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Advanced Methodology for European Laeken Indicators

## Deliverable 9.1

# Policy Use of Indicators on Poverty and Social Exclusion

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# Aim and objectives of Deliverable 9.1

The objective of workpackage 9 was to summarize policy needs as input for the methodological work within AMELI. This was planned to allow investigating appropriate methodological recommendations that allow measuring what is to be measured within the area of social cohesion.

On the one hand it was planned to give an overview of policy needs. This overview is given in the first chapters of this deliverable. On the other hand it was planned to give recommendations concerning indicators use in close cooperation with political intermediates like the indicators Sub-Group of the Social Protection committee. An online survey was processed to realize the communication with political intermediates.

Especially in the coherence of political use of the indicators, composite indicators are often discussed. Therefore, an assessment of the quality of such composite indicators is realized to round up this deliverable.

We warmly thank our project officer Ian Perry for helpful comments.

# Contents

# Chapter 1

# Introduction

For a long time poverty was declared as mastered in the European postwar societies, nevertheless it is again of public importance since the end of the eighties. This is to a great extent a merit of the European Commission which promoted the scientific research on and the scientific processing of poverty. A first set of indicators has been adopted in December 2000 to monitor the progress towards the objectives. These indicators which are also called the indicators on poverty and social exclusion, have been implemented in 2001 by the indicators Sub-Group (ISG) of the Social Protection Committee (SPC). The EU-wide measurement of poverty and social exclusion are the result of a development which has been always supported by NGO's, researchers and a minority of governments.

As a product of political and scientific deliberations, the indicators should serve as a common basis of valuation and assessment for the objectives concerning poverty and social exclusion presented at the Lisbon summit (2000). At this summit, social cohesion as well as becoming the most competitive and dynamic knowledge-based economy were defined as the most challenging responsibilities for the European Union (cf. Atkinson et al. 2005, p. 17). As the European institutions do not have the authority to act in the fields of social policy and combating poverty, the indicators on poverty and social exclusion are part of a *smooth* method of government. This is known as the Open Method of Coordination on Social Protection and Social Inclusion (OMC). It is the objective of the OMC to guide a rational and informed social policy by using the common European indicators as well as to support and to monitor the member countries in their fight against poverty. Thus the indicators on poverty and social exclusion should play a crucial role in the OMC and are considered as a reliable source policy makers can base their decisions on.

Nevertheless, there is of course a lively questions about the usage of the income and inequality indicators[1] and on the question which type of indicators are used. This discussion includes the question of whether to use relative or absolute measures, as well as the question whether to use single or composite indicators.

The economic crisis which arrived in the autumn of the year 2008 exacerbated the problems of the poverty and social exclusion and led to a situation where the indicators on poverty and social exclusion became a more useful instrument for the follow up of the poverty and social inclusion for the period during and after the crisis.

[1] See Atkinson and Marlier (2010) for recent information about the used indicators

Because a decisive and comprehensive reduction of poverty and social exclusion was not realized up to 2010, the debate about the reasons is growing. While political reasons are obvious, the judgment of the mechanisms of the OMC are often missed out. There is potential left for the evaluation of to what extent the instruments of the OMC are used and whether these instruments are used properly.

This is the link to the present study for which the objective is twofold, the indicators on poverty and social exclusion and the conceptional and political basics should be examined on the one hand and on the other hand it will be analyzed to what extent the indicators on poverty and social exclusion are used to coordinate and harmonize European social politics. The subject of the study is therefore confined on the background analysis of the macro level. Research on poverty is thus policy advisory evaluation. The accompanying research can be seen as support for successful social politics.

The portfolio of indicators has undergone several changes so far, that complicate the use of this important policy-tool. To dis- or uncover the demands of the relevant actors and to evaluate the use of the indicators on poverty and social exclusion we will analyse the relevant literature in chapter 2.1 of this deliverable which is a follow up of the article by Beil et al. (2011). With the conclusions drawn from this part and the insights gained from a systematic review of the social indicators we hope to arrive at a point where the mechanisms (chapter 2.2) can be understood more easily. As a result of this, our findings may lead to a better use of the indicators on poverty and social exclusion which should meet the main demands of the relevant policy makers. In chapter 3 we will than analyse the recent use of the indicators on poverty and social exclusion by means of a literature analysis and an online survey. Composite indicators are often discussed as an instrument to improve the monitoring of poverty and social exclusion. As a contribution to this field, chapter 4 provides sensitivity analyses on the construction scheme of composite indicators. We will then give concluding remarks.

# Chapter 2

# Background on social reporting with indicators

Before the use of indicators can be evaluated and the concept and assessment of new types of indicators can be presented, it is necessary to give some preliminary remarks on indicators and social reporting in the European Commission.

## 2.1 Opening remarks on indicators

Mancur Olsen stated in 1969 that the economic reporting should be amended with a social reporting, that would prevent the economic and social conditions from drifting apart. This can be seen as the starting point of social reporting. One of the most important functions of social reporting is the long-term monitoring of social processes and the monitoring of the process of modernisation (Beil et al. 2011 pp. 1).

This requires that welfare concepts are based on theoretical models and that these concepts have been made usable and measurable. In other words, these concepts should be operationalized. To this end, the latent (not observable) variables postulated by a theory have to be linked with manifest variables (indicators). Further rules for the measurement, that means for the assignment of values to objects have to be established. (Schnell et al. (2008), p. 125 and Gehring and Weins (2004), p. 33).

Some characteristics of social reporting do result from their focus on continuous social observation and the measurement of individual welfare. Following Noll (1999) (pp. 18-20) the social reporting should be oriented on individuals and outputs, empirical and quantitative as well as comprehensible.

Three types of approaches do exist for the selection of indicators for social reporting. Indicators can be selected data driven, policy driven and concept driven (Noll 2005). In reality, a mixture of these approaches is often used depending on whether the selection is based on the data situation, on a political debate, or derived from a concept. The awareness of the problem is not static and the definition of objectives is often controversial. Therefore the normative orientation can be seen as another characteristic of social reporting.

Indicators can be used for different purposes, for example problem recognition, issue definition or agenda setting, policy formulation and identification of options, decision making, implementation and evaluation.

The research on social indicators results in an ad-hoc manner from the specific requirement on information (cf. Carley 1981,p.13). The work on indicators was based on the assumption that the indicators are used to help in the decision and planning process. Indicators and the reports based on indicators should guide informed politics (cf. Noll 2004, p. 167). This idea of the relation between science and politics is often characterized and criticized as technocratic and described in the scientific research as a rational-positivistic model (cf. Gudmundsson et al. 2009, p. 31).

This model is characterized as a simplified and mechanistic view on the interplay between indicators and politics. It can be seen as significant for the success of the movement on social indicators. Without the instrumental usage there would be no justification for expansive programs. Therefore it holds that:

> „Indicators are increasingly in demand as *tools* to inform policy analysis and decision making, they are produced and delivered in rising numbers, but their actual use and impact is often limited or unclear “
>
> (Gudmundsson et al. 2009, pp. 8.).

This characterizes the situation in the EU and was a trigger for a recent EU-research project which is called *Policy Influence of Indicators* (POINT) and funded under the seventh research framework program.[1] The results of this project gave an important input for this deliverable.

## 2.2 Social indicators and social reporting

Social reporting can be considered a scientific endeavour that presupposes theoretical construction in form of indicators and results empirical descriptions based on these indicators. It is strongly connected to politics where a constant demand of reliable information about the state of the society is needed. Following Noll (2004, p. 151) the roots of the modern social indicator and social reporting movement date back to the 1960's, when US NASA became aware of the lack of information on social processes that could have been affected by its projects and when the predominant economic development paradigms were challenged and complemented by more holistic visions of the society. One of the first social reports was produced by Mancur Olson in 1969 for the *US Department of Health, Education and Welfare*. Constant monitoring of social processes and the measurement of individual and collective welfare can be seen as the main functions of social reporting. Both functions imply that social reporting is predominantly based on survey data and oriented towards outputs and individuals. Moreover, it should be comprehensible to a broader public and based on panel data.Apart from the distinction between different levels and types (holistic or specific) of social reports, different ways to choose indicators

[1] http://www.point-eufp7.info/

can be distinguished. The already mentioned differentiation of NOLL (2005, p. 4) can nevertheless only be a theoretical one since in practice there will be always a mixture of them and social indicators mostly reflect normative orientations against which progress and regress can be measured. Accordingly the UN defines social indicators as indicators

> „that usefully reflect important social conditions and that facilitate the process of assessing those conditions and their evolution. Social indicators are used to identify social problems that require action, to develop priorities and goals for action and spending, and to assess the effectiveness of programmes and policies "
>
> (as cited in NOLL 2004, p. 153).

The measurement of social phenomena furthermore presupposes the theoretical development of (e.g. welfare) concepts and their empirical operationalization, that is the specification of general latent (not observable) concepts and their attribution to manifest variables (indicators) as well as the establishment of appropriate rules to assign values to objects (cf. SCHNELL et al. 2008, p. 125).

*Purpose and expected roles of indicators in politics*

Social reporting and social indicator research occurred *ad hoc* due to a public need for specific information on social problems (cf. CARLEY 1981, p. 13). Until now a vast quantity of literature on the potential (policy) functions of social indicators has been produced but even though „indicators are increasingly in demand as 'tools' to inform policy analysis [...] their actual use and impact is often unclear "(cf. GUDMUNDSSON et al. 2009, p. 8). In general, indicators should help to describe, identify, understand, measure and communicate social phenomena and their changing nature (cf. HOERNIG and SEASONS 2005, p. 5). But their actual role depends very much on their implementation in different stages of what is called the policy cycle. Following BOULANGER (2007, p. 16) most works in the field of social indicators share(d) the a priori that the knowledge provided for social indicators would be used in an instrumental way to rationally solve established public problems (rational-positivist model). In this narrow representation of the relation between science and politics the „indicators come on stage when the objectives have been defined "and fulfil the task of quantifying objectives, assessing (ex ante) alternative means to reach them and evaluating (ex post) effects and impacts (ibid. p. 17). The emphasis lies therefore „on the scientific, technical [...] properties of the indicators: they are expected to be specific, sensitive, reliable, [...] timely "and robust (ibid. p. 17). As will be shown later, the increase in the number of indicators at the European level (especially in the field of poverty) at first was in line with this rational setting. From this rational model Boulanger distinguishes a discursive-interpretive model and a strategic model. The former conceptualises the policy process as a constant and iterative struggle over the justified policy frame that determines which social problems are of importance, how they should be defined and how public policy can act on them. In this model indicators have the informative function of establishing a common language that allows for balancing existing and finally constructing new frames. This presupposes salient and communicable indicators (ibid. p. 23). The strategic model is less normative because it does not see the policy process as the self-evident „quest for a 'common good' "but „as a pure competition

between private conflicting interests "(ibid. p. 20). Following this model, indicators are used merely in a strategic way. The strategic model therefore includes the misuse and even the manipulation of indicators. The secretary general of the OECD Gurria warned against these dangers in his opening speech to the *OECD 3rd World Forum on Statistics, Knowledge and Policy* (cf. Gurria 2009). It should be noted, that the three models are ideal types that necessarily complement and may be consecutive. Components of each of them are more or less present at the same time. Obviously the models reflect a certain cultural background, which furthermore influences the way indicators are used in the varying contexts.

We will now analyse the assumptions that underlie the use and construction of the indicators on poverty and social exclusion. We will reconstruct the development of the indicators on poverty and social exclusion. By analysing the official documents of the member states (MS) and the Commission, we will confront their potential role with their use in the recent policy process.

Measures against poverty and social exclusion have to be evaluated based on information from indicators. They are embedded in the social reporting process. The Open Method of Coordination in social inclusion established the official reporting on poverty in the EU-member states.

Though the European Community's capacity for action in the realm of social policy was, at least until the Single European Act in 1987, weak, the European Council and especially the European Commission have a long-standing tradition in dealing with poverty. Asked by the heads of states during the 1972 Paris Summit to elaborate a catalogue of social policy measures to accompany the planed Economic and Monetary Union, the Commission presented its social action programme in 1974 and set up the first European Poverty Programme in 1975 (cf. Falkner 1998, p. 63, and Herrmann 1995). In a context where poverty was ignored by most of the states most governments in fact claimed that *their* social security system saved the citizens from being poor - this can be considered a major achievement. The aim of this first and the following two European Poverty Programs was the improvement of the action capacity of the EC member states by working out a better understanding of poverty and, the newly introduced notion of, social exclusion.

# Chapter 3

# Use of the indicators on poverty and social exclusion

At the Lisbon Council of March 2000, social cohesion as well as becoming *the most competitive and dynamic knowledge-based economy* were defined as the most challenging responsibilities for the European Union (cf. Atkinson et al. 2005, p. 17). The Council furthermore concluded that

> „...steps must be taken to make a decisive impact on the eradication of poverty by setting adequate targets to be agreed by the Council by the end of the year."
> (Atkinson et al. 2002, V).

To monitor the progress towards the objectives that have been agreed at the European Council in December 2000, a first set of indicators, which are also called the indicators on poverty and social exclusion, has been set up by the indicators Sub-Group (ISG) of the Social Protection Committee (SPC) and finally decided on at the Laeken Council in December 2001. These indicators play a crucial role in the Open Method of Coordination on Social Inclusion and are considered as a reliable source policy makers can base their decisions on. For this reason a systematic examination of the indicators on poverty and social exclusion seems reasonable.

Therefore we keep in mind:

- The development of the Laeken-Indicators since 2001/2002 and the idea of secondary and tertiary indicators.
- The fact that there are six dimensions of social exclusion and for every dimension one indicator.
- The possibility to look at output indicators and composite indicators.
- The Laeken portfolio has undergone many changes.
- The change of the social inclusion strategy (mid-term-review).

- The fact that new Indicators have been introduced and a new structure has been implemented.

We want to evaluate the handling of indicators on poverty and social exclusion, what is important for the presentation of indicators on poverty and social exclusion, and the status quo in policy making with the indicators on poverty and social exclusion (as a policy tool)?

The following table 3.1 shows the indicators which are designated as the indicators on poverty and social exclusion. The indicators are coloured differently depending on their belonging to the different dimensions: income, inequality, material deprivation, education, health and labour market. The use of these indicators is evaluated in the following.

| nr. | indicator | short description | source | usage in other fields |
|---|---|---|---|---|
| SIP1 | EU: At-risk-of poverty rate + illustrative threshold values | Share of persons aged 0+ with an equivalised disposable income below 60% of the national equivalised median income (modified OECD scale). | SILC | SI, SDI, OI, (UN-CSD, OECD) |
| SIP2 | EU: Persistent at-risk of poverty rate | Share of persons aged 0+ with an equivalised disposable income below the at-risk-of-poverty threshold in the current year and in at least two of the preceding three years. | SILC | SI, SDI |
| SIP3 | EU: Relative median poverty risk gap | Difference between the median equivalised income of persons aged 0+ below the at-risk-of poverty threshold and the threshold itself, expressed as a percentage of the at-risk-of poverty threshold. | SILC | SDI, OI, (MDG, OECD) |
| SIP4 | EU: Long term unemployment rate | Total long-term unemployed population (≥12 months' unemployment) as a proportion of total active population aged 15 years or more. | LFS | SI, SDI, EES, (OECD) |
| SIP5 | EU: Population living in jobless households | Proportion of people living in jobless households, expressed as a share of all people in the same age group. | LFS | SI, SDI, OI |
| SIP6 | EU: Early school leavers not in education or training | Share of persons aged 18 to 24 who have only lower secondary education and have not received education or training in the four weeks preceding the survey. | LFS | SI, SDI, EES, ET2010, OI |
| SIP7 | *NAT: Employment gap of immigrants* | Percentage point difference between the employment rate for non-immigrants and that for immigrants. | national data | (OECD) |
| SIP8 | EU: Material deprivation (2009) | Share of population living in households lacking at least 3 items among 9 items. | SILC | SDI, (OECD) |
| SIP9 | *Housing* | *Indicator to be developed* | *SILC* | *(SDI)* |
| SIP10 | NAT: Self reported unmet need for medical care<br>NAT: Care utilisation | Total self-reported unmet need for medical care for three reasons.<br>To be analysed together with care utilisation defined as the number of visits to a doctor during the last 12 months. | national data | OECD |
| SIP11 | *Child well-being* | *Indicator to be developed* | | *(SDI)* |

**income** **inequality** **material deprivation** **education** **health** **work/labour market**

Figure 3.1: The new Laeken Portfolio

## 3.1 Analysis of relevant documents

Is there a difference in the usage of the indicators on poverty and social exclusion between the member states of the EU? Are there differences between eastern and western Europe, between new and old member states, between poor and rich countries or big and small countries? These are the questions of interest in this part of the paper.[1]

The European institutions do not have legislative competencies in the field of combating poverty and social exclusion. The OMC is more a soft monitoring and coordination system which is based on consensus and voluntary self-assessment. This system should promote a convergence process, policy learning and should lead to more social equality (European Commission 2008a, p.2).

[1]This section is based on the master thesis of Beil 2010

Although not all of the OMC's are on a equal level of development, it is nevertheless possible to recognize similar elements. After the Council's decision the OMC includes the following steps (COUNCIL OF THE EUROPEAN UNION 2000.):

- fixing guidelines for the Union combined with specific timetables for achieving the goals which they set in the short, medium and long terms;
- establishing, where appropriate, quantitative and qualitative indicators and benchmarks against the best in the world and tailored to the needs of different member states and sectors as a means of comparing best practice;
- translating these European guidelines into national and regional policies by setting specific targets and adopting measures, taking into account national and regional differences;
- periodic monitoring, evaluation and peer review organised as mutual learning processes.

The reporting on the social OMC's is integrated since 2005, which means that there is a overarching indicator profile and common objectives. But besides that there are also separate indicators for the three areas. These indicators should be taken into consideration in the reports on national strategies for social security. The Commission evaluates and summarizes these reports in the Joint Report on Social Protection and Social Inclusion. The determination of the common targets and indicators takes place in the OMC.

The main targets are to enable everybody to participate in the society, in the labour market and to reach a coordinated policy in this area. These targets together with the indicators on poverty and social exclusion can be seen as a reference system of the OMC. The indicators should enable the measurement of the targets without prescribing the policies.

> „Defining common objectives in terms of social protection and social inclusion implies the definition of common indicators to compare best practices and to measure progress towards these common objectives. As such, common indicators do not mean common policies ... "
>
> EUROPEAN COMMISSION 2009a

The SPC pursues the objective to promote the issues under their guidance permanent in politics.

### 3.1.1 The national strategy reports

To strengthen the OMC, the Commission requested the member states to set targets for themselves (PREUNKERT 2009, p. 128 and STEINER 2010, p. 2). These targets should be declared in the national action plans [2] which appear every two years. At the beginning

[2] They are called *National Strategy Reports on Social Protection and Social Inclusion.*

concrete aims and the indicators on poverty and social exclusion have been lacking in these documents (Mabbett 2007, p. 6). But henceforth they are formulated in common guidelines which have been determined by the member states.

It is expected from the member states that they use at least the primary indicators from the Laeken portfolio (Indicators Sub-Group of the Social Protection Committee 2009, p. 15). In the following it will be evaluated if this is the case. The strategy reports for the three-year cycle 2008-2011 [3] do vary in their number of pages between 60 pages in Belgium and Romania and 250 pages in Spain (including the appendix). With a few exceptions the strategy reports have been generated by the ministries of health and social affairs. All reports are available in English, apart from the report for France and the appendixes. The form of publication gives hints on the purpose. The report for Austria for example is published as a print version with a ISBN number, this suggests that it is planned to establish the report also in the national discourse. After a short general view about the social situation and the fields of actions the analysis and strategies in each area are presented. Here the emphasis of the reports is on the field of social inclusion. Every country has different emphases. In parts other indicators or issues are discussed. Graphics are used very seldom.

> „Unless otherwise specified, all indicators used in the country profiles draw on the indicators which Member States have agreed to use in the context of the OMC on social protection and social inclusion ... “
>
> (European Commission 2009b, p. 118).

The use of the (at this time eight) Laeken primary indicators in the national strategical report (NSRP) of 2008 is depicted in the figures 3.2 and 3.3. Whereas the number of used indicators on poverty and social exclusion is shown in figure 3.2 the absolute frequencies of used indicators on poverty and social exclusion over all countries are visible in figure 3.3

It is visible that the amount of used indicators vary between two in Slovenia and eight in Great Britain. In a vast majority of reports the indicators are described in the text. It is not possible to confirm the statement of Mabbett (2007, p. 85-87) and Hamel and Vanhercke (2008, p. 93f.), that the indicators on poverty and social exclusion are used first of all by countries, where the official statistic in the areas of social exclusion and poverty was less developed.

On the other hand one can suppose that the reason for the low values for Sweden and Denmark is a reserved attitude of these Scandinavian countries towards European efforts to influence the national social politics by means of the OMC. The differences regarding the usage of the indicators between the member states is less due to the performance of these states on the indicators or the assignment to regional or social political clusters but more due to the stance of governments on the OMC. In contrast there are differences between the new and old member states: The countries of the EU-15 use in average 4 to 5 indicators in the text and 3 to 5 indicators overall. The countries of the old member states (EU-12) use 3 to 5 indicators in the text and 4 to 6 indicators overall.

[3] There is one year of overlap between the strategy reports.

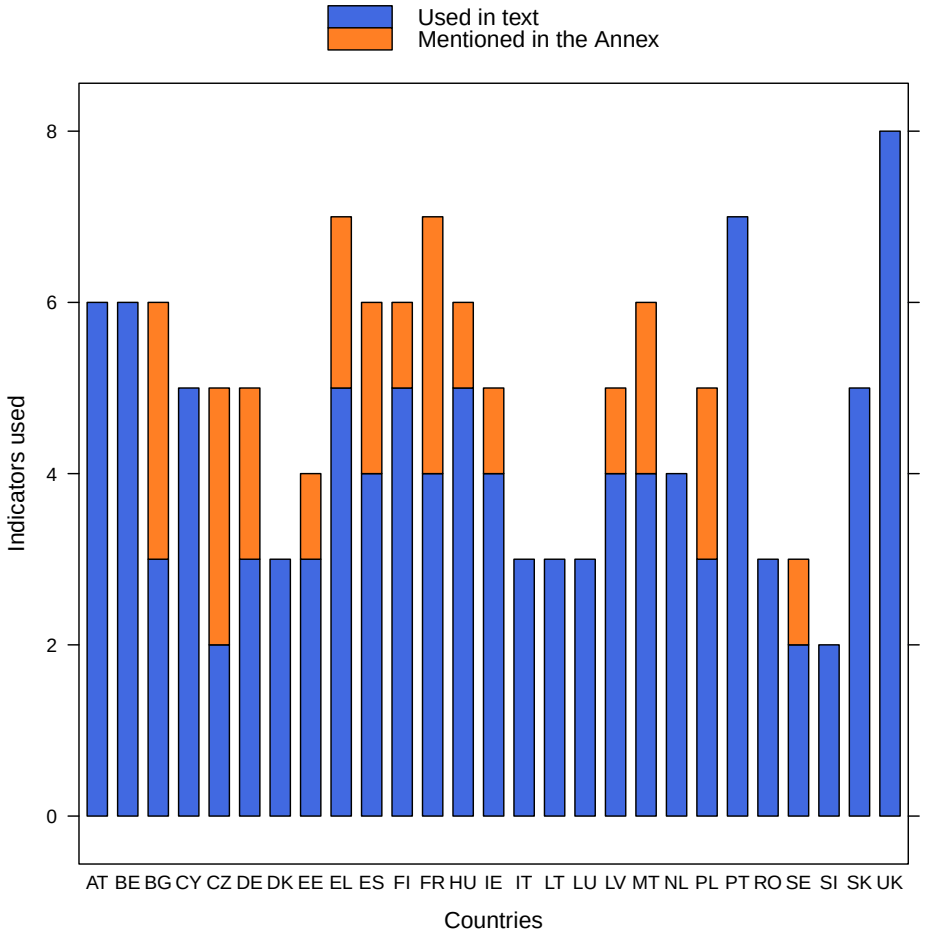


Figure 3.2: Used Laeken primary indicators in the countries

The analysis of used indicators per country has to be completed by the analysis of used indicators over all countries. According to figure 3.3 the usage is highly selective. In particular indicators of the overarching portfolio (SI-P1, SI-P3, SI-P5 and SI-P6) or indicators derived from the paradigm of active inclusion are used. If one compares the usage of the long-term unemployment rate (not in the overarching portfolio) with the usage of the relative median poverty risk gap (in the overarching portfolio) it becomes clear how important the employment dimension is. One exception is the employment gap between residents and non-residents, this indicator is ignored in most of the countries. The availability of data can be one reason for the sparse usage of an indicator. But it is not evident that this is the case for the *at-risk-of-poverty-rate* (ARPR). The indicator *self reported unmet need for medical care* (SI-P10) has been introduced some few months before the creation of the strategic reports. This indicator is used only in 30 % of the cases, and is explained seldom. Seven countries do use indicators measuring the deprivation, but these are seldom based on the European proposals and they are calculated on the base of national data.

The Commission's view is that the selective utilization of the indicators is reflected in the treated issues and proposed measures, these are often not linked between each other and not referred to the indicators (cf. EUROPEAN COMMISSION 2007, p. 8f.):

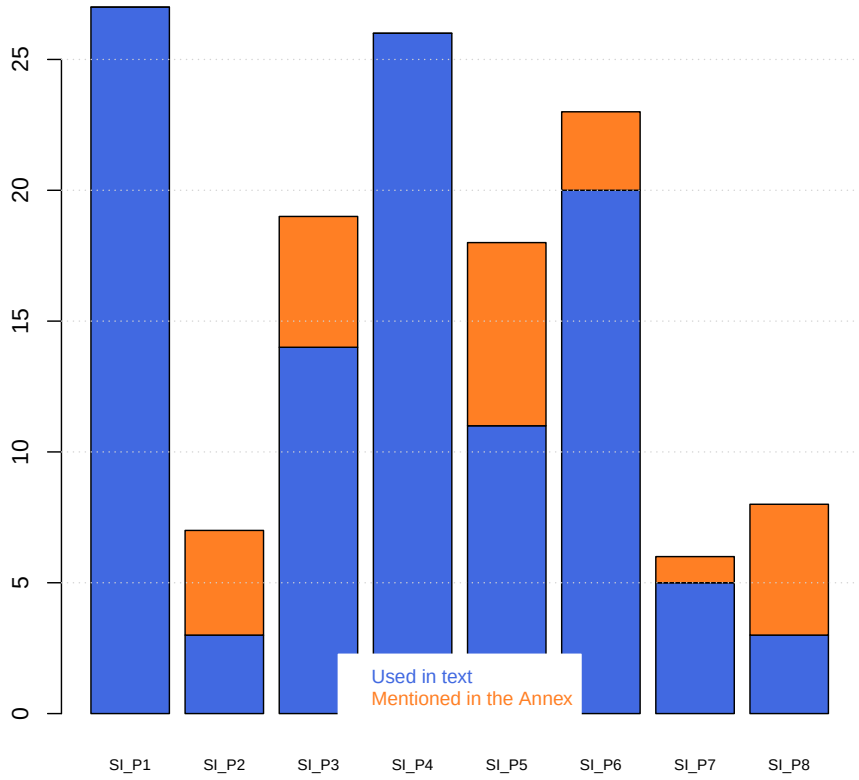


Figure 3.3: Usage of the Laeken primary indicators in total

„As in the 2006 NSRs, most Member States have active inclusion among their priorities. However, inclusive labour markets, access to quality services and adequate income are dealt with separately in most cases, whereas most disadvantaged people suffer from multiple disadvantages and integrated responses are essential. Several countries have taken steps to ensure that the purchasing power of minimum incomes is maintained. It remains essential to design better links between out-of-work benefits and in-work support, in order to create the right incentives, while at the same time ensuring adequate income support and prevent in work poverty. Coordinated social and employment services are needed to tackle obstacles to full and lasting participation in society and the labour market. So more attention must be paid to optimizing the interaction between the three strands and ensuring that due account is given to each.“

(Council of the European Union 2009, p. 5).

A growing number of member states sets objectives on the basis of common indicators. This is especially true for the new member states. Nearly all of these countries formulated concrete short and medium term objectives in their strategic reports of 2008.

Tackling child poverty is of special interest, 22 member states have set concrete objectives in this field of action, 16 of them based on common indicators (cf. COUNCIL OF THE EUROPEAN UNION 2009, p. 6). France, Austria and Great Britain used in addition point methods to measure the progress regarding central indicators. Whereas France concentrates on the *at-risk-of-poverty-rate* (SI-C5) and other national primary and secondary indicators at a specific date, Great Britain evaluates the progress based on overarching primary and context indicators.[4]

The data for the common indicators stem mostly from Eurostat or national EU-SILC surveys in particular in those cases where the European comparison is intended. However there are countries which do calculate the indicators based on own surveys, or exchange the indicators completely with national indicators. This is often the case if (long reaching) inter-temporal comparisons should be employed, because these comparisons are often not (yet) possible. France for example uses the Laeken definition for the monetary indicators, but these indicators are calculated based on the *enquête Revenus fiscaux et sociaux* (ERFS) of the Insee. This survey does exist in slightly modified form since 1956. The dissent choice of indicators and data basis and the resulting differences to the EU-SILC data is explained in the introduction (cf. FRANCE 2008, p. 3 and INSTITUT NATIONAL DE LA STATISTIQUE ET DES ÉTUDES ÉCONOMIQUES O.J.). The same logic applies for Denmark, where the ratio of people with low income (The wording at-risk-of-poverty is avoided in Denmark) is indicated for the EU comparison based on Eurostat data, and for the national analysis based on own surveys (cf. DENMARK ET AL. 2008, pp. 5-7).

Italy deviates from the European definition since the national *at-risk-of-poverty-rate* is calculated based on expenses of the households using the so called *Carbonara-scale*.[5] Following this scale the poverty line for a two person household is the arithmetic mean of the per capita expenditure (cf. SESTITO ET AL. 2003, p. 21). Common indicators based on the EU-SILC data and European definitions is formally used in Italy for international comparisons whereas the Italian poverty rate has priority for the national analysis (cf. ITALY 2008, p. 15-17).

### 3.1.2 The joint report

The yearly published Joint Report on Social Protection and Social Inclusion can be seen as the basic document. This report is written by the Commission in collaboration with the national delegations in the SPC.

The report got a lot of praise in advance as it was supposed to enable the exchange of best practices together with the *Peer Reviews*. The objective was to increase the pressure to act for national governments with the evidence-based analysis.

But the fact has to be taken into account that a common report is regarded as critical only in so far as the governments are willing to be criticized (PREUNKERT 2009, p. 134).

[4] France has published the objective, to reduce the headline indicator within five years by 30 %. This was a realistic option before the crisis (cf. FRANCE 2008, pp. 58). It is not evident if the indicator is calculated on the common basis.

[5] „[...] which takes into account only the number and not the age of the members, according to the following coefficients: 0.60 (1-member household), 1.00 (2 members.), 1.33 (3 members), 1.63 (4 members), 1.90 (5 members), 2.16 (6 members), 2.40 (7 or more members) "(SESTITO ET AL. 2003, p. 21).

Actually, the reports result from a negotiation process involving the Commission, which is interested and endeavoured in a critical note and the national delegations who want to turn away critique from themselves. The Commission relies for this purpose on national strategic reports and common indicators.

The common reports which have been formalized by the European Council are very short (15 to 20 pages), this is why there is only a spare analysis of the fields of action. In additional the analysis of the area of poverty and social exclusion loosed in scope because of the streamlining of the OMC.

The report is only emphasized by the working documents of the Commission and the biennially published country profiles which do accompany the report. Despite the common indicators it is hard for the Commission to judge about developments because common European aims are lacking. That is why the common reports are more statements than monitoring reports for the OMC.[6]

## 3.2 Analysis of a survey of political actors

To further increase the knowledge about the way the indicators on poverty and social exclusion are perceived and used, an online survey has been developed as part of the AMELI project. This online survey started in December 2010 and is still running (it can be accessed via http://www.unipark.de/uc/ameli_project/). So far 262 persons took part in the survey, whereas 54 questionnaires have been completed. Thus the survey can not be considered representative. Furthermore, it has to be stated that a considerable sample selection bias does exist, as the questionnaire was sent mainly to the persons who come into contact with the indicators on poverty and social exclusion in their daily work.

Moreover, the audience is rather wide as some participants are very familiar with the topic of indicators on poverty and social exclusion while others are not too familiar. The evaluation of the personal information resulting from the questionnaire shows that the group of respondents is very heterogeneous. The respondents are are divided equally into the age classes, as well as their involvement in different policy processes like policy preparation, policy making, policy implementation, policy monitoring, ex-ante evaluation and ex-post evaluation. The focus concerning responsibilities lies more on policy making and scientific consultancy but there are also representatives from every proposed group that did respond to the questionnaire.

The online survey addresses different questions. One target is to get information on the general awareness about the indicators on poverty and social exclusion. It is of interest to see how people inform themselves about the field of poverty. Furthermore, we wanted to get an idea about the user profile and the use of the indicators on poverty and social exclusion. It is a target to get information about the attitudes towards the indicators on poverty and social exclusion as well as getting proposals on how to improve the methodology of indicators and their use. If we draw attention to the field of poverty and social exclusion indicators, it is not exactly clear what is the benchmarking methodology for

[6]Therefore it is not possible to names responsibilities in the common reports, because they are too general. The naming of responsibilities is only possible for the country profiles.

these indicators. Many different definitions do exist and are published by different national and international organizations. The definitions have been elaborated by different expert groups. Different types of indicators do contradict each other partly because of good reasons. Here it is indispensable to have a common basis for discussion.

The first issue covers the question how interested persons do inform themselves about poverty and social exclusion. The Joint Report for Social Protection and Social Inclusion seems to be the main source of information for the respondents. Another publication which is of interest is the Eurobarometer[7], which is a survey Commissioned by the European Commission about development of opinions in the European Union.

The following figure 3.4 shows the use of the different websites covering topics on poverty and social exclusion.

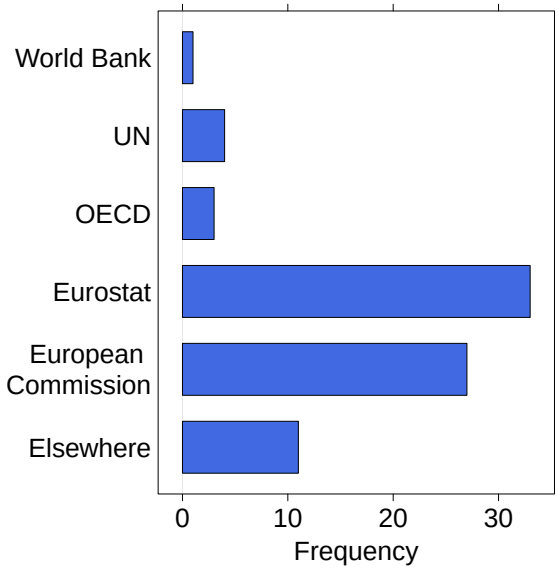


Figure 3.4: When you look for information about poverty and social inclusion in Europe: On which website do you look first?

The Eurostat website seems to be the most relevant website for the respondents, followed by the website of the European Commission. Fewer people look at the websites of UN, OECD and World Bank, when they want to inform themselves about poverty and social exclusion in Europe. Other websites which are in use of the respondents are the following:

- Eurocities website[8]
- European Social Network[9]
- STATEC [10]

[7] http://ec.europa.eu/public_opinion/archives/eb_special_en.htm
[8] http://www.eurocities.eu/main.php
[9] http://www.esn-eu.org/
[10] http://www.statistiques.public.lu/fr/acteurs/statec/index.html

- European Anti Poverty Network (EAPN)[11]
- Social Platform[12]

Some respondents do also use websites of specific Non-Governmental Organisations (NGOs) or start an internet research for example via Google. The fact that the most relevant information for the respondents are coming from the websites of Eurostat and the European Commission suggests vast usage of the indicators on poverty and social exclusion but in fact only 37.5 per cent of the respondents did know the expression *indicators on poverty and social exclusion*. That can be due to the change in naming of the indicators. This observations shows that it is difficult to explore the frame population, the user group of the indicators on poverty and social exclusion. Some persons are suggested to use the Laeken indicators in their professional life but do not know the term Laeken indicators. From other people one would suspect the usage but in fact they do not use the indicators. And the third group does include people who use the indicators whereas one would not suspect them to use this type of tool. The reason for the disuse of indicators on poverty and social exclusion of the second group may be due to the fact that the awareness of the indicators is expandable. One respondent noted that the indicators are not transparent to an external audience using the Internet. This is worsened by the fact that often things move around and change over time for example on the Eurostat website.

We have also been interested in the question which other indicator portfolios are in use by the respondents.

Other indicator portfolios used are the *World bank poverty indicators* and national indicator portfolios. Whereas the national portfolios are in wide use, no other specific indicator portfolios have been named in the open part of the question.

In the open part of the questionnaire it was noticed that it is difficult to choose indicators for the special purpose of measuring poverty (and social exclusion) in the enlarged union because of dissimilarities between the national welfare systems and different levels of development. As can be seen in figure 3.6 most respondents agreed on the statement that the indicator selection should be based on quality criteria. This suggests that most of the respondents support a concept driven selection of indicators. In the questionnaire six criteria have been proposed: **political relevance** means that an indicator should be relevant for the issue and target audience at hand, whereas **validity** means that an indicator should actually measure the issue or phenomenon it is supposed to measure.

The requirement that an indicator must be simple and easily understood by the target audience is assigned with the keyword **comprehensibility**. A **reliable** indicator will yield the same conclusions or express the same message if it is carried out with different tools or by different people in similar circumstances. With **incidence** it is meant that the indicators that are widely used are preferable. The last criterion covered is the **legitimacy**, hereby we mean the requirement that an indicator has to be established in a democratic and transparent process involving a multitude of stakeholders.

The most important criteria for the respondents are reliability and validity. Legitimacy and incidence seem less important. That can be seen in the smaller share of the orange bar in the first and second row of figure 3.7.

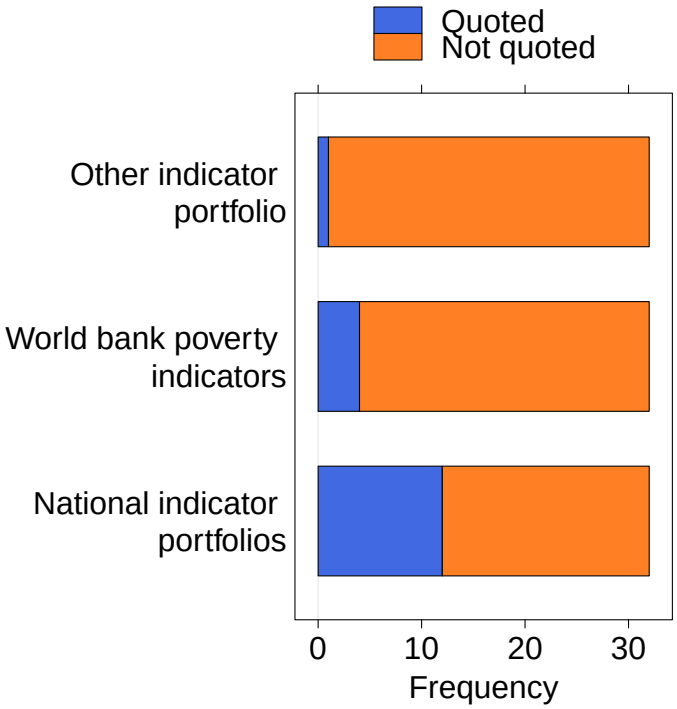


Figure 3.5: Do you use other sets of indicators?

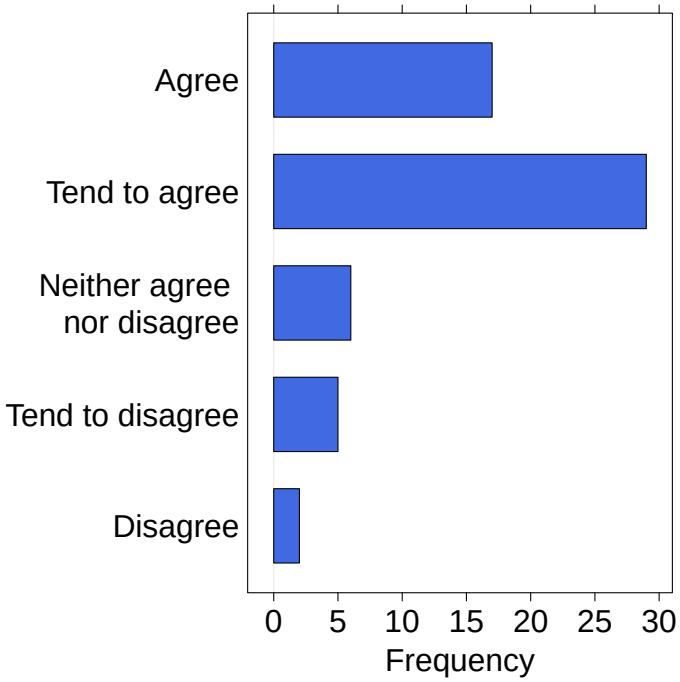


Figure 3.6: What do you think about the following statement: „Indicators must be selected on the basis of quality criteria“?

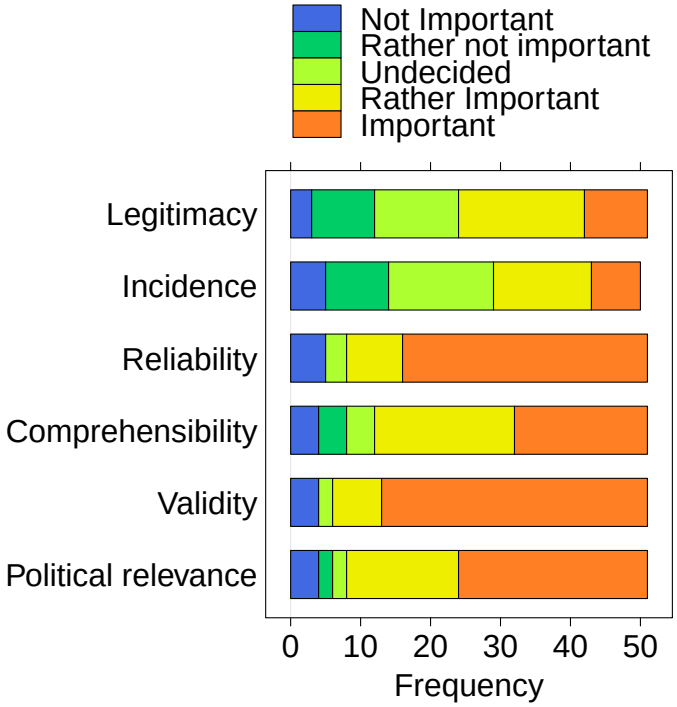


Figure 3.7: How important are the following criteria for you?

Different opinions do exist on the question of how to measure the multidimensional phenomena poverty and social exclusion. One important question is whether to measure in absolute or relative terms. The respondents answered to this question with a similar pattern for both types of indicators. A majority of respondents said, that it would be better to measure the tackled phenomena in both relative and absolute terms. The results are visible in figure 3.8.

In the answers on the open questions it was stated that an *absolute* poverty measure should be developed at EU level, even though the relative concept of poverty currently prevails. It was judged as easy to calculate, but also significant weaknesses have been detected.

The respondents of the questionnaire stated the importance of considering non income indicators like health outcomes, education, social capital, and opportunity deprivation. One proposition includes the introduction of an absolute poverty measure which could include non-monetary items and could be constructed based on consumption or valuation of a basket of necessary goods and services.

The definition of Coombes for deprivation was mentioned, which stipulates that people are deprived who do not avail of the attributes, possessions and opportunities that others can take for granted. Attributes and possessions are seen as observations which can be (easily) measured in the individual, whilst opportunity deprivation is seen as an observation which has to be constructed as it is an interaction term between a person's personal characteristics, his or her possessions and the environment. It was stated that

[11] http://www.eapn.org/
[12] http://www.socialplatform.org

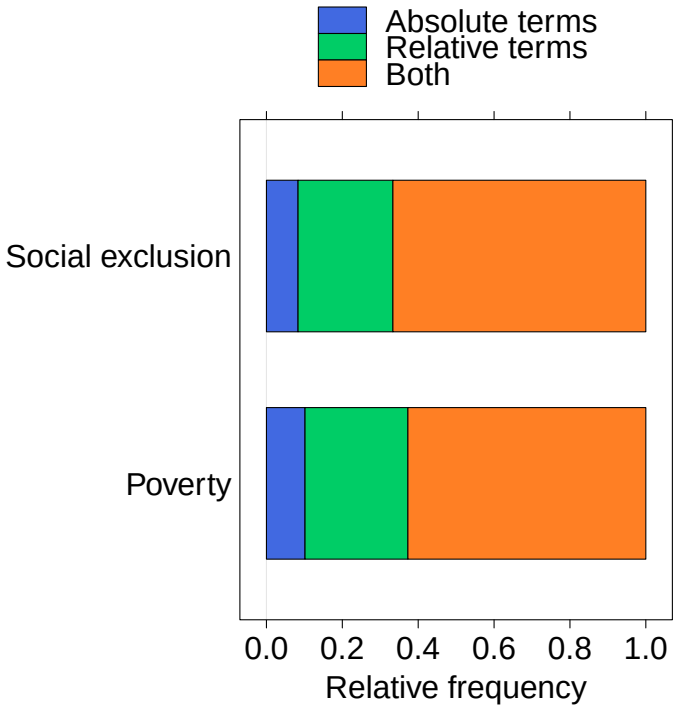


Figure 3.8: Do you think poverty/social exclusion should be measured in:

rural deprivation is first and foremost mediated through opportunity deprivation and that restriction to measures resting within the individual (i.e. characteristics and possessions) will inevitably result in the under-specification of rural deprivation and thus lead to an urban bias.

Other respondents did not propose alternative indicators or different concepts to measure but indicators which can complement the indicators on poverty and social exclusion like the European Integration Indicators, currently developed by the EU. Further, there are elements in other indicators such as UNICEF or OECD indicators on child well-being that are described as elements which could usefully be added to the indicators on poverty and social exclusion. A need for an indicator on homelessness is also observed by parts of the respondents. Moreover, it is stated that the indicators on poverty and social exclusion need to be revised from time to time and adapted to the changes in societies (for example effects of economic crisis etc.).

The economic crisis which occurred in the global economy in the autumn of 2008 spread rapidly in the countries of the European Union. A number of key indicators presented a sharp deterioration and urgent policies and interventions were needed to minimize negative impacts. The total number of unemployed people in the European Union grew rapidly in 2009 and still continues to remain at the same high levels. Some signs of recovery evident in some countries in 2010 could not change the overall picture which, according to statements by international officials[13], will persist.

[13]According to Dominique Strauss-Khan President of the International Monetary Fund „The global crisis has not yet been overcome, but we learned through the crisis that it is not enough to observe only some macro-aggregates. We should concentrate on the distribution of income and employment “.

In this new socio-economic environment shaped by the crisis, income distribution, poverty and social exclusion appear high in the priorities of countries. Consequently, the Laeken indicators that measure these phenomena are now more important instruments than in the past. Through these indicators we can have a picture of the state of each country, observe its evolution, monitor the implementation of policies and measure their effectiveness. It is therefore crucial that the Laeken indicators have a number of features, such as those promoted by the AMELI project, i.e. quality, completeness, harmonization etc. in order to give a reliable picture of the situation in the individual countries and the European Union in general.

It has been said that countries will always need to have their own programme indicators reflecting their social protection systems and outcome measures based on their living standards.

If we concentrate on the Laeken portfolio, it is of course interesting which of the indicators in the Laeken portfolio are most widely in use. The two indicators *long term unemployment rate* (SIP4) and *population living in jobless households* (SIP5) seem to be the most important indicators for the respondents. Maybe this is due to the significance these indicators do have in other indicator portfolios. Whereas the indicators *employment gap of immigrants* (SIP7) and *self reported unmet need for medical care* (SIP10) seem to be of less importance. Possible explanations are the date of introduction of these indicators or the questioning about the intention of these indicators.

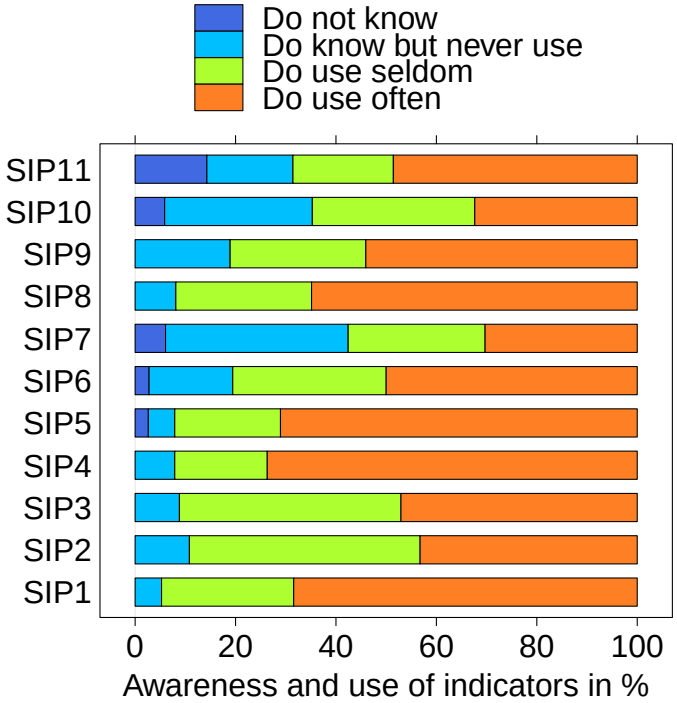


Figure 3.9: Below you find a list of the indicators on poverty and social exclusion. Please mark for each how important you consider the indicator and also whether you use it in your own work.

Interview to Deutsche Welle on April 9, 2011

On the other hand we also asked which of the indicators give the least information about poverty to the respondents. A similar pattern was observed for this question (visible in figure 3.10). Here the *self reported unmet need for medical care* (SIP10) was quoted most commonly. None of the respondents quoted the choice all indicators or *relative median poverty gap*.

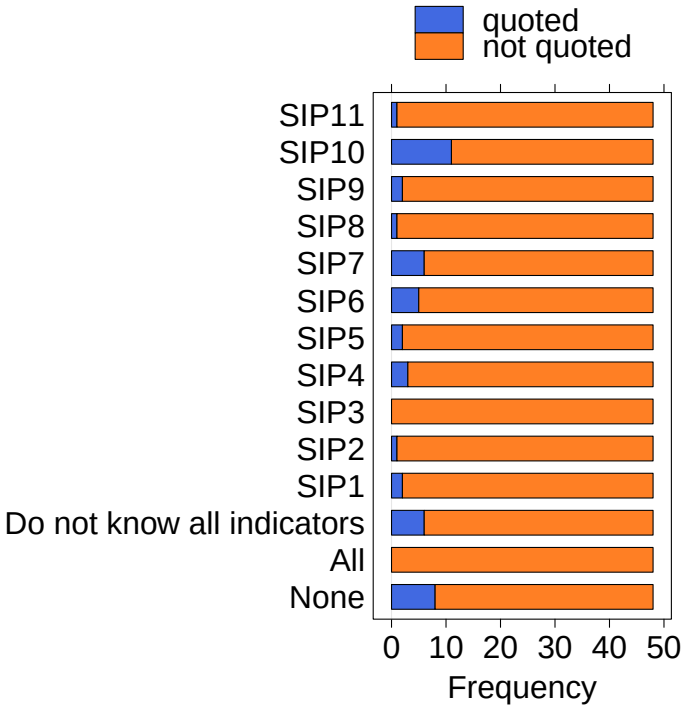


Figure 3.10: In your opinion which of the indicators on poverty and social exclusion gives least information about poverty?

In this context it is also of interest for which purposes the indicators are used for. We listed the following possibilities in the questionnaire:

1. To support decision-making,
2. to set targets and establish standards,
3. to disseminate information,
4. to focus discussion,
5. to promote the idea of integrated action,
6. to monitor and evaluate developments.

The figure 3.11 shows for what purposes respondents do use indicators, which did not know the term indicators on poverty and social exclusion. Whereas figure 3.12 shows the purposes the indicators on poverty and social exclusion are used by the respondents who

did know these indicators. Figure 3.11 shows that the *support decision-making* and the *monitoring and evaluation of developments* seem to be the most important purposes.

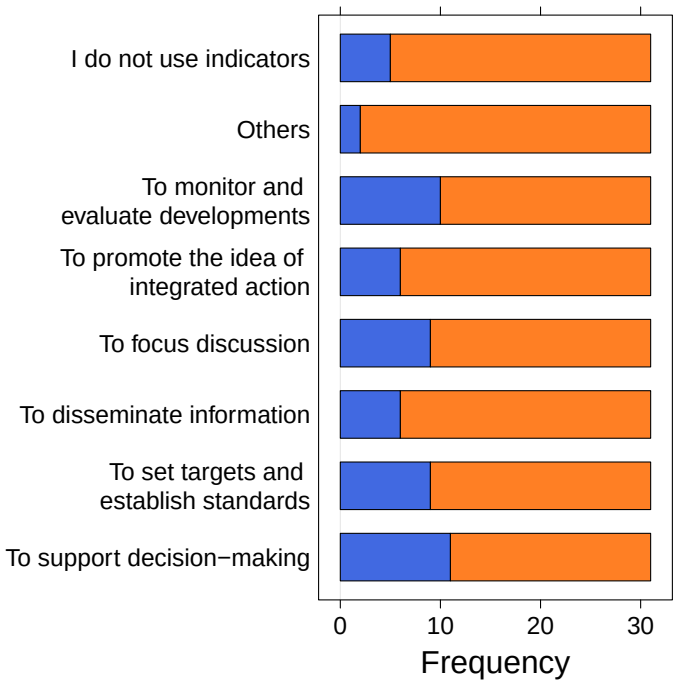


Figure 3.11: For what purpose do you use Indicators?


Figure 3.12: For what purpose do you use Indicators?

Other types of use indicated are the possibility to influence national policy, the prospect of lobbying research, for research purposes and in the context of the OMC process and EU 2020 strategy.

To summarize the above issues we asked the question which of the indicator is most useful for the daily work of the respondents. In figure 3.13 it is visible that the indicators *At-risk-of-poverty rate for different subgroups* seems to be the most important one for the respondents, because many people quoted this indicator as useful. If one looks only at the *At-risk-of-poverty rate* without the breakdown to subgroups it is no longer possible to discern clear trends.

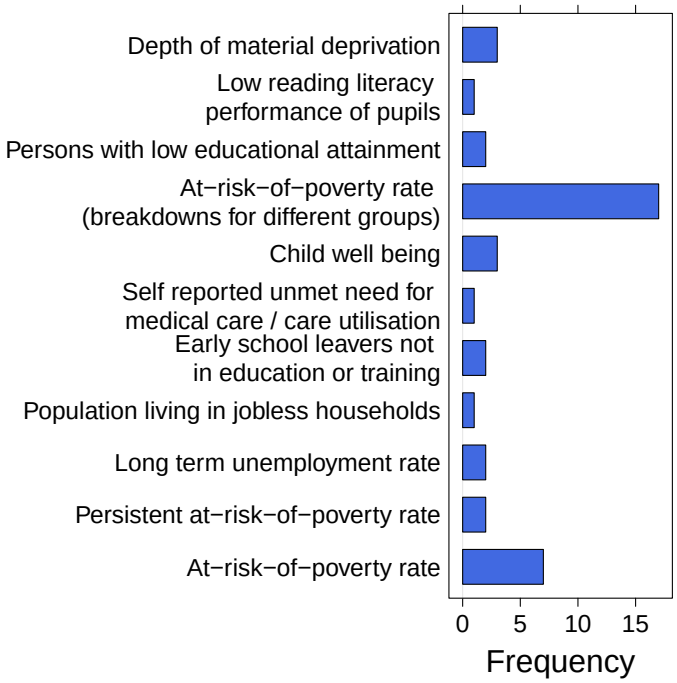


Figure 3.13: Which indicator of the new Laeken-Portfolio is most useful for you?

Of course it is interesting to know why the indicators are judged like this. Here the categories of the question displayed in figure 3.7 are revived.

Validity and relevance are the most decisive reasons for the respondents, this can be seen by the share of the blue parts which is for both cases relatively high.

As the indicators on poverty and social exclusion are a trans-European instrument the question about harmonization is an important one. The results of the questionnaire show that harmonization is more important on methodological issues than it is for the interpretation (see figure 3.15).

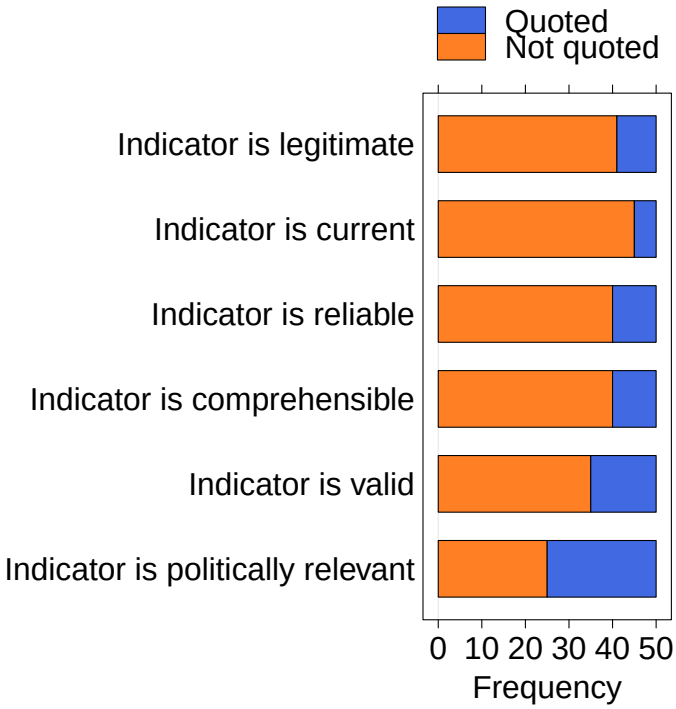


Figure 3.14: Please indicate why this indicator is so important for you.

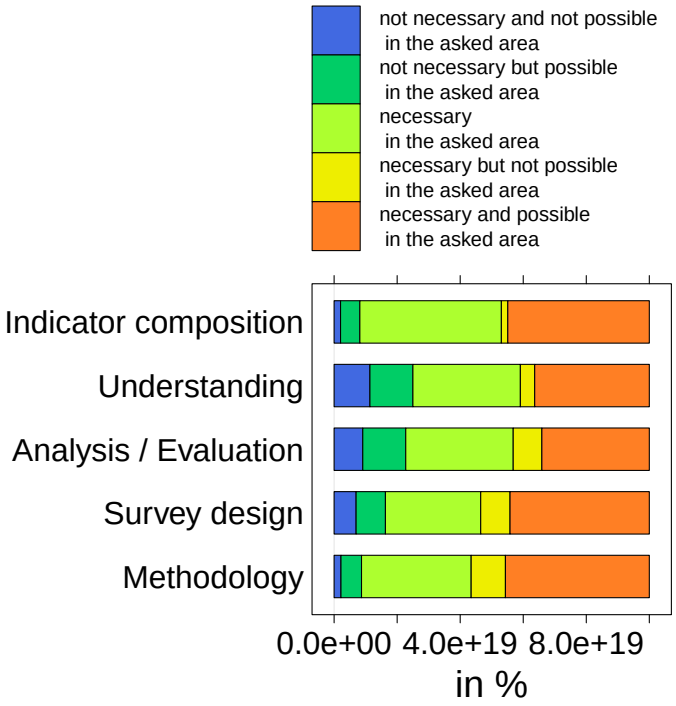


Figure 3.15: Harmonization is ...

The respondents indicated possible improvements in different areas. The first example affects the data basis. Most of the indicators are built upon EU-SILC data, but EU

SILC is seen as a data base which is far from perfect, due to suboptimal data quality which results mainly from harmonization problems. Still the basic data set EU-SILC is quite heterogeneous despite the ex-post output harmonization. Therefore an evaluation of the country specific social context and the country specific data source evaluation is needed. Improvements in EU-SILC, like the harmonization of the sampling strategies, will by definition improve the indicators on poverty and social exclusion. It was stated that the data should be collected cross country and that the results should be discussed in expert groups. This should be done in several rounds in a longer period of time. Another statement was that the data basis on information about child poverty should be improved, in order to support effective development of responsive preventive approaches. Other aspects which should be taken into account are that the measuring of well being and quality of life are also important, not only for children.

Another question which should be tackled for the evaluation of the policy use of the indicators on poverty and social exclusion is the question about the amount of indicators in the portfolio. 47 % of the respondents do not think that there is an appropriate number of indicators on poverty and social exclusion. In some statements it is also said that more indicators could be involved like indicators concerning social exclusion.

Another interesting question is whether indicators on poverty and social exclusion allow appropriate comparisons to be made between the different EU Member States. Here 76 % of the respondents think that the indicators on poverty and social exclusion allow for these comparisons. But also other indicators are proposed like the *Irish Deprivation Index*, which uses confirmatory factor analysis in its construction and includes specific considerations with regard to the measurement of opportunity deprivation. A lack of a systematic assessment of opportunity deprivation is expected to lead to an inevitable urban bias and thus to an underestimation of rural deprivation or deprivation in the more rural countries and regions of the EU.

A breakdown to subgroups for example by gender and age is very important. Also it was stated that information on the risk to experience poverty or social exclusion would be very helpful. A concentration should take place on specific information on children, young people and families exclusion related to well-being and rights.

A more balanced portfolio should be achieved and the individual indicators should be improved. Further, it was proposed to apply more sophisticated statistical methods (structural equation modelling) in developing a concept of the underlying (latent) factors that determine the observed measurements. This, in turn, would lead to a more reliable composite measurement of poverty and social exclusion

There is a need for more information on participation, well-being and subjective poverty in the indicator portfolio, further an interaction with the integration process indicators is needed. Indicators for the number of homeless would be useful.

It is criticized that the at-risk-of-poverty indicator does not take payments into account. It has been said that a breakdown of the at-risk-of-poverty rate to sub-national level is important. All indicators should have a relationship to targets which may be fulfilled. The *Relative poverty indicator* for example implies that poverty never disappears, this is not useful.

Most respondents consider the indicators on poverty and social exclusion as an appropriate instrument to measure poverty. Following the opinions reflected in the questionnaire, the Laeken portfolio comprehends an appropriate number of indicators and the indicators are balanced across all dimensions. But it is also stated that it is complicated for outsiders to understand the practice behind the common reports. In general indicators need to be complemented with a thorough analysis from other sources, both qualitative and quantitative. A regular review of this indicators is important. This review must be based on the evaluation of the usability and efficacy of the indicators. The indicators on poverty and social exclusion are judged as a good instrument to evaluate and compare member states. But the results have to be enriched with background information or other insights, for example from qualitative analysis.

Beside single indicators also composite indicators are discussed as a tool for evidence based policy making. The introduction of composite indicators to measure the multidimensional phenomena of poverty and social exclusion is often discussed on European level. The following question was therefore introduced in the questionnaire: *What do you think about using composite indicators to monitor progress using the Open Method of Coordination in connection with the fields of social protection and social inclusion?*

In total 36 % of the respondents do know of any composite indicators in the field of poverty and social exclusion. Some respondents have the opinion that composite indicators are important to measure progress on achieving the EU poverty targets. It is stated that a single indicator is essential for developing political consensus on where to target resources on. They are seen as means to improve the communication. But then it is stated that composite indicators can also directly be used for resource allocation models and transfer payments. It is exposed that composites do give an additional aspect to monitor and compare poverty.

But on the other hand it is criticized that the current ways in which the EU composite indicators are derived lack technical expertise (e.g. the application of structural equation modelling). Another criticism is that all indicators are to some extent suboptimal and that composite indicators are cumulating these weaknesses. Further, it is criticized that composite indicators tend to complicate the discussions, particularly because the weighting of different components is judged as very subjective. The question of interpretation can also be an issue as the complexity increases. Often, certain aspects are neglected and that is supposed to lead to an oversimplification. Therefore, it is proposed to limit the application, as composite indicators do not indicate clear policy messages. Composite indicators are seen as a useful instrument with the challenge that the difficulty to explain at a political level should not be neglected. It is said that the EU 2020 target is actually a composite one and that it will be interesting to see the presentation to politicians and the public.

Some respondents headed the following indicator constructions as examples for the application of composite indicators to measure the multidimensional phenomena like poverty and social exclusion:

- Millennium Development Goals Indicators [14]

[14] http://unstats.un.org/unsd/mdg/Host.aspx?Content=Indicators/OfficialList.htm

- Multidimensional Poverty Index (MPI) (UNDP 2010)
- My work is predominantly with regard to spatial analysis at NUTS 4 and 5. The New Measures of Deprivation for Ireland (Haase and Pratschke, 2008)
- Social indicators being used in the USA
- EU-2020 poverty target
- Kakwani index
- UN human development index (HDI) SDI
- Unicef research unit on child poverty
- Consistent poverty in Ireland

Improvements and extensions are also proposed for composite indicators. Following one statement composite indicators on deprivation, housing indicators and national indicators on beneficiaries of different benefits should be used. Another proposal suggests that besides material deprivation it would be useful to measure also cultural deprivation (access to books, theatres, arts, sports etc.) because the chance to avoid poverty and social exclusion or to come up from it, depends also from cultivation.

Further investigations are needed to improve the indicators or introduce additional ones on the measurement of the poverty rate as well as the social exclusion rate (which currently comprises of the material deprivation rate and people living in households with low work intensity).

One conclusion which can be drawn from the questionnaire is, that it is not clear what composite indicators can accomplish. Therefore the concept of composite indicators and an analysis on the sensitivity of such indicators is presented in the following chapter.

# Chapter 4

# Applied sensitivity analysis of composite indicators

Composite indicators are a widely used, discussed and also criticized tool. The major problem arises from the fact that (possibly) a vast amount of information is condensed into a few numbers which are used for policy recommendations. To reduce the impact of the construction process of composite indicators one may apply a sensitivity analysis in order to elaborate weaknesses of the methodology. A thorough overview of the methodology of composite indicators can be drawn from OECD (2008) and Saltelli et al. (2008).

This present chapter deals with sensitivity analyses on the construction scheme of composite indicators. Its first section provides a general motivation of the concept of composite indicators. Section 4.2 deals with the selection of indicators.Section 4.3 describes the set-up of the sensitivity analyses in detail, whereas section 4.4 presents the results of the simulation study.

## 4.1 The concept and assessment of composite indicators

Dealing with composite indicators, the first step is to look at single indicators. The spider plot in figure 4.1 shows the indicator values of the severe housing deprivation rate (SHDR) and the at-risk-of-poverty-rate (ARPR) after social transfers for the EU-27 in 2007. The line is printed at the edge of the circle for very high values and near the centre for low values for the two indicators in each country.

Both indicators are scaled to 100%, this is done by dividing their values with the maximum value of the respective indicator achieved by a country (the same procedure is underlying the plots in figures 4.2 and 4.3).

It is a difficult task to take these two indicators to construct a ranking of the EU-15-countries, since the interpretation of the two indicators is rather ambiguous: For both measures a higher value indicates an increase in poverty and social cohesion respectively, but a higher value for one indicator does not entail necessarily a high value for the other

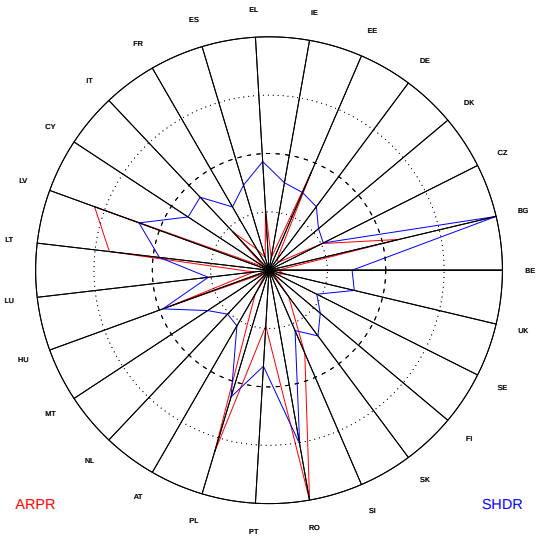


Figure 4.1: Spider plot of two indicators

indicator. But sometimes it is necessary to give one statement about the situation or a development in general. This intention gets harder, if more than two indicators are considered.

One approach to tackle this problem is the usage of composite indicators (CI). There are two main reasons why composite indicators are useful for measuring poverty:

1. A general advantage of CI: A single number is easier to present than a set of indicators.
2. The specific advantage in the field of poverty measurement: Poverty is multidimensional, so a single indicator does not represent the whole range of the phenomena. (MAZZIOTTA et al., 2010).

The main problem is, that a CI is not easy to construct, since there are infinite possibilities to do so. In politics CI are mainly used for benchmarking and the documentation of the development of countries over time. Currently the emphasis of political interest lies on the second application.

MÜNNICH (2007) defines composite indicators as follows:

Let $x_{i,c}^t$ be the value of a single indicator $i$ ($i = 1, \ldots, \nu$, with $\nu$ variables of interest), for country $c$ ($c = 1, \ldots, C$) at time $t$ ($t = 1, \ldots, T$). Then a composite indicator can be defined as a function

$$f_{c,t} = f_{c,t}\left(x_{1,c}^t, x_{2,c}^t, \ldots, x_{\nu,c}^t\right) \quad : \quad \mathbb{R}^\nu \to \mathbb{R}.$$

Typically $f(\cdot)$ is a linear function. As a matter of fact, this definition leaves the concept of a CI open to a wide variety of possible construction schemes.

The advantages and disadvantages of CI are discussed extensively in literature. Typical advantages of the CI are the fast interpretation, the possibility to summarize complex realities and the assessment of changes over time. Disadvantages of CI are, that they may send misleading messages and therefore invite simplistic policy conclusions. They also may be misused if the construction process is not transparent and/or lacks sound statistical or conceptual principles. Therefore, composite indicators should be constructed very carefully. Subjective influence is possible in two stages of the construction process:

1. The selection of single indicators.
2. The choice of a construction algorithm.

The choice of a construction algorithm is of primary interest for this deliverable. We will present two sensitivity analyses on the construction scheme of a composite indicator in the following. Sensitivity analysis is not intended for the prevention of results by subjective influences, but can quantify the impact of several construction steps on the final composite indicator. If large impact is evident, the methods have to be chosen with extra caution on these steps.

## 4.2 Construction of composite indicators

To create a composite indicator, firstly one has to select the single indicators which form the composite indicator. Afterwards it is necessary to define the various construction steps within the building process. These construction steps are also called input factors, input triggers or simply triggers.

This section deals with the selection of the single indicators. The first study is based on the AMELIA data set, a synthetic data set described in detail in deliverable 6.2, representing a *synthetic Europe*. The whole AMELIA data set can be divided into eleven regions. It does not provide variables for the calculation of most indicators used by the European Commission in the field of poverty and social exclusion, so it is somewhat limiting in this sense. On the other hand the data set provides micro data which allows the inclusion of the sampling effect in the construction scheme as presented in 4.3.1.
The second study, was performed with real indicator values from the Eurostat Database[1].

### 4.2.1 The single indicators of study 1

For the first study we selected a set of single indicators related to the one used for a composite indicator proposed by Mazziotta, Pareto and Talucci (see Mazziotta et al., 2010):

- Gini coefficient
- At-risk-of-poverty rate

[1] http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database

- Projected total public social expenditure
- Self reported unmet need for medical examination or treatment (by reason)
- Long-term unemployment rate
- Early school leavers

The first two indicators are also used by us in the exact same way, while the self reported unmet need for medical examination or treatment (by reason) indicator had to be modified due to a lack of the reason variable in the AMELIA data set. Since the AMELIA data set does not include several years, the long-term unemployment rate was changed to an indicator named medium- and long-term unemployment rate, containing the adequate share of persons unemployed for 6 months (instead of 12 months) and more. Due to a lack of data we substituted the projected total public social expenditure and the early school leavers indicators with the somewhat related quintile share ratio and the share of persons with low educational attainment. This leads to the following indicator set:

- Gini coefficient
- At-risk-of-poverty rate
- Quintile share ratio
- Self reported unmet need for medical examination or treatment
- Medium- and long-term unemployment rate
- Share of persons with low educational attainment

While the first three indicators cover different aspects of the monetary dimension of poverty and inequality, the other three indicators represent different dimensions of the topic, namely health care (self reported unmet need for medical examination or treatment), labour market (medium- and long-term unemployment rate) and education (share of persons with low educational attainment).

The spider plot in figure 4.2 illustrates the indicator values of the six indicators for the eleven regions of AMELIA. The values for the Gini coefficient (Gini) are plotted in blue, while values for the quintile share ratio (QSR) are depicted with the pink line and the values for the at-risk-of-poverty rate (Arpr) are plotted in orange.

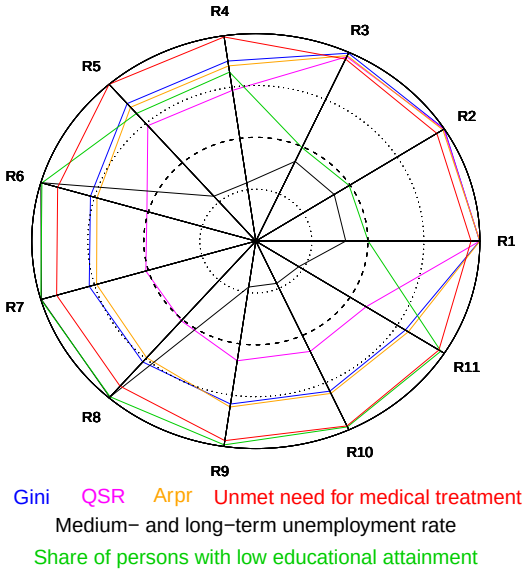


Figure 4.2: Spider plot of the single indicators of study 1

It is intuitive that the interpretation problems illustrated in figure 4.1 increases, because of the higher number of single indicators.

### 4.2.2 The single indicators of study 2

In the second study we used indicators from the accepted *Portfolio of indicators for the monitoring of the European strategy for social protection and social inclusion*, precisely primary and secondary indicators from this selection. Detailed explanations of this set can be found in European Commission (2008b). We avoid break-downs and always take the indicator for the whole population to avoid unnatural overlaps of indicators. We also exclude the indicators which contain missing data for at least one of the countries in the study. In addition to that, we have to exclude the indicators from the set which are not available till now. All indicators were taken from the Eurostat database from the year 2009. The final set is (`code`):

- At-risk-of-poverty rate (SI-P1)
- Relative median poverty risk gap (SI-P3)
- Long term unemployment rate (SI-P4)
- Early school leavers not in education or training (SI-P6)
- Material deprivation rate (SI-P8)
- Self reported unmet need for medical care (SI-P10)
- Persons with low educational attainment (SI-S2)

- Depth of material deprivation (SI-S4)
- Housing costs (SI-S5)
- Overcrowding (SI-S6)

Spider plot 4.3 shows the indicator values of the ten single indicators for the EU-25 countries. It demonstrates how confusing the interpretation of ten indicators at once can be.

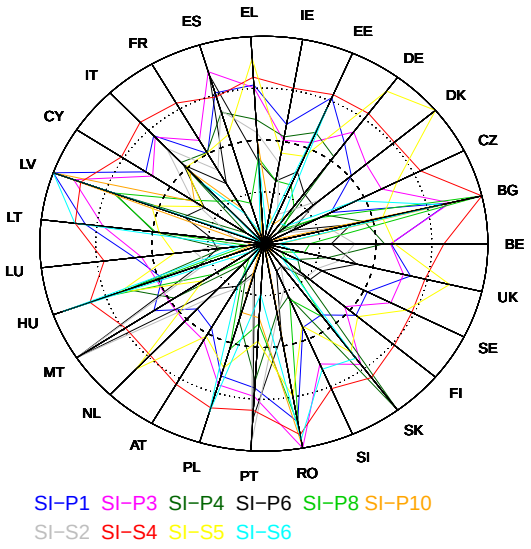


Figure 4.3: Spider plot of the single indicators of study 2

## 4.3 Sensitivity analysis in the field of composite indicators

### 4.3.1 General setup

The main idea of sensitivity analysis in this context is to analyse how much impact the single triggers have on the output of the construction process, i.e. the composite indicators. For that matter one calculates many different composite indicators out of a set of single indicators by varying the input triggers in the construction scheme. This leads to a distribution of composite indicators, referred to as the output ($\mathbf{Y}$) of the model, for each region or country. In our analyses $f(x)$ is always a linear model. Figure 4.4 shows this setup.

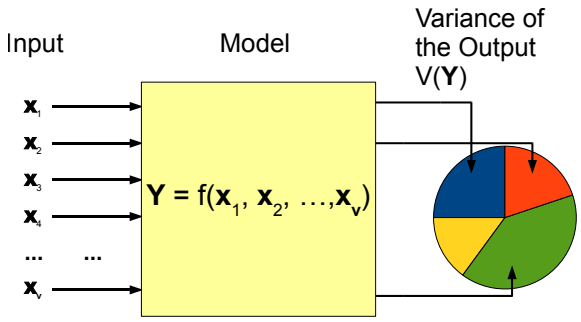


Figure 4.4: General setup of a sensitivity analysis

With the Sobol' method of variance decomposition, it is possible to calculate and quantify the impact of the different triggers on the output. This subsection firstly describes the construction of a *decision matrix* which deals with the randomization of trigger combinations. Secondly the single triggers for both simulation studies are presented. The final part of this subsection explains the Sobol' method of variance decomposition.

### 4.3.2 Construction of the decision matrix

There are many possible ways to create a random set of composite indicators for given sets of single indicators and construction steps. The procedure shortly described in the following is a method leading to a decision matrix with the property that it makes the calculation of the impact of the triggers easier. A detailed explanation of the algorithm and its theoretical foundation can be found in Saltelli et al. (2008).

Let $k$ denote the number of input triggers and $n$ the number of the base sample size which determines the number of CIs calculated. Firstly a $n \times 2k$-matrix of quasi-random numbers, called $M$, is created. In our studies we used pseudo-random numbers in the $[0, 1]$ interval, generated with the well accepted Mersenne twister. Detailed explanation on this method can be found in Matsumoto and Nishimura (1998). Afterwards the matrix $M$ is divided into two equal sub-matrices, named $SubM1$ and $SubM2$. Also a larger matrix, $DM$, of size $[number\ of\ input\ factors \cdot 2\ +\ 2\ ] \cdot\ sample\ size \times number\ of\ input\ factors$ is constructed. Thereafter the matrix $DM$ is systematically filled out with: $SubM1$, $SubM2$, $SubM2$ with the first column replaced by the first of $SubM1$ and so on. Finally exactly the same is done with $SubM1$. It is shown in Saltelli et al. (2008) that first-order and total influence of the input triggers can be calculated at a cost of $number\ of\ input\ factors\ + 2 \cdot sample\ size$ model runs. In addition to that any interaction term between two input triggers is computed at the additional cost of model evaluations per sensitivity measure. In our studies we took a base sample of $n = 1{,}024$, since that is the recommended number by Sobol'.

### 4.3.3 The single triggers for the two simulation studies

This subsection presents the different triggers for both studies. In study 1 there are five triggers used: The first trigger selects a sampling design according to which a sample is drawn. The designs used are explained in HULLIGER et al. (2011). Trigger number two then selects one sample out of a set of samples drawn by the design determined by the first trigger. Out of this sample the single indicators are calculated. In practice, indicators are often estimated out of samples which imply the presence of uncertainty. The first two triggers take account of that issue. After the estimation of the single indicators, the third trigger standardises them. Trigger number four then determines if one of the single indicators should be excluded or not. The final trigger creates a set of weights for the single indicators. At the end a composite indicator is calculated as a weighted mean of the single indicators. Details of the construction mechanism of composite indicators can be found in OECD (2008). Due to the fact that there is no sufficient micro data available, the first two triggers are excluded in the second study. This decreases the number of triggers to three. These are the only changes for the second simulation study. Each trigger is associated to a column of the decision matrix.

#### Choice of sampling design

The first trigger is the choice of the sampling design (sd).

The associated indicator function can be described as:

$$D_{sd} = \begin{cases} \text{Design 1} & \text{for } x \in [0, 0.2] \\ \text{Design 2} & \text{for } x \in (0.2, 0.4] \\ \text{Design 3} & \text{for } x \in (0.4, 0.6] \\ \text{Design 4} & \text{for } x \in (0.6, 0.8] \\ \text{Design 5} & \text{for } x \in (0.8, 1] \end{cases}$$

where x is a random number of the decision matrix.

#### Sample selection

The second trigger is the selection of the sample according to the sampling design (ssel). For the sake of simplicity we drew 1,000 samples per design earlier and saved the resulting indicators in a file. This trigger simply selects one of this samples of the sampling design selected before according to the random number of the decision matrix in the second position $x$. Its indicator function is:

$$D_{ssel} = \begin{cases} \text{Select sample number 1} & \text{for } x \in [0, 0.001] \\ \text{Select sample number 2} & \text{for } x \in (0.001, 0.002] \\ \ldots & \\ \text{Select sample number 1,000} & \text{for } x \in (0.999, 1] \end{cases}$$

### Standardisation

The third input trigger is standardisation (st). Since the single indicators are scaled differently, it is necessary to standardise them. There are three methods used.
The indicator function of this trigger can be expressed as:

$$D_{st} = \begin{cases} \text{Z-Scores} & \text{for } x \in [0, \frac{1}{3}] \\ \text{Min-max method} & \text{for } x \in (\frac{1}{3}, \frac{2}{3}] \\ \text{Distance to a reference} & \text{for } x \in (\frac{2}{3}, 1] \end{cases}$$

where $x$ is a random number of the decision matrix at the third position.

Z-scores: Let $x_i^c$ denote the value of indicator $i$ for country $c$, $\overline{x}_i$ the mean value and $\sigma_i$ the standard deviation of indicator $i$ across all countries. Then

$$I_i^c = \frac{x_i^c - \overline{x}_i}{\sigma_i}$$

is called the Z-score of indicator $i$ and country $c$.

Min-Max: With the same denotation as above

$$I_i^c = \frac{x_i^c - \min_c(x_i)}{\max_c(x_i) - \min_c(x_i)}$$

Distance to a reference: Let $x_i^{\overline{c}}$ denote the indicator value of reference country $\overline{c}$:

$$I_i^c = \frac{x_i^c - x_i^{\overline{c}}}{x_i^{\overline{c}}}$$

In our study we took the mean value over all regions/countries as a reference. The used normalisation methods are explained more detailed in Saisana et al. (2005).

### Exclusion of an indicator or not

The fourth input trigger is excluding an indicator or not(ex). According to the related random number in the decision matrix, it is decided whether one indicator gets eliminated or not and, in case of elimination, which one it is. This input factor is very helpful for data sets in which one single indicator explains a large part of the output variance. Its indicator function can be written as:

$$D_{ex} = \begin{cases} \text{all indicators in} & \text{for } x \in [0, 1/(n+1)] \\ \text{first indicator excluded} & \text{for } x \in (1/(n+1), 2/(n+1)] \\ \ldots & \\ \text{last indicator excluded} & \text{for } x \in (n/(n+1), 1] \end{cases}$$

where $n$ is the number of indicators and $x$ a random number of the decision matrix.

**Weighting**

The fifth and last input trigger is weighting (we). The indicator function of the weighting trigger can be written as:

$$D_{we} = \begin{cases} \text{equal weights} & \text{for } x \in [0, 1/3] \\ \text{pca weights} & \text{for } x \in (1/3, 2/3] \\ \text{random weights} & \text{for } x \in (2/3, 1] \end{cases}$$

where $x$ is a random number of the decision matrix. Equal weights simply means, that all indicators have the same weight. PCA-weighting is a relatively complex weighting scheme, resulting from **P**rinciple **C**omponent **A**nalysis of the indicator matrix (*the data weights itself*). A detailed explanation of this method can be found in SAISANA ET AL. (2005). The last weighting method used is random weighting, the weights are simply non-negative random numbers with a sum scaled to 1. Independent of the selected weighting method, the data matrix is finally multiplied by the weighting vector (linear aggregation). The results are saved in a matrix of scores for every country or region in the studies. Each row of each of those matrices can be interpreted as a composite indicator.

### 4.3.4 Variance decomposition

To calculate the impact of the different input triggers on the output, we use the variance decomposition by Sobol'. Its mathematical details are described in detail in SALTELLI ET AL. (2008), we focus rather on its intuition. The main idea of this method is to decompose the total variance of the output distribution of indicators to parts which only depend on one trigger, on two triggers and so on. To accomplish that, so-called sensitivity indices are calculated. A first-order sensitivity index measures the direct influence of one input trigger on the output without interactions, while a second-order sensitivity index measures the influence of the interaction of two triggers and so on. Finally a total-order effect of a trigger is defined as the sum of and all the higher-order indices which include this trigger. In analogy to that denotation, a first-order effect can be defined as a first-order sensitivity index, a second-order effect as the sum of all indices with a maximum order of two, which are related to this trigger. A sensitivity index of an input factor can be interpreted intuitionally as a measure for the portion of the total output variance caused solely by this input factor. In the studies only the first-order and total-order effects are analysed, since they are the most intuitively to interpret. Those measures are calculated for all countries or regions in both studies.

## 4.4 Results of the studies on composite indicators

Figure 4.5 shows the first-order indices of study one. For a better illustration all values were scaled, so that the sum of first-order indices reaches one for the country or region with the highest sum of first-order indices. This was also performed in the following bar-charts. Although its values vary a lot between the regions, it can be seen that the dominating trigger for all regions is standardisation, therefore the standardisation method

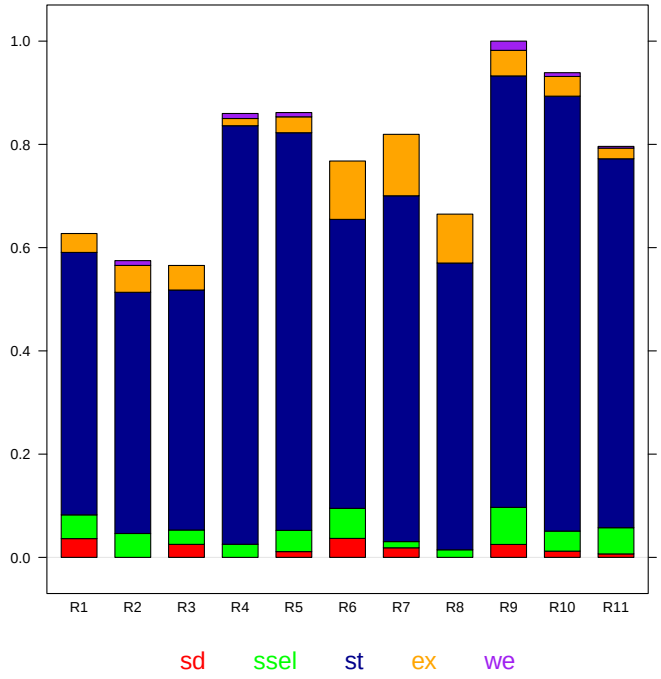


Figure 4.5: First-order effects of study 1

has to be chosen extra carefully. For most regions the exclusion trigger has the second biggest impact. This means that a single indicator might have a decent influence on the final composite indicators. Both sampling triggers do not play a large role, whereupon the selection of the concrete sample has a bigger direct impact on the output then the selection of a sampling design. The choice of a weighting scheme seems to be the least important trigger over all regions, except of region 2. Overall the sum of direct impacts varies a lot between the regions, for example, the value of region 3 is less than 60% of the value of region 9.

The total effects of study 1 are plotted in 4.6. All in all the influence of the different triggers is a lot more balanced, though the standardisation trigger has again the highest total influence. It is relatively unclear which higher-order indices lead to this result. This could be a starting point for further analysis. Furthermore the total influence of the different triggers varies a lot: For example the influence of the choice of a weighting scheme for region 1 is more than three times higher than for region 4.

Since the standardisation trigger has such a huge influence on the input it seems rather sophisticated to compare the impact of the other triggers. To tackle this problem we run another cycle of this study with a fixed standardisation method and used exclusively the Z-scores standardisation. This run of the study is referred to as study 1b. Its results for the first-order effects are illustrated in figure 4.7.

Depending on the region, the exclusion or the sample selection trigger have the highest direct impact on the output. Especially the second observation is of great importance, since the sampling effect regarding the single indicators is often neglected in the context of composite indicators. The selection of the concrete sample seems to be far more important

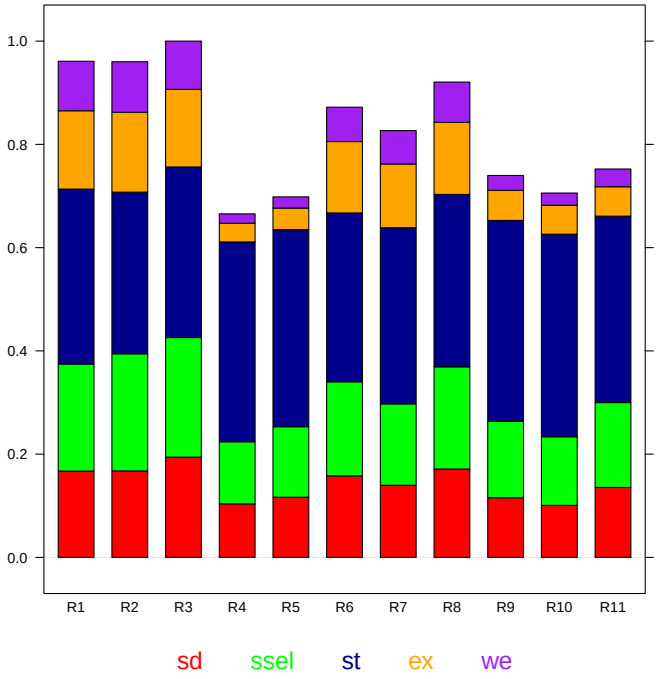


Figure 4.6: Total effects of study 1

than the choice of a sampling design, while the weighting trigger possesses the lowest of all first-order indices for most regions. Overall the sum of the first-order effect differs a lot between the regions, for example the one of region 4 is less than 40% of the value of region 8.

The total-order effects, diagrammed in figure 4.8, tend to substantiate the previous result that the sampling effect on the single indicators plays a major role. In this case in can be seen in the total-order effects of the sd- as well as the ssel-trigger. Those factors are directly connected, that is why they are supposed to have a very high combined second-order index. Because of that this result has to be analysed circumspectively. Nevertheless it subjects to underline the meaningfulness of sampling in the field of composite indicators.

Another observation is that the sum of total-order effects is very balanced across all regions. The first-order effect results of study 2 are illustrated in figure 4.9. In this study the standardisation trigger has the highest direct impact on the output variance, too. But the results differ a lot from country to country. While for some countries like Luxembourg, Austria and Finland, basically only standardisation has a direct impact, for some other countries like Spain, Hungary and especially Malta, the other triggers are also of decent importance. It is notable that the sums of first-order indices of those countries are considerably lower than the one of Luxembourg.

Figure 4.10 shows the total effects of study 2. Remarkably the countries with low first-order indices of the exclusion- and the weighting- trigger also have low total effects of the named triggers. They can be described as basically one-trigger-dependent. On the other hand countries with a decent first-order impact of those triggers, show also high values of total effects. Since second-order indices of two triggers are included in the total effect

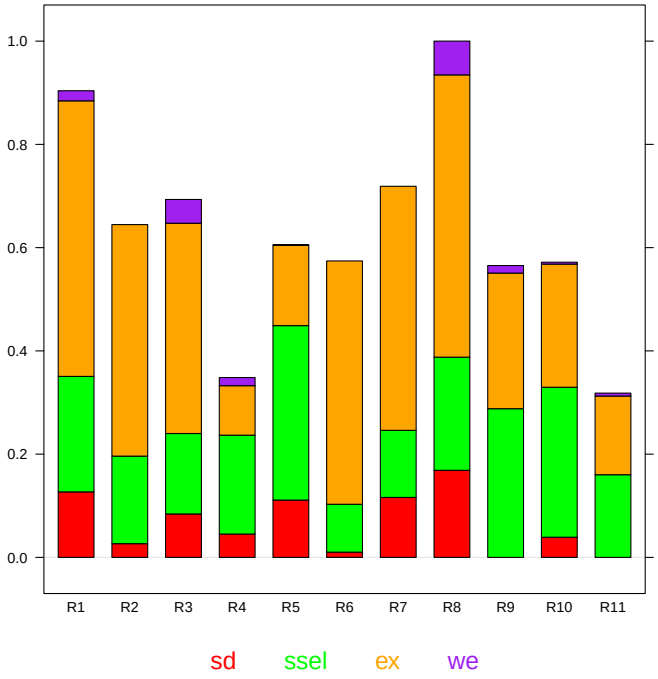


Figure 4.7: First-order effects of study 1b

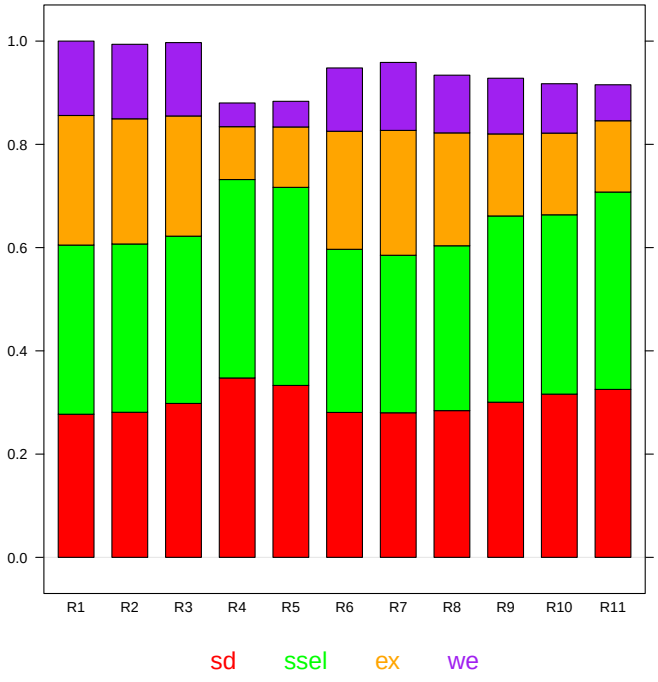


Figure 4.8: Total-order effects of study 1b

of both triggers, the sum of total effects is generally higher for countries depending on several triggers. This culminates in the fact that Luxembourg's sum of total effects is

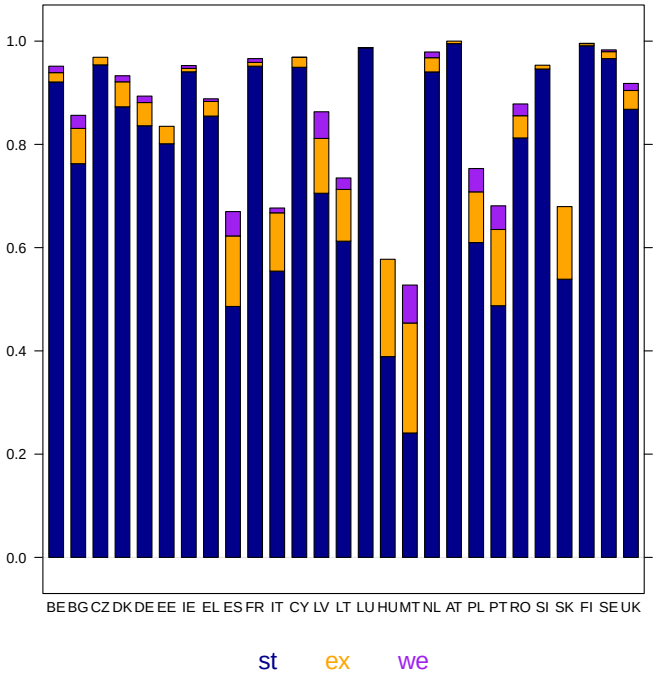


Figure 4.9: First-order effects of study 2

only around 60% of Malta's. In general the results of study 2 have to be interpreted very carefully, since they are based on a construction scheme of three triggers only, which leads to very few different composite indicators.

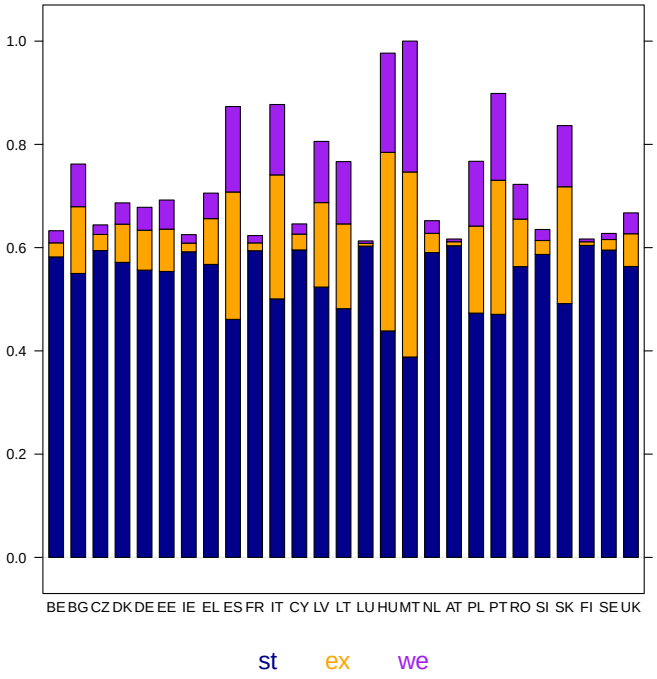


Figure 4.10: Total effects of study 2

Overall it should be clarified for both studies that the results of the triggers have to be interpreted relatively to the other triggers. Because of that, it cannot be said that the weighting scheme is not important. The results of the analyses only show that for example the weighting method has a relatively low impact on the output variance compared to the standardisation trigger. This is rather intuitive since the standardisation method can normalise the single indicators to a given scale, whereas the weighting method is applied to the already standardised indicators and does not tend to change the scale level heavily.

# Chapter 5

# Conclusions

Besides measuring progress, social indicators give reliable information about the impact of policy and therefore increase the steering-capacity of governments and politicians. They are furthermore considered to be a central part of the democratic process. The measurement of progress with consistent information helps to improve the evaluation of the policy process. Further, it is possible to improve the participation of a broader audience. If the indicators should be useful for these tasks different conditions have to be fulfilled. The consistent and harmonized reporting based on a reliable database is indispensable. Predetermined benchmarks could help to raise the level of interest in the evaluation of social processes. The use of simple composite indicators (e.g. to measure consistent poverty) is discussed. Here high attention has to be put on the construction scheme as pointed out in chapter 4. Summarizing the questionnaire results it can be said that most respondents judge the indicators on poverty and social exclusion as a useful instrument without neglecting the problems which do occur in a framework of big diversities between the different European societies and subgroups. Further research has to show if they can provide valuable input. New dimensions of poverty have to be covered or fully excluded. New investments in data quality and infrastructure are also necessary for the indicators on poverty and social exclusion (and EU-SILC) to become the number one reference for policy making in the field of poverty and comparisons across countries. Steps have been taken to ramp up the social dimension and the fight against poverty, this development has to be supported and extended. Further research on ideas of how to foster the use of the indicators is indispensable and will be carried out.

# Bibliography


**Atkinson, A.**, **Cantillon, B.**, **Marlier, E.** and **Nolan, B.** (editors) (**2002**): Social indicators: the EU and social inclusion. Oxford: Oxford Univ. Press.

**Atkinson, A.**, **Cantillon, B.**, **Marlier, E.** and **Nolan, B.** (**2005**): Taking forward the eu social inclusion process report. Luxembourg: Council of the European Union.

**Atkinson, A. B.** and **Marlier, E.** (editors) (**2010**): Income and living conditions in Europe. European Union.
URL http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-31-10-555/EN/KS-31-10-555-EN.PDF

**Beil, S.** (**2010**): Armutsberichterstattung und Sozialpolitik mit Hilfe der Laeken Indikatoren. Diploma thesis, Universität Trier.

**Beil, S.**, **Kolb, J.-P.** and **Münnich, R.** (**2011**): *Policy use of Laeken Indicators.* Proceedings of the 2011 NTTS (New Techniques and Technologies for Statistics) Conference in Bruxelles, Belgium.
URL http://www.cros-portal.eu/filedepot_download/95/54/0/edit

**Boulanger, P.-M.** (**2007**): *Political uses of social indicators: overview and application to sustainable development indicators.* Int. J. Sustainable Development, Vol. 10„ pp. 14–32.

**Carley, M.** (**1981**): Social measurement and social indicators: Issues of policy and theory, *Contemporary social research series*, vol. 1. London: Allen & Unwin, ISBN 0-04-310009-0.

**Council of the European Union** (**2000**): *Lisbon European Council 23-24.03.2000: Conclusions of the Presidency.*
URL http://www.europarl.europa.eu/summits/lis1_en.htm

**Council of the European Union** (**2009**): *Gemeinsamer Bericht über Sozialschutz und soziale Eingliederung 2009: 7503/09.* Brüssel.

**Denmark**, **Ministry of Health and Prevention** and **Ministry of Social Welfare** (**2008**): *National Report on Strategies for Social Protection and Social Inclusion 2008 - 2010: September 2008.*
URL http://ec.europa.eu/social/BlobServlet?docId=2542&langId=en

**European Commission** (**2007**): Joint report on social protection and social inclusion 2007. Luxemburg: Office for Offical Publ. of the European Communities.

**European Commission** (**2008**a): *Ein erneuertes Engagement für ein soziales Europa: Verstärkung der offenen Koordinierungsmethode für Sozialschutz und soziale Eingliederung*. Brüssel.

**European Commission** (**2008**b): Portfolio of indicators for the monitoring of the European strategy for social protection and social inclusion 2009 update.

**European Commission** (**2009**a): *Common indicators*.
URL http://ec.europa.eu/employment_social/spsi/common_indicators_en.htm

**European Commission** (**2009**b): Joint report on social protection and social inclusion 2009. Luxemburg: Office for Official Publications of the European Communities, ISBN 9279019368.

**Falkner, G.** (**1998**): EU social policy in the 1990s: Towards a corporatist policy community. London: Routledge, ISBN 0415157773.

**France** (**2008**): *Rapport de strategies nationales sur la protection et l'inclusion sociale 2008- 2010: ANNEXES*.
URL http://ec.europa.eu/social/BlobServlet?docId=2545&langId=fr

**Gehring, U. W.** and **Weins, C.** (**2004**): Grundkurs Statistik für Politologen und Soziologen. Wiesbaden: VS Verl. für Sozialwiss., 4., überarb. aufl. ed., ISBN 9783531162690.

**Gudmundsson, H.**, **Lehtonen, M.**, **Bauler, T.**, **Sebastien, L.** and **Morse, S.** (**2009**): *Process and results of analytical framework and typology development for POINT: Deliverable number: D5*.
URL http://point.pbworks.com/f/POINT_WP2+Deliverable+D5-+FINAL-REV.pdf

**Hamel, M.-P.** and **Vanhercke, B.** (**2008**): *Politique nationale et coopération européenne: la méthode de la coordination ouverte est-elle devenue plus contraignante?* Revue Belge de Sécurité Sociale, 1e TRIMESTRE 2008 (1), pp. 73–111.

**Herrmann, P.** (**1995**): *Subsidiarität und die falsche Zurückhaltung oder: Über den Sinn Europäischer Armutsprogramme*. Nachrichtendienst des Deutschen Vereins für öffentliche und private Fürsorge, 75 (2) (2), pp. 79–86.

**Hoernig, H.** and **Seasons, M.** (**2005**): *Understanding Indicators*. **Phillips, R.** (editor) Community indicators measuring systems, Urban and regional planning and development series, pp. 3–32, Aldershot, Hants,: Ashgate, ISBN 0754640051.

**Hulliger, B.**, **Alfons, A.**, **Bruch, C.**, **Filzmoser, P.**, **Graf, M.**, **Kolb, J.-P.**, **Lehtonen, R.**, **Lussmann, D.**, **Meraner, A.**, **Münnich, R.**, **Nedyalkova, D.**, **Schoch, T.**, **Templ, M.**, **Valaste, M.**, **Veijanen, A.** and **Zins, S.** (**2011**): *Report on the Simulation Results*. Research Project Report WP7 – D7.1, FP7-SSH-2007-217322 AMELI.
URL http://ameli.surveystatistics.net

**Indicators Sub-Group of the Social Protection Committee** (**2009**): *Portfolio of overarching Indicators and streamlined socila inclusion pension, and health portfolios: September 2009 update*.
URL http://ec.europa.eu/social/BlobServlet?docId=3882&langId=en

**Institut national de la statistique et des études économiques** (**o.J.**): *Opération statistique : Enquête Revenus fiscaux et sociaux / ERFS*.
URL http://www.insee.fr/fr/methodes/default.asp?page=sources/ope-enq-erfs.htm

**Italy** (**2008**): *National Strategy Report on Social Protection and Social Inclusion 2008-2010*.
URL http://ec.europa.eu/social/BlobServlet?docId=2550&langId=en

**Mabbett, D.** (**2007**): *Learning by numbers? The use of indicators in the co-ordination of social inclusion policies in Europe*. Journal of European Public Policy, 14:1 (1), pp. 78–95.

**Matsumoto, M.** and **Nishimura, T.** (**1998**): *Mersenne Twister: A 623-dimensionally equidistributed uniform pseudorandom number generator*. ACM Trans. on Modeling and Computer Simulation, Vol. 8 (1), pp. 3–30.

**Mazziotta, M.**, **Pareto, A.** and **Talucci, V.** (**2010**): *Composite Indices to Measure Poverty and Social Inequality in Europe*. Conference on Indicators and Survey Methodology 2010.

**Münnich, R.** (**2007**): *Composite Indicators - Boon or bane?* 16th Scientific Colloquium German Federal Statistical Office and German Statistical Society.

**Noll, H.-H.** (**1999**): *Die Perspektive der Sozialberichterstattung*. **Flora, P.** and **Noll, H.-H.** (editors) Sozialberichterstattung und Sozialstaatsbeobachtung, *Soziale Indikatoren*, vol. 20, pp. 13–28, Frankfurt/Main: Campus-Verl., ISBN 3593361205.

**Noll, H.-H.** (**2004**): *Heinz-Herbert Noll Social Indicators and Quality of Life Research: Background, Achievements and Current Trends*. **Genov, N.** (editor) Advances in sociological knowledge, Wiesbaden: VS Verl. für Sozialwiss., ISBN 3810040126.

**Noll, H.-H.** (**2005**): *European System of Social Indicators - Konzeptueller Rahmen und Systemarchitektur*.
URL http://www.gesis.org/fileadmin/upload/institut/wiss_arbeitsbereiche/soz_indikatoren/Publikationen/Praes_Noll_EUSI-Concept-Structure.pdf

**OECD** (**2008**): Handbook on Constructing Composite Indicators.

**Olsen, M.** (**May, 1969**): *The Principle of „Fiscal Equivalence “: The Division of Responsibilities among Different Levels of Government*. The American Economic Review, 59, No. 2, pp. 479–487.

**Preunkert, J.** (**2009**): Chancen für ein soziales Europa? Die Offene Methode der Koordinierung als neue Regulierungsform. VS Research, Wiesbaden: VS Verl. für Sozialwiss., 1 ed., ISBN 978-3-531-16879-1.

**Saisana, M.**, **Tarantola, S.**, **Schulze, N.**, **Cherchye, L.**, **Moesen, W.** and **Puyenbroeck, T. V.** (**2005**): *State-of-the-Art Report on Composite Indicators for the Knowledge-based Economy*. Deliverable 5.1. of the KEI project, KEI.

**Saltelli, A.**, **Ratto, M.**, **Andres, T.**, **Campolongo, F.**, **Cariboni, J.**, **Gatelli, D.**, **Saisana, M.** and **Tarantola, S.** (**2008**): Global Sensitivity Analysis. John Wiley & Sons.

**Schnell, R.**, **Hill, P. B.** and **Esser, E.** (**2008**): Methoden der empirischen Sozialforschung. Lehrbuch, München: Oldenbourg, 8., unveränd. aufl. ed., ISBN 9783486587081.
URL http://www.gbv.de/dms/ilmenau/toc/562969705.PDF

**Sestito, P.**, **Tangorra, R.**, **Freguja, C.** and **Utili, F.** (**2003**): *Poverty and Social Exclusion in Italy: EU and Italian Indicators: Annex to the NAP/incl 2003.*
URL http://ec.europa.eu/employment_social/spsi/docs/social_inclusion/it_statannex_napincl_2003_Final_en.pdf

**Steiner, H.** (**2010**): *Political Relevance of EU-Social Indicators: Unveröffentlichtes Dokument.*