

A Comparative Study of the Quality of Income Statistics Based on Interview Surveys and/or Administrative Records

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1. Introduction

During recent years we have witnessed a growing interest in comparative income distribution analysis. The creation of new, secondary cross-national data-sets, like the Deininger-Squire data-set at the World Bank, has made it possible to study e.g. the relationship between inequality and growth and to test hypotheses concerning the convergence of inequality across nations. The establishment of the Luxembourg Income Study (LIS) in 1983 was a significant step forward in providing reliable and harmonised micro-data for cross-national comparisons (Atkinson et al, 1995).

As a reaction to the urgent need for reliable information about the changes in living conditions of households in the EU-Member States, Eurostat launched in 1994 a new input harmonised panel survey called the European Household Panel Survey (ECHP). The ECHP -data can be assumed to further increase the interest in cross-national comparisons of income inequality, poverty, welfare etc. Thus, it seems appropriate to more generally analyse the quality of survey-based income data. In this study, we will look at what administrative data can tell about the reliability of the ECHP data. The empirical part of our study is based on data from the Finnish ECHP (FECHP) in 1996-1997 and on information available from Finnish statistical registers. However, it seems obvious that most of the results can be generalised to concern the quality of income surveys in general.

2. Quality of data from income surveys

Most statistics on income are based on income or expenditure surveys. During recent years there has also been a significant improvement in the availability and reliability of income data as many countries have made considerable investments in improving the quality of existing surveys and in starting new ones.

The ECHP forms a component of a co-ordinated system of household surveys to produce comparable social statistics at the EU level. It was designed in close co-operation by the Member States to provide a harmonised set of tools for all stages of implementing the survey. The first wave of this panel study in 1994 included all the then twelve Member States. In Finland, the ECHP has been conducted yearly by Statistics Finland since 1996. The panel will stop in 2001.

Most income surveys (incl. the ECHP) are today based on probability sampling. Thus, by choosing a suitable sampling strategy it is possible to keep the sampling errors at an acceptable level. What generally is much more problematic is to evaluate the effect of the so-called non-sampling errors. Of the many types of non-sampling errors that are typical of sampling surveys in general, the following seem to be the most important in income and expenditure surveys:

- Coverage

- Measurement errors
- Non –response and attrition

Coverage

In most surveys, the available sampling frame determines the population. Thus, surveys can be based on, for example, population registers, postal address registers or electoral rolls. If the sampling frame consists of persons, while the unit used in the survey is a household, the final sample is usually defined to consist of all those households of which at least one member is included in the basic sample. Of course, if the unit on which data are collected is a household, persons who do not belong to any household (in the usual sense) are excluded by definition alone. It is also quite common that people who are especially difficult to interview, are not included in the sampling frame. This often means that, for example, homeless and institutionalised persons are excluded. Obviously, this can have serious consequences to estimates of the level of poverty in the country, and may, of course, also invalidate cross-country comparisons.

In the ECHP the target population includes all private households throughout the national territory of each country.

In Table 1 we make a comparison between the sampled and non-sampled FECHP populations using data from the population register.

Table 1 FECHP 1996: Sampled and Non-sampled population

Population	Sampled population	Non-sampled population
Total size	5 063 368	68 952
Gender (%)		
Male	48.7	48.6
Female	51.3	51.4
Age(%)		
0 – 14	19.0	8.1
15 – 64	66.8	52.8
65 -	14.2	39.1
Yearly income (FIM 1,000)		
Earned income		
Age 15 – 64	73.3	24.3
65 -	2.1	0.1
Taxable income		
Age 15 – 64	94.1	45.3
65 -	66.8	42.7

The size of the non-sampled population is quite moderate, so even if there are structural differences, under-coverage does not seem to be a problem where Finland is concerned.

Measurement errors

Income surveys seem to be especially prone to measurement errors (Gottschalk and Smeeding, 2000, 264-271). There are several reasons for this. The respondents may have difficulty to understand the terminology used in the questions, for example the difference between gross and net income. If the question concerns e.g. the monthly income a year ago they may simply not remember the correct amount. The respondents may also deliberately give wrong answers if they, for example, have income from the black economy or other income that for some reason has not been declared to the tax authorities. We may, of course, also have interviewer effects in the answers.

There seems to be a common understanding that income is generally under-reported, i.e. that there are errors and that they do not cancel out at the aggregated level. Under-reporting seems to be especially high for government transfers, property income and self-employment income, while

wages and salaries are generally well reported.

It is easy to see that the effect of measurement errors on estimates of e.g mean income, inequality and poverty may be wildly different depending of the distributional properties of the errors. Thus, observed income may be either more equally or more unequally distributed than true income, depending primarily on how the conditional distributions of measurement errors changes with true income.

In Table 2 we have cross-classified the respondents in the 1996 FECHP sample according yearly equalised disposable cash income as estimated on the one hand from the FECHP data and on the other from data in the statistical registers. Statistics Finland has always relied on registers in producing income statistics. The reason for this is that almost all “legal” economic transactions involving individuals are registered somewhere and can be “personalised” via the so-called central personal identification numbers (PIN). The main reason for not relying completely on register information is that interviews still seem to be the only way to get up-to-dat information about the size and structure of households and the economic activity of the household members.

As the statistical registers have generally proved to be very reliable it seems reasonable to interpret possible differences between the register information and survey information on income as being generally due to measurement errors in the survey data. Even if in some cases we have to slightly redefine the ECHP -variables in order to find the same variables in the registers, this does not have any significant effect on the results.

“Interview income” is defined as the unadjusted sum all incomes reported by all member of the household during the interviews. In calculating the equalised incomes we have used the modified OECD scale.

Table 2 FECHP 1996: Individual equalised disposable cash income in 1995 for the respondents according to interviews and registers (unweighted observations)

Register income (FIM 1,000)	Interview income (FIM 1,000)						Total
	Income class	0 – 50	51 – 100	101 – 150	151 – 200	201 -	
0 – 50		1234	536	15	9	5	1799
51 - 100		1605	4859	412	47	4	6927
101 - 150		242	639	930	115	34	1960
151 – 200		19	67	111	97	40	334
201 -		26	17	40	45	66	194
Total		3126	6118	1508	313	149	11214

We note a tendency for under-reporting in all income brackets. How much of the differences can be eliminated by appropriate imputation and weighting techniques is a question for further research.

Non-response and attrition

Income surveys are often characterised by relatively high non-response rates. In Table 3 we compare the income distribution of the respondents with that of non-respondents in the 1996 FECHP using in both cases register data and weighted observations (household non-response rate= 27 %). The weights are the original base weights, i.e. the weights that would have been used if there had been no non-response.

Table 3 FECHP 1996: Distribution of individual equalised disposable cash income among respondents and non-respondents in 1995 (base weights), %

Individuals	Register income (FIM 1,000)					Total
	0 – 50	51 – 100	101 – 150	151 – 200	201 -	
Respondents	21.6	59.1	15.3	2.4	1.6	100 n = 3 737 137
Non-respondents	20.4	43.7	23.6	7.8	4.5	100 n = 1 337 188

Non-response is clearly concentrated to both tails, especially to the right tail.

As ECHP is a longitudinal survey, it is also important to analyse the attrition effect. The availability of the register information makes it possible to also compare the income distribution of the attriters with that of the respondents. In Table 5 we make a comparison between the respondents in 1997 with the same year attriters, e.g. the household that participated in the first wave, but not in the second (household attrition rate = 6 %)

Table 4 FECHP 1997: Distribution of individual equalised disposable cash income among respondents and attriters in 1996 (base weights), %

Individuals	Register income (FIM 1,000)					Total
	0 – 50	51 – 100	101 – 150	151 – 200	201 -	
Respondents	17.1	58.8	18.8	3.4	1.9	100 n = 10 886
Attriters	23.4	34.4	22.3	10.2	7.1	100 n = 1 458

Again we have a clear under-representation of both tails among the respondents.

Thus, it seems clear that the process causing missing observations is far from ignorable.

3. Conclusions

Obviously measurement errors and non-response/attrition may have profound effects on survey-based income statistics. The effects of non-response and attrition can be partly eliminated through imputation and re-weighting procedures. The availability of reliable register information is of course of great help in this respect. Another, ethically more controversial solution is to also include the non-respondents in the sample, using purely register information for them. The treatment of measurement errors is more problematic and an area for further research. Clearly, if reliable and comprehensive registers of all income items of interest are available there is no need to interview people about their income. However, if the registering is deficient in respect of some transactions, the best strategy might be to use register information for some income items and survey data for others. Alternatively one could interpret both survey income and register income as just indicators, using some kind of latent variable methods to estimate the unobservable “true income”. The combined use of both registers and surveys may of course be quite expensive, so the gains in quality have to be weighed up against risen costs, as always. Even if there is a clear trend towards more extensive use of registers, we also need more reliable techniques for interviewing people about their income. Micro-level studies of the effects of various imputation and re-weighting procedures are also important.

REFERENCE

Atkinson, A., Rainwater, L. and Smeeding, T. (1995). Income Distribution in OECD Countries. Evidence from the Luxembourg Income Study. OECD. Paris.

Gottschalk, P. and Smeeding, T. (2000): Empirical Evidence on Income Inequality in Industrial Countries. In: Handbook of Income Distribution (A. Atkinson and F. Bourguignon, eds.), 261-307. Amsterdam. North-Holland. Amsterdam.

RESUME

Dans cette enquête nous regardons ce qui les données administratives peuvent témoigner de la fiabilité des données de l'ECHP (European Household Panel Survey). La partie empirique de l'enquête se base sur les données de l'ECHP finlandais de 1996 à 2000 et sur les renseignements disponibles dans les registres statistiques finlandais.