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Reconciling Micro and Macro Data on Household Wealth: A Test Based on Three Euro Area Countries

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Abstract

The report on the Measurement of Economic Performance and Social Progress by Stiglitz, Sen and Fitoussi concludes that, in the measurement of household welfare, all material components should be covered, i.e. consumption, income and wealth, from both the micro as well as the macro perspective. Additionally, several other initiatives like the G20 finance ministers' and central bank governors' data gap initiative have emphasised having an integrated micro-macro framework where consumption, income and wealth can be analysed.

Current researchers linking macro and micro information for the households have focused so far on income and consumption as these are the areas where most data sources are available. The purpose of this article is to extend the focus to household wealth using both household survey data and national financial accounts. The article also aims to create a first set of macroeconomic accounts that include wealth broken down by household groups.

Introduction

This article examines the linkages between household wealth surveys (HS) and National Accounts' (NA) household balance sheets. It aims to build a bridge between the survey results and the macro balance sheets. It also makes a first attempt to break down the macro wealth aggregates using survey data. At this stage the linkage is undertaken using country data.

There is an increasing interest in breaking down the household sector figures from NAs using distributional information, and the distributional aspects of wealth, consumption and income (Stiglitz, Sen and Fitoussi, 2009; IMF/FSB, 2009).[1] For instance, as a part of the Stiglitz et al. (2009) report follow-up, the Organisation for Economic Co-operation and Development (OECD) and the European Commission established an Expert Group to examine the linkage between NA and survey data; it also aims to break down NA by household types using survey data. The Expert Group work focuses at this stage only on breaking down consumption and income items. The idea is later to broaden this approach to the household balance sheets. Currently, this is considered to be too challenging as there is too little household balance sheet information available.

The Stiglitz et al. (2009) report did not present anything new. The underlying reason for the whole report was the well-known criticism stating that focusing on gross domestic product (GDP) is not enough in the political decision-making processes as it neither covers distributional aspects of welfare, nor sustainable development. Simon Kuznets mentioned already in his report presented to the U.S. senate in 1934 that "The welfare of a nation can, therefore, scarcely be inferred from a measurement from a national income as defined above."

The recent 'GDP and Beyond' criticism has focused on GDP not covering all the non-monetary elements as well as the distributional aspects of the welfare.[2] The Expert Group tried to find practical solutions of showing NAs' income and consumption data broken down by different household types. In order to complete this type of analysis and to get a complete picture of household material welfare, the Group has clearly stated that the analysis should cover balance sheet analysis as well. However, this is not believed to be possible at this stage as data availability is considered to be too sparse.

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[1] From the papers investigating micro-macro wealth linkage can be mentioned: Antoniewicz et al., 2005.
[2] See for instance: Fleurbaey (2009).

The IMF/FSB report to the G20 Finance Ministers and Central Bank Governors[3] additionally emphasises the political importance of having these types of analyses and data, such as data on financial accounts/flows of funds, including households. Alongside aggregate information, more attention should be paid to distributional information. Finally, it is crucial that the data should be consistent, i.e. there should be a statistical system that shows no discrepancies. This would, for instance, allow the examination of risk transmission in economies. This aspect has been emphasised in the financial stability analysis on the transmission mechanism of shocks and risks between and across the different agents in the economy (see Castrén and Kavonius, 2009).

The background of the G20 data gap exercise is that the current financial and also real economic crisis has shown that more comprehensive household level balance sheet information – which should be comparable across economies – combined with distributional information, is of vital importance for the analysis of the reasons behind and consequences of these kinds of crises. Many believe that by having this type of analysis and information, it would possible in the future to prevent similar crises arising. However, at the same time it should be emphasised that the work is currently on-going and much work needs to be done before these types of accounts can really be used in policy analysis.

This article has been organised as follows: the second section of the article builds the conceptual framework for the analysis, i.e. the linkage between micro and macro wealth items is created. The latter is based broadly on the article by Kavonius and Törmälehto (2010), where the conceptual link between the Euro Area Accounts (EAA)/NA and the Household Finance and Consumption Survey (HFCS)/HS definitions of assets and liabilities was created. The section further discusses the applied data and their constraints. The third section discusses potential errors and differences between the two data sets. The fourth section of the article analyses the actual differences and tries to quantify the reasons for the differences by attempting to break down the accounts by household types and discussing reliability and usefulness of the results. The final section summarises the main conclusions.

The Data and Applied Link in the Analysis

This section presents a practical linkage between the definitions of micro and macro data sources. The framework for the micro definitions is HFCS and for the macro definitions EAA. For the wealth items this linkage was already presented in

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[3]IMF/FSB report to the G-20 Finance Ministers and Central Bank Governors (http://www.financialstabilityboard.org/publications/r_091107e.pdf).

the paper by Kavonius and Törmälehto (2010) and this section summarises and partly revises the paper's conclusions.

One of the problems is that the nature of these two data sources is different and, therefore, it is not straightforward to build a linkage between the two. The HFCS has been set up as a decentralised ex-ante harmonised multi-national survey to collect micro data on household finances in the Euro area. The survey focuses on household finances, including detailed information on assets and liabilities. Each Euro area country is expected to conduct its own survey. The survey is output harmonised, i.e. it has a common set of target variables rather than identical questions, but with a blueprint questionnaire available.

The EAA constitute a quarterly integrated accounting system, which encompasses non-financial accounts and financial accounts, including financial balance sheets covering other changes (i.e. price changes and in some rare cases classification changes). The accounts are integrated, encompassing the transaction accounts and the balance sheet including other changes. The EAA is compiled according the European System of Accounts (ESA95), which is the European application of the System of National Accounts 1993 (SNA93). The country data used in this article is consistent with the data used in the compilation of the Euro area aggregate.

The analysis in this article is performed at a country level by using national survey data consistent with the HFCS framework and annual financial accounts, which are consistent with the EAA inputs. Therefore, we refer hereafter to these data as HS and NA. There are two reasons for selecting these data sets. First, the analysis of differences and actual linkage is more accurate at the country level than at the Euro area level. The Euro area aggregate hides the conceptual differences that are caused by the different data collection methods or the estimation methods used in the estimation of the Euro area aggregate. Second, the annual data are more detailed than quarterly data and this helps to make these comparisons.

We restrict the analysis to three countries: Finland, Italy and the Netherlands. We have chosen countries that use different data collection methods, to at least be able to make tentative comparisons between these data collection methods. In Italy the data are collected through CAPI (Computer-Assisted Personal Interview). In Finland, balance sheet variables are collected from registers or via register-based estimations for the sample of the European Union Statistics on Income and Living Conditions (EU-SILC) survey. In the Netherlands, the data are collected by a web survey.

The classification and concepts in the NA and HS data are considerably different. Therefore, it is essential to investigate which balance sheet items are essential for the households and which are not. The largest item in the household balance sheet is non-financial assets, which according to the NA represent around 57 percent of total assets (Kavonius and Törmälehto, 2010). However, the focus of this article is on the financial assets as the non-financial assets are not fully available at the country level.

The practical linkage is achieved by using a kind of hybrid concept, i.e. the wealth concept is not fully the one applied in the NA or HS. It is almost impossible to apply a standardised concept as the wealth concept applied in both sets of statistics are considerable different.

Appendix 1 shows the applied linkage between the financial assets in the HS/HFCS and the NA/EAA. For some asset types there is a direct linkage. Deposits, bonds and other debt securities, mutual funds and publicly traded shares are included in both sources with identical or very similar definitions. These items cover roughly 30 percent of all assets and 65 percent of financial assets in the NA.

The assets can be classified into three categories: (i) identical or very similar definitions; (ii) several HFCS items corresponding to one item; and (iii) items not existing or very weakly corresponding very weakly with each other. As can be seen in Appendix 1, the NA items deposits, securities other than shares except financial derivatives, mutual fund shares and quoted shares have identical or very similar definitions in the HFCS. Accumulated assets of life insurance and pension funds, unquoted equity and financial derivatives have several corresponding items in the HFCS. Loans, other accounts, and currency in the NAs, and managed accounts in the HFCS, do not have a corresponding item in the other statistics or the link is weak. Additionally, in the table presented in Appendix 1, a column 'comment' is shown where the most difficult issues of the linking are mentioned.

Appendix 2 shows the linkage between liabilities in the HS and NA. In the HS, liabilities consist of mortgages and loans, credit lines, overdraft balances, and outstanding credit card balances. The NA also covers these balance sheet items and on top of this some other small balance sheet items, which are either related to accounting conventions or in some country-specific cases. As in the case of assets, the table in the Appendix includes a 'comment' column, where these differences are mentioned in more detail.[4]

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[4] The linkage on assets' as well as liabilities' side is discussed in more detail in Kavonius and Törmälehto (2010) and Honkkila and Kavonius (2012).

Potential Differences in the Two Statistics

There are many reasons why sample survey estimates and corresponding NA totals might differ. In this article, we classify the differences to the following three generic groups: (i) the macro versus micro point of view; (ii) errors in estimation: population coverage and sampling; and finally, (iii) errors in measurement: timing and differences in data collection methods. This list might not be comprehensive but it covers most of the differences between these two sources.

Macro versus Micro Point of View

Differences in the statistics may arise from three separate sources: first from the conceptual point of view, i.e. some concepts do not necessarily make sense at the balanced macro level system while they do at the micro level. Second, the valuation of some instruments might be different at the macro and micro levels. Finally, the balancing framework might lead to the situation that some data are estimated by using accounting rules or counterpart information.[5]

Concerning the conceptual issues, the HS focuses only on one individual household, which forces one to define the concepts from the household point of view. In the NA, the concepts are defined at total economy level and are also counter-parted to the other sectors. This might lead to conceptual differences. On the wealth side, the concept of business wealth can be mentioned as an example. In the HS it is treated as one stock of wealth, whereas in the NA the different components of business wealth are distributed to the corresponding wealth items.
The different aspects affect the valuation of different wealth components. The non-financial assets, i.e. predominantly housing wealth, are relatively easy to estimate at the micro level. Financial wealth is, however, easier to estimate correctly at the macro level. Consequently, in HS the share of non-financial assets in total wealth has been recorded as significantly higher compared with the NA (in HS: 74 – 88% as in NA: 50 – 68% in the three countries analysed in this article[6]).

The data collection and the balancing framework, i.e. the process that aims to reach this consistency in the accounting system, have a twofold effect on the accounts. On the one hand, the accounting system forces a cross-check of different data sources and gets them as comparable and consistent as possible before the balancing. From this point of view, it can be argued that NA data provide more reliable estimates than data retrieved from an individual data source.

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[5]See for instance: Kavonius and Törmälehto (2003).
[6] See for instance: ECB 2013, 96–97.

On the other hand, since in this balancing process the inconsistencies or discrepancies are distributed through the accounts according to the relative weights of the items, it is possible that errors in measurement from other sources or sectors balance out and eventually 'correct the data' to a certain extent (if one relies on simplified processes or uninformed integrators). Moreover, it should be emphasised that these kinds of balancing adjustments are typically small. Typically, if the size of total balancing adjustment is known, it can be considered as an error margin in the estimations.

NA may need to allow some bias in the household sector to satisfy the balancing constraints, i.e. the ultimate aim is not to minimise bias in the household sector; rather there is the dual objective to minimise bias in the estimates for the economy as a whole and to minimise statistical discrepancies within the system. The latter may result in bias within sectors, for instance, certain economic transactions for the household sector may be derived as residual, by subtracting from the estimated total the estimates of other institutional sectors. Finally, NAs are typically based on other statistical sources and possible errors are inherited from source statistics.

Errors in Estimation: Population Coverage and Sampling

The quality of the estimates based on a household sample survey may be thought of in terms of errors in estimation and errors in measurement. Errors in estimation are errors in the extrapolation from the households enumerated in the survey to the entire population of private households for which estimates are required. Errors in measurement occur when the value that is recorded for a household in the sample departs from the actual true value for the household. Item non-response can be classified as a mixed category between measurement and estimation error (Verma and Betti, 2010).

The first group of estimation errors are coverage errors. These arise if the target population is different from the sampling frame or if all units in the frame do not have a random non-zero probability of being selected. In the wealth surveys analysed in this article probability sampling is used, meaning that the second case would never occur.

Persons living in collective households and institutions are generally excluded from the target population of household surveys while they are included in the NA. The share of persons living in collective households and institutions vary from country to country. Based on the 2001 population census in Finland, 1.9 percent, in Italy 0.7 percent and in the Netherlands 1.4 percent of the population is living in collective households and institutions (Eurostat). Unfortunately, there is

no information regarding the share of assets and liabilities that can be attributed to this group; it seems that the population share is the only available proxy.

The second coverage issue is that the household sector is often compiled as an aggregate combined with the non-profit institutions serving households (NPISHs) sector. The size of the household sector varies considerably from country to county. Considering the countries analysed in this article, NPISHs can be separated from households in Finland and partly in the Netherlands by using actual reported data. The disposable income share of the NPISHs in 2010 was 4.7 percent in Finland, 0.6 percent in Italy and 1.4 percent in the Netherlands. The share of financial assets can only be estimated for Finland, which was 7.2 percent, and for financial liabilities 2 percent.

Table 1 shows some indicators related to unit non-response and sampling errors. Unit non-response is the failure to contact a household or to persuade a respondent to participate in the survey. Sampling error is the measure of variability between estimates from different samples. Since sampling errors might be dominant in surveys using smaller samples, the number of achieved interviews is an important determinant of estimation errors. In the Netherlands the sample size is relatively small in comparison to Finland and Italy.

Because of the sensitive nature of the data being collected, higher rates of unit non-response have been experienced in wealth surveys in comparison to various other kinds of surveys (such as income or labour force surveys). The Finnish wealth survey data are based on the income and living conditions survey, and the response rates are thus relatively high. The response rates in Italy and the Netherlands are at an acceptable level in comparison to other wealth surveys.

Table 1: Sample sizes, number of households, response rates and oversampling of the wealthy

Country	Interviewed households	Number of households	Response rate[a]	Population coverage[b]	Oversampling of the wealthy[c]
Finland	10, 989	2, 531, 500	82.3 %[d]	98.1 %	1.68
Italy	7, 977	23, 876, 179	54.5 %	99.3 %	1.01
Netherlands	1, 301	7, 386 ,144	57.0 %[e]	98.6 %	1.76

Source: Eurostat, Authors' calculations, Statistics Finland, Banca d'Italia, De Nederlandsche Bank.

a The response rate is the net sample size divided to the number of eligible units in the sample. An estimated share of households with unknown eligibility is included in the number of eligible households.
b Calculated on the basis of population statistics. Source: Eurostat
c Interviewed households in the (weighted) top wealth decile / all interviewed households
d The response rate for households interviewed for the first time was 70.1 percent . The response rate refers to the EU-SILC survey.
e Due to Computer-Assisted Web Survey mode, only complete interview entirely or partly by desired respondents and refusals at introduction, before or during the interview and break-offs have been measured.

In sample surveys the bias caused by unit non-response should be reduced with weight adjustment (Pérez-Duarte, Sanchez-Muñoz and Törmälehto, 2010). In household surveys on wealth design, weights are adjusted for over-coverage, multiple selection probabilities and non-response, and finally weights are calibrated using external sources. As a result of weighting, the population estimates of the household survey data used for this article are very close to population statistics, which is natural since figures from the population statistics are frequently used in the calibration of final weights.

It is known that the distribution of wealth items is quite skewed, which means that obtaining data from the wealthier households is extremely important for the survey to adequately represent the full distribution of wealth in the population (Kennickell, 2007). Consequently, oversampling of the wealthy households is a recommended procedure for wealth surveys. Determining wealthy households' ex-ante requires feasible external information on households. In Finland, income register data is used to select more units to the gross sample from strata having higher income levels. In Italy and the Netherlands, no such registers are available in central banks or survey companies, and wealthy households are not systematically oversampled. However, the share of wealthy households in the Netherlands net sample is even higher than in Finland.

Errors in Measurement due to Item Non-Response, Timing and Differences in Data Collection Methods

Item non-response occurs when the respondent is not able or is unwilling to provide an answer to a specific question. Given the difficulties in the concepts of some balance sheet variables, a non-ignorable degree of item non-response can be expected in wealth surveys. Of the three data sets used in this article, item non-response is a noteworthy issue only in the Netherlands, where multiple imputation methodology (see Rubin, 1987) was applied to correct for partially non-ignorable degree of item non-response. For Finland – where all balance sheet or income variables are collected from registers – item non-response is naturally not

relevant. In the Italian data, item non-response is very low due to the incentive structure for interviewers. Later, when Euro area data are available, imputation becomes a more relevant issue, and specific emphasis should be put on the analysis of multiple imputations, used in most Euro area countries.

The scope for measurement errors due to differences in the definition of variables was described in the second section. Another basic conceptual difference between HS and NA is timing. The three countries analysed in this article use the last day of the previous calendar year (2008 in Italy, 2009 in Finland and the Netherlands) as a reference period for stocks. In the annual NA data used in this analysis the reference date of the stock is the last day of the year. While reference periods do not cause any comparability problems for country comparisons, the issue becomes more problematic when figures are constructed for the Euro area, with various countries using different reference periods.

Survey design literature and further empirical evidence show that the survey mode is an important determinant of measurement error. It has been argued that Computer-Assisted Personal Interview (CAPI) is the most reliable method for data collection (ECB 2013). In Italy, the main data collection method was CAPI, the share of which was 80 percent of achieved interviews. The rest of the interviews were conducted via Paper-Assisted Personal Interviews. The wealth survey data from the Netherlands is collected via Computer-Assisted Web Survey (CAWI). The balance sheet variables in Finland are collected from registers, either directly or with the use of estimation methods. All register data available in Statistics Finland can be linked to the demographic information of the EU-SILC sample with personal IDs. While some definitional issues may be involved with the use of register data, problems of underreporting can be avoided with this method if the quality and coverage of the registers is very good.

Register data are used in Finland directly to construct variables for debt, mutual funds, bonds and publicly traded shares. The definitions of register variables are identical or very similar to the survey variables. Most liabilities can also be measured accurately from registers. Estimation methods are used for unlisted shares, deposits and real assets. These methods include some uncertainties and possible comparability issues.

The Linkage between the Two Statistics and Reasons for Discrepancies

This section discusses the comparability of the two sets of statistics and also tries to quantify what the sources of the differences are. Finally, the results concerning the NA broken down by the HS are presented and the validity of these results is discussed.

Assets and Liabilities

As a conclusion from the second section, we use two definitions for financial wealth: total financial wealth and restricted financial wealth. The former definition includes all financial assets recorded either in the micro or macro sources, recognising the fact that there are partially severe coherence problems with some of the components. This comparison is, however, useful to recognise the differences between the micro and macro sources caused by dissimilar definitions. The latter definition includes the four assets (deposits, bonds, mutual funds and quoted shares) for which the definitions are identical or very similar in NA and HS. These assets cover about 65 percent of financial wealth in financial accounts.

Table 2: Coverage of household wealth survey (HS) compared with the National Accounts (NA) [values in Mio €] – Finland. The numbers in *italics* refer to an estimated value

	HS	NA	NA Households	NA Adjusted	HS/NA
Deposits	38,955	74,785	71,581	*70,221*	55%
Bonds	716	5,809	4,879	*4,786*	15%
Quoted shares	19,571	28,661	22,982	*22,545*	87%
Mutual funds	8,658	16,714	12,778	*12,535*	69%
Restricted financial wealth	**67,900**	**125,969**	**112,220**	**110,088**	**62%**
Pensions	7,091	35,111	35,111	*34,444*	21%
Unquoted shares	4,517	43,209	42,324	*41,520*	11%
Other assets	0	17,360	17,145	*16,819*	0%
Total financial wealth	**79,509**	**221,649**	**206,800**	**202,871**	**39%**
Real wealth	421,438				
Liabilities	**92,023**	**106,664**	**104,771**	*102,780*	**90%**

Source: Authors' calculations and Statistics Finland.

Table 3: Coverage of household wealth survey (HS) compared with the National Accounts (NA) [values in Mio €] – Italy. The numbers in *italics* refer to an estimated value

	HS	NA	NA Households	NA Adjusted	HS/NA
Deposits	319,404	999,299	*964,124*	*957,375*	33%
Bonds	124,301	780,033	*752,576*	*747,308*	17%
Quoted shares	26,535	76,192	*73,510*	*72,995*	36%
Mutual funds	51,015	192,522	*185,745*	*184,445*	28%
Restricted financial wealth	**521,255**	**2,048,046**	**1,975,955**	**1,962,123**	**27%**
Pensions	90,103	552,069	552,069	*548,205*	16%
Unquoted shares	149,078	880,730	*849,728*	*843,780*	18%
Other assets	25,230	255,910	*246,902*	*245,174*	10%
Total financial wealth	**785,666**	**3,736,755**	**3,624,654**	**3,599,281**	**22%**
Real wealth	**5,999,064**				
Liabilities	**275,723**	**638,049**	*618,908*	*615,813*	**45%**

Source: Authors' calculations, Banca d'Italia, and Eurostat.

Table 4: Coverage of household wealth survey (HS) compared with the National Accounts (NA) [values in Mio €] – the Netherlands. The numbers in *italics* refer to an estimated value

	HS	NA	NA Households	NA Adjusted	HS/NA
Deposits	167,527	373,610	344,072	*339,255*	49%
Bonds	21,519	43,319	*39,894*	*39,336*	55%
Quoted shares	17,054	87,625	*80,697*	*79,568*	21%
Mutual funds	31,580	51,797	*47,702*	*47,034*	67%
Restricted financial wealth	**237,680**	**556,351**	**512,365**	**505,192**	**47%**
Pensions	243,790	1,044,248	1,044,248	*1,029,629*	24%
Unquoted shares	11,210	84,084	*77,436*	*76,352*	15%
Other assets	12,935	71,269	*65,634*	*64,716*	20%
Total financial wealth	**505,615**	**1,755,952**	**1,699,684**	**1,675,888**	**30%**
Real wealth	**1,454,381**				
Liabilities	**604,480**	**747,763**	**654,957**	*653,647*	**92%**

Source: Authors' calculations, Statistic Netherlands, De Nederlandsche Bank and Eurostat.

Tables 2 to 4 present the values of financial assets and liabilities in the two sources. To minimise coverage errors, the following population-related adjustments have been made to the NA data: non-profit institutions serving households (NPISH) are excluded in the column 'NA Households'. In Finland, the values for NPISHs are reported. In Italy, the share of NPISHs (3.5%) for assets and liabilities has been estimated separately for both from the average of 12 countries for which data are available. In the Netherlands, the share of NPISHs (7.9%) is reported for deposits, and this share has been applied for other items. The liabilities, i.e. loans, are available separately for the Dutch households. There is no adjustment for pensions, since NPISHs do not have any. The final comparable values are in the column 'NA Adjusted', which is adjusted using the population coverage figures presented in Table 1.

The coverage of restricted financial wealth in survey data compared with financial accounts data varies from 27 percent in Italy to 62 percent in Finland. The coverage seems quite low, but is not contradicting the problems in household level data collection on financial wealth that have been experienced earlier. There is quite significant variation in the HS/NA ratio of various wealth items both within and between different countries. Very low HS/NA ratios in the remaining items of total financial wealth highlight the comparability problems in the definitions.

Based on the methods discussed previously, population coverage, item non-response or timing does not seem to be a significant cause for low coverage rates of restricted financial wealth. However, measurement errors at the household level, also related to the mode of data collection, and estimation errors related to the achieved sample size and sampling design deserve some attention.

Two possibilities of measurement errors at the household level should be distinguished: either a household reports a false value for an item, or a household having an item reports that it does not have it. While these measurement errors can occur both ways, usually measurement errors in data collection have been observed to lead to under-reporting rather than over-reporting of wealth.

In Finland, values for quoted shares, bonds and mutual funds are constructed using register data that can be matched to the sample by personal identification codes. This should minimise the number of cases where information on having the item is completely missing. However, the valuation of the items is a potential source of measurement errors. Additionally, municipal and sovereign bonds are missing from the register data used in Finland. Deposits in Finland are estimated with statistical matching methodology. The use of these figures at the individual

level is not recommended by the data producer but the coverage of deposits is at a comparatively reasonable level.

From the two countries that use survey data to collect asset values, the coverage rates of survey data are higher in the Netherlands. This could be explained by the use of a web panel. First of all, a high share of respondents consists of panel households having more experience in reporting the values of assets. Moreover, the distribution of respondents by certain characteristics has been observed to be different in web surveys compared with survey modes with interviewer involvement (Revilla 2010, Martin and Lynn 2011). Finally, while there are no experiences on this from mixed-mode surveys on wealth, a self-administered survey mode does not necessarily seem to have a negative impact on the collection of assets and other objectively measurable variables.

In addition to the survey mode, the main reasons behind the differences in coverage rates may be related to the sampling design and the ability to collect data efficiently from the wealthiest households. Even though the bias caused by a low share of responses in certain groups should be decreased by weight adjustment, a smaller number of respondents will lead to less efficient results in the corresponding population groups.

Table 5 presents the shares of households that reported having individual components of restricted financial wealth, demonstrating that the distributions of bonds, quoted shares or mutual funds are very skewed. For example, in Finland less than one percent of the population possess bonds. It is very challenging from household surveys to cover items possessed by such a low share of households (as can be seen in table 2).

In addition, oversampling rates are shown in table 5. For wealth items that are owned by a relatively large share of households, this rate is calculated as in table 1. For bonds, mutual funds and quoted shares the oversampling rate shows the ratio between the share of net sample households having the item and the weighted percentage of households having the item. These figures provide a possible explanation for country differences. In Italy the rates of oversampling are clearly lower than in Finland and the Netherlands, which indicates that the Italian survey has not been able to capture the wealthier households as well. Although the Dutch oversampling rates are even higher than the Finnish ones, the sample size is substantially smaller. For further research, when data for more countries with sufficient sample sizes are available, it would be interesting to refine this analysis to even smaller groups of the wealthiest households, the top 5 percent or even the top 1 percent.

Table 5: Shares of households holding assets and oversampling rates

	Finland		Italy		Netherlands	
	% having item	Rate of oversampling	% having item	Rate of oversampling	% having item	Rate of oversampling
Deposits	100.0	1.32[a]	89.2	1.06[a]	94.2	1.52[a]
Mutual funds	27.4	1.19[b]	6.3	1.00[b]	17.7	1.27[b]
Bonds	0.8	1.33[b]	13.9	1.11[b]	6.0	1.27[b]
Quoted shares	22.2	1.25[b]	5.7	0.97[b]	10.4	1.28[b]
Restricted financial wealth		1.40[a]		1.08[a]		1.62[a]
Aggregate financial wealth		1.47[a]		1.04[a]		1.56[a]
Real wealth		1.73[a]		1.03[a]		1.80[a]
Liabilities	59.8	1.37[a]	44.2	0.87[a]	65.7	1.20[a]

Source: Authors' calculations from Statistics Finland, Banca d'Italia, De Nederlandsche Bank.

a Percentage of (net) sample households in 10th net wealth decile / 10.

b Percentage of (net) sample households having item / weighted percentage of households having item.

Unfortunately, it is impossible to estimate the significance of individual measurement and estimation errors in the HS/NA ratios of financial assets. A tendency to under-report financial assets is visible in the data, while a look at sampling issues implies that the ability to get responses from the wealthiest part of the population also plays an important role. It should be, though, emphasised that wealth surveys are usually designed for other purposes than maximal coverage of aggregate wealth. Survey results are used for various kinds of analyses on all parts of the wealth distribution, and applying costly procedures for oversampling wealthy households would not always be a rational choice for the data collector.

Breakdown of wealth

The final step in the joint analysis of these data sources is breaking down macro data to groups of households with the help of micro data. In this article, the emphasis is on restricted financial wealth, definitions being comparable between the two sources. Two household classifications are used based on the work by OECD Expert Group on Disparities in a National Accounts Framework: household type and main source of income. In addition to the breakdowns the

significance of adjusting restricted financial wealth on the distribution of total financial wealth and total wealth is analysed.

Breaking down NA data on restricted financial wealth for household groups is undertaken in two steps. First, values for each of the four individual financial assets are broken down by household groups using data from the micro source. Second, the aggregate values from NA (adjusted for NPISHs and population coverage) are multiplied with the shares obtained in step one for each asset and each group of households. The methodology used relies on the assumption that the rate of under-reporting, whether related to households under-reporting the value of an existing item or to households not reporting having an existing item, is assumed to be randomly distributed across groups of households.

Due to conceptual discrepancies, breaking down other asset types from NA does not seem a feasible option. However, the distributional impact of adjusting restricted financial wealth to the NA level can be presented. The adjusted wealth concept used in the remaining part of this article will thus consist of:

1. **Restricted financial assets** (deposits, bonds, mutual funds and quoted shares): levels taken from NA, distribution from HS data.
2. **Other financial assets** (pensions, unquoted shares, other financial assets): levels and distribution taken from HS data, recognising the lack of coverage to NA.
3. **Real assets**: level and distribution taken from HS data, no information on coverage available, but coverage can be assumed to be relatively good.

Hence, this exercise could be interpreted as an adjustment of survey data rather than as a breakdown of NA.

Shares of asset values included in restricted financial wealth by household groups in HS data are shown in Appendix 3 tables A3.1.1 – 3.1.3, together with the population shares of corresponding groups. Appendix 3 tables A3.2.1 – 3.2.3 show the results of the breakdown of restricted financial wealth by items. These figures enable an analysis on how changes in NA totals presumably affect different population groups. For example, households with two adults and children possess 22 percent of total restricted financial wealth in both Finland and Italy, but only 16 percent in the Netherlands. Furthermore, the most risky asset, quoted shares, has a relatively high significance for this population group in Finland. As another example, for households with employee income as the

primary income source, relatively low shares of restricted financial wealth (compared with their population share) are observed in all countries.

Table 6 indicates the distribution of aggregate wealth items in HS data, both before and after NA adjustment. In Finland the significance of restricted financial wealth is bigger in the original survey data, especially in relation to total financial wealth. One main reason for this is that the register-based data does not capture self-employment businesses very comprehensively in comparison to survey data. Naturally, the lower the coverage of assets included in restricted financial is, the bigger the impact of adjustment to NA. As a result of adjustment to national accounts, the share of restricted financial wealth in total wealth is 20 – 24 percent and the share of financial wealth 22 – 37 percent of total wealth.

Table 6: Significance of restricted financial wealth in HS data before and after adjustments to the NA

County	Restricted financial wealth / total financial wealth		Restricted financial wealth / total wealth		Financial wealth / total wealth	
	HS data	After NA adjustment	Survey data	After NA adjustment	HS data	After NA adjustment
Finland	85 %	90 %	14 %	20 %	16 %	22 %
Italy	66 %	88 %	8 %	24 %	12 %	27 %
Netherlands	47 %	65 %	12 %	23 %	26 %	35 %

Source: Authors' calculations, Statistics Finland, Banca d'Italia, De Nederlandsche Bank.

Figures A3.1– A3.6 in Appendix 3 show the distributions of wealth by household type and main source of income for all three countries, first from survey data and then with adjusted figures for restricted financial wealth. For Finland, the adjustment has only a minor impact on the distributions. For Italy, the distributional impact is somewhat bigger, especially for financial wealth. The reason is the high share of self-employment business wealth in financial assets and low coverage of restricted financial wealth. Since the significance of self-employment business wealth is high only for certain groups of households (obviously, for those having self-employment income as main income source, as well as households with 3+ adults), and no adjustment is made for this asset type, households with larger shares of restricted financial wealth will "gain" more from the adjustment procedure.

In the Netherlands, the share of restricted financial wealth is only 47 percent of total financial wealth in the survey data. However, the majority of financial wealth is pension wealth, which is relatively equally distributed among the groups of households observed. Some changes in the distribution are observed after the

adjustment, mainly the share of total wealth decreases for households with two adults and children and households having employee income as the main income source.

Conclusion

This article compares and explores potential for linkages between micro and macro sources in regard to household balance sheets. Household wealth accounts, broken down by different household subpopulations, permit a differentiated analysis of their vulnerability, thus broadening and providing an invaluable input into financial stability analysis. Besides, this kind of approach permits the cross-checking of the results of both statistics. Finally, it also provides important value added to the analysis of welfare, in line with the recommendations of the Stiglitz, Sen and Fitoussi report (2009).

The development of these types of accounts is only starting and this article shows one of the first attempts to create household balance sheets that are broken down by household types. The G20 data initiative and the emphasis given to the Stiglitz, Sen and Fitoussi report (2009) show the political need of having this type consistent micro-macro analysis. However, only later – when these accounts are established – will we see how large in importance these are getting in the economic and social analysis.

The different composition/methodology underlying the two sets of statistics may require that comparisons of household wealth and income be undertaken with proper care. This article has analysed the case of three countries, Finland, Italy and the Netherlands, having comparable data from the macro and micro sources available.

Of balance sheet variables, deposits, bonds, mutual fund shares and quoted shares have similar definitions in the two sources. The results show that for these assets, micro data produces values that are 27 – 62 percent of the corresponding macro data values. While the differences are quite substantial, they do not contradict the previously observed difficulties in collecting data on financial assets from HS.

Data collection methods seem to explain the differences in the coverage of financial wealth only partially, primarily in Finland where the values for balance sheet items were collected from registers and through register-based estimations of varying quality. Probably the main lesson to be learned from this analysis is that to achieve better coverage the importance of collecting data from the wealthiest households should be stressed. This is of special importance for items that are owned only by a small share of households.

It should be emphasised that the low values of financial wealth in comparison to NA restrict the analytical power of survey data only to some extent. HS on wealth are, after all, conducted to make several kinds of analyses on all parts of the wealth distribution, not only on the wealthy. While low coverage rates suggest that data on the wealthiest households are somewhat biased, the negative impact on data quality for other parts of the distribution might be limited, given that most households do not own any other financial assets than deposits. Naturally, the general picture of wealth inequality will suffer from the inability to collect data from the top fractions of the distribution in HS.

Coverage issues might also be explained by the production process of NA figures. To satisfy balancing constraints, NA do not aim primarily to minimise bias in the household sector, but to minimise bias in the estimates for the economy as a whole. For example, if certain economic transactions for the household sector are derived as a residual, i.e. by subtracting from the estimated total the estimates of other institutional sectors, the level of household wealth will be overestimated in the macro source.

Survey data enables the breaking down of NA by groups of households, and this is among the first attempts to do this for wealth items. Due to conceptual issues and lack of suitable data on real assets in NAs, only the levels of deposits, bonds, mutual funds and quoted shares are adjusted to NA levels. The impact of this adjustment on the wealth distribution observed in the survey data was negligible in Finland, and only somewhat noticeable for certain individual household groups in Italy and the Netherlands.

Finally, it can be concluded that this is a useful first step in building linkage between wealth surveys and NAs. However, there is still much to improve and much work needs to be done in order to get the results fully usable. There is room for development in the area of measuring household real assets in NAs and improving the conceptual analysis of pensions and business wealth between the two sources. Additionally, the framework applied to the analysis of country data can be extended to the Euro area aggregate, in both cases based on consistent output-harmonised micro datasets.

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Appendix 1: Financial Assets in the Household Finance and Consumption Survey (HFCS) and in the National Accounts (NA)

HFCS/household survey	EAA/financial accounts	Comment
Identical or very similar definition		
Sight accounts	F2M Deposits	In the EAA, there is no further breakdown for deposits available.
Saving accounts		
Bonds and other debt securities	F33 Securities other than shares except financial derivatives	
Mutual funds	F52 Mutual fund shares	
Shares, publicly traded	F511 Quoted shares	
Several items corresponding to one item		
Voluntary pension/whole life insurance schemes (Public or social security account) (Occupational pension plans)	F61 Accumulated assets of life insurance and pension funds	Unfunded social security schemes are generally not covered by the NA. In the HFCS public and occupational pension schemes are collected on an experimental basis in some countries, and are not included in the analysis of this paper.
Net wealth in business, non-self-employment and not publicly traded; part of self-employed business wealth	F51M Unquoted equity	In HS, the total value of non-self-employment business wealth and self-employment business wealth from limited liability companies and cooperative societies is treated as financial assets of the household sector.
Other financial assets	F34 Financial derivatives	Financial derivatives in the EAA are always netted and, by convention, recorded on the liability side. Therefore financial derivatives owned by the households are recorded as a negative liability. These link only partially to the EAA concepts (for instance options, futures and index certificates).
Items not existing or very weakly corresponding with each other		
Amount owed to household	F4 Loans	In the EAA, these are practically loans to non-financial corporations. These are usually from households to small family businesses.

Assets in managed accounts	F2-F5,F7 Corresponding financial instruments (risk is carried by the investor)	
Other financial assets	F7 Other accounts	In the EAA, these include interest accruals and other accounts payable/receivable. These items are mainly counter-parts of the other liabilities/transitory items of corporations. In the HFCS, this item includes miscellaneous assets not reported elsewhere, some of which are in the EAA included in F34.
Other financial assets	F21 Currency	Currency not explicitly included in the HS.

EAA = Euro Area Accounts; HS = household wealth survey.

Appendix 2: Typology of Liabilities in the Household Finance and
Consumption Survey (HFCS) and the National Accounts (NA)

Household wealth survey (HS)	Euro Area Accounts (EAA)/financial accounts	Comment
Included in NA and HS		
Mortgages or loans using household main residence as collateral	F41 Loans, short-term F42 Loans, long-term	In the EAA, loans are split into short- and long-term loans. The short-term loans do not necessarily in practice include any mortgages. In the HFCS, the split is based on collateral but maturity of loan can be determined.
Mortgages or loans using other properties as collateral	F41 Loans, short-term F42 Loans, long-term	
Non-collaterised loans	F41 Loans, short-term F42 Loans, long-term	
Outstanding credit line/overdraft balance	F41 Loans, short-term	
Outstanding credit cards balance		
Not included in HS		
NOT INCLUDED	F34 Derivatives	In the EAA, negative balances may be generated out of options and futures sold by entities included in the household sector, but typically the household sector will tend to hold a total positive balance in financial derivatives (i.e. a negative liability).
	F51 Quoted and unquoted shares and equity	
	F61 Net equity of households in life insurance reserves and in pension fund reserves	Small enterprises in Italy, which are classified to the household sector, have direct pension commitments and this item covers only those.
	F7 Other accounts receivable/payable	This can be, for instance, late payments of households. This can also be counterpart for the other assets of financial corporations.

Appendix 3: Breakdown of wealth items by household groups

Table A3.1.1: Shares of deposits, bonds, mutual funds, quoted shares and households by household groups in household wealth survey (HS) data – FINLAND

	Deposits	Mutual funds	Bonds	Quoted shares	Restricted financial wealth	Share of all households
By household type						
1 person <65 years	12%	17%	18%	20%	15%	26%
1 person >64 years	13%	16%	4%	9%	12%	14%
Single parent	2%	2%	1%	3%	2%	3%
Two adults, no children	46%	37%	23%	38%	42%	33%
Two adults with children	20%	21%	53%	25%	22%	20%
Other	7%	7%	2%	6%	7%	5%
By main source of income						
Employee	52%	42%	29%	40%	47%	55%
Self-employment	5%	3%	4%	3%	4%	4%
Financial	2%	20%	47%	25%	11%	1%
Transfers	41%	34%	20%	32%	37%	41%

Table A3.1.2: Shares of deposits, bonds, mutual funds, quoted shares and households by household groups in household wealth survey (HS) data – ITALY

	Deposits	Mutual funds	Bonds	Quoted shares	Restricted financial wealth	Share of all households
By household type						
1 person <65 years	9%	8%	9%	13%	9%	13%
1 person >64 years	8%	3%	9%	3%	8%	14%
Single parent	1%	0%	1%	0%	1%	2%
Two adults, no children	34%	34%	42%	41%	36%	28%
Two adults with children	24%	24%	14%	20%	22%	26%
Other	23%	30%	25%	23%	24%	18%
By main source of income						
Employee	38%	49%	35%	36%	39%	47%
Self-employment	19%	17%	10%	20%	17%	12%
Financial	3%	5%	11%	7%	5%	1%
Transfers	40%	30%	43%	37%	39%	40%

Table A3.1.3: Shares of deposits, bonds, mutual funds, quoted shares and households by household groups in household wealth survey (HS) data – NETHERLANDS

	Deposits	Mutual funds	Bonds	Quoted shares	Restricted financial wealth	Share of all households
By household type						
1 person <65 years	20%	19%	13%	8%	18%	25%
1 person >64 years	12%	19%	36%	19%	16%	11%
Single parent	5%	1%	0%	0%	4%	10%
Two adults, no children	41%	47%	35%	56%	42%	29%
Two adults with children	19%	10%	7%	15%	16%	20%
Other	4%	4%	10%	2%	4%	6%
By main source of income						
Employee	53%	41%	26%	27%	47%	60%
Self-employment	7%	3%	3%	5%	6%	4%
Financial	3%	4%	2%	22%	4%	1%
Transfers	38%	52%	69%	46%	43%	34%

Table A3.2.1: Breakdown of deposits, bonds, mutual funds and quoted shares by household groups from National Accounts (NA) – FINLAND

	Deposits	Mutual funds	Bonds	Quoted shares	Restricted financial wealth
By household type					
1 person <65 years	8,617	2,081	877	4,506	16,082
1 person >64 years	8,897	2,052	174	2,020	13,143
Single parent	1,313	202	33	621	2,169
Two adults, no children	32,348	4,663	1,097	8,560	46,668
Two adults with children	13,895	2,616	2,520	5,536	24,567
Other	5,151	920	86	1,301	7,458
By main source of income					
Employee	36,349	5,292	1,369	9,060	52,070
Self-employment	3,613	398	191	660	4,862
Financial	1,333	2,561	2,265	5,695	11,854
Transfers	28,926	4,283	962	7,130	41,302
TOTAL	**70,221**	**12,535**	**4,786**	**22,545**	**110,088**

Table A3.2.2: Breakdown of deposits, bonds, mutual funds and quoted shares by household groups from National Accounts (NA) – ITALY

	Deposits	Mutual funds	Bonds	Quoted shares	Restricted financial wealth
By household type					
1 person <65 years	85,488	14,905	66,097	9,321	175,811
1 person >64 years	76,902	6,383	70,047	2,400	155,732
Single parent	12,732	587	6,389	118	19,828
Two adults, no children	327,990	63,241	313,767	29,931	734,929
Two adults with children	232,883	44,016	107,745	14,752	399,396
Other	221,380	55,313	183,262	16,472	476,427
By main source of income					
Employee	368,192	89,821	261,599	26,615	746,227
Self-employment	179,794	30,572	76,871	14,496	301,733
Financial	28,325	9,011	85,269	5,147	127,751
Transfers	381,064	55,041	323,569	26,738	786,411
TOTAL	**957,375**	**184,445**	**747,308**	**72,995**	**1,962,123**

Table A3.2.3: Breakdown of deposits, bonds, mutual funds and quoted shares by household groups from National Accounts (NA) – NETHERLANDS

	Deposits	Mutual funds	Bonds	Quoted shares	Restricted financial wealth
By household type					
1 person <65 years	66,497	8,881	4,937	6,648	86,962
1 person >64 years	40,963	8,785	13,972	14,753	78,474
Single parent	16,093	664	-	-	16,757
Two adults, no children	139,585	22,008	13,762	44,811	220,167
Two adults with children	63,074	4,803	2,685	12,063	82,626
Other	13,043	1,892	3,979	1,292	20,207
By main source of income					
Employee	178,913	19,274	10,366	21,712	230,265
Self-employment	22,399	1,387	1,184	4,055	29,027
Financial	8,556	1,949	686	17,461	28,651
Transfers	129,387	24,424	27,099	36,340	217,249
TOTAL	**339,255**	**47,034**	**39,336**	**79,568**	**505,192**
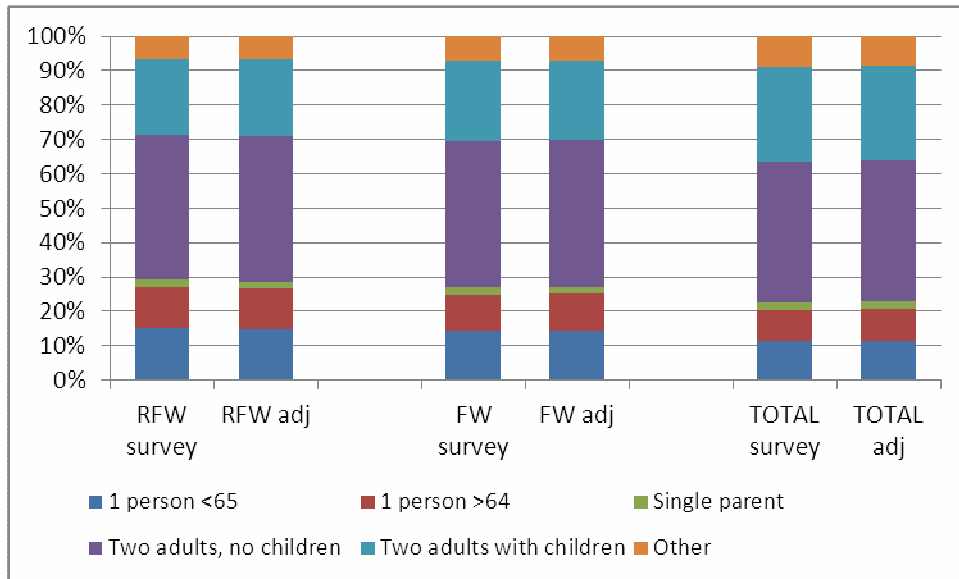
Figure A3.1: Distribution of restricted financial wealth (RFW), financial wealth (FW) and total wealth by household type, survey data and data adjusted for National Accounts (NA) – FINLAND
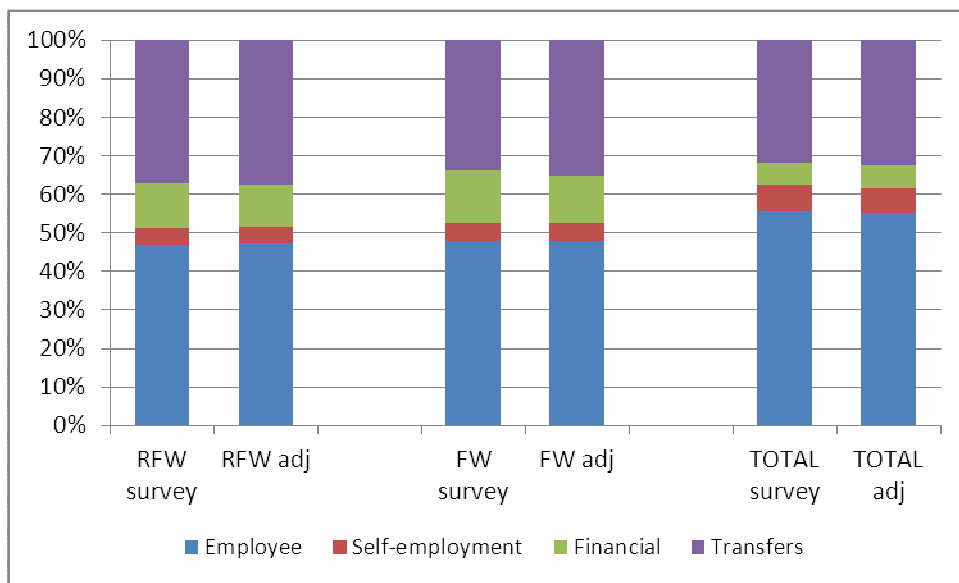

Figure A3.2: Distribution of restricted financial wealth (RFW), financial wealth (FW) and total wealth by main source of income, survey data and data adjusted for National Accounts (NA) – FINLAND
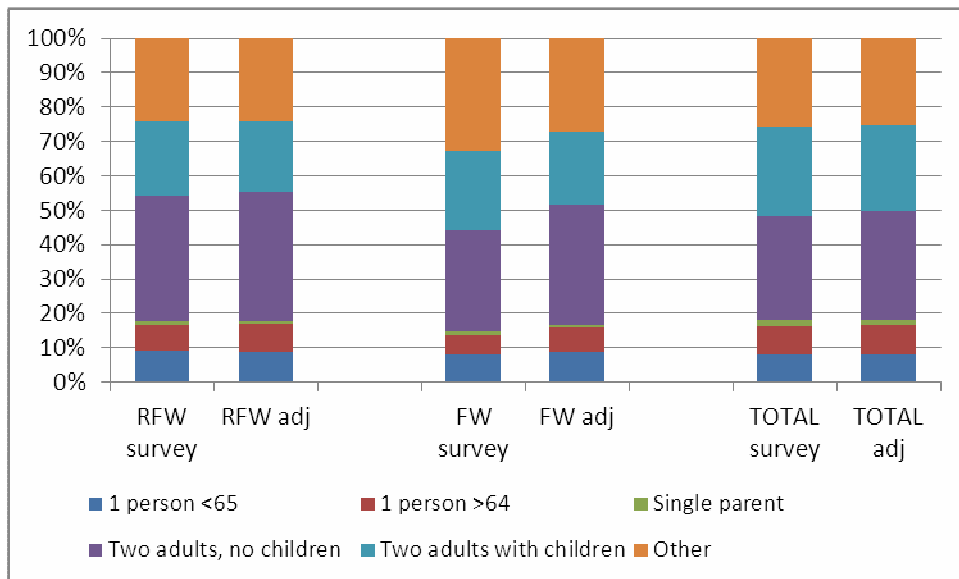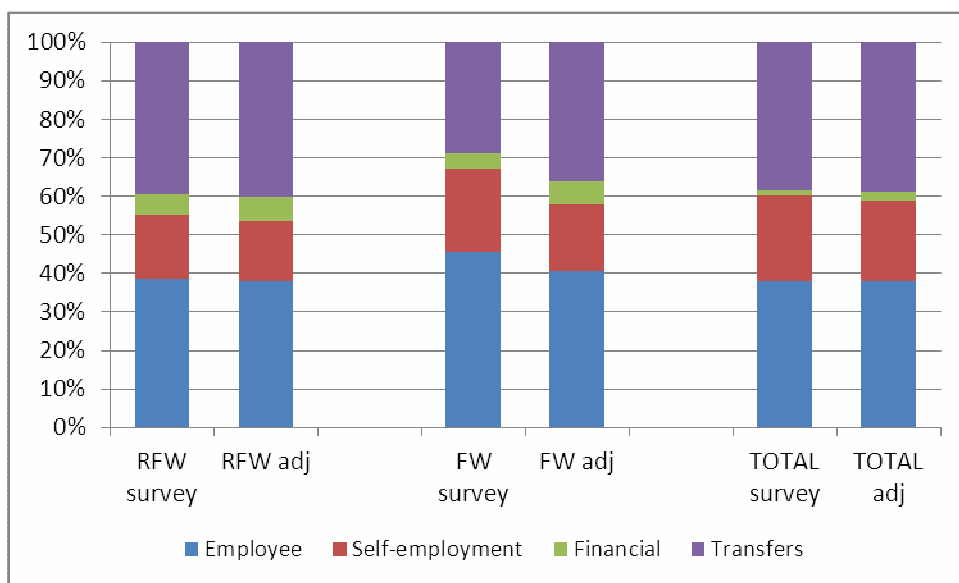
Figure A3.3: Distribution of restricted financial wealth (RFW), financial wealth (FW) and total wealth by household type, survey data and data adjusted for National Accounts (NA) – ITALY

Figure A3.4: Distribution of restricted financial wealth (RFW), financial wealth (FW) and total wealth by main source of income, survey data and data adjusted for National Accounts (NA) – ITALY
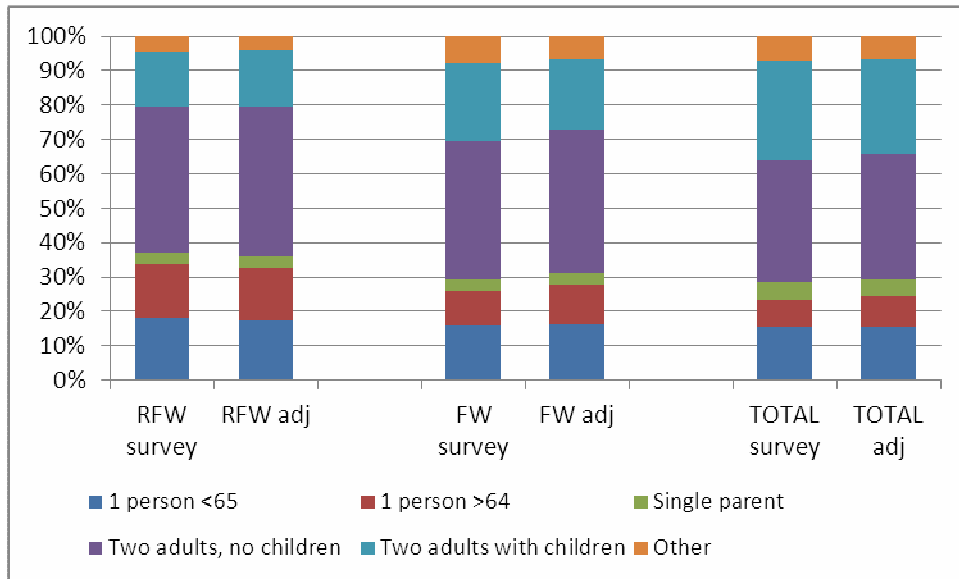
Figure A3.5: Distribution of restricted financial wealth (RFW), financial wealth (FW) and total wealth by household type, survey data and data adjusted for National Accounts (NA) – NETHERLANDS
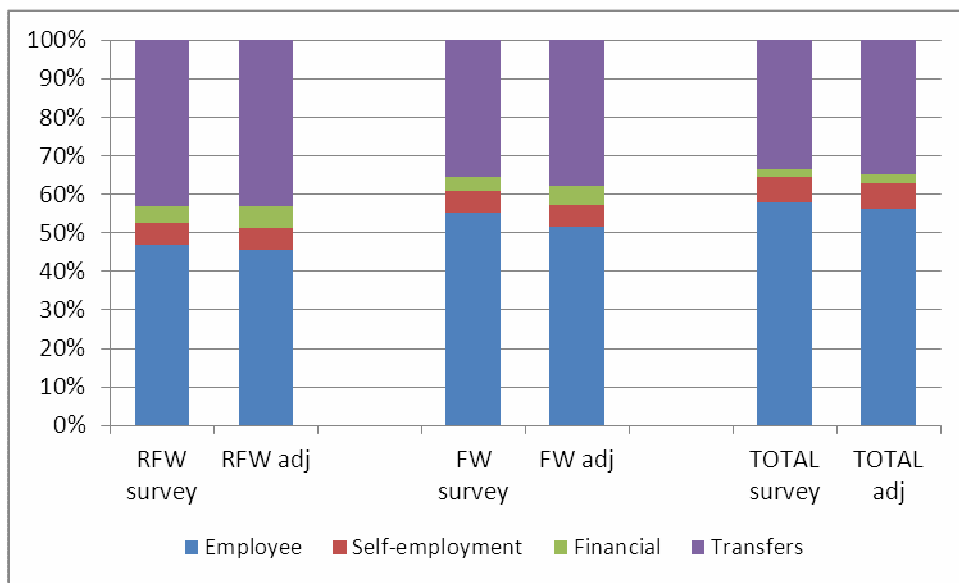

Figure A3.6: Distribution of restricted financial wealth (RFW), financial wealth (FW) and total wealth by main source of income, survey data and data adjusted for National Accounts (NA) – NETHERLANDS