Deutsches Institut für
Wirtschaftsforschung

DIW BERLIN

SOEP

The German
Socio-Economic
Panel Study

SOEPpapers
on Multidisciplinary Panel Data Research

86

Richard Hauser

Problems of the German Contribution to EU-SILC - A research perspective, comparing EU-SILC, Microcensus and SOEP

Berlin, January 2008

SOEPpapers on Multidisciplinary Panel Data Research
at DIW Berlin

This series presents research findings based either directly on data from the German Socio-Economic Panel Study (SOEP) or using SOEP data as part of an internationally comparable data set (e.g. CNEF, ECHP, LIS, LWS, CHER/PACO). SOEP is a truly multidisciplinary household panel study covering a wide range of social and behavioral sciences: economics, sociology, psychology, survey methodology, econometrics and applied statistics, educational science, political science, public health, behavioral genetics, demography, geography, and sport science.

The decision to publish a submission in SOEPpapers is made by a board of editors chosen by the DIW Berlin to represent the wide range of disciplines covered by SOEP. There is no external referee process and papers are either accepted or rejected without revision. Papers appear in this series as works in progress and may also appear elsewhere. They often represent preliminary studies and are circulated to encourage discussion. Citation of such a paper should account for its provisional character. A revised version may be requested from the author directly.

Any opinions expressed in this series are those of the author(s) and not those of DIW Berlin. Research disseminated by DIW Berlin may include views on public policy issues, but the institute itself takes no institutional policy positions.

The SOEPpapers are available at
http://www.diw.de/soeppapers

Problems of the German Contribution to EU-SILC -

A research perspective, comparing EU-SILC, Microcensus and SOEP[1]

Richard Hauser

Johann Wolfgang Goethe-Universität, Frankfurt am Main

Abstract

EU-SILC will become one of the most important statistical data sources for the Federal Government's future Poverty and Wealth Reports, for comparing Germany's position with those of the other EU member states in the "open method of coordination", and for the international scientific community and international organisations. Hence this sample needs intensive quality control to ensure data quality. Ex ante quality control must take the form of selecting suitable survey methods, internal control of consistency of the data collected from each household, transparent data editing, reliable imputation methods and compensation for drop-outs by reweighting. Ex post consistency checks are needed in the form of comparison with other similar household samples, with administrative statistics and with macro-economic aggregates of the national accounts.

---

[1] Paper given at the Conference of the Rat für Sozial- und Wirtschaftsdaten in cooperation with ZUMA on 14 November 2007 in Mannheim

In this paper the need for intensive ex post quality control is met with consistency checks in the form of a comparison between the results of EU-SILC and the microcensus and SOEP, which reveals significant deviations in the coverage of poorly integrated foreigners, small children and the level of education, as well as the ratio of house/apartment owners and the employment ratio. This causes serious distortions to the Laeken indicators calculated.

1. Introduction

"LEBEN IN EUROPA" (Living in Europe) is the German name of the European Union Statistics on Income and Living Conditions, EU-SILC for short, that have been compiled in all 27 EU member states and some neighbouring countries since 2005. The survey is held every year as a rotating panel, and it will develop into one of the most important household samples for the analysis of the incomes, living conditions and poverty ratios of the people living in Germany.

The EU-SILC results will be even more important for comparisons between EU member states than on the national level, for the survey is to form the basis for the comparisons in the "open method of coordination". The European Commission will use the survey results to calculate the Laeken indicators, as they are called, to assess Germany's progress and any backlogs in regard to the social policy aims agreed.

Finally, the international scientific community will also use this data, which is provided by Eurostat as a scientific use file and constantly updated, to make comparisons of every aspect of living conditions with the other EU member states and other highly developed countries. This will largely determine Germany's image abroad. The view will have repercussions on Germany through economic analysts and the capital markets they influence, as well as through the OECD and other international organisations.

2. *Requirements for Household Samples*

Household samples which are of such political importance must meet stiff requirements. They must give a representative picture of the private households and individuals in a society, in every relevant aspect and as up to date as possible. Ideally, this can only be achieved with a sufficiently large random sample and with a refusal rate of zero.[2] Only then can undistorted results and reliable confidence intervals be obtained from the samples. This ideal state is not achievable, but the aim should be to come as close to it as possible on every level of the data production. So every sample needs intensive quality control to ensure data quality.

---

[2] As the Eurostat staff responsible say: "According to the Commission Regulation on sampling and tracing rules, for all components of EU-SILC (whether survey or register-based), the cross-sectional and longitudinal (initial sample) data are to be based on a nationally representative probability sample of the population residing in private households within the country, irrespective of language, nationality or legal residence status (Clemenceau/Museux in: Eurostat (2007), pp. 19-20).

A distinction can be drawn between two levels of quality control: Firstly, ex ante securing of data quality. On this level the following measures are decisive:

- designing the survey methods,

- internal consistency control of the data collected from each household,

- data editing and the imputation methods,

- compensation for drop-outs through reweighting.

But that is not enough, for how close the various approaches will come to the ideal cannot always be judged in advance. Hence, to ensure quality in the results as many comparisons with other statistics as possible should be made. That can be called ex post consistency checking, and it is the second level of quality control.[3] This ex post consistency checking is to ensure as much agreement as possible

- with similar household samples,

- with administrative data compiled,

- and with macro-economic aggregates.

Only these two levels of quality control together will enable high data quality to be achieved. However, they also reveal the limits of

---

[3] One example of ex post consistency checking is in Becker et al. (2002), who use the example of cross-validation between information based on incomes and consumption samples (ICS), the Socio-Economic Panel (SOEP) and the microcensus (MC).

each survey, so that both the interpretation of the statistical results is made easier and future improvements are stimulated.

Great weight is attached to the first level, ex ante securing of data quality, in the compilation of the official statistics, but the ex post consistency checking leaves something to be desired. This may be of little relevance for the usual publication of averages for the population as a whole, or for large groups, but in the case of fringe groups, on whom data is difficult to compile in any case, it is very important. And if individual data is to be supplied for research purposes and is to be evaluated in many ways that are not known in advance, it is very important to have ex post consistency checks that are as comprehensive as possible.

3. The ex ante securing of data quality in EU-SILC

At a conference on the requirements for EU-SILC and the problems needing to be solved here organised by Eurostat in Helsinki in November 2006 various quality criteria were also discussed and applied to the national surveys that were already available for the year 2004.[4] The criteria "exactitude", "reliability" and "international comparability" were outstanding. As Germany was not involved in this first EU-SILC wave it was only partly included in the report. The quality reports by the Federal Statistical Office

---

[4] Cf. Clemenceau, Anne/Museux, Jean-Marc, EU-SILC (Community statistics on income and living conditions: general presentation of the instrument) in: Eurostat (2007), pp. 11-36, and Verma, Vijay, Issues in Data Quality and Comparability in EU-SILC, in: Eurostat (2007), pp. 287-309.

on the German contribution to EU-SILC for the year 2005 are now available.[5] They show, firstly, the great efforts that were made to ensure quality and secondly, compared with the other official household samples they also increase the transparency of the internal consistency control of the data from each household, data editing and the imputation methods, as well as the compensation for drop-outs through reweighting. However, these quality reports cannot clear away all the doubts in the quality of the data compiled.

Germany is the only country that does not use interviews for this survey but conducts the survey entirely by post. Moreover, Germany has been granted a transition period up to 2008 to develop a full random sample. Every year starting from the year 2005 one quarter of the required number of households will be taken from a "permanent random sample of households willing to take part" (DSP) in the official statistics and then surveyed again in three more years. Only after four years will the full group of households that is regarded as a random selection be available. In the meantime the missing number of households will be added using quota samples.

This approach will cause problems and it is already clear that these will have a negative effect on quality:

---

[5] Statistisches Bundesamt (2006) and (2007).

- First, there are higher drop-out rates in postal surveys despite follow-up phone calls, and many forms are not precisely filled out (e.g. due to rounding). As a considerable number of households, particularly in the bottom segment, do not have a land line telephone follow-up phone calls are not possible, and this is likely to result in under-representation of this lowest segment of the population.

- Second, a purely postal survey using highly complex questionnaires that are only in German does not reach enough households of foreigners with insufficient command of German. This is likely to reduce even further the representation of the lowest segment of the population, in which foreigner households are above the average.

- Third, we know from the panel surveys conducted for research that owing to misunderstandings the first panel wave of complicated questionnaires contains a particularly large number of wrong answers, and that the drop-out rate on the transition to the second wave is particularly high. This ex ante argument is based on experience, and it would suggest that on principle the first panel wave should only be regarded as a big pre-test, and always only the second wave should be incorporated in the EU-SILC data. That would require five-year part-panels and Germany's full contribution to EU-SILC in the form of a rotating random sample would be delayed until 2009. The second panel wave was carried out in 2006, and it must be carefully checked to see whether the

approach used so far is justifiable in regard to quality. If an extension to five panel waves is not possible, one should at least wait for the second wave in order to correct the imputation of figures that are missing in the first wave on the basis of longitudinal data.

- Fourth, the random selection of the panel households from the DSP cannot be regarded as a correct method, for the DSP consists of households that were previously in the microcensus, which was a random sample, and have agreed to take part in further surveys. As only about one tenth of the microcensus households did agree to a further survey (compared with about 50% actually taking part in a new random sample) there is a great and *permanent* risk of distorted selection, and it is very unlikely that this can be removed by any reweighting process. At least this applies to the many variables that cannot be included in the reweighting.

- Fifth, the composition of the German panel does not allow a methodologically correct calculation of random sample errors and confidence intervals, at least in the first three years;[6] for this requires the assumption that the households in the quota sample parts were also randomly selected, which is not tenable. The unknown distortions caused by basing the selection process for the random part-panel on the DSP could also hinder the accurate identification of random errors in the samples.

---

[6] But in Statistisches Bundesamt (2006) this is done.

- Sixth, the extrapolation using an income variable based on the microcensus could cause problems, as in these statistics the net monthly incomes are only requested by income class, while the EU-SILC gives detailed figures on income in the previous year. Moreover, the income questions in the microcensus contain a high "non-response rate", and the figures typically underestimate the level of income. As EU-SILC, unlike the microcensus, aims to calculate the ratios of income poverty, this probably distorts the results for the lower segment in the population.

- Seventh, as so far the extrapolation factors for households and persons have been calculated separately for EU-SILC, using different criteria, there is a danger of inconsistencies. These may balance out on highly aggregated level, but they may cause problems in the consideration of individual cases and small groups.

As a final judgement is not possible ex ante on in how far the data compiled deviates from the data that could have been compiled in ideal conditions, ex post consistency checks are needed as a second level of quality control. Let us now consider these.

4. An ex post consistency check of the German EU-SILC contribution and of SOEP with the help of the microcensus

First let us compare EU-SILC with similar samples as the first form of ex post consistency check. As a basis we will use the microcensus (MC), which is a random sample. Whether its random

properties are actually present in every aspect will not be examined here. Although the microcensus is a survey in which the provision of information is compulsory, so that there cannot be any total refusals, there are "missing values". Moreover, about 20% of the individual responses are proxy interviews, in which the information was given by other members of the household for a member who was not present That naturally leads to inconsistencies, and as a result the Socio-Economic Panel (SOEP), which is based on a random selection, is used as a supplement as it is on principle also a random sample. On principle one can carry out an ex post consistency check for all the variables contained in all the three samples, for which one can suppose a priori that there is a relation to the poverty ratios and other Laeken indicators. However, in our example we will limit ourselves to the nationality of the persons, the age of the members of the household, the level of education and the employment status.

The first comparison should clarify whether persons of foreign nationality living in Germany are suitably represented. Table 1 below compares selected results from the microcensus with the corresponding results in EU-SILC and SOEP.

Table 1:

Differences between the Microcensus (MC), EU-SILC and SOEP in Showing the Nationality of Over-16s

- Shares in % -

Nationality	MC	EU-SILC	SOEP
German	91.3	90.5	92.8
- Turkey	2.1	(0.8)	2.6
- Old EU South [1]	1.5	(0.9)	1.4
- Old EU West/North + CH [2]	1.0	3.4	1.1
- New EU	0.6	(1.4)	(0.3)
- Rest of Europe	1.8	(1.6)	1.1
- Others	1.6	(1.5)	0.7
All foreigners	8.7	9.5	7.2

Figures in brackets = low number of cases

[1] Spain, Greece, Italy, Portugal

[2] The microcensus includes the Baltic states and Malta, Slovenia and Cyprus

Sources: SOEP 2005, Microcensus 2005 (SUF), EU-SILC 2005 (data access for guest researchers in the Federal Statistical Office Research Data Centre), calculations by W. Strengmann-Kuhn.

It can be seen that the share of foreigners in EU-SILC is actually higher than in the microcensus, while in SOEP it is slightly lower. This overstatement of the share of foreigners in EU-SILC is mainly due to the over-representation of the share of foreigners from the old northern EU countries, while Turks in particular are greatly under-represented. Foreigners from the old southern EU states are

also under-represented. This result confirms the suspicion that the survey method using only postal questionnaires is not suitable to give a representative picture of poorly integrated foreigners.

A second comparison is of the composition of the population by age of the members of the household. The background to this consistency check is the particularly high percentage of children in poverty, which is frequently mentioned and is also reflected in the administrative statistics on social assistance and Unemployment Benefit II. Table 2 shows the results. We see that small children up to the age of four are clearly under-represented in EU-SILC, while they are slightly over-represented in SOEP compared with the microcensus. Persons aged between 55 and 79 are clearly over-represented in EU-SILC while the age structure in SOEP shows only slight deviations from the microcensus. As age is one of the variables used to calculate the weighting of persons in EU-SILC[7] these deviations are particularly in need of explanation. And they can also clearly distort the poverty ratios calculated.

---

[7] Statistisches Bundesamt (2007), p. 24

Table 2:

Differences between the Microcensus (MC), EU-SILC and SOEP in the Age of Household Members

- Shares in % -

Age groups	MC	EU-SILC	SOEP
Up to 15	14.6	14.4	15.4
- up to 4	3.8	2.9	4.3
- 5 to 9	4.8	4.8	4.8
-10 to 15	6.0	6.7	6.3
16 to 24	11.0	10.7	10.6
25 to 39	20.1	18.5	20.2
40 to 54	23.2	23.5	23.1
55 to 69	18.6	21.1	18.6
70 to 79	8.5	9.3	8.2
80 and over	4.1	2.5	3.9
Total	100	100	100

Sources: SOEP 2005, Microcensus 2005 (SUF), EU-SILC 2005 (data access for guest researchers in the Federal Statistical Office Research Data Centre), calculations by W. Strengmann-Kuhn.

In the third comparison we consider the structure of the population as a whole by level of education. As incomes and other variables (e.g. health) are correlated with the level of education an inappropriate structure of the population classified according to level of education in EU-SILC would be an indication that the poverty ratios and other Laeken indicators are probably distorted. Table 3 shows considerable under-representation of the lowest education category in EU-SILC, i.e., persons who attended school only up to the age of 15 but did not obtain a certificate of graduation, while this group is over-represented in SOEP. By contrast, persons with high educational qualifications (technicians, holders of a master craftsman's degree, university graduates and holders of a Ph.D.) account for 32.8% in EU-SILC compared with only 20.5% in the microcensus. SOEP also shows a discrepancy from the microcensus, but it is clearly less. These two distortions in the EU-SILC sample may be expected to have a noticeable effect on the poverty ratios calculated and other Laeken indicators.

Table 3:

Differences between the Microcensus (MC), EU-SILC and SOEP

in Level of Education (only persons aged over 16)

- Shares in % -

Level of Education	MC	EU-SILC	SOEP
ISCED 1 (elementary sch./no certificate)	3.2	1.9	4.4
ISCED 2 (main/comprehensive school, no vocational training	20.6	15.2	16.9
ISCED 3 (Abitur* or vocational training)	49.5	41.8	45.7
ISCED 4 (Abitur plus vocational training etc.)	5.3	6.5	5.3
ISCED 5 (technician, master craftsman's degree, university graduate)	19.5	31.6	23.8
ISCED 6 (Ph.D.)	1.0	1.2	n.a.
No information	1.0	1.8	3.9
Total (only over-16s)	100.0	100.0	100.0

*Abitur = 13 years of schooling; leaving certificate is university entrance qualification.
Sources: SOEP 2005, Microcensus 2005 (SUF), EU-SILC 2005 (data access for guest researchers in the Federal Statistical Office Research Data Centre), calculations by W. Strengmann-Kuhn.

In the last few years the problem of poverty despite employment, that is, the working poor as they are known, has grown in importance. Hence employment and the income derived from it need to be shown as precisely as possible. The EU-SILC results are puzzling here. Table 4 shows that EU-SILC gives a much lower share of households in which the head is working than the microcensus or SOEP, despite the very broad definition of employment by the ILO criteria. The counterpart is a share of

households with a head who is classified as "otherwise not employed" that is four times greater than that shown in the microcensus. A similar discrepancy appears in employment calculated on individual level. Clearly such differences also cause distortions in several Laeken indicators. It is urgently necessary to examine whether differences in definition are playing a part here, or whether there is indeed crass under-representation of working households.

Table 4:

Differences between the Microcensus (MC), EU-SILC and SOEP

in the Employment Status of Heads of Households

- Shares in % -

Employment status of head of household	MC	EU-SILC	SOEP
Employed[1]	53.2	44.2	53.7
- self-employed	6.6	4.6	5.9
- in employment	46.7	39.6	47.8
Unemployed[2]	7.5	7.0	7.2
- with unemployment benefit/assistance	5.7	4.8	4.9
- No unemployment benefit/assistance	1.8	2.2	2.3
Retired[3]	27.3	27.7	26.3
Otherwise not employed	11.9	21.1	12.8
Total	100.0	100.0	100.0

[1] Employed at time of survey, ILO definition
[2] EU-SILC, MC: ILO definition, SOEP: Not employed and registered as unemployed; drawing unemployment benefit or assistance: SOEP, EU-SILC in previous year, MC at time of survey.
[3] EU-SILC: Stated "retired" and drawing a retirement or invalidity pension and/or aged > 65; MC: Not employed and drawing a pension and/or aged > 65; SOEP: not employed and aged > 65.
Sources: SOEP 2005, Microcensus 2005 (SUF), EU-SILC 2005 (data access for guest researchers at the Federal Statistical Office Research Data Centre), calculations by W. Strengmann-Kuhn.

Other deviations in EU-SILC not shown in a Table here are a home ownership ratio which is clearly too high by comparison with SOEP and the EVS. Another implausible result derived from EU-SILC is that the poverty ratio of couples without children, and where both are under 65, is higher, at 10.4%, than the poverty ratios of couples with one child (8.2%), couples with two children (6.4%) and couples with three and more children (8.9%).[8] The results of the EVS given in the Second Poverty and Wealth Report, and the ratios of recipients of social assistance, give a picture of ratios of poverty or of recipients of benefits that increase with the number of children.[9] Distorted results on group-specific poverty ratios based on EU-SILC can thus be misleading for social policy as well.

These few results of comparing EU-SILC with other samples given here already show the importance of the first form of ex post consistency checking as a component of quality control.

The second form of ex post consistency checking consists of a comparison with administrative statistics. Examples have already been cited at the start of this paper. For EU-SILC a comparison with the following statistics would appear to be essential:
- the statistics on social assistance, and on recipients of Unemployment Benefit II;

---

[8] Statistisches Bundesamt (2007), p. 10.
[9] Bundesregierung (2005), pp. 62, 85, 110

- housing allowance statistics

- the Federal Vocational Training Promotion Law statistics

- studies on households in receipt of a pension (ASID studies);

- income tax statistics.

Naturally, there are difficulties in making such comparisons because terminology and survey methods differ, but these should be overcome as far as possible, or at least their significance estimated. Household samples can, in fact, also be regarded as an element linking many individual statistics, and they can perform a cross-sectional function, providing stimulus in all directions.

The third form of ex post consistency checking consists of a comparison with aggregates of the national accounts. Aggregated amounts, derived from the sample should be compared with the respective amounts found in the national accounts:

- the wage bill

- the sum of incomes from entrepreneurial activity and property

- the sum of transfer payments received, if possible split up into pensions paid and other transfers

- the sum of wage and income tax payments

- the sum of disposable incomes in the household sector (without non-profit organisations).

5. *Conclusion*

EU-SILC will be one of the most important sources of statistical data for the future Reports on Poverty and Wealth by the Federal Government and for the comparison of Germany's position with those of other EU member states in the "open method of coordination". Hence this sample needs intensive quality control to ensure data quality. Ex ante quality controls already indicate significant problems in data quality. But the ex post consistency checks presented here also indicate striking differences from other standard surveys like the microcensus and SOEP. So the question arises what consequences should be drawn from the results of the ex post consistency check. There can be two types of consequences:

Firstly, for important variables in the results - and on principle for all the Laeken indicators as well - sensitivity analyses can be carried out in order to establish the direction and rough extent of the distortion. However, these analyses can always only be made for one over- or under-representation of population groups or variables in isolation; the relation between the variables and multi-distortions does not appear.

Secondly, the much more significant consequence is to be seen in that repercussions occur on the first level of quality control - at any rate it is to be hoped so. For the ex post consistency check provides definite evidence of where the selection methods, survey methods

and extrapolation processes can be modified, in a permanent process of improving the German part of EU-SILC, so that the results meet the high quality requirements appropriate for so important a sample. The principal requirement of permanent efforts to improve the surveys naturally also applies to the EVS and SOEP, as well as to the obligatory survey for the microcensus.

Literature

Becker, Irene, Joachim R. Frick, Markus M. Grabka, Richard Hauser, Peter Krause and Gert G. Wagner (2002): A Comparison of the Main Household Income Surveys for Germany: EVS and SOEP. In: Hauser, R. and Irene Becker (Eds.): Reporting on Income Distribution and Poverty. Perspectives from a German and a European Point of View. Springer, p. 55-90.

Bundesregierung (2005), Lebenslagen in Deutschland. Der 2. Armuts- und Reichtumsbericht der Bundesregierung, Bonn.

Eurostat (2007), Comparative EU Statistics on Income and Living Conditions: Issues and Challenges, Proceedings of the EU-SILC Conference (Helsinki, 6-8 November 2006), Luxembourg

Statistisches Bundesamt (2006), Armut und Lebensbedingungen. Ergebnisse aus LEBEN IN EUROPA für Deutschland 2005 (Presseexemplar), Wiesbaden

Statistisches Bundesamt (2006), Qualitätsbericht Gemeinschaftsstatistik über Einkommen und Lebensbedingungen (LEBEN IN EUROPA), Wiesbaden

Statistisches Bundesamt (Federal Statistical Office) (2007), Quality Report on EU-SILC 2005, Final Report Germany, Wiesbaden

Strengmann-Kuhn, Wolfgang (2007), Ein Vergleich der Ergebnisse auf Basis von EU-SILC für 2005 mit denen auf Basis des Sozio-oekonomischen Panels für 2005, Frankfurt (still unpublished manuscript)