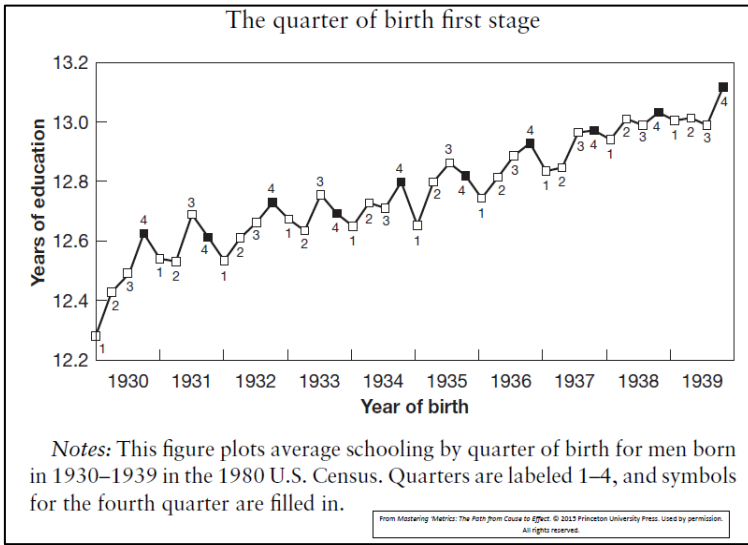# Empirical Labor Economics
Final Exam (Winter Semester 2023/24)
60 Points

Note: Choose <u>either</u> **Part 1** <u>or</u> **Part 2**. If you answer both parts, we will only consider Part 1.

Part 1:
1.1. Explain the Regression Discontinuity Design (RDD) and provide an example. *(20 points)*
1.2. Discuss the relationship between schooling and wages using quarter of birth instruments. *(40 points)*

The quarter of birth first stage

Notes: This figure plots average schooling by quarter of birth for men born in 1930–1939 in the 1980 U.S. Census. Quarters are labeled 1–4, and symbols for the fourth quarter are filled in.

Returns to schooling using alternative quarter of birth instruments

	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	2SLS (5)
Years of education	.071 (.0004)	.074 (.028)	.071 (.0004)	.075 (.028)	.105 (.020)
First-stage *F*-statistic		48		47	33
Instruments	None	Quarter 4	None	Quarter 4	3 quarter dummies
Year of birth controls	No	No	Yes	Yes	Yes

Notes: This table reports OLS and 2SLS estimates of the returns to schooling using quarter of birth instruments. The estimates in columns (3)–(5) are from models controlling for year of birth. Columns (1) and (3) show OLS estimates. Columns (2), (4), and (5) show 2SLS estimates using the instruments indicated in the third row of the table. *F*-tests for the joint significance of the instruments in the corresponding first-stage regression are reported in the second row. Sample size is 329,509. Standard errors are reported in parentheses.

Part 2:
2.1. Explain the two-stage least squares (2SLS) and provide the instrumental variable (IV) assumptions. *(20 points)*
2.2. Discuss the relationship between family size and schooling using twins and same-sex instruments. *(40 points)*

Quantity-quality first stages

	Twins instruments (1)	Twins instruments (2)	Same-sex instruments (3)	Same-sex instruments (4)	Twins and same-sex instruments (5)
Second-born twins	.320 (.052)	.437 (.050)			.449 (.050)
Same-sex sibships			.079 (.012)	.073 (.010)	.076 (.010)
Male		−.018 (.010)		−.020 (.010)	−.020 (.010)
Controls	No	Yes	No	Yes	Yes

Notes: This table reports coefficients from a regression of the number of children on instruments and covariates. The sample size is 89,445. Standard errors are reported in parentheses.

OLS and 2SLS estimates of the quantity-quality trade-off

		2SLS estimates		
Dependent variable	OLS estimates (1)	Twins instruments (2)	Same-sex instruments (3)	Twins and same-sex instruments (4)
Years of schooling	−.145 (.005)	.174 (.166)	.318 (.210)	.237 (.128)
High school graduate	−.029 (.001)	.030 (.028)	.001 (.033)	.017 (.021)
Some college (for age ≥ 24)	−.023 (.001)	.017 (.052)	.078 (.054)	.048 (.037)
College graduate (for age ≥ 24)	−.015 (.001)	−.021 (.045)	.125 (.053)	.052 (.032)

Notes: This table reports OLS and 2SLS estimates of the effect of family size on schooling. OLS estimates appear in column (1). Columns (2), (3), and (4) show 2SLS estimates constructed using the instruments indicated in column headings. Sample sizes are 89,445 for rows (1) and (2); 50,561 for row (3); and 50,535 for row (4). Standard errors are reported in parentheses.