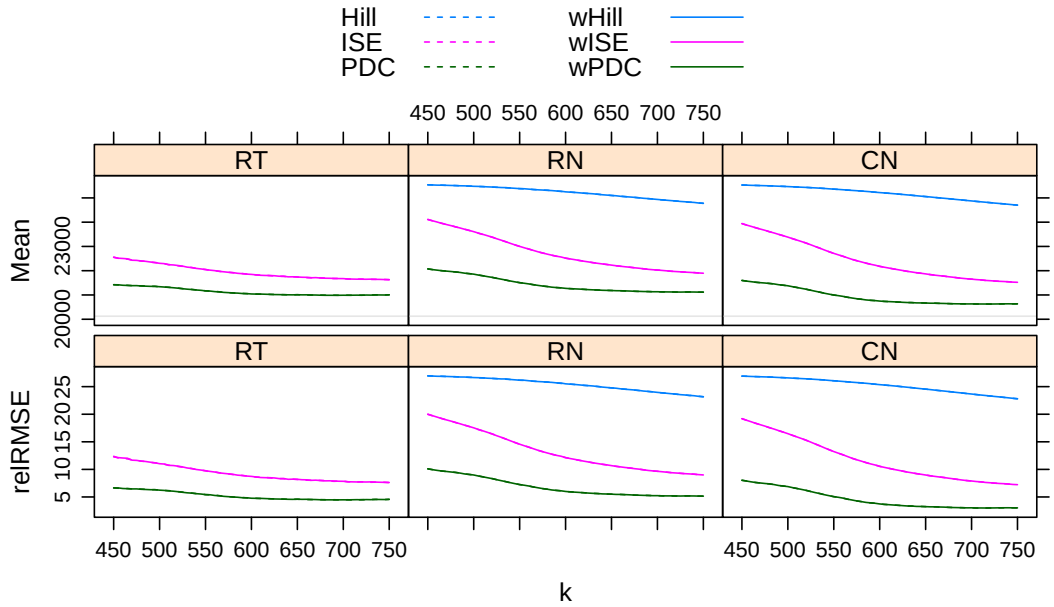

Figure F.256.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

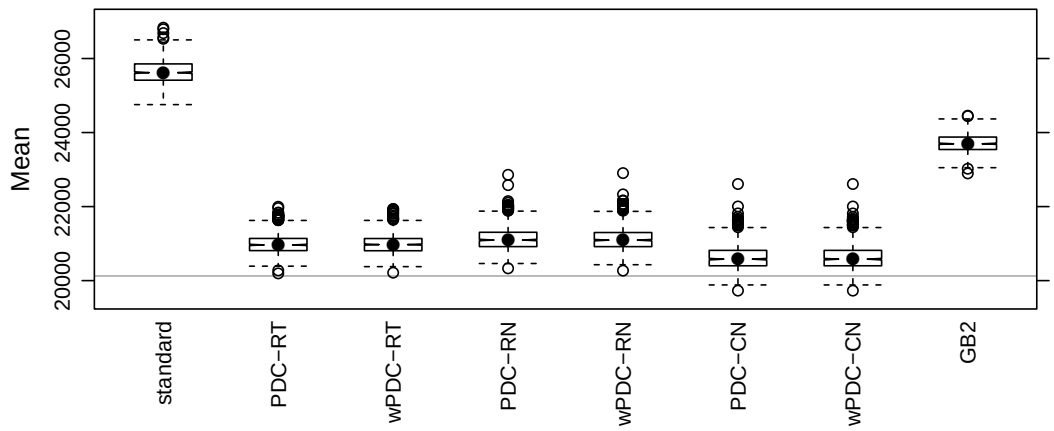

Figure F.257.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.128.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			25634.92	105961.19	5509.56	27.38	25618.75	316.61	5493.39	5519.15	27.42	8144.50	0.33
wHill	RT	500	25730.90	3902140.33	5605.54	27.85	25381.58	879.52	5256.21	5943.09	29.53	7792.86	2.40
wHill	RT	700	24735.77	5079369.56	4610.41	22.91	24521.08	590.74	4395.72	5131.29	25.50	6517.09	3.38
wHill	RN	300	25626.27	106363.01	5500.90	27.33	25600.16	317.84	5474.79	5510.55	27.38	8116.93	0.33
wHill	RN	500	25477.99	106568.05	5352.63	26.60	25469.28	339.10	5343.92	5362.57	26.65	7922.90	0.32
wHill	RN	700	24936.30	108261.62	4810.93	23.90	24925.98	346.68	4800.62	4822.16	23.96	7117.40	0.29
wHill	CN	300	25625.85	106482.46	5500.48	27.33	25599.92	317.93	5474.56	5510.15	27.38	8116.58	0.33
wHill	CN	500	25466.51	107996.15	5341.15	26.54	25455.89	338.68	5330.53	5351.24	26.59	7903.05	0.32
wHill	CN	700	24875.24	112222.75	4749.87	23.60	24863.49	352.20	4738.13	4761.66	23.66	7024.75	0.29
wISE	RT	500	22304.63	177015.08	2179.27	10.83	22273.79	389.13	2148.43	2219.47	11.03	3185.26	0.27
wISE	RT	700	21674.51	89173.80	1549.15	7.70	21649.74	273.77	1524.38	1577.64	7.84	2260.04	0.13
wISE	RN	300	25532.65	119392.98	5407.29	26.87	25522.93	341.54	5397.57	5418.31	26.92	8002.44	0.33
wISE	RN	500	23608.89	318254.99	3483.53	17.31	23645.93	589.66	3520.57	3528.87	17.53	5219.60	0.25
wISE	RN	700	22026.04	160797.11	1900.68	9.44	22003.32	385.49	1877.96	1942.48	9.65	2784.26	0.17
wISE	CN	300	25521.30	120927.73	5395.94	26.81	25513.44	345.52	5388.08	5407.13	26.87	7988.37	0.33
wISE	CN	500	23383.72	379362.04	3258.36	16.19	23434.84	625.59	3309.48	3316.00	16.48	4906.64	0.25
wISE	CN	700	21651.99	192917.77	1526.62	7.59	21624.70	427.91	1499.34	1588.49	7.89	2222.92	0.16
wPDC	RT	500	21340.47	97987.57	1215.11	6.04	21324.09	299.41	1198.73	1254.74	6.23	1777.24	0.11
wPDC	RT	700	20989.51	67001.60	864.15	4.29	20973.50	243.53	848.14	902.04	4.48	1257.45	0.09
wPDC	RN	300	23714.52	1179007.34	3589.16	17.83	23717.35	1378.27	3591.98	3749.65	18.63	5325.47	0.30
wPDC	RN	500	21857.94	265963.96	1732.58	8.61	21791.91	522.75	1666.54	1807.63	8.98	2470.82	0.19
wPDC	RN	700	21133.25	96476.87	1007.89	5.01	21093.49	278.31	968.13	1054.62	5.24	1435.35	0.14
wPDC	CN	300	23421.83	1606090.90	3296.47	16.38	23424.05	1605.65	3298.69	3531.46	17.55	4890.64	0.30
wPDC	CN	500	21378.58	346791.31	1253.22	6.23	21309.97	589.73	1184.61	1384.56	6.88	1756.30	0.18
wPDC	CN	700	20631.50	116073.98	506.13	2.51	20579.47	300.87	454.11	610.02	3.03	673.26	0.12
GB2			23710.93	61984.76	3585.57	17.82	23696.81	252.26	3571.45	3594.19	17.86	5295.04	0.22

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OAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

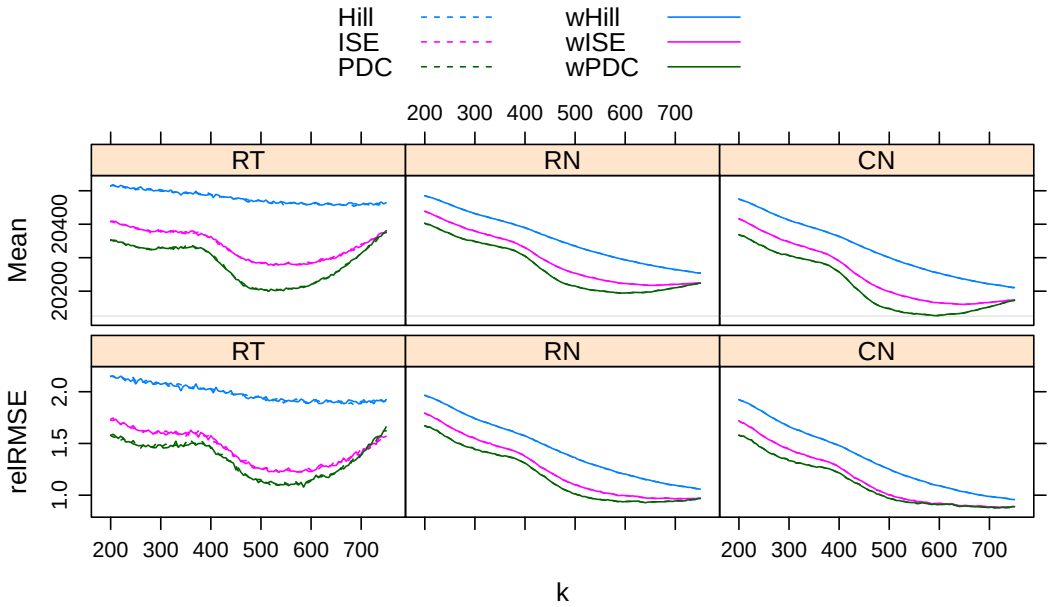

Figure F.258.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

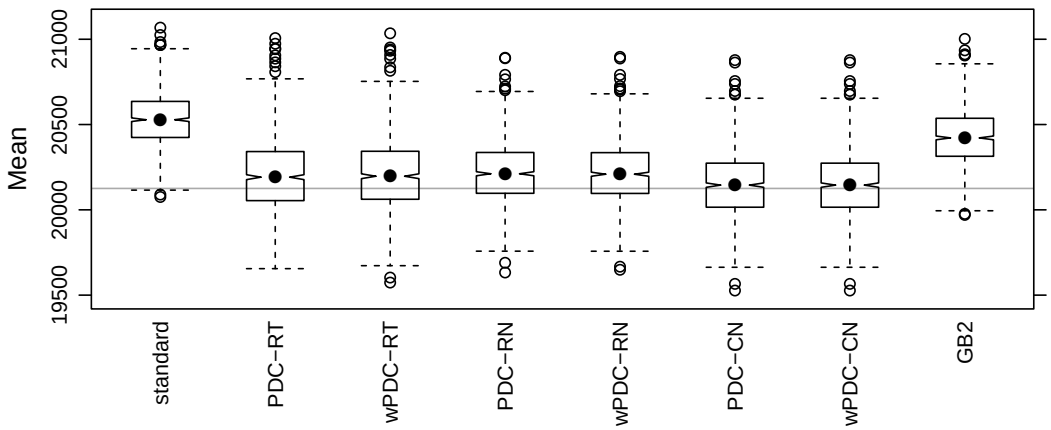

Figure F.259.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.129.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20530.17	24775.59	404.80	2.01	20528.27	157.25	402.91	434.30	2.16	597.36	0.05
wHill	RT	300	20498.58	34435.58	373.22	1.85	20490.15	177.69	364.78	416.77	2.07	540.83	0.05
wHill	RT	500	20469.80	34934.18	344.44	1.71	20473.42	189.40	348.06	391.84	1.95	516.04	0.05
wHill	RT	700	20458.63	32838.51	333.27	1.66	20453.26	173.50	327.90	379.31	1.88	486.14	0.05
wHill	RN	300	20431.73	28949.51	306.36	1.52	20430.23	169.73	304.87	350.40	1.74	451.99	0.04
wHill	RN	500	20335.49	31181.80	210.13	1.04	20333.40	174.39	208.04	274.42	1.36	313.56	0.04
wHill	RN	700	20264.71	29224.98	139.35	0.69	20263.47	169.15	138.11	220.49	1.10	229.64	0.03
wHill	CN	300	20411.95	29879.32	286.59	1.42	20409.89	169.80	284.53	334.63	1.66	421.84	0.04
wHill	CN	500	20300.50	32896.22	175.14	0.87	20297.10	173.77	171.74	252.07	1.25	270.22	0.04
wHill	CN	700	20221.33	30345.42	95.97	0.48	20221.10	170.58	95.74	198.81	0.99	198.97	0.03
wISE	RT	300	20376.84	40098.33	251.47	1.25	20381.74	197.54	256.38	321.40	1.60	380.56	0.05
wISE	RT	500	20285.50	38051.56	160.14	0.80	20289.51	191.54	164.15	252.31	1.25	271.82	0.04
wISE	RT	700	20334.13	35451.91	208.77	1.04	20328.31	189.69	202.94	281.07	1.40	305.07	0.04
wISE	RN	300	20379.47	32752.26	254.11	1.26	20382.87	176.61	257.51	311.92	1.55	383.59	0.04
wISE	RN	500	20253.50	32688.46	128.14	0.64	20247.22	175.25	121.86	221.53	1.10	227.43	0.04
wISE	RN	700	20220.38	28737.26	95.02	0.47	20219.97	167.52	94.61	194.26	0.97	193.52	0.03
wISE	CN	300	20346.75	35520.28	221.39	1.10	20354.67	182.35	229.31	290.69	1.44	346.96	0.04
wISE	CN	500	20198.51	35411.28	73.14	0.36	20193.01	175.75	67.65	201.81	1.00	194.74	0.04
wISE	CN	700	20166.43	30236.99	41.07	0.20	20163.50	173.87	38.14	178.59	0.89	178.72	0.03
wPDC	RT	300	20329.36	47675.76	204.00	1.01	20328.10	210.81	202.74	298.74	1.48	315.33	0.04
wPDC	RT	500	20206.99	46218.21	81.63	0.41	20196.98	207.61	71.62	229.86	1.14	218.62	0.05
wPDC	RT	700	20312.50	42973.03	187.14	0.93	20307.25	208.64	181.89	279.20	1.39	290.31	0.05
wPDC	RN	300	20348.30	34623.31	222.94	1.11	20355.98	184.95	230.62	290.33	1.44	344.71	0.04
wPDC	RN	500	20215.30	33393.81	89.94	0.45	20208.74	176.80	83.38	203.59	1.01	194.99	0.04
wPDC	RN	700	20210.40	28930.75	85.04	0.42	20205.47	168.87	80.11	190.09	0.94	190.80	0.03
wPDC	CN	300	20306.23	39346.67	180.86	0.90	20313.17	193.12	187.81	268.36	1.33	300.09	0.04
wPDC	CN	500	20148.18	37570.80	22.82	0.11	20144.86	191.37	19.50	195.07	0.97	189.18	0.04
wPDC	CN	700	20153.21	30700.11	27.84	0.14	20149.57	174.64	24.21	177.33	0.88	178.07	0.03
GB2			20425.81	27475.87	300.45	1.49	20421.59	164.90	296.23	343.10	1.70	439.19	0.04

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OAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

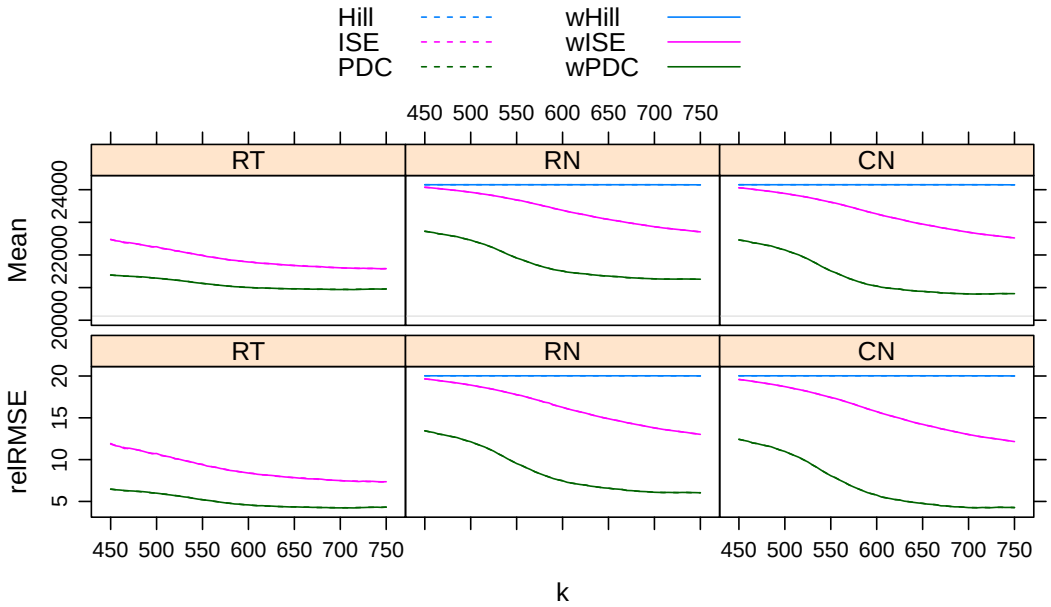

Figure F.260.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

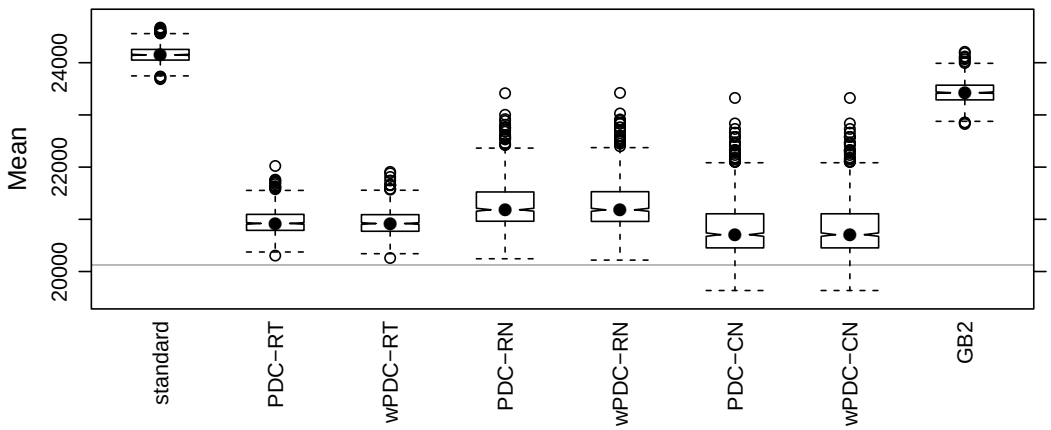

Figure F.261.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.130.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			24152.02	26592.88	4026.66	20.01	24150.02	151.47	4024.66	4029.96	20.02	5966.96	0.23
wHill	RT	500	24088.07	806126.33	3962.71	19.69	23980.51	468.76	3855.15	4063.05	20.19	5715.65	1.07
wHill	RT	700	23593.16	162046.57	3467.80	17.23	23551.51	367.48	3426.15	3491.06	17.35	5079.61	0.39
wHill	RN	300	24152.02	26592.88	4026.66	20.01	24150.02	151.47	4024.66	4029.96	20.02	5966.96	0.23
wHill	RN	500	24152.02	26592.88	4026.66	20.01	24150.02	151.47	4024.66	4029.96	20.02	5966.96	0.23
wHill	RN	700	24152.00	26596.43	4026.64	20.01	24150.02	151.47	4024.66	4029.94	20.02	5966.96	0.23
wHill	CN	300	24152.02	26592.88	4026.66	20.01	24150.02	151.47	4024.66	4029.96	20.02	5966.96	0.23
wHill	CN	500	24152.02	26592.88	4026.66	20.01	24150.02	151.47	4024.66	4029.96	20.02	5966.96	0.23
wHill	CN	700	24152.00	26596.95	4026.64	20.01	24150.02	151.47	4024.66	4029.94	20.02	5966.96	0.23
wISE	RT	500	22251.65	141976.83	2126.28	10.57	22244.10	375.31	2118.73	2159.38	10.73	3141.24	0.17
wISE	RT	700	21605.71	81896.16	1480.35	7.36	21585.32	265.87	1459.96	1507.73	7.49	2164.54	0.13
wISE	RN	300	24152.02	26592.88	4026.66	20.01	24150.02	151.47	4024.66	4029.96	20.02	5966.96	0.23
wISE	RN	500	23922.30	69157.04	3796.93	18.87	23928.60	261.39	3803.24	3806.02	18.91	5638.68	0.23
wISE	RN	700	22864.96	195392.73	2739.59	13.61	22871.13	406.42	2745.77	2774.99	13.79	4070.88	0.20
wISE	CN	300	24152.02	26592.88	4026.66	20.01	24150.02	151.47	4024.66	4029.96	20.02	5966.96	0.23
wISE	CN	500	23884.19	79992.12	3758.83	18.68	23885.25	285.61	3759.88	3769.44	18.73	5574.40	0.23
wISE	CN	700	22694.62	242851.69	2569.26	12.77	22699.17	435.93	2573.81	2616.05	13.00	3815.93	0.20
wPDC	RT	500	21290.18	95809.81	1164.82	5.79	21274.22	299.58	1148.86	1205.20	5.99	1703.30	0.11
wPDC	RT	700	20940.58	59939.22	815.22	4.05	20919.14	238.21	793.78	851.15	4.23	1176.86	0.09
wPDC	RN	300	23943.85	232070.92	3818.48	18.97	24082.24	239.92	3956.88	3848.72	19.12	5866.47	0.23
wPDC	RN	500	22454.35	543156.50	2328.99	11.57	22503.39	824.45	2378.03	2442.71	12.14	3525.67	0.21
wPDC	RN	700	21267.78	199269.37	1142.41	5.68	21182.02	396.56	1056.66	1226.45	6.09	1566.60	0.16
wPDC	CN	300	23895.73	337050.01	3770.37	18.73	24078.04	253.37	3952.68	3814.76	18.95	5860.25	0.23
wPDC	CN	500	22153.72	767977.66	2028.36	10.08	22220.03	968.99	2094.66	2209.40	10.98	3105.55	0.21
wPDC	CN	700	20805.78	272327.02	680.42	3.38	20706.26	457.53	580.90	857.33	4.26	861.24	0.16
GB2			23432.82	45295.91	3307.46	16.43	23425.69	209.01	3300.33	3314.29	16.47	4893.07	0.20

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OAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

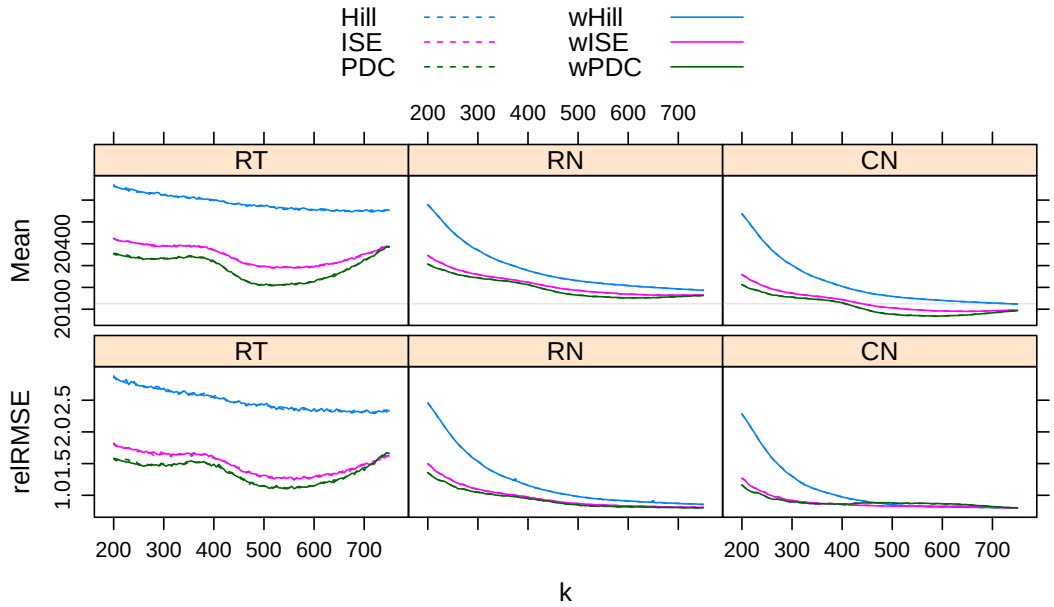

Figure F.262.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

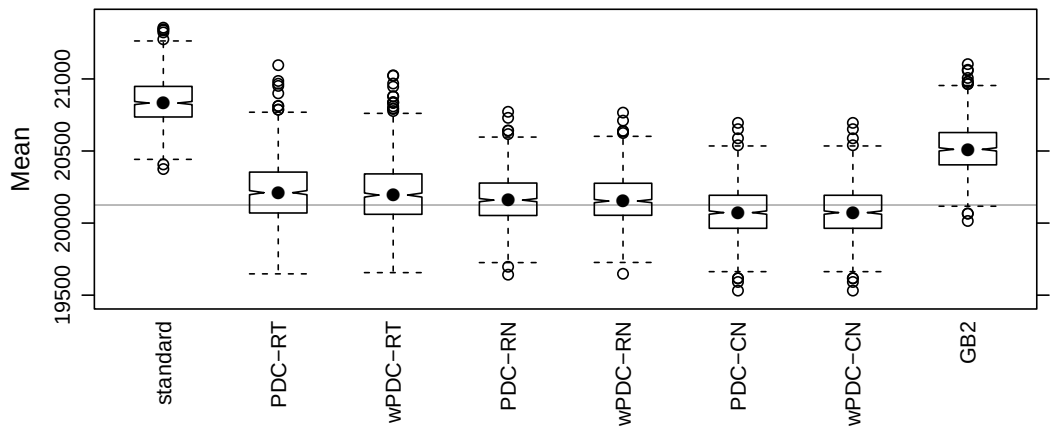

Figure F.263.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.131.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20839.94	24906.19	714.57	3.55	20832.75	159.78	707.39	731.78	3.64	1048.78	0.06
wHill	RT	300	20625.90	42125.87	500.54	2.49	20615.97	198.01	490.61	540.95	2.69	727.38	0.12
wHill	RT	500	20571.49	38854.89	446.13	2.22	20565.73	194.04	440.37	487.70	2.42	652.89	0.06
wHill	RT	700	20551.81	37555.53	426.45	2.12	20542.10	202.24	416.74	468.37	2.33	617.86	0.06
wHill	RN	300	20370.79	35336.87	245.43	1.22	20361.64	186.84	236.28	309.09	1.54	353.83	0.04
wHill	RN	500	20231.06	27750.33	105.70	0.53	20226.10	168.22	100.74	197.22	0.98	189.09	0.03
wHill	RN	700	20193.32	26344.91	67.96	0.34	20187.83	163.46	62.47	175.89	0.87	172.18	0.03
wHill	CN	300	20301.75	37471.10	176.39	0.88	20294.74	188.58	169.38	261.81	1.30	271.77	0.04
wHill	CN	500	20159.00	28349.46	33.63	0.17	20150.00	166.57	24.63	171.62	0.85	172.55	0.03
wHill	CN	700	20128.61	26365.61	3.24	0.02	20123.43	159.74	−1.94	162.33	0.81	159.90	0.03
wISE	RT	300	20390.76	42094.27	265.40	1.32	20380.43	198.89	255.07	335.39	1.67	383.43	0.05
wISE	RT	500	20297.58	40732.66	172.22	0.86	20294.60	195.67	169.24	265.24	1.32	271.89	0.04
wISE	RT	700	20352.88	38127.52	227.51	1.13	20342.71	195.94	217.35	299.75	1.49	329.82	0.05
wISE	RN	300	20259.16	30939.46	133.80	0.66	20250.97	180.56	125.61	220.93	1.10	225.27	0.04
wISE	RN	500	20186.50	27035.66	61.14	0.30	20179.46	163.53	54.10	175.35	0.87	170.06	0.03
wISE	RN	700	20164.99	25166.94	39.63	0.20	20161.39	164.66	36.03	163.44	0.81	163.02	0.03
wISE	CN	300	20174.00	32001.50	48.63	0.24	20165.45	181.15	40.09	185.30	0.92	191.11	0.04
wISE	CN	500	20106.16	27569.43	−19.20	−0.10	20098.28	166.92	−27.08	167.06	0.83	167.05	0.03
wISE	CN	700	20092.65	25431.42	−32.72	−0.16	20087.51	164.80	−37.85	162.72	0.81	163.84	0.03
wPDC	RT	300	20331.48	46116.22	206.12	1.02	20331.32	209.08	205.96	297.58	1.48	318.79	0.05
wPDC	RT	500	20211.44	46276.51	86.07	0.43	20194.37	206.60	69.01	231.60	1.15	224.37	0.04
wPDC	RT	700	20328.26	42789.11	202.89	1.01	20322.93	197.20	197.56	289.68	1.44	304.43	0.05
wPDC	RN	300	20244.50	30517.82	119.14	0.59	20237.65	175.33	112.29	211.38	1.05	213.29	0.04
wPDC	RN	500	20164.52	27671.41	39.16	0.19	20152.66	168.54	27.30	170.81	0.85	168.75	0.03
wPDC	RN	700	20158.27	25206.05	32.91	0.16	20152.78	162.10	27.42	162.06	0.81	166.36	0.03
wPDC	CN	300	20155.98	31960.26	30.62	0.15	20148.14	177.79	22.77	181.29	0.90	181.00	0.04
wPDC	CN	500	20077.57	29161.13	−47.79	−0.24	20072.76	168.73	−52.60	177.25	0.88	178.51	0.03
wPDC	CN	700	20083.53	25616.11	−41.83	−0.21	20079.05	161.69	−46.32	165.35	0.82	164.93	0.03
GB2			20518.22	27905.89	392.85	1.95	20511.33	166.58	385.97	426.86	2.12	572.23	0.05

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OAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

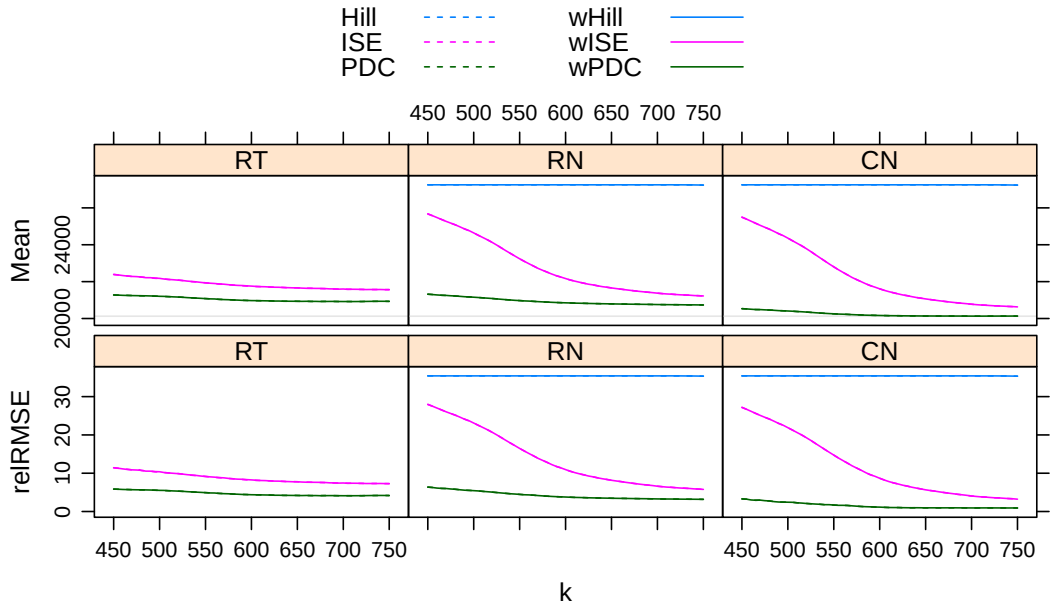

Figure F.264.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

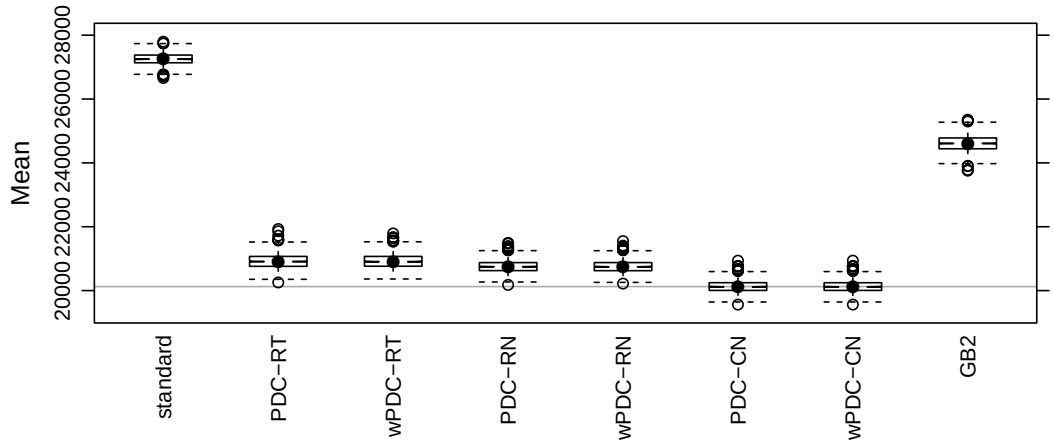

Figure F.265.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.132.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			27251.37	34023.51	7126.00	35.41	27248.99	182.86	7123.63	7128.39	35.42	10561.50	0.38
wHill	RT	500	26857.95	12260086.84	6732.58	33.45	26348.78	1002.15	6223.42	7587.85	37.70	9226.84	4.61
wHill	RT	700	25346.53	890115.44	5221.17	25.94	25214.81	602.00	5089.44	5305.64	26.36	7545.61	1.09
wHill	RN	300	27251.37	34023.51	7126.00	35.41	27248.99	182.86	7123.63	7128.39	35.42	10561.50	0.38
wHill	RN	500	27251.37	34023.51	7126.00	35.41	27248.99	182.86	7123.63	7128.39	35.42	10561.50	0.38
wHill	RN	700	27251.19	34025.74	7125.83	35.41	27247.99	182.18	7122.63	7128.21	35.42	10560.01	0.38
wHill	CN	300	27251.37	34023.51	7126.00	35.41	27248.99	182.86	7123.63	7128.39	35.42	10561.50	0.38
wHill	CN	500	27251.37	34023.51	7126.00	35.41	27248.99	182.86	7123.63	7128.39	35.42	10561.50	0.38
wHill	CN	700	27251.18	34027.03	7125.82	35.41	27247.99	182.18	7122.63	7128.20	35.42	10560.01	0.38
wISE	RT	500	22177.28	156925.31	2051.92	10.20	22142.32	351.72	2016.96	2089.77	10.38	2990.34	0.33
wISE	RT	700	21600.20	72797.61	1474.84	7.33	21592.91	269.37	1467.55	1499.29	7.45	2175.78	0.11
wISE	RN	300	27250.71	34045.60	7125.34	35.40	27248.43	182.84	7123.07	7127.73	35.42	10560.66	0.38
wISE	RN	500	24642.31	1214535.28	4516.95	22.44	24880.43	933.46	4755.06	4649.31	23.10	7049.86	0.36
wISE	RN	700	21374.75	204783.87	1249.39	6.21	21285.71	364.56	1160.35	1328.74	6.60	1720.33	0.20
wISE	CN	300	27250.64	34075.92	7125.28	35.40	27248.43	182.84	7123.07	7127.67	35.42	10560.66	0.38
wISE	CN	500	24358.82	1495473.71	4233.46	21.04	24621.63	1008.38	4496.27	4406.38	21.89	6666.17	0.35
wISE	CN	700	20774.11	240403.02	648.75	3.22	20671.52	396.75	546.16	813.04	4.04	809.73	0.19
wPDC	RT	500	21204.88	67757.58	1079.52	5.36	21195.77	262.29	1070.41	1110.43	5.52	1586.99	0.11
wPDC	RT	700	20921.32	53089.99	795.96	3.96	20906.01	225.53	780.65	828.61	4.12	1157.39	0.08
wPDC	RN	300	23234.99	1253518.25	3109.63	15.45	22828.74	474.69	2703.37	3304.85	16.42	4008.02	0.37
wPDC	RN	500	21155.63	139591.27	1030.27	5.12	21086.61	282.41	961.25	1095.86	5.45	1425.15	0.17
wPDC	RN	700	20757.34	36979.04	631.98	3.14	20746.23	188.26	620.86	660.56	3.28	920.49	0.07
wPDC	CN	300	22568.25	1727438.82	2442.89	12.14	22082.54	532.44	1957.18	2773.70	13.78	2901.72	0.37
wPDC	CN	500	20408.08	159038.64	282.72	1.40	20327.37	286.73	202.01	488.68	2.43	330.68	0.15
wPDC	CN	700	20129.89	34986.05	4.53	0.02	20118.84	179.79	−6.52	187.01	0.93	179.34	0.04
GB2			24611.29	64000.74	4485.93	22.29	24608.94	251.00	4483.58	4493.05	22.33	6647.36	0.26

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OAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

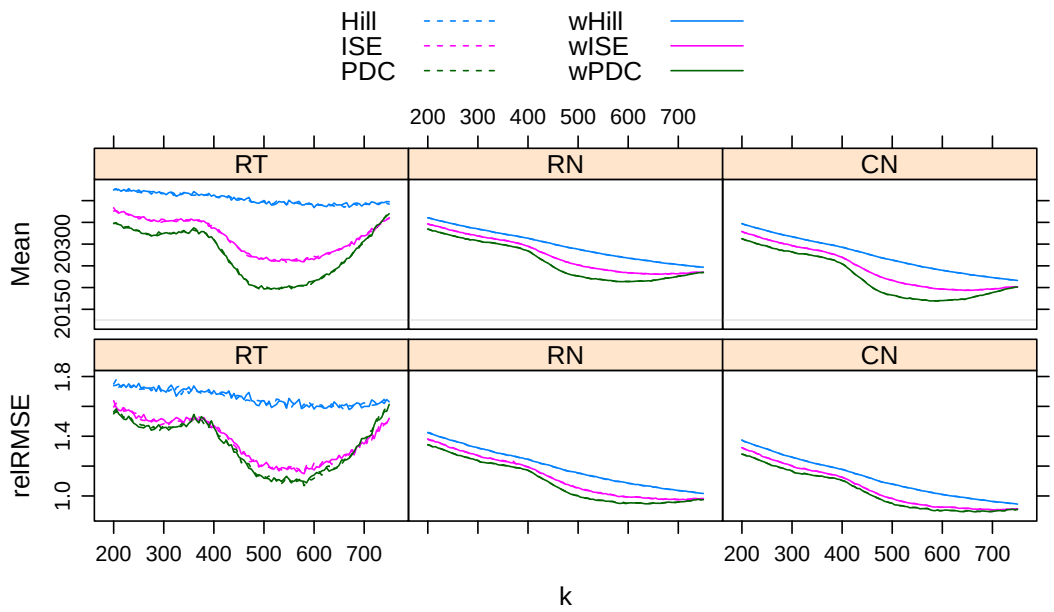

Figure F.266.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

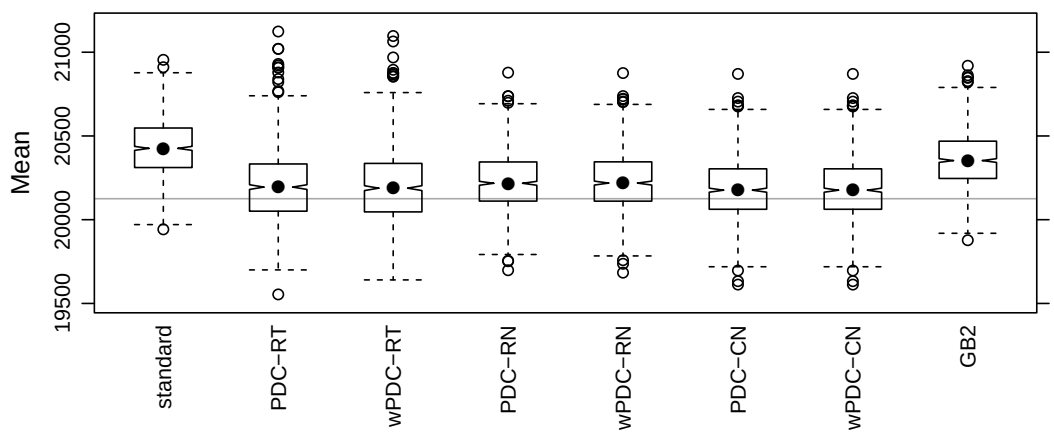

Figure F.267.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.133.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20430.40	27190.19	305.03	1.52	20425.89	171.52	300.53	346.71	1.72	445.57	0.04
wHill	RT	300	20416.89	32832.51	291.52	1.45	20413.39	184.16	288.03	343.20	1.71	427.04	0.05
wHill	RT	500	20397.07	34920.98	271.71	1.35	20392.98	180.32	267.62	329.71	1.64	397.17	0.05
wHill	RT	700	20392.17	32507.51	266.80	1.33	20385.64	184.80	260.28	321.96	1.60	386.46	0.05
wHill	RN	300	20334.87	27102.94	209.50	1.04	20326.05	165.03	200.68	266.40	1.32	298.53	0.04
wHill	RN	500	20288.22	27377.10	162.85	0.81	20283.69	168.25	158.33	232.10	1.15	244.80	0.04
wHill	RN	700	20252.65	27389.55	127.28	0.63	20247.19	167.39	121.83	208.72	1.04	215.59	0.03
wHill	CN	300	20317.11	27541.77	191.75	0.95	20309.27	167.09	183.91	253.54	1.26	277.87	0.04
wHill	CN	500	20263.22	28184.56	137.86	0.69	20259.99	168.35	134.63	217.17	1.08	223.84	0.04
wHill	CN	700	20223.03	28064.69	97.67	0.49	20218.16	171.33	92.80	193.84	0.96	190.78	0.03
wISE	RT	300	20356.65	38968.71	231.29	1.15	20355.44	193.25	230.08	304.01	1.51	348.93	0.04
wISE	RT	500	20266.41	39438.99	141.05	0.70	20258.18	198.76	132.82	243.50	1.21	245.35	0.04
wISE	RT	700	20318.73	36308.76	193.36	0.96	20317.46	188.06	192.10	271.41	1.35	299.46	0.04
wISE	RN	300	20318.41	28135.42	193.05	0.96	20316.99	167.30	191.63	255.68	1.27	290.29	0.04
wISE	RN	500	20251.75	29149.87	126.39	0.63	20244.06	174.07	118.70	212.36	1.06	214.00	0.04
wISE	RN	700	20231.78	27209.79	106.41	0.53	20229.89	166.25	104.53	196.23	0.98	193.56	0.03
wISE	CN	300	20296.45	29223.62	171.09	0.85	20296.86	171.08	171.50	241.79	1.20	263.52	0.04
wISE	CN	500	20216.55	30880.34	91.19	0.45	20211.75	178.80	86.39	197.90	0.98	191.05	0.04
wISE	CN	700	20196.50	28320.03	71.14	0.35	20193.11	168.97	67.75	182.63	0.91	179.24	0.03
wPDC	RT	300	20324.74	46401.89	199.38	0.99	20322.65	198.62	197.29	293.44	1.46	309.33	0.06
wPDC	RT	500	20196.55	45658.09	71.18	0.35	20188.40	213.69	63.04	225.12	1.12	217.72	0.05
wPDC	RT	700	20307.52	44517.31	182.16	0.91	20302.23	208.86	176.86	278.66	1.38	281.14	0.04
wPDC	RN	300	20307.79	28733.94	182.42	0.91	20310.30	169.30	184.94	248.97	1.24	281.57	0.04
wPDC	RN	500	20226.62	30369.57	101.26	0.50	20218.54	172.14	93.18	201.48	1.00	194.76	0.04
wPDC	RN	700	20226.18	27090.52	100.82	0.50	20224.82	163.23	99.45	192.95	0.96	188.80	0.03
wPDC	CN	300	20281.79	30748.11	156.43	0.78	20285.52	176.42	160.16	234.92	1.17	252.98	0.04
wPDC	CN	500	20182.48	33376.71	57.12	0.28	20176.19	180.11	50.83	191.33	0.95	188.50	0.04
wPDC	CN	700	20188.52	28601.96	63.16	0.31	20188.12	166.33	62.76	180.45	0.90	183.11	0.03
GB2			20358.36	27477.48	232.99	1.16	20353.13	164.57	227.77	285.90	1.42	338.59	0.04

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OAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

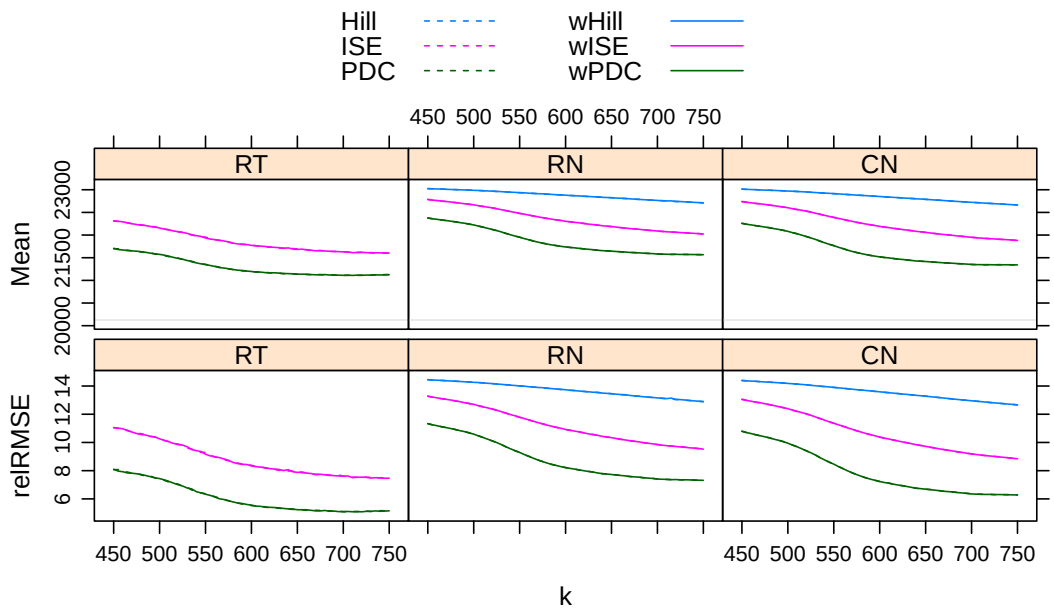

Figure F.268.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

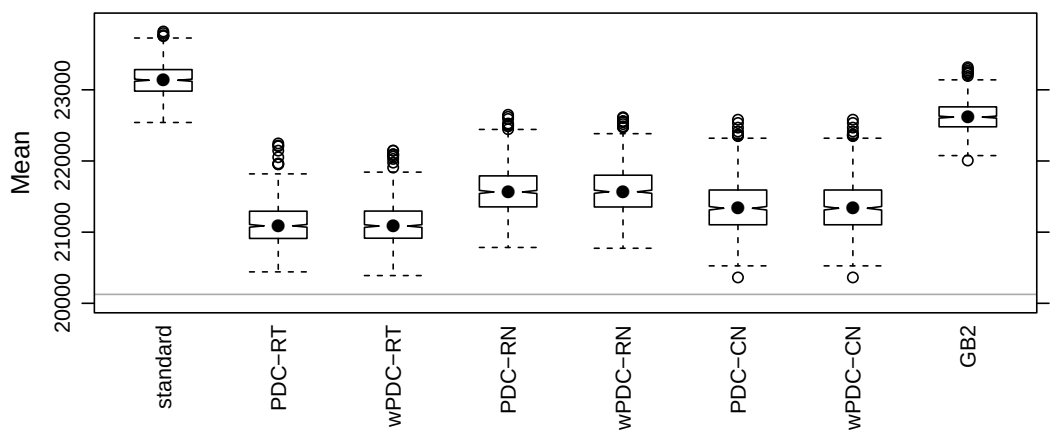

Figure F.269.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.134.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			23133.04	48852.20	3007.68	14.94	23134.44	223.35	3009.07	3015.78	14.98	4461.25	0.18
wHill	RT	500	23182.66	351972.44	3057.30	15.19	23117.94	394.54	2992.57	3114.27	15.47	4436.79	0.69
wHill	RT	700	22878.55	139008.35	2753.19	13.68	22851.86	330.82	2726.49	2778.29	13.80	4042.30	0.28
wHill	RN	300	23100.24	49182.33	2974.88	14.78	23103.69	221.22	2978.33	2983.12	14.82	4415.67	0.18
wHill	RN	500	22986.86	49872.26	2861.50	14.22	22990.84	221.55	2865.48	2870.19	14.26	4248.35	0.18
wHill	RN	700	22764.01	50005.74	2638.65	13.11	22770.47	218.20	2645.11	2648.10	13.16	3921.64	0.17
wHill	CN	300	23096.48	48807.83	2971.12	14.76	23098.94	221.65	2973.58	2979.31	14.80	4408.63	0.18
wHill	CN	500	22971.33	50549.07	2845.97	14.14	22975.21	225.31	2849.85	2854.82	14.19	4225.19	0.18
wHill	CN	700	22722.59	52061.14	2597.22	12.91	22730.31	229.62	2604.95	2607.22	12.95	3862.10	0.17
wISE	RT	500	22154.67	143677.32	2029.30	10.08	22142.69	352.09	2017.33	2064.37	10.26	2990.90	0.19
wISE	RT	700	21628.62	86935.30	1503.26	7.47	21609.94	281.86	1484.58	1531.88	7.61	2201.03	0.13
wISE	RN	300	23075.20	50978.97	2949.83	14.66	23077.24	226.85	2951.87	2958.45	14.70	4376.45	0.18
wISE	RN	500	22666.72	77310.52	2541.36	12.63	22673.43	265.24	2548.07	2556.51	12.70	3777.76	0.23
wISE	RN	700	22089.55	77199.58	1964.19	9.76	22087.85	269.52	1962.49	1983.73	9.86	2909.59	0.14
wISE	CN	300	23068.16	51701.66	2942.80	14.62	23074.38	222.55	2949.02	2951.56	14.67	4372.21	0.18
wISE	CN	500	22603.38	82292.30	2478.02	12.31	22614.03	278.03	2488.67	2494.55	12.40	3689.70	0.16
wISE	CN	700	21950.72	89188.95	1825.36	9.07	21951.19	301.26	1825.83	1849.60	9.19	2706.97	0.14
wPDC	RT	500	21573.98	143861.28	1448.61	7.20	21546.55	378.32	1421.19	1497.40	7.44	2107.05	0.16
wPDC	RT	700	21111.54	81152.37	986.18	4.90	21085.86	273.69	960.50	1026.46	5.10	1424.04	0.10
wPDC	RN	300	22949.77	80787.41	2824.41	14.03	22966.37	282.61	2841.01	2838.66	14.10	4212.08	0.18
wPDC	RN	500	22223.35	141335.33	2097.99	10.42	22245.02	374.57	2119.66	2131.37	10.59	3142.60	0.16
wPDC	RN	700	21581.23	102166.19	1455.87	7.23	21567.87	329.70	1442.51	1490.51	7.41	2138.67	0.12
wPDC	CN	300	22922.82	94204.02	2797.46	13.90	22944.68	291.65	2819.32	2814.23	13.98	4179.92	0.18
wPDC	CN	500	22081.64	181685.04	1956.28	9.72	22104.47	427.92	1979.11	2002.13	9.95	2934.22	0.16
wPDC	CN	700	21351.17	131629.98	1225.81	6.09	21335.70	366.18	1210.34	1278.32	6.35	1794.45	0.12
GB2			22618.84	43463.13	2493.48	12.39	22616.35	206.89	2490.99	2502.17	12.43	3693.15	0.16

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OAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 20.

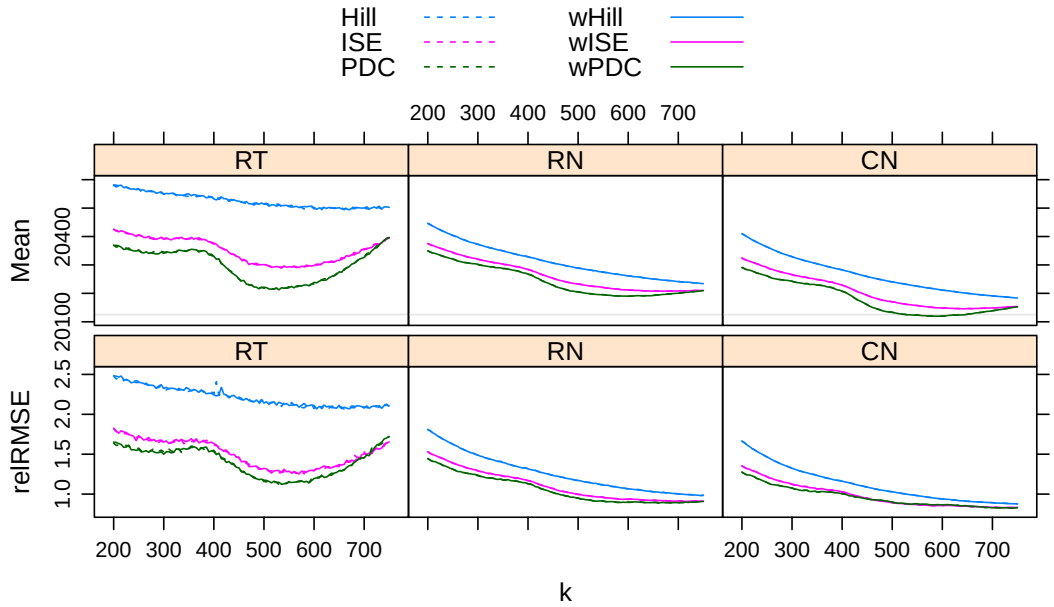

Figure F.270.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

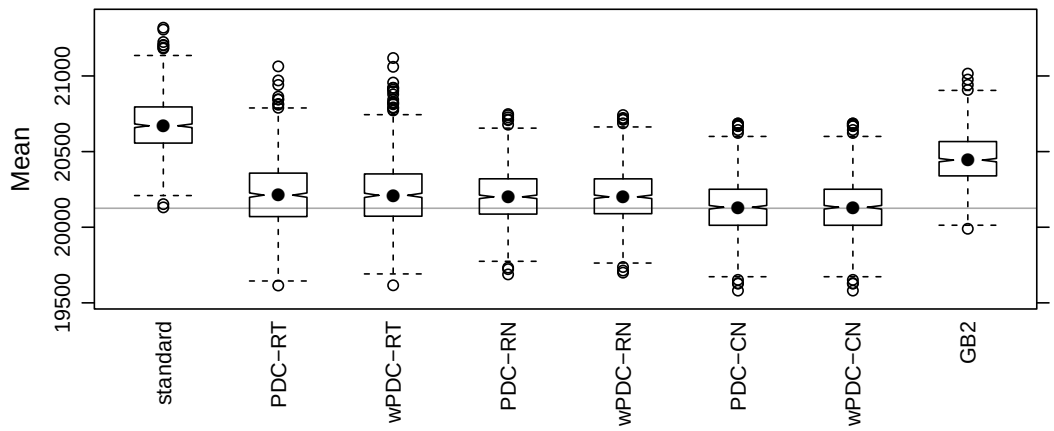

Figure F.271.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.135.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20674.90	32963.19	549.53	2.73	20670.73	177.39	545.37	578.72	2.88	808.57	0.06
wHill	RT	300	20548.97	39191.72	423.61	2.10	20539.15	201.07	413.78	467.54	2.32	613.48	0.06
wHill	RT	500	20513.50	34992.12	388.14	1.93	20503.45	188.25	378.09	430.82	2.14	560.56	0.06
wHill	RT	700	20500.65	34094.61	375.29	1.86	20501.08	187.42	375.72	418.21	2.08	557.05	0.05
wHill	RN	300	20372.94	28538.11	247.57	1.23	20365.57	177.81	240.21	299.67	1.49	356.14	0.04
wHill	RN	500	20288.94	28798.48	163.58	0.81	20282.47	170.48	157.11	235.64	1.17	251.13	0.03
wHill	RN	700	20241.25	27196.80	115.89	0.58	20239.36	167.23	114.00	201.49	1.00	196.61	0.03
wHill	CN	300	20328.89	29468.93	203.53	1.01	20321.96	175.61	196.60	266.20	1.32	296.36	0.04
wHill	CN	500	20240.45	29657.89	115.09	0.57	20236.02	173.99	110.66	207.06	1.03	204.92	0.03
wHill	CN	700	20191.11	27945.40	65.75	0.33	20189.85	165.23	64.49	179.56	0.89	174.43	0.03
wISE	RT	300	20391.98	39444.52	266.62	1.32	20394.26	195.69	268.90	332.40	1.65	399.95	0.05
wISE	RT	500	20301.37	39863.75	176.01	0.87	20293.28	200.14	167.92	266.09	1.32	277.92	0.05
wISE	RT	700	20353.71	39427.59	228.34	1.13	20345.27	202.35	219.91	302.54	1.50	330.12	0.05
wISE	RN	300	20319.92	29752.11	194.56	0.97	20319.38	172.78	194.01	259.95	1.29	292.39	0.04
wISE	RN	500	20233.18	28583.55	107.82	0.54	20228.64	160.68	103.27	200.45	1.00	202.37	0.03
wISE	RN	700	20208.44	26984.87	83.08	0.41	20202.24	169.42	76.87	184.01	0.91	180.84	0.03
wISE	CN	300	20265.79	31439.00	140.43	0.70	20267.84	176.22	142.48	226.12	1.12	232.00	0.04
wISE	CN	500	20170.09	30302.10	44.73	0.22	20166.24	169.37	40.88	179.65	0.89	179.84	0.03
wISE	CN	700	20148.91	27607.74	23.55	0.12	20143.33	168.35	17.97	167.73	0.83	169.16	0.03
wPDC	RT	300	20340.63	44790.40	215.26	1.07	20338.29	200.17	212.93	301.80	1.50	327.26	0.05
wPDC	RT	500	20221.35	46658.94	95.99	0.48	20210.77	208.42	85.41	236.28	1.17	226.57	0.05
wPDC	RT	700	20326.16	45313.69	200.80	1.00	20318.27	207.15	192.91	292.55	1.45	299.99	0.05
wPDC	RN	300	20302.14	30820.04	176.78	0.88	20302.25	168.85	176.88	249.08	1.24	275.00	0.04
wPDC	RN	500	20205.29	30091.29	79.93	0.40	20201.14	169.96	75.78	190.92	0.95	189.24	0.03
wPDC	RN	700	20200.54	26491.74	75.17	0.37	20195.20	166.93	69.84	179.21	0.89	177.49	0.03
wPDC	CN	300	20242.51	33206.23	117.14	0.58	20250.09	178.54	124.73	216.55	1.08	223.58	0.04
wPDC	CN	500	20133.35	32718.47	7.99	0.04	20131.92	176.64	6.56	180.97	0.90	176.18	0.03
wPDC	CN	700	20138.78	27613.42	13.41	0.07	20132.78	166.84	7.42	166.63	0.83	166.59	0.03
GB2			20451.52	27756.39	326.16	1.62	20443.52	166.88	318.16	366.21	1.82	471.70	0.04

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OAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 20.

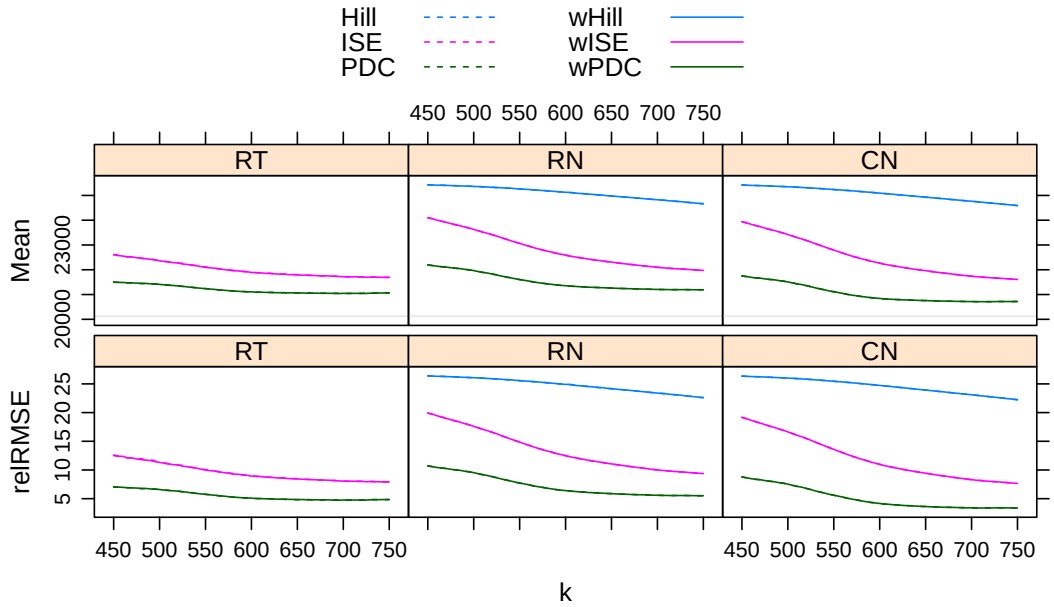

Figure F.272.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

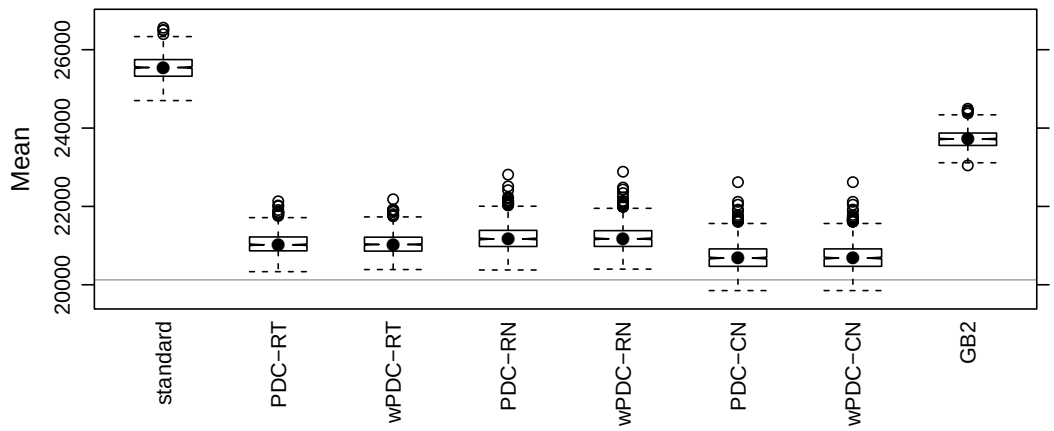

Figure F.273.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.136.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			25537.14	95355.35	5411.78	26.89	25545.77	317.82	5420.41	5420.57	26.93	8036.30	0.32
wHill	RT	500	25491.50	2619388.69	5366.13	26.66	25219.58	776.59	5094.22	5604.66	27.85	7552.69	1.54
wHill	RT	700	24556.84	710514.62	4431.48	22.02	24439.92	541.11	4314.56	4510.86	22.41	6396.77	0.80
wHill	RN	300	25525.30	97913.37	5399.94	26.83	25528.86	319.19	5403.50	5408.99	26.88	8011.22	0.34
wHill	RN	500	25364.49	94982.79	5239.12	26.03	25352.53	313.60	5227.17	5248.17	26.08	7749.79	0.31
wHill	RN	700	24824.50	93761.73	4699.14	23.35	24821.08	280.80	4695.71	4709.09	23.40	6961.87	0.29
wHill	CN	300	25522.80	95524.17	5397.44	26.82	25525.12	321.54	5399.76	5406.28	26.86	8005.68	0.32
wHill	CN	500	25350.39	96011.95	5225.03	25.96	25333.57	313.56	5208.21	5234.20	26.01	7721.69	0.31
wHill	CN	700	24765.74	97682.21	4640.37	23.06	24761.88	286.00	4636.52	4650.88	23.11	6874.11	0.29
wISE	RT	500	22361.89	183071.99	2236.53	11.11	22336.80	410.38	2211.44	2277.05	11.31	3278.67	0.21
wISE	RT	700	21720.28	92191.84	1594.92	7.92	21696.19	286.25	1570.83	1623.54	8.07	2328.91	0.13
wISE	RN	300	25422.06	99297.17	5296.70	26.32	25417.26	332.24	5291.89	5306.05	26.37	7845.76	0.31
wISE	RN	500	23628.90	283482.18	3503.54	17.41	23641.91	522.90	3516.55	3543.72	17.61	5213.64	0.26
wISE	RN	700	22100.03	160257.23	1974.67	9.81	22070.92	404.81	1945.56	2014.80	10.01	2884.48	0.18
wISE	CN	300	25411.61	102007.50	5286.25	26.27	25407.11	335.86	5281.74	5295.88	26.31	7830.71	0.31
wISE	CN	500	23420.88	343552.05	3295.52	16.37	23442.18	575.30	3316.82	3347.18	16.63	4917.52	0.25
wISE	CN	700	21740.78	191145.86	1615.42	8.03	21699.70	432.52	1574.34	1673.48	8.32	2334.11	0.17
wPDC	RT	500	21410.33	110567.10	1284.97	6.38	21387.81	329.47	1262.44	1327.25	6.59	1871.70	0.12
wPDC	RT	700	21047.83	68131.90	922.47	4.58	21028.80	260.75	903.44	958.65	4.76	1339.44	0.10
wPDC	RN	300	23832.83	1048355.46	3707.47	18.42	23875.91	1245.28	3750.55	3846.12	19.11	5560.57	0.30
wPDC	RN	500	21966.54	293330.62	1841.18	9.15	21914.50	531.82	1789.13	1919.11	9.54	2652.57	0.20
wPDC	RN	700	21205.81	97640.04	1080.45	5.37	21173.65	296.56	1048.28	1124.68	5.59	1554.19	0.14
wPDC	CN	300	23574.68	1426233.29	3449.32	17.14	23644.89	1443.31	3519.52	3650.01	18.14	5218.05	0.30
wPDC	CN	500	21509.53	382094.21	1384.17	6.88	21448.98	606.42	1323.62	1515.79	7.53	1962.40	0.19
wPDC	CN	700	20716.27	120073.90	590.91	2.94	20681.59	326.59	556.23	684.93	3.40	824.66	0.12
GB2			23723.20	56696.69	3597.84	17.88	23720.26	239.22	3594.90	3605.70	17.92	5329.80	0.22

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Stratified Midzuno sampling

No contamination

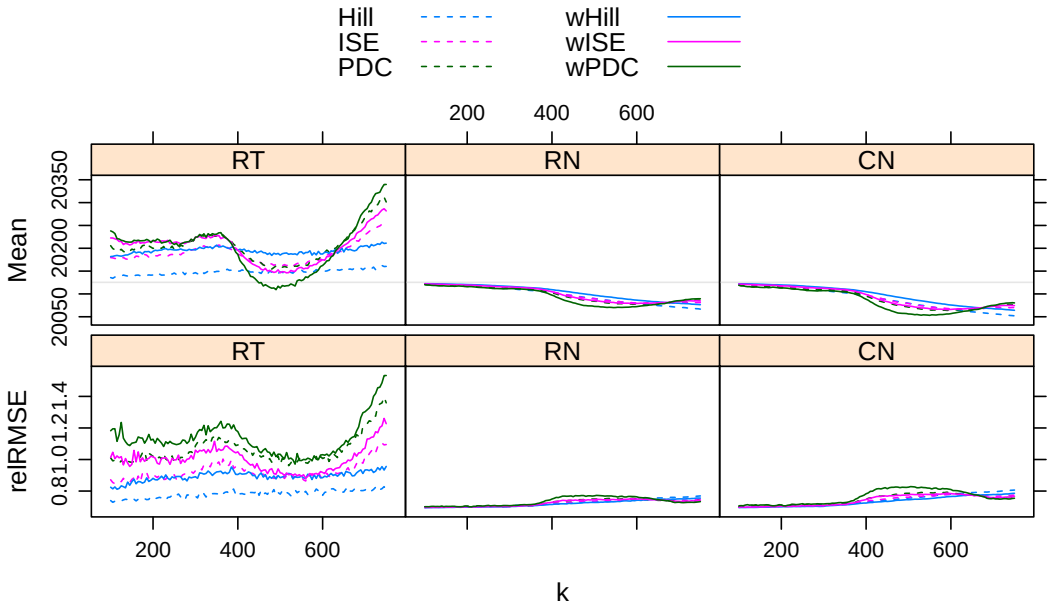

Figure F.274.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 100 and 750.

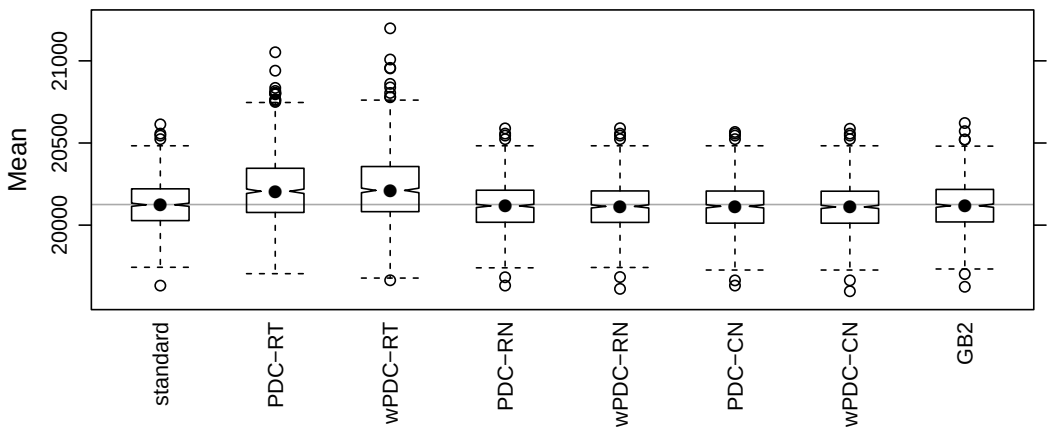

Figure F.275.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 300$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.137.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20122.83	19548.30	−2.54	−0.01	20124.00	143.12	−1.36	139.77	0.69	143.27	0.02
wHill	RT	300	20196.23	27168.85	70.87	0.35	20194.37	160.92	69.00	179.34	0.89	174.78	0.03
wHill	RT	500	20185.11	28144.40	59.75	0.30	20180.79	172.62	55.43	178.01	0.88	181.85	0.03
wHill	RT	700	20205.51	28924.60	80.15	0.40	20205.51	173.12	80.14	187.93	0.93	191.58	0.03
wHill	RN	300	20116.49	19801.70	−8.87	−0.04	20118.59	144.72	−6.78	140.93	0.70	145.82	0.03
wHill	RN	500	20096.98	20676.44	−28.38	−0.14	20099.23	144.19	−26.14	146.50	0.73	148.11	0.03
wHill	RN	700	20079.63	20746.29	−45.74	−0.23	20081.51	147.25	−43.85	151.05	0.75	148.95	0.03
wHill	CN	300	20114.23	19927.84	−11.13	−0.06	20117.18	145.50	−8.18	141.53	0.70	148.83	0.03
wHill	CN	500	20089.22	21197.38	−36.14	−0.18	20090.79	146.79	−34.57	149.94	0.75	151.56	0.03
wHill	CN	700	20067.55	21210.77	−57.81	−0.29	20069.42	146.71	−55.95	156.62	0.78	156.21	0.03
wISE	RT	300	20224.20	35723.22	98.84	0.49	20212.65	176.87	87.28	213.20	1.06	196.07	0.04
wISE	RT	500	20146.37	33579.22	21.01	0.10	20134.29	175.58	8.93	184.36	0.92	174.32	0.04
wISE	RT	700	20246.97	31703.33	121.61	0.60	20251.69	169.56	126.33	215.55	1.07	223.76	0.03
wISE	RN	300	20115.31	19832.84	−10.06	−0.05	20117.47	144.90	−7.89	141.12	0.70	148.39	0.03
wISE	RN	500	20085.60	20908.75	−39.77	−0.20	20088.43	144.78	−36.94	149.90	0.74	149.49	0.03
wISE	RN	700	20083.51	20150.22	−41.85	−0.21	20082.22	143.28	−43.14	147.93	0.74	146.48	0.03
wISE	CN	300	20112.58	20016.10	−12.78	−0.06	20114.80	145.66	−10.57	141.98	0.71	149.58	0.03
wISE	CN	500	20073.53	21659.90	−51.83	−0.26	20075.70	146.99	−49.66	155.96	0.77	151.75	0.03
wISE	CN	700	20073.04	20616.25	−52.32	−0.26	20072.57	143.20	−52.79	152.75	0.76	153.05	0.03
wPDC	RT	300	20224.33	43048.58	98.97	0.49	20211.38	203.06	86.02	229.78	1.14	214.08	0.05
wPDC	RT	500	20112.98	43113.19	−12.38	−0.06	20108.47	208.36	−16.89	207.90	1.03	205.88	0.04
wPDC	RT	700	20283.39	43804.17	158.03	0.79	20280.83	195.22	155.46	262.17	1.30	260.48	0.05
wPDC	RN	300	20111.56	20087.44	−13.80	−0.07	20114.15	143.99	−11.22	142.33	0.71	148.50	0.03
wPDC	RN	500	20072.65	21245.12	−52.71	−0.26	20073.94	147.40	−51.42	154.93	0.77	149.85	0.03
wPDC	RN	700	20085.13	19940.38	−40.24	−0.20	20083.78	138.65	−41.58	146.76	0.73	142.79	0.03
wPDC	CN	300	20107.23	20583.68	−18.14	−0.09	20110.97	145.79	−14.39	144.54	0.72	151.35	0.03
wPDC	CN	500	20056.06	22768.44	−69.31	−0.34	20058.11	150.39	−67.25	165.98	0.82	160.61	0.03
wPDC	CN	700	20074.94	20476.93	−50.42	−0.25	20074.69	139.71	−50.68	151.65	0.75	151.66	0.03
GB2			20117.44	20621.22	−7.92	−0.04	20118.35	146.79	−7.02	143.75	0.71	146.67	0.02

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OCAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

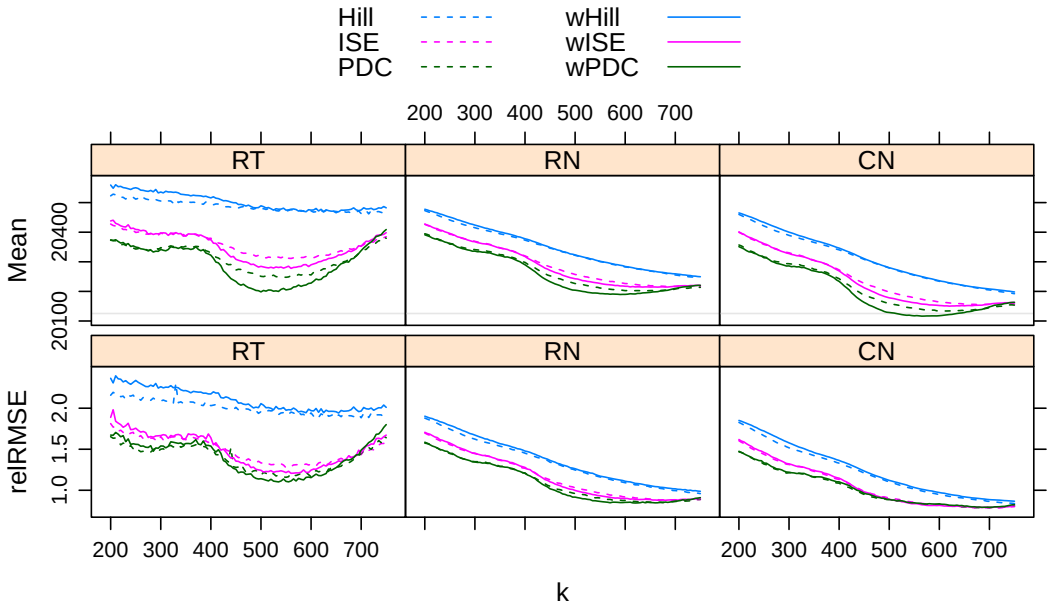

Figure F.276.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

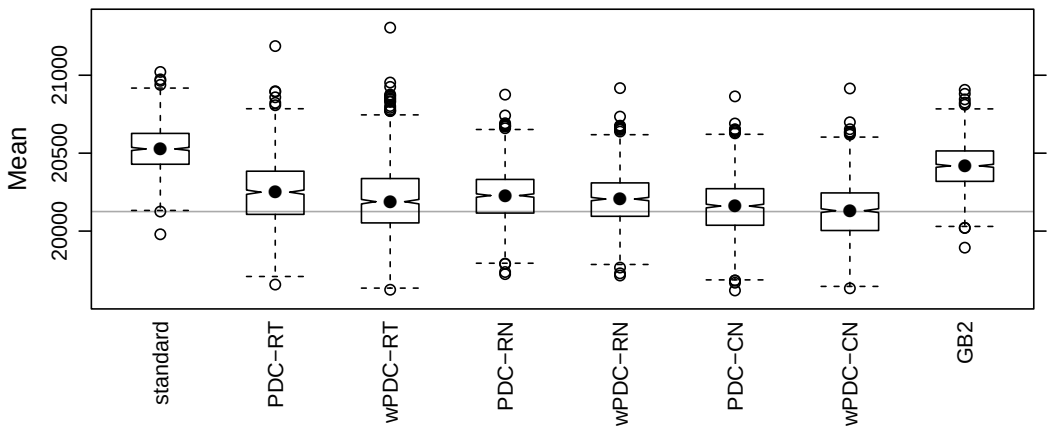

Figure F.277.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.138.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20527.43	20881.13	402.07	2.00	20526.99	146.65	401.63	427.22	2.12	595.46	0.04
wHill	RT	300	20535.70	38940.75	410.34	2.04	20528.65	183.67	403.29	455.28	2.26	597.91	0.05
wHill	RT	500	20489.20	38862.53	363.84	1.81	20485.05	191.10	359.68	413.77	2.06	533.27	0.06
wHill	RT	700	20475.22	34030.09	349.86	1.74	20475.47	182.54	350.11	395.47	1.97	519.07	0.05
wHill	RN	300	20423.98	24100.41	298.61	1.48	20422.67	160.02	297.31	336.52	1.67	440.80	0.04
wHill	RN	500	20323.39	25361.52	198.02	0.98	20323.65	161.95	198.28	254.07	1.26	294.74	0.04
wHill	RN	700	20259.36	24003.08	134.00	0.67	20259.68	157.52	134.32	204.78	1.02	220.43	0.04
wHill	CN	300	20400.04	25346.71	274.68	1.36	20399.08	161.19	273.72	317.44	1.58	405.82	0.04
wHill	CN	500	20279.97	26934.80	154.61	0.77	20277.78	166.35	152.42	225.42	1.12	243.61	0.04
wHill	CN	700	20208.10	24942.29	82.74	0.41	20208.11	156.35	82.74	178.22	0.89	181.68	0.03
wISE	RT	300	20396.15	39174.18	270.78	1.35	20385.82	192.05	260.46	335.35	1.67	386.15	0.05
wISE	RT	500	20284.72	37220.80	159.36	0.79	20275.98	190.67	150.62	250.16	1.24	246.91	0.05
wISE	RT	700	20352.05	34576.73	226.69	1.13	20344.71	183.83	219.34	293.14	1.46	330.48	0.05
wISE	RN	300	20367.98	26618.06	242.61	1.21	20362.64	168.73	237.27	292.32	1.45	352.35	0.04
wISE	RN	500	20242.65	26587.92	117.28	0.58	20242.34	160.03	116.98	200.79	1.00	210.54	0.04
wISE	RN	700	20217.39	23206.70	92.03	0.46	20218.61	151.97	93.25	177.91	0.88	179.86	0.04
wISE	CN	300	20327.86	29781.94	202.50	1.01	20331.49	176.55	206.13	266.00	1.32	307.15	0.04
wISE	CN	500	20178.26	29251.58	52.90	0.26	20181.06	166.81	55.70	178.94	0.89	179.21	0.04
wISE	CN	700	20156.96	24333.82	31.60	0.16	20158.22	154.68	32.86	159.08	0.79	162.75	0.03
wPDC	RT	300	20341.94	49206.41	216.58	1.08	20329.40	218.93	204.04	309.94	1.54	313.63	0.06
wPDC	RT	500	20198.45	47393.02	73.09	0.36	20188.80	210.25	63.44	229.54	1.14	216.66	0.06
wPDC	RT	700	20337.80	44748.87	212.44	1.06	20327.23	197.90	201.87	299.72	1.49	310.18	0.05
wPDC	RN	300	20336.11	28818.50	210.75	1.05	20329.77	173.03	204.41	270.56	1.34	304.45	0.04
wPDC	RN	500	20204.13	27850.34	78.77	0.39	20205.62	158.73	80.26	184.46	0.92	187.38	0.04
wPDC	RN	700	20209.86	23385.03	84.50	0.42	20205.55	152.29	80.18	174.65	0.87	182.98	0.03
wPDC	CN	300	20286.04	34478.28	160.68	0.80	20278.37	193.94	153.01	245.48	1.22	253.24	0.03
wPDC	CN	500	20128.79	31953.68	3.43	0.02	20131.10	176.89	5.73	178.70	0.89	179.29	0.04
wPDC	CN	700	20147.80	24948.01	22.43	0.11	20143.41	160.83	18.05	159.46	0.79	164.55	0.03
GB2			20417.27	21503.08	291.91	1.45	20418.90	145.99	293.54	326.64	1.62	435.20	0.04

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OCAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

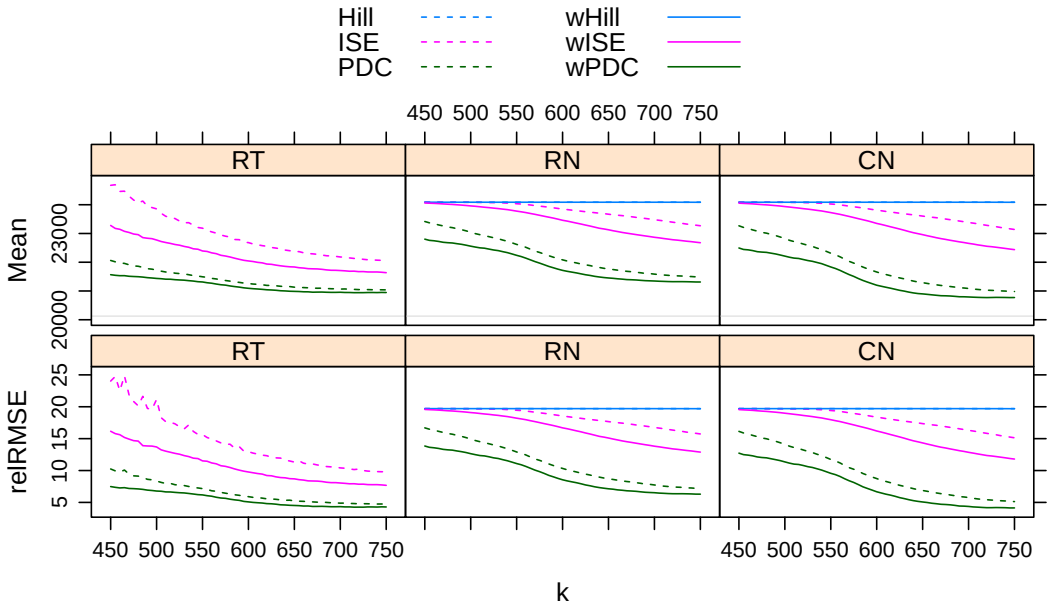

Figure F.278.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

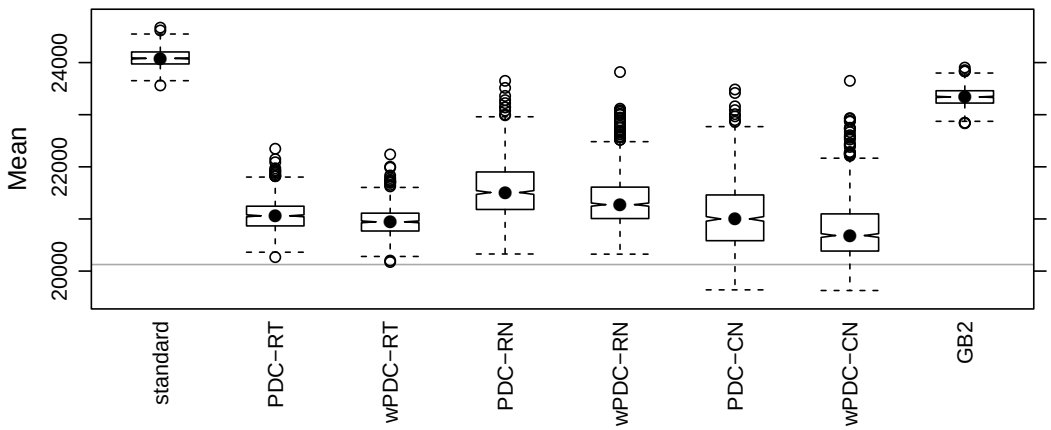

Figure F.279.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.139.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			24087.51	27700.64	3962.15	19.69	24080.19	167.84	3954.83	3965.64	19.70	5863.43	0.23
wHill	RT	500	25586.07	16199737.35	5460.71	27.13	25116.88	923.14	4991.52	6782.54	33.70	7400.42	5.82
wHill	RT	700	24218.89	859513.61	4093.53	20.34	24086.02	613.06	3960.65	4197.10	20.85	5872.07	0.72
wHill	RN	300	24087.51	27700.64	3962.15	19.69	24080.19	167.84	3954.83	3965.64	19.70	5863.43	0.23
wHill	RN	500	24087.51	27700.64	3962.15	19.69	24080.19	167.84	3954.83	3965.64	19.70	5863.43	0.23
wHill	RN	700	24087.35	27808.24	3961.99	19.69	24080.19	168.04	3954.83	3965.49	19.70	5863.43	0.23
wHill	CN	300	24087.51	27700.64	3962.15	19.69	24080.19	167.84	3954.83	3965.64	19.70	5863.43	0.23
wHill	CN	500	24087.51	27700.64	3962.15	19.69	24080.19	167.84	3954.83	3965.64	19.70	5863.43	0.23
wHill	CN	700	24087.32	27832.21	3961.96	19.69	24080.19	168.04	3954.83	3965.47	19.70	5863.43	0.23
wISE	RT	500	22772.84	586463.69	2647.48	13.15	22689.52	528.31	2564.16	2755.90	13.69	3801.63	0.69
wISE	RT	700	21711.32	105343.23	1585.96	7.88	21696.20	321.61	1570.83	1618.80	8.04	2328.92	0.17
wISE	RN	300	24087.51	27700.64	3962.15	19.69	24080.19	167.84	3954.83	3965.64	19.70	5863.43	0.23
wISE	RN	500	23958.86	64669.57	3833.49	19.05	23975.76	272.80	3850.40	3841.91	19.09	5708.61	0.23
wISE	RN	700	22867.54	207836.61	2742.18	13.63	22883.74	406.14	2758.38	2779.78	13.81	4089.57	0.20
wISE	CN	300	24087.51	27700.64	3962.15	19.69	24080.19	167.84	3954.83	3965.64	19.70	5863.43	0.23
wISE	CN	500	23936.32	76484.09	3810.96	18.94	23966.94	291.53	3841.58	3820.97	18.99	5695.52	0.23
wISE	CN	700	22656.52	286185.73	2531.16	12.58	22686.62	475.05	2561.25	2587.02	12.85	3797.31	0.20
wPDC	RT	500	21436.55	145105.12	1311.19	6.52	21390.99	359.90	1265.63	1365.35	6.78	1876.42	0.16
wPDC	RT	700	20955.59	72272.20	830.23	4.13	20944.40	255.56	819.04	872.63	4.34	1214.31	0.10
wPDC	RN	300	24051.93	72972.23	3926.57	19.51	24075.02	173.28	3949.66	3935.84	19.56	5855.76	0.23
wPDC	RN	500	22558.83	552312.23	2433.47	12.09	22637.96	815.31	2512.60	2544.31	12.64	3725.18	0.21
wPDC	RN	700	21347.50	228683.60	1222.14	6.07	21275.36	432.53	1150.00	1312.28	6.52	1704.99	0.18
wPDC	CN	300	24041.41	101831.95	3916.04	19.46	24075.02	173.55	3949.66	3929.01	19.52	5855.76	0.23
wPDC	CN	500	22212.99	864432.18	2087.62	10.37	22320.48	1011.94	2195.12	2285.11	11.35	3254.48	0.21
wPDC	CN	700	20791.78	329285.03	666.42	3.31	20682.06	500.49	556.70	879.25	4.37	825.36	0.18
GB2			23340.30	32693.40	3214.94	15.97	23341.43	175.53	3216.07	3220.01	16.00	4768.14	0.19

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OCAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

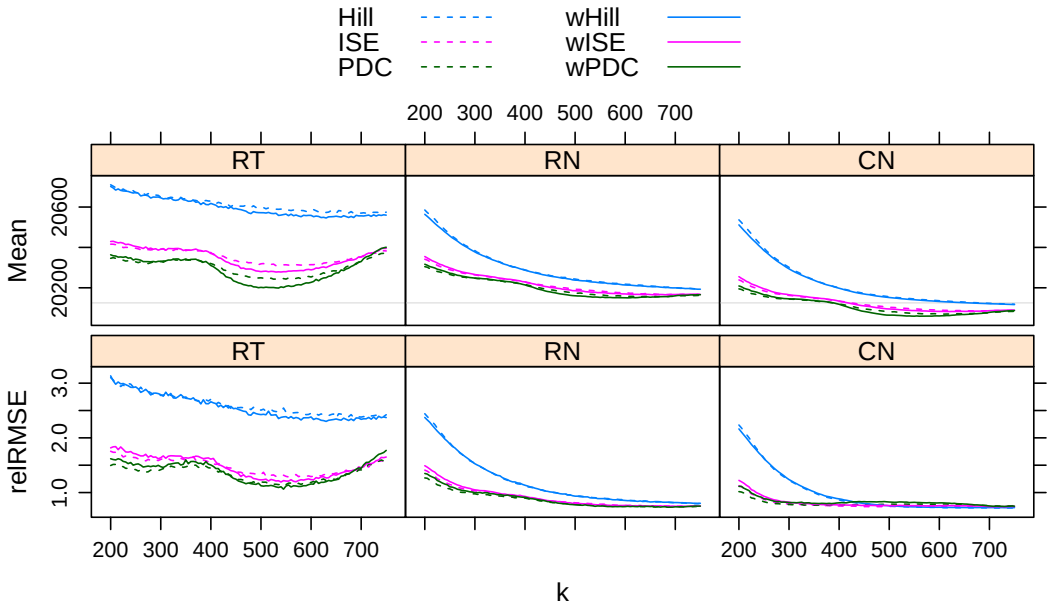

Figure F.280.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

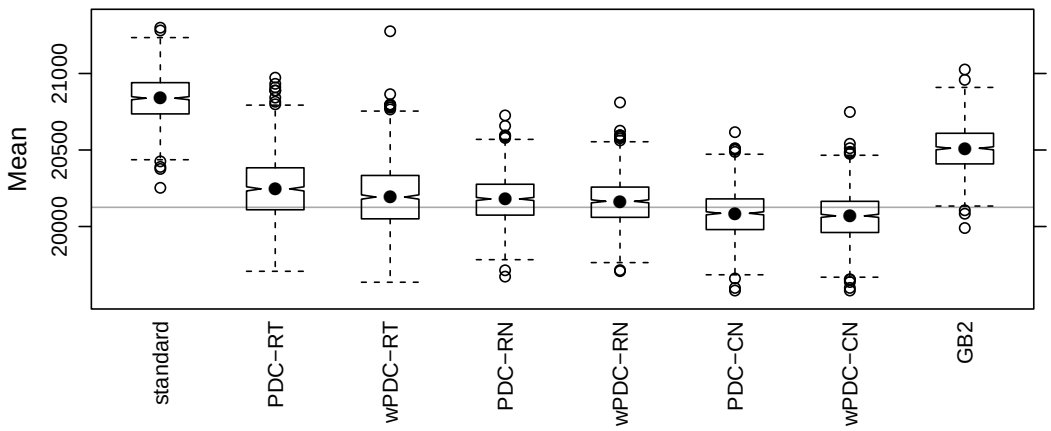

Figure F.281.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.140.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20838.01	22679.14	712.65	3.54	20838.58	151.81	713.22	728.37	3.62	1057.42	0.06
wHill	RT	300	20645.76	44265.22	520.40	2.59	20645.85	204.44	520.48	561.28	2.79	771.67	0.06
wHill	RT	500	20571.94	38802.33	446.58	2.22	20565.78	197.55	440.42	488.05	2.43	652.96	0.07
wHill	RT	700	20556.34	35816.34	430.98	2.14	20546.64	190.76	421.28	470.66	2.34	624.58	0.05
wHill	RN	300	20377.53	30819.27	252.17	1.25	20372.78	174.45	247.42	307.21	1.53	367.84	0.05
wHill	RN	500	20237.85	22702.78	112.49	0.56	20239.32	149.91	113.96	187.97	0.93	198.02	0.03
wHill	RN	700	20199.53	21559.55	74.17	0.37	20204.69	150.54	79.33	164.44	0.82	164.82	0.03
wHill	CN	300	20293.82	33600.82	168.46	0.84	20288.15	185.29	162.79	248.89	1.24	266.51	0.04
wHill	CN	500	20151.83	22605.95	26.47	0.13	20153.41	152.10	28.05	152.59	0.76	146.19	0.03
wHill	CN	700	20121.33	21262.55	−4.03	−0.02	20124.71	146.65	−0.65	145.80	0.72	146.19	0.03
wISE	RT	300	20391.30	37842.70	265.94	1.32	20379.01	192.31	253.65	329.44	1.64	376.07	0.05
wISE	RT	500	20279.89	37590.27	154.53	0.77	20272.12	191.20	146.76	247.86	1.23	249.06	0.05
wISE	RT	700	20352.49	34186.30	227.13	1.13	20351.01	178.31	225.64	292.81	1.45	336.91	0.04
wISE	RN	300	20265.36	25027.67	139.99	0.70	20261.41	157.50	136.05	211.19	1.05	219.11	0.03
wISE	RN	500	20185.50	22534.10	60.14	0.30	20189.24	149.64	63.88	161.64	0.80	163.96	0.03
wISE	RN	700	20166.63	21025.01	41.27	0.21	20165.91	146.83	40.55	150.69	0.75	150.73	0.03
wISE	CN	300	20165.28	25956.32	39.92	0.20	20159.97	161.18	34.61	165.90	0.82	157.88	0.03
wISE	CN	500	20095.05	22558.46	−30.31	−0.15	20100.58	148.93	−24.78	153.15	0.76	152.04	0.03
wISE	CN	700	20086.51	20899.92	−38.85	−0.19	20087.33	143.12	−38.03	149.63	0.74	146.89	0.03
wPDC	RT	300	20331.17	45550.07	205.81	1.02	20314.77	202.44	189.40	296.41	1.47	293.17	0.06
wPDC	RT	500	20202.07	45320.76	76.71	0.38	20192.75	209.09	67.39	226.19	1.12	214.09	0.06
wPDC	RT	700	20329.89	42571.73	204.53	1.02	20329.05	198.34	203.68	290.45	1.44	317.72	0.04
wPDC	RN	300	20247.92	25243.06	122.56	0.61	20239.93	155.87	114.57	200.59	1.00	201.80	0.03
wPDC	RN	500	20160.42	23153.94	35.06	0.17	20164.62	147.88	39.26	156.08	0.78	152.83	0.03
wPDC	RN	700	20160.18	20948.84	34.81	0.17	20163.69	146.60	38.33	148.79	0.74	147.38	0.03
wPDC	CN	300	20145.20	26649.78	19.84	0.10	20138.63	161.44	13.27	164.37	0.82	160.87	0.03
wPDC	CN	500	20064.40	24004.50	−60.96	−0.30	20069.81	147.75	−55.55	166.42	0.83	163.61	0.03
wPDC	CN	700	20078.36	20902.20	−47.00	−0.23	20077.43	143.67	−47.93	151.96	0.76	151.81	0.03
GB2			20508.90	21784.64	383.54	1.91	20511.27	149.90	385.91	410.93	2.04	572.14	0.04

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OCAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

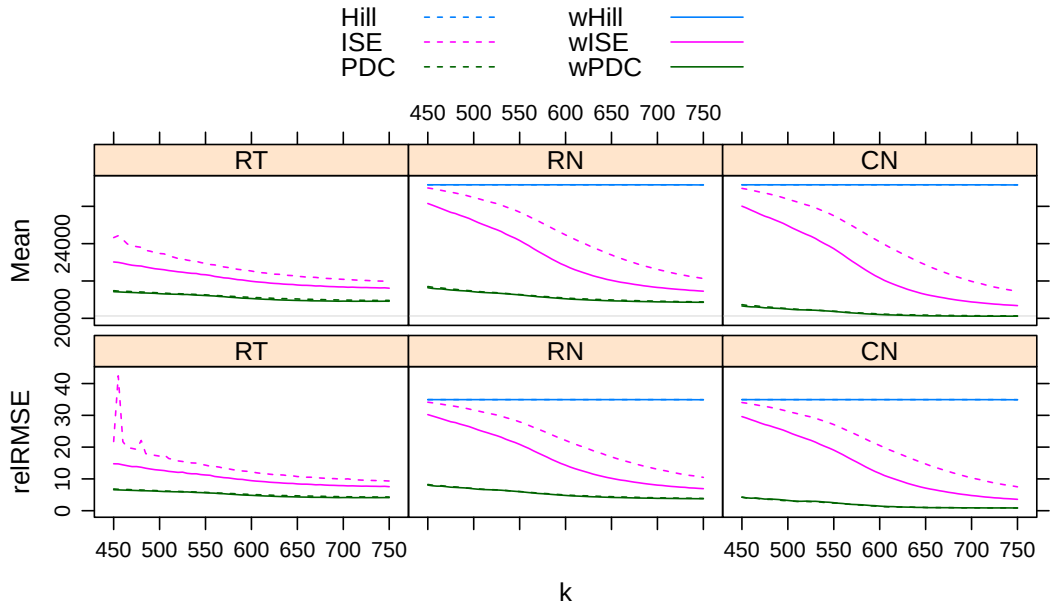

Figure F.282.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

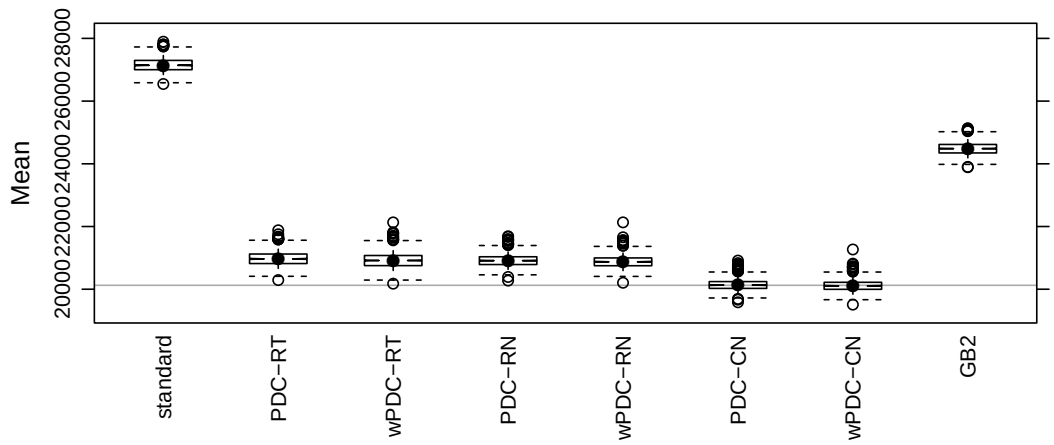

Figure F.283.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.141.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			27153.50	46708.98	7028.14	34.92	27141.72	224.93	7016.36	7031.46	34.94	10402.46	0.39
wHill	RT	500	31438.54	108966986.46	11313.18	56.21	29345.17	2436.63	9219.81	15389.80	76.47	13669.29	9.38
wHill	RT	700	27049.09	7495334.19	6923.73	34.40	26459.54	1226.06	6334.18	7444.85	36.99	9391.06	2.32
wHill	RN	300	27153.50	46708.98	7028.14	34.92	27141.72	224.93	7016.36	7031.46	34.94	10402.46	0.39
wHill	RN	500	27153.50	46708.98	7028.14	34.92	27141.72	224.93	7016.36	7031.46	34.94	10402.46	0.39
wHill	RN	700	27153.16	46993.76	7027.80	34.92	27141.72	224.93	7016.36	7031.14	34.94	10402.46	0.39
wHill	CN	300	27153.50	46708.98	7028.14	34.92	27141.72	224.93	7016.36	7031.46	34.94	10402.46	0.39
wHill	CN	500	27153.50	46708.98	7028.14	34.92	27141.72	224.93	7016.36	7031.46	34.94	10402.46	0.39
wHill	CN	700	27153.13	47006.72	7027.77	34.92	27141.72	225.79	7016.36	7031.11	34.94	10402.46	0.39
wISE	RT	500	22629.24	330362.31	2503.88	12.44	22572.86	522.97	2447.50	2568.94	12.76	3628.67	0.42
wISE	RT	700	21680.35	96726.32	1554.98	7.73	21660.94	303.86	1535.58	1585.75	7.88	2276.65	0.14
wISE	RN	300	27153.50	46708.98	7028.14	34.92	27141.72	224.93	7016.36	7031.46	34.94	10402.46	0.39
wISE	RN	500	25236.97	1108591.03	5111.61	25.40	25212.37	1109.73	5087.01	5218.82	25.93	7542.00	0.37
wISE	RN	700	21652.93	287508.51	1527.57	7.59	21548.08	459.79	1422.72	1618.86	8.04	2109.32	0.24
wISE	CN	300	27153.50	46708.98	7028.14	34.92	27141.72	224.93	7016.36	7031.46	34.94	10402.46	0.39
wISE	CN	500	24961.71	1471233.03	4836.34	24.03	24935.11	1283.36	4809.75	4985.98	24.77	7130.94	0.37
wISE	CN	700	20877.64	355132.36	752.28	3.74	20741.89	474.95	616.53	959.53	4.77	914.06	0.22
wPDC	RT	500	21319.52	80737.37	1194.16	5.93	21284.92	266.99	1159.56	1227.47	6.10	1719.16	0.14
wPDC	RT	700	20921.19	60745.76	795.83	3.95	20916.24	238.31	790.87	833.08	4.14	1172.55	0.10
wPDC	RN	300	25045.33	1645030.33	4919.97	24.45	24582.56	1108.80	4457.20	5084.24	25.26	6608.25	0.38
wPDC	RN	500	21423.40	233484.09	1298.04	6.45	21307.12	305.30	1181.75	1384.97	6.88	1752.07	0.25
wPDC	RN	700	20880.34	39922.08	754.98	3.75	20875.17	184.70	749.81	780.94	3.88	1111.67	0.10
wPDC	CN	300	24611.85	2408544.67	4486.49	22.29	24057.87	1352.27	3932.51	4747.07	23.59	5830.34	0.38
wPDC	CN	500	20494.62	285674.23	369.26	1.83	20354.25	301.68	228.89	649.41	3.23	354.46	0.24
wPDC	CN	700	20115.40	32230.78	−9.96	−0.05	20108.17	165.79	−17.19	179.72	0.89	167.31	0.06
GB2			24485.87	42286.07	4360.51	21.67	24484.70	199.82	4359.33	4365.35	21.69	6463.15	0.25

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OCAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

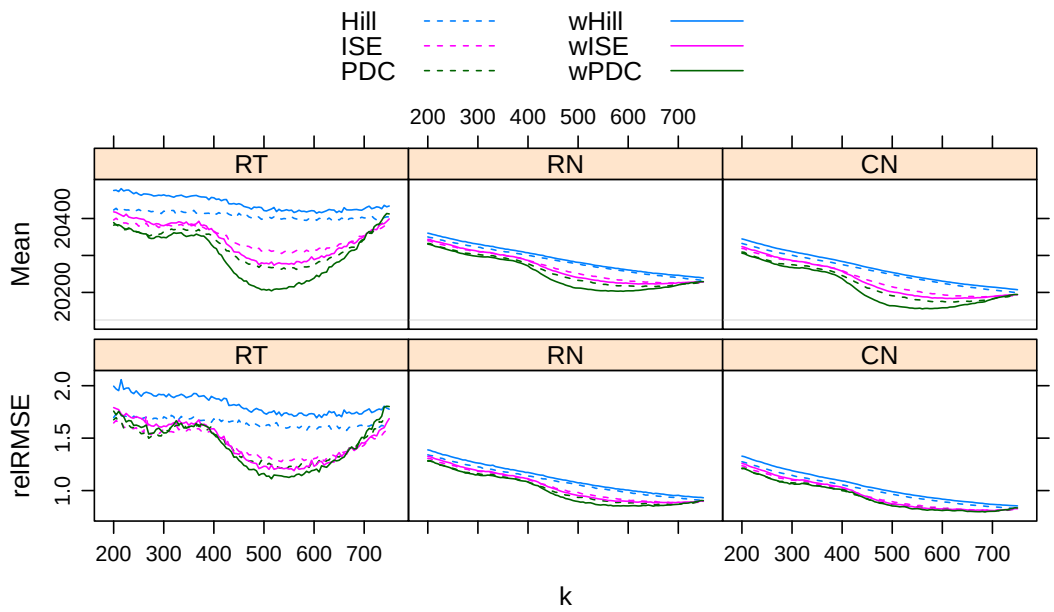

Figure F.284.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

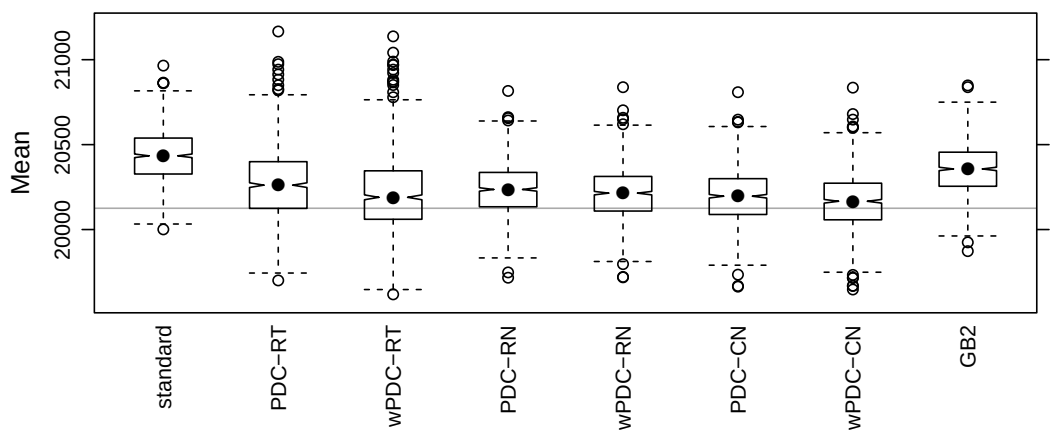

Figure F.285.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.142.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20433.64	22577.62	308.28	1.53	20434.04	157.67	308.68	342.92	1.70	457.65	0.04
wHill	RT	300	20463.98	34027.65	338.62	1.68	20457.18	179.71	331.81	385.56	1.92	491.95	0.05
wHill	RT	500	20421.49	34967.50	296.12	1.47	20414.94	191.79	289.58	350.17	1.74	429.33	0.05
wHill	RT	700	20426.12	34194.12	300.76	1.49	20425.96	183.99	300.60	353.01	1.75	445.74	0.05
wHill	RN	300	20330.65	22441.80	205.29	1.02	20327.97	149.49	202.61	254.09	1.26	301.35	0.04
wHill	RN	500	20281.27	22379.94	155.91	0.77	20281.40	149.62	156.03	216.02	1.07	237.36	0.03
wHill	RN	700	20246.50	22294.40	121.14	0.60	20245.22	151.07	119.86	192.22	0.96	201.10	0.03
wHill	CN	300	20310.55	22975.68	185.18	0.92	20305.15	154.09	179.79	239.26	1.19	273.80	0.03
wHill	CN	500	20253.95	23138.50	128.59	0.64	20255.39	151.94	130.02	199.13	0.99	208.79	0.03
wHill	CN	700	20214.39	22650.03	89.03	0.44	20215.01	151.57	89.65	174.80	0.87	180.77	0.03
wISE	RT	300	20380.57	40610.85	255.21	1.27	20364.28	200.13	238.91	325.12	1.62	355.06	0.07
wISE	RT	500	20278.24	38164.64	152.88	0.76	20269.00	185.85	143.64	247.99	1.23	245.11	0.06
wISE	RT	700	20351.07	34574.70	225.70	1.12	20349.62	174.55	224.25	292.37	1.45	335.54	0.05
wISE	RN	300	20311.08	22744.27	185.72	0.92	20307.70	151.15	182.34	239.19	1.19	273.16	0.03
wISE	RN	500	20240.12	23569.89	114.76	0.57	20242.12	152.85	116.75	191.61	0.95	195.73	0.03
wISE	RN	700	20226.65	21803.77	101.29	0.50	20227.27	145.71	101.91	179.00	0.89	183.37	0.03
wISE	CN	300	20286.30	23887.27	160.94	0.80	20284.43	156.79	159.07	223.08	1.11	242.36	0.03
wISE	CN	500	20201.51	25148.06	76.15	0.38	20207.77	156.49	82.41	175.85	0.87	177.68	0.03
wISE	CN	700	20189.00	22547.54	63.64	0.32	20190.67	147.36	65.31	163.02	0.81	161.63	0.03
wPDC	RT	300	20349.02	47204.08	223.66	1.11	20333.26	213.17	207.90	311.74	1.55	317.34	0.05
wPDC	RT	500	20208.12	47948.75	82.76	0.41	20189.75	208.61	64.38	233.99	1.16	221.76	0.05
wPDC	RT	700	20343.08	44240.32	217.72	1.08	20337.72	197.60	212.36	302.65	1.50	322.68	0.05
wPDC	RN	300	20297.43	24046.06	172.07	0.85	20293.21	156.21	167.85	231.58	1.15	255.94	0.03
wPDC	RN	500	20211.79	25038.19	86.43	0.43	20214.38	150.33	89.02	180.23	0.90	179.55	0.04
wPDC	RN	700	20220.26	21611.85	94.90	0.47	20219.52	147.41	94.15	174.92	0.87	175.08	0.03
wPDC	CN	300	20267.53	26037.99	142.17	0.71	20262.63	162.88	137.27	215.00	1.07	222.25	0.03
wPDC	CN	500	20164.00	27989.28	38.64	0.19	20166.47	160.35	41.11	171.62	0.85	171.11	0.04
wPDC	CN	700	20182.13	22874.93	56.77	0.28	20180.24	147.11	54.87	161.48	0.80	165.05	0.03
GB2			20355.02	21824.88	229.66	1.14	20356.86	148.06	231.50	273.03	1.36	343.27	0.04

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OCAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

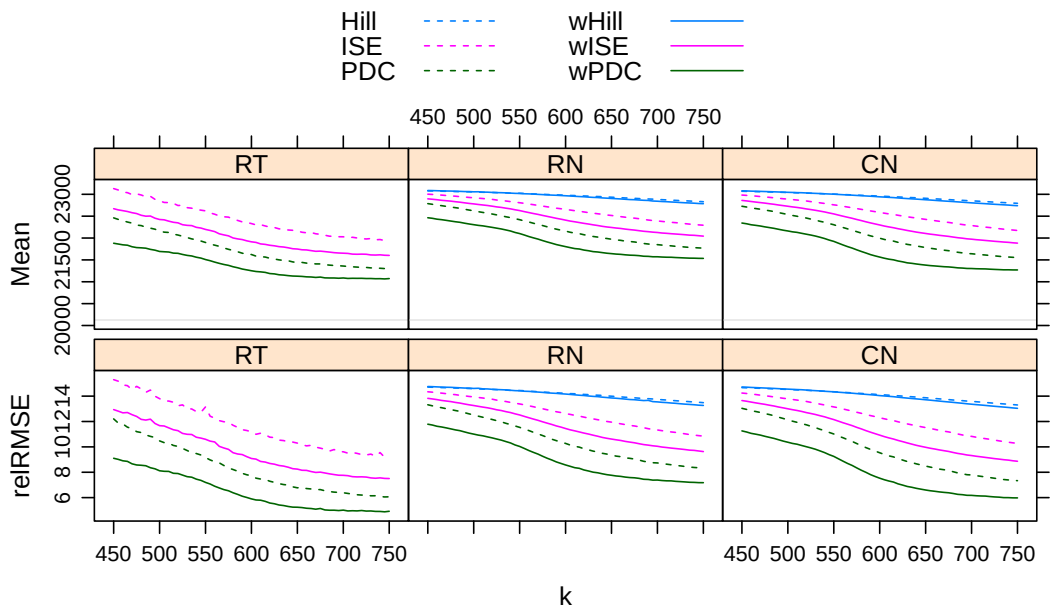

Figure F.286.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

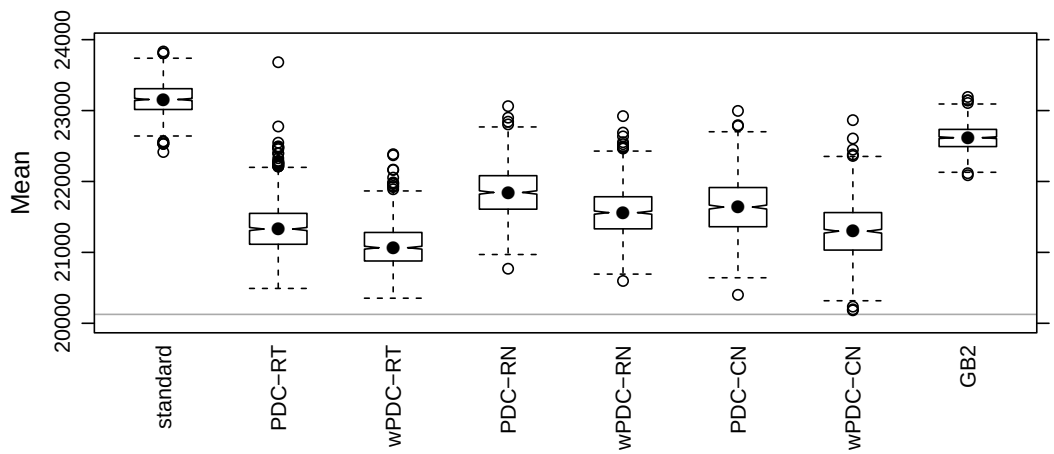

Figure F.287.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.143.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			23163.72	47473.52	3038.36	15.10	23156.37	214.89	3031.00	3046.15	15.14	4493.77	0.18
wHill	RT	500	23682.78	727162.70	3557.42	17.68	23561.87	564.30	3436.51	3658.09	18.18	5094.97	0.78
wHill	RT	700	23122.38	2322799.36	2997.01	14.89	23036.12	447.62	2910.76	3361.93	16.70	4315.50	2.41
wHill	RN	300	23142.90	46509.04	3017.54	14.99	23134.97	209.04	3009.61	3025.23	15.03	4462.05	0.19
wHill	RN	500	23056.93	46386.82	2931.57	14.57	23054.22	215.48	2928.86	2939.46	14.61	4342.33	0.18
wHill	RN	700	22841.76	51361.04	2716.40	13.50	22837.50	221.52	2712.14	2725.83	13.54	4021.01	0.18
wHill	CN	300	23140.64	46122.54	3015.28	14.98	23132.76	209.90	3007.40	3022.91	15.02	4458.77	0.18
wHill	CN	500	23045.56	47539.92	2920.20	14.51	23041.50	222.63	2916.13	2928.32	14.55	4323.46	0.18
wHill	CN	700	22804.55	53171.16	2679.19	13.31	22797.30	227.11	2671.93	2689.08	13.36	3961.41	0.18
wISE	RT	500	22423.72	234858.18	2298.36	11.42	22368.42	445.79	2243.05	2348.84	11.67	3325.55	0.24
wISE	RT	700	21653.08	103907.15	1527.72	7.59	21630.39	310.73	1505.03	1561.32	7.76	2231.35	0.18
wISE	RN	300	23139.86	47480.72	3014.49	14.98	23134.72	212.80	3009.35	3022.35	15.02	4461.67	0.18
wISE	RN	500	22780.66	69021.21	2655.30	13.19	22782.25	247.49	2656.89	2668.26	13.26	3939.11	0.18
wISE	RN	700	22127.15	81119.36	2001.79	9.95	22119.47	282.22	1994.11	2021.93	10.05	2956.47	0.15
wISE	CN	300	23136.92	47682.82	3011.56	14.96	23131.46	213.08	3006.10	3019.46	15.00	4456.85	0.18
wISE	CN	500	22726.95	79114.40	2601.59	12.93	22736.68	268.69	2611.31	2616.73	13.00	3871.53	0.18
wISE	CN	700	21973.68	99282.67	1848.32	9.18	21969.41	305.62	1844.04	1874.96	9.32	2733.98	0.14
wPDC	RT	500	21692.87	211053.89	1567.51	7.79	21644.89	425.59	1519.53	1633.38	8.12	2252.85	0.25
wPDC	RT	700	21087.06	93668.68	961.70	4.78	21065.92	299.02	940.56	1009.18	5.01	1394.48	0.11
wPDC	RN	300	23074.12	70566.44	2948.75	14.65	23092.79	238.66	2967.43	2960.68	14.71	4399.51	0.18
wPDC	RN	500	22305.58	152041.15	2180.22	10.83	22321.67	411.81	2196.31	2214.78	11.00	3256.25	0.16
wPDC	RN	700	21571.71	117024.83	1446.35	7.19	21560.71	333.32	1435.35	1486.21	7.38	2128.05	0.14
wPDC	CN	300	23059.72	81327.40	2934.36	14.58	23081.88	246.84	2956.52	2948.17	14.65	4383.34	0.18
wPDC	CN	500	22161.72	205321.20	2036.35	10.12	22187.02	470.77	2061.65	2086.11	10.37	3056.61	0.16
wPDC	CN	700	21302.83	159298.92	1177.47	5.85	21298.21	391.55	1172.85	1243.21	6.18	1738.87	0.14
GB2			22614.79	34416.19	2489.43	12.37	22617.78	181.08	2492.42	2496.32	12.40	3695.27	0.15

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OCAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 20.

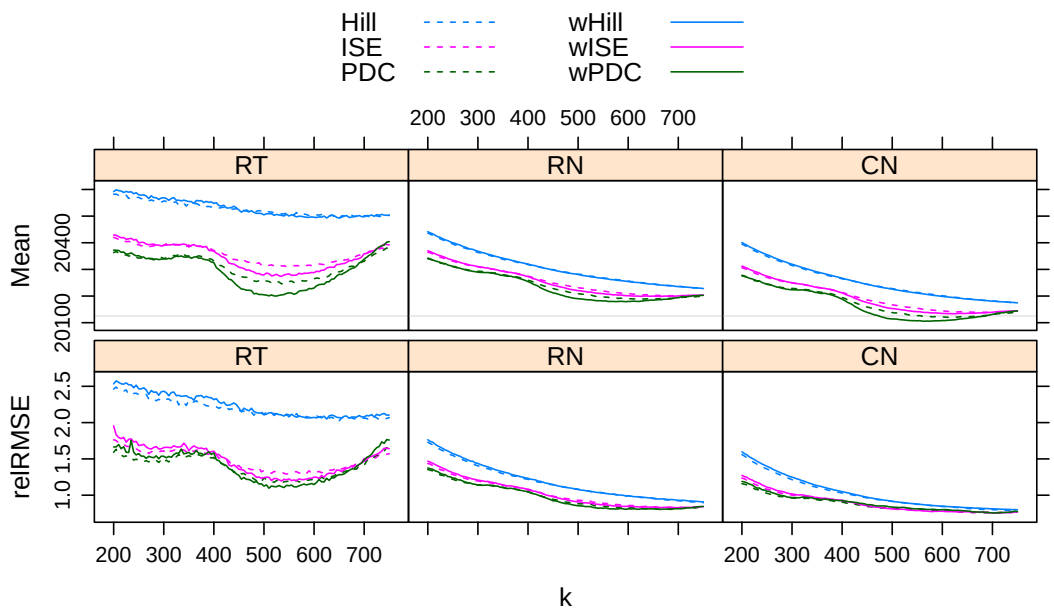

Figure F.288.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

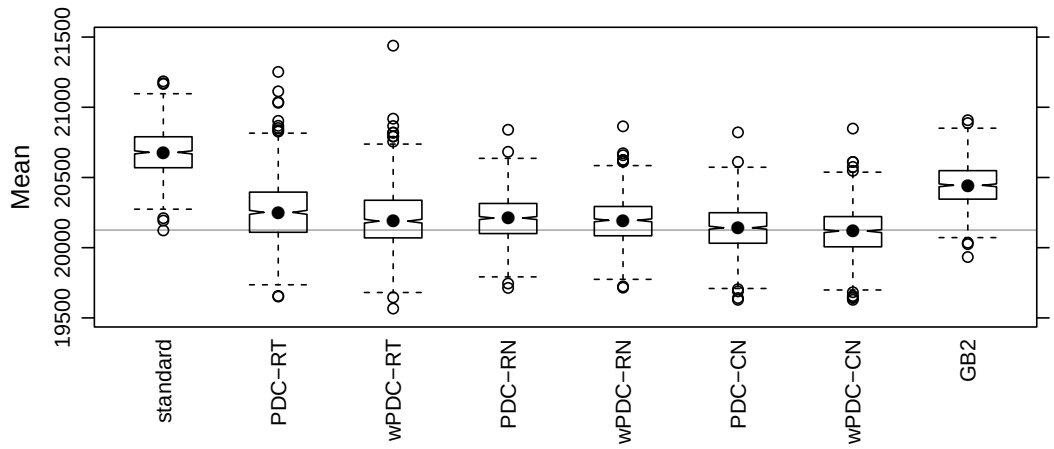

Figure F.289.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.144.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20680.22	26514.97	554.86	2.76	20678.89	163.08	553.52	578.24	2.87	820.65	0.05
wHill	RT	300	20568.96	42815.08	443.60	2.20	20560.96	200.97	435.60	489.44	2.43	645.82	0.10
wHill	RT	500	20504.67	35887.37	379.31	1.88	20498.86	185.10	373.50	423.94	2.11	553.75	0.05
wHill	RT	700	20497.29	36583.65	371.92	1.85	20499.11	185.05	373.75	418.18	2.08	554.12	0.05
wHill	RN	300	20368.33	24826.73	242.97	1.21	20361.30	162.56	235.94	289.54	1.44	350.24	0.04
wHill	RN	500	20280.86	23274.82	155.50	0.77	20279.25	153.49	153.89	217.79	1.08	239.64	0.04
wHill	RN	700	20235.44	22783.43	110.08	0.55	20237.82	150.85	112.46	186.76	0.93	192.95	0.03
wHill	CN	300	20319.37	25508.46	194.01	0.96	20316.43	165.98	191.06	251.24	1.25	286.43	0.04
wHill	CN	500	20226.02	23944.71	100.66	0.50	20227.19	158.72	101.83	184.54	0.92	185.01	0.03
wHill	CN	700	20180.86	23651.70	55.50	0.28	20181.99	155.88	56.63	163.43	0.81	161.71	0.03
wISE	RT	300	20391.08	40429.10	265.72	1.32	20383.86	194.21	258.50	333.16	1.66	384.78	0.07
wISE	RT	500	20279.36	38832.91	153.99	0.77	20273.65	199.56	148.29	250.02	1.24	253.10	0.05
wISE	RT	700	20358.78	37369.24	233.41	1.16	20355.84	184.88	230.48	303.01	1.51	345.43	0.05
wISE	RN	300	20310.33	24853.42	184.97	0.92	20308.54	163.35	183.18	242.99	1.21	274.54	0.03
wISE	RN	500	20220.08	24342.63	94.72	0.47	20222.24	151.54	96.87	182.46	0.91	188.52	0.04
wISE	RN	700	20200.42	22262.32	75.06	0.37	20199.92	146.02	74.56	166.96	0.83	164.83	0.03
wISE	CN	300	20250.08	26387.63	124.72	0.62	20245.20	168.67	119.84	204.73	1.02	212.87	0.03
wISE	CN	500	20152.95	25923.13	27.59	0.14	20154.97	158.06	29.61	163.27	0.81	157.36	0.04
wISE	CN	700	20139.12	22997.27	13.76	0.07	20140.52	147.60	15.16	152.20	0.76	145.09	0.03
wPDC	RT	300	20339.26	49851.74	213.90	1.06	20318.56	219.55	193.20	309.12	1.54	299.71	0.07
wPDC	RT	500	20204.77	45062.64	79.41	0.39	20188.92	201.11	63.56	226.55	1.13	210.69	0.07
wPDC	RT	700	20338.72	44086.49	213.36	1.06	20324.94	198.94	199.57	299.27	1.49	306.62	0.04
wPDC	RN	300	20289.55	25509.21	164.19	0.82	20284.46	167.03	159.10	229.00	1.14	244.01	0.03
wPDC	RN	500	20189.97	25446.72	64.60	0.32	20194.96	153.25	69.60	172.03	0.85	169.89	0.04
wPDC	RN	700	20193.91	22153.33	68.55	0.34	20191.61	142.70	66.25	163.80	0.81	162.50	0.03
wPDC	CN	300	20223.51	28346.50	98.15	0.49	20220.92	176.33	95.56	194.81	0.97	191.56	0.03
wPDC	CN	500	20113.87	28243.50	−11.49	−0.06	20118.12	162.63	−7.24	168.37	0.84	163.56	0.04
wPDC	CN	700	20131.30	23116.09	5.94	0.03	20130.51	149.62	5.14	152.08	0.76	152.04	0.03
GB2			20446.16	21507.06	320.79	1.59	20444.29	148.84	318.93	352.70	1.75	472.85	0.04

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OCAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 20.

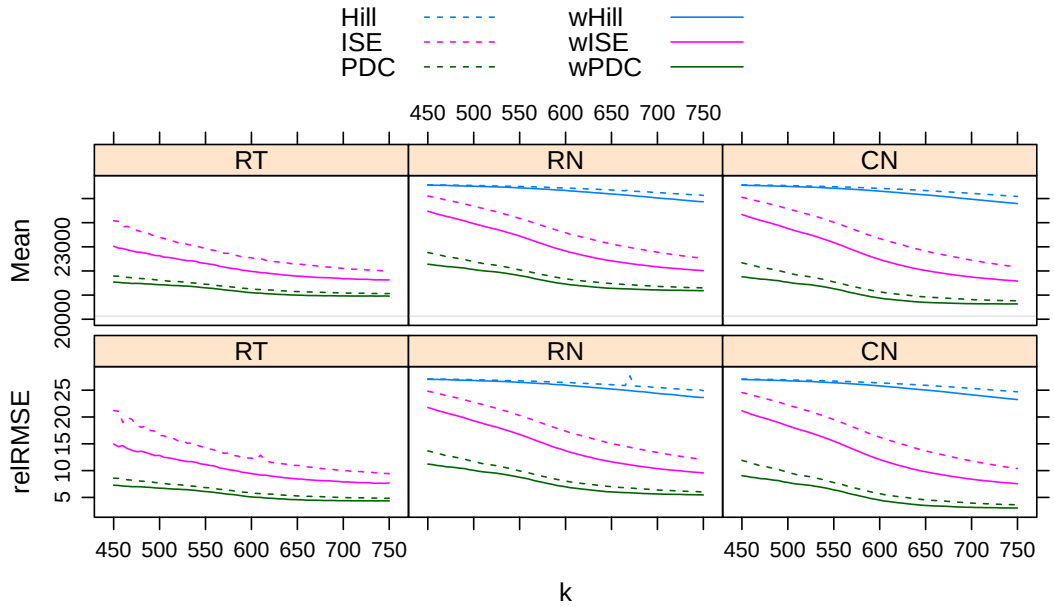

Figure F.290.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

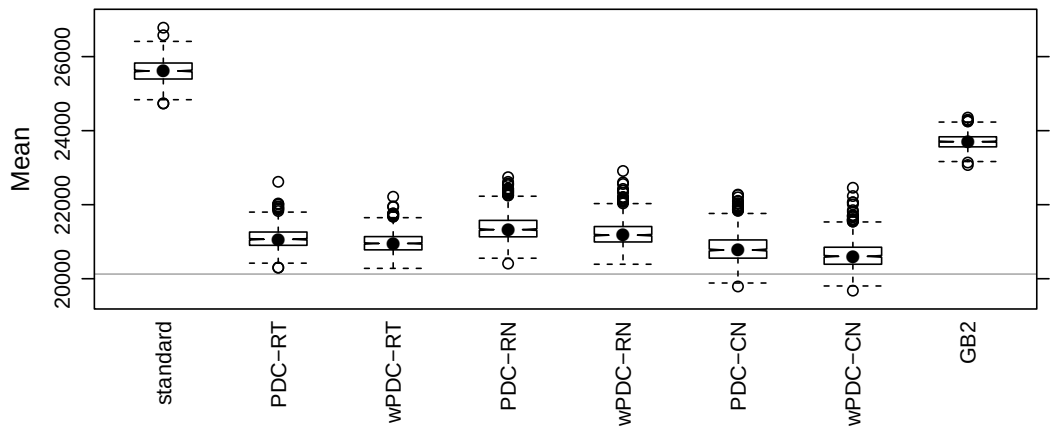

Figure F.291.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.145.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			25615.19	92861.99	5489.82	27.28	25612.74	318.19	5487.38	5498.27	27.32	8135.59	0.33
wHill	RT	500	27111.61	20722059.16	6986.25	34.71	26297.07	1337.98	6171.71	8337.21	41.43	9150.17	3.36
wHill	RT	700	24952.22	1225148.76	4826.86	23.98	24747.71	778.92	4622.35	4952.02	24.61	6853.10	0.76
wHill	RN	300	25613.65	93370.13	5488.29	27.27	25611.42	319.39	5486.06	5496.78	27.31	8133.63	0.33
wHill	RN	500	25512.17	93201.87	5386.80	26.77	25500.05	314.39	5374.69	5395.44	26.81	7968.52	0.32
wHill	RN	700	25024.60	109183.26	4899.24	24.34	25026.09	345.29	4900.73	4910.36	24.40	7265.82	0.30
wHill	CN	300	25613.46	93539.52	5488.10	27.27	25611.42	319.39	5486.06	5496.60	27.31	8133.63	0.33
wHill	CN	500	25501.94	94549.79	5376.58	26.72	25491.09	320.12	5365.73	5385.36	26.76	7955.23	0.31
wHill	CN	700	24972.53	115161.65	4847.17	24.08	24967.79	354.69	4842.42	4859.02	24.14	7179.38	0.30
wISE	RT	500	22631.13	390172.94	2505.77	12.45	22551.30	500.17	2425.93	2582.38	12.83	3596.69	0.59
wISE	RT	700	21675.11	102745.88	1549.75	7.70	21659.46	310.63	1534.10	1582.52	7.86	2274.45	0.15
wISE	RN	300	25601.80	92682.94	5476.44	27.21	25604.22	319.73	5478.86	5484.88	27.25	8122.95	0.33
wISE	RN	500	23962.38	339049.28	3837.02	19.07	23960.23	578.32	3834.87	3880.91	19.28	5685.58	0.27
wISE	RN	700	22168.39	178437.99	2043.03	10.15	22134.23	429.12	2008.87	2086.20	10.37	2978.35	0.21
wISE	CN	300	25600.70	92826.58	5475.33	27.21	25603.31	318.39	5477.95	5483.80	27.25	8121.61	0.33
wISE	CN	500	23761.25	424927.98	3635.89	18.07	23751.97	664.78	3626.61	3693.81	18.35	5376.81	0.27
wISE	CN	700	21748.04	222883.54	1622.67	8.06	21706.45	475.93	1581.09	1689.89	8.40	2344.12	0.20
wPDC	RT	500	21429.59	131944.88	1304.23	6.48	21384.86	337.58	1259.50	1353.82	6.73	1867.33	0.15
wPDC	RT	700	20966.67	72339.10	841.31	4.18	20952.52	262.65	827.16	883.21	4.39	1226.35	0.10
wPDC	RN	300	24726.59	1056609.54	4601.23	22.86	25063.87	843.63	4938.51	4714.54	23.43	7321.83	0.32
wPDC	RN	500	22059.61	351831.22	1934.24	9.61	21993.99	593.28	1868.63	2023.06	10.05	2770.43	0.21
wPDC	RN	700	21214.18	107335.60	1088.82	5.41	21176.47	308.80	1051.11	1136.99	5.65	1558.38	0.14
wPDC	CN	300	24577.64	1458997.29	4452.28	22.12	25024.12	912.61	4898.76	4613.06	22.92	7262.90	0.32
wPDC	CN	500	21533.00	479358.90	1407.64	6.99	21456.32	691.76	1330.96	1568.54	7.79	1973.28	0.20
wPDC	CN	700	20644.74	133394.89	519.38	2.58	20604.37	343.90	479.00	634.83	3.15	710.17	0.12
GB2			23699.38	40585.03	3574.01	17.76	23703.32	201.02	3577.96	3579.68	17.79	5304.68	0.21

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OAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

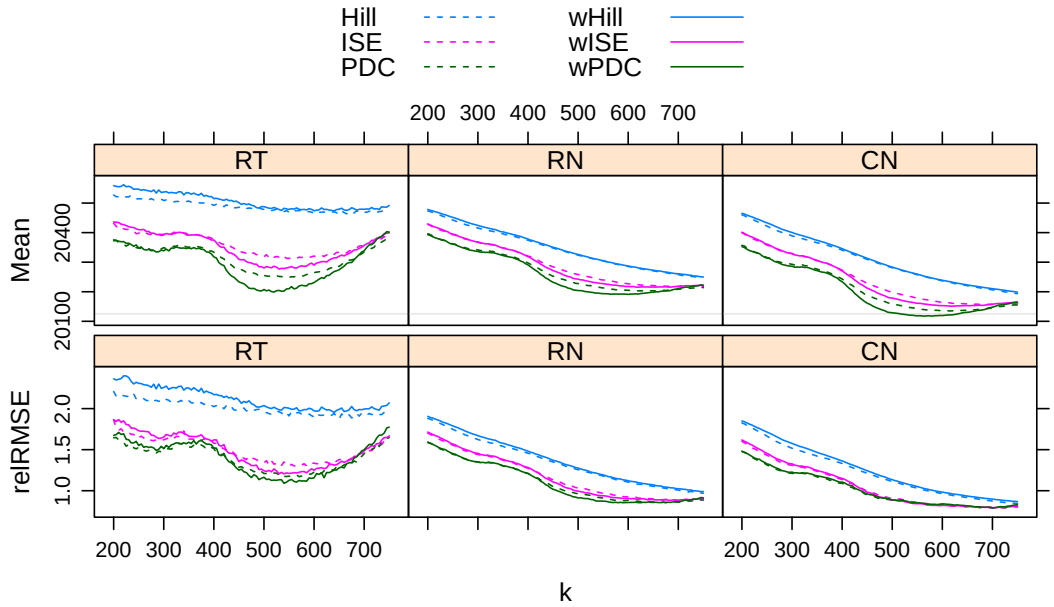

Figure F.292.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

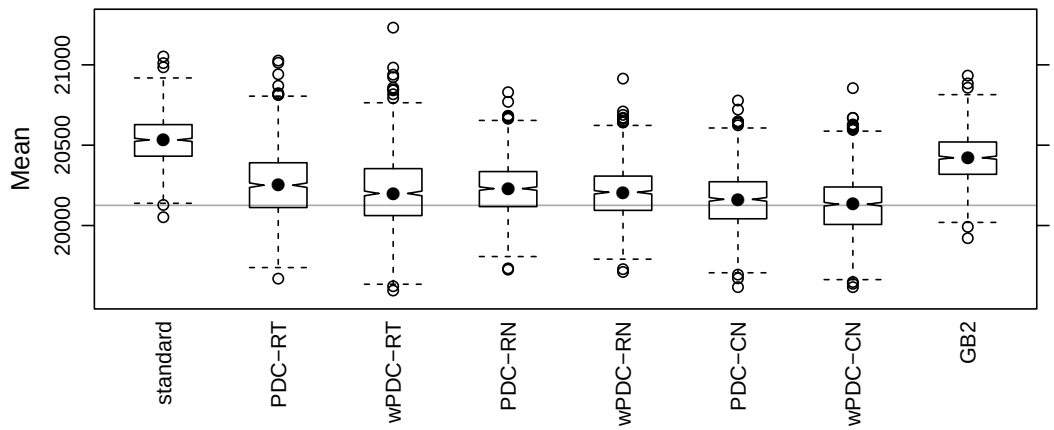

Figure F.293.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.146.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20530.15	20722.05	404.79	2.01	20533.08	143.71	407.71	429.60	2.13	604.48	0.05
wHill	RT	300	20537.39	36606.60	412.02	2.05	20535.49	194.14	410.13	454.24	2.26	608.06	0.06
wHill	RT	500	20487.90	36807.69	362.54	1.80	20482.09	193.48	356.72	410.13	2.04	528.88	0.05
wHill	RT	700	20479.01	36107.46	353.65	1.76	20482.20	193.88	356.84	401.42	1.99	529.06	0.05
wHill	RN	300	20424.20	23820.43	298.84	1.48	20424.72	157.90	299.36	336.31	1.67	443.83	0.04
wHill	RN	500	20326.01	25746.25	200.65	1.00	20325.56	159.07	200.20	256.87	1.28	299.09	0.04
wHill	RN	700	20260.85	24198.77	135.49	0.67	20261.84	159.68	136.48	206.23	1.02	220.73	0.03
wHill	CN	300	20400.50	24945.64	275.14	1.37	20401.21	163.13	275.85	317.21	1.58	408.97	0.04
wHill	CN	500	20283.44	27221.46	158.08	0.79	20284.89	165.35	159.53	228.43	1.14	249.94	0.03
wHill	CN	700	20210.31	25431.86	84.95	0.42	20205.97	160.39	80.61	180.62	0.90	177.38	0.03
wISE	RT	300	20392.45	39369.52	267.08	1.33	20385.25	198.34	259.89	332.66	1.65	386.14	0.06
wISE	RT	500	20280.37	38552.42	155.01	0.77	20265.87	196.33	140.51	250.08	1.24	243.55	0.05
wISE	RT	700	20356.75	36057.23	231.39	1.15	20353.28	177.38	227.92	299.27	1.49	342.94	0.05
wISE	RN	300	20368.05	27007.54	242.69	1.21	20364.24	167.02	238.88	293.05	1.46	354.28	0.04
wISE	RN	500	20242.65	26344.75	117.29	0.58	20246.35	158.48	120.99	200.19	0.99	206.72	0.04
wISE	RN	700	20217.81	23018.14	92.44	0.46	20219.93	150.70	94.57	177.60	0.88	182.40	0.03
wISE	CN	300	20328.62	30083.03	203.26	1.01	20325.05	174.18	199.69	267.15	1.33	299.12	0.04
wISE	CN	500	20178.56	29038.86	53.20	0.26	20178.02	164.40	52.65	178.44	0.89	177.37	0.04
wISE	CN	700	20157.53	24538.33	32.17	0.16	20155.02	151.29	29.66	159.84	0.79	156.88	0.03
wPDC	RT	300	20338.56	47129.28	213.20	1.06	20321.19	217.15	195.82	304.20	1.51	305.90	0.05
wPDC	RT	500	20207.66	48161.35	82.30	0.41	20199.56	219.39	74.20	234.28	1.16	223.51	0.05
wPDC	RT	700	20338.59	45646.41	213.23	1.06	20332.61	206.15	207.24	301.77	1.50	319.48	0.05
wPDC	RN	300	20336.27	29509.05	210.91	1.05	20327.98	175.27	202.61	271.96	1.35	302.86	0.04
wPDC	RN	500	20203.97	27514.16	78.61	0.39	20206.60	158.44	81.24	183.48	0.91	184.30	0.04
wPDC	RN	700	20210.48	22923.18	85.12	0.42	20208.42	148.17	83.06	173.62	0.86	176.54	0.03
wPDC	CN	300	20286.37	35021.48	161.01	0.80	20280.64	193.17	155.27	246.80	1.23	250.97	0.04
wPDC	CN	500	20129.00	31820.70	3.64	0.02	20132.38	178.56	7.02	178.33	0.89	174.22	0.04
wPDC	CN	700	20148.03	24808.17	22.67	0.11	20142.38	156.84	17.02	159.05	0.79	157.20	0.03
GB2			20419.26	21590.14	293.90	1.46	20422.07	149.20	296.71	328.55	1.63	439.90	0.04

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OAR-CCAR (moderate outliers) Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 300\,000$ and $\sigma = 20\,000$.

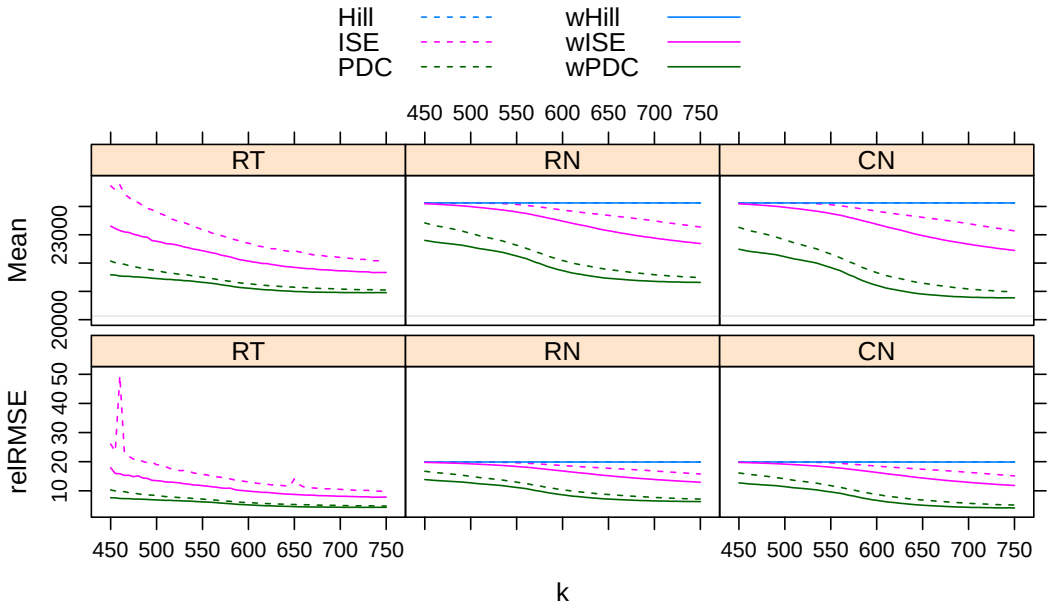

Figure F.294.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

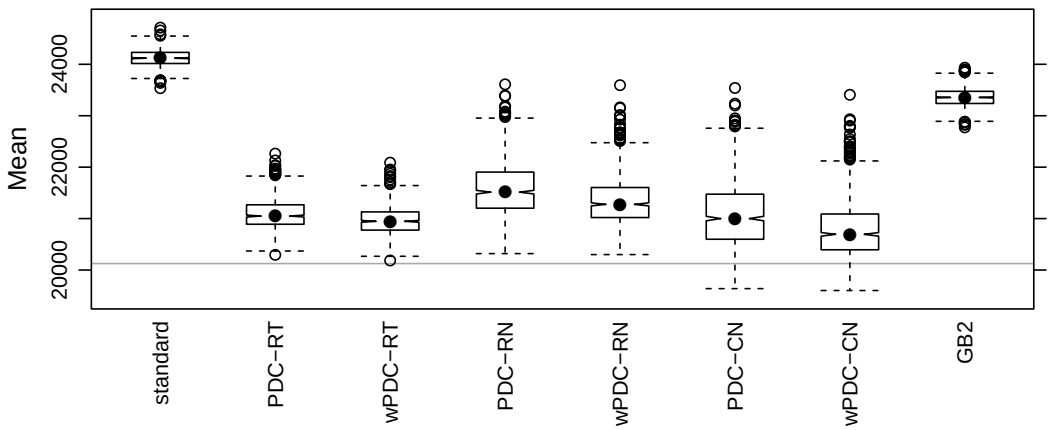

Figure F.295.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.147.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			24124.44	27146.30	3999.08	19.87	24119.03	160.00	3993.67	4002.47	19.89	5921.01	0.23
wHill	RT	500	25647.74	3182388.32	5522.38	27.44	25250.88	1020.43	5125.52	5803.09	28.83	7599.10	1.35
wHill	RT	700	24375.24	1270016.62	4249.88	21.12	24206.28	624.98	4080.92	4396.61	21.85	6050.37	1.22
wHill	RN	300	24124.44	27146.30	3999.08	19.87	24119.03	160.00	3993.67	4002.47	19.89	5921.01	0.23
wHill	RN	500	24124.44	27146.30	3999.08	19.87	24119.03	160.00	3993.67	4002.47	19.89	5921.01	0.23
wHill	RN	700	24124.34	27159.82	3998.98	19.87	24119.03	160.00	3993.67	4002.37	19.89	5921.01	0.23
wHill	CN	300	24124.44	27146.30	3999.08	19.87	24119.03	160.00	3993.67	4002.47	19.89	5921.01	0.23
wHill	CN	500	24124.44	27146.30	3999.08	19.87	24119.03	160.00	3993.67	4002.47	19.89	5921.01	0.23
wHill	CN	700	24124.33	27160.94	3998.97	19.87	24119.03	160.00	3993.67	4002.36	19.89	5921.01	0.23
wISE	RT	500	22771.37	359769.49	2646.01	13.15	22690.49	575.79	2565.12	2713.07	13.48	3803.05	0.26
wISE	RT	700	21724.43	104943.85	1599.07	7.95	21698.19	306.20	1572.83	1631.52	8.11	2331.87	0.14
wISE	RN	300	24124.44	27146.30	3999.08	19.87	24119.03	160.00	3993.67	4002.47	19.89	5921.01	0.23
wISE	RN	500	23994.14	68955.45	3868.78	19.22	24020.47	267.70	3895.10	3877.67	19.27	5774.88	0.23
wISE	RN	700	22882.40	214407.14	2757.03	13.70	22894.90	433.51	2769.54	2795.61	13.89	4106.12	0.20
wISE	CN	300	24124.44	27146.30	3999.08	19.87	24119.03	160.00	3993.67	4002.47	19.89	5921.01	0.23
wISE	CN	500	23970.96	81341.15	3845.60	19.11	24010.10	287.92	3884.74	3856.15	19.16	5759.51	0.23
wISE	CN	700	22666.63	291581.89	2541.27	12.63	22691.49	487.50	2566.13	2597.95	12.91	3804.54	0.20
wPDC	RT	500	21452.63	155233.73	1327.26	6.59	21421.27	369.08	1295.91	1384.45	6.88	1921.32	0.21
wPDC	RT	700	20960.02	70498.69	834.66	4.15	20946.52	261.42	821.16	875.84	4.35	1217.45	0.10
wPDC	RN	300	24085.69	76610.48	3960.33	19.68	24115.28	168.66	3989.92	3969.98	19.73	5915.45	0.23
wPDC	RN	500	22573.07	580163.06	2447.71	12.16	22635.31	830.05	2509.95	2563.37	12.74	3721.25	0.21
wPDC	RN	700	21353.02	216067.60	1227.66	6.10	21276.35	415.34	1150.99	1312.63	6.52	1706.46	0.17
wPDC	CN	300	24074.77	106811.55	3949.41	19.62	24115.28	168.66	3989.92	3962.90	19.69	5915.45	0.23
wPDC	CN	500	22223.66	895136.05	2098.30	10.43	22333.22	1013.47	2207.86	2301.54	11.44	3273.37	0.21
wPDC	CN	700	20794.33	312344.47	668.97	3.32	20693.84	493.77	568.48	871.52	4.33	842.82	0.16
GB2			23360.41	33211.90	3235.05	16.07	23355.85	175.01	3230.49	3240.17	16.10	4789.52	0.19

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OAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

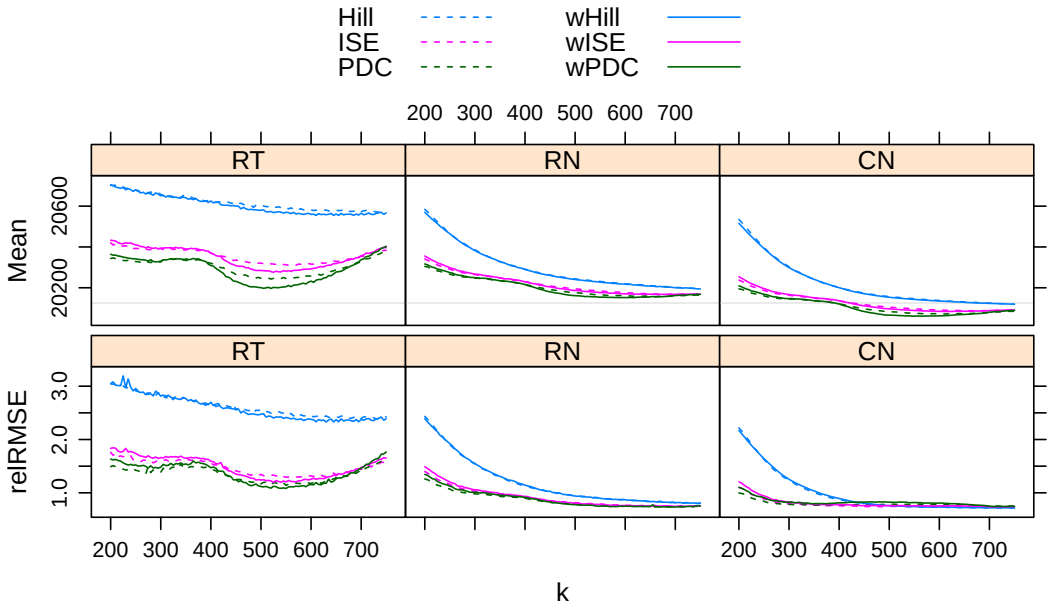

Figure F.296.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

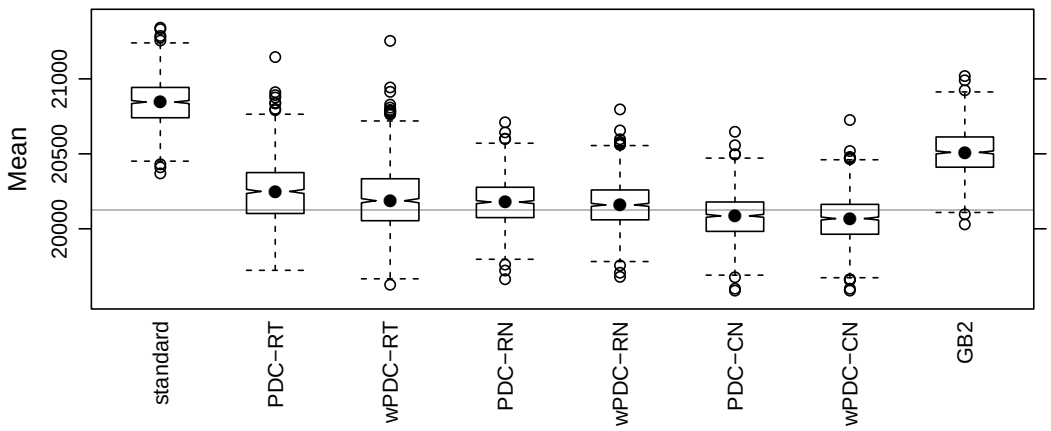

Figure F.297.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.148.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20844.87	21869.41	719.50	3.58	20845.33	149.57	719.96	734.53	3.65	1067.42	0.06
wHill	RT	300	20650.86	44449.65	525.50	2.61	20639.32	205.03	513.96	566.17	2.81	761.99	0.08
wHill	RT	500	20580.21	41078.01	454.84	2.26	20572.65	202.99	447.29	497.92	2.47	663.15	0.06
wHill	RT	700	20565.42	35137.19	440.05	2.19	20557.04	186.62	431.68	478.28	2.38	640.01	0.05
wHill	RN	300	20382.67	31426.07	257.31	1.28	20379.98	175.29	254.62	312.41	1.55	377.54	0.04
wHill	RN	500	20240.88	22463.94	115.51	0.57	20245.25	147.67	119.89	189.17	0.94	201.86	0.03
wHill	RN	700	20200.12	21311.77	74.76	0.37	20202.62	148.27	77.26	163.95	0.81	164.97	0.03
wHill	CN	300	20298.59	33704.67	173.22	0.86	20294.85	181.49	169.49	252.34	1.25	269.95	0.04
wHill	CN	500	20153.57	22672.24	28.20	0.14	20157.83	145.04	32.47	153.12	0.76	149.00	0.03
wHill	CN	700	20123.42	20910.06	−1.94	−0.01	20127.08	147.47	1.71	144.54	0.72	146.41	0.03
wISE	RT	300	20394.22	39482.11	268.86	1.34	20384.03	189.39	258.67	334.26	1.66	384.33	0.06
wISE	RT	500	20284.62	36896.86	159.26	0.79	20278.71	182.61	153.35	249.44	1.24	253.13	0.05
wISE	RT	700	20356.50	34885.49	231.14	1.15	20353.75	183.14	228.39	297.11	1.48	344.04	0.04
wISE	RN	300	20266.69	25320.76	141.33	0.70	20264.25	158.08	138.89	212.76	1.06	221.66	0.04
wISE	RN	500	20186.91	22119.20	61.55	0.31	20188.19	146.44	62.82	160.89	0.80	163.95	0.03
wISE	RN	700	20167.65	20718.74	42.29	0.21	20171.64	145.26	46.28	149.96	0.75	148.97	0.03
wISE	CN	300	20166.70	25964.12	41.34	0.21	20161.99	158.48	36.63	166.27	0.83	156.05	0.03
wISE	CN	500	20096.74	22508.55	−28.63	−0.14	20102.85	150.71	−22.51	152.66	0.76	153.46	0.03
wISE	CN	700	20088.12	20742.78	−37.24	−0.19	20089.98	144.68	−35.38	148.69	0.74	151.34	0.03
wPDC	RT	300	20330.19	47029.22	204.83	1.02	20310.33	208.83	184.97	298.22	1.48	288.11	0.05
wPDC	RT	500	20200.78	44955.14	75.42	0.37	20187.56	210.51	62.19	224.94	1.12	211.02	0.06
wPDC	RT	700	20337.60	41648.72	212.24	1.05	20336.85	201.13	211.49	294.37	1.46	319.90	0.05
wPDC	RN	300	20249.34	26014.03	123.98	0.62	20244.98	157.74	119.62	203.37	1.01	205.02	0.03
wPDC	RN	500	20161.13	23300.62	35.77	0.18	20159.63	147.44	34.26	156.71	0.78	155.75	0.03
wPDC	RN	700	20162.22	20508.84	36.86	0.18	20161.27	142.47	35.91	147.81	0.73	147.14	0.03
wPDC	CN	300	20146.88	27115.95	21.51	0.11	20144.18	156.42	18.82	165.99	0.82	160.64	0.03
wPDC	CN	500	20065.79	23931.14	−59.57	−0.30	20068.38	148.55	−56.98	165.70	0.82	160.69	0.03
wPDC	CN	700	20080.35	20814.03	−45.01	−0.22	20081.75	145.38	−43.61	151.06	0.75	152.12	0.03
GB2			20511.27	21648.31	385.91	1.92	20509.63	148.67	384.26	412.98	2.05	569.71	0.04

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OAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

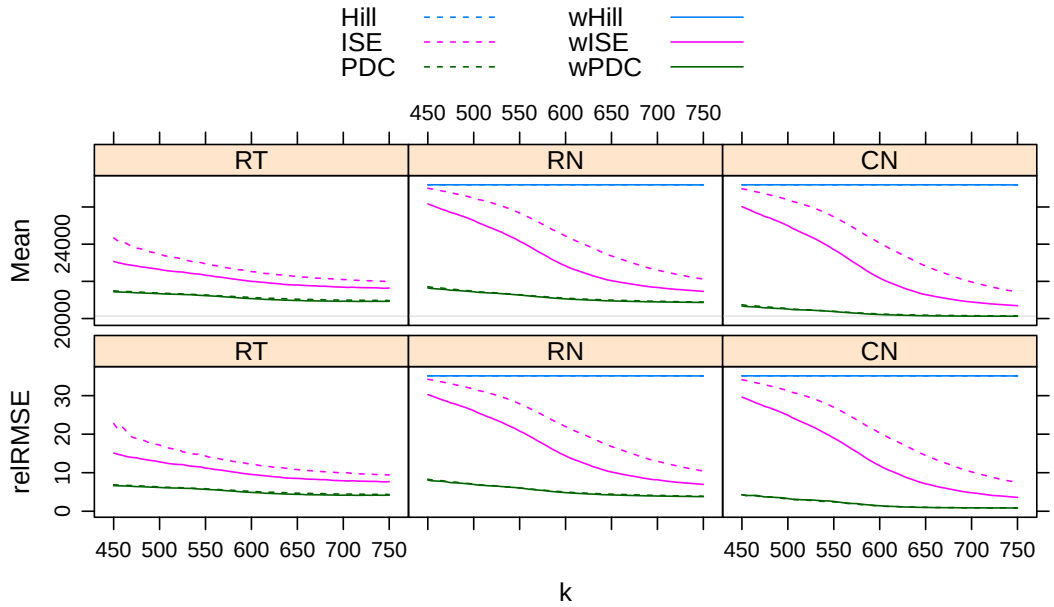

Figure F.298.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

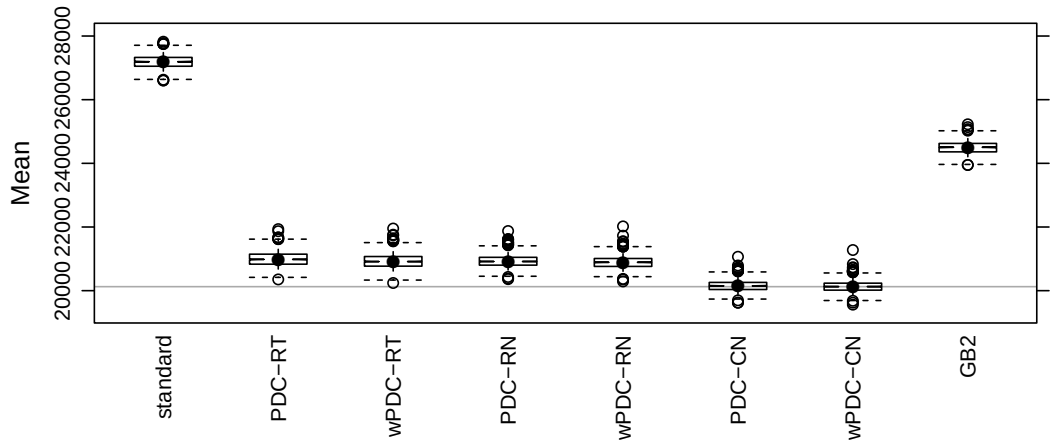

Figure F.299.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.149.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			27193.20	42637.17	7067.83	35.12	27192.48	206.19	7067.11	7070.85	35.13	10477.70	0.38
wHill	RT	500	32126.16	415560826.18	12000.79	59.63	29323.31	2358.57	9197.95	23646.66	117.50	13636.88	17.10
wHill	RT	700	26937.97	12921765.22	6812.61	33.85	26455.24	1203.76	6329.88	7701.98	38.27	9384.67	4.51
wHill	RN	300	27193.20	42637.17	7067.83	35.12	27192.48	206.19	7067.11	7070.85	35.13	10477.70	0.38
wHill	RN	500	27193.20	42637.17	7067.83	35.12	27192.48	206.19	7067.11	7070.85	35.13	10477.70	0.38
wHill	RN	700	27193.11	42689.63	7067.75	35.12	27192.48	206.19	7067.11	7070.77	35.13	10477.70	0.38
wHill	CN	300	27193.20	42637.17	7067.83	35.12	27192.48	206.19	7067.11	7070.85	35.13	10477.70	0.38
wHill	CN	500	27193.20	42637.17	7067.83	35.12	27192.48	206.19	7067.11	7070.85	35.13	10477.70	0.38
wHill	CN	700	27193.11	42690.50	7067.75	35.12	27192.48	206.19	7067.11	7070.77	35.13	10477.70	0.38
wISE	RT	500	22639.94	301082.35	2514.58	12.49	22565.32	478.94	2439.96	2573.69	12.79	3617.49	0.31
wISE	RT	700	21685.40	97239.15	1560.04	7.75	21668.71	307.89	1543.35	1590.87	7.90	2288.17	0.14
wISE	RN	300	27193.20	42637.17	7067.83	35.12	27192.48	206.19	7067.11	7070.85	35.13	10477.70	0.38
wISE	RN	500	25272.08	1087170.79	5146.72	25.57	25278.15	1099.57	5152.79	5251.17	26.09	7639.53	0.37
wISE	RN	700	21670.77	313804.56	1545.41	7.68	21565.99	434.90	1440.63	1643.71	8.17	2135.88	0.36
wISE	CN	300	27193.20	42637.17	7067.83	35.12	27192.48	206.19	7067.11	7070.85	35.13	10477.70	0.38
wISE	CN	500	24994.74	1453253.75	4869.37	24.20	24989.23	1256.28	4863.86	5016.23	24.92	7211.16	0.37
wISE	CN	700	20888.55	345559.22	763.19	3.79	20755.54	463.34	630.18	963.16	4.79	934.31	0.23
wPDC	RT	500	21336.57	75868.69	1211.21	6.02	21293.96	260.65	1168.59	1242.10	6.17	1732.56	0.12
wPDC	RT	700	20931.67	57306.93	806.31	4.01	20914.17	225.10	788.81	841.06	4.18	1169.48	0.09
wPDC	RN	300	25024.65	1543164.53	4899.29	24.34	24596.60	980.51	4471.23	5054.17	25.11	6629.05	0.38
wPDC	RN	500	21440.01	235931.08	1314.64	6.53	21329.43	301.98	1204.07	1401.42	6.96	1785.16	0.26
wPDC	RN	700	20893.31	38893.97	767.94	3.82	20889.88	184.32	764.52	792.84	3.94	1133.48	0.09
wPDC	CN	300	24577.42	2256615.59	4452.06	22.12	24057.15	1211.04	3931.78	4698.43	23.35	5829.26	0.38
wPDC	CN	500	20509.65	289054.67	384.29	1.91	20373.54	294.88	248.18	660.64	3.28	378.42	0.25
wPDC	CN	700	20129.84	31107.09	4.48	0.02	20128.41	162.02	3.05	176.34	0.88	162.55	0.06
GB2			24494.58	41798.10	4369.21	21.71	24503.69	200.16	4378.33	4373.99	21.73	6491.31	0.25

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OAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

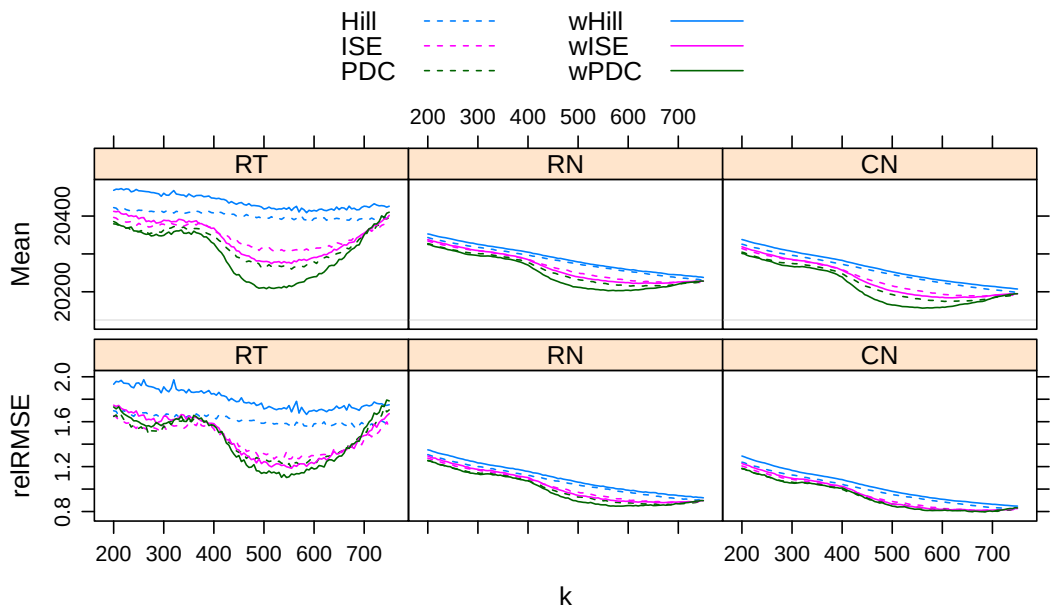

Figure F.300.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

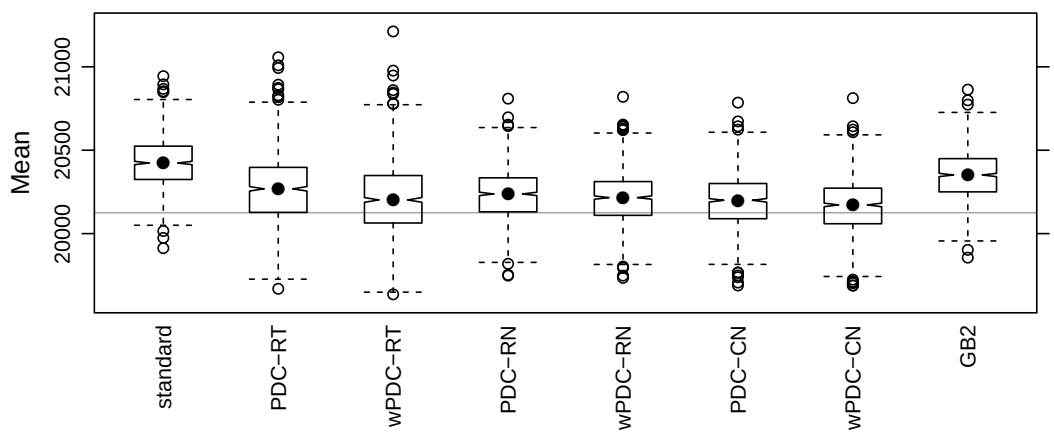

Figure F.301.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.150.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20423.44	22642.01	298.08	1.48	20423.38	147.67	298.02	333.87	1.66	441.84	0.04
wHill	RT	300	20460.45	35624.52	335.09	1.67	20455.57	181.32	330.20	384.54	1.91	489.56	0.07
wHill	RT	500	20418.77	32844.49	293.40	1.46	20414.68	178.53	289.32	344.81	1.71	428.95	0.05
wHill	RT	700	20426.10	32528.14	300.74	1.49	20426.33	178.70	300.97	350.63	1.74	446.22	0.04
wHill	RN	300	20325.29	21574.70	199.93	0.99	20323.94	148.43	198.58	248.04	1.23	294.75	0.04
wHill	RN	500	20278.79	22106.69	153.43	0.76	20282.15	151.75	156.79	213.60	1.06	241.02	0.03
wHill	RN	700	20244.64	21676.46	119.27	0.59	20248.79	145.96	123.43	189.42	0.94	201.83	0.03
wHill	CN	300	20306.62	22185.05	181.26	0.90	20304.04	147.57	178.68	234.56	1.17	268.87	0.03
wHill	CN	500	20252.36	22764.03	127.00	0.63	20253.94	151.15	128.58	197.16	0.98	212.11	0.03
wHill	CN	700	20214.19	22378.87	88.82	0.44	20217.50	147.22	92.14	173.91	0.86	177.25	0.03
wISE	RT	300	20389.10	40622.86	263.74	1.31	20378.48	201.85	253.11	331.87	1.65	375.50	0.07
wISE	RT	500	20279.67	38963.08	154.31	0.77	20274.31	189.37	148.95	250.47	1.24	250.39	0.06
wISE	RT	700	20355.02	35642.35	229.66	1.14	20351.42	188.86	226.06	297.23	1.48	337.16	0.04
wISE	RN	300	20308.99	22268.50	183.63	0.91	20311.15	151.21	185.78	236.57	1.18	277.37	0.03
wISE	RN	500	20239.38	23102.27	114.02	0.57	20244.82	152.10	119.45	189.95	0.94	202.53	0.04
wISE	RN	700	20225.92	21626.50	100.56	0.50	20224.94	145.53	99.58	178.09	0.88	184.19	0.03
wISE	CN	300	20285.46	23053.25	160.10	0.80	20285.49	153.79	160.13	220.60	1.10	246.61	0.03
wISE	CN	500	20202.09	24591.75	76.73	0.38	20207.19	154.22	81.83	174.51	0.87	184.60	0.03
wISE	CN	700	20190.51	22535.34	65.15	0.32	20193.15	149.49	67.79	163.58	0.81	164.35	0.03
wPDC	RT	300	20348.92	51491.84	223.56	1.11	20321.02	215.42	195.66	318.46	1.58	310.02	0.07
wPDC	RT	500	20210.97	46078.33	85.61	0.43	20201.94	210.55	76.58	231.00	1.15	227.13	0.05
wPDC	RT	700	20350.59	45257.18	225.23	1.12	20349.61	203.10	224.24	309.74	1.54	339.09	0.05
wPDC	RN	300	20295.73	23196.50	170.37	0.85	20293.64	154.61	168.27	228.47	1.14	254.91	0.03
wPDC	RN	500	20211.84	24507.78	86.48	0.43	20215.95	147.42	90.59	178.78	0.89	189.58	0.03
wPDC	RN	700	20220.26	21563.29	94.90	0.47	20221.09	146.31	95.73	174.78	0.87	177.87	0.03
wPDC	CN	300	20267.01	24968.59	141.65	0.70	20267.67	161.57	142.31	212.15	1.05	227.08	0.03
wPDC	CN	500	20165.05	27563.24	39.69	0.20	20172.04	161.02	46.68	170.62	0.85	172.56	0.03
wPDC	CN	700	20183.64	22634.88	58.28	0.29	20184.58	152.50	59.22	161.27	0.80	160.93	0.03
GB2			20349.69	21774.11	224.32	1.11	20351.56	147.88	226.20	268.47	1.33	335.69	0.04

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OAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

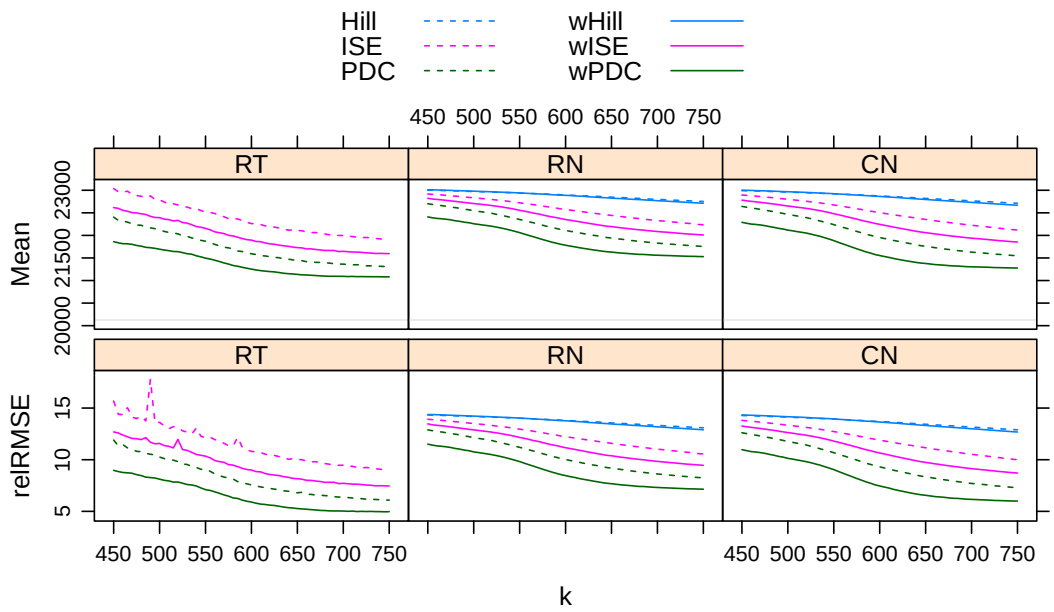

Figure F.302.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

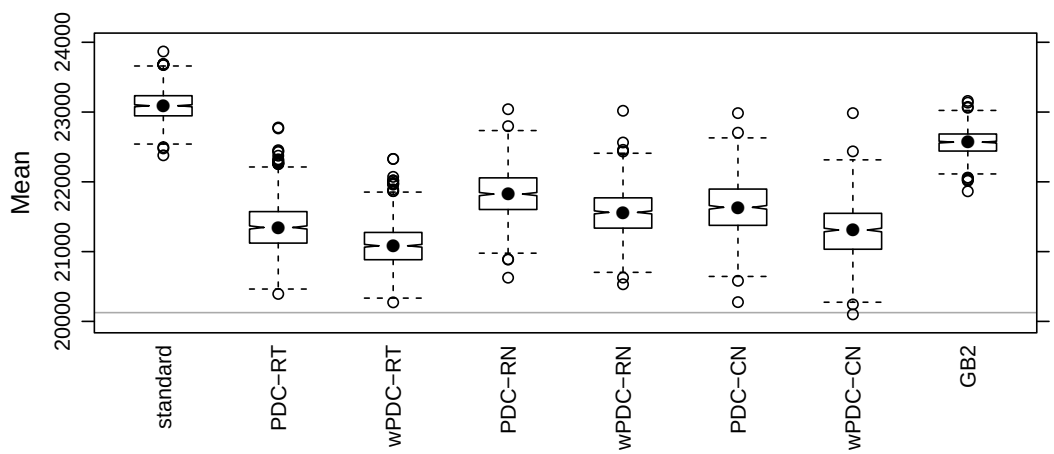

Figure F.303.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.151.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			23092.28	45793.73	2966.91	14.74	23090.85	214.11	2965.49	2974.61	14.78	4396.64	0.19
wHill	RT	500	23527.31	543304.58	3401.94	16.90	23394.68	538.28	3269.32	3480.80	17.30	4847.09	0.49
wHill	RT	700	23024.03	232938.55	2898.67	14.40	22963.22	425.23	2837.86	2938.53	14.60	4207.41	0.31
wHill	RN	300	23072.24	48027.83	2946.88	14.64	23075.67	210.17	2950.31	2955.01	14.68	4374.13	0.23
wHill	RN	500	22979.65	44963.57	2854.29	14.18	22980.91	212.10	2855.55	2862.15	14.22	4233.64	0.18
wHill	RN	700	22768.32	47669.80	2642.96	13.13	22772.34	214.97	2646.98	2651.95	13.18	3924.41	0.16
wHill	CN	300	23068.05	45128.41	2942.68	14.62	23073.08	209.51	2947.71	2950.33	14.66	4370.28	0.19
wHill	CN	500	22967.47	45484.88	2842.11	14.12	22966.23	214.68	2840.86	2850.09	14.16	4211.87	0.18
wHill	CN	700	22731.25	49511.42	2605.89	12.95	22726.25	219.08	2600.89	2615.37	13.00	3856.08	0.16
wISE	RT	500	22393.78	282992.06	2268.42	11.27	22313.44	432.11	2188.08	2329.90	11.58	3244.05	0.38
wISE	RT	700	21647.39	96160.31	1522.03	7.56	21622.29	299.36	1496.93	1553.27	7.72	2219.34	0.16
wISE	RN	300	23061.63	46206.26	2936.27	14.59	23070.23	212.04	2944.87	2944.12	14.63	4366.07	0.19
wISE	RN	500	22706.16	66430.98	2580.80	12.82	22702.97	270.92	2577.61	2593.62	12.89	3821.56	0.16
wISE	RN	700	22086.06	75447.10	1960.70	9.74	22090.73	274.10	1965.37	1979.82	9.84	2913.85	0.15
wISE	CN	300	23058.47	46936.82	2933.11	14.57	23068.24	213.59	2942.88	2941.10	14.61	4363.12	0.19
wISE	CN	500	22651.00	76245.54	2525.64	12.55	22655.65	290.33	2530.29	2540.67	12.62	3751.40	0.16
wISE	CN	700	21939.17	92797.27	1813.81	9.01	21948.59	303.27	1823.23	1839.18	9.14	2703.12	0.15
wPDC	RT	500	21693.75	209249.38	1568.39	7.79	21650.09	412.49	1524.73	1633.67	8.12	2260.57	0.18
wPDC	RT	700	21093.45	87977.78	968.09	4.81	21083.55	285.59	958.18	1012.47	5.03	1420.60	0.11
wPDC	RN	300	22983.38	75749.66	2858.02	14.20	23001.92	247.14	2876.56	2871.23	14.27	4264.79	0.18
wPDC	RN	500	22258.06	138851.17	2132.69	10.60	22264.75	386.70	2139.39	2164.97	10.76	3171.85	0.16
wPDC	RN	700	21560.73	106459.39	1435.36	7.13	21562.25	317.96	1436.89	1471.95	7.31	2130.33	0.14
wPDC	CN	300	22965.81	89776.02	2840.45	14.11	22992.30	252.89	2866.94	2856.19	14.19	4250.53	0.18
wPDC	CN	500	22116.80	189130.76	1991.43	9.90	22134.84	443.39	2009.48	2038.32	10.13	2979.25	0.16
wPDC	CN	700	21304.03	147427.66	1178.67	5.86	21309.57	373.65	1184.21	1239.57	6.16	1755.71	0.14
GB2			22561.84	33689.41	2436.48	12.11	22568.70	181.66	2443.34	2443.38	12.14	3622.49	0.15

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OAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 20.

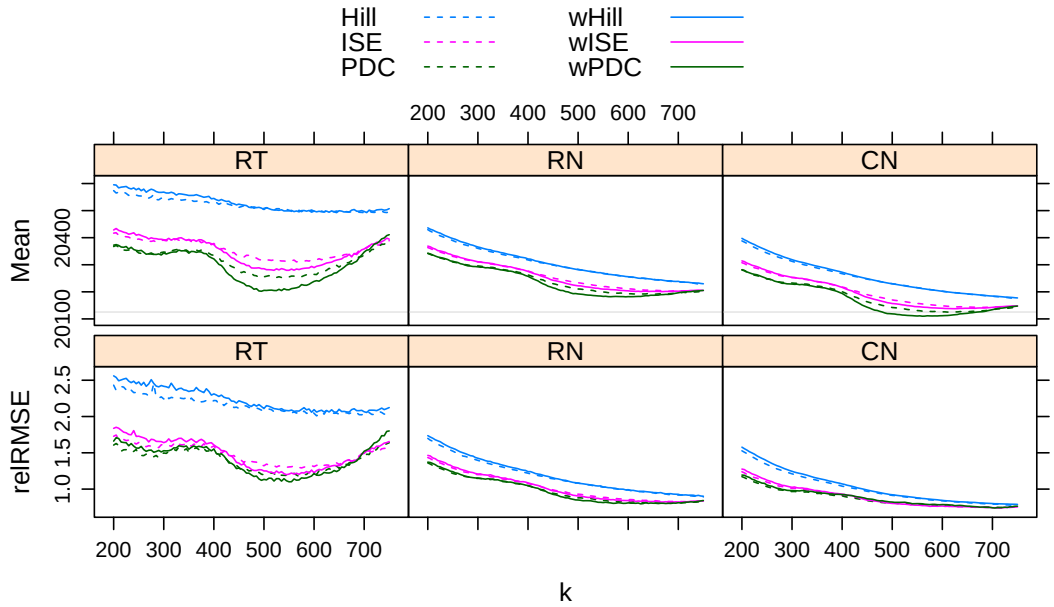

Figure F.304.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

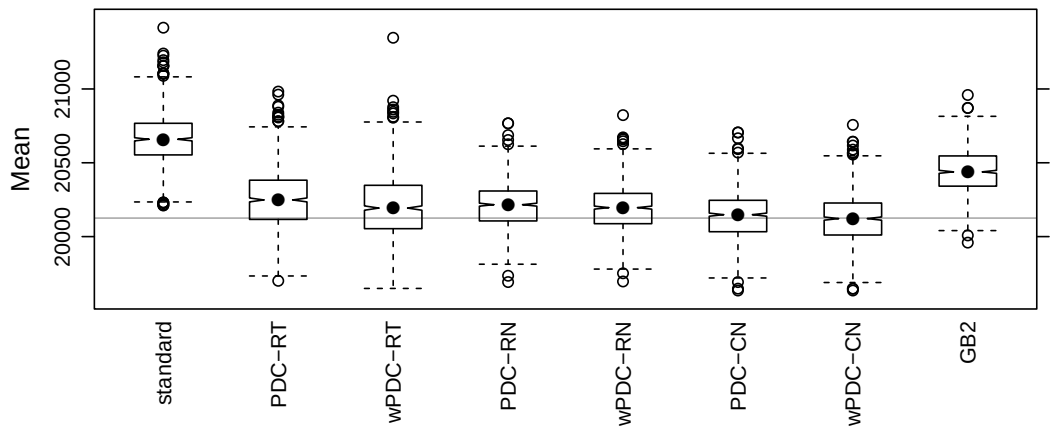

Figure F.305.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.152.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			20664.31	28260.73	538.95	2.68	20659.08	158.01	533.72	564.53	2.81	791.29	0.06
wHill	RT	300	20568.35	40195.99	442.99	2.20	20559.04	198.77	433.68	486.20	2.42	642.97	0.06
wHill	RT	500	20504.12	36740.57	378.76	1.88	20496.18	187.18	370.82	424.45	2.11	549.77	0.06
wHill	RT	700	20496.92	34811.43	371.56	1.85	20489.37	185.03	364.01	415.73	2.07	539.67	0.05
wHill	RN	300	20365.64	24561.63	240.28	1.19	20368.25	157.64	242.88	286.83	1.43	360.39	0.04
wHill	RN	500	20281.73	22970.51	156.37	0.78	20278.74	144.34	153.38	217.71	1.08	235.80	0.03
wHill	RN	700	20238.68	22100.62	113.32	0.56	20240.07	148.50	114.71	186.87	0.93	198.21	0.03
wHill	CN	300	20318.84	25400.06	193.48	0.96	20318.91	160.79	193.55	250.61	1.25	289.49	0.04
wHill	CN	500	20229.72	23584.69	104.35	0.52	20226.67	152.74	101.30	185.61	0.92	191.96	0.03
wHill	CN	700	20184.38	22528.23	59.02	0.29	20185.22	151.91	59.86	161.21	0.80	158.51	0.03
wISE	RT	300	20392.36	37675.47	266.99	1.33	20384.14	194.79	258.78	330.04	1.64	384.90	0.06
wISE	RT	500	20285.40	37732.35	160.03	0.80	20281.41	188.28	156.04	251.61	1.25	257.90	0.05
wISE	RT	700	20358.32	35900.68	232.96	1.16	20350.59	187.32	225.23	300.22	1.49	336.38	0.04
wISE	RN	300	20310.94	24624.94	185.57	0.92	20311.23	157.23	185.87	242.98	1.21	279.24	0.04
wISE	RN	500	20222.08	23804.62	96.72	0.48	20227.34	149.53	101.98	182.03	0.90	191.34	0.03
wISE	RN	700	20201.95	21558.25	76.59	0.38	20203.80	143.10	78.44	165.54	0.82	169.85	0.03
wISE	CN	300	20253.16	26225.63	127.80	0.64	20252.41	160.16	127.04	206.23	1.02	216.52	0.04
wISE	CN	500	20156.72	25118.01	31.36	0.16	20164.21	155.54	38.85	161.48	0.80	156.19	0.03
wISE	CN	700	20142.67	22121.19	17.31	0.09	20145.53	143.22	20.17	149.66	0.74	142.46	0.03
wPDC	RT	300	20343.53	47106.05	218.16	1.08	20323.40	214.73	198.04	307.66	1.53	303.49	0.05
wPDC	RT	500	20205.43	45710.49	80.06	0.40	20193.28	219.56	67.92	228.20	1.13	228.29	0.06
wPDC	RT	700	20346.79	44798.23	221.43	1.10	20344.14	217.00	218.78	306.24	1.52	334.41	0.05
wPDC	RN	300	20292.37	25955.52	167.01	0.83	20292.92	156.87	167.56	232.00	1.15	251.65	0.03
wPDC	RN	500	20192.20	24815.65	66.84	0.33	20196.17	153.96	70.81	171.05	0.85	171.93	0.03
wPDC	RN	700	20196.43	21718.19	71.07	0.35	20197.88	142.97	72.51	163.55	0.81	164.47	0.03
wPDC	CN	300	20228.62	28258.91	103.26	0.51	20225.74	160.95	100.38	197.22	0.98	195.36	0.03
wPDC	CN	500	20118.58	27322.68	−6.78	−0.03	20122.10	162.91	−3.27	165.35	0.82	160.39	0.03
wPDC	CN	700	20134.04	22305.59	8.68	0.04	20135.97	146.95	10.61	149.53	0.74	146.41	0.03
GB2			20440.91	21922.27	315.55	1.57	20438.65	153.01	313.29	348.53	1.73	464.48	0.04

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OAR-NCAR (larger outliers) Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 20.

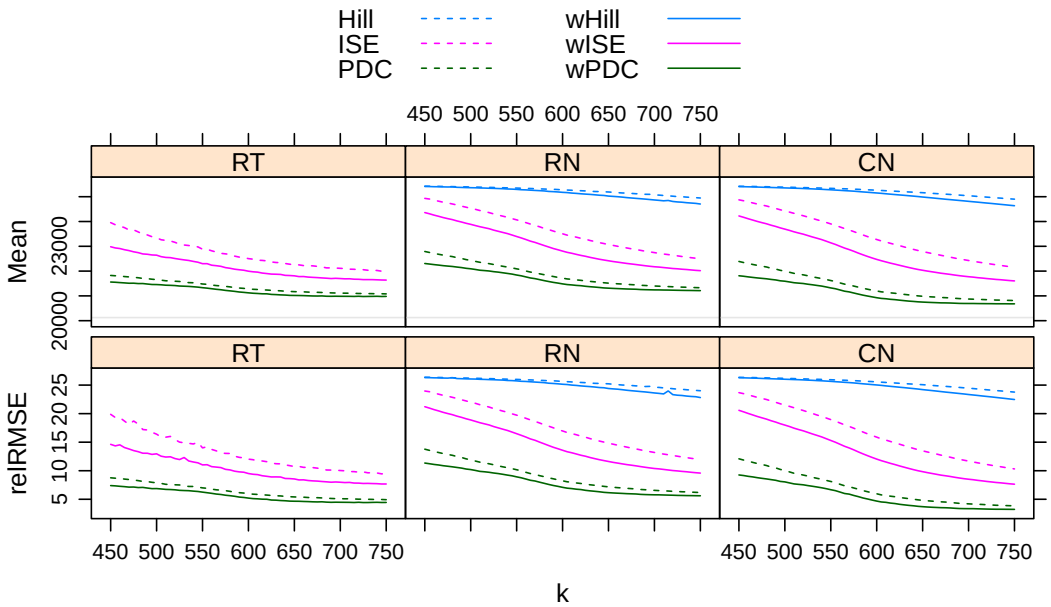

Figure F.306.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

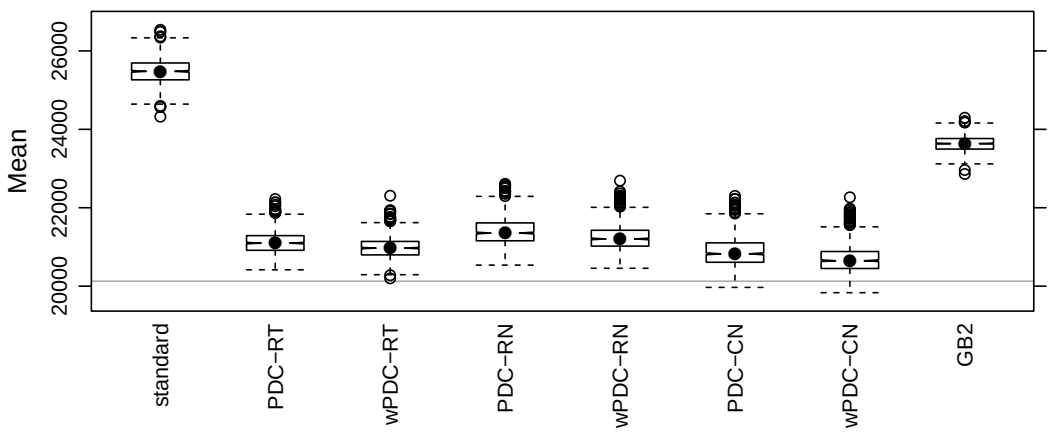

Figure F.307.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

F.6. Simulation results: AMELIA

The simulation setup for the AMELIA population data (Alfons et al., 2011d) is briefly described in the following. Note that the simulations are carried out in the statistical environment R (R Development Core Team, 2010) using the add-on package `simFrame` (Alfons et al., 2010; Alfons, 2011).

Sampling designs (for details, see ALFONS et al., 2011a)

1. Simple random sampling
2. Stratified simple random sampling with sample sizes proportional to strata
3. Stratified Midzuno sampling with sample sizes proportional to strata and inclusion probabilities given by household sizes
4. Two-stage design with stratified simple random sampling of municipalities in the first stage and simple random sampling of households in the second stage
5. Two-stage design with stratified simple random sampling of municipalities in the first stage and Midzuno sampling of households in the second stage

In all cases, the (expected) sample size is set to 6 000 households.

Contamination settings (for details, see ALFONS et al., 2011a)

1. Selection of outliers:
   - *Outlying completely at random* (OCAR)
   - *Outlying at random* (OAR): outliers are drawn by stratified sampling by main activity status
2. Modeling the distribution of the selected outliers:
   - *Contaminated completely at random* (CCAR): outliers are drawn from a normal distribution and equivalized
   - *Not contaminated at random* (NCAR): values are multiplied by a scaling factor and equivalized

F.6.1. Quintile share ratio (QSR)

Simple random sampling

No contamination

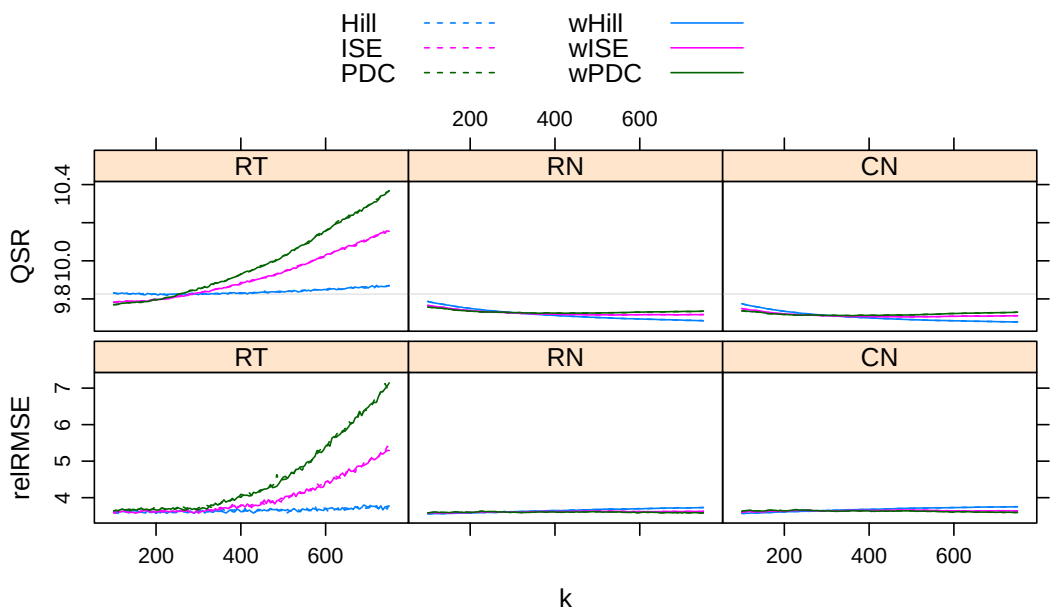

Figure F.308.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 100 and 750.

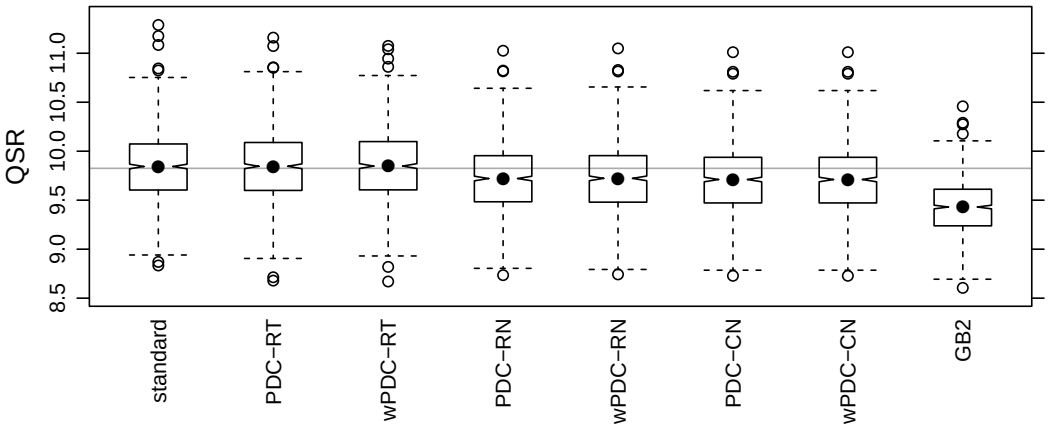

Figure F.309.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 300$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.153.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			25477.52	99900.82	5352.16	26.59	25478.23	318.77	5352.87	5361.48	26.64	7936.17	0.32
wHill	RT	500	26654.04	6928268.73	6528.68	32.44	26108.90	1266.14	5983.54	7038.82	34.97	8871.19	2.00
wHill	RT	700	24929.32	1618605.71	4803.96	23.87	24779.87	794.98	4654.51	4969.41	24.69	6900.78	1.07
wHill	RN	300	25473.87	100232.25	5348.51	26.58	25474.73	320.45	5349.37	5357.86	26.62	7930.97	0.32
wHill	RN	500	25363.56	95229.19	5238.20	26.03	25354.63	303.81	5229.27	5247.27	26.07	7752.92	0.32
wHill	RN	700	24868.28	110293.43	4742.92	23.57	24866.41	336.28	4741.05	4754.52	23.62	7029.07	0.31
wHill	CN	300	25473.63	100209.77	5348.27	26.57	25474.73	319.57	5349.37	5357.62	26.62	7930.97	0.32
wHill	CN	500	25354.30	96749.83	5228.94	25.98	25342.86	304.47	5217.50	5238.17	26.03	7735.46	0.32
wHill	CN	700	24813.12	112504.11	4687.75	23.29	24811.59	342.74	4686.23	4699.73	23.35	6947.80	0.29
wISE	RT	500	22642.09	470675.01	2516.73	12.51	22543.15	494.93	2417.79	2608.47	12.96	3584.61	0.46
wISE	RT	700	21699.17	105822.24	1573.81	7.82	21680.85	300.15	1555.49	1607.05	7.99	2306.17	0.18
wISE	RN	300	25458.12	99947.59	5332.76	26.50	25452.04	314.36	5326.68	5342.12	26.54	7897.33	0.32
wISE	RN	500	23885.66	314936.74	3760.30	18.68	23930.00	558.29	3804.64	3801.91	18.89	5640.76	0.27
wISE	RN	700	22174.38	175208.68	2049.02	10.18	22141.82	423.82	2016.46	2091.29	10.39	2989.60	0.19
wISE	CN	300	25456.74	100275.88	5331.38	26.49	25451.16	316.77	5325.80	5340.77	26.54	7896.03	0.32
wISE	CN	500	23692.68	391324.66	3567.32	17.73	23727.05	636.79	3601.69	3621.70	18.00	5339.87	0.26
wISE	CN	700	21773.31	218605.10	1647.95	8.19	21737.72	459.25	1612.35	1712.93	8.51	2390.48	0.17
wPDC	RT	500	21456.94	141764.32	1331.57	6.62	21408.05	347.98	1282.69	1383.73	6.88	1901.72	0.16
wPDC	RT	700	20983.54	74863.90	858.18	4.26	20971.64	253.70	846.27	900.70	4.48	1254.69	0.11
wPDC	RN	300	24634.21	946120.04	4508.85	22.40	24939.69	792.41	4814.32	4612.47	22.92	7137.72	0.30
wPDC	RN	500	22092.61	344840.67	1967.25	9.77	22009.09	592.26	1883.73	2052.94	10.20	2792.81	0.23
wPDC	RN	700	21241.84	107541.23	1116.47	5.55	21204.50	295.49	1079.13	1163.59	5.78	1599.92	0.13
wPDC	CN	300	24493.15	1314501.06	4367.79	21.70	24903.25	854.71	4777.89	4515.62	22.44	7083.69	0.30
wPDC	CN	500	21591.89	471388.56	1466.53	7.29	21499.59	706.94	1374.23	1619.15	8.05	2037.44	0.22
wPDC	CN	700	20693.15	133321.46	567.79	2.82	20648.63	321.13	523.27	674.96	3.35	775.80	0.11
GB2			23632.90	41488.05	3507.54	17.43	23636.11	200.88	3510.74	3513.44	17.46	5205.03	0.21

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Table F.154.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			9.85	0.13	0.02	0.23	9.84	0.35	0.02	0.36	3.62	0.35	0.15
wHill	RT	300	9.82	0.13	−0.00	−0.03	9.82	0.36	−0.01	0.35	3.61	0.35	0.14
wHill	RT	500	9.84	0.13	0.01	0.11	9.83	0.36	0.01	0.36	3.66	0.37	0.15
wHill	RT	700	9.86	0.13	0.03	0.32	9.84	0.37	0.02	0.37	3.73	0.37	0.16
wHill	RN	300	9.73	0.12	−0.10	−0.99	9.73	0.35	−0.10	0.35	3.61	0.36	0.13
wHill	RN	500	9.70	0.12	−0.12	−1.25	9.69	0.35	−0.13	0.36	3.67	0.36	0.12
wHill	RN	700	9.69	0.11	−0.14	−1.39	9.68	0.35	−0.15	0.37	3.72	0.36	0.12
wHill	CN	300	9.71	0.12	−0.11	−1.14	9.71	0.35	−0.12	0.36	3.65	0.35	0.13
wHill	CN	500	9.69	0.12	−0.13	−1.36	9.68	0.36	−0.14	0.36	3.71	0.36	0.12
wHill	CN	700	9.68	0.11	−0.14	−1.47	9.67	0.35	−0.15	0.37	3.75	0.36	0.12
wISE	RT	300	9.83	0.12	0.01	0.07	9.83	0.36	0.00	0.35	3.57	0.36	0.13
wISE	RT	500	9.94	0.14	0.12	1.17	9.94	0.37	0.11	0.39	3.96	0.39	0.16
wISE	RT	700	10.11	0.16	0.28	2.90	10.09	0.38	0.26	0.49	4.95	0.48	0.21
wISE	RN	300	9.73	0.12	−0.10	−1.01	9.72	0.35	−0.10	0.35	3.61	0.36	0.12
wISE	RN	500	9.72	0.12	−0.11	−1.11	9.71	0.35	−0.12	0.36	3.63	0.36	0.12
wISE	RN	700	9.72	0.11	−0.11	−1.10	9.71	0.34	−0.12	0.36	3.62	0.35	0.12
wISE	CN	300	9.71	0.12	−0.11	−1.16	9.71	0.35	−0.12	0.36	3.64	0.36	0.12
wISE	CN	500	9.71	0.12	−0.12	−1.21	9.70	0.35	−0.12	0.36	3.66	0.36	0.12
wISE	CN	700	9.71	0.11	−0.11	−1.17	9.71	0.34	−0.12	0.36	3.64	0.36	0.12
wPDC	RT	300	9.86	0.13	0.03	0.32	9.85	0.37	0.02	0.36	3.67	0.36	0.13
wPDC	RT	500	10.03	0.16	0.20	2.05	10.03	0.41	0.21	0.45	4.56	0.44	0.18
wPDC	RT	700	10.29	0.19	0.47	4.74	10.28	0.42	0.45	0.64	6.47	0.68	0.22
wPDC	RN	300	9.73	0.12	−0.10	−0.99	9.72	0.35	−0.10	0.35	3.60	0.36	0.12
wPDC	RN	500	9.73	0.12	−0.10	−1.01	9.72	0.36	−0.11	0.36	3.61	0.36	0.12
wPDC	RN	700	9.73	0.12	−0.09	−0.93	9.73	0.34	−0.10	0.35	3.58	0.35	0.13
wPDC	CN	300	9.71	0.12	−0.11	−1.14	9.71	0.34	−0.11	0.36	3.64	0.37	0.12
wPDC	CN	500	9.72	0.12	−0.11	−1.11	9.71	0.35	−0.12	0.36	3.64	0.36	0.12
wPDC	CN	700	9.73	0.12	−0.10	−0.99	9.72	0.35	−0.10	0.35	3.60	0.35	0.13
GB2			9.43	0.08	−0.40	−4.06	9.43	0.28	−0.39	0.49	4.98	0.59	0.12

OCAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

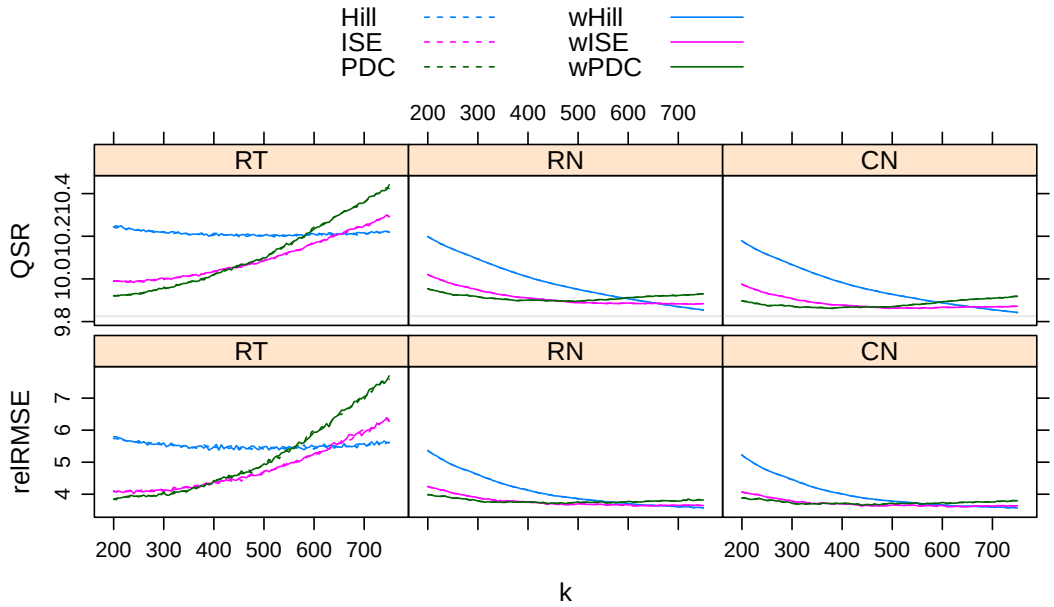

Figure F.310.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

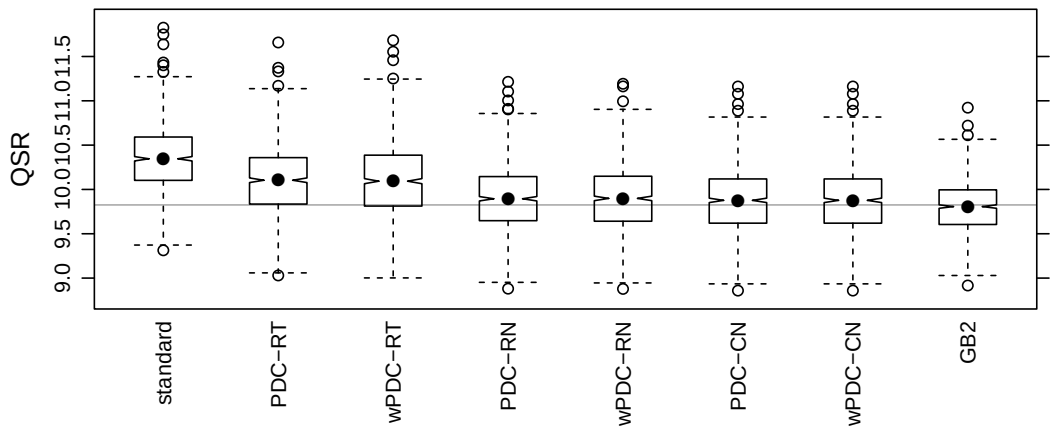

Figure F.311.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.155.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			10.35	0.14	0.53	5.37	10.35	0.36	0.52	0.65	6.57	0.77	0.20
wHill	RT	300	10.22	0.15	0.40	4.04	10.22	0.38	0.40	0.55	5.60	0.60	0.19
wHill	RT	500	10.20	0.15	0.38	3.86	10.19	0.38	0.36	0.54	5.48	0.57	0.20
wHill	RT	700	10.22	0.15	0.39	3.99	10.21	0.38	0.38	0.55	5.58	0.59	0.20
wHill	RN	300	10.09	0.13	0.27	2.73	10.09	0.37	0.26	0.45	4.61	0.46	0.17
wHill	RN	500	9.95	0.13	0.13	1.28	9.94	0.35	0.12	0.38	3.85	0.37	0.15
wHill	RN	700	9.87	0.12	0.04	0.45	9.87	0.36	0.04	0.35	3.61	0.37	0.15
wHill	CN	300	10.07	0.13	0.24	2.46	10.06	0.37	0.24	0.44	4.46	0.45	0.16
wHill	CN	500	9.93	0.13	0.10	1.04	9.92	0.35	0.10	0.37	3.78	0.37	0.15
wHill	CN	700	9.86	0.12	0.03	0.31	9.85	0.36	0.03	0.35	3.59	0.36	0.15
wISE	RT	300	10.00	0.13	0.18	1.80	9.99	0.38	0.16	0.41	4.12	0.40	0.16
wISE	RT	500	10.08	0.15	0.26	2.64	10.08	0.39	0.25	0.46	4.70	0.47	0.17
wISE	RT	700	10.25	0.16	0.42	4.31	10.24	0.41	0.42	0.58	5.92	0.63	0.18
wISE	RN	300	9.95	0.13	0.12	1.26	9.95	0.37	0.12	0.38	3.89	0.37	0.15
wISE	RN	500	9.89	0.13	0.06	0.64	9.89	0.37	0.06	0.36	3.70	0.39	0.14
wISE	RN	700	9.88	0.13	0.06	0.59	9.88	0.36	0.06	0.36	3.65	0.37	0.14
wISE	CN	300	9.91	0.13	0.08	0.84	9.91	0.36	0.08	0.37	3.78	0.37	0.15
wISE	CN	500	9.86	0.13	0.04	0.38	9.86	0.37	0.04	0.36	3.66	0.37	0.14
wISE	CN	700	9.87	0.13	0.04	0.44	9.87	0.36	0.04	0.36	3.63	0.37	0.14
wPDC	RT	300	9.96	0.14	0.13	1.35	9.94	0.38	0.12	0.40	4.04	0.38	0.16
wPDC	RT	500	10.10	0.16	0.27	2.78	10.09	0.43	0.27	0.49	4.95	0.49	0.19
wPDC	RT	700	10.36	0.20	0.53	5.42	10.34	0.44	0.52	0.69	7.04	0.78	0.22
wPDC	RN	300	9.92	0.13	0.09	0.92	9.91	0.37	0.09	0.37	3.79	0.37	0.15
wPDC	RN	500	9.90	0.13	0.07	0.72	9.90	0.38	0.07	0.37	3.76	0.38	0.14
wPDC	RN	700	9.92	0.13	0.10	0.99	9.92	0.36	0.10	0.37	3.78	0.37	0.15
wPDC	CN	300	9.87	0.13	0.05	0.48	9.87	0.36	0.04	0.37	3.72	0.36	0.15
wPDC	CN	500	9.87	0.13	0.05	0.46	9.88	0.37	0.05	0.37	3.72	0.37	0.14
wPDC	CN	700	9.91	0.13	0.08	0.85	9.90	0.35	0.08	0.37	3.76	0.37	0.15
GB2			9.80	0.09	−0.02	−0.23	9.81	0.29	−0.02	0.30	3.00	0.28	0.11

OCAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

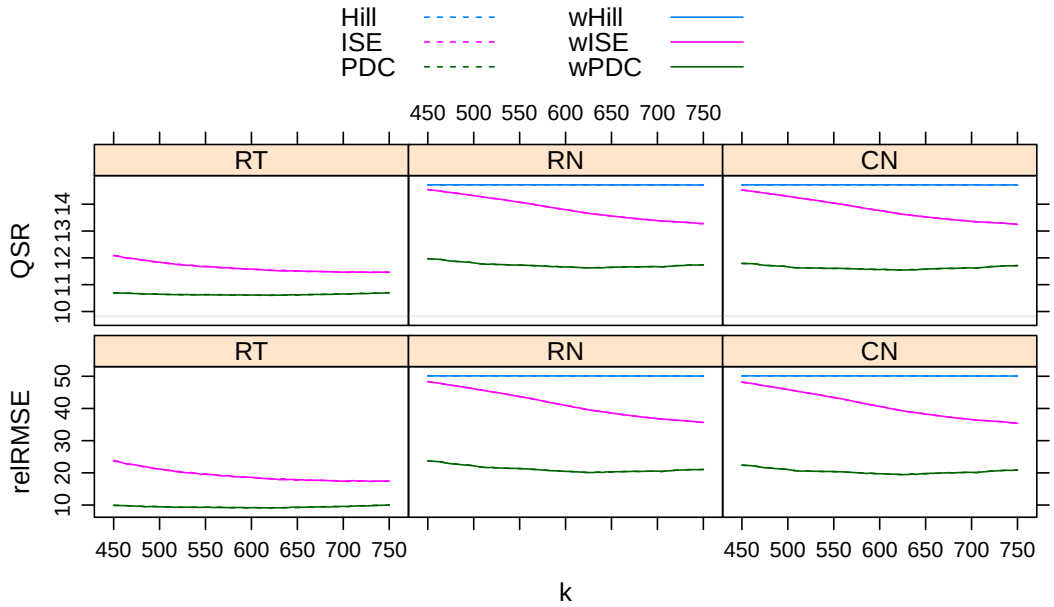

Figure F.312.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

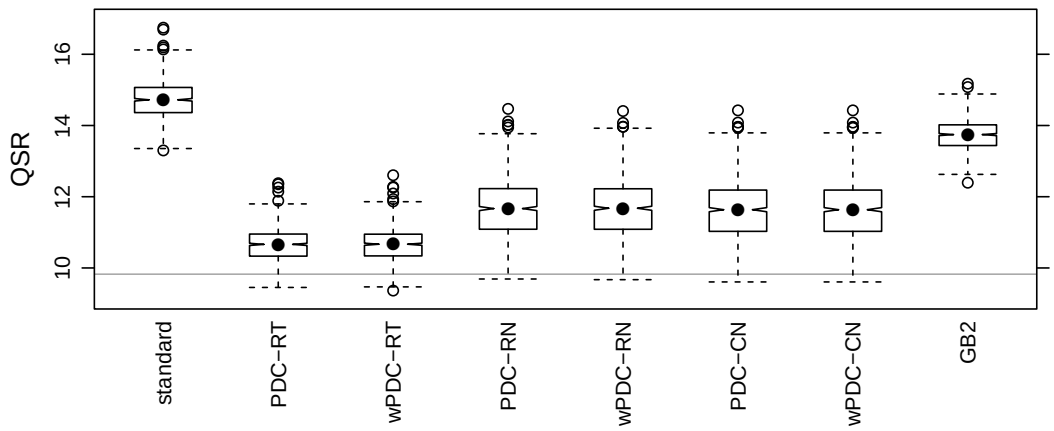

Figure F.313.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.156.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			14.72	0.26	4.90	49.86	14.72	0.52	4.90	4.92	50.12	7.26	0.70
wHill	RT	500	14.58	1.14	4.76	48.44	14.47	0.82	4.64	4.88	49.64	6.88	1.61
wHill	RT	700	14.06	0.69	4.23	43.08	14.00	0.67	4.17	4.31	43.90	6.19	1.68
wHill	RN	300	14.72	0.26	4.90	49.86	14.72	0.52	4.90	4.92	50.12	7.26	0.70
wHill	RN	500	14.72	0.26	4.90	49.85	14.72	0.52	4.90	4.92	50.11	7.26	0.70
wHill	RN	700	14.72	0.26	4.89	49.82	14.72	0.53	4.89	4.92	50.08	7.25	0.70
wHill	CN	300	14.72	0.26	4.90	49.86	14.72	0.52	4.90	4.92	50.12	7.26	0.70
wHill	CN	500	14.72	0.26	4.90	49.85	14.72	0.52	4.90	4.92	50.11	7.26	0.70
wHill	CN	700	14.72	0.26	4.89	49.82	14.72	0.53	4.89	4.92	50.08	7.25	0.70
wISE	RT	500	11.84	0.29	2.01	20.50	11.81	0.52	1.98	2.09	21.23	2.94	0.41
wISE	RT	700	11.46	0.24	1.64	16.69	11.46	0.49	1.63	1.71	17.41	2.42	0.43
wISE	RN	300	14.72	0.26	4.90	49.86	14.72	0.52	4.90	4.92	50.12	7.26	0.70
wISE	RN	500	14.32	0.33	4.50	45.75	14.32	0.56	4.49	4.53	46.12	6.66	0.65
wISE	RN	700	13.39	0.39	3.56	36.28	13.38	0.66	3.55	3.62	36.83	5.27	0.59
wISE	CN	300	14.72	0.26	4.90	49.86	14.72	0.52	4.90	4.92	50.12	7.26	0.70
wISE	CN	500	14.29	0.34	4.47	45.49	14.30	0.57	4.47	4.51	45.87	6.63	0.65
wISE	CN	700	13.36	0.40	3.54	35.99	13.34	0.66	3.52	3.59	36.55	5.22	0.59
wPDC	RT	500	10.64	0.19	0.82	8.31	10.63	0.44	0.81	0.93	9.44	1.20	0.24
wPDC	RT	700	10.66	0.20	0.83	8.45	10.67	0.46	0.84	0.94	9.60	1.25	0.28
wPDC	RN	300	13.95	1.09	4.12	41.94	14.17	1.07	4.34	4.25	43.27	6.44	0.70
wPDC	RN	500	11.81	0.79	1.99	20.23	11.79	0.98	1.96	2.18	22.17	2.91	0.48
wPDC	RN	700	11.67	0.66	1.85	18.79	11.68	0.83	1.85	2.02	20.52	2.74	0.47
wPDC	CN	300	13.86	1.29	4.03	41.05	14.14	1.12	4.31	4.19	42.65	6.39	0.70
wPDC	CN	500	11.67	0.88	1.84	18.75	11.65	1.03	1.82	2.07	21.04	2.70	0.47
wPDC	CN	700	11.62	0.68	1.80	18.31	11.64	0.84	1.81	1.98	20.14	2.68	0.47
GB2			13.73	0.19	3.91	39.78	13.75	0.42	3.92	3.93	40.02	5.81	0.54

OCAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

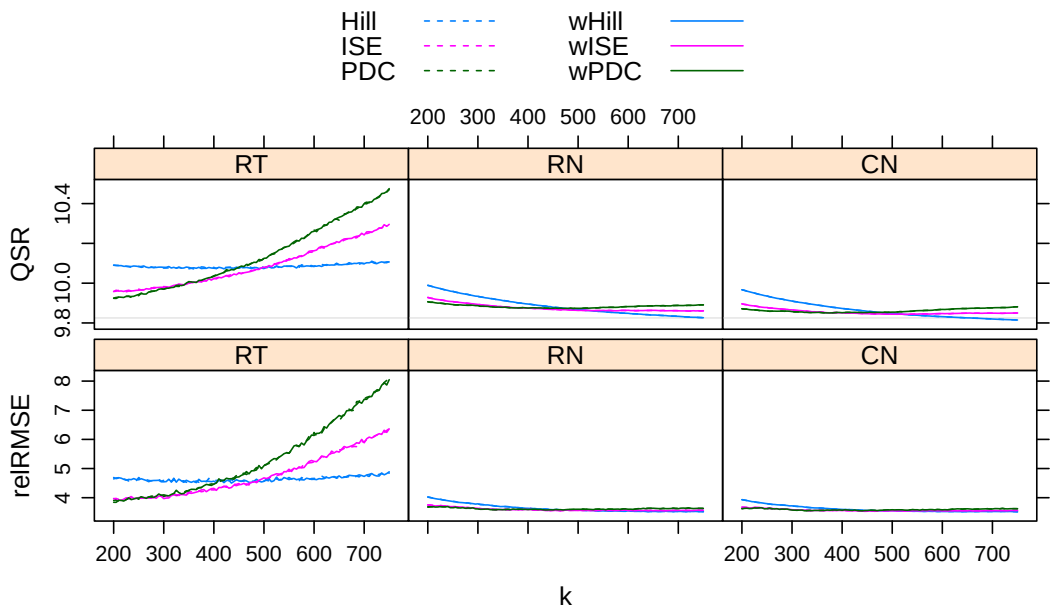

Figure F.314.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

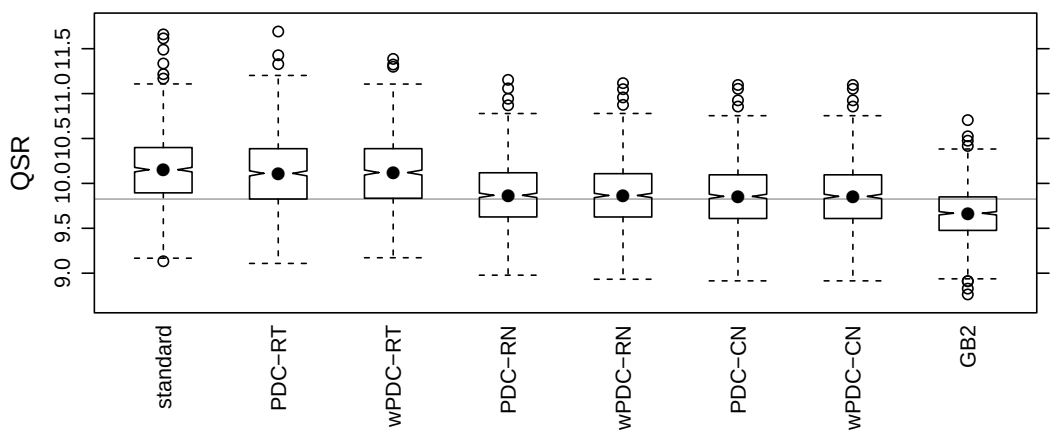

Figure F.315.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.157.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			10.16	0.14	0.33	3.37	10.15	0.37	0.33	0.50	5.10	0.51	0.19
wHill	RT	300	10.08	0.13	0.25	2.59	10.07	0.36	0.25	0.45	4.54	0.46	0.17
wHill	RT	500	10.07	0.14	0.25	2.53	10.06	0.37	0.23	0.45	4.56	0.44	0.19
wHill	RT	700	10.10	0.14	0.27	2.77	10.10	0.38	0.28	0.46	4.73	0.48	0.19
wHill	RN	300	9.93	0.13	0.11	1.11	9.92	0.37	0.10	0.37	3.79	0.37	0.15
wHill	RN	500	9.87	0.12	0.04	0.42	9.86	0.36	0.03	0.35	3.58	0.37	0.13
wHill	RN	700	9.83	0.12	0.01	0.08	9.82	0.35	−0.00	0.35	3.53	0.35	0.13
wHill	CN	300	9.91	0.13	0.08	0.86	9.90	0.37	0.08	0.37	3.72	0.37	0.15
wHill	CN	500	9.85	0.12	0.02	0.23	9.84	0.36	0.01	0.35	3.55	0.36	0.13
wHill	CN	700	9.82	0.12	−0.01	−0.06	9.81	0.35	−0.02	0.35	3.53	0.35	0.13
wISE	RT	300	9.98	0.13	0.15	1.55	9.96	0.37	0.14	0.39	3.97	0.40	0.15
wISE	RT	500	10.08	0.15	0.25	2.59	10.06	0.38	0.23	0.46	4.68	0.46	0.16
wISE	RT	700	10.24	0.16	0.42	4.25	10.25	0.39	0.42	0.58	5.88	0.64	0.19
wISE	RN	300	9.89	0.12	0.07	0.69	9.88	0.36	0.06	0.36	3.63	0.36	0.14
wISE	RN	500	9.86	0.12	0.04	0.38	9.86	0.35	0.03	0.35	3.56	0.37	0.13
wISE	RN	700	9.86	0.12	0.04	0.36	9.85	0.36	0.03	0.35	3.56	0.36	0.14
wISE	CN	300	9.87	0.12	0.04	0.41	9.86	0.36	0.04	0.35	3.59	0.36	0.14
wISE	CN	500	9.84	0.12	0.02	0.19	9.84	0.36	0.01	0.35	3.55	0.36	0.13
wISE	CN	700	9.85	0.12	0.02	0.24	9.84	0.37	0.02	0.35	3.55	0.36	0.13
wPDC	RT	300	9.97	0.14	0.14	1.47	9.96	0.38	0.14	0.40	4.10	0.41	0.15
wPDC	RT	500	10.12	0.16	0.30	3.05	10.12	0.41	0.30	0.50	5.10	0.52	0.16
wPDC	RT	700	10.40	0.19	0.57	5.85	10.39	0.44	0.57	0.72	7.38	0.85	0.23
wPDC	RN	300	9.89	0.12	0.06	0.63	9.88	0.35	0.05	0.36	3.61	0.35	0.14
wPDC	RN	500	9.87	0.12	0.05	0.49	9.87	0.36	0.04	0.35	3.60	0.36	0.13
wPDC	RN	700	9.89	0.12	0.06	0.64	9.88	0.36	0.06	0.36	3.62	0.37	0.14
wPDC	CN	300	9.86	0.12	0.03	0.32	9.85	0.35	0.03	0.35	3.58	0.35	0.14
wPDC	CN	500	9.85	0.12	0.03	0.30	9.86	0.36	0.03	0.35	3.59	0.36	0.13
wPDC	CN	700	9.88	0.12	0.05	0.52	9.87	0.35	0.05	0.36	3.61	0.36	0.14
GB2			9.66	0.09	−0.16	−1.67	9.67	0.28	−0.16	0.34	3.42	0.34	0.11

OCAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

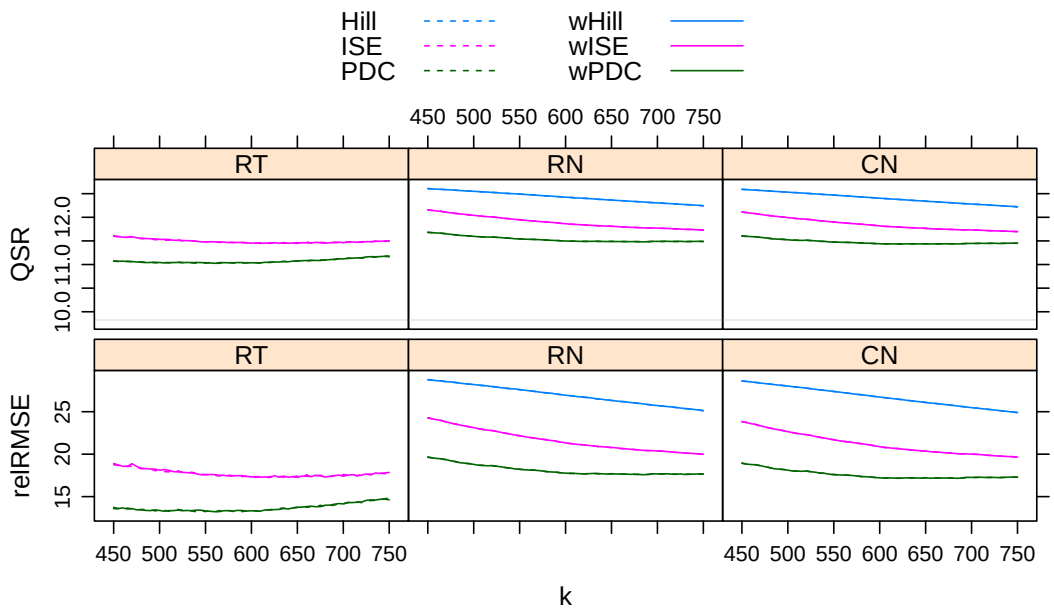

Figure F.316.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

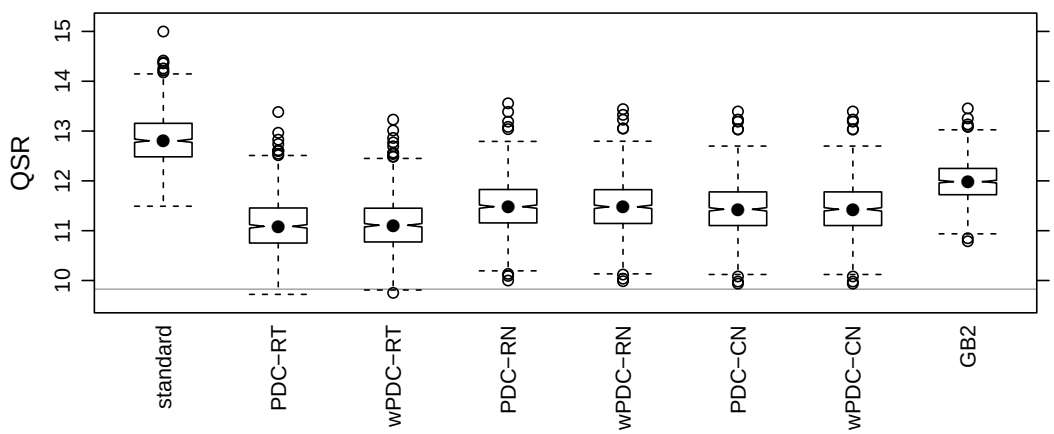

Figure F.317.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.158.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			12.83	0.25	3.01	30.60	12.81	0.50	2.98	3.05	31.02	4.42	0.53
wHill	RT	500	12.66	0.42	2.83	28.83	12.58	0.60	2.75	2.90	29.56	4.08	0.70
wHill	RT	700	12.48	0.33	2.65	27.02	12.44	0.55	2.61	2.72	27.65	3.87	0.66
wHill	RN	300	12.75	0.25	2.92	29.76	12.73	0.49	2.90	2.97	30.19	4.30	0.51
wHill	RN	500	12.55	0.25	2.73	27.74	12.52	0.49	2.70	2.77	28.20	4.00	0.47
wHill	RN	700	12.30	0.24	2.48	25.24	12.29	0.49	2.47	2.53	25.72	3.66	0.45
wHill	CN	300	12.74	0.25	2.92	29.69	12.71	0.49	2.89	2.96	30.12	4.28	0.51
wHill	CN	500	12.53	0.25	2.71	27.55	12.51	0.50	2.68	2.75	28.02	3.98	0.47
wHill	CN	700	12.28	0.24	2.46	24.99	12.27	0.49	2.44	2.50	25.48	3.62	0.45
wISE	RT	500	11.53	0.25	1.71	17.37	11.51	0.51	1.68	1.78	18.11	2.49	0.36
wISE	RT	700	11.46	0.25	1.64	16.66	11.43	0.48	1.61	1.71	17.41	2.38	0.38
wISE	RN	300	12.59	0.26	2.77	28.15	12.58	0.50	2.75	2.81	28.62	4.08	0.49
wISE	RN	500	12.04	0.25	2.22	22.56	12.04	0.50	2.22	2.27	23.12	3.29	0.40
wISE	RN	700	11.77	0.23	1.94	19.79	11.77	0.47	1.94	2.00	20.38	2.88	0.38
wISE	CN	300	12.57	0.26	2.74	27.93	12.56	0.50	2.74	2.79	28.42	4.06	0.49
wISE	CN	500	11.99	0.25	2.17	22.06	11.98	0.50	2.16	2.22	22.64	3.20	0.39
wISE	CN	700	11.73	0.23	1.91	19.40	11.73	0.48	1.90	1.96	20.00	2.82	0.38
wPDC	RT	500	11.04	0.24	1.22	12.39	11.04	0.52	1.22	1.31	13.37	1.80	0.29
wPDC	RT	700	11.12	0.26	1.29	13.17	11.11	0.50	1.28	1.39	14.14	1.90	0.35
wPDC	RN	300	12.19	0.34	2.37	24.11	12.20	0.56	2.38	2.44	24.82	3.53	0.48
wPDC	RN	500	11.60	0.27	1.77	18.04	11.59	0.54	1.77	1.85	18.80	2.62	0.35
wPDC	RN	700	11.49	0.24	1.67	16.95	11.48	0.50	1.65	1.74	17.68	2.45	0.37
wPDC	CN	300	12.13	0.36	2.31	23.47	12.15	0.60	2.33	2.38	24.26	3.45	0.48
wPDC	CN	500	11.52	0.28	1.70	17.29	11.52	0.55	1.69	1.78	18.11	2.51	0.34
wPDC	CN	700	11.45	0.25	1.62	16.51	11.43	0.50	1.60	1.70	17.26	2.38	0.36
GB2			11.99	0.16	2.17	22.07	11.98	0.39	2.16	2.20	22.44	3.20	0.37

OAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

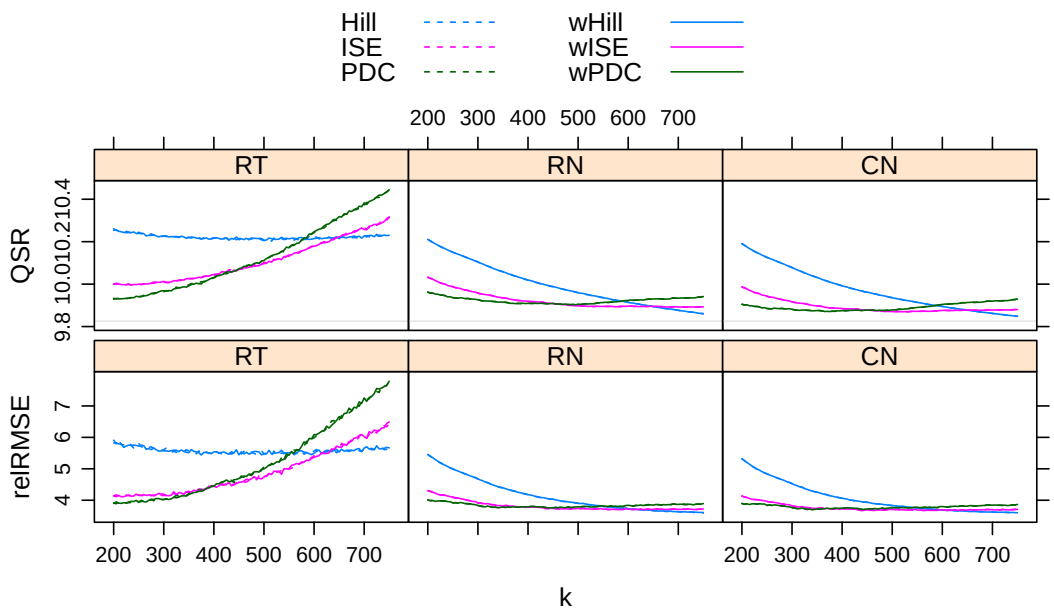

Figure F.318.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

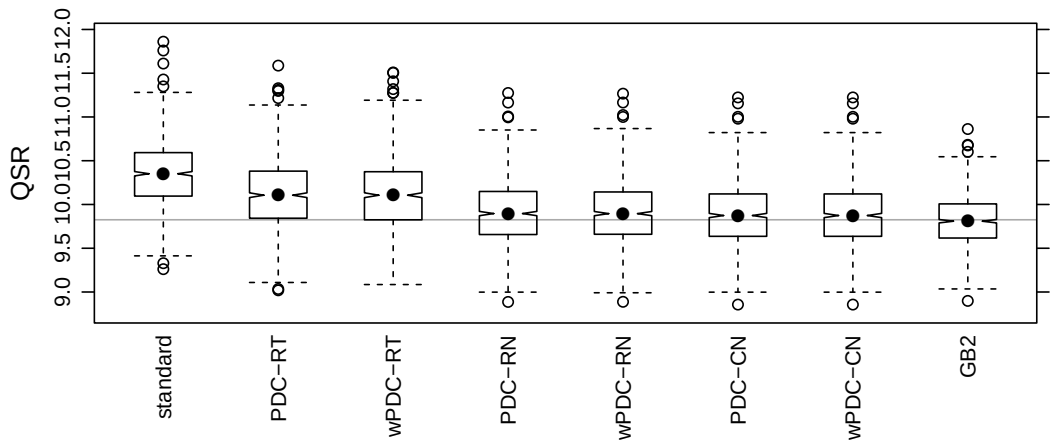

Figure F.319.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.159.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			10.36	0.14	0.53	5.43	10.35	0.36	0.53	0.65	6.61	0.78	0.21
wHill	RT	300	10.23	0.14	0.40	4.09	10.21	0.37	0.39	0.55	5.57	0.59	0.20
wHill	RT	500	10.20	0.14	0.38	3.86	10.19	0.37	0.37	0.54	5.47	0.57	0.20
wHill	RT	700	10.23	0.15	0.40	4.09	10.23	0.39	0.40	0.56	5.66	0.60	0.19
wHill	RN	300	10.10	0.13	0.28	2.84	10.10	0.36	0.27	0.46	4.68	0.46	0.18
wHill	RN	500	9.96	0.13	0.13	1.37	9.95	0.36	0.13	0.38	3.90	0.38	0.16
wHill	RN	700	9.88	0.13	0.05	0.52	9.87	0.35	0.04	0.36	3.64	0.36	0.15
wHill	CN	300	10.08	0.13	0.25	2.57	10.07	0.37	0.24	0.44	4.53	0.44	0.17
wHill	CN	500	9.94	0.13	0.11	1.13	9.93	0.37	0.10	0.38	3.83	0.37	0.16
wHill	CN	700	9.86	0.13	0.04	0.37	9.85	0.35	0.03	0.36	3.63	0.36	0.15
wISE	RT	300	10.01	0.13	0.19	1.91	10.01	0.37	0.18	0.41	4.19	0.41	0.17
wISE	RT	500	10.10	0.14	0.27	2.77	10.09	0.37	0.26	0.47	4.74	0.46	0.17
wISE	RT	700	10.26	0.16	0.43	4.40	10.24	0.41	0.42	0.59	6.03	0.64	0.22
wISE	RN	300	9.96	0.13	0.13	1.35	9.94	0.36	0.12	0.38	3.92	0.38	0.17
wISE	RN	500	9.90	0.13	0.07	0.74	9.89	0.36	0.06	0.37	3.74	0.36	0.15
wISE	RN	700	9.89	0.13	0.07	0.68	9.87	0.36	0.05	0.36	3.71	0.36	0.15
wISE	CN	300	9.92	0.13	0.09	0.93	9.90	0.36	0.08	0.37	3.82	0.37	0.16
wISE	CN	500	9.87	0.13	0.05	0.46	9.86	0.36	0.04	0.36	3.71	0.36	0.15
wISE	CN	700	9.88	0.13	0.05	0.53	9.86	0.36	0.04	0.36	3.70	0.36	0.16
wPDC	RT	300	9.97	0.14	0.14	1.46	9.96	0.36	0.13	0.40	4.03	0.40	0.15
wPDC	RT	500	10.11	0.16	0.29	2.91	10.11	0.41	0.28	0.49	5.00	0.50	0.17
wPDC	RT	700	10.38	0.20	0.56	5.68	10.36	0.41	0.53	0.71	7.25	0.80	0.22
wPDC	RN	300	9.93	0.13	0.10	1.03	9.91	0.36	0.09	0.38	3.83	0.37	0.16
wPDC	RN	500	9.91	0.13	0.08	0.82	9.90	0.36	0.07	0.37	3.79	0.36	0.15
wPDC	RN	700	9.93	0.13	0.11	1.10	9.92	0.37	0.09	0.38	3.87	0.37	0.16
wPDC	CN	300	9.88	0.13	0.06	0.57	9.87	0.36	0.04	0.37	3.76	0.36	0.16
wPDC	CN	500	9.88	0.13	0.05	0.54	9.87	0.36	0.05	0.37	3.75	0.36	0.14
wPDC	CN	700	9.92	0.13	0.09	0.96	9.90	0.37	0.08	0.38	3.84	0.37	0.16
GB2			9.81	0.09	−0.02	−0.16	9.81	0.29	−0.02	0.30	3.01	0.29	0.11

OAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

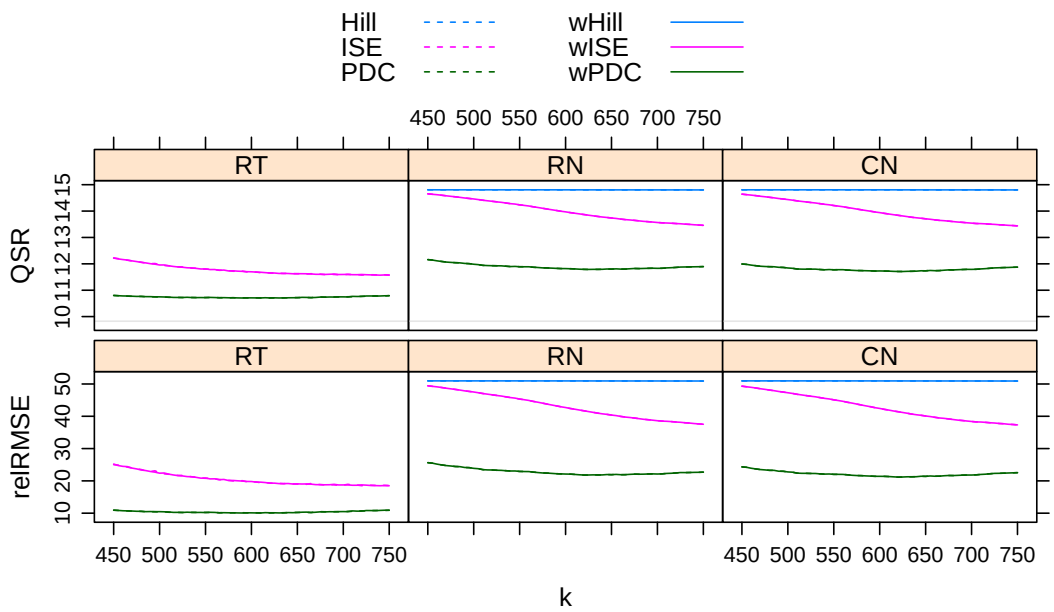

Figure F.320.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

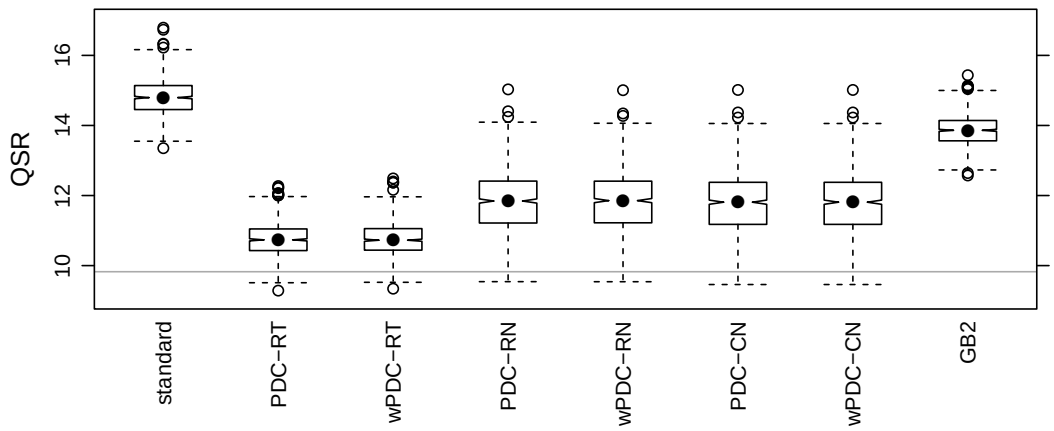

Figure F.321.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.160.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			14.81	0.26	4.98	50.71	14.80	0.51	4.97	5.01	50.98	7.37	0.71
wHill	RT	500	14.68	1.27	4.85	49.41	14.57	0.77	4.74	4.98	50.73	7.03	1.86
wHill	RT	700	14.16	0.56	4.34	44.16	14.11	0.67	4.29	4.40	44.82	6.35	1.05
wHill	RN	300	14.81	0.26	4.98	50.71	14.80	0.51	4.97	5.01	50.98	7.37	0.71
wHill	RN	500	14.81	0.26	4.98	50.69	14.79	0.51	4.97	5.01	50.96	7.37	0.71
wHill	RN	700	14.80	0.26	4.98	50.66	14.79	0.51	4.96	5.00	50.93	7.36	0.71
wHill	CN	300	14.81	0.26	4.98	50.71	14.80	0.51	4.97	5.01	50.98	7.37	0.71
wHill	CN	500	14.81	0.26	4.98	50.69	14.79	0.51	4.97	5.01	50.96	7.37	0.71
wHill	CN	700	14.80	0.26	4.98	50.66	14.79	0.51	4.96	5.00	50.93	7.36	0.71
wISE	RT	500	11.96	0.29	2.13	21.69	11.92	0.52	2.10	2.20	22.38	3.11	0.41
wISE	RT	700	11.60	0.25	1.77	18.03	11.59	0.50	1.77	1.84	18.74	2.62	0.40
wISE	RN	300	14.81	0.26	4.98	50.71	14.80	0.51	4.97	5.01	50.97	7.37	0.71
wISE	RN	500	14.46	0.32	4.63	47.16	14.47	0.56	4.64	4.67	47.52	6.88	0.66
wISE	RN	700	13.57	0.40	3.74	38.08	13.55	0.65	3.73	3.80	38.63	5.53	0.63
wISE	CN	300	14.81	0.26	4.98	50.71	14.80	0.51	4.97	5.01	50.97	7.37	0.71
wISE	CN	500	14.44	0.33	4.61	46.92	14.45	0.56	4.63	4.65	47.28	6.86	0.66
wISE	CN	700	13.54	0.41	3.72	37.84	13.53	0.66	3.70	3.77	38.39	5.49	0.63
wPDC	RT	500	10.75	0.21	0.92	9.40	10.73	0.44	0.90	1.03	10.46	1.34	0.28
wPDC	RT	700	10.75	0.21	0.92	9.39	10.72	0.46	0.90	1.03	10.49	1.33	0.27
wPDC	RN	300	14.11	1.11	4.28	43.57	14.34	0.97	4.52	4.41	44.87	6.69	0.70
wPDC	RN	500	11.98	0.84	2.16	21.98	11.95	0.97	2.12	2.35	23.88	3.15	0.52
wPDC	RN	700	11.83	0.71	2.00	20.40	11.86	0.88	2.03	2.17	22.12	3.01	0.53
wPDC	CN	300	14.03	1.31	4.20	42.77	14.33	1.02	4.50	4.36	44.33	6.68	0.70
wPDC	CN	500	11.84	0.94	2.02	20.53	11.82	1.04	2.00	2.24	22.77	2.96	0.51
wPDC	CN	700	11.79	0.73	1.96	19.99	11.81	0.90	1.98	2.14	21.80	2.94	0.53
GB2			13.85	0.20	4.03	41.00	13.86	0.43	4.04	4.05	41.25	5.98	0.57

OAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

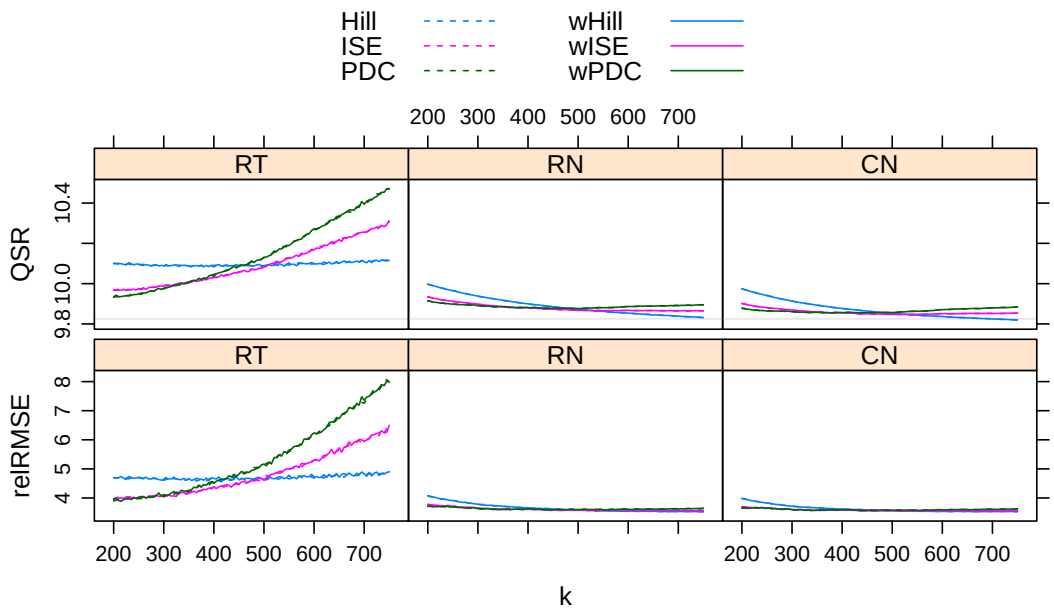

Figure F.322.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

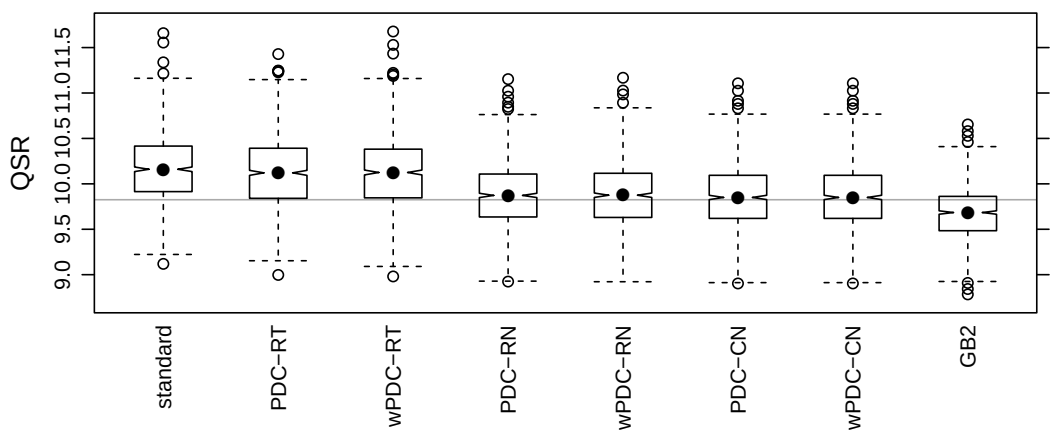

Figure F.323.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.161.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			10.17	0.14	0.35	3.52	10.16	0.37	0.33	0.51	5.18	0.53	0.19
wHill	RT	300	10.09	0.14	0.26	2.68	10.08	0.37	0.26	0.45	4.61	0.45	0.18
wHill	RT	500	10.09	0.14	0.26	2.68	10.09	0.36	0.27	0.46	4.63	0.45	0.17
wHill	RT	700	10.11	0.14	0.28	2.89	10.10	0.37	0.28	0.47	4.83	0.47	0.17
wHill	RN	300	9.94	0.13	0.11	1.15	9.94	0.35	0.11	0.37	3.79	0.37	0.15
wHill	RN	500	9.87	0.12	0.05	0.48	9.87	0.35	0.04	0.35	3.59	0.36	0.14
wHill	RN	700	9.84	0.12	0.01	0.14	9.83	0.34	0.01	0.35	3.53	0.35	0.14
wHill	CN	300	9.91	0.13	0.09	0.90	9.91	0.36	0.08	0.37	3.72	0.37	0.15
wHill	CN	500	9.85	0.12	0.03	0.28	9.85	0.35	0.03	0.35	3.57	0.35	0.14
wHill	CN	700	9.82	0.12	−0.00	−0.00	9.82	0.34	−0.00	0.35	3.53	0.34	0.13
wISE	RT	300	9.99	0.14	0.16	1.65	9.97	0.39	0.15	0.40	4.11	0.41	0.16
wISE	RT	500	10.08	0.14	0.26	2.61	10.07	0.38	0.25	0.45	4.60	0.45	0.15
wISE	RT	700	10.26	0.16	0.43	4.38	10.26	0.41	0.43	0.58	5.94	0.65	0.19
wISE	RN	300	9.90	0.12	0.07	0.74	9.90	0.35	0.07	0.36	3.66	0.36	0.15
wISE	RN	500	9.87	0.12	0.04	0.43	9.86	0.35	0.04	0.35	3.58	0.35	0.13
wISE	RN	700	9.86	0.12	0.04	0.40	9.87	0.35	0.04	0.35	3.57	0.35	0.15
wISE	CN	300	9.87	0.12	0.04	0.44	9.87	0.35	0.04	0.35	3.60	0.35	0.15
wISE	CN	500	9.85	0.12	0.02	0.22	9.84	0.35	0.02	0.35	3.56	0.34	0.13
wISE	CN	700	9.85	0.12	0.03	0.27	9.85	0.35	0.03	0.35	3.56	0.35	0.14
wPDC	RT	300	9.98	0.14	0.15	1.55	9.97	0.38	0.14	0.40	4.12	0.41	0.14
wPDC	RT	500	10.13	0.16	0.31	3.11	10.13	0.40	0.30	0.51	5.17	0.51	0.19
wPDC	RT	700	10.39	0.20	0.57	5.79	10.39	0.43	0.56	0.72	7.36	0.84	0.24
wPDC	RN	300	9.89	0.12	0.07	0.66	9.89	0.35	0.07	0.36	3.63	0.35	0.15
wPDC	RN	500	9.88	0.12	0.05	0.52	9.87	0.36	0.05	0.35	3.60	0.35	0.14
wPDC	RN	700	9.89	0.12	0.07	0.67	9.89	0.35	0.07	0.36	3.62	0.35	0.15
wPDC	CN	300	9.86	0.12	0.04	0.36	9.86	0.35	0.03	0.35	3.60	0.35	0.14
wPDC	CN	500	9.86	0.12	0.03	0.32	9.85	0.35	0.02	0.35	3.58	0.35	0.13
wPDC	CN	700	9.88	0.12	0.05	0.55	9.88	0.35	0.06	0.35	3.61	0.35	0.15
GB2			9.67	0.09	−0.15	−1.56	9.68	0.27	−0.14	0.33	3.37	0.33	0.11

OAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

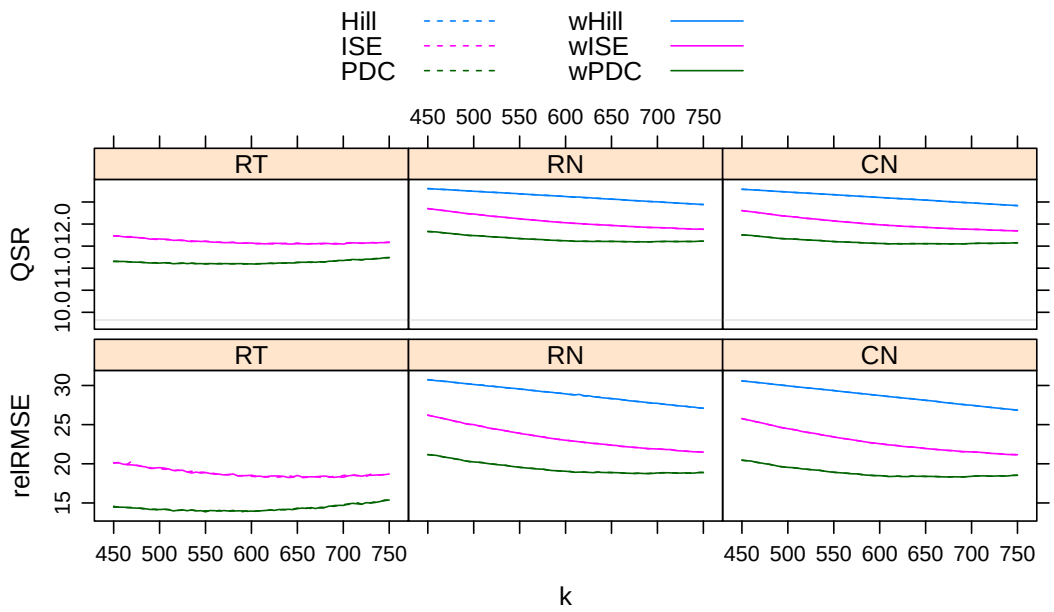

Figure F.324.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

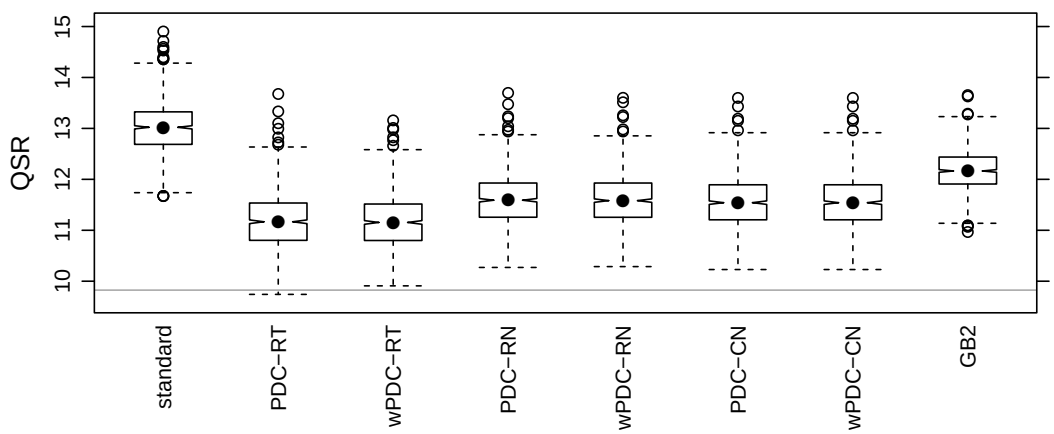

Figure F.325.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.162.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			13.02	0.25	3.19	32.48	13.02	0.48	3.20	3.23	32.88	4.74	0.52
wHill	RT	500	12.84	0.40	3.01	30.65	12.78	0.61	2.96	3.08	31.33	4.39	0.73
wHill	RT	700	12.64	0.34	2.82	28.68	12.61	0.57	2.79	2.88	29.29	4.13	0.55
wHill	RN	300	12.94	0.25	3.11	31.68	12.92	0.48	3.09	3.15	32.08	4.59	0.52
wHill	RN	500	12.74	0.25	2.92	29.70	12.73	0.50	2.90	2.96	30.13	4.30	0.49
wHill	RN	700	12.50	0.24	2.68	27.27	12.49	0.48	2.66	2.72	27.72	3.95	0.47
wHill	CN	300	12.93	0.25	3.11	31.62	12.91	0.48	3.09	3.15	32.03	4.58	0.52
wHill	CN	500	12.73	0.25	2.90	29.52	12.71	0.49	2.88	2.94	29.95	4.27	0.49
wHill	CN	700	12.48	0.24	2.65	27.02	12.46	0.48	2.64	2.70	27.48	3.91	0.47
wISE	RT	500	11.66	0.30	1.84	18.70	11.62	0.51	1.79	1.92	19.51	2.66	0.43
wISE	RT	700	11.55	0.26	1.72	17.52	11.53	0.52	1.71	1.80	18.28	2.53	0.44
wISE	RN	300	12.81	0.26	2.98	30.34	12.79	0.51	2.97	3.02	30.78	4.40	0.52
wISE	RN	500	12.23	0.27	2.40	24.45	12.20	0.51	2.38	2.46	25.00	3.53	0.54
wISE	RN	700	11.92	0.24	2.09	21.32	11.91	0.48	2.09	2.15	21.89	3.09	0.39
wISE	CN	300	12.79	0.27	2.96	30.16	12.77	0.50	2.95	3.01	30.61	4.37	0.52
wISE	CN	500	12.18	0.26	2.35	23.92	12.16	0.51	2.33	2.41	24.49	3.46	0.40
wISE	CN	700	11.88	0.24	2.06	20.93	11.87	0.49	2.04	2.11	21.52	3.03	0.39
wPDC	RT	500	11.11	0.28	1.29	13.11	11.09	0.52	1.26	1.39	14.15	1.87	0.33
wPDC	RT	700	11.17	0.26	1.35	13.72	11.15	0.53	1.33	1.44	14.68	1.97	0.34
wPDC	RN	300	12.42	0.36	2.59	26.37	12.41	0.61	2.59	2.66	27.07	3.84	0.51
wPDC	RN	500	11.74	0.29	1.91	19.47	11.71	0.54	1.88	1.99	20.23	2.79	0.37
wPDC	RN	700	11.60	0.26	1.78	18.11	11.58	0.50	1.76	1.85	18.83	2.60	0.38
wPDC	CN	300	12.36	0.39	2.53	25.77	12.36	0.64	2.53	2.61	26.54	3.75	0.51
wPDC	CN	500	11.66	0.31	1.84	18.71	11.64	0.55	1.81	1.92	19.54	2.69	0.37
wPDC	CN	700	11.56	0.26	1.73	17.66	11.54	0.51	1.72	1.81	18.40	2.55	0.38
GB2			12.17	0.16	2.35	23.89	12.16	0.39	2.34	2.38	24.24	3.47	0.39

Stratified simple random sampling

No contamination

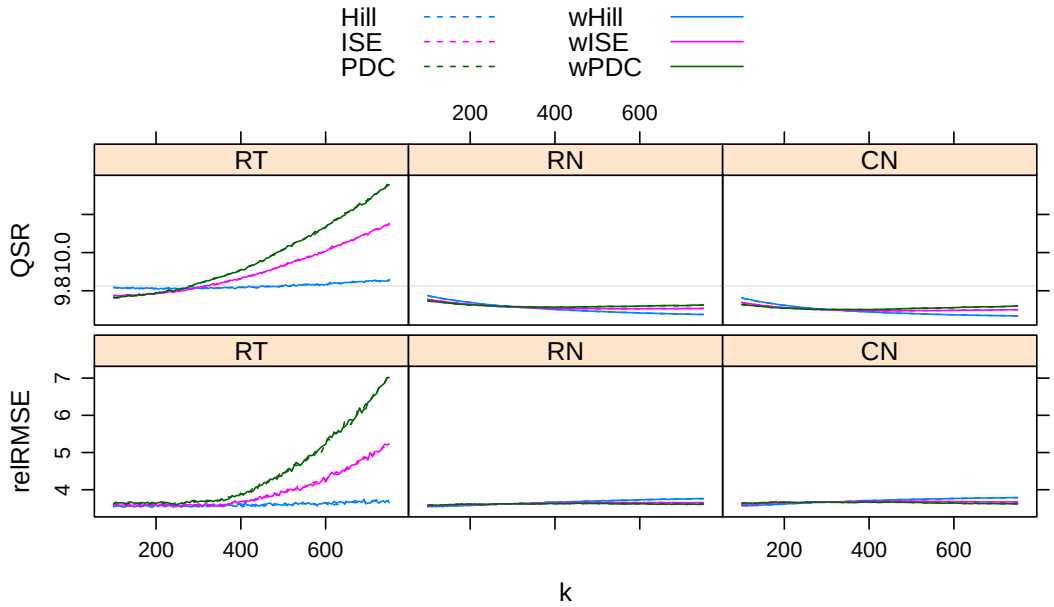

Figure F.326.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 100 and 750.

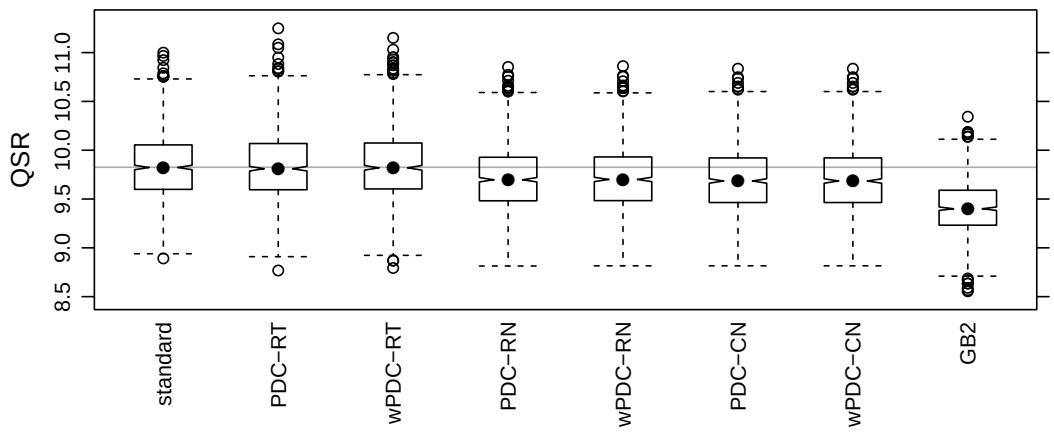

Figure F.327.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 300$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.163.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			9.83	0.12	0.01	0.09	9.82	0.34	−0.00	0.35	3.55	0.34	0.12
wHill	RT	300	9.81	0.12	−0.01	−0.12	9.80	0.34	−0.02	0.35	3.54	0.35	0.12
wHill	RT	500	9.82	0.12	−0.00	−0.02	9.81	0.36	−0.01	0.35	3.59	0.35	0.12
wHill	RT	700	9.85	0.13	0.02	0.25	9.83	0.36	0.01	0.36	3.64	0.36	0.12
wHill	RN	300	9.72	0.11	−0.11	−1.11	9.70	0.33	−0.12	0.36	3.62	0.37	0.11
wHill	RN	500	9.69	0.11	−0.13	−1.36	9.67	0.33	−0.15	0.36	3.70	0.38	0.11
wHill	RN	700	9.68	0.11	−0.15	−1.50	9.66	0.33	−0.17	0.37	3.75	0.39	0.11
wHill	CN	300	9.70	0.11	−0.12	−1.26	9.69	0.34	−0.14	0.36	3.66	0.38	0.11
wHill	CN	500	9.68	0.11	−0.14	−1.48	9.67	0.34	−0.16	0.37	3.74	0.39	0.11
wHill	CN	700	9.67	0.11	−0.16	−1.58	9.65	0.33	−0.17	0.37	3.78	0.40	0.11
wISE	RT	300	9.82	0.12	−0.01	−0.06	9.80	0.35	−0.03	0.35	3.59	0.35	0.12
wISE	RT	500	9.93	0.14	0.10	1.04	9.89	0.36	0.07	0.38	3.92	0.36	0.14
wISE	RT	700	10.09	0.15	0.27	2.74	10.08	0.38	0.26	0.47	4.80	0.47	0.17
wISE	RN	300	9.71	0.11	−0.11	−1.13	9.70	0.33	−0.13	0.36	3.63	0.37	0.10
wISE	RN	500	9.70	0.12	−0.12	−1.22	9.69	0.33	−0.14	0.36	3.66	0.37	0.11
wISE	RN	700	9.71	0.11	−0.12	−1.21	9.69	0.34	−0.14	0.36	3.65	0.38	0.11
wISE	CN	300	9.70	0.11	−0.13	−1.28	9.68	0.33	−0.14	0.36	3.67	0.37	0.10
wISE	CN	500	9.70	0.11	−0.13	−1.32	9.68	0.33	−0.15	0.36	3.69	0.38	0.11
wISE	CN	700	9.70	0.11	−0.13	−1.28	9.68	0.34	−0.14	0.36	3.67	0.38	0.11
wPDC	RT	300	9.84	0.13	0.01	0.15	9.82	0.34	−0.01	0.36	3.68	0.34	0.13
wPDC	RT	500	10.02	0.16	0.19	1.96	10.00	0.37	0.17	0.44	4.46	0.42	0.16
wPDC	RT	700	10.28	0.18	0.46	4.65	10.25	0.43	0.42	0.62	6.35	0.66	0.19
wPDC	RN	300	9.72	0.12	−0.11	−1.10	9.70	0.33	−0.12	0.36	3.62	0.38	0.11
wPDC	RN	500	9.72	0.12	−0.11	−1.11	9.70	0.34	−0.12	0.36	3.63	0.38	0.11
wPDC	RN	700	9.72	0.12	−0.10	−1.05	9.71	0.34	−0.12	0.36	3.62	0.37	0.11
wPDC	CN	300	9.70	0.11	−0.12	−1.25	9.68	0.33	−0.14	0.36	3.67	0.37	0.10
wPDC	CN	500	9.71	0.12	−0.12	−1.21	9.69	0.34	−0.13	0.36	3.66	0.38	0.11
wPDC	CN	700	9.72	0.12	−0.11	−1.11	9.70	0.34	−0.12	0.36	3.62	0.37	0.11
GB2			9.41	0.08	−0.41	−4.19	9.40	0.26	−0.42	0.50	5.06	0.63	0.13

OCAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

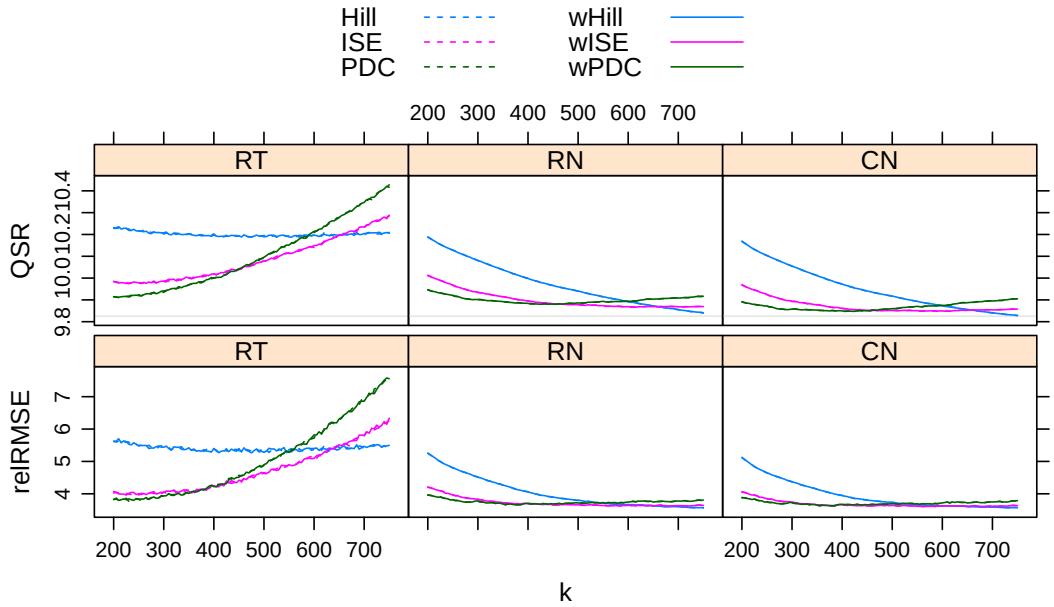

Figure F.328.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

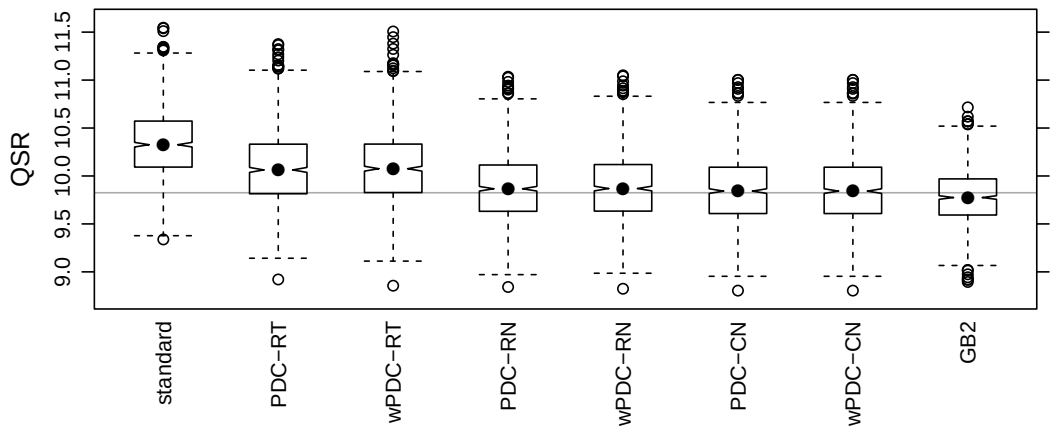

Figure F.329.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.164.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			10.34	0.13	0.51	5.23	10.33	0.35	0.50	0.63	6.42	0.74	0.18
wHill	RT	300	10.21	0.14	0.38	3.89	10.19	0.37	0.37	0.53	5.44	0.56	0.17
wHill	RT	500	10.19	0.14	0.36	3.71	10.18	0.37	0.36	0.52	5.28	0.56	0.15
wHill	RT	700	10.20	0.14	0.38	3.86	10.19	0.38	0.36	0.54	5.47	0.57	0.17
wHill	RN	300	10.08	0.13	0.26	2.60	10.07	0.36	0.25	0.44	4.52	0.43	0.15
wHill	RN	500	9.94	0.13	0.11	1.17	9.93	0.35	0.10	0.37	3.80	0.36	0.13
wHill	RN	700	9.86	0.12	0.03	0.31	9.84	0.34	0.01	0.35	3.61	0.34	0.13
wHill	CN	300	10.05	0.13	0.23	2.34	10.04	0.36	0.22	0.43	4.37	0.42	0.15
wHill	CN	500	9.92	0.13	0.09	0.94	9.91	0.35	0.08	0.37	3.73	0.35	0.13
wHill	CN	700	9.84	0.12	0.02	0.16	9.82	0.34	−0.00	0.35	3.59	0.34	0.12
wISE	RT	300	9.99	0.13	0.16	1.64	9.97	0.35	0.15	0.40	4.04	0.37	0.14
wISE	RT	500	10.08	0.14	0.25	2.58	10.05	0.36	0.22	0.45	4.63	0.44	0.16
wISE	RT	700	10.23	0.16	0.41	4.16	10.20	0.39	0.38	0.57	5.81	0.58	0.19
wISE	RN	300	9.93	0.13	0.11	1.12	9.92	0.35	0.10	0.38	3.83	0.36	0.13
wISE	RN	500	9.88	0.13	0.05	0.54	9.87	0.35	0.04	0.36	3.66	0.34	0.12
wISE	RN	700	9.87	0.13	0.04	0.44	9.84	0.35	0.02	0.36	3.63	0.35	0.12
wISE	CN	300	9.89	0.13	0.07	0.69	9.88	0.35	0.05	0.37	3.74	0.35	0.12
wISE	CN	500	9.85	0.13	0.03	0.27	9.84	0.35	0.01	0.36	3.64	0.34	0.12
wISE	CN	700	9.85	0.13	0.03	0.29	9.83	0.35	0.01	0.36	3.61	0.35	0.12
wPDC	RT	300	9.94	0.14	0.12	1.18	9.93	0.36	0.11	0.39	3.93	0.36	0.14
wPDC	RT	500	10.10	0.16	0.27	2.75	10.08	0.38	0.25	0.48	4.90	0.47	0.17
wPDC	RT	700	10.35	0.18	0.52	5.31	10.31	0.41	0.48	0.67	6.86	0.72	0.19
wPDC	RN	300	9.90	0.13	0.08	0.77	9.88	0.34	0.05	0.37	3.78	0.36	0.13
wPDC	RN	500	9.89	0.13	0.06	0.62	9.87	0.36	0.04	0.37	3.72	0.34	0.12
wPDC	RN	700	9.91	0.13	0.08	0.85	9.88	0.36	0.05	0.37	3.78	0.37	0.13
wPDC	CN	300	9.86	0.13	0.03	0.33	9.84	0.35	0.02	0.37	3.73	0.35	0.13
wPDC	CN	500	9.86	0.13	0.03	0.35	9.84	0.36	0.02	0.36	3.69	0.35	0.12
wPDC	CN	700	9.90	0.13	0.07	0.71	9.87	0.36	0.04	0.37	3.75	0.37	0.13
GB2			9.79	0.08	−0.04	−0.38	9.78	0.28	−0.05	0.29	2.97	0.28	0.09

OCAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

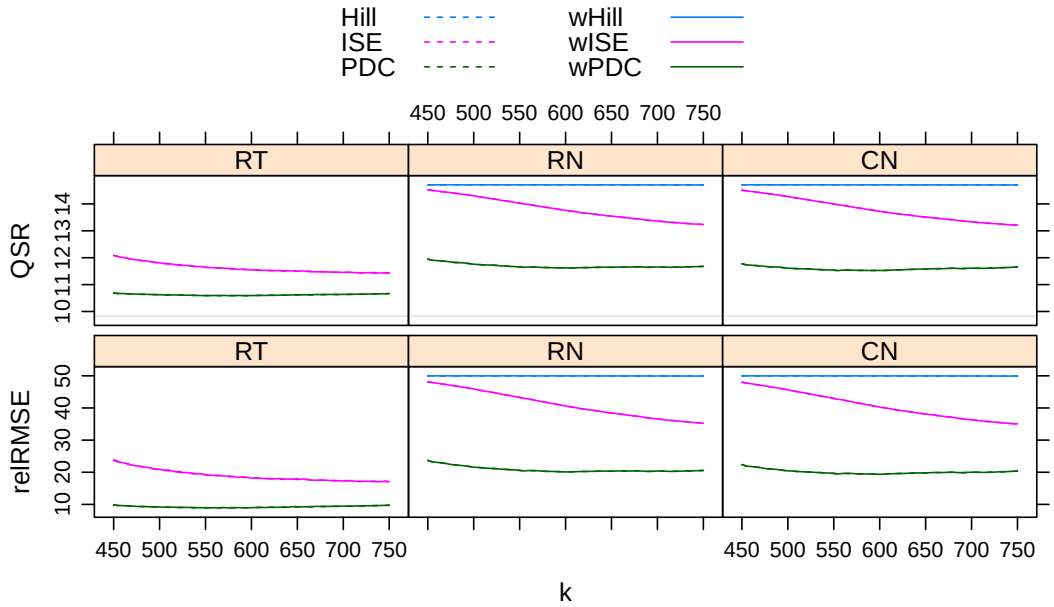

Figure F.330.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

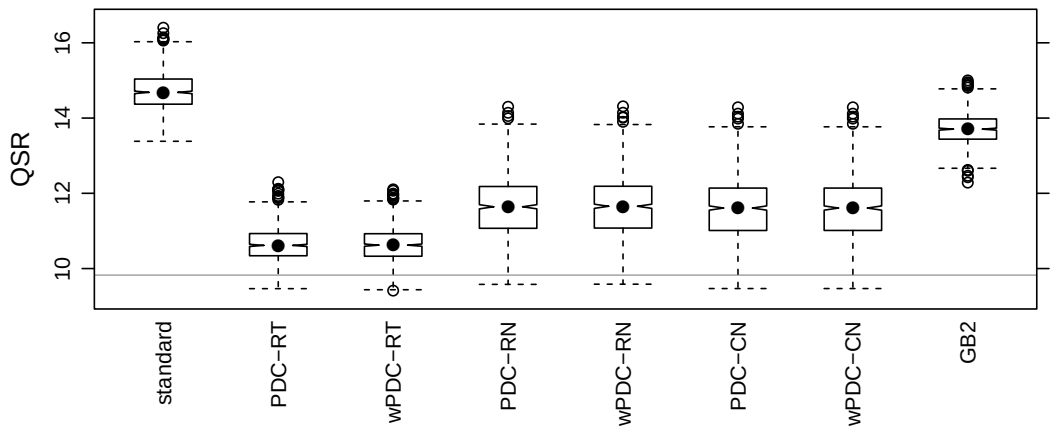

Figure F.331.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.165.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			14.71	0.25	4.89	49.73	14.68	0.49	4.86	4.91	49.99	7.20	0.67
wHill	RT	500	14.62	1.43	4.79	48.77	14.47	0.77	4.65	4.94	50.27	6.89	2.53
wHill	RT	700	14.01	0.57	4.18	42.59	13.93	0.66	4.10	4.25	43.27	6.08	1.32
wHill	RN	300	14.71	0.25	4.89	49.73	14.68	0.49	4.86	4.91	49.99	7.20	0.67
wHill	RN	500	14.71	0.25	4.89	49.72	14.68	0.49	4.86	4.91	49.98	7.20	0.67
wHill	RN	700	14.71	0.25	4.88	49.69	14.68	0.50	4.85	4.91	49.95	7.20	0.67
wHill	CN	300	14.71	0.25	4.89	49.73	14.68	0.49	4.86	4.91	49.99	7.20	0.67
wHill	CN	500	14.71	0.25	4.89	49.72	14.68	0.50	4.86	4.91	49.98	7.20	0.67
wHill	CN	700	14.71	0.25	4.88	49.69	14.68	0.49	4.85	4.91	49.95	7.20	0.67
wISE	RT	500	11.81	0.29	1.99	20.20	11.77	0.53	1.94	2.06	20.95	2.88	0.63
wISE	RT	700	11.45	0.24	1.63	16.54	11.42	0.49	1.59	1.70	17.29	2.36	0.37
wISE	RN	300	14.71	0.25	4.89	49.73	14.68	0.49	4.86	4.91	49.99	7.20	0.67
wISE	RN	500	14.30	0.32	4.47	45.55	14.28	0.55	4.45	4.51	45.90	6.60	0.62
wISE	RN	700	13.36	0.41	3.54	36.02	13.31	0.63	3.48	3.60	36.61	5.16	0.58
wISE	CN	300	14.71	0.25	4.89	49.73	14.68	0.49	4.86	4.91	49.99	7.20	0.67
wISE	CN	500	14.27	0.32	4.45	45.27	14.25	0.55	4.43	4.48	45.63	6.57	0.62
wISE	CN	700	13.33	0.42	3.51	35.71	13.28	0.62	3.45	3.57	36.32	5.12	0.58
wPDC	RT	500	10.62	0.18	0.80	8.13	10.59	0.44	0.77	0.90	9.19	1.14	0.22
wPDC	RT	700	10.64	0.20	0.81	8.29	10.62	0.44	0.80	0.93	9.45	1.18	0.23
wPDC	RN	300	13.91	1.08	4.08	41.57	14.16	1.04	4.34	4.21	42.89	6.43	0.67
wPDC	RN	500	11.76	0.76	1.93	19.67	11.72	0.98	1.89	2.12	21.58	2.81	0.45
wPDC	RN	700	11.66	0.66	1.83	18.63	11.66	0.84	1.83	2.00	20.38	2.71	0.46
wPDC	CN	300	13.82	1.27	4.00	40.66	14.13	1.12	4.30	4.15	42.25	6.38	0.67
wPDC	CN	500	11.61	0.85	1.79	18.17	11.58	1.01	1.76	2.01	20.44	2.61	0.45
wPDC	CN	700	11.61	0.68	1.79	18.18	11.61	0.85	1.78	1.97	20.03	2.64	0.45
GB2			13.71	0.18	3.89	39.58	13.71	0.40	3.88	3.91	39.81	5.75	0.53

OCAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

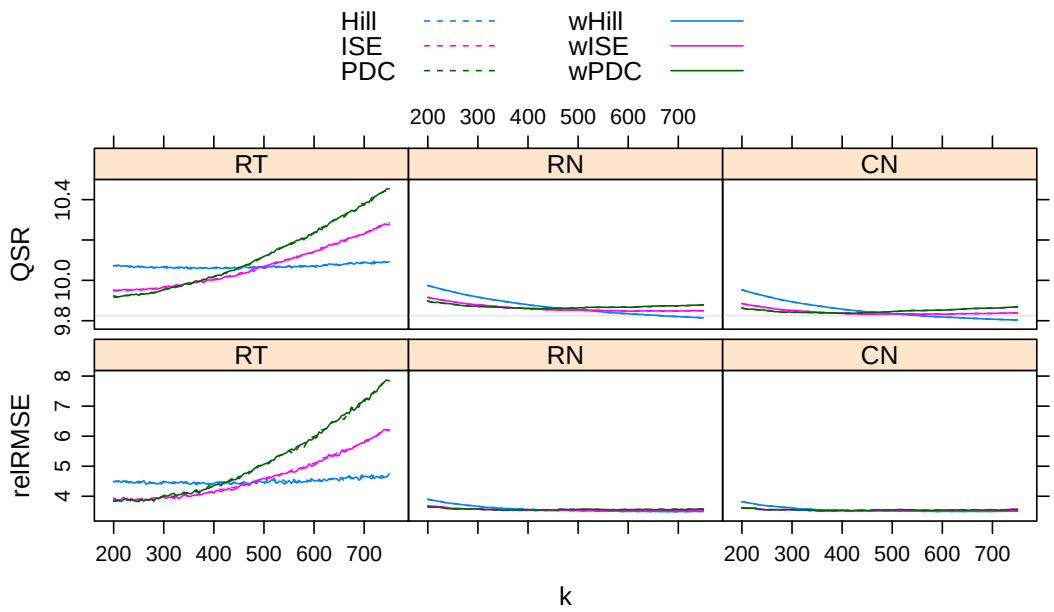

Figure F.332.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

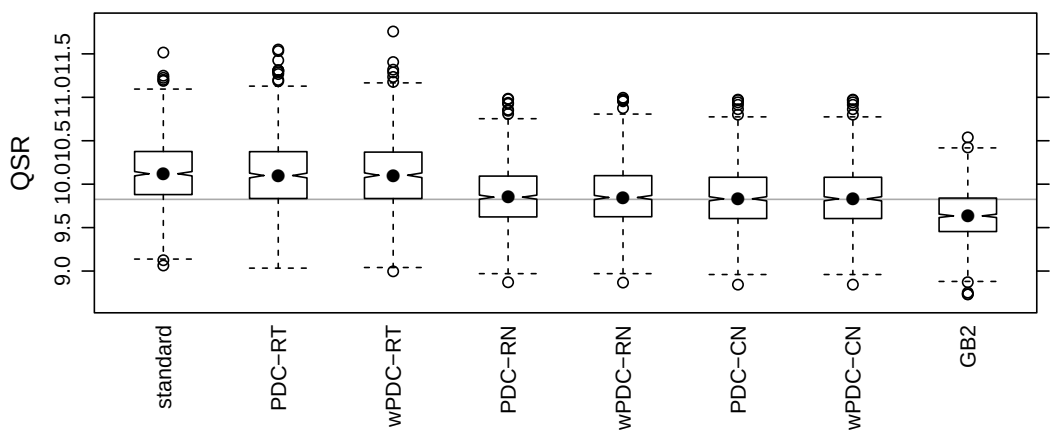

Figure F.333.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.166.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			10.14	0.13	0.31	3.18	10.12	0.37	0.30	0.48	4.90	0.49	0.17
wHill	RT	300	10.06	0.14	0.24	2.43	10.04	0.35	0.22	0.44	4.48	0.42	0.14
wHill	RT	500	10.06	0.14	0.24	2.40	10.04	0.35	0.22	0.44	4.46	0.42	0.15
wHill	RT	700	10.09	0.14	0.27	2.70	10.08	0.36	0.25	0.46	4.67	0.45	0.15
wHill	RN	300	9.92	0.12	0.09	0.93	9.91	0.34	0.09	0.36	3.67	0.35	0.12
wHill	RN	500	9.85	0.12	0.03	0.29	9.85	0.34	0.02	0.35	3.53	0.34	0.12
wHill	RN	700	9.82	0.12	−0.00	−0.05	9.81	0.34	−0.01	0.34	3.49	0.35	0.11
wHill	CN	300	9.89	0.12	0.07	0.70	9.89	0.35	0.07	0.35	3.61	0.34	0.12
wHill	CN	500	9.83	0.12	0.01	0.10	9.83	0.34	0.00	0.35	3.51	0.34	0.12
wHill	CN	700	9.81	0.12	−0.02	−0.18	9.80	0.34	−0.03	0.34	3.50	0.35	0.11
wISE	RT	300	9.97	0.13	0.14	1.46	9.95	0.36	0.13	0.39	3.96	0.37	0.14
wISE	RT	500	10.07	0.15	0.24	2.46	10.04	0.37	0.22	0.45	4.60	0.45	0.16
wISE	RT	700	10.23	0.16	0.40	4.11	10.21	0.37	0.38	0.57	5.78	0.58	0.18
wISE	RN	300	9.88	0.12	0.05	0.54	9.87	0.35	0.05	0.35	3.57	0.35	0.12
wISE	RN	500	9.85	0.12	0.03	0.28	9.84	0.34	0.02	0.35	3.54	0.34	0.12
wISE	RN	700	9.85	0.12	0.02	0.22	9.83	0.34	0.01	0.35	3.52	0.34	0.12
wISE	CN	300	9.85	0.12	0.03	0.26	9.85	0.35	0.02	0.35	3.54	0.35	0.11
wISE	CN	500	9.83	0.12	0.01	0.09	9.82	0.34	−0.00	0.35	3.52	0.34	0.11
wISE	CN	700	9.84	0.12	0.01	0.11	9.82	0.35	−0.00	0.35	3.51	0.35	0.12
wPDC	RT	300	9.95	0.14	0.13	1.30	9.94	0.37	0.12	0.40	4.03	0.38	0.15
wPDC	RT	500	10.12	0.16	0.29	2.99	10.10	0.40	0.28	0.50	5.07	0.48	0.20
wPDC	RT	700	10.38	0.20	0.55	5.64	10.37	0.44	0.54	0.71	7.21	0.80	0.24
wPDC	RN	300	9.87	0.12	0.05	0.46	9.86	0.35	0.04	0.35	3.57	0.34	0.12
wPDC	RN	500	9.86	0.12	0.04	0.39	9.85	0.35	0.02	0.35	3.57	0.34	0.12
wPDC	RN	700	9.87	0.12	0.05	0.49	9.86	0.35	0.04	0.35	3.56	0.34	0.12
wPDC	CN	300	9.84	0.12	0.02	0.17	9.83	0.35	0.00	0.35	3.56	0.35	0.12
wPDC	CN	500	9.85	0.12	0.02	0.21	9.83	0.35	0.01	0.35	3.55	0.35	0.12
wPDC	CN	700	9.86	0.12	0.04	0.38	9.85	0.35	0.03	0.35	3.55	0.35	0.12
GB2			9.65	0.08	−0.18	−1.83	9.64	0.28	−0.19	0.34	3.45	0.36	0.11

OCAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

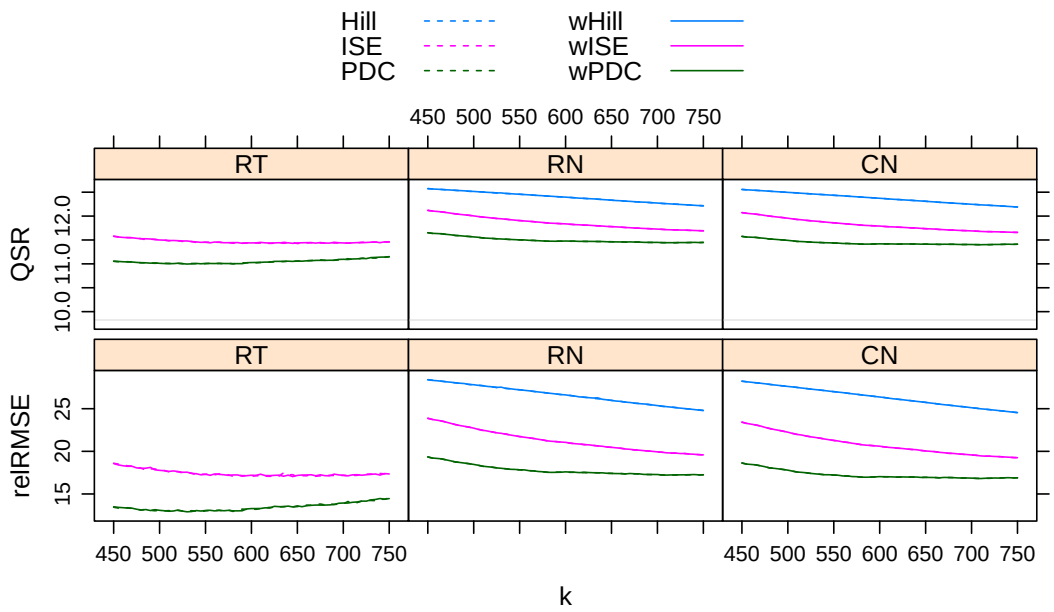

Figure F.334.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

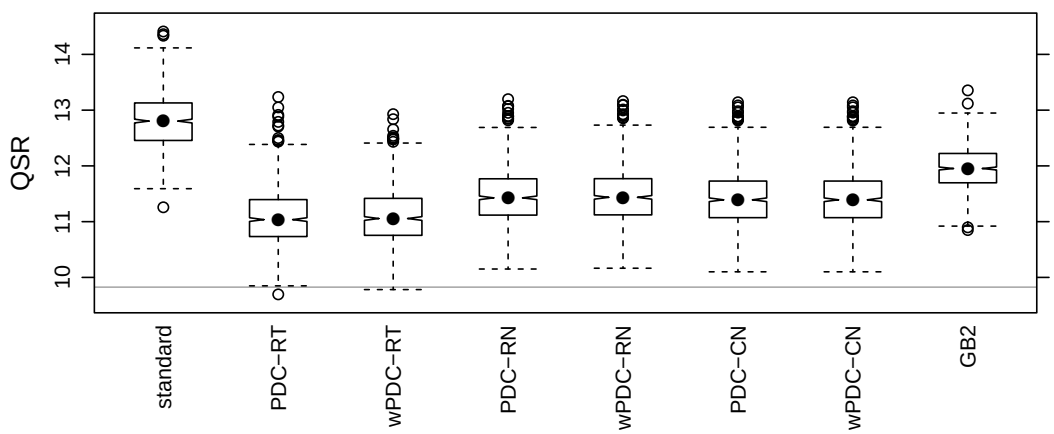

Figure F.335.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.167.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			12.80	0.23	2.98	30.32	12.80	0.50	2.98	3.02	30.71	4.42	0.47
wHill	RT	500	12.63	0.49	2.80	28.53	12.60	0.58	2.78	2.89	29.40	4.12	1.36
wHill	RT	700	12.43	0.29	2.61	26.52	12.40	0.56	2.58	2.66	27.08	3.82	0.50
wHill	RN	300	12.72	0.23	2.90	29.48	12.71	0.49	2.89	2.94	29.88	4.28	0.46
wHill	RN	500	12.52	0.23	2.69	27.39	12.51	0.48	2.69	2.73	27.81	3.99	0.45
wHill	RN	700	12.27	0.22	2.45	24.91	12.27	0.47	2.44	2.49	25.36	3.62	0.41
wHill	CN	300	12.71	0.23	2.89	29.41	12.71	0.49	2.88	2.93	29.82	4.27	0.46
wHill	CN	500	12.50	0.23	2.67	27.18	12.49	0.48	2.67	2.71	27.61	3.95	0.45
wHill	CN	700	12.25	0.22	2.42	24.65	12.23	0.47	2.41	2.47	25.11	3.57	0.41
wISE	RT	500	11.50	0.24	1.67	17.04	11.45	0.48	1.63	1.75	17.77	2.41	0.35
wISE	RT	700	11.44	0.25	1.61	16.41	11.40	0.47	1.58	1.69	17.18	2.34	0.35
wISE	RN	300	12.56	0.24	2.74	27.85	12.55	0.51	2.73	2.78	28.29	4.04	0.45
wISE	RN	500	12.00	0.24	2.18	22.17	11.99	0.48	2.16	2.23	22.72	3.20	0.41
wISE	RN	700	11.73	0.22	1.90	19.36	11.71	0.47	1.88	1.96	19.94	2.79	0.37
wISE	CN	300	12.54	0.25	2.71	27.61	12.54	0.51	2.71	2.76	28.06	4.02	0.45
wISE	CN	500	11.96	0.24	2.13	21.68	11.94	0.48	2.12	2.19	22.25	3.14	0.41
wISE	CN	700	11.69	0.22	1.86	18.98	11.67	0.47	1.85	1.92	19.58	2.74	0.37
wPDC	RT	500	11.01	0.24	1.19	12.08	11.00	0.47	1.17	1.29	13.08	1.74	0.28
wPDC	RT	700	11.10	0.26	1.27	12.93	11.06	0.49	1.23	1.37	13.94	1.82	0.32
wPDC	RN	300	12.16	0.33	2.34	23.79	12.17	0.58	2.34	2.41	24.50	3.48	0.42
wPDC	RN	500	11.56	0.27	1.74	17.70	11.53	0.50	1.71	1.81	18.46	2.53	0.37
wPDC	RN	700	11.45	0.24	1.62	16.53	11.44	0.48	1.61	1.70	17.28	2.39	0.34
wPDC	CN	300	12.10	0.36	2.27	23.14	12.12	0.62	2.30	2.35	23.94	3.41	0.41
wPDC	CN	500	11.49	0.28	1.67	16.96	11.47	0.51	1.64	1.75	17.79	2.43	0.36
wPDC	CN	700	11.41	0.25	1.58	16.08	11.39	0.49	1.57	1.66	16.86	2.32	0.34
GB2			11.97	0.15	2.14	21.79	11.95	0.39	2.13	2.17	22.13	3.15	0.36

OAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

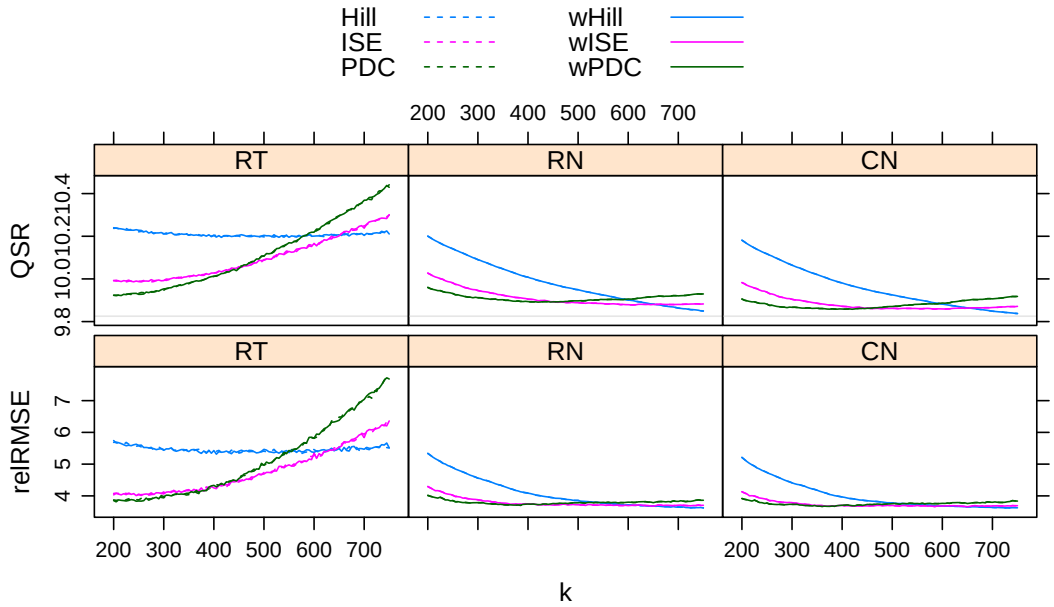

Figure F.336.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

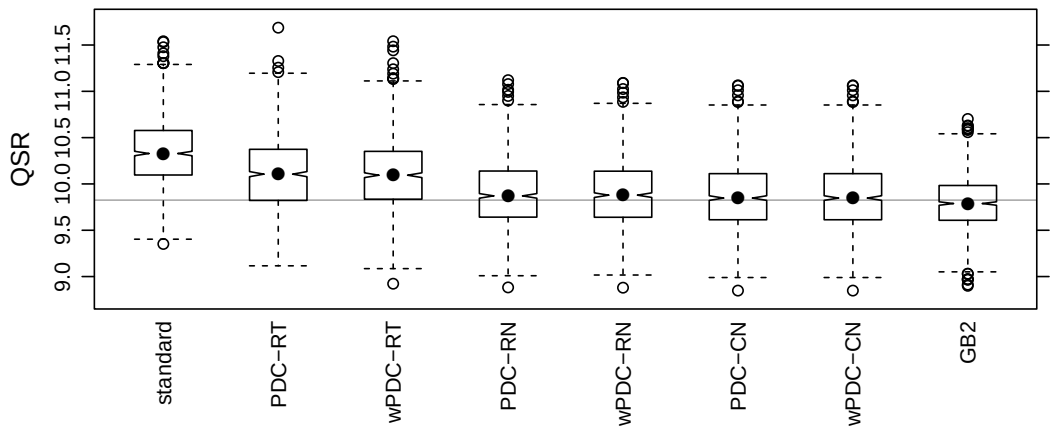

Figure F.337.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.168.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			10.34	0.13	0.52	5.28	10.33	0.35	0.50	0.63	6.46	0.75	0.17
wHill	RT	300	10.21	0.14	0.39	3.94	10.19	0.38	0.36	0.53	5.43	0.55	0.17
wHill	RT	500	10.20	0.14	0.38	3.86	10.19	0.37	0.36	0.54	5.47	0.56	0.18
wHill	RT	700	10.20	0.15	0.38	3.85	10.18	0.37	0.36	0.54	5.47	0.56	0.16
wHill	RN	300	10.09	0.13	0.27	2.70	10.07	0.35	0.24	0.45	4.56	0.45	0.14
wHill	RN	500	9.95	0.13	0.12	1.27	9.93	0.35	0.11	0.38	3.86	0.37	0.13
wHill	RN	700	9.86	0.13	0.04	0.38	9.84	0.36	0.01	0.36	3.65	0.35	0.13
wHill	CN	300	10.06	0.13	0.24	2.44	10.04	0.35	0.22	0.43	4.41	0.44	0.14
wHill	CN	500	9.93	0.13	0.10	1.02	9.91	0.35	0.09	0.37	3.78	0.37	0.13
wHill	CN	700	9.85	0.13	0.02	0.24	9.82	0.36	−0.00	0.36	3.64	0.36	0.13
wISE	RT	300	9.99	0.13	0.17	1.70	9.98	0.37	0.15	0.40	4.06	0.39	0.15
wISE	RT	500	10.09	0.14	0.26	2.67	10.07	0.37	0.24	0.46	4.69	0.44	0.19
wISE	RT	700	10.24	0.16	0.41	4.20	10.22	0.40	0.40	0.57	5.84	0.61	0.19
wISE	RN	300	9.95	0.13	0.12	1.23	9.93	0.36	0.10	0.38	3.88	0.37	0.13
wISE	RN	500	9.89	0.13	0.06	0.64	9.87	0.36	0.04	0.37	3.72	0.35	0.13
wISE	RN	700	9.88	0.13	0.06	0.56	9.84	0.36	0.02	0.36	3.71	0.36	0.13
wISE	CN	300	9.90	0.13	0.08	0.81	9.89	0.36	0.07	0.37	3.78	0.36	0.12
wISE	CN	500	9.86	0.13	0.04	0.37	9.84	0.36	0.02	0.36	3.70	0.36	0.13
wISE	CN	700	9.87	0.13	0.04	0.42	9.83	0.36	0.01	0.36	3.69	0.36	0.13
wPDC	RT	300	9.95	0.14	0.13	1.30	9.93	0.37	0.11	0.39	3.98	0.37	0.14
wPDC	RT	500	10.11	0.16	0.28	2.86	10.09	0.38	0.27	0.49	4.96	0.48	0.17
wPDC	RT	700	10.37	0.18	0.54	5.53	10.34	0.42	0.51	0.69	7.04	0.76	0.20
wPDC	RN	300	9.91	0.13	0.09	0.88	9.89	0.36	0.06	0.37	3.79	0.36	0.13
wPDC	RN	500	9.90	0.13	0.07	0.73	9.88	0.37	0.05	0.37	3.78	0.37	0.13
wPDC	RN	700	9.92	0.13	0.10	0.97	9.89	0.37	0.07	0.38	3.83	0.38	0.13
wPDC	CN	300	9.87	0.13	0.04	0.42	9.84	0.35	0.02	0.37	3.73	0.36	0.12
wPDC	CN	500	9.87	0.13	0.05	0.46	9.85	0.37	0.02	0.37	3.75	0.37	0.13
wPDC	CN	700	9.91	0.13	0.08	0.83	9.88	0.36	0.05	0.37	3.80	0.38	0.13
GB2			9.80	0.08	−0.03	−0.30	9.79	0.28	−0.04	0.29	2.97	0.28	0.09

OAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

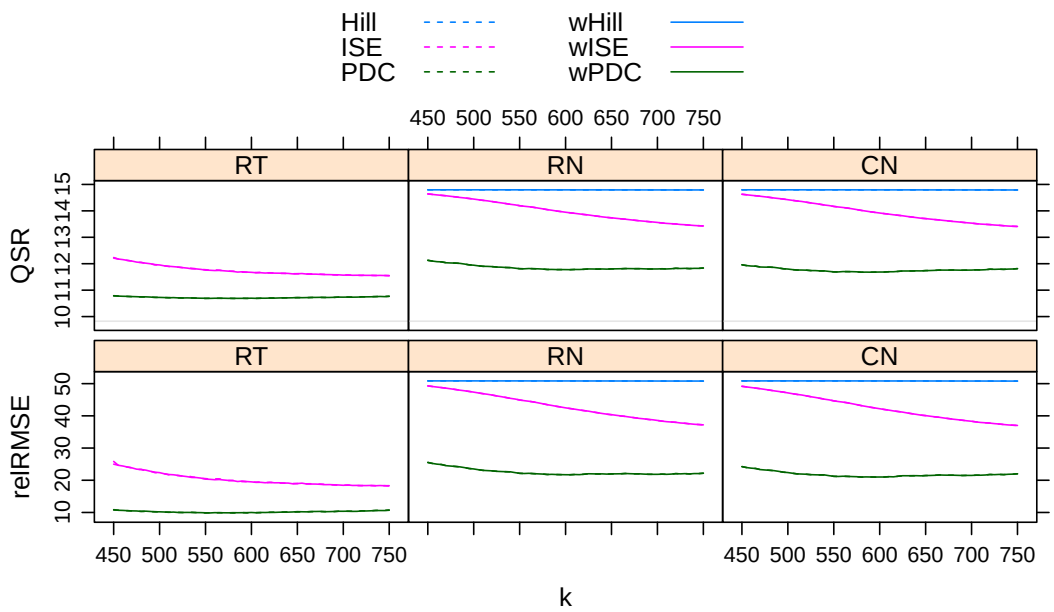

Figure F.338.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

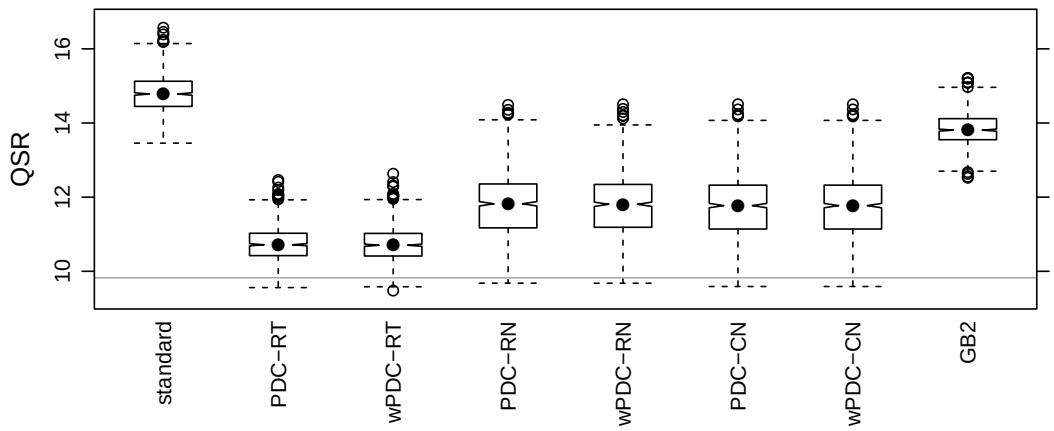

Figure F.339.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.169.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			14.80	0.26	4.97	50.60	14.78	0.50	4.96	5.00	50.86	7.35	0.69
wHill	RT	500	14.84	13.61	5.02	51.04	14.58	0.78	4.76	6.23	63.36	7.05	11.67
wHill	RT	700	14.15	0.64	4.32	43.99	14.06	0.66	4.23	4.40	44.74	6.28	1.42
wHill	RN	300	14.80	0.26	4.97	50.60	14.78	0.50	4.96	5.00	50.86	7.35	0.69
wHill	RN	500	14.80	0.26	4.97	50.59	14.78	0.50	4.96	5.00	50.85	7.35	0.69
wHill	RN	700	14.79	0.26	4.97	50.55	14.78	0.50	4.95	4.99	50.81	7.34	0.69
wHill	CN	300	14.80	0.26	4.97	50.60	14.78	0.50	4.96	5.00	50.86	7.35	0.69
wHill	CN	500	14.80	0.26	4.97	50.59	14.78	0.50	4.96	5.00	50.85	7.35	0.69
wHill	CN	700	14.79	0.26	4.97	50.55	14.78	0.50	4.95	4.99	50.81	7.34	0.69
wISE	RT	500	11.95	0.30	2.13	21.65	11.91	0.57	2.09	2.20	22.36	3.09	0.44
wISE	RT	700	11.57	0.25	1.74	17.73	11.54	0.48	1.72	1.81	18.43	2.54	0.38
wISE	RN	300	14.80	0.26	4.97	50.60	14.78	0.50	4.96	5.00	50.86	7.35	0.69
wISE	RN	500	14.45	0.31	4.62	47.02	14.43	0.54	4.60	4.65	47.36	6.83	0.66
wISE	RN	700	13.56	0.40	3.74	38.03	13.53	0.64	3.71	3.79	38.57	5.49	0.61
wISE	CN	300	14.80	0.26	4.97	50.60	14.78	0.50	4.96	5.00	50.86	7.35	0.69
wISE	CN	500	14.42	0.31	4.60	46.78	14.41	0.54	4.59	4.63	47.13	6.80	0.66
wISE	CN	700	13.54	0.41	3.71	37.77	13.50	0.64	3.68	3.76	38.32	5.46	0.60
wPDC	RT	500	10.73	0.20	0.90	9.16	10.71	0.44	0.88	1.00	10.20	1.30	0.26
wPDC	RT	700	10.73	0.21	0.91	9.26	10.70	0.44	0.88	1.02	10.37	1.30	0.29
wPDC	RN	300	14.15	1.01	4.32	44.01	14.40	0.85	4.57	4.44	45.18	6.78	0.68
wPDC	RN	500	11.94	0.85	2.12	21.57	11.92	0.97	2.10	2.31	23.51	3.11	0.50
wPDC	RN	700	11.80	0.70	1.98	20.12	11.81	0.87	1.98	2.15	21.84	2.94	0.48
wPDC	CN	300	14.08	1.18	4.25	43.26	14.38	0.87	4.56	4.39	44.66	6.76	0.68
wPDC	CN	500	11.80	0.95	1.97	20.08	11.77	1.03	1.94	2.20	22.39	2.88	0.49
wPDC	CN	700	11.76	0.72	1.93	19.68	11.77	0.88	1.95	2.11	21.50	2.89	0.48
GB2			13.84	0.19	4.02	40.88	13.81	0.41	3.98	4.04	41.12	5.90	0.55

OAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

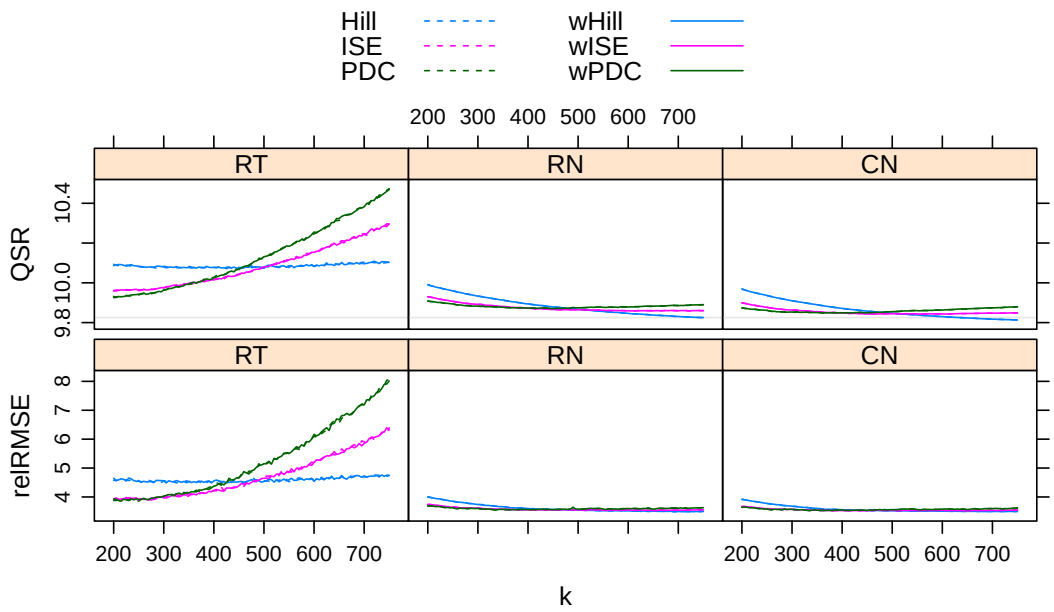

Figure F.340.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

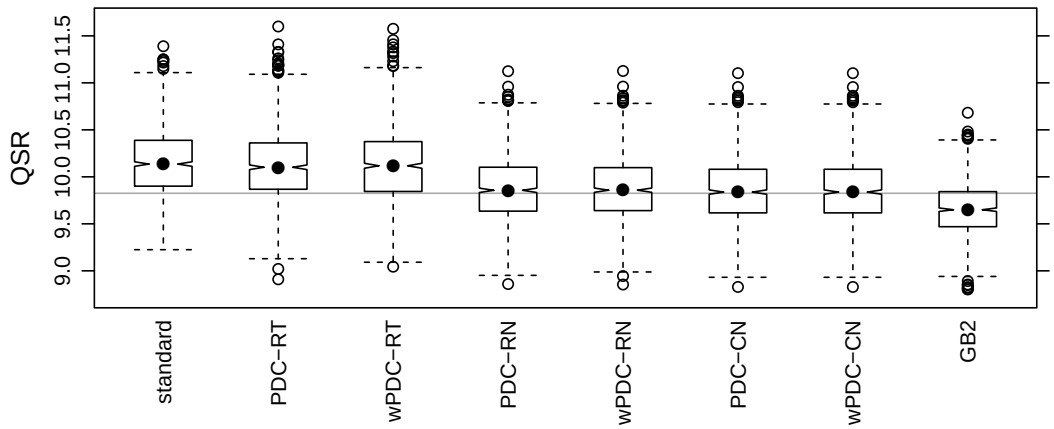

Figure F.341.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.170.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			10.16	0.13	0.33	3.37	10.14	0.36	0.31	0.49	5.02	0.50	0.16
wHill	RT	300	10.08	0.14	0.25	2.59	10.07	0.36	0.24	0.45	4.56	0.43	0.15
wHill	RT	500	10.07	0.14	0.25	2.52	10.05	0.36	0.23	0.45	4.54	0.42	0.15
wHill	RT	700	10.10	0.14	0.27	2.75	10.08	0.38	0.25	0.46	4.73	0.46	0.16
wHill	RN	300	9.93	0.12	0.11	1.09	9.92	0.35	0.10	0.37	3.74	0.35	0.14
wHill	RN	500	9.87	0.12	0.04	0.42	9.85	0.33	0.02	0.35	3.54	0.34	0.13
wHill	RN	700	9.83	0.12	0.01	0.06	9.81	0.34	−0.02	0.34	3.50	0.34	0.13
wHill	CN	300	9.91	0.12	0.08	0.86	9.90	0.35	0.07	0.36	3.68	0.35	0.13
wHill	CN	500	9.85	0.12	0.02	0.22	9.83	0.34	0.01	0.35	3.52	0.34	0.13
wHill	CN	700	9.82	0.12	−0.01	−0.08	9.80	0.34	−0.03	0.34	3.50	0.34	0.13
wISE	RT	300	9.98	0.13	0.15	1.53	9.96	0.36	0.13	0.39	3.99	0.36	0.15
wISE	RT	500	10.08	0.14	0.25	2.59	10.05	0.36	0.22	0.46	4.65	0.43	0.16
wISE	RT	700	10.25	0.15	0.42	4.29	10.23	0.38	0.40	0.58	5.86	0.60	0.17
wISE	RN	300	9.89	0.12	0.07	0.68	9.88	0.35	0.05	0.36	3.62	0.34	0.13
wISE	RN	500	9.86	0.12	0.04	0.40	9.85	0.34	0.02	0.35	3.56	0.33	0.13
wISE	RN	700	9.86	0.12	0.03	0.35	9.84	0.34	0.01	0.35	3.54	0.34	0.13
wISE	CN	300	9.86	0.12	0.04	0.39	9.85	0.35	0.02	0.35	3.57	0.34	0.13
wISE	CN	500	9.84	0.12	0.02	0.20	9.83	0.34	0.01	0.35	3.54	0.34	0.13
wISE	CN	700	9.85	0.12	0.02	0.22	9.83	0.34	0.00	0.35	3.53	0.34	0.13
wPDC	RT	300	9.96	0.14	0.14	1.41	9.95	0.36	0.13	0.39	4.02	0.37	0.15
wPDC	RT	500	10.13	0.16	0.31	3.11	10.12	0.39	0.29	0.51	5.15	0.50	0.18
wPDC	RT	700	10.38	0.19	0.56	5.67	10.35	0.42	0.53	0.71	7.18	0.79	0.21
wPDC	RN	300	9.88	0.12	0.06	0.58	9.87	0.35	0.05	0.35	3.61	0.34	0.13
wPDC	RN	500	9.87	0.12	0.05	0.50	9.86	0.34	0.03	0.35	3.58	0.34	0.13
wPDC	RN	700	9.89	0.12	0.06	0.61	9.87	0.34	0.04	0.35	3.61	0.34	0.13
wPDC	CN	300	9.85	0.12	0.03	0.28	9.84	0.35	0.01	0.35	3.58	0.35	0.12
wPDC	CN	500	9.85	0.12	0.03	0.30	9.84	0.35	0.01	0.35	3.56	0.34	0.13
wPDC	CN	700	9.87	0.12	0.05	0.50	9.85	0.34	0.03	0.35	3.60	0.34	0.13
GB2			9.66	0.08	−0.16	−1.67	9.65	0.27	−0.18	0.33	3.39	0.34	0.10

OAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

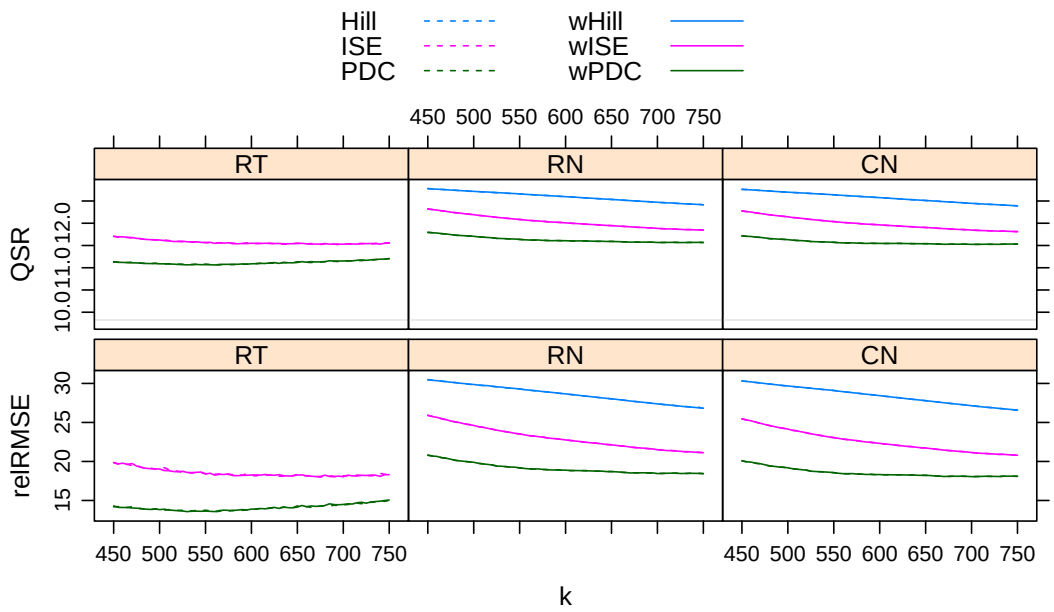

Figure F.342.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

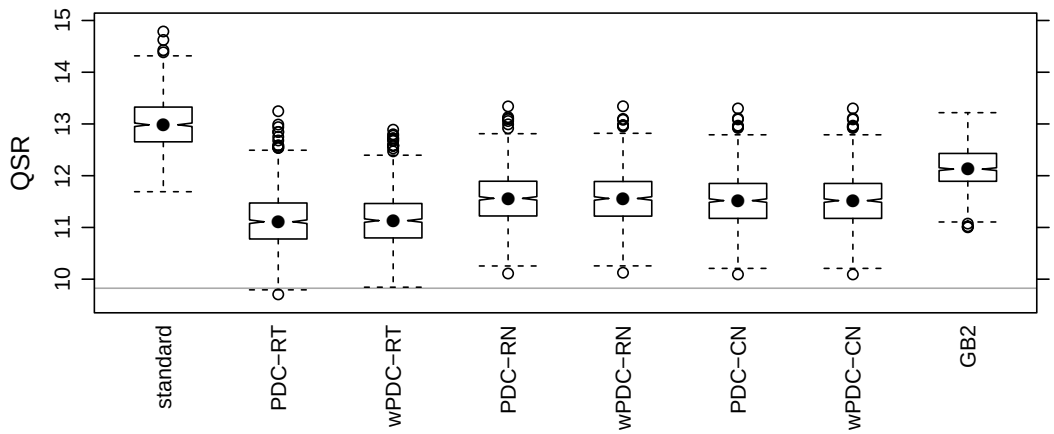

Figure F.343.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.171.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			12.99	0.25	3.17	32.23	12.98	0.50	3.16	3.21	32.63	4.68	0.51
wHill	RT	500	12.79	0.39	2.97	30.21	12.78	0.57	2.95	3.03	30.87	4.37	0.68
wHill	RT	700	12.62	0.32	2.79	28.44	12.59	0.55	2.76	2.85	29.02	4.10	0.46
wHill	RN	300	12.91	0.25	3.09	31.43	12.90	0.50	3.08	3.13	31.84	4.57	0.49
wHill	RN	500	12.72	0.25	2.89	29.43	12.70	0.48	2.88	2.93	29.87	4.26	0.46
wHill	RN	700	12.47	0.23	2.65	26.93	12.47	0.48	2.64	2.69	27.38	3.92	0.43
wHill	CN	300	12.91	0.25	3.08	31.36	12.90	0.50	3.07	3.12	31.78	4.55	0.49
wHill	CN	500	12.70	0.25	2.87	29.24	12.68	0.48	2.86	2.92	29.68	4.24	0.46
wHill	CN	700	12.45	0.24	2.62	26.69	12.45	0.47	2.62	2.67	27.14	3.89	0.44
wISE	RT	500	11.62	0.26	1.80	18.31	11.61	0.54	1.79	1.87	19.03	2.65	0.36
wISE	RT	700	11.53	0.24	1.70	17.33	11.50	0.49	1.67	1.77	18.04	2.48	0.34
wISE	RN	300	12.78	0.26	2.96	30.09	12.77	0.50	2.95	3.00	30.53	4.37	0.45
wISE	RN	500	12.19	0.24	2.37	24.09	12.19	0.49	2.37	2.42	24.61	3.51	0.41
wISE	RN	700	11.88	0.23	2.06	20.95	11.88	0.48	2.06	2.11	21.50	3.05	0.39
wISE	CN	300	12.76	0.26	2.94	29.88	12.75	0.49	2.93	2.98	30.33	4.34	0.45
wISE	CN	500	12.14	0.25	2.32	23.61	12.14	0.50	2.32	2.37	24.15	3.43	0.40
wISE	CN	700	11.85	0.23	2.02	20.57	11.84	0.48	2.02	2.08	21.14	2.99	0.39
wPDC	RT	500	11.09	0.25	1.26	12.85	11.05	0.51	1.23	1.36	13.83	1.82	0.36
wPDC	RT	700	11.15	0.27	1.33	13.50	11.13	0.49	1.31	1.42	14.49	1.94	0.31
wPDC	RN	300	12.38	0.35	2.56	26.02	12.40	0.58	2.57	2.62	26.71	3.81	0.43
wPDC	RN	500	11.71	0.28	1.88	19.15	11.69	0.54	1.87	1.95	19.90	2.77	0.39
wPDC	RN	700	11.57	0.25	1.74	17.73	11.56	0.50	1.73	1.81	18.45	2.57	0.36
wPDC	CN	300	12.32	0.38	2.50	25.41	12.35	0.61	2.53	2.57	26.18	3.75	0.43
wPDC	CN	500	11.63	0.29	1.81	18.38	11.62	0.55	1.80	1.89	19.19	2.66	0.39
wPDC	CN	700	11.53	0.26	1.70	17.31	11.52	0.50	1.69	1.77	18.06	2.51	0.35
GB2			12.15	0.16	2.32	23.63	12.13	0.39	2.30	2.36	23.98	3.41	0.35

Stratified Midzuno sampling

No contamination

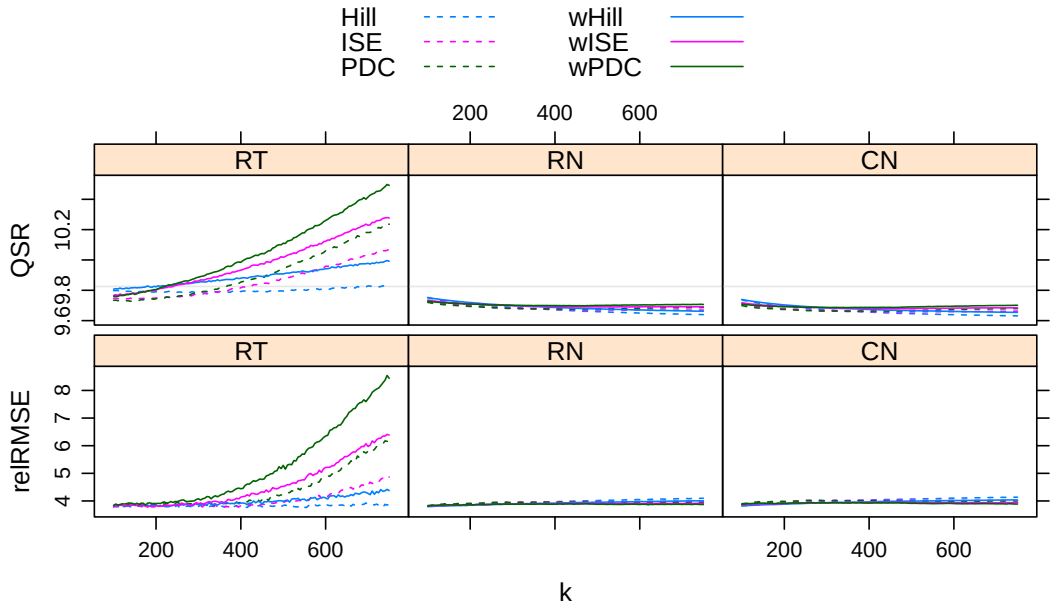

Figure F.344.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 100 and 750.

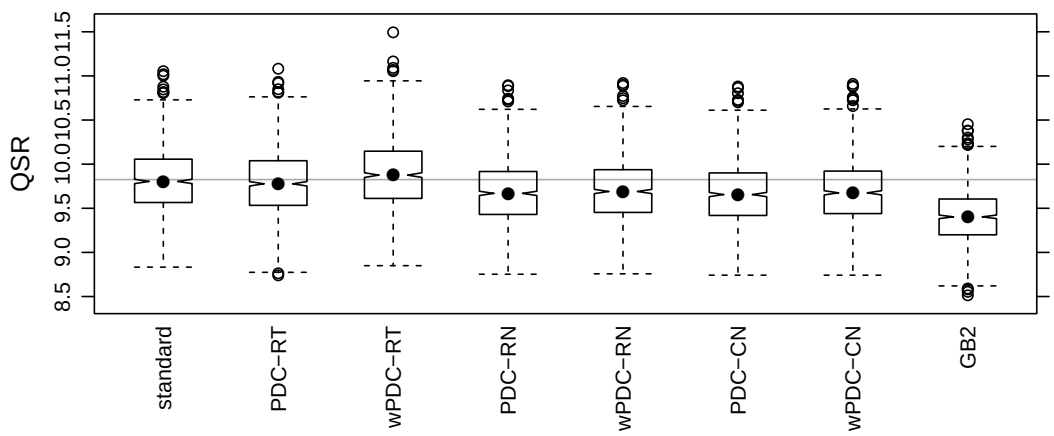

Figure F.345.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 300$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.172.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			9.82	0.14	−0.01	−0.07	9.80	0.37	−0.02	0.37	3.78	0.36	0.13
wHill	RT	300	9.85	0.14	0.03	0.28	9.84	0.38	0.02	0.38	3.87	0.37	0.14
wHill	RT	500	9.91	0.15	0.08	0.84	9.90	0.38	0.08	0.39	3.99	0.38	0.14
wHill	RT	700	9.98	0.15	0.15	1.55	9.97	0.38	0.15	0.42	4.27	0.41	0.16
wHill	RN	300	9.70	0.13	−0.13	−1.28	9.69	0.36	−0.13	0.38	3.89	0.39	0.11
wHill	RN	500	9.68	0.13	−0.15	−1.51	9.67	0.36	−0.16	0.39	3.95	0.39	0.11
wHill	RN	700	9.66	0.13	−0.16	−1.64	9.66	0.36	−0.17	0.39	4.00	0.39	0.11
wHill	CN	300	9.68	0.13	−0.14	−1.43	9.68	0.35	−0.15	0.39	3.94	0.39	0.11
wHill	CN	500	9.67	0.13	−0.16	−1.62	9.66	0.36	−0.17	0.39	4.00	0.40	0.11
wHill	CN	700	9.66	0.13	−0.17	−1.72	9.65	0.36	−0.18	0.40	4.03	0.40	0.11
wISE	RT	300	9.86	0.15	0.04	0.36	9.86	0.38	0.03	0.38	3.90	0.38	0.13
wISE	RT	500	10.02	0.16	0.19	1.95	10.01	0.40	0.18	0.44	4.53	0.46	0.20
wISE	RT	700	10.23	0.18	0.40	4.11	10.21	0.42	0.38	0.59	5.97	0.60	0.17
wISE	RN	300	9.70	0.13	−0.13	−1.28	9.69	0.35	−0.13	0.38	3.88	0.38	0.11
wISE	RN	500	9.69	0.13	−0.13	−1.37	9.68	0.36	−0.14	0.38	3.91	0.39	0.11
wISE	RN	700	9.69	0.13	−0.13	−1.36	9.68	0.36	−0.14	0.38	3.91	0.39	0.11
wISE	CN	300	9.68	0.13	−0.14	−1.43	9.68	0.35	−0.15	0.39	3.93	0.39	0.11
wISE	CN	500	9.68	0.13	−0.15	−1.48	9.67	0.36	−0.15	0.39	3.94	0.39	0.11
wISE	CN	700	9.68	0.13	−0.14	−1.43	9.67	0.36	−0.15	0.39	3.93	0.39	0.11
wPDC	RT	300	9.89	0.16	0.06	0.62	9.88	0.40	0.05	0.40	4.08	0.39	0.17
wPDC	RT	500	10.11	0.19	0.28	2.90	10.10	0.45	0.27	0.52	5.29	0.52	0.21
wPDC	RT	700	10.41	0.22	0.59	6.00	10.39	0.47	0.56	0.76	7.70	0.84	0.28
wPDC	RN	300	9.70	0.13	−0.12	−1.26	9.69	0.36	−0.13	0.38	3.88	0.39	0.11
wPDC	RN	500	9.70	0.13	−0.13	−1.27	9.69	0.37	−0.13	0.38	3.88	0.37	0.11
wPDC	RN	700	9.71	0.13	−0.12	−1.21	9.69	0.36	−0.13	0.38	3.87	0.38	0.11
wPDC	CN	300	9.69	0.13	−0.14	−1.41	9.68	0.36	−0.15	0.39	3.93	0.39	0.11
wPDC	CN	500	9.69	0.13	−0.13	−1.37	9.68	0.37	−0.15	0.38	3.92	0.38	0.11
wPDC	CN	700	9.70	0.13	−0.13	−1.28	9.69	0.36	−0.14	0.38	3.89	0.38	0.11
GB2			9.40	0.10	−0.42	−4.28	9.40	0.30	−0.42	0.52	5.34	0.63	0.13

OCAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

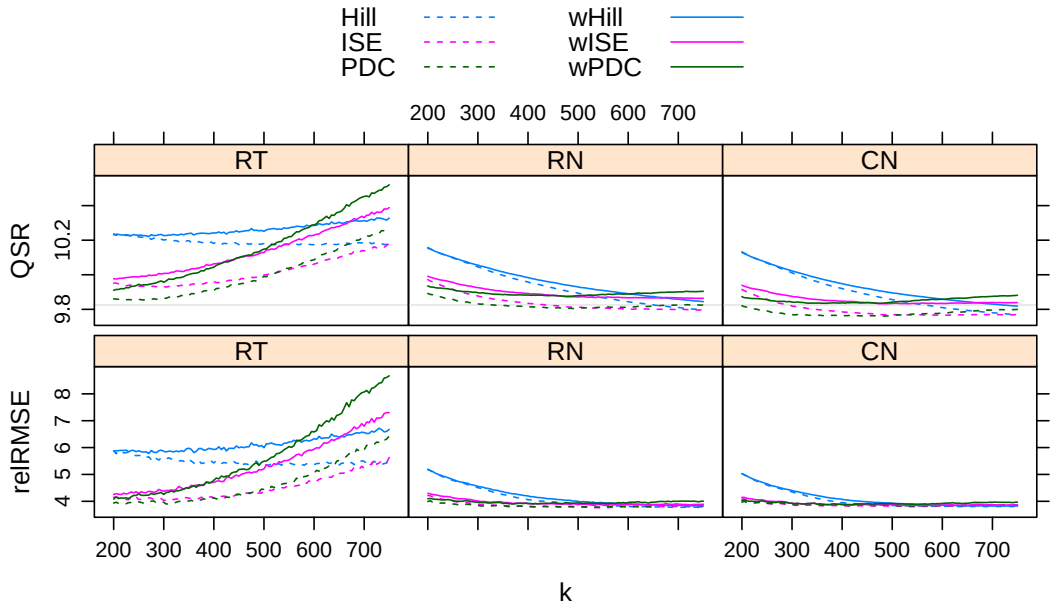

Figure F.346.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

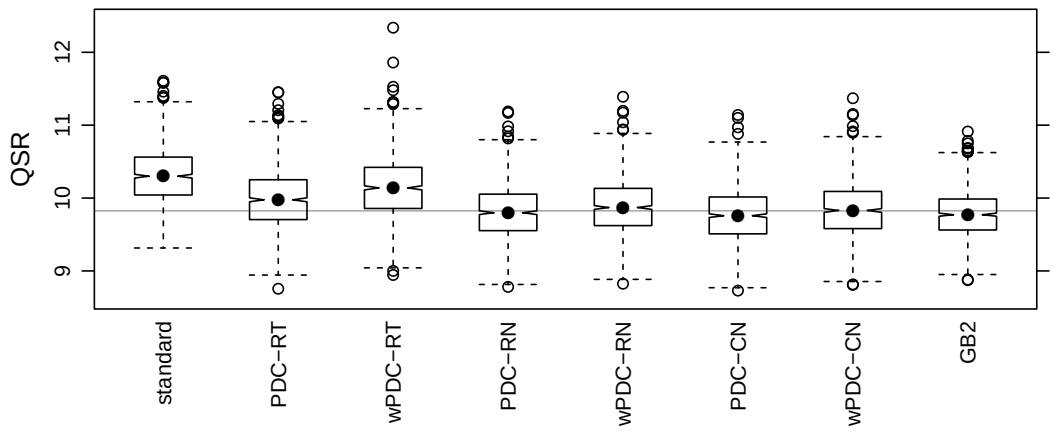

Figure F.347.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.173.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			10.31	0.15	0.49	4.98	10.30	0.39	0.48	0.63	6.38	0.71	0.18
wHill	RT	300	10.23	0.17	0.40	4.08	10.22	0.41	0.39	0.58	5.86	0.62	0.18
wHill	RT	500	10.25	0.17	0.43	4.33	10.25	0.39	0.42	0.59	5.99	0.64	0.17
wHill	RT	700	10.31	0.18	0.49	4.97	10.32	0.42	0.50	0.64	6.56	0.74	0.19
wHill	RN	300	10.06	0.15	0.23	2.35	10.05	0.38	0.22	0.45	4.56	0.44	0.17
wHill	RN	500	9.93	0.14	0.10	1.06	9.92	0.37	0.10	0.39	4.00	0.39	0.14
wHill	RN	700	9.86	0.14	0.03	0.34	9.85	0.37	0.03	0.38	3.84	0.37	0.14
wHill	CN	300	10.02	0.15	0.20	2.01	10.01	0.38	0.19	0.43	4.40	0.42	0.16
wHill	CN	500	9.90	0.14	0.07	0.71	9.89	0.37	0.06	0.39	3.93	0.38	0.14
wHill	CN	700	9.83	0.14	0.00	0.05	9.83	0.36	0.00	0.38	3.83	0.36	0.13
wISE	RT	300	10.01	0.15	0.18	1.86	10.00	0.38	0.17	0.43	4.37	0.43	0.16
wISE	RT	500	10.13	0.17	0.30	3.08	10.11	0.40	0.28	0.51	5.20	0.50	0.23
wISE	RT	700	10.33	0.19	0.51	5.14	10.31	0.42	0.48	0.67	6.80	0.72	0.20
wISE	RN	300	9.93	0.15	0.10	1.02	9.92	0.38	0.09	0.39	4.01	0.38	0.15
wISE	RN	500	9.87	0.14	0.05	0.47	9.87	0.38	0.04	0.38	3.88	0.38	0.16
wISE	RN	700	9.87	0.14	0.04	0.42	9.85	0.37	0.03	0.38	3.90	0.37	0.14
wISE	CN	300	9.87	0.15	0.05	0.50	9.86	0.38	0.04	0.39	3.93	0.37	0.15
wISE	CN	500	9.83	0.14	0.01	0.09	9.83	0.38	0.01	0.38	3.87	0.38	0.16
wISE	CN	700	9.84	0.15	0.01	0.14	9.83	0.37	0.00	0.38	3.88	0.37	0.13
wPDC	RT	300	9.96	0.16	0.13	1.34	9.94	0.40	0.12	0.42	4.25	0.40	0.16
wPDC	RT	500	10.15	0.19	0.32	3.29	10.14	0.42	0.31	0.54	5.49	0.55	0.26
wPDC	RT	700	10.45	0.23	0.63	6.39	10.44	0.46	0.61	0.79	8.07	0.92	0.23
wPDC	RN	300	9.90	0.15	0.07	0.72	9.88	0.39	0.06	0.39	3.96	0.38	0.16
wPDC	RN	500	9.88	0.15	0.05	0.55	9.87	0.38	0.05	0.39	3.94	0.38	0.16
wPDC	RN	700	9.90	0.15	0.08	0.77	9.90	0.38	0.07	0.39	4.00	0.38	0.14
wPDC	CN	300	9.84	0.15	0.02	0.17	9.83	0.38	−0.00	0.39	3.93	0.38	0.16
wPDC	CN	500	9.84	0.15	0.02	0.17	9.83	0.38	0.00	0.38	3.92	0.38	0.16
wPDC	CN	700	9.88	0.15	0.05	0.51	9.87	0.38	0.04	0.39	3.97	0.37	0.14
GB2			9.77	0.11	−0.05	−0.53	9.77	0.31	−0.05	0.33	3.35	0.34	0.11

OCAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

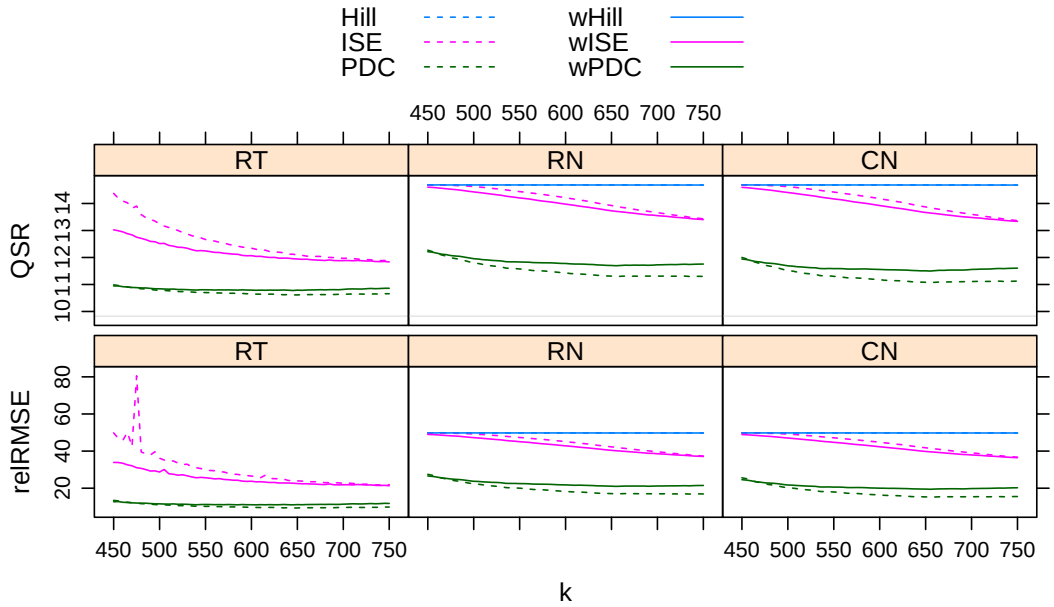

Figure F.348.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

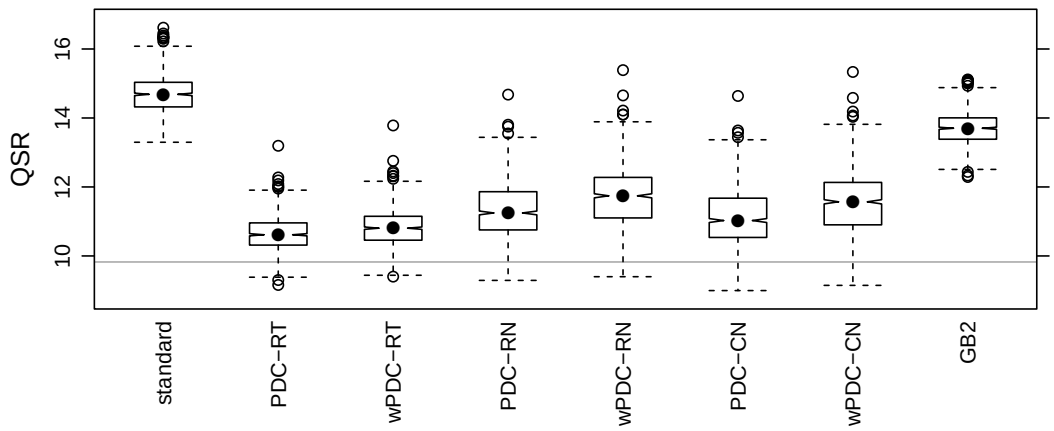

Figure F.349.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.174.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			14.69	0.30	4.86	49.49	14.69	0.53	4.86	4.89	49.80	7.21	0.69
wHill	RT	500	17.21	22.88	7.38	75.12	16.40	1.52	6.58	8.79	89.50	9.75	8.28
wHill	RT	700	15.54	3.00	5.71	58.16	15.24	1.05	5.41	5.97	60.77	8.02	2.82
wHill	RN	300	14.69	0.30	4.86	49.49	14.69	0.53	4.86	4.89	49.80	7.21	0.69
wHill	RN	500	14.69	0.30	4.86	49.48	14.68	0.53	4.86	4.89	49.78	7.20	0.69
wHill	RN	700	14.68	0.29	4.86	49.45	14.68	0.53	4.85	4.89	49.76	7.20	0.69
wHill	CN	300	14.69	0.30	4.86	49.49	14.69	0.53	4.86	4.89	49.80	7.21	0.69
wHill	CN	500	14.69	0.30	4.86	49.48	14.68	0.53	4.86	4.89	49.78	7.20	0.69
wHill	CN	700	14.68	0.29	4.86	49.45	14.68	0.53	4.85	4.89	49.76	7.20	0.69
wISE	RT	500	12.51	0.74	2.69	27.37	12.46	0.75	2.64	2.82	28.74	3.91	1.61
wISE	RT	700	11.89	0.37	2.06	20.96	11.87	0.61	2.04	2.15	21.86	3.03	0.57
wISE	RN	300	14.69	0.30	4.86	49.49	14.69	0.53	4.86	4.89	49.80	7.21	0.69
wISE	RN	500	14.43	0.36	4.60	46.85	14.43	0.59	4.60	4.64	47.25	6.82	0.69
wISE	RN	700	13.55	0.49	3.72	37.90	13.53	0.71	3.71	3.79	38.55	5.49	0.66
wISE	CN	300	14.69	0.30	4.86	49.49	14.69	0.53	4.86	4.89	49.80	7.21	0.69
wISE	CN	500	14.41	0.37	4.58	46.62	14.40	0.60	4.58	4.62	47.04	6.79	0.69
wISE	CN	700	13.48	0.51	3.66	37.22	13.47	0.73	3.64	3.73	37.93	5.40	0.66
wPDC	RT	500	10.84	0.26	1.02	10.33	10.80	0.49	0.98	1.14	11.57	1.45	0.32
wPDC	RT	700	10.82	0.27	0.99	10.10	10.80	0.51	0.98	1.12	11.40	1.45	0.40
wPDC	RN	300	14.46	0.63	4.64	47.21	14.58	0.67	4.76	4.71	47.89	7.05	0.69
wPDC	RN	500	11.95	0.90	2.13	21.68	11.88	0.95	2.06	2.33	23.73	3.05	0.60
wPDC	RN	700	11.73	0.72	1.90	19.37	11.74	0.89	1.92	2.08	21.20	2.84	0.57
wPDC	CN	300	14.43	0.75	4.60	46.84	14.58	0.67	4.75	4.68	47.66	7.05	0.69
wPDC	CN	500	11.69	1.07	1.87	18.99	11.62	1.04	1.80	2.13	21.72	2.66	0.59
wPDC	CN	700	11.56	0.79	1.73	17.62	11.57	0.94	1.74	1.95	19.81	2.59	0.56
GB2			13.70	0.22	3.88	39.48	13.70	0.46	3.88	3.91	39.76	5.75	0.54

OCAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

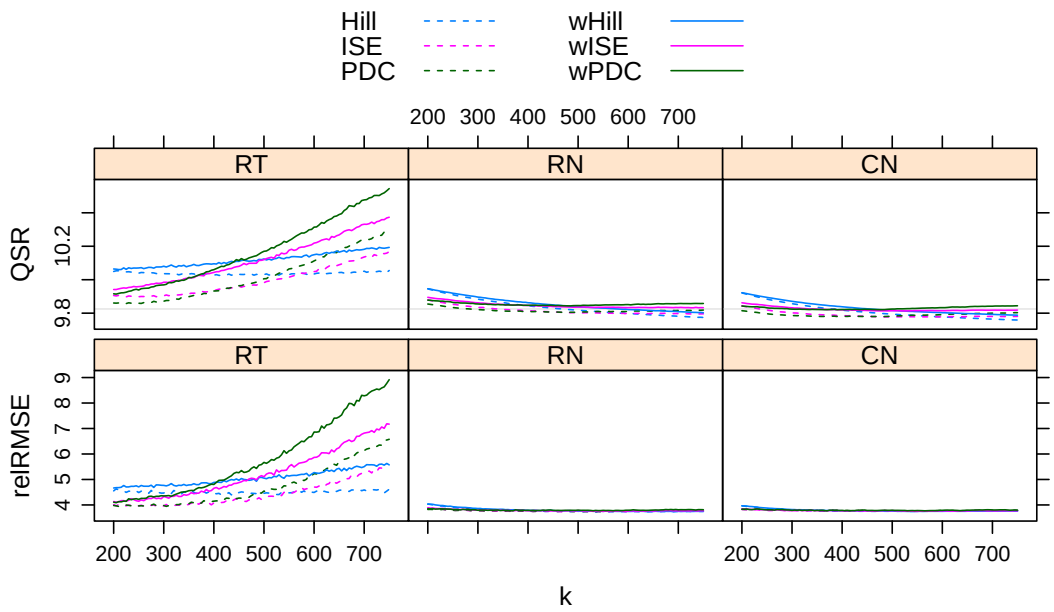

Figure F.350.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

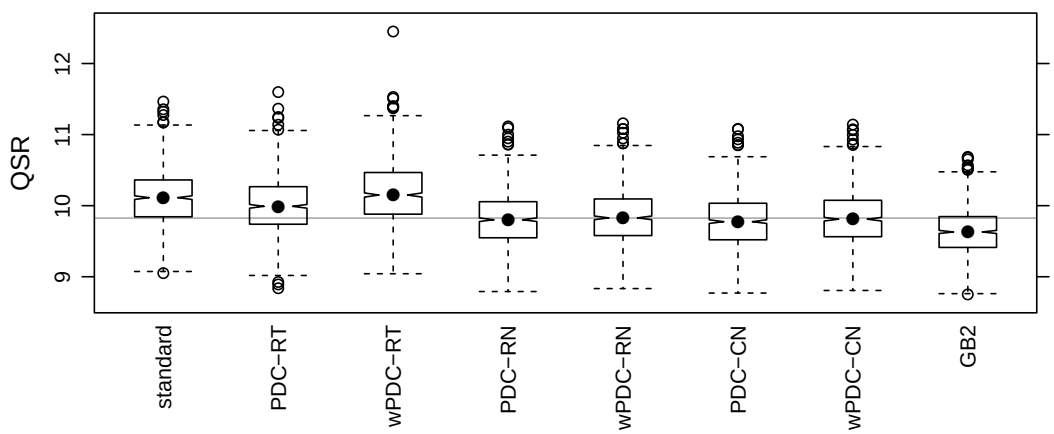

Figure F.351.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.175.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			10.12	0.15	0.29	2.97	10.11	0.38	0.29	0.48	4.92	0.48	0.17
wHill	RT	300	10.08	0.15	0.26	2.60	10.07	0.39	0.25	0.47	4.77	0.47	0.16
wHill	RT	500	10.12	0.16	0.30	3.04	10.11	0.38	0.28	0.50	5.05	0.51	0.17
wHill	RT	700	10.18	0.17	0.36	3.63	10.18	0.39	0.35	0.54	5.50	0.57	0.19
wHill	RN	300	9.90	0.14	0.07	0.72	9.88	0.37	0.06	0.38	3.86	0.38	0.14
wHill	RN	500	9.84	0.14	0.01	0.13	9.83	0.37	0.00	0.37	3.75	0.37	0.13
wHill	RN	700	9.81	0.14	−0.02	−0.17	9.80	0.36	−0.03	0.37	3.75	0.37	0.13
wHill	CN	300	9.87	0.14	0.05	0.46	9.86	0.37	0.03	0.38	3.82	0.37	0.13
wHill	CN	500	9.82	0.14	−0.01	−0.09	9.81	0.37	−0.02	0.37	3.76	0.37	0.13
wHill	CN	700	9.79	0.14	−0.03	−0.33	9.78	0.37	−0.04	0.37	3.75	0.37	0.13
wISE	RT	300	9.98	0.16	0.16	1.62	9.98	0.39	0.15	0.43	4.34	0.41	0.18
wISE	RT	500	10.12	0.16	0.29	3.00	10.11	0.40	0.29	0.50	5.11	0.51	0.21
wISE	RT	700	10.33	0.19	0.51	5.15	10.32	0.45	0.49	0.67	6.82	0.74	0.19
wISE	RN	300	9.86	0.14	0.04	0.37	9.85	0.37	0.02	0.37	3.79	0.38	0.13
wISE	RN	500	9.84	0.14	0.01	0.12	9.83	0.38	0.00	0.37	3.78	0.38	0.14
wISE	RN	700	9.83	0.14	0.01	0.09	9.82	0.37	−0.00	0.37	3.77	0.37	0.13
wISE	CN	300	9.83	0.14	0.01	0.07	9.82	0.37	−0.01	0.37	3.78	0.37	0.13
wISE	CN	500	9.81	0.14	−0.01	−0.11	9.80	0.38	−0.02	0.37	3.78	0.37	0.13
wISE	CN	700	9.82	0.14	−0.01	−0.07	9.81	0.37	−0.02	0.37	3.77	0.37	0.13
wPDC	RT	300	9.97	0.16	0.14	1.46	9.96	0.39	0.13	0.43	4.35	0.41	0.20
wPDC	RT	500	10.17	0.19	0.34	3.51	10.15	0.44	0.32	0.56	5.67	0.55	0.27
wPDC	RT	700	10.48	0.24	0.65	6.63	10.46	0.48	0.63	0.81	8.28	0.94	0.23
wPDC	RN	300	9.85	0.14	0.03	0.30	9.84	0.37	0.02	0.37	3.79	0.37	0.14
wPDC	RN	500	9.85	0.14	0.02	0.21	9.83	0.38	0.00	0.37	3.80	0.38	0.14
wPDC	RN	700	9.86	0.14	0.03	0.33	9.84	0.37	0.01	0.37	3.81	0.37	0.13
wPDC	CN	300	9.82	0.14	−0.00	−0.01	9.81	0.37	−0.01	0.37	3.79	0.37	0.13
wPDC	CN	500	9.82	0.14	−0.00	−0.01	9.81	0.38	−0.02	0.37	3.79	0.38	0.13
wPDC	CN	700	9.84	0.14	0.02	0.17	9.82	0.37	−0.00	0.37	3.80	0.37	0.13
GB2			9.63	0.10	−0.19	−1.95	9.63	0.32	−0.20	0.38	3.82	0.39	0.11

OCAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

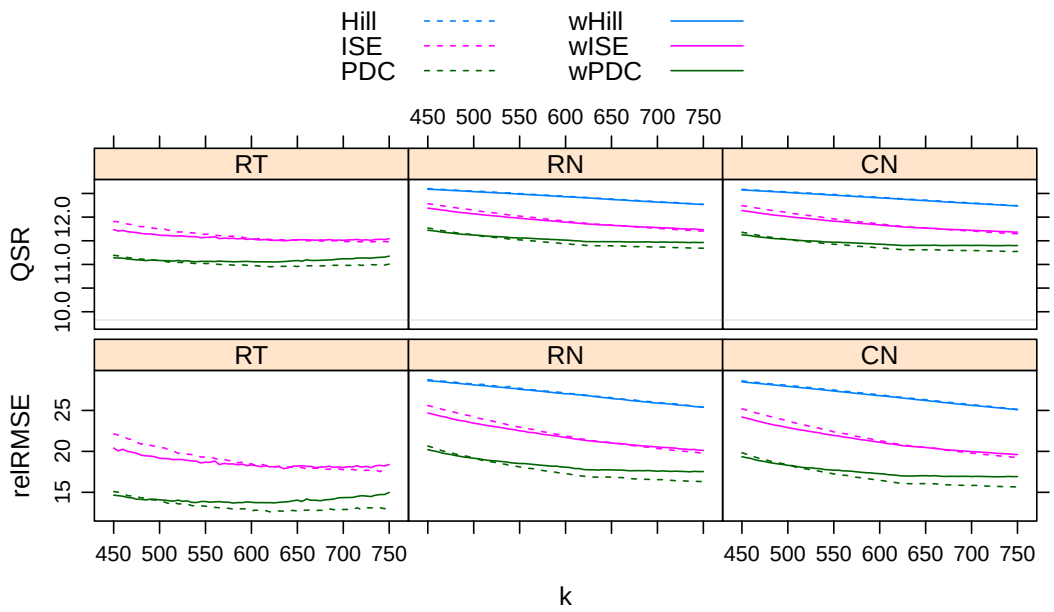

Figure F.352.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

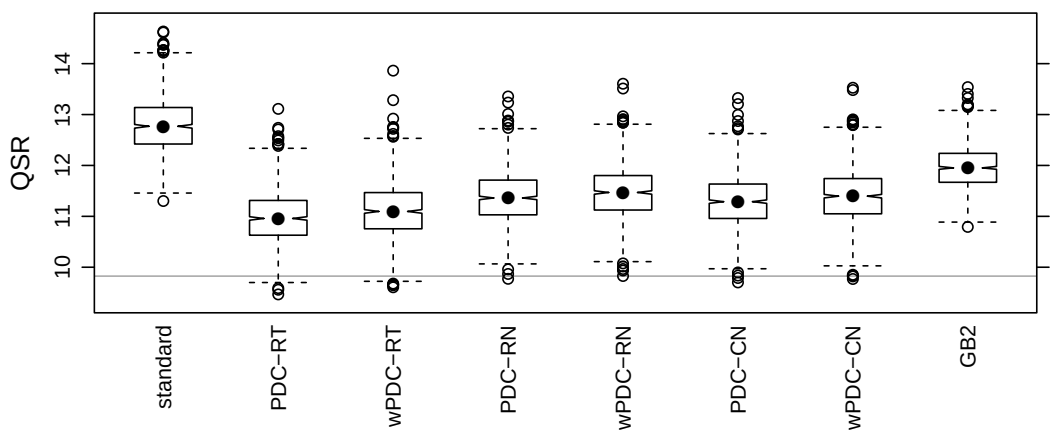

Figure F.353.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.176.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			12.79	0.28	2.96	30.14	12.77	0.53	2.94	3.01	30.62	4.36	0.49
wHill	RT	500	12.83	0.56	3.01	30.62	12.80	0.66	2.98	3.10	31.55	4.42	1.14
wHill	RT	700	12.64	0.45	2.82	28.69	12.59	0.62	2.76	2.90	29.50	4.10	0.66
wHill	RN	300	12.72	0.27	2.89	29.44	12.69	0.52	2.86	2.94	29.92	4.24	0.49
wHill	RN	500	12.54	0.27	2.71	27.62	12.52	0.52	2.70	2.76	28.12	4.00	0.49
wHill	RN	700	12.32	0.26	2.49	25.37	12.30	0.51	2.47	2.54	25.89	3.66	0.42
wHill	CN	300	12.71	0.27	2.89	29.39	12.68	0.52	2.86	2.93	29.87	4.23	0.49
wHill	CN	500	12.52	0.27	2.70	27.43	12.50	0.51	2.67	2.75	27.94	3.96	0.46
wHill	CN	700	12.29	0.26	2.46	25.09	12.27	0.51	2.45	2.52	25.62	3.63	0.41
wISE	RT	500	11.62	0.33	1.79	18.24	11.55	0.53	1.73	1.88	19.16	2.56	0.48
wISE	RT	700	11.51	0.29	1.68	17.14	11.48	0.52	1.65	1.77	18.00	2.45	0.39
wISE	RN	300	12.61	0.28	2.78	28.30	12.57	0.52	2.74	2.83	28.80	4.07	0.46
wISE	RN	500	12.07	0.27	2.24	22.82	12.04	0.54	2.21	2.30	23.44	3.28	0.41
wISE	RN	700	11.78	0.26	1.95	19.88	11.76	0.50	1.93	2.02	20.54	2.87	0.40
wISE	CN	300	12.59	0.28	2.76	28.10	12.55	0.53	2.72	2.81	28.62	4.04	0.46
wISE	CN	500	12.01	0.28	2.19	22.25	11.97	0.55	2.14	2.25	22.90	3.18	0.41
wISE	CN	700	11.72	0.26	1.90	19.29	11.71	0.51	1.88	1.96	19.97	2.79	0.39
wPDC	RT	500	11.08	0.33	1.26	12.80	11.04	0.56	1.21	1.38	14.08	1.80	0.41
wPDC	RT	700	11.12	0.32	1.29	13.16	11.10	0.53	1.27	1.41	14.35	1.88	0.41
wPDC	RN	300	12.28	0.38	2.45	24.96	12.26	0.59	2.44	2.53	25.75	3.61	0.42
wPDC	RN	500	11.62	0.32	1.80	18.28	11.59	0.55	1.77	1.88	19.16	2.62	0.40
wPDC	RN	700	11.47	0.28	1.64	16.74	11.47	0.50	1.64	1.73	17.58	2.44	0.38
wPDC	CN	300	12.22	0.42	2.39	24.33	12.21	0.62	2.38	2.48	25.22	3.53	0.42
wPDC	CN	500	11.53	0.33	1.70	17.32	11.50	0.58	1.68	1.80	18.29	2.49	0.40
wPDC	CN	700	11.40	0.29	1.57	16.03	11.40	0.51	1.57	1.66	16.93	2.33	0.38
GB2			11.96	0.18	2.13	21.73	11.95	0.42	2.13	2.18	22.16	3.15	0.38

OAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

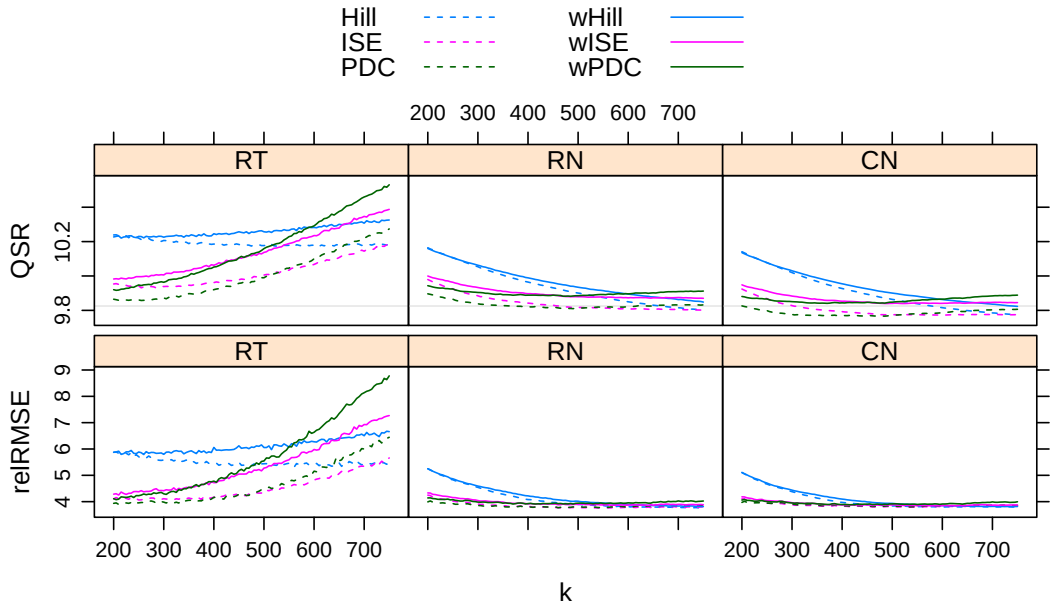

Figure F.354.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

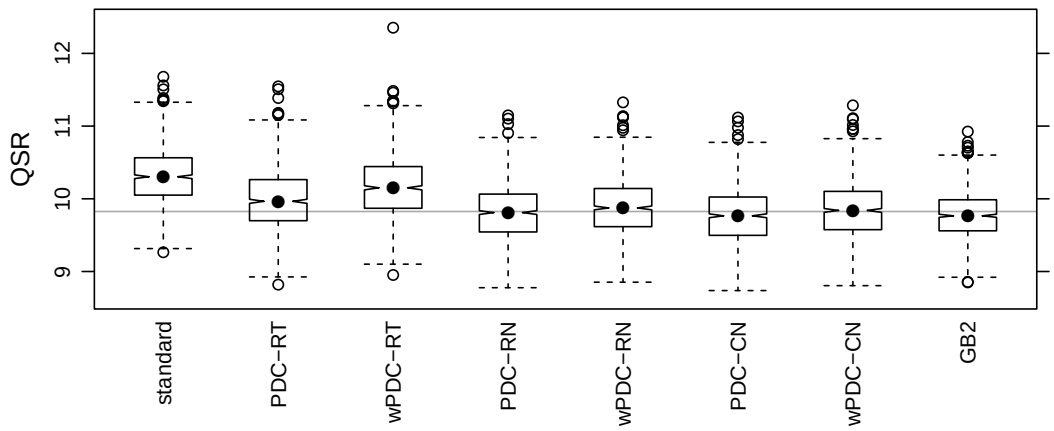

Figure F.355.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.177.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			10.31	0.15	0.49	4.96	10.30	0.38	0.48	0.62	6.36	0.72	0.19
wHill	RT	300	10.23	0.16	0.40	4.07	10.21	0.43	0.39	0.57	5.80	0.60	0.19
wHill	RT	500	10.26	0.17	0.43	4.40	10.25	0.42	0.42	0.59	6.06	0.64	0.18
wHill	RT	700	10.31	0.18	0.48	4.90	10.30	0.43	0.48	0.64	6.50	0.72	0.18
wHill	RN	300	10.06	0.15	0.24	2.41	10.05	0.38	0.22	0.45	4.59	0.45	0.16
wHill	RN	500	9.93	0.14	0.11	1.11	9.92	0.37	0.10	0.39	4.02	0.38	0.14
wHill	RN	700	9.86	0.14	0.04	0.38	9.85	0.38	0.02	0.38	3.83	0.37	0.14
wHill	CN	300	10.03	0.15	0.21	2.09	10.01	0.38	0.19	0.44	4.44	0.43	0.16
wHill	CN	500	9.90	0.14	0.08	0.77	9.89	0.37	0.06	0.39	3.93	0.38	0.14
wHill	CN	700	9.84	0.14	0.01	0.11	9.82	0.37	−0.01	0.38	3.82	0.37	0.13
wISE	RT	300	10.01	0.16	0.18	1.84	10.00	0.39	0.18	0.43	4.42	0.43	0.16
wISE	RT	500	10.14	0.17	0.31	3.17	10.12	0.42	0.30	0.52	5.27	0.51	0.22
wISE	RT	700	10.35	0.19	0.52	5.31	10.34	0.45	0.51	0.68	6.93	0.77	0.20
wISE	RN	300	9.93	0.15	0.11	1.10	9.92	0.37	0.10	0.40	4.04	0.38	0.14
wISE	RN	500	9.88	0.14	0.05	0.55	9.87	0.38	0.05	0.38	3.90	0.38	0.15
wISE	RN	700	9.87	0.14	0.05	0.50	9.87	0.36	0.04	0.38	3.90	0.38	0.14
wISE	CN	300	9.88	0.15	0.06	0.59	9.86	0.38	0.04	0.39	3.96	0.38	0.14
wISE	CN	500	9.84	0.14	0.02	0.16	9.83	0.39	0.01	0.38	3.87	0.38	0.15
wISE	CN	700	9.85	0.14	0.02	0.22	9.84	0.37	0.01	0.38	3.87	0.37	0.13
wPDC	RT	300	9.96	0.16	0.14	1.41	9.95	0.40	0.13	0.42	4.30	0.42	0.17
wPDC	RT	500	10.16	0.19	0.33	3.40	10.15	0.43	0.33	0.54	5.54	0.57	0.26
wPDC	RT	700	10.46	0.24	0.63	6.46	10.44	0.47	0.62	0.80	8.14	0.92	0.23
wPDC	RN	300	9.90	0.15	0.08	0.80	9.89	0.38	0.06	0.39	3.98	0.38	0.15
wPDC	RN	500	9.89	0.15	0.06	0.61	9.87	0.39	0.05	0.39	3.94	0.39	0.15
wPDC	RN	700	9.91	0.15	0.08	0.86	9.90	0.38	0.07	0.40	4.03	0.39	0.14
wPDC	CN	300	9.85	0.15	0.03	0.26	9.84	0.39	0.01	0.39	3.95	0.38	0.15
wPDC	CN	500	9.85	0.15	0.02	0.23	9.84	0.39	0.01	0.38	3.91	0.39	0.15
wPDC	CN	700	9.88	0.15	0.06	0.60	9.87	0.37	0.04	0.39	3.99	0.38	0.14
GB2			9.77	0.11	−0.05	−0.52	9.77	0.32	−0.06	0.33	3.34	0.33	0.11

OAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

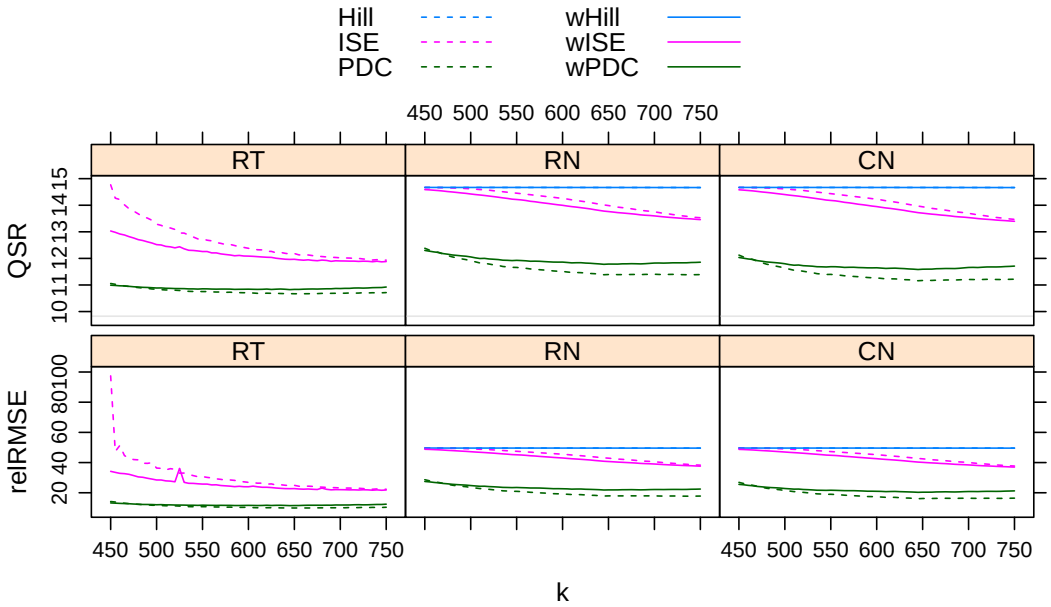

Figure F.356.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

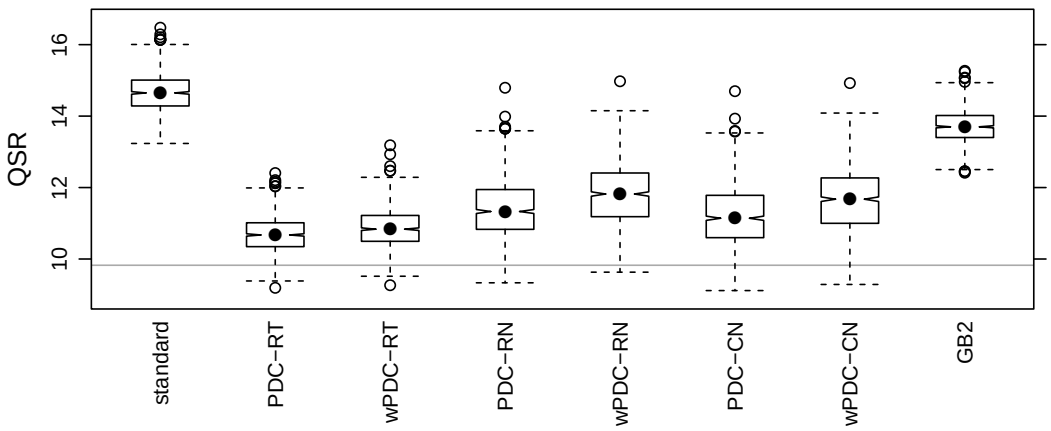

Figure F.357.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.178.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			14.67	0.29	4.85	49.32	14.65	0.54	4.82	4.88	49.62	7.15	0.68
wHill	RT	500	16.61	18.98	6.78	69.04	16.09	1.30	6.26	8.06	82.04	9.29	12.66
wHill	RT	700	15.47	9.50	5.64	57.41	15.12	0.98	5.29	6.43	65.42	7.84	7.55
wHill	RN	300	14.67	0.29	4.85	49.32	14.65	0.54	4.82	4.88	49.62	7.15	0.68
wHill	RN	500	14.67	0.29	4.84	49.30	14.65	0.54	4.82	4.87	49.61	7.15	0.68
wHill	RN	700	14.67	0.29	4.84	49.27	14.65	0.54	4.82	4.87	49.58	7.15	0.68
wHill	CN	300	14.67	0.29	4.85	49.32	14.65	0.54	4.82	4.88	49.62	7.15	0.68
wHill	CN	500	14.67	0.29	4.84	49.30	14.65	0.54	4.82	4.87	49.61	7.15	0.68
wHill	CN	700	14.67	0.29	4.84	49.27	14.65	0.54	4.82	4.87	49.57	7.15	0.68
wISE	RT	500	12.52	0.56	2.69	27.41	12.44	0.69	2.62	2.80	28.45	3.88	0.72
wISE	RT	700	11.90	0.37	2.08	21.16	11.88	0.58	2.05	2.17	22.04	3.04	0.61
wISE	RN	300	14.67	0.29	4.85	49.32	14.65	0.54	4.82	4.88	49.62	7.15	0.68
wISE	RN	500	14.42	0.36	4.60	46.80	14.40	0.59	4.57	4.64	47.19	6.78	0.68
wISE	RN	700	13.60	0.47	3.77	38.41	13.57	0.71	3.75	3.84	39.04	5.56	0.63
wISE	CN	300	14.67	0.29	4.85	49.32	14.65	0.54	4.82	4.88	49.62	7.15	0.68
wISE	CN	500	14.40	0.37	4.58	46.58	14.38	0.59	4.55	4.62	46.99	6.75	0.68
wISE	CN	700	13.54	0.50	3.71	37.76	13.50	0.72	3.68	3.78	38.43	5.45	0.62
wPDC	RT	500	10.89	0.27	1.06	10.80	10.86	0.50	1.03	1.18	12.03	1.53	0.34
wPDC	RT	700	10.87	0.28	1.04	10.59	10.84	0.54	1.01	1.17	11.87	1.50	0.34
wPDC	RN	300	14.47	0.60	4.65	47.28	14.56	0.64	4.73	4.71	47.93	7.02	0.68
wPDC	RN	500	12.05	0.95	2.23	22.69	12.01	1.00	2.18	2.43	24.77	3.24	0.59
wPDC	RN	700	11.82	0.74	2.00	20.35	11.82	0.90	1.99	2.18	22.15	2.96	0.52
wPDC	CN	300	14.44	0.71	4.61	46.94	14.56	0.64	4.73	4.69	47.71	7.02	0.68
wPDC	CN	500	11.80	1.13	1.97	20.08	11.76	1.09	1.93	2.24	22.81	2.87	0.58
wPDC	CN	700	11.66	0.82	1.83	18.66	11.67	0.93	1.85	2.04	20.81	2.74	0.52
GB2			13.71	0.22	3.89	39.57	13.70	0.46	3.88	3.92	39.86	5.75	0.55

OAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

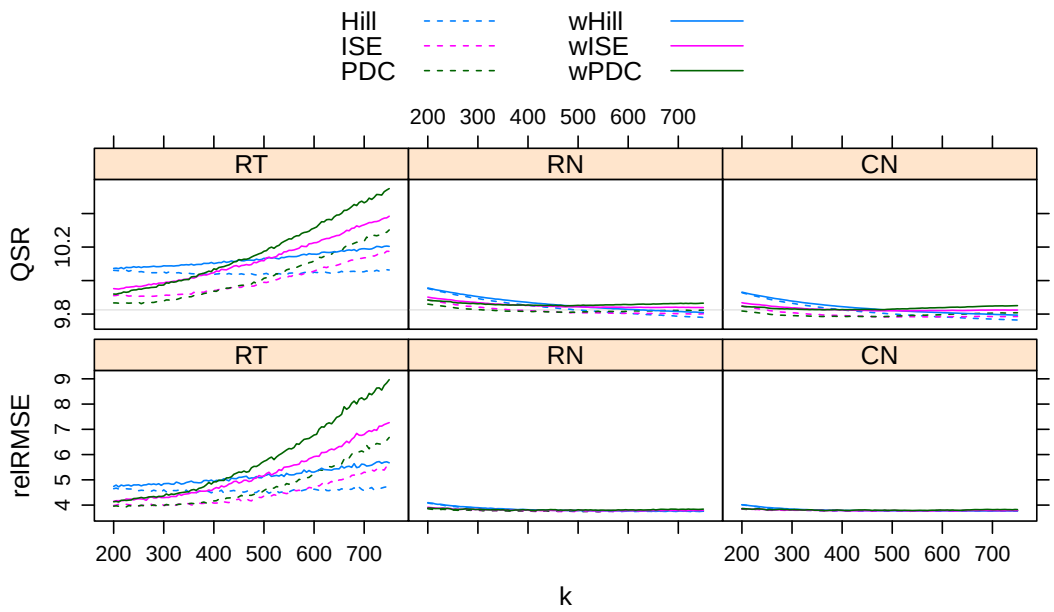

Figure F.358.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

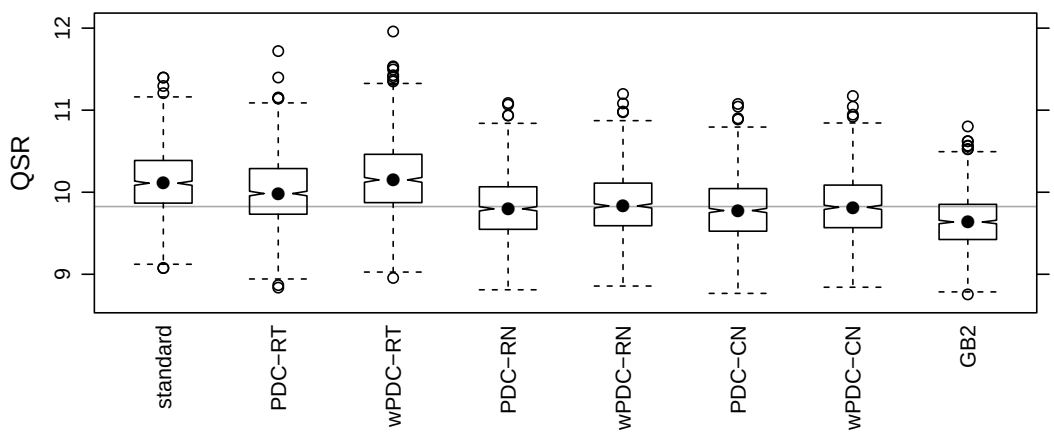

Figure F.359.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.179.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			10.13	0.15	0.30	3.09	10.11	0.39	0.28	0.50	5.04	0.51	0.16
wHill	RT	300	10.09	0.16	0.26	2.68	10.08	0.39	0.25	0.48	4.85	0.47	0.17
wHill	RT	500	10.13	0.16	0.31	3.13	10.12	0.39	0.30	0.51	5.16	0.51	0.15
wHill	RT	700	10.19	0.17	0.37	3.72	10.18	0.42	0.35	0.55	5.61	0.56	0.17
wHill	RN	300	9.90	0.14	0.08	0.80	9.90	0.37	0.07	0.38	3.90	0.38	0.14
wHill	RN	500	9.85	0.14	0.02	0.20	9.83	0.37	0.01	0.37	3.78	0.37	0.13
wHill	RN	700	9.82	0.14	−0.01	−0.10	9.80	0.37	−0.02	0.37	3.76	0.37	0.12
wHill	CN	300	9.88	0.14	0.05	0.53	9.87	0.37	0.05	0.38	3.84	0.37	0.13
wHill	CN	500	9.82	0.14	−0.00	−0.03	9.81	0.37	−0.01	0.37	3.77	0.37	0.12
wHill	CN	700	9.80	0.14	−0.03	−0.27	9.79	0.38	−0.04	0.37	3.76	0.37	0.12
wISE	RT	300	9.99	0.15	0.16	1.63	9.96	0.39	0.14	0.42	4.30	0.41	0.17
wISE	RT	500	10.12	0.17	0.29	2.98	10.10	0.42	0.27	0.51	5.15	0.51	0.19
wISE	RT	700	10.33	0.19	0.51	5.17	10.33	0.43	0.50	0.67	6.80	0.76	0.19
wISE	RN	300	9.87	0.14	0.04	0.43	9.86	0.37	0.03	0.38	3.83	0.37	0.13
wISE	RN	500	9.84	0.14	0.02	0.19	9.83	0.38	0.00	0.37	3.79	0.38	0.14
wISE	RN	700	9.84	0.14	0.01	0.15	9.82	0.37	−0.01	0.37	3.79	0.37	0.13
wISE	CN	300	9.84	0.14	0.01	0.12	9.83	0.38	−0.00	0.37	3.80	0.38	0.13
wISE	CN	500	9.82	0.14	−0.01	−0.06	9.81	0.38	−0.02	0.37	3.78	0.38	0.13
wISE	CN	700	9.82	0.14	−0.00	−0.01	9.81	0.37	−0.02	0.37	3.79	0.38	0.13
wPDC	RT	300	9.97	0.16	0.15	1.51	9.96	0.40	0.13	0.43	4.36	0.41	0.17
wPDC	RT	500	10.17	0.20	0.35	3.56	10.15	0.43	0.33	0.56	5.73	0.57	0.22
wPDC	RT	700	10.46	0.24	0.64	6.50	10.46	0.47	0.63	0.80	8.17	0.94	0.24
wPDC	RN	300	9.86	0.14	0.04	0.37	9.86	0.37	0.03	0.38	3.83	0.37	0.14
wPDC	RN	500	9.85	0.14	0.03	0.27	9.83	0.38	0.01	0.37	3.82	0.38	0.14
wPDC	RN	700	9.86	0.14	0.04	0.39	9.86	0.37	0.03	0.38	3.82	0.38	0.13
wPDC	CN	300	9.83	0.14	0.00	0.05	9.82	0.37	−0.00	0.37	3.82	0.37	0.13
wPDC	CN	500	9.83	0.14	0.00	0.05	9.82	0.38	−0.01	0.37	3.80	0.38	0.14
wPDC	CN	700	9.85	0.14	0.02	0.23	9.84	0.37	0.01	0.38	3.82	0.37	0.13
GB2			9.64	0.10	−0.18	−1.86	9.64	0.32	−0.19	0.37	3.77	0.39	0.11

OAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

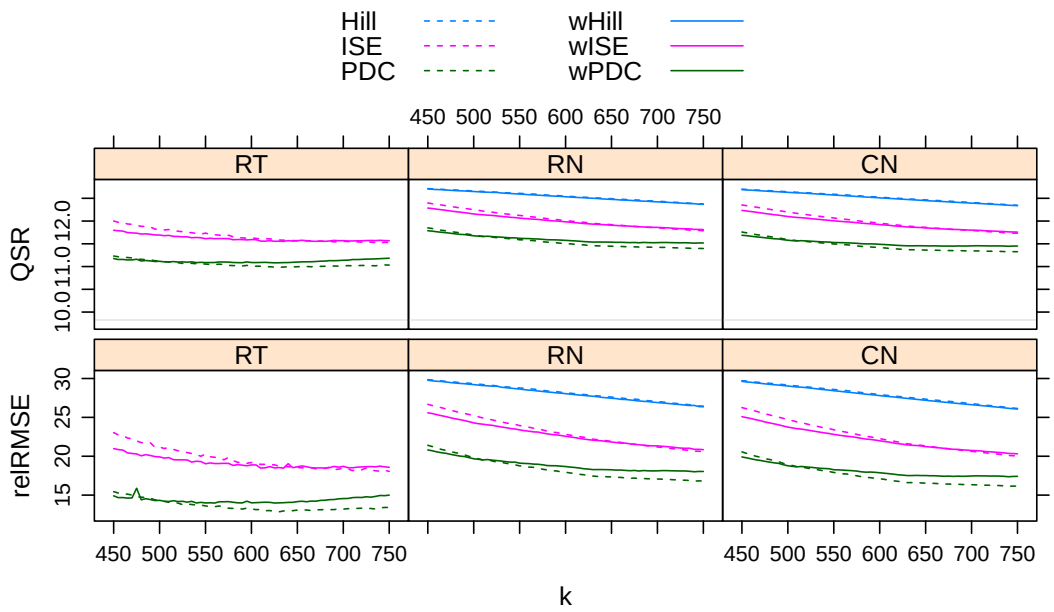

Figure F.360.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

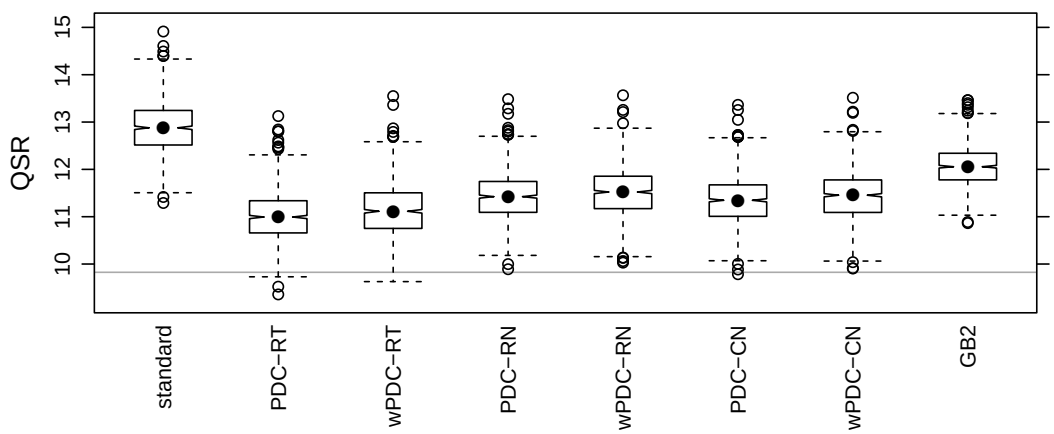

Figure F.361.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.180.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			12.89	0.28	3.07	31.20	12.88	0.54	3.05	3.11	31.66	4.53	0.52
wHill	RT	500	12.94	0.63	3.11	31.66	12.88	0.65	3.06	3.21	32.67	4.53	1.34
wHill	RT	700	12.73	0.47	2.90	29.54	12.69	0.61	2.86	2.98	30.34	4.24	0.62
wHill	RN	300	12.83	0.28	3.00	30.55	12.81	0.53	2.99	3.05	31.01	4.43	0.48
wHill	RN	500	12.65	0.26	2.82	28.75	12.64	0.52	2.82	2.87	29.22	4.17	0.46
wHill	RN	700	12.42	0.24	2.60	26.43	12.42	0.51	2.60	2.64	26.91	3.85	0.43
wHill	CN	300	12.82	0.27	3.00	30.49	12.81	0.53	2.99	3.04	30.95	4.43	0.47
wHill	CN	500	12.63	0.26	2.81	28.56	12.63	0.52	2.80	2.85	29.03	4.15	0.45
wHill	CN	700	12.39	0.24	2.57	26.15	12.39	0.52	2.56	2.62	26.63	3.80	0.43
wISE	RT	500	11.69	0.34	1.87	19.01	11.64	0.56	1.81	1.96	19.92	2.69	0.50
wISE	RT	700	11.57	0.33	1.74	17.75	11.52	0.53	1.70	1.84	18.70	2.52	0.73
wISE	RN	300	12.72	0.27	2.89	29.44	12.71	0.53	2.88	2.94	29.92	4.27	0.46
wISE	RN	500	12.16	0.26	2.33	23.72	12.15	0.54	2.33	2.39	24.29	3.45	0.41
wISE	RN	700	11.86	0.25	2.04	20.72	11.86	0.49	2.03	2.10	21.34	3.01	0.39
wISE	CN	300	12.70	0.28	2.88	29.30	12.69	0.54	2.86	2.93	29.78	4.25	0.46
wISE	CN	500	12.10	0.27	2.27	23.15	12.09	0.53	2.26	2.33	23.75	3.35	0.40
wISE	CN	700	11.80	0.25	1.98	20.10	11.81	0.49	1.99	2.04	20.74	2.95	0.38
wPDC	RT	500	11.12	0.31	1.29	13.14	11.06	0.57	1.24	1.41	14.33	1.84	0.35
wPDC	RT	700	11.14	0.32	1.31	13.36	11.11	0.56	1.29	1.43	14.56	1.91	0.38
wPDC	RN	300	12.39	0.37	2.57	26.14	12.40	0.58	2.58	2.64	26.87	3.82	0.44
wPDC	RN	500	11.68	0.31	1.85	18.84	11.68	0.55	1.85	1.93	19.67	2.74	0.40
wPDC	RN	700	11.53	0.28	1.70	17.31	11.52	0.51	1.70	1.78	18.12	2.51	0.38
wPDC	CN	300	12.34	0.41	2.51	25.56	12.33	0.62	2.51	2.59	26.38	3.72	0.44
wPDC	CN	500	11.58	0.33	1.75	17.84	11.56	0.57	1.74	1.84	18.77	2.58	0.38
wPDC	CN	700	11.45	0.29	1.63	16.58	11.45	0.51	1.63	1.72	17.46	2.41	0.38
GB2			12.05	0.18	2.23	22.69	12.06	0.42	2.23	2.27	23.09	3.31	0.37

Two-stage simple random sampling

No contamination

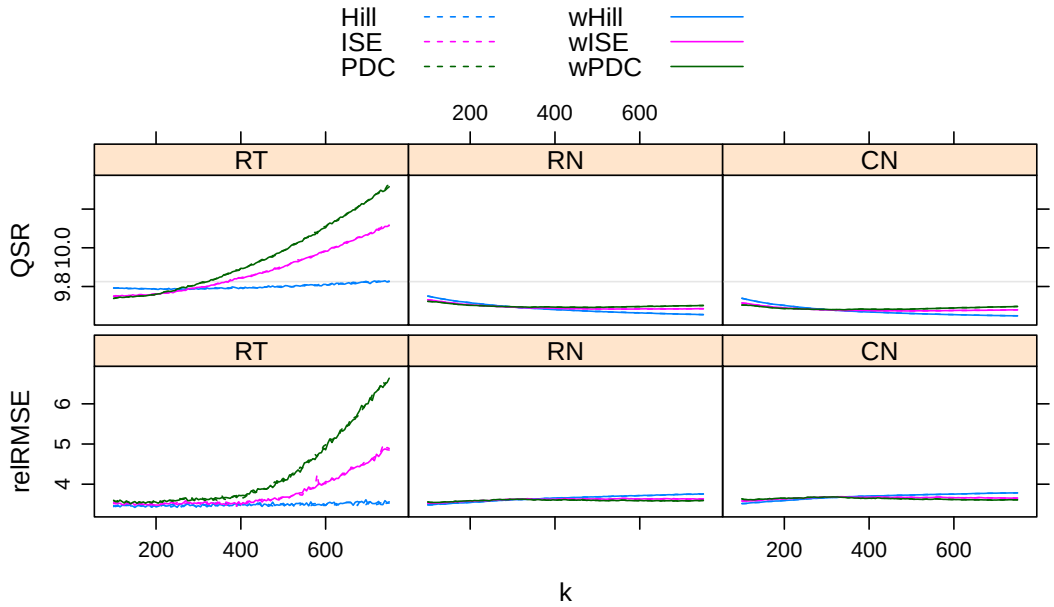

Figure F.362.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 100 and 750.

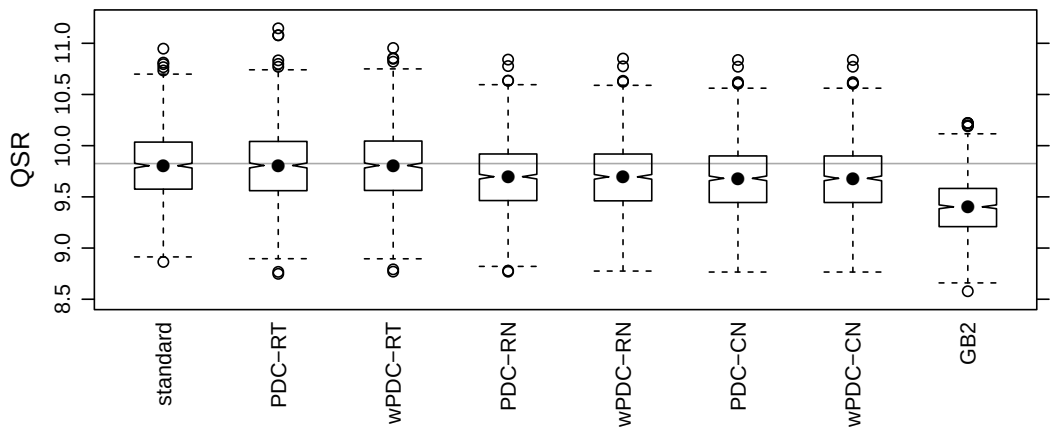

Figure F.363.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 300$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.181.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			9.81	0.11	−0.02	−0.16	9.80	0.34	−0.02	0.34	3.42	0.35	0.11
wHill	RT	300	9.79	0.11	−0.04	−0.40	9.78	0.33	−0.05	0.34	3.46	0.35	0.12
wHill	RT	500	9.80	0.12	−0.03	−0.27	9.79	0.34	−0.03	0.35	3.52	0.35	0.13
wHill	RT	700	9.82	0.12	−0.00	−0.04	9.83	0.36	0.00	0.34	3.51	0.37	0.13
wHill	RN	300	9.69	0.11	−0.13	−1.33	9.69	0.34	−0.13	0.35	3.61	0.37	0.11
wHill	RN	500	9.67	0.11	−0.15	−1.57	9.67	0.34	−0.16	0.36	3.69	0.37	0.11
wHill	RN	700	9.66	0.11	−0.17	−1.71	9.66	0.33	−0.17	0.37	3.75	0.37	0.11
wHill	CN	300	9.68	0.11	−0.14	−1.47	9.68	0.34	−0.15	0.36	3.66	0.37	0.11
wHill	CN	500	9.66	0.11	−0.16	−1.68	9.66	0.33	−0.16	0.37	3.73	0.38	0.11
wHill	CN	700	9.65	0.11	−0.18	−1.78	9.65	0.33	−0.17	0.37	3.78	0.38	0.11
wISE	RT	300	9.80	0.12	−0.03	−0.30	9.80	0.36	−0.03	0.35	3.52	0.37	0.11
wISE	RT	500	9.90	0.12	0.08	0.77	9.91	0.36	0.08	0.36	3.68	0.36	0.14
wISE	RT	700	10.07	0.14	0.24	2.46	10.04	0.38	0.22	0.45	4.53	0.43	0.16
wISE	RN	300	9.69	0.11	−0.13	−1.35	9.69	0.34	−0.13	0.36	3.63	0.37	0.11
wISE	RN	500	9.68	0.11	−0.14	−1.44	9.69	0.33	−0.13	0.36	3.64	0.37	0.11
wISE	RN	700	9.68	0.11	−0.14	−1.44	9.69	0.34	−0.14	0.36	3.64	0.37	0.11
wISE	CN	300	9.68	0.11	−0.15	−1.49	9.68	0.34	−0.14	0.36	3.68	0.37	0.11
wISE	CN	500	9.67	0.11	−0.15	−1.54	9.68	0.34	−0.14	0.36	3.67	0.37	0.11
wISE	CN	700	9.68	0.11	−0.15	−1.50	9.68	0.34	−0.14	0.36	3.66	0.37	0.11
wPDC	RT	300	9.81	0.13	−0.01	−0.11	9.81	0.36	−0.02	0.35	3.61	0.35	0.11
wPDC	RT	500	9.99	0.14	0.16	1.64	9.97	0.38	0.14	0.41	4.15	0.39	0.15
wPDC	RT	700	10.24	0.17	0.42	4.26	10.24	0.43	0.41	0.59	6.00	0.63	0.17
wPDC	RN	300	9.70	0.11	−0.13	−1.32	9.70	0.34	−0.13	0.36	3.62	0.37	0.11
wPDC	RN	500	9.69	0.11	−0.13	−1.35	9.70	0.34	−0.13	0.35	3.60	0.37	0.11
wPDC	RN	700	9.70	0.11	−0.12	−1.27	9.71	0.34	−0.12	0.35	3.59	0.36	0.11
wPDC	CN	300	9.68	0.11	−0.14	−1.46	9.68	0.34	−0.14	0.36	3.68	0.37	0.11
wPDC	CN	500	9.68	0.11	−0.14	−1.45	9.69	0.34	−0.14	0.36	3.63	0.37	0.11
wPDC	CN	700	9.69	0.11	−0.13	−1.33	9.70	0.35	−0.12	0.35	3.61	0.36	0.11
GB2			9.40	0.08	−0.43	−4.34	9.40	0.27	−0.42	0.51	5.20	0.63	0.13

OCAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

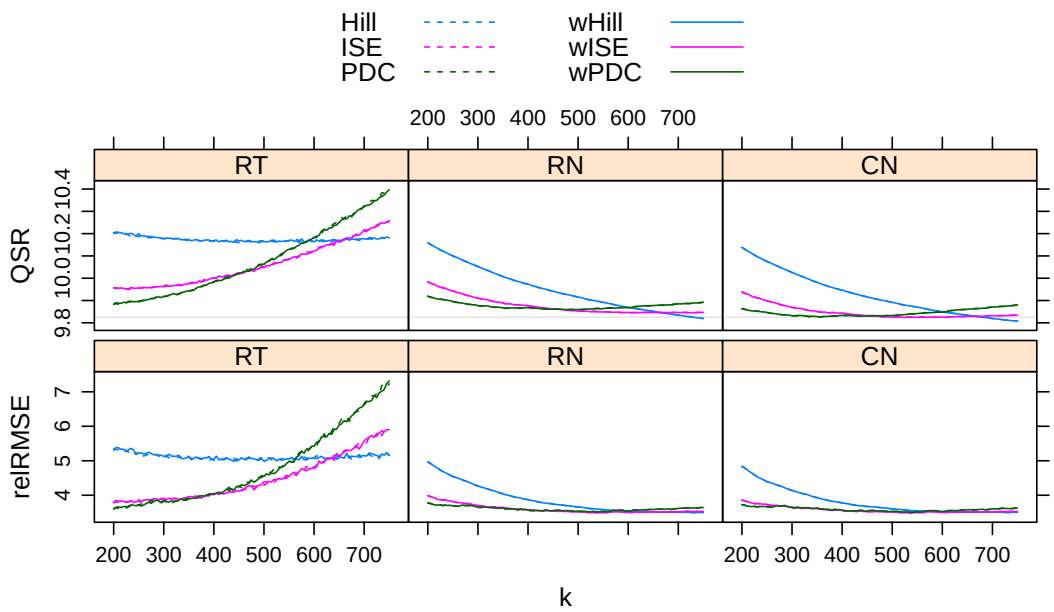

Figure F.364.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

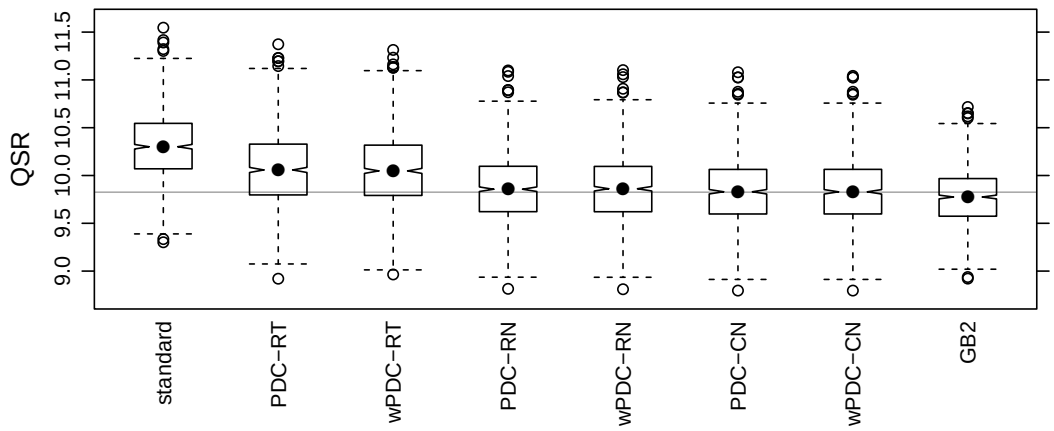

Figure F.365.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.182.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			10.31	0.12	0.49	4.94	10.30	0.35	0.48	0.60	6.10	0.71	0.18
wHill	RT	300	10.18	0.13	0.35	3.59	10.18	0.37	0.35	0.50	5.13	0.55	0.17
wHill	RT	500	10.16	0.13	0.34	3.45	10.16	0.36	0.34	0.49	4.98	0.53	0.16
wHill	RT	700	10.18	0.13	0.35	3.58	10.18	0.36	0.35	0.51	5.15	0.54	0.18
wHill	RN	300	10.05	0.12	0.23	2.31	10.05	0.36	0.23	0.42	4.27	0.42	0.15
wHill	RN	500	9.92	0.12	0.09	0.92	9.92	0.36	0.10	0.36	3.66	0.37	0.14
wHill	RN	700	9.83	0.12	0.01	0.09	9.83	0.35	0.01	0.35	3.52	0.35	0.13
wHill	CN	300	10.03	0.13	0.20	2.04	10.03	0.36	0.20	0.41	4.14	0.41	0.15
wHill	CN	500	9.89	0.12	0.07	0.67	9.90	0.36	0.07	0.35	3.61	0.36	0.14
wHill	CN	700	9.82	0.12	−0.01	−0.06	9.82	0.35	−0.01	0.34	3.51	0.35	0.12
wISE	RT	300	9.96	0.13	0.14	1.39	9.97	0.37	0.14	0.38	3.90	0.39	0.14
wISE	RT	500	10.05	0.14	0.22	2.27	10.04	0.39	0.22	0.43	4.39	0.42	0.16
wISE	RT	700	10.22	0.15	0.39	4.00	10.20	0.38	0.37	0.55	5.58	0.57	0.17
wISE	RN	300	9.91	0.13	0.08	0.86	9.90	0.36	0.07	0.36	3.71	0.36	0.13
wISE	RN	500	9.85	0.12	0.03	0.27	9.86	0.35	0.03	0.35	3.51	0.35	0.13
wISE	RN	700	9.85	0.12	0.02	0.22	9.84	0.35	0.02	0.35	3.52	0.34	0.13
wISE	CN	300	9.87	0.13	0.04	0.45	9.86	0.36	0.03	0.36	3.66	0.37	0.13
wISE	CN	500	9.83	0.12	0.00	0.00	9.82	0.35	−0.00	0.35	3.51	0.35	0.12
wISE	CN	700	9.83	0.12	0.01	0.07	9.83	0.35	0.00	0.35	3.52	0.35	0.12
wPDC	RT	300	9.92	0.13	0.09	0.96	9.90	0.36	0.07	0.38	3.82	0.37	0.13
wPDC	RT	500	10.06	0.14	0.24	2.41	10.05	0.39	0.22	0.45	4.54	0.43	0.15
wPDC	RT	700	10.32	0.18	0.50	5.04	10.30	0.41	0.48	0.65	6.62	0.71	0.22
wPDC	RN	300	9.88	0.13	0.05	0.52	9.86	0.36	0.03	0.36	3.65	0.37	0.13
wPDC	RN	500	9.86	0.12	0.03	0.35	9.86	0.35	0.04	0.35	3.54	0.35	0.13
wPDC	RN	700	9.89	0.12	0.06	0.61	9.88	0.35	0.06	0.36	3.62	0.36	0.14
wPDC	CN	300	9.83	0.13	0.01	0.06	9.82	0.36	−0.01	0.36	3.64	0.37	0.13
wPDC	CN	500	9.83	0.12	0.01	0.08	9.83	0.35	0.00	0.35	3.53	0.35	0.12
wPDC	CN	700	9.87	0.12	0.05	0.47	9.86	0.36	0.03	0.35	3.60	0.35	0.13
GB2			9.77	0.09	−0.05	−0.54	9.77	0.29	−0.05	0.30	3.04	0.30	0.09

OCAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

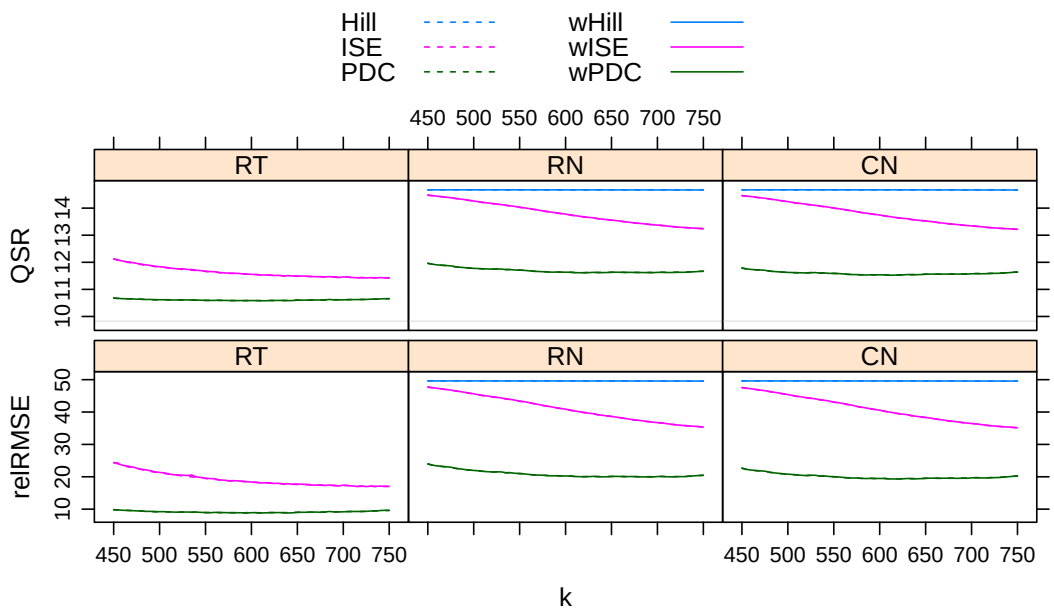

Figure F.366.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

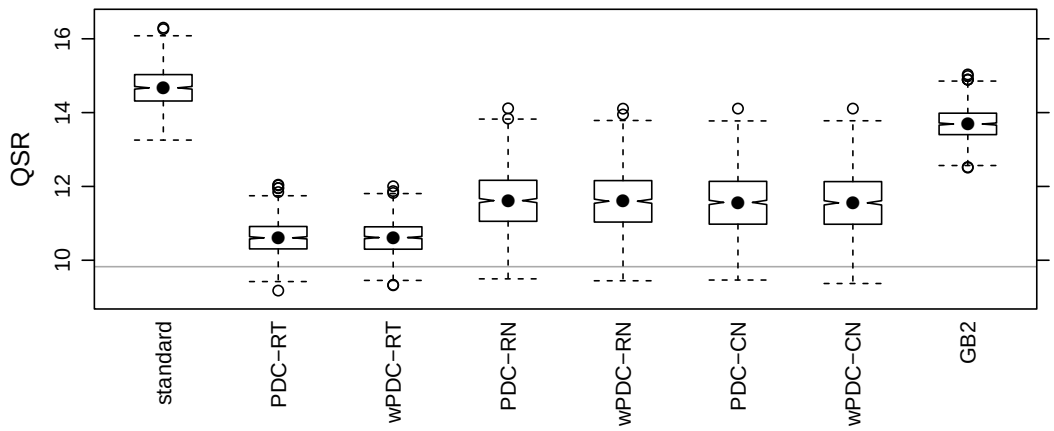

Figure F.367.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.183.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			14.68	0.25	4.85	49.37	14.67	0.53	4.85	4.88	49.63	7.19	0.66
wHill	RT	500	14.66	4.22	4.83	49.18	14.48	0.84	4.65	5.25	53.44	6.89	5.96
wHill	RT	700	14.02	0.55	4.20	42.74	13.97	0.67	4.15	4.26	43.40	6.15	1.03
wHill	RN	300	14.68	0.25	4.85	49.37	14.67	0.53	4.85	4.88	49.63	7.19	0.66
wHill	RN	500	14.68	0.25	4.85	49.36	14.67	0.53	4.85	4.88	49.62	7.19	0.66
wHill	RN	700	14.67	0.25	4.85	49.33	14.66	0.53	4.83	4.87	49.59	7.17	0.66
wHill	CN	300	14.68	0.25	4.85	49.37	14.67	0.53	4.85	4.88	49.63	7.19	0.66
wHill	CN	500	14.68	0.25	4.85	49.36	14.67	0.53	4.85	4.88	49.62	7.19	0.66
wHill	CN	700	14.67	0.25	4.85	49.33	14.66	0.53	4.83	4.87	49.59	7.17	0.66
wISE	RT	500	11.84	0.35	2.01	20.47	11.79	0.59	1.97	2.10	21.35	2.91	0.41
wISE	RT	700	11.46	0.25	1.64	16.65	11.43	0.49	1.61	1.71	17.41	2.38	0.38
wISE	RN	300	14.68	0.25	4.85	49.37	14.67	0.53	4.85	4.88	49.63	7.19	0.66
wISE	RN	500	14.26	0.40	4.44	45.17	14.26	0.64	4.44	4.48	45.62	6.58	0.66
wISE	RN	700	13.37	0.45	3.55	36.09	13.34	0.67	3.51	3.61	36.74	5.21	0.61
wISE	CN	300	14.68	0.25	4.85	49.37	14.67	0.53	4.85	4.88	49.63	7.19	0.66
wISE	CN	500	14.24	0.42	4.41	44.91	14.24	0.63	4.42	4.46	45.39	6.55	0.66
wISE	CN	700	13.34	0.46	3.52	35.81	13.31	0.67	3.48	3.58	36.47	5.17	0.61
wPDC	RT	500	10.62	0.19	0.79	8.07	10.60	0.45	0.78	0.91	9.22	1.15	0.29
wPDC	RT	700	10.61	0.19	0.79	8.01	10.61	0.45	0.79	0.90	9.17	1.17	0.22
wPDC	RN	300	13.86	1.29	4.04	41.08	14.15	1.21	4.32	4.19	42.68	6.41	0.66
wPDC	RN	500	11.78	0.85	1.95	19.86	11.70	1.00	1.88	2.16	21.96	2.79	0.55
wPDC	RN	700	11.63	0.64	1.80	18.34	11.60	0.83	1.77	1.97	20.07	2.63	0.44
wPDC	CN	300	13.77	1.52	3.95	40.19	14.12	1.25	4.30	4.14	42.10	6.37	0.66
wPDC	CN	500	11.63	0.93	1.80	18.34	11.55	1.06	1.73	2.04	20.81	2.56	0.54
wPDC	CN	700	11.58	0.67	1.75	17.81	11.56	0.85	1.73	1.93	19.66	2.57	0.44
GB2			13.69	0.20	3.87	39.35	13.69	0.43	3.87	3.89	39.60	5.73	0.53

OCAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

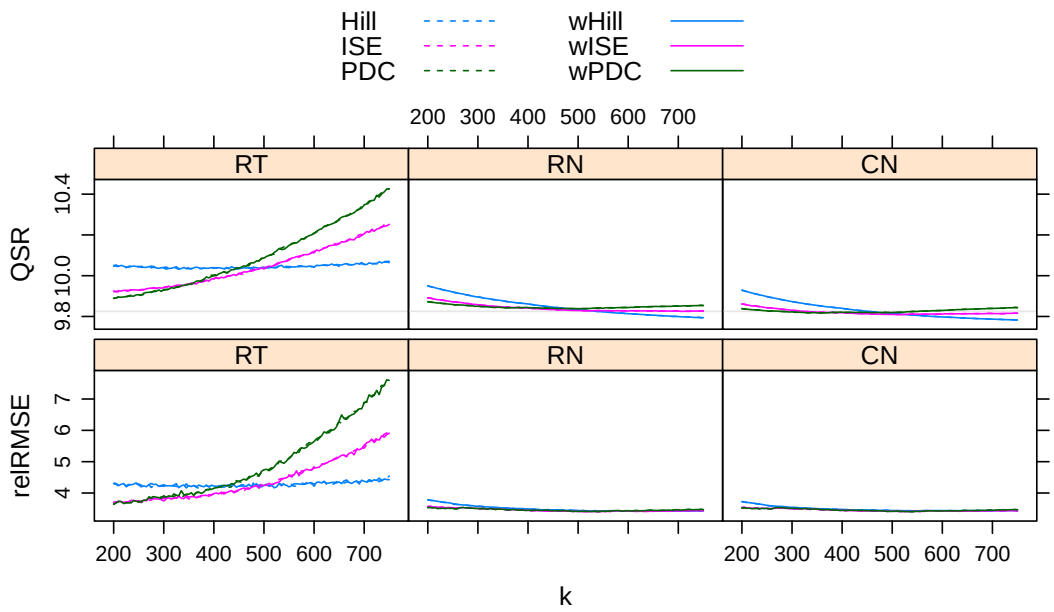

Figure F.368.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

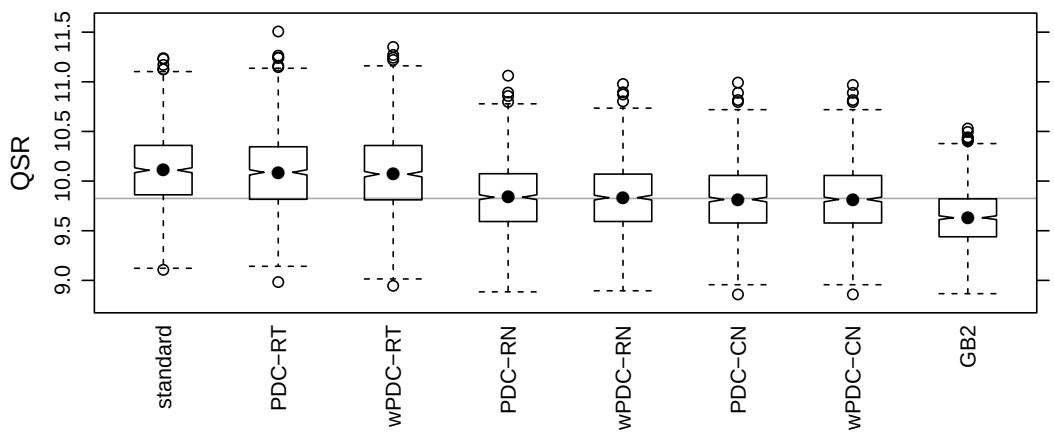

Figure F.369.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.184.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			10.12	0.13	0.29	2.95	10.11	0.37	0.28	0.46	4.66	0.47	0.14
wHill	RT	300	10.04	0.13	0.22	2.19	10.02	0.36	0.20	0.42	4.27	0.42	0.14
wHill	RT	500	10.04	0.13	0.21	2.18	10.03	0.36	0.21	0.42	4.24	0.42	0.14
wHill	RT	700	10.05	0.13	0.23	2.33	10.04	0.38	0.22	0.43	4.37	0.41	0.15
wHill	RN	300	9.90	0.12	0.07	0.72	9.89	0.36	0.06	0.35	3.58	0.36	0.12
wHill	RN	500	9.83	0.11	0.01	0.08	9.83	0.35	0.00	0.34	3.44	0.35	0.12
wHill	RN	700	9.80	0.11	−0.03	−0.26	9.79	0.35	−0.03	0.34	3.42	0.35	0.11
wHill	CN	300	9.87	0.12	0.05	0.49	9.87	0.36	0.04	0.35	3.54	0.36	0.12
wHill	CN	500	9.81	0.11	−0.01	−0.11	9.81	0.35	−0.01	0.34	3.44	0.35	0.11
wHill	CN	700	9.79	0.11	−0.04	−0.39	9.78	0.35	−0.04	0.34	3.43	0.35	0.11
wISE	RT	300	9.94	0.13	0.12	1.19	9.93	0.37	0.11	0.38	3.84	0.38	0.14
wISE	RT	500	10.03	0.13	0.21	2.11	10.03	0.37	0.20	0.42	4.24	0.42	0.15
wISE	RT	700	10.21	0.15	0.38	3.87	10.20	0.39	0.38	0.54	5.53	0.58	0.17
wISE	RN	300	9.86	0.12	0.03	0.33	9.84	0.36	0.02	0.34	3.51	0.36	0.12
wISE	RN	500	9.83	0.11	0.00	0.04	9.83	0.35	0.00	0.33	3.41	0.35	0.12
wISE	RN	700	9.83	0.11	0.00	0.01	9.82	0.36	−0.00	0.34	3.43	0.36	0.12
wISE	CN	300	9.83	0.12	0.01	0.05	9.82	0.36	−0.01	0.34	3.50	0.36	0.11
wISE	CN	500	9.81	0.11	−0.02	−0.15	9.81	0.35	−0.02	0.34	3.42	0.35	0.12
wISE	CN	700	9.81	0.11	−0.01	−0.11	9.81	0.35	−0.01	0.34	3.43	0.36	0.11
wPDC	RT	300	9.93	0.14	0.11	1.10	9.92	0.38	0.09	0.38	3.91	0.39	0.15
wPDC	RT	500	10.09	0.15	0.26	2.66	10.07	0.41	0.24	0.47	4.74	0.46	0.16
wPDC	RT	700	10.35	0.18	0.52	5.31	10.32	0.44	0.50	0.68	6.88	0.75	0.21
wPDC	RN	300	9.85	0.12	0.03	0.26	9.84	0.35	0.01	0.34	3.51	0.36	0.11
wPDC	RN	500	9.84	0.11	0.01	0.13	9.83	0.35	0.01	0.34	3.41	0.35	0.12
wPDC	RN	700	9.85	0.12	0.03	0.26	9.84	0.36	0.01	0.34	3.46	0.36	0.12
wPDC	CN	300	9.82	0.12	−0.00	−0.02	9.81	0.35	−0.01	0.34	3.51	0.36	0.11
wPDC	CN	500	9.82	0.11	−0.01	−0.06	9.81	0.36	−0.01	0.34	3.42	0.35	0.12
wPDC	CN	700	9.84	0.11	0.01	0.14	9.83	0.36	0.01	0.34	3.45	0.36	0.12
GB2			9.63	0.09	−0.19	−1.97	9.63	0.28	−0.19	0.35	3.58	0.37	0.10

OCAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

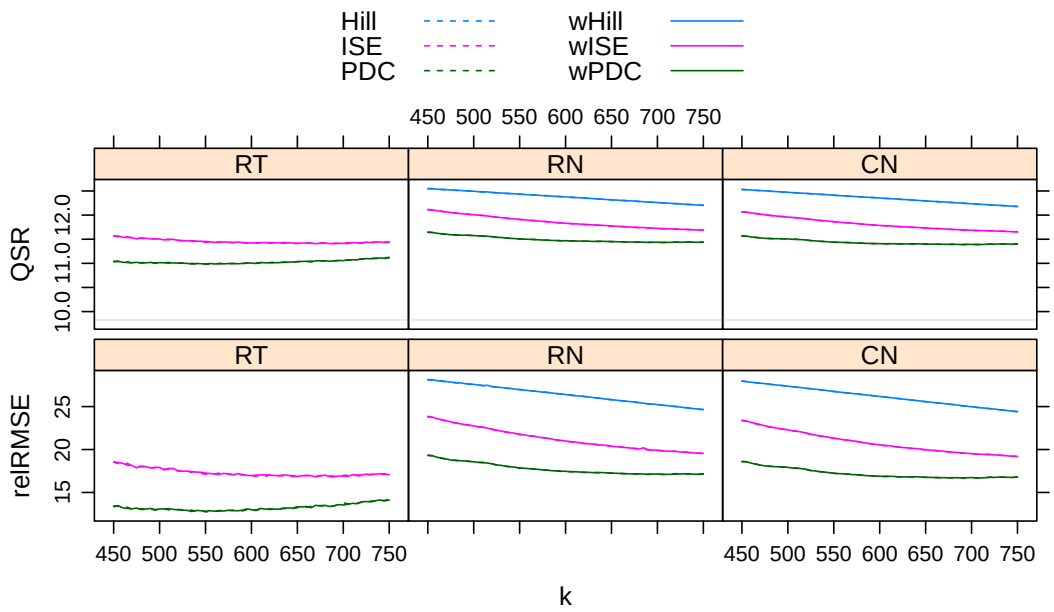

Figure F.370.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

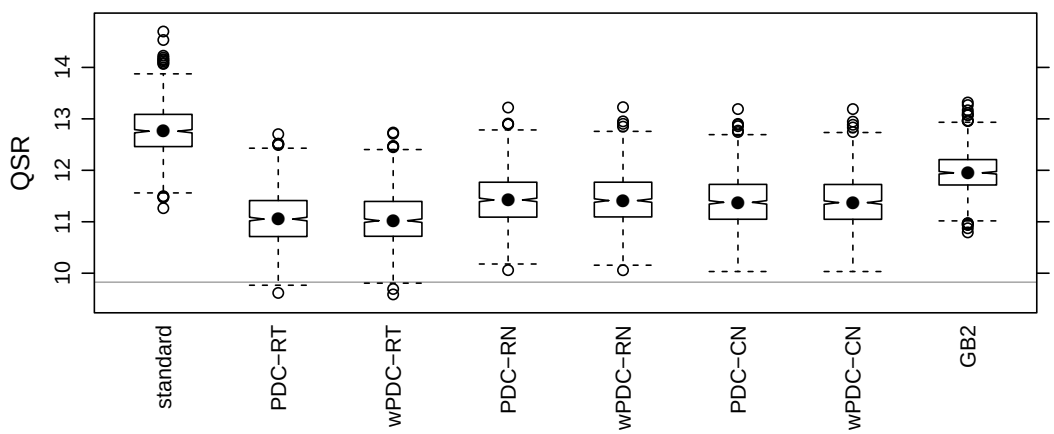

Figure F.371.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.185.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			12.78	0.22	2.96	30.09	12.76	0.46	2.93	2.99	30.47	4.35	0.50
wHill	RT	500	12.58	0.31	2.75	28.00	12.57	0.52	2.74	2.81	28.58	4.06	0.56
wHill	RT	700	12.44	0.31	2.62	26.64	12.40	0.53	2.57	2.68	27.24	3.82	0.53
wHill	RN	300	12.70	0.22	2.87	29.24	12.67	0.45	2.85	2.91	29.63	4.22	0.50
wHill	RN	500	12.49	0.23	2.67	27.17	12.47	0.47	2.65	2.71	27.59	3.92	0.45
wHill	RN	700	12.26	0.22	2.43	24.78	12.24	0.47	2.41	2.48	25.23	3.58	0.44
wHill	CN	300	12.69	0.22	2.87	29.17	12.66	0.45	2.84	2.90	29.56	4.21	0.50
wHill	CN	500	12.47	0.22	2.65	26.95	12.45	0.47	2.63	2.69	27.38	3.89	0.45
wHill	CN	700	12.23	0.22	2.41	24.52	12.21	0.47	2.39	2.45	24.98	3.54	0.43
wISE	RT	500	11.50	0.29	1.68	17.07	11.48	0.51	1.65	1.76	17.92	2.45	0.89
wISE	RT	700	11.41	0.23	1.59	16.18	11.41	0.48	1.58	1.66	16.90	2.35	0.34
wISE	RN	300	12.54	0.24	2.72	27.66	12.53	0.49	2.71	2.76	28.10	4.01	0.46
wISE	RN	500	12.01	0.23	2.18	22.21	11.99	0.49	2.17	2.23	22.74	3.21	0.39
wISE	RN	700	11.73	0.22	1.90	19.34	11.73	0.48	1.91	1.96	19.92	2.83	0.37
wISE	CN	300	12.52	0.24	2.69	27.43	12.51	0.49	2.68	2.74	27.88	3.97	0.46
wISE	CN	500	11.96	0.24	2.13	21.73	11.94	0.51	2.12	2.19	22.29	3.14	0.39
wISE	CN	700	11.69	0.22	1.86	18.93	11.69	0.48	1.87	1.92	19.52	2.77	0.37
wPDC	RT	500	11.01	0.23	1.19	12.10	10.99	0.47	1.17	1.28	13.07	1.73	0.32
wPDC	RT	700	11.06	0.26	1.23	12.53	11.02	0.49	1.20	1.33	13.54	1.77	0.30
wPDC	RN	300	12.17	0.34	2.34	23.82	12.19	0.60	2.36	2.41	24.55	3.50	0.41
wPDC	RN	500	11.58	0.27	1.75	17.81	11.58	0.53	1.75	1.82	18.57	2.59	0.36
wPDC	RN	700	11.44	0.24	1.61	16.40	11.41	0.49	1.59	1.68	17.15	2.35	0.35
wPDC	CN	300	12.10	0.37	2.28	23.20	12.14	0.62	2.31	2.36	24.02	3.43	0.41
wPDC	CN	500	11.51	0.28	1.68	17.11	11.50	0.53	1.68	1.76	17.92	2.49	0.35
wPDC	CN	700	11.39	0.24	1.57	15.96	11.37	0.50	1.55	1.64	16.73	2.29	0.34
GB2			11.96	0.15	2.13	21.70	11.95	0.37	2.13	2.17	22.06	3.15	0.36

OAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

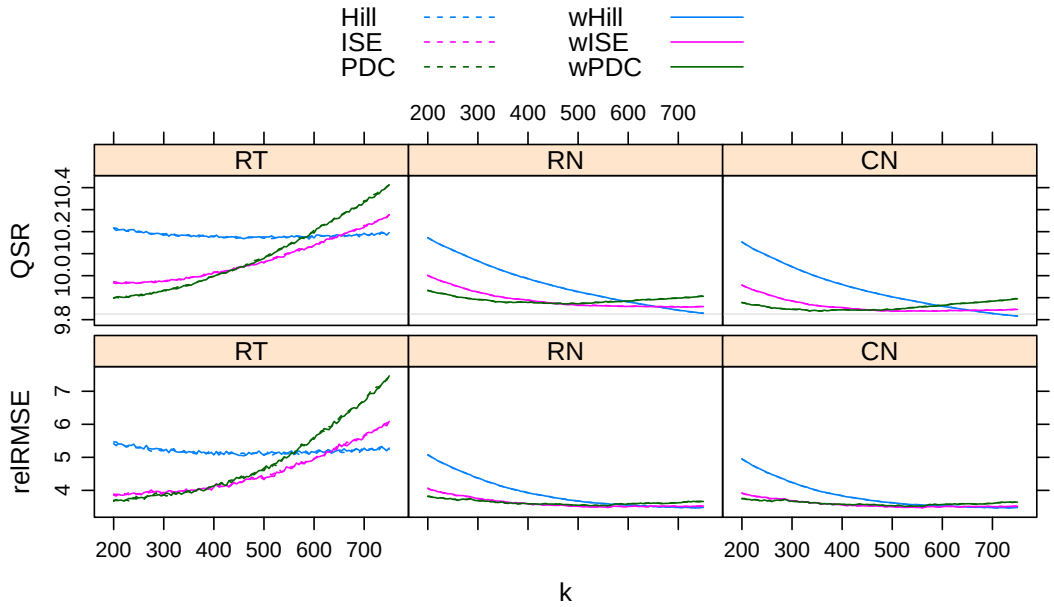

Figure F.372.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

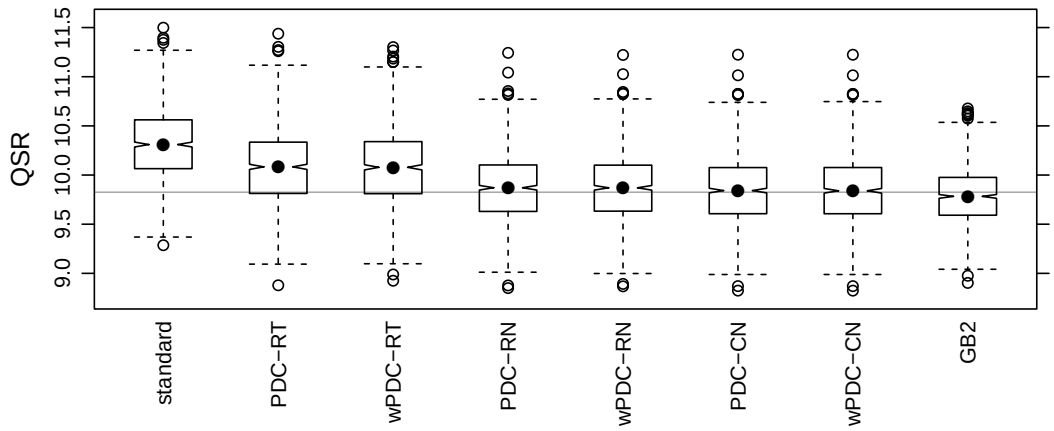

Figure F.373.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.186.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			10.32	0.12	0.49	5.00	10.31	0.37	0.48	0.60	6.15	0.72	0.17
wHill	RT	300	10.18	0.13	0.36	3.64	10.18	0.38	0.35	0.51	5.20	0.56	0.17
wHill	RT	500	10.17	0.13	0.34	3.50	10.17	0.38	0.34	0.50	5.06	0.54	0.19
wHill	RT	700	10.19	0.13	0.37	3.74	10.20	0.38	0.37	0.52	5.28	0.58	0.17
wHill	RN	300	10.07	0.13	0.24	2.46	10.06	0.37	0.24	0.43	4.37	0.44	0.15
wHill	RN	500	9.93	0.12	0.10	1.04	9.93	0.36	0.10	0.36	3.68	0.37	0.15
wHill	RN	700	9.84	0.12	0.02	0.18	9.85	0.35	0.02	0.34	3.49	0.36	0.13
wHill	CN	300	10.04	0.13	0.22	2.20	10.03	0.38	0.21	0.42	4.24	0.42	0.15
wHill	CN	500	9.90	0.12	0.08	0.79	9.90	0.36	0.08	0.36	3.63	0.37	0.15
wHill	CN	700	9.83	0.12	0.00	0.03	9.83	0.35	0.00	0.34	3.48	0.36	0.13
wISE	RT	300	9.97	0.13	0.15	1.52	9.97	0.36	0.14	0.39	3.93	0.38	0.14
wISE	RT	500	10.06	0.13	0.23	2.37	10.06	0.37	0.23	0.43	4.35	0.43	0.14
wISE	RT	700	10.22	0.15	0.39	4.01	10.22	0.38	0.40	0.55	5.62	0.61	0.16
wISE	RN	300	9.93	0.13	0.10	1.02	9.92	0.37	0.09	0.37	3.76	0.37	0.13
wISE	RN	500	9.86	0.12	0.04	0.40	9.87	0.35	0.05	0.35	3.52	0.35	0.13
wISE	RN	700	9.86	0.12	0.03	0.34	9.85	0.35	0.03	0.34	3.51	0.35	0.14
wISE	CN	300	9.88	0.13	0.06	0.60	9.87	0.36	0.05	0.36	3.69	0.37	0.13
wISE	CN	500	9.84	0.12	0.01	0.13	9.84	0.35	0.02	0.34	3.50	0.35	0.14
wISE	CN	700	9.84	0.12	0.02	0.19	9.83	0.36	0.01	0.34	3.50	0.36	0.14
wPDC	RT	300	9.93	0.13	0.11	1.10	9.92	0.38	0.10	0.38	3.86	0.38	0.14
wPDC	RT	500	10.08	0.15	0.25	2.57	10.08	0.39	0.25	0.46	4.67	0.45	0.15
wPDC	RT	700	10.33	0.17	0.51	5.19	10.34	0.43	0.51	0.66	6.69	0.77	0.18
wPDC	RN	300	9.89	0.13	0.07	0.67	9.88	0.37	0.05	0.36	3.69	0.37	0.12
wPDC	RN	500	9.87	0.12	0.05	0.47	9.87	0.35	0.05	0.35	3.55	0.35	0.14
wPDC	RN	700	9.90	0.12	0.07	0.75	9.89	0.36	0.06	0.36	3.62	0.36	0.15
wPDC	CN	300	9.85	0.13	0.02	0.22	9.83	0.37	0.00	0.36	3.67	0.37	0.12
wPDC	CN	500	9.85	0.12	0.02	0.20	9.84	0.35	0.01	0.35	3.54	0.35	0.14
wPDC	CN	700	9.88	0.12	0.06	0.60	9.88	0.36	0.05	0.35	3.60	0.37	0.15
GB2			9.78	0.09	−0.04	−0.45	9.78	0.28	−0.04	0.30	3.03	0.29	0.09

OAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

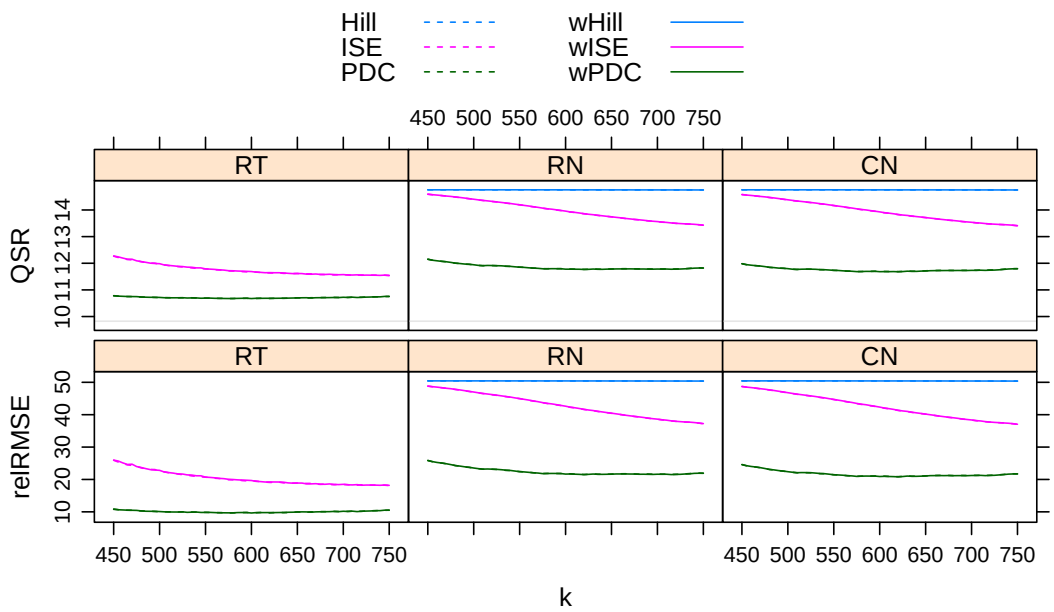

Figure F.374.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

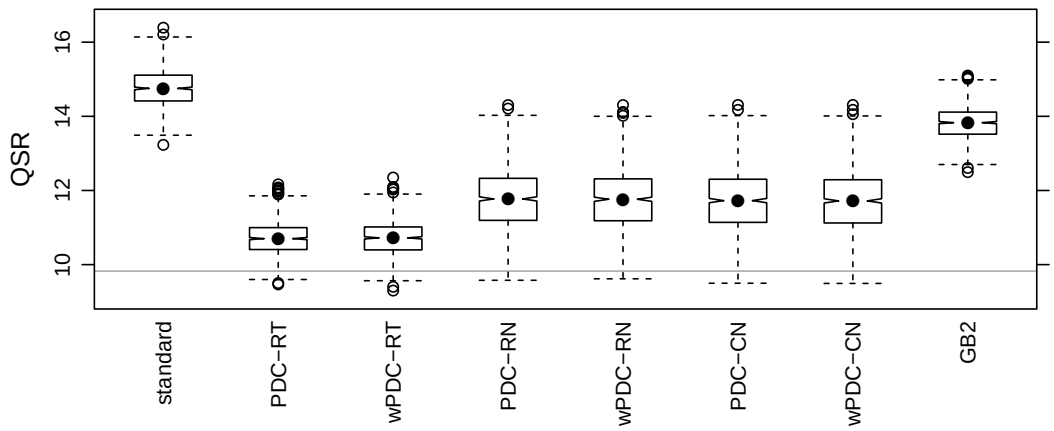

Figure F.375.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.187.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			14.76	0.24	4.93	50.20	14.75	0.52	4.93	4.96	50.45	7.31	0.67
wHill	RT	500	14.73	2.06	4.91	49.94	14.55	0.87	4.72	5.11	52.04	7.00	2.75
wHill	RT	700	14.15	0.89	4.32	43.99	14.08	0.71	4.26	4.42	45.03	6.31	2.02
wHill	RN	300	14.76	0.24	4.93	50.20	14.75	0.52	4.93	4.96	50.45	7.31	0.67
wHill	RN	500	14.76	0.25	4.93	50.19	14.75	0.52	4.93	4.96	50.44	7.31	0.67
wHill	RN	700	14.75	0.24	4.93	50.15	14.75	0.51	4.92	4.95	50.41	7.30	0.67
wHill	CN	300	14.76	0.24	4.93	50.20	14.75	0.52	4.93	4.96	50.45	7.31	0.67
wHill	CN	500	14.76	0.25	4.93	50.19	14.75	0.52	4.93	4.96	50.44	7.31	0.67
wHill	CN	700	14.75	0.24	4.93	50.15	14.75	0.51	4.92	4.95	50.40	7.30	0.67
wISE	RT	500	11.98	0.36	2.16	21.97	11.94	0.59	2.12	2.24	22.81	3.14	0.43
wISE	RT	700	11.57	0.24	1.75	17.80	11.56	0.47	1.74	1.82	18.49	2.57	0.47
wISE	RN	300	14.76	0.25	4.93	50.20	14.75	0.52	4.93	4.96	50.45	7.31	0.67
wISE	RN	500	14.40	0.37	4.58	46.59	14.42	0.61	4.59	4.62	47.00	6.81	0.67
wISE	RN	700	13.56	0.42	3.74	38.06	13.51	0.63	3.68	3.80	38.63	5.46	0.61
wISE	CN	300	14.76	0.25	4.93	50.20	14.75	0.52	4.93	4.96	50.45	7.31	0.67
wISE	CN	500	14.38	0.38	4.56	46.38	14.40	0.62	4.58	4.60	46.79	6.78	0.67
wISE	CN	700	13.54	0.43	3.71	37.79	13.48	0.64	3.66	3.77	38.37	5.42	0.61
wPDC	RT	500	10.72	0.19	0.89	9.08	10.70	0.45	0.87	0.99	10.09	1.30	0.23
wPDC	RT	700	10.72	0.19	0.90	9.14	10.72	0.46	0.90	1.00	10.18	1.33	0.26
wPDC	RN	300	14.06	1.17	4.23	43.06	14.35	1.00	4.53	4.37	44.45	6.71	0.67
wPDC	RN	500	11.94	0.86	2.12	21.56	11.91	1.00	2.09	2.31	23.53	3.10	0.52
wPDC	RN	700	11.78	0.68	1.96	19.93	11.76	0.84	1.94	2.12	21.62	2.87	0.46
wPDC	CN	300	13.98	1.38	4.15	42.28	14.34	1.05	4.51	4.32	43.94	6.69	0.67
wPDC	CN	500	11.80	0.95	1.97	20.07	11.78	1.04	1.95	2.20	22.40	2.89	0.52
wPDC	CN	700	11.73	0.71	1.91	19.42	11.72	0.86	1.89	2.09	21.22	2.81	0.46
GB2			13.82	0.19	3.99	40.65	13.83	0.44	4.00	4.02	40.89	5.94	0.54

OAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

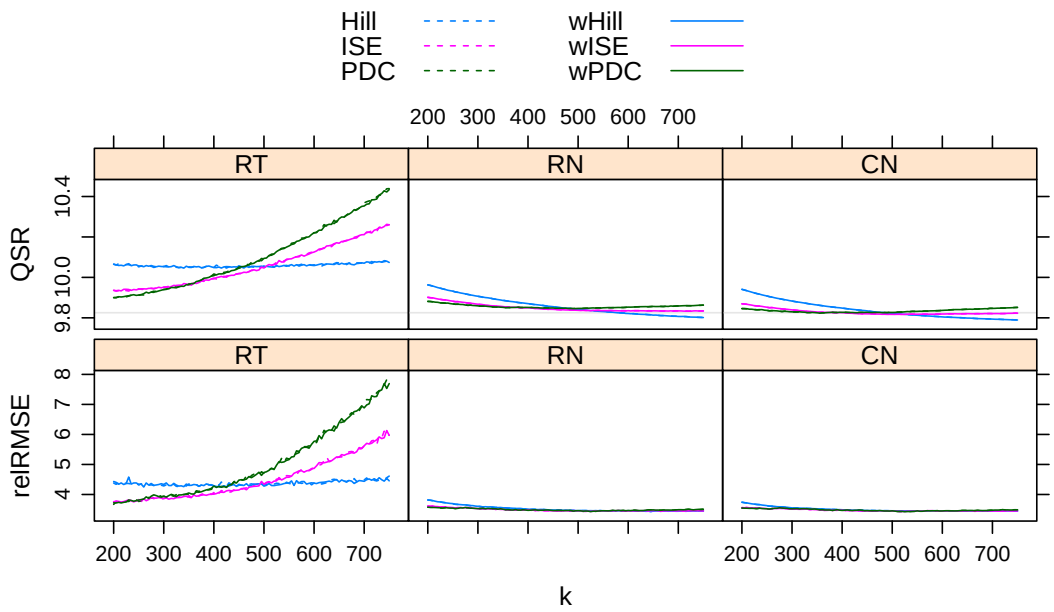

Figure F.376.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

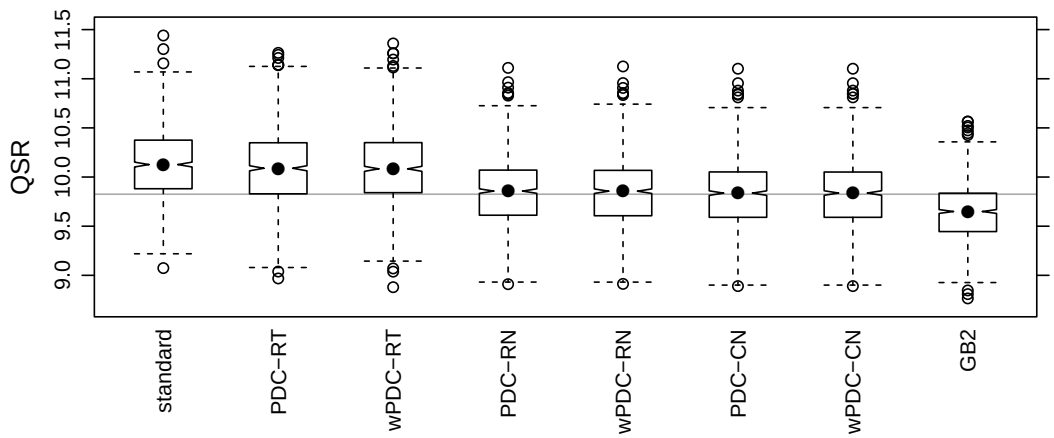

Figure F.377.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.188.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			10.13	0.13	0.31	3.11	10.13	0.37	0.30	0.47	4.76	0.49	0.16
wHill	RT	300	10.05	0.13	0.23	2.32	10.05	0.36	0.22	0.43	4.33	0.44	0.16
wHill	RT	500	10.05	0.13	0.23	2.31	10.05	0.36	0.23	0.42	4.28	0.43	0.16
wHill	RT	700	10.07	0.13	0.24	2.49	10.07	0.36	0.24	0.44	4.44	0.44	0.15
wHill	RN	300	9.91	0.12	0.08	0.83	9.91	0.36	0.08	0.35	3.61	0.35	0.13
wHill	RN	500	9.84	0.12	0.02	0.17	9.85	0.34	0.02	0.34	3.46	0.34	0.13
wHill	RN	700	9.81	0.11	−0.02	−0.19	9.81	0.34	−0.02	0.34	3.44	0.35	0.12
wHill	CN	300	9.88	0.12	0.06	0.59	9.88	0.36	0.06	0.35	3.55	0.35	0.13
wHill	CN	500	9.82	0.12	−0.00	−0.03	9.83	0.34	0.00	0.34	3.46	0.34	0.13
wHill	CN	700	9.79	0.11	−0.03	−0.32	9.80	0.34	−0.03	0.34	3.45	0.34	0.12
wISE	RT	300	9.95	0.13	0.13	1.29	9.94	0.36	0.11	0.38	3.87	0.38	0.14
wISE	RT	500	10.05	0.13	0.22	2.25	10.04	0.36	0.21	0.43	4.34	0.44	0.16
wISE	RT	700	10.21	0.16	0.39	3.93	10.20	0.39	0.38	0.55	5.62	0.59	0.18
wISE	RN	300	9.87	0.12	0.04	0.43	9.87	0.34	0.04	0.35	3.53	0.35	0.13
wISE	RN	500	9.84	0.12	0.01	0.12	9.85	0.34	0.02	0.34	3.45	0.34	0.13
wISE	RN	700	9.83	0.12	0.01	0.09	9.83	0.35	0.00	0.34	3.46	0.34	0.13
wISE	CN	300	9.84	0.12	0.01	0.14	9.84	0.34	0.02	0.34	3.51	0.35	0.12
wISE	CN	500	9.82	0.11	−0.01	−0.08	9.83	0.34	0.00	0.34	3.45	0.34	0.13
wISE	CN	700	9.82	0.11	−0.00	−0.05	9.82	0.34	−0.01	0.34	3.45	0.34	0.13
wPDC	RT	300	9.94	0.14	0.11	1.17	9.93	0.38	0.11	0.39	3.94	0.38	0.15
wPDC	RT	500	10.09	0.14	0.27	2.74	10.08	0.38	0.26	0.46	4.73	0.46	0.16
wPDC	RT	700	10.35	0.18	0.53	5.37	10.34	0.41	0.52	0.68	6.88	0.77	0.20
wPDC	RN	300	9.86	0.12	0.03	0.34	9.85	0.34	0.03	0.35	3.53	0.34	0.13
wPDC	RN	500	9.85	0.12	0.02	0.22	9.86	0.34	0.03	0.34	3.46	0.34	0.13
wPDC	RN	700	9.86	0.12	0.03	0.34	9.86	0.34	0.04	0.34	3.49	0.34	0.13
wPDC	CN	300	9.83	0.12	0.00	0.04	9.82	0.35	−0.00	0.35	3.52	0.35	0.12
wPDC	CN	500	9.83	0.12	0.00	0.01	9.84	0.34	0.01	0.34	3.46	0.34	0.13
wPDC	CN	700	9.85	0.12	0.02	0.22	9.85	0.34	0.02	0.34	3.48	0.34	0.13
GB2			9.65	0.09	−0.18	−1.83	9.65	0.29	−0.18	0.35	3.51	0.35	0.11

OAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

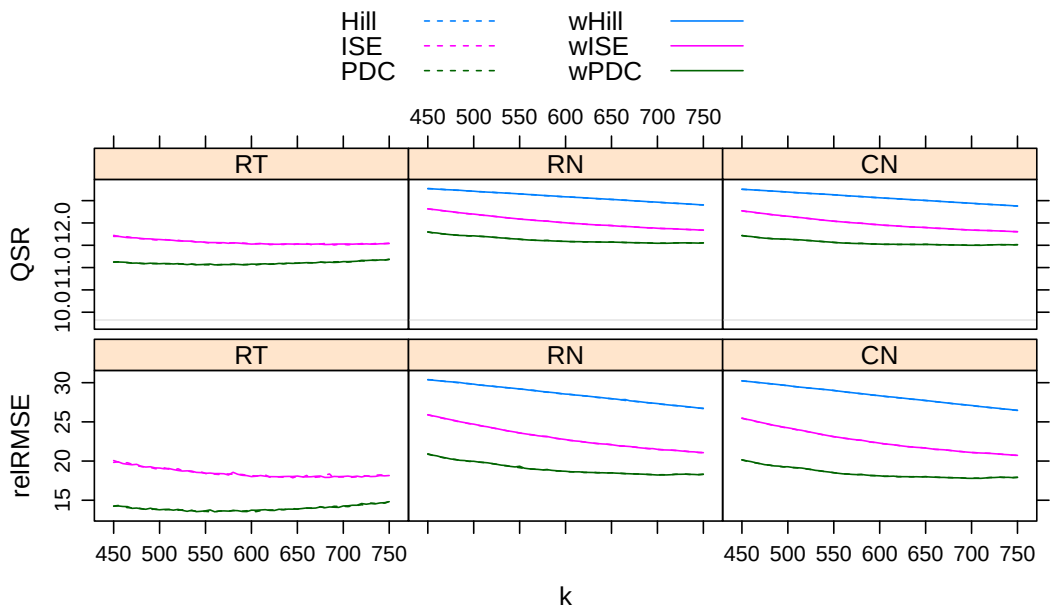

Figure F.378.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

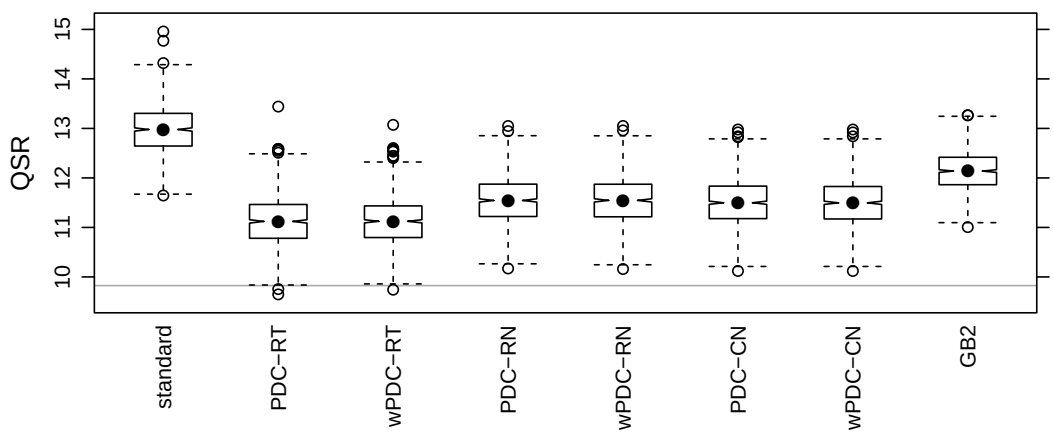

Figure F.379.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.189.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			12.98	0.24	3.15	32.09	12.98	0.49	3.15	3.19	32.47	4.67	0.52
wHill	RT	500	12.83	0.45	3.00	30.53	12.79	0.60	2.97	3.07	31.29	4.40	0.87
wHill	RT	700	12.63	0.39	2.80	28.54	12.61	0.57	2.78	2.87	29.24	4.12	0.92
wHill	RN	300	12.91	0.24	3.08	31.36	12.90	0.50	3.08	3.12	31.75	4.56	0.52
wHill	RN	500	12.71	0.25	2.89	29.38	12.71	0.50	2.88	2.93	29.81	4.27	0.48
wHill	RN	700	12.47	0.24	2.64	26.88	12.46	0.49	2.63	2.69	27.34	3.90	0.46
wHill	CN	300	12.90	0.24	3.08	31.30	12.89	0.50	3.07	3.11	31.69	4.54	0.52
wHill	CN	500	12.69	0.25	2.87	29.19	12.69	0.50	2.87	2.91	29.62	4.25	0.48
wHill	CN	700	12.44	0.24	2.62	26.63	12.44	0.49	2.61	2.66	27.09	3.87	0.45
wISE	RT	500	11.63	0.27	1.80	18.36	11.61	0.52	1.79	1.88	19.11	2.65	0.37
wISE	RT	700	11.53	0.24	1.70	17.33	11.51	0.49	1.69	1.77	18.03	2.50	0.38
wISE	RN	300	12.76	0.26	2.94	29.89	12.75	0.50	2.93	2.98	30.33	4.34	0.50
wISE	RN	500	12.20	0.26	2.37	24.15	12.17	0.50	2.34	2.43	24.71	3.48	0.42
wISE	RN	700	11.88	0.23	2.06	20.92	11.87	0.48	2.05	2.11	21.49	3.03	0.37
wISE	CN	300	12.74	0.26	2.92	29.69	12.73	0.51	2.90	2.96	30.15	4.30	0.49
wISE	CN	500	12.15	0.27	2.33	23.67	12.12	0.50	2.30	2.38	24.24	3.41	0.42
wISE	CN	700	11.84	0.23	2.02	20.51	11.84	0.49	2.01	2.07	21.09	2.98	0.36
wPDC	RT	500	11.09	0.24	1.26	12.83	11.07	0.51	1.25	1.35	13.78	1.85	0.28
wPDC	RT	700	11.13	0.25	1.31	13.32	11.12	0.47	1.30	1.40	14.27	1.92	0.33
wPDC	RN	300	12.37	0.39	2.55	25.95	12.40	0.60	2.57	2.62	26.71	3.81	0.45
wPDC	RN	500	11.71	0.29	1.89	19.20	11.69	0.53	1.87	1.96	19.97	2.77	0.37
wPDC	RN	700	11.54	0.25	1.72	17.50	11.55	0.49	1.72	1.79	18.22	2.55	0.33
wPDC	CN	300	12.31	0.42	2.49	25.34	12.34	0.64	2.52	2.57	26.19	3.73	0.45
wPDC	CN	500	11.64	0.30	1.81	18.44	11.62	0.54	1.80	1.89	19.27	2.66	0.37
wPDC	CN	700	11.50	0.25	1.67	17.04	11.50	0.49	1.67	1.75	17.79	2.48	0.32
GB2			12.14	0.16	2.32	23.60	12.14	0.41	2.31	2.35	23.94	3.43	0.35

Two-stage design with simple random sampling and Midzuno sampling

No contamination

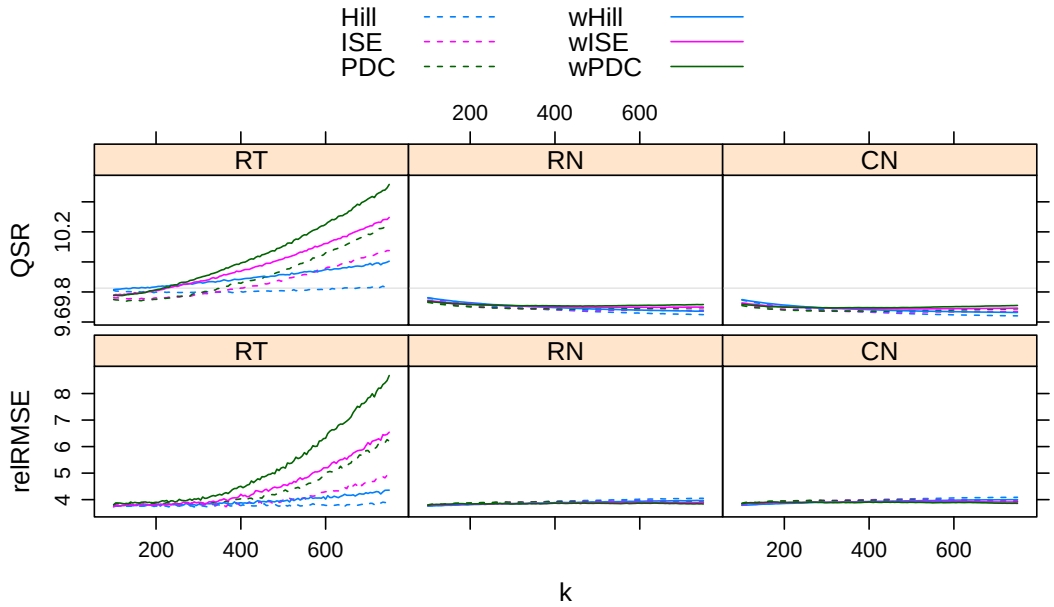

Figure F.380.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 100 and 750.

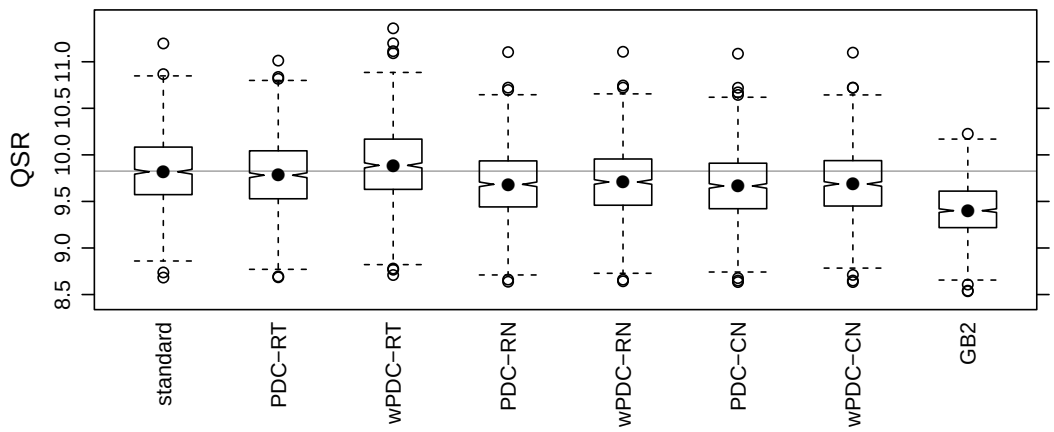

Figure F.381.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 300$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.190.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			9.83	0.13	0.00	0.01	9.82	0.38	−0.01	0.37	3.73	0.38	0.14
wHill	RT	300	9.86	0.14	0.04	0.38	9.85	0.37	0.02	0.38	3.82	0.37	0.14
wHill	RT	500	9.92	0.14	0.09	0.92	9.91	0.39	0.09	0.39	3.94	0.39	0.14
wHill	RT	700	9.98	0.15	0.16	1.59	9.97	0.39	0.15	0.42	4.23	0.42	0.14
wHill	RN	300	9.71	0.13	−0.12	−1.19	9.71	0.37	−0.12	0.38	3.85	0.39	0.13
wHill	RN	500	9.69	0.13	−0.14	−1.42	9.68	0.37	−0.15	0.38	3.92	0.39	0.12
wHill	RN	700	9.67	0.13	−0.15	−1.54	9.67	0.37	−0.16	0.39	3.96	0.39	0.12
wHill	CN	300	9.69	0.13	−0.13	−1.34	9.69	0.37	−0.14	0.38	3.90	0.40	0.13
wHill	CN	500	9.67	0.13	−0.15	−1.54	9.67	0.37	−0.16	0.39	3.96	0.39	0.12
wHill	CN	700	9.67	0.13	−0.16	−1.63	9.66	0.36	−0.16	0.39	3.99	0.40	0.12
wISE	RT	300	9.87	0.15	0.04	0.43	9.86	0.40	0.03	0.38	3.90	0.40	0.14
wISE	RT	500	10.02	0.16	0.20	1.99	10.01	0.41	0.18	0.45	4.56	0.45	0.18
wISE	RT	700	10.23	0.20	0.41	4.16	10.22	0.48	0.39	0.60	6.15	0.61	0.21
wISE	RN	300	9.71	0.13	−0.12	−1.19	9.70	0.37	−0.12	0.38	3.85	0.38	0.13
wISE	RN	500	9.70	0.13	−0.13	−1.30	9.69	0.36	−0.14	0.38	3.89	0.39	0.13
wISE	RN	700	9.70	0.13	−0.13	−1.29	9.69	0.37	−0.14	0.38	3.88	0.38	0.13
wISE	CN	300	9.69	0.13	−0.13	−1.34	9.69	0.37	−0.14	0.38	3.90	0.39	0.13
wISE	CN	500	9.69	0.13	−0.14	−1.41	9.67	0.36	−0.15	0.39	3.93	0.39	0.13
wISE	CN	700	9.69	0.13	−0.13	−1.37	9.68	0.37	−0.14	0.38	3.91	0.39	0.13
wPDC	RT	300	9.89	0.15	0.07	0.70	9.89	0.40	0.06	0.40	4.05	0.40	0.16
wPDC	RT	500	10.11	0.18	0.28	2.86	10.10	0.43	0.27	0.51	5.22	0.51	0.19
wPDC	RT	700	10.42	0.24	0.59	6.05	10.42	0.52	0.60	0.77	7.83	0.89	0.32
wPDC	RN	300	9.71	0.13	−0.12	−1.17	9.71	0.37	−0.12	0.38	3.84	0.38	0.13
wPDC	RN	500	9.71	0.13	−0.12	−1.20	9.69	0.37	−0.13	0.38	3.86	0.38	0.13
wPDC	RN	700	9.71	0.13	−0.11	−1.13	9.71	0.37	−0.12	0.38	3.85	0.38	0.13
wPDC	CN	300	9.70	0.13	−0.13	−1.32	9.69	0.36	−0.14	0.38	3.89	0.39	0.13
wPDC	CN	500	9.70	0.13	−0.13	−1.31	9.68	0.36	−0.15	0.38	3.90	0.39	0.13
wPDC	CN	700	9.71	0.13	−0.12	−1.20	9.70	0.37	−0.12	0.38	3.87	0.39	0.13
GB2			9.41	0.09	−0.42	−4.23	9.40	0.29	−0.42	0.51	5.17	0.63	0.13

OCAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

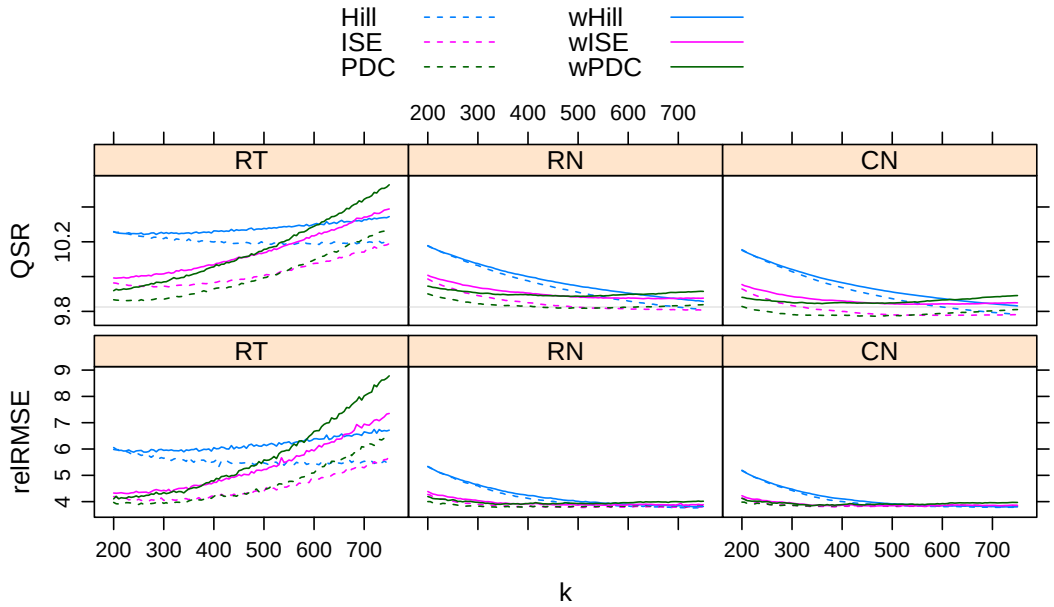

Figure F.382.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

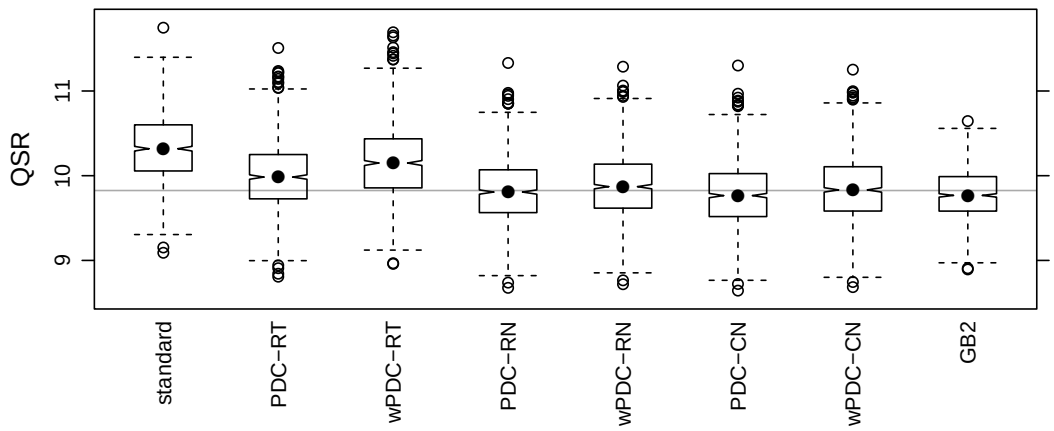

Figure F.383.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.191.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			10.33	0.15	0.50	5.14	10.32	0.40	0.49	0.63	6.46	0.74	0.20
wHill	RT	300	10.25	0.16	0.42	4.30	10.25	0.40	0.42	0.58	5.95	0.64	0.19
wHill	RT	500	10.28	0.16	0.45	4.60	10.28	0.41	0.46	0.61	6.17	0.69	0.18
wHill	RT	700	10.33	0.18	0.50	5.11	10.31	0.42	0.49	0.65	6.65	0.73	0.24
wHill	RN	300	10.07	0.15	0.25	2.54	10.07	0.39	0.24	0.46	4.65	0.46	0.18
wHill	RN	500	9.95	0.14	0.12	1.23	9.93	0.39	0.11	0.39	4.01	0.41	0.15
wHill	RN	700	9.87	0.14	0.05	0.47	9.85	0.38	0.03	0.38	3.84	0.40	0.15
wHill	CN	300	10.04	0.15	0.22	2.20	10.03	0.39	0.21	0.44	4.48	0.44	0.18
wHill	CN	500	9.91	0.14	0.09	0.88	9.90	0.38	0.07	0.38	3.92	0.40	0.15
wHill	CN	700	9.84	0.14	0.02	0.19	9.83	0.38	0.01	0.37	3.81	0.38	0.14
wISE	RT	300	10.02	0.15	0.19	1.94	10.01	0.38	0.19	0.44	4.43	0.43	0.15
wISE	RT	500	10.14	0.17	0.31	3.17	10.12	0.40	0.30	0.51	5.22	0.52	0.18
wISE	RT	700	10.34	0.20	0.52	5.27	10.34	0.45	0.52	0.68	6.95	0.77	0.21
wISE	RN	300	9.94	0.14	0.11	1.14	9.94	0.39	0.12	0.40	4.04	0.41	0.16
wISE	RN	500	9.88	0.14	0.06	0.60	9.87	0.38	0.04	0.38	3.87	0.38	0.15
wISE	RN	700	9.88	0.14	0.05	0.51	9.87	0.39	0.05	0.38	3.89	0.40	0.14
wISE	CN	300	9.89	0.15	0.06	0.62	9.88	0.40	0.06	0.39	3.94	0.39	0.15
wISE	CN	500	9.84	0.14	0.02	0.19	9.82	0.38	−0.00	0.38	3.84	0.38	0.15
wISE	CN	700	9.85	0.14	0.02	0.22	9.84	0.39	0.02	0.38	3.86	0.40	0.14
wPDC	RT	300	9.97	0.16	0.14	1.47	9.97	0.42	0.14	0.43	4.34	0.44	0.16
wPDC	RT	500	10.16	0.19	0.33	3.37	10.15	0.43	0.32	0.55	5.59	0.55	0.19
wPDC	RT	700	10.44	0.24	0.62	6.30	10.43	0.50	0.61	0.79	8.02	0.91	0.25
wPDC	RN	300	9.91	0.15	0.08	0.82	9.90	0.40	0.08	0.39	3.97	0.40	0.15
wPDC	RN	500	9.89	0.14	0.06	0.63	9.87	0.39	0.05	0.39	3.92	0.39	0.15
wPDC	RN	700	9.91	0.15	0.08	0.86	9.91	0.40	0.08	0.39	4.00	0.42	0.15
wPDC	CN	300	9.85	0.15	0.02	0.25	9.84	0.40	0.02	0.39	3.93	0.40	0.14
wPDC	CN	500	9.85	0.15	0.02	0.23	9.83	0.39	0.01	0.38	3.89	0.39	0.15
wPDC	CN	700	9.88	0.15	0.06	0.59	9.87	0.40	0.05	0.39	3.96	0.41	0.15
GB2			9.78	0.09	−0.04	−0.41	9.77	0.30	−0.06	0.30	3.09	0.30	0.09

OCAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

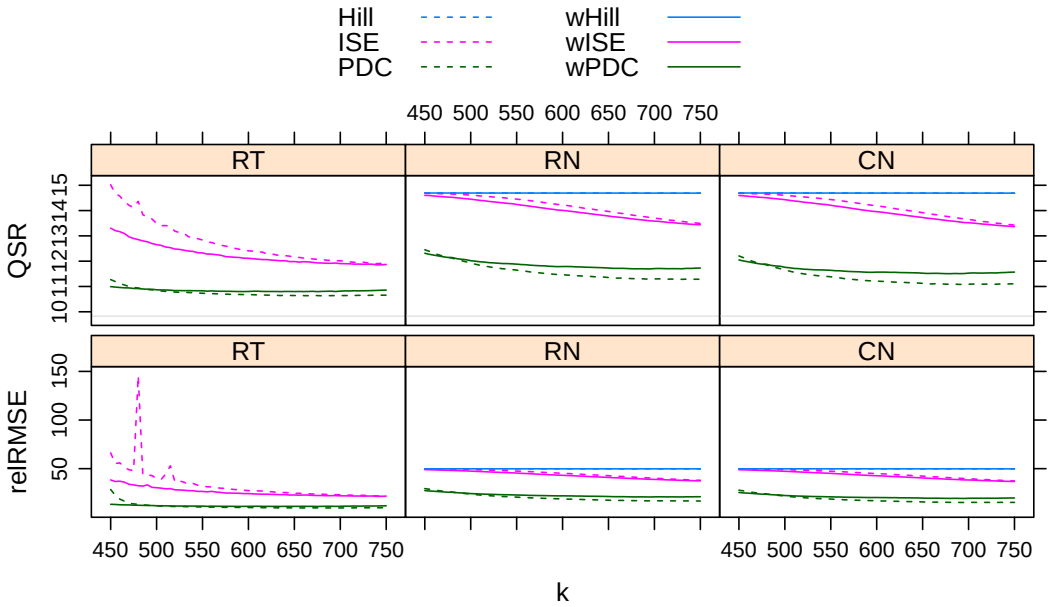

Figure F.384.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

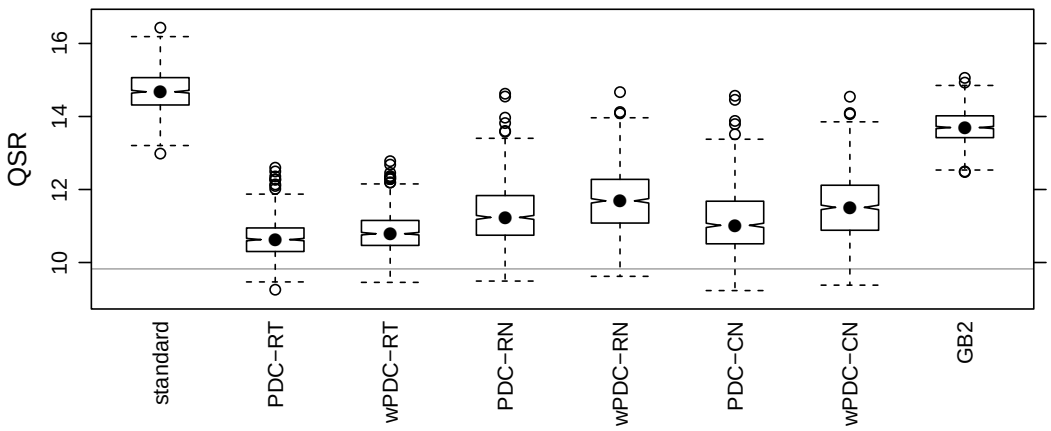

Figure F.385.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.192.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			14.69	0.30	4.87	49.56	14.68	0.56	4.85	4.90	49.87	7.19	0.67
wHill	RT	500	16.93	9.10	7.10	72.30	16.38	1.59	6.55	7.72	78.55	9.72	5.54
wHill	RT	700	15.55	2.29	5.73	58.30	15.34	1.10	5.52	5.92	60.29	8.18	1.74
wHill	RN	300	14.69	0.30	4.87	49.56	14.68	0.56	4.85	4.90	49.87	7.19	0.67
wHill	RN	500	14.69	0.30	4.87	49.54	14.68	0.56	4.85	4.90	49.86	7.19	0.67
wHill	RN	700	14.69	0.30	4.86	49.52	14.68	0.56	4.85	4.90	49.83	7.19	0.67
wHill	CN	300	14.69	0.30	4.87	49.56	14.68	0.56	4.85	4.90	49.87	7.19	0.67
wHill	CN	500	14.69	0.30	4.87	49.54	14.68	0.56	4.85	4.90	49.86	7.19	0.67
wHill	CN	700	14.69	0.30	4.86	49.51	14.68	0.56	4.85	4.90	49.83	7.19	0.67
wISE	RT	500	12.66	0.92	2.83	28.80	12.56	0.83	2.73	2.99	30.41	4.05	0.86
wISE	RT	700	11.90	0.38	2.08	21.15	11.88	0.64	2.06	2.17	22.06	3.05	0.43
wISE	RN	300	14.69	0.30	4.87	49.56	14.68	0.56	4.85	4.90	49.87	7.19	0.67
wISE	RN	500	14.45	0.38	4.63	47.08	14.46	0.62	4.63	4.67	47.50	6.86	0.64
wISE	RN	700	13.58	0.53	3.76	38.27	13.55	0.78	3.73	3.83	38.98	5.53	0.62
wISE	CN	300	14.69	0.30	4.87	49.56	14.68	0.56	4.85	4.90	49.87	7.19	0.67
wISE	CN	500	14.43	0.40	4.61	46.88	14.44	0.62	4.62	4.65	47.32	6.84	0.64
wISE	CN	700	13.52	0.56	3.69	37.61	13.47	0.79	3.65	3.77	38.37	5.41	0.61
wPDC	RT	500	10.87	0.27	1.04	10.63	10.85	0.49	1.02	1.17	11.89	1.52	0.32
wPDC	RT	700	10.81	0.26	0.99	10.07	10.79	0.50	0.96	1.11	11.34	1.43	0.30
wPDC	RN	300	14.41	0.73	4.58	46.66	14.56	0.68	4.73	4.66	47.46	7.02	0.67
wPDC	RN	500	12.02	0.92	2.19	22.33	11.94	1.00	2.11	2.39	24.37	3.14	0.54
wPDC	RN	700	11.71	0.72	1.88	19.15	11.69	0.88	1.86	2.06	21.01	2.76	0.49
wPDC	CN	300	14.37	0.87	4.54	46.21	14.56	0.69	4.73	4.64	47.18	7.02	0.67
wPDC	CN	500	11.76	1.09	1.93	19.68	11.69	1.13	1.87	2.20	22.37	2.77	0.54
wPDC	CN	700	11.53	0.80	1.70	17.33	11.51	0.91	1.68	1.92	19.56	2.50	0.48
GB2			13.71	0.19	3.88	39.49	13.70	0.44	3.87	3.90	39.73	5.74	0.53

OCAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

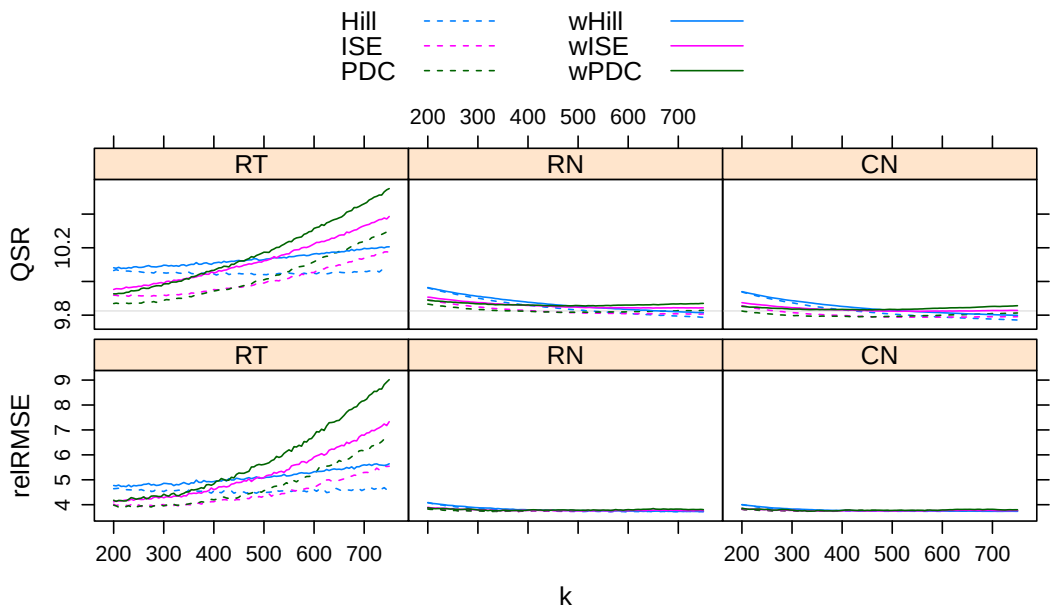

Figure F.386.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

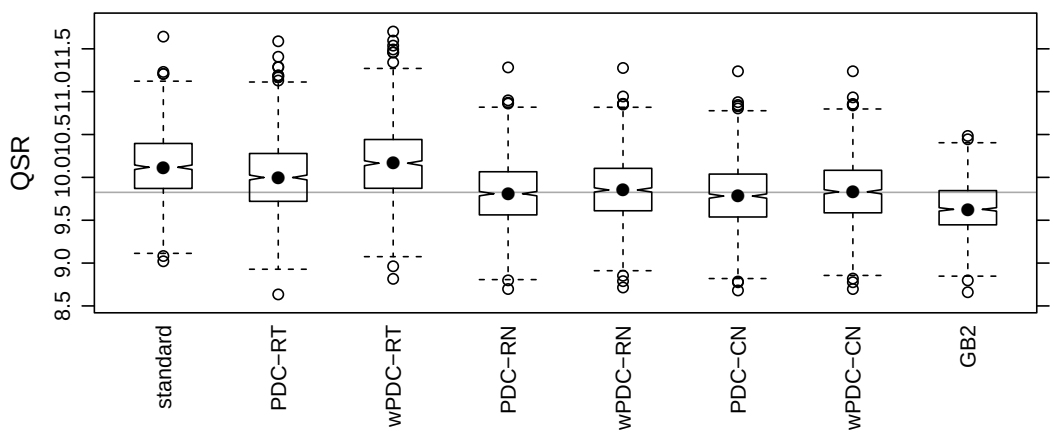

Figure F.387.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.193.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			10.13	0.15	0.31	3.12	10.12	0.38	0.29	0.49	5.02	0.49	0.18
wHill	RT	300	10.10	0.15	0.27	2.76	10.08	0.40	0.26	0.48	4.86	0.48	0.19
wHill	RT	500	10.13	0.16	0.30	3.10	10.11	0.39	0.29	0.50	5.08	0.51	0.16
wHill	RT	700	10.20	0.16	0.37	3.78	10.19	0.40	0.36	0.55	5.60	0.58	0.18
wHill	RN	300	9.91	0.14	0.09	0.88	9.90	0.38	0.08	0.38	3.88	0.40	0.15
wHill	RN	500	9.85	0.14	0.03	0.27	9.85	0.38	0.02	0.37	3.76	0.38	0.14
wHill	RN	700	9.82	0.13	−0.00	−0.05	9.82	0.38	−0.01	0.37	3.73	0.38	0.14
wHill	CN	300	9.89	0.14	0.06	0.62	9.88	0.37	0.05	0.38	3.83	0.40	0.15
wHill	CN	500	9.83	0.14	0.00	0.03	9.82	0.38	−0.00	0.37	3.75	0.37	0.14
wHill	CN	700	9.80	0.13	−0.02	−0.23	9.80	0.37	−0.02	0.37	3.73	0.36	0.14
wISE	RT	300	9.99	0.15	0.16	1.66	9.99	0.40	0.16	0.42	4.28	0.43	0.16
wISE	RT	500	10.12	0.16	0.30	3.04	10.12	0.40	0.29	0.50	5.09	0.51	0.17
wISE	RT	700	10.33	0.19	0.51	5.15	10.31	0.45	0.48	0.67	6.79	0.73	0.22
wISE	RN	300	9.87	0.14	0.05	0.50	9.88	0.38	0.05	0.37	3.80	0.38	0.15
wISE	RN	500	9.85	0.14	0.02	0.22	9.84	0.37	0.01	0.37	3.75	0.37	0.15
wISE	RN	700	9.84	0.14	0.02	0.19	9.84	0.39	0.02	0.37	3.77	0.39	0.14
wISE	CN	300	9.84	0.14	0.02	0.19	9.84	0.37	0.02	0.37	3.77	0.38	0.14
wISE	CN	500	9.82	0.14	−0.00	−0.02	9.81	0.37	−0.01	0.37	3.75	0.37	0.14
wISE	CN	700	9.83	0.14	0.00	0.03	9.83	0.38	0.00	0.37	3.77	0.38	0.14
wPDC	RT	300	9.98	0.16	0.16	1.63	9.96	0.42	0.14	0.43	4.42	0.44	0.16
wPDC	RT	500	10.17	0.18	0.35	3.55	10.17	0.43	0.34	0.55	5.62	0.56	0.19
wPDC	RT	700	10.46	0.24	0.64	6.47	10.44	0.50	0.61	0.80	8.17	0.91	0.24
wPDC	RN	300	9.87	0.14	0.04	0.43	9.86	0.38	0.04	0.37	3.79	0.38	0.15
wPDC	RN	500	9.86	0.14	0.03	0.32	9.85	0.37	0.03	0.37	3.78	0.38	0.15
wPDC	RN	700	9.87	0.14	0.04	0.42	9.87	0.39	0.05	0.38	3.82	0.38	0.14
wPDC	CN	300	9.84	0.14	0.01	0.10	9.83	0.37	0.01	0.37	3.78	0.37	0.14
wPDC	CN	500	9.83	0.14	0.01	0.09	9.83	0.37	0.01	0.37	3.77	0.37	0.14
wPDC	CN	700	9.85	0.14	0.03	0.27	9.85	0.38	0.03	0.37	3.82	0.39	0.14
GB2			9.64	0.09	−0.18	−1.84	9.63	0.30	−0.20	0.35	3.57	0.38	0.12

OCAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

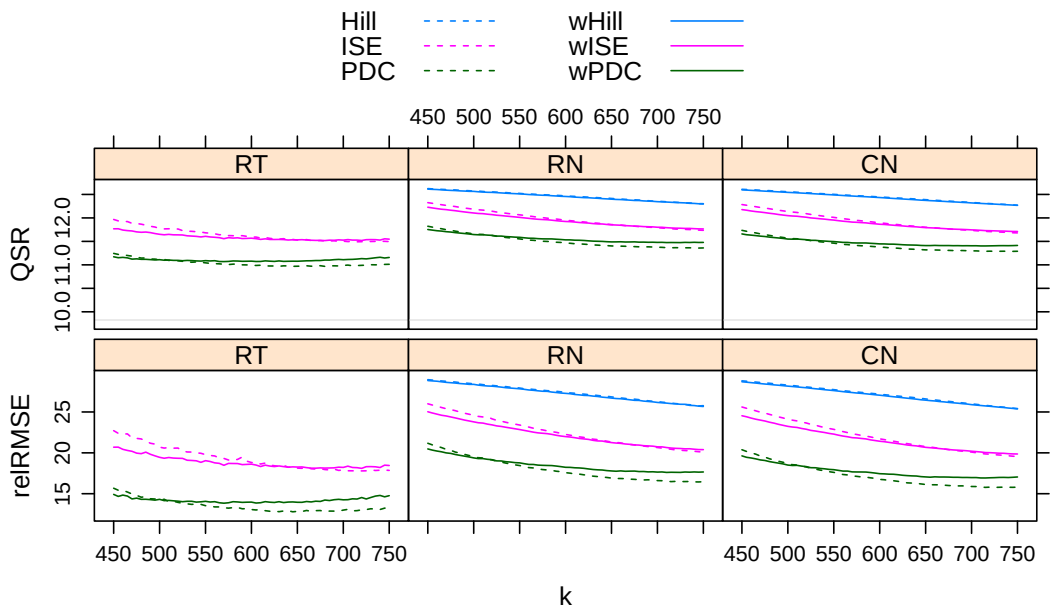

Figure F.388.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

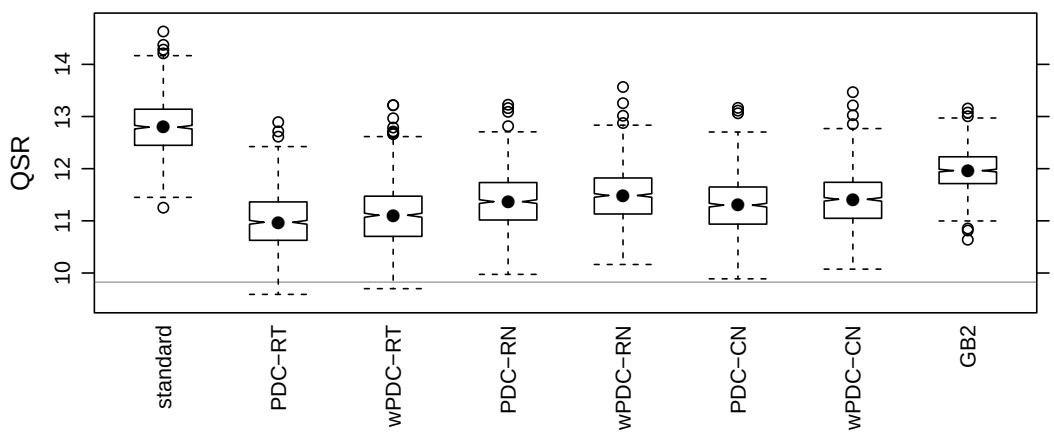

Figure F.389.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.194.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			12.80	0.26	2.98	30.32	12.80	0.51	2.97	3.02	30.76	4.40	0.49
wHill	RT	500	12.86	0.57	3.03	30.88	12.81	0.70	2.98	3.13	31.81	4.42	0.85
wHill	RT	700	12.65	0.42	2.83	28.77	12.60	0.63	2.78	2.90	29.51	4.11	0.62
wHill	RN	300	12.74	0.26	2.91	29.65	12.74	0.51	2.91	2.96	30.10	4.32	0.49
wHill	RN	500	12.57	0.26	2.74	27.89	12.55	0.52	2.73	2.79	28.38	4.04	0.48
wHill	RN	700	12.35	0.25	2.52	25.66	12.34	0.50	2.51	2.57	26.17	3.72	0.43
wHill	CN	300	12.73	0.26	2.91	29.60	12.73	0.51	2.91	2.95	30.05	4.31	0.49
wHill	CN	500	12.54	0.26	2.72	27.67	12.53	0.51	2.70	2.77	28.16	4.01	0.48
wHill	CN	700	12.32	0.25	2.49	25.38	12.31	0.50	2.48	2.54	25.90	3.68	0.42
wISE	RT	500	11.65	0.32	1.83	18.58	11.62	0.53	1.80	1.91	19.45	2.67	0.43
wISE	RT	700	11.53	0.31	1.70	17.32	11.50	0.54	1.67	1.79	18.22	2.48	0.52
wISE	RN	300	12.63	0.27	2.81	28.58	12.63	0.53	2.81	2.86	29.07	4.16	0.49
wISE	RN	500	12.10	0.27	2.28	23.20	12.09	0.53	2.27	2.34	23.79	3.36	0.41
wISE	RN	700	11.80	0.25	1.98	20.11	11.80	0.52	1.98	2.04	20.73	2.93	0.38
wISE	CN	300	12.62	0.28	2.79	28.40	12.61	0.53	2.79	2.84	28.91	4.13	0.49
wISE	CN	500	12.05	0.27	2.22	22.63	12.05	0.53	2.22	2.28	23.24	3.29	0.41
wISE	CN	700	11.75	0.25	1.92	19.55	11.75	0.51	1.93	1.98	20.20	2.86	0.38
wPDC	RT	500	11.11	0.33	1.29	13.08	11.06	0.57	1.24	1.41	14.31	1.84	0.37
wPDC	RT	700	11.11	0.31	1.28	13.07	11.11	0.56	1.28	1.40	14.25	1.90	0.35
wPDC	RN	300	12.32	0.41	2.50	25.43	12.34	0.61	2.52	2.58	26.25	3.73	0.47
wPDC	RN	500	11.65	0.31	1.82	18.53	11.63	0.55	1.80	1.90	19.38	2.67	0.39
wPDC	RN	700	11.48	0.27	1.65	16.83	11.49	0.50	1.66	1.73	17.64	2.46	0.38
wPDC	CN	300	12.27	0.46	2.44	24.86	12.29	0.64	2.47	2.53	25.80	3.66	0.47
wPDC	CN	500	11.55	0.33	1.72	17.55	11.53	0.57	1.71	1.82	18.50	2.53	0.39
wPDC	CN	700	11.41	0.28	1.58	16.09	11.41	0.51	1.59	1.67	16.97	2.35	0.37
GB2			11.98	0.15	2.15	21.88	11.96	0.38	2.14	2.18	22.23	3.17	0.34

OAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

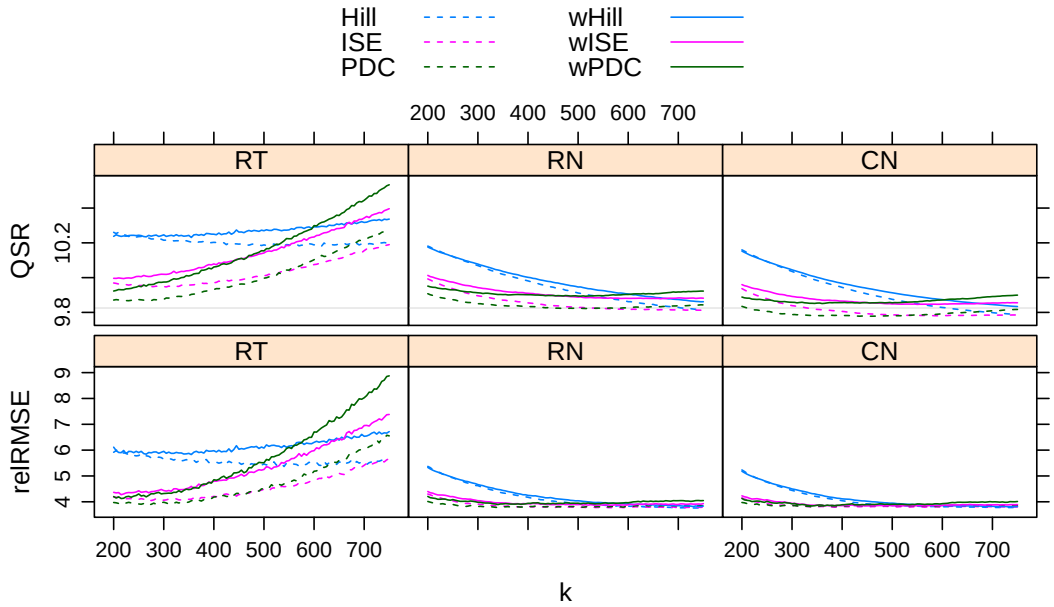

Figure F.390.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

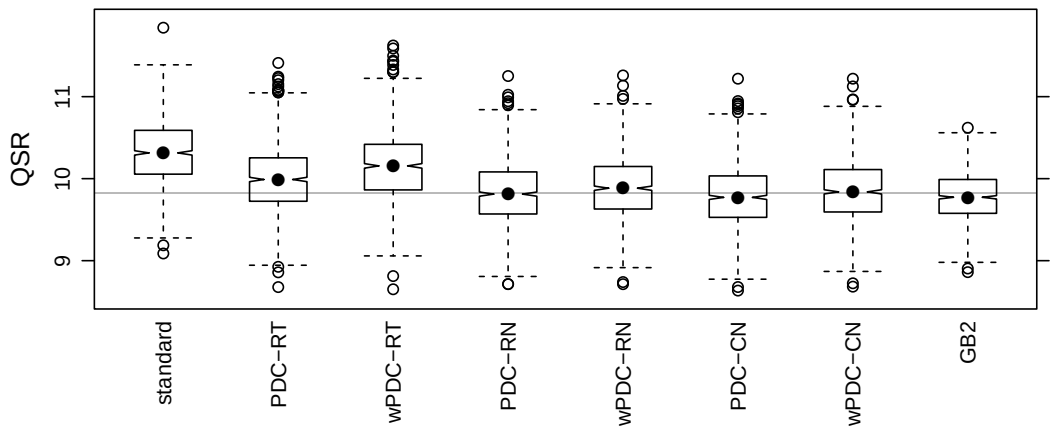

Figure F.391.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.195.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			10.32	0.15	0.50	5.08	10.31	0.40	0.49	0.63	6.43	0.73	0.21
wHill	RT	300	10.25	0.17	0.42	4.28	10.23	0.42	0.41	0.59	5.95	0.62	0.24
wHill	RT	500	10.27	0.16	0.44	4.52	10.26	0.39	0.44	0.60	6.08	0.66	0.21
wHill	RT	700	10.32	0.17	0.49	5.01	10.31	0.42	0.49	0.64	6.53	0.73	0.19
wHill	RN	300	10.08	0.15	0.25	2.57	10.07	0.40	0.24	0.46	4.67	0.46	0.18
wHill	RN	500	9.95	0.14	0.12	1.23	9.93	0.38	0.11	0.40	4.04	0.40	0.15
wHill	RN	700	9.87	0.14	0.05	0.50	9.87	0.38	0.04	0.38	3.85	0.38	0.14
wHill	CN	300	10.04	0.15	0.22	2.23	10.04	0.40	0.21	0.44	4.50	0.44	0.18
wHill	CN	500	9.91	0.14	0.09	0.89	9.90	0.39	0.08	0.39	3.95	0.39	0.14
wHill	CN	700	9.85	0.14	0.02	0.20	9.84	0.39	0.01	0.38	3.83	0.38	0.14
wISE	RT	300	10.02	0.15	0.19	1.97	10.02	0.40	0.20	0.44	4.43	0.44	0.16
wISE	RT	500	10.14	0.17	0.32	3.22	10.12	0.41	0.30	0.52	5.25	0.53	0.18
wISE	RT	700	10.34	0.20	0.52	5.27	10.33	0.46	0.51	0.68	6.95	0.76	0.22
wISE	RN	300	9.94	0.14	0.12	1.19	9.94	0.39	0.12	0.40	4.04	0.40	0.15
wISE	RN	500	9.89	0.14	0.06	0.64	9.88	0.38	0.05	0.38	3.89	0.39	0.14
wISE	RN	700	9.88	0.14	0.06	0.59	9.88	0.39	0.05	0.38	3.90	0.40	0.14
wISE	CN	300	9.89	0.15	0.07	0.68	9.89	0.39	0.06	0.39	3.94	0.39	0.14
wISE	CN	500	9.85	0.14	0.02	0.24	9.83	0.38	0.01	0.38	3.84	0.37	0.14
wISE	CN	700	9.85	0.14	0.03	0.30	9.86	0.39	0.03	0.38	3.88	0.40	0.14
wPDC	RT	300	9.97	0.16	0.15	1.52	9.97	0.40	0.14	0.42	4.32	0.42	0.15
wPDC	RT	500	10.15	0.19	0.33	3.34	10.16	0.41	0.33	0.54	5.51	0.57	0.18
wPDC	RT	700	10.44	0.24	0.62	6.30	10.44	0.49	0.61	0.79	8.03	0.91	0.25
wPDC	RN	300	9.91	0.15	0.09	0.89	9.92	0.40	0.09	0.39	3.98	0.39	0.15
wPDC	RN	500	9.89	0.15	0.07	0.70	9.88	0.39	0.06	0.39	3.94	0.40	0.15
wPDC	RN	700	9.92	0.15	0.09	0.94	9.91	0.40	0.08	0.40	4.04	0.42	0.14
wPDC	CN	300	9.86	0.15	0.03	0.33	9.86	0.40	0.03	0.39	3.92	0.40	0.14
wPDC	CN	500	9.86	0.15	0.03	0.30	9.84	0.38	0.01	0.38	3.90	0.38	0.14
wPDC	CN	700	9.89	0.15	0.07	0.67	9.89	0.40	0.06	0.39	4.00	0.41	0.14
GB2			9.78	0.09	−0.04	−0.43	9.77	0.30	−0.05	0.31	3.11	0.31	0.10

OAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

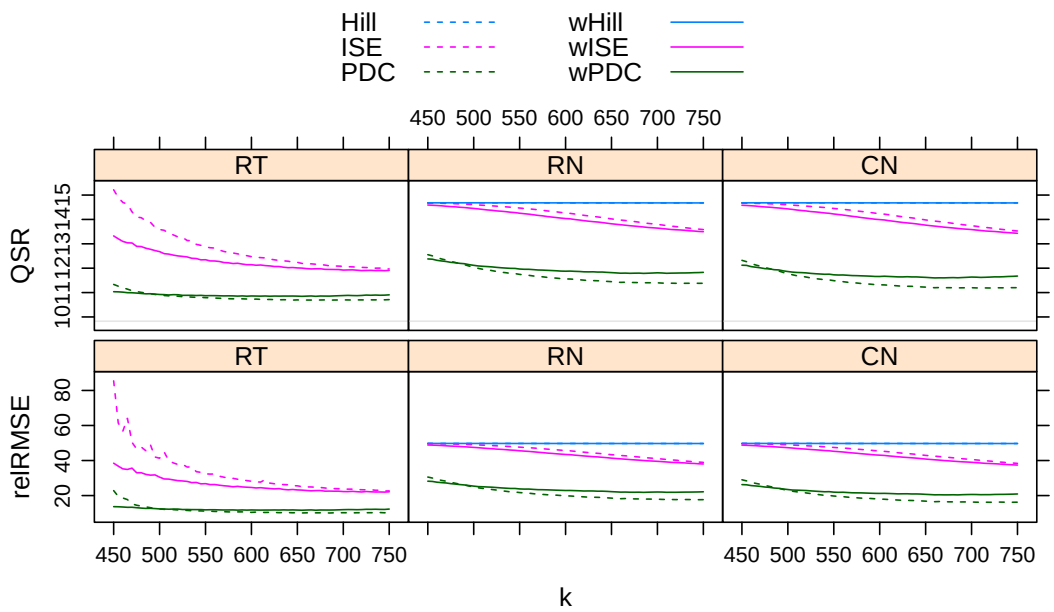

Figure F.392.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

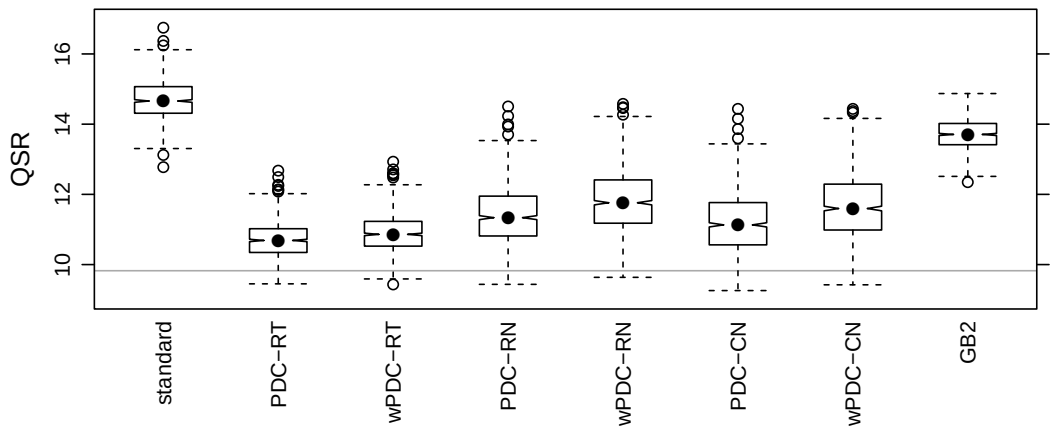

Figure F.393.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.196.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			14.68	0.31	4.86	49.44	14.66	0.57	4.83	4.89	49.76	7.17	0.70
wHill	RT	500	16.84	7.79	7.01	71.36	16.30	1.54	6.48	7.55	76.80	9.61	4.08
wHill	RT	700	15.39	2.00	5.56	56.62	15.23	1.09	5.41	5.74	58.42	8.02	2.61
wHill	RN	300	14.68	0.31	4.86	49.44	14.66	0.57	4.83	4.89	49.76	7.17	0.70
wHill	RN	500	14.68	0.31	4.86	49.43	14.66	0.57	4.83	4.89	49.75	7.16	0.70
wHill	RN	700	14.68	0.31	4.85	49.40	14.65	0.57	4.82	4.88	49.72	7.15	0.70
wHill	CN	300	14.68	0.31	4.86	49.44	14.66	0.57	4.83	4.89	49.76	7.17	0.70
wHill	CN	500	14.68	0.31	4.86	49.43	14.66	0.57	4.83	4.89	49.75	7.16	0.70
wHill	CN	700	14.68	0.31	4.85	49.39	14.65	0.57	4.82	4.88	49.71	7.15	0.70
wISE	RT	500	12.68	0.85	2.85	29.05	12.56	0.84	2.74	3.00	30.52	4.06	0.74
wISE	RT	700	11.92	0.40	2.10	21.34	11.88	0.60	2.06	2.19	22.28	3.05	0.52
wISE	RN	300	14.68	0.31	4.86	49.44	14.66	0.57	4.83	4.89	49.76	7.17	0.70
wISE	RN	500	14.45	0.38	4.63	47.09	14.45	0.62	4.63	4.67	47.51	6.86	0.66
wISE	RN	700	13.64	0.52	3.82	38.87	13.62	0.72	3.79	3.89	39.55	5.62	0.61
wISE	CN	300	14.68	0.31	4.86	49.44	14.66	0.57	4.83	4.89	49.76	7.17	0.70
wISE	CN	500	14.43	0.39	4.61	46.89	14.44	0.63	4.61	4.65	47.32	6.84	0.66
wISE	CN	700	13.58	0.54	3.76	38.27	13.54	0.75	3.72	3.83	38.99	5.51	0.61
wPDC	RT	500	10.92	0.28	1.10	11.15	10.89	0.52	1.06	1.22	12.38	1.58	0.34
wPDC	RT	700	10.88	0.28	1.05	10.70	10.86	0.52	1.04	1.18	11.97	1.53	0.32
wPDC	RN	300	14.43	0.69	4.60	46.86	14.55	0.72	4.72	4.68	47.61	7.00	0.70
wPDC	RN	500	12.12	0.97	2.29	23.33	12.06	1.08	2.24	2.49	25.39	3.32	0.55
wPDC	RN	700	11.81	0.75	1.99	20.21	11.76	0.90	1.94	2.17	22.04	2.87	0.48
wPDC	CN	300	14.39	0.82	4.56	46.44	14.54	0.72	4.72	4.65	47.35	6.99	0.70
wPDC	CN	500	11.86	1.15	2.04	20.74	11.82	1.20	1.99	2.30	23.44	2.95	0.53
wPDC	CN	700	11.64	0.83	1.81	18.43	11.60	0.97	1.77	2.03	20.63	2.63	0.47
GB2			13.72	0.19	3.90	39.67	13.71	0.45	3.88	3.92	39.92	5.75	0.51

OAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

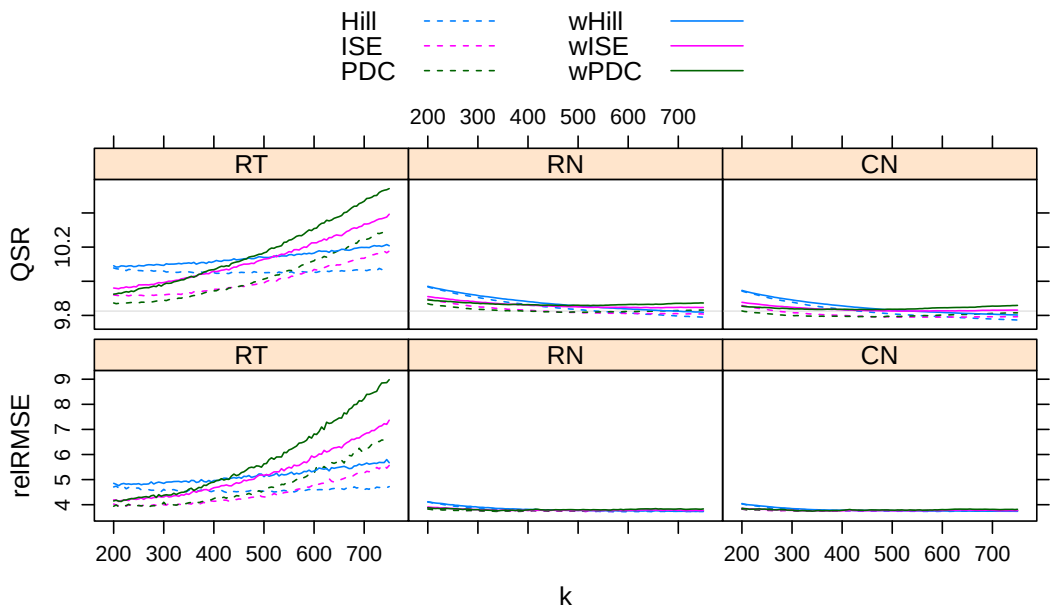

Figure F.394.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 200 and 750.

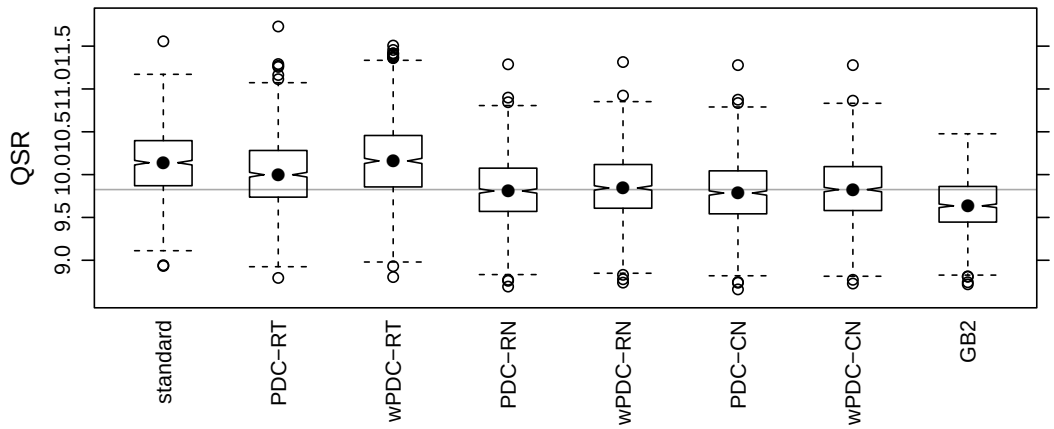

Figure F.395.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.197.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			10.14	0.15	0.31	3.19	10.14	0.40	0.31	0.50	5.04	0.50	0.18
wHill	RT	300	10.09	0.16	0.27	2.73	10.09	0.40	0.26	0.48	4.85	0.48	0.18
wHill	RT	500	10.14	0.15	0.31	3.20	10.12	0.38	0.30	0.50	5.12	0.51	0.19
wHill	RT	700	10.20	0.17	0.37	3.79	10.19	0.42	0.37	0.55	5.61	0.57	0.18
wHill	RN	300	9.92	0.14	0.09	0.93	9.91	0.38	0.09	0.38	3.90	0.39	0.15
wHill	RN	500	9.86	0.14	0.03	0.31	9.85	0.38	0.02	0.37	3.77	0.38	0.15
wHill	RN	700	9.82	0.13	−0.00	−0.01	9.82	0.37	−0.01	0.37	3.74	0.37	0.15
wHill	CN	300	9.89	0.14	0.07	0.67	9.89	0.38	0.06	0.38	3.84	0.39	0.15
wHill	CN	500	9.83	0.14	0.01	0.06	9.82	0.38	−0.00	0.37	3.76	0.38	0.15
wHill	CN	700	9.81	0.13	−0.02	−0.19	9.80	0.37	−0.02	0.37	3.74	0.37	0.15
wISE	RT	300	9.99	0.15	0.17	1.70	9.99	0.39	0.16	0.42	4.31	0.43	0.15
wISE	RT	500	10.13	0.17	0.30	3.10	10.13	0.40	0.31	0.51	5.17	0.53	0.19
wISE	RT	700	10.34	0.19	0.51	5.19	10.32	0.45	0.49	0.67	6.80	0.74	0.18
wISE	RN	300	9.88	0.14	0.05	0.54	9.87	0.37	0.05	0.37	3.80	0.38	0.15
wISE	RN	500	9.85	0.14	0.02	0.25	9.84	0.37	0.01	0.37	3.77	0.38	0.15
wISE	RN	700	9.85	0.14	0.02	0.22	9.84	0.38	0.02	0.37	3.78	0.38	0.15
wISE	CN	300	9.85	0.14	0.02	0.23	9.84	0.37	0.01	0.37	3.77	0.37	0.15
wISE	CN	500	9.83	0.14	0.00	0.00	9.81	0.37	−0.01	0.37	3.76	0.37	0.15
wISE	CN	700	9.83	0.14	0.01	0.06	9.83	0.37	0.00	0.37	3.78	0.38	0.15
wPDC	RT	300	9.98	0.16	0.16	1.60	9.97	0.42	0.14	0.43	4.38	0.44	0.15
wPDC	RT	500	10.17	0.19	0.34	3.47	10.16	0.44	0.33	0.55	5.63	0.58	0.17
wPDC	RT	700	10.47	0.24	0.64	6.55	10.47	0.51	0.64	0.81	8.23	0.95	0.26
wPDC	RN	300	9.87	0.14	0.05	0.47	9.86	0.37	0.03	0.37	3.80	0.38	0.15
wPDC	RN	500	9.86	0.14	0.03	0.35	9.84	0.37	0.02	0.37	3.79	0.37	0.15
wPDC	RN	700	9.87	0.14	0.05	0.46	9.87	0.38	0.05	0.38	3.83	0.38	0.15
wPDC	CN	300	9.84	0.14	0.01	0.14	9.83	0.37	0.00	0.37	3.78	0.37	0.15
wPDC	CN	500	9.84	0.14	0.01	0.11	9.83	0.38	0.00	0.37	3.78	0.38	0.15
wPDC	CN	700	9.85	0.14	0.03	0.30	9.86	0.38	0.03	0.37	3.81	0.38	0.15
GB2			9.65	0.09	−0.18	−1.79	9.64	0.30	−0.19	0.35	3.55	0.37	0.11

OAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

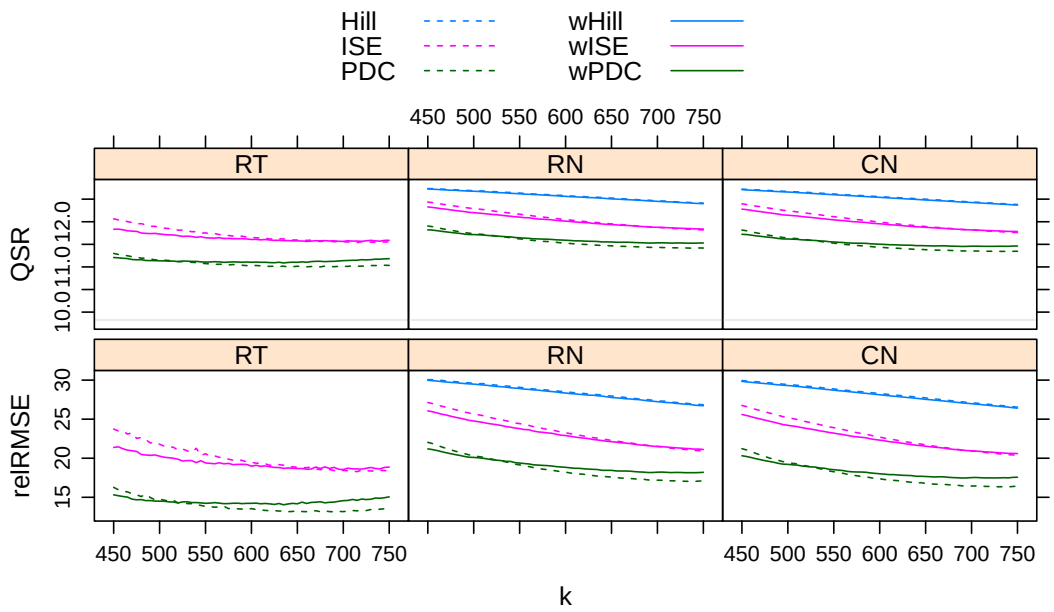

Figure F.396.: Average results (*top*) and relative RMSE (*bottom*) for the QSR using the three approaches for Pareto tail modeling with k varying between 450 and 750.

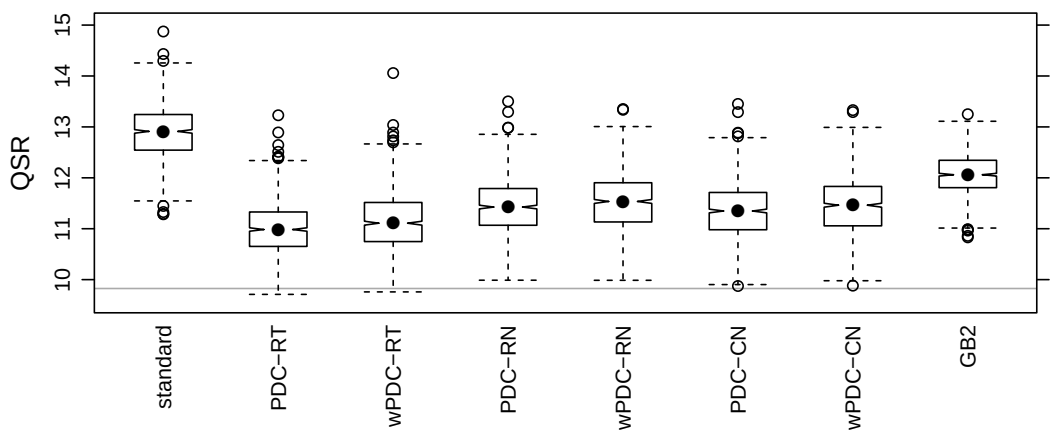

Figure F.397.: Box plots of the simulation results for the QSR using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.198.: Evaluation of selected simulation results for the QSR.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			12.91	0.27	3.09	31.42	12.91	0.52	3.09	3.13	31.86	4.58	0.51
wHill	RT	500	13.02	0.67	3.19	32.50	12.96	0.70	3.14	3.30	33.54	4.65	1.24
wHill	RT	700	12.78	0.44	2.96	30.11	12.75	0.66	2.93	3.03	30.86	4.34	0.68
wHill	RN	300	12.85	0.27	3.03	30.80	12.84	0.51	3.01	3.07	31.25	4.46	0.49
wHill	RN	500	12.68	0.27	2.85	29.01	12.68	0.54	2.86	2.90	29.49	4.24	0.49
wHill	RN	700	12.45	0.26	2.63	26.73	12.46	0.52	2.64	2.68	27.24	3.91	0.48
wHill	CN	300	12.85	0.27	3.02	30.74	12.83	0.52	3.01	3.06	31.19	4.46	0.49
wHill	CN	500	12.66	0.27	2.83	28.83	12.66	0.54	2.84	2.88	29.30	4.21	0.49
wHill	CN	700	12.42	0.27	2.60	26.46	12.44	0.53	2.62	2.65	26.98	3.88	0.47
wISE	RT	500	11.73	0.34	1.90	19.37	11.70	0.56	1.88	1.99	20.26	2.78	0.41
wISE	RT	700	11.57	0.29	1.74	17.72	11.57	0.55	1.75	1.82	18.55	2.59	0.39
wISE	RN	300	12.75	0.28	2.92	29.75	12.76	0.52	2.94	2.97	30.24	4.35	0.49
wISE	RN	500	12.20	0.28	2.38	24.18	12.20	0.52	2.38	2.43	24.77	3.52	0.40
wISE	RN	700	11.88	0.26	2.05	20.89	11.89	0.52	2.07	2.11	21.51	3.07	0.40
wISE	CN	300	12.73	0.29	2.91	29.59	12.75	0.53	2.92	2.96	30.09	4.33	0.49
wISE	CN	500	12.14	0.28	2.32	23.60	12.13	0.52	2.30	2.38	24.22	3.41	0.39
wISE	CN	700	11.82	0.26	1.99	20.30	11.83	0.53	2.01	2.06	20.95	2.98	0.40
wPDC	RT	500	11.13	0.32	1.31	13.32	11.11	0.55	1.29	1.42	14.50	1.91	0.35
wPDC	RT	700	11.14	0.32	1.31	13.37	11.11	0.57	1.28	1.43	14.57	1.90	0.43
wPDC	RN	300	12.43	0.41	2.61	26.55	12.48	0.63	2.65	2.69	27.34	3.93	0.45
wPDC	RN	500	11.72	0.33	1.89	19.24	11.70	0.59	1.88	1.98	20.10	2.78	0.35
wPDC	RN	700	11.53	0.29	1.71	17.38	11.54	0.56	1.71	1.79	18.21	2.54	0.36
wPDC	CN	300	12.38	0.46	2.55	25.99	12.44	0.66	2.61	2.64	26.89	3.87	0.44
wPDC	CN	500	11.62	0.35	1.79	18.25	11.62	0.60	1.79	1.89	19.22	2.66	0.35
wPDC	CN	700	11.46	0.30	1.63	16.63	11.46	0.57	1.64	1.72	17.52	2.43	0.36
GB2			12.07	0.16	2.25	22.87	12.06	0.40	2.24	2.28	23.22	3.31	0.35

F.6.2. Gini coefficient

Simple random sampling

No contamination

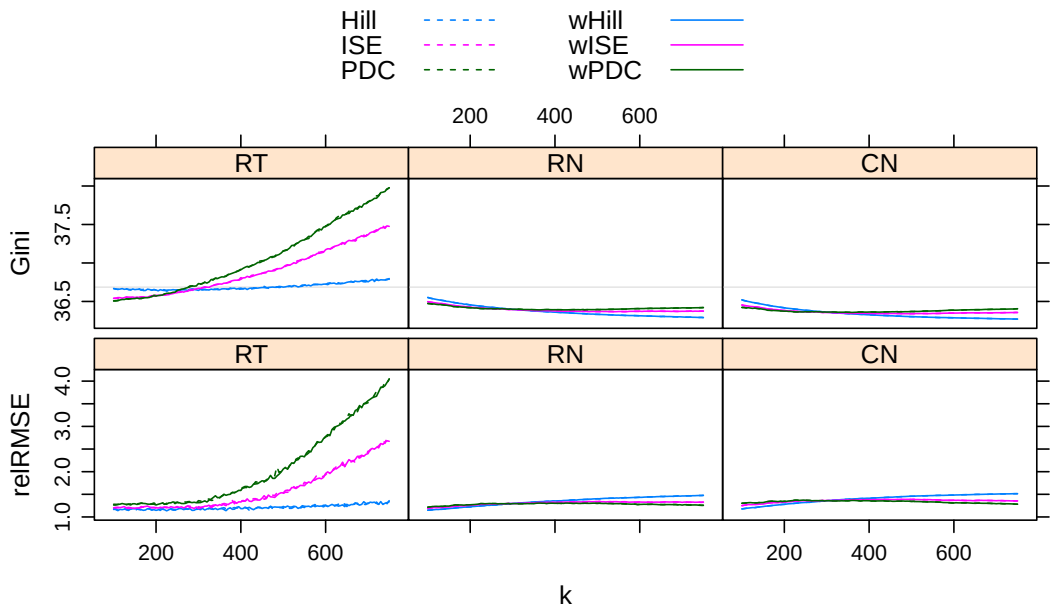

Figure F.398.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 100 and 750.

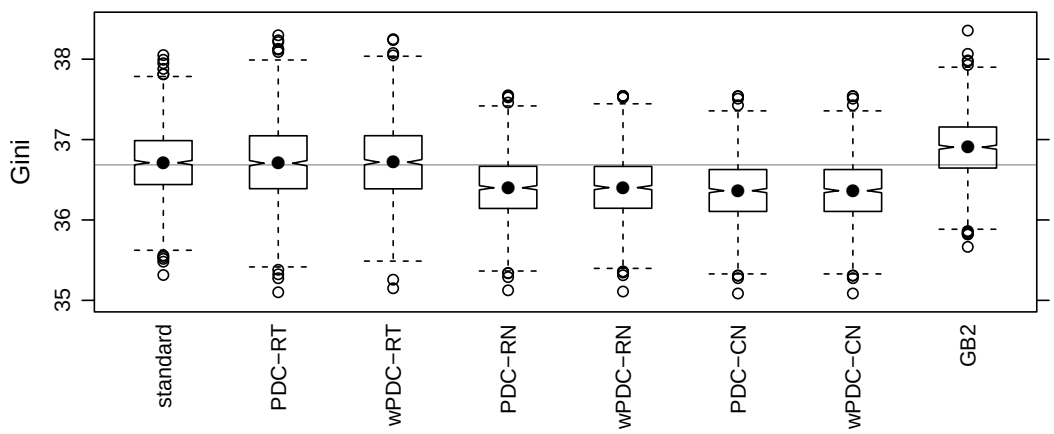

Figure F.399.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 300$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.199.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			36.71	0.17	0.03	0.07	36.71	0.40	0.03	0.42	1.14	0.41	0.04
wHill	RT	300	36.64	0.19	−0.04	−0.11	36.64	0.43	−0.05	0.44	1.19	0.43	0.04
wHill	RT	500	36.69	0.20	0.00	0.00	36.68	0.48	−0.00	0.45	1.23	0.48	0.05
wHill	RT	700	36.75	0.22	0.07	0.19	36.77	0.47	0.08	0.47	1.29	0.49	0.06
wHill	RN	300	36.40	0.14	−0.29	−0.79	36.40	0.37	−0.28	0.48	1.30	0.49	0.04
wHill	RN	500	36.33	0.14	−0.35	−0.97	36.33	0.38	−0.36	0.51	1.40	0.56	0.04
wHill	RN	700	36.30	0.14	−0.39	−1.06	36.30	0.38	−0.38	0.54	1.46	0.58	0.04
wHill	CN	300	36.36	0.14	−0.33	−0.89	36.36	0.38	−0.33	0.50	1.36	0.54	0.04
wHill	CN	500	36.30	0.14	−0.38	−1.05	36.29	0.38	−0.39	0.53	1.46	0.60	0.05
wHill	CN	700	36.28	0.14	−0.41	−1.12	36.28	0.38	−0.41	0.55	1.51	0.62	0.05
wISE	RT	300	36.67	0.19	−0.02	−0.04	36.67	0.43	−0.02	0.44	1.19	0.43	0.04
wISE	RT	500	36.94	0.25	0.26	0.70	36.93	0.51	0.25	0.56	1.53	0.57	0.05
wISE	RT	700	37.37	0.31	0.68	1.86	37.34	0.56	0.65	0.88	2.40	0.98	0.08
wISE	RN	300	36.39	0.14	−0.29	−0.80	36.40	0.38	−0.29	0.48	1.30	0.51	0.04
wISE	RN	500	36.37	0.14	−0.32	−0.87	36.37	0.38	−0.31	0.49	1.34	0.52	0.04
wISE	RN	700	36.37	0.14	−0.31	−0.85	36.37	0.38	−0.31	0.48	1.32	0.50	0.04
wISE	CN	300	36.36	0.14	−0.33	−0.90	36.36	0.38	−0.33	0.50	1.36	0.55	0.04
wISE	CN	500	36.34	0.14	−0.34	−0.94	36.35	0.38	−0.34	0.51	1.39	0.55	0.05
wISE	CN	700	36.35	0.14	−0.33	−0.91	36.36	0.37	−0.33	0.50	1.36	0.52	0.05
wPDC	RT	300	36.73	0.23	0.05	0.13	36.72	0.49	0.03	0.48	1.31	0.49	0.04
wPDC	RT	500	37.16	0.35	0.47	1.28	37.13	0.59	0.44	0.75	2.06	0.75	0.07
wPDC	RT	700	37.80	0.48	1.11	3.03	37.76	0.67	1.08	1.31	3.57	1.60	0.09
wPDC	RN	300	36.40	0.14	−0.29	−0.78	36.40	0.39	−0.28	0.47	1.29	0.50	0.04
wPDC	RN	500	36.40	0.14	−0.29	−0.79	36.41	0.38	−0.28	0.48	1.30	0.49	0.04
wPDC	RN	700	36.42	0.14	−0.27	−0.73	36.43	0.38	−0.25	0.46	1.26	0.48	0.04
wPDC	CN	300	36.36	0.14	−0.32	−0.88	36.36	0.39	−0.32	0.50	1.36	0.54	0.04
wPDC	CN	500	36.37	0.14	−0.32	−0.86	36.38	0.38	−0.31	0.49	1.34	0.52	0.04
wPDC	CN	700	36.40	0.14	−0.29	−0.78	36.41	0.38	−0.28	0.47	1.29	0.48	0.05
GB2			36.90	0.15	0.21	0.58	36.90	0.38	0.22	0.45	1.22	0.46	0.05

OCAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

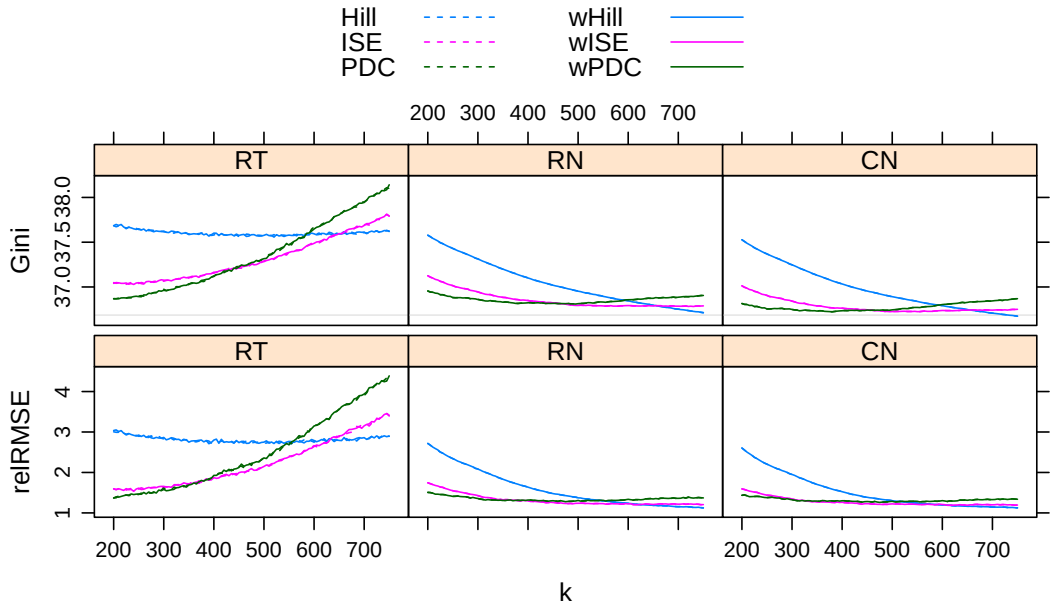

Figure F.400.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

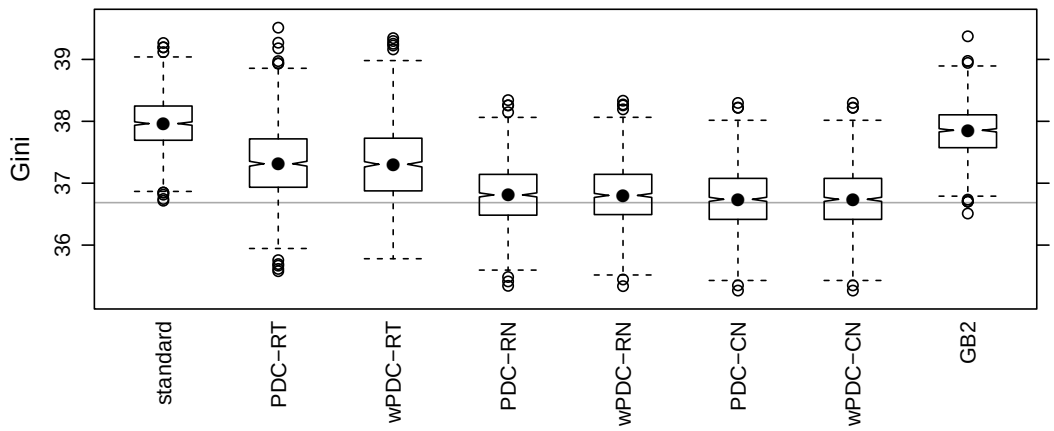

Figure F.401.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.200.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.97	0.17	1.28	3.50	37.96	0.41	1.28	1.35	3.67	1.89	0.07
wHill	RT	300	37.62	0.23	0.94	2.56	37.62	0.46	0.93	1.05	2.87	1.38	0.07
wHill	RT	500	37.58	0.22	0.89	2.43	37.57	0.46	0.88	1.01	2.75	1.31	0.07
wHill	RT	700	37.61	0.24	0.93	2.53	37.63	0.49	0.94	1.05	2.86	1.40	0.07
wHill	RN	300	37.31	0.19	0.63	1.71	37.33	0.44	0.64	0.76	2.08	0.95	0.05
wHill	RN	500	36.95	0.18	0.27	0.73	36.96	0.43	0.27	0.50	1.37	0.52	0.04
wHill	RN	700	36.75	0.17	0.07	0.18	36.76	0.42	0.08	0.42	1.15	0.43	0.04
wHill	CN	300	37.25	0.20	0.56	1.53	37.25	0.45	0.57	0.72	1.95	0.85	0.05
wHill	CN	500	36.89	0.19	0.21	0.56	36.90	0.43	0.21	0.48	1.30	0.49	0.04
wHill	CN	700	36.71	0.18	0.02	0.06	36.72	0.43	0.03	0.42	1.15	0.42	0.04
wISE	RT	300	37.08	0.22	0.39	1.06	37.06	0.48	0.38	0.61	1.66	0.63	0.05
wISE	RT	500	37.28	0.27	0.60	1.63	37.28	0.52	0.60	0.79	2.15	0.90	0.07
wISE	RT	700	37.69	0.34	1.00	2.73	37.67	0.58	0.98	1.16	3.15	1.46	0.11
wISE	RN	300	36.94	0.21	0.26	0.70	36.93	0.45	0.24	0.52	1.43	0.52	0.05
wISE	RN	500	36.79	0.20	0.11	0.29	36.80	0.46	0.12	0.45	1.24	0.48	0.04
wISE	RN	700	36.79	0.19	0.10	0.27	36.79	0.44	0.11	0.45	1.22	0.47	0.04
wISE	CN	300	36.84	0.22	0.16	0.42	36.83	0.47	0.14	0.49	1.34	0.49	0.05
wISE	CN	500	36.73	0.20	0.04	0.11	36.73	0.46	0.05	0.45	1.22	0.48	0.04
wISE	CN	700	36.74	0.19	0.06	0.15	36.75	0.45	0.06	0.44	1.20	0.46	0.04
wPDC	RT	300	36.96	0.26	0.28	0.76	36.94	0.52	0.25	0.58	1.58	0.56	0.06
wPDC	RT	500	37.32	0.35	0.63	1.72	37.31	0.63	0.62	0.87	2.36	0.94	0.07
wPDC	RT	700	37.94	0.51	1.26	3.43	37.89	0.72	1.21	1.44	3.94	1.79	0.10
wPDC	RN	300	36.86	0.22	0.17	0.47	36.84	0.47	0.15	0.50	1.36	0.50	0.04
wPDC	RN	500	36.81	0.21	0.13	0.35	36.80	0.49	0.12	0.48	1.31	0.51	0.04
wPDC	RN	700	36.89	0.21	0.20	0.54	36.90	0.48	0.21	0.50	1.36	0.52	0.04
wPDC	CN	300	36.75	0.23	0.06	0.17	36.73	0.50	0.05	0.49	1.32	0.49	0.04
wPDC	CN	500	36.74	0.22	0.06	0.16	36.74	0.49	0.05	0.47	1.29	0.51	0.04
wPDC	CN	700	36.84	0.21	0.16	0.43	36.85	0.48	0.17	0.49	1.33	0.52	0.04
GB2			37.84	0.16	1.15	3.13	37.85	0.40	1.17	1.22	3.32	1.73	0.07

OCAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

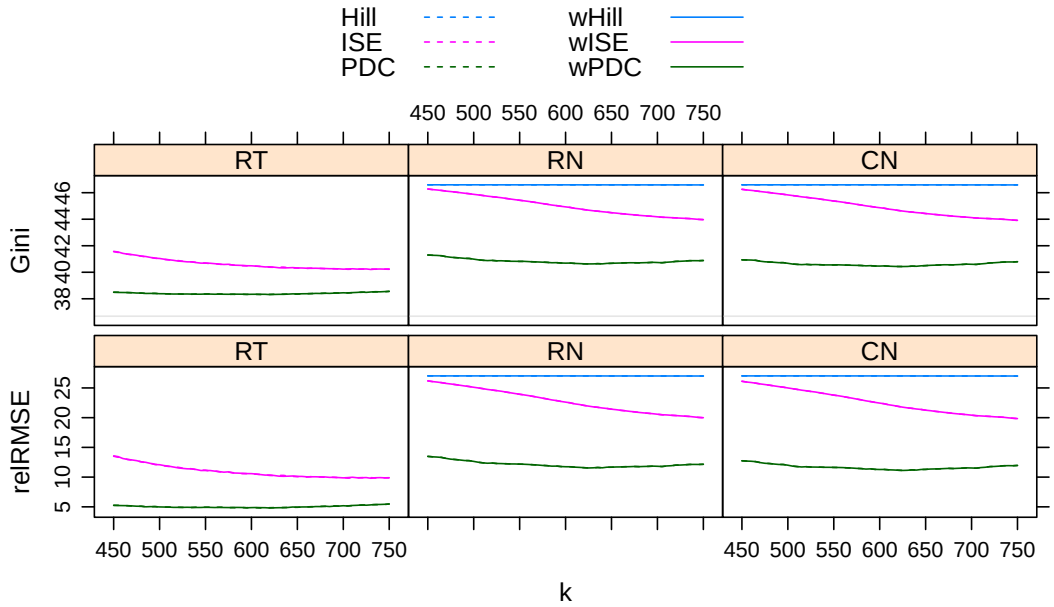

Figure F.402.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

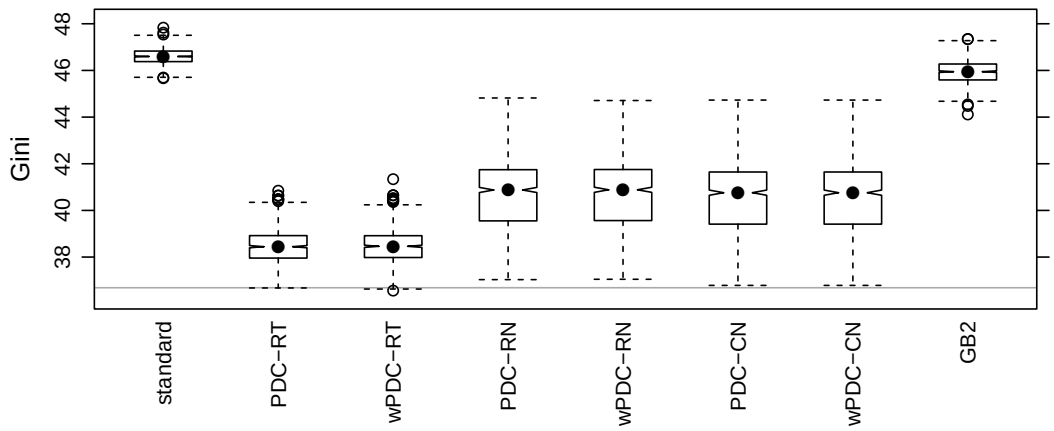

Figure F.403.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.201.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			46.60	0.12	9.91	27.01	46.60	0.34	9.91	9.92	27.03	14.70	0.30
wHill	RT	500	46.35	2.41	9.66	26.33	46.16	1.08	9.47	9.78	26.67	14.05	0.67
wHill	RT	700	45.32	1.42	8.63	23.53	45.19	0.95	8.50	8.71	23.75	12.61	0.68
wHill	RN	300	46.60	0.12	9.91	27.01	46.60	0.34	9.91	9.92	27.03	14.70	0.30
wHill	RN	500	46.59	0.12	9.91	27.01	46.60	0.33	9.91	9.91	27.03	14.69	0.30
wHill	RN	700	46.59	0.11	9.90	26.99	46.59	0.33	9.91	9.91	27.01	14.69	0.30
wHill	CN	300	46.60	0.12	9.91	27.01	46.60	0.34	9.91	9.92	27.03	14.70	0.30
wHill	CN	500	46.59	0.12	9.91	27.01	46.60	0.33	9.91	9.91	27.02	14.69	0.30
wHill	CN	700	46.59	0.11	9.90	26.99	46.59	0.33	9.90	9.91	27.01	14.68	0.30
wISE	RT	500	41.04	0.69	4.35	11.87	41.00	0.81	4.32	4.43	12.08	6.40	0.21
wISE	RT	700	40.23	0.53	3.55	9.67	40.21	0.74	3.52	3.62	9.87	5.22	0.20
wISE	RN	300	46.60	0.12	9.91	27.01	46.60	0.34	9.91	9.92	27.03	14.70	0.30
wISE	RN	500	45.88	0.41	9.19	25.05	45.95	0.56	9.27	9.21	25.11	13.74	0.29
wISE	RN	700	44.18	0.79	7.50	20.43	44.11	0.85	7.42	7.55	20.58	11.00	0.27
wISE	CN	300	46.60	0.12	9.91	27.01	46.60	0.34	9.91	9.92	27.03	14.70	0.30
wISE	CN	500	45.83	0.43	9.15	24.93	45.91	0.57	9.23	9.17	25.00	13.68	0.29
wISE	CN	700	44.12	0.82	7.43	20.27	44.05	0.88	7.36	7.49	20.41	10.91	0.27
wPDC	RT	500	38.38	0.46	1.70	4.62	38.32	0.66	1.64	1.83	4.98	2.43	0.12
wPDC	RT	700	38.45	0.50	1.77	4.82	38.46	0.70	1.78	1.90	5.18	2.63	0.13
wPDC	RN	300	45.15	3.13	8.47	23.08	45.94	1.23	9.26	8.65	23.57	13.72	0.30
wPDC	RN	500	40.99	2.99	4.30	11.73	41.02	1.88	4.33	4.64	12.64	6.43	0.25
wPDC	RN	700	40.74	2.41	4.05	11.04	40.88	1.59	4.20	4.34	11.82	6.22	0.22
wPDC	CN	300	44.99	3.85	8.31	22.64	45.91	1.30	9.22	8.53	23.26	13.67	0.30
wPDC	CN	500	40.67	3.48	3.99	10.87	40.76	2.02	4.07	4.40	12.00	6.04	0.25
wPDC	CN	700	40.60	2.57	3.91	10.67	40.76	1.66	4.07	4.23	11.53	6.04	0.22
GB2			45.93	0.24	9.24	25.20	45.95	0.50	9.26	9.26	25.23	13.73	0.29

OCAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

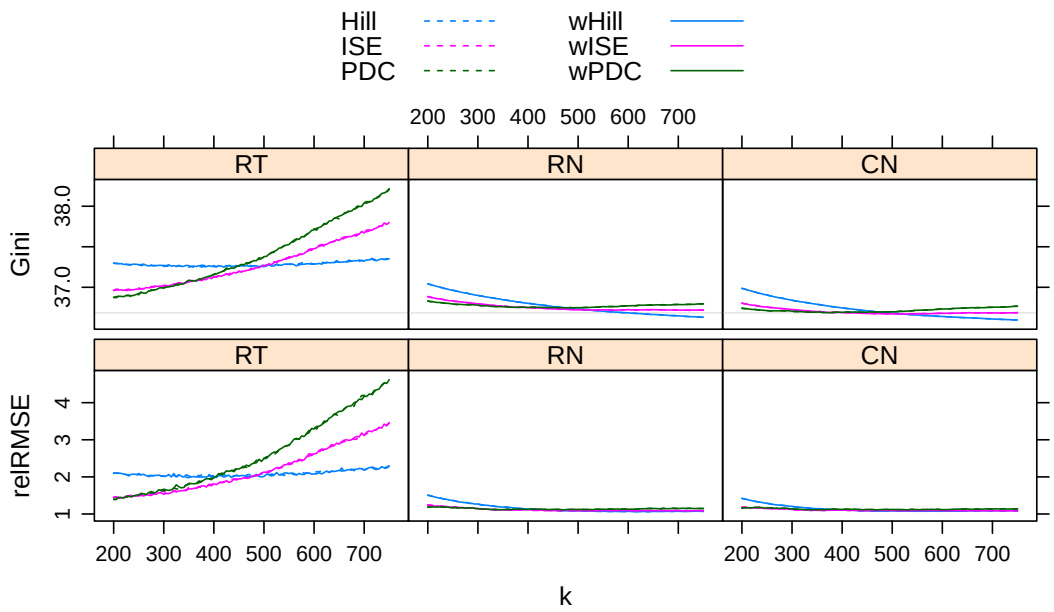

Figure F.404.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

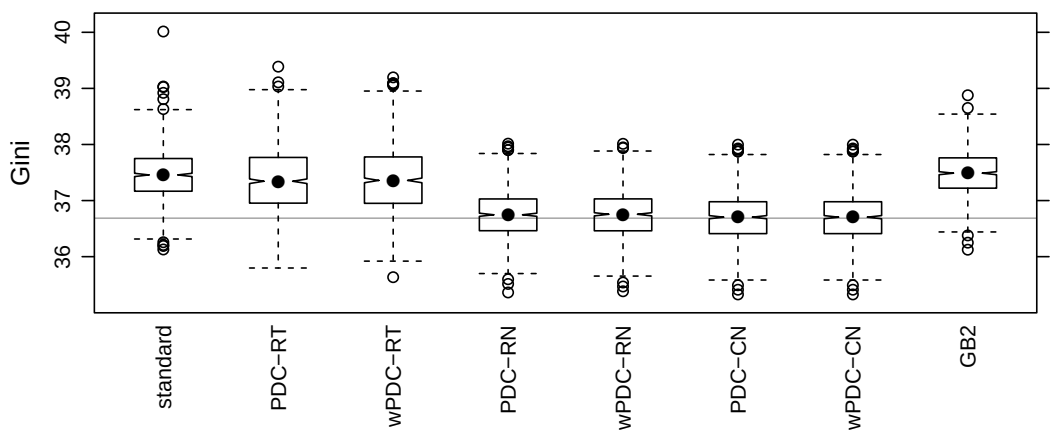

Figure F.405.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.202.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.47	0.21	0.79	2.14	37.46	0.43	0.77	0.91	2.48	1.14	0.09
wHill	RT	300	37.27	0.21	0.58	1.59	37.26	0.47	0.58	0.74	2.01	0.86	0.05
wHill	RT	500	37.25	0.22	0.57	1.55	37.24	0.47	0.55	0.74	2.01	0.83	0.06
wHill	RT	700	37.32	0.23	0.64	1.74	37.34	0.46	0.66	0.80	2.18	0.98	0.08
wHill	RN	300	36.90	0.17	0.22	0.59	36.90	0.43	0.22	0.47	1.27	0.48	0.04
wHill	RN	500	36.73	0.16	0.05	0.12	36.74	0.41	0.06	0.40	1.09	0.41	0.03
wHill	RN	700	36.65	0.15	−0.04	−0.10	36.66	0.40	−0.02	0.39	1.07	0.40	0.04
wHill	CN	300	36.84	0.17	0.15	0.42	36.85	0.43	0.17	0.44	1.21	0.45	0.04
wHill	CN	500	36.68	0.16	−0.01	−0.02	36.68	0.41	−0.01	0.40	1.08	0.41	0.04
wHill	CN	700	36.61	0.15	−0.08	−0.21	36.62	0.41	−0.07	0.40	1.09	0.40	0.04
wISE	RT	300	37.01	0.21	0.33	0.89	37.00	0.47	0.31	0.56	1.53	0.58	0.05
wISE	RT	500	37.27	0.27	0.58	1.59	37.25	0.54	0.56	0.78	2.13	0.84	0.06
wISE	RT	700	37.67	0.34	0.98	2.68	37.66	0.58	0.97	1.14	3.11	1.44	0.08
wISE	RN	300	36.80	0.17	0.11	0.30	36.79	0.42	0.10	0.42	1.15	0.45	0.04
wISE	RN	500	36.72	0.16	0.04	0.10	36.72	0.41	0.04	0.40	1.09	0.41	0.04
wISE	RN	700	36.72	0.16	0.03	0.09	36.72	0.41	0.04	0.40	1.09	0.42	0.04
wISE	CN	300	36.73	0.17	0.04	0.11	36.72	0.43	0.03	0.41	1.13	0.44	0.04
wISE	CN	500	36.67	0.16	−0.01	−0.04	36.67	0.41	−0.01	0.40	1.09	0.41	0.04
wISE	CN	700	36.68	0.16	−0.00	−0.00	36.68	0.41	−0.01	0.40	1.09	0.41	0.04
wPDC	RT	300	36.99	0.28	0.30	0.83	36.98	0.54	0.29	0.61	1.67	0.60	0.06
wPDC	RT	500	37.38	0.36	0.69	1.89	37.36	0.61	0.67	0.92	2.50	1.01	0.07
wPDC	RT	700	38.04	0.51	1.36	3.70	38.00	0.73	1.32	1.53	4.17	1.95	0.10
wPDC	RN	300	36.78	0.17	0.09	0.26	36.78	0.43	0.09	0.42	1.14	0.44	0.04
wPDC	RN	500	36.75	0.17	0.06	0.17	36.76	0.42	0.07	0.41	1.13	0.43	0.04
wPDC	RN	700	36.79	0.17	0.10	0.28	36.78	0.43	0.10	0.42	1.14	0.43	0.03
wPDC	CN	300	36.71	0.17	0.02	0.05	36.69	0.44	0.01	0.42	1.14	0.45	0.04
wPDC	CN	500	36.70	0.17	0.01	0.03	36.70	0.41	0.02	0.41	1.12	0.43	0.04
wPDC	CN	700	36.75	0.17	0.07	0.19	36.75	0.44	0.07	0.42	1.13	0.43	0.04
GB2			37.48	0.17	0.80	2.17	37.49	0.40	0.80	0.89	2.44	1.19	0.06

OCAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

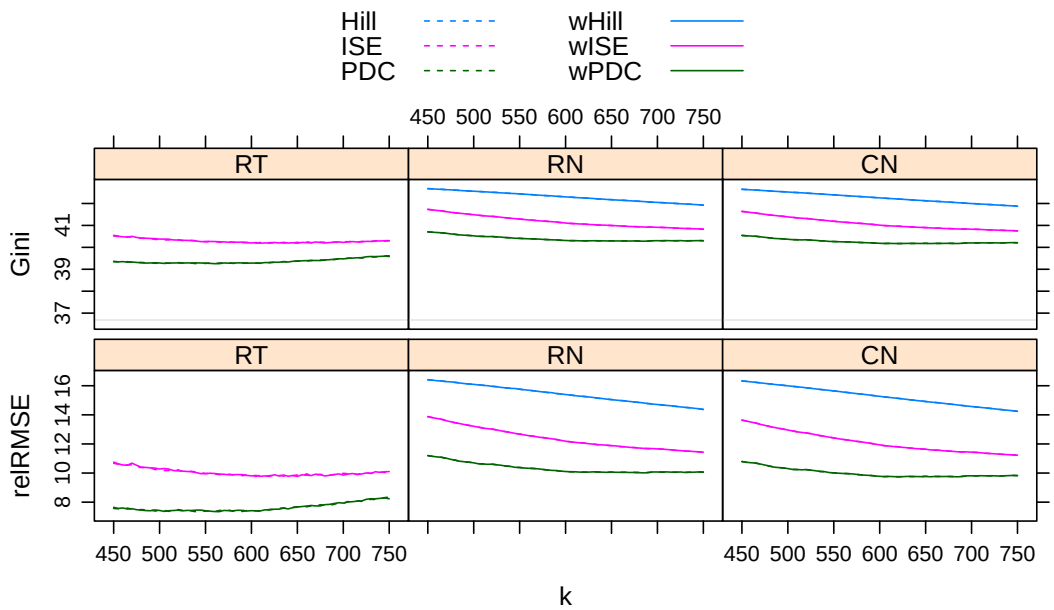

Figure F.406.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

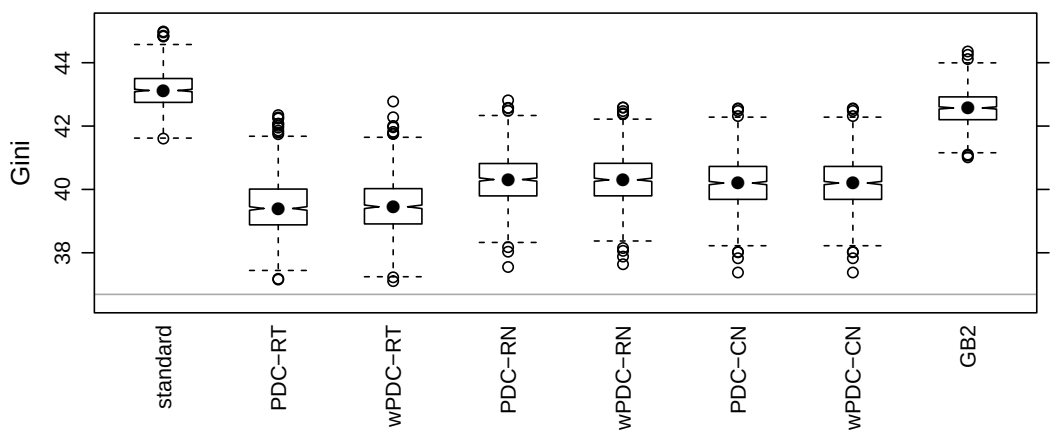

Figure F.407.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.203.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			43.14	0.32	6.46	17.60	43.12	0.56	6.44	6.48	17.67	9.54	0.23
wHill	RT	500	42.74	0.98	6.05	16.50	42.64	0.88	5.95	6.13	16.72	8.82	0.34
wHill	RT	700	42.34	0.74	5.66	15.42	42.32	0.81	5.64	5.72	15.59	8.36	0.33
wHill	RN	300	42.97	0.33	6.29	17.14	42.96	0.58	6.27	6.31	17.21	9.30	0.22
wHill	RN	500	42.56	0.36	5.87	16.01	42.55	0.60	5.87	5.90	16.09	8.70	0.21
wHill	RN	700	42.05	0.36	5.36	14.62	42.05	0.59	5.36	5.40	14.71	7.95	0.19
wHill	CN	300	42.96	0.33	6.27	17.10	42.95	0.58	6.27	6.30	17.17	9.29	0.22
wHill	CN	500	42.52	0.36	5.84	15.91	42.52	0.61	5.83	5.87	16.00	8.65	0.21
wHill	CN	700	42.00	0.37	5.31	14.48	42.00	0.59	5.32	5.35	14.57	7.88	0.19
wISE	RT	500	40.38	0.60	3.69	10.06	40.34	0.74	3.65	3.77	10.27	5.41	0.20
wISE	RT	700	40.22	0.57	3.54	9.65	40.17	0.72	3.49	3.62	9.86	5.17	0.19
wISE	RN	300	42.64	0.40	5.96	16.24	42.64	0.60	5.95	5.99	16.33	8.82	0.21
wISE	RN	500	41.49	0.45	4.80	13.09	41.51	0.68	4.83	4.85	13.22	7.16	0.18
wISE	RN	700	40.91	0.42	4.23	11.52	40.93	0.66	4.24	4.28	11.66	6.29	0.17
wISE	CN	300	42.60	0.41	5.91	16.12	42.60	0.62	5.91	5.95	16.22	8.76	0.21
wISE	CN	500	41.39	0.47	4.70	12.82	41.42	0.70	4.74	4.75	12.96	7.02	0.18
wISE	CN	700	40.83	0.43	4.14	11.29	40.83	0.67	4.15	4.19	11.43	6.15	0.17
wPDC	RT	500	39.29	0.66	2.60	7.09	39.26	0.80	2.58	2.73	7.43	3.82	0.16
wPDC	RT	700	39.47	0.70	2.79	7.60	39.45	0.83	2.77	2.91	7.93	4.10	0.17
wPDC	RN	300	41.80	0.84	5.12	13.94	41.89	0.89	5.20	5.20	14.16	7.72	0.21
wPDC	RN	500	40.52	0.67	3.84	10.46	40.55	0.86	3.86	3.93	10.70	5.72	0.17
wPDC	RN	700	40.30	0.57	3.62	9.86	40.30	0.76	3.62	3.70	10.07	5.36	0.16
wPDC	CN	300	41.67	0.97	4.99	13.60	41.76	0.96	5.08	5.08	13.86	7.53	0.21
wPDC	CN	500	40.37	0.74	3.68	10.04	40.38	0.89	3.69	3.78	10.31	5.48	0.17
wPDC	CN	700	40.20	0.59	3.52	9.58	40.20	0.77	3.51	3.60	9.81	5.21	0.16
GB2			42.57	0.28	5.88	16.03	42.57	0.54	5.89	5.90	16.10	8.73	0.21

OAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

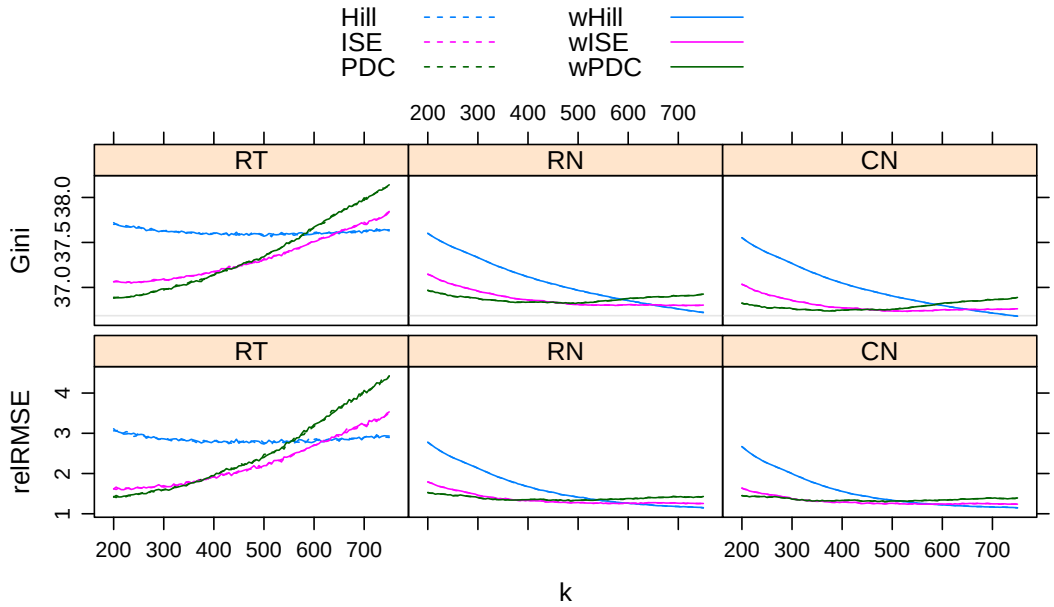

Figure F.408.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

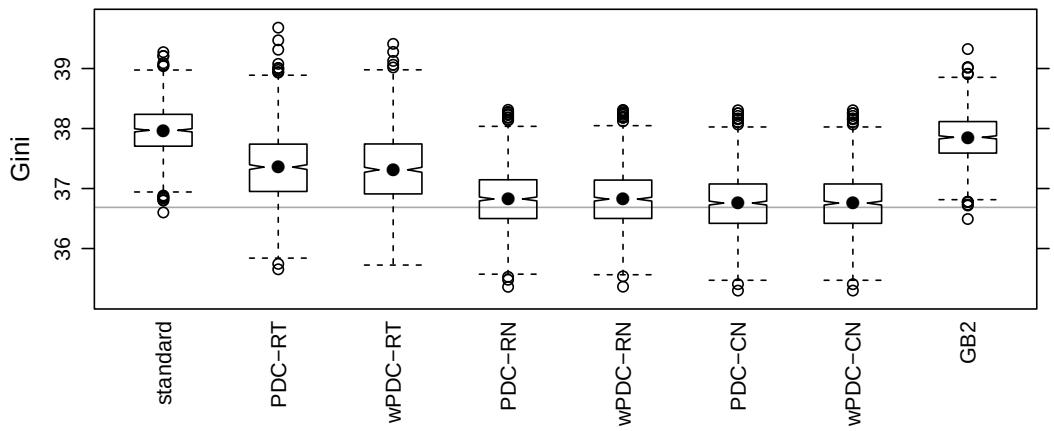

Figure F.409.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.204.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.97	0.17	1.29	3.51	37.97	0.39	1.28	1.35	3.68	1.90	0.07
wHill	RT	300	37.63	0.21	0.94	2.58	37.63	0.44	0.95	1.05	2.86	1.40	0.07
wHill	RT	500	37.57	0.23	0.88	2.41	37.56	0.49	0.87	1.00	2.73	1.29	0.06
wHill	RT	700	37.63	0.24	0.95	2.58	37.62	0.48	0.93	1.07	2.90	1.38	0.07
wHill	RN	300	37.33	0.19	0.65	1.76	37.33	0.43	0.64	0.78	2.13	0.95	0.05
wHill	RN	500	36.97	0.19	0.28	0.77	36.97	0.43	0.28	0.52	1.41	0.52	0.05
wHill	RN	700	36.76	0.18	0.08	0.21	36.75	0.44	0.06	0.43	1.18	0.45	0.04
wHill	CN	300	37.27	0.20	0.58	1.58	37.26	0.44	0.58	0.73	2.00	0.87	0.05
wHill	CN	500	36.91	0.19	0.22	0.60	36.91	0.44	0.22	0.49	1.34	0.49	0.05
wHill	CN	700	36.72	0.18	0.03	0.08	36.71	0.44	0.02	0.43	1.17	0.44	0.04
wISE	RT	300	37.10	0.22	0.41	1.12	37.10	0.49	0.41	0.62	1.70	0.64	0.05
wISE	RT	500	37.31	0.26	0.62	1.69	37.28	0.51	0.59	0.81	2.20	0.88	0.07
wISE	RT	700	37.70	0.35	1.02	2.77	37.67	0.59	0.99	1.17	3.20	1.46	0.09
wISE	RN	300	36.96	0.21	0.27	0.74	36.94	0.46	0.26	0.53	1.46	0.52	0.05
wISE	RN	500	36.81	0.20	0.12	0.34	36.82	0.44	0.13	0.47	1.28	0.48	0.05
wISE	RN	700	36.80	0.20	0.11	0.31	36.78	0.46	0.09	0.46	1.26	0.46	0.04
wISE	CN	300	36.85	0.22	0.17	0.46	36.84	0.48	0.15	0.50	1.37	0.49	0.05
wISE	CN	500	36.74	0.21	0.05	0.14	36.74	0.46	0.05	0.46	1.26	0.46	0.04
wISE	CN	700	36.76	0.20	0.07	0.19	36.73	0.46	0.05	0.46	1.25	0.46	0.04
wPDC	RT	300	36.98	0.25	0.30	0.81	36.96	0.52	0.28	0.59	1.60	0.58	0.06
wPDC	RT	500	37.34	0.35	0.65	1.78	37.31	0.61	0.63	0.88	2.40	0.93	0.07
wPDC	RT	700	38.00	0.51	1.31	3.57	37.98	0.69	1.29	1.49	4.07	1.91	0.12
wPDC	RN	300	36.88	0.23	0.19	0.52	36.87	0.48	0.18	0.51	1.40	0.50	0.05
wPDC	RN	500	36.83	0.22	0.14	0.39	36.82	0.47	0.14	0.49	1.34	0.51	0.04
wPDC	RN	700	36.90	0.22	0.22	0.60	36.90	0.47	0.21	0.52	1.42	0.50	0.05
wPDC	CN	300	36.76	0.24	0.08	0.21	36.75	0.49	0.07	0.50	1.36	0.51	0.05
wPDC	CN	500	36.76	0.23	0.07	0.20	36.76	0.49	0.07	0.48	1.32	0.49	0.04
wPDC	CN	700	36.86	0.23	0.18	0.48	36.86	0.48	0.17	0.51	1.39	0.49	0.05
GB2			37.85	0.16	1.16	3.16	37.85	0.39	1.17	1.23	3.35	1.73	0.07

OAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

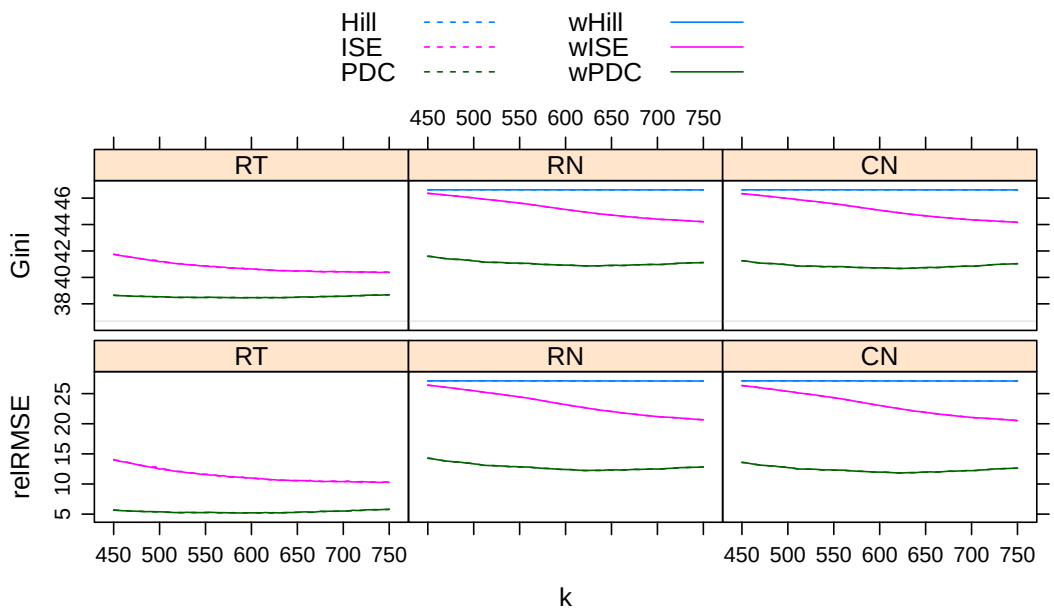

Figure F.410.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

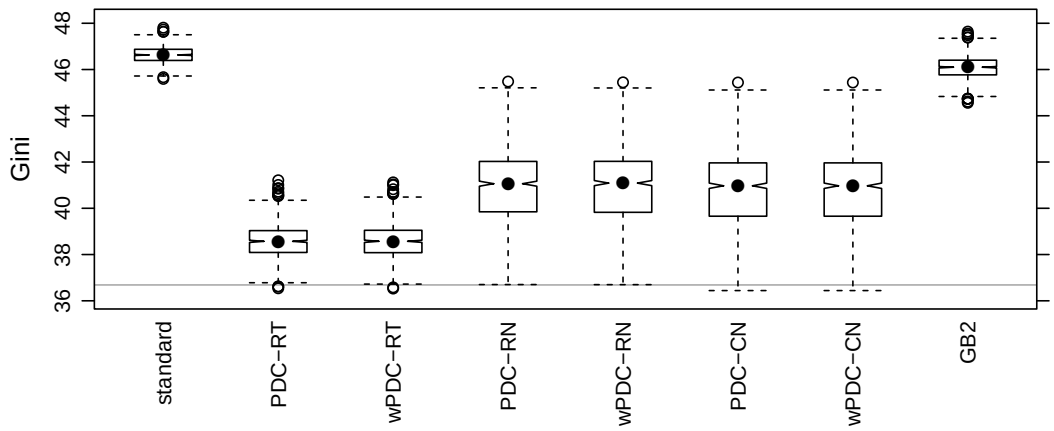

Figure F.411.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.205.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			46.63	0.12	9.94	27.11	46.63	0.36	9.94	9.95	27.12	14.74	0.30
wHill	RT	500	46.41	2.47	9.72	26.50	46.22	1.12	9.54	9.85	26.84	14.14	0.70
wHill	RT	700	45.41	1.14	8.73	23.79	45.34	0.86	8.65	8.79	23.97	12.83	0.47
wHill	RN	300	46.63	0.12	9.94	27.11	46.63	0.36	9.94	9.95	27.12	14.74	0.30
wHill	RN	500	46.63	0.12	9.94	27.10	46.63	0.36	9.94	9.95	27.12	14.74	0.30
wHill	RN	700	46.62	0.12	9.94	27.09	46.62	0.35	9.94	9.94	27.10	14.73	0.30
wHill	CN	300	46.63	0.12	9.94	27.11	46.63	0.36	9.94	9.95	27.12	14.74	0.30
wHill	CN	500	46.63	0.12	9.94	27.10	46.63	0.36	9.94	9.95	27.12	14.74	0.30
wHill	CN	700	46.62	0.12	9.94	27.09	46.62	0.36	9.94	9.94	27.10	14.73	0.30
wISE	RT	500	41.19	0.68	4.50	12.28	41.14	0.80	4.45	4.58	12.48	6.60	0.21
wISE	RT	700	40.43	0.57	3.74	10.20	40.42	0.75	3.74	3.82	10.40	5.54	0.18
wISE	RN	300	46.63	0.12	9.94	27.11	46.63	0.36	9.94	9.95	27.12	14.74	0.30
wISE	RN	500	46.01	0.36	9.33	25.43	46.09	0.50	9.40	9.35	25.48	13.94	0.31
wISE	RN	700	44.41	0.77	7.72	21.05	44.33	0.85	7.64	7.77	21.19	11.33	0.29
wISE	CN	300	46.63	0.12	9.94	27.11	46.63	0.36	9.94	9.95	27.12	14.74	0.30
wISE	CN	500	45.97	0.38	9.29	25.32	46.06	0.50	9.37	9.31	25.37	13.89	0.30
wISE	CN	700	44.36	0.79	7.67	20.91	44.27	0.86	7.58	7.72	21.05	11.24	0.28
wPDC	RT	500	38.54	0.48	1.85	5.04	38.49	0.69	1.81	1.98	5.39	2.68	0.12
wPDC	RT	700	38.58	0.51	1.89	5.15	38.57	0.72	1.89	2.02	5.51	2.80	0.12
wPDC	RN	300	45.34	3.06	8.65	23.58	46.21	0.98	9.52	8.83	24.06	14.12	0.30
wPDC	RN	500	41.25	3.10	4.57	12.44	41.36	1.88	4.67	4.89	13.34	6.93	0.25
wPDC	RN	700	40.97	2.54	4.29	11.69	41.09	1.60	4.40	4.57	12.47	6.53	0.24
wPDC	CN	300	45.19	3.77	8.51	23.19	46.19	1.03	9.50	8.73	23.78	14.09	0.30
wPDC	CN	500	40.95	3.61	4.26	11.62	41.08	2.00	4.40	4.66	12.72	6.52	0.25
wPDC	CN	700	40.85	2.71	4.17	11.36	40.97	1.66	4.29	4.48	12.21	6.36	0.24
GB2			46.09	0.24	9.40	25.62	46.10	0.47	9.41	9.41	25.66	13.95	0.30

OAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

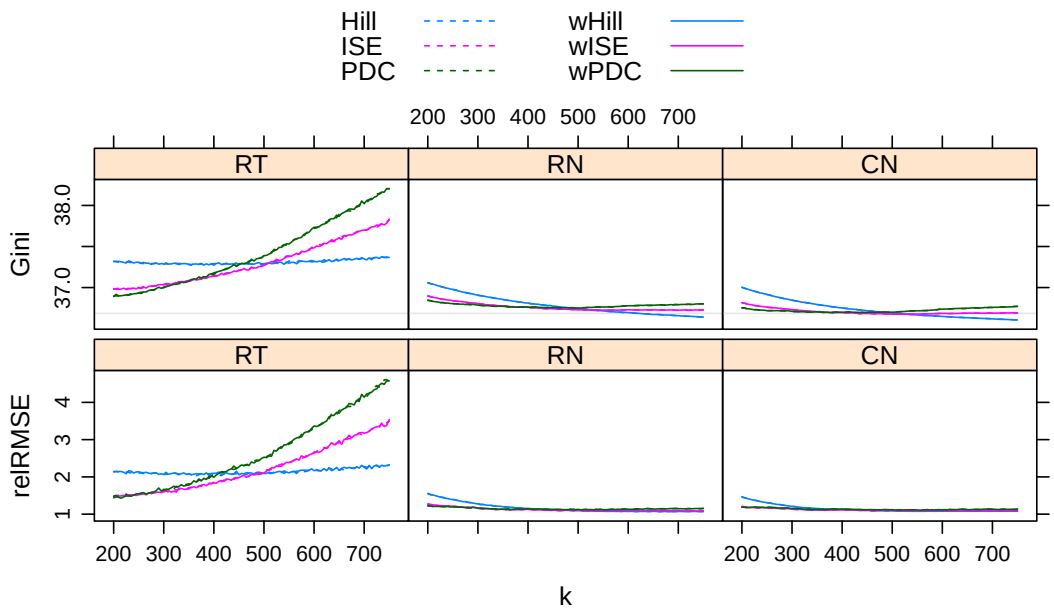

Figure F.412.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

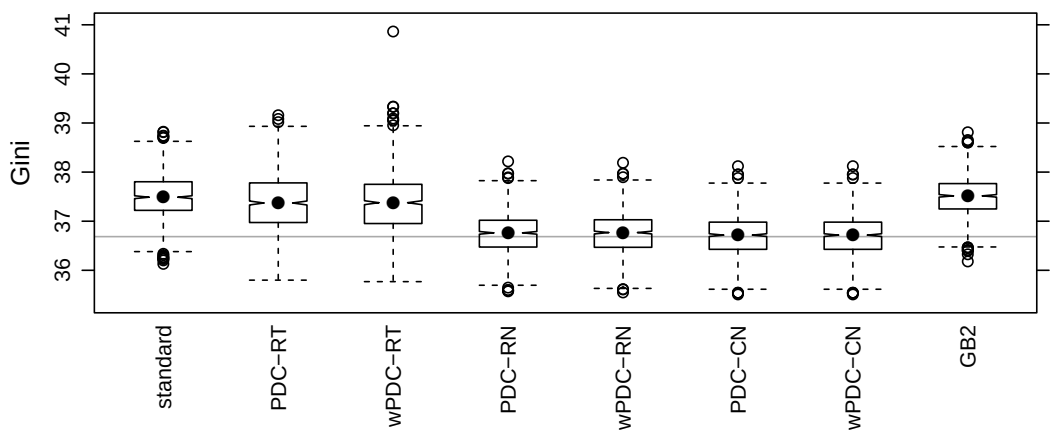

Figure F.413.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.206.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.50	0.21	0.82	2.23	37.49	0.43	0.80	0.94	2.55	1.19	0.06
wHill	RT	300	37.29	0.21	0.60	1.64	37.28	0.46	0.59	0.76	2.06	0.89	0.06
wHill	RT	500	37.29	0.22	0.60	1.64	37.29	0.45	0.60	0.77	2.09	0.92	0.07
wHill	RT	700	37.35	0.25	0.66	1.81	37.36	0.47	0.67	0.83	2.26	1.00	0.06
wHill	RN	300	36.91	0.17	0.22	0.61	36.92	0.41	0.23	0.47	1.28	0.48	0.04
wHill	RN	500	36.74	0.16	0.06	0.15	36.75	0.39	0.07	0.40	1.10	0.41	0.04
wHill	RN	700	36.66	0.15	−0.03	−0.07	36.66	0.40	−0.03	0.39	1.07	0.40	0.03
wHill	CN	300	36.85	0.17	0.16	0.44	36.85	0.40	0.17	0.44	1.21	0.45	0.04
wHill	CN	500	36.69	0.16	0.00	0.01	36.70	0.39	0.02	0.40	1.09	0.39	0.03
wHill	CN	700	36.62	0.15	−0.07	−0.18	36.62	0.41	−0.06	0.40	1.08	0.40	0.03
wISE	RT	300	37.03	0.23	0.35	0.94	37.01	0.49	0.33	0.59	1.61	0.58	0.08
wISE	RT	500	37.27	0.25	0.58	1.59	37.28	0.52	0.59	0.77	2.10	0.89	0.08
wISE	RT	700	37.70	0.33	1.01	2.76	37.71	0.58	1.02	1.16	3.17	1.52	0.09
wISE	RN	300	36.80	0.17	0.12	0.32	36.81	0.41	0.12	0.43	1.17	0.43	0.05
wISE	RN	500	36.73	0.16	0.04	0.11	36.74	0.40	0.06	0.40	1.10	0.42	0.04
wISE	RN	700	36.72	0.16	0.04	0.11	36.74	0.41	0.05	0.40	1.09	0.41	0.04
wISE	CN	300	36.73	0.17	0.05	0.13	36.72	0.42	0.04	0.42	1.13	0.42	0.04
wISE	CN	500	36.68	0.16	−0.01	−0.03	36.69	0.41	0.01	0.40	1.10	0.40	0.04
wISE	CN	700	36.69	0.16	0.00	0.01	36.70	0.41	0.02	0.40	1.09	0.41	0.03
wPDC	RT	300	37.01	0.27	0.32	0.87	36.98	0.51	0.29	0.61	1.66	0.58	0.06
wPDC	RT	500	37.39	0.37	0.70	1.92	37.38	0.59	0.69	0.93	2.53	1.03	0.11
wPDC	RT	700	38.02	0.52	1.34	3.64	38.01	0.71	1.32	1.52	4.14	1.96	0.10
wPDC	RN	300	36.79	0.17	0.10	0.27	36.78	0.43	0.10	0.42	1.16	0.43	0.04
wPDC	RN	500	36.75	0.17	0.07	0.18	36.77	0.41	0.08	0.41	1.13	0.42	0.04
wPDC	RN	700	36.79	0.17	0.11	0.29	36.80	0.40	0.11	0.42	1.15	0.42	0.04
wPDC	CN	300	36.71	0.18	0.02	0.07	36.70	0.44	0.02	0.42	1.15	0.44	0.04
wPDC	CN	500	36.70	0.17	0.01	0.04	36.72	0.41	0.03	0.41	1.12	0.42	0.04
wPDC	CN	700	36.76	0.17	0.07	0.20	36.76	0.41	0.07	0.42	1.13	0.41	0.04
GB2			37.51	0.17	0.82	2.24	37.52	0.38	0.83	0.92	2.50	1.23	0.06

OAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

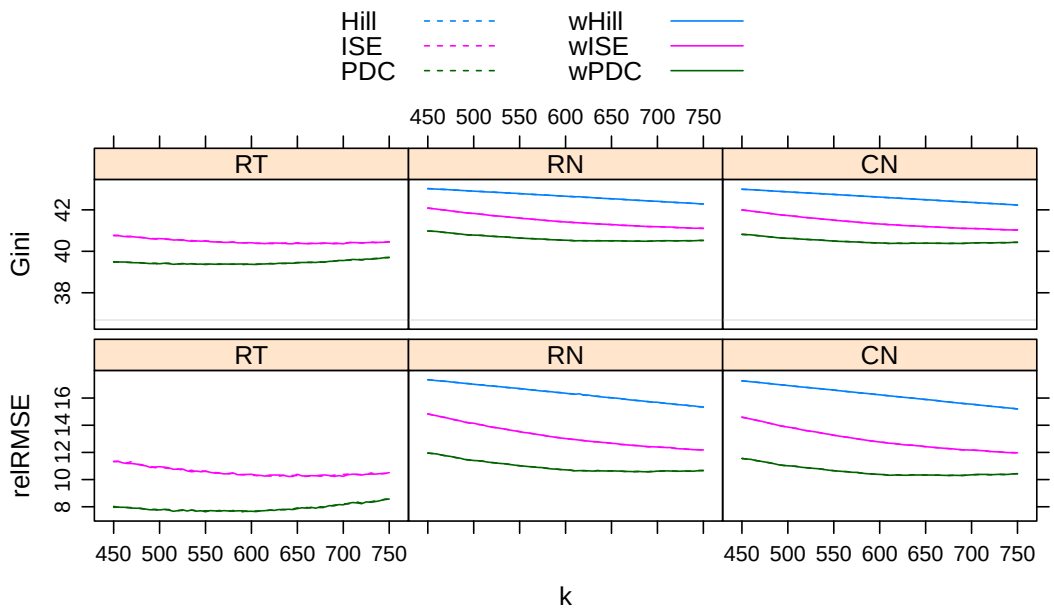

Figure F.414.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

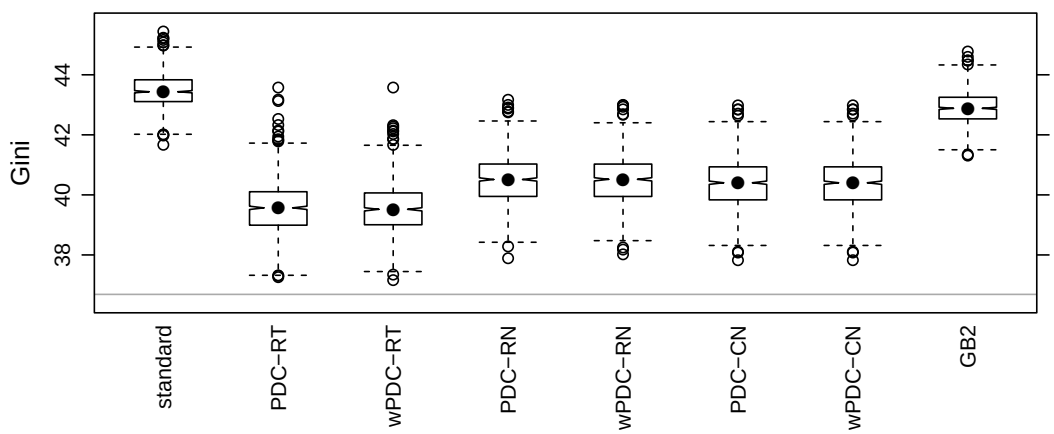

Figure F.415.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.207.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			43.46	0.32	6.78	18.47	43.44	0.54	6.75	6.80	18.53	10.01	0.24
wHill	RT	500	43.05	0.96	6.37	17.35	42.96	0.89	6.28	6.44	17.56	9.30	0.39
wHill	RT	700	42.62	0.70	5.94	16.18	42.57	0.77	5.89	6.00	16.34	8.73	0.29
wHill	RN	300	43.30	0.31	6.61	18.03	43.29	0.55	6.60	6.64	18.10	9.79	0.23
wHill	RN	500	42.90	0.33	6.22	16.94	42.91	0.59	6.22	6.24	17.02	9.22	0.22
wHill	RN	700	42.41	0.34	5.73	15.61	42.41	0.60	5.72	5.76	15.69	8.49	0.20
wHill	CN	300	43.29	0.32	6.60	18.00	43.28	0.54	6.59	6.63	18.06	9.77	0.23
wHill	CN	500	42.87	0.34	6.18	16.85	42.88	0.60	6.19	6.21	16.92	9.18	0.22
wHill	CN	700	42.36	0.34	5.68	15.47	42.37	0.58	5.68	5.70	15.55	8.42	0.20
wISE	RT	500	40.61	0.72	3.93	10.70	40.55	0.83	3.86	4.02	10.95	5.72	0.24
wISE	RT	700	40.36	0.60	3.68	10.02	40.33	0.77	3.64	3.76	10.24	5.40	0.20
wISE	RN	300	43.03	0.38	6.34	17.29	43.04	0.61	6.36	6.37	17.37	9.43	0.23
wISE	RN	500	41.83	0.49	5.14	14.02	41.83	0.67	5.15	5.19	14.15	7.63	0.30
wISE	RN	700	41.19	0.44	4.50	12.27	41.19	0.66	4.50	4.55	12.40	6.67	0.18
wISE	CN	300	42.99	0.40	6.31	17.19	43.00	0.62	6.32	6.34	17.28	9.36	0.23
wISE	CN	500	41.72	0.49	5.04	13.73	41.74	0.69	5.06	5.09	13.86	7.50	0.19
wISE	CN	700	41.10	0.45	4.41	12.03	41.09	0.67	4.40	4.46	12.17	6.53	0.18
wPDC	RT	500	39.40	0.75	2.71	7.40	39.34	0.84	2.66	2.85	7.76	3.94	0.15
wPDC	RT	700	39.55	0.70	2.87	7.82	39.52	0.80	2.83	2.99	8.15	4.20	0.19
wPDC	RN	300	42.21	0.85	5.53	15.07	42.30	0.96	5.61	5.60	15.27	8.32	0.23
wPDC	RN	500	40.78	0.73	4.10	11.16	40.78	0.88	4.09	4.18	11.40	6.06	0.18
wPDC	RN	700	40.51	0.59	3.82	10.41	40.52	0.80	3.83	3.90	10.62	5.68	0.17
wPDC	CN	300	42.10	0.97	5.41	14.75	42.17	1.04	5.49	5.50	14.99	8.13	0.23
wPDC	CN	500	40.62	0.81	3.94	10.74	40.62	0.92	3.94	4.04	11.01	5.84	0.18
wPDC	CN	700	40.40	0.61	3.72	10.13	40.40	0.81	3.72	3.80	10.35	5.51	0.17
GB2			42.89	0.28	6.20	16.91	42.88	0.53	6.20	6.23	16.97	9.19	0.22

Stratified simple random sampling

No contamination

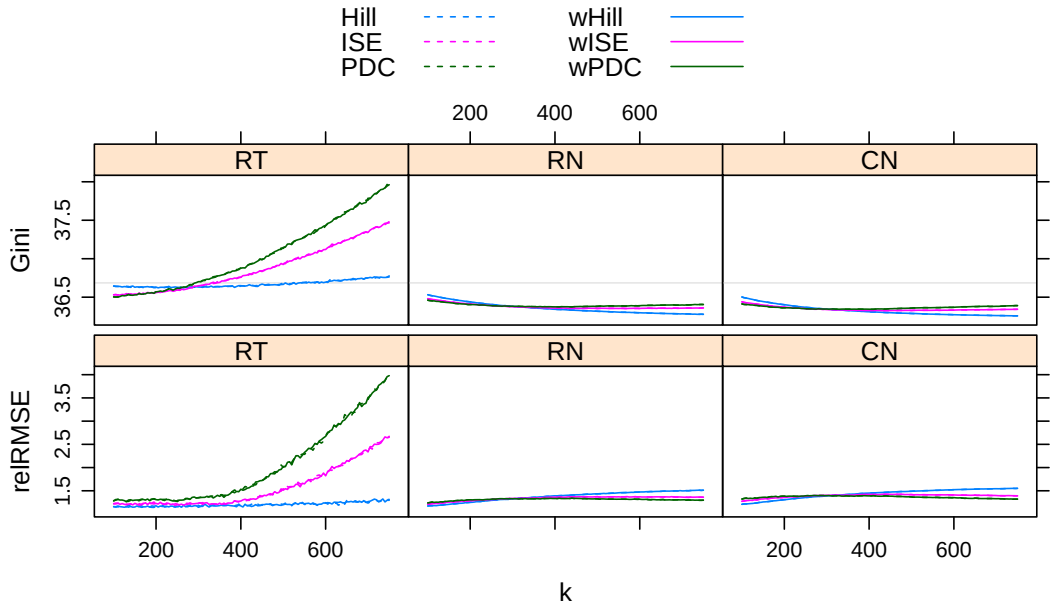

Figure F.416.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 100 and 750.

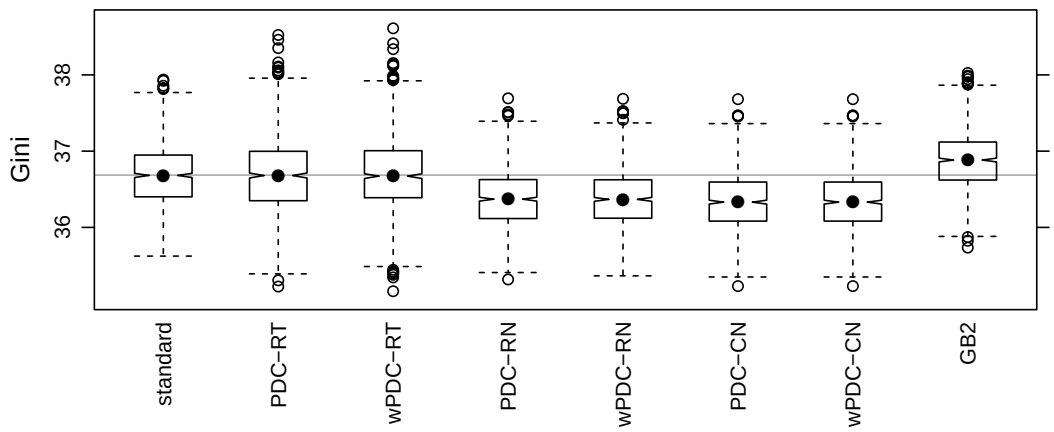

Figure F.417.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 300$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.208.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			36.69	0.17	0.00	0.01	36.68	0.40	−0.00	0.41	1.12	0.40	0.03
wHill	RT	300	36.63	0.17	−0.05	−0.15	36.62	0.41	−0.06	0.42	1.14	0.42	0.04
wHill	RT	500	36.67	0.19	−0.02	−0.05	36.66	0.44	−0.03	0.44	1.20	0.44	0.04
wHill	RT	700	36.75	0.21	0.06	0.17	36.72	0.47	0.03	0.46	1.27	0.47	0.06
wHill	RN	300	36.38	0.14	−0.31	−0.83	36.38	0.37	−0.31	0.49	1.33	0.54	0.04
wHill	RN	500	36.32	0.14	−0.37	−1.01	36.31	0.37	−0.37	0.53	1.43	0.58	0.04
wHill	RN	700	36.28	0.14	−0.40	−1.10	36.28	0.37	−0.41	0.55	1.50	0.62	0.04
wHill	CN	300	36.35	0.14	−0.34	−0.93	36.34	0.38	−0.34	0.51	1.39	0.57	0.04
wHill	CN	500	36.29	0.14	−0.40	−1.08	36.29	0.37	−0.40	0.55	1.49	0.61	0.04
wHill	CN	700	36.26	0.14	−0.43	−1.16	36.26	0.36	−0.43	0.57	1.54	0.65	0.04
wISE	RT	300	36.65	0.20	−0.04	−0.10	36.64	0.42	−0.05	0.45	1.23	0.43	0.05
wISE	RT	500	36.92	0.25	0.24	0.65	36.90	0.50	0.22	0.55	1.51	0.53	0.06
wISE	RT	700	37.34	0.31	0.66	1.79	37.31	0.54	0.62	0.86	2.34	0.93	0.07
wISE	RN	300	36.38	0.14	−0.31	−0.85	36.37	0.37	−0.32	0.49	1.34	0.54	0.04
wISE	RN	500	36.35	0.14	−0.33	−0.91	36.35	0.37	−0.33	0.50	1.37	0.55	0.04
wISE	RN	700	36.36	0.14	−0.33	−0.90	36.34	0.38	−0.34	0.50	1.36	0.56	0.04
wISE	CN	300	36.34	0.15	−0.35	−0.94	36.33	0.37	−0.36	0.51	1.40	0.57	0.04
wISE	CN	500	36.33	0.14	−0.36	−0.98	36.32	0.38	−0.37	0.52	1.42	0.57	0.04
wISE	CN	700	36.34	0.14	−0.35	−0.95	36.32	0.38	−0.36	0.51	1.40	0.58	0.04
wPDC	RT	300	36.70	0.25	0.02	0.04	36.67	0.46	−0.01	0.50	1.35	0.45	0.05
wPDC	RT	500	37.15	0.34	0.46	1.26	37.13	0.61	0.44	0.74	2.02	0.72	0.07
wPDC	RT	700	37.79	0.45	1.10	3.00	37.77	0.70	1.08	1.29	3.51	1.60	0.12
wPDC	RN	300	36.38	0.15	−0.30	−0.83	36.37	0.38	−0.32	0.49	1.33	0.54	0.04
wPDC	RN	500	36.38	0.14	−0.31	−0.83	36.38	0.38	−0.31	0.49	1.33	0.52	0.04
wPDC	RN	700	36.40	0.15	−0.29	−0.78	36.38	0.37	−0.31	0.48	1.30	0.53	0.04
wPDC	CN	300	36.35	0.15	−0.34	−0.93	36.33	0.38	−0.35	0.51	1.40	0.57	0.04
wPDC	CN	500	36.36	0.14	−0.33	−0.89	36.36	0.38	−0.33	0.50	1.37	0.54	0.04
wPDC	CN	700	36.38	0.15	−0.30	−0.83	36.36	0.38	−0.32	0.49	1.33	0.54	0.04
GB2			36.88	0.15	0.19	0.53	36.88	0.36	0.20	0.43	1.18	0.42	0.04

OCAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

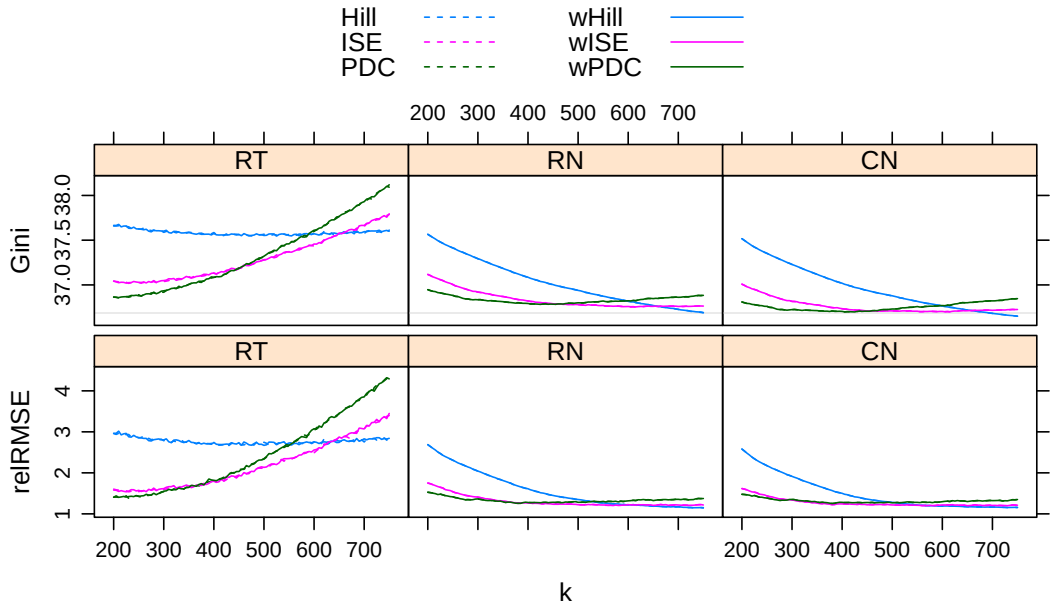

Figure F.418.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

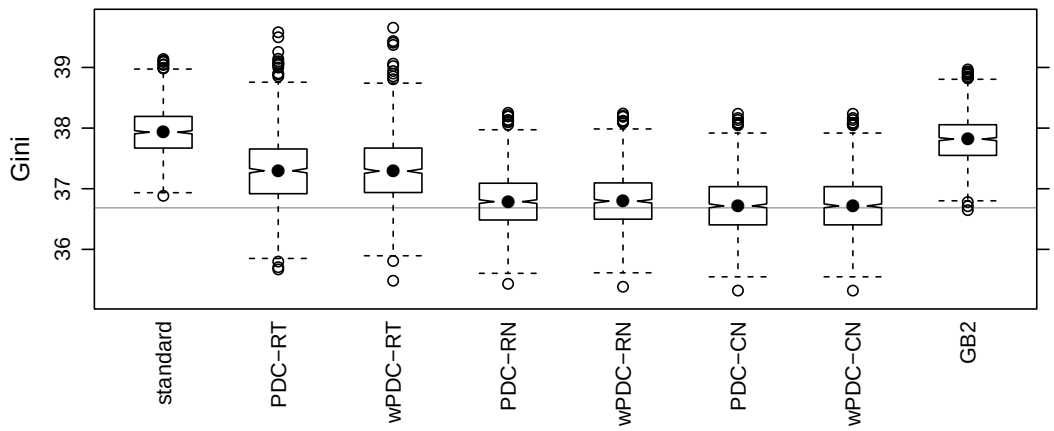

Figure F.419.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.209.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.95	0.16	1.26	3.44	37.93	0.39	1.25	1.32	3.61	1.85	0.07
wHill	RT	300	37.60	0.22	0.92	2.49	37.59	0.45	0.90	1.03	2.80	1.34	0.07
wHill	RT	500	37.55	0.21	0.87	2.36	37.56	0.46	0.87	0.98	2.67	1.29	0.06
wHill	RT	700	37.59	0.25	0.91	2.48	37.59	0.51	0.90	1.04	2.83	1.33	0.07
wHill	RN	300	37.29	0.19	0.61	1.66	37.30	0.45	0.61	0.75	2.04	0.91	0.05
wHill	RN	500	36.94	0.18	0.25	0.69	36.95	0.44	0.26	0.49	1.35	0.50	0.04
wHill	RN	700	36.73	0.18	0.04	0.11	36.73	0.43	0.05	0.43	1.17	0.43	0.04
wHill	CN	300	37.23	0.20	0.54	1.48	37.24	0.44	0.55	0.70	1.91	0.83	0.05
wHill	CN	500	36.88	0.18	0.19	0.52	36.88	0.44	0.20	0.47	1.28	0.47	0.04
wHill	CN	700	36.68	0.18	−0.00	−0.01	36.69	0.43	0.00	0.43	1.17	0.43	0.04
wISE	RT	300	37.05	0.22	0.36	0.99	37.04	0.46	0.35	0.59	1.61	0.62	0.05
wISE	RT	500	37.28	0.26	0.60	1.63	37.26	0.50	0.57	0.78	2.13	0.85	0.07
wISE	RT	700	37.66	0.31	0.98	2.67	37.64	0.55	0.95	1.13	3.07	1.41	0.08
wISE	RN	300	36.92	0.21	0.24	0.64	36.91	0.46	0.23	0.52	1.41	0.52	0.05
wISE	RN	500	36.78	0.19	0.09	0.26	36.78	0.44	0.09	0.45	1.22	0.44	0.04
wISE	RN	700	36.76	0.19	0.07	0.20	36.75	0.43	0.06	0.45	1.22	0.42	0.04
wISE	CN	300	36.82	0.22	0.13	0.35	36.79	0.47	0.11	0.49	1.34	0.49	0.04
wISE	CN	500	36.71	0.20	0.02	0.06	36.71	0.45	0.02	0.45	1.22	0.44	0.04
wISE	CN	700	36.72	0.19	0.03	0.08	36.71	0.43	0.02	0.44	1.21	0.44	0.04
wPDC	RT	300	36.93	0.26	0.25	0.68	36.91	0.51	0.23	0.57	1.55	0.54	0.06
wPDC	RT	500	37.32	0.34	0.63	1.73	37.29	0.54	0.60	0.86	2.35	0.92	0.08
wPDC	RT	700	37.93	0.45	1.24	3.39	37.87	0.70	1.18	1.41	3.85	1.75	0.10
wPDC	RN	300	36.83	0.23	0.15	0.40	36.83	0.48	0.14	0.50	1.36	0.49	0.04
wPDC	RN	500	36.80	0.21	0.11	0.31	36.79	0.44	0.11	0.47	1.28	0.46	0.04
wPDC	RN	700	36.86	0.22	0.18	0.48	36.85	0.47	0.16	0.50	1.35	0.49	0.04
wPDC	CN	300	36.72	0.24	0.04	0.10	36.72	0.51	0.03	0.50	1.35	0.50	0.04
wPDC	CN	500	36.73	0.22	0.04	0.12	36.72	0.47	0.03	0.47	1.27	0.46	0.04
wPDC	CN	700	36.82	0.22	0.14	0.37	36.81	0.47	0.12	0.49	1.32	0.49	0.04
GB2			37.82	0.16	1.13	3.08	37.82	0.37	1.13	1.20	3.26	1.68	0.06

OCAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

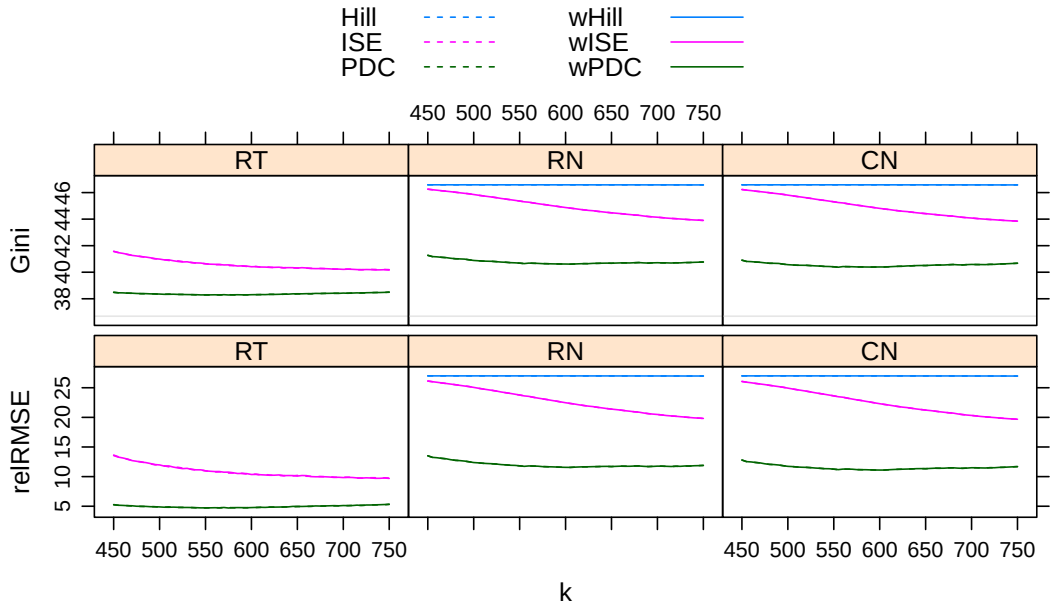

Figure F.420.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

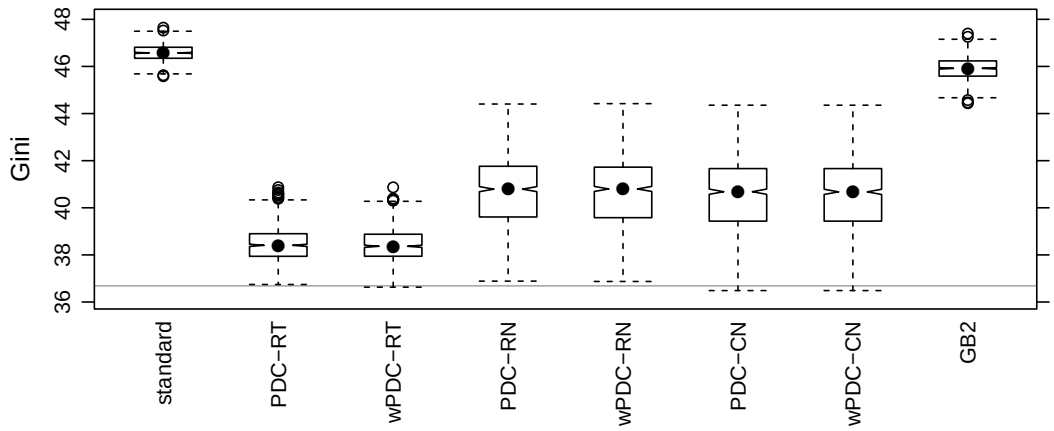

Figure F.421.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.210.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			46.59	0.12	9.90	26.99	46.57	0.35	9.89	9.91	27.01	14.66	0.30
wHill	RT	500	46.41	2.74	9.73	26.51	46.18	1.06	9.49	9.86	26.89	14.07	0.88
wHill	RT	700	45.25	1.19	8.56	23.33	45.12	0.87	8.44	8.63	23.52	12.51	0.59
wHill	RN	300	46.59	0.12	9.90	26.99	46.57	0.35	9.89	9.91	27.01	14.66	0.30
wHill	RN	500	46.59	0.12	9.90	26.99	46.57	0.34	9.89	9.91	27.00	14.66	0.30
wHill	RN	700	46.58	0.12	9.90	26.97	46.57	0.34	9.88	9.90	26.99	14.65	0.30
wHill	CN	300	46.59	0.12	9.90	26.99	46.57	0.35	9.89	9.91	27.01	14.66	0.30
wHill	CN	500	46.59	0.12	9.90	26.99	46.57	0.34	9.89	9.91	27.00	14.66	0.30
wHill	CN	700	46.58	0.12	9.89	26.97	46.57	0.34	9.88	9.90	26.99	14.65	0.30
wISE	RT	500	40.99	0.77	4.30	11.73	40.95	0.81	4.27	4.39	11.97	6.32	0.33
wISE	RT	700	40.22	0.57	3.53	9.62	40.18	0.71	3.50	3.61	9.84	5.18	0.21
wISE	RN	300	46.59	0.12	9.90	26.99	46.57	0.35	9.89	9.91	27.01	14.66	0.30
wISE	RN	500	45.85	0.43	9.17	24.99	45.94	0.54	9.25	9.19	25.06	13.71	0.29
wISE	RN	700	44.14	0.87	7.46	20.33	44.06	0.85	7.37	7.52	20.49	10.93	0.28
wISE	CN	300	46.59	0.12	9.90	26.99	46.57	0.35	9.89	9.91	27.01	14.66	0.30
wISE	CN	500	45.81	0.46	9.12	24.87	45.90	0.55	9.21	9.15	24.93	13.66	0.29
wISE	CN	700	44.08	0.89	7.40	20.16	44.00	0.87	7.31	7.46	20.33	10.84	0.28
wPDC	RT	500	38.35	0.43	1.67	4.55	38.33	0.66	1.64	1.79	4.88	2.44	0.12
wPDC	RT	700	38.43	0.49	1.74	4.75	38.37	0.67	1.68	1.88	5.12	2.49	0.11
wPDC	RN	300	45.10	3.11	8.41	22.93	45.88	1.36	9.19	8.60	23.43	13.63	0.29
wPDC	RN	500	40.89	2.97	4.20	11.45	40.98	1.86	4.30	4.54	12.37	6.37	0.24
wPDC	RN	700	40.71	2.40	4.03	10.98	40.80	1.58	4.11	4.32	11.77	6.10	0.21
wPDC	CN	300	44.94	3.81	8.25	22.49	45.83	1.46	9.15	8.48	23.11	13.56	0.29
wPDC	CN	500	40.57	3.46	3.88	10.58	40.71	2.02	4.02	4.30	11.73	5.96	0.24
wPDC	CN	700	40.59	2.57	3.90	10.63	40.68	1.65	3.99	4.22	11.49	5.92	0.21
GB2			45.92	0.23	9.23	25.16	45.92	0.47	9.23	9.24	25.19	13.69	0.29

OCAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

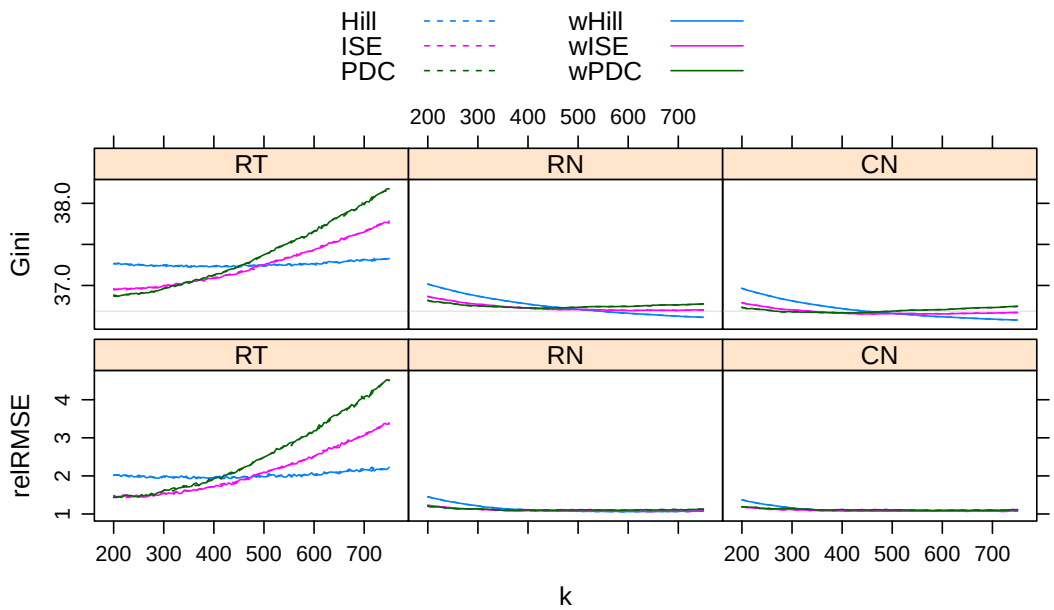

Figure F.422.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

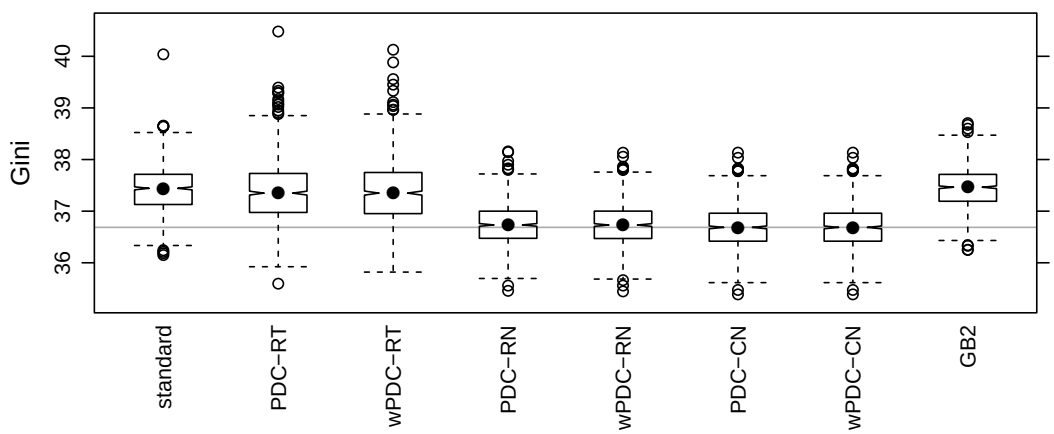

Figure F.423.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.211.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.44	0.20	0.75	2.05	37.44	0.43	0.76	0.87	2.38	1.12	0.09
wHill	RT	300	37.24	0.22	0.56	1.51	37.22	0.47	0.53	0.73	1.98	0.80	0.07
wHill	RT	500	37.23	0.23	0.55	1.49	37.21	0.47	0.52	0.72	1.98	0.79	0.06
wHill	RT	700	37.32	0.23	0.63	1.72	37.30	0.49	0.61	0.80	2.17	0.91	0.06
wHill	RN	300	36.87	0.16	0.18	0.50	36.87	0.41	0.18	0.45	1.21	0.45	0.04
wHill	RN	500	36.71	0.15	0.02	0.07	36.71	0.39	0.02	0.39	1.07	0.39	0.04
wHill	RN	700	36.63	0.15	−0.06	−0.16	36.63	0.38	−0.06	0.39	1.07	0.38	0.04
wHill	CN	300	36.81	0.16	0.13	0.34	36.81	0.41	0.13	0.42	1.16	0.42	0.04
wHill	CN	500	36.66	0.16	−0.03	−0.07	36.67	0.39	−0.02	0.39	1.08	0.39	0.03
wHill	CN	700	36.59	0.15	−0.10	−0.26	36.59	0.38	−0.10	0.40	1.09	0.40	0.04
wISE	RT	300	37.00	0.22	0.31	0.86	36.99	0.44	0.30	0.57	1.54	0.54	0.06
wISE	RT	500	37.25	0.28	0.56	1.53	37.21	0.50	0.53	0.77	2.10	0.82	0.07
wISE	RT	700	37.65	0.33	0.96	2.62	37.62	0.56	0.93	1.12	3.06	1.39	0.08
wISE	RN	300	36.77	0.16	0.08	0.23	36.77	0.39	0.08	0.41	1.12	0.40	0.04
wISE	RN	500	36.71	0.16	0.02	0.06	36.71	0.39	0.02	0.40	1.08	0.39	0.04
wISE	RN	700	36.70	0.15	0.01	0.03	36.69	0.39	0.00	0.39	1.07	0.40	0.03
wISE	CN	300	36.70	0.17	0.01	0.04	36.70	0.40	0.01	0.41	1.11	0.41	0.04
wISE	CN	500	36.66	0.16	−0.03	−0.08	36.67	0.39	−0.02	0.40	1.09	0.39	0.04
wISE	CN	700	36.66	0.15	−0.02	−0.06	36.66	0.40	−0.03	0.39	1.07	0.40	0.03
wPDC	RT	300	36.96	0.28	0.27	0.75	36.93	0.54	0.24	0.59	1.62	0.56	0.07
wPDC	RT	500	37.37	0.36	0.69	1.88	37.35	0.59	0.66	0.91	2.49	1.00	0.09
wPDC	RT	700	38.00	0.50	1.32	3.59	37.95	0.71	1.26	1.49	4.07	1.87	0.13
wPDC	RN	300	36.75	0.17	0.06	0.17	36.74	0.40	0.06	0.42	1.14	0.41	0.04
wPDC	RN	500	36.73	0.16	0.05	0.13	36.73	0.39	0.05	0.41	1.11	0.40	0.04
wPDC	RN	700	36.76	0.16	0.08	0.21	36.75	0.39	0.07	0.41	1.11	0.40	0.04
wPDC	CN	300	36.68	0.18	−0.01	−0.02	36.67	0.42	−0.02	0.42	1.15	0.42	0.04
wPDC	CN	500	36.69	0.16	0.00	0.00	36.69	0.40	−0.00	0.41	1.11	0.40	0.04
wPDC	CN	700	36.73	0.16	0.04	0.12	36.71	0.39	0.03	0.40	1.10	0.40	0.03
GB2			37.46	0.16	0.77	2.10	37.46	0.39	0.78	0.87	2.37	1.15	0.06

OCAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

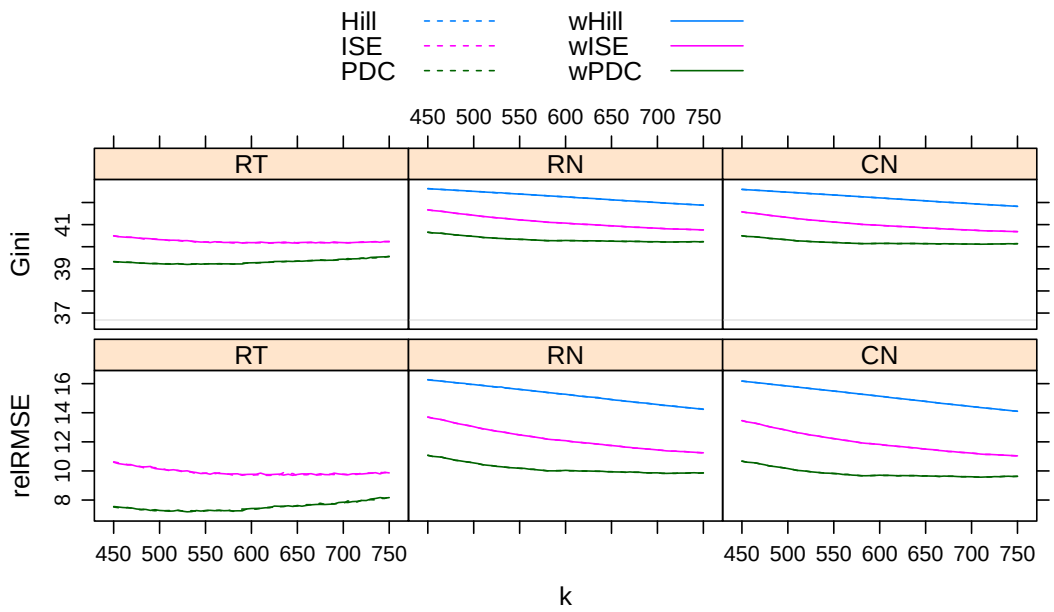

Figure F.424.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

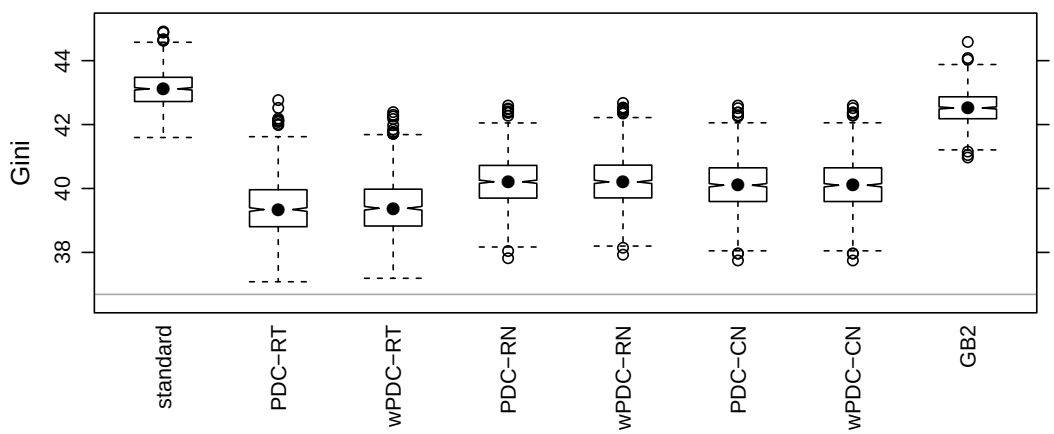

Figure F.425.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.212.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			43.11	0.30	6.42	17.50	43.12	0.55	6.43	6.44	17.57	9.54	0.22
wHill	RT	500	42.69	1.13	6.00	16.36	42.61	0.82	5.93	6.10	16.61	8.79	0.60
wHill	RT	700	42.26	0.62	5.57	15.18	42.19	0.76	5.51	5.63	15.34	8.17	0.26
wHill	RN	300	42.93	0.31	6.25	17.03	42.95	0.57	6.26	6.27	17.10	9.28	0.22
wHill	RN	500	42.51	0.33	5.82	15.87	42.53	0.56	5.84	5.85	15.94	8.66	0.21
wHill	RN	700	42.00	0.33	5.31	14.48	42.00	0.57	5.31	5.34	14.57	7.88	0.20
wHill	CN	300	42.92	0.31	6.24	17.00	42.94	0.56	6.26	6.26	17.07	9.28	0.22
wHill	CN	500	42.47	0.33	5.78	15.76	42.49	0.57	5.80	5.81	15.83	8.60	0.21
wHill	CN	700	41.95	0.34	5.26	14.34	41.95	0.57	5.26	5.29	14.42	7.80	0.19
wISE	RT	500	40.32	0.59	3.63	9.91	40.29	0.74	3.60	3.71	10.13	5.34	0.19
wISE	RT	700	40.19	0.58	3.50	9.54	40.14	0.72	3.45	3.58	9.76	5.11	0.19
wISE	RN	300	42.60	0.37	5.91	16.12	42.60	0.63	5.91	5.94	16.20	8.77	0.21
wISE	RN	500	41.42	0.46	4.74	12.91	41.43	0.68	4.75	4.78	13.04	7.04	0.19
wISE	RN	700	40.84	0.41	4.15	11.31	40.83	0.63	4.14	4.20	11.44	6.14	0.17
wISE	CN	300	42.55	0.39	5.87	15.99	42.56	0.66	5.87	5.90	16.08	8.71	0.21
wISE	CN	500	41.32	0.48	4.64	12.64	41.31	0.71	4.63	4.69	12.78	6.86	0.19
wISE	CN	700	40.75	0.42	4.07	11.08	40.75	0.65	4.06	4.12	11.22	6.02	0.17
wPDC	RT	500	39.23	0.67	2.54	6.93	39.19	0.81	2.50	2.67	7.28	3.71	0.16
wPDC	RT	700	39.44	0.73	2.75	7.50	39.38	0.87	2.69	2.88	7.85	4.00	0.16
wPDC	RN	300	41.75	0.84	5.06	13.80	41.81	0.93	5.12	5.15	14.03	7.59	0.20
wPDC	RN	500	40.47	0.69	3.78	10.31	40.46	0.87	3.78	3.87	10.55	5.60	0.18
wPDC	RN	700	40.23	0.57	3.54	9.65	40.21	0.75	3.52	3.62	9.87	5.22	0.16
wPDC	CN	300	41.62	0.98	4.94	13.46	41.68	1.00	5.00	5.04	13.73	7.41	0.20
wPDC	CN	500	40.31	0.76	3.63	9.89	40.32	0.89	3.64	3.73	10.17	5.39	0.18
wPDC	CN	700	40.12	0.59	3.44	9.37	40.10	0.78	3.42	3.52	9.60	5.06	0.16
GB2			42.53	0.26	5.84	15.93	42.52	0.51	5.83	5.86	15.99	8.65	0.22

OAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

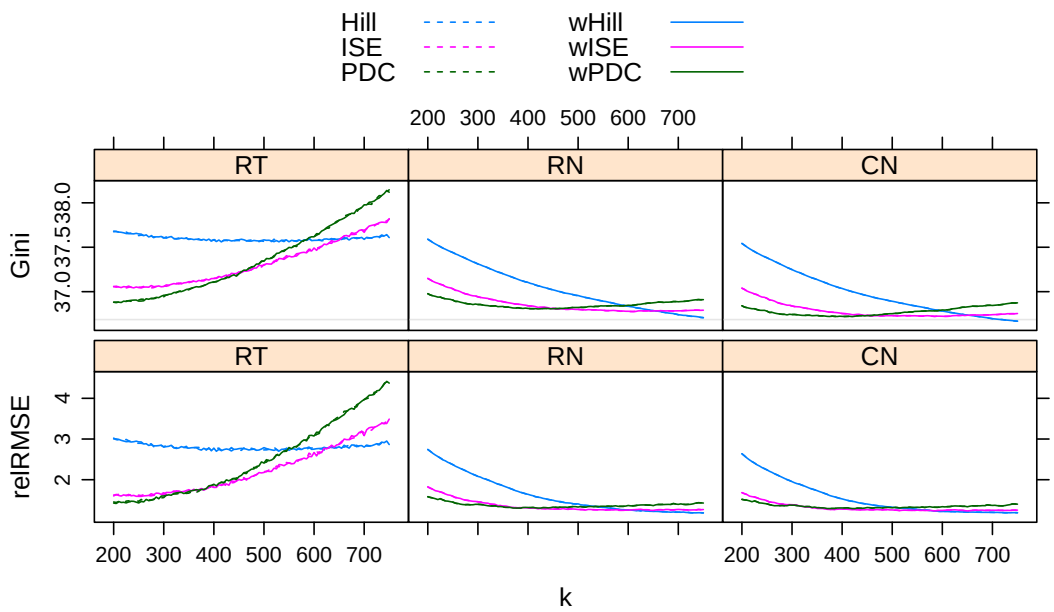

Figure F.426.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

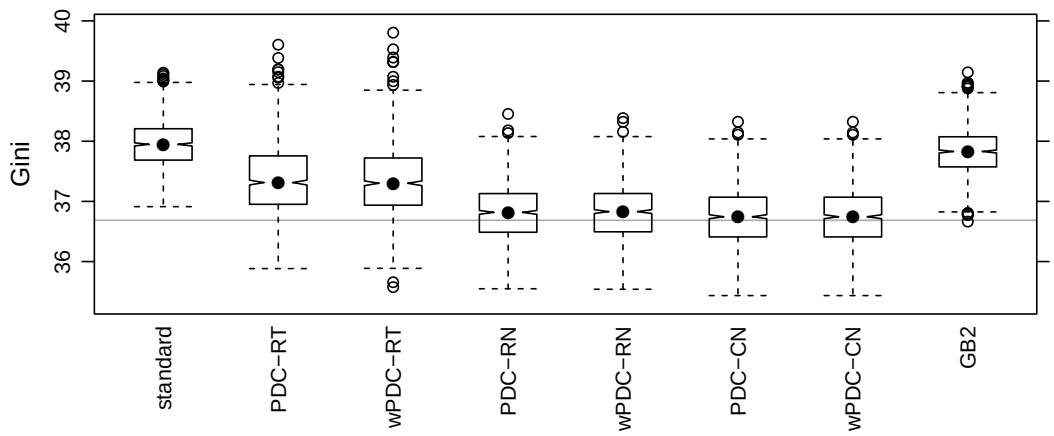

Figure F.427.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.213.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.95	0.16	1.27	3.45	37.95	0.39	1.26	1.33	3.63	1.87	0.07
wHill	RT	300	37.61	0.21	0.92	2.51	37.58	0.46	0.90	1.03	2.80	1.33	0.07
wHill	RT	500	37.58	0.24	0.90	2.45	37.58	0.48	0.89	1.02	2.79	1.32	0.10
wHill	RT	700	37.59	0.24	0.90	2.46	37.56	0.46	0.88	1.03	2.80	1.30	0.09
wHill	RN	300	37.31	0.19	0.63	1.71	37.31	0.43	0.62	0.76	2.08	0.92	0.05
wHill	RN	500	36.96	0.19	0.27	0.74	36.95	0.43	0.26	0.52	1.41	0.52	0.04
wHill	RN	700	36.74	0.19	0.05	0.15	36.73	0.44	0.04	0.44	1.20	0.44	0.03
wHill	CN	300	37.25	0.20	0.56	1.53	37.23	0.44	0.55	0.72	1.95	0.82	0.05
wHill	CN	500	36.89	0.19	0.21	0.56	36.90	0.43	0.21	0.49	1.32	0.50	0.04
wHill	CN	700	36.70	0.19	0.01	0.03	36.69	0.44	0.01	0.44	1.20	0.44	0.03
wISE	RT	300	37.06	0.22	0.37	1.02	37.05	0.48	0.36	0.60	1.64	0.61	0.05
wISE	RT	500	37.30	0.26	0.61	1.67	37.29	0.50	0.61	0.80	2.18	0.91	0.08
wISE	RT	700	37.67	0.31	0.98	2.68	37.64	0.58	0.96	1.13	3.08	1.42	0.07
wISE	RN	300	36.94	0.22	0.26	0.70	36.95	0.47	0.26	0.54	1.46	0.55	0.05
wISE	RN	500	36.80	0.20	0.11	0.31	36.80	0.45	0.12	0.47	1.27	0.46	0.04
wISE	RN	700	36.78	0.21	0.10	0.27	36.78	0.44	0.10	0.47	1.27	0.46	0.04
wISE	CN	300	36.84	0.23	0.15	0.42	36.84	0.49	0.15	0.51	1.38	0.50	0.04
wISE	CN	500	36.73	0.21	0.04	0.12	36.73	0.46	0.04	0.46	1.26	0.46	0.04
wISE	CN	700	36.74	0.21	0.06	0.15	36.73	0.45	0.04	0.46	1.25	0.46	0.04
wPDC	RT	300	36.96	0.27	0.27	0.75	36.94	0.50	0.25	0.59	1.60	0.58	0.07
wPDC	RT	500	37.34	0.35	0.66	1.79	37.30	0.58	0.62	0.88	2.41	0.92	0.09
wPDC	RT	700	37.98	0.45	1.29	3.52	37.95	0.65	1.26	1.46	3.97	1.87	0.11
wPDC	RN	300	36.86	0.23	0.17	0.46	36.84	0.50	0.15	0.51	1.39	0.50	0.05
wPDC	RN	500	36.82	0.22	0.14	0.37	36.83	0.47	0.14	0.49	1.33	0.49	0.05
wPDC	RN	700	36.89	0.22	0.20	0.55	36.88	0.45	0.19	0.51	1.39	0.50	0.04
wPDC	CN	300	36.74	0.25	0.06	0.15	36.73	0.51	0.04	0.50	1.37	0.51	0.04
wPDC	CN	500	36.75	0.23	0.07	0.18	36.75	0.48	0.06	0.48	1.31	0.48	0.04
wPDC	CN	700	36.84	0.23	0.16	0.43	36.84	0.46	0.15	0.50	1.37	0.48	0.04
GB2			37.83	0.16	1.15	3.12	37.83	0.37	1.14	1.21	3.30	1.70	0.07

OAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

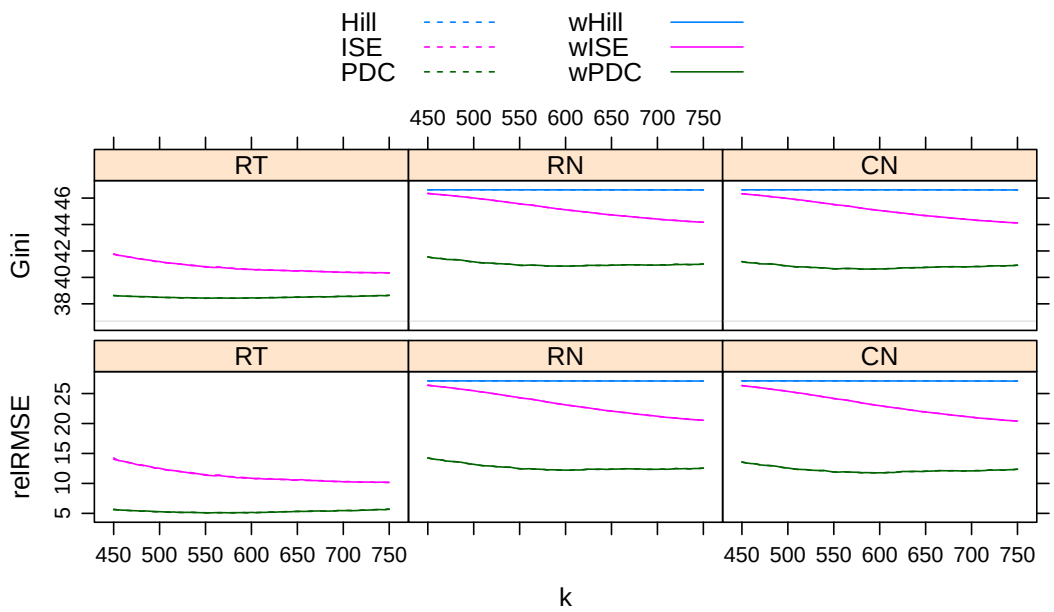

Figure F.428.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

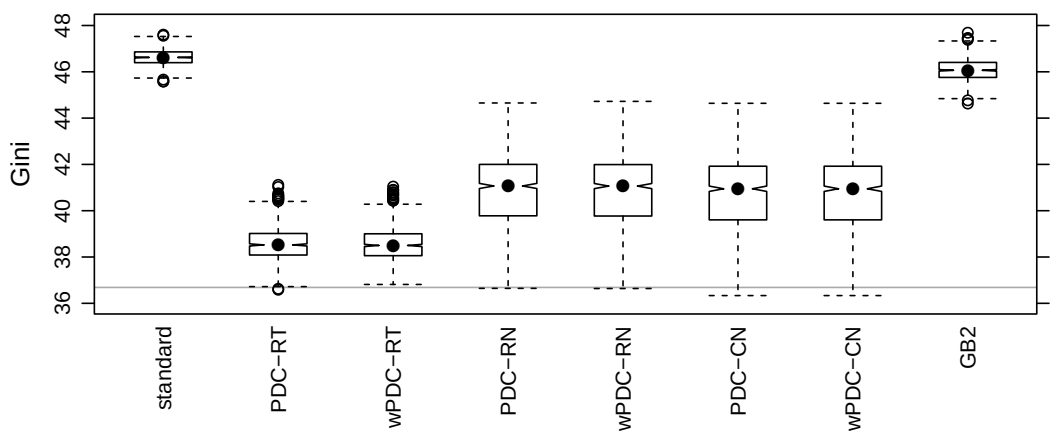

Figure F.429.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.214.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			46.63	0.12	9.94	27.10	46.62	0.34	9.93	9.95	27.12	14.73	0.30
wHill	RT	500	46.55	4.63	9.86	26.89	46.28	1.09	9.59	10.10	27.52	14.22	1.42
wHill	RT	700	45.39	1.31	8.71	23.74	45.29	0.89	8.61	8.78	23.94	12.76	0.62
wHill	RN	300	46.63	0.12	9.94	27.10	46.62	0.34	9.93	9.95	27.12	14.73	0.30
wHill	RN	500	46.63	0.12	9.94	27.10	46.62	0.34	9.93	9.95	27.11	14.73	0.30
wHill	RN	700	46.62	0.12	9.93	27.08	46.61	0.33	9.93	9.94	27.09	14.72	0.30
wHill	CN	300	46.63	0.12	9.94	27.10	46.62	0.34	9.93	9.95	27.12	14.73	0.30
wHill	CN	500	46.63	0.12	9.94	27.09	46.62	0.34	9.93	9.95	27.11	14.72	0.30
wHill	CN	700	46.62	0.12	9.93	27.07	46.61	0.33	9.92	9.94	27.09	14.71	0.30
wISE	RT	500	41.20	0.78	4.51	12.30	41.11	0.89	4.43	4.60	12.53	6.57	0.21
wISE	RT	700	40.38	0.54	3.69	10.06	40.35	0.72	3.66	3.76	10.26	5.43	0.18
wISE	RN	300	46.63	0.12	9.94	27.10	46.62	0.34	9.93	9.95	27.11	14.73	0.30
wISE	RN	500	46.01	0.37	9.32	25.40	46.08	0.50	9.39	9.34	25.46	13.93	0.29
wISE	RN	700	44.41	0.78	7.73	21.07	44.34	0.81	7.66	7.78	21.20	11.35	0.29
wISE	CN	300	46.63	0.12	9.94	27.10	46.62	0.34	9.93	9.95	27.11	14.73	0.30
wISE	CN	500	45.97	0.39	9.28	25.30	46.04	0.50	9.36	9.30	25.35	13.87	0.29
wISE	CN	700	44.36	0.80	7.67	20.92	44.28	0.81	7.59	7.73	21.06	11.26	0.28
wPDC	RT	500	38.50	0.47	1.81	4.94	38.45	0.69	1.76	1.94	5.28	2.61	0.12
wPDC	RT	700	38.56	0.50	1.87	5.11	38.50	0.70	1.81	2.00	5.46	2.69	0.12
wPDC	RN	300	45.44	2.76	8.75	23.85	46.16	0.94	9.48	8.91	24.28	14.05	0.30
wPDC	RN	500	41.18	3.22	4.49	12.25	41.27	1.97	4.58	4.84	13.19	6.79	0.24
wPDC	RN	700	40.93	2.51	4.25	11.57	41.06	1.69	4.38	4.53	12.35	6.49	0.22
wPDC	CN	300	45.30	3.38	8.62	23.49	46.14	0.99	9.46	8.81	24.02	14.02	0.29
wPDC	CN	500	40.87	3.78	4.18	11.40	40.99	2.15	4.31	4.61	12.57	6.38	0.24
wPDC	CN	700	40.81	2.68	4.12	11.23	40.95	1.74	4.26	4.43	12.09	6.32	0.22
GB2			46.08	0.23	9.40	25.62	46.06	0.48	9.38	9.41	25.65	13.90	0.30

OAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

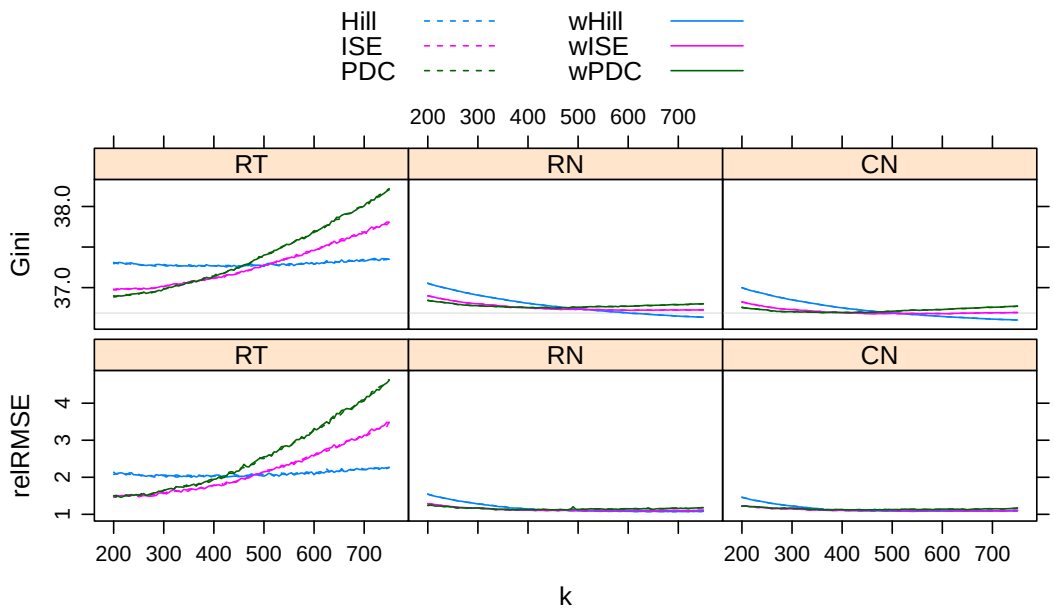

Figure F.430.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

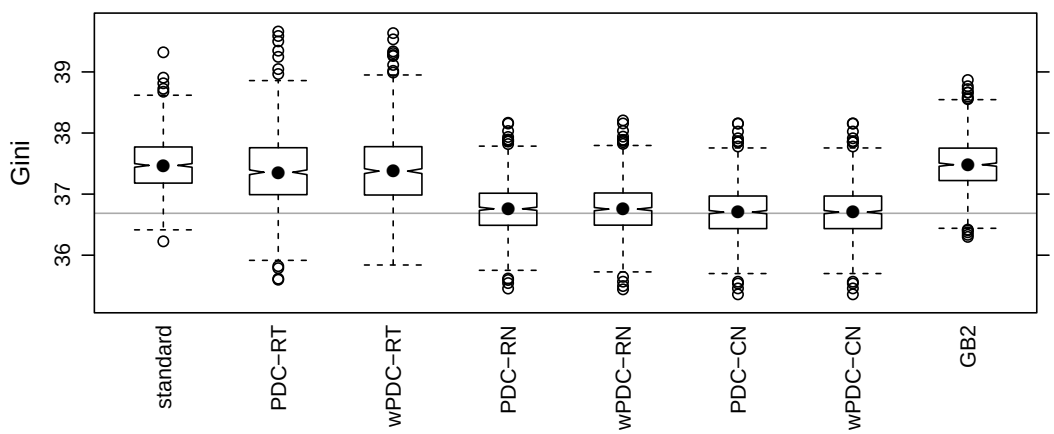

Figure F.431.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.215.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.48	0.19	0.79	2.16	37.47	0.44	0.78	0.91	2.47	1.16	0.07
wHill	RT	300	37.28	0.22	0.59	1.61	37.27	0.45	0.58	0.75	2.05	0.86	0.06
wHill	RT	500	37.26	0.22	0.57	1.56	37.25	0.48	0.57	0.74	2.03	0.85	0.05
wHill	RT	700	37.33	0.24	0.64	1.75	37.33	0.50	0.64	0.81	2.20	0.96	0.06
wHill	RN	300	36.91	0.17	0.22	0.60	36.91	0.42	0.22	0.47	1.28	0.45	0.05
wHill	RN	500	36.74	0.16	0.05	0.14	36.74	0.39	0.05	0.40	1.09	0.40	0.04
wHill	RN	700	36.65	0.15	−0.04	−0.10	36.65	0.38	−0.04	0.40	1.08	0.37	0.04
wHill	CN	300	36.85	0.17	0.16	0.45	36.85	0.43	0.16	0.45	1.22	0.43	0.05
wHill	CN	500	36.69	0.16	0.00	0.01	36.69	0.39	0.00	0.40	1.09	0.39	0.04
wHill	CN	700	36.61	0.15	−0.07	−0.20	36.61	0.37	−0.08	0.40	1.09	0.39	0.04
wISE	RT	300	37.01	0.23	0.33	0.89	37.00	0.47	0.31	0.58	1.59	0.58	0.05
wISE	RT	500	37.28	0.27	0.59	1.61	37.27	0.51	0.59	0.79	2.15	0.89	0.07
wISE	RT	700	37.69	0.32	1.00	2.73	37.67	0.56	0.98	1.15	3.14	1.45	0.09
wISE	RN	300	36.80	0.17	0.11	0.31	36.80	0.40	0.11	0.43	1.17	0.42	0.04
wISE	RN	500	36.73	0.16	0.05	0.13	36.72	0.39	0.03	0.41	1.11	0.38	0.04
wISE	RN	700	36.72	0.16	0.04	0.10	36.71	0.38	0.03	0.40	1.10	0.38	0.04
wISE	CN	300	36.73	0.17	0.04	0.12	36.72	0.41	0.04	0.42	1.15	0.41	0.04
wISE	CN	500	36.68	0.16	−0.00	−0.01	36.67	0.38	−0.01	0.41	1.11	0.39	0.04
wISE	CN	700	36.69	0.16	0.00	0.01	36.67	0.38	−0.01	0.40	1.10	0.39	0.04
wPDC	RT	300	36.98	0.27	0.30	0.81	36.96	0.51	0.27	0.60	1.64	0.58	0.06
wPDC	RT	500	37.40	0.37	0.72	1.95	37.38	0.59	0.69	0.94	2.55	1.04	0.08
wPDC	RT	700	38.01	0.48	1.32	3.60	37.95	0.68	1.27	1.49	4.06	1.88	0.10
wPDC	RN	300	36.78	0.18	0.09	0.25	36.76	0.41	0.08	0.43	1.17	0.42	0.04
wPDC	RN	500	36.76	0.17	0.07	0.20	36.75	0.39	0.07	0.42	1.13	0.40	0.04
wPDC	RN	700	36.79	0.17	0.10	0.28	36.78	0.40	0.09	0.42	1.16	0.40	0.04
wPDC	CN	300	36.70	0.18	0.02	0.05	36.68	0.42	−0.01	0.43	1.17	0.42	0.04
wPDC	CN	500	36.71	0.17	0.02	0.06	36.70	0.39	0.02	0.41	1.13	0.39	0.04
wPDC	CN	700	36.76	0.17	0.07	0.20	36.75	0.40	0.07	0.42	1.15	0.40	0.04
GB2			37.49	0.16	0.81	2.20	37.48	0.40	0.80	0.90	2.46	1.18	0.06

OAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

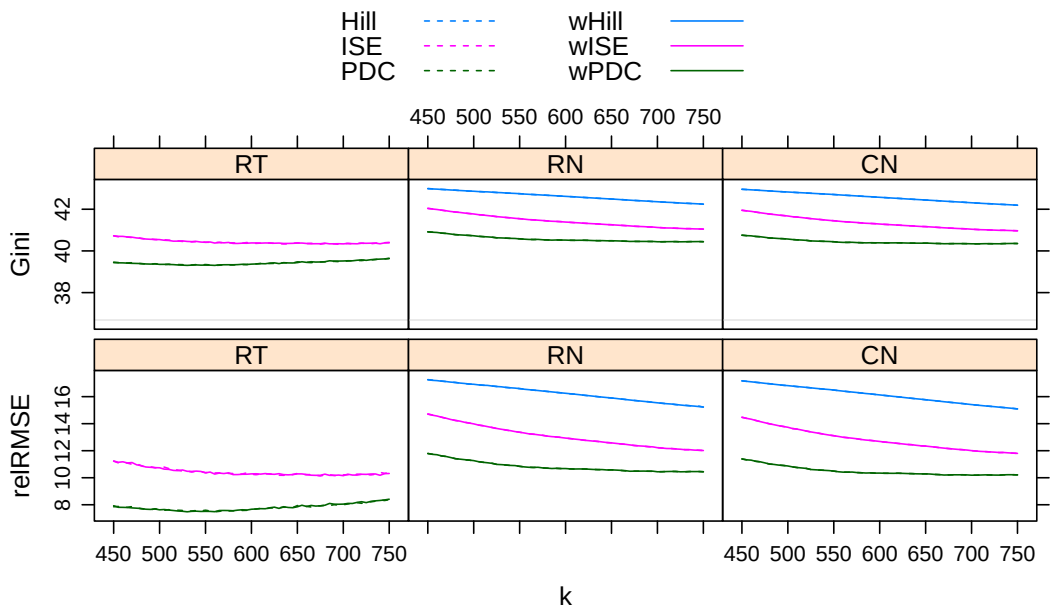

Figure F.432.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

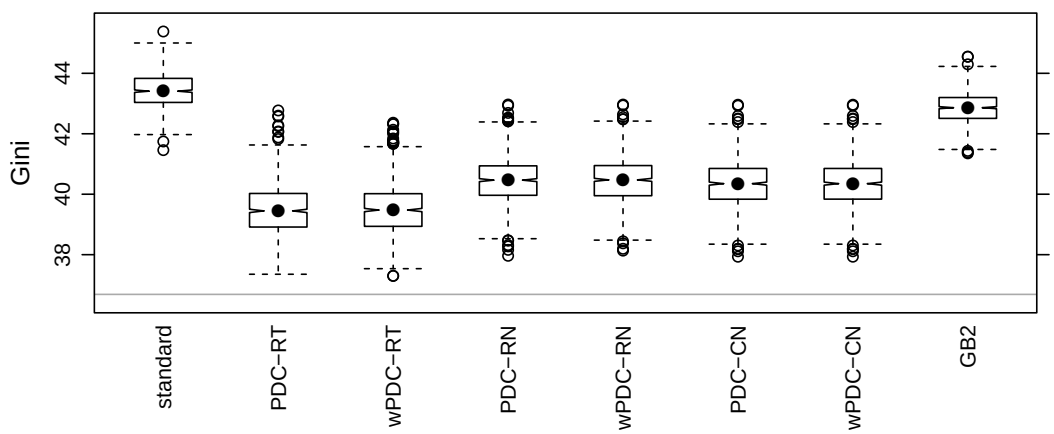

Figure F.433.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.216.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			43.43	0.33	6.74	18.38	43.41	0.59	6.72	6.77	18.44	9.97	0.24
wHill	RT	500	42.98	0.93	6.29	17.15	42.88	0.84	6.19	6.37	17.35	9.18	0.37
wHill	RT	700	42.59	0.69	5.90	16.09	42.55	0.81	5.86	5.96	16.25	8.69	0.27
wHill	RN	300	43.26	0.33	6.58	17.93	43.25	0.61	6.56	6.60	18.00	9.73	0.23
wHill	RN	500	42.86	0.36	6.18	16.84	42.83	0.59	6.15	6.21	16.92	9.12	0.26
wHill	RN	700	42.36	0.34	5.67	15.46	42.34	0.59	5.66	5.70	15.55	8.39	0.21
wHill	CN	300	43.25	0.34	6.57	17.90	43.24	0.61	6.55	6.59	17.97	9.71	0.23
wHill	CN	500	42.83	0.35	6.14	16.74	42.81	0.60	6.12	6.17	16.82	9.08	0.22
wHill	CN	700	42.31	0.35	5.62	15.33	42.31	0.61	5.62	5.65	15.41	8.33	0.21
wISE	RT	500	40.54	0.63	3.86	10.52	40.53	0.81	3.85	3.94	10.74	5.70	0.18
wISE	RT	700	40.34	0.55	3.65	9.95	40.32	0.71	3.64	3.72	10.15	5.39	0.17
wISE	RN	300	42.99	0.39	6.31	17.20	43.00	0.63	6.32	6.34	17.28	9.37	0.22
wISE	RN	500	41.77	0.46	5.09	13.86	41.79	0.69	5.10	5.13	13.99	7.56	0.19
wISE	RN	700	41.12	0.41	4.44	12.10	41.15	0.63	4.47	4.48	12.22	6.62	0.17
wISE	CN	300	42.95	0.41	6.27	17.09	42.96	0.64	6.28	6.30	17.17	9.31	0.22
wISE	CN	500	41.68	0.49	4.99	13.60	41.69	0.71	5.01	5.04	13.73	7.42	0.19
wISE	CN	700	41.04	0.43	4.36	11.87	41.08	0.66	4.39	4.40	12.01	6.51	0.17
wPDC	RT	500	39.35	0.71	2.67	7.27	39.33	0.88	2.64	2.80	7.63	3.92	0.17
wPDC	RT	700	39.52	0.70	2.83	7.72	39.48	0.80	2.79	2.95	8.05	4.14	0.15
wPDC	RN	300	42.16	0.89	5.47	14.91	42.27	0.94	5.58	5.55	15.14	8.27	0.21
wPDC	RN	500	40.73	0.75	4.04	11.02	40.75	0.90	4.06	4.13	11.27	6.02	0.18
wPDC	RN	700	40.44	0.58	3.75	10.23	40.47	0.74	3.79	3.83	10.44	5.62	0.17
wPDC	CN	300	42.04	1.03	5.35	14.59	42.17	1.00	5.49	5.45	14.85	8.13	0.21
wPDC	CN	500	40.57	0.81	3.88	10.59	40.58	0.94	3.89	3.99	10.87	5.77	0.18
wPDC	CN	700	40.34	0.61	3.65	9.96	40.35	0.75	3.66	3.74	10.19	5.43	0.17
GB2			42.86	0.29	6.17	16.82	42.86	0.51	6.18	6.19	16.88	9.16	0.21

Stratified Midzuno sampling

No contamination

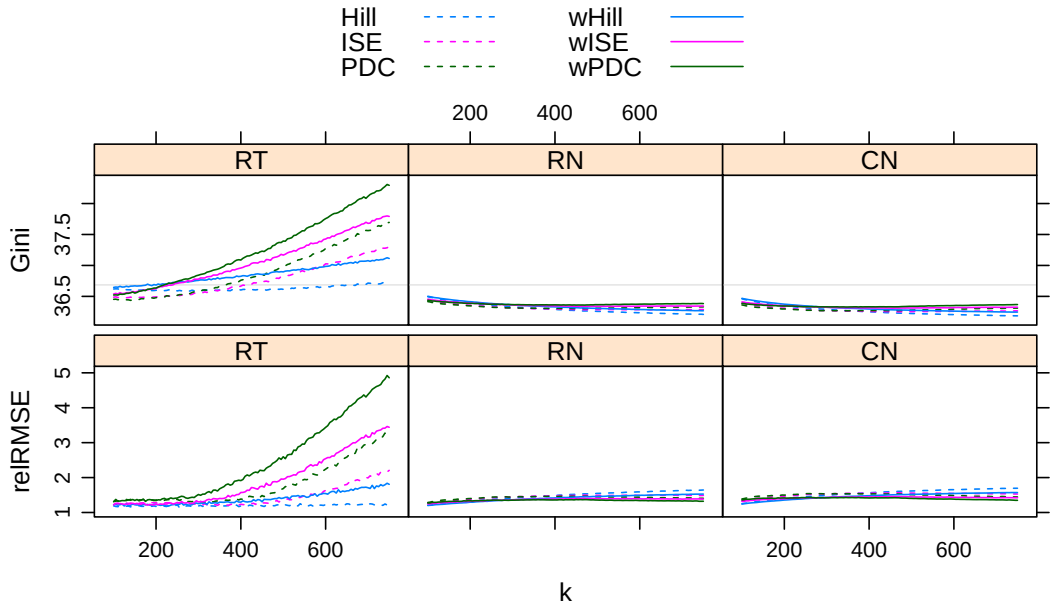

Figure F.434.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 100 and 750.

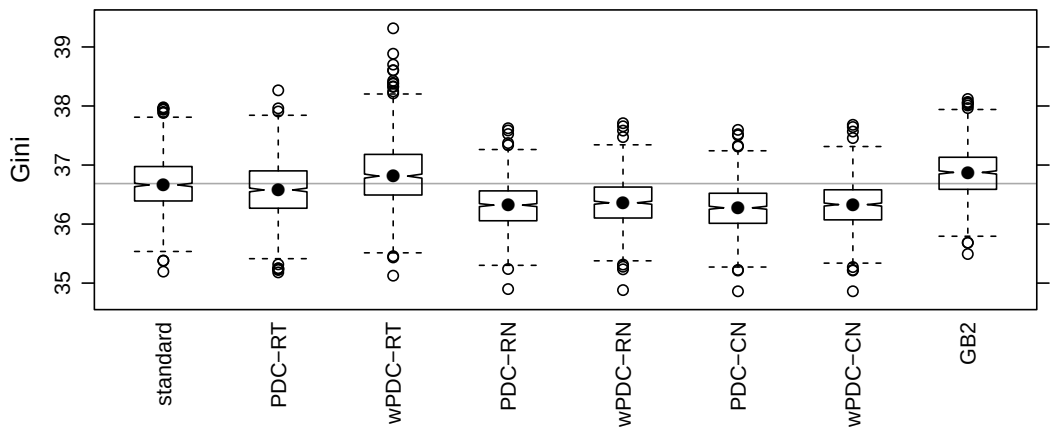

Figure F.435.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 300$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.217.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			36.68	0.17	−0.01	−0.03	36.66	0.43	−0.02	0.42	1.14	0.44	0.04
wHill	RT	300	36.76	0.21	0.07	0.20	36.75	0.46	0.06	0.46	1.25	0.47	0.05
wHill	RT	500	36.90	0.22	0.21	0.57	36.89	0.49	0.21	0.52	1.41	0.50	0.05
wHill	RT	700	37.08	0.24	0.39	1.07	37.07	0.48	0.39	0.63	1.71	0.65	0.05
wHill	RN	300	36.36	0.15	−0.32	−0.88	36.36	0.39	−0.32	0.50	1.36	0.54	0.05
wHill	RN	500	36.31	0.14	−0.38	−1.04	36.31	0.38	−0.37	0.53	1.46	0.58	0.05
wHill	RN	700	36.27	0.14	−0.41	−1.12	36.29	0.38	−0.40	0.56	1.52	0.61	0.05
wHill	CN	300	36.33	0.15	−0.36	−0.98	36.33	0.39	−0.36	0.53	1.43	0.57	0.05
wHill	CN	500	36.28	0.14	−0.41	−1.12	36.28	0.38	−0.40	0.56	1.52	0.61	0.05
wHill	CN	700	36.25	0.14	−0.44	−1.19	36.25	0.38	−0.43	0.57	1.56	0.65	0.05
wISE	RT	300	36.78	0.22	0.09	0.25	36.75	0.46	0.06	0.48	1.30	0.46	0.05
wISE	RT	500	37.17	0.28	0.48	1.31	37.16	0.53	0.48	0.72	1.95	0.76	0.08
wISE	RT	700	37.68	0.35	0.99	2.71	37.64	0.60	0.96	1.16	3.16	1.42	0.12
wISE	RN	300	36.36	0.14	−0.32	−0.88	36.36	0.37	−0.33	0.50	1.36	0.53	0.05
wISE	RN	500	36.34	0.14	−0.35	−0.94	36.34	0.38	−0.34	0.51	1.40	0.55	0.05
wISE	RN	700	36.35	0.14	−0.34	−0.93	36.34	0.37	−0.35	0.51	1.38	0.55	0.05
wISE	CN	300	36.32	0.14	−0.36	−0.99	36.33	0.38	−0.36	0.52	1.43	0.57	0.05
wISE	CN	500	36.31	0.14	−0.37	−1.02	36.32	0.38	−0.37	0.53	1.45	0.58	0.05
wISE	CN	700	36.32	0.14	−0.36	−0.99	36.32	0.38	−0.36	0.52	1.42	0.57	0.05
wPDC	RT	300	36.84	0.28	0.16	0.43	36.81	0.50	0.13	0.56	1.52	0.52	0.07
wPDC	RT	500	37.39	0.41	0.71	1.93	37.38	0.63	0.70	0.95	2.60	1.06	0.08
wPDC	RT	700	38.12	0.54	1.43	3.90	38.11	0.75	1.43	1.61	4.38	2.12	0.12
wPDC	RN	300	36.37	0.14	−0.32	−0.87	36.36	0.39	−0.32	0.50	1.35	0.52	0.05
wPDC	RN	500	36.37	0.15	−0.32	−0.87	36.37	0.38	−0.32	0.50	1.36	0.53	0.05
wPDC	RN	700	36.38	0.15	−0.30	−0.82	36.38	0.37	−0.30	0.49	1.33	0.52	0.05
wPDC	CN	300	36.33	0.15	−0.35	−0.97	36.33	0.38	−0.36	0.52	1.42	0.57	0.05
wPDC	CN	500	36.34	0.15	−0.35	−0.94	36.35	0.38	−0.34	0.52	1.40	0.55	0.05
wPDC	CN	700	36.36	0.15	−0.32	−0.88	36.36	0.37	−0.32	0.50	1.36	0.53	0.05
GB2			36.87	0.17	0.18	0.50	36.87	0.40	0.19	0.45	1.23	0.46	0.04

OCAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

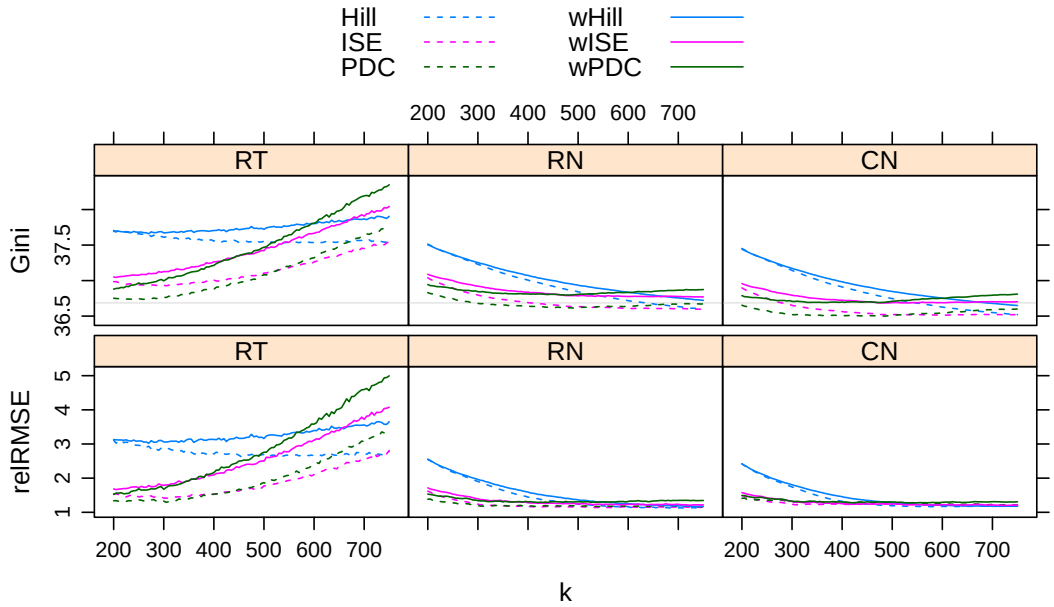

Figure F.436.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

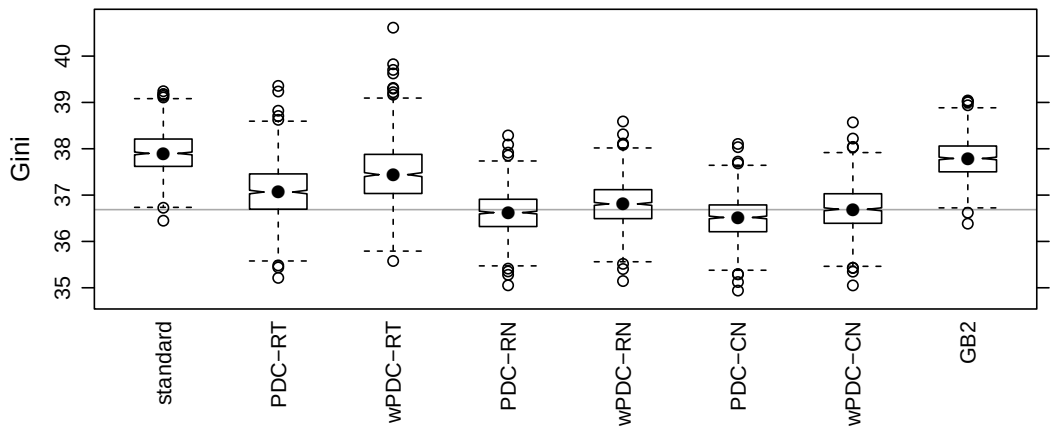

Figure F.437.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.218.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.91	0.18	1.22	3.33	37.90	0.44	1.21	1.29	3.53	1.80	0.07
wHill	RT	300	37.67	0.29	0.99	2.69	37.65	0.52	0.96	1.12	3.06	1.43	0.07
wHill	RT	500	37.72	0.27	1.04	2.82	37.71	0.53	1.02	1.16	3.16	1.52	0.07
wHill	RT	700	37.87	0.31	1.18	3.22	37.86	0.56	1.17	1.31	3.56	1.74	0.09
wHill	RN	300	37.25	0.19	0.57	1.55	37.25	0.44	0.56	0.72	1.96	0.83	0.06
wHill	RN	500	36.93	0.19	0.25	0.68	36.94	0.45	0.25	0.50	1.36	0.52	0.05
wHill	RN	700	36.76	0.18	0.07	0.19	36.76	0.43	0.07	0.44	1.19	0.44	0.04
wHill	CN	300	37.17	0.20	0.49	1.32	37.16	0.44	0.47	0.66	1.81	0.73	0.06
wHill	CN	500	36.85	0.19	0.16	0.44	36.85	0.43	0.17	0.47	1.27	0.49	0.04
wHill	CN	700	36.68	0.19	−0.01	−0.02	36.68	0.44	−0.01	0.43	1.18	0.43	0.04
wISE	RT	300	37.13	0.24	0.44	1.20	37.13	0.49	0.44	0.66	1.79	0.68	0.06
wISE	RT	500	37.42	0.30	0.73	2.00	37.41	0.51	0.72	0.92	2.50	1.07	0.09
wISE	RT	700	37.91	0.37	1.22	3.33	37.89	0.56	1.21	1.37	3.72	1.79	0.09
wISE	RN	300	36.92	0.21	0.24	0.64	36.92	0.47	0.24	0.51	1.40	0.53	0.05
wISE	RN	500	36.78	0.20	0.10	0.27	36.79	0.43	0.10	0.45	1.24	0.46	0.05
wISE	RN	700	36.78	0.20	0.09	0.25	36.80	0.42	0.11	0.45	1.23	0.45	0.05
wISE	CN	300	36.79	0.22	0.11	0.29	36.80	0.48	0.12	0.48	1.32	0.48	0.05
wISE	CN	500	36.69	0.21	0.00	0.01	36.69	0.45	0.00	0.45	1.24	0.45	0.05
wISE	CN	700	36.70	0.20	0.02	0.05	36.72	0.43	0.04	0.45	1.22	0.43	0.04
wPDC	RT	300	37.00	0.28	0.31	0.85	36.97	0.51	0.29	0.61	1.67	0.58	0.06
wPDC	RT	500	37.47	0.41	0.78	2.14	37.44	0.62	0.76	1.01	2.76	1.13	0.11
wPDC	RT	700	38.19	0.57	1.51	4.11	38.17	0.73	1.48	1.69	4.59	2.20	0.13
wPDC	RN	300	36.84	0.22	0.16	0.43	36.85	0.46	0.16	0.49	1.34	0.50	0.05
wPDC	RN	500	36.81	0.22	0.12	0.33	36.81	0.46	0.12	0.48	1.31	0.49	0.05
wPDC	RN	700	36.87	0.21	0.18	0.49	36.87	0.43	0.18	0.49	1.35	0.49	0.05
wPDC	CN	300	36.71	0.24	0.02	0.06	36.70	0.50	0.02	0.49	1.33	0.49	0.05
wPDC	CN	500	36.71	0.23	0.02	0.06	36.69	0.48	0.01	0.48	1.30	0.48	0.05
wPDC	CN	700	36.79	0.22	0.11	0.29	36.80	0.43	0.12	0.48	1.31	0.46	0.04
GB2			37.79	0.17	1.10	3.01	37.79	0.41	1.10	1.18	3.22	1.64	0.06

OCAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

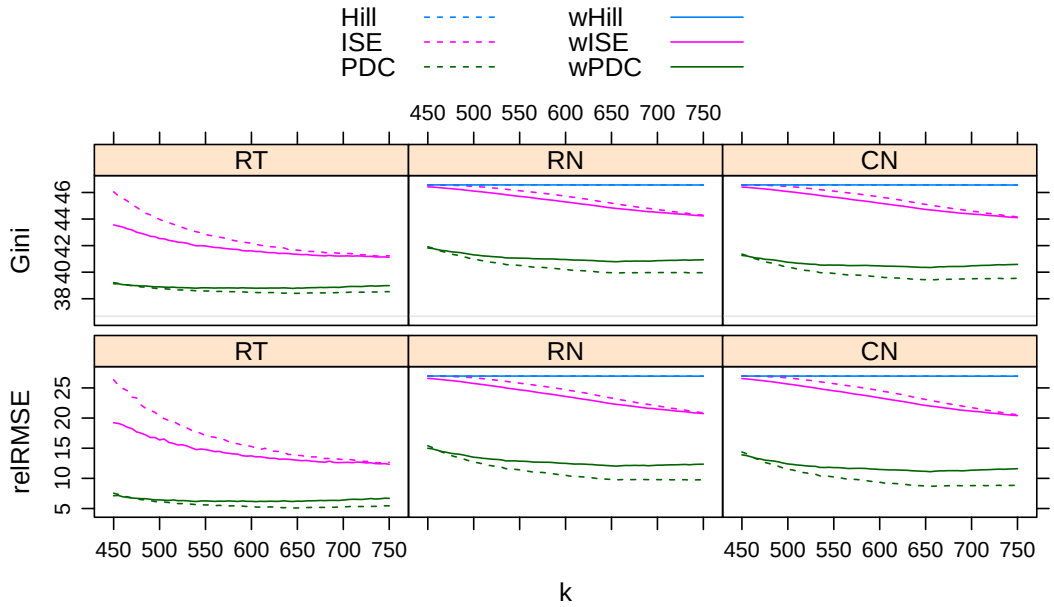

Figure F.438.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

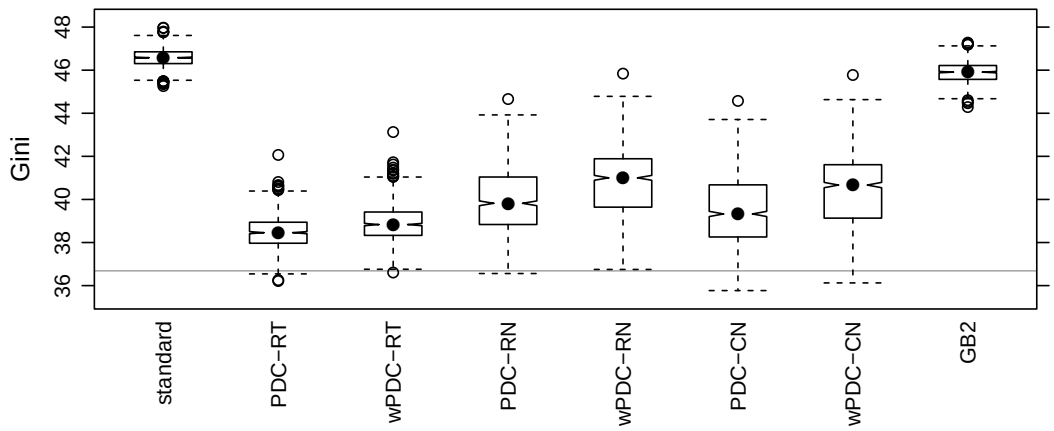

Figure F.439.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.219.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			46.57	0.16	9.89	26.95	46.58	0.40	9.89	9.89	26.97	14.67	0.31
wHill	RT	500	50.37	15.08	13.68	37.29	49.61	2.28	12.93	14.22	38.76	19.17	1.31
wHill	RT	700	47.98	5.57	11.30	30.80	47.58	1.62	10.90	11.54	31.46	16.16	0.93
wHill	RN	300	46.57	0.16	9.89	26.95	46.58	0.40	9.89	9.89	26.97	14.67	0.31
wHill	RN	500	46.57	0.16	9.88	26.94	46.58	0.40	9.89	9.89	26.96	14.67	0.31
wHill	RN	700	46.57	0.16	9.88	26.93	46.58	0.40	9.89	9.89	26.95	14.66	0.31
wHill	CN	300	46.57	0.16	9.89	26.95	46.58	0.40	9.89	9.89	26.97	14.67	0.31
wHill	CN	500	46.57	0.16	9.88	26.94	46.58	0.40	9.89	9.89	26.96	14.67	0.31
wHill	CN	700	46.56	0.16	9.88	26.93	46.58	0.40	9.89	9.89	26.95	14.66	0.31
wISE	RT	500	42.53	1.99	5.84	15.92	42.36	1.26	5.67	6.01	16.38	8.41	0.70
wISE	RT	700	41.22	0.91	4.53	12.36	41.17	0.95	4.49	4.63	12.63	6.65	0.25
wISE	RN	300	46.57	0.16	9.89	26.95	46.58	0.40	9.89	9.89	26.97	14.67	0.31
wISE	RN	500	46.11	0.40	9.42	25.68	46.15	0.57	9.46	9.44	25.74	14.03	0.31
wISE	RN	700	44.50	0.94	7.82	21.31	44.42	1.05	7.73	7.88	21.48	11.47	0.29
wISE	CN	300	46.57	0.16	9.89	26.95	46.58	0.40	9.89	9.89	26.97	14.67	0.31
wISE	CN	500	46.07	0.44	9.38	25.58	46.11	0.59	9.43	9.41	25.64	13.97	0.31
wISE	CN	700	44.38	1.03	7.70	20.98	44.28	1.09	7.60	7.76	21.16	11.26	0.29
wPDC	RT	500	38.89	0.70	2.21	6.02	38.79	0.74	2.10	2.36	6.44	3.11	0.15
wPDC	RT	700	38.88	0.69	2.20	5.99	38.83	0.81	2.15	2.35	6.40	3.18	0.18
wPDC	RN	300	46.16	1.29	9.47	25.81	46.50	0.52	9.81	9.54	26.00	14.55	0.31
wPDC	RN	500	41.30	3.22	4.62	12.58	41.30	2.00	4.62	4.95	13.50	6.85	0.26
wPDC	RN	700	40.87	2.51	4.18	11.40	41.00	1.69	4.32	4.47	12.19	6.40	0.25
wPDC	CN	300	46.09	1.68	9.40	25.63	46.50	0.52	9.81	9.49	25.87	14.55	0.31
wPDC	CN	500	40.75	4.16	4.06	11.07	40.78	2.28	4.09	4.54	12.39	6.07	0.26
wPDC	CN	700	40.48	2.95	3.80	10.35	40.67	1.82	3.98	4.17	11.36	5.90	0.25
GB2			45.90	0.22	9.22	25.13	45.91	0.48	9.22	9.23	25.16	13.67	0.29

OCAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

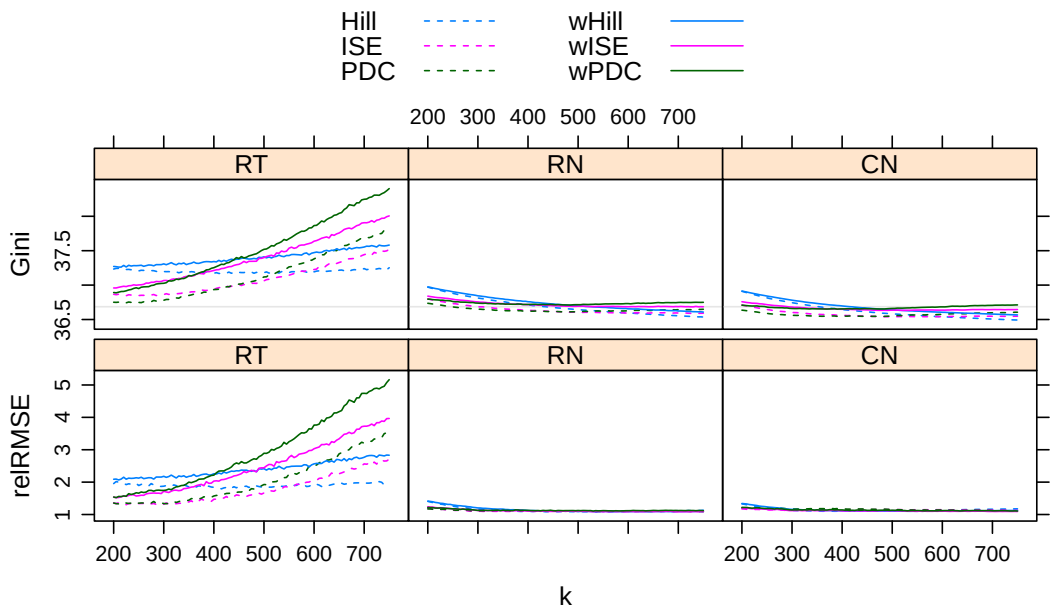

Figure F.440.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

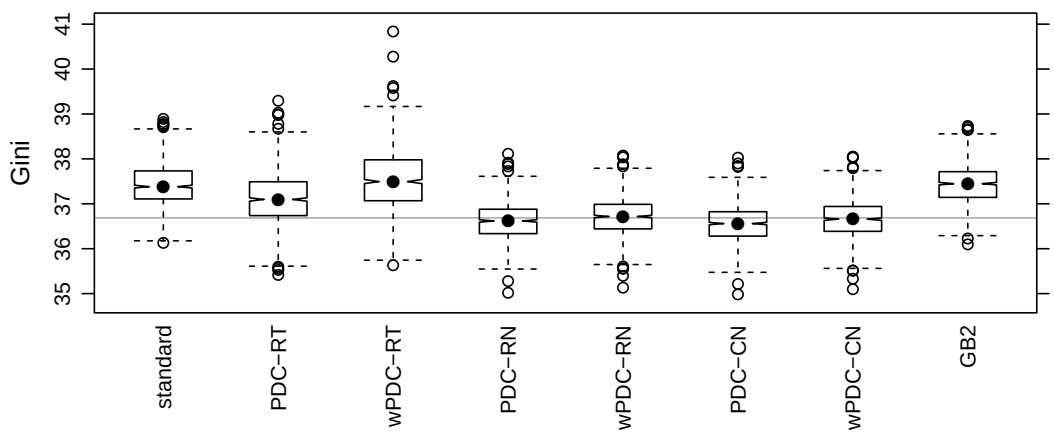

Figure F.441.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.220.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.41	0.20	0.73	1.98	37.38	0.46	0.70	0.86	2.33	1.03	0.06
wHill	RT	300	37.31	0.25	0.62	1.70	37.28	0.49	0.59	0.80	2.18	0.89	0.06
wHill	RT	500	37.41	0.26	0.72	1.98	37.40	0.50	0.71	0.89	2.41	1.06	0.07
wHill	RT	700	37.55	0.28	0.87	2.36	37.53	0.54	0.85	1.02	2.77	1.26	0.09
wHill	RN	300	36.84	0.17	0.16	0.43	36.83	0.41	0.14	0.44	1.20	0.45	0.04
wHill	RN	500	36.70	0.16	0.01	0.03	36.70	0.40	0.01	0.40	1.09	0.40	0.04
wHill	RN	700	36.62	0.16	−0.06	−0.17	36.63	0.40	−0.06	0.40	1.10	0.40	0.04
wHill	CN	300	36.78	0.17	0.09	0.26	36.77	0.40	0.08	0.42	1.16	0.44	0.04
wHill	CN	500	36.64	0.16	−0.05	−0.12	36.64	0.41	−0.05	0.40	1.10	0.40	0.04
wHill	CN	700	36.58	0.16	−0.11	−0.29	36.58	0.39	−0.11	0.41	1.12	0.41	0.04
wISE	RT	300	37.07	0.25	0.38	1.04	37.04	0.52	0.36	0.63	1.72	0.62	0.06
wISE	RT	500	37.40	0.29	0.71	1.95	37.40	0.54	0.71	0.90	2.44	1.08	0.08
wISE	RT	700	37.91	0.38	1.22	3.33	37.86	0.59	1.18	1.37	3.73	1.75	0.09
wISE	RN	300	36.76	0.17	0.07	0.19	36.75	0.40	0.06	0.41	1.12	0.42	0.04
wISE	RN	500	36.69	0.16	0.01	0.02	36.69	0.40	0.00	0.40	1.10	0.41	0.04
wISE	RN	700	36.69	0.16	0.00	0.00	36.68	0.39	−0.01	0.40	1.08	0.38	0.04
wISE	CN	300	36.68	0.17	−0.00	−0.01	36.68	0.41	−0.01	0.41	1.12	0.41	0.04
wISE	CN	500	36.64	0.17	−0.05	−0.13	36.64	0.41	−0.04	0.41	1.12	0.40	0.04
wISE	CN	700	36.64	0.16	−0.04	−0.11	36.65	0.39	−0.04	0.40	1.10	0.38	0.04
wPDC	RT	300	37.03	0.29	0.34	0.93	37.02	0.53	0.34	0.64	1.74	0.63	0.08
wPDC	RT	500	37.52	0.43	0.83	2.27	37.49	0.68	0.81	1.06	2.89	1.20	0.11
wPDC	RT	700	38.25	0.59	1.56	4.26	38.19	0.77	1.51	1.74	4.74	2.24	0.13
wPDC	RN	300	36.74	0.17	0.05	0.14	36.74	0.40	0.06	0.41	1.13	0.41	0.04
wPDC	RN	500	36.72	0.17	0.03	0.08	36.72	0.41	0.03	0.41	1.12	0.40	0.04
wPDC	RN	700	36.75	0.17	0.06	0.17	36.74	0.38	0.05	0.41	1.12	0.40	0.04
wPDC	CN	300	36.66	0.17	−0.03	−0.07	36.67	0.42	−0.02	0.42	1.14	0.41	0.04
wPDC	CN	500	36.66	0.17	−0.02	−0.07	36.66	0.41	−0.03	0.42	1.13	0.41	0.04
wPDC	CN	700	36.71	0.17	0.02	0.05	36.69	0.38	0.01	0.41	1.11	0.39	0.04
GB2			37.44	0.18	0.75	2.05	37.45	0.42	0.76	0.86	2.35	1.13	0.06

OCAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

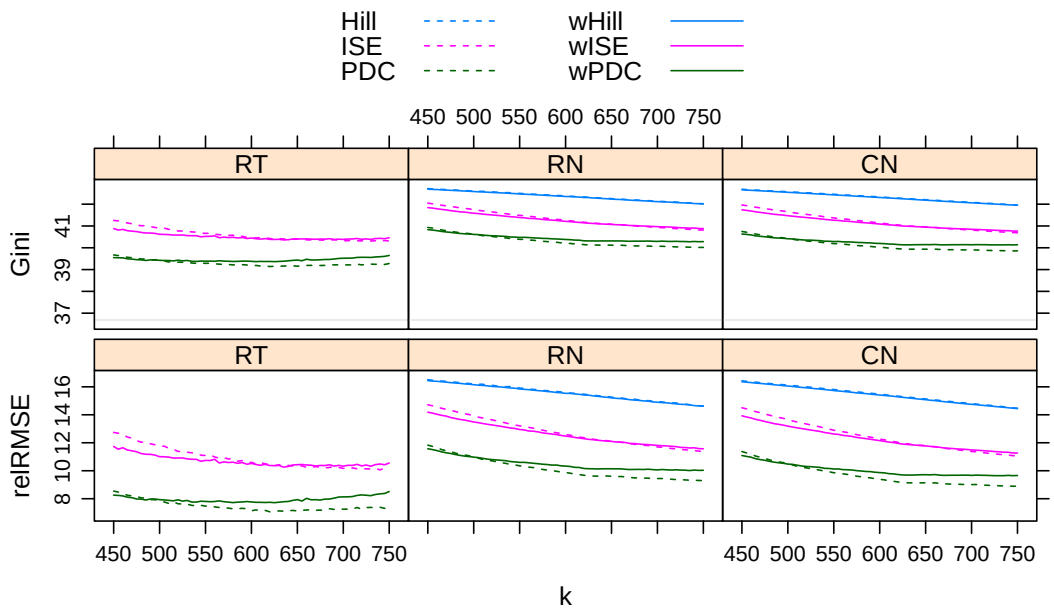

Figure F.442.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

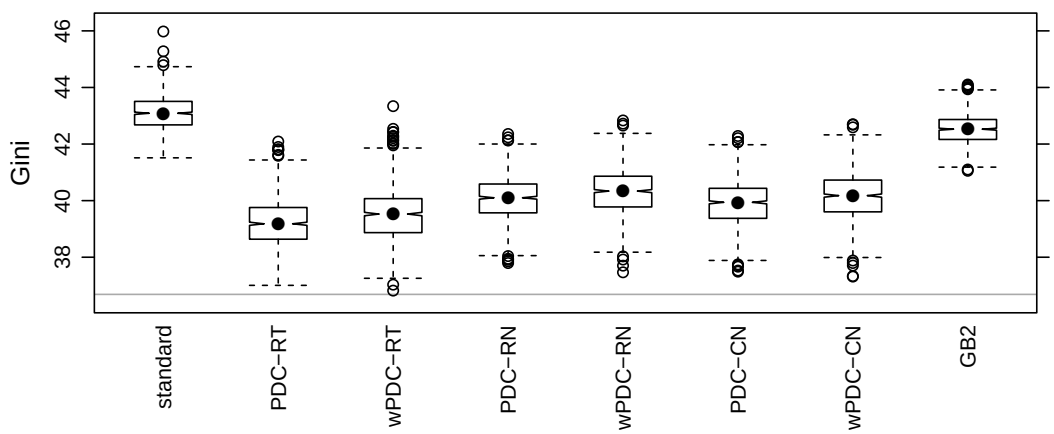

Figure F.443.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.221.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			43.10	0.36	6.41	17.48	43.09	0.61	6.40	6.44	17.55	9.49	0.25
wHill	RT	500	43.16	1.41	6.48	17.66	43.08	1.04	6.39	6.59	17.95	9.47	0.53
wHill	RT	700	42.74	1.04	6.06	16.51	42.66	1.02	5.98	6.14	16.75	8.86	0.31
wHill	RN	300	42.96	0.33	6.27	17.09	42.92	0.57	6.24	6.30	17.16	9.25	0.23
wHill	RN	500	42.58	0.35	5.90	16.07	42.57	0.60	5.89	5.93	16.15	8.73	0.24
wHill	RN	700	42.12	0.35	5.43	14.81	42.09	0.59	5.40	5.46	14.90	8.01	0.20
wHill	CN	300	42.95	0.33	6.26	17.06	42.91	0.58	6.23	6.29	17.13	9.23	0.22
wHill	CN	500	42.54	0.35	5.86	15.97	42.53	0.59	5.84	5.89	16.05	8.66	0.21
wHill	CN	700	42.06	0.36	5.38	14.66	42.03	0.61	5.34	5.41	14.75	7.92	0.20
wISE	RT	500	40.62	0.83	3.93	10.72	40.52	0.86	3.84	4.04	11.00	5.69	0.24
wISE	RT	700	40.38	0.68	3.70	10.08	40.33	0.79	3.64	3.79	10.33	5.40	0.20
wISE	RN	300	42.72	0.40	6.03	16.44	42.71	0.64	6.02	6.07	16.53	8.93	0.23
wISE	RN	500	41.59	0.47	4.90	13.35	41.57	0.66	4.88	4.95	13.48	7.24	0.19
wISE	RN	700	40.97	0.42	4.28	11.68	40.98	0.65	4.30	4.33	11.81	6.37	0.18
wISE	CN	300	42.68	0.41	5.99	16.34	42.67	0.66	5.99	6.03	16.43	8.88	0.21
wISE	CN	500	41.47	0.51	4.79	13.04	41.47	0.71	4.79	4.84	13.19	7.10	0.19
wISE	CN	700	40.85	0.45	4.16	11.34	40.87	0.68	4.19	4.21	11.48	6.20	0.17
wPDC	RT	500	39.42	0.97	2.74	7.46	39.33	0.89	2.65	2.91	7.93	3.93	0.23
wPDC	RT	700	39.52	0.86	2.84	7.73	39.53	0.89	2.84	2.98	8.13	4.21	0.18
wPDC	RN	300	42.02	0.96	5.34	14.55	42.08	0.92	5.39	5.43	14.79	7.99	0.21
wPDC	RN	500	40.61	0.77	3.93	10.71	40.60	0.85	3.92	4.03	10.97	5.81	0.18
wPDC	RN	700	40.29	0.62	3.61	9.83	40.34	0.80	3.65	3.69	10.06	5.41	0.17
wPDC	CN	300	41.90	1.17	5.21	14.20	42.00	0.97	5.31	5.32	14.50	7.88	0.21
wPDC	CN	500	40.41	0.87	3.73	10.16	40.39	0.92	3.70	3.84	10.48	5.49	0.18
wPDC	CN	700	40.14	0.67	3.45	9.41	40.18	0.83	3.49	3.55	9.67	5.18	0.16
GB2			42.53	0.27	5.84	15.92	42.52	0.52	5.84	5.86	15.99	8.66	0.20

OAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

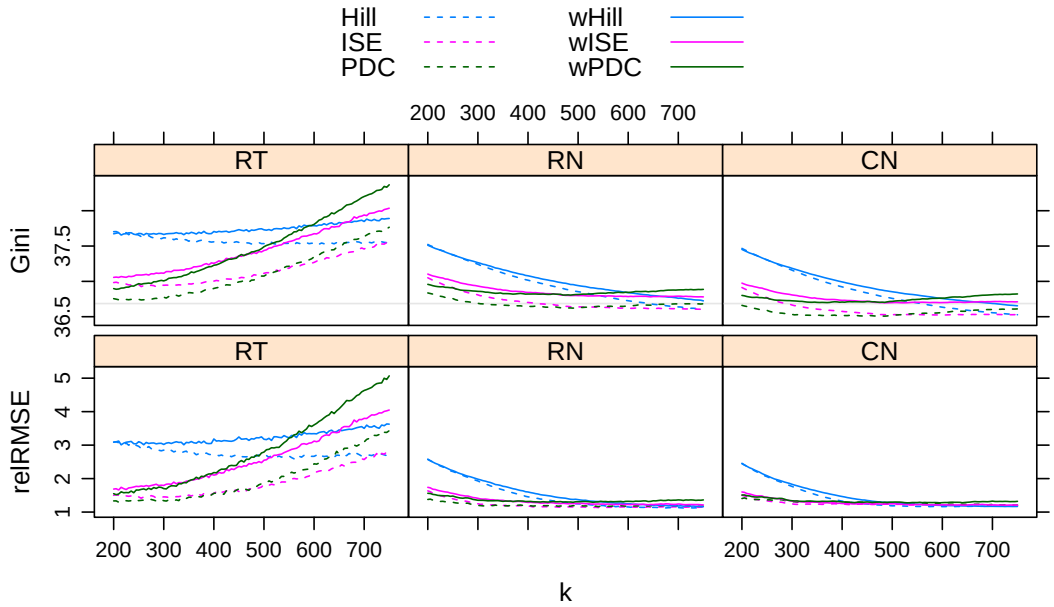

Figure F.444.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

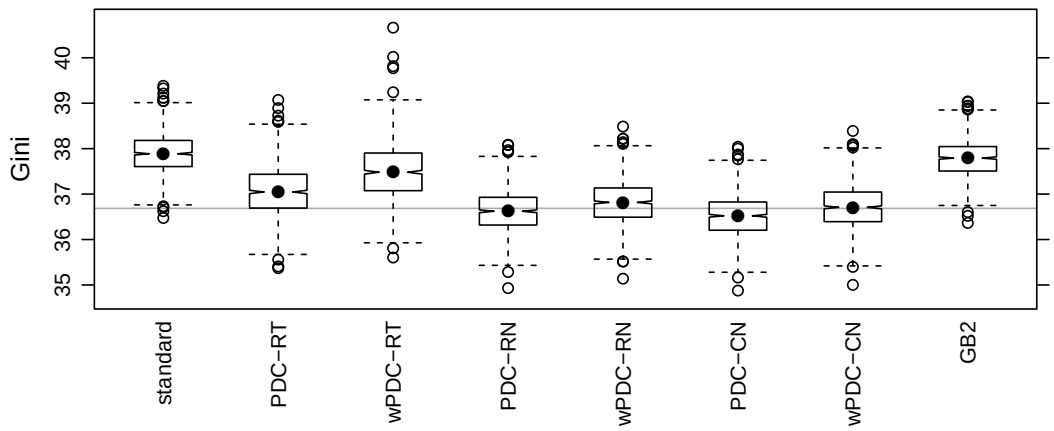

Figure F.445.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.222.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.90	0.18	1.21	3.30	37.89	0.43	1.20	1.28	3.49	1.78	0.07
wHill	RT	300	37.66	0.27	0.98	2.66	37.65	0.52	0.96	1.11	3.02	1.42	0.08
wHill	RT	500	37.73	0.27	1.04	2.85	37.71	0.53	1.02	1.16	3.18	1.52	0.08
wHill	RT	700	37.85	0.30	1.16	3.16	37.83	0.57	1.15	1.28	3.50	1.70	0.08
wHill	RN	300	37.26	0.19	0.58	1.58	37.27	0.45	0.58	0.73	1.98	0.86	0.06
wHill	RN	500	36.94	0.19	0.25	0.69	36.95	0.44	0.27	0.50	1.37	0.53	0.05
wHill	RN	700	36.76	0.18	0.07	0.20	36.75	0.42	0.07	0.43	1.18	0.44	0.04
wHill	CN	300	37.18	0.20	0.50	1.36	37.17	0.45	0.49	0.67	1.83	0.74	0.06
wHill	CN	500	36.85	0.19	0.17	0.46	36.86	0.44	0.18	0.47	1.28	0.48	0.04
wHill	CN	700	36.69	0.18	0.00	0.00	36.69	0.43	0.00	0.43	1.17	0.43	0.04
wISE	RT	300	37.11	0.25	0.43	1.17	37.09	0.48	0.40	0.66	1.80	0.67	0.06
wISE	RT	500	37.44	0.31	0.75	2.05	37.42	0.54	0.74	0.94	2.55	1.09	0.09
wISE	RT	700	37.94	0.37	1.25	3.42	37.91	0.61	1.22	1.39	3.80	1.81	0.09
wISE	RN	300	36.93	0.21	0.25	0.67	36.92	0.45	0.24	0.52	1.41	0.53	0.05
wISE	RN	500	36.80	0.20	0.11	0.31	36.80	0.45	0.12	0.46	1.26	0.47	0.05
wISE	RN	700	36.79	0.20	0.10	0.29	36.80	0.41	0.12	0.46	1.24	0.44	0.06
wISE	CN	300	36.81	0.22	0.12	0.33	36.80	0.48	0.11	0.49	1.33	0.49	0.04
wISE	CN	500	36.70	0.21	0.01	0.04	36.70	0.46	0.02	0.46	1.25	0.47	0.05
wISE	CN	700	36.71	0.20	0.03	0.08	36.73	0.42	0.04	0.44	1.21	0.42	0.04
wPDC	RT	300	37.01	0.29	0.32	0.87	36.98	0.53	0.29	0.62	1.70	0.58	0.06
wPDC	RT	500	37.49	0.40	0.80	2.19	37.48	0.61	0.79	1.02	2.79	1.18	0.11
wPDC	RT	700	38.20	0.59	1.52	4.13	38.18	0.74	1.49	1.70	4.63	2.21	0.11
wPDC	RN	300	36.86	0.22	0.17	0.47	36.85	0.47	0.16	0.50	1.35	0.48	0.05
wPDC	RN	500	36.81	0.21	0.13	0.35	36.82	0.48	0.13	0.48	1.31	0.49	0.05
wPDC	RN	700	36.88	0.21	0.19	0.53	36.89	0.44	0.20	0.50	1.36	0.49	0.05
wPDC	CN	300	36.72	0.24	0.04	0.11	36.71	0.50	0.03	0.49	1.34	0.50	0.05
wPDC	CN	500	36.72	0.23	0.03	0.08	36.71	0.49	0.02	0.48	1.30	0.49	0.05
wPDC	CN	700	36.81	0.22	0.12	0.34	36.83	0.44	0.14	0.49	1.33	0.47	0.04
GB2			37.79	0.17	1.10	3.01	37.79	0.40	1.11	1.18	3.21	1.64	0.06

OAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

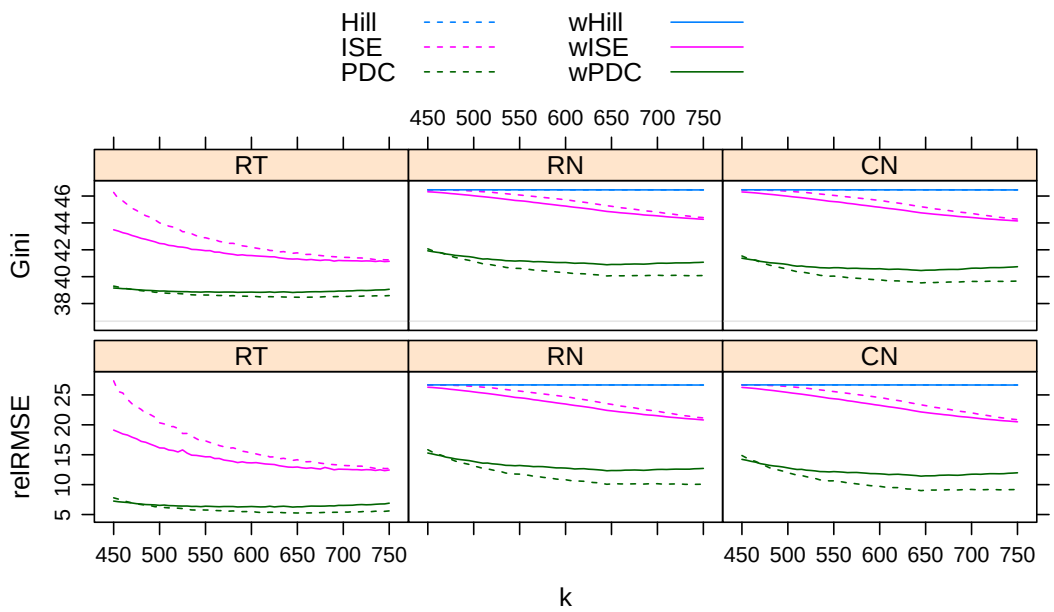

Figure F.446.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

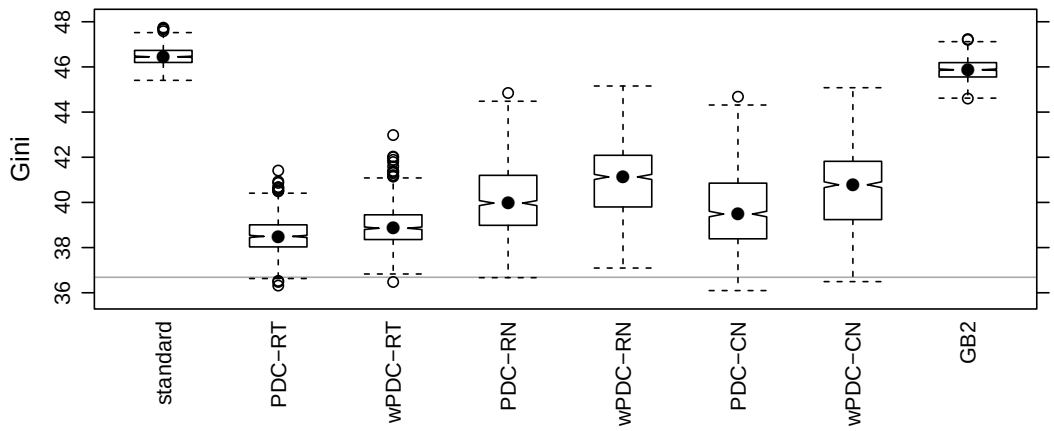

Figure F.447.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.223.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			46.47	0.15	9.78	26.66	46.45	0.40	9.76	9.79	26.68	14.47	0.30
wHill	RT	500	49.54	9.77	12.85	35.03	48.97	2.07	12.28	13.23	36.05	18.21	1.44
wHill	RT	700	47.69	6.63	11.00	29.99	47.28	1.48	10.59	11.30	30.80	15.70	1.29
wHill	RN	300	46.47	0.15	9.78	26.66	46.45	0.40	9.76	9.79	26.68	14.47	0.30
wHill	RN	500	46.46	0.15	9.78	26.65	46.45	0.40	9.76	9.79	26.67	14.47	0.30
wHill	RN	700	46.46	0.15	9.77	26.64	46.45	0.40	9.76	9.78	26.66	14.47	0.30
wHill	CN	300	46.47	0.15	9.78	26.66	46.45	0.40	9.76	9.79	26.68	14.47	0.30
wHill	CN	500	46.46	0.15	9.78	26.65	46.45	0.40	9.76	9.79	26.67	14.47	0.30
wHill	CN	700	46.46	0.15	9.77	26.64	46.45	0.40	9.76	9.78	26.66	14.47	0.30
wISE	RT	500	42.47	1.60	5.78	15.77	42.35	1.14	5.67	5.92	16.14	8.40	0.35
wISE	RT	700	41.19	0.96	4.51	12.28	41.13	0.88	4.44	4.61	12.57	6.59	0.36
wISE	RN	300	46.47	0.15	9.78	26.66	46.45	0.40	9.76	9.79	26.68	14.47	0.30
wISE	RN	500	46.02	0.39	9.34	25.45	46.06	0.53	9.38	9.36	25.51	13.90	0.30
wISE	RN	700	44.53	0.88	7.84	21.37	44.46	0.96	7.77	7.90	21.52	11.52	0.28
wISE	CN	300	46.47	0.15	9.78	26.66	46.45	0.40	9.76	9.79	26.68	14.47	0.30
wISE	CN	500	45.99	0.42	9.30	25.35	46.02	0.56	9.34	9.32	25.41	13.85	0.30
wISE	CN	700	44.41	0.96	7.72	21.04	44.30	0.97	7.62	7.78	21.21	11.29	0.28
wPDC	RT	500	38.93	0.71	2.24	6.12	38.85	0.83	2.16	2.40	6.53	3.20	0.15
wPDC	RT	700	38.93	0.72	2.24	6.10	38.86	0.83	2.17	2.39	6.52	3.22	0.17
wPDC	RN	300	46.09	1.21	9.41	25.64	46.40	0.50	9.71	9.47	25.82	14.40	0.30
wPDC	RN	500	41.44	3.33	4.75	12.95	41.49	2.03	4.80	5.09	13.87	7.12	0.27
wPDC	RN	700	41.00	2.54	4.32	11.76	41.13	1.67	4.44	4.60	12.54	6.59	0.23
wPDC	CN	300	46.03	1.58	9.35	25.48	46.40	0.50	9.71	9.43	25.71	14.40	0.30
wPDC	CN	500	40.90	4.27	4.22	11.49	40.97	2.36	4.28	4.69	12.79	6.35	0.26
wPDC	CN	700	40.63	3.01	3.94	10.75	40.78	1.79	4.10	4.31	11.74	6.07	0.23
GB2			45.88	0.22	9.19	25.06	45.88	0.47	9.19	9.20	25.09	13.63	0.29

OAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

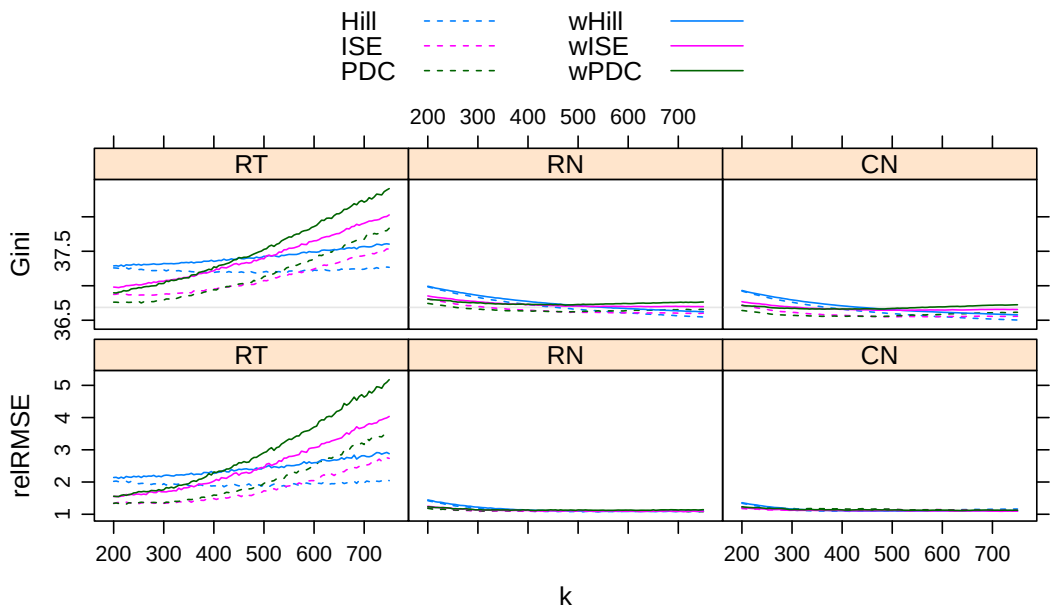

Figure F.448.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

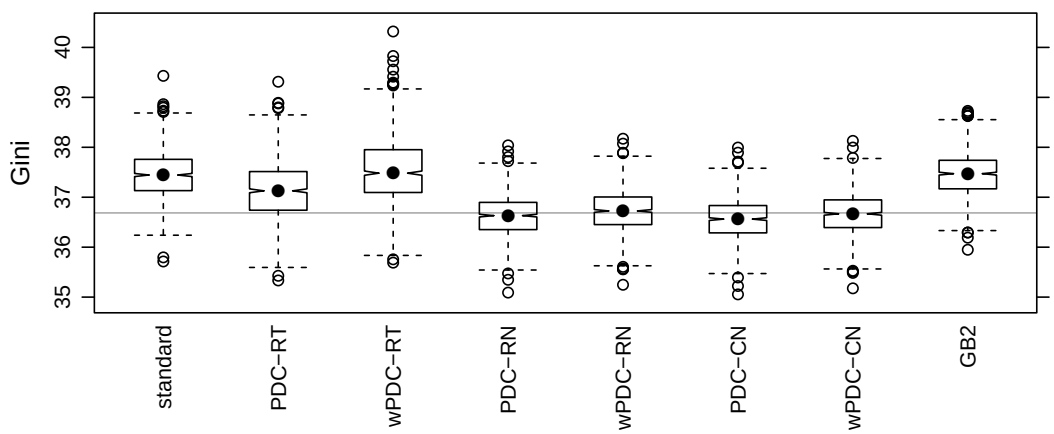

Figure F.449.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.224.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.44	0.21	0.75	2.05	37.44	0.46	0.76	0.88	2.39	1.13	0.07
wHill	RT	300	37.32	0.25	0.64	1.74	37.30	0.49	0.62	0.81	2.20	0.93	0.06
wHill	RT	500	37.43	0.27	0.74	2.02	37.43	0.46	0.74	0.90	2.46	1.10	0.07
wHill	RT	700	37.57	0.29	0.88	2.41	37.57	0.54	0.88	1.03	2.82	1.31	0.07
wHill	RN	300	36.86	0.17	0.17	0.48	36.86	0.41	0.18	0.45	1.22	0.46	0.05
wHill	RN	500	36.71	0.16	0.02	0.07	36.72	0.39	0.03	0.40	1.10	0.40	0.04
wHill	RN	700	36.64	0.16	−0.05	−0.14	36.64	0.38	−0.05	0.40	1.09	0.39	0.04
wHill	CN	300	36.79	0.17	0.11	0.30	36.80	0.40	0.12	0.43	1.16	0.42	0.04
wHill	CN	500	36.65	0.16	−0.03	−0.09	36.66	0.39	−0.03	0.40	1.10	0.39	0.04
wHill	CN	700	36.59	0.16	−0.10	−0.26	36.59	0.39	−0.10	0.41	1.11	0.40	0.04
wISE	RT	300	37.07	0.24	0.38	1.03	37.04	0.46	0.36	0.62	1.70	0.59	0.06
wISE	RT	500	37.39	0.30	0.70	1.92	37.36	0.57	0.67	0.89	2.44	1.00	0.07
wISE	RT	700	37.91	0.36	1.22	3.33	37.89	0.61	1.21	1.36	3.71	1.79	0.10
wISE	RN	300	36.77	0.17	0.08	0.22	36.76	0.40	0.07	0.42	1.14	0.42	0.04
wISE	RN	500	36.71	0.16	0.02	0.06	36.71	0.40	0.03	0.41	1.11	0.40	0.04
wISE	RN	700	36.70	0.16	0.01	0.04	36.70	0.38	0.02	0.40	1.09	0.38	0.04
wISE	CN	300	36.69	0.17	0.00	0.01	36.69	0.41	0.00	0.41	1.12	0.41	0.04
wISE	CN	500	36.65	0.17	−0.04	−0.11	36.65	0.39	−0.04	0.41	1.11	0.40	0.04
wISE	CN	700	36.66	0.16	−0.03	−0.08	36.66	0.39	−0.03	0.40	1.10	0.39	0.04
wPDC	RT	300	37.03	0.30	0.35	0.95	37.00	0.53	0.32	0.65	1.76	0.60	0.06
wPDC	RT	500	37.53	0.43	0.84	2.29	37.48	0.64	0.80	1.07	2.91	1.18	0.10
wPDC	RT	700	38.21	0.56	1.53	4.16	38.19	0.76	1.51	1.70	4.63	2.24	0.11
wPDC	RN	300	36.75	0.17	0.06	0.17	36.74	0.41	0.06	0.42	1.14	0.41	0.04
wPDC	RN	500	36.73	0.17	0.04	0.12	36.73	0.41	0.04	0.42	1.13	0.41	0.04
wPDC	RN	700	36.76	0.17	0.07	0.20	36.76	0.38	0.07	0.41	1.13	0.41	0.04
wPDC	CN	300	36.67	0.18	−0.01	−0.04	36.66	0.41	−0.02	0.42	1.14	0.41	0.04
wPDC	CN	500	36.67	0.17	−0.01	−0.04	36.67	0.41	−0.02	0.42	1.13	0.41	0.04
wPDC	CN	700	36.72	0.17	0.03	0.09	36.71	0.39	0.03	0.41	1.13	0.40	0.04
GB2			37.46	0.18	0.77	2.10	37.47	0.42	0.79	0.88	2.40	1.17	0.06

OAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

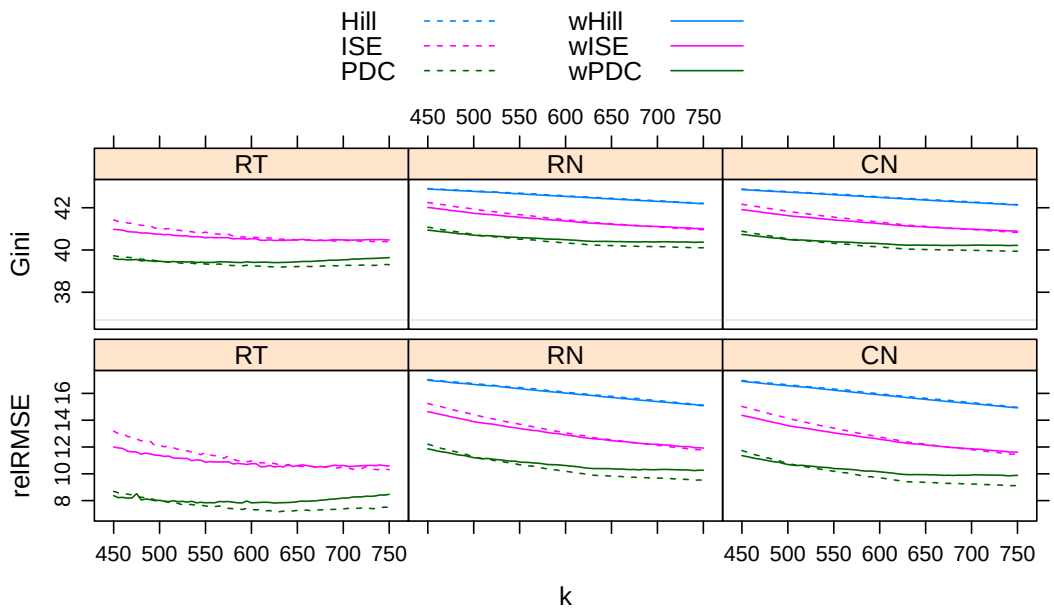

Figure F.450.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

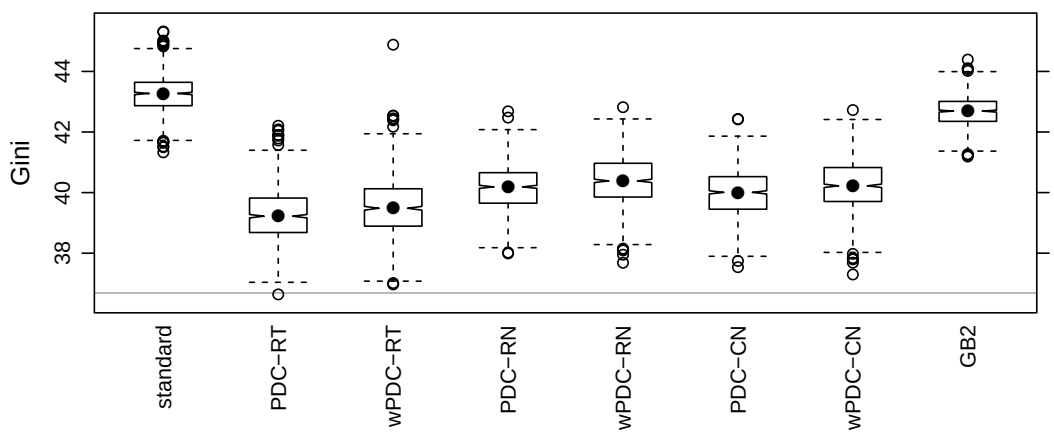

Figure F.451.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.225.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			43.27	0.35	6.59	17.95	43.27	0.58	6.59	6.61	18.02	9.76	0.24
wHill	RT	500	43.33	1.65	6.65	18.12	43.26	1.09	6.57	6.77	18.45	9.75	0.60
wHill	RT	700	42.88	1.08	6.19	16.88	42.77	0.94	6.09	6.28	17.12	9.02	0.31
wHill	RN	300	43.14	0.34	6.45	17.59	43.12	0.57	6.44	6.48	17.66	9.54	0.25
wHill	RN	500	42.77	0.33	6.09	16.60	42.76	0.53	6.08	6.12	16.67	9.01	0.22
wHill	RN	700	42.30	0.32	5.62	15.31	42.31	0.56	5.63	5.65	15.39	8.34	0.20
wHill	CN	300	43.13	0.34	6.44	17.56	43.12	0.56	6.43	6.47	17.63	9.54	0.23
wHill	CN	500	42.74	0.34	6.05	16.50	42.73	0.55	6.04	6.08	16.57	8.96	0.22
wHill	CN	700	42.25	0.32	5.56	15.16	42.27	0.56	5.58	5.59	15.24	8.28	0.20
wISE	RT	500	40.75	0.86	4.07	11.09	40.68	0.90	3.99	4.17	11.37	5.92	0.26
wISE	RT	700	40.48	0.80	3.79	10.34	40.44	0.84	3.75	3.90	10.63	5.56	0.35
wISE	RN	300	42.92	0.37	6.23	16.98	42.92	0.59	6.23	6.26	17.06	9.24	0.23
wISE	RN	500	41.74	0.44	5.05	13.77	41.76	0.67	5.08	5.10	13.89	7.53	0.19
wISE	RN	700	41.11	0.43	4.43	12.07	41.16	0.62	4.47	4.48	12.20	6.63	0.19
wISE	CN	300	42.89	0.38	6.20	16.90	42.90	0.59	6.21	6.23	16.99	9.21	0.23
wISE	CN	500	41.63	0.47	4.94	13.47	41.63	0.69	4.94	4.99	13.60	7.33	0.19
wISE	CN	700	40.99	0.45	4.30	11.72	41.03	0.62	4.35	4.35	11.86	6.45	0.17
wPDC	RT	500	39.47	0.91	2.78	7.59	39.34	0.89	2.66	2.94	8.03	3.94	0.19
wPDC	RT	700	39.54	0.91	2.85	7.77	39.48	0.93	2.80	3.01	8.19	4.15	0.22
wPDC	RN	300	42.23	0.89	5.55	15.12	42.35	0.85	5.66	5.62	15.33	8.39	0.21
wPDC	RN	500	40.70	0.76	4.02	10.95	40.69	0.89	4.00	4.11	11.20	5.93	0.18
wPDC	RN	700	40.38	0.64	3.70	10.08	40.39	0.83	3.70	3.78	10.31	5.49	0.17
wPDC	CN	300	42.12	1.07	5.43	14.80	42.26	0.92	5.57	5.53	15.07	8.26	0.21
wPDC	CN	500	40.50	0.87	3.81	10.39	40.47	0.95	3.79	3.92	10.69	5.62	0.18
wPDC	CN	700	40.23	0.69	3.54	9.65	40.22	0.86	3.54	3.64	9.91	5.25	0.16
GB2			42.69	0.25	6.01	16.37	42.69	0.49	6.00	6.03	16.43	8.90	0.21

Two-stage simple random sampling

No contamination

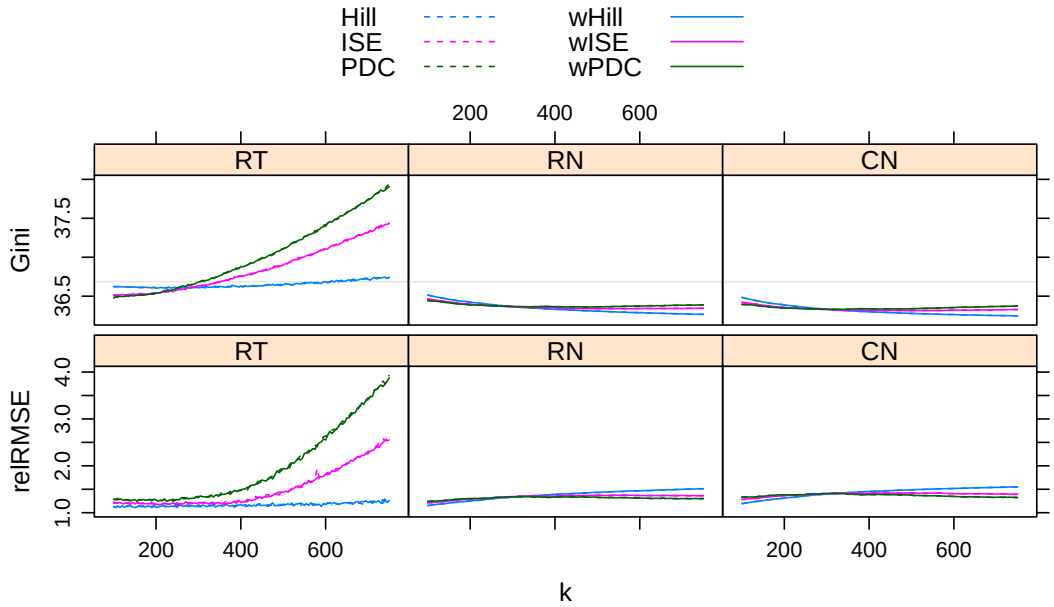

Figure F.452.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 100 and 750.

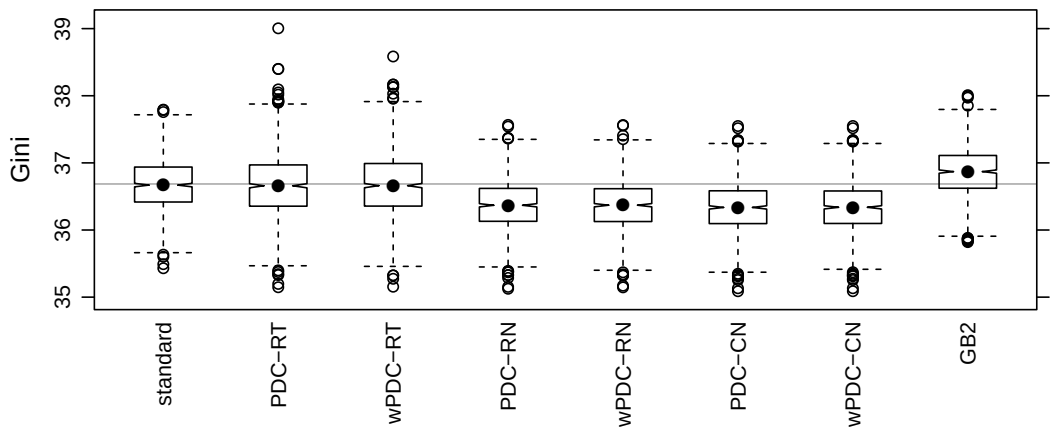

Figure F.453.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 300$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.226.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			36.67	0.16	−0.02	−0.04	36.67	0.38	−0.02	0.40	1.08	0.39	0.03
wHill	RT	300	36.61	0.17	−0.08	−0.22	36.61	0.41	−0.07	0.42	1.13	0.41	0.04
wHill	RT	500	36.65	0.19	−0.04	−0.11	36.65	0.42	−0.04	0.43	1.18	0.42	0.04
wHill	RT	700	36.72	0.20	0.03	0.09	36.73	0.45	0.04	0.45	1.22	0.45	0.04
wHill	RN	300	36.37	0.14	−0.32	−0.87	36.37	0.36	−0.32	0.49	1.33	0.50	0.04
wHill	RN	500	36.31	0.13	−0.38	−1.03	36.31	0.34	−0.38	0.53	1.43	0.58	0.04
wHill	RN	700	36.27	0.13	−0.41	−1.13	36.27	0.35	−0.41	0.55	1.50	0.62	0.04
wHill	CN	300	36.33	0.14	−0.35	−0.97	36.34	0.35	−0.35	0.51	1.40	0.55	0.04
wHill	CN	500	36.28	0.13	−0.41	−1.11	36.28	0.35	−0.40	0.55	1.49	0.61	0.04
wHill	CN	700	36.25	0.13	−0.43	−1.18	36.26	0.35	−0.43	0.56	1.54	0.65	0.04
wISE	RT	300	36.63	0.19	−0.06	−0.15	36.62	0.44	−0.06	0.44	1.21	0.43	0.04
wISE	RT	500	36.90	0.23	0.21	0.58	36.89	0.47	0.20	0.53	1.43	0.50	0.05
wISE	RT	700	37.31	0.29	0.63	1.71	37.32	0.54	0.63	0.83	2.25	0.95	0.07
wISE	RN	300	36.36	0.14	−0.32	−0.88	36.37	0.36	−0.32	0.49	1.35	0.52	0.04
wISE	RN	500	36.34	0.13	−0.35	−0.94	36.35	0.35	−0.34	0.50	1.37	0.54	0.04
wISE	RN	700	36.34	0.13	−0.34	−0.94	36.35	0.35	−0.34	0.50	1.37	0.54	0.04
wISE	CN	300	36.33	0.14	−0.36	−0.98	36.34	0.35	−0.35	0.52	1.41	0.56	0.04
wISE	CN	500	36.31	0.13	−0.37	−1.01	36.32	0.35	−0.36	0.52	1.42	0.57	0.04
wISE	CN	700	36.32	0.13	−0.36	−0.98	36.33	0.35	−0.36	0.51	1.40	0.56	0.04
wPDC	RT	300	36.68	0.24	−0.01	−0.02	36.66	0.47	−0.02	0.48	1.32	0.47	0.05
wPDC	RT	500	37.11	0.33	0.43	1.16	37.08	0.53	0.39	0.71	1.94	0.69	0.07
wPDC	RT	700	37.74	0.46	1.05	2.86	37.71	0.68	1.03	1.25	3.41	1.53	0.09
wPDC	RN	300	36.37	0.14	−0.32	−0.86	36.37	0.36	−0.32	0.49	1.34	0.52	0.04
wPDC	RN	500	36.36	0.13	−0.32	−0.88	36.37	0.35	−0.32	0.49	1.33	0.52	0.04
wPDC	RN	700	36.38	0.14	−0.30	−0.82	36.39	0.36	−0.30	0.48	1.30	0.49	0.04
wPDC	CN	300	36.33	0.14	−0.35	−0.96	36.34	0.36	−0.35	0.52	1.41	0.56	0.04
wPDC	CN	500	36.34	0.13	−0.35	−0.95	36.35	0.35	−0.34	0.50	1.38	0.54	0.04
wPDC	CN	700	36.37	0.14	−0.32	−0.87	36.37	0.36	−0.32	0.49	1.33	0.51	0.04
GB2			36.86	0.15	0.18	0.48	36.87	0.36	0.18	0.42	1.15	0.43	0.04

OCAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

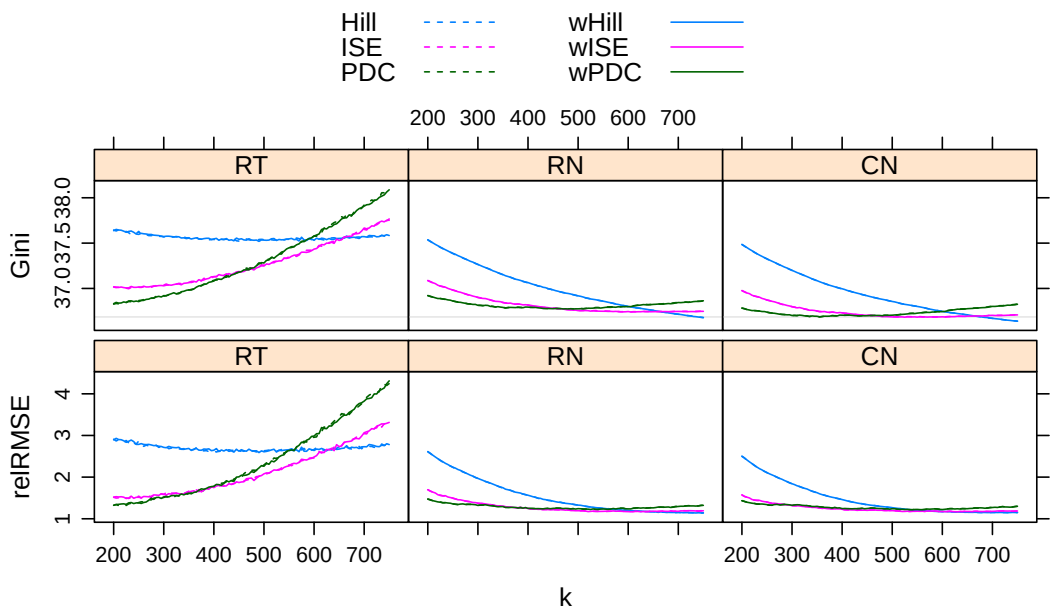

Figure F.454.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

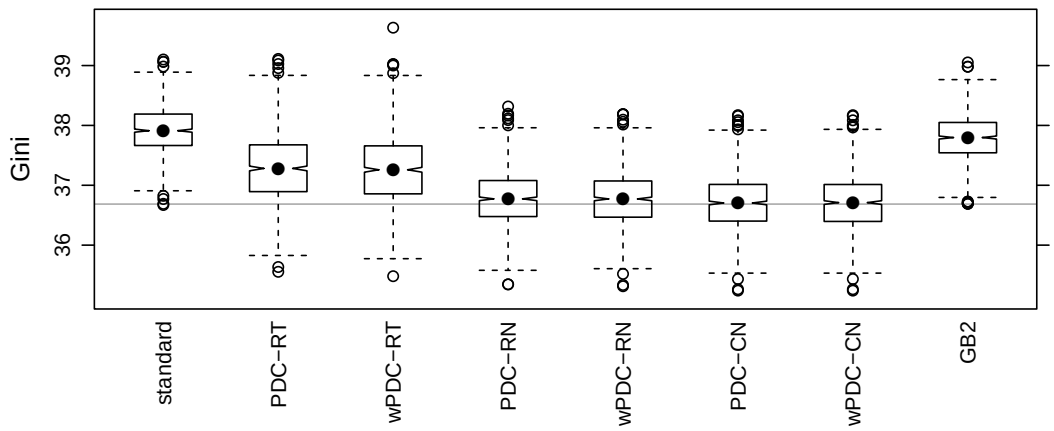

Figure F.455.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.227.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.92	0.15	1.23	3.36	37.91	0.39	1.23	1.29	3.52	1.82	0.07
wHill	RT	300	37.57	0.21	0.89	2.42	37.55	0.45	0.87	1.00	2.71	1.29	0.07
wHill	RT	500	37.53	0.20	0.85	2.31	37.54	0.44	0.85	0.96	2.61	1.27	0.06
wHill	RT	700	37.57	0.22	0.89	2.41	37.56	0.48	0.87	1.00	2.73	1.29	0.07
wHill	RN	300	37.26	0.19	0.58	1.58	37.27	0.43	0.58	0.72	1.97	0.87	0.06
wHill	RN	500	36.92	0.18	0.23	0.63	36.91	0.42	0.22	0.49	1.33	0.49	0.05
wHill	RN	700	36.72	0.18	0.03	0.08	36.71	0.43	0.02	0.42	1.16	0.42	0.04
wHill	CN	300	37.20	0.19	0.51	1.40	37.20	0.43	0.51	0.68	1.84	0.77	0.06
wHill	CN	500	36.86	0.19	0.17	0.46	36.84	0.43	0.15	0.46	1.27	0.45	0.04
wHill	CN	700	36.67	0.18	−0.02	−0.04	36.67	0.43	−0.02	0.42	1.15	0.43	0.04
wISE	RT	300	37.03	0.22	0.34	0.94	37.02	0.47	0.33	0.58	1.59	0.59	0.05
wISE	RT	500	37.25	0.27	0.56	1.53	37.23	0.53	0.55	0.76	2.08	0.82	0.07
wISE	RT	700	37.67	0.30	0.98	2.67	37.65	0.53	0.97	1.12	3.07	1.43	0.08
wISE	RN	300	36.90	0.21	0.21	0.58	36.89	0.43	0.20	0.50	1.37	0.50	0.05
wISE	RN	500	36.76	0.19	0.07	0.19	36.76	0.44	0.07	0.44	1.19	0.43	0.04
wISE	RN	700	36.75	0.18	0.06	0.16	36.75	0.42	0.06	0.43	1.18	0.42	0.04
wISE	CN	300	36.80	0.22	0.11	0.31	36.78	0.44	0.09	0.48	1.32	0.46	0.04
wISE	CN	500	36.69	0.19	0.00	0.00	36.68	0.44	−0.00	0.44	1.20	0.44	0.04
wISE	CN	700	36.70	0.19	0.02	0.05	36.71	0.42	0.02	0.43	1.18	0.43	0.04
wPDC	RT	300	36.92	0.26	0.24	0.64	36.90	0.50	0.21	0.56	1.52	0.51	0.07
wPDC	RT	500	37.28	0.33	0.59	1.62	37.26	0.60	0.57	0.83	2.26	0.87	0.08
wPDC	RT	700	37.91	0.47	1.22	3.33	37.87	0.67	1.18	1.40	3.82	1.75	0.10
wPDC	RN	300	36.81	0.22	0.13	0.35	36.80	0.44	0.11	0.48	1.32	0.44	0.04
wPDC	RN	500	36.78	0.20	0.09	0.24	36.77	0.45	0.09	0.46	1.24	0.45	0.04
wPDC	RN	700	36.84	0.20	0.16	0.43	36.85	0.43	0.17	0.47	1.29	0.46	0.04
wPDC	CN	300	36.70	0.24	0.02	0.04	36.70	0.46	0.01	0.49	1.32	0.46	0.04
wPDC	CN	500	36.70	0.21	0.02	0.05	36.71	0.46	0.02	0.46	1.24	0.46	0.04
wPDC	CN	700	36.80	0.20	0.12	0.32	36.80	0.43	0.11	0.47	1.27	0.45	0.04
GB2			37.79	0.15	1.11	3.02	37.80	0.38	1.11	1.17	3.20	1.65	0.06

OCAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

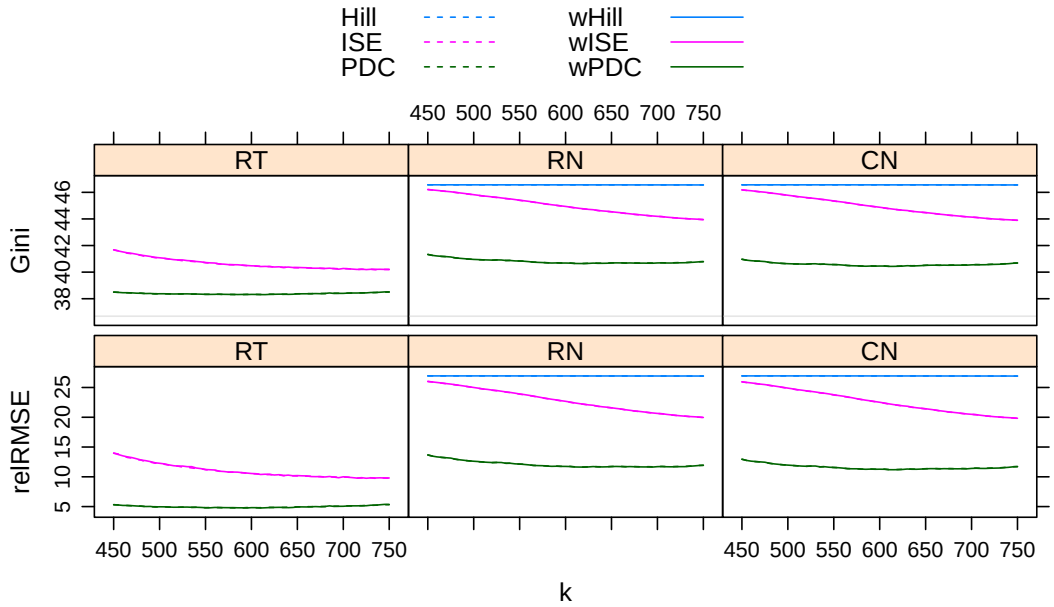

Figure F.456.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

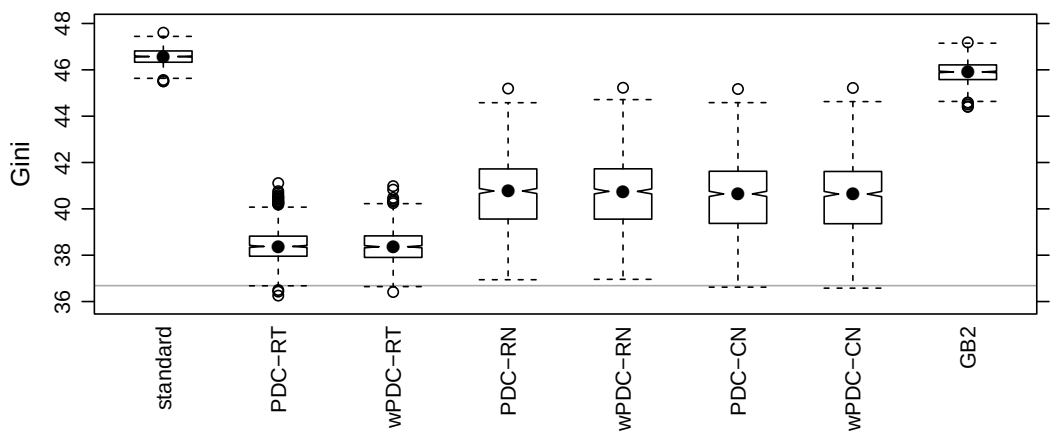

Figure F.457.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.228.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			46.57	0.12	9.88	26.93	46.57	0.36	9.89	9.89	26.95	14.66	0.30
wHill	RT	500	46.47	4.03	9.78	26.66	46.17	1.25	9.48	9.98	27.22	14.06	1.21
wHill	RT	700	45.32	1.17	8.63	23.53	45.19	0.94	8.50	8.70	23.71	12.60	0.52
wHill	RN	300	46.57	0.12	9.88	26.93	46.57	0.36	9.89	9.89	26.95	14.66	0.30
wHill	RN	500	46.56	0.12	9.88	26.93	46.57	0.36	9.89	9.89	26.95	14.66	0.30
wHill	RN	700	46.56	0.12	9.87	26.91	46.56	0.35	9.88	9.88	26.93	14.64	0.30
wHill	CN	300	46.57	0.12	9.88	26.93	46.57	0.36	9.89	9.89	26.95	14.66	0.30
wHill	CN	500	46.56	0.12	9.88	26.93	46.57	0.36	9.89	9.89	26.95	14.66	0.30
wHill	CN	700	46.56	0.12	9.87	26.91	46.56	0.35	9.88	9.88	26.93	14.64	0.30
wISE	RT	500	41.08	0.97	4.39	11.98	41.01	0.95	4.33	4.50	12.27	6.42	0.23
wISE	RT	700	40.27	0.59	3.59	9.78	40.21	0.71	3.52	3.67	10.00	5.22	0.22
wISE	RN	300	46.57	0.12	9.88	26.93	46.57	0.36	9.89	9.89	26.95	14.66	0.30
wISE	RN	500	45.82	0.64	9.14	24.91	45.93	0.68	9.24	9.17	25.00	13.71	0.30
wISE	RN	700	44.19	0.98	7.51	20.47	44.07	0.89	7.39	7.57	20.64	10.95	0.28
wISE	CN	300	46.57	0.12	9.88	26.93	46.57	0.36	9.89	9.89	26.95	14.66	0.30
wISE	CN	500	45.78	0.69	9.09	24.79	45.89	0.69	9.21	9.13	24.89	13.65	0.30
wISE	CN	700	44.14	1.01	7.45	20.31	44.02	0.91	7.33	7.52	20.49	10.87	0.28
wPDC	RT	500	38.37	0.47	1.69	4.60	38.32	0.66	1.64	1.82	4.96	2.42	0.13
wPDC	RT	700	38.40	0.49	1.72	4.68	38.37	0.69	1.68	1.85	5.05	2.49	0.12
wPDC	RN	300	45.04	3.76	8.35	22.76	46.00	1.34	9.32	8.57	23.37	13.82	0.30
wPDC	RN	500	40.96	3.19	4.27	11.64	41.01	2.02	4.32	4.63	12.61	6.40	0.26
wPDC	RN	700	40.69	2.41	4.00	10.92	40.75	1.59	4.07	4.29	11.71	6.03	0.23
wPDC	CN	300	44.87	4.57	8.19	22.31	45.97	1.38	9.29	8.46	23.06	13.77	0.30
wPDC	CN	500	40.63	3.69	3.95	10.76	40.72	2.17	4.04	4.39	11.96	5.99	0.26
wPDC	CN	700	40.55	2.61	3.86	10.53	40.64	1.65	3.95	4.19	11.41	5.86	0.23
GB2			45.89	0.24	9.20	25.09	45.91	0.47	9.22	9.22	25.12	13.67	0.29

OCAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

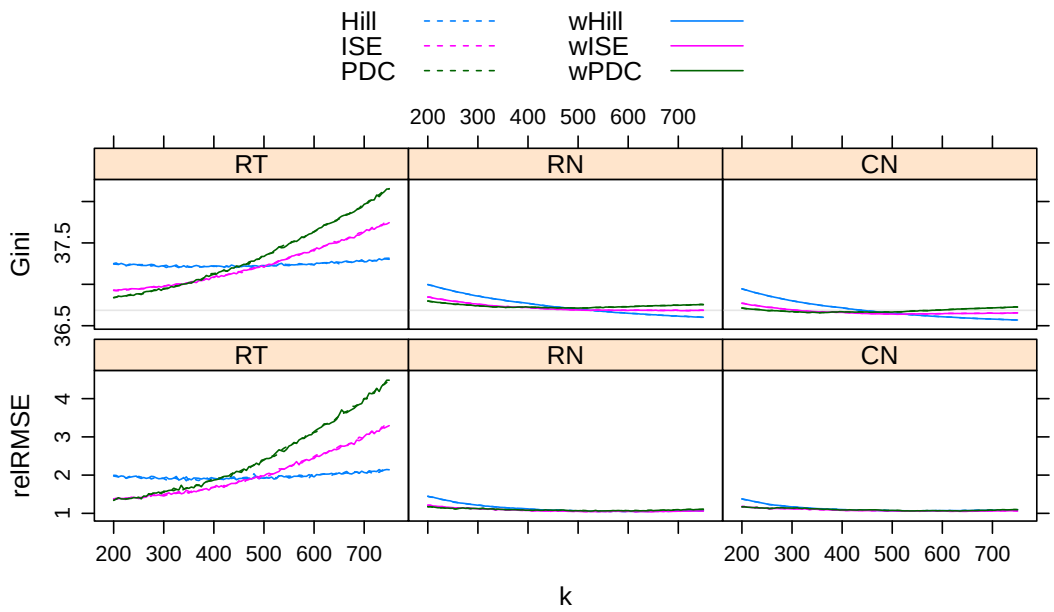

Figure F.458.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

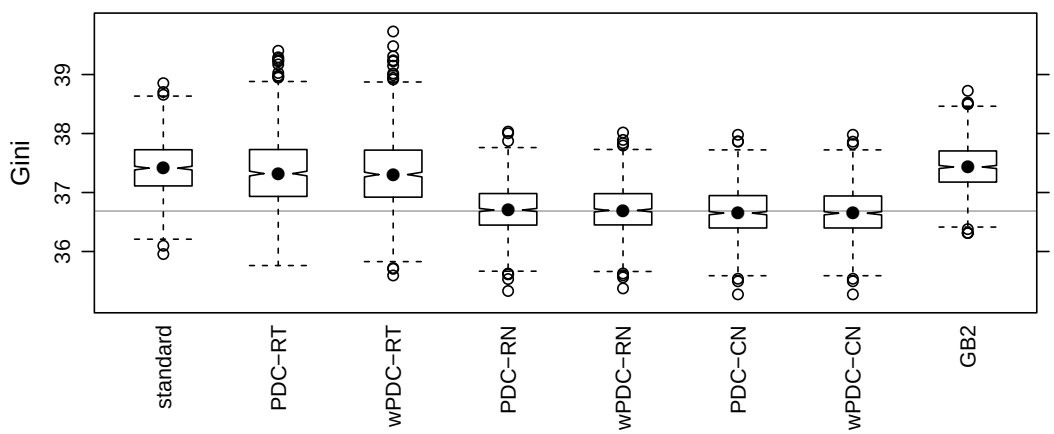

Figure F.459.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.229.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.42	0.19	0.74	2.01	37.41	0.45	0.73	0.86	2.34	1.08	0.06
wHill	RT	300	37.22	0.21	0.54	1.47	37.20	0.45	0.51	0.71	1.92	0.77	0.06
wHill	RT	500	37.22	0.21	0.54	1.46	37.21	0.48	0.52	0.70	1.92	0.79	0.05
wHill	RT	700	37.27	0.23	0.59	1.60	37.26	0.47	0.57	0.76	2.07	0.86	0.08
wHill	RN	300	36.86	0.17	0.17	0.47	36.85	0.42	0.16	0.44	1.21	0.42	0.04
wHill	RN	500	36.70	0.15	0.01	0.04	36.69	0.39	0.00	0.39	1.06	0.38	0.03
wHill	RN	700	36.62	0.15	−0.07	−0.19	36.60	0.37	−0.08	0.39	1.06	0.41	0.03
wHill	CN	300	36.80	0.17	0.12	0.32	36.79	0.41	0.11	0.43	1.17	0.40	0.04
wHill	CN	500	36.65	0.15	−0.04	−0.10	36.64	0.39	−0.04	0.39	1.07	0.40	0.03
wHill	CN	700	36.58	0.15	−0.11	−0.29	36.57	0.38	−0.12	0.40	1.08	0.41	0.03
wISE	RT	300	36.98	0.22	0.29	0.79	36.96	0.43	0.28	0.55	1.50	0.53	0.05
wISE	RT	500	37.21	0.26	0.52	1.42	37.20	0.50	0.51	0.73	1.98	0.77	0.07
wISE	RT	700	37.63	0.32	0.95	2.58	37.61	0.58	0.92	1.10	3.01	1.37	0.08
wISE	RN	300	36.76	0.16	0.07	0.20	36.75	0.40	0.07	0.41	1.12	0.39	0.03
wISE	RN	500	36.69	0.15	0.00	0.01	36.67	0.37	−0.01	0.39	1.05	0.37	0.04
wISE	RN	700	36.68	0.15	−0.00	−0.00	36.68	0.38	−0.01	0.39	1.06	0.39	0.03
wISE	CN	300	36.69	0.17	0.01	0.02	36.68	0.40	−0.01	0.41	1.11	0.40	0.03
wISE	CN	500	36.64	0.15	−0.05	−0.12	36.62	0.38	−0.06	0.39	1.06	0.39	0.04
wISE	CN	700	36.65	0.15	−0.04	−0.10	36.64	0.38	−0.05	0.39	1.06	0.40	0.03
wPDC	RT	300	36.95	0.27	0.27	0.72	36.93	0.51	0.25	0.58	1.58	0.54	0.06
wPDC	RT	500	37.34	0.36	0.65	1.77	37.30	0.58	0.62	0.88	2.41	0.93	0.08
wPDC	RT	700	37.97	0.51	1.28	3.49	37.93	0.71	1.24	1.47	4.00	1.84	0.11
wPDC	RN	300	36.74	0.17	0.06	0.15	36.72	0.39	0.04	0.41	1.12	0.40	0.04
wPDC	RN	500	36.71	0.15	0.03	0.07	36.70	0.40	0.01	0.39	1.07	0.40	0.04
wPDC	RN	700	36.75	0.16	0.06	0.17	36.75	0.40	0.06	0.40	1.10	0.39	0.03
wPDC	CN	300	36.67	0.17	−0.01	−0.04	36.66	0.40	−0.03	0.42	1.14	0.39	0.04
wPDC	CN	500	36.66	0.16	−0.02	−0.06	36.65	0.41	−0.04	0.40	1.08	0.40	0.04
wPDC	CN	700	36.72	0.16	0.03	0.08	36.71	0.39	0.03	0.40	1.08	0.39	0.03
GB2			37.44	0.16	0.75	2.06	37.43	0.39	0.75	0.86	2.34	1.11	0.06

OCAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

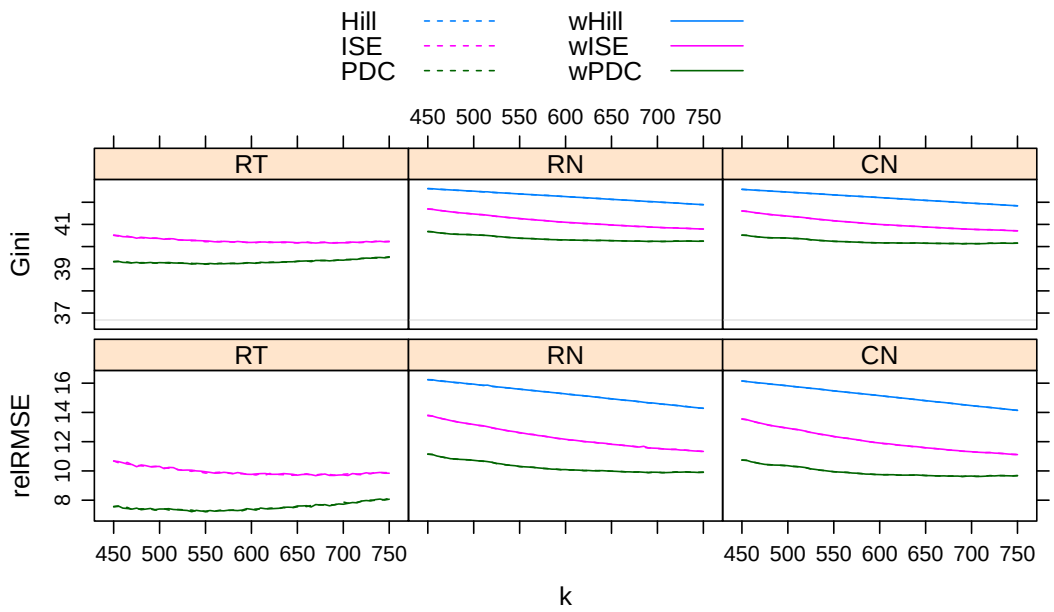

Figure F.460.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

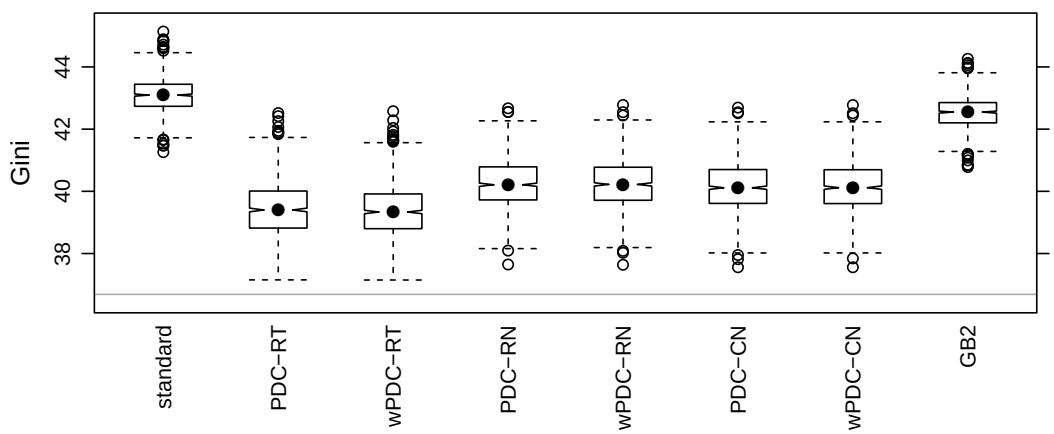

Figure F.461.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.230.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			43.10	0.31	6.41	17.49	43.10	0.52	6.41	6.44	17.55	9.50	0.23
wHill	RT	500	42.63	0.75	5.95	16.21	42.56	0.81	5.87	6.01	16.38	8.71	0.31
wHill	RT	700	42.32	0.71	5.63	15.36	42.30	0.81	5.61	5.70	15.53	8.32	0.28
wHill	RN	300	42.93	0.31	6.24	17.01	42.91	0.53	6.23	6.27	17.08	9.23	0.23
wHill	RN	500	42.50	0.35	5.82	15.85	42.50	0.57	5.82	5.85	15.93	8.63	0.23
wHill	RN	700	42.01	0.35	5.33	14.52	42.00	0.57	5.32	5.36	14.61	7.88	0.20
wHill	CN	300	42.91	0.31	6.23	16.97	42.90	0.54	6.22	6.25	17.04	9.22	0.23
wHill	CN	500	42.46	0.34	5.77	15.74	42.47	0.58	5.78	5.80	15.82	8.58	0.21
wHill	CN	700	41.96	0.35	5.27	14.37	41.96	0.58	5.28	5.31	14.46	7.82	0.20
wISE	RT	500	40.36	0.77	3.68	10.02	40.29	0.76	3.60	3.78	10.30	5.34	0.47
wISE	RT	700	40.17	0.58	3.49	9.51	40.13	0.74	3.44	3.57	9.73	5.10	0.19
wISE	RN	300	42.60	0.39	5.92	16.12	42.63	0.64	5.94	5.95	16.21	8.81	0.22
wISE	RN	500	41.47	0.47	4.78	13.04	41.46	0.68	4.78	4.83	13.17	7.08	0.18
wISE	RN	700	40.87	0.44	4.18	11.41	40.89	0.70	4.20	4.24	11.55	6.23	0.17
wISE	CN	300	42.56	0.41	5.87	16.00	42.59	0.64	5.91	5.91	16.10	8.76	0.21
wISE	CN	500	41.37	0.50	4.69	12.78	41.37	0.71	4.68	4.74	12.92	6.94	0.18
wISE	CN	700	40.78	0.45	4.10	11.16	40.80	0.71	4.11	4.15	11.31	6.10	0.17
wPDC	RT	500	39.28	0.66	2.59	7.06	39.22	0.76	2.53	2.71	7.40	3.75	0.17
wPDC	RT	700	39.39	0.74	2.70	7.36	39.34	0.83	2.65	2.83	7.72	3.93	0.16
wPDC	RN	300	41.80	0.93	5.11	13.93	41.91	0.89	5.22	5.20	14.18	7.74	0.20
wPDC	RN	500	40.53	0.70	3.84	10.48	40.53	0.83	3.85	3.93	10.72	5.70	0.18
wPDC	RN	700	40.24	0.60	3.55	9.68	40.22	0.79	3.54	3.64	9.91	5.24	0.17
wPDC	CN	300	41.67	1.08	4.99	13.60	41.79	0.98	5.11	5.09	13.89	7.57	0.20
wPDC	CN	500	40.38	0.76	3.70	10.08	40.39	0.86	3.70	3.80	10.36	5.49	0.17
wPDC	CN	700	40.14	0.63	3.45	9.40	40.12	0.80	3.43	3.54	9.65	5.09	0.17
GB2			42.53	0.27	5.84	15.93	42.55	0.49	5.86	5.87	15.99	8.69	0.21

OAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

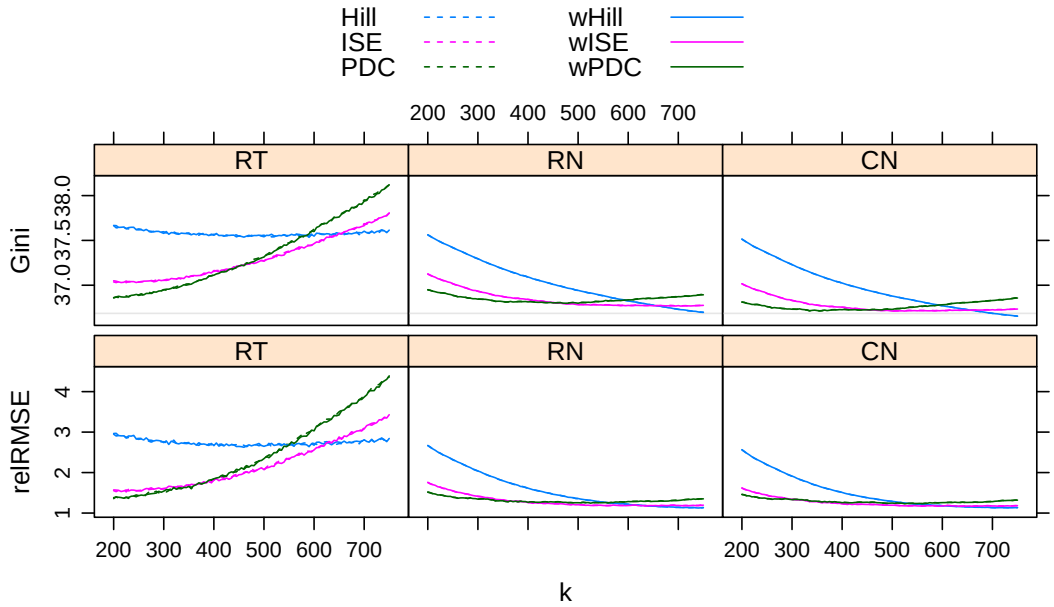

Figure F.462.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

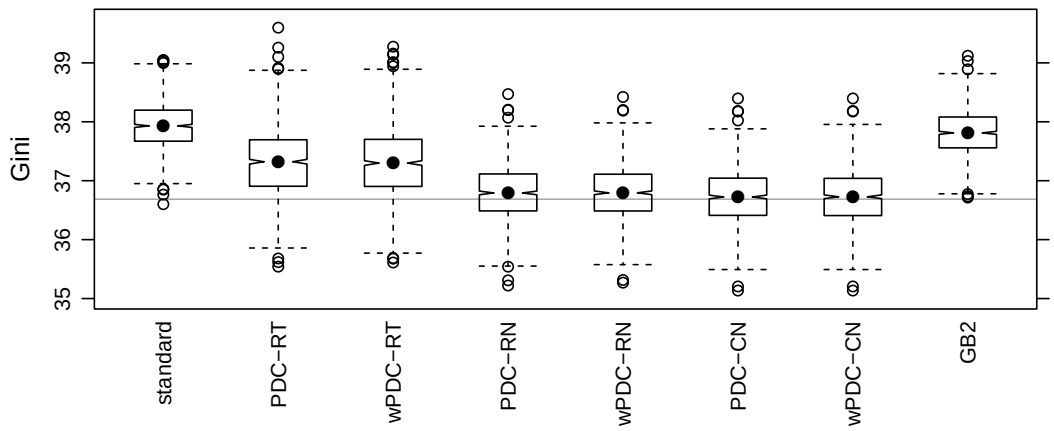

Figure F.463.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.231.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.93	0.15	1.24	3.38	37.93	0.39	1.24	1.30	3.54	1.84	0.06
wHill	RT	300	37.58	0.21	0.89	2.43	37.58	0.47	0.89	1.01	2.74	1.32	0.07
wHill	RT	500	37.54	0.21	0.85	2.33	37.53	0.46	0.85	0.97	2.65	1.25	0.09
wHill	RT	700	37.60	0.22	0.92	2.50	37.60	0.49	0.92	1.03	2.81	1.36	0.07
wHill	RN	300	37.30	0.19	0.61	1.66	37.30	0.44	0.62	0.75	2.04	0.92	0.05
wHill	RN	500	36.94	0.18	0.26	0.70	36.95	0.44	0.26	0.50	1.36	0.51	0.05
wHill	RN	700	36.73	0.17	0.05	0.13	36.73	0.43	0.04	0.42	1.14	0.43	0.04
wHill	CN	300	37.23	0.20	0.54	1.48	37.24	0.44	0.56	0.70	1.91	0.83	0.05
wHill	CN	500	36.88	0.19	0.19	0.53	36.88	0.44	0.20	0.47	1.29	0.49	0.05
wHill	CN	700	36.69	0.17	0.00	0.00	36.68	0.42	−0.00	0.42	1.14	0.42	0.04
wISE	RT	300	37.06	0.21	0.37	1.01	37.06	0.44	0.37	0.59	1.61	0.61	0.05
wISE	RT	500	37.27	0.24	0.58	1.59	37.27	0.49	0.58	0.76	2.07	0.88	0.07
wISE	RT	700	37.66	0.32	0.98	2.67	37.67	0.54	0.99	1.13	3.08	1.47	0.08
wISE	RN	300	36.93	0.21	0.25	0.67	36.93	0.46	0.25	0.52	1.41	0.52	0.05
wISE	RN	500	36.78	0.19	0.10	0.26	36.77	0.44	0.09	0.44	1.21	0.45	0.04
wISE	RN	700	36.77	0.18	0.09	0.23	36.77	0.42	0.08	0.44	1.19	0.43	0.05
wISE	CN	300	36.83	0.22	0.14	0.39	36.83	0.46	0.14	0.49	1.34	0.49	0.05
wISE	CN	500	36.71	0.19	0.03	0.07	36.70	0.45	0.02	0.44	1.19	0.44	0.04
wISE	CN	700	36.73	0.18	0.04	0.11	36.72	0.43	0.03	0.43	1.18	0.43	0.05
wPDC	RT	300	36.95	0.25	0.26	0.72	36.92	0.47	0.24	0.57	1.54	0.53	0.05
wPDC	RT	500	37.31	0.34	0.63	1.71	37.30	0.59	0.61	0.86	2.34	0.93	0.07
wPDC	RT	700	37.94	0.45	1.25	3.41	37.95	0.67	1.27	1.42	3.87	1.88	0.10
wPDC	RN	300	36.84	0.22	0.16	0.43	36.83	0.45	0.14	0.49	1.34	0.48	0.05
wPDC	RN	500	36.80	0.20	0.11	0.31	36.79	0.46	0.11	0.46	1.25	0.46	0.05
wPDC	RN	700	36.87	0.20	0.19	0.51	36.88	0.44	0.19	0.48	1.31	0.49	0.05
wPDC	CN	300	36.73	0.24	0.05	0.13	36.71	0.46	0.02	0.49	1.33	0.47	0.05
wPDC	CN	500	36.73	0.21	0.04	0.12	36.73	0.47	0.04	0.46	1.25	0.46	0.05
wPDC	CN	700	36.83	0.20	0.14	0.39	36.83	0.44	0.15	0.47	1.28	0.48	0.05
GB2			37.81	0.15	1.13	3.07	37.81	0.38	1.13	1.19	3.25	1.67	0.07

OAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

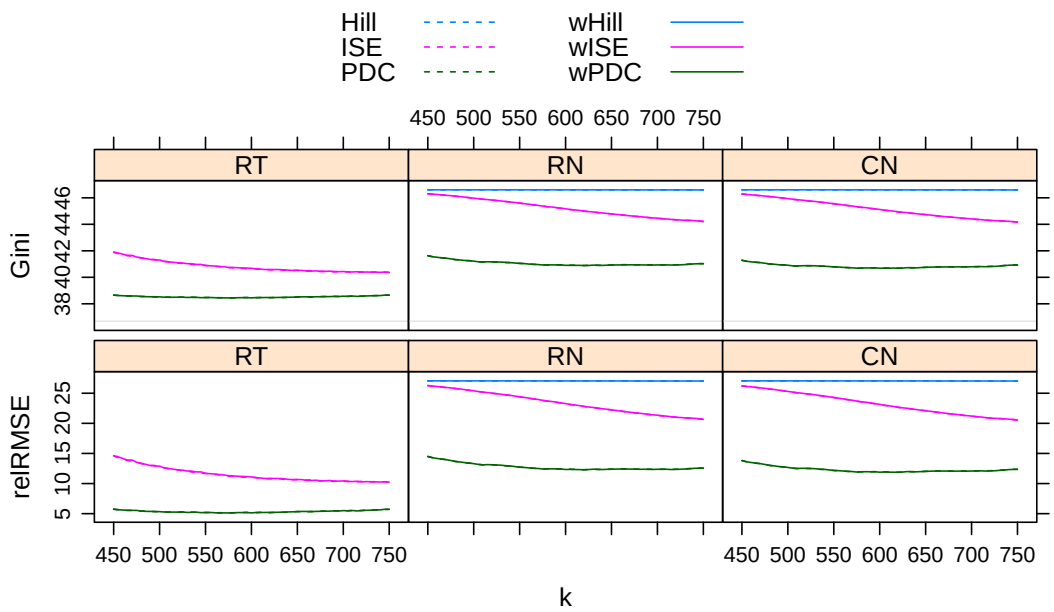

Figure F.464.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

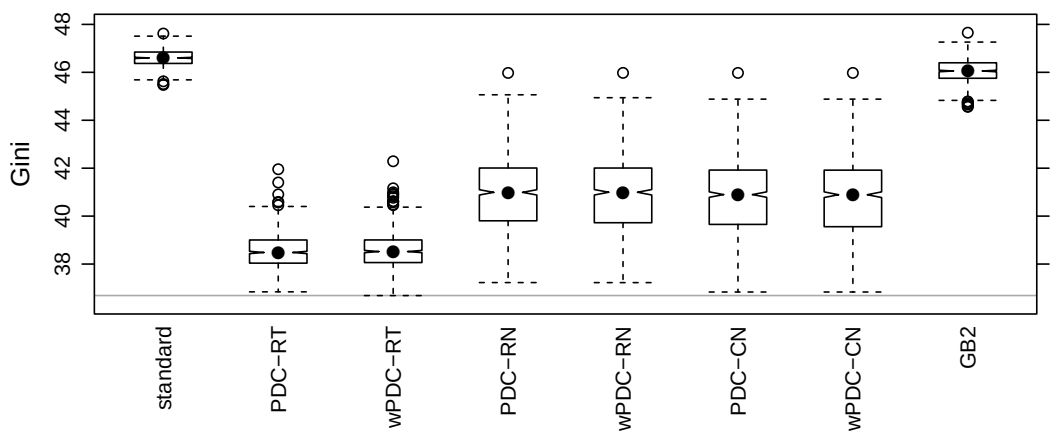

Figure F.465.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.232.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			46.61	0.12	9.92	27.04	46.60	0.35	9.92	9.93	27.06	14.70	0.30
wHill	RT	500	46.53	3.55	9.85	26.85	46.22	1.21	9.54	10.03	27.33	14.14	0.89
wHill	RT	700	45.44	1.79	8.75	23.85	45.28	0.98	8.59	8.85	24.13	12.74	0.77
wHill	RN	300	46.61	0.12	9.92	27.04	46.60	0.35	9.92	9.93	27.06	14.70	0.30
wHill	RN	500	46.60	0.12	9.92	27.04	46.60	0.35	9.92	9.92	27.05	14.70	0.30
wHill	RN	700	46.60	0.12	9.91	27.02	46.60	0.35	9.91	9.92	27.03	14.70	0.30
wHill	CN	300	46.61	0.12	9.92	27.04	46.60	0.35	9.92	9.93	27.06	14.70	0.30
wHill	CN	500	46.60	0.12	9.92	27.04	46.60	0.35	9.92	9.92	27.05	14.70	0.30
wHill	CN	700	46.60	0.12	9.91	27.02	46.60	0.35	9.91	9.92	27.03	14.70	0.30
wISE	RT	500	41.30	1.03	4.62	12.59	41.21	1.04	4.53	4.73	12.89	6.71	0.25
wISE	RT	700	40.44	0.59	3.75	10.22	40.37	0.72	3.68	3.83	10.43	5.45	0.25
wISE	RN	300	46.61	0.12	9.92	27.04	46.60	0.35	9.92	9.93	27.06	14.70	0.30
wISE	RN	500	45.97	0.52	9.29	25.32	46.07	0.59	9.39	9.32	25.40	13.92	0.30
wISE	RN	700	44.46	0.86	7.78	21.20	44.34	0.85	7.66	7.83	21.35	11.35	0.27
wISE	CN	300	46.61	0.12	9.92	27.04	46.60	0.35	9.92	9.93	27.06	14.70	0.30
wISE	CN	500	45.94	0.56	9.25	25.22	46.04	0.59	9.35	9.28	25.30	13.87	0.30
wISE	CN	700	44.41	0.89	7.72	21.05	44.27	0.85	7.59	7.78	21.21	11.25	0.27
wPDC	RT	500	38.52	0.45	1.84	5.01	38.49	0.66	1.80	1.96	5.33	2.68	0.11
wPDC	RT	700	38.57	0.51	1.89	5.15	38.52	0.70	1.84	2.02	5.51	2.72	0.15
wPDC	RN	300	45.30	3.35	8.62	23.49	46.22	1.01	9.53	8.81	24.01	14.13	0.30
wPDC	RN	500	41.22	3.25	4.53	12.36	41.36	1.99	4.67	4.88	13.30	6.93	0.25
wPDC	RN	700	40.93	2.54	4.25	11.58	41.00	1.64	4.31	4.54	12.37	6.39	0.25
wPDC	CN	300	45.16	4.08	8.48	23.10	46.20	1.04	9.51	8.71	23.75	14.11	0.30
wPDC	CN	500	40.91	3.77	4.22	11.51	41.08	2.19	4.40	4.65	12.67	6.52	0.25
wPDC	CN	700	40.80	2.75	4.11	11.21	40.89	1.68	4.21	4.43	12.08	6.24	0.25
GB2			46.07	0.23	9.38	25.57	46.06	0.49	9.37	9.39	25.60	13.89	0.30

OAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

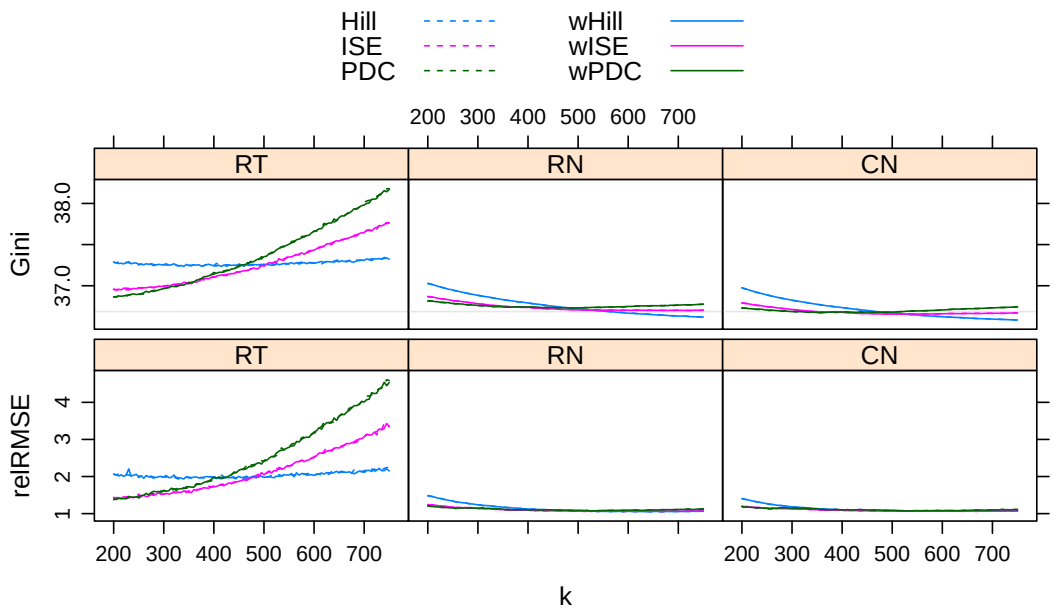

Figure F.466.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

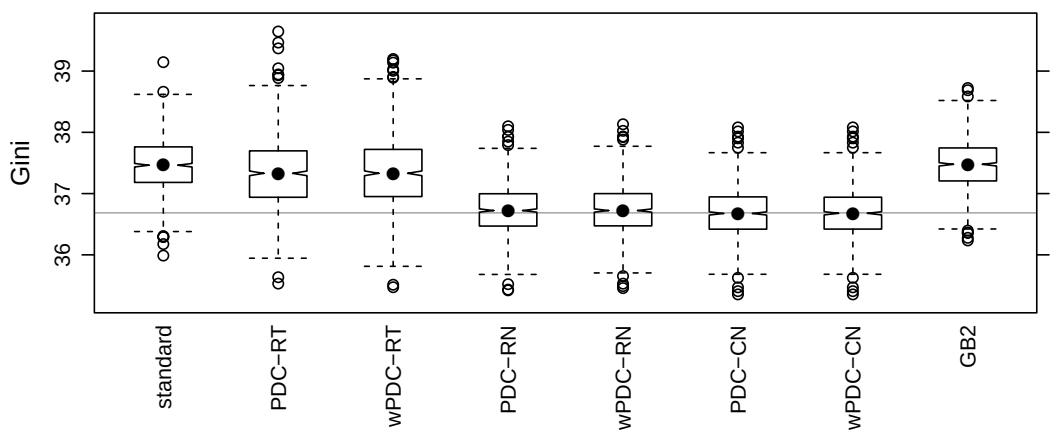

Figure F.467.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.233.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.46	0.19	0.77	2.11	37.46	0.42	0.78	0.89	2.42	1.15	0.07
wHill	RT	300	37.25	0.21	0.57	1.55	37.24	0.44	0.55	0.73	1.99	0.84	0.06
wHill	RT	500	37.25	0.21	0.57	1.54	37.25	0.44	0.57	0.72	1.98	0.85	0.06
wHill	RT	700	37.31	0.21	0.62	1.70	37.30	0.47	0.61	0.77	2.11	0.91	0.06
wHill	RN	300	36.88	0.17	0.20	0.54	36.88	0.41	0.20	0.45	1.24	0.45	0.04
wHill	RN	500	36.72	0.15	0.03	0.09	36.72	0.38	0.03	0.39	1.07	0.38	0.04
wHill	RN	700	36.63	0.15	−0.05	−0.15	36.63	0.38	−0.06	0.39	1.06	0.38	0.04
wHill	CN	300	36.82	0.17	0.14	0.38	36.82	0.41	0.14	0.43	1.18	0.43	0.04
wHill	CN	500	36.67	0.15	−0.02	−0.05	36.67	0.38	−0.02	0.39	1.07	0.39	0.04
wHill	CN	700	36.59	0.15	−0.09	−0.25	36.59	0.37	−0.10	0.39	1.07	0.40	0.04
wISE	RT	300	37.00	0.22	0.31	0.85	36.97	0.44	0.29	0.56	1.53	0.54	0.05
wISE	RT	500	37.24	0.26	0.55	1.50	37.23	0.48	0.55	0.75	2.05	0.83	0.07
wISE	RT	700	37.65	0.35	0.96	2.62	37.64	0.59	0.95	1.13	3.07	1.41	0.09
wISE	RN	300	36.78	0.17	0.10	0.26	36.79	0.40	0.10	0.42	1.14	0.41	0.04
wISE	RN	500	36.71	0.15	0.02	0.06	36.71	0.39	0.02	0.39	1.07	0.38	0.04
wISE	RN	700	36.70	0.15	0.02	0.04	36.70	0.40	0.02	0.39	1.06	0.39	0.04
wISE	CN	300	36.71	0.17	0.03	0.07	36.71	0.40	0.03	0.41	1.12	0.40	0.04
wISE	CN	500	36.66	0.15	−0.03	−0.08	36.66	0.38	−0.02	0.39	1.07	0.39	0.04
wISE	CN	700	36.66	0.15	−0.02	−0.06	36.67	0.38	−0.02	0.39	1.06	0.39	0.04
wPDC	RT	300	36.97	0.27	0.28	0.77	36.93	0.51	0.24	0.59	1.62	0.57	0.06
wPDC	RT	500	37.35	0.35	0.67	1.82	37.33	0.57	0.65	0.89	2.43	0.96	0.07
wPDC	RT	700	37.98	0.49	1.29	3.53	37.97	0.70	1.28	1.47	4.01	1.90	0.10
wPDC	RN	300	36.76	0.17	0.07	0.20	36.75	0.40	0.07	0.42	1.14	0.39	0.04
wPDC	RN	500	36.73	0.16	0.05	0.12	36.72	0.38	0.04	0.40	1.09	0.39	0.04
wPDC	RN	700	36.76	0.16	0.08	0.21	36.76	0.41	0.07	0.41	1.11	0.40	0.04
wPDC	CN	300	36.69	0.18	0.00	0.00	36.67	0.40	−0.01	0.42	1.15	0.40	0.04
wPDC	CN	500	36.68	0.16	−0.01	−0.02	36.68	0.39	−0.01	0.40	1.09	0.39	0.04
wPDC	CN	700	36.73	0.16	0.05	0.12	36.73	0.41	0.04	0.40	1.10	0.40	0.04
GB2			37.47	0.16	0.79	2.14	37.48	0.40	0.79	0.88	2.41	1.17	0.06

OAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

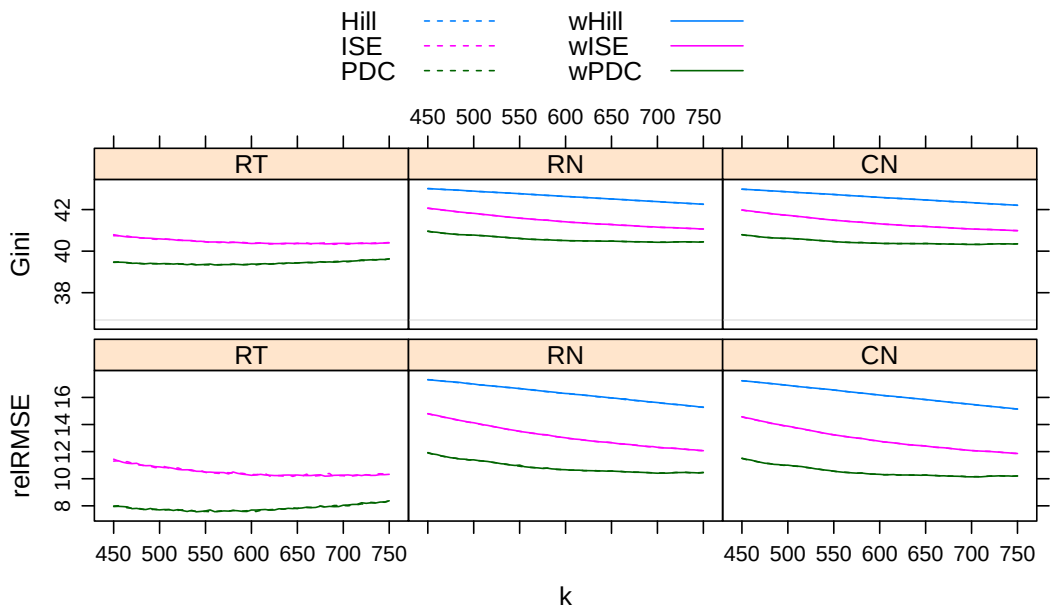

Figure F.468.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

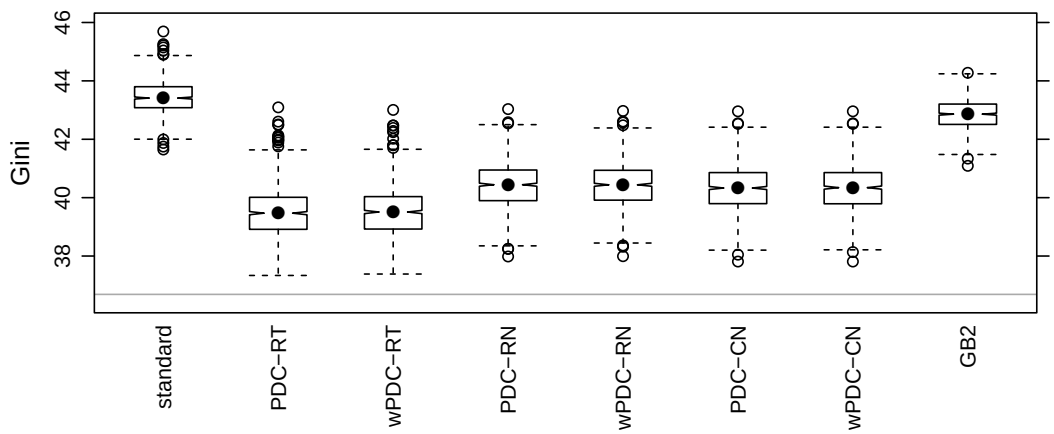

Figure F.469.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.234.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			43.44	0.31	6.75	18.41	43.41	0.54	6.73	6.77	18.47	9.97	0.25
wHill	RT	500	43.08	1.13	6.39	17.42	42.96	0.90	6.27	6.48	17.66	9.30	0.44
wHill	RT	700	42.64	0.93	5.96	16.24	42.56	0.79	5.87	6.04	16.45	8.71	0.44
wHill	RN	300	43.29	0.31	6.60	18.00	43.28	0.54	6.60	6.63	18.07	9.78	0.25
wHill	RN	500	42.89	0.36	6.20	16.91	42.88	0.58	6.19	6.23	16.99	9.18	0.23
wHill	RN	700	42.38	0.38	5.70	15.53	42.37	0.62	5.69	5.73	15.62	8.43	0.22
wHill	CN	300	43.28	0.31	6.59	17.97	43.28	0.54	6.59	6.62	18.04	9.77	0.25
wHill	CN	500	42.85	0.36	6.17	16.82	42.85	0.59	6.16	6.20	16.89	9.14	0.23
wHill	CN	700	42.34	0.38	5.65	15.40	42.32	0.63	5.64	5.68	15.49	8.36	0.21
wISE	RT	500	40.59	0.66	3.90	10.64	40.52	0.77	3.84	3.99	10.87	5.69	0.20
wISE	RT	700	40.37	0.58	3.69	10.05	40.33	0.74	3.65	3.76	10.26	5.41	0.21
wISE	RN	300	42.99	0.40	6.31	17.19	43.00	0.63	6.31	6.34	17.28	9.36	0.23
wISE	RN	500	41.82	0.52	5.13	13.99	41.81	0.71	5.13	5.18	14.13	7.60	0.20
wISE	RN	700	41.15	0.45	4.47	12.18	41.18	0.68	4.49	4.52	12.32	6.66	0.17
wISE	CN	300	42.96	0.42	6.27	17.09	42.97	0.66	6.29	6.30	17.18	9.32	0.23
wISE	CN	500	41.72	0.54	5.04	13.74	41.72	0.72	5.04	5.09	13.88	7.47	0.20
wISE	CN	700	41.07	0.46	4.38	11.94	41.09	0.68	4.40	4.43	12.08	6.52	0.17
wPDC	RT	500	39.39	0.67	2.70	7.37	39.34	0.80	2.66	2.82	7.70	3.94	0.16
wPDC	RT	700	39.51	0.71	2.83	7.71	39.51	0.82	2.82	2.95	8.05	4.18	0.17
wPDC	RN	300	42.18	1.04	5.49	14.97	42.27	1.01	5.58	5.59	15.22	8.28	0.22
wPDC	RN	500	40.77	0.75	4.09	11.14	40.78	0.87	4.10	4.18	11.39	6.08	0.19
wPDC	RN	700	40.43	0.59	3.74	10.20	40.44	0.76	3.75	3.82	10.41	5.57	0.17
wPDC	CN	300	42.06	1.20	5.37	14.65	42.18	1.05	5.49	5.48	14.95	8.14	0.22
wPDC	CN	500	40.62	0.82	3.93	10.72	40.65	0.89	3.96	4.04	11.00	5.87	0.19
wPDC	CN	700	40.32	0.61	3.64	9.91	40.34	0.78	3.66	3.72	10.14	5.42	0.17
GB2			42.86	0.27	6.18	16.84	42.86	0.51	6.17	6.20	16.90	9.15	0.21

Two-stage design with simple random sampling and Midzuno sampling

No contamination

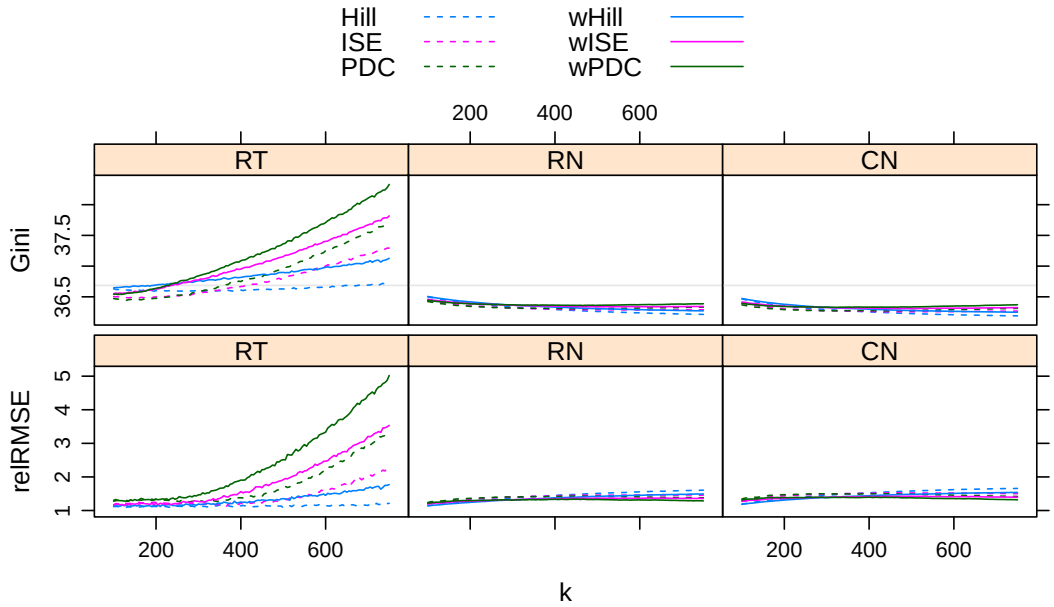

Figure F.470.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 100 and 750.

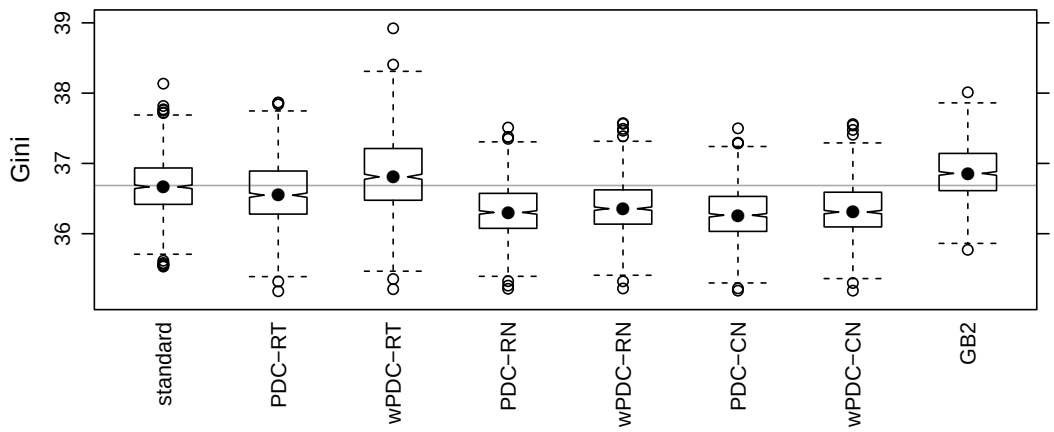

Figure F.471.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 300$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.235.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			36.67	0.15	−0.01	−0.03	36.67	0.39	−0.02	0.39	1.06	0.38	0.04
wHill	RT	300	36.76	0.19	0.08	0.21	36.75	0.42	0.06	0.44	1.19	0.42	0.05
wHill	RT	500	36.90	0.20	0.21	0.58	36.89	0.44	0.20	0.50	1.35	0.48	0.06
wHill	RT	700	37.07	0.23	0.38	1.04	37.06	0.48	0.38	0.61	1.67	0.64	0.06
wHill	RN	300	36.36	0.13	−0.32	−0.88	36.35	0.36	−0.34	0.48	1.32	0.54	0.04
wHill	RN	500	36.31	0.13	−0.38	−1.03	36.30	0.37	−0.38	0.52	1.42	0.59	0.04
wHill	RN	700	36.28	0.13	−0.41	−1.11	36.28	0.37	−0.41	0.54	1.48	0.62	0.04
wHill	CN	300	36.33	0.13	−0.36	−0.98	36.31	0.37	−0.38	0.51	1.39	0.58	0.04
wHill	CN	500	36.28	0.13	−0.41	−1.11	36.27	0.37	−0.42	0.54	1.48	0.62	0.04
wHill	CN	700	36.25	0.13	−0.43	−1.18	36.25	0.37	−0.43	0.56	1.53	0.65	0.04
wISE	RT	300	36.77	0.21	0.09	0.24	36.78	0.46	0.09	0.47	1.27	0.48	0.04
wISE	RT	500	37.15	0.28	0.47	1.28	37.15	0.49	0.46	0.70	1.92	0.75	0.07
wISE	RT	700	37.67	0.42	0.98	2.68	37.64	0.67	0.95	1.18	3.21	1.41	0.10
wISE	RN	300	36.36	0.13	−0.32	−0.88	36.35	0.36	−0.34	0.48	1.32	0.54	0.04
wISE	RN	500	36.34	0.13	−0.35	−0.95	36.33	0.37	−0.36	0.50	1.37	0.56	0.04
wISE	RN	700	36.34	0.13	−0.35	−0.94	36.33	0.37	−0.36	0.50	1.36	0.55	0.04
wISE	CN	300	36.33	0.13	−0.36	−0.98	36.30	0.36	−0.39	0.51	1.39	0.59	0.04
wISE	CN	500	36.31	0.13	−0.38	−1.02	36.30	0.37	−0.39	0.52	1.42	0.60	0.04
wISE	CN	700	36.32	0.13	−0.37	−1.00	36.31	0.38	−0.38	0.51	1.40	0.58	0.04
wPDC	RT	300	36.84	0.27	0.16	0.42	36.81	0.54	0.12	0.54	1.47	0.55	0.06
wPDC	RT	500	37.36	0.39	0.68	1.85	37.34	0.63	0.65	0.92	2.52	0.98	0.09
wPDC	RT	700	38.11	0.63	1.42	3.87	38.04	0.81	1.35	1.63	4.43	2.01	0.15
wPDC	RN	300	36.37	0.13	−0.32	−0.86	36.36	0.36	−0.33	0.48	1.31	0.53	0.04
wPDC	RN	500	36.36	0.13	−0.32	−0.88	36.35	0.37	−0.34	0.49	1.33	0.53	0.04
wPDC	RN	700	36.38	0.13	−0.30	−0.83	36.38	0.37	−0.31	0.48	1.30	0.51	0.04
wPDC	CN	300	36.33	0.13	−0.35	−0.96	36.31	0.36	−0.38	0.51	1.38	0.57	0.04
wPDC	CN	500	36.33	0.13	−0.35	−0.96	36.32	0.38	−0.36	0.51	1.38	0.57	0.04
wPDC	CN	700	36.36	0.13	−0.32	−0.88	36.35	0.37	−0.33	0.49	1.33	0.53	0.04
GB2			36.87	0.14	0.19	0.51	36.86	0.39	0.17	0.41	1.13	0.41	0.04

OCAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

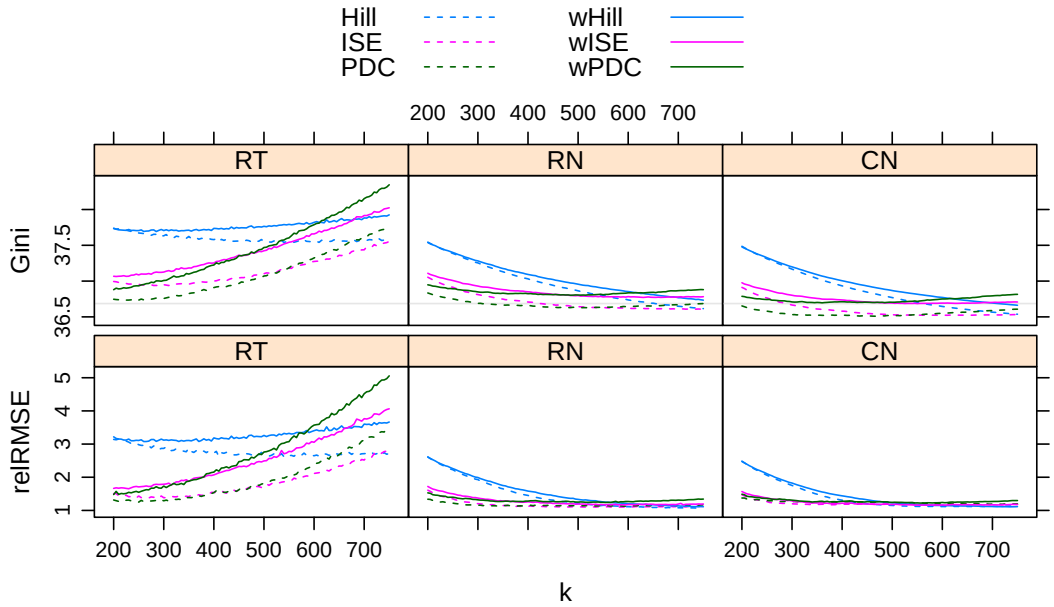

Figure F.472.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

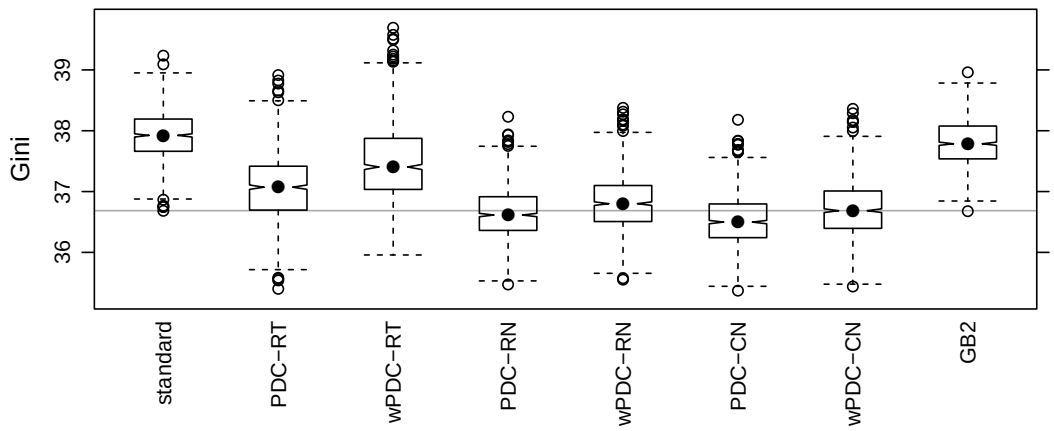

Figure F.473.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.236.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.93	0.15	1.24	3.38	37.92	0.39	1.24	1.30	3.55	1.83	0.07
wHill	RT	300	37.71	0.27	1.02	2.78	37.68	0.48	1.00	1.14	3.12	1.48	0.09
wHill	RT	500	37.77	0.27	1.08	2.94	37.77	0.53	1.08	1.20	3.26	1.61	0.08
wHill	RT	700	37.88	0.32	1.20	3.26	37.87	0.56	1.18	1.32	3.60	1.75	0.16
wHill	RN	300	37.28	0.18	0.60	1.63	37.28	0.45	0.59	0.73	1.99	0.89	0.06
wHill	RN	500	36.96	0.17	0.27	0.74	36.95	0.40	0.26	0.49	1.33	0.49	0.05
wHill	RN	700	36.77	0.17	0.08	0.22	36.76	0.41	0.08	0.42	1.14	0.40	0.04
wHill	CN	300	37.20	0.19	0.51	1.40	37.19	0.45	0.50	0.67	1.82	0.76	0.06
wHill	CN	500	36.87	0.17	0.18	0.50	36.85	0.41	0.17	0.45	1.23	0.44	0.05
wHill	CN	700	36.69	0.17	0.01	0.02	36.70	0.41	0.01	0.41	1.12	0.41	0.04
wISE	RT	300	37.13	0.24	0.44	1.20	37.11	0.46	0.42	0.66	1.79	0.67	0.06
wISE	RT	500	37.42	0.29	0.74	2.01	37.41	0.56	0.72	0.91	2.49	1.07	0.07
wISE	RT	700	37.92	0.40	1.23	3.35	37.90	0.63	1.22	1.38	3.77	1.80	0.10
wISE	RN	300	36.93	0.19	0.24	0.67	36.92	0.44	0.23	0.50	1.37	0.50	0.05
wISE	RN	500	36.80	0.18	0.11	0.31	36.78	0.42	0.10	0.44	1.19	0.43	0.05
wISE	RN	700	36.78	0.18	0.09	0.25	36.77	0.43	0.08	0.44	1.19	0.44	0.04
wISE	CN	300	36.80	0.21	0.12	0.32	36.79	0.45	0.10	0.47	1.29	0.46	0.04
wISE	CN	500	36.69	0.19	0.01	0.02	36.68	0.43	−0.01	0.43	1.18	0.43	0.04
wISE	CN	700	36.70	0.18	0.02	0.04	36.70	0.44	0.01	0.43	1.17	0.44	0.04
wPDC	RT	300	37.01	0.30	0.32	0.88	36.98	0.57	0.29	0.64	1.73	0.63	0.08
wPDC	RT	500	37.47	0.41	0.78	2.14	37.40	0.63	0.72	1.01	2.76	1.07	0.08
wPDC	RT	700	38.15	0.60	1.47	4.00	38.11	0.80	1.42	1.66	4.52	2.11	0.11
wPDC	RN	300	36.85	0.21	0.16	0.44	36.84	0.45	0.15	0.48	1.32	0.47	0.05
wPDC	RN	500	36.81	0.20	0.12	0.33	36.80	0.44	0.12	0.46	1.25	0.46	0.05
wPDC	RN	700	36.87	0.20	0.18	0.49	36.86	0.45	0.17	0.48	1.31	0.48	0.05
wPDC	CN	300	36.71	0.23	0.02	0.06	36.69	0.48	0.00	0.48	1.31	0.48	0.04
wPDC	CN	500	36.70	0.21	0.02	0.05	36.69	0.45	−0.00	0.46	1.24	0.45	0.05
wPDC	CN	700	36.79	0.21	0.11	0.29	36.79	0.46	0.11	0.47	1.27	0.47	0.05
GB2			37.81	0.14	1.12	3.05	37.79	0.40	1.10	1.18	3.22	1.63	0.06

OCAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

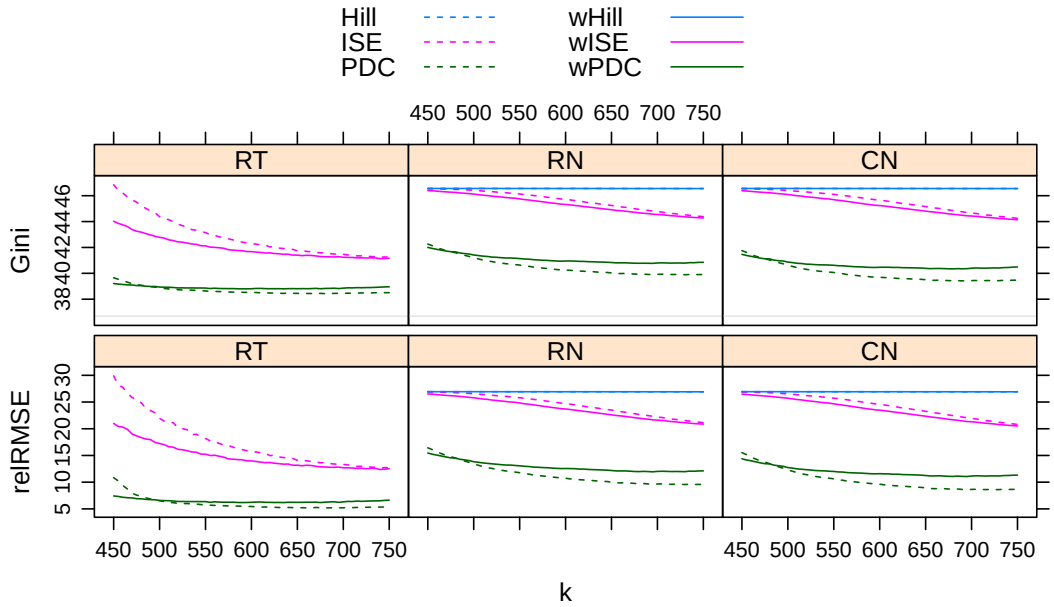

Figure F.474.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

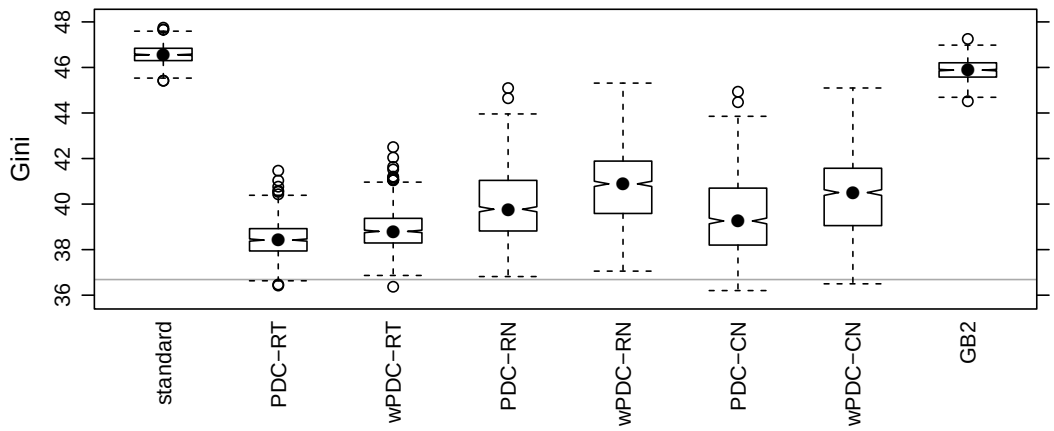

Figure F.475.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.237.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			46.56	0.16	9.87	26.92	46.56	0.41	9.87	9.88	26.94	14.63	0.30
wHill	RT	500	50.14	11.04	13.45	36.67	49.58	2.33	12.90	13.86	37.77	19.12	1.19
wHill	RT	700	48.01	4.66	11.32	30.86	47.70	1.69	11.01	11.53	31.42	16.33	0.71
wHill	RN	300	46.56	0.16	9.87	26.92	46.56	0.41	9.87	9.88	26.94	14.63	0.30
wHill	RN	500	46.56	0.16	9.87	26.91	46.56	0.41	9.87	9.88	26.93	14.63	0.30
wHill	RN	700	46.55	0.16	9.87	26.90	46.55	0.41	9.86	9.88	26.92	14.62	0.30
wHill	CN	300	46.56	0.16	9.87	26.92	46.56	0.41	9.87	9.88	26.94	14.63	0.30
wHill	CN	500	46.56	0.16	9.87	26.91	46.56	0.41	9.87	9.88	26.93	14.63	0.30
wHill	CN	700	46.55	0.16	9.87	26.90	46.55	0.41	9.86	9.88	26.92	14.62	0.30
wISE	RT	500	42.78	2.80	6.10	16.62	42.57	1.41	5.88	6.32	17.23	8.72	0.42
wISE	RT	700	41.24	0.93	4.55	12.41	41.18	0.95	4.49	4.65	12.68	6.66	0.23
wISE	RN	300	46.56	0.16	9.87	26.92	46.56	0.41	9.87	9.88	26.94	14.63	0.30
wISE	RN	500	46.12	0.46	9.44	25.73	46.17	0.64	9.48	9.46	25.79	14.06	0.30
wISE	RN	700	44.55	1.04	7.86	21.43	44.40	1.17	7.72	7.93	21.61	11.44	0.29
wISE	CN	300	46.56	0.16	9.87	26.92	46.56	0.41	9.87	9.88	26.94	14.63	0.30
wISE	CN	500	46.09	0.50	9.41	25.64	46.13	0.66	9.45	9.43	25.71	14.01	0.30
wISE	CN	700	44.43	1.14	7.74	21.10	44.28	1.23	7.60	7.82	21.30	11.27	0.29
wPDC	RT	500	38.94	0.73	2.26	6.15	38.85	0.78	2.17	2.41	6.58	3.21	0.18
wPDC	RT	700	38.86	0.66	2.17	5.91	38.80	0.78	2.12	2.32	6.32	3.14	0.16
wPDC	RN	300	46.03	1.64	9.35	25.48	46.46	0.54	9.77	9.43	25.71	14.48	0.30
wPDC	RN	500	41.42	3.36	4.73	12.89	41.43	2.10	4.75	5.07	13.83	7.04	0.28
wPDC	RN	700	40.80	2.50	4.11	11.22	40.89	1.74	4.20	4.41	12.01	6.23	0.24
wPDC	CN	300	45.95	2.14	9.27	25.26	46.46	0.54	9.77	9.38	25.57	14.48	0.30
wPDC	CN	500	40.87	4.31	4.18	11.41	40.95	2.45	4.26	4.67	12.73	6.32	0.28
wPDC	CN	700	40.40	2.97	3.71	10.12	40.51	1.93	3.82	4.09	11.15	5.66	0.23
GB2			45.90	0.19	9.21	25.10	45.88	0.47	9.20	9.22	25.13	13.64	0.29

OCAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

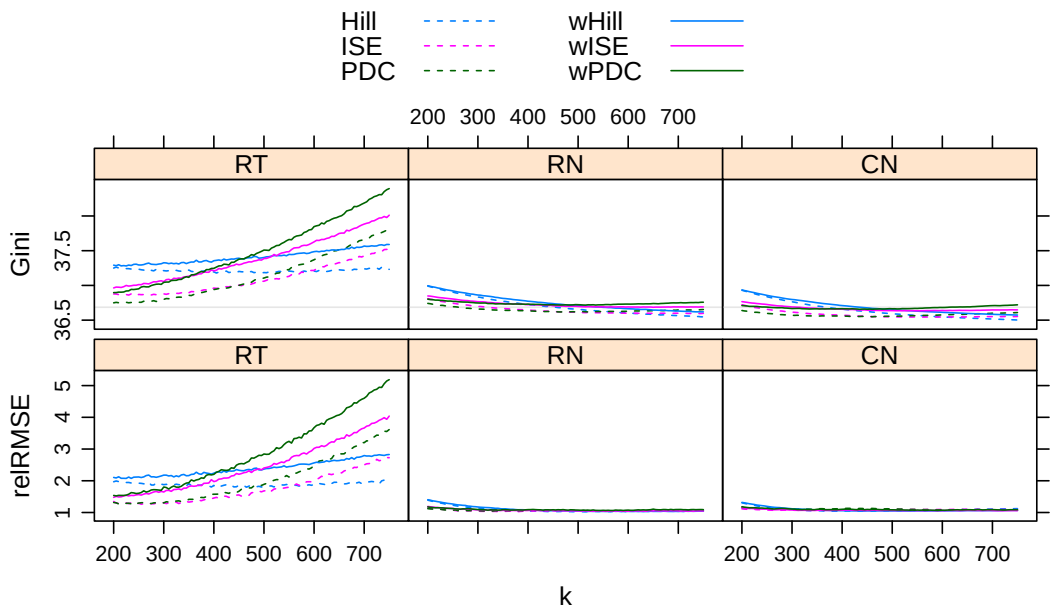

Figure F.476.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

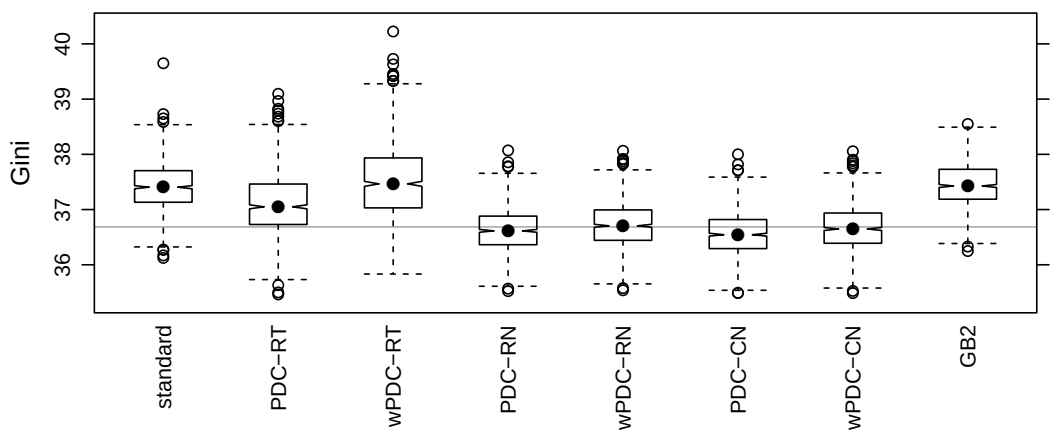

Figure F.477.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.238.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.43	0.19	0.74	2.02	37.40	0.43	0.72	0.86	2.33	1.07	0.08
wHill	RT	300	37.33	0.23	0.64	1.75	37.30	0.47	0.62	0.80	2.18	0.91	0.07
wHill	RT	500	37.40	0.24	0.72	1.95	37.38	0.48	0.70	0.87	2.37	1.04	0.07
wHill	RT	700	37.57	0.27	0.88	2.40	37.54	0.53	0.85	1.03	2.79	1.26	0.07
wHill	RN	300	36.86	0.15	0.18	0.48	36.86	0.40	0.17	0.43	1.17	0.43	0.04
wHill	RN	500	36.71	0.15	0.02	0.06	36.70	0.40	0.01	0.38	1.04	0.40	0.04
wHill	RN	700	36.63	0.14	−0.05	−0.15	36.62	0.39	−0.06	0.38	1.03	0.40	0.04
wHill	CN	300	36.80	0.16	0.11	0.30	36.79	0.40	0.10	0.41	1.12	0.41	0.04
wHill	CN	500	36.65	0.15	−0.04	−0.10	36.64	0.39	−0.04	0.38	1.05	0.39	0.03
wHill	CN	700	36.58	0.14	−0.10	−0.28	36.58	0.40	−0.11	0.39	1.06	0.40	0.04
wISE	RT	300	37.05	0.23	0.37	1.00	37.05	0.51	0.36	0.60	1.65	0.62	0.07
wISE	RT	500	37.39	0.29	0.70	1.91	37.37	0.50	0.68	0.88	2.40	1.01	0.10
wISE	RT	700	37.88	0.37	1.20	3.26	37.84	0.63	1.15	1.34	3.66	1.71	0.09
wISE	RN	300	36.77	0.15	0.08	0.22	36.75	0.39	0.07	0.40	1.09	0.39	0.04
wISE	RN	500	36.70	0.15	0.01	0.03	36.67	0.40	−0.02	0.38	1.05	0.40	0.04
wISE	RN	700	36.69	0.15	0.00	0.01	36.68	0.40	−0.00	0.39	1.05	0.40	0.03
wISE	CN	300	36.69	0.16	0.00	0.01	36.68	0.39	−0.01	0.40	1.08	0.39	0.03
wISE	CN	500	36.64	0.15	−0.05	−0.13	36.61	0.39	−0.08	0.39	1.06	0.39	0.04
wISE	CN	700	36.65	0.15	−0.04	−0.11	36.64	0.40	−0.04	0.39	1.06	0.40	0.04
wPDC	RT	300	37.04	0.31	0.36	0.98	36.99	0.57	0.31	0.66	1.80	0.63	0.07
wPDC	RT	500	37.51	0.41	0.82	2.24	37.46	0.67	0.78	1.04	2.84	1.16	0.10
wPDC	RT	700	38.19	0.60	1.50	4.09	38.13	0.77	1.45	1.69	4.60	2.15	0.11
wPDC	RN	300	36.75	0.16	0.06	0.17	36.74	0.40	0.06	0.40	1.09	0.39	0.04
wPDC	RN	500	36.72	0.15	0.04	0.10	36.71	0.41	0.02	0.39	1.08	0.40	0.04
wPDC	RN	700	36.75	0.16	0.06	0.17	36.74	0.42	0.06	0.40	1.09	0.40	0.04
wPDC	CN	300	36.67	0.16	−0.02	−0.05	36.66	0.41	−0.03	0.41	1.11	0.42	0.03
wPDC	CN	500	36.66	0.16	−0.02	−0.06	36.65	0.41	−0.04	0.40	1.09	0.40	0.04
wPDC	CN	700	36.71	0.16	0.02	0.06	36.70	0.42	0.01	0.40	1.09	0.41	0.03
GB2			37.45	0.15	0.77	2.09	37.43	0.39	0.74	0.86	2.33	1.10	0.05

OCAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

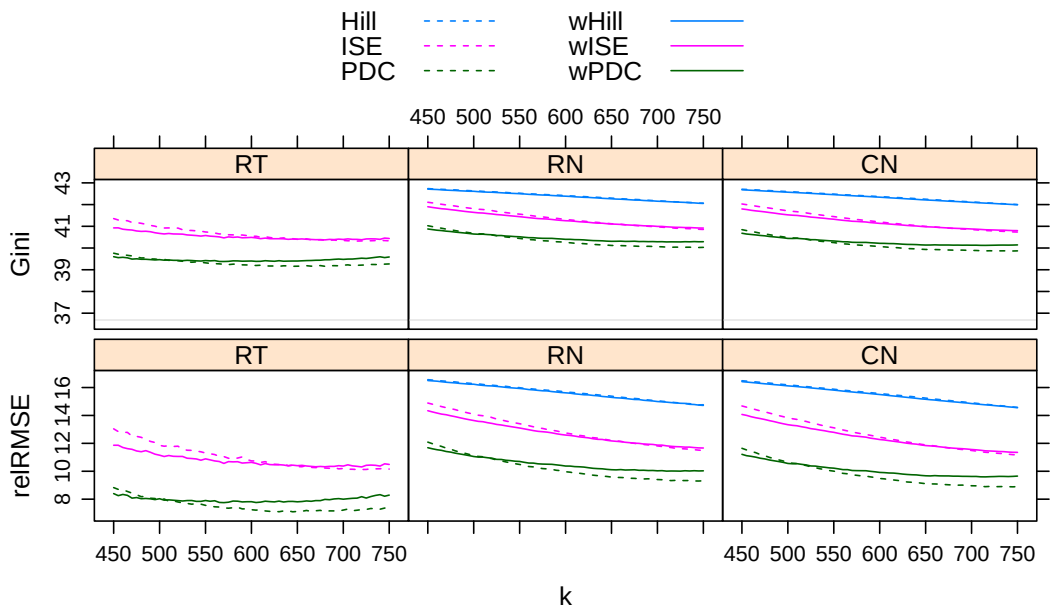

Figure F.478.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

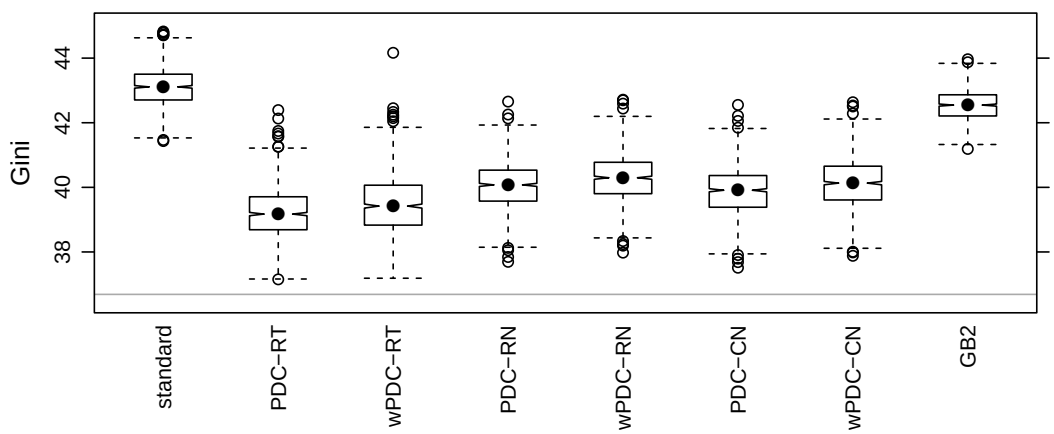

Figure F.479.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.239.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			43.11	0.32	6.42	17.51	43.11	0.59	6.42	6.45	17.58	9.52	0.22
wHill	RT	500	43.19	1.43	6.51	17.74	43.09	1.04	6.41	6.62	18.04	9.50	0.44
wHill	RT	700	42.74	0.98	6.05	16.50	42.66	0.95	5.97	6.13	16.72	8.85	0.32
wHill	RN	300	42.97	0.33	6.29	17.14	42.96	0.58	6.28	6.31	17.21	9.31	0.22
wHill	RN	500	42.61	0.36	5.93	16.15	42.60	0.60	5.91	5.96	16.24	8.77	0.24
wHill	RN	700	42.16	0.35	5.47	14.91	42.14	0.62	5.46	5.50	15.00	8.09	0.21
wHill	CN	300	42.96	0.33	6.28	17.11	42.96	0.58	6.27	6.30	17.18	9.30	0.22
wHill	CN	500	42.57	0.35	5.88	16.04	42.56	0.60	5.87	5.91	16.12	8.71	0.21
wHill	CN	700	42.10	0.36	5.42	14.76	42.09	0.62	5.40	5.45	14.85	8.01	0.21
wISE	RT	500	40.67	0.84	3.99	10.87	40.58	0.88	3.90	4.09	11.15	5.78	0.27
wISE	RT	700	40.40	0.72	3.71	10.11	40.32	0.83	3.64	3.80	10.37	5.39	0.22
wISE	RN	300	42.75	0.39	6.07	16.54	42.76	0.64	6.07	6.10	16.62	9.00	0.22
wISE	RN	500	41.64	0.47	4.96	13.51	41.62	0.68	4.93	5.00	13.64	7.32	0.20
wISE	RN	700	41.00	0.40	4.31	11.75	41.00	0.64	4.31	4.36	11.87	6.39	0.18
wISE	CN	300	42.72	0.41	6.03	16.44	42.73	0.64	6.04	6.07	16.54	8.96	0.22
wISE	CN	500	41.53	0.50	4.84	13.20	41.52	0.72	4.83	4.89	13.34	7.16	0.20
wISE	CN	700	40.88	0.42	4.19	11.42	40.89	0.67	4.20	4.24	11.56	6.23	0.17
wPDC	RT	500	39.46	0.96	2.78	7.58	39.38	0.90	2.69	2.95	8.03	3.99	0.21
wPDC	RT	700	39.48	0.82	2.79	7.61	39.42	0.92	2.73	2.93	8.00	4.05	0.20
wPDC	RN	300	42.09	1.02	5.41	14.74	42.22	0.94	5.54	5.50	14.99	8.21	0.21
wPDC	RN	500	40.64	0.78	3.96	10.79	40.64	0.91	3.95	4.06	11.06	5.86	0.18
wPDC	RN	700	40.29	0.57	3.60	9.82	40.30	0.72	3.61	3.68	10.03	5.35	0.16
wPDC	CN	300	41.98	1.24	5.29	14.43	42.15	0.99	5.47	5.41	14.74	8.10	0.21
wPDC	CN	500	40.44	0.90	3.76	10.24	40.43	0.95	3.75	3.87	10.56	5.56	0.18
wPDC	CN	700	40.13	0.62	3.44	9.39	40.13	0.77	3.45	3.53	9.63	5.11	0.16
GB2			42.55	0.22	5.86	15.98	42.55	0.49	5.86	5.88	16.03	8.69	0.20

OAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

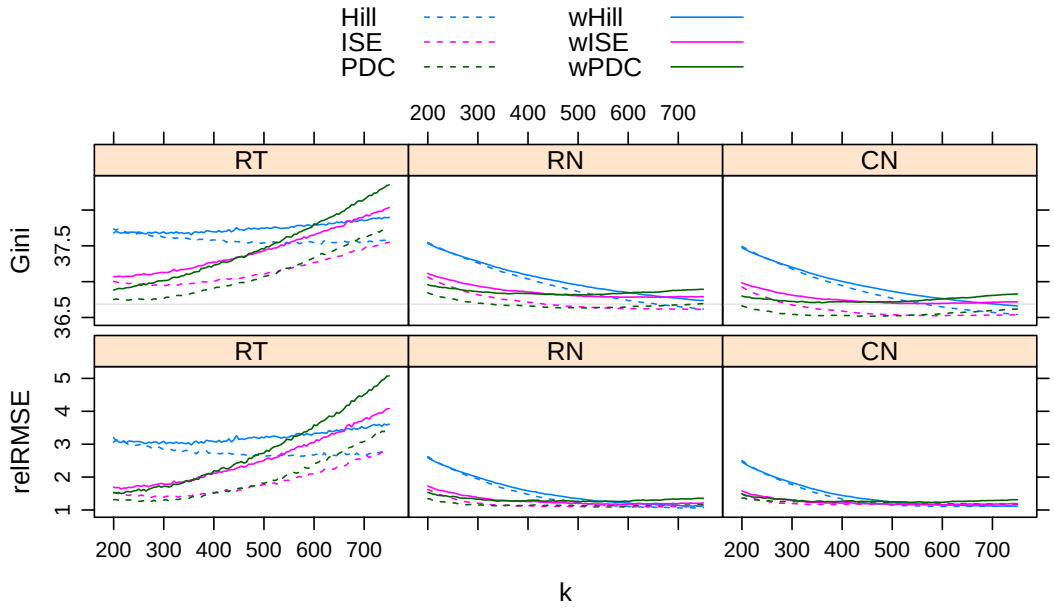

Figure F.480.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

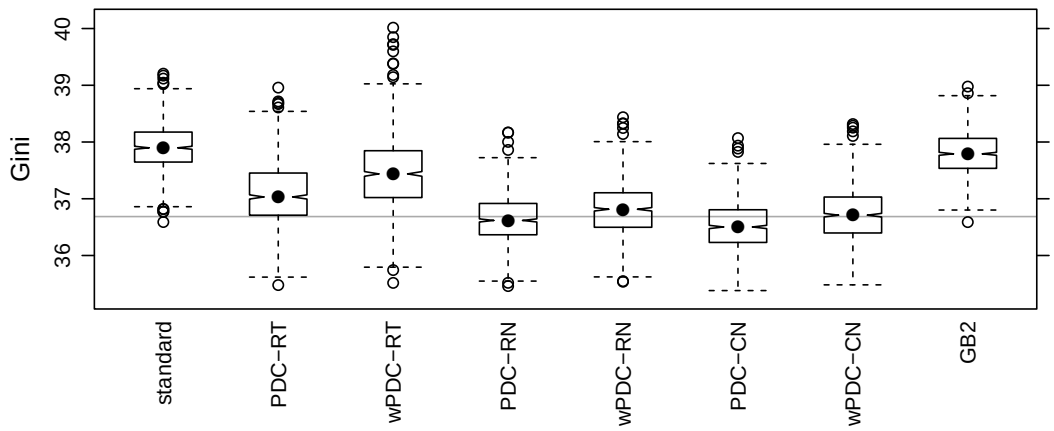

Figure F.481.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.240.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.91	0.16	1.22	3.33	37.90	0.40	1.21	1.28	3.50	1.80	0.07
wHill	RT	300	37.69	0.27	1.01	2.75	37.65	0.50	0.96	1.13	3.09	1.43	0.10
wHill	RT	500	37.74	0.26	1.06	2.88	37.72	0.51	1.03	1.17	3.19	1.53	0.07
wHill	RT	700	37.85	0.27	1.17	3.18	37.86	0.55	1.17	1.28	3.48	1.74	0.08
wHill	RN	300	37.28	0.18	0.60	1.63	37.27	0.44	0.58	0.73	1.99	0.87	0.06
wHill	RN	500	36.95	0.18	0.26	0.72	36.94	0.42	0.25	0.49	1.35	0.49	0.05
wHill	RN	700	36.77	0.17	0.08	0.23	36.77	0.42	0.09	0.42	1.14	0.42	0.04
wHill	CN	300	37.20	0.18	0.52	1.41	37.19	0.44	0.50	0.67	1.83	0.76	0.06
wHill	CN	500	36.86	0.18	0.18	0.49	36.85	0.43	0.16	0.46	1.25	0.44	0.05
wHill	CN	700	36.69	0.17	0.00	0.01	36.68	0.42	−0.00	0.41	1.12	0.42	0.04
wISE	RT	300	37.13	0.23	0.44	1.20	37.10	0.48	0.41	0.65	1.78	0.66	0.06
wISE	RT	500	37.43	0.29	0.74	2.03	37.39	0.54	0.71	0.92	2.51	1.06	0.08
wISE	RT	700	37.91	0.41	1.22	3.34	37.87	0.62	1.19	1.38	3.76	1.76	0.10
wISE	RN	300	36.94	0.19	0.25	0.68	36.92	0.44	0.23	0.50	1.38	0.51	0.05
wISE	RN	500	36.80	0.18	0.11	0.31	36.79	0.43	0.10	0.44	1.20	0.44	0.04
wISE	RN	700	36.79	0.18	0.11	0.29	36.78	0.43	0.10	0.44	1.19	0.44	0.04
wISE	CN	300	36.81	0.21	0.12	0.34	36.80	0.45	0.11	0.47	1.29	0.47	0.05
wISE	CN	500	36.70	0.19	0.01	0.04	36.70	0.44	0.02	0.43	1.18	0.45	0.04
wISE	CN	700	36.71	0.19	0.03	0.08	36.71	0.44	0.03	0.43	1.18	0.44	0.04
wPDC	RT	300	37.02	0.29	0.33	0.90	36.99	0.53	0.30	0.63	1.72	0.60	0.06
wPDC	RT	500	37.46	0.41	0.77	2.10	37.44	0.61	0.75	1.00	2.73	1.12	0.09
wPDC	RT	700	38.15	0.60	1.46	3.98	38.10	0.76	1.42	1.65	4.51	2.10	0.13
wPDC	RN	300	36.86	0.21	0.17	0.48	36.84	0.44	0.16	0.49	1.33	0.48	0.05
wPDC	RN	500	36.82	0.20	0.13	0.35	36.81	0.45	0.13	0.46	1.26	0.47	0.05
wPDC	RN	700	36.88	0.20	0.19	0.53	36.88	0.45	0.19	0.49	1.33	0.49	0.05
wPDC	CN	300	36.72	0.23	0.04	0.10	36.71	0.47	0.02	0.48	1.30	0.47	0.05
wPDC	CN	500	36.72	0.21	0.03	0.08	36.71	0.47	0.02	0.46	1.25	0.47	0.04
wPDC	CN	700	36.81	0.21	0.12	0.33	36.81	0.46	0.12	0.47	1.29	0.48	0.05
GB2			37.80	0.14	1.11	3.04	37.79	0.39	1.11	1.18	3.20	1.64	0.06

OAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

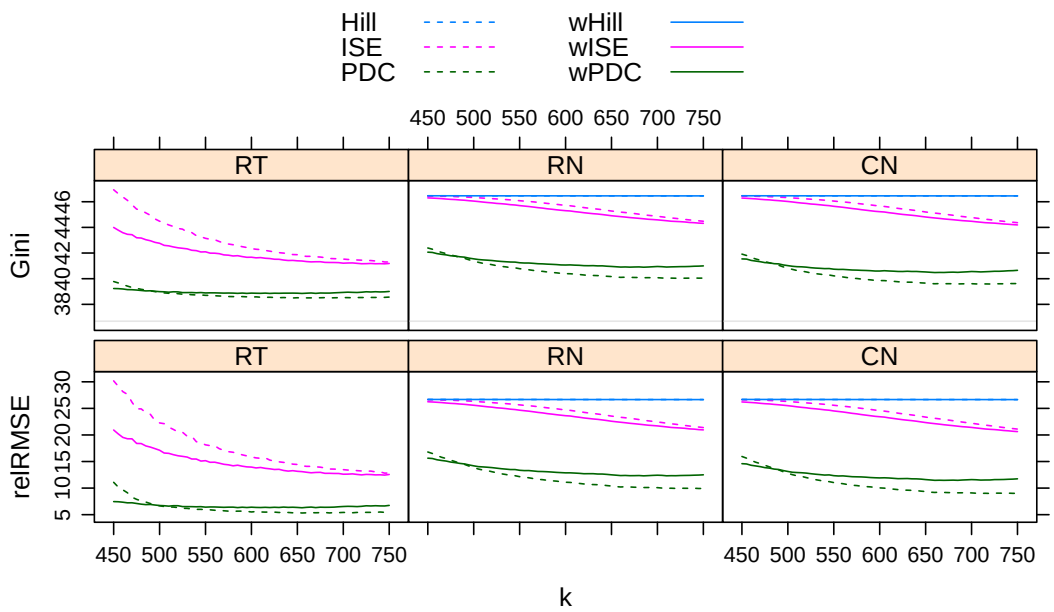

Figure F.482.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

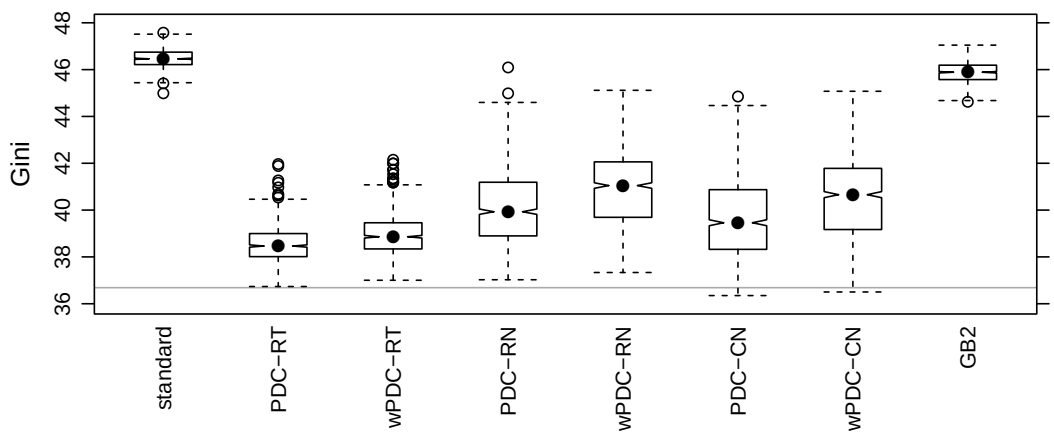

Figure F.483.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.241.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			46.47	0.16	9.78	26.66	46.46	0.40	9.78	9.79	26.68	14.49	0.30
wHill	RT	500	49.94	11.60	13.25	36.13	49.26	2.35	12.58	13.68	37.30	18.65	1.07
wHill	RT	700	47.67	3.92	10.99	29.95	47.43	1.57	10.74	11.16	30.43	15.93	0.89
wHill	RN	300	46.47	0.16	9.78	26.66	46.46	0.40	9.78	9.79	26.68	14.49	0.30
wHill	RN	500	46.46	0.16	9.78	26.65	46.46	0.40	9.77	9.79	26.67	14.49	0.30
wHill	RN	700	46.46	0.16	9.77	26.64	46.46	0.39	9.77	9.78	26.66	14.49	0.30
wHill	CN	300	46.47	0.16	9.78	26.66	46.46	0.40	9.78	9.79	26.68	14.49	0.30
wHill	CN	500	46.46	0.16	9.78	26.65	46.46	0.40	9.77	9.79	26.67	14.49	0.30
wHill	CN	700	46.46	0.16	9.77	26.63	46.46	0.39	9.77	9.78	26.66	14.49	0.30
wISE	RT	500	42.76	2.54	6.08	16.57	42.51	1.41	5.82	6.28	17.12	8.63	0.38
wISE	RT	700	41.21	0.96	4.52	12.33	41.10	0.93	4.42	4.63	12.61	6.55	0.28
wISE	RN	300	46.47	0.16	9.78	26.66	46.46	0.40	9.78	9.79	26.68	14.49	0.30
wISE	RN	500	46.05	0.42	9.37	25.53	46.10	0.60	9.42	9.39	25.59	13.96	0.30
wISE	RN	700	44.59	0.96	7.90	21.53	44.49	1.09	7.81	7.96	21.70	11.58	0.28
wISE	CN	300	46.47	0.16	9.78	26.66	46.46	0.40	9.78	9.79	26.68	14.49	0.30
wISE	CN	500	46.02	0.45	9.33	25.44	46.07	0.62	9.38	9.36	25.51	13.91	0.30
wISE	CN	700	44.48	1.04	7.79	21.24	44.36	1.12	7.68	7.86	21.42	11.39	0.28
wPDC	RT	500	38.99	0.76	2.31	6.28	38.90	0.84	2.21	2.46	6.72	3.28	0.19
wPDC	RT	700	38.93	0.71	2.25	6.12	38.86	0.83	2.18	2.40	6.53	3.23	0.15
wPDC	RN	300	45.99	1.48	9.31	25.37	46.36	0.50	9.68	9.39	25.59	14.35	0.30
wPDC	RN	500	41.55	3.46	4.86	13.25	41.52	2.15	4.84	5.21	14.19	7.17	0.29
wPDC	RN	700	40.95	2.59	4.27	11.63	41.05	1.73	4.36	4.56	12.43	6.47	0.23
wPDC	CN	300	45.92	1.95	9.23	25.17	46.36	0.51	9.68	9.34	25.45	14.35	0.30
wPDC	CN	500	41.02	4.44	4.33	11.81	41.04	2.52	4.36	4.82	13.13	6.46	0.28
wPDC	CN	700	40.56	3.10	3.87	10.56	40.66	1.91	3.97	4.25	11.60	5.89	0.23
GB2			45.88	0.19	9.20	25.07	45.89	0.46	9.20	9.21	25.10	13.64	0.28

OAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

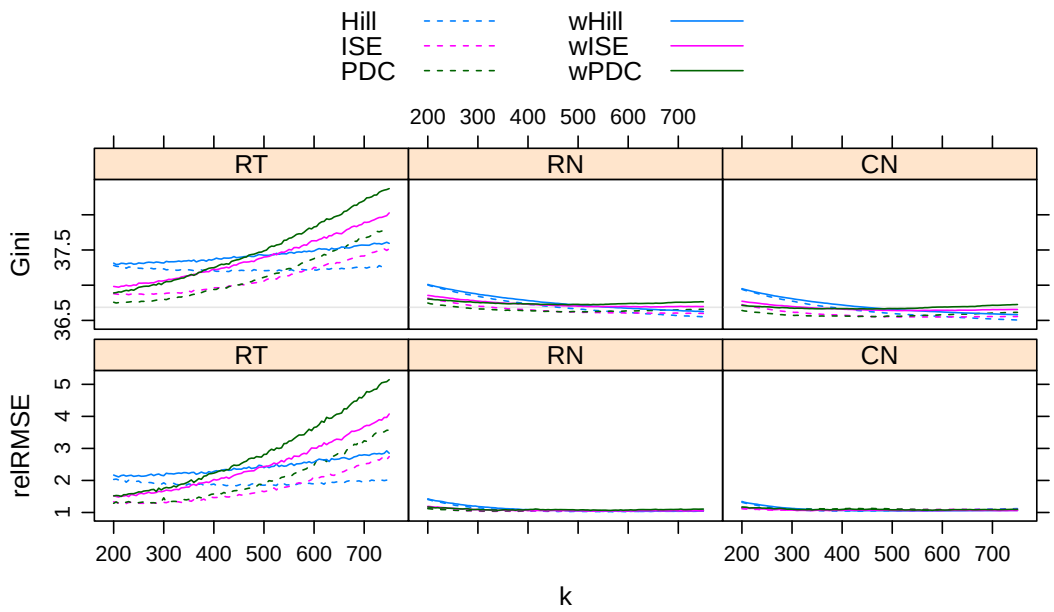

Figure F.484.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 200 and 750.

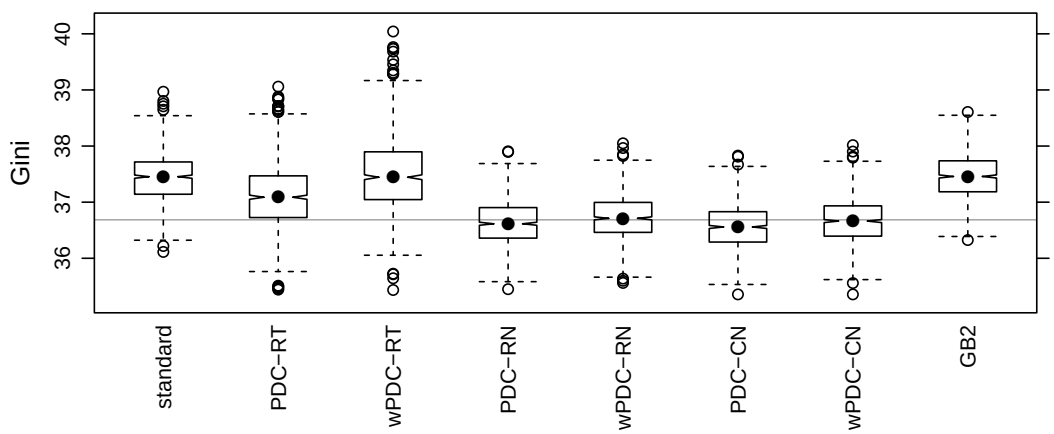

Figure F.485.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.242.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			37.44	0.18	0.76	2.06	37.45	0.43	0.77	0.87	2.36	1.14	0.06
wHill	RT	300	37.31	0.23	0.63	1.71	37.30	0.45	0.61	0.79	2.15	0.92	0.07
wHill	RT	500	37.43	0.23	0.74	2.02	37.41	0.47	0.73	0.88	2.40	1.08	0.07
wHill	RT	700	37.57	0.28	0.88	2.41	37.55	0.51	0.87	1.03	2.80	1.28	0.09
wHill	RN	300	36.87	0.15	0.19	0.51	36.87	0.40	0.18	0.43	1.19	0.43	0.05
wHill	RN	500	36.72	0.15	0.03	0.08	36.70	0.39	0.01	0.39	1.05	0.39	0.04
wHill	RN	700	36.64	0.14	−0.05	−0.12	36.64	0.39	−0.05	0.38	1.04	0.39	0.04
wHill	CN	300	36.81	0.16	0.12	0.34	36.80	0.40	0.11	0.41	1.13	0.42	0.05
wHill	CN	500	36.66	0.15	−0.03	−0.08	36.64	0.38	−0.05	0.39	1.05	0.38	0.04
wHill	CN	700	36.59	0.14	−0.09	−0.25	36.58	0.40	−0.10	0.39	1.06	0.38	0.04
wISE	RT	300	37.06	0.23	0.38	1.03	37.05	0.46	0.37	0.61	1.67	0.63	0.07
wISE	RT	500	37.40	0.29	0.71	1.95	37.38	0.54	0.70	0.89	2.43	1.03	0.08
wISE	RT	700	37.89	0.37	1.21	3.29	37.88	0.62	1.20	1.35	3.69	1.78	0.09
wISE	RN	300	36.77	0.15	0.09	0.24	36.77	0.39	0.08	0.40	1.09	0.39	0.04
wISE	RN	500	36.70	0.15	0.02	0.04	36.69	0.39	0.00	0.38	1.05	0.38	0.04
wISE	RN	700	36.70	0.15	0.01	0.03	36.70	0.39	0.01	0.38	1.05	0.39	0.04
wISE	CN	300	36.70	0.16	0.01	0.03	36.69	0.39	−0.00	0.39	1.07	0.39	0.04
wISE	CN	500	36.64	0.15	−0.05	−0.12	36.63	0.38	−0.06	0.39	1.06	0.39	0.04
wISE	CN	700	36.65	0.15	−0.03	−0.09	36.65	0.39	−0.03	0.39	1.06	0.40	0.04
wPDC	RT	300	37.04	0.29	0.35	0.95	37.02	0.54	0.33	0.64	1.76	0.60	0.08
wPDC	RT	500	37.49	0.42	0.80	2.19	37.44	0.63	0.76	1.03	2.81	1.13	0.09
wPDC	RT	700	38.20	0.62	1.52	4.13	38.18	0.80	1.50	1.71	4.65	2.22	0.12
wPDC	RN	300	36.76	0.16	0.07	0.19	36.74	0.39	0.06	0.40	1.10	0.40	0.03
wPDC	RN	500	36.73	0.15	0.04	0.11	36.71	0.40	0.03	0.39	1.08	0.40	0.04
wPDC	RN	700	36.76	0.16	0.07	0.20	36.76	0.40	0.07	0.40	1.10	0.40	0.04
wPDC	CN	300	36.67	0.16	−0.01	−0.03	36.67	0.39	−0.02	0.40	1.10	0.40	0.04
wPDC	CN	500	36.67	0.16	−0.02	−0.05	36.66	0.40	−0.02	0.40	1.08	0.41	0.04
wPDC	CN	700	36.72	0.16	0.03	0.08	36.71	0.41	0.03	0.40	1.09	0.40	0.04
GB2			37.46	0.15	0.78	2.12	37.46	0.41	0.77	0.87	2.36	1.14	0.05

OAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

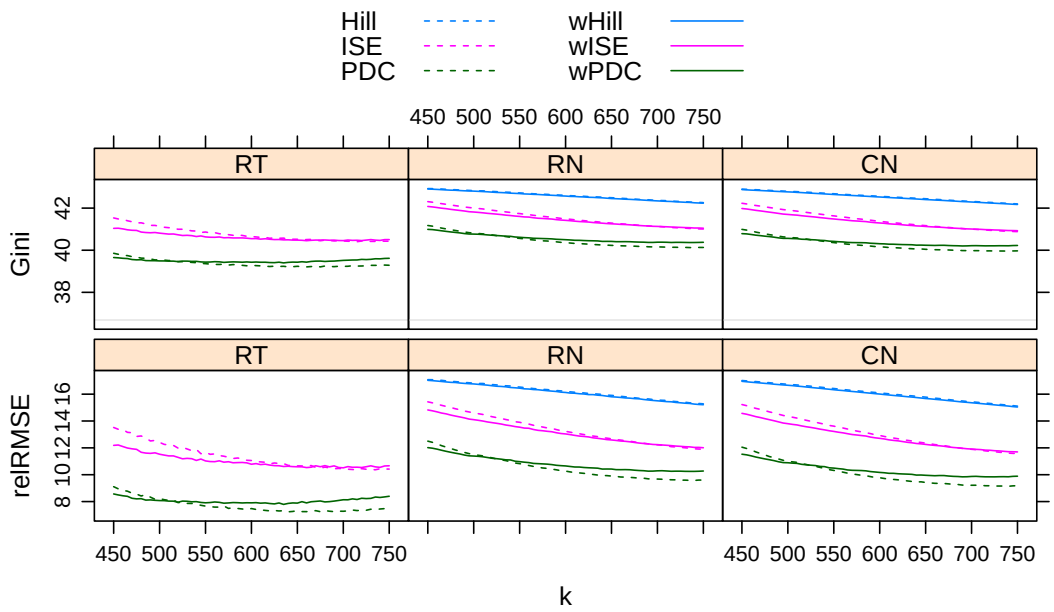

Figure F.486.: Average results (*top*) and relative RMSE (*bottom*) for the Gini coefficient using the three approaches for Pareto tail modeling with k varying between 450 and 750.

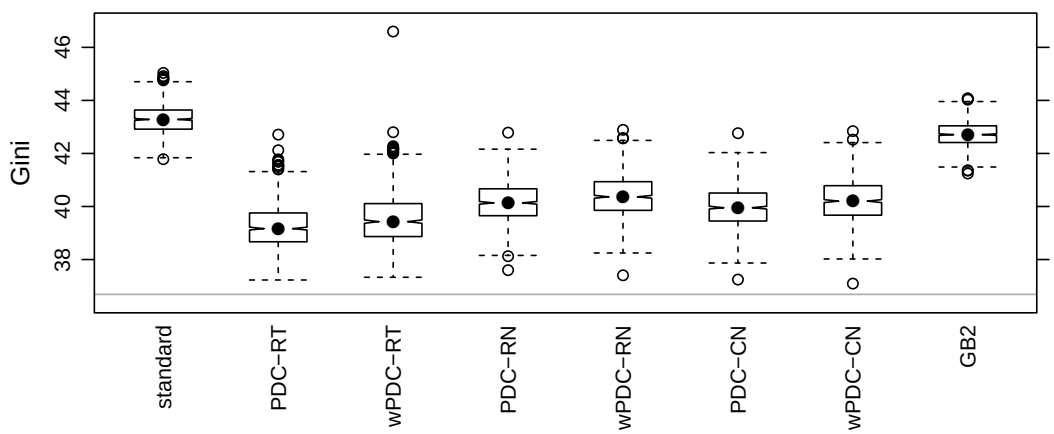

Figure F.487.: Box plots of the simulation results for the Gini coefficient using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.243.: Evaluation of selected simulation results for the Gini coefficient.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			43.30	0.31	6.61	18.02	43.28	0.54	6.60	6.63	18.08	9.78	0.23
wHill	RT	500	43.48	1.74	6.79	18.51	43.34	1.12	6.65	6.92	18.86	9.86	0.59
wHill	RT	700	42.98	1.02	6.29	17.15	42.89	0.95	6.21	6.37	17.37	9.20	0.28
wHill	RN	300	43.17	0.31	6.48	17.67	43.18	0.54	6.50	6.51	17.74	9.63	0.22
wHill	RN	500	42.81	0.33	6.12	16.69	42.80	0.57	6.11	6.15	16.76	9.06	0.21
wHill	RN	700	42.34	0.34	5.66	15.42	42.32	0.59	5.64	5.69	15.50	8.36	0.20
wHill	CN	300	43.16	0.31	6.47	17.64	43.17	0.54	6.48	6.50	17.71	9.61	0.22
wHill	CN	500	42.77	0.33	6.09	16.59	42.77	0.57	6.08	6.11	16.66	9.02	0.21
wHill	CN	700	42.29	0.35	5.60	15.28	42.27	0.59	5.59	5.63	15.36	8.28	0.20
wISE	RT	500	40.81	0.86	4.13	11.24	40.77	0.87	4.09	4.23	11.53	6.06	0.24
wISE	RT	700	40.46	0.65	3.77	10.28	40.42	0.83	3.74	3.86	10.51	5.54	0.20
wISE	RN	300	42.96	0.38	6.27	17.09	42.96	0.60	6.28	6.30	17.17	9.31	0.22
wISE	RN	500	41.81	0.46	5.13	13.98	41.80	0.69	5.12	5.17	14.10	7.58	0.20
wISE	RN	700	41.13	0.41	4.44	12.12	41.15	0.65	4.47	4.49	12.24	6.62	0.19
wISE	CN	300	42.92	0.40	6.24	17.01	42.93	0.60	6.25	6.27	17.09	9.26	0.22
wISE	CN	500	41.70	0.50	5.01	13.67	41.72	0.70	5.03	5.06	13.80	7.46	0.20
wISE	CN	700	41.01	0.43	4.32	11.78	41.01	0.67	4.33	4.37	11.91	6.41	0.19
wPDC	RT	500	39.49	0.90	2.81	7.65	39.47	0.94	2.78	2.96	8.07	4.12	0.19
wPDC	RT	700	39.52	0.88	2.83	7.72	39.43	0.90	2.74	2.98	8.13	4.07	0.27
wPDC	RN	300	42.29	0.98	5.61	15.28	42.44	0.93	5.76	5.69	15.52	8.54	0.21
wPDC	RN	500	40.77	0.82	4.08	11.12	40.77	0.93	4.09	4.18	11.39	6.06	0.19
wPDC	RN	700	40.38	0.60	3.69	10.07	40.36	0.79	3.68	3.77	10.29	5.45	0.17
wPDC	CN	300	42.18	1.19	5.49	14.98	42.37	0.99	5.68	5.60	15.27	8.43	0.21
wPDC	CN	500	40.56	0.93	3.88	10.57	40.56	1.00	3.88	4.00	10.89	5.75	0.19
wPDC	CN	700	40.22	0.65	3.53	9.62	40.20	0.82	3.52	3.62	9.87	5.21	0.17
GB2			42.72	0.22	6.03	16.44	42.71	0.46	6.02	6.05	16.49	8.93	0.20

F.6.3. Mean equivalized disposable income

Simple random sampling

No contamination

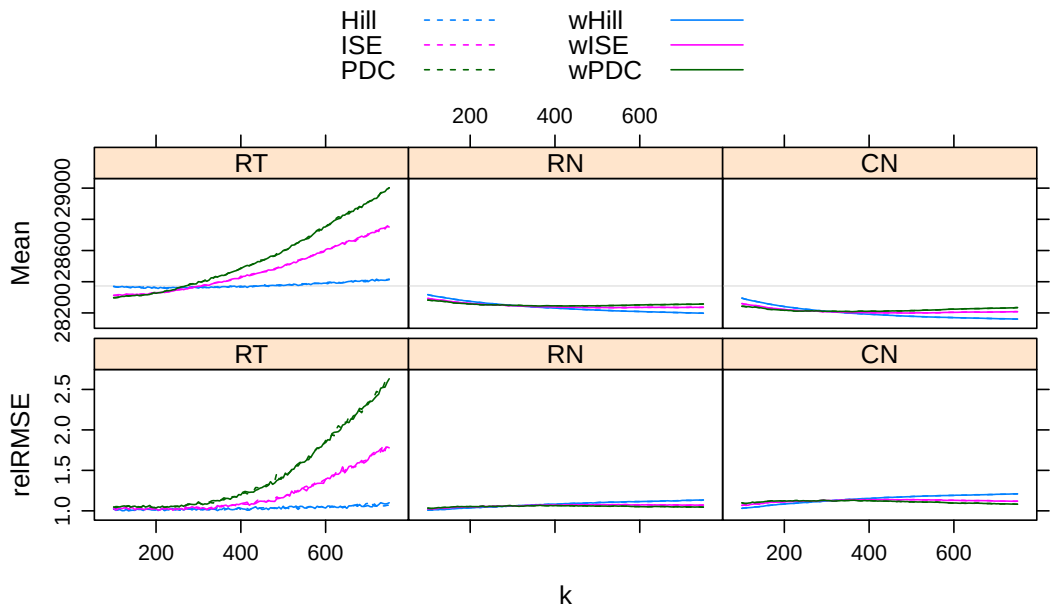

Figure F.488.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 100 and 750.

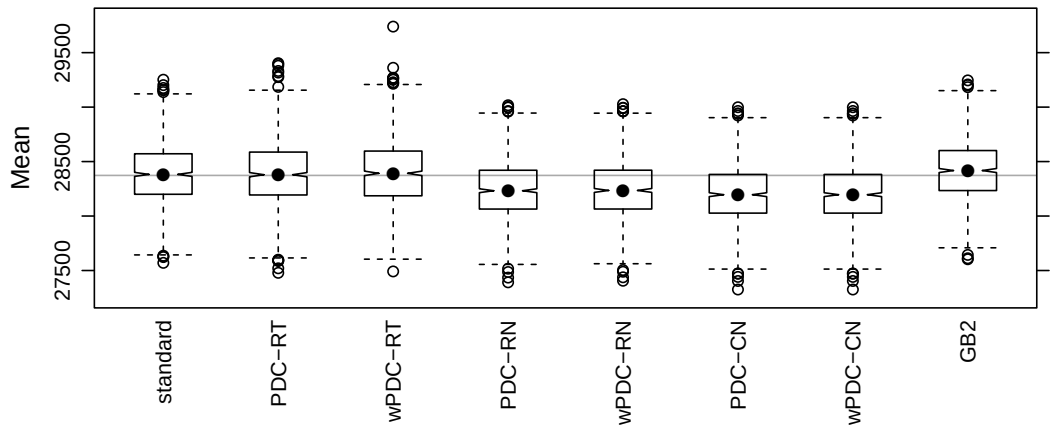

Figure F.489.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 300$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.244.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28389.55	80838.38	16.66	0.06	28382.37	279.25	9.48	284.67	1.00	281.02	0.03
wHill	RT	300	28359.33	84781.62	−13.56	−0.05	28349.28	288.61	−23.62	291.34	1.03	294.23	0.03
wHill	RT	500	28376.01	89958.04	3.12	0.01	28366.73	297.51	−6.17	299.80	1.06	298.59	0.04
wHill	RT	700	28400.19	90820.94	27.30	0.10	28389.26	298.11	16.37	302.45	1.07	291.42	0.03
wHill	RN	300	28247.97	74924.41	−124.93	−0.44	28236.70	267.38	−136.19	300.76	1.06	312.31	0.03
wHill	RN	500	28217.41	73682.59	−155.48	−0.55	28203.12	274.93	−169.77	312.70	1.10	327.30	0.03
wHill	RN	700	28201.74	73369.71	−171.15	−0.60	28188.74	266.66	−184.15	320.30	1.13	342.71	0.03
wHill	CN	300	28210.46	75106.74	−162.43	−0.57	28197.23	264.20	−175.66	318.46	1.12	337.90	0.03
wHill	CN	500	28178.27	73669.66	−194.63	−0.69	28165.92	273.51	−206.97	333.88	1.18	364.09	0.03
wHill	CN	700	28163.29	72933.11	−209.60	−0.74	28153.97	269.08	−218.92	341.75	1.20	376.02	0.04
wISE	RT	300	28371.40	84924.18	−1.49	−0.01	28360.26	289.68	−12.63	291.28	1.03	287.35	0.03
wISE	RT	500	28498.27	93262.77	125.38	0.44	28483.65	316.89	110.75	329.98	1.16	324.63	0.04
wISE	RT	700	28698.26	108541.81	325.36	1.15	28685.20	320.50	312.31	462.92	1.63	488.81	0.05
wISE	RN	300	28246.27	74449.99	−126.62	−0.45	28232.54	262.08	−140.35	300.68	1.06	305.79	0.03
wISE	RN	500	28234.00	73877.61	−138.89	−0.49	28225.88	271.47	−147.01	305.11	1.08	319.49	0.03
wISE	RN	700	28235.40	73383.17	−137.50	−0.48	28218.61	272.67	−154.28	303.67	1.07	318.58	0.03
wISE	CN	300	28207.68	75103.70	−165.21	−0.58	28194.26	265.75	−178.64	319.88	1.13	337.47	0.03
wISE	CN	500	28199.74	74230.32	−173.15	−0.61	28192.76	266.63	−180.13	322.70	1.14	341.81	0.03
wISE	CN	700	28206.26	73338.95	−166.63	−0.59	28194.90	263.85	−178.00	317.85	1.12	341.80	0.03
wPDC	RT	300	28400.59	98688.24	27.70	0.10	28391.94	305.53	19.05	315.21	1.11	306.12	0.05
wPDC	RT	500	28599.82	108171.90	226.93	0.80	28588.35	342.06	215.46	399.45	1.41	393.94	0.05
wPDC	RT	700	28912.21	150615.86	539.31	1.90	28879.63	404.65	506.73	664.32	2.34	751.28	0.08
wPDC	RN	300	28248.22	74895.08	−124.67	−0.44	28235.01	265.21	−137.89	300.60	1.06	306.29	0.03
wPDC	RN	500	28246.34	74145.94	−126.56	−0.45	28234.44	269.62	−138.46	300.15	1.06	312.61	0.03
wPDC	RN	700	28255.68	74623.48	−117.22	−0.41	28250.41	269.98	−122.48	297.13	1.05	303.79	0.03
wPDC	CN	300	28210.45	75913.24	−162.45	−0.57	28196.20	263.23	−176.69	319.73	1.13	337.12	0.04
wPDC	CN	500	28214.99	74662.35	−157.91	−0.56	28203.30	264.44	−169.59	315.47	1.11	338.56	0.03
wPDC	CN	700	28230.73	74886.48	−142.16	−0.50	28220.67	265.04	−152.23	308.26	1.09	320.21	0.03
GB2			28425.66	79216.91	52.76	0.19	28417.79	272.60	44.90	286.22	1.01	272.06	0.03

OCAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

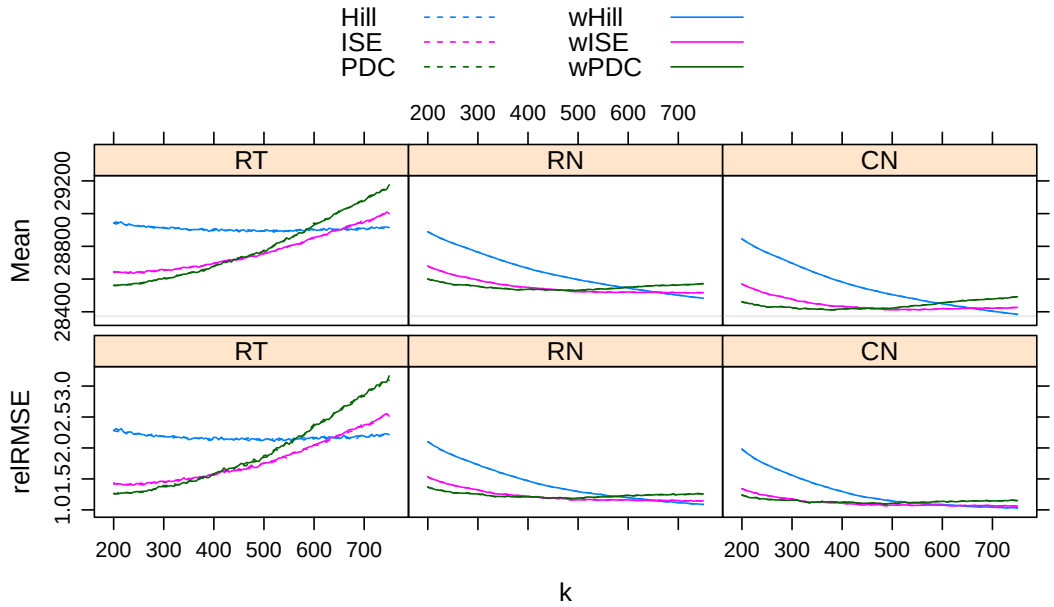

Figure F.490.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

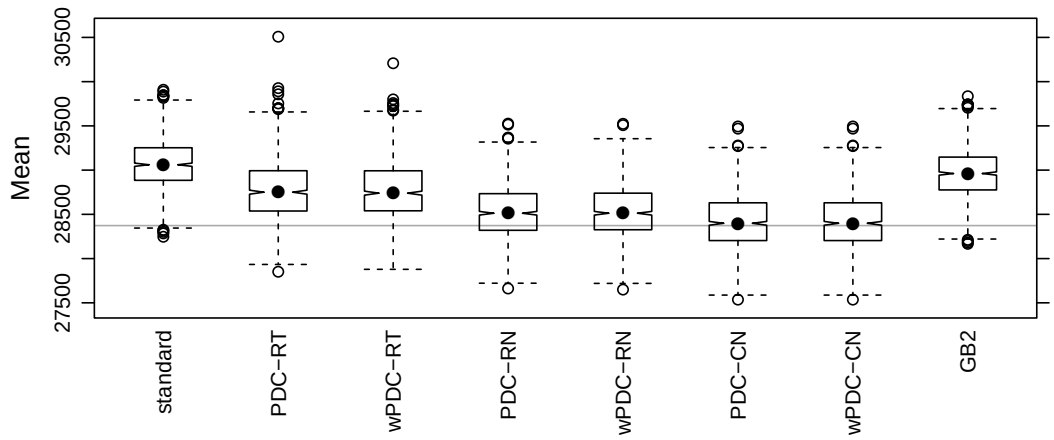

Figure F.491.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.245.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			29071.89	80298.57	699.00	2.46	29060.79	269.18	687.89	754.20	2.66	1019.87	0.05
wHill	RT	300	28916.22	91441.99	543.33	1.91	28906.67	293.46	533.78	621.74	2.19	791.38	0.05
wHill	RT	500	28895.96	91739.85	523.06	1.84	28880.40	281.38	507.50	604.36	2.13	752.43	0.05
wHill	RT	700	28911.14	97627.14	538.24	1.90	28902.32	316.42	529.43	622.28	2.19	784.93	0.05
wHill	RN	300	28764.86	87680.49	391.96	1.38	28765.35	284.82	392.46	491.15	1.73	582.45	0.05
wHill	RN	500	28596.17	85187.72	223.28	0.79	28580.34	277.08	207.45	367.36	1.29	364.61	0.04
wHill	RN	700	28500.74	84187.72	127.85	0.45	28493.41	278.24	120.52	316.94	1.12	316.97	0.03
wHill	CN	300	28697.06	91006.67	324.17	1.14	28694.87	287.15	321.98	442.72	1.56	489.34	0.04
wHill	CN	500	28504.59	88017.41	131.70	0.46	28487.47	278.93	114.58	324.46	1.14	313.07	0.04
wHill	CN	700	28402.97	86777.30	30.07	0.11	28388.69	282.69	15.80	295.96	1.04	282.84	0.03
wISE	RT	300	28656.83	90813.96	283.94	1.00	28648.23	296.69	275.34	413.94	1.46	440.95	0.04
wISE	RT	500	28753.86	101673.53	380.97	1.34	28739.42	306.76	366.52	496.70	1.75	548.41	0.06
wISE	RT	700	28948.10	123061.54	575.20	2.03	28943.72	339.12	570.83	673.65	2.37	846.31	0.08
wISE	RN	300	28594.32	92331.47	221.42	0.78	28587.07	296.29	214.18	375.86	1.32	378.22	0.04
wISE	RN	500	28522.46	86725.53	149.57	0.53	28504.81	292.98	131.91	330.17	1.16	319.42	0.04
wISE	RN	700	28516.57	86236.88	143.68	0.51	28508.17	287.01	135.28	326.79	1.15	317.05	0.04
wISE	CN	300	28476.76	100904.76	103.87	0.37	28474.41	303.41	101.52	334.05	1.18	316.98	0.04
wISE	CN	500	28412.88	91940.63	39.98	0.14	28396.14	308.86	23.25	305.69	1.08	303.53	0.04
wISE	CN	700	28421.42	89402.26	48.53	0.17	28407.55	288.23	34.65	302.77	1.07	296.31	0.03
wPDC	RT	300	28604.42	99022.51	231.53	0.82	28597.45	303.27	224.56	390.55	1.38	386.80	0.05
wPDC	RT	500	28770.78	117191.71	397.89	1.40	28739.51	336.19	366.62	524.78	1.85	547.68	0.06
wPDC	RT	700	29077.25	158252.18	704.36	2.48	29061.34	405.76	688.45	808.83	2.85	1020.70	0.07
wPDC	RN	300	28555.31	93515.02	182.42	0.64	28549.87	298.05	176.98	355.95	1.25	347.59	0.04
wPDC	RN	500	28531.81	89169.65	158.92	0.56	28512.53	296.86	139.64	338.13	1.19	321.88	0.04
wPDC	RN	700	28563.22	89267.65	190.33	0.67	28550.08	292.82	177.19	354.12	1.25	346.43	0.04
wPDC	CN	300	28424.79	105052.09	51.90	0.18	28413.81	308.85	40.92	328.09	1.16	309.38	0.04
wPDC	CN	500	28422.76	96208.96	49.86	0.18	28398.65	314.10	25.75	314.00	1.11	304.07	0.04
wPDC	CN	700	28477.91	94640.02	105.02	0.37	28462.79	301.42	89.90	324.92	1.15	314.52	0.04
GB2			28972.47	81211.11	599.58	2.11	28961.43	274.68	588.54	663.79	2.34	872.56	0.05

OCAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

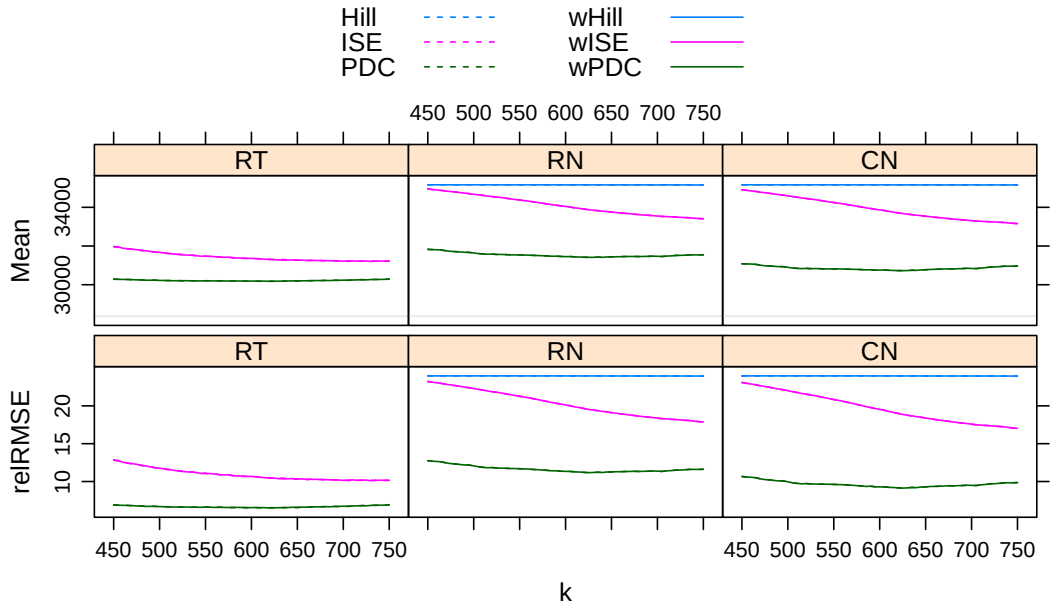

Figure F.492.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

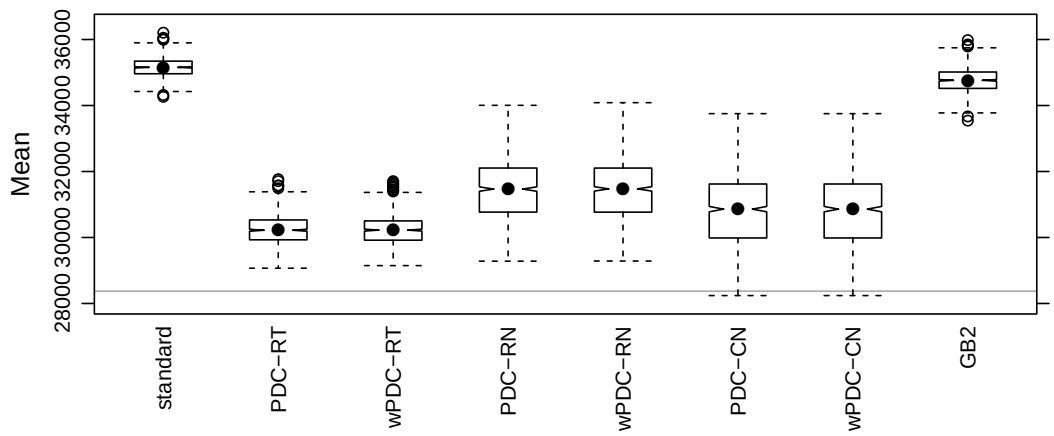

Figure F.493.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.246.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			35164.99	84069.58	6792.10	23.94	35155.47	283.30	6782.57	6798.28	23.96	10055.84	0.28
wHill	RT	500	34995.74	1393082.08	6622.84	23.34	34882.79	761.00	6509.90	6727.09	23.71	9651.57	0.72
wHill	RT	700	34358.72	759770.87	5985.83	21.10	34283.64	641.44	5910.75	6048.89	21.32	8763.27	0.72
wHill	RN	300	35164.99	84069.58	6792.10	23.94	35155.47	283.30	6782.57	6798.28	23.96	10055.84	0.28
wHill	RN	500	35163.65	84365.57	6790.76	23.93	35154.47	283.65	6781.58	6796.96	23.96	10054.37	0.28
wHill	RN	700	35160.03	83827.69	6787.13	23.92	35152.60	284.15	6779.70	6793.30	23.94	10051.59	0.28
wHill	CN	300	35164.99	84069.58	6792.10	23.94	35155.47	283.30	6782.57	6798.28	23.96	10055.84	0.28
wHill	CN	500	35163.41	84309.28	6790.52	23.93	35154.47	282.79	6781.58	6796.71	23.95	10054.37	0.28
wHill	CN	700	35159.60	83859.55	6786.71	23.92	35152.60	285.54	6779.70	6792.88	23.94	10051.59	0.28
wISE	RT	500	31671.64	261318.60	3298.74	11.63	31641.12	501.39	3268.23	3338.08	11.77	4845.48	0.19
wISE	RT	700	31217.80	209064.00	2844.91	10.03	31189.56	461.30	2816.66	2881.38	10.16	4175.98	0.16
wISE	RN	300	35164.99	84069.58	6792.10	23.94	35155.47	283.30	6782.57	6798.28	23.96	10055.84	0.28
wISE	RN	500	34676.19	224199.52	6303.29	22.22	34723.15	416.38	6350.26	6321.03	22.28	9414.89	0.27
wISE	RN	700	33550.11	378482.03	5177.21	18.25	33482.75	621.18	5109.86	5213.60	18.38	7575.87	0.26
wISE	CN	300	35164.99	84069.58	6792.10	23.94	35155.47	283.30	6782.57	6798.28	23.96	10055.84	0.28
wISE	CN	500	34592.35	268285.94	6219.46	21.92	34643.21	442.53	6270.31	6240.97	22.00	9296.37	0.26
wISE	CN	700	33311.80	469701.50	4938.91	17.41	33228.56	683.79	4855.67	4986.18	17.57	7199.02	0.26
wPDC	RT	500	30221.60	180817.53	1848.71	6.52	30199.91	408.60	1827.02	1896.93	6.69	2708.74	0.12
wPDC	RT	700	30238.13	187975.19	1865.24	6.57	30223.32	428.30	1850.42	1914.92	6.75	2743.44	0.12
wPDC	RN	300	34223.71	1414629.00	5850.82	20.62	34727.39	942.20	6354.50	5970.37	21.04	9421.18	0.27
wPDC	RN	500	31640.94	1044333.20	3268.05	11.52	31646.43	1113.32	3273.53	3423.95	12.07	4853.34	0.22
wPDC	RN	700	31468.95	825413.84	3096.06	10.91	31472.90	987.87	3100.01	3226.48	11.37	4596.07	0.20
wPDC	CN	300	33979.72	2189520.77	5606.83	19.76	34675.46	1047.46	6302.56	5798.61	20.44	9344.18	0.27
wPDC	CN	500	30900.69	1609984.68	2527.79	8.91	30931.63	1369.21	2558.74	2828.09	9.97	3793.58	0.21
wPDC	CN	700	30841.21	1169019.54	2468.32	8.70	30858.95	1191.32	2486.06	2694.52	9.50	3685.83	0.19
GB2			34776.72	132643.38	6403.83	22.57	34762.35	370.62	6389.46	6414.17	22.61	9473.01	0.27

OCAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

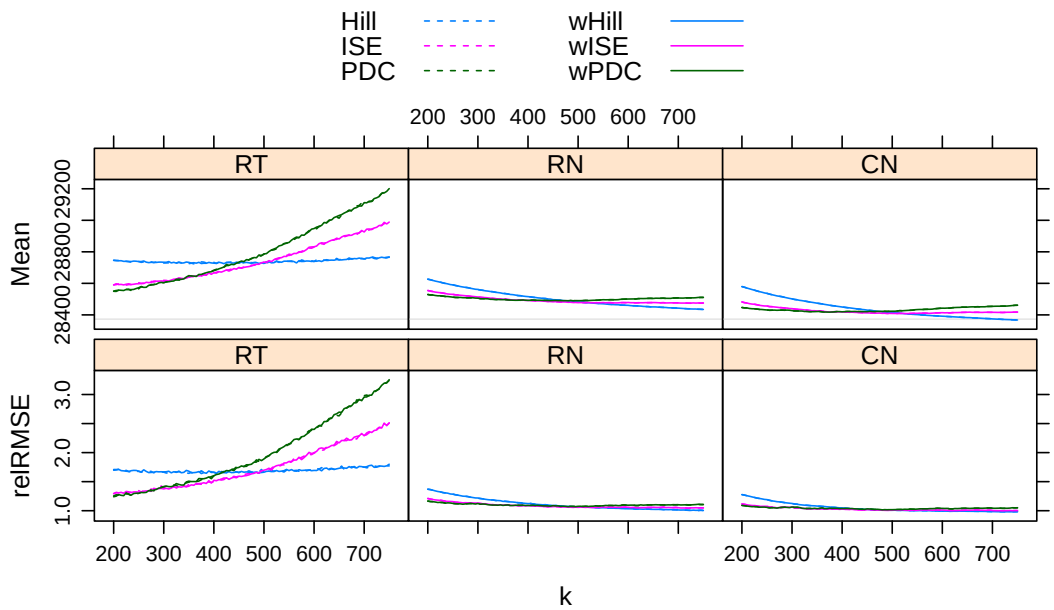

Figure F.494.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

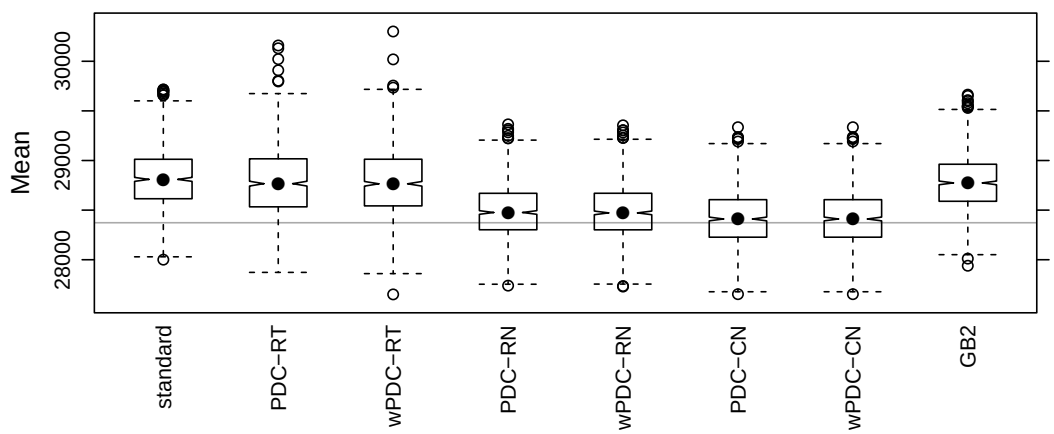

Figure F.495.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.247.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28824.28	90711.20	451.39	1.59	28809.70	295.89	436.81	542.56	1.91	647.61	0.05
wHill	RT	300	28733.77	93950.27	360.88	1.27	28713.46	292.25	340.57	473.38	1.67	515.02	0.05
wHill	RT	500	28726.22	97781.58	353.33	1.25	28706.48	309.87	333.59	471.73	1.66	499.49	0.05
wHill	RT	700	28754.94	100490.99	382.04	1.35	28751.16	310.86	378.26	496.33	1.75	561.50	0.05
wHill	RN	300	28561.45	83994.26	188.56	0.66	28539.56	280.82	166.67	345.64	1.22	327.77	0.04
wHill	RN	500	28482.13	79396.69	109.24	0.39	28471.94	270.51	99.05	302.08	1.06	291.76	0.03
wHill	RN	700	28442.71	77815.39	69.82	0.25	28439.83	263.74	66.94	287.42	1.01	276.62	0.03
wHill	CN	300	28501.47	85327.80	128.58	0.45	28489.06	280.62	116.16	319.02	1.12	300.90	0.04
wHill	CN	500	28414.18	80086.74	41.28	0.15	28405.71	273.37	32.82	285.85	1.01	272.55	0.03
wHill	CN	700	28374.48	78112.96	1.58	0.01	28369.46	265.87	−3.43	279.35	0.98	266.96	0.03
wISE	RT	300	28613.73	94355.95	240.84	0.85	28598.86	298.82	225.96	390.21	1.38	385.87	0.04
wISE	RT	500	28733.87	101682.30	360.97	1.27	28720.76	327.97	347.87	481.54	1.70	518.57	0.05
wISE	RT	700	28925.84	116326.66	552.95	1.95	28906.31	335.56	533.42	649.58	2.29	790.85	0.06
wISE	RN	300	28513.46	83475.88	140.56	0.50	28503.45	278.14	130.56	321.17	1.13	305.88	0.03
wISE	RN	500	28477.68	79189.84	104.78	0.37	28466.26	274.71	93.37	300.15	1.06	290.38	0.03
wISE	RN	700	28475.53	78585.64	102.64	0.36	28467.90	273.67	95.01	298.40	1.05	280.88	0.03
wISE	CN	300	28439.65	86094.48	66.75	0.24	28434.66	284.08	61.77	300.77	1.06	284.49	0.03
wISE	CN	500	28409.10	80662.41	36.20	0.13	28401.98	276.60	29.09	286.17	1.01	286.14	0.03
wISE	CN	700	28416.20	79285.01	43.31	0.15	28408.52	275.98	35.63	284.75	1.00	270.05	0.03
wPDC	RT	300	28603.71	107835.62	230.82	0.81	28590.67	326.16	217.78	401.26	1.41	376.45	0.06
wPDC	RT	500	28786.82	116750.60	413.93	1.46	28765.30	343.86	392.40	536.63	1.89	592.87	0.07
wPDC	RT	700	29112.16	157473.84	739.27	2.61	29098.30	380.08	725.40	838.95	2.96	1075.48	0.08
wPDC	RN	300	28505.98	83971.57	133.08	0.47	28497.14	283.55	124.25	318.75	1.12	300.81	0.03
wPDC	RN	500	28490.21	79500.14	117.32	0.41	28472.08	276.27	99.19	305.26	1.08	290.67	0.03
wPDC	RN	700	28507.12	80001.74	134.22	0.47	28499.00	277.08	126.11	312.95	1.10	302.62	0.04
wPDC	CN	300	28427.14	88335.28	54.25	0.19	28426.12	290.05	53.23	301.98	1.06	286.15	0.03
wPDC	CN	500	28423.19	80961.97	50.30	0.18	28410.68	280.87	37.79	288.81	1.02	282.61	0.03
wPDC	CN	700	28454.08	81061.68	81.19	0.29	28450.88	276.11	77.98	295.93	1.04	278.98	0.04
GB2			28787.63	84152.65	414.74	1.46	28774.26	276.81	401.36	506.04	1.78	596.25	0.05

OCAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

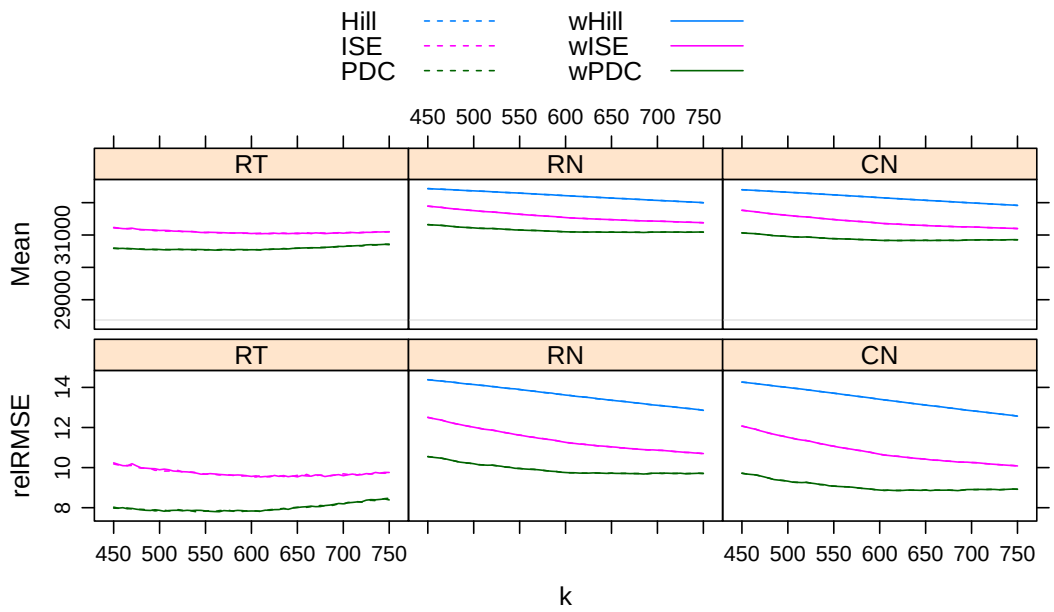

Figure F.496.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

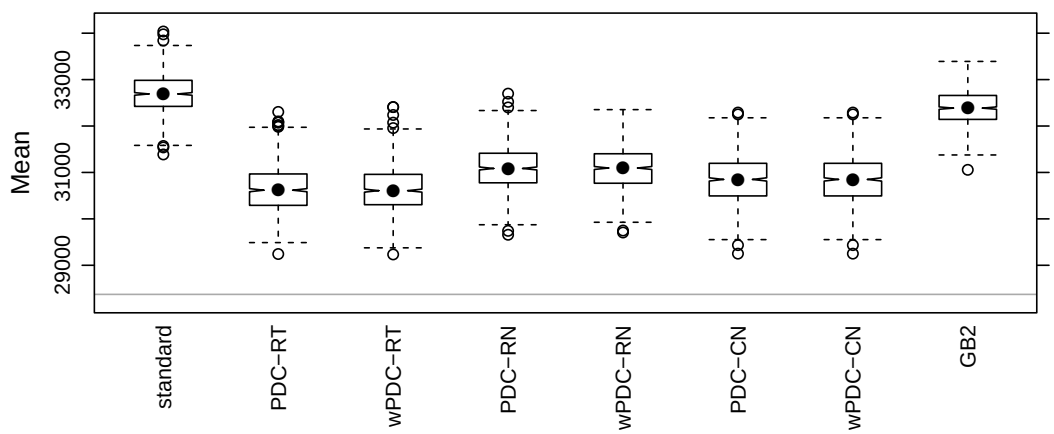

Figure F.497.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.248.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			32703.88	156000.42	4330.99	15.26	32691.10	410.67	4318.21	4348.94	15.33	6402.18	0.20
wHill	RT	500	32494.22	398908.79	4121.33	14.53	32434.65	563.67	4061.76	4169.39	14.69	6021.96	0.29
wHill	RT	700	32281.62	305225.42	3908.73	13.78	32253.57	501.50	3880.68	3947.54	13.91	5753.50	0.29
wHill	RN	300	32604.78	159388.70	4231.88	14.92	32594.63	417.27	4221.74	4250.66	14.98	6259.15	0.19
wHill	RN	500	32365.54	161977.38	3992.65	14.07	32359.14	397.55	3986.25	4012.86	14.14	5910.02	0.19
wHill	RN	700	32070.21	160299.00	3697.32	13.03	32073.20	419.13	3700.31	3718.91	13.11	5486.07	0.18
wHill	CN	300	32592.56	161030.39	4219.67	14.87	32587.10	410.55	4214.20	4238.69	14.94	6247.98	0.19
wHill	CN	500	32322.98	167571.38	3950.09	13.92	32319.92	414.49	3947.02	3971.22	14.00	5851.86	0.19
wHill	CN	700	31992.16	165889.24	3619.27	12.76	31997.90	421.46	3625.01	3642.09	12.84	5374.44	0.17
wISE	RT	500	31140.65	217061.38	2767.75	9.75	31113.47	457.17	2740.58	2806.65	9.89	4063.18	0.16
wISE	RT	700	31056.54	210295.31	2683.65	9.46	31022.16	461.23	2649.27	2722.51	9.60	3927.81	0.16
wISE	RN	300	32414.58	178433.42	4041.68	14.24	32408.53	431.07	4035.64	4063.67	14.32	5983.24	0.19
wISE	RN	500	31753.85	190832.17	3380.96	11.92	31739.64	444.22	3366.75	3409.04	12.02	4991.54	0.17
wISE	RN	700	31427.63	178525.57	3054.74	10.77	31425.66	431.92	3052.77	3083.79	10.87	4526.04	0.15
wISE	CN	300	32370.91	189680.09	3998.02	14.09	32363.78	435.62	3990.89	4021.65	14.17	5916.89	0.19
wISE	CN	500	31605.61	216380.44	3232.71	11.39	31602.87	465.24	3229.97	3265.98	11.51	4788.76	0.16
wISE	CN	700	31247.56	200321.22	2874.67	10.13	31252.88	454.79	2879.98	2909.27	10.25	4269.86	0.15
wPDC	RT	500	30552.67	233494.10	2179.78	7.68	30542.79	507.37	2169.90	2232.64	7.87	3217.09	0.16
wPDC	RT	700	30644.64	243343.44	2271.74	8.01	30608.20	478.07	2235.31	2324.63	8.19	3314.07	0.14
wPDC	RN	300	31937.54	331667.65	3564.64	12.56	31962.71	564.86	3589.82	3610.82	12.73	5322.26	0.19
wPDC	RN	500	31220.18	256893.70	2847.29	10.04	31215.62	476.97	2842.72	2892.00	10.19	4214.62	0.16
wPDC	RN	700	31091.24	216195.40	2718.34	9.58	31095.63	468.03	2722.74	2757.78	9.72	4036.73	0.14
wPDC	CN	300	31786.22	440945.79	3413.32	12.03	31817.84	641.09	3444.95	3477.25	12.26	5107.48	0.18
wPDC	CN	500	30954.74	332663.38	2581.85	9.10	30959.54	566.33	2586.65	2645.43	9.32	3834.96	0.16
wPDC	CN	700	30847.38	264548.18	2474.49	8.72	30849.27	516.80	2476.38	2527.33	8.91	3671.48	0.14
GB2			32397.69	139010.28	4024.80	14.19	32385.75	386.03	4012.85	4042.01	14.25	5949.46	0.18

OAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

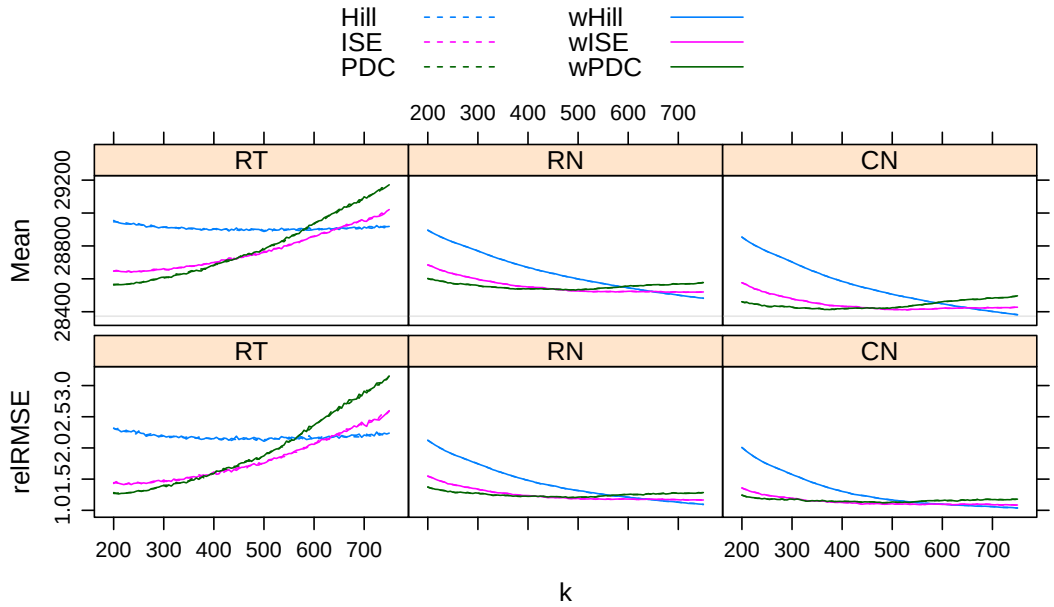

Figure F.498.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

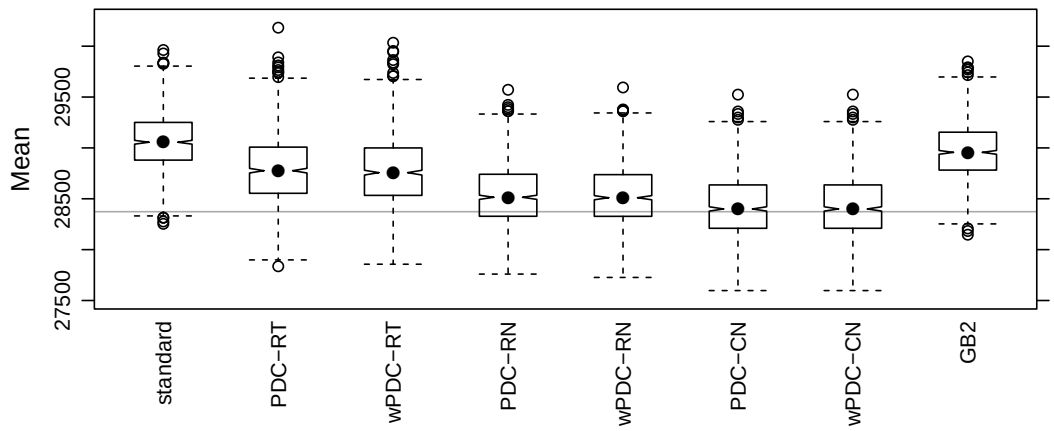

Figure F.499.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.249.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			29070.17	80847.50	697.27	2.46	29055.58	276.05	682.69	752.97	2.65	1012.16	0.06
wHill	RT	300	28915.00	93165.04	542.11	1.91	28904.52	307.47	531.63	622.06	2.19	788.19	0.05
wHill	RT	500	28888.10	91809.73	515.20	1.82	28879.02	287.09	506.13	597.62	2.11	750.38	0.05
wHill	RT	700	28914.80	98667.77	541.90	1.91	28904.28	308.59	531.39	626.28	2.21	787.83	0.06
wHill	RN	300	28770.23	87834.37	397.33	1.40	28760.64	290.67	387.75	495.60	1.75	578.50	0.04
wHill	RN	500	28598.73	88722.05	225.84	0.80	28588.24	294.31	215.35	373.68	1.32	378.95	0.04
wHill	RN	700	28501.05	86186.35	128.15	0.45	28492.83	289.68	119.93	320.19	1.13	302.38	0.03
wHill	CN	300	28702.34	91159.29	329.45	1.16	28696.95	295.93	324.06	446.77	1.57	486.73	0.04
wHill	CN	500	28506.52	92072.39	133.63	0.47	28494.10	305.26	121.20	331.42	1.17	314.93	0.04
wHill	CN	700	28401.57	89568.46	28.68	0.10	28389.11	293.89	16.22	300.50	1.06	290.86	0.03
wISE	RT	300	28661.97	94312.15	289.08	1.02	28648.62	303.29	275.73	421.65	1.49	437.39	0.04
wISE	RT	500	28761.14	97226.66	388.25	1.37	28738.28	305.12	365.39	497.86	1.75	542.80	0.05
wISE	RT	700	28950.72	118286.89	577.83	2.04	28922.93	356.28	550.03	672.35	2.37	815.48	0.06
wISE	RN	300	28596.88	94524.44	223.98	0.79	28586.94	312.44	214.05	380.26	1.34	384.31	0.04
wISE	RN	500	28526.17	90743.57	153.27	0.54	28506.41	304.89	133.51	337.85	1.19	320.94	0.04
wISE	RN	700	28519.11	88747.79	146.22	0.52	28505.42	291.26	132.53	331.72	1.17	323.78	0.04
wISE	CN	300	28478.45	103494.71	105.55	0.37	28469.06	322.68	96.16	338.43	1.19	325.48	0.04
wISE	CN	500	28413.83	97001.33	40.94	0.14	28387.47	307.77	14.58	313.98	1.11	307.56	0.04
wISE	CN	700	28423.51	93174.21	50.61	0.18	28417.69	301.69	44.80	309.26	1.09	302.89	0.04
wPDC	RT	300	28610.03	101404.39	237.14	0.84	28594.52	311.50	221.63	396.91	1.40	400.45	0.04
wPDC	RT	500	28777.81	118541.34	404.91	1.43	28756.76	345.78	383.87	531.39	1.87	582.73	0.06
wPDC	RT	700	29098.82	155135.99	725.92	2.56	29071.98	387.35	699.09	825.80	2.91	1036.47	0.07
wPDC	RN	300	28559.67	96198.42	186.77	0.66	28554.50	300.15	181.61	361.92	1.28	351.31	0.04
wPDC	RN	500	28535.03	92025.13	162.14	0.57	28510.37	299.70	137.48	343.83	1.21	334.91	0.04
wPDC	RN	700	28568.01	92214.83	195.12	0.69	28550.41	303.93	177.52	360.82	1.27	352.05	0.04
wPDC	CN	300	28427.73	108926.93	54.83	0.19	28418.69	323.21	45.80	334.40	1.18	307.31	0.04
wPDC	CN	500	28424.57	100973.56	51.67	0.18	28400.03	314.78	27.14	321.78	1.13	317.64	0.04
wPDC	CN	700	28482.12	98648.11	109.23	0.38	28462.92	316.10	90.02	332.39	1.17	319.78	0.04
GB2			28974.36	82576.12	601.47	2.12	28956.03	274.39	583.14	666.53	2.35	864.57	0.05

OAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

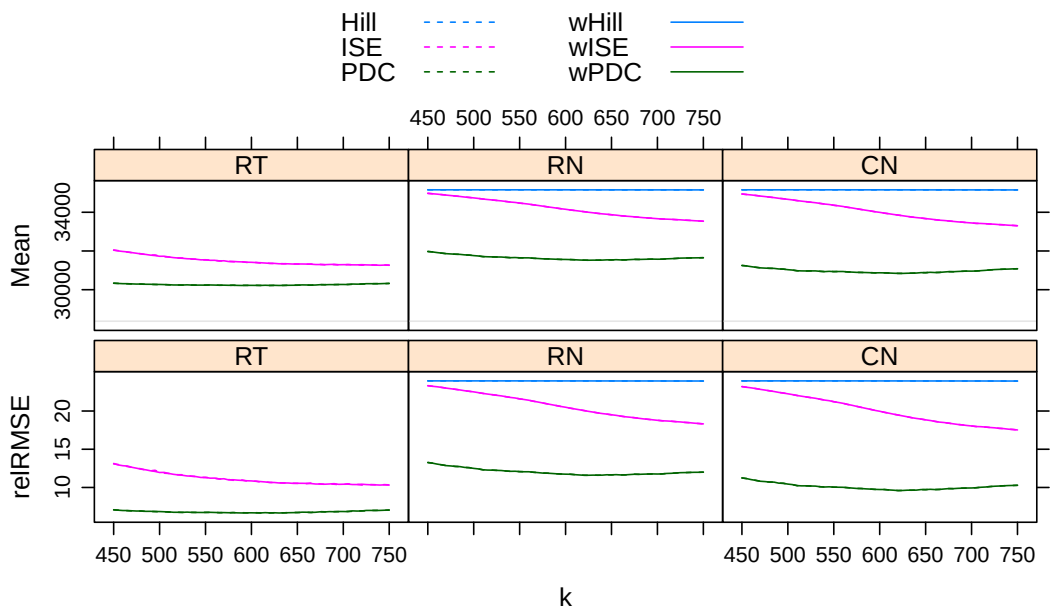

Figure F.500.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

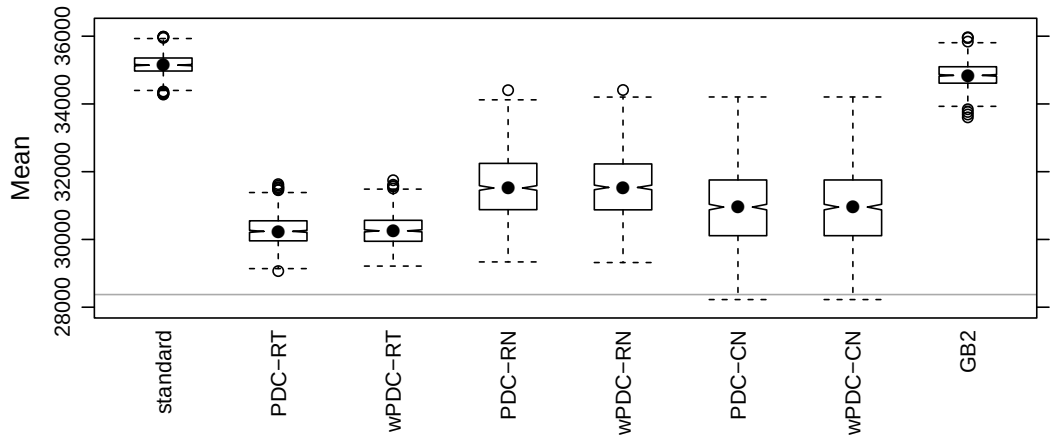

Figure F.501.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.250.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			35161.40	82100.10	6788.51	23.93	35145.92	286.72	6773.03	6794.54	23.95	10041.69	0.27
wHill	RT	500	35007.59	1490706.38	6634.70	23.38	34868.26	746.66	6495.36	6746.00	23.78	9630.03	0.74
wHill	RT	700	34387.34	577289.63	6014.45	21.20	34328.86	592.95	5955.96	6062.20	21.37	8830.31	0.46
wHill	RN	300	35161.40	82100.10	6788.51	23.93	35145.92	286.72	6773.03	6794.54	23.95	10041.69	0.27
wHill	RN	500	35159.79	82174.46	6786.89	23.92	35145.92	286.95	6773.03	6792.94	23.94	10041.69	0.27
wHill	RN	700	35156.37	81359.92	6783.48	23.91	35145.47	286.61	6772.58	6789.46	23.93	10041.02	0.27
wHill	CN	300	35161.40	82100.10	6788.51	23.93	35145.92	286.72	6773.03	6794.54	23.95	10041.69	0.27
wHill	CN	500	35159.69	82178.10	6786.80	23.92	35145.92	286.95	6773.03	6792.85	23.94	10041.69	0.27
wHill	CN	700	35155.76	81376.26	6782.87	23.91	35144.37	285.61	6771.48	6788.86	23.93	10039.40	0.27
wISE	RT	500	31726.28	267082.85	3353.39	11.82	31698.45	509.74	3325.56	3392.94	11.96	4930.47	0.18
wISE	RT	700	31293.66	214180.27	2920.77	10.29	31277.35	471.20	2904.46	2957.17	10.42	4306.15	0.16
wISE	RN	300	35161.23	82109.83	6788.34	23.93	35145.92	286.72	6773.03	6794.37	23.95	10041.69	0.27
wISE	RN	500	34742.04	196261.70	6369.14	22.45	34791.50	397.14	6418.60	6384.52	22.50	9516.22	0.26
wISE	RN	700	33667.63	369354.91	5294.73	18.66	33600.22	571.98	5227.33	5329.47	18.78	7750.03	0.25
wISE	CN	300	35161.22	82110.42	6788.33	23.93	35145.92	286.72	6773.03	6794.37	23.95	10041.69	0.27
wISE	CN	500	34667.52	234573.11	6294.62	22.19	34721.79	410.99	6348.90	6313.21	22.25	9412.87	0.26
wISE	CN	700	33447.36	457642.79	5074.47	17.88	33366.59	631.88	4993.70	5119.32	18.04	7403.66	0.25
wPDC	RT	500	30270.73	175031.63	1897.84	6.69	30247.10	419.30	1874.20	1943.36	6.85	2778.69	0.11
wPDC	RT	700	30269.96	183155.15	1897.07	6.69	30254.79	457.61	1881.90	1944.70	6.85	2790.10	0.12
wPDC	RN	300	34316.76	1378284.90	5943.87	20.95	34866.85	765.41	6493.96	6058.58	21.35	9627.94	0.27
wPDC	RN	500	31761.29	1088102.66	3388.40	11.94	31789.95	1152.68	3417.05	3545.17	12.49	5066.13	0.22
wPDC	RN	700	31574.16	879234.33	3201.27	11.28	31535.15	1011.49	3162.25	3335.64	11.76	4688.36	0.21
wPDC	CN	300	34093.46	2152212.44	5720.57	20.16	34836.74	815.50	6463.85	5905.50	20.81	9583.30	0.27
wPDC	CN	500	31033.29	1697140.72	2660.40	9.38	31096.71	1413.90	2723.81	2961.95	10.44	4038.33	0.21
wPDC	CN	700	30958.69	1254075.25	2585.80	9.11	30955.53	1215.17	2582.64	2817.65	9.93	3829.02	0.21
GB2			34853.09	125723.78	6480.20	22.84	34842.62	354.29	6469.73	6489.88	22.87	9592.02	0.27

OAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

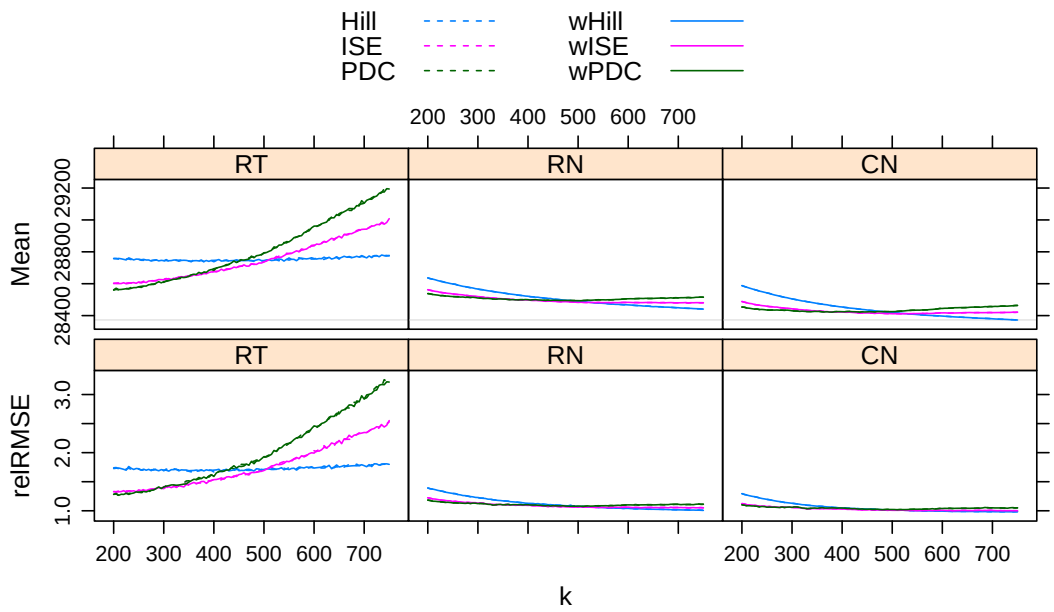

Figure F.502.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

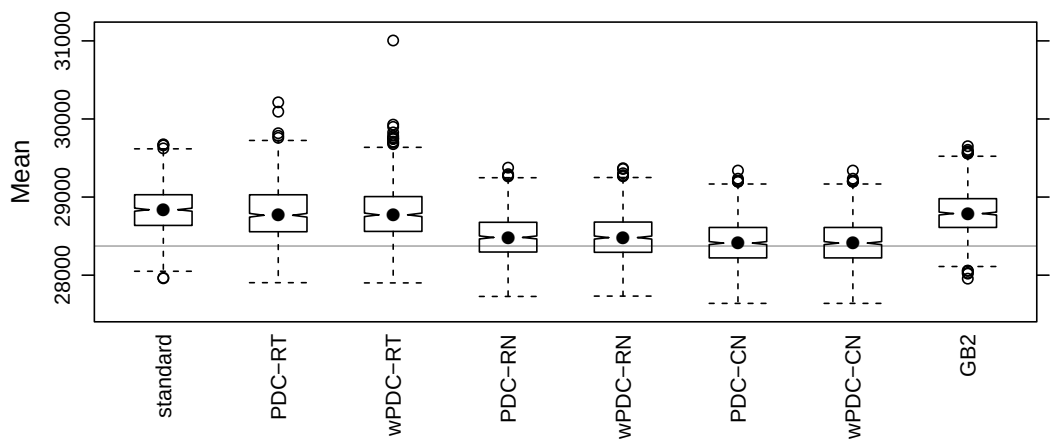

Figure F.503.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.251.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28841.92	89597.75	469.03	1.65	28838.45	291.52	465.56	556.32	1.96	690.23	0.05
wHill	RT	300	28744.51	94522.39	371.61	1.31	28722.61	312.16	349.72	482.21	1.70	526.62	0.05
wHill	RT	500	28744.81	97577.45	371.92	1.31	28736.03	292.41	363.14	485.59	1.71	543.43	0.05
wHill	RT	700	28768.57	97567.69	395.68	1.39	28755.57	307.53	382.68	504.02	1.78	576.71	0.05
wHill	RN	300	28566.67	83895.03	193.78	0.68	28556.67	287.01	183.78	348.37	1.23	339.91	0.04
wHill	RN	500	28489.37	79592.78	116.47	0.41	28487.96	274.54	115.06	305.09	1.08	290.51	0.04
wHill	RN	700	28449.37	77244.80	76.47	0.27	28443.48	274.53	70.58	288.12	1.02	274.61	0.03
wHill	CN	300	28504.72	85274.25	131.82	0.46	28489.96	287.12	117.07	320.26	1.13	307.74	0.03
wHill	CN	500	28419.43	80873.08	46.53	0.16	28415.85	277.24	42.96	288.02	1.02	280.42	0.03
wHill	CN	700	28380.11	78130.05	7.22	0.03	28370.94	274.28	−1.96	279.47	0.98	274.32	0.03
wISE	RT	300	28624.68	90268.56	251.78	0.89	28614.27	287.13	241.38	391.88	1.38	394.78	0.05
wISE	RT	500	28736.37	98776.61	363.47	1.28	28725.41	318.75	352.52	480.41	1.69	523.59	0.05
wISE	RT	700	28941.73	120057.80	568.84	2.00	28927.40	359.36	554.51	665.97	2.35	822.11	0.06
wISE	RN	300	28519.20	81578.28	146.30	0.52	28510.36	285.00	137.47	320.78	1.13	296.72	0.04
wISE	RN	500	28482.62	78658.53	109.73	0.39	28472.87	280.97	99.98	301.03	1.06	290.04	0.04
wISE	RN	700	28479.94	77903.79	107.05	0.38	28467.07	274.62	94.18	298.81	1.05	280.48	0.03
wISE	CN	300	28442.55	84986.39	69.66	0.25	28437.31	284.38	64.42	299.59	1.06	279.78	0.03
wISE	CN	500	28411.76	80398.85	38.87	0.14	28405.57	283.54	32.68	286.06	1.01	276.76	0.03
wISE	CN	700	28418.68	79470.57	45.79	0.16	28406.14	273.27	33.25	285.46	1.01	273.89	0.03
wPDC	RT	300	28612.84	102373.37	239.94	0.85	28603.75	308.32	230.86	399.81	1.41	396.97	0.05
wPDC	RT	500	28793.99	123171.57	421.10	1.48	28772.42	328.17	399.53	548.06	1.93	596.26	0.09
wPDC	RT	700	29104.58	151588.42	731.69	2.58	29078.49	394.07	705.60	828.74	2.92	1046.12	0.09
wPDC	RN	300	28510.21	82790.74	137.31	0.48	28499.37	283.80	126.48	318.69	1.12	294.03	0.04
wPDC	RN	500	28493.67	79515.29	120.77	0.43	28481.21	283.99	108.31	306.63	1.08	292.85	0.04
wPDC	RN	700	28511.08	80392.45	138.19	0.49	28493.69	278.85	120.79	315.29	1.11	300.00	0.04
wPDC	CN	300	28430.04	87253.75	57.15	0.20	28422.28	294.51	49.39	300.72	1.06	283.00	0.03
wPDC	CN	500	28424.93	81448.15	52.03	0.18	28410.51	289.23	37.61	289.96	1.02	278.72	0.03
wPDC	CN	700	28456.46	81918.24	83.57	0.29	28442.93	272.44	70.04	298.03	1.05	287.89	0.04
GB2			28800.40	84533.16	427.51	1.51	28789.01	276.65	416.12	516.93	1.82	617.73	0.05

OAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

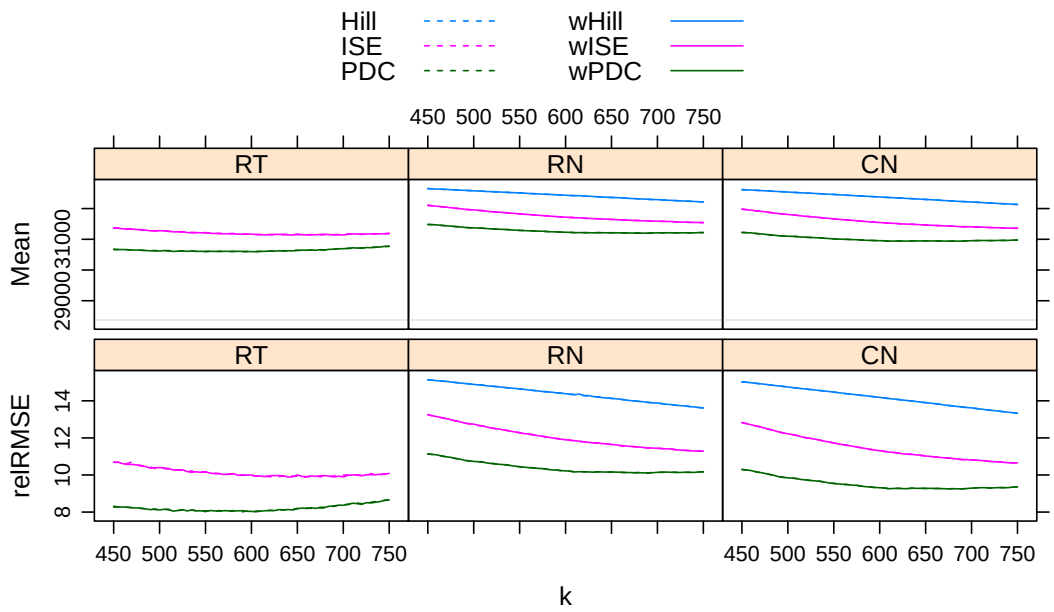

Figure F.504.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

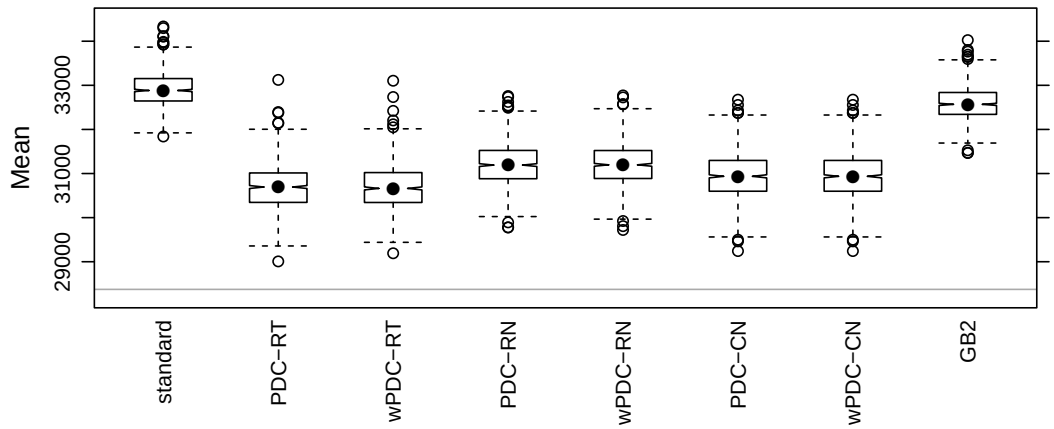

Figure F.505.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.252.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			32905.70	153850.54	4532.81	15.98	32883.05	385.34	4510.16	4549.73	16.04	6686.76	0.21
wHill	RT	500	32690.79	394120.24	4317.90	15.22	32615.66	584.98	4242.77	4363.25	15.38	6290.33	0.33
wHill	RT	700	32457.28	281844.10	4084.39	14.40	32437.08	509.19	4064.19	4118.71	14.52	6025.57	0.24
wHill	RN	300	32811.66	151996.29	4438.77	15.64	32799.54	404.58	4426.65	4455.84	15.70	6562.95	0.20
wHill	RN	500	32577.79	154836.11	4204.90	14.82	32565.00	401.59	4192.11	4223.25	14.88	6215.22	0.20
wHill	RN	700	32291.14	156695.48	3918.25	13.81	32290.79	380.94	3917.90	3938.17	13.88	5808.68	0.19
wHill	CN	300	32801.08	152734.59	4428.19	15.61	32791.61	404.38	4418.72	4445.39	15.67	6551.19	0.20
wHill	CN	500	32537.65	158383.86	4164.76	14.68	32525.68	403.68	4152.78	4183.71	14.75	6156.92	0.20
wHill	CN	700	32215.53	161194.16	3842.64	13.54	32215.12	391.57	3842.22	3863.54	13.62	5696.48	0.19
wISE	RT	500	31279.30	262446.32	2906.41	10.24	31265.56	510.05	2892.67	2951.17	10.40	4288.67	0.19
wISE	RT	700	31140.36	225537.85	2767.47	9.75	31121.13	483.82	2748.24	2807.88	9.90	4074.53	0.16
wISE	RN	300	32652.33	167432.04	4279.44	15.08	32642.46	405.79	4269.57	4298.94	15.15	6330.06	0.20
wISE	RN	500	31957.99	214881.43	3585.10	12.64	31941.65	451.01	3568.75	3614.91	12.74	5291.03	0.26
wISE	RN	700	31588.92	188828.56	3216.03	11.33	31566.46	416.07	3193.56	3245.23	11.44	4734.78	0.17
wISE	CN	300	32616.43	177707.44	4243.54	14.96	32601.81	417.17	4228.92	4264.41	15.03	6269.79	0.20
wISE	CN	500	31806.95	231755.66	3434.05	12.10	31793.76	483.24	3420.87	3467.60	12.22	5071.78	0.18
wISE	CN	700	31405.17	215694.69	3032.28	10.69	31393.33	441.77	3020.43	3067.60	10.81	4478.10	0.17
wPDC	RT	500	30619.87	253993.25	2246.98	7.92	30598.63	520.39	2225.74	2302.75	8.12	3299.89	0.14
wPDC	RT	700	30692.75	252090.81	2319.85	8.18	30662.21	486.86	2289.32	2373.51	8.37	3394.15	0.17
wPDC	RN	300	32183.98	321711.07	3811.09	13.43	32215.32	570.96	3842.43	3853.02	13.58	5696.79	0.19
wPDC	RN	500	31371.19	280830.10	2998.30	10.57	31368.48	526.69	2995.59	3044.72	10.73	4441.26	0.16
wPDC	RN	700	31210.63	231554.95	2837.74	10.00	31197.10	468.33	2824.21	2878.21	10.14	4187.17	0.16
wPDC	CN	300	32045.77	421322.42	3672.88	12.95	32102.98	655.79	3730.09	3729.74	13.15	5530.23	0.19
wPDC	CN	500	31099.08	372292.81	2726.19	9.61	31101.55	605.25	2728.66	2793.57	9.85	4045.51	0.16
wPDC	CN	700	30954.35	285184.60	2581.46	9.10	30936.40	520.39	2563.50	2636.06	9.29	3800.65	0.15
GB2			32596.68	138314.54	4223.78	14.89	32568.27	364.02	4195.38	4240.11	14.94	6220.07	0.20

Stratified simple random sampling

No contamination

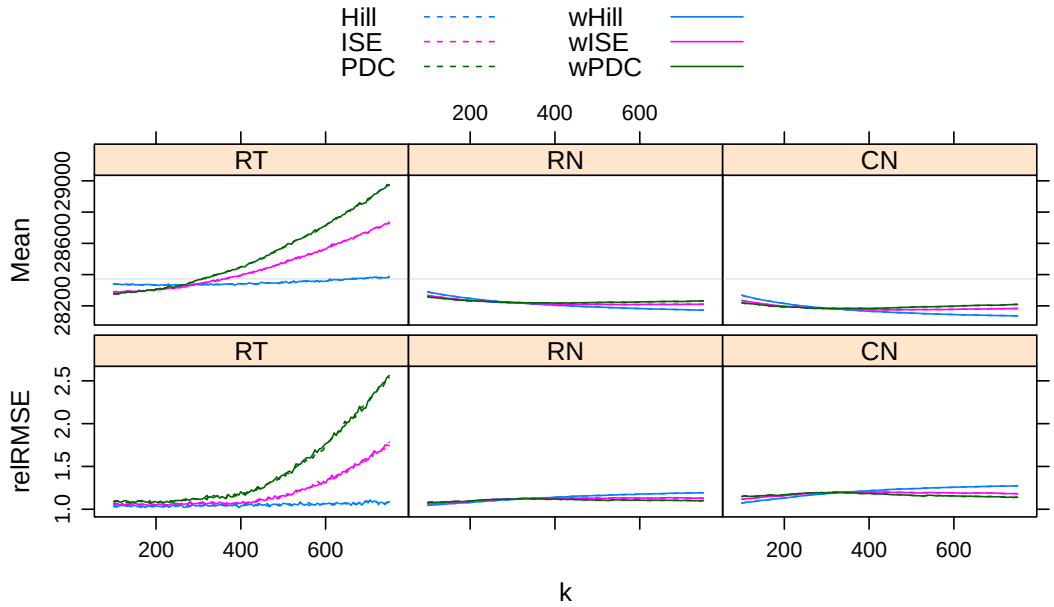

Figure F.506.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 100 and 750.

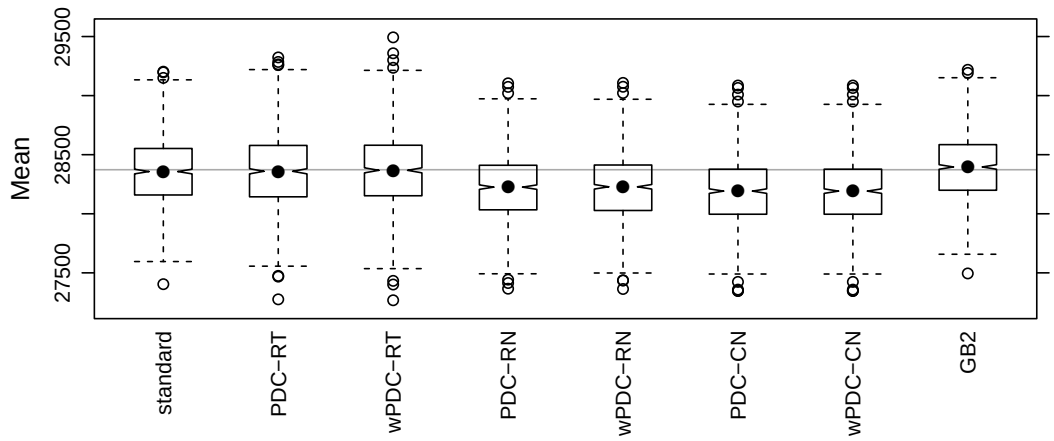

Figure F.507.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 300$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.253.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28359.74	83560.10	−13.15	−0.05	28357.40	290.90	−15.49	289.22	1.02	295.22	0.03
wHill	RT	300	28335.34	86547.36	−37.55	−0.13	28344.38	300.83	−28.51	296.43	1.04	308.59	0.03
wHill	RT	500	28347.92	91633.28	−24.97	−0.09	28344.09	293.26	−28.81	303.59	1.07	296.57	0.04
wHill	RT	700	28378.99	92958.96	6.10	0.02	28372.82	303.63	−0.07	304.80	1.07	303.52	0.04
wHill	RN	300	28221.37	77028.95	−151.53	−0.53	28222.30	273.14	−150.59	316.09	1.11	316.85	0.04
wHill	RN	500	28192.19	76120.81	−180.71	−0.64	28192.54	272.70	−180.35	329.70	1.16	338.45	0.04
wHill	RN	700	28176.31	75022.28	−196.58	−0.69	28179.80	265.58	−193.09	337.04	1.19	347.81	0.04
wHill	CN	300	28184.79	77188.70	−188.11	−0.66	28187.92	271.41	−184.97	335.40	1.18	344.68	0.04
wHill	CN	500	28153.55	75670.12	−219.34	−0.77	28156.08	273.39	−216.82	351.72	1.24	365.85	0.04
wHill	CN	700	28138.17	74661.13	−234.73	−0.83	28143.30	268.70	−229.59	360.12	1.27	373.78	0.04
wISE	RT	300	28342.90	91810.41	−29.99	−0.11	28344.37	311.83	−28.53	304.33	1.07	308.74	0.04
wISE	RT	500	28470.06	99261.45	97.16	0.34	28460.25	306.38	87.36	329.55	1.16	326.77	0.04
wISE	RT	700	28667.23	113723.31	294.33	1.04	28670.66	323.14	297.77	447.48	1.58	475.88	0.05
wISE	RN	300	28219.19	76800.32	−153.70	−0.54	28219.02	275.31	−153.87	316.78	1.12	320.16	0.04
wISE	RN	500	28207.97	75924.16	−164.93	−0.58	28213.68	271.92	−159.22	321.01	1.13	324.78	0.04
wISE	RN	700	28209.85	76931.93	−163.05	−0.57	28209.32	272.44	−163.57	321.62	1.13	324.21	0.04
wISE	CN	300	28181.51	77481.35	−191.38	−0.67	28185.58	274.53	−187.32	337.69	1.19	342.71	0.04
wISE	CN	500	28175.03	76073.05	−197.87	−0.70	28182.15	271.82	−190.74	339.33	1.20	345.94	0.04
wISE	CN	700	28181.09	77188.96	−191.80	−0.68	28183.25	271.54	−189.65	337.49	1.19	350.44	0.04
wPDC	RT	300	28367.37	100909.38	−5.53	−0.02	28367.65	316.93	−5.24	317.55	1.12	318.78	0.04
wPDC	RT	500	28576.44	116836.27	203.55	0.72	28568.68	338.53	195.79	397.68	1.40	390.53	0.05
wPDC	RT	700	28888.04	147865.99	515.15	1.82	28877.41	366.98	504.52	642.73	2.27	751.16	0.07
wPDC	RN	300	28222.44	77986.49	−150.45	−0.53	28228.43	281.31	−144.47	317.09	1.12	316.88	0.04
wPDC	RN	500	28220.93	75556.03	−151.96	−0.54	28221.80	270.46	−151.09	313.96	1.11	317.37	0.04
wPDC	RN	700	28228.49	76884.25	−144.41	−0.51	28227.95	273.52	−144.94	312.51	1.10	316.47	0.04
wPDC	CN	300	28184.85	79437.37	−188.04	−0.66	28191.69	281.24	−181.20	338.70	1.19	344.88	0.04
wPDC	CN	500	28191.44	75910.15	−181.46	−0.64	28192.32	268.82	−180.57	329.79	1.16	338.09	0.04
wPDC	CN	700	28204.35	77411.76	−168.54	−0.59	28203.15	271.19	−169.75	325.18	1.15	329.05	0.04
GB2			28398.04	80213.00	25.15	0.09	28396.12	284.45	23.23	284.19	1.00	285.23	0.03

OCAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

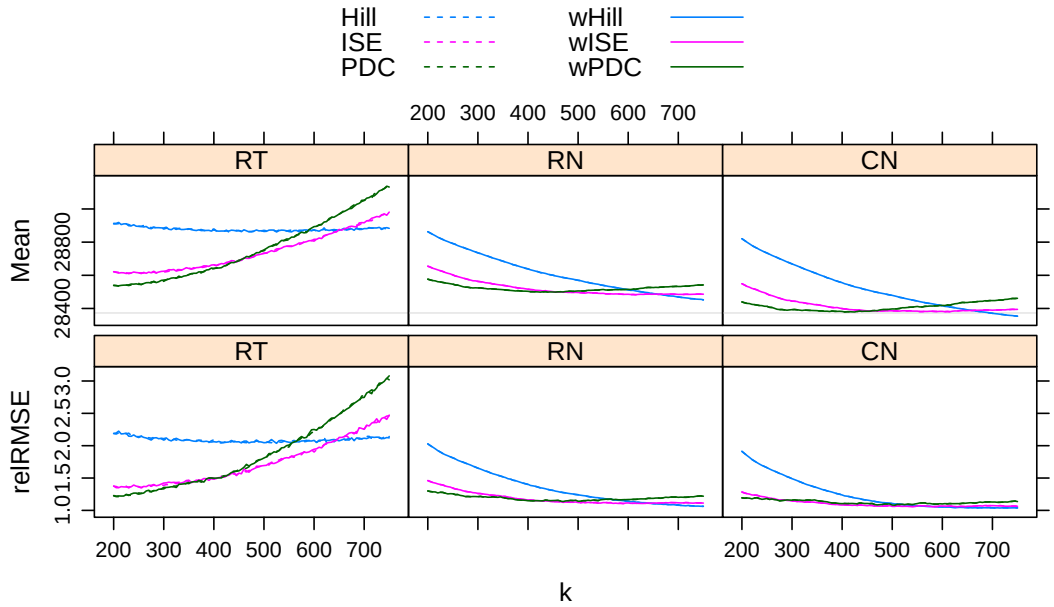

Figure F.508.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

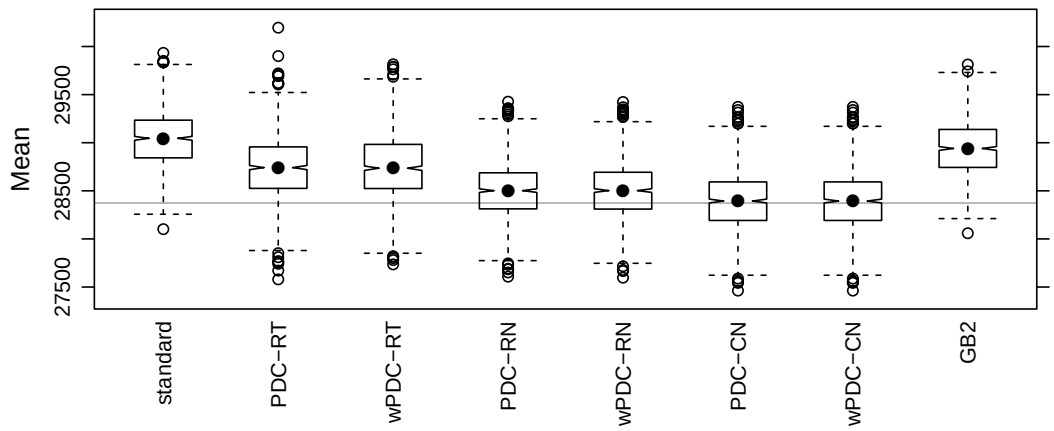

Figure F.509.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.254.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			29041.26	84552.46	668.37	2.36	29045.68	290.16	672.79	728.83	2.57	997.47	0.06
wHill	RT	300	28885.30	95541.03	512.41	1.81	28881.35	307.07	508.46	598.34	2.11	753.85	0.05
wHill	RT	500	28864.33	95640.20	491.43	1.73	28856.54	305.61	483.65	580.56	2.05	717.06	0.06
wHill	RT	700	28881.83	101236.77	508.94	1.79	28873.58	300.39	500.68	600.13	2.12	742.31	0.05
wHill	RN	300	28735.64	88478.83	362.74	1.28	28740.43	289.63	367.54	469.01	1.65	547.28	0.04
wHill	RN	500	28569.64	85195.16	196.75	0.69	28573.61	281.81	200.71	351.88	1.24	366.77	0.04
wHill	RN	700	28469.78	85704.25	96.88	0.34	28467.68	287.76	94.79	308.23	1.09	309.20	0.04
wHill	CN	300	28668.52	91367.96	295.63	1.04	28670.15	294.93	297.26	422.69	1.49	463.22	0.04
wHill	CN	500	28479.06	87509.61	106.16	0.37	28483.11	281.88	110.21	314.15	1.11	313.88	0.04
wHill	CN	700	28370.85	87233.73	−2.04	−0.01	28370.17	283.99	−2.72	295.21	1.04	282.80	0.03
wISE	RT	300	28624.46	99665.63	251.56	0.89	28620.49	310.33	247.60	403.55	1.42	417.98	0.05
wISE	RT	500	28733.84	100555.07	360.95	1.27	28734.88	315.40	361.98	480.35	1.69	550.31	0.06
wISE	RT	700	28916.83	112824.03	543.94	1.92	28913.94	332.52	541.05	639.20	2.25	802.16	0.06
wISE	RN	300	28563.57	91884.87	190.68	0.67	28561.55	290.90	188.65	357.98	1.26	372.99	0.04
wISE	RN	500	28496.29	86106.97	123.39	0.43	28494.99	277.68	122.10	318.19	1.12	317.37	0.04
wISE	RN	700	28484.54	88046.00	111.65	0.39	28489.01	285.99	116.12	316.90	1.12	316.98	0.04
wISE	CN	300	28444.11	100420.92	71.22	0.25	28446.79	303.90	73.90	324.64	1.14	317.75	0.04
wISE	CN	500	28385.72	90649.29	12.83	0.05	28381.54	284.97	8.65	301.20	1.06	286.22	0.03
wISE	CN	700	28389.56	92596.57	16.67	0.06	28394.24	289.11	21.35	304.60	1.07	286.85	0.04
wPDC	RT	300	28571.22	108663.79	198.33	0.70	28582.59	324.76	209.70	384.56	1.36	397.86	0.04
wPDC	RT	500	28753.19	119082.23	380.30	1.34	28735.28	336.09	362.39	513.41	1.81	552.63	0.05
wPDC	RT	700	29050.70	147746.65	677.81	2.39	29037.14	377.03	664.25	779.11	2.75	984.81	0.07
wPDC	RN	300	28523.84	95543.34	150.95	0.53	28524.39	305.74	151.50	343.85	1.21	342.18	0.04
wPDC	RN	500	28505.79	87276.10	132.90	0.47	28502.54	282.80	129.65	323.81	1.14	324.29	0.04
wPDC	RN	700	28532.30	91013.01	159.41	0.56	28538.42	293.16	165.53	341.08	1.20	349.32	0.04
wPDC	CN	300	28392.93	107655.57	20.04	0.07	28390.81	321.34	17.91	328.56	1.16	325.46	0.04
wPDC	CN	500	28397.05	93852.87	24.16	0.09	28393.93	296.86	21.04	307.15	1.08	298.60	0.04
wPDC	CN	700	28447.34	97148.75	74.45	0.26	28455.25	298.40	82.35	320.30	1.13	319.31	0.04
GB2			28942.93	83042.84	570.04	2.01	28940.25	293.03	567.36	638.67	2.25	841.17	0.05

OCAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

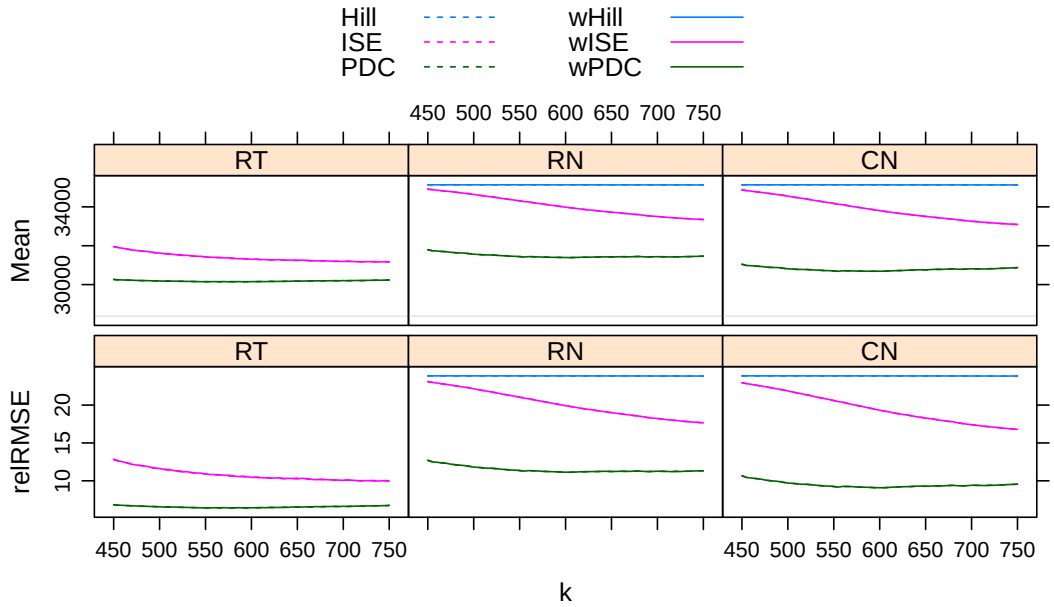

Figure F.510.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

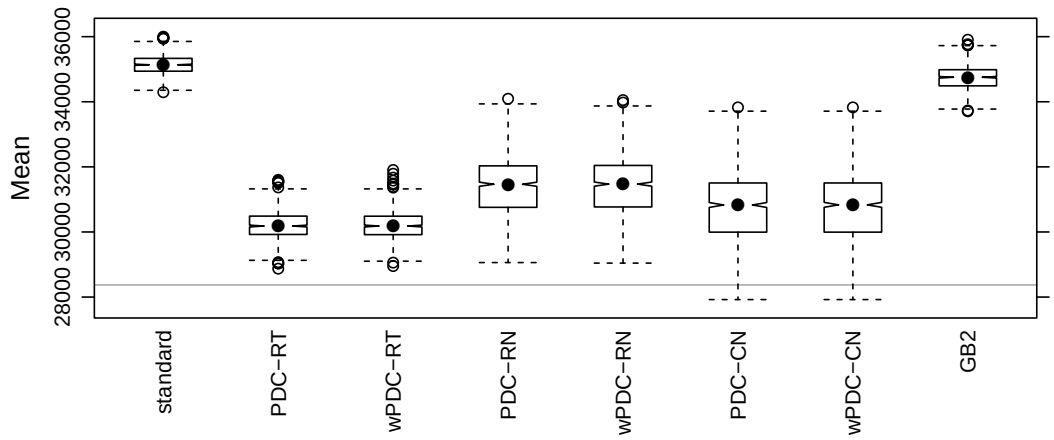

Figure F.511.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.255.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			35137.13	85613.74	6764.23	23.84	35136.78	290.96	6763.89	6770.55	23.86	10028.14	0.27
wHill	RT	500	35023.15	1883707.69	6650.26	23.44	34858.01	754.45	6485.12	6790.27	23.93	9614.84	1.14
wHill	RT	700	34287.33	625961.31	5914.44	20.85	34222.11	647.97	5849.22	5967.07	21.03	8672.05	0.61
wHill	RN	300	35137.13	85613.74	6764.23	23.84	35136.78	290.96	6763.89	6770.55	23.86	10028.14	0.27
wHill	RN	500	35136.12	85290.74	6763.23	23.84	35136.21	290.48	6763.32	6769.52	23.86	10027.29	0.27
wHill	RN	700	35132.23	84991.22	6759.34	23.82	35130.99	288.76	6758.10	6765.62	23.85	10019.56	0.27
wHill	CN	300	35137.13	85613.74	6764.23	23.84	35136.78	290.96	6763.89	6770.55	23.86	10028.14	0.27
wHill	CN	500	35136.01	85240.89	6763.11	23.84	35136.21	290.48	6763.32	6769.41	23.86	10027.29	0.27
wHill	CN	700	35131.46	84779.78	6758.57	23.82	35129.82	288.13	6756.92	6764.83	23.84	10017.82	0.27
wISE	RT	500	31624.82	323074.17	3251.93	11.46	31605.76	533.32	3232.87	3301.18	11.63	4793.05	0.28
wISE	RT	700	31188.44	223106.49	2815.55	9.92	31156.02	459.57	2783.13	2854.85	10.06	4126.27	0.20
wISE	RN	300	35137.13	85613.74	6764.23	23.84	35136.78	290.96	6763.89	6770.55	23.86	10028.14	0.27
wISE	RN	500	34639.94	241851.62	6267.04	22.09	34684.01	432.30	6311.12	6286.29	22.16	9356.86	0.27
wISE	RN	700	33505.75	398027.45	5132.85	18.09	33452.05	589.47	5079.16	5171.44	18.23	7530.36	0.25
wISE	CN	300	35137.13	85613.74	6764.23	23.84	35136.78	290.96	6763.89	6770.55	23.86	10028.14	0.27
wISE	CN	500	34552.93	291635.69	6180.04	21.78	34616.08	464.64	6243.19	6203.57	21.86	9256.15	0.27
wISE	CN	700	33264.30	495442.76	4891.41	17.24	33189.66	651.27	4816.77	4941.74	17.42	7141.34	0.24
wPDC	RT	500	30188.12	179455.62	1815.23	6.40	30173.75	416.28	1800.86	1863.96	6.57	2669.96	0.14
wPDC	RT	700	30205.80	186252.25	1832.91	6.46	30182.65	421.65	1809.76	1882.98	6.64	2683.15	0.12
wPDC	RN	300	34166.54	1389312.23	5793.64	20.42	34689.74	980.70	6316.84	5912.21	20.84	9365.35	0.27
wPDC	RN	500	31562.93	1055140.36	3190.04	11.24	31552.76	1073.92	3179.87	3351.18	11.81	4714.48	0.24
wPDC	RN	700	31437.08	827714.13	3064.19	10.80	31470.45	915.74	3097.55	3196.27	11.27	4592.43	0.20
wPDC	CN	300	33917.56	2142428.22	5544.66	19.54	34603.77	1113.82	6230.88	5734.42	20.21	9237.90	0.27
wPDC	CN	500	30811.19	1628675.99	2438.29	8.59	30821.53	1341.61	2448.64	2751.79	9.70	3630.35	0.24
wPDC	CN	700	30813.54	1173008.55	2440.64	8.60	30833.28	1071.52	2460.38	2669.94	9.41	3647.77	0.19
GB2			34744.71	132213.65	6371.82	22.46	34752.66	362.73	6379.77	6382.17	22.49	9458.65	0.27

OCAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

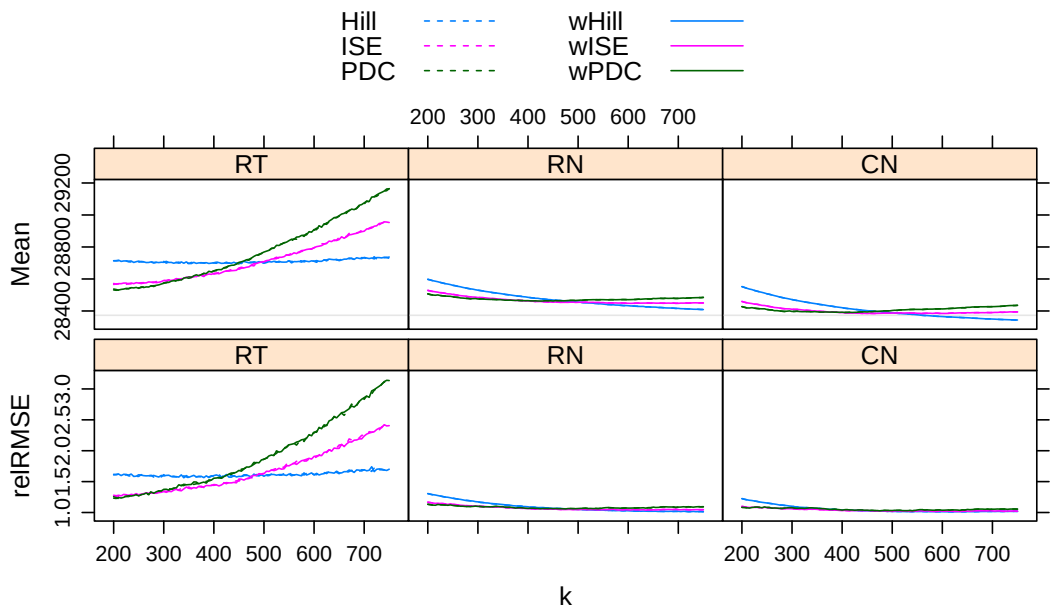

Figure F.512.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

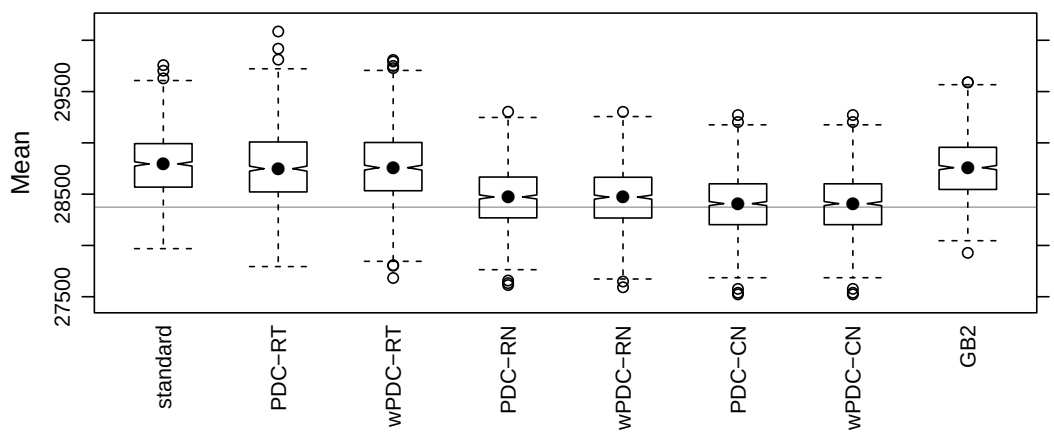

Figure F.513.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.256.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28791.10	89740.26	418.20	1.47	28794.76	311.38	421.87	514.34	1.81	625.46	0.05
wHill	RT	300	28704.06	94547.04	331.17	1.17	28699.48	312.47	326.58	451.80	1.59	495.41	0.05
wHill	RT	500	28699.91	95781.36	327.02	1.15	28689.04	322.08	316.15	450.14	1.59	494.11	0.04
wHill	RT	700	28734.57	99955.30	361.68	1.27	28722.91	310.60	350.02	480.28	1.69	529.41	0.06
wHill	RN	300	28529.91	86088.37	157.01	0.55	28534.53	310.37	161.64	332.65	1.17	338.89	0.04
wHill	RN	500	28455.69	81923.78	82.80	0.29	28462.49	289.35	89.60	297.82	1.05	293.96	0.03
wHill	RN	700	28416.26	81802.45	43.36	0.15	28420.58	297.84	47.69	289.14	1.02	296.91	0.03
wHill	CN	300	28471.20	88088.39	98.31	0.35	28474.70	308.89	101.81	312.51	1.10	318.02	0.03
wHill	CN	500	28388.74	82954.10	15.85	0.06	28397.21	290.15	24.32	288.31	1.02	294.53	0.03
wHill	CN	700	28349.39	82875.65	−23.50	−0.08	28358.47	298.82	−14.42	288.70	1.02	297.46	0.03
wISE	RT	300	28590.63	97016.32	217.74	0.77	28599.87	308.77	226.98	379.91	1.34	410.05	0.04
wISE	RT	500	28707.06	101763.21	334.17	1.18	28696.34	303.15	323.44	461.88	1.63	499.56	0.05
wISE	RT	700	28898.62	126687.89	525.73	1.85	28882.54	342.40	509.65	634.79	2.24	755.61	0.06
wISE	RN	300	28483.99	85622.05	111.10	0.39	28488.66	300.93	115.77	312.86	1.10	313.10	0.03
wISE	RN	500	28454.03	81339.33	81.14	0.29	28460.03	290.95	87.13	296.38	1.04	291.09	0.03
wISE	RN	700	28447.64	82365.52	74.74	0.26	28452.93	299.72	80.04	296.43	1.04	295.65	0.03
wISE	CN	300	28410.62	89136.63	37.73	0.13	28416.65	302.40	43.76	300.78	1.06	296.85	0.03
wISE	CN	500	28387.12	83098.75	14.23	0.05	28394.36	288.93	21.47	288.48	1.02	295.85	0.03
wISE	CN	700	28390.14	84464.28	17.25	0.06	28398.76	304.73	25.86	290.99	1.03	297.87	0.03
wPDC	RT	300	28572.95	112278.32	200.06	0.71	28573.71	345.83	200.82	390.12	1.37	392.91	0.05
wPDC	RT	500	28768.33	122772.27	395.44	1.39	28758.30	346.66	385.41	528.23	1.86	594.60	0.05
wPDC	RT	700	29075.68	164151.45	702.78	2.48	29047.73	402.10	674.84	811.11	2.86	1000.51	0.08
wPDC	RN	300	28474.98	86854.49	102.09	0.36	28478.28	305.15	105.39	311.75	1.10	300.02	0.03
wPDC	RN	500	28466.68	82441.49	93.79	0.33	28470.99	294.35	98.10	301.92	1.06	297.98	0.03
wPDC	RN	700	28478.59	84064.95	105.70	0.37	28480.23	299.81	107.34	308.47	1.09	311.58	0.03
wPDC	CN	300	28396.96	92951.84	24.07	0.08	28400.23	303.99	27.33	305.68	1.08	310.46	0.03
wPDC	CN	500	28403.08	84789.66	30.18	0.11	28407.97	293.66	35.08	292.60	1.03	297.21	0.03
wPDC	CN	700	28426.98	86482.32	54.08	0.19	28427.85	301.91	54.96	298.87	1.05	302.58	0.03
GB2			28758.46	82977.14	385.56	1.36	28758.57	306.33	385.68	481.20	1.70	575.29	0.04

OCAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

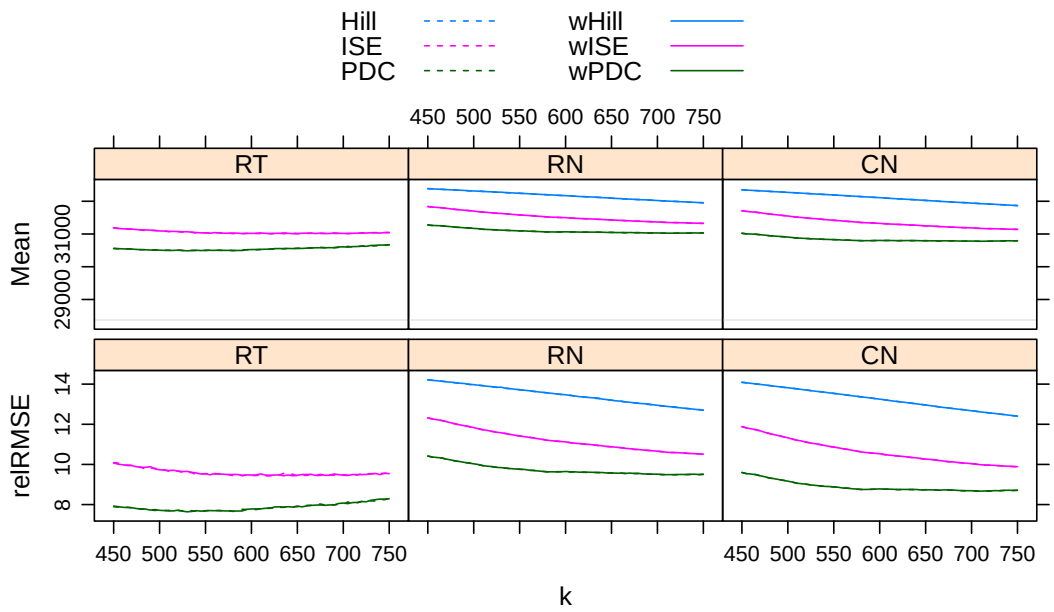

Figure F.514.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

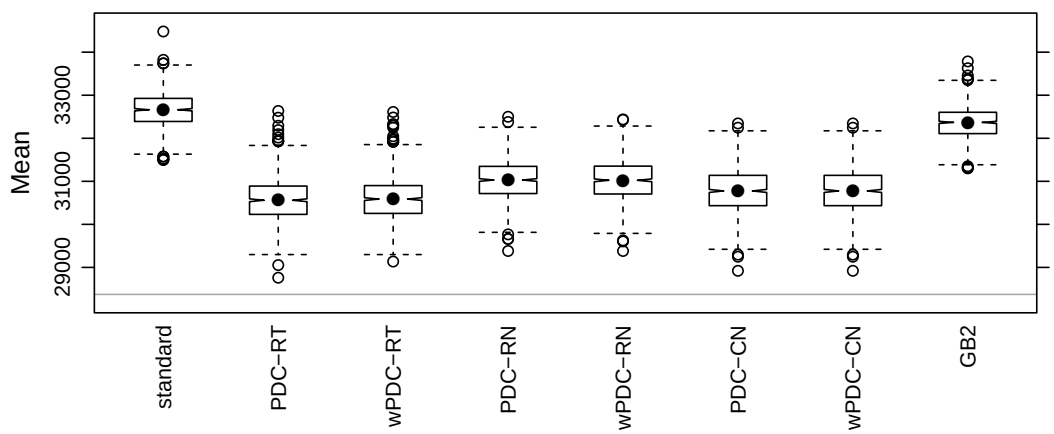

Figure F.515.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.257.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			32662.68	172629.87	4289.79	15.12	32662.87	394.02	4289.98	4309.84	15.19	6360.33	0.22
wHill	RT	500	32449.49	495503.85	4076.60	14.37	32392.24	533.35	4019.35	4136.86	14.58	5959.08	0.57
wHill	RT	700	32213.10	276180.60	3840.21	13.53	32212.22	522.86	3839.33	3875.96	13.66	5692.19	0.23
wHill	RN	300	32563.26	165213.43	4190.37	14.77	32572.08	401.03	4199.19	4210.01	14.84	6225.72	0.19
wHill	RN	500	32315.87	174122.84	3942.98	13.90	32307.22	429.85	3934.33	3964.97	13.97	5833.04	0.18
wHill	RN	700	32022.70	170920.50	3649.80	12.86	32032.25	421.52	3659.36	3673.12	12.95	5425.36	0.17
wHill	CN	300	32551.71	166724.63	4178.82	14.73	32564.29	403.21	4191.40	4198.70	14.80	6214.17	0.19
wHill	CN	500	32270.80	176378.58	3897.90	13.74	32258.54	431.57	3885.65	3920.44	13.82	5760.86	0.18
wHill	CN	700	31943.49	175071.84	3570.60	12.58	31953.84	422.34	3580.95	3595.00	12.67	5309.12	0.17
wISE	RT	500	31093.43	228496.09	2720.54	9.59	31062.84	455.94	2689.95	2762.17	9.74	3988.12	0.17
wISE	RT	700	31018.10	218468.89	2645.20	9.32	31000.14	475.50	2627.24	2686.14	9.47	3895.15	0.17
wISE	RN	300	32370.04	186165.61	3997.14	14.09	32376.93	422.59	4004.03	4020.34	14.17	5936.38	0.18
wISE	RN	500	31699.50	206690.14	3326.61	11.72	31691.38	445.65	3318.48	3357.50	11.83	4919.98	0.17
wISE	RN	700	31366.74	179182.37	2993.84	10.55	31366.96	428.64	2994.07	3023.59	10.66	4439.01	0.15
wISE	CN	300	32324.28	197960.07	3951.39	13.93	32341.09	432.47	3968.20	3976.34	14.01	5883.25	0.18
wISE	CN	500	31549.63	235440.57	3176.74	11.20	31529.69	487.36	3156.80	3213.55	11.33	4680.27	0.17
wISE	CN	700	31185.65	201989.35	2812.76	9.91	31185.95	449.55	2813.05	2848.40	10.04	4170.63	0.15
wPDC	RT	500	30505.95	239645.13	2133.06	7.52	30470.89	470.35	2098.00	2188.46	7.71	3110.49	0.16
wPDC	RT	700	30607.38	258186.26	2234.49	7.88	30587.41	482.85	2214.51	2291.48	8.08	3283.24	0.15
wPDC	RN	300	31889.83	315035.99	3516.94	12.40	31905.95	564.28	3533.05	3561.40	12.55	5238.11	0.18
wPDC	RN	500	31171.05	269040.77	2798.15	9.86	31174.44	516.03	2801.55	2845.78	10.03	4153.58	0.16
wPDC	RN	700	31032.59	216554.91	2659.70	9.37	31023.05	477.33	2650.16	2700.06	9.52	3929.13	0.14
wPDC	CN	300	31738.11	421094.28	3365.22	11.86	31774.65	636.26	3401.75	3427.15	12.08	5043.44	0.17
wPDC	CN	500	30905.58	348844.23	2532.69	8.93	30900.42	578.50	2527.52	2600.57	9.17	3747.31	0.16
wPDC	CN	700	30783.71	266940.43	2410.82	8.50	30776.37	521.89	2403.48	2465.51	8.69	3563.39	0.14
GB2			32356.23	144248.21	3983.33	14.04	32368.93	363.97	3996.04	4001.38	14.10	5924.53	0.19

OAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

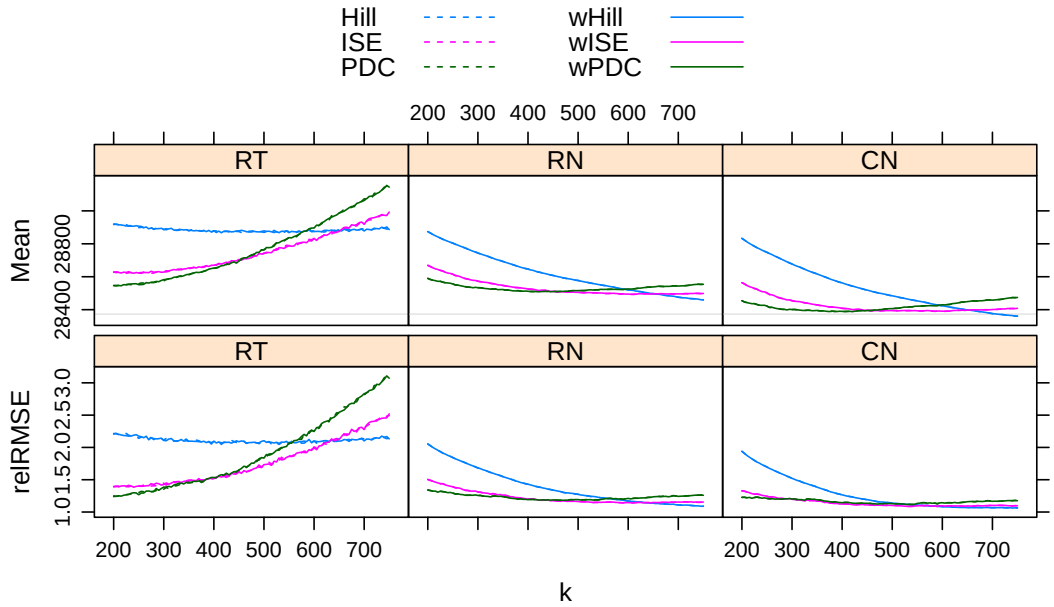

Figure F.516.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

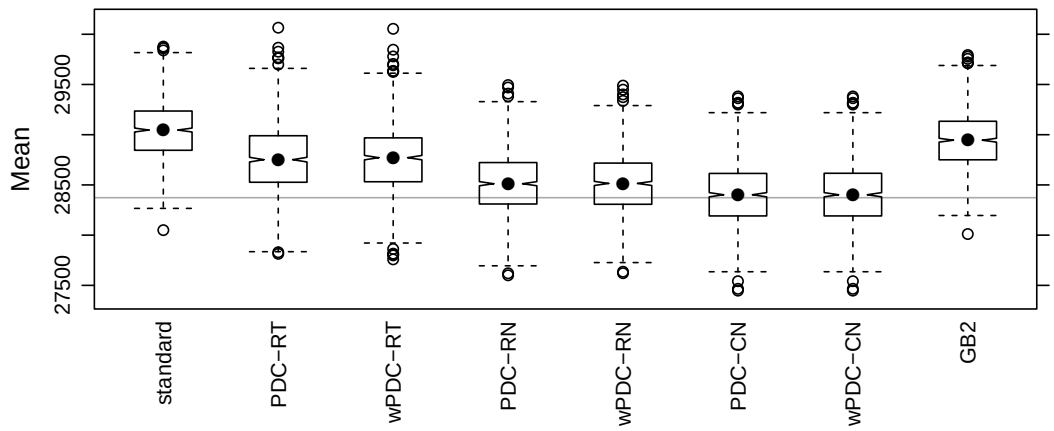

Figure F.517.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.258.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			29043.99	82523.50	671.10	2.37	29046.37	290.08	673.47	729.94	2.57	998.49	0.05
wHill	RT	300	28887.73	92701.98	514.84	1.81	28893.71	304.90	520.82	598.06	2.11	772.16	0.05
wHill	RT	500	28878.56	100857.35	505.67	1.78	28875.28	311.22	502.39	597.04	2.10	744.84	0.06
wHill	RT	700	28877.78	100603.44	504.89	1.78	28873.17	314.88	500.28	596.17	2.10	741.71	0.07
wHill	RN	300	28743.89	90348.90	371.00	1.31	28745.37	314.68	372.47	477.39	1.68	556.60	0.05
wHill	RN	500	28577.56	89172.52	204.67	0.72	28580.18	294.80	207.28	361.90	1.28	377.92	0.04
wHill	RN	700	28475.26	88675.11	102.37	0.36	28479.01	287.75	106.11	314.75	1.11	311.98	0.04
wHill	CN	300	28677.21	93679.55	304.32	1.07	28681.21	319.50	308.32	431.51	1.52	476.01	0.04
wHill	CN	500	28484.20	91974.11	111.30	0.39	28487.39	304.47	114.50	322.91	1.14	317.42	0.04
wHill	CN	700	28376.02	91690.04	3.13	0.01	28380.49	289.55	7.60	302.67	1.07	288.67	0.04
wISE	RT	300	28628.19	98193.97	255.30	0.90	28643.28	307.91	270.38	404.07	1.42	430.78	0.05
wISE	RT	500	28740.94	106658.79	368.04	1.30	28731.70	315.03	358.80	491.94	1.73	537.90	0.05
wISE	RT	700	28918.26	120026.31	545.37	1.92	28905.33	340.17	532.44	646.02	2.28	789.39	0.07
wISE	RN	300	28573.32	98067.43	200.43	0.71	28576.92	310.59	204.03	371.67	1.31	392.49	0.04
wISE	RN	500	28505.14	91301.37	132.25	0.47	28511.62	295.18	138.72	329.70	1.16	326.46	0.04
wISE	RN	700	28495.92	92338.73	123.03	0.43	28493.95	290.71	121.05	327.69	1.15	316.59	0.04
wISE	CN	300	28454.52	108874.29	81.63	0.29	28460.64	328.33	87.75	339.75	1.20	350.98	0.04
wISE	CN	500	28394.57	97219.39	21.67	0.08	28401.20	302.13	28.31	312.40	1.10	306.99	0.04
wISE	CN	700	28400.88	97129.26	27.99	0.10	28400.30	300.82	27.40	312.75	1.10	304.02	0.04
wPDC	RT	300	28582.41	110935.15	209.52	0.74	28579.11	324.05	206.22	393.35	1.39	401.75	0.05
wPDC	RT	500	28762.89	118941.77	390.00	1.37	28771.52	326.73	398.63	520.50	1.83	606.74	0.06
wPDC	RT	700	29072.97	155506.32	700.08	2.47	29054.90	385.19	682.01	803.41	2.83	1011.15	0.08
wPDC	RN	300	28533.48	101390.00	160.59	0.57	28537.25	324.32	164.36	356.48	1.26	356.24	0.04
wPDC	RN	500	28515.58	94114.37	142.69	0.50	28514.89	302.48	142.00	338.20	1.19	330.45	0.04
wPDC	RN	700	28543.20	95224.00	170.31	0.60	28546.09	311.58	173.20	352.33	1.24	340.09	0.04
wPDC	CN	300	28400.70	115475.02	27.80	0.10	28404.55	345.83	31.65	340.78	1.20	343.27	0.04
wPDC	CN	500	28406.30	101666.98	33.41	0.12	28402.26	314.88	29.37	320.44	1.13	309.42	0.04
wPDC	CN	700	28457.78	102293.47	84.89	0.30	28452.91	320.63	80.02	330.75	1.17	331.32	0.04
GB2			28950.05	82762.76	577.16	2.03	28945.13	283.27	572.24	644.82	2.27	848.40	0.05

OAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

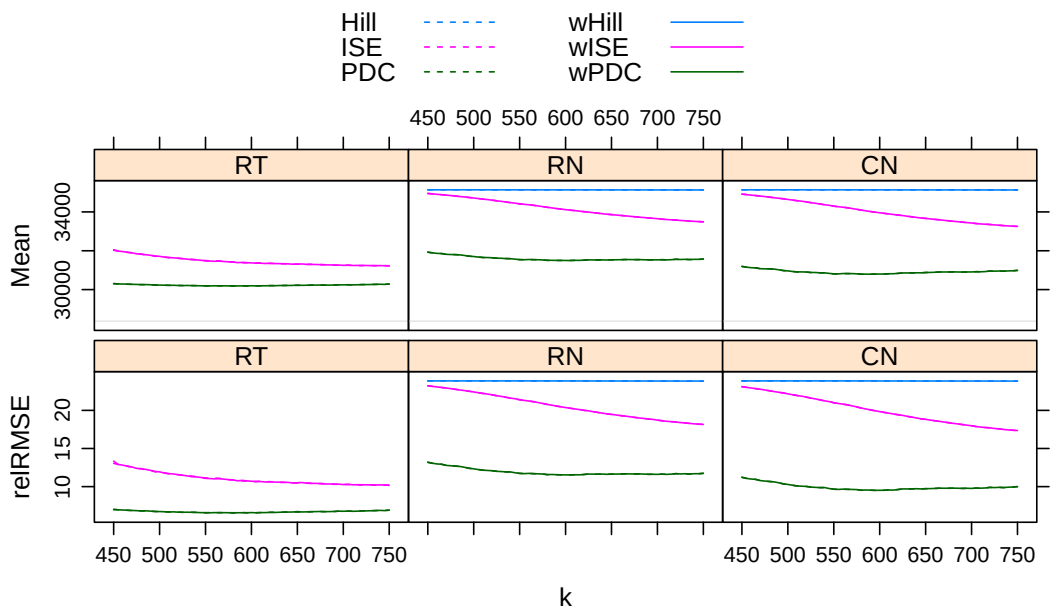

Figure F.518.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

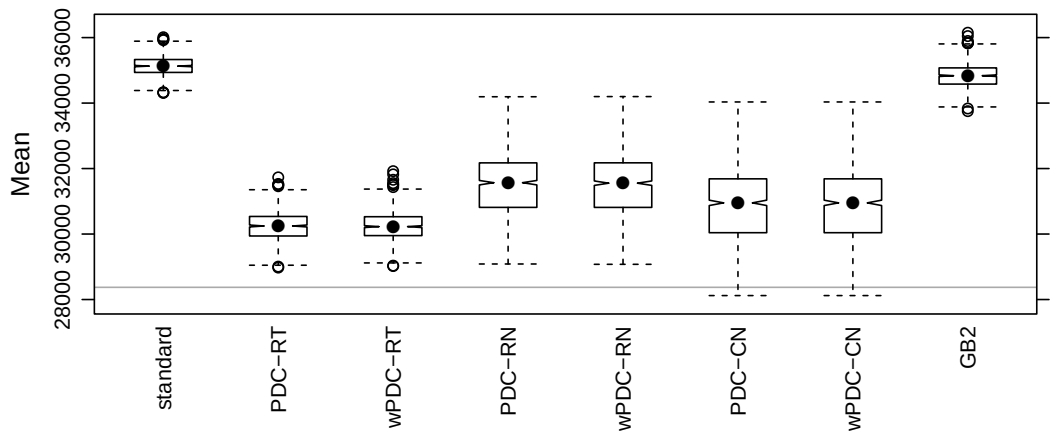

Figure F.519.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.259.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			35139.49	85243.17	6766.60	23.85	35129.58	292.52	6756.69	6772.89	23.87	10017.46	0.27
wHill	RT	500	35192.91	19657311.69	6820.02	24.04	34871.60	726.95	6498.71	8133.29	28.67	9634.98	4.93
wHill	RT	700	34357.10	693876.99	5984.21	21.09	34285.81	629.46	5912.92	6041.85	21.29	8766.49	0.64
wHill	RN	300	35139.49	85243.17	6766.60	23.85	35129.58	292.52	6756.69	6772.89	23.87	10017.46	0.27
wHill	RN	500	35138.53	85020.67	6765.64	23.85	35129.22	292.29	6756.32	6771.91	23.87	10016.93	0.27
wHill	RN	700	35133.59	84105.83	6760.70	23.83	35125.29	293.52	6752.40	6766.91	23.85	10011.11	0.27
wHill	CN	300	35139.49	85243.17	6766.60	23.85	35129.58	292.52	6756.69	6772.89	23.87	10017.46	0.27
wHill	CN	500	35138.38	84942.49	6765.48	23.84	35129.22	292.29	6756.32	6771.75	23.87	10016.93	0.27
wHill	CN	700	35133.04	84057.66	6760.14	23.83	35125.29	292.97	6752.40	6766.35	23.85	10011.11	0.27
wISE	RT	500	31713.21	311483.52	3340.32	11.77	31695.64	543.54	3322.75	3386.57	11.94	4926.30	0.20
wISE	RT	700	31247.80	220827.94	2874.91	10.13	31239.44	457.65	2866.54	2913.02	10.27	4249.94	0.16
wISE	RN	300	35139.42	85183.55	6766.52	23.85	35129.58	292.52	6756.69	6772.81	23.87	10017.46	0.27
wISE	RN	500	34716.57	210146.94	6343.68	22.36	34752.07	397.30	6379.18	6360.21	22.42	9457.77	0.27
wISE	RN	700	33652.02	365499.39	5279.13	18.61	33630.79	597.81	5257.90	5313.60	18.73	7795.36	0.24
wISE	CN	300	35139.41	85176.03	6766.51	23.85	35129.58	292.52	6756.69	6772.80	23.87	10017.46	0.27
wISE	CN	500	34642.26	252644.45	6269.37	22.10	34695.19	419.66	6322.29	6289.47	22.17	9373.43	0.27
wISE	CN	700	33429.97	455128.88	5057.08	17.82	33389.94	665.07	5017.05	5101.83	17.98	7438.27	0.24
wPDC	RT	500	30233.30	182416.20	1860.41	6.56	30223.39	423.45	1850.50	1908.76	6.73	2743.55	0.13
wPDC	RT	700	30244.30	185869.08	1871.41	6.60	30226.88	429.12	1853.98	1920.38	6.77	2748.71	0.13
wPDC	RN	300	34359.97	1254314.92	5987.08	21.10	34840.99	729.30	6468.09	6090.83	21.47	9589.59	0.27
wPDC	RN	500	31704.30	1151949.35	3331.41	11.74	31681.44	1149.56	3308.55	3499.87	12.34	4905.25	0.24
wPDC	RN	700	31531.24	877037.68	3158.35	11.13	31553.65	985.84	3180.76	3294.14	11.61	4715.79	0.21
wPDC	CN	300	34154.99	1945685.85	5782.09	20.38	34800.77	800.02	6427.87	5947.80	20.96	9529.97	0.27
wPDC	CN	500	30963.83	1803869.51	2590.94	9.13	30948.34	1462.54	2575.45	2918.05	10.28	3818.36	0.24
wPDC	CN	700	30909.20	1248392.72	2536.30	8.94	30952.55	1176.88	2579.66	2771.28	9.77	3824.60	0.20
GB2			34834.48	131983.26	6461.59	22.77	34836.57	372.03	6463.68	6471.79	22.81	9583.05	0.27

OAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

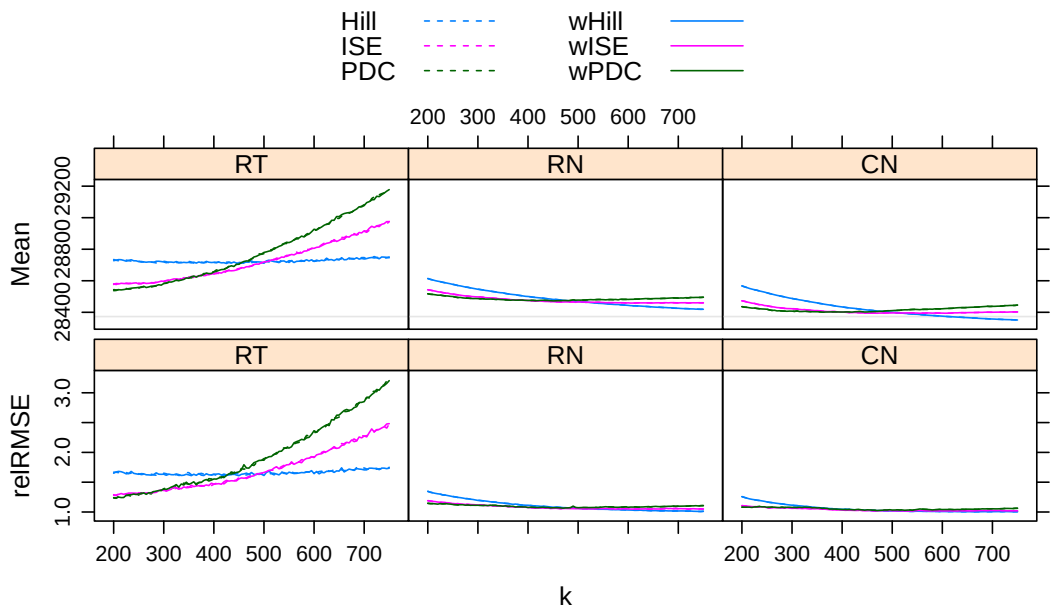

Figure F.520.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

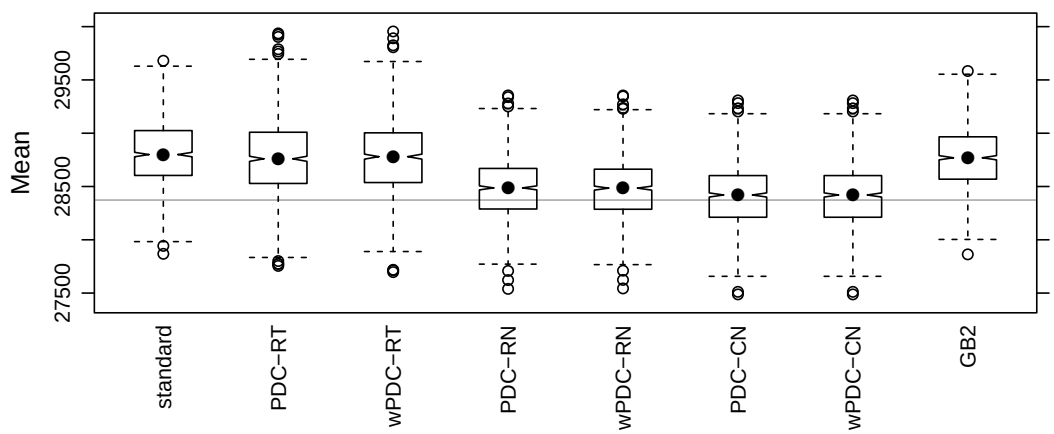

Figure F.521.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.260.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28810.14	90693.28	437.25	1.54	28799.71	315.14	426.81	530.84	1.87	634.01	0.05
wHill	RT	300	28719.32	95101.19	346.42	1.22	28710.50	306.00	337.61	463.70	1.63	520.93	0.04
wHill	RT	500	28711.15	94881.08	338.26	1.19	28703.45	304.47	330.55	457.39	1.61	506.27	0.05
wHill	RT	700	28738.08	101098.87	365.19	1.29	28730.54	319.49	357.64	484.11	1.71	540.99	0.05
wHill	RN	300	28545.85	84967.07	172.96	0.61	28541.62	283.78	168.73	338.82	1.19	340.11	0.04
wHill	RN	500	28467.41	81913.47	94.52	0.33	28474.42	284.08	101.53	301.27	1.06	299.66	0.04
wHill	RN	700	28425.56	80576.96	52.67	0.19	28430.03	287.38	57.14	288.57	1.02	285.75	0.03
wHill	CN	300	28487.71	86806.48	114.82	0.40	28489.91	285.75	117.02	316.07	1.11	315.16	0.04
wHill	CN	500	28399.87	82607.15	26.98	0.10	28410.44	285.99	37.54	288.53	1.02	285.49	0.03
wHill	CN	700	28357.27	81293.03	−15.62	−0.06	28360.15	287.77	−12.74	285.40	1.01	282.30	0.03
wISE	RT	300	28596.20	101031.21	223.30	0.79	28600.26	315.25	227.37	388.32	1.37	408.91	0.04
wISE	RT	500	28718.75	103059.95	345.86	1.22	28713.60	306.02	340.70	471.78	1.66	521.42	0.05
wISE	RT	700	28917.12	120906.34	544.23	1.92	28921.23	330.86	548.34	645.73	2.28	812.96	0.06
wISE	RN	300	28497.68	84820.60	124.79	0.44	28504.80	293.50	131.91	316.72	1.12	314.67	0.04
wISE	RN	500	28465.72	81468.60	92.83	0.33	28472.06	281.36	99.16	300.01	1.06	291.53	0.04
wISE	RN	700	28459.09	82312.22	86.20	0.30	28462.39	289.69	89.50	299.43	1.06	298.26	0.04
wISE	CN	300	28422.50	88312.93	49.60	0.17	28432.46	305.97	59.57	301.14	1.06	308.04	0.04
wISE	CN	500	28396.11	83212.59	23.21	0.08	28402.87	287.03	29.98	289.25	1.02	287.87	0.03
wISE	CN	700	28400.23	83994.19	27.34	0.10	28403.66	287.72	30.76	290.96	1.03	286.33	0.03
wPDC	RT	300	28582.38	110503.79	209.49	0.74	28585.97	334.42	213.07	392.78	1.38	417.34	0.05
wPDC	RT	500	28779.75	123788.55	406.86	1.43	28780.08	349.99	407.19	537.77	1.90	608.58	0.06
wPDC	RT	700	29076.99	158866.44	704.10	2.48	29072.38	396.79	699.49	808.99	2.85	1037.06	0.08
wPDC	RN	300	28486.79	86911.68	113.90	0.40	28493.51	307.28	120.61	315.91	1.11	311.01	0.04
wPDC	RN	500	28477.32	81693.56	104.43	0.37	28484.66	278.88	111.76	304.17	1.07	301.07	0.03
wPDC	RN	700	28489.85	83446.11	116.96	0.41	28488.44	285.99	115.55	311.52	1.10	306.18	0.04
wPDC	CN	300	28407.25	92195.37	34.36	0.12	28416.12	311.71	43.23	305.42	1.08	311.31	0.04
wPDC	CN	500	28410.68	84573.59	37.79	0.13	28420.37	287.96	47.48	293.12	1.03	293.44	0.03
wPDC	CN	700	28437.63	85328.33	64.74	0.23	28440.85	287.03	67.96	299.05	1.05	297.60	0.04
GB2			28774.52	83968.03	401.63	1.42	28769.79	295.81	396.90	495.17	1.75	589.96	0.04

OAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

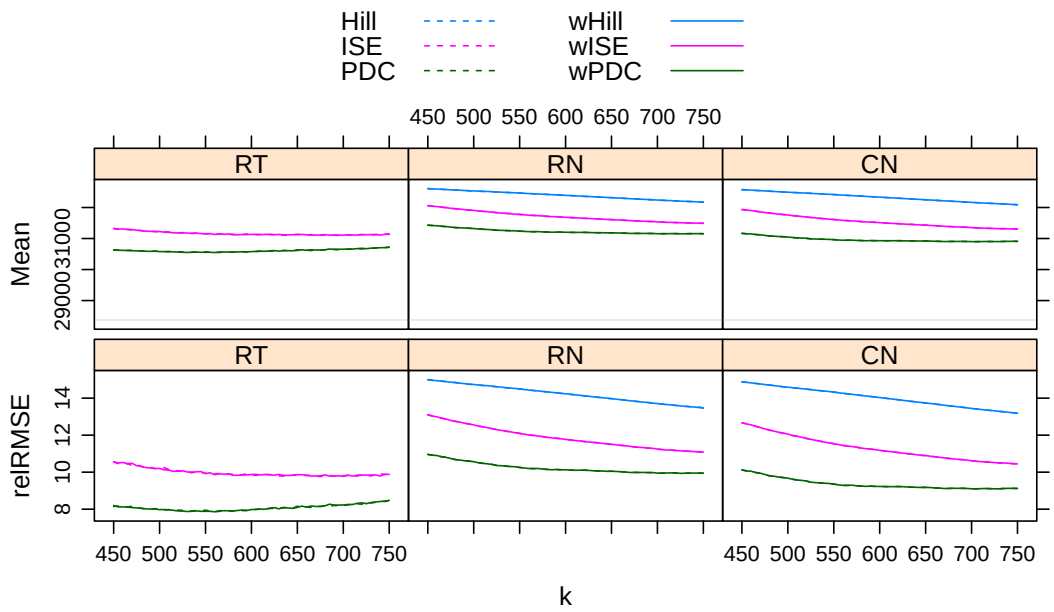

Figure F.522.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

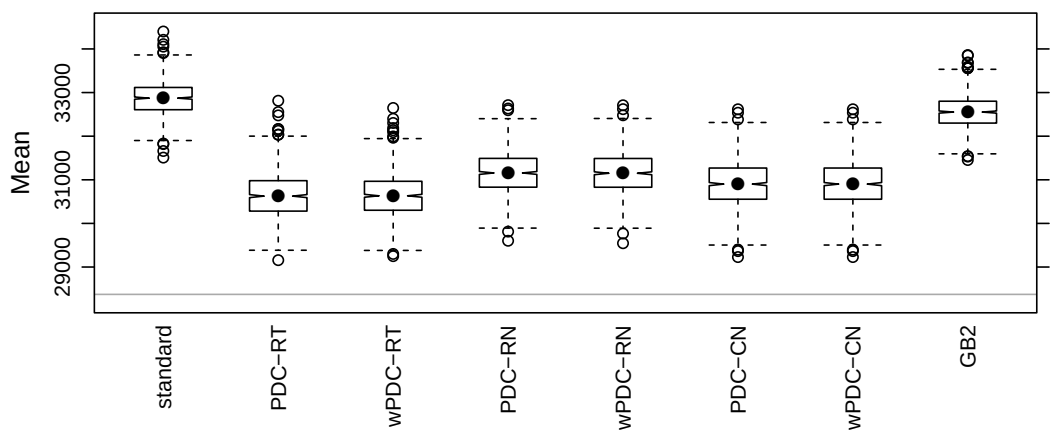

Figure F.523.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.261.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			32865.16	156864.83	4492.27	15.83	32872.13	379.27	4499.24	4509.68	15.89	6670.58	0.21
wHill	RT	500	32627.22	375843.69	4254.32	14.99	32576.08	584.12	4203.18	4298.22	15.15	6231.64	0.31
wHill	RT	700	32419.10	284136.05	4046.21	14.26	32382.74	508.51	4009.85	4081.14	14.38	5945.00	0.24
wHill	RN	300	32770.26	156487.31	4397.37	15.50	32777.53	402.75	4404.64	4415.11	15.56	6530.32	0.21
wHill	RN	500	32535.37	167146.62	4162.48	14.67	32538.72	405.97	4165.83	4182.49	14.74	6176.26	0.24
wHill	RN	700	32240.52	164302.79	3867.62	13.63	32242.87	398.53	3869.98	3888.79	13.71	5737.63	0.18
wHill	CN	300	32759.65	158434.37	4386.76	15.46	32762.74	404.98	4389.84	4404.76	15.52	6508.38	0.21
wHill	CN	500	32493.41	165597.38	4120.52	14.52	32495.82	413.87	4122.92	4140.54	14.59	6112.65	0.19
wHill	CN	700	32165.23	168992.95	3792.34	13.37	32166.13	407.77	3793.24	3814.53	13.44	5623.85	0.18
wISE	RT	500	31223.17	253362.65	2850.27	10.05	31205.02	469.00	2832.12	2894.33	10.20	4198.91	0.17
wISE	RT	700	31107.41	213964.93	2734.52	9.64	31076.07	458.76	2703.18	2773.33	9.77	4007.73	0.17
wISE	RN	300	32612.91	177973.13	4240.02	14.94	32623.58	423.09	4250.69	4260.93	15.02	6302.07	0.20
wISE	RN	500	31906.04	205295.15	3533.15	12.45	31917.39	459.48	3544.50	3562.06	12.55	5255.08	0.17
wISE	RN	700	31534.93	179298.46	3162.04	11.14	31527.16	445.33	3154.27	3190.23	11.24	4676.52	0.16
wISE	CN	300	32573.33	187638.98	4200.43	14.80	32591.69	432.93	4218.80	4222.69	14.88	6254.79	0.20
wISE	CN	500	31759.07	237167.01	3386.18	11.93	31767.84	491.21	3394.95	3420.98	12.06	5033.35	0.17
wISE	CN	700	31351.07	204631.77	2978.18	10.50	31339.08	477.80	2966.18	3012.31	10.62	4397.66	0.16
wPDC	RT	500	30578.41	253543.38	2205.51	7.77	30573.40	510.62	2200.51	2262.21	7.97	3262.48	0.14
wPDC	RT	700	30654.76	240282.53	2281.86	8.04	30633.38	491.86	2260.49	2333.87	8.23	3351.40	0.15
wPDC	RN	300	32133.00	342377.15	3760.11	13.25	32180.94	594.99	3808.04	3805.32	13.41	5645.80	0.19
wPDC	RN	500	31322.30	288827.49	2949.41	10.40	31329.76	548.11	2956.87	2997.92	10.57	4383.86	0.16
wPDC	RN	700	31154.81	227597.98	2781.91	9.80	31149.41	478.41	2776.52	2822.48	9.95	4116.47	0.15
wPDC	CN	300	31990.25	454414.25	3617.36	12.75	32056.15	668.35	3683.26	3679.57	12.97	5460.80	0.19
wPDC	CN	500	31048.02	380472.61	2675.13	9.43	31051.86	637.12	2678.97	2745.25	9.68	3971.84	0.16
wPDC	CN	700	30899.87	284293.55	2526.98	8.91	30901.40	537.92	2528.50	2582.56	9.10	3748.76	0.15
GB2			32557.92	140917.07	4185.03	14.75	32552.79	372.49	4179.90	4201.81	14.81	6197.12	0.19

Stratified Midzuno sampling

No contamination

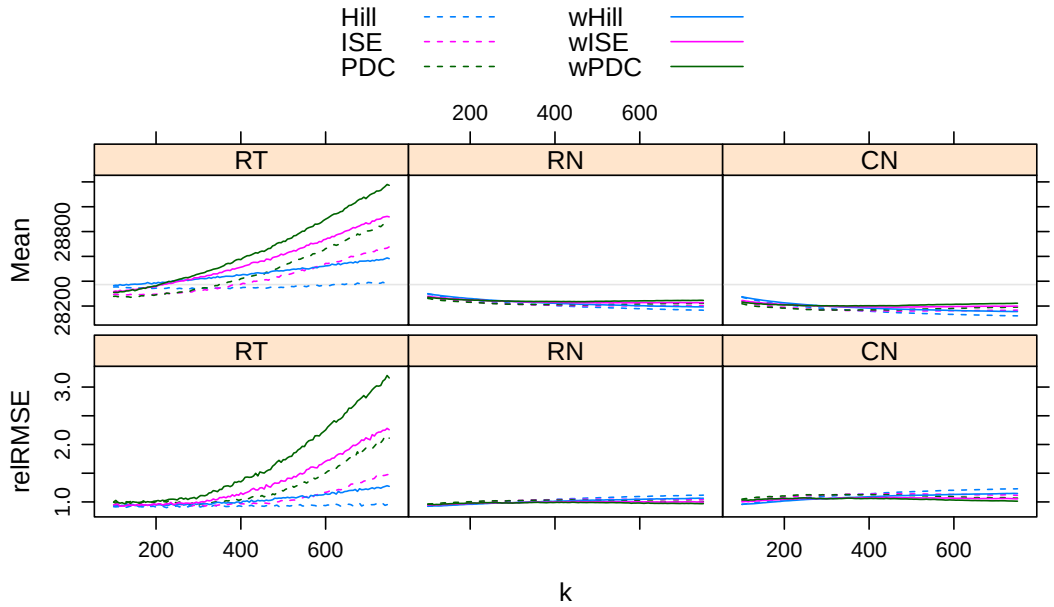

Figure F.524.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 100 and 750.

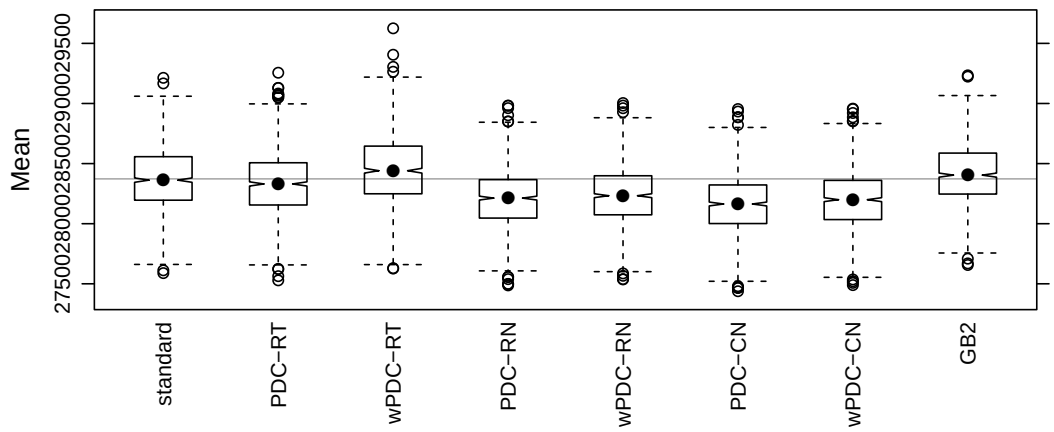

Figure F.525.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 300$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.262.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28377.79	65728.79	4.89	0.02	28362.46	272.52	−10.43	256.29	0.90	269.84	0.03
wHill	RT	300	28418.40	73019.23	45.50	0.16	28403.68	275.79	30.79	273.89	0.97	271.75	0.04
wHill	RT	500	28482.95	80776.88	110.06	0.39	28463.79	290.96	90.89	304.65	1.07	290.07	0.04
wHill	RT	700	28566.13	81775.16	193.23	0.68	28553.88	289.94	180.99	345.01	1.22	334.18	0.04
wHill	RN	300	28237.28	60066.30	−135.62	−0.48	28229.86	249.46	−143.03	280.00	0.99	298.36	0.03
wHill	RN	500	28211.06	59668.65	−161.84	−0.57	28202.51	238.37	−170.38	292.92	1.03	315.38	0.03
wHill	RN	700	28195.62	58654.11	−177.27	−0.62	28190.44	236.49	−182.46	300.03	1.06	324.04	0.03
wHill	CN	300	28199.34	60248.23	−173.55	−0.61	28191.59	243.54	−181.31	300.51	1.06	323.13	0.03
wHill	CN	500	28172.24	59765.94	−200.65	−0.71	28165.47	236.07	−207.43	316.17	1.11	339.62	0.03
wHill	CN	700	28158.16	58876.42	−214.74	−0.76	28152.56	232.68	−220.33	323.93	1.14	354.52	0.03
wISE	RT	300	28428.05	74738.44	55.16	0.19	28419.63	269.40	46.73	278.76	0.98	264.57	0.03
wISE	RT	500	28612.10	92222.77	239.21	0.84	28604.25	291.39	231.35	386.46	1.36	403.51	0.05
wISE	RT	700	28862.69	114201.73	489.80	1.73	28852.10	332.12	479.21	594.97	2.10	710.48	0.08
wISE	RN	300	28236.81	59530.87	−136.08	−0.48	28228.28	243.29	−144.61	279.27	0.98	295.26	0.03
wISE	RN	500	28226.80	59675.49	−146.09	−0.51	28219.15	241.02	−153.74	284.53	1.00	304.91	0.03
wISE	RN	700	28228.25	59653.61	−144.64	−0.51	28220.31	244.62	−152.59	283.75	1.00	303.74	0.03
wISE	CN	300	28198.54	59935.43	−174.35	−0.61	28192.42	243.96	−180.47	300.46	1.06	320.09	0.03
wISE	CN	500	28192.27	60102.88	−180.63	−0.64	28185.71	240.81	−187.18	304.42	1.07	326.34	0.03
wISE	CN	700	28198.88	59850.27	−174.01	−0.61	28192.03	241.69	−180.87	300.12	1.06	323.18	0.03
wPDC	RT	300	28457.89	87629.30	84.99	0.30	28440.87	290.03	67.98	307.84	1.08	297.93	0.04
wPDC	RT	500	28722.05	120731.90	349.16	1.23	28715.05	340.43	342.16	492.46	1.74	527.80	0.05
wPDC	RT	700	29081.59	157774.15	708.69	2.50	29081.16	390.53	708.26	812.32	2.86	1050.07	0.08
wPDC	RN	300	28239.14	59475.44	−133.75	−0.47	28232.85	241.08	−140.04	278.04	0.98	294.58	0.03
wPDC	RN	500	28238.02	60633.22	−134.87	−0.48	28229.48	241.05	−143.41	280.65	0.99	300.90	0.03
wPDC	RN	700	28245.62	60345.15	−127.27	−0.45	28237.18	239.39	−135.72	276.56	0.97	290.33	0.03
wPDC	CN	300	28202.27	60312.84	−170.62	−0.60	28199.86	242.79	−173.04	298.94	1.05	320.53	0.03
wPDC	CN	500	28207.18	61233.62	−165.72	−0.58	28199.18	239.34	−173.71	297.71	1.05	315.28	0.03
wPDC	CN	700	28219.82	60387.95	−153.07	−0.54	28216.87	239.00	−156.02	289.41	1.02	302.38	0.03
GB2			28413.00	64337.76	40.11	0.14	28403.99	253.76	31.10	256.68	0.90	260.51	0.03

OCAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

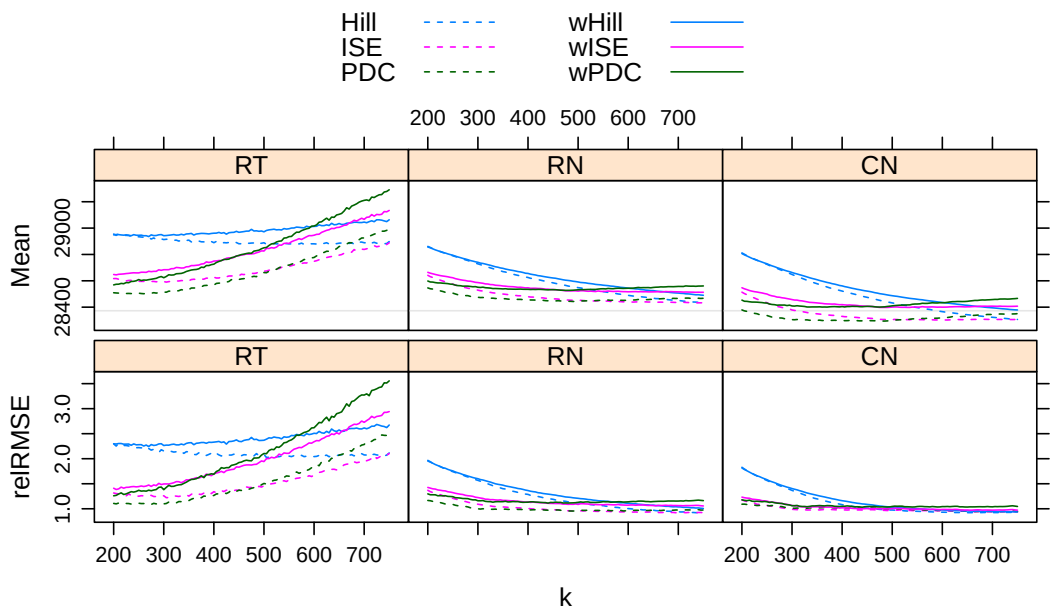

Figure F.526.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

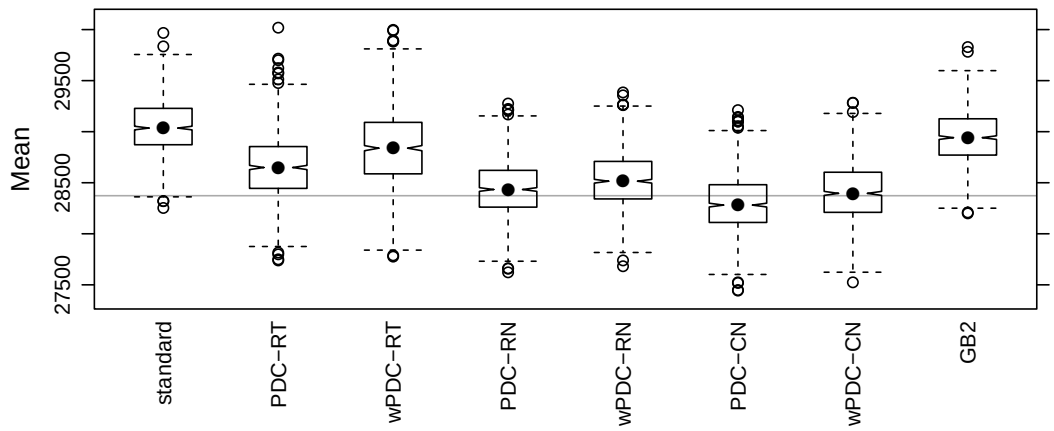

Figure F.527.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.263.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			29046.54	66197.55	673.64	2.37	29035.60	264.58	662.71	721.06	2.54	982.53	0.06
wHill	RT	300	28942.39	88207.78	569.50	2.01	28939.46	295.57	566.56	642.22	2.26	839.99	0.07
wHill	RT	500	28971.80	93213.08	598.91	2.11	28954.28	316.97	581.38	672.17	2.37	861.96	0.06
wHill	RT	700	29045.49	98225.95	672.60	2.37	29030.77	305.39	657.88	741.97	2.62	975.37	0.07
wHill	RN	300	28740.58	71095.24	367.69	1.30	28730.00	273.96	357.11	454.12	1.60	531.14	0.05
wHill	RN	500	28591.20	70064.98	218.30	0.77	28580.81	264.53	207.92	343.00	1.21	358.56	0.04
wHill	RN	700	28506.95	68633.10	134.05	0.47	28497.90	260.45	125.01	294.17	1.04	277.27	0.04
wHill	CN	300	28662.96	74584.42	290.07	1.02	28649.53	273.01	276.64	398.31	1.40	423.44	0.05
wHill	CN	500	28486.95	72923.69	114.05	0.40	28473.97	267.96	101.08	293.02	1.03	281.16	0.04
wHill	CN	700	28394.94	71378.16	22.04	0.08	28388.47	266.70	15.58	267.94	0.94	265.07	0.03
wISE	RT	300	28684.15	83267.01	311.25	1.10	28668.78	283.03	295.88	424.34	1.50	456.69	0.05
wISE	RT	500	28825.90	98721.04	453.01	1.60	28810.67	306.09	437.78	551.21	1.94	649.05	0.06
wISE	RT	700	29065.86	118022.74	692.97	2.44	29049.29	340.59	676.40	773.38	2.73	1002.83	0.07
wISE	RN	300	28586.58	75026.02	213.69	0.75	28573.78	273.12	200.89	347.30	1.22	351.32	0.04
wISE	RN	500	28521.88	73039.56	148.99	0.53	28512.64	264.70	139.75	308.49	1.09	299.89	0.03
wISE	RN	700	28516.09	70553.76	143.20	0.50	28511.74	259.55	138.85	301.64	1.06	284.62	0.04
wISE	CN	300	28457.56	84413.56	84.66	0.30	28442.55	297.01	69.66	302.49	1.07	296.47	0.04
wISE	CN	500	28400.62	80201.62	27.72	0.10	28386.69	281.68	13.80	284.41	1.00	280.66	0.03
wISE	CN	700	28407.62	74960.80	34.73	0.12	28404.10	272.48	31.21	275.85	0.97	270.88	0.04
wPDC	RT	300	28623.23	91042.35	250.34	0.88	28601.43	306.57	228.54	391.95	1.38	387.09	0.05
wPDC	RT	500	28850.43	128475.82	477.53	1.68	28838.58	372.80	465.68	596.98	2.10	696.23	0.06
wPDC	RT	700	29210.53	160396.32	837.63	2.95	29194.65	378.29	821.76	928.37	3.27	1218.33	0.09
wPDC	RN	300	28550.96	76755.21	178.07	0.63	28543.41	287.75	170.52	329.22	1.16	323.52	0.04
wPDC	RN	500	28531.67	77389.36	158.78	0.56	28514.80	272.40	141.91	320.19	1.13	306.27	0.04
wPDC	RN	700	28557.39	73292.22	184.50	0.65	28552.66	264.22	179.76	327.50	1.15	332.11	0.04
wPDC	CN	300	28409.13	89398.58	36.24	0.13	28394.76	306.90	21.87	301.04	1.06	306.51	0.03
wPDC	CN	500	28410.11	86920.39	37.22	0.13	28395.66	297.74	22.76	297.02	1.05	296.13	0.03
wPDC	CN	700	28457.63	79711.17	84.74	0.30	28453.15	279.36	80.26	294.64	1.04	291.80	0.04
GB2			28948.88	65849.92	575.99	2.03	28941.73	261.62	568.84	630.52	2.22	843.36	0.05

OCAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

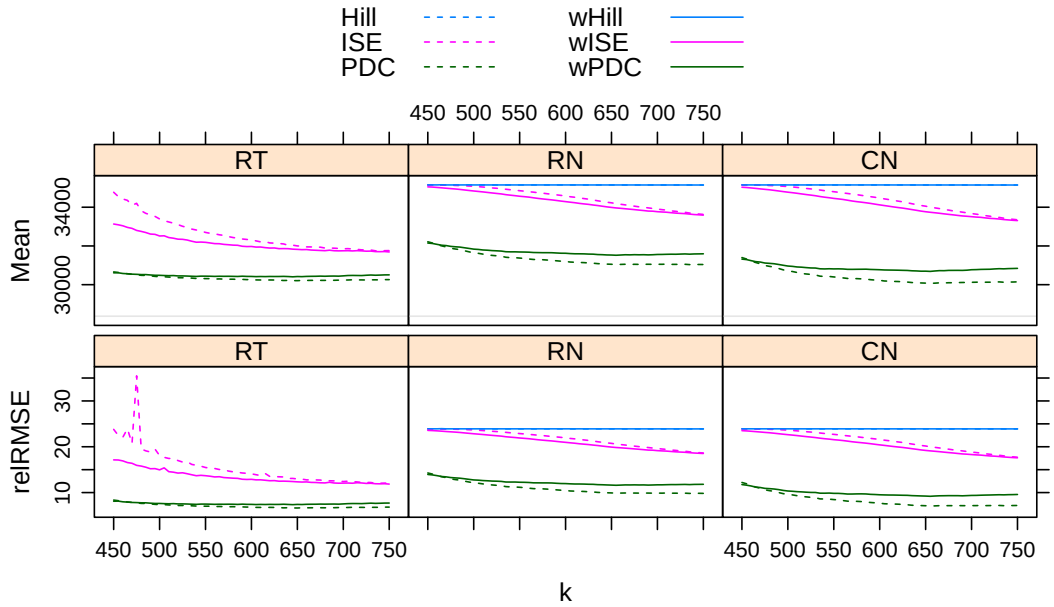

Figure F.528.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

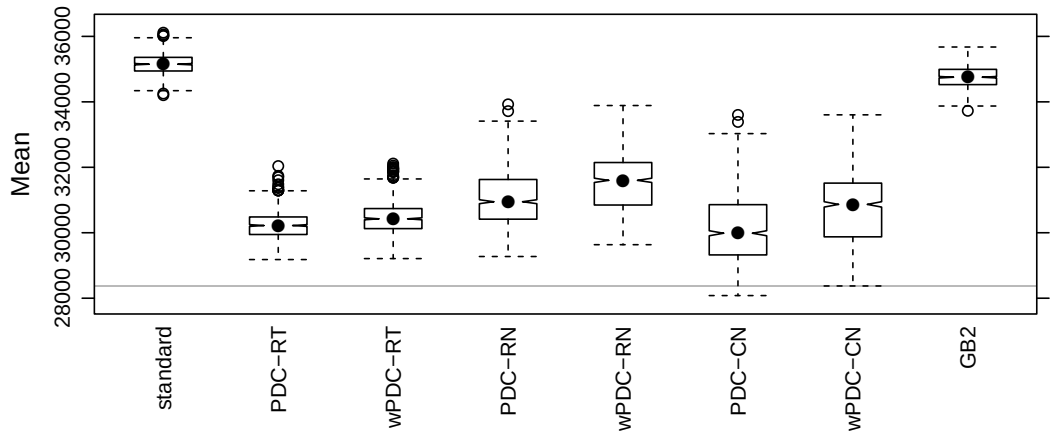

Figure F.529.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.264.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			35152.05	91965.71	6779.15	23.89	35150.02	307.42	6777.13	6785.93	23.92	10047.77	0.27
wHill	RT	500	38202.24	31997745.47	9829.35	34.64	37251.00	1649.12	8878.11	11339.39	39.97	13162.69	3.34
wHill	RT	700	36186.08	4061677.08	7813.19	27.54	35803.84	1136.09	7430.95	8068.68	28.44	11017.13	1.31
wHill	RN	300	35152.05	91965.71	6779.15	23.89	35150.02	307.42	6777.13	6785.93	23.92	10047.77	0.27
wHill	RN	500	35150.35	92048.60	6777.46	23.89	35147.03	307.57	6774.14	6784.24	23.91	10043.34	0.27
wHill	RN	700	35147.65	91997.23	6774.76	23.88	35146.41	307.01	6773.52	6781.54	23.90	10042.41	0.27
wHill	CN	300	35152.05	91965.71	6779.15	23.89	35150.02	307.42	6777.13	6785.93	23.92	10047.77	0.27
wHill	CN	500	35150.23	92081.58	6777.34	23.89	35147.03	307.30	6774.14	6784.12	23.91	10043.34	0.27
wHill	CN	700	35147.09	91898.11	6774.19	23.88	35146.41	307.28	6773.52	6780.97	23.90	10042.41	0.27
wISE	RT	500	32515.01	865209.72	4142.12	14.60	32410.89	732.19	4037.99	4245.17	14.96	5986.73	0.75
wISE	RT	700	31750.43	314465.01	3377.54	11.90	31702.85	546.40	3329.96	3423.73	12.07	4937.00	0.22
wISE	RN	300	35152.05	91965.71	6779.15	23.89	35150.02	307.42	6777.13	6785.93	23.92	10047.77	0.27
wISE	RN	500	34837.03	196249.89	6464.14	22.78	34855.50	414.74	6482.60	6479.29	22.84	9611.11	0.27
wISE	RN	700	33769.30	411700.39	5396.40	19.02	33687.09	695.21	5314.20	5434.38	19.15	7878.83	0.25
wISE	CN	300	35152.05	91965.71	6779.15	23.89	35150.02	307.42	6777.13	6785.93	23.92	10047.77	0.27
wISE	CN	500	34776.68	241605.48	6403.79	22.57	34805.04	450.35	6432.15	6422.61	22.64	9536.30	0.27
wISE	CN	700	33512.14	548423.70	5139.25	18.11	33388.63	790.34	5015.73	5192.28	18.30	7436.33	0.25
wPDC	RT	500	30483.71	227843.24	2110.82	7.44	30443.21	455.55	2070.32	2164.06	7.63	3069.45	0.13
wPDC	RT	700	30455.75	223251.66	2082.86	7.34	30425.98	458.40	2053.09	2135.73	7.53	3043.90	0.13
wPDC	RN	300	34879.48	567009.66	6506.59	22.93	35090.83	373.84	6717.93	6549.97	23.09	9960.01	0.27
wPDC	RN	500	31836.02	1114333.45	3463.13	12.21	31821.08	1178.30	3448.18	3620.29	12.76	5112.28	0.24
wPDC	RN	700	31560.40	849594.14	3187.51	11.23	31601.44	956.60	3228.54	3317.97	11.69	4786.64	0.19
wPDC	CN	300	34793.95	913906.64	6421.06	22.63	35090.83	380.13	6717.93	6491.76	22.88	9960.01	0.27
wPDC	CN	500	30963.47	1906590.75	2590.57	9.13	30940.88	1574.87	2567.98	2935.26	10.35	3807.29	0.24
wPDC	CN	700	30772.39	1321520.66	2399.50	8.46	30866.56	1198.87	2493.67	2660.41	9.38	3697.12	0.18
GB2			34759.36	105316.22	6386.47	22.51	34751.99	344.94	6379.10	6394.70	22.54	9457.65	0.26

OCAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

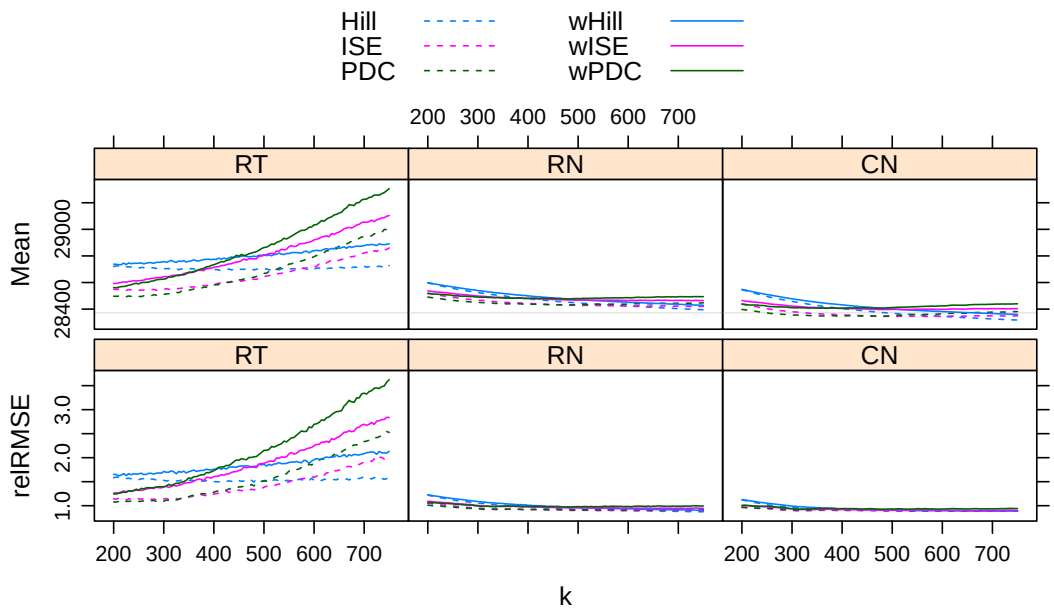

Figure F.530.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

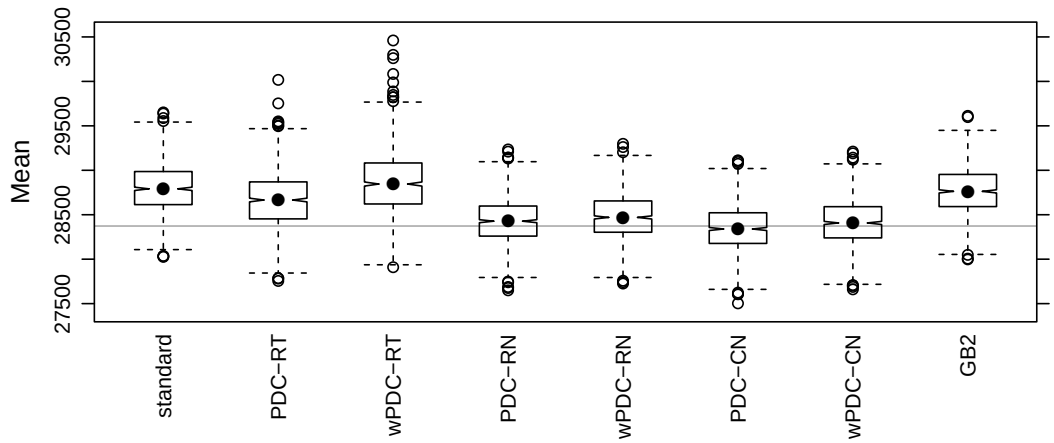

Figure F.531.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.265.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28800.91	74826.54	428.02	1.51	28791.36	275.51	418.47	507.89	1.79	620.42	0.05
wHill	RT	300	28757.75	88074.43	384.86	1.36	28750.30	300.49	377.41	485.90	1.71	562.73	0.05
wHill	RT	500	28809.13	89642.06	436.23	1.54	28801.86	296.32	428.97	529.01	1.86	639.67	0.06
wHill	RT	700	28877.45	94774.23	504.56	1.78	28872.24	318.50	499.35	590.98	2.08	740.34	0.05
wHill	RN	300	28539.17	67293.17	166.28	0.59	28535.67	263.23	162.77	308.02	1.09	298.08	0.04
wHill	RN	500	28470.36	65047.74	97.46	0.34	28460.73	255.92	87.84	272.91	0.96	253.06	0.03
wHill	RN	700	28435.59	62795.70	62.69	0.22	28426.22	246.52	53.33	258.19	0.91	250.08	0.03
wHill	CN	300	28477.39	68398.41	104.50	0.37	28473.72	257.20	100.83	281.51	0.99	262.39	0.04
wHill	CN	500	28400.88	65407.23	27.99	0.10	28387.03	247.01	14.14	257.15	0.91	245.77	0.03
wHill	CN	700	28366.41	63379.88	−6.48	−0.02	28354.43	245.04	−18.47	251.71	0.89	246.12	0.03
wISE	RT	300	28643.96	82934.28	271.07	0.96	28619.66	283.92	246.77	395.39	1.39	408.74	0.04
wISE	RT	500	28804.21	98605.95	431.32	1.52	28794.68	313.01	421.79	533.43	1.88	627.87	0.05
wISE	RT	700	29054.23	120458.40	681.33	2.40	29037.80	333.47	664.90	764.56	2.69	985.79	0.07
wISE	RN	300	28498.83	65410.53	125.94	0.44	28490.47	257.67	117.58	284.96	1.00	264.61	0.03
wISE	RN	500	28468.77	64330.36	95.87	0.34	28458.54	249.26	85.65	271.03	0.96	249.44	0.03
wISE	RN	700	28465.20	63657.04	92.31	0.33	28461.22	247.14	88.33	268.54	0.95	249.22	0.03
wISE	CN	300	28422.98	67976.76	50.09	0.18	28410.35	259.83	37.46	265.36	0.94	259.46	0.03
wISE	CN	500	28398.55	66096.82	25.66	0.09	28389.96	245.84	17.06	258.24	0.91	245.95	0.03
wISE	CN	700	28403.18	64538.06	30.28	0.11	28394.43	250.93	21.53	255.72	0.90	244.53	0.03
wPDC	RT	300	28625.47	92746.67	252.58	0.89	28604.48	295.92	231.58	395.54	1.39	395.64	0.05
wPDC	RT	500	28863.20	133010.49	490.30	1.73	28845.32	336.90	472.43	610.96	2.15	700.43	0.07
wPDC	RT	700	29226.22	171570.92	853.33	3.01	29206.49	413.29	833.60	948.46	3.34	1235.90	0.11
wPDC	RN	300	28490.41	66213.74	117.52	0.41	28476.87	258.52	103.98	282.77	1.00	263.45	0.03
wPDC	RN	500	28479.19	66397.22	106.29	0.37	28469.82	254.30	96.93	278.62	0.98	255.21	0.03
wPDC	RN	700	28493.09	64641.86	120.20	0.42	28489.01	255.01	116.12	281.11	0.99	261.26	0.03
wPDC	CN	300	28410.77	69743.35	37.88	0.13	28395.55	259.66	22.66	266.66	0.94	258.33	0.03
wPDC	CN	500	28411.85	68396.94	38.96	0.14	28407.68	259.54	34.78	264.28	0.93	255.32	0.03
wPDC	CN	700	28436.33	66113.94	63.44	0.22	28423.28	257.83	50.38	264.71	0.93	250.07	0.03
GB2			28767.06	68198.89	394.17	1.39	28762.78	265.98	389.89	472.76	1.67	578.05	0.04

OCAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

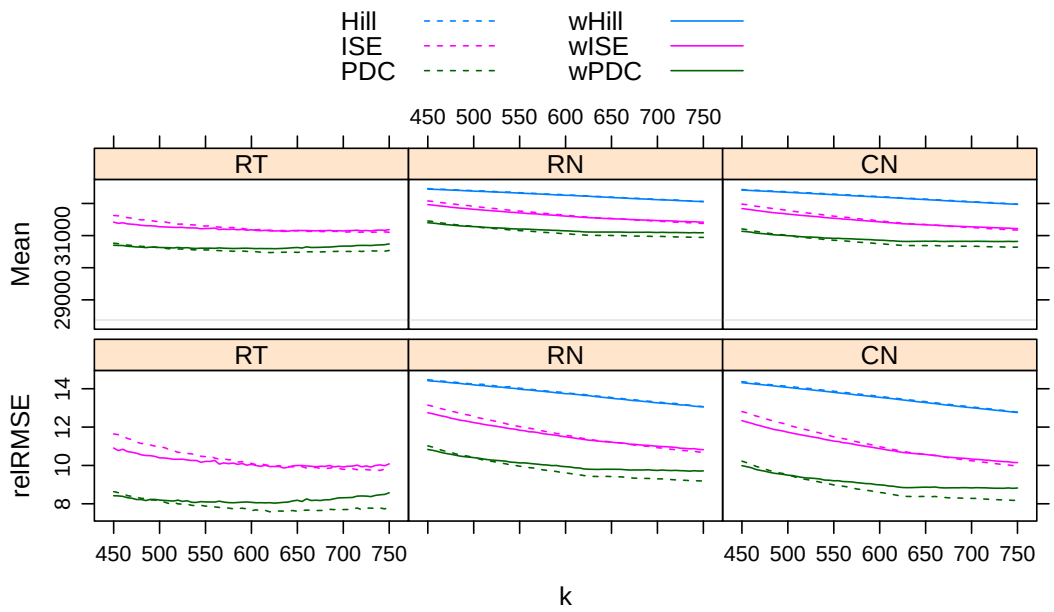

Figure F.532.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

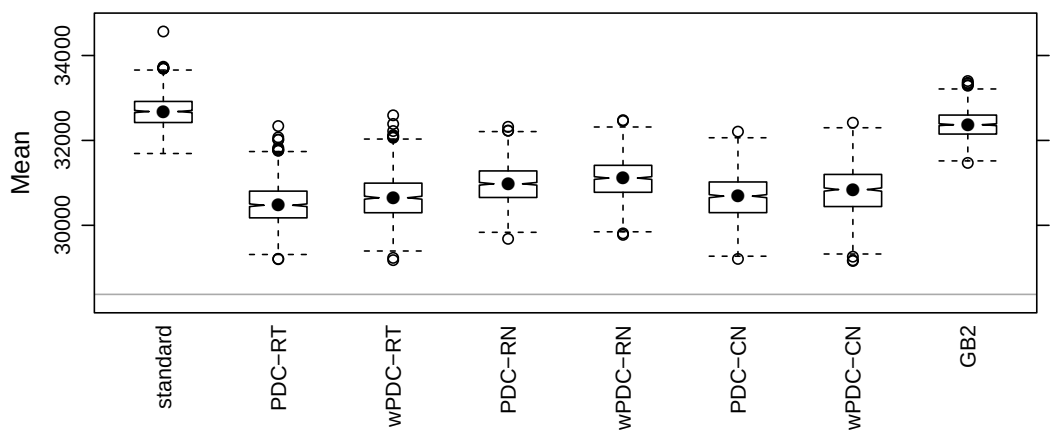

Figure F.533.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.266.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			32683.87	143162.48	4310.97	15.19	32680.47	368.40	4307.58	4327.53	15.25	6386.42	0.22
wHill	RT	500	32741.22	570623.48	4368.33	15.40	32684.89	632.42	4312.00	4433.10	15.62	6392.97	0.47
wHill	RT	700	32511.72	383200.64	4138.83	14.59	32462.65	576.95	4089.76	4184.82	14.75	6063.47	0.24
wHill	RN	300	32601.37	136276.32	4228.48	14.90	32612.30	373.39	4239.41	4244.55	14.96	6285.35	0.19
wHill	RN	500	32385.41	143900.11	4012.52	14.14	32389.79	371.83	4016.90	4030.39	14.21	5955.45	0.19
wHill	RN	700	32118.41	141120.97	3745.51	13.20	32116.98	384.70	3744.09	3764.29	13.27	5550.99	0.17
wHill	CN	300	32592.65	137388.32	4219.76	14.87	32603.84	373.02	4230.95	4235.99	14.93	6272.80	0.19
wHill	CN	500	32346.24	145818.16	3973.34	14.00	32354.83	375.27	3981.93	3991.63	14.07	5903.61	0.18
wHill	CN	700	32044.02	149095.54	3671.13	12.94	32041.46	394.44	3668.56	3691.36	13.01	5439.01	0.17
wISE	RT	500	31273.88	279702.80	2900.99	10.22	31228.91	499.61	2856.02	2948.76	10.39	4234.33	0.18
wISE	RT	700	31144.72	240839.36	2771.83	9.77	31116.84	481.05	2743.95	2814.90	9.92	4068.18	0.17
wISE	RN	300	32465.53	160083.07	4092.63	14.42	32470.52	389.90	4097.63	4112.13	14.49	6075.15	0.20
wISE	RN	500	31817.53	182346.56	3444.64	12.14	31816.14	420.25	3443.25	3470.98	12.23	5104.96	0.17
wISE	RN	700	31468.76	158933.05	3095.86	10.91	31474.72	407.61	3101.83	3121.40	11.00	4598.77	0.16
wISE	CN	300	32429.88	168325.49	4056.99	14.30	32443.74	398.52	4070.84	4077.66	14.37	6035.43	0.19
wISE	CN	500	31669.08	215821.91	3296.19	11.62	31666.26	456.04	3293.36	3328.74	11.73	4882.74	0.17
wISE	CN	700	31271.37	189938.41	2898.48	10.22	31277.84	433.19	2904.95	2931.03	10.33	4306.87	0.15
wPDC	RT	500	30630.11	309040.07	2257.21	7.96	30581.78	517.65	2208.89	2324.60	8.19	3274.90	0.19
wPDC	RT	700	30672.73	275645.08	2299.84	8.11	30649.81	517.43	2276.92	2358.95	8.31	3375.76	0.15
wPDC	RN	300	32071.38	336729.64	3698.49	13.04	32137.71	521.07	3764.82	3743.69	13.19	5581.72	0.18
wPDC	RN	500	31279.81	268773.60	2906.92	10.25	31282.58	526.91	2909.69	2952.74	10.41	4313.90	0.17
wPDC	RN	700	31096.45	218370.65	2723.55	9.60	31113.37	474.94	2740.48	2763.31	9.74	4063.04	0.14
wPDC	CN	300	31937.15	482330.33	3564.26	12.56	32043.40	600.50	3670.51	3631.23	12.80	5441.89	0.18
wPDC	CN	500	30996.07	369722.71	2623.18	9.25	31014.46	615.21	2641.56	2692.66	9.49	3916.38	0.17
wPDC	CN	700	30818.97	290545.75	2446.07	8.62	30842.81	550.93	2469.92	2504.70	8.83	3661.91	0.14
GB2			32377.76	108200.60	4004.87	14.12	32370.15	331.69	3997.26	4018.34	14.16	5926.34	0.18

OAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

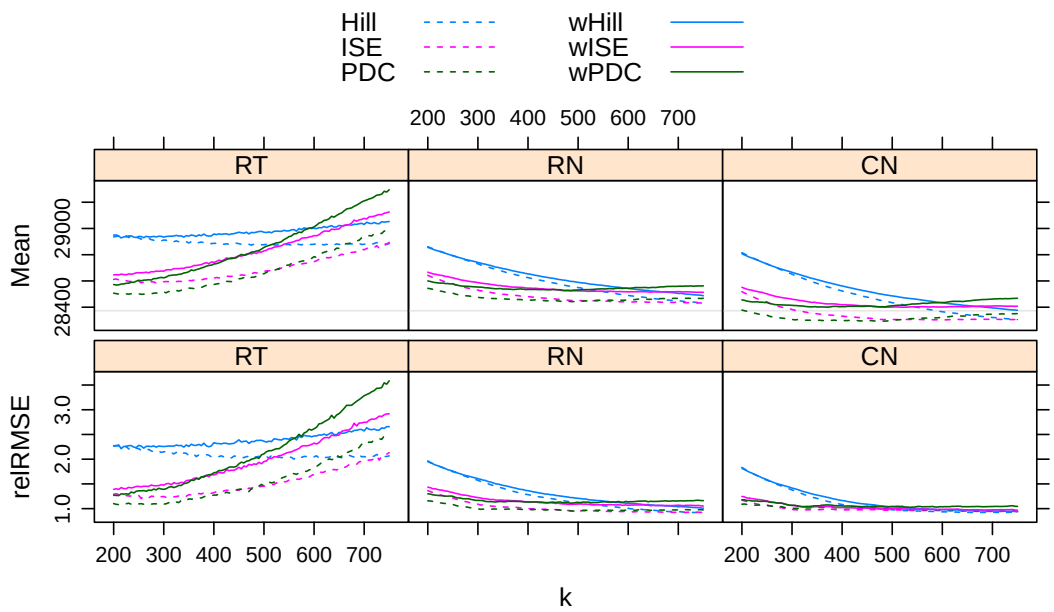

Figure F.534.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

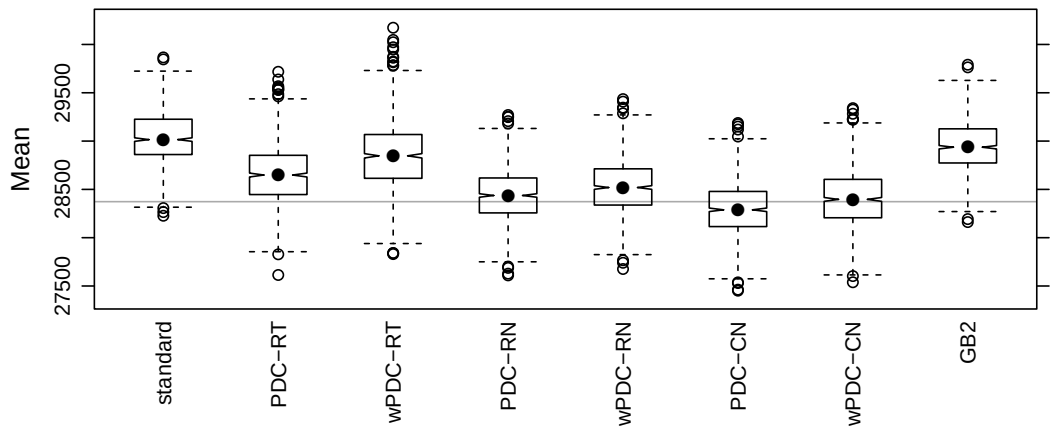

Figure F.535.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.267.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			29036.57	68428.85	663.67	2.34	29015.39	262.72	642.50	713.32	2.51	952.57	0.05
wHill	RT	300	28934.25	94748.45	561.35	1.98	28918.43	317.41	545.54	640.13	2.26	808.82	0.06
wHill	RT	500	28971.26	91639.59	598.37	2.11	28965.58	304.34	592.69	670.52	2.36	878.71	0.05
wHill	RT	700	29030.18	99880.41	657.29	2.32	29034.25	315.54	661.36	729.25	2.57	980.53	0.06
wHill	RN	300	28740.96	71854.20	368.06	1.30	28727.08	271.40	354.19	455.25	1.60	528.69	0.05
wHill	RN	500	28589.41	70545.59	216.52	0.76	28575.33	276.27	202.44	342.57	1.21	346.14	0.04
wHill	RN	700	28504.54	69242.25	131.65	0.46	28495.78	265.13	122.89	294.12	1.04	269.52	0.04
wHill	CN	300	28665.70	75704.81	292.81	1.03	28652.55	267.51	279.66	401.70	1.42	427.79	0.05
wHill	CN	500	28485.98	74049.04	113.09	0.40	28473.43	279.30	100.54	294.56	1.04	274.12	0.04
wHill	CN	700	28394.62	72703.47	21.72	0.08	28386.03	269.04	13.14	270.37	0.95	266.85	0.03
wISE	RT	300	28674.31	84190.46	301.42	1.06	28660.43	294.48	287.54	418.28	1.47	442.63	0.05
wISE	RT	500	28829.26	98824.48	456.37	1.61	28822.92	311.17	450.02	554.07	1.95	667.20	0.05
wISE	RT	700	29076.93	112293.38	704.03	2.48	29075.78	337.19	702.88	779.64	2.75	1042.09	0.07
wISE	RN	300	28587.75	74560.79	214.86	0.76	28574.53	278.13	201.63	347.35	1.22	346.14	0.04
wISE	RN	500	28524.18	73473.38	151.29	0.53	28512.77	265.87	139.88	310.30	1.09	295.38	0.04
wISE	RN	700	28518.66	70832.14	145.77	0.51	28517.12	265.58	144.23	303.33	1.07	289.49	0.04
wISE	CN	300	28460.62	83604.12	87.73	0.31	28449.72	292.12	76.82	302.02	1.06	293.33	0.03
wISE	CN	500	28401.03	79983.24	28.14	0.10	28391.86	279.57	18.97	284.07	1.00	275.28	0.03
wISE	CN	700	28409.15	75540.54	36.26	0.13	28406.32	277.47	33.43	277.09	0.98	274.15	0.04
wPDC	RT	300	28623.74	92640.39	250.84	0.88	28610.55	293.30	237.66	394.30	1.39	390.03	0.05
wPDC	RT	500	28855.61	124953.27	482.71	1.70	28847.45	335.85	474.55	598.20	2.11	707.30	0.06
wPDC	RT	700	29210.57	166613.70	837.67	2.95	29194.08	391.60	821.19	931.74	3.28	1217.50	0.09
wPDC	RN	300	28553.50	76956.10	180.61	0.64	28540.23	284.11	167.34	330.90	1.17	320.38	0.04
wPDC	RN	500	28531.23	77160.02	158.34	0.56	28519.39	278.21	146.49	319.62	1.13	309.79	0.04
wPDC	RN	700	28559.68	72772.76	186.79	0.66	28555.10	275.86	182.21	328.01	1.16	327.81	0.04
wPDC	CN	300	28414.01	90110.20	41.11	0.14	28401.67	298.47	28.77	302.84	1.07	297.41	0.03
wPDC	CN	500	28410.29	86455.96	37.40	0.13	28396.30	292.62	23.40	296.26	1.04	291.35	0.03
wPDC	CN	700	28462.04	79631.22	89.15	0.31	28460.17	289.90	87.28	295.80	1.04	298.36	0.04
GB2			28944.49	66264.83	571.60	2.01	28936.31	259.00	563.42	626.83	2.21	835.32	0.05

OAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

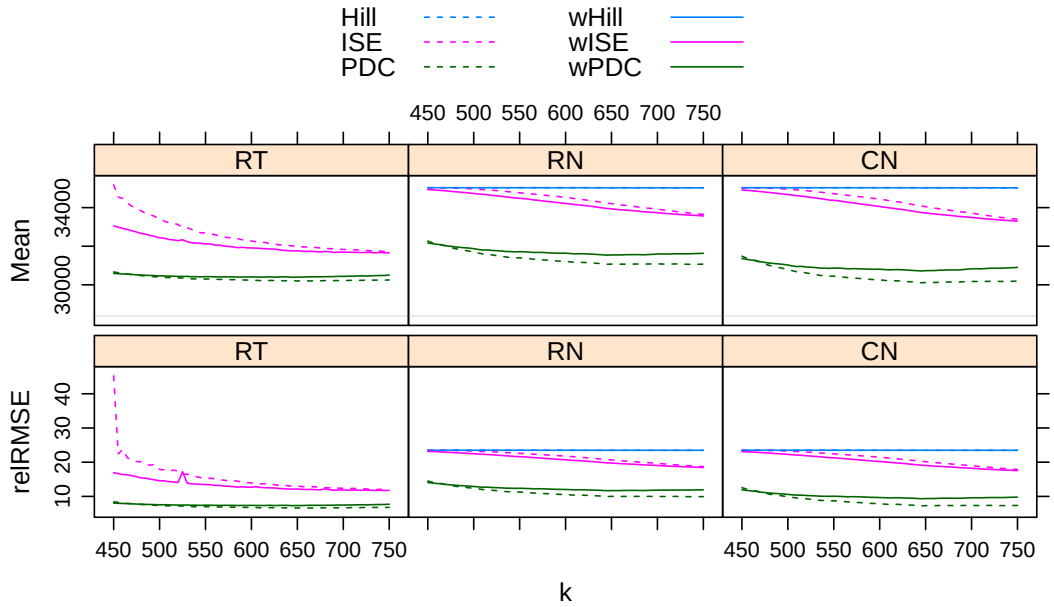

Figure F.536.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

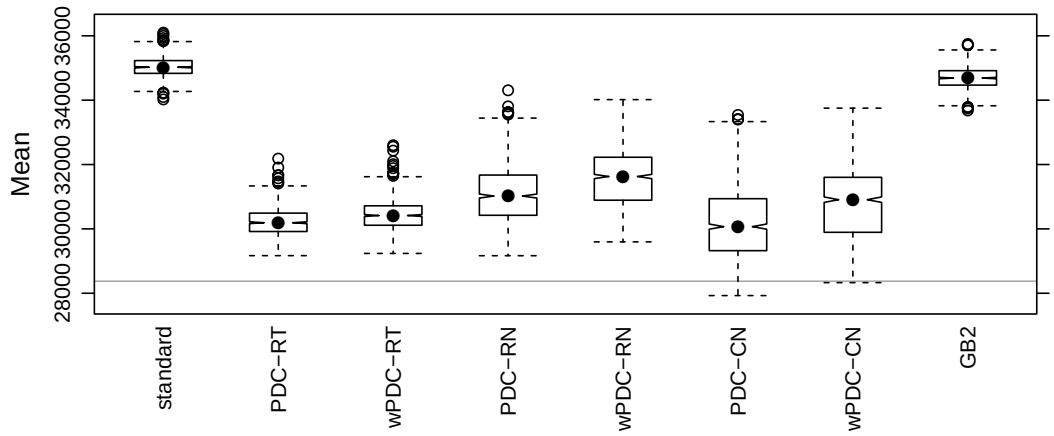

Figure F.537.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.268.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			35033.95	92416.66	6661.06	23.48	35022.80	297.55	6649.91	6667.98	23.50	9859.16	0.27
wHill	RT	500	37375.87	27820082.02	9002.97	31.73	36728.95	1546.48	8356.06	10432.92	36.77	12388.70	5.42
wHill	RT	700	35992.32	13007401.68	7619.43	26.85	35577.99	1106.23	7205.10	8429.12	29.71	10682.28	3.14
wHill	RN	300	35033.95	92416.66	6661.06	23.48	35022.80	297.55	6649.91	6667.98	23.50	9859.16	0.27
wHill	RN	500	35032.31	92389.88	6659.42	23.47	35020.43	297.49	6647.54	6666.34	23.50	9855.64	0.27
wHill	RN	700	35028.62	91983.92	6655.73	23.46	35017.34	301.22	6644.45	6662.63	23.48	9851.06	0.27
wHill	CN	300	35033.95	92416.66	6661.06	23.48	35022.80	297.55	6649.91	6667.98	23.50	9859.16	0.27
wHill	CN	500	35032.14	92264.94	6659.24	23.47	35020.43	297.49	6647.54	6666.16	23.49	9855.64	0.27
wHill	CN	700	35028.14	92036.07	6655.25	23.46	35016.42	300.63	6643.53	6662.15	23.48	9849.70	0.27
wISE	RT	500	32433.49	590494.97	4060.60	14.31	32361.15	715.32	3988.26	4132.60	14.57	5912.99	0.31
wISE	RT	700	31691.57	349399.60	3318.68	11.70	31638.26	528.18	3265.37	3370.86	11.88	4841.24	0.32
wISE	RN	300	35033.95	92416.66	6661.06	23.48	35022.80	297.55	6649.91	6667.98	23.50	9859.16	0.27
wISE	RN	500	34734.56	189745.52	6361.67	22.42	34746.98	389.93	6374.09	6376.55	22.47	9450.23	0.27
wISE	RN	700	33738.70	399686.07	5365.81	18.91	33662.81	637.36	5289.91	5402.89	19.04	7842.83	0.26
wISE	CN	300	35033.95	92416.66	6661.06	23.48	35022.80	297.55	6649.91	6667.98	23.50	9859.16	0.27
wISE	CN	500	34676.51	230620.22	6303.62	22.22	34701.16	413.60	6328.27	6321.87	22.28	9382.29	0.27
wISE	CN	700	33492.70	534670.28	5119.81	18.04	33366.19	739.11	4993.30	5171.71	18.23	7403.06	0.26
wPDC	RT	500	30461.18	227986.60	2088.28	7.36	30406.87	443.32	2033.98	2142.12	7.55	3015.58	0.15
wPDC	RT	700	30436.61	234240.69	2063.72	7.27	30415.48	447.48	2042.59	2119.66	7.47	3028.34	0.15
wPDC	RN	300	34791.82	535853.25	6418.93	22.62	34977.55	350.21	6604.66	6460.49	22.77	9792.07	0.27
wPDC	RN	500	31872.41	1150956.38	3499.52	12.33	31848.39	1214.44	3475.50	3660.11	12.90	5152.77	0.23
wPDC	RN	700	31595.49	874871.26	3222.60	11.36	31627.91	973.31	3255.02	3355.46	11.83	4825.89	0.20
wPDC	CN	300	34713.04	864935.13	6340.15	22.35	34977.09	352.15	6604.20	6407.93	22.58	9791.38	0.27
wPDC	CN	500	31026.21	1965086.82	2653.32	9.35	31051.66	1598.16	2678.76	3000.54	10.58	3971.54	0.23
wPDC	CN	700	30829.26	1376452.03	2456.37	8.66	30907.51	1205.82	2534.62	2721.92	9.59	3757.82	0.19
GB2			34694.08	103712.01	6321.19	22.28	34687.58	327.87	6314.69	6329.38	22.31	9362.16	0.26

OAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

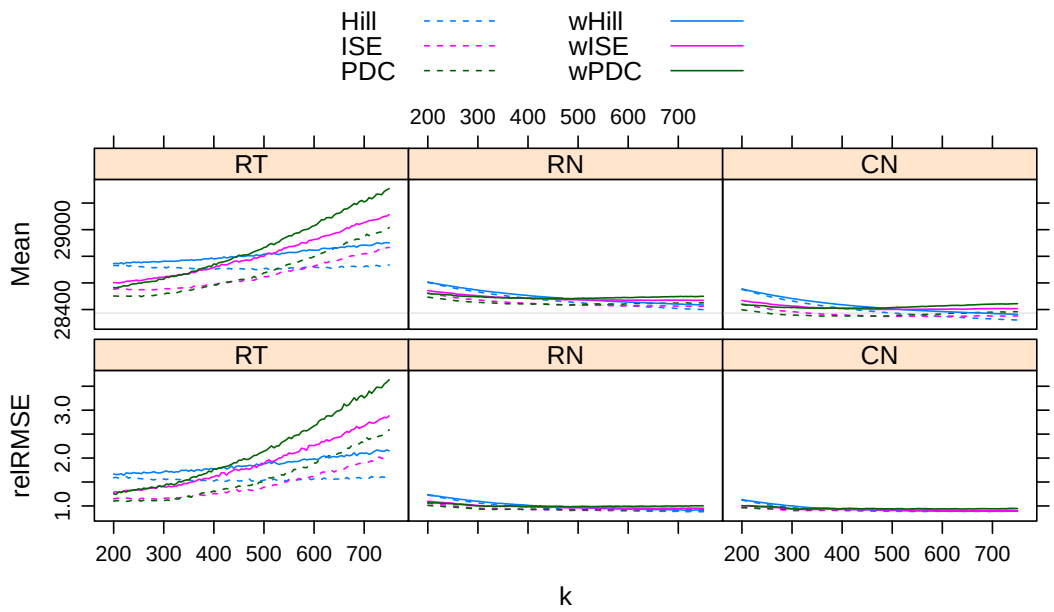

Figure F.538.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

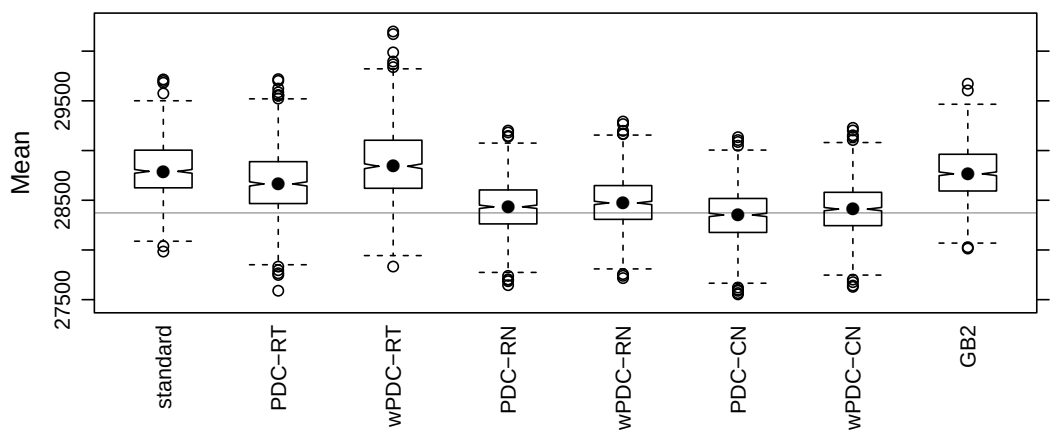

Figure F.539.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.269.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28811.84	73304.50	438.95	1.55	28790.38	281.61	417.49	515.66	1.82	618.97	0.05
wHill	RT	300	28763.68	83520.99	390.79	1.38	28749.64	295.34	376.75	485.96	1.71	560.29	0.04
wHill	RT	500	28816.61	90370.00	443.72	1.56	28807.30	294.95	434.41	535.88	1.89	645.71	0.05
wHill	RT	700	28884.43	93383.81	511.54	1.80	28880.69	306.96	507.80	595.78	2.10	752.87	0.05
wHill	RN	300	28545.96	67592.59	173.07	0.61	28541.35	260.74	168.46	312.21	1.10	311.01	0.04
wHill	RN	500	28476.32	64927.64	103.42	0.36	28471.32	255.58	98.43	274.88	0.97	266.69	0.04
wHill	RN	700	28440.61	63076.24	67.72	0.24	28436.08	249.74	63.18	260.00	0.92	252.66	0.03
wHill	CN	300	28482.62	68779.85	109.73	0.39	28485.02	257.99	112.13	284.17	1.00	270.83	0.04
wHill	CN	500	28405.10	65089.52	32.20	0.11	28404.13	247.16	31.24	257.02	0.91	248.43	0.03
wHill	CN	700	28370.49	63794.52	−2.40	−0.01	28365.28	248.27	−7.61	252.46	0.89	246.54	0.03
wISE	RT	300	28642.50	85820.38	269.61	0.95	28614.49	281.20	241.60	398.03	1.40	379.77	0.04
wISE	RT	500	28799.16	101817.24	426.27	1.50	28783.43	304.07	410.53	532.37	1.88	608.77	0.05
wISE	RT	700	29053.20	110859.71	680.31	2.40	29040.17	315.02	667.28	757.34	2.67	989.31	0.08
wISE	RN	300	28502.93	65302.20	130.04	0.46	28492.80	251.34	119.91	286.61	1.01	282.24	0.03
wISE	RN	500	28474.18	64921.39	101.29	0.36	28475.30	248.51	102.41	274.07	0.97	267.14	0.03
wISE	RN	700	28469.92	63402.55	97.03	0.34	28467.33	258.53	94.44	269.73	0.95	257.77	0.04
wISE	CN	300	28424.82	67885.00	51.93	0.18	28412.28	250.00	39.39	265.54	0.94	254.61	0.03
wISE	CN	500	28401.05	67230.16	28.16	0.10	28395.46	247.11	22.57	260.68	0.92	251.34	0.03
wISE	CN	700	28407.12	64955.03	34.22	0.12	28407.28	256.44	34.38	257.02	0.91	247.34	0.03
wPDC	RT	300	28628.12	95639.12	255.23	0.90	28611.16	307.43	238.27	400.86	1.41	389.17	0.04
wPDC	RT	500	28866.03	126778.19	493.14	1.74	28841.96	354.85	469.06	608.14	2.14	695.63	0.06
wPDC	RT	700	29207.95	157201.73	835.05	2.94	29199.00	385.44	826.11	924.31	3.26	1224.78	0.10
wPDC	RN	300	28495.28	65525.25	122.38	0.43	28489.74	255.22	116.85	283.61	1.00	274.47	0.03
wPDC	RN	500	28484.37	66410.92	111.48	0.39	28473.19	251.92	100.30	280.66	0.99	273.10	0.03
wPDC	RN	700	28497.59	65194.09	124.70	0.44	28502.18	248.90	129.29	284.04	1.00	273.94	0.04
wPDC	CN	300	28414.36	69903.43	41.47	0.15	28405.44	259.32	32.55	267.49	0.94	260.18	0.03
wPDC	CN	500	28414.71	69748.95	41.82	0.15	28410.79	249.12	37.90	267.26	0.94	263.20	0.03
wPDC	CN	700	28440.40	67013.97	67.50	0.24	28441.30	253.62	68.40	267.40	0.94	257.37	0.03
GB2			28775.45	67496.64	402.55	1.42	28766.01	274.44	393.12	479.04	1.69	582.84	0.05

OAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

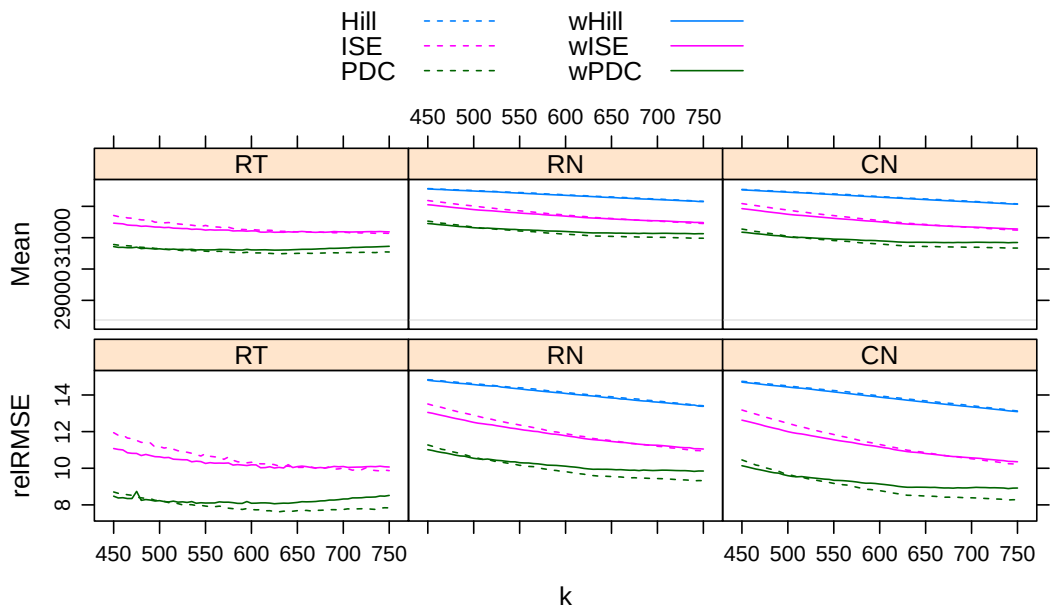

Figure F.540.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

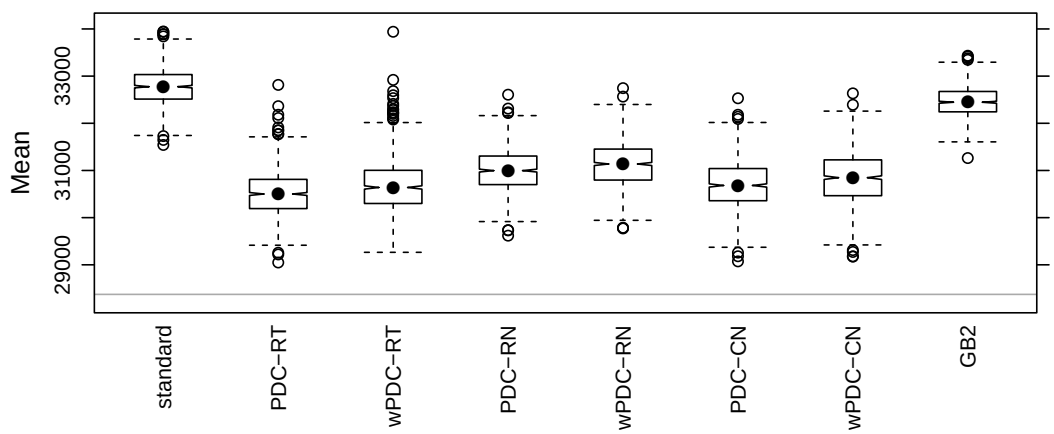

Figure F.541.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.270.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			32779.33	150965.27	4406.44	15.53	32776.39	387.89	4403.50	4423.52	15.59	6528.62	0.20
wHill	RT	500	32834.78	704465.29	4461.89	15.73	32749.75	659.23	4376.86	4540.07	16.00	6489.13	0.58
wHill	RT	700	32582.26	407086.69	4209.37	14.84	32530.88	606.42	4157.99	4257.40	15.01	6164.63	0.27
wHill	RN	300	32702.35	143951.79	4329.45	15.26	32693.67	387.09	4320.77	4346.03	15.32	6405.98	0.20
wHill	RN	500	32489.76	141989.60	4116.87	14.51	32472.21	384.21	4099.32	4134.06	14.57	6077.65	0.19
wHill	RN	700	32216.37	141344.74	3843.48	13.55	32211.22	378.66	3838.33	3861.80	13.61	5690.71	0.18
wHill	CN	300	32692.90	143012.23	4320.01	15.23	32684.85	389.06	4311.96	4336.51	15.28	6392.91	0.19
wHill	CN	500	32451.30	145237.53	4078.41	14.37	32437.22	399.81	4064.32	4096.16	14.44	6025.77	0.19
wHill	CN	700	32141.92	145622.26	3769.03	13.28	32143.36	377.63	3770.47	3788.28	13.35	5590.10	0.17
wISE	RT	500	31337.89	291973.31	2965.00	10.45	31300.61	540.13	2927.72	3013.78	10.62	4340.63	0.19
wISE	RT	700	31188.58	274648.52	2815.69	9.92	31166.75	463.66	2793.85	2864.00	10.09	4142.17	0.30
wISE	RN	300	32572.23	158436.79	4199.33	14.80	32568.30	385.48	4195.41	4218.14	14.87	6220.11	0.19
wISE	RN	500	31895.94	176198.45	3523.04	12.42	31891.38	439.28	3518.49	3547.94	12.50	5216.51	0.17
wISE	RN	700	31540.29	166690.91	3167.40	11.16	31543.44	407.21	3170.55	3193.58	11.26	4700.65	0.16
wISE	CN	300	32543.85	168556.98	4170.95	14.70	32543.21	401.64	4170.32	4191.09	14.77	6182.92	0.19
wISE	CN	500	31746.69	207226.06	3373.79	11.89	31738.92	483.50	3366.03	3404.33	12.00	4990.48	0.17
wISE	CN	700	31337.99	198212.68	2965.10	10.45	31344.98	449.83	2972.08	2998.30	10.57	4406.41	0.15
wPDC	RT	500	30644.35	292626.70	2271.45	8.01	30578.97	528.75	2206.07	2334.92	8.23	3270.73	0.17
wPDC	RT	700	30670.25	295906.28	2297.36	8.10	30639.55	529.29	2266.65	2360.82	8.32	3360.54	0.20
wPDC	RN	300	32182.12	323340.57	3809.22	13.43	32240.35	502.94	3867.45	3851.39	13.57	5733.89	0.18
wPDC	RN	500	31318.51	271203.85	2945.62	10.38	31293.25	543.35	2920.35	2991.25	10.54	4329.72	0.16
wPDC	RN	700	31136.81	223748.56	2763.92	9.74	31137.30	482.58	2764.41	2804.06	9.88	4098.51	0.15
wPDC	CN	300	32056.75	452150.77	3683.86	12.98	32157.48	561.39	3784.59	3744.66	13.20	5611.03	0.18
wPDC	CN	500	31023.84	383022.89	2650.95	9.34	31000.64	663.45	2627.75	2722.16	9.59	3895.90	0.16
wPDC	CN	700	30850.35	299089.13	2477.46	8.73	30847.78	561.63	2474.89	2537.05	8.94	3669.26	0.15
GB2			32462.75	110202.74	4089.86	14.41	32445.88	328.31	4072.99	4103.30	14.46	6038.61	0.18

Two-stage simple random sampling

No contamination

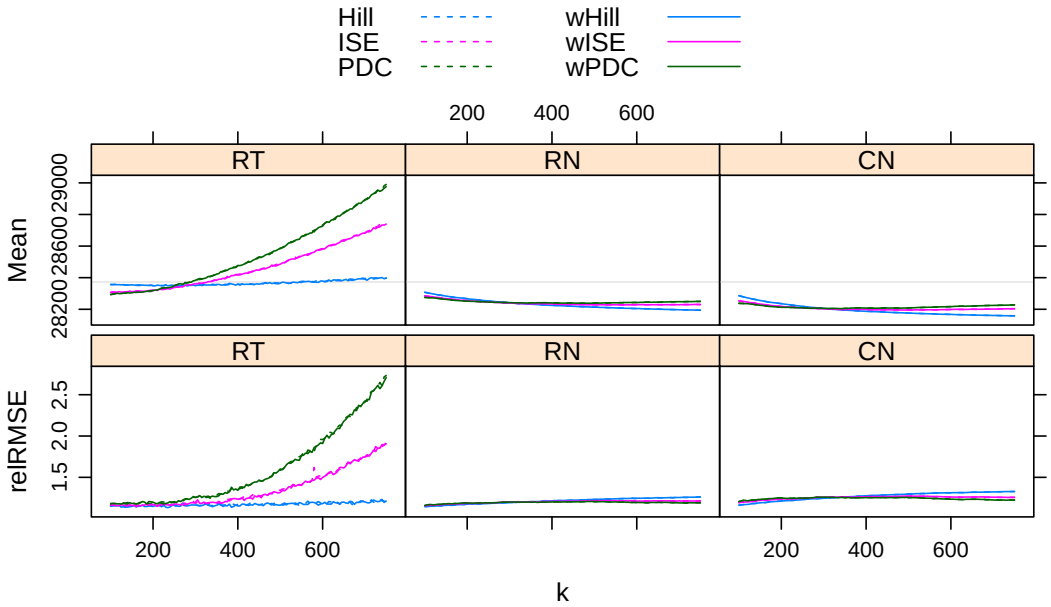

Figure F.542.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 100 and 750.

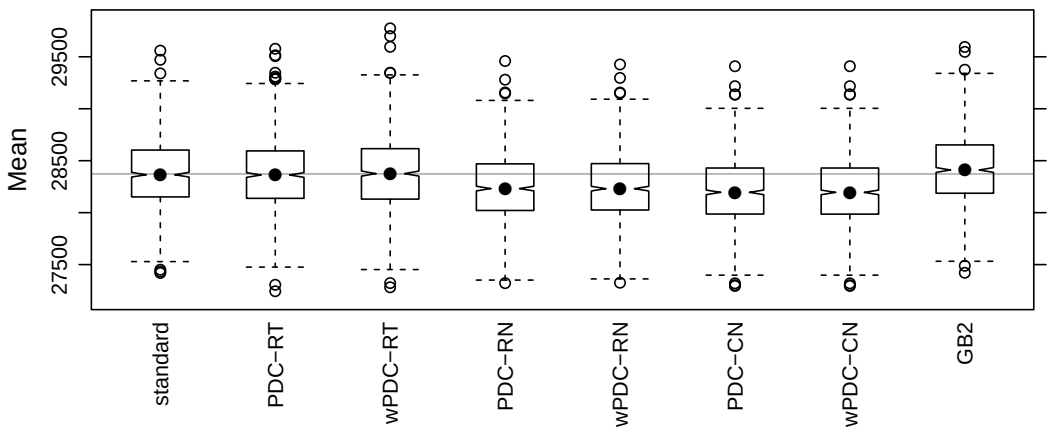

Figure F.543.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 300$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.271.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28377.57	105187.44	4.67	0.02	28365.01	334.46	−7.88	324.20	1.14	333.54	0.04
wHill	RT	300	28349.62	108687.97	−23.28	−0.08	28344.73	339.06	−28.16	330.33	1.16	333.21	0.04
wHill	RT	500	28364.78	108835.88	−8.11	−0.03	28352.48	345.59	−20.42	329.84	1.16	339.78	0.04
wHill	RT	700	28390.93	116167.81	18.03	0.06	28385.65	359.54	12.76	341.14	1.20	355.57	0.05
wHill	RN	300	28241.00	97392.63	−131.89	−0.46	28229.18	323.70	−143.71	338.66	1.19	351.77	0.04
wHill	RN	500	28213.35	96965.40	−159.55	−0.56	28199.89	323.64	−173.01	349.75	1.23	357.85	0.04
wHill	RN	700	28197.11	96152.12	−175.78	−0.62	28183.96	312.25	−188.93	356.31	1.26	359.02	0.04
wHill	CN	300	28204.81	97102.02	−168.08	−0.59	28188.55	322.35	−184.34	353.92	1.25	363.01	0.04
wHill	CN	500	28175.96	96986.65	−196.93	−0.69	28161.50	317.48	−211.39	368.34	1.30	378.72	0.04
wHill	CN	700	28160.82	96067.44	−212.08	−0.75	28148.19	315.15	−224.70	375.43	1.32	396.45	0.04
wISE	RT	300	28360.49	115489.19	−12.40	−0.04	28346.60	344.50	−26.29	339.89	1.20	352.42	0.05
wISE	RT	500	28485.21	127275.75	112.32	0.40	28475.67	359.19	102.78	373.85	1.32	368.02	0.05
wISE	RT	700	28681.26	150420.50	308.37	1.09	28670.10	378.84	297.21	495.34	1.75	517.92	0.06
wISE	RN	300	28239.33	98710.12	−133.56	−0.47	28228.32	327.66	−144.57	341.25	1.20	356.81	0.04
wISE	RN	500	28228.63	98297.44	−144.27	−0.51	28220.51	328.03	−152.38	344.98	1.22	349.17	0.04
wISE	RN	700	28228.45	98162.06	−144.44	−0.51	28217.38	325.19	−155.51	344.86	1.22	350.70	0.04
wISE	CN	300	28202.92	99290.36	−169.97	−0.60	28189.12	329.81	−183.77	357.88	1.26	376.06	0.04
wISE	CN	500	28195.94	98669.80	−176.95	−0.62	28182.66	326.35	−190.23	360.39	1.27	367.47	0.04
wISE	CN	700	28201.33	98432.91	−171.56	−0.60	28189.92	329.02	−182.97	357.45	1.26	373.78	0.04
wPDC	RT	300	28383.57	127109.09	10.68	0.04	28375.93	360.79	3.03	356.51	1.26	360.21	0.05
wPDC	RT	500	28586.90	160850.07	214.00	0.75	28590.42	414.26	217.53	454.41	1.60	462.96	0.06
wPDC	RT	700	28890.80	199962.82	517.90	1.83	28875.97	451.88	503.08	684.10	2.41	752.41	0.07
wPDC	RN	300	28241.96	99275.60	−130.93	−0.46	28231.06	327.68	−141.84	341.06	1.20	354.91	0.04
wPDC	RN	500	28239.47	99298.03	−133.43	−0.47	28233.70	330.80	−139.19	342.06	1.21	346.98	0.04
wPDC	RN	700	28248.08	98550.94	−124.81	−0.44	28239.37	320.81	−133.52	337.68	1.19	344.86	0.03
wPDC	CN	300	28206.21	100075.52	−166.68	−0.59	28195.02	329.97	−177.87	357.43	1.26	372.17	0.04
wPDC	CN	500	28208.58	99963.06	−164.31	−0.58	28203.69	333.72	−169.20	356.18	1.26	361.42	0.04
wPDC	CN	700	28224.45	99141.23	−148.44	−0.52	28213.18	322.77	−159.71	347.96	1.23	357.56	0.04
GB2			28416.26	106198.01	43.37	0.15	28410.73	343.90	37.84	328.59	1.16	331.39	0.04

OCAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

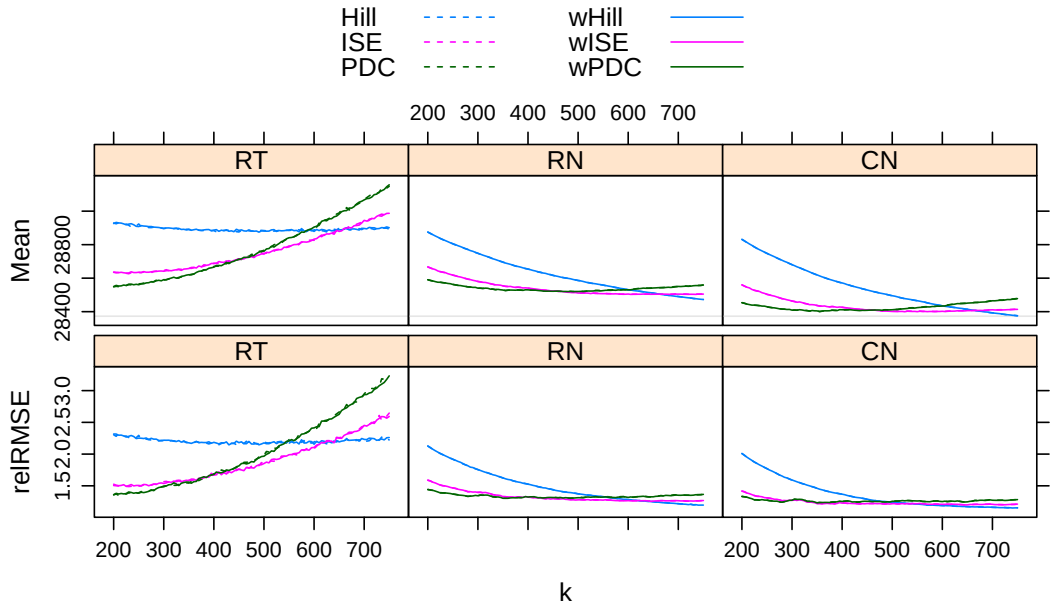

Figure F.544.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

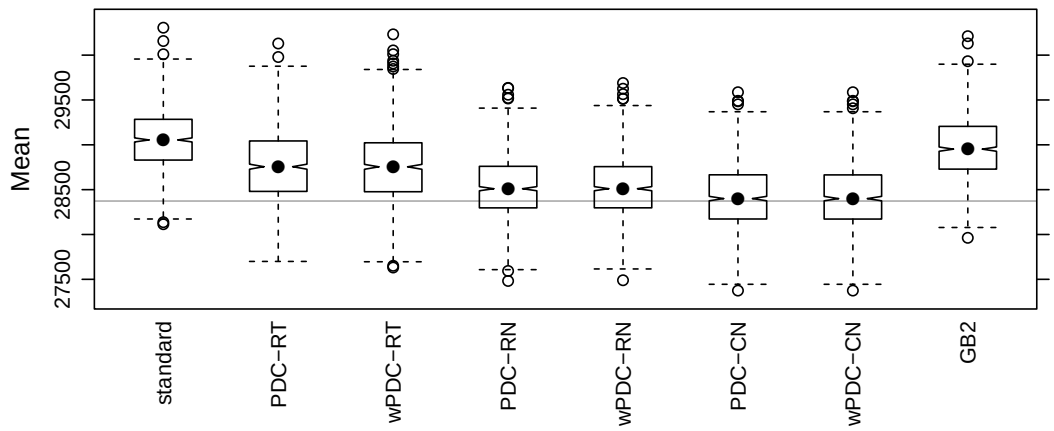

Figure F.545.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.272.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			29054.62	106428.96	681.73	2.40	29054.29	337.39	681.40	755.70	2.66	1010.24	0.07
wHill	RT	300	28897.66	121021.11	524.77	1.85	28890.58	359.40	517.69	629.51	2.22	767.52	0.06
wHill	RT	500	28881.13	123030.58	508.24	1.79	28875.63	359.40	502.73	617.43	2.18	745.35	0.06
wHill	RT	700	28896.69	126753.56	523.80	1.85	28884.08	337.57	511.19	633.24	2.23	760.49	0.06
wHill	RN	300	28748.46	107528.11	375.56	1.32	28747.34	329.28	374.45	498.47	1.76	565.83	0.06
wHill	RN	500	28586.41	106398.53	213.51	0.75	28575.33	328.62	202.44	389.72	1.37	403.10	0.05
wHill	RN	700	28490.13	105586.50	117.23	0.41	28479.66	330.54	106.77	345.29	1.22	335.43	0.04
wHill	CN	300	28680.71	109301.41	307.82	1.08	28679.19	328.04	306.29	451.60	1.59	488.77	0.05
wHill	CN	500	28495.14	108955.05	122.24	0.43	28489.45	329.64	116.55	351.84	1.24	350.47	0.04
wHill	CN	700	28392.90	108151.06	20.01	0.07	28380.56	334.74	7.67	329.31	1.16	336.65	0.04
wISE	RT	300	28641.28	118243.61	268.38	0.95	28637.31	354.43	264.42	436.07	1.54	444.22	0.05
wISE	RT	500	28743.54	138684.83	370.64	1.31	28741.67	376.82	368.77	525.28	1.85	577.90	0.06
wISE	RT	700	28945.22	156845.77	572.33	2.02	28932.17	403.56	559.28	695.88	2.45	830.09	0.07
wISE	RN	300	28579.93	114073.66	207.03	0.73	28573.84	334.01	200.95	396.01	1.40	402.17	0.05
wISE	RN	500	28511.07	112693.15	138.18	0.49	28502.59	333.88	129.70	362.87	1.28	368.12	0.04
wISE	RN	700	28504.66	111603.85	131.77	0.46	28492.38	341.61	119.49	358.96	1.27	353.41	0.04
wISE	CN	300	28463.18	121859.67	90.29	0.32	28462.18	349.59	89.28	360.40	1.27	344.62	0.05
wISE	CN	500	28401.20	118810.31	28.31	0.10	28389.78	336.56	16.89	345.68	1.22	346.40	0.04
wISE	CN	700	28411.09	116317.35	38.19	0.13	28400.69	359.40	27.79	343.02	1.21	343.29	0.04
wPDC	RT	300	28590.99	132805.33	218.09	0.77	28577.28	370.93	204.38	424.54	1.50	406.50	0.05
wPDC	RT	500	28760.51	161257.35	387.62	1.37	28754.48	405.55	381.59	557.98	1.97	593.66	0.07
wPDC	RT	700	29067.22	212418.14	694.33	2.45	29033.20	437.03	660.31	833.24	2.94	978.97	0.07
wPDC	RN	300	28540.27	117412.80	167.38	0.59	28531.57	341.61	158.68	381.20	1.34	382.81	0.05
wPDC	RN	500	28520.29	117136.56	147.40	0.52	28510.76	337.42	137.87	372.49	1.31	375.73	0.05
wPDC	RN	700	28550.44	115658.22	177.55	0.63	28545.18	346.75	172.28	383.49	1.35	373.98	0.05
wPDC	CN	300	28408.97	129398.11	36.08	0.13	28404.82	361.89	31.92	361.35	1.27	356.36	0.05
wPDC	CN	500	28411.29	125796.70	38.40	0.14	28400.20	357.13	27.30	356.57	1.26	363.14	0.04
wPDC	CN	700	28464.96	122092.65	92.06	0.32	28461.84	356.31	88.95	361.17	1.27	346.86	0.05
GB2			28958.18	111128.51	585.28	2.06	28951.71	342.98	578.82	673.48	2.37	858.16	0.06

OCAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

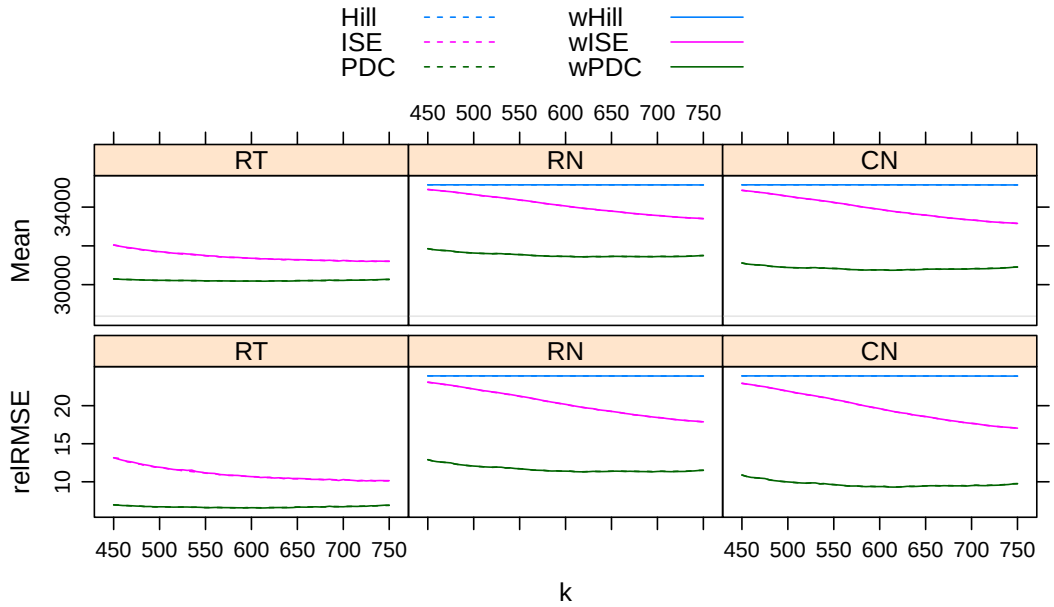

Figure F.546.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

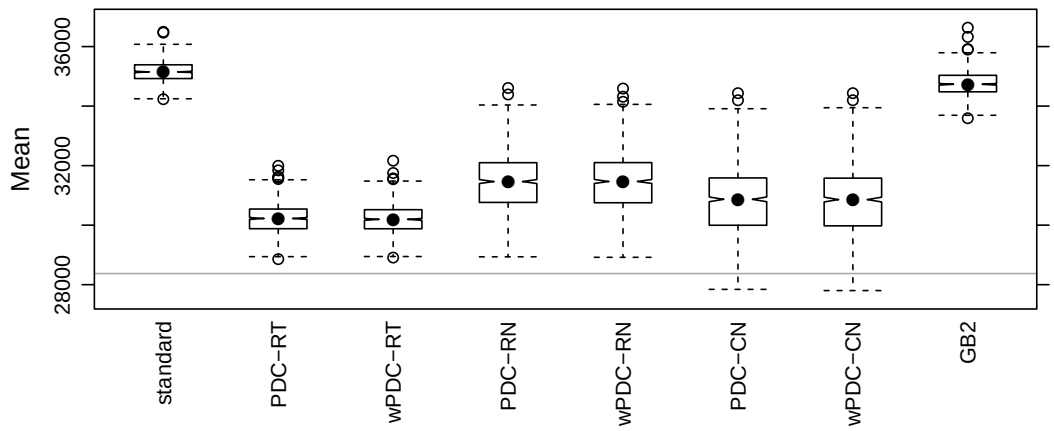

Figure F.547.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.273.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			35150.45	108606.84	6777.56	23.89	35148.38	340.83	6775.48	6785.56	23.92	10045.33	0.29
wHill	RT	500	35125.84	5731120.17	6752.95	23.80	34853.68	787.53	6480.79	7164.33	25.25	9608.42	2.48
wHill	RT	700	34358.26	525393.02	5985.37	21.10	34327.38	613.72	5954.48	6029.06	21.25	8828.12	0.50
wHill	RN	300	35150.45	108606.84	6777.56	23.89	35148.38	340.83	6775.48	6785.56	23.92	10045.33	0.29
wHill	RN	500	35149.39	108526.04	6776.50	23.88	35148.38	342.23	6775.48	6784.49	23.91	10045.33	0.29
wHill	RN	700	35145.13	108072.44	6772.24	23.87	35142.60	342.12	6769.70	6780.21	23.90	10036.76	0.29
wHill	CN	300	35150.45	108606.84	6777.56	23.89	35148.38	340.83	6775.48	6785.56	23.92	10045.33	0.29
wHill	CN	500	35149.31	108505.93	6776.42	23.88	35148.38	342.23	6775.48	6784.41	23.91	10045.33	0.29
wHill	CN	700	35144.79	108053.52	6771.89	23.87	35142.07	342.86	6769.18	6779.86	23.90	10035.99	0.29
wISE	RT	500	31702.03	329627.27	3329.14	11.73	31647.64	541.23	3274.75	3378.23	11.91	4855.14	0.20
wISE	RT	700	31248.03	253827.12	2875.14	10.13	31243.95	482.67	2871.06	2918.91	10.29	4256.63	0.19
wISE	RN	300	35150.36	108646.21	6777.47	23.89	35148.38	341.19	6775.48	6785.47	23.92	10045.33	0.29
wISE	RN	500	34647.16	269464.72	6274.26	22.11	34719.21	445.56	6346.32	6295.68	22.19	9409.05	0.28
wISE	RN	700	33566.03	427397.32	5193.14	18.30	33506.79	662.83	5133.90	5234.08	18.45	7611.52	0.25
wISE	CN	300	35150.36	108648.27	6777.46	23.89	35148.38	341.19	6775.48	6785.47	23.92	10045.33	0.29
wISE	CN	500	34561.61	334626.02	6188.72	21.81	34651.40	486.90	6278.51	6215.67	21.91	9308.52	0.28
wISE	CN	700	33334.93	530937.34	4962.03	17.49	33267.66	740.10	4894.76	5015.19	17.68	7256.98	0.24
wPDC	RT	500	30223.98	198351.16	1851.08	6.52	30210.21	416.04	1837.32	1903.85	6.71	2724.01	0.13
wPDC	RT	700	30218.26	224315.05	1845.37	6.50	30193.58	475.22	1820.69	1905.12	6.71	2699.35	0.13
wPDC	RN	300	34157.37	1466611.05	5784.48	20.39	34697.22	959.75	6324.32	5909.77	20.83	9376.44	0.29
wPDC	RN	500	31630.20	1104949.58	3257.31	11.48	31593.04	1196.09	3220.15	3422.56	12.06	4774.19	0.24
wPDC	RN	700	31450.91	904780.61	3078.02	10.85	31467.22	1000.29	3094.33	3221.50	11.35	4587.65	0.22
wPDC	CN	300	33901.98	2295082.45	5529.08	19.49	34675.12	1026.92	6302.23	5732.67	20.20	9343.68	0.29
wPDC	CN	500	30885.85	1703784.76	2512.96	8.86	30871.94	1529.34	2499.05	2831.44	9.98	3705.09	0.24
wPDC	CN	700	30817.79	1287216.55	2444.90	8.62	30859.19	1168.37	2486.29	2695.08	9.50	3686.18	0.21
GB2			34755.55	165963.14	6382.66	22.50	34732.22	406.70	6359.33	6395.64	22.54	9428.34	0.29

OCAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

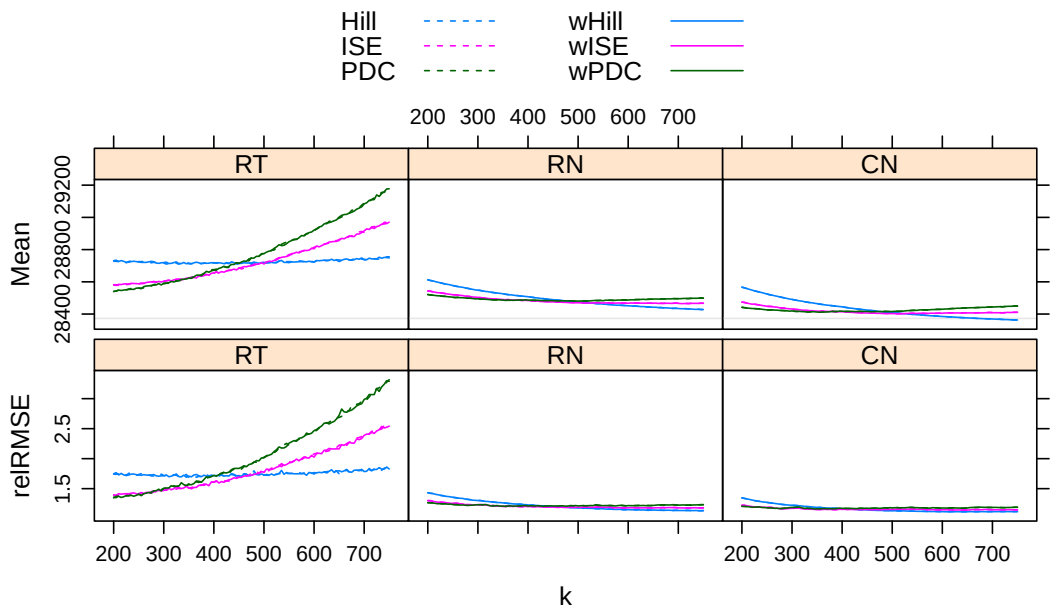

Figure F.548.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

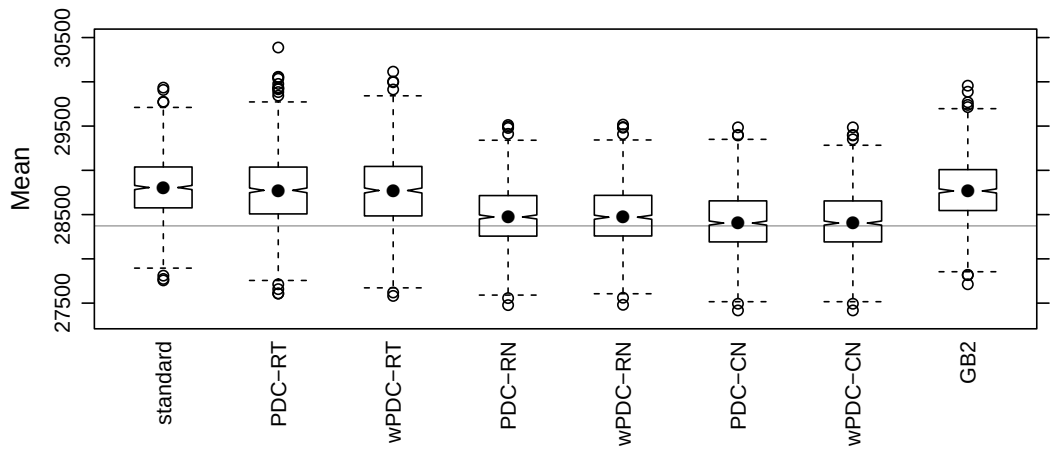

Figure F.549.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.274.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28808.84	117230.03	435.95	1.54	28805.78	344.36	432.89	554.22	1.95	645.14	0.06
wHill	RT	300	28719.52	116810.21	346.63	1.22	28717.06	336.47	344.16	486.67	1.72	532.97	0.06
wHill	RT	500	28718.64	120487.47	345.74	1.22	28706.09	361.66	333.19	489.80	1.73	506.99	0.05
wHill	RT	700	28736.14	124538.80	363.25	1.28	28728.95	339.53	356.05	506.32	1.78	549.36	0.05
wHill	RN	300	28548.12	105668.07	175.22	0.62	28540.90	333.89	168.01	369.14	1.30	365.15	0.05
wHill	RN	500	28474.12	101384.79	101.23	0.36	28460.14	333.16	87.24	333.96	1.18	329.27	0.04
wHill	RN	700	28434.28	100172.85	61.39	0.22	28416.18	332.73	43.29	322.24	1.14	324.18	0.04
wHill	CN	300	28490.80	106728.40	117.91	0.42	28479.91	338.14	107.02	347.16	1.22	341.14	0.05
wHill	CN	500	28408.29	101768.19	35.40	0.12	28395.11	334.89	22.22	320.81	1.13	328.15	0.04
wHill	CN	700	28369.18	100444.41	−3.72	−0.01	28351.96	326.66	−20.93	316.79	1.12	335.21	0.04
wISE	RT	300	28603.53	120321.04	230.63	0.81	28586.59	345.60	213.70	416.40	1.47	401.60	0.05
wISE	RT	500	28710.75	138079.64	337.85	1.19	28706.41	378.09	333.52	502.08	1.77	537.12	0.05
wISE	RT	700	28916.05	164371.57	543.16	1.91	28896.91	415.70	524.02	677.66	2.39	779.32	0.08
wISE	RN	300	28503.43	105580.55	130.54	0.46	28493.49	332.99	120.60	350.02	1.23	345.78	0.05
wISE	RN	500	28469.73	104897.18	96.84	0.34	28460.93	340.82	88.04	337.89	1.19	335.14	0.04
wISE	RN	700	28466.51	103517.43	93.62	0.33	28455.04	333.87	82.15	334.93	1.18	327.84	0.04
wISE	CN	300	28431.05	107425.26	58.16	0.20	28419.43	335.39	46.54	332.72	1.17	323.12	0.05
wISE	CN	500	28402.96	106890.36	30.07	0.11	28391.52	338.20	18.63	328.16	1.16	338.88	0.04
wISE	CN	700	28408.62	104913.84	35.73	0.13	28393.24	335.63	20.35	325.71	1.15	327.03	0.04
wPDC	RT	300	28592.38	135019.59	219.49	0.77	28576.44	370.01	203.55	427.85	1.51	414.63	0.06
wPDC	RT	500	28774.52	165428.06	401.63	1.42	28772.30	413.21	399.41	571.46	2.01	613.75	0.06
wPDC	RT	700	29083.80	212846.07	710.91	2.51	29041.06	446.65	668.17	847.36	2.99	990.62	0.08
wPDC	RN	300	28494.74	107278.15	121.85	0.43	28476.23	338.93	103.33	349.31	1.23	340.53	0.05
wPDC	RN	500	28480.48	106776.63	107.59	0.38	28470.47	338.84	97.58	343.87	1.21	336.42	0.04
wPDC	RN	700	28495.18	106162.69	122.28	0.43	28484.96	332.38	112.07	347.86	1.23	340.69	0.05
wPDC	CN	300	28419.54	111389.93	46.65	0.16	28405.64	343.50	32.74	336.83	1.19	343.50	0.05
wPDC	CN	500	28415.68	110204.18	42.79	0.15	28404.31	339.54	31.42	334.55	1.18	344.28	0.04
wPDC	CN	700	28443.90	108463.90	71.01	0.25	28437.17	342.45	64.27	336.75	1.19	341.52	0.04
GB2			28774.97	112938.17	402.08	1.42	28767.22	336.30	394.32	523.92	1.85	592.93	0.06

OCAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

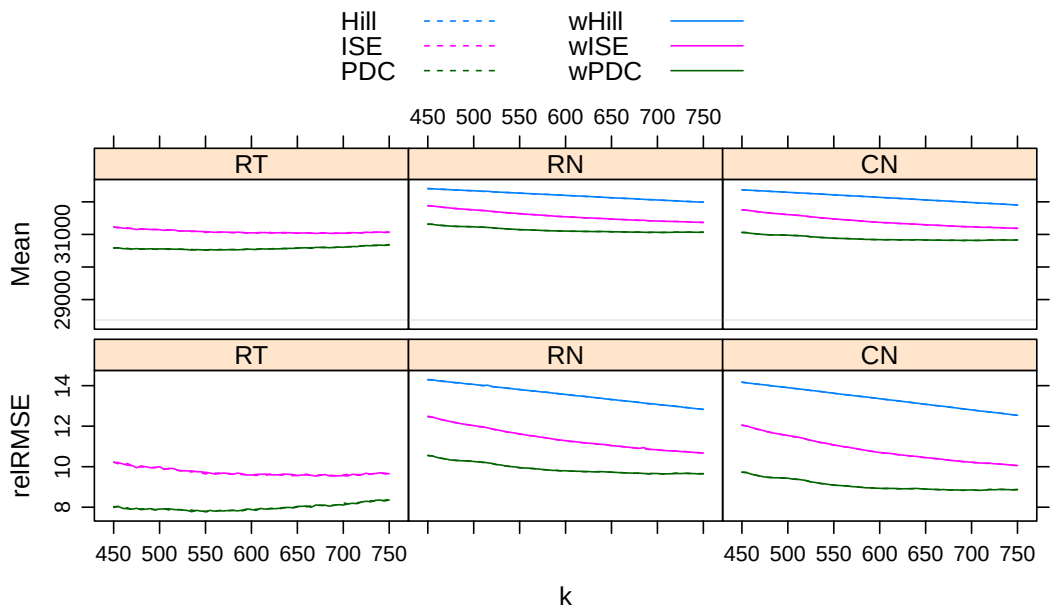

Figure F.550.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

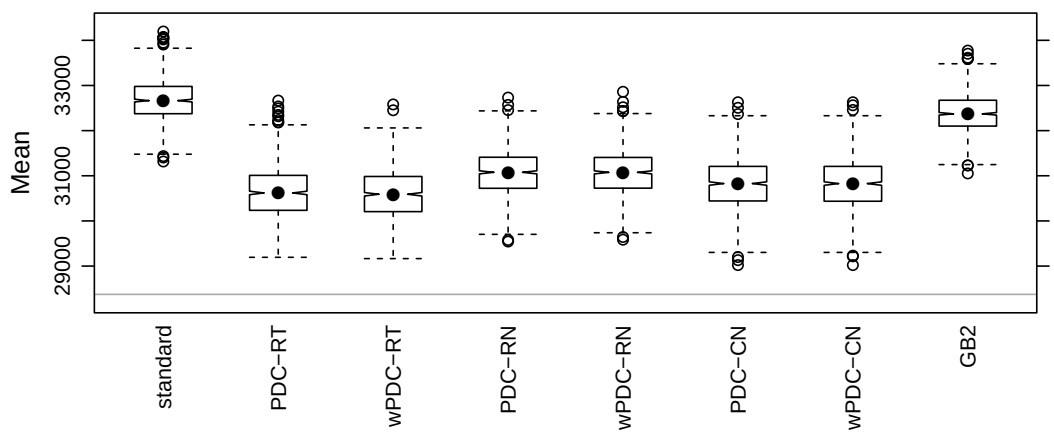

Figure F.551.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.275.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			32687.25	199442.37	4314.36	15.21	32664.86	442.78	4291.97	4337.39	15.29	6363.27	0.21
wHill	RT	500	32440.35	349790.13	4067.46	14.34	32406.80	574.24	4033.91	4110.19	14.49	5980.67	0.27
wHill	RT	700	32277.43	307263.95	3904.53	13.76	32259.44	540.14	3886.55	3943.64	13.90	5762.20	0.22
wHill	RN	300	32586.44	187764.15	4213.55	14.85	32575.09	427.04	4202.20	4235.75	14.93	6230.18	0.20
wHill	RN	500	32340.36	181904.06	3967.46	13.98	32337.35	429.97	3964.46	3990.30	14.06	5877.70	0.19
wHill	RN	700	32057.88	179978.41	3684.99	12.99	32050.98	426.86	3678.09	3709.31	13.07	5453.13	0.18
wHill	CN	300	32573.92	188842.34	4201.03	14.81	32564.21	429.43	4191.31	4223.42	14.89	6214.04	0.20
wHill	CN	500	32293.90	182913.67	3921.01	13.82	32284.81	436.71	3911.92	3944.24	13.90	5799.81	0.18
wHill	CN	700	31979.89	183066.54	3606.99	12.71	31974.68	429.61	3601.79	3632.26	12.80	5340.01	0.18
wISE	RT	500	31144.66	364495.70	2771.77	9.77	31101.43	494.42	2728.54	2836.70	10.00	4045.33	0.45
wISE	RT	700	31039.04	248411.13	2666.15	9.40	31036.96	504.74	2664.07	2712.29	9.56	3949.75	0.18
wISE	RN	300	32398.75	196652.54	4025.86	14.19	32403.05	438.86	4030.16	4050.19	14.27	5975.12	0.21
wISE	RN	500	31752.63	219119.41	3379.73	11.91	31735.95	457.51	3363.06	3411.96	12.03	4986.07	0.18
wISE	RN	700	31413.11	209729.51	3040.22	10.72	31401.46	467.61	3028.57	3074.49	10.84	4490.16	0.16
wISE	CN	300	32353.76	203014.86	3980.86	14.03	32359.00	457.27	3986.10	4006.26	14.12	5909.80	0.19
wISE	CN	500	31608.50	244938.00	3235.61	11.40	31588.20	494.60	3215.31	3273.20	11.54	4767.02	0.16
wISE	CN	700	31231.70	235516.56	2858.81	10.08	31224.38	482.54	2851.49	2899.67	10.22	4227.61	0.15
wPDC	RT	500	30556.01	270857.70	2183.12	7.69	30518.24	507.35	2145.34	2244.24	7.91	3180.69	0.17
wPDC	RT	700	30606.31	302836.39	2233.42	7.87	30590.48	576.22	2217.59	2300.15	8.11	3287.80	0.15
wPDC	RN	300	31943.71	344198.55	3570.82	12.59	31966.69	565.50	3593.80	3618.65	12.75	5328.17	0.18
wPDC	RN	500	31232.06	293684.70	2859.17	10.08	31218.50	506.03	2845.60	2910.02	10.26	4218.89	0.16
wPDC	RN	700	31065.37	266154.96	2692.48	9.49	31075.15	502.65	2702.25	2741.41	9.66	4006.36	0.16
wPDC	CN	300	31797.01	458387.28	3424.12	12.07	31854.66	641.30	3481.77	3490.35	12.30	5162.07	0.18
wPDC	CN	500	30977.80	373512.36	2604.91	9.18	30965.17	583.23	2592.28	2675.57	9.43	3843.31	0.16
wPDC	CN	700	30819.38	327778.78	2446.48	8.62	30827.46	573.49	2454.57	2512.52	8.86	3639.14	0.15
GB2			32383.61	179580.26	4010.72	14.14	32371.84	423.52	3998.95	4033.02	14.21	5928.84	0.19

OAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

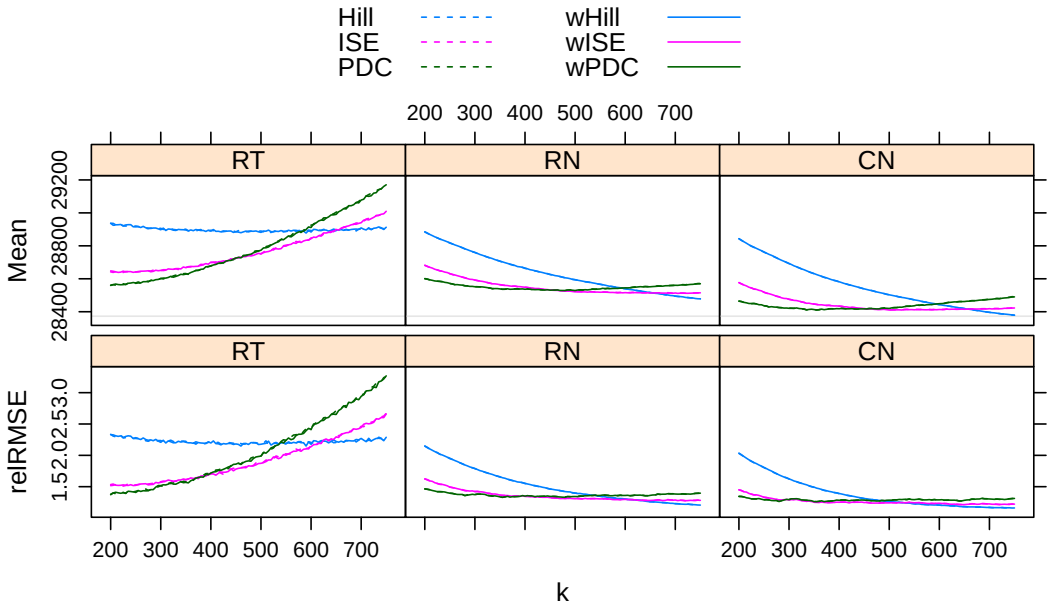

Figure F.552.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

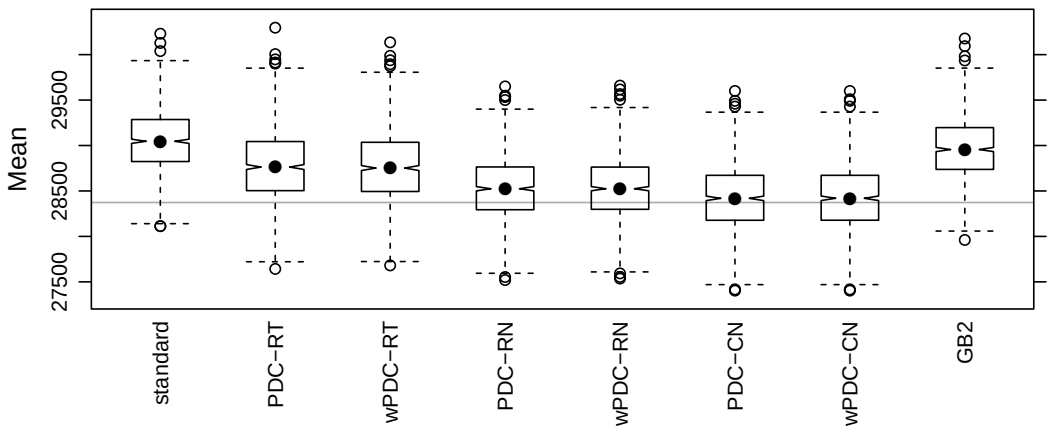

Figure F.553.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.276.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			29055.21	106549.44	682.32	2.40	29046.46	338.12	673.57	756.31	2.67	998.63	0.07
wHill	RT	300	28897.55	117097.85	524.66	1.85	28887.65	347.86	514.76	626.30	2.21	763.36	0.06
wHill	RT	500	28881.79	122752.42	508.89	1.79	28880.23	357.54	507.34	617.74	2.18	757.86	0.06
wHill	RT	700	28908.93	127688.38	536.04	1.89	28894.69	347.54	521.80	644.13	2.27	774.17	0.06
wHill	RN	300	28759.77	108021.99	386.88	1.36	28753.82	334.52	380.93	507.53	1.79	572.95	0.05
wHill	RN	500	28594.76	108213.45	221.86	0.78	28585.59	338.22	212.70	396.65	1.40	415.53	0.05
wHill	RN	700	28494.93	106594.17	122.03	0.43	28474.35	318.67	101.46	348.40	1.23	342.97	0.04
wHill	CN	300	28693.04	110177.70	320.15	1.13	28688.21	334.35	315.31	461.04	1.62	499.65	0.05
wHill	CN	500	28502.66	111418.76	129.77	0.46	28494.45	339.44	121.56	357.98	1.26	349.61	0.04
wHill	CN	700	28396.53	109657.37	23.64	0.08	28378.28	331.08	5.39	331.82	1.17	333.90	0.04
wISE	RT	300	28650.91	121235.19	278.02	0.98	28645.58	358.71	272.69	445.43	1.57	463.54	0.06
wISE	RT	500	28750.35	139934.92	377.46	1.33	28747.11	359.70	374.21	531.29	1.87	574.25	0.06
wISE	RT	700	28940.34	159306.51	567.45	2.00	28928.24	397.87	555.35	693.64	2.44	823.36	0.08
wISE	RN	300	28592.26	114698.06	219.37	0.77	28587.65	340.85	214.76	403.37	1.42	406.21	0.05
wISE	RN	500	28520.52	115937.83	147.62	0.52	28513.07	342.37	140.17	370.96	1.31	364.13	0.04
wISE	RN	700	28513.86	113659.09	140.97	0.50	28505.21	336.52	132.32	365.26	1.29	361.06	0.04
wISE	CN	300	28475.21	123349.02	102.32	0.36	28467.96	345.31	95.06	365.64	1.29	355.00	0.05
wISE	CN	500	28410.24	122774.15	37.35	0.13	28400.95	345.07	28.05	352.20	1.24	350.93	0.04
wISE	CN	700	28418.53	118828.19	45.63	0.16	28410.26	346.70	37.36	347.55	1.22	341.12	0.04
wPDC	RT	300	28601.60	133120.98	228.71	0.81	28579.96	371.90	207.07	430.46	1.52	420.19	0.05
wPDC	RT	500	28773.33	158074.66	400.44	1.41	28752.06	405.82	379.16	564.15	1.99	593.01	0.06
wPDC	RT	700	29077.92	199513.12	705.02	2.48	29078.23	439.97	705.34	834.49	2.94	1045.73	0.08
wPDC	RN	300	28551.66	119887.09	178.77	0.63	28541.78	346.51	168.88	389.52	1.37	378.42	0.05
wPDC	RN	500	28528.68	120981.84	155.78	0.55	28524.93	348.59	152.04	380.96	1.34	388.20	0.05
wPDC	RN	700	28560.58	118855.31	187.69	0.66	28557.02	348.76	184.13	392.38	1.38	393.07	0.05
wPDC	CN	300	28420.84	132498.97	47.95	0.17	28410.47	371.06	37.57	366.97	1.29	367.62	0.04
wPDC	CN	500	28419.93	130834.37	47.04	0.17	28419.21	367.51	46.31	364.58	1.28	360.59	0.04
wPDC	CN	700	28474.94	126486.47	102.05	0.36	28474.36	360.43	101.46	369.83	1.30	356.22	0.04
GB2			28964.55	111401.25	591.65	2.09	28955.88	341.60	582.98	679.22	2.39	864.33	0.06

OAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

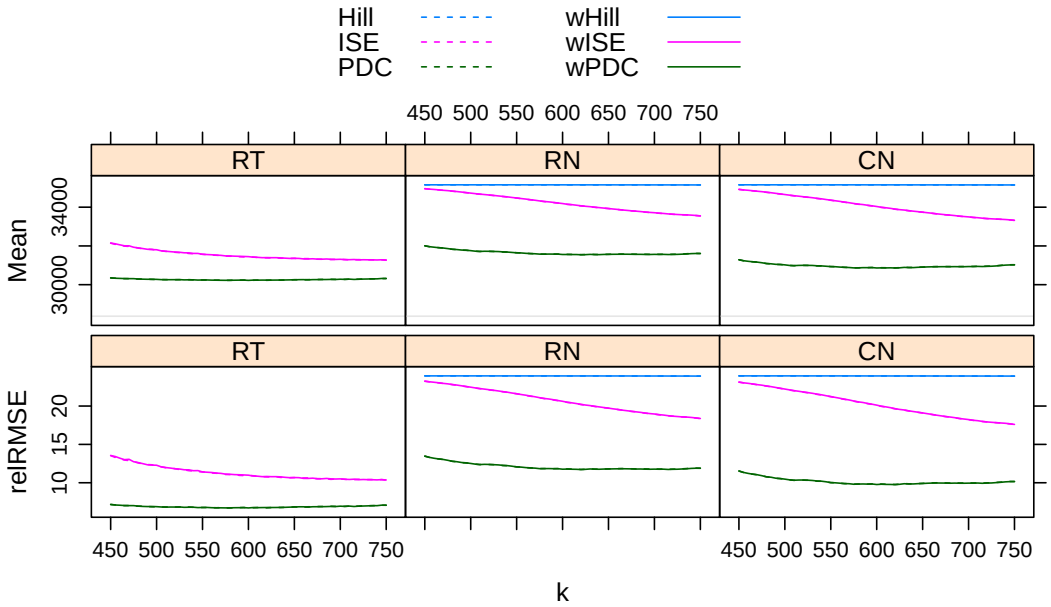

Figure F.554.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

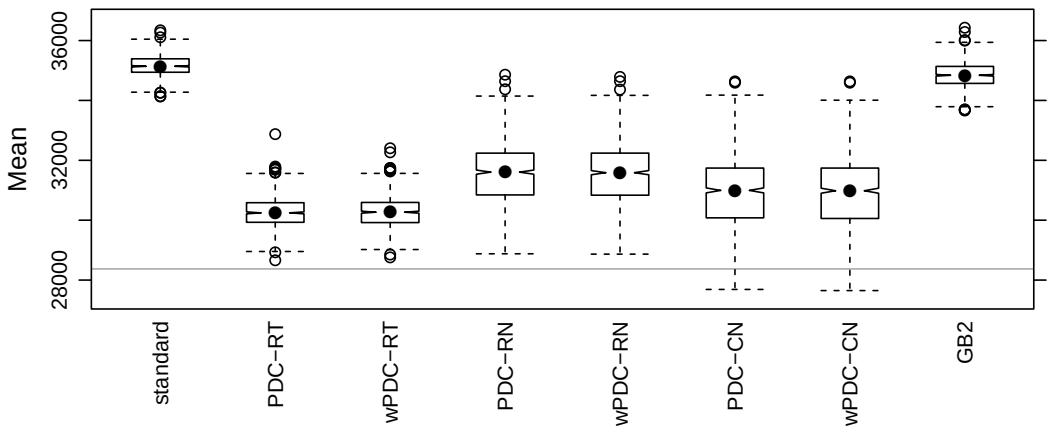

Figure F.555.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.277.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			35155.79	108153.06	6782.90	23.91	35139.42	336.15	6766.53	6790.86	23.93	10032.06	0.28
wHill	RT	500	35120.39	2451431.32	6747.50	23.78	34893.10	746.11	6520.20	6926.60	24.41	9666.86	1.15
wHill	RT	700	34419.82	1166042.92	6046.93	21.31	34301.36	627.97	5928.47	6142.50	21.65	8789.55	0.94
wHill	RN	300	35155.79	108153.06	6782.90	23.91	35139.42	336.15	6766.53	6790.86	23.93	10032.06	0.28
wHill	RN	500	35154.56	108129.43	6781.67	23.90	35138.60	338.11	6765.70	6789.63	23.93	10030.83	0.28
wHill	RN	700	35150.23	107562.96	6777.34	23.89	35136.07	337.56	6763.17	6785.26	23.91	10027.08	0.28
wHill	CN	300	35155.79	108153.06	6782.90	23.91	35139.42	336.15	6766.53	6790.86	23.93	10032.06	0.28
wHill	CN	500	35154.46	108136.02	6781.57	23.90	35138.60	338.11	6765.70	6789.53	23.93	10030.83	0.28
wHill	CN	700	35149.64	107599.60	6776.75	23.88	35135.44	337.99	6762.55	6784.67	23.91	10026.16	0.28
wISE	RT	500	31803.23	372324.30	3430.34	12.09	31746.75	566.61	3373.86	3484.13	12.28	5002.09	0.23
wISE	RT	700	31309.68	257975.93	2936.78	10.35	31273.34	503.82	2900.45	2980.34	10.50	4300.21	0.20
wISE	RN	300	35155.60	108238.98	6782.71	23.91	35139.42	338.04	6766.53	6790.67	23.93	10032.06	0.28
wISE	RN	500	34726.51	234252.70	6353.62	22.39	34772.41	432.79	6399.52	6372.01	22.46	9487.93	0.27
wISE	RN	700	33714.31	405605.25	5341.41	18.83	33657.13	621.94	5284.24	5379.21	18.96	7834.41	0.25
wISE	CN	300	35155.59	108243.28	6782.70	23.91	35139.42	338.04	6766.53	6790.67	23.93	10032.06	0.28
wISE	CN	500	34652.23	284891.53	6279.34	22.13	34714.84	451.57	6341.95	6301.96	22.21	9402.57	0.27
wISE	CN	700	33498.08	504310.33	5125.18	18.06	33399.90	696.18	5027.01	5174.10	18.24	7453.04	0.25
wPDC	RT	500	30273.74	200195.86	1900.85	6.70	30266.23	454.75	1893.34	1952.74	6.88	2807.07	0.13
wPDC	RT	700	30281.78	240753.93	1908.89	6.73	30267.58	497.05	1894.69	1970.88	6.95	2809.06	0.14
wPDC	RN	300	34305.57	1352112.45	5932.68	20.91	34789.57	784.76	6416.68	6045.44	21.31	9513.37	0.28
wPDC	RN	500	31755.80	1166537.89	3382.91	11.92	31789.74	1207.29	3416.84	3550.97	12.52	5065.81	0.24
wPDC	RN	700	31564.31	976241.24	3191.42	11.25	31587.26	1047.34	3214.37	3340.72	11.77	4765.62	0.23
wPDC	CN	300	34082.45	2129131.03	5709.55	20.12	34773.89	817.26	6401.00	5892.88	20.77	9490.12	0.28
wPDC	CN	500	31022.55	1806494.15	2649.66	9.34	31095.00	1498.54	2722.11	2970.75	10.47	4035.80	0.23
wPDC	CN	700	30936.00	1402307.80	2563.11	9.03	30984.02	1243.08	2611.13	2823.20	9.95	3871.26	0.22
GB2			34851.74	171081.37	6478.85	22.83	34839.43	420.79	6466.54	6492.02	22.88	9587.29	0.28

OAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

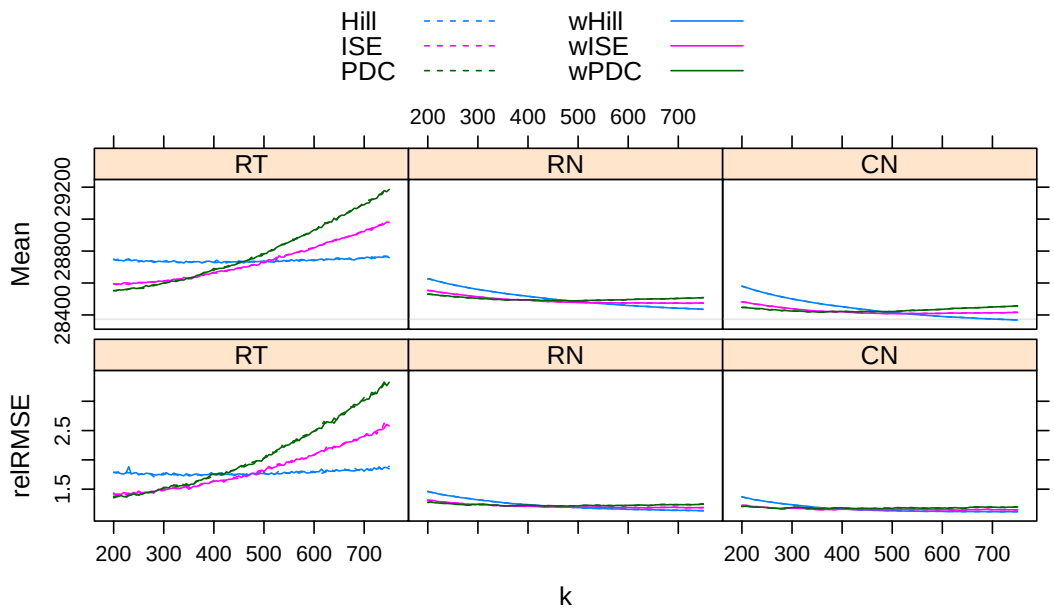

Figure F.556.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

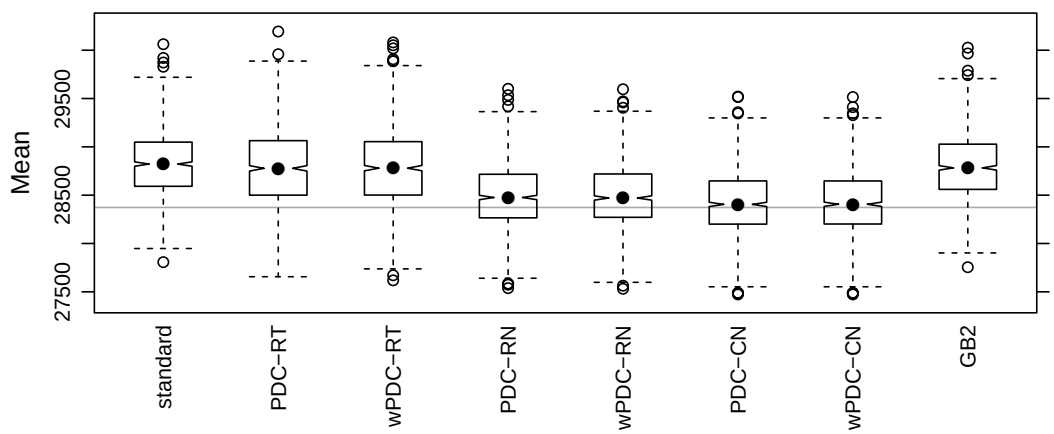

Figure F.557.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.278.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28826.12	112617.62	453.23	1.60	28821.82	338.29	448.93	563.85	1.99	665.84	0.06
wHill	RT	300	28733.59	115225.08	360.70	1.27	28726.28	342.33	353.39	495.19	1.75	554.10	0.05
wHill	RT	500	28732.32	122017.28	359.42	1.27	28723.55	347.37	350.66	501.08	1.77	544.36	0.05
wHill	RT	700	28753.83	117919.53	380.93	1.34	28756.17	348.23	383.28	512.75	1.81	573.02	0.05
wHill	RN	300	28560.12	105246.49	187.22	0.66	28548.01	331.38	175.12	374.42	1.32	374.41	0.05
wHill	RN	500	28483.77	101038.40	110.88	0.39	28474.59	322.51	101.69	336.50	1.19	334.54	0.04
wHill	RN	700	28441.82	99912.36	68.93	0.24	28420.77	319.56	47.88	323.36	1.14	318.78	0.04
wHill	CN	300	28500.61	106670.49	127.72	0.45	28495.29	334.46	122.40	350.54	1.24	344.93	0.05
wHill	CN	500	28415.21	101078.15	42.32	0.15	28400.94	324.91	28.05	320.57	1.13	321.00	0.04
wHill	CN	700	28374.59	100509.69	1.70	0.01	28356.29	321.21	−16.60	316.88	1.12	321.95	0.04
wISE	RT	300	28613.48	117798.44	240.59	0.85	28604.84	335.06	231.95	419.00	1.48	412.66	0.05
wISE	RT	500	28725.92	136107.19	353.03	1.24	28710.74	363.70	337.85	510.49	1.80	536.15	0.07
wISE	RT	700	28921.50	162886.22	548.61	1.93	28904.07	402.64	531.18	680.95	2.40	791.92	0.08
wISE	RN	300	28513.41	104672.06	140.52	0.50	28496.06	325.59	123.17	352.58	1.24	345.88	0.05
wISE	RN	500	28477.87	103048.20	104.98	0.37	28464.78	331.36	91.89	337.59	1.19	337.91	0.04
wISE	RN	700	28474.31	103372.67	101.41	0.36	28454.84	328.91	81.94	336.98	1.19	338.89	0.04
wISE	CN	300	28438.88	106823.07	65.99	0.23	28421.49	320.73	48.59	333.27	1.17	326.69	0.05
wISE	CN	500	28408.15	105681.15	35.26	0.12	28388.56	334.28	15.67	326.83	1.15	332.80	0.04
wISE	CN	700	28413.28	104722.40	40.39	0.14	28400.59	331.83	27.70	325.96	1.15	332.91	0.04
wPDC	RT	300	28599.57	136807.00	226.68	0.80	28582.03	384.54	209.13	433.65	1.53	410.98	0.05
wPDC	RT	500	28783.01	163883.76	410.12	1.45	28779.51	406.96	406.61	576.12	2.03	629.35	0.06
wPDC	RT	700	29089.81	215577.23	716.91	2.53	29070.43	478.41	697.54	854.01	3.01	1035.62	0.10
wPDC	RN	300	28503.76	106788.75	130.86	0.46	28485.57	329.92	112.67	351.86	1.24	342.26	0.05
wPDC	RN	500	28489.13	104883.60	116.23	0.41	28470.67	326.39	97.78	343.93	1.21	348.09	0.04
wPDC	RN	700	28503.11	105910.00	130.22	0.46	28485.94	333.57	113.05	350.37	1.23	339.51	0.05
wPDC	CN	300	28424.32	110931.27	51.43	0.18	28406.20	332.19	33.30	336.85	1.19	328.62	0.05
wPDC	CN	500	28421.38	108136.27	48.49	0.17	28405.79	333.60	32.90	332.23	1.17	344.41	0.04
wPDC	CN	700	28449.59	108677.00	76.69	0.27	28424.22	338.07	51.33	338.31	1.19	333.39	0.05
GB2			28789.97	110782.82	417.08	1.47	28782.52	341.36	409.63	533.51	1.88	612.26	0.06

OAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

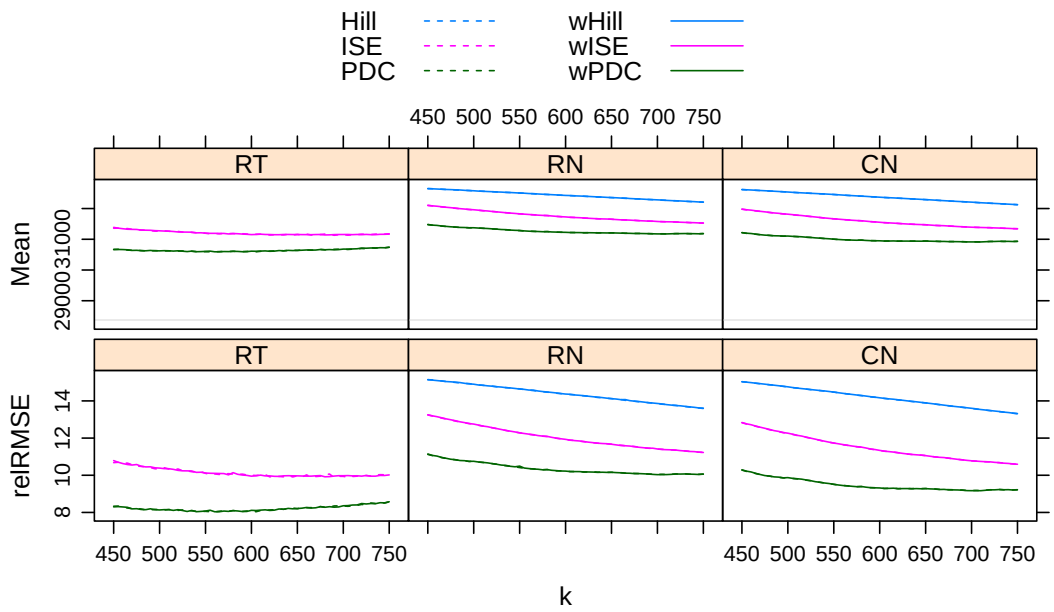

Figure F.558.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

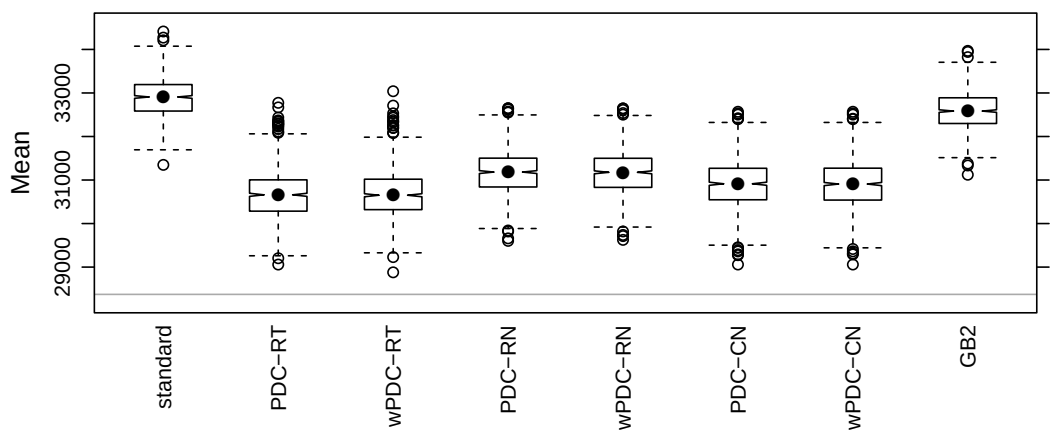

Figure F.559.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.279.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			32900.04	188837.80	4527.15	15.96	32907.94	447.42	4535.05	4547.94	16.03	6723.67	0.21
wHill	RT	500	32715.19	465055.67	4342.30	15.30	32680.66	587.27	4307.77	4395.47	15.49	6386.70	0.36
wHill	RT	700	32480.09	410098.13	4107.20	14.48	32406.43	526.90	4033.54	4156.77	14.65	5980.13	0.40
wHill	RN	300	32813.58	181627.85	4440.68	15.65	32813.54	432.91	4440.65	4461.07	15.72	6583.71	0.20
wHill	RN	500	32578.65	180826.91	4205.76	14.82	32566.22	433.85	4193.32	4227.18	14.90	6217.02	0.20
wHill	RN	700	32282.99	179883.45	3910.10	13.78	32276.15	407.21	3903.25	3933.01	13.86	5786.96	0.19
wHill	CN	300	32803.85	182420.57	4430.96	15.62	32802.94	428.65	4430.05	4451.47	15.69	6567.99	0.20
wHill	CN	500	32538.28	182383.47	4165.39	14.68	32527.01	424.13	4154.12	4187.20	14.76	6158.89	0.20
wHill	CN	700	32208.27	186414.70	3835.38	13.52	32207.34	411.75	3834.45	3859.58	13.60	5684.95	0.18
wISE	RT	500	31275.23	258422.74	2902.33	10.23	31248.61	469.76	2875.71	2946.47	10.38	4263.53	0.18
wISE	RT	700	31155.22	268167.37	2782.33	9.81	31118.55	506.60	2745.66	2830.06	9.97	4070.71	0.18
wISE	RN	300	32639.10	192636.30	4266.20	15.04	32629.06	461.77	4256.17	4288.70	15.12	6310.20	0.20
wISE	RN	500	31960.88	219622.39	3587.99	12.65	31954.13	449.67	3581.24	3618.44	12.75	5309.55	0.18
wISE	RN	700	31579.18	206708.75	3206.29	11.30	31573.31	444.17	3200.42	3238.33	11.41	4744.94	0.16
wISE	CN	300	32601.03	202545.89	4228.14	14.90	32592.69	465.18	4219.79	4252.00	14.99	6256.26	0.20
wISE	CN	500	31816.80	245880.58	3443.90	12.14	31814.22	463.25	3441.33	3479.38	12.26	5102.12	0.18
wISE	CN	700	31392.88	230979.19	3019.98	10.64	31389.95	466.00	3017.06	3057.95	10.78	4473.09	0.16
wPDC	RT	500	30622.57	264578.67	2249.68	7.93	30582.54	483.60	2209.65	2307.67	8.13	3276.03	0.16
wPDC	RT	700	30680.22	302173.55	2307.32	8.13	30650.66	516.11	2277.77	2371.84	8.36	3377.02	0.16
wPDC	RN	300	32172.56	366337.70	3799.66	13.39	32223.16	587.88	3850.27	3847.52	13.56	5708.41	0.19
wPDC	RN	500	31374.87	294567.96	3001.98	10.58	31367.06	494.84	2994.17	3050.59	10.75	4439.15	0.17
wPDC	RN	700	31174.46	254527.41	2801.56	9.87	31177.16	493.24	2804.27	2846.58	10.03	4157.61	0.15
wPDC	CN	300	32029.51	491415.06	3656.62	12.89	32112.79	661.70	3739.89	3723.14	13.12	5544.77	0.19
wPDC	CN	500	31105.11	381979.65	2732.22	9.63	31109.16	590.30	2736.27	2801.18	9.87	4056.79	0.17
wPDC	CN	700	30913.86	314460.21	2540.97	8.96	30907.72	542.03	2534.83	2602.05	9.17	3758.14	0.15
GB2			32590.51	174090.96	4217.62	14.86	32584.23	436.39	4211.34	4238.19	14.94	6243.74	0.20

Two-stage design with simple random sampling and Midzuno sampling

No contamination

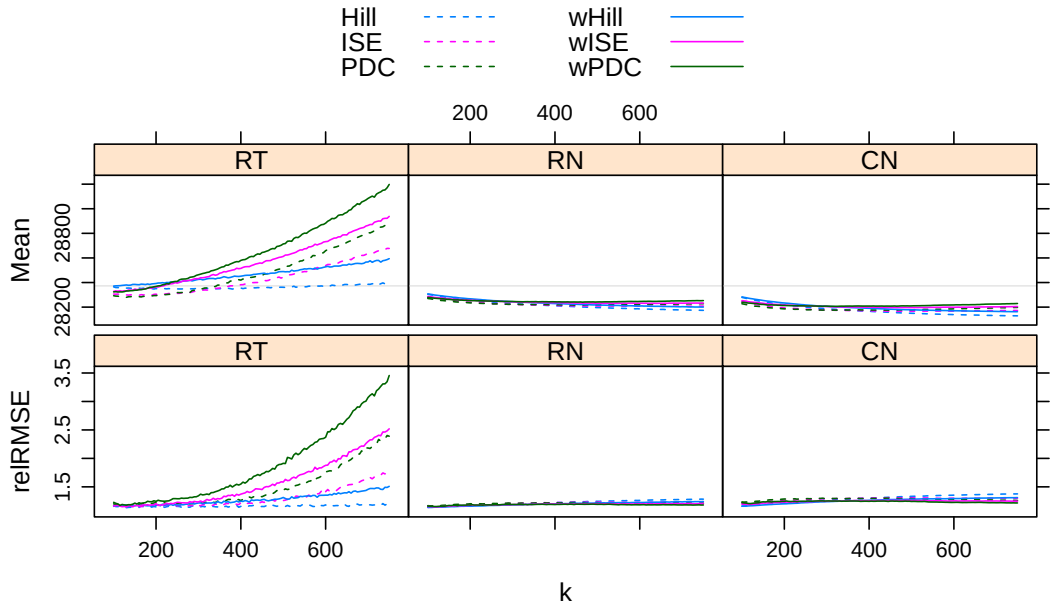

Figure F.560.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 100 and 750.

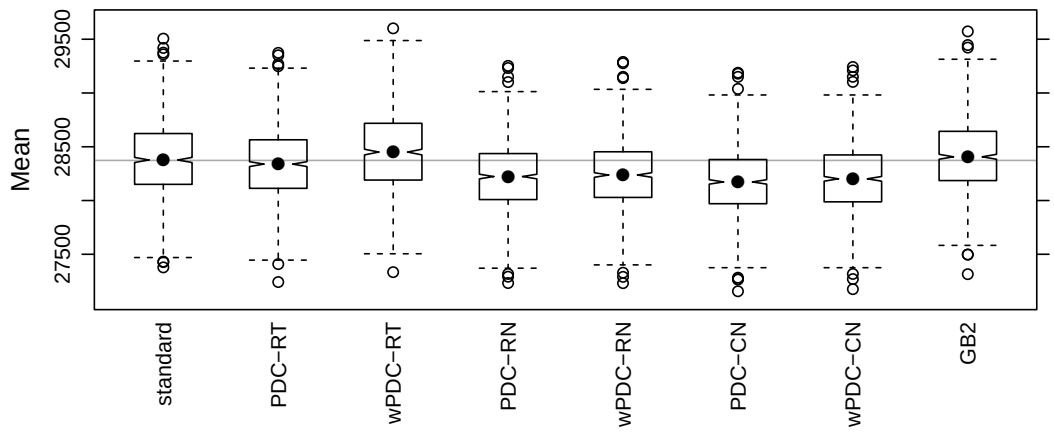

Figure F.561.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 300$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.280.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28383.35	104845.17	10.45	0.04	28377.13	347.22	4.23	323.80	1.14	343.56	0.04
wHill	RT	300	28425.73	116556.05	52.84	0.19	28422.09	362.88	49.20	345.30	1.22	364.21	0.04
wHill	RT	500	28489.32	125421.81	116.43	0.41	28482.49	365.49	109.60	372.63	1.31	375.32	0.05
wHill	RT	700	28567.05	133099.86	194.16	0.68	28551.16	376.65	178.26	413.11	1.46	410.01	0.05
wHill	RN	300	28243.52	96318.52	−129.37	−0.46	28235.82	316.08	−137.07	336.10	1.18	348.67	0.04
wHill	RN	500	28217.46	94761.81	−155.44	−0.55	28212.56	308.54	−160.34	344.71	1.21	364.23	0.04
wHill	RN	700	28203.63	94286.84	−169.26	−0.60	28194.57	312.51	−178.32	350.49	1.24	366.25	0.04
wHill	CN	300	28206.02	96161.67	−166.87	−0.59	28200.64	315.54	−172.26	352.01	1.24	369.56	0.04
wHill	CN	500	28178.25	94649.35	−194.64	−0.69	28177.38	303.41	−195.51	363.92	1.28	379.75	0.04
wHill	CN	700	28165.21	94214.85	−207.68	−0.73	28161.63	303.35	−211.26	370.48	1.31	388.91	0.04
wISE	RT	300	28431.33	119487.93	58.44	0.21	28427.42	363.91	54.53	350.41	1.23	359.98	0.04
wISE	RT	500	28612.19	144807.41	239.30	0.84	28594.53	403.79	221.64	449.36	1.58	444.89	0.06
wISE	RT	700	28864.39	183076.51	491.50	1.73	28872.76	427.84	499.86	651.51	2.30	750.64	0.07
wISE	RN	300	28243.73	96901.73	−129.17	−0.46	28236.90	319.29	−136.00	336.88	1.19	345.13	0.04
wISE	RN	500	28231.23	96569.42	−141.66	−0.50	28226.59	315.58	−146.31	341.38	1.20	356.56	0.04
wISE	RN	700	28231.93	96746.84	−140.96	−0.50	28223.37	313.55	−149.53	341.35	1.20	353.74	0.04
wISE	CN	300	28205.40	97157.66	−167.49	−0.59	28197.65	315.64	−175.24	353.72	1.25	366.27	0.04
wISE	CN	500	28196.47	96926.99	−176.42	−0.62	28193.02	314.82	−179.88	357.71	1.26	375.66	0.04
wISE	CN	700	28202.22	97151.70	−170.67	−0.60	28195.08	311.27	−177.81	355.22	1.25	364.74	0.04
wPDC	RT	300	28463.17	137088.44	90.28	0.32	28450.61	390.38	77.71	380.92	1.34	391.17	0.04
wPDC	RT	500	28713.81	178573.91	340.91	1.20	28708.08	426.24	335.18	542.79	1.91	556.30	0.05
wPDC	RT	700	29083.83	253383.09	710.94	2.51	29070.08	518.43	697.19	870.96	3.07	1033.65	0.09
wPDC	RN	300	28246.03	98123.18	−126.86	−0.45	28237.28	315.46	−135.62	337.81	1.19	346.17	0.04
wPDC	RN	500	28242.02	97503.37	−130.88	−0.46	28238.25	317.82	−134.64	338.43	1.19	355.25	0.04
wPDC	RN	700	28250.41	97516.26	−122.49	−0.43	28242.04	312.42	−130.85	335.29	1.18	345.17	0.04
wPDC	CN	300	28208.15	99092.95	−164.74	−0.58	28201.71	325.14	−171.18	355.15	1.25	366.85	0.04
wPDC	CN	500	28209.87	98028.66	−163.02	−0.57	28206.03	313.82	−166.86	352.85	1.24	362.97	0.04
wPDC	CN	700	28225.03	98220.02	−147.86	−0.52	28216.45	310.17	−156.44	346.39	1.22	356.00	0.04
GB2			28417.54	105817.12	44.65	0.16	28406.64	340.73	33.75	328.18	1.16	333.65	0.04

OCAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

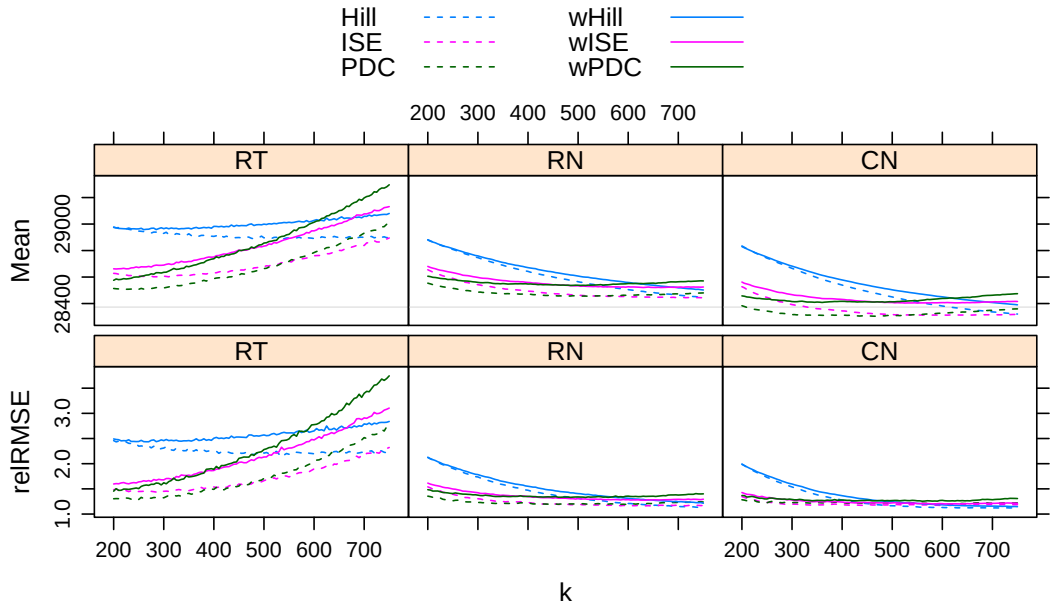

Figure F.562.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

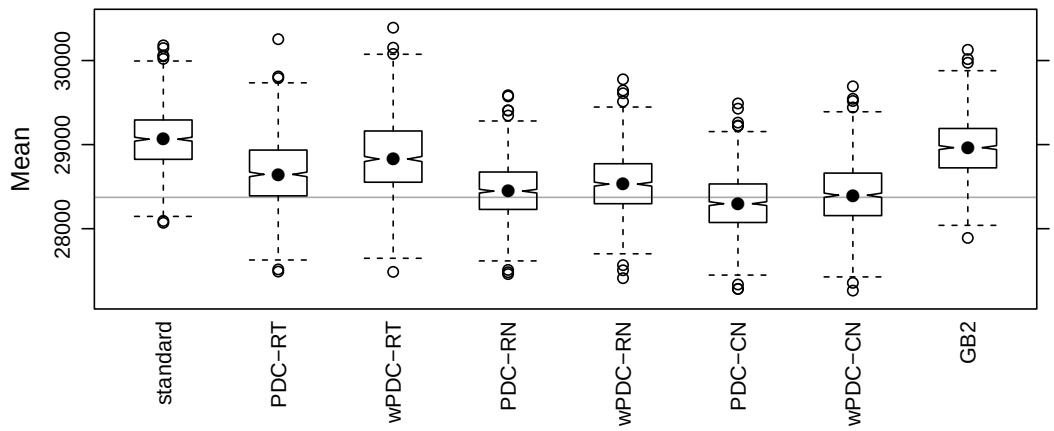

Figure F.563.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.281.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			29061.78	107732.85	688.89	2.43	29064.35	348.03	691.46	763.02	2.69	1025.16	0.06
wHill	RT	300	28965.09	135799.02	592.19	2.09	28960.24	380.05	587.35	697.39	2.46	872.86	0.07
wHill	RT	500	28999.43	139587.83	626.53	2.21	28994.27	381.31	621.38	729.38	2.57	921.26	0.07
wHill	RT	700	29059.06	156129.67	686.17	2.42	29052.28	409.04	679.38	791.71	2.79	1007.25	0.11
wHill	RN	300	28759.83	106488.73	386.94	1.36	28762.99	343.90	390.10	506.07	1.78	588.04	0.05
wHill	RN	500	28607.51	104215.14	234.61	0.83	28598.41	340.36	225.51	398.94	1.41	405.70	0.05
wHill	RN	700	28518.67	103303.59	145.78	0.51	28507.89	329.43	135.00	352.78	1.24	355.84	0.05
wHill	CN	300	28682.44	109549.60	309.55	1.09	28680.02	343.21	307.12	453.06	1.60	486.25	0.05
wHill	CN	500	28503.56	107562.49	130.67	0.46	28500.34	345.72	127.45	352.89	1.24	362.41	0.04
wHill	CN	700	28407.72	106716.38	34.82	0.12	28400.05	335.27	27.15	328.36	1.16	337.48	0.04
wISE	RT	300	28690.21	126456.66	317.32	1.12	28688.50	382.09	315.61	476.47	1.68	507.93	0.05
wISE	RT	500	28833.71	154116.20	460.81	1.62	28805.16	409.95	432.27	605.24	2.13	654.00	0.06
wISE	RT	700	29076.85	186449.04	703.96	2.48	29060.46	430.15	687.56	825.72	2.91	1019.38	0.08
wISE	RN	300	28596.95	113043.03	224.05	0.79	28588.36	348.55	215.47	403.89	1.42	404.84	0.05
wISE	RN	500	28534.55	111979.42	161.65	0.57	28526.67	342.52	153.77	371.48	1.31	370.49	0.05
wISE	RN	700	28523.73	111711.40	150.83	0.53	28508.32	335.05	135.42	366.54	1.29	366.26	0.05
wISE	CN	300	28467.02	123155.11	94.12	0.33	28460.86	365.22	87.97	363.17	1.28	364.65	0.04
wISE	CN	500	28407.93	119143.48	35.03	0.12	28397.67	354.81	24.78	346.77	1.22	359.08	0.04
wISE	CN	700	28412.29	117022.27	39.40	0.14	28398.89	350.88	25.99	344.18	1.21	354.42	0.04
wPDC	RT	300	28635.67	142743.47	262.78	0.93	28629.95	396.63	257.06	460.06	1.62	454.39	0.05
wPDC	RT	500	28856.69	185122.34	483.80	1.71	28828.66	457.27	455.77	647.30	2.28	689.06	0.07
wPDC	RT	700	29197.55	250095.62	824.66	2.91	29166.57	508.39	793.68	964.31	3.40	1176.70	0.09
wPDC	RN	300	28559.69	117521.08	186.79	0.66	28557.63	356.15	184.74	390.25	1.38	392.28	0.05
wPDC	RN	500	28537.96	117370.44	165.06	0.58	28529.90	351.12	157.01	380.13	1.34	370.31	0.05
wPDC	RN	700	28564.41	116100.35	191.51	0.67	28561.67	349.13	188.78	390.72	1.38	396.77	0.05
wPDC	CN	300	28414.87	132286.89	41.98	0.15	28398.75	367.95	25.85	365.95	1.29	370.81	0.04
wPDC	CN	500	28413.22	127930.65	40.33	0.14	28397.59	371.17	24.70	359.76	1.27	365.78	0.05
wPDC	CN	700	28462.70	124894.99	89.81	0.32	28455.03	366.57	82.14	364.47	1.28	372.63	0.05
GB2			28960.58	109549.63	587.68	2.07	28964.30	341.71	591.40	674.40	2.38	876.81	0.06

OCAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

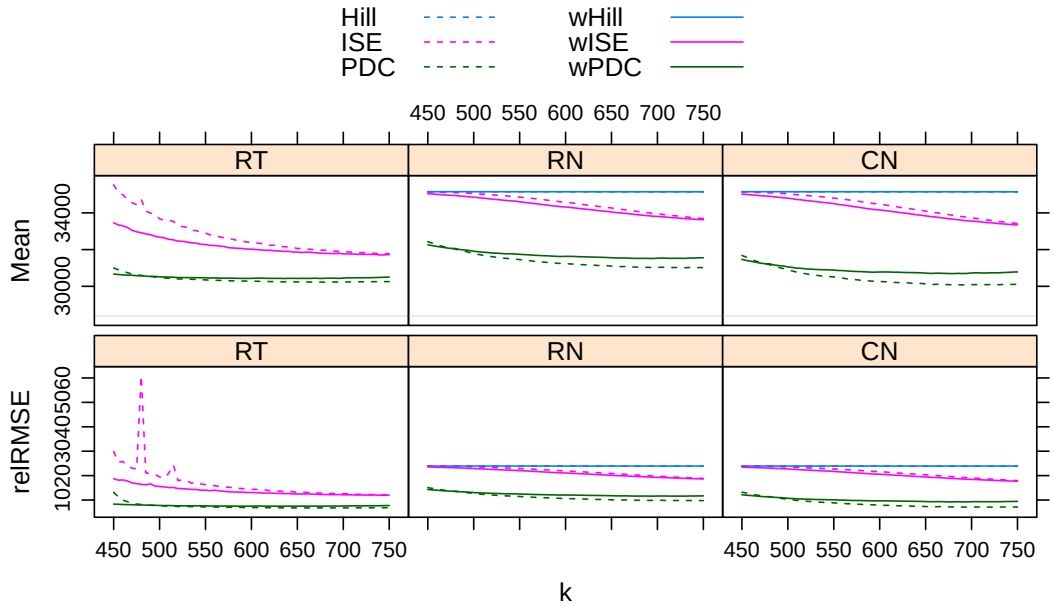

Figure F.564.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

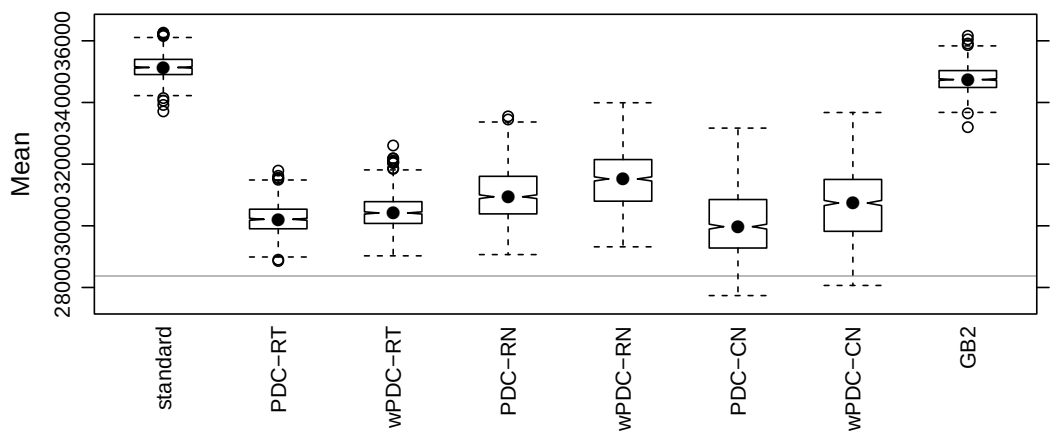

Figure F.565.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.282.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			35152.10	127890.75	6779.21	23.89	35135.53	355.04	6762.64	6788.62	23.93	10026.29	0.28
wHill	RT	500	37849.36	12031108.46	9476.47	33.40	37208.13	1597.63	8835.24	10090.71	35.56	13099.13	2.35
wHill	RT	700	36187.86	2668853.95	7814.97	27.54	35912.82	1136.07	7539.93	7983.73	28.14	11178.69	0.76
wHill	RN	300	35152.10	127890.75	6779.21	23.89	35135.53	355.04	6762.64	6788.62	23.93	10026.29	0.28
wHill	RN	500	35150.71	128258.88	6777.82	23.89	35133.32	354.42	6760.43	6787.26	23.92	10023.01	0.28
wHill	RN	700	35147.31	126258.57	6774.41	23.88	35130.76	354.34	6757.87	6783.72	23.91	10019.22	0.28
wHill	CN	300	35152.10	127890.75	6779.21	23.89	35135.53	355.04	6762.64	6788.62	23.93	10026.29	0.28
wHill	CN	500	35150.62	128282.96	6777.73	23.89	35133.32	354.42	6760.43	6787.17	23.92	10023.01	0.28
wHill	CN	700	35146.79	126082.40	6773.89	23.87	35130.76	353.89	6757.87	6783.18	23.91	10019.22	0.28
wISE	RT	500	32676.88	951831.13	4303.99	15.17	32522.64	816.51	4149.75	4413.07	15.55	6152.42	0.37
wISE	RT	700	31767.79	351687.56	3394.89	11.97	31735.18	582.28	3362.29	3446.25	12.15	4984.92	0.19
wISE	RN	300	35152.10	127890.75	6779.21	23.89	35135.53	355.04	6762.64	6788.62	23.93	10026.29	0.28
wISE	RN	500	34856.09	204332.91	6483.20	22.85	34883.25	388.96	6510.36	6498.92	22.91	9652.26	0.27
wISE	RN	700	33805.49	434974.96	5432.60	19.15	33771.11	724.16	5398.21	5472.45	19.29	8003.39	0.26
wISE	CN	300	35152.10	127890.75	6779.21	23.89	35135.53	355.04	6762.64	6788.62	23.93	10026.29	0.28
wISE	CN	500	34800.35	247741.61	6427.46	22.65	34847.40	412.72	6474.50	6446.69	22.72	9599.10	0.27
wISE	CN	700	33554.48	580276.98	5181.59	18.26	33508.89	844.78	5136.00	5237.23	18.46	7614.63	0.26
wPDC	RT	500	30515.27	264368.46	2142.38	7.55	30494.82	516.71	2121.92	2203.15	7.76	3145.97	0.15
wPDC	RT	700	30449.21	288611.23	2076.31	7.32	30417.45	520.04	2044.55	2144.62	7.56	3031.26	0.15
wPDC	RN	300	34805.97	684837.57	6433.08	22.67	35018.49	449.23	6645.60	6486.04	22.86	9852.77	0.28
wPDC	RN	500	31910.30	1206726.13	3537.41	12.47	31884.38	1253.39	3511.49	3703.89	13.05	5206.14	0.24
wPDC	RN	700	31531.06	929629.15	3158.17	11.13	31520.97	1005.62	3148.07	3301.93	11.64	4667.34	0.20
wPDC	CN	300	34699.59	1112675.58	6326.70	22.30	35010.12	452.55	6637.23	6413.95	22.61	9840.35	0.28
wPDC	CN	500	31055.50	2043351.50	2682.61	9.45	31059.94	1692.69	2687.05	3039.36	10.71	3983.82	0.24
wPDC	CN	700	30725.60	1443973.12	2352.71	8.29	30739.55	1247.20	2366.66	2641.54	9.31	3508.81	0.19
GB2			34756.77	167502.85	6383.88	22.50	34742.45	406.14	6369.56	6396.97	22.55	9443.51	0.27

OCAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

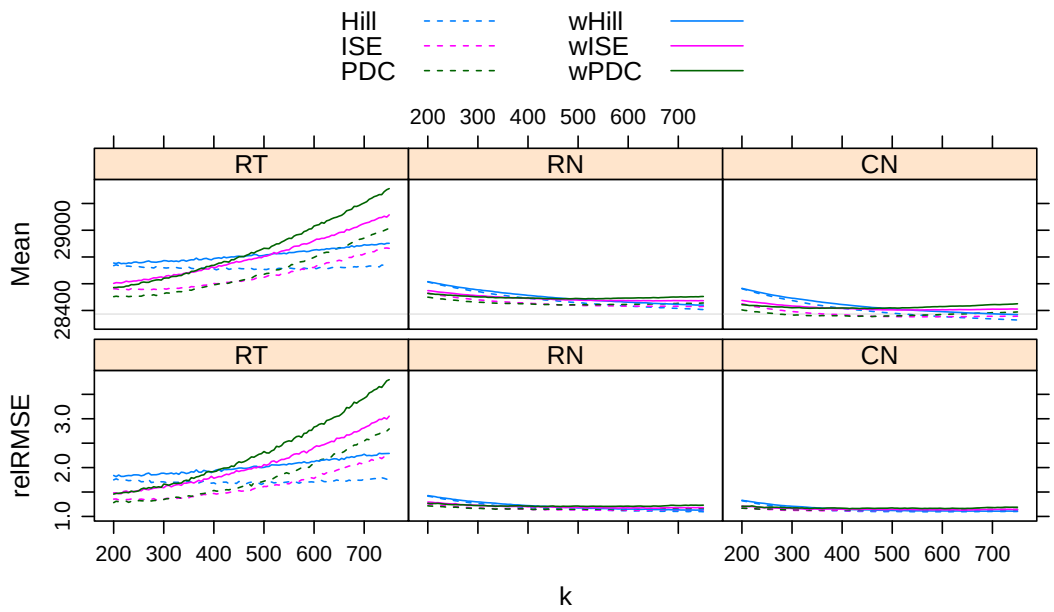

Figure F.566.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

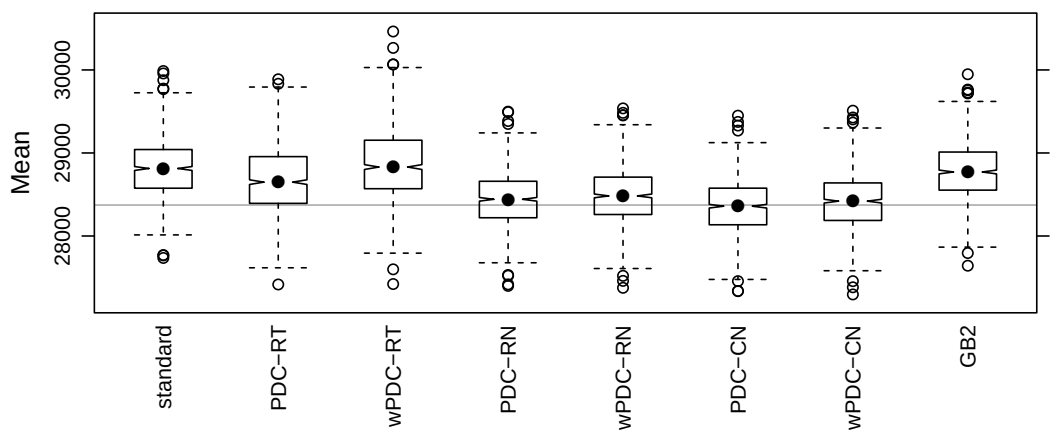

Figure F.567.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.283.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28813.90	112842.88	441.00	1.55	28812.98	346.30	440.08	554.27	1.95	654.49	0.06
wHill	RT	300	28773.05	126031.32	400.16	1.41	28765.66	357.77	392.77	534.82	1.88	594.78	0.06
wHill	RT	500	28811.81	131010.82	438.92	1.55	28800.11	357.34	427.22	568.80	2.00	636.51	0.06
wHill	RT	700	28891.58	147402.75	518.68	1.83	28872.89	388.64	500.00	645.20	2.27	744.19	0.06
wHill	RN	300	28553.99	102746.66	181.10	0.64	28544.95	331.83	172.05	368.02	1.30	376.04	0.04
wHill	RN	500	28482.74	98775.37	109.85	0.39	28471.65	319.90	98.76	332.78	1.17	337.41	0.04
wHill	RN	700	28446.48	98690.83	73.59	0.26	28432.53	316.62	59.64	322.50	1.14	322.14	0.04
wHill	CN	300	28491.78	103438.27	118.88	0.42	28486.35	324.87	113.46	342.74	1.21	354.76	0.04
wHill	CN	500	28411.55	99925.74	38.66	0.14	28409.04	322.75	36.15	318.31	1.12	321.30	0.04
wHill	CN	700	28375.17	99092.77	2.27	0.01	28369.19	313.46	−3.70	314.64	1.11	314.46	0.04
wISE	RT	300	28644.91	129009.22	272.02	0.96	28649.46	364.84	276.56	450.42	1.59	475.75	0.05
wISE	RT	500	28805.29	155234.78	432.40	1.52	28795.33	415.67	422.44	584.85	2.06	635.84	0.07
wISE	RT	700	29050.21	178371.30	677.31	2.39	29045.80	444.81	672.91	798.09	2.81	997.65	0.07
wISE	RN	300	28510.06	102088.42	137.17	0.48	28506.09	322.41	133.20	347.56	1.22	352.53	0.04
wISE	RN	500	28477.75	102641.11	104.86	0.37	28469.61	330.44	96.72	336.95	1.19	336.42	0.04
wISE	RN	700	28473.62	101456.33	100.73	0.36	28472.35	317.16	99.46	333.92	1.18	336.91	0.04
wISE	CN	300	28433.14	105112.68	60.25	0.21	28439.49	319.88	66.59	329.60	1.16	331.02	0.04
wISE	CN	500	28404.54	104855.70	31.65	0.11	28399.35	334.44	26.46	325.20	1.15	330.43	0.04
wISE	CN	700	28410.26	104149.63	37.36	0.13	28414.48	325.86	41.59	324.72	1.14	332.34	0.04
wPDC	RT	300	28641.14	150712.68	268.25	0.95	28638.27	386.87	265.38	471.72	1.66	478.35	0.05
wPDC	RT	500	28865.15	194830.19	492.26	1.73	28830.43	441.40	457.53	661.02	2.33	692.05	0.07
wPDC	RT	700	29204.47	249841.96	831.58	2.93	29195.83	499.67	822.94	970.11	3.42	1220.09	0.10
wPDC	RN	300	28501.68	104120.08	128.78	0.45	28499.98	325.69	127.08	347.28	1.22	350.65	0.04
wPDC	RN	500	28489.25	105075.04	116.35	0.41	28482.77	334.99	109.88	344.25	1.21	346.45	0.04
wPDC	RN	700	28500.63	104076.61	127.73	0.45	28488.60	330.13	115.71	346.83	1.22	345.24	0.04
wPDC	CN	300	28420.14	108646.93	47.25	0.17	28431.39	329.24	58.49	332.82	1.17	333.55	0.04
wPDC	CN	500	28418.68	109110.77	45.79	0.16	28419.73	337.51	46.83	333.31	1.17	333.98	0.04
wPDC	CN	700	28443.97	107555.33	71.08	0.25	28438.39	338.63	65.49	335.41	1.18	335.97	0.04
GB2			28778.05	110302.45	405.15	1.43	28771.03	338.05	398.13	523.78	1.85	592.44	0.06

OCAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

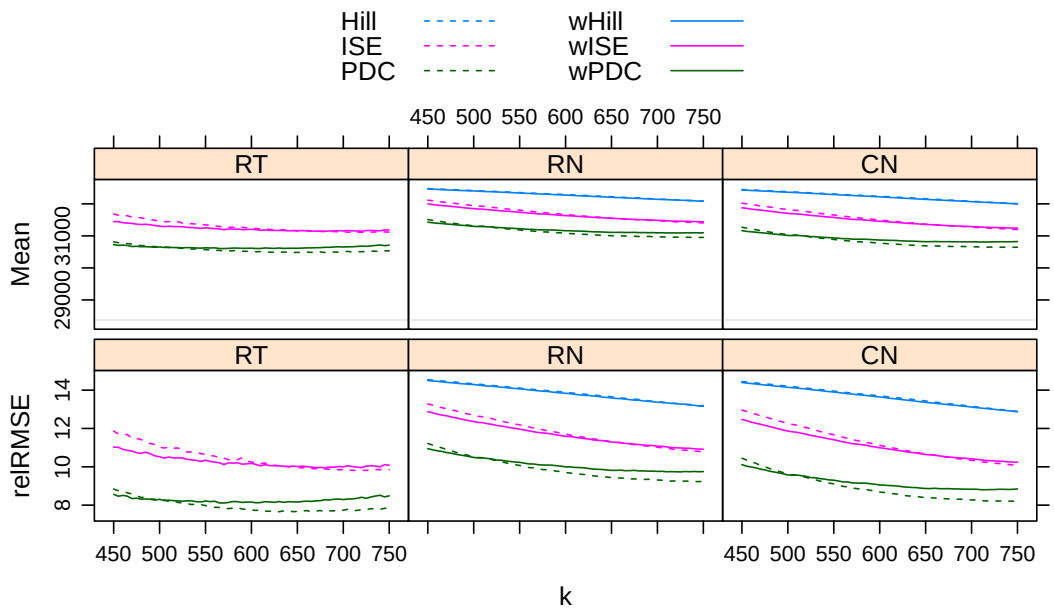

Figure F.568.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

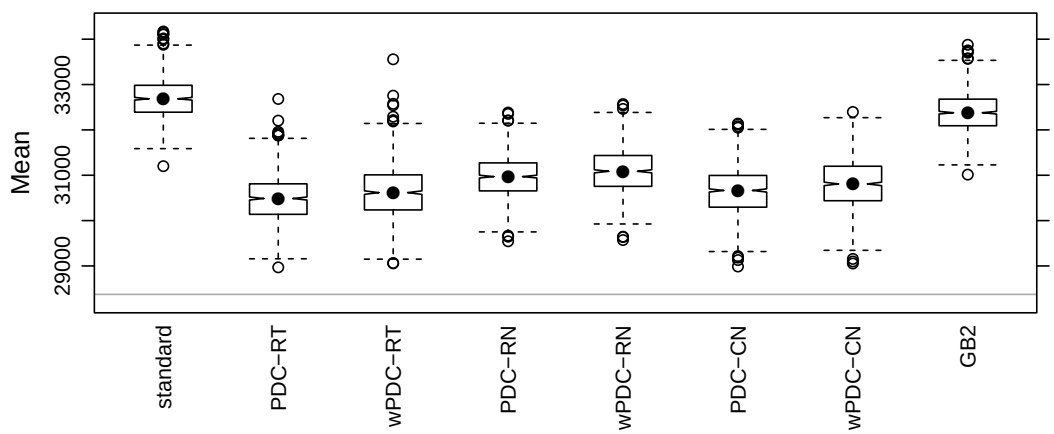

Figure F.569.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.284.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			32694.33	199577.24	4321.44	15.23	32686.16	440.40	4313.27	4344.45	15.31	6394.86	0.20
wHill	RT	500	32759.01	583635.83	4386.12	15.46	32678.16	673.94	4305.27	4452.09	15.69	6382.99	0.41
wHill	RT	700	32510.63	429780.65	4137.74	14.58	32454.57	600.90	4081.68	4189.30	14.77	6051.50	0.27
wHill	RN	300	32614.99	192466.03	4242.10	14.95	32610.59	440.02	4237.70	4264.70	15.03	6282.81	0.20
wHill	RN	500	32406.03	187178.72	4033.14	14.21	32398.68	426.84	4025.78	4056.26	14.30	5968.63	0.20
wHill	RN	700	32141.81	178334.83	3768.92	13.28	32135.32	420.38	3762.43	3792.48	13.37	5578.18	0.19
wHill	CN	300	32605.70	192281.49	4232.81	14.92	32603.43	441.27	4230.54	4255.44	15.00	6272.20	0.20
wHill	CN	500	32363.15	186014.19	3990.26	14.06	32360.13	435.06	3987.24	4013.48	14.15	5911.48	0.20
wHill	CN	700	32069.12	182480.23	3696.22	13.03	32074.51	415.04	3701.62	3720.80	13.11	5488.02	0.19
wISE	RT	500	31305.05	320079.34	2932.15	10.33	31268.43	551.38	2895.54	2986.18	10.52	4292.93	0.23
wISE	RT	700	31154.66	308491.12	2781.77	9.80	31121.41	557.40	2748.52	2836.62	10.00	4074.95	0.18
wISE	RN	300	32487.56	195464.73	4114.67	14.50	32490.64	439.73	4117.75	4138.33	14.59	6104.97	0.20
wISE	RN	500	31851.28	199837.79	3478.39	12.26	31854.36	463.38	3481.47	3506.97	12.36	5161.63	0.17
wISE	RN	700	31485.15	185676.30	3112.26	10.97	31463.17	419.44	3090.28	3141.92	11.07	4581.65	0.16
wISE	CN	300	32454.94	202317.59	4082.05	14.39	32457.67	443.56	4084.78	4106.73	14.47	6056.09	0.20
wISE	CN	500	31704.44	230994.42	3331.55	11.74	31708.96	491.20	3336.06	3366.00	11.86	4946.05	0.17
wISE	CN	700	31290.77	210552.46	2917.88	10.28	31273.66	450.85	2900.77	2953.70	10.41	4300.68	0.16
wPDC	RT	500	30653.53	352868.99	2280.63	8.04	30606.59	545.36	2233.70	2356.65	8.31	3311.68	0.19
wPDC	RT	700	30652.51	339619.52	2279.61	8.03	30616.99	573.04	2244.10	2352.85	8.29	3327.11	0.18
wPDC	RN	300	32113.59	340841.57	3740.69	13.18	32154.14	572.06	3781.25	3785.93	13.34	5606.08	0.19
wPDC	RN	500	31298.18	298246.65	2925.29	10.31	31336.21	554.75	2963.32	2975.78	10.49	4393.42	0.17
wPDC	RN	700	31096.49	249686.55	2723.60	9.60	31087.05	505.80	2714.16	2769.02	9.76	4024.01	0.15
wPDC	CN	300	31988.67	476076.81	3615.77	12.74	32080.46	640.12	3707.57	3680.95	12.97	5496.84	0.19
wPDC	CN	500	31012.63	414783.53	2639.74	9.30	31050.87	641.19	2677.97	2717.10	9.58	3970.36	0.17
wPDC	CN	700	30813.80	316545.57	2440.91	8.60	30809.16	559.51	2436.26	2504.85	8.83	3612.01	0.14
GB2			32389.13	173458.03	4016.24	14.16	32379.43	434.76	4006.54	4037.75	14.23	5940.09	0.19

OAR-CCAR Contamination level $\varepsilon = 0.001$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

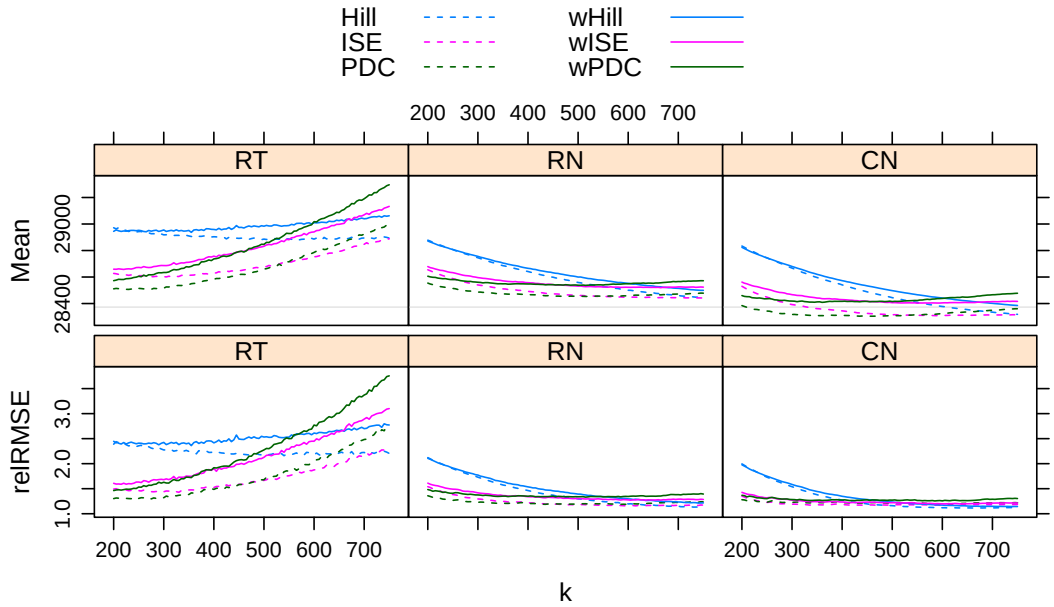

Figure F.570.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

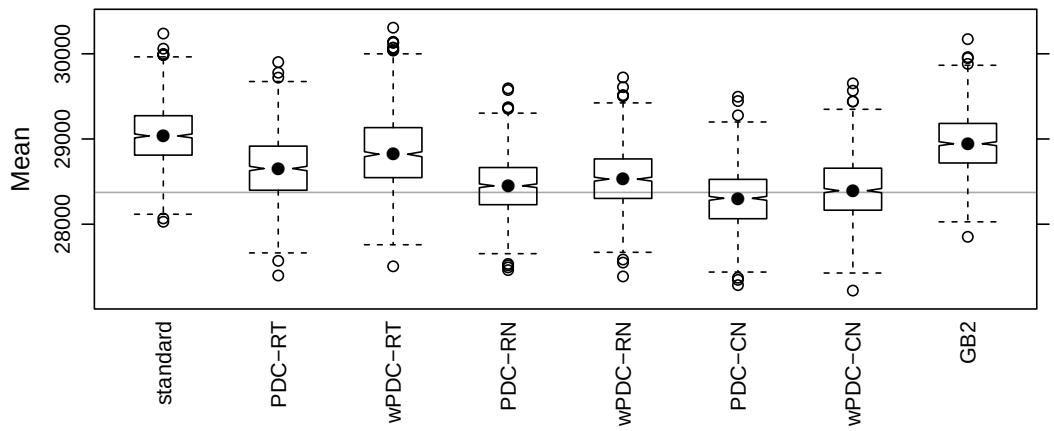

Figure F.571.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.285.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			29047.71	108775.02	674.82	2.38	29035.66	341.72	662.77	751.03	2.65	982.62	0.07
wHill	RT	300	28955.09	134680.64	582.20	2.05	28947.15	364.56	574.26	688.12	2.43	852.31	0.07
wHill	RT	500	28983.44	143447.58	610.54	2.15	28971.49	392.18	598.59	718.38	2.53	887.47	0.07
wHill	RT	700	29039.36	142755.32	666.47	2.35	29011.26	391.58	638.37	766.02	2.70	946.45	0.07
wHill	RN	300	28755.73	106449.81	382.83	1.35	28741.01	331.34	368.11	502.90	1.77	556.73	0.05
wHill	RN	500	28599.87	104508.48	226.98	0.80	28594.49	333.29	221.59	394.87	1.39	396.84	0.05
wHill	RN	700	28514.79	102671.48	141.90	0.50	28506.60	322.26	133.71	350.29	1.23	345.56	0.04
wHill	CN	300	28679.65	108238.05	306.76	1.08	28671.11	333.25	298.22	449.70	1.58	469.30	0.05
wHill	CN	500	28497.37	107198.04	124.47	0.44	28496.99	337.42	124.10	350.12	1.23	358.35	0.05
wHill	CN	700	28401.65	105328.25	28.76	0.10	28389.18	330.69	16.29	325.65	1.15	327.52	0.04
wISE	RT	300	28686.52	128991.38	313.63	1.11	28683.49	368.57	310.60	476.68	1.68	496.64	0.06
wISE	RT	500	28831.86	153833.71	458.97	1.62	28806.08	393.09	433.19	603.60	2.13	659.94	0.06
wISE	RT	700	29069.35	187474.07	696.46	2.45	29085.54	437.14	712.64	819.96	2.89	1056.57	0.08
wISE	RN	300	28595.61	112180.74	222.72	0.78	28599.11	340.09	226.22	402.09	1.42	404.07	0.05
wISE	RN	500	28531.17	111432.88	158.28	0.56	28526.55	327.43	153.66	369.29	1.30	364.59	0.05
wISE	RN	700	28525.55	110963.52	152.66	0.54	28513.24	331.83	140.35	366.28	1.29	369.62	0.05
wISE	CN	300	28467.02	121420.54	94.13	0.33	28473.76	360.67	100.86	360.78	1.27	358.72	0.05
wISE	CN	500	28406.35	118980.54	33.46	0.12	28392.72	345.37	19.83	346.38	1.22	345.07	0.05
wISE	CN	700	28414.30	116520.85	41.41	0.15	28404.74	346.23	31.85	343.68	1.21	342.18	0.05
wPDC	RT	300	28634.16	145330.96	261.27	0.92	28626.16	380.83	253.27	462.00	1.63	462.98	0.05
wPDC	RT	500	28846.26	192903.68	473.37	1.67	28821.21	429.93	448.32	645.59	2.28	681.21	0.07
wPDC	RT	700	29190.08	247369.04	817.19	2.88	29160.26	515.46	787.37	956.52	3.37	1167.36	0.10
wPDC	RN	300	28560.60	117124.40	187.71	0.66	28567.86	342.89	194.97	390.18	1.38	399.01	0.05
wPDC	RN	500	28538.16	117060.89	165.27	0.58	28528.73	341.93	155.84	379.81	1.34	380.55	0.05
wPDC	RN	700	28566.14	116363.51	193.25	0.68	28561.89	336.69	188.99	391.91	1.38	407.91	0.05
wPDC	CN	300	28418.55	130647.88	45.66	0.16	28417.40	371.61	44.50	364.15	1.28	355.99	0.05
wPDC	CN	500	28414.91	128485.82	42.02	0.15	28394.14	361.98	21.25	360.73	1.27	370.82	0.05
wPDC	CN	700	28466.26	125239.69	93.37	0.33	28463.50	357.40	90.60	365.83	1.29	373.03	0.05
GB2			28953.31	110345.62	580.42	2.05	28944.57	345.87	571.68	668.67	2.36	847.57	0.06

OAR-CCAR Contamination level $\varepsilon = 0.01$, outliers based on $\mathcal{N}(\mu, \sigma)$ with $\mu = 500\,000$ and $\sigma = 20\,000$.

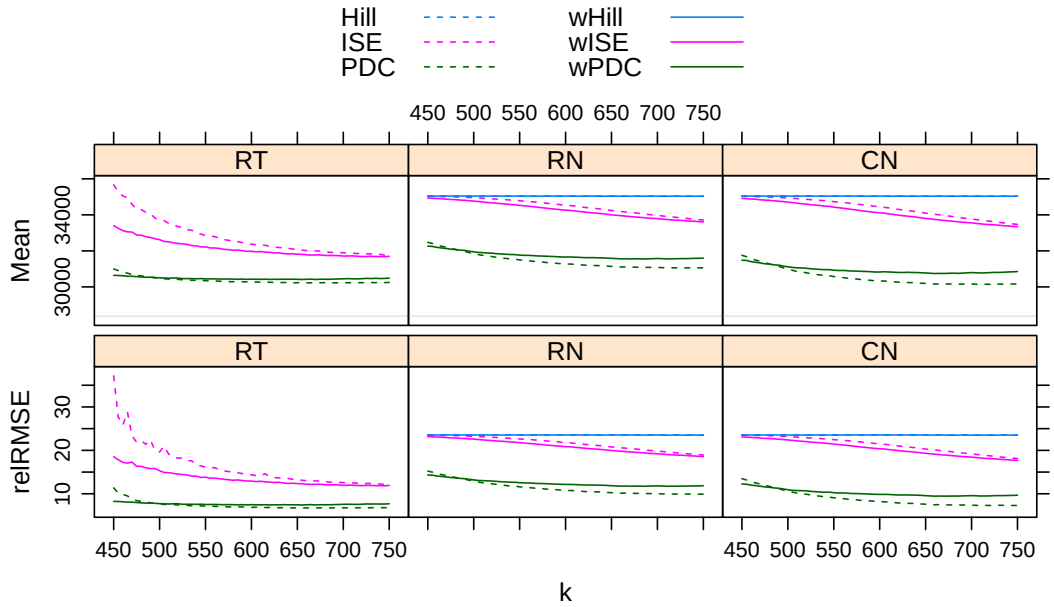

Figure F.572.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

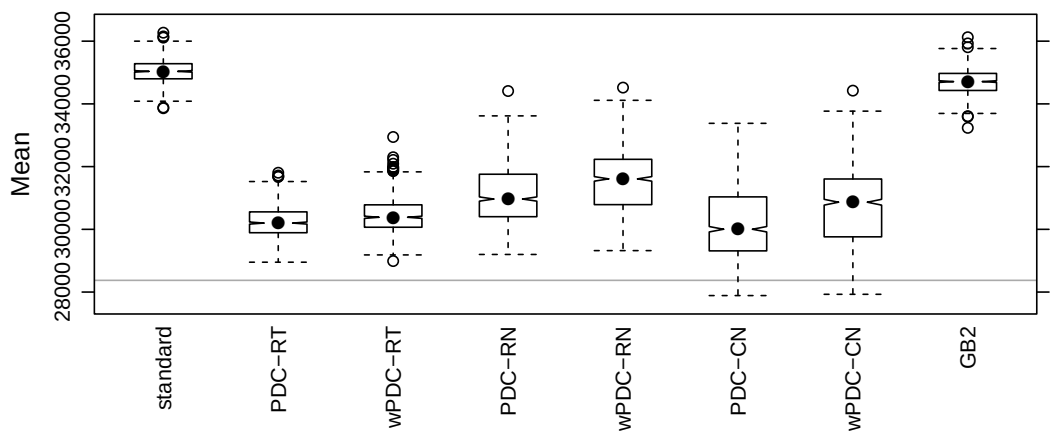

Figure F.573.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.286.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			35043.90	127198.30	6671.01	23.51	35036.10	355.61	6663.20	6680.53	23.55	9878.86	0.28
wHill	RT	500	37643.85	10824969.53	9270.96	32.68	36933.10	1708.08	8560.21	9836.91	34.67	12691.37	1.78
wHill	RT	700	35894.68	2477340.29	7521.79	26.51	35698.14	1033.45	7325.25	7684.54	27.08	10860.42	1.16
wHill	RN	300	35043.90	127198.30	6671.01	23.51	35036.10	355.61	6663.20	6680.53	23.55	9878.86	0.28
wHill	RN	500	35042.60	127279.57	6669.71	23.51	35035.66	355.34	6662.77	6679.23	23.54	9878.22	0.28
wHill	RN	700	35038.75	126343.02	6665.86	23.49	35033.90	357.02	6661.01	6675.32	23.53	9875.61	0.28
wHill	CN	300	35043.90	127198.30	6671.01	23.51	35036.10	355.61	6663.20	6680.53	23.55	9878.86	0.28
wHill	CN	500	35042.46	127291.06	6669.57	23.51	35035.66	355.34	6662.77	6679.09	23.54	9878.22	0.28
wHill	CN	700	35038.14	126058.12	6665.24	23.49	35033.34	357.85	6660.45	6674.69	23.52	9874.79	0.28
wISE	RT	500	32621.60	834449.81	4248.71	14.97	32475.21	796.99	4102.32	4345.71	15.32	6082.10	0.33
wISE	RT	700	31710.13	357509.53	3337.24	11.76	31661.93	586.16	3289.04	3390.33	11.95	4876.33	0.21
wISE	RN	300	35043.90	127198.30	6671.01	23.51	35036.10	355.61	6663.20	6680.53	23.55	9878.86	0.28
wISE	RN	500	34764.04	188639.21	6391.14	22.53	34781.22	399.72	6408.33	6405.87	22.58	9500.99	0.27
wISE	RN	700	33788.29	405502.59	5415.39	19.09	33745.31	700.95	5372.42	5452.67	19.22	7965.15	0.25
wISE	CN	300	35043.90	127198.30	6671.01	23.51	35036.10	355.61	6663.20	6680.53	23.55	9878.86	0.28
wISE	CN	500	34710.83	224507.36	6337.94	22.34	34749.16	424.76	6376.27	6355.61	22.40	9453.46	0.27
wISE	CN	700	33554.23	535931.80	5181.34	18.26	33507.47	820.15	5134.58	5232.75	18.44	7612.53	0.25
wPDC	RT	500	30502.93	273678.08	2130.04	7.51	30469.79	513.47	2096.90	2193.28	7.73	3108.87	0.16
wPDC	RT	700	30449.71	295498.03	2076.82	7.32	30384.06	519.61	2011.17	2146.71	7.57	2981.76	0.16
wPDC	RN	300	34736.75	617020.20	6363.86	22.43	34915.56	453.30	6542.67	6412.11	22.60	9700.16	0.28
wPDC	RN	500	31947.66	1233811.43	3574.77	12.60	31925.19	1270.38	3552.30	3743.20	13.19	5266.64	0.25
wPDC	RN	700	31577.95	967486.01	3205.06	11.30	31608.74	1078.16	3235.85	3352.45	11.82	4797.47	0.22
wPDC	CN	300	34638.34	1020904.22	6265.45	22.08	34913.03	458.19	6540.14	6346.32	22.37	9696.41	0.28
wPDC	CN	500	31115.74	2107378.14	2742.85	9.67	31136.90	1709.07	2764.00	3102.98	10.94	4097.91	0.24
wPDC	CN	700	30794.05	1520494.66	2421.16	8.53	30864.32	1368.60	2491.43	2716.80	9.58	3693.80	0.21
GB2			34703.86	165175.94	6330.97	22.31	34710.99	400.68	6338.10	6343.99	22.36	9396.86	0.27

OAR-NCAR Contamination level $\varepsilon = 0.001$, outliers based on scaling factor 12.

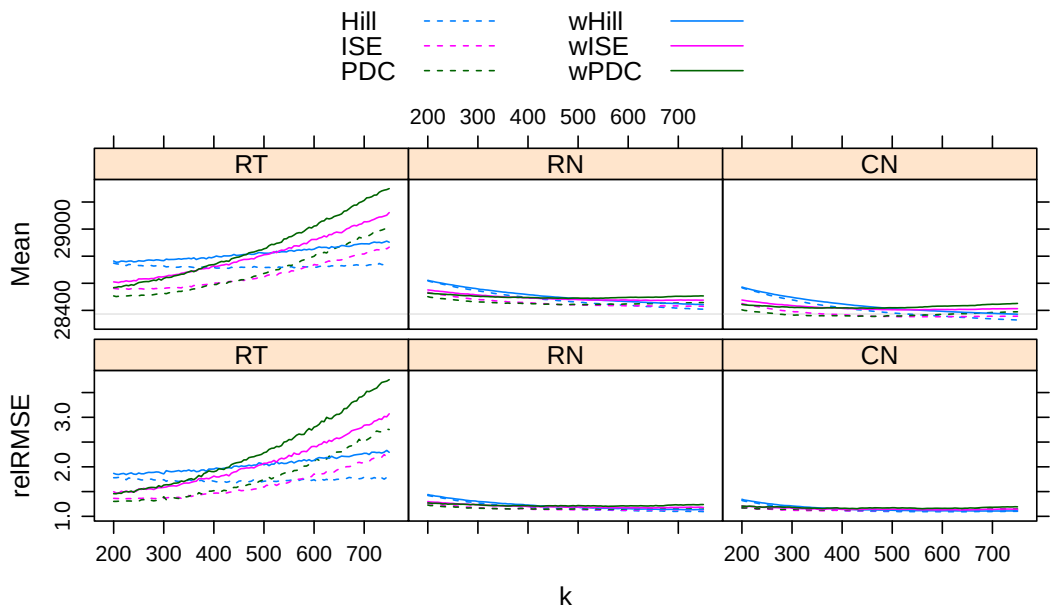

Figure F.574.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 200 and 750.

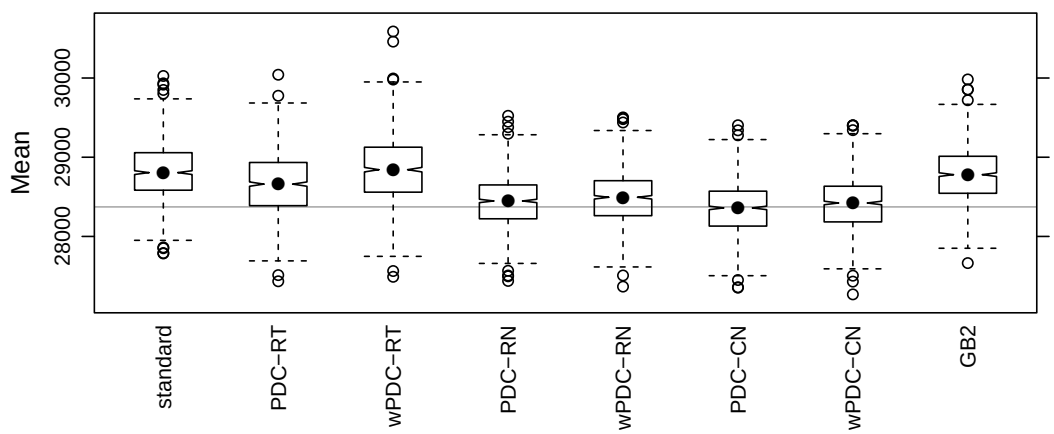

Figure F.575.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 500$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

Table F.287.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			28821.27	115207.67	448.37	1.58	28805.68	352.07	432.79	562.26	1.98	645.01	0.06
wHill	RT	300	28766.92	122404.78	394.03	1.39	28762.21	356.21	389.32	526.82	1.86	588.57	0.06
wHill	RT	500	28822.33	133601.07	449.44	1.58	28816.82	383.38	443.92	579.19	2.04	666.72	0.06
wHill	RT	700	28891.25	147605.08	518.36	1.83	28876.44	397.56	503.55	645.10	2.27	753.37	0.07
wHill	RN	300	28558.14	101823.44	185.25	0.65	28545.51	330.37	172.62	368.84	1.30	374.85	0.04
wHill	RN	500	28486.00	100255.60	113.11	0.40	28482.82	327.04	109.92	336.08	1.18	338.35	0.04
wHill	RN	700	28449.64	98512.77	76.75	0.27	28447.43	321.10	74.53	322.96	1.14	319.29	0.04
wHill	CN	300	28496.31	102702.74	123.42	0.43	28484.72	327.92	111.83	343.27	1.21	352.33	0.04
wHill	CN	500	28412.76	100073.65	39.87	0.14	28417.56	318.81	44.67	318.69	1.12	324.79	0.04
wHill	CN	700	28378.00	98785.99	5.11	0.02	28370.33	318.05	−2.57	314.19	1.11	316.50	0.04
wISE	RT	300	28648.27	126591.20	275.38	0.97	28644.03	357.55	271.14	449.77	1.59	460.00	0.06
wISE	RT	500	28810.58	154254.47	437.69	1.54	28783.37	381.46	410.47	587.94	2.07	623.47	0.06
wISE	RT	700	29054.33	184425.84	681.44	2.40	29041.28	428.88	668.39	805.36	2.84	990.95	0.08
wISE	RN	300	28513.03	103097.08	140.14	0.49	28511.25	320.54	138.36	350.19	1.23	359.04	0.04
wISE	RN	500	28478.97	102031.27	106.07	0.37	28490.18	316.94	117.29	336.42	1.19	335.48	0.04
wISE	RN	700	28476.02	101424.34	103.12	0.36	28470.88	317.70	97.99	334.60	1.18	335.00	0.04
wISE	CN	300	28435.17	105471.72	62.27	0.22	28440.21	321.72	67.32	330.52	1.16	329.03	0.04
wISE	CN	500	28404.58	104521.40	31.69	0.11	28413.48	326.10	40.59	324.69	1.14	324.38	0.04
wISE	CN	700	28411.84	103346.34	38.95	0.14	28409.56	329.10	36.67	323.67	1.14	326.13	0.04
wPDC	RT	300	28636.02	145077.61	263.12	0.93	28639.18	392.45	266.29	462.78	1.63	476.73	0.05
wPDC	RT	500	28854.33	189059.23	481.44	1.70	28842.78	420.96	469.89	648.58	2.29	709.84	0.08
wPDC	RT	700	29211.75	254820.65	838.86	2.96	29181.89	519.33	809.00	978.90	3.45	1199.42	0.09
wPDC	RN	300	28504.65	105610.55	131.75	0.46	28505.56	320.61	132.67	350.52	1.24	356.65	0.04
wPDC	RN	500	28491.00	105669.95	118.10	0.42	28494.11	332.39	121.22	345.71	1.22	344.76	0.04
wPDC	RN	700	28503.98	104543.14	131.08	0.46	28494.79	328.98	121.90	348.74	1.23	352.09	0.04
wPDC	CN	300	28422.60	109745.40	49.71	0.18	28430.78	323.90	57.89	334.82	1.18	327.54	0.04
wPDC	CN	500	28419.23	108974.54	46.34	0.16	28422.28	333.60	49.39	333.19	1.17	335.15	0.04
wPDC	CN	700	28445.49	107472.98	72.60	0.26	28440.89	339.19	67.99	335.61	1.18	334.93	0.04
GB2			28782.53	110636.47	409.64	1.44	28780.15	344.90	407.25	527.57	1.86	606.49	0.06

OAR-NCAR Contamination level $\varepsilon = 0.01$, outliers based on scaling factor 12.

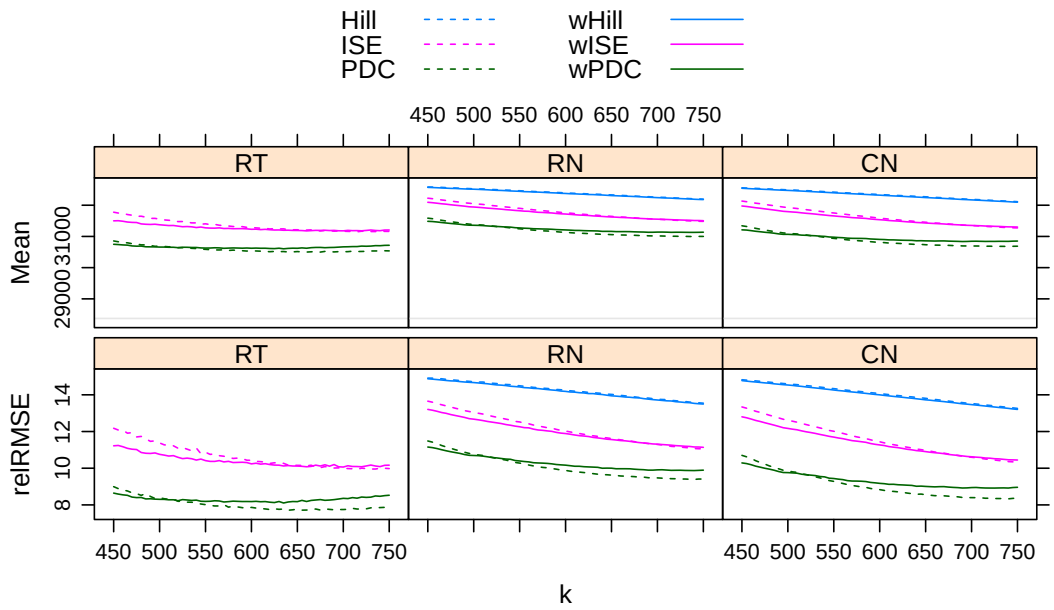

Figure F.576.: Average results (*top*) and relative RMSE (*bottom*) for the mean using the three approaches for Pareto tail modeling with k varying between 450 and 750.

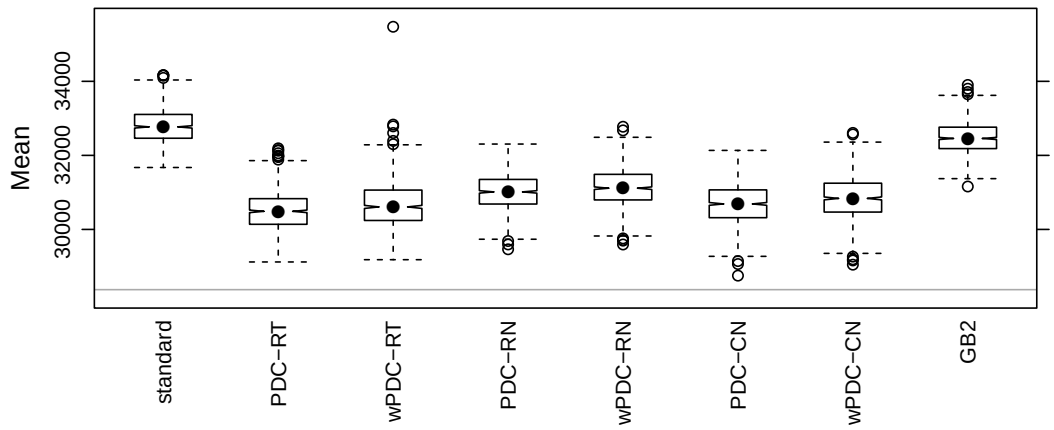

Figure F.577.: Box plots of the simulation results for the mean using standard estimation, the three semiparametric approaches for Pareto tail modeling with the PDC and wPDC estimators and $k = 700$, as well as parametric estimation using a GB2 distribution with the profile log-likelihood approach.

F.7. Discussion and conclusions

The semiparametric approaches based on Pareto tail modeling are evaluated by plotting the average results and the root mean squared error (RMSE) for varying k. It is clearly visible from the plots how the range of suitable choices of k is

pushed to the right with increasing contamination level ϵ, since the upper tail gets heavier as a result of replacing the selected observations with outliers.

Due to the resulting instabilities for lower values of k in the presence of outliers, which occur particularly for the RT approach, the x-axis of the plot is adjusted for the different contamination levels so that the plots remain readable. Also note that for $\epsilon = 0.01$, the non-robust Hill and wHill estimators are in particular unstable, which is why their results for the RT approach are excluded from the corresponding plots.

In addition, box plots are produced to compare the standard estimation to the robust PDC and wPDC estimators for a selected value of k, as well as to parametric estimation using a GB2 distribution with the profile log-likelihood approach. The box plots show that the standard estimation of the selected indicators is corrupted if there are outliers in the data. As there is not enough space to display all semiparametric methods, the wPDC estimator is chosen because it performed best, while the unweighted PDC estimator is included as a reference to further study the effect of using the sample weights for fitting the Pareto distribution.

To complement the graphical evaluation methods, Tables containing various evaluation criteria for univariate point estimation are produced (see ALFONS et al., 2011a): average, variance, bias, relative bias (relBias), median, median absolute deviation (MAD), median error (MedE), root mean squared error (RMSE), relative root mean squared error (relRMSE), median absolute error (MedAE), and maximum absolute relative error (MaxARE). In particular the relBias and the relRMSE are of interest. For the semiparametric methods, results for $k = 300, 500, 700$ are shown. These choices of k are selected to compare the results across different contamination settings.

Concerning the semiparametric approaches, the RT approach clearly introduces a considerable amount of additional uncertainty, since all values in the tail are replaced by randomly drawn ones. This results in a visible lack of smoothness in the evaluation curves for varying k. In particular for heavier contamination, the results are frequently highly unstable. Nevertheless, in some situations the RT approach performs better than the RN and CN approaches with respect to bias, sometimes even resulting in a lower RMSE, provided k is selected appropriately.

However, the RN and CN approaches are much less influenced by the choice of k and are thus preferred. They result in a wide range of values of k with a low and stable RMSE, therefore being fairly robust with respect to the estimation of the threshold for the Pareto distribution. It should be noted, though, that the choice of α for the quantile of the fitted distribution constitutes an additional tuning parameter. Moreover, the CN approach is in general favorable over RN, as the former does not require random draws from the Pareto model and typically performs slightly better in the case of heavier contamination.

The advantage of the parametric approach using the GB2 distribution is that it does not involve tuning parameters and hence is simpler to use. However, the box plots cleary show that this approach does not perform as well as the semiparametric approaches with the wPDC estimator. There is a significant bias even if there are no outliers in the data.

In the cases of no contamination and $\epsilon = 0.001$, the semiparametric methods based on the wPDC estimator in general gave excellent results. Even though there is still some bias in the case of $\epsilon = 0.01$ for most scenarios, in particular if the contamination is moderate, the results are much better than for the other methods and certainly are a significant improvement over the standard estimation. In any case, 1% of contamination in real life EU-SILC data is rather unrealistic.

Last but not least, in many cases there is not much difference between using the weighted and unweighted estimators for the shape of the Pareto distribution for the RN and CN approaches, since the procedures are quite stable in case of slight misspecifications in the Pareto model. Nevertheless, it is advised to use the weighted versions to avoid any unnecessary misspecifications.

To summarize the above, the CN approach for Pareto tail modeling using the wPDC estimator performed best in the simulation study and lead to excellent results in most scenarios.

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Table F.288.: Evaluation of selected simulation results for the mean.

Method	Type	k	Average	Variance	Bias	relBias	Median	MAD	MedE	RMSE	relRMSE	MedAE	MaxARE
standard			32798.41	194385.12	4425.51	15.60	32769.90	477.46	4397.01	4447.40	15.67	6519.01	0.20
wHill	RT	500	32925.85	767134.95	4552.96	16.05	32809.83	697.52	4436.93	4636.36	16.34	6578.20	0.60
wHill	RT	700	32644.08	446029.23	4271.19	15.05	32576.14	647.03	4203.25	4323.04	15.24	6231.74	0.24
wHill	RN	300	32724.77	187034.32	4351.88	15.34	32697.86	438.21	4324.97	4373.29	15.41	6412.20	0.20
wHill	RN	500	32513.40	176585.11	4140.51	14.59	32476.54	415.40	4103.64	4161.76	14.67	6084.06	0.20
wHill	RN	700	32243.44	167789.92	3870.55	13.64	32229.48	407.95	3856.59	3892.14	13.72	5717.77	0.19
wHill	CN	300	32715.02	187618.45	4342.13	15.30	32688.68	431.89	4315.79	4363.66	15.38	6398.59	0.20
wHill	CN	500	32475.33	177353.42	4102.44	14.46	32441.88	421.18	4068.99	4123.97	14.53	6032.68	0.20
wHill	CN	700	32171.19	170638.47	3798.30	13.39	32149.21	408.97	3776.32	3820.67	13.47	5598.77	0.19
wISE	RT	500	31373.57	308859.23	3000.67	10.58	31319.61	549.65	2946.71	3051.65	10.76	4368.80	0.20
wISE	RT	700	31178.85	278660.51	2805.95	9.89	31141.66	521.94	2768.77	2855.13	10.06	4104.97	0.17
wISE	RN	300	32600.54	184829.21	4227.64	14.90	32590.21	421.04	4217.31	4249.42	14.98	6252.59	0.20
wISE	RN	500	31942.48	186503.81	3569.59	12.58	31933.69	443.72	3560.79	3595.59	12.67	5279.23	0.18
wISE	RN	700	31553.16	184815.80	3180.27	11.21	31525.27	427.58	3152.38	3209.16	11.31	4673.71	0.17
wISE	CN	300	32570.26	193530.02	4197.37	14.79	32569.31	443.06	4196.41	4220.34	14.87	6221.60	0.20
wISE	CN	500	31794.75	213483.12	3421.86	12.06	31775.82	463.95	3402.93	3452.88	12.17	5045.19	0.17
wISE	CN	700	31352.02	209873.79	2979.12	10.50	31326.44	453.48	2953.54	3014.11	10.62	4378.93	0.16
wPDC	RT	500	30659.50	322366.44	2286.61	8.06	30622.51	549.81	2249.61	2355.97	8.30	3335.28	0.16
wPDC	RT	700	30666.03	364745.66	2293.14	8.08	30607.94	587.93	2235.05	2371.26	8.36	3313.68	0.25
wPDC	RN	300	32220.81	318522.65	3847.92	13.56	32264.25	527.01	3891.36	3889.05	13.71	5769.33	0.20
wPDC	RN	500	31358.05	294448.60	2985.16	10.52	31356.01	542.06	2983.11	3034.03	10.69	4422.76	0.16
wPDC	RN	700	31139.09	255274.54	2766.20	9.75	31113.46	503.03	2740.57	2811.91	9.91	4063.17	0.16
wPDC	CN	300	32098.30	443479.11	3725.41	13.13	32183.84	585.88	3810.95	3784.40	13.34	5650.11	0.20
wPDC	CN	500	31067.39	408107.18	2694.50	9.50	31072.57	621.30	2699.68	2769.12	9.76	4002.55	0.16
wPDC	CN	700	30845.30	328666.00	2472.41	8.71	30837.62	571.25	2464.73	2537.94	8.94	3654.20	0.15
GB2			32479.06	171052.95	4106.17	14.47	32456.68	423.49	4083.79	4126.93	14.55	6054.62	0.19

Appendix G.

Specific R-Code for simulations

G.1. Additional R Code for Missingness

Once missing values in the income components are generated on the personal level (see Chapter 5 of AMELI Deliverable D7.1), the function `collectNA()` should be used to collect missing values in the household income components, i.e., to set `NA`s for all persons in a household that contain `NA`s in the respective household income component. Listing G.1 contains the `R` code of `collectNA()` and a short description of its arguments. The default values for the arguments `hid` and `hcomp` are thereby given by the corresponding variable names in AAT-SILC.

```
# ---------------------------------------
# Author: Andreas Alfons
#         Vienna University of Technology
# ---------------------------------------
# Arguments:
# x ....... a data.frame containing NAs on the personal level
# hid ..... a character string specifying the variable of 'x'
#           that contains the household ID
# hcomp ... a character vector specifying the variables of 'x'
#           that contain the household income components
# ---------------------------------------

collectNA <- function(x, hid = "db030",
        hcomp = c("hyc", "hyet")) {
    nam <- names(x)
    if(!is.character(hid) || length(hid) != 1 ||
            !(hid %in% nam)) {
        stop("'hid' must be a character string specifying a ",
            "column of 'x'")
    }
    if(!is.character(hcomp) || (length(hcomp) > 0 &&
            !(hcomp %in% nam))) {
        stop("'hid' must be a character vector specifying ",
            "columns of 'x'")
    }
    if(length(hcomp) == 0) return(x)
    whichSetNA <- sapply(hcomp, function(cp) {
            households <- x[is.na(x[, cp]), hid]
            x[, hid] %in% households
        })
    x[, hcomp][whichSetNA] <- NA
    x
}
```

Listing G.1: Function `collectNA()` for collecting missing values in the household income components from initial missing values on the personal level.

G.2. R-Code for Contamination

G.2.1. Standard Functions

```
#=====================================================================
# SUBJECT:     generate ncar contamination
# AUTHOR:      Tobias Schoch, October 16, 2010
# LICENSE:     GPL > 2
#---------------------------------------------------------------------
# contaminate the outlying observations according to NCAR
ncar <- function(x, CTypeMechSpec, eqIncome, eqSS){
   # assing the outlying income (equivalized by eqSS) to all household
      members
   x[,eqIncome] <- (x[, eqIncome]*CTypeMechSpec$scale)/unique(x[,eqSS])
   return(x)
}
```

```
#=====================================================================
# SUBJECT:     generate ccar contamination
# AUTHOR:      Tobias Schoch, October 16, 2010
# LICENSE:     GPL > 2
#---------------------------------------------------------------------
# generate a utility-function to generate the outliers according to
   CTypeMech
 ccar <- function(x, CTypeMech, CTypeMechSpec, eqIncome, eqSS){
   # get the number of household members
   NHouesholdmembers <- dim(x)[1]
   # draw the outlying income
   OutlyingIncome <- do.call(CTypeMech, args=as.list(c(n=1,
      CTypeMechSpec)))
   # assing the outlying income (equivalized by eqSS) to all household
      members
   x[,eqIncome] <- rep(OutlyingIncome/unique(x[,eqSS]),
      NHouesholdmembers)
   return(x)
}
```

```
#=====================================================================
# SUBJECT:     makeoutliers defines outlying observations and
#        contaminates them
# AUTHOR:      Tobias Schoch, October 16, 2010
# LICENSE:     GPL > 2
# DEPENDENCY:  depends on the functions "ncar" and "ccar" (see above)
#---------------------------------------------------------------------
# ARGUMENTS;
#  oc        list-object that defines outlyingness and contamination
#  data        data-frame (these data will be contaminated)
#  hid         name of the household-id variable (character-string);
#        "db030" in the case of the EUROSTAT user DB
#  eqSS        name of the variable that contains the equivalization
#        scale in order to build the equivalized disp. income
#  eqIncome    name of the equivalized disp. income in the data
#  flag        logical if a variable "flag" (consisting of outlier flags
#        : 1=outlier, 0=non-outlier) should be added
#---------------------------------------------------------------------
```

```
makeoutliers <- function(oc, data, hid, eqSS, eqIncome, flag=TRUE){
   # PREPARATIONS
   # outlyingness type
   OType <- oc$OType
   # outylingness mechanism
   OTypeSpec <- oc$OTypeSpec
   # amount of outlyingness
   OTypeEpsilon <- oc$OTypeEpsilon
   CType <- oc$CType
   # contamination mechanism
   CTypeMech <- oc$CTypeMech
   # specifications of the contamination mechanism
   CTypeMechSpec <- oc$CTypeMechSpec
   # get the sample size (i.e., number of individuals)
   SampleSize <- dim(data)[1]
   # add an id to the data
   data <- cbind(data, theid=seq(1,SampleSize))
   id <- "theid"
   # add the flagging-variable
   if(flag){
      data <- cbind(data, flag=rep(0,SampleSize))
   }
   #==============================================
   # OUTLIER-DEFINITION PART
   #==============================================
   # define the number of outlying households (i.e., as integer number)
   NumberOutliers <- floor(SampleSize*OTypeEpsilon)
   #----------------------------------------------
   # switch cases
   if(OType=="OCAR"){
      # draw the outlier persons
      OutlyingAt <- sample(1:SampleSize, NumberOutliers)
      # retrieve the household ID where the outlying person lives
      OutlyingHH <- unique(data[OutlyingAt, hid])
   }
   if(OType=="OAR"){
   #----------------------------------------------
      # check if the OAR-probability-determining variable exists
      if(is.na(pmatch(OTypeSpec$var, names(data)))){
   stop("OAR-probability-determining variable does not exist \n")
      }
      # retrieve a frequency table of the outlyingness-determining
         variable
      OARVarTable <- table(data[, OTypeSpec$var])
      if(length(OARVarTable) != length(OTypeSpec$prob)){
   stop("OAR-prob-vector and OAR-prob-variable are of different length \
      n")
      }
      OutlyingProb <- OTypeSpec$prob
      # the outliers are distributed among the levels of the OAR-groups
         proportional to the OAR-probability-determining vector
      OutliersPerLevel <- floor(OutlyingProb*NumberOutliers)
      # note that floor(n*e) may not be equal to sum(n_i * e_i), i
         =1,...,[# OAR-groups].
      # Thus, we check if:
     if(sum(OutliersPerLevel) != NumberOutliers){
```

```
# ... and rise the number of outliers in the largest OAR-group such
   that sum(outliers_i), where i denotes the OAR-group, is equal to
   the total number of outliers
thehighest <- which(OutlyingProb==max(OutlyingProb))
OutliersPerLevel[thehighest] <- OutliersPerLevel[thehighest] + (
   NumberOutliers - sum(OutliersPerLevel))
   }
   # generate a vector of individuals, BUT expressed in terms of
      household ID. Thus, the vector contains the same hid for each
      household member
   what <- unname(unlist(data[,hid, drop=FALSE]))
   # split the individuals into a list according to OTypeSpec$var
   IndividualsPerLevel <- split(what, data[,OTypeSpec$var])
   # draw the outliers in terms of households, and remove multiple
      instances
   OutlyingHH <- unique(unname(unlist(mapply(sample,
      IndividualsPerLevel, OutliersPerLevel))))
#-----------------------------------------------
}
# prepare the contamination part
IndividualsInOutlyingHH <- data[data[, hid] %in% OutlyingHH, c(id,
   hid, eqIncome, eqSS)]
DefineSplit <- IndividualsInOutlyingHH[,hid]
IndividualsInOutlyingHHasList <- split(IndividualsInOutlyingHH,
   DefineSplit)
#===============================================
# CONTAMINATION PART
#===============================================
if(CType=="CCAR"){
   # check if the arguments of the function in CTypeMech fit with the
       arguments delivered in CTypeMechSpec, else break
   if(any(is.na(match(c("n", names(CTypeMechSpec)), names(formals(
      CTypeMech))))) stop("CTypeMech and its arguments in
      CTypeMechSpec do not match\n")
   # contaminate the outlying observations according to CCAR
   ContList <- lapply(IndividualsInOutlyingHHasList, ccar, CTypeMech,
       CTypeMechSpec, eqIncome, eqSS)
}
#-----------------------------------------------
# if(CType=="CAR") stop("CAR mechanism not implemented, yet\n")
#-----------------------------------------------
if(CType=="NCAR"){
   # check if CTypeMechSpec has a 'scale' argument, else break
   if(is.null(CTypeMechSpec$scale)) stop("'NCAR' must have an 'scale'
       argument in CTypeMechSpec\n")
   # contaminate the outlying observations according to NCAR
   ContList <- lapply(IndividualsInOutlyingHHasList, ncar,
      CTypeMechSpec, eqIncome, eqSS)
}
#-----------------------------------------------
# add the outliers to the data
ContDF <- unsplit(ContList, DefineSplit)
if(flag){
   ct <- ContDF[,eqIncome]
   data[data[, id] %in% ContDF[,id], c(eqIncome, "flag")] <- c(ct,
      rep(1,length(ct)))
}else{
```

```
      data[data[, id] %in% ContDF[,id], eqIncome] <- ContDF[,eqIncome]
    }
    return(data)
}
```

G.2.2. Alternative Functions

```
# ==================================================================
# SUBJECT : generate ncar contamination
# AUTHOR : Tobias Schoch , October 16, 2010
# LICENSE : GPL > 2
# ------------------------------------------------------------------
# contaminate the outlying observations according to NCAR
ncar <- function (x, CTypeMechSpec , eqIncome , eqSS ){
  # assing the outlying income ( equivalized by eqSS ) to all household
     members
  x[, eqIncome ] <- (x[, eqIncome ]* CTypeMechSpec$scale )/ unique (x[,
     eqSS])
  return (x)
}
# ==================================================================
# SUBJECT : generate ccar contamination
# AUTHOR : Tobias Schoch , October 16, 2010
# LICENSE : GPL > 2
# ------------------------------------------------------------------
# generate a utility - function to generate the outliers according to
   CTypeMech
ccar <- function (x, CTypeMech , CTypeMechSpec , eqIncome , eqSS ){
  # get the number of household members
  NHouesholdmembers <- dim(x)[1]
  # draw the outlying income
  OutlyingIncome <- do.call(CTypeMech, args=as.list(c(n=1, CTypeMechSpec
     )))
  # assing the outlying income ( equivalized by eqSS ) to all household
     members
  x[, eqIncome ] <- rep( OutlyingIncome / unique(x[, eqSS ]) ,
     NHouesholdmembers )
  return (x)
}
# ==================================================================
# SUBJECT : makeoutliers defines outlying observations and
# contaminates them
# AUTHOR : Tobias Schoch , October 16, 2010; Stefan Zins, November, 2,
   2010
# LICENSE : GPL > 2
# DEPENDENCY :
# depends on the functions " ncar " and " ccar " (see above )
# depends on simFrame:::midzuno
# ------------------------------------------------------------------
# ARGUMENTS ;
# oc        list - object that defines outlyingness and contamination
# data      data - frame ( these data will be contaminated )
# hid       name of the household -id variable ( character - string );
#           " db030 " in the case of the EUROSTAT user DB
# eqSS      name of the variable that contains the equivalization
#           scale in order to build the equivalized disp . income
```

```
# eqIncome  name of the equivalized disp . income in the data
# flag      logical if a variable " flag " ( consisting of outlier flags
#           : 1= outlier , 0= non - outlier ) should be added
# ---------------------------------------------------------------------
makeoutliers <- function(oc , data , hid , eqSS , eqIncome , flag = TRUE
   ){
    # PREPARATIONS
    # outlyingness type
    OType <- oc$OType
    # outylingness mechanism
    # amount of outlyingness
    OTypeEpsilon <- oc$OTypeEpsilon
    OTypeSpec <- oc$OTypeSpec
    CType <- oc$CType
    # contamination mechanism
    CTypeMech <- oc$CTypeMech
    # specifications of the contamination mechanism
    CTypeMechSpec <- oc$CTypeMechSpec
    # get the sample size (i.e., number of individuals )
    SampleSize <- dim(data)[1]
    # add an id to the data
    data <- cbind (data , theid=seq(1, SampleSize ))
    id <- "theid"
    # add the flagging - variable
    if( flag ){
      data <- cbind(data , flag=rep(0, SampleSize ))
    }
    # ==============================================
    # OUTLIER - DEFINITION PART
    # ==============================================
    # define the number of outlying households (i.e., as integer number
       )
    NumberOutliers <- round(SampleSize*OTypeEpsilon)
    # select main income holder
    h.data <- data[data$HEB,]
    # ----------------------------------------------
    # switch cases
    if( OType=="OCAR"){
        # draw the outlier persons
        OutlyingAt <- simFrame:::midzuno(OTypeEpsilon*h.data[,hsize])
        # retrieve the household ID where the outlying person lives
        OutlyingHH <- h.data[OutlyingAt , hid]
    }
    if(OType=="OAR"){
      # ----------------------------------------------
      # check if the OAR - probability - determining variable exists
      if(is.na(pmatch(OTypeSpec$var , names( data )))){
        stop ("OAR - probability - determining variable does not exist \
           n")
      }
      # retrieve a frequency table of the outlyingness - determining
         variable
      OARVarTable <- table(data[, OTypeSpec$var])
      if( length (OARVarTable) != length (OTypeSpec$prob)){
        stop ("OAR -prob - vector and OAR -prob - variable are of
           different length \n")
      }
```

```
    OutlyingProb <- OTypeSpec$prob
    #the outliers are distributed among the levels of the OAR - groups
        proportional to the OAR - probability - determining vector
    OutliersPerLevel <- round(OutlyingProb * NumberOutliers)
    # note that floor (n*e) may not be equal to sum(n_i * e_i), i=1
       ,... ,[# OAR -groups ].
    # Thus , we check if:
    minOutliersPerLevel <- 2
    while(sum(OutliersPerLevel)!= NumberOutliers){
        FIX.low  <- (OutliersPerLevel == minOutliersPerLevel|
           OutliersPerLevel == OARVarTable )
        FIX.high <- OutliersPerLevel == OARVarTable
        #if(any(Nh<nh))stop("Nh<nh.r")
        if(NumberOutliers < sum(OutliersPerLevel)) {
          LOSS <- ((OutlyingProb * NumberOutliers) - OutliersPerLevel)
              * order(OARVarTable,decreasing=F)
          OutliersPerLevel[!FIX.low][which.min(LOSS[!FIX.low])] <-
          OutliersPerLevel[!FIX.low][which.min(LOSS[!FIX.low])]-1
        } else {
          LOSS <-  ((OutlyingProb * NumberOutliers) - OutliersPerLevel
             ) * order(OARVarTable,decreasing=T)
          OutliersPerLevel[!FIX.high][which.max(LOSS[!FIX.high])] <-
          OutliersPerLevel[!FIX.high][which.max(LOSS[!FIX.high])]+1
        }
    }
    # generate a vector of individuals , BUT expressed in terms of
       household ID . Thus , the vector contains the same hid for each
        household member
    what <- split(h.data[, hid, drop=F], h.data[, OTypeSpec$var])
    # split the individuals into a list according to OTypeSpec$var
    PerLevel <- mapply( inclusionProb ,split(h.data[,hsize], h.data[,
       OTypeSpec$var]),OutliersPerLevel)
    # draw the outliers in terms of households , and remove multiple
       instances
    OutlyingHH <- unname(unlist(mapply( function(x,y)y[simFrame:::
       midzuno(x),] ,PerLevel, what)))
    # ----------------------------------------------
  }
  # prepare the contamination part
  IndividualsInOutlyingHH <- data[data[, hid]%in%OutlyingHH , c(id ,
     hid , eqIncome, eqSS)]
  DefineSplit <- IndividualsInOutlyingHH[, hid]
  IndividualsInOutlyingHHasList <- split(IndividualsInOutlyingHH ,
     DefineSplit)
  # ==============================================
  # CONTAMINATION PART
  # ==============================================
  if( CType == "CCAR"){
    # check if the arguments of the function in CTypeMech fit with the
        arguments delivered in CTypeMechSpec , else break
    if(any(is.na(match(c("n", names(CTypeMechSpec)), names(formals(
       CTypeMech))
    )))) stop (" CTypeMech and its arguments in CTypeMechSpec do not
       match \n ")
    # contaminate the outlying observations according to CCAR
    ContList <- lapply( IndividualsInOutlyingHHasList , ccar ,
       CTypeMech,CTypeMechSpec , eqIncome , eqSS)
```

```
  }
   # ----------------------------------------------
   # if( CType ==" CAR ") stop (" CAR mechanism not implemented , yet \
     n")
   # ----------------------------------------------
   if( CType == "NCAR"){
     # check if CTypeMechSpec has a scale  argument , else break
     if(is.null(CTypeMechSpec $ scale )) stop ("NCAR must have an scale
         argument in CTypeMechSpec \n")
     # contaminate the outlying observations according to NCAR
     ContList <- lapply(IndividualsInOutlyingHHasList , ncar,
        CTypeMechSpec, eqIncome, eqSS)
   }
   # ----------------------------------------------
   # add the outliers to the data
   ContDF <- unsplit(ContList, DefineSplit)
   if(flag){
     ct <- ContDF[, eqIncome]
     data [data[, id]%in%ContDF[,id], c(eqIncome , "flag")] <- c(ct ,
        rep (1,
     length(ct)))
   } else {
     data [data[, id]%in%ContDF[,id], eqIncome ] <- ContDF[, eqIncome]
   }
   return(data)
}
```

G.3. R Functions for Computing Point and Variance Estimates

```
#=================================================================
# SUBJECT:     Design based point and variance estimation for ARPR
#              using linearization methods
# AUTHOR:      Stefan Zins, 02.03.2011
# LICENSE:     GPL > 2
# DEPENDENCY:  'survey' package
#-----------------------------------------------------------------
# ARGUMENTS;
#
# svyX       'survey.design' object (see definition above)
# Vest       logical, if TRUE variance estimation is performed
# INC        income variable (the equivalised disposable income)

ARPR <- function(svyX, Vest=FALSE) {

  X <- svyX$variables
  p <- 0.6

  #point estimation
  h  <- svyquantile(~INC, svyX, 0.5)[1]
  PThres <- p*h
  F.hat <- svycdf(~INC, svyX)
  p.est <- F.hat[[1]](PThres)
```

```
  #variance estimation
  if(Vest){

    bw <- (density(X$INC)$bw)
    dens <- svysmooth(~INC, svyX, bandwidth=bw, n=nrow(X))
    dens.smooth <- approxfun(x=dens$INC$x, y=dens$INC$y, method="linear"
       )
    SmoothK <- dens.smooth(PThres)/dens.smooth(h)

    z <- ((as.numeric(X$INC <= PThres) - p.est) - p*SmoothK*(as.numeric(
       X$INC <= h) - 0.5))

    svyX <- update(svyX, INC=z)

    var.z <-  (SE(svymean(~INC, svyX)))^2

  }else{

    var.z <- NULL

  }
  list( p.est = as.numeric(p.est)
       ,v.est = var.z
  )

}
```

```
#=====================================================================
# SUBJECT:     Design based point and variance estimation for RMPG
#              using linearization methods
# AUTHOR:      Stefan Zins, 02.03.2011
# LICENSE:     GPL > 2
# DEPENDENCY:  'survey' package
#---------------------------------------------------------------------
# ARGUMENTS;
#
# svyX       'survey.design' object (see definition above)
# N          Population size, if NULL sum of
# Vest       logical, if TRUE variance estimation is performed
# INC        income variable (the equivalised disposable income)

RMPG <- function(svyX, N=NULL, Vest=FALSE){

  X <- svyX$variables
  p <- 0.6

  # point estimation
  h  <- svyquantile(~INC, svyX, 0.5)[1]
  PThres <- p*h
  F.hat <- svycdf(~INC, svyX)

  med.p <- as.numeric(svyquantile(~INC,svyX,(F.hat[[1]](PThres))*0.5))
  ARPR <- F.hat[[1]](PThres)
  p.est <- 1 - med.p/PThres

  #variance estimation
```

```
  if(Vest){

    bw <- (density(X$INC)$bw)
    dens <- svysmooth(~INC, svyX, bandwidth=bw, n=nrow(X))
    dens.smooth <- approxfun(x=dens$INC$x,y=dens$INC$y,method="linear")
    N.hat <- if(is.null(N)) sum(1/svyX$prob) else N

    z_PThres <- - (p/dens.smooth(h))*1/N.hat*( as.numeric(X$INC <= h) -
       0.5)
    z_ARPR <- ((as.numeric(X$INC <= PThres) - ARPR) - p*dens.smooth(
       PThres)/dens.smooth(h)*(as.numeric(X$INC <= h) - 0.5)) / N.hat

    z.1 <- 0.5*z_ARPR
    z.2 <- (as.numeric(X$INC <= med.p) - F.hat[[1]](med.p))/N.hat
    z_med.p <- (z.1 - z.2)/dens.smooth(med.p)

    z <- -(PThres * z_med.p*N.hat - med.p * z_PThres*N.hat)/PThres^2

    svyX <- update(svyX, INC=z)
    var.z <- (SE(svymean(~INC, svyX)))^2

  }else{

    var.z <- NULL

  }

  list( p.est = as.numeric(p.est)
       ,v.est = var.z
  )

}
```

```
#=====================================================================
# SUBJECT:      Design based point and variance estimation for QSR
#               using linearization methods
# AUTHOR:       Stefan Zins, 02.03.2011
# LICENSE:      GPL > 2
# DEPENDENCY:   'survey' package
#---------------------------------------------------------------------
# ARGUMENTS;
#
# svyX        'survey.design' object (see definition above)
# N           Population size, if NULL sum of
# Vest        logical, if TRUE variance estimation is performed
# INC         income variable (the equivalised disposable income)

QSR <- function(svyX, N=NULL, Vest=FALSE) {

  X <- svyX$variables
  alpha <- c(0.2, 0.8)

  # ponit estimate
  y.quantiles <- svyquantile(~INC, svyX, alpha)
  y.vec <- apply(y.quantiles,2,function(x)as.numeric(X$INC<=x))
  y.Lo <- y.vec[,1]*X$INC
```

```
  y.Hi <- y.vec[,2]*X$INC

  t1.hat <- (svytotal(~INC, svyX) - svytotal(y.Hi, svyX))[1]
  t2.hat <- svytotal(1-y.vec[,2],svyX)[1]
  t3.hat <- svytotal(y.Lo, svyX)[1]
  t4.hat <- svytotal(y.vec[,1],svyX)[1]

  R1       <- (t1.hat/t2.hat)
  R2       <- (t3.hat/t4.hat)
  p.est      <- R1 / R2

  # variance estimate
  if(Vest){

    u1 <- X$INC - ((X$INC - y.quantiles[2])*as.numeric(X$INC<=y.
       quantiles[2])+alpha[2]*y.quantiles[2])
    u2 <- 1-alpha[2]
    u3 <- (X$INC - y.quantiles[1]) * as.numeric(X$INC <= y.quantiles[1])
        + alpha[1] * y.quantiles[1]
    u4 <- alpha[1]
    u5 <- (u1 - (R1)*u2)*1/(t2.hat)
    u6 <- (u3 - (R2)*u4)*1/(t4.hat)
    z <- (u5 - p.est*u6)*(t4.hat/t3.hat)

    svyX <- update(svyX, INC=z)
    var.z <- (SE(svytotal(~INC, svyX)))^2

  }else{

    var.z <- NULL

  }

  list( p.est = as.numeric(p.est)
       ,v.est = var.z
  )

}
```

```
#=================================================================
# SUBJECT:     Design based point and variance estimation for GINI
#              using linearization methods
# AUTHOR:      Stefan Zins, 02.03.2011
# LICENSE:     GPL > 2
# DEPENDENCY:  'survey' package, 'invcs2' function (see below)
#-----------------------------------------------------------------
# ARGUMENTS;
#
# svyX       'survey.design' object (see definition above)
# N          Population size, if NULL sum of
# Vest       logical, if TRUE variance estimation is performed
# INC        income variable (the equivalised disposable income)

GINI <- function (svyX, N=NULL, Vest=FALSE) {

  invcs2 <- function(b,y,y2){
```

```
    .C("invcs2",
        as.double(b),
        as.double(y),
        as.double(y2),
        as.integer(length(y)),
        res = double(length(y)))$res
   }

  X <- svyX$variables

  #point estimation
  F.hat <- svycdf(~INC, svyX)
  N.hat <- if(is.null(N)) sum(1/svyX$prob) else N
  hm <- svymean(~INC, svyX)[[1]]
  ht <- svytotal(~INC, svyX)[[1]]
  u  <- (2*F.hat[[1]](X$INC) - 1)*(X$INC/ht)
  p.est <- svytotal(u, svyX)[[1]]

  #variance estimation
  if(Vest){

    A.hat <- F.hat[[1]](X$INC) - (p.est + 1)/2
    b <- (1/svyX$prob)*X$INC/N.hat

    z <- (2/hm)*(A.hat*X$INC + invcs2(b, X$INC, X$INC) - svymean(~INC,
       svyX)[[1]]/2*(p.est+1))

    svyX <- update(svyX, INC=z)

    var.z <- (SE(svymean(~INC, svyX)))^2

   }else{

      var.z <- NULL

   }

          list( p.est = as.numeric(p.est)
                ,v.est = var.z
          )

}
```

```
#=================================================================
# SUBJECT:     Design based point and variance estimation for MEAN
#              using linearization methods
# AUTHOR:      Stefan Zins, 02.03.2011
# LICENSE:     GPL > 2
# DEPENDENCY:  'survey' package
#-----------------------------------------------------------------
# ARGUMENTS;
#
# svyX       'survey.design' object (see definition above)
# N          Population size, if NULL sum of
# Vest       logical, if TRUE variance estimation is performed
# INC        income variable (the equivalised disposable income)
```

```
MEAN <- function(svyX, N=NULL, Vest=FALSE) {

  p.est <- svymean(~INC, svyX)
  N.hat <- if(is.null(N)) sum(1/svyX$prob) else N

  if(Vest){
    TL = SE(p.est)^2
  }else{
    var.z <- NULL
  }

  list( p.est = as.numeric(p.est[[1]])
       ,v.est = var.z
  )

}
```

G.3.1. C Subroutines

```
#=====================================================================
# SUBJECT:     C code for 'invcs2' function to compute a
#              inverse cumulative sum
#
# AUTHOR:      Jan Pablo Burgard, 25.10.2009
# LICENSE:     GPL > 2
#---------------------------------------------------------------------

#include <R.h>
#include <Rinternals.h>
#include <R_ext/Rdynload.h>

void invcs2(double *b, double *y, double *y2, int *len, double *res)
     {
       int i,j;
       for(j = 0; j < *len; j++){
        for(i = 0; i < *len; i++){
          if(y[i] >= y2[j]){
            res[j] += b[i];
          };
        };
      };
    }
```