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LIS Micro-Data and National Accounts Macro- Data Comparison: Findings from wave I - wave VIII

Miri Endeweld and Paul Alkemade

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Introduction

Statistical data on incomes of the household sector is available both from National Accounts, and from household surveys. When focusing on individual household's financial situation, the first choice is a household income survey (micro level data). Summing up all individual household incomes gives an aggregate for all surveyed households in the country. Once inflated to the total population size, this aggregate can be compared with results from the National Accounts (NA): the macro level outcomes for the Household Sector. Theoretically, one might think that these two outcomes should match since they measure the same phenomenon. In practice however, the results differ to various extents. In recent years, there is a growing interest in understanding how the two different angles relate.

One of the triggers for the growing interest was the appointment of the *Commission on the Measurement of Economic Performance and Social Progress* (CMEPSP), better known as the Stiglitz-Sen-Fitoussi commission. This commission's aim was manifold: to examine the limitations of Gross Domestic Product (GDP) as indicator of economic performance and social progress, to move beyond measures of production and shift towards measuring well-being, and to find out what other statistical information might be available for the production of more relevant indicators of social progress. In the 2009 Report¹, the Commission argues that due to inequality, average measures like per capita GDP are an insufficient measure for individual well-being. One of the recommendations is to combine several dimensions (micro, macro, income, consumption, wealth, etc.) in order to improve indicators of living standards.

Reconciling micro and macro information

In 2011, the OECD picked up on the recommendations of the Stiglitz-commission by hosting several Expert Groups. One of the Expert Groups "Measures of Disparities in a National Accounts framework" (EG DNA), jointly organized by the OECD and Eurostat, focused on enhancing the consistency between micro and macro information. The main goals were to propose improvements for the compilation of the Household Sector Accounts by making better use of micro data, to propose a breakdown of the Household Sector into socio-demographic groups, as well as to propose disparities indicators consistent within the framework of the NA. In order to achieve these goals, it was necessary to first take stock of the current practices for data compilation. To prepare the integration of micro and macro data, experts from countries participating in the Expert Group were asked to complete a rather detailed questionnaire,

¹ http://www.stiglitz-sen-fitoussi.fr/documents/rapport_anglais.pdf

comparing component by component, micro and macro data available in their countries for income, consumption and wealth. Starting from a list of transactions according to National Accounts definition, experts looked for similar information in micro data. This exercise was carried out throughout 34 OECD-countries, of which 20 countries actively participated in the EG DNA. Bringing together specialists in the field of macro and micro statistics was considered a unique opportunity to not only gain insight in the limitations of the data compiling process, but moreover to explore ways to improve the consistency of the two sources. Also, having experts from so many different countries made it possible to discuss the diversity in NA compilation practices across countries, mainly the diversity between SNA93, ESA, U.S. , Canada and other country-specific methods.

The preliminary results of the EG DNA were first presented at the 2012 meeting of the IARIW in Boston², and recently the final paper was made available at the OECD website as number 52 in their Statistical Working Paper series³. The paper measures the extent to which estimates from the relevant micro and macro datasets line up. In examining discrepancies between micro and macro estimates, the paper offers valuable information for compilers and for national and international organizations by identifying possible measurement issues. This, in turn will be useful in assessing and improving the quality of micro and macro sources.

Micro-macro comparisons

Whenever comparisons were presented, the EG DNA examined one single point in time per country, mainly focusing on the most recent data available. The comparisons were done “in house” by the respective data providers. This enabled in-depth analyses of the compilation process, and allowed to explore conceptual differences in detail.

In this paper, the Luxembourg Income Study database is being used for micro-macro comparisons. Being a “secondary” database this does not allow for the same approach as the data providers since we lack the detailed information from first hand on the compilation process. Therefore, this paper takes another approach. This work does not attempt to explain the difference between NA and LIS aggregates but only to report them. National Accounts

² <http://www.iariw.org/papers/2012/FesseauPaper.pdf>

³ http://www.oecd-ilibrary.org/economics/oecd-statistics-working-papers_18152031

numbers are not necessarily considered the “truth” nor vice visa. The gaps may derive from the differences in concepts, definitions etc. as pointed out in the EG DNA paper.

During 2010, a first set of comparisons was carried out using LIS data from the mid-nineties from four countries. The results were presented in an earlier LIS Technical Working Paper by Törmälehto⁴. Building upon this exercise, we now expand the scope to using the entire LIS database and compare as many data points as possible to the National Accounts. This results in having comparisons for nearly 200 datasets from 34 different countries, covering a time-span of four decades. Where the four countries still allowed for a closer examination of the gaps, the strength of the underlying work is the sheer number of micro-macro comparisons. From this number, it will be clear that country specific checks, already very laborious by nature, could no longer be pursued. Instead, a common approach had to be applied, limiting ourselves to standard methods for all comparisons. It has proven very helpful that since 2010 the entire LIS database was updated; now adopting a new template. The main advantage of this template being that only one single variable list exists for all datasets from any wave. As a result, the LIS variable names used hereafter will differ from the 2010 paper, even though the income concepts applied remain by and large similar. The correspondence between old and new LIS variables can be found in Appendix1.

Methodology

In this paper, we compare several LIS household income components at the aggregate level to NA results that are available from international organizations (OECD, Eurostat). The National Accounts are presented in the form of balance sheets containing items received (resources) or items paid (uses). Corresponding items may appear on different sectors of the balance sheets. Wages and salaries for instance show up as payments by employers in sector S1, or receipts by households (sector S14). For those interested in the System of National Accounts, its terminology, the different types and sequences of accounts, we advise to have a closer look at “Understanding National Accounts”, a manual published by the OECD⁵. Our basic choices for how to use National Accounts in terms of the direction of flows, the sector and the income components follow the method outlined by Törmälehto. From the National Accounts, mainly three sectors were used: S1 = Total Economy, S14 = Households, S14/S15 = Households and

⁴ LIS technical paper no 2, LIS and national accounts comparison (2010) , by Veli-Matti Törmälehto, <http://www.lisdatacenter.org/wps/techwps/2.pdf>

⁵ <http://www.oecd.org/std/na/understandingnationalaccounts.htm>

Non-Profit Institutions Serving Households (NPISH). Theoretically it is preferable to use S14 over S14+S15, as it is closer to the micro data of households. In practice, the international NA databases from OECD or Eurostat have certain countries or income components available only for S14/S15 which forced us to use the data for sector S14/S15. However, since NPISH constitutes a small sector, their inclusion in the household accounts makes little difference to the results. Moreover, compared to the larger conceptual differences in definitions between the micro and macro sources, the use of sector S14/S15 was considered a minor issue.

A specific methodological difference to the previous method concerns the weighting factor: the survey data are now inflated to the entire population and no longer to only the surveyed population. Conceptually, inflating survey data to the same population as the macro data should enhance the comparisons. However, the implicit assumption here is that the characteristics of institutional households which the surveys do not cover are similar to the covered households of the surveys.

The income comparisons are not carried out at the level of total disposable income (aggregate variables like DPI in LIS versus B6N in NA), but instead focus on a reduced number of main income components: Wages and Salaries (WS), Other factor income (OINC), Cash Social Benefits (SB), Taxes (T), Social Security contributions (SCP) and finally the calculated sum of these components above, also referred to as Calculated Net Disposable income. When summing up these categories (i.e. $WS+OINC+SB-T-SCP$), one must bear in mind that the following types of income were deliberately left out from the comparison such as: imputed rent, non-monetary social benefits, inter-household transfers and transfers from non-profit organizations, etc. The reasons why these incomes are excluded from the comparisons were well explained by Törmälehto earlier.

Besides Cash Social Benefits (SB), one finds an additional line marked as SB2. This variable is not part of the summation. It represents a reduced scope of Cash Social Benefits where occupational pensions from the micro data are removed. Depending on the nature of occupational pensions, they may in some countries be classified as transfers while in other countries are considered as capital income. Apart from this, the system of National Accounts may have classified them differently from LIS. In the tables below, comparisons are carried out on SB for any given country. However, whenever the survey aggregates exceed the NA numbers, like for instance in the case of Canada, using SB2 may turn out to be the preferred alternative.

Table 1 below presents the components of the comparison as well as their code in micro and macro data.

Table 1: Compared categories

Name	Label	SNA codes*	LIS variables
WS	Wages and salaries	D11P	HILE
OINC	Other factor income	B3G+D4R-D44R-FISIM	HMILS+HMIC
SB	Cash Social Benefits	D62	HMITS
of which SB2	Cash Social Benefits2	D62	HMITS-(HMITSILMIP+HMITSILO)
T	Taxes on Income and Property	D5	HMXITI+ HMXOTP
SCP	Social Contributions Paid	D6112+D61131	HMXITS
NDI	Net Disposable Income	sum of above	sum of above

*The *System of National Accounts* (the last one is SNA 2008) is the framework which all countries should follow for compiling the national accounts, but in practice there are still a number of differences between the national implementations and the SNA mainly in non-European countries.

Table 2 below shows in detail how the compared categories were constructed from NA data and LIS data.

Table 2: Detailed calculations made on LIS and NA databases to achieve the aggregates

Category	LIS income	Description	NA corresponding aggregate	Description
WS	HILE	Paid employment Income	D11P	Wages and salaries Paid, Sector 1 (Total economy)
OINC	HMILS+HMIC	Self-employment income & Capital income	B3G+D4R-D44R-FISIM:	Other factor income:
	HMILS	Self-employment income	B3G	Gross mixed income , Sector 14
	HMIC	Capital income	D4R	Property Income, Sector 14/15
			D44R	Property income attributed to insurance policy holders, Sector 14/15
			FISIM	FISIM correction=D41-D41g
			D41	Interest received, sector 14/15

Category	LIS income	Description	NA corresponding aggregate	Description
			D41G	Total interest before FISIM allocation, S14/15
SB	HMITS	Social security transfers	D62	Social benefits other than social transfers in kind, received, sector 14
SB2	HMITS-HMITSILMIP-HMITSILO	Social security transfers excl. private and public occupational pensions	D62	Social benefits other than social transfers in kind, received, sector 14
T	HMXITI+HMXOTP	Direct taxes	D5P	Current taxes on income, wealth, etc., paid
	HMXITI	Income taxes		
	HMXOTP	Property taxes		
SCP	HMXITS	Social Security contributions	D6112+D61131 = D61-D12R	Employees social contributions paid
			D6112*	Employees social contributions paid
			D61131*	Mandatory social cont. paid by self- and non-employed persons
			D61	Social contributions (employees + employers), s14/15, paid
			D12R	Employers' social contributions
NDI	WS+OINC+SB-T-SCP		sum of above	

*No longer separately available in the LIS datasets.

Data sources

Comparisons could only be carried out for those countries and years that were available both in LIS and NA databases. This limited the comparisons to data from OECD countries only. The time-series was limited at both ends, starting from the early nineteen-eighties in NA databases until income reference year 2010 for the most recent datasets that were added to LIS during 2013.

National accounts data sources

The two main sources for the macro data were the databases of the OECD⁶ and Eurostat⁷. The OECD database includes data and metadata for OECD countries and selected non-member economies in a variety of themes. Eurostat data is similar, but only for the European countries.

When detailed data about non-financial accounts by sectors was not available in the OECD database, we used the less detailed data from the “simplified non-financial accounts” (as of now it does not include data for s14-households separately). In these cases, which are relevant for example to Canada and part of USA datasets – we used “D1p: Compensation to Employees” (sector 1) for WS; SD61R_D62R: Social contributions and benefits other than social transfers in kind, (sector 14/15) for SB; SD5P: Current taxes on income, wealth etc. (sector s14/15) for T. Using data from the combined sector s14/15 as kind of compromise is considered more preferable than registering missing values in the results.

In summary, the preferred NA data sources were in the following order: (1) the detailed OECD database (2) the Eurostat database (3) the less detailed data from the OECD. The detailed table which indicates the NA data source used for every LIS dataset appears in appendix 2.

LIS datasets

LIS collects and harmonises micro datasets from upper and middle-income countries. The datasets are available to researchers world-wide⁸. For our purposes it should be noted that part of the datasets are “**Net**” i.e. the wages and salaries net of income taxes and social contributions. This can affect then the comparison because the values of WS (Wages and salaries) are likely to be systematically downward biased and the values for the T (taxes) component are usually missing or meaningless and therefore could not be comparable with the corresponding NA components⁹. Survey data often comes with a certain percentage of non-response. As a result LIS income variables contain missing values, except when the non-response was imputed by the national data collection units. This in general constitutes another downward bias in aggregated micro data.

⁶ URL: <http://www.oecd-ilibrary.org/statistics> , then choose OECD.stat--National accounts--Annual national accounts—Non--financial accounts by sectors) (as of June 2012)

⁷ URL: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database , then choose Database by themes—Economy and Finance -- Annual sector accounts (nasa) (as of June 2012)

⁸ URL: <http://www.lisdatacenter.org/>

⁹ Information about net/gross LIS datasets appeared in: <http://www.lisdatacenter.org/our-data/lis-database/datasets-information/>

Normally, LIS amounts are stored in national currency. The amounts found in the OECD and Eurostat databases for countries within the Euro-zone are expressed in Euro. To render the two data sources comparable, one main adjustment has been done to the LIS data: all countries were brought to the base of the same currency, meaning that the historical currencies in the LIS datasets were converted to Euro.

Findings

After adjustments and calculations were made, we could get the “Coverage Rate” (CR) defined as the ratio of the LIS aggregation divided by the corresponding NA aggregation. In the Ideal case this CR should be close to 100%, indicating that the two aggregations are comparable. In reality the picture varies widely between countries and between the different key figures, and can range from 10% to 300% in the extreme cases¹⁰.

Table 3 below introduces several other main statistics: the number of comparable cases (out of the entire LIS datasets up to now), minimum and maximum of the CR’s, and the STD which teaches us about the dispersion of the rates between the cases (a same summary table for 1-6 waves is presented in appendix 3.1). As can be seen, the data on wages and salaries or social benefits is available more often than the other components. The data for “other factor income” (based on self-employment income and income from interest) is also available in relatively many cases, but the ratio is very low while the standard deviation is the highest, reflecting the difficulty of the computation and the low quality of those components both in the micro and macro data.

The chart after table 3 presents average CR’s for each compared category in the two last LIS waves, in the last LIS waves (7+8) compared to waves 1 to 6¹¹ and to the aggregations in the net/mixed LIS datasets. It could be seen that on average, wages and salaries in the micro data - LIS wave 7+8 as well as LIS 1-6 waves - represent nearly 80% of the total wages and salaries as they appeared in the NA data. However as expected, the average for this item when looking in the net LIS datasets shows a significant gap and is around only 60%.

Table 3: Summary of the findings by categories, LIS Wave 7-8*:

Category	Number	Coverage Rates (CR)
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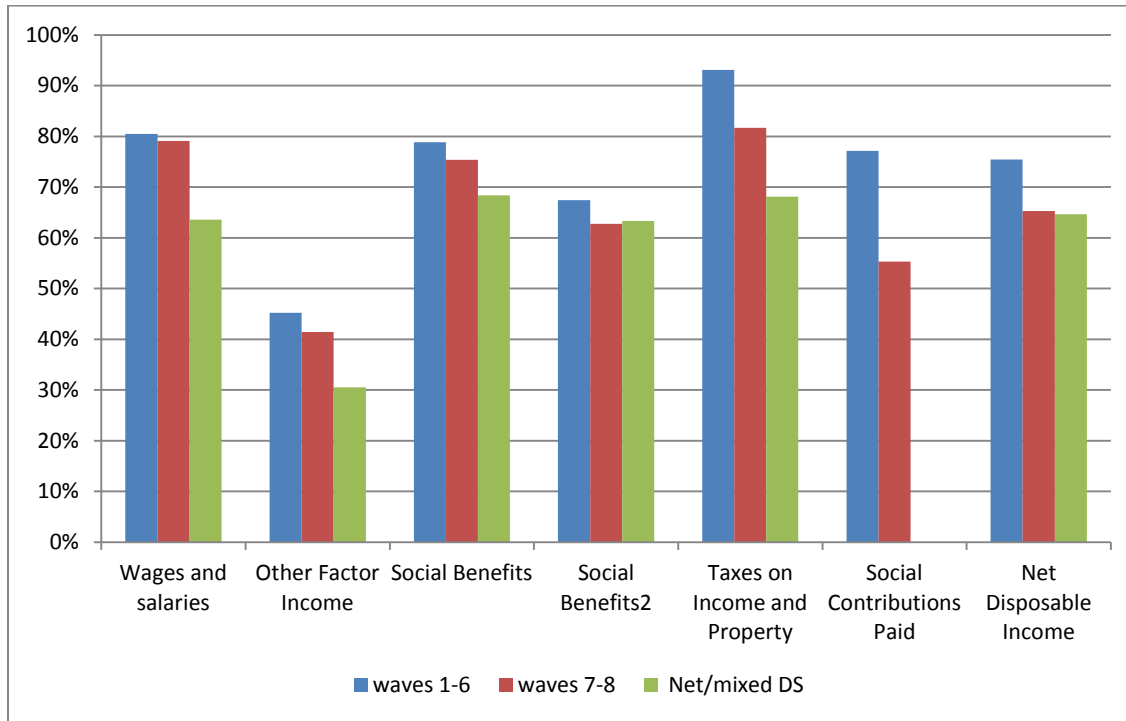
¹⁰ In the few cases (15 out of 640) when the ratios were less than 10% and more than 300% the ratios were omitted from the aggregative calculations. (see also appendix 4).

¹¹ With the exception of several figures detailed in the first note to appendix 4.

	of cases	Average	Minimum	Maximum	Standard Deviation
Wages and salaries	22	78%	59%	100%	14%
Other Factor Income	18	41%	15%	86%	20%
Social Benefits	22	75%	49%	114%	16%
Social Benefits2	20	63%	36%	90%	16%
Taxes on Income and Property	12	82%	58%	108%	18%
Social Contributions Paid	8	60%	24%	84%	22%
Net Disposable Income	14	65%	45%	90%	13%

*Parallel summary for all former waves are shown in appendix 3.

Chart: Average Coverage Rates of compared categories (LIS/NA), for waves 1-6 LIS datasets, Waves 7-8 LIS datasets and net/mixed LIS datasets*



*For the net datasets, the “social contributions paid” column was omitted from the chart due to only one observation with available data.

The same trend exists for the other compared aggregates: the average of the net datasets is always lower than the two other displayed groups (apart from the case of the DPI which is deducted from direct taxes).

The highest average ratio is of the direct taxes when based on all 1-6 LIS waves – more than 93%, compared to about 82% for 7+8 waves and 65% in the net datasets. It should be

mentioned that in those net datasets there were a relatively small number of cases in which the micro data on taxes were available (9 out of 31 and only 1 case of available social contribution data, as it can be seen in appendix 3.2 presenting the statistics for this group).

Social benefits and Social contributions paid also represent 80% of the corresponding NA incomes when considering waves 1-6, which based on a number of observations is more than five times higher than the number in the last two waves, and is based also on more updated NA data. It should be noted that in the two last LIS waves there were no net datasets (up to now). In these two waves, and also as it can be seen from the table, the standard deviation is generally lower than the parallel statistic for the waves 1-6. These findings are perhaps indicating a trend of improving data over time.

All Wave 7+8 CR's figures are detailed by country and year in table 4 below, and the figures for all LIS datasets are shown in appendix 4. As mentioned above, in the 7+8 LIS waves, countries that used to supply net datasets made changes in their micro statistics in the right direction, and started to supply gross datasets, a trend that benefits the micro-macro comparison. However for some reason in these countries (like Italy or Luxembourg) the ratios for wages and salaries are still low relative to other countries¹². However it should be remembered that for some datasets we used the "simplified OECD data" where the "wages and salaries" component actually represents "compensation to employee" which is systematically higher and therefore the data for this aggregate is upward biased in several cases (like the case of Canada, and see also the full list of the NA data source for every LIS dataset appeared in appendix 2).

Luxembourg has relatively high ratios for the problematic component of the "other factor income", and Greece, Japan, South Africa and the United States have a low ratio for the social benefits, while the taxes as usual shows relatively high coverage rate in almost all the cases in the table. The calculated net disposable income moves between 45% in Italy 08 to 89%-90% in the two cases of the UK.

¹² Despite the transition to "gross" dataset in Italy, this only applies to total gross income (LIS variable HI) whereas the component for wages and salaries (HILE) remained net.

Table 4. Detailed findings, LIS wave 7+8*

Country/Year	Wages and Salaries	Other Factor Income	Social Benefits	social Benefits2	Taxes on Income and Property	Social Contrib. Paid	Calc. Net Disposable Income
CA2007	84%		114%	70%	76%		
DE2007	67%	36%	93%	78%	108%	82%	
ES2007	90%	23%	75%	72%			69%
GR2007	100%	42%	64%	61%			59%
IE2007	70%	74%	100%	81%	70%	15%	
IT2008	61%	35%	65%	64%	83%	74%	45%
JP2008	74%		49%	37%	58%	52%	
LU2007	68%	65%	90%	90%			70%
SK2007	93%	15%	74%				64%
UK2007	91%	47%	75%	51%	59%	44%	89%
US2007	94%	26%	60%	49%	77%		60%
ZA2008	59%		64%	43%			
DE2010	62%	35%	91%	76%	107%	76%	
ES2010	80%	24%	70%	66%			66%
GR2010	86%	50%	69%	65%			63%
IE2010	73%	53%	91%	73%	103%	24%	
IT2010	60%	37%	63%	61%	84%	84%	45%
LU2010	64%	86%	85%	84%			68%
SK2010	97%	16%	73%				66%
UK2010	93%	55%	71%	48%	60%	46%	90%
US2010	94%	27%	57%	48%	96%		60%
ZA2010	60%		66%	36%			

*Detailed findings for all LIS waves are shown in Appendix 4.

Summary and future work

In summary, we see a huge variation in coverage ratios. In general, wages and salaries tend to be closer to NA outcomes, while other factor income lines up poorly. The variation and sometimes the unreasonable values of the CR's values can be explained by a variety of factors, beyond the explanations related to the quality of the surveys and of data transferred to the international organizations. There are differences in definitions, concepts, classifications and methods including imputed income issues (like owner occupied housing services), lack of

coverage of several components of income in the survey, population coverage, the treatment of specific population groups like tourists, etc.

Even though we mentioned that this paper will not attempt to explain the difference between NA and LIS aggregates, we would like to highlight one most striking outcome concerning the coverage ratio for income from self-employment. From the IARIW paper as referred to earlier in footnote 2, we would like to cite the following:

“Macro estimates include fraud correction :

The survey on national account compilation practices launched by the EG DNA shows that, in most countries, compilers are using direct sources (surveys or/and administrative sources) to estimate mixed income. Also, most compilers are making an adjustment for deliberately under declared activity affecting the balance item. This adjustment can have a strong impact on the final value. Indeed, five countries report that it represents more than 50% of the final mixed income value.”

Future work could focus on furthering the alignment of micro and macro data sources. Continued improvements and refinement of the methodology we used here might be useful. There are several directions for improvements:

- to go beyond international OECD/Eurostat NA databases and explore national NA figures,
- to look more in-depth into the cases with extreme coverage rates, and try to tailor the comparison towards the country’s specific settings,
- to find ways to deal with missing values in micro data that are causing underestimation of the LIS aggregated sum, possibly by imputing the missing data,
- to convert net LIS datasets to gross amounts to eliminate the NET issue,
- to add other income groupings that take into account lumped incomes in certain household surveys. One could think of an overall category Taxes+Social Security contributions (TSCP) to be filled in-stead of the two separate items when the micro data came lumped that way (this will help eliminate some of the extreme CR values from EU-Silc surveys), etc.

A first step towards this process is that LIS envisions to make the micro-macro comparisons an integral part of the data harmonization process. The evaluation of the coverage ratios will become part of the internal checking process. Also it is planned that the coverage ratios will be published together with other metadata each time a new dataset is being added to the Luxembourg Income Study database.

Appendices

Appendix 1: old and new relevant LIS variables

Name	Label	Old LIS variables	New LIS variables
WS	Wages and salaries	v1+v6	HILE
OINC	Other factor income	v4+v5+v8	HMILS+HMIC
SB	Social Benefits	soci+ meansi+ v32+ v33	HMITS
SB2	social benefits2	soci+ meansi	HMITS- HMITSILMIP- HMITSILO
T	Taxes on Income and Property	v11+v12	HMXITI+HMX OTP
SCP	Social Contributions Paid	v7+v13	HMXITS
NDI	cash disposable household income	calculated as = ws+oinc+sb-t-scp	
Weighting factor	Household survey weight	hweight	hpopwgt

Appendix 2: National Account data source for every LIS datasets:

1=detailed OECD; 2=Eurostat; 3=simplified OECD (0 – No database found)

Code	Year	Wave	Wages and Salaries	Other Factor Income	Social Ben-efits	social Ben-efits2	Taxes on Income and Property	Social Contr-ibutions. Paid	Calc. Net Dispo-sable Income
AT	1987	1-6	0	0	0	0	0	0	0
AT	1994	1-6	0	0	0	0	0	0	0
AT	1995	1-6	0	0	0	0	0	0	0
AT	1997	1-6	1	1	1	1	0	0	1
AT	2000	1-6	1	1	1	1	0	0	1
AT	2004	1-6	1	1	1	0	1	0	1
AU	1981	1-6	3	0	3	3	3	0	0
AU	1985	1-6	3	0	3	3	3	0	0
AU	1989	1-6	3	0	3	3	3	0	0
AU	1995	1-6	3	0	3	3	3	0	0
AU	2001	1-6	3	0	3	3	3	0	0
AU	2003	1-6	3	0	3	3	3	0	0
BE	1985	1-6	2	0	2	2	0	0	0
BE	1988	1-6	2	0	2	0	0	0	0
BE	1992	1-6	2	0	2	2	2	2	0
BE	1995	1-6	1	1	1	1	0	0	1
BE	1997	1-6	1	1	1	1	1	1	1
BE	2000	1-6	1	1	1	1	0	0	1
CA	1981	1-6	3	0	3	3	3	0	0
CA	1987	1-6	3	0	3	3	3	0	0
CA	1991	1-6	3	0	3	3	3	0	0
CA	1994	1-6	3	0	3	3	3	0	0
CA	1997	1-6	3	0	3	3	3	0	0
CA	1998	1-6	3	0	3	3	3	0	0
CA	2000	1-6	3	0	3	3	3	0	0
CA	2004	1-6	3	0	3	3	3	0	0
CA	2007	7	3	0	3	3	3	0	0
CH	1982	1-6	0	0	0	0	0	0	0
CH	1992	1-6	0	0	0	0	0	0	0
CH	2000	1-6	1	1	1	1	1	1	1
CH	2002	1-6	1	1	1	1	1	1	1
CH	2004	1-6	1	1	1	1	1	1	1
CN	2002	1-6	0	0	0	0	0	0	0
CZ	1992	1-6	0	0	0	0	0	0	0
CZ	1996	1-6	1	1	1	0	1	1	1

Code	Year	Wave	Wages and Salaries	Other Factor Income	Social Ben-efits	social Ben-efits2	Taxes on Income and Property	Social Contr-ibutions. Paid	Calc. Net Dispo-sable Income
CZ	2004	1-6	1	1	1	0	1	1	1
DE	1981	1-6	0	0	0	0	0	0	0
DE	1983	1-6	0	0	0	0	0	0	0
DE	1984	1-6	0	0	0	0	0	0	0
DE	1989	1-6	0	0	0	0	0	0	0
DE	1994	1-6	0	0	0	0	0	0	0
DE	2000	1-6	3	1	1	1	1	1	0
DE	2004	1-6	3	1	1	1	1	1	0
DE	2007	7	3	1	1	1	1	1	0
DE	2010	8	3	1	1	1	1	1	0
DK	1987	1-6	0	0	0	0	0	0	0
DK	1992	1-6	0	0	0	0	0	0	0
DK	1995	1-6	1	0	1	1	1	0	0
DK	2000	1-6	1	0	1	1	1	1	0
DK	2004	1-6	1	0	1	1	1	0	0
EE	2000	1-6	1	1	1	0	1	0	1
EE	2004	1-6	1	1	1	0	1	1	1
ES	1980	1-6	0	0	0	0	0	0	0
ES	1990	1-6	0	0	0	0	0	0	0
ES	1995	1-6	0	0	0	0	0	0	0
ES	2000	1-6	1	1	1	1	0	0	1
ES	2004	1-6	1	1	1	0	0	0	1
ES	2007	7	1	1	1	1	0	0	1
ES	2010	8	1	1	1	1	0	0	1
FI	1987	1-6	1	1	1	1	1	1	1
FI	1991	1-6	1	1	1	1	1	1	1
FI	1995	1-6	1	1	1	0	1	1	1
FI	2000	1-6	1	1	1	1	1	1	1
FI	2004	1-6	1	1	1	1	1	1	1
FR	1979	1-6	1	1	1	0	1	0	1
FR	1981	1-6	1	0	1	0	0	0	0
FR	1984	1-6	1	1	1	0	1	0	1
FR	1984	1-6	1	1	1	0	1	0	1
FR	1989	1-6	1	1	1	0	1	0	1
FR	1994	1-6	1	1	1	0	1	0	1
FR	2000	1-6	1	1	1	0	1	0	1
FR	2005	1-6	1	1	1	1	1	0	1
GR	1995	1-6	0	0	0	0	0	0	0
GR	2000	1-6	0	0	0	0	0	0	0

Code	Year	Wave	Wages and Salaries	Other Factor Income	Social Ben-efits	social Ben-efits2	Taxes on Income and Property	Social Contr-ibutions. Paid	Calc. Net Dispo-sable Income
GR	2004	1-6	0	0	0	0	0	0	0
GR	2007	7	1	1	1	1	0	0	1
GR	2010	8	1	1	1	1	0	0	1
HU	1991	1-6	0	0	0	0	0	0	0
HU	1994	1-6	0	0	0	0	0	0	0
HU	1999	1-6	1	0	1	0	0	0	0
HU	2005	1-6	1	1	1	0	0	0	1
IE	1987	1-6	0	0	0	0	0	0	0
IE	1994	1-6	0	0	0	0	0	0	0
IE	1995	1-6	0	0	0	0	0	0	0
IE	1996	1-6	0	0	0	0	0	0	0
IE	2000	1-6	0	0	0	0	0	0	0
IE	2004	1-6	3	1	1	1	1	1	0
IE	2007	7	3	1	1	1	1	1	0
IE	2010	8	3	1	1	1	1	1	0
IL	1979	1-6	0	0	0	0	0	0	0
IL	1986	1-6	0	0	0	0	0	0	0
IL	1992	1-6	0	0	0	0	0	0	0
IL	1997	1-6	0	0	0	0	0	0	0
IL	2001	1-6	3	0	0	0	0	0	0
IL	2005	1-6	3	0	0	0	0	0	0
IL	2007	7	0	0	0	0	0	0	0
IN	2004	1-6	0	0	0	0	0	0	0
IT	1986	1-6	0	0	0	0	0	0	0
IT	1987	1-6	0	0	0	0	0	0	0
IT	1989	1-6	0	0	0	0	0	0	0
IT	1991	1-6	1	1	1	0	0	0	1
IT	1993	1-6	1	1	1	0	0	0	1
IT	1995	1-6	1	1	1	1	0	0	1
IT	1998	1-6	1	1	1	0	0	0	1
IT	2000	1-6	1	1	1	0	0	0	1
IT	2004	1-6	1	1	1	0	1	1	1
IT	2008	7	1	1	1	1	1	1	1
IT	2010	8	1	1	1	1	1	1	1
JP	2008	7	1	0	1	1	1	1	0
KR	2006	1-6	0	0	1	0	1	1	0
LU	1985	1-6	0	0	0	0	0	0	0
LU	1991	1-6	0	0	0	0	0	0	0
LU	1994	1-6	0	0	0	0	0	0	0

Code	Year	Wave	Wages and Salaries	Other Factor Income	Social Ben-efits	social Ben-efits2	Taxes on Income and Property	Social Contr-ibutions. Paid	Calc. Net Dispo-sable Income
LU	1997	1-6	1	0	0	0	0	0	0
LU	2000	1-6	1	0	0	0	0	0	0
LU	2004	1-6	1	0	0	0	0	0	0
LU	2007	7	1	1	1	1	0	0	1
LU	2010	8	1	1	1	1	0	0	1
MX	1984	1-6	0	0	0	0	0	0	0
MX	1989	1-6	0	0	0	0	0	0	0
MX	1992	1-6	0	0	0	0	0	0	0
MX	1994	1-6	0	0	0	0	0	0	0
MX	1996	1-6	0	0	0	0	0	0	0
MX	1998	1-6	0	0	0	0	0	0	0
MX	2000	1-6	0	0	0	0	0	0	0
MX	2002	1-6	0	0	0	0	0	0	0
MX	2004	1-6	1	1	1	0	0	0	1
NL	1983	1-6	0	0	2	2	2	0	0
NL	1987	1-6	0	0	2	2	2	0	0
NL	1990	1-6	1	0	1	1	1	0	0
NL	1993	1-6	1	0	1	1	1	1	0
NL	1999	1-6	1	2	1	1	1	1	2
NL	2004	1-6	1	2	1	0	1	0	2
NO	1979	1-6	1	1	1	1	1	1	1
NO	1986	1-6	1	1	1	1	1	1	1
NO	1991	1-6	1	1	1	1	1	1	1
NO	1995	1-6	1	1	1	1	1	1	1
NO	2000	1-6	1	1	1	1	1	1	1
NO	2004	1-6	1	1	1	1	1	1	1
PL	1986	1-6	0	0	0	0	0	0	0
PL	1992	1-6	0	0	0	0	0	0	0
PL	1995	1-6	1	1	1	0	1	0	1
PL	1999	1-6	1	1	1	0	1	0	1
PL	2004	1-6	1	1	1	0	1	0	1
RO	1995	1-6	2	0	2	0	2	0	0
RO	1997	1-6	2	0	2	0	2	0	0
RU	2000	1-6	0	0	0	0	0	0	0
SE	1981	1-6	0	0	0	0	0	0	0
SE	1987	1-6	0	0	0	0	0	0	0
SE	1992	1-6	0	0	0	0	0	0	0
SE	1995	1-6	1	1	1	1	1	0	1
SE	2000	1-6	1	1	1	1	1	1	1

Code	Year	Wave	Wages and Salaries	Other Factor Income	Social Benefits	social Benefits2	Taxes on Income and Property	Social Contributions Paid	Calc. Net Disposable Income
SE	2005	1-6	1	1	1	1	1	1	1
SI	1997	1-6	3	1	1	0	0	0	0
SI	1999	1-6	3	1	1	0	0	0	0
SI	2004	1-6	3	1	1	0	0	0	0
SK	1992	1-6	0	0	0	0	0	0	0
SK	1996	1-6	1	0	1	0	0	0	1
SK	2004	1-6	1	0	1	0	0	0	1
SK	2007	7	1	1	1	0	0	0	1
SK	2010	8	1	1	1	0	0	0	1
UK	1979	1-6	0	0	0	0	0	0	0
UK	1986	1-6	0	0	0	0	0	0	0
UK	1991	1-6	2	2	2	2	2	2	2
UK	1994	1-6	2	2	2	2	2	2	2
UK	1995	1-6	2	2	2	2	2	2	2
UK	1999	1-6	2	2	2	2	2	2	2
UK	2004	1-6	2	2	2	2	2	2	2
UK	2007	7	2	2	2	2	2	2	2
UK	2010	8	2	2	2	2	2	2	2
US	1979	1-6	3	0	3	3	3	0	0
US	1986	1-6	3	0	3	3	3	0	0
US	1991	1-6	3	0	3	3	3	0	0
US	1994	1-6	3	0	3	3	3	0	0
US	1997	1-6	3	0	3	3	3	0	0
US	2000	1-6	1	1	1	1	1	0	1
US	2004	1-6	1	1	1	1	1	0	1
US	2007	7	1	1	1	1	1	0	1
US	2010	8	1	1	1	1	1	0	1
ZA	2008	7	3	0	1	1	0	0	0
ZA	2010	8	3	0	1	1	0	0	0

Appendix 3.1: Summary table - findings by categories, waves 1-6

Category	num.of cases	Coverage Rates (CR)			
		Average	Minimum	Maximum	Standard Deviation
Wages and salaries	100	80%	43%	109%	16%
Other Factor Income	62	45%	15%	97%	21%
Social Benefits	98	79%	24%	116%	15%
Social Benefits2	63	67%	39%	99%	13%
Taxes on Income and Property	76	93%	24%	285%	32%
Social Contributions Paid	34	77%	12%	285%	44%
Net Disposable Income	58	75%	41%	104%	15%

Appendix 3.2: Summary table - findings by categories in all net/mixed LIS datasets

Category	num.of cases (out of 22)	Coverage Rates (CR)			
		Average	Minimum	Maximum	Standard Deviation
Wages and salaries	31	64%	43%	83%	0.09783
Other Factor Income	25	31%	15%	51%	0.09614
Social Benefits	29	68%	24%	90%	0.13146
Social Benefits2	8	63%	55%	78%	0.07115
Taxes on Income and Property	9	68%	37%	93%	0.18384
Social Contributions Paid	1		93%	93%	n.a.
Net Disposable Income	22	65%	41%	84%	0.11323



Appendix 4: Detailed findings, all LIS waves*

Code	Year	wave	*	Wages and Salaries	Other Factor Income	Social Ben-efits	social Ben-efits2	Taxes on Income and Property	Social Contr-ibutions. Paid	Calc. Net Dispo-sable Income
AT	1997	1-6	*	59%	25%	56%	55%			65%
AT	2000	1-6	*	62%	29%	65%	64%			72%
AT	2004	1-6		96%	45%	95%		148%		84%
AU	1981	1-6		80%		91%	81%	105%		
AU	1985	1-6		85%		87%	76%	105%		
AU	1989	1-6		82%		90%	78%	101%		
AU	1995	1-6		75%		82%	73%	79%		
AU	2001	1-6		73%		83%	72%	73%		
AU	2003	1-6		74%		77%	64%	77%		
BE	1985	1-6	*	75%		63%	63%			
BE	1988	1-6	*	73%		64%				
BE	1992	1-6		106%		71%	70%	70%	86%	
BE	1995	1-6	*	60%	24%	68%	67%			67%
BE	1997	1-6		104%	47%	81%	81%	96%	85%	81%
BE	2000	1-6	*	54%	35%	56%	56%			64%
CA	1981	1-6		87%		87%	73%	89%		
CA	1987	1-6		90%		89%	69%	97%		
CA	1991	1-6		88%		95%	74%	94%		
CA	1994	1-6		93%		99%	75%	103%		
CA	1997	1-6		91%		104%	75%	96%		
CA	1998	1-6		87%		109%	76%	91%		
CA	2000	1-6		86%		107%	70%	91%		
CA	2004	1-6		84%		116%	73%	91%		
CA	2007	7		84%		114%	70%	76%		
CH	2000	1-6		93%	42%	61%	40%	69%	63%	77%
CH	2002	1-6		88%	59%	63%	40%	72%	66%	79%
CH	2004	1-6		90%	47%	61%	39%	71%	68%	77%
CZ	1996	1-6		93%	26%	73%		80%	64%	67%
CZ	2004	1-6		83%	42%	79%		96%	51%	71%
DE	2000	1-6		82%	45%	84%	80%	108%	85%	
DE	2004	1-6		83%	45%	85%	81%	111%	82%	
DE	2007	7		67%	36%	93%	78%	108%	82%	
DE	2010	8		62%	35%	91%	76%	107%	76%	
DK	1995	1-6		97%		92%	80%	88%		

Code	Year	wave	*	Wages and Salaries	Other Factor Income	Social Ben-efits	social Ben-efits2	Taxes on Income and Property	Social Contr-ibutions. Paid	Calc. Net Dispo-sable Income
DK	2000	1-6		97%		90%	76%	88%	12%	
DK	2004	1-6		95%		90%	74%	86%		
EE	2000	1-6	*	76%	28%	90%		69%		72%
EE	2004	1-6		96%	16%	84%		99%	104%	79%
ES	2000	1-6	*	69%	43%	78%	78%			74%
ES	2004	1-6	*	71%	20%	71%				68%
ES	2007	7		90%	23%	75%	72%			69%
ES	2010	8		80%	24%	70%	66%			66%
FI	1987	1-6		102%	58%	91%	49%	107%	95%	89%
FI	1991	1-6		102%	54%	94%	48%	100%	96%	89%
FI	1995	1-6		98%	66%	97%		101%	90%	91%
FI	2000	1-6		100%	72%	92%	91%	94%	81%	95%
FI	2004	1-6		99%	81%	92%	90%	100%	75%	95%
FR	1979	1-6	*	77%	50%	63%		88%		73%
FR	1981	1-6	*	73%		24%				
FR	1984	1-6	*	83%	27%	67%		73%		75%
FR	1984	1-6		81%	57%	69%		77%		81%
FR	1989	1-6	*	69%	32%	67%		74%		68%
FR	1994	1-6	*	76%	51%	79%		61%		84%
FR	2000	1-6	*	71%	41%	74%		44%		78%
FR	2005	1-6	*	64%	36%	75%	63%	37%		74%
GR	2007	7		100%	42%	64%	61%			59%
GR	2010	8		86%	50%	69%	65%			63%
HU	1999	1-6	*	60%		88%				
HU	2005	1-6	*	43%	33%	83%				61%
IE	2004	1-6		73%	82%	94%	74%	76%	15%	
IE	2007	7		70%	74%	100%	81%	70%	15%	
IE	2010	8		73%	53%	91%	73%	103%	24%	
IL	2001	1-6		64%						
IL	2005	1-6		65%						
IT	1991	1-6	*	65%	32%	59%				59%
IT	1993	1-6	*	63%	29%	57%				59%
IT	1995	1-6	*	63%	26%	61%	61%			57%
IT	1998	1-6	*	60%	37%	60%				62%
IT	2000	1-6	*	60%	35%	60%				62%
IT	2004	1-6	*	62%	37%	61%		93%	93%	42%
IT	2008	7		61%	35%	65%	64%	83%	74%	45%

Code	Year	wave	*	Wages and Salaries	Other Factor Income	Social Ben-efits	social Ben-efits2	Taxes on Income and Property	Social Contr-ibutions. Paid	Calc. Net Dispo-sable Income
IT	2010	8		60%	37%	63%	61%	84%	84%	45%
JP	2008	7		74%		49%	37%	58%	52%	
KR	2006	1-6				30%		24%	60%	
LU	1997	1-6	*	57%						
LU	2000	1-6	*	55%						
LU	2004	1-6		71%						
LU	2007	7		68%	65%	90%	90%			70%
LU	2010	8		64%	86%	85%	84%			68%
MX	2004	1-6	*	72%	15%	84%				41%
NL	1983	1-6				90%	72%	83%		
NL	1987	1-6				89%	74%	80%		
NL	1990	1-6		102%		82%	57%	153%		
NL	1993	1-6		99%		78%	57%	95%	47%	
NL	1999	1-6		88%	24%	71%	47%	77%	44%	80%
NL	2004	1-6		106%	39%	90%		285%		87%
NO	1979	1-6		92%	70%	72%	66%	92%	82%	83%
NO	1986	1-6		103%	68%	76%	70%	94%	96%	90%
NO	1991	1-6		109%	83%	75%	62%	98%	102%	95%
NO	1995	1-6		103%	84%	111%	99%	100%	96%	104%
NO	2000	1-6		103%	93%	78%	65%	97%	104%	95%
NO	2004	1-6		98%	97%	89%	76%	95%	93%	96%
PL	1995	1-6	*	49%	15%	85%		72%		44%
PL	1999	1-6		61%	21%	86%		93%		56%
PL	2004	1-6		58%	17%	85%		67%		54%
RO	1995	1-6		75%		82%		129%		
RO	1997	1-6		76%		79%		189%		
SE	1995	1-6		94%	42%	100%	90%	104%		90%
SE	2000	1-6		95%	68%	94%	82%	87%	67%	97%
SE	2005	1-6		95%	60%	98%	85%	80%	285%	94%
SI	1997	1-6	*	51%	19%	78%				
SI	1999	1-6	*	50%	20%	72%				
SI	2004	1-6	*	51%	23%	75%				
SK	1996	1-6		72%		70%				64%
SK	2004	1-6		95%		76%				63%
SK	2007	7		93%	15%	74%				64%
SK	2010	8		97%	16%	73%				66%
UK	1991	1-6		92%	63%	74%	54%	95%	53%	83%

Code	Year	wave	*	Wages and Salaries	Other Factor Income	Social Ben-efits	social Ben-efits2	Taxes on Income and Property	Social Contr-ibutions. Paid	Calc. Net Dispo-sable Income
UK	1994	1-6		89%	64%	78%	56%	87%	48%	84%
UK	1995	1-6		79%	72%	72%	50%	83%	48%	78%
UK	1999	1-6		87%	65%	80%	57%	87%	39%	86%
UK	2004	1-6		92%	65%	84%	59%	87%	45%	90%
UK	2007	7		91%	47%	75%	51%	59%	44%	89%
UK	2010	8		93%	55%	71%	48%	60%	46%	90%
US	1979	1-6		76%		73%	64%	104%		
US	1986	1-6		80%		79%	67%	101%		
US	1991	1-6		76%		77%	64%	101%		
US	1994	1-6		78%		73%	61%	102%		
US	1997	1-6		81%		72%	60%	88%		
US	2000	1-6		96%	33%	66%	53%	83%		66%
US	2004	1-6		97%	28%	65%	53%	93%		63%
US	2007	7		94%	26%	60%	49%	77%		60%
US	2010	8		94%	27%	57%	48%	96%		60%
ZA	2008	7		59%		64%	43%			
ZA	2010	8		60%		66%	36%			

* Net/mixed LIS dataset
 ratio higher than 300%
 ratio lower than 10%

**CR's are presented for all aggregates of all datasets allowed comparison, even if the results are extremely low/high, with the exception of 15 cases (out of 680), only 1 found to have a ratio which was higher than 300%, and 14 had ratios which were lower than 10% (out of them 4 of "social contributions paid" component in the 4 last USA LIS datasets of USA, which found to be negative due to a negative values in the corresponding NA item).