

Andreasch, Michael; Lindner, Peter

Working Paper

Micro and macro data: a comparison of the Household Finance and Consumption Survey with financial accounts in Austria

ECB Working Paper, No. 1673

Provided in Cooperation with:

European Central Bank (ECB)

Suggested Citation: Andreasch, Michael; Lindner, Peter (2014) : Micro and macro data: a comparison of the Household Finance and Consumption Survey with financial accounts in Austria, ECB Working Paper, No. 1673, European Central Bank (ECB), Frankfurt a. M.

This Version is available at:

<https://hdl.handle.net/10419/154106>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



EUROPEAN CENTRAL BANK

EUROSYSTEM



In 2014 all ECB publications feature a motif taken from the €20 banknote.

WORKING PAPER SERIES

NO 1673 / MAY 2014

MICRO AND MACRO DATA A COMPARISON OF THE HOUSEHOLD FINANCE AND CONSUMPTION SURVEY WITH FINANCIAL ACCOUNTS IN AUSTRIA

Michael Andreasch and Peter Lindner

HOUSEHOLD FINANCE AND
CONSUMPTION NETWORK

NOTE: This Working Paper should not be reported as representing the views of the European Central Bank (ECB). The views expressed are those of the authors and do not necessarily reflect those of the ECB.



Household Finance and Consumption Network

This paper contains research conducted within the Household Finance and Consumption Network (HFCN). The HFCN consists of survey specialists, statisticians and economists from the ECB, the national central banks of the Eurosystem and a number of national statistical institutes.

The HFCN is chaired by Gabriel Fagan (ECB) and Carlos Sánchez Muñoz (ECB). Michael Haliassos (Goethe University Frankfurt), Tullio Jappelli (University of Naples Federico II), Arthur Kennickell (Federal Reserve Board) and Peter Tufano (University of Oxford) act as external consultants, and Sébastien Pérez Duarte (ECB) and Jiri Slacalek (ECB) as Secretaries.

The HFCN collects household-level data on households' finances and consumption in the euro area through a harmonised survey. The HFCN aims at studying in depth the micro-level structural information on euro area households' assets and liabilities. The objectives of the network are:

- 1) understanding economic behaviour of individual households, developments in aggregate variables and the interactions between the two;
- 2) evaluating the impact of shocks, policies and institutional changes on household portfolios and other variables;
- 3) understanding the implications of heterogeneity for aggregate variables;
- 4) estimating choices of different households and their reaction to economic shocks;
- 5) building and calibrating realistic economic models incorporating heterogeneous agents;
- 6) gaining insights into issues such as monetary policy transmission and financial stability.

The refereeing process of this paper has been co-ordinated by a team composed of Gabriel Fagan (ECB), Pirmin Fessler (Oesterreichische Nationalbank), Michalis Haliassos (Goethe University Frankfurt), Tullio Jappelli (University of Naples Federico II), Sébastien Pérez Duarte (ECB), Jiri Slacalek (ECB), Federica Teppa (De Nederlandsche Bank), Peter Tufano (Oxford University) and Philip Vermeulen (ECB).

The paper is released in order to make the results of HFCN research generally available, in preliminary form, to encourage comments and suggestions prior to final publication. The views expressed in the paper are the author's own and do not necessarily reflect those of the ESCB.

Acknowledgements

We would like to thank Nicolás Albacete, Pirmin Fessler and Martin Schürz for very helpful discussions and comments. Additional to the usual disclaimer, the opinions expressed in this study solely represent those of the authors and do not necessarily reflect the official viewpoint of the Oesterreichische Nationalbank or of the Eurosystem.

Michael Andreasch

Oesterreichische Nationalbank; e-mail: michael.andreasch@oenb.at

Peter Lindner

Oesterreichische Nationalbank; e-mail: peter.lindner@oenb.at

© European Central Bank, 2014

Address	Kaiserstrasse 29, 60311 Frankfurt am Main, Germany
Postal address	Postfach 16 03 19, 60066 Frankfurt am Main, Germany
Telephone	+49 69 1344 0
Internet	http://www.ecb.europa.eu
Fax	+49 69 1344 6000

All rights reserved.

ISSN	1725-2806 (online)
EU Catalogue No	QB-AR-14-047-EN-N (online)

Any reproduction, publication and reprint in the form of a different publication, whether printed or produced electronically, in whole or in part, is permitted only with the explicit written authorisation of the ECB or the authors.

This paper can be downloaded without charge from <http://www.ecb.europa.eu> or from the Social Science Research Network electronic library at http://ssrn.com/abstract_id=2431299.

Information on all of the papers published in the ECB Working Paper Series can be found on the ECB's website, <http://www.ecb.europa.eu/pub/scientific/wps/date/html/index.en.html>

This paper compares the survey results on savings deposits and estimates on total financial assets from the Household Finance and Consumption Survey (HFCS) in Austria with administrative records from the national accounts for the household sector. The micro data newly generated through the HFCS and the detailed (internally available) breakdowns of savings deposits in the existing macro data (Financial Accounts) lend themselves to a more in-depth analysis of the similarities and differences in these two sources than what has been done in the literature so far. Cross-checking the data shows that the HFCS-based aggregate estimates differ from the financial accounts data, which is line with evidence from the literature, but additionally the paper adds to the literature that the underlying patterns have been captured adequately by the survey at the micro level. Moreover, a simulation based on the HFCS data serves to demonstrate the effect that the inclusion of savings deposits in the most affluent tail of the distribution has on common statistics. Undercoverage above all of the upper deposit ranges suggests an underestimation or bias in the statistics. This underestimation, however, can be shown to be relatively minor, in particular in the case of robust statistical measures such as the median or percentile ratios.

JEL Codes: C80, D30, D31, E01, E21

Non-technical summary

The paper compares and analyses the information from the newly established Household Finance and Consumption Survey (HFCS) and parts of the National Accounts for Austria. The main focus lies in the comparison of the data on financial wealth, especially an in depth comparison of one of the most widely held types of financial asset holdings of households. These are saving deposits, accounting for more than one third of the financial assets in both the survey and the financial accounts data. Detailed breakdowns according to the banking sector and asset holding ranges are under investigation. These asset holding ranges are pre-specified magnitudes of savings, e.g. the first range or category goes from no wealth to EUR 10.000 and the highest one is over EUR 3 million. This classification is due to banking supervisory reporting requirements, which call for a reporting of both the number of accounts and aggregate savings in these pre-specified magnitudes. Doing so, one can get a deeper understanding of the similarities and differences of the two datasets that goes beyond the comparison of aggregate values which has been commonly done in the literature so far.

Although there are differences between the two sources of data most obviously in the way the data are collected, but also in the classification/definition of certain types of assets and the unit of data collection, the structure of financial assets is comparable in both data sources. The analysis sets out from the well-known fact in the literature that (comparable) aggregate financial wealth is underestimated in surveys. In Austria the estimate of comparable aggregate financial wealth in the survey is around 44% of the according figure in the National Accounts. However, one can also look at aggregate portfolio composition of the various types of financial assets. With some exceptions the relative share of assets in each type follows a remarkable similar pattern in both data sources in the euro area countries covered in the HFCS.

In Austria, one can - given the internal data availability - further analyse / compare deposits in more depth. The results from both data sources show that there is a relatively close match in the structure and the distribution of saving deposits over the banking sectors. The distribution of aggregate saving deposits over asset holding ranges is at the household level in the HFCS shifted to higher ranges in comparison to the data from the banking statistics used in financial accounts. This is due to the differences of the unit of collection, which is a savings account attributed to the household sector in the banking statistics and a household in the HFCS, which on average holds more than one savings account. Only the top two categories with wealth in savings accounts in excess of 1 million € are not covered in the HFCS in Austria.

There are, however, less than 0.01% of the accounts (in total there are about 23.5 million accounts in Austria) in the top two categories altogether. Additionally, mean holdings and (relative) number of accounts according to the banking sector and holding category are discussed in the paper. The results confirm that the structure of the distribution of deposits is similar in both data sources and the top asset categories are not reached in the HFCS. Thus, given the detailed administrative records internally available, this paper adds to the literature demonstrating not only the discrepancies at the aggregate level but also the similar structure in terms of the distribution over asset ranges and banking sectors.

Furthermore, extending the results in the literature, the analysis attempts to answer how the two ranges with the highest savings assets affect key statistics of wealth in savings accounts in the HFCS. Simulating households in these two categories including a re-calculation of final household weights with these households allows us to estimate the impact on several statistics. This exercise shows that the impact on robust statistics (i.e. median, percentile ratios) is negligible, i.e. the change is below 0,5% in absolute value. This results points towards reliability of the robust statistics from surveys even so the highest asset ranges are not covered. As expected there is a stronger effect on the estimates of aggregate level of savings wealth and accordingly on the mean from the survey data of about 9%. Inequality in savings account measured by the Gini-Coefficient is affected and increases by about three percentage points.

1. Introduction

In recent years, survey data have become an important tool in the research field on assets and debt. These data often constitute the only pool of data on household assets that are collected systematically at the micro level. Yet surveys on household assets have a shorter tradition than income surveys.² For this reason, survey data on incomes have been compared with income data from other sources more frequently and in greater detail in the literature. The innovation of the Household Finance and Consumption Survey (HFCS) is that it provides a harmonised framework for collecting information on euro area households' (financial and nonfinancial) assets and liabilities that represents a basis for euro area wide analyses.

Although all forms of data compilation come with their own specific problems, various difficulties attached to surveys attract special criticism, such as nonparticipation or nonresponse. A key criticism is that households often decline to participate in the generally voluntary surveys or that, if they do agree to participate, they provide incorrect information or refuse to respond to particular questions. In addition, survey data are also influenced by the methods for conducting surveys, e.g. the interview method (see Fessler et al., 2012). Hence, to identify the strengths and possible weaknesses of the HFCS data, it is useful to thoroughly compare them with other national statistics. Doing so, one needs to bear in mind that also the macro data exhibit certain weaknesses. The most obvious one is that data from the financial accounts are (publicly) only available at the aggregate level and thus it is not possible to attempt a distributional analysis. Additionally, however, as will become clearer later on, there are also issues concerning classification of the data (households vs. self-employed businesses / other institutions) and estimations (e.g. cash holdings). Thus it is far from clear that one or the other source of data present a better choice for all investigations, and cross-checking the results of the HFCS survey with other national statistics contributes to a better understanding of the economy, as different data sources tend to generate complimentary findings. Also in the light of the "Report of the commission on the measurement of economic performance and social progress" from Stiglitz et al. (2009) which recommended to "[g]ive more prominence to the distribution of income, consumption and wealth" (Recommendation 4 on page 13.) one has to analyse and understand the integration of micro and macro data to a greater extent.

One of the general cross-checking results documented here is evidence that the HFCS in Austria underrepresents households' financial assets: Total financial assets as identified by the

² See, for example, the Statistics on Income and Living Conditions (EU-SILC), which national institutions have been compiling for 10 years or more.

HFCS come to roughly 40% of total financial assets as shown by the financial accounts (table 2). Essentially, this finding corresponds to similar comparisons of survey data and administrative records described in the literature (section 2). Due to the internal availability of administrative records on financial wealth the paper contributes to the existing literature in the following ways. First, we compare the allocation of savings over different deposit ranges and different sectors of the Austrian banking system as these are recorded by both the HFCS and existing national statistics (hence the paper goes beyond a comparison of the aggregate statistics). We find that the deposit patterns are similar in both the survey data and the banks' reports. Furthermore, a microsimulation of the upper deposit amounts, which are underrepresented in the HFCS, shows that the ensuing (negative) bias is relatively low in particular for statistical robust estimates. Thus, depending on the issue being researched, both the aggregated data of the national accounts and the HFCS data represent a valid basis for empirical evaluations.

This paper is structured as follows. In section 2, we establish a link between this paper and existing literature that also compares micro and macro data. Section 3 provides a detailed explanation of the data used. The results of the comparison are presented in section 4. In line with the approach commonly used in other analyses, we compare aggregate estimates in a first step, in this case for Austria. Next and additional to what has been done in the literature so far, we provide a cross-check of the HFCS data with the banking statistics (used for the compilation of financial accounts) in a detailed breakdown of deposits on sight accounts and savings accounts. The simulation of the upper savings deposit ranges, which are not covered by the HFCS, along with the evaluation of the impact of undercoverage on the main estimators constitutes an additional focus of this analysis (section 5). The analysis is rounded up with concluding remarks and suggestions for further research.

2. Background

The comparison of survey data with data derived from administrative sources is a familiar approach in the scientific literature. As data on flows of the household balance sheet, in particular from administrative sources, are more readily available than data on household stocks, most studies have been limited to evaluating information on incomes. As a case in point, Törmälehto (2011) compares the data collected by the Luxembourg Income Study

Group (LIS)³ with income aggregates in the national accounts. He observes that surveys capture over 90% of income in most countries, admittedly with a lower degree of coverage in some income subcategories. For the U.S.A., in their analysis, Davis and Fisher (2008) find some differences between individual income sources using data from the Current Population Survey (CPS) and the Survey of Income and Program Participation (SIPP)⁴ matched with administrative data from the social security administration. Using the same datasets, Roemer (2002) is able to show that the surveys accurately capture the underlying patterns of income distribution. For a respondent's position in the income distribution, it is after all fairly irrelevant whether his or her annual income is given as USD 2,000 or USD 1,000 even though, in the event of a (potentially) incorrect response, an absolute difference of 50% between the two sums is quite high. Roemer also points out the problems underlying income distributions based on administrative data (e.g. because illegal work and related income are not captured in the administrative data). Kavonius and Törlälehto (2003) compare income aggregates of various sources from survey data⁵ with national accounts data for Finland. While wages and incomes are nearly identical in both data sources, the data for investment income and self-employment income differ. Brickler and Engelhardt (2007) report on measurement error in earnings data for men and for women in the United States. To this end, the authors compare administrative records of the Social Security Administration (SSA) and of the Internal Revenue Service (IRS) with the survey data in the Health and Retirement Study (HRS). As the data can be matched precisely, the authors are able to identify a measurement error of about 6% in men's incomes and of approximately 7% in women's incomes. Finally, Kapteyn and Ypma (2006) research measurement error on the basis of data from the Swedish Longitudinal Individual Data Base (LINDA) compared with information from the Survey of Health, Ageing, and Retirement in Europe (SHARE).⁶ In this paper, the authors show that erroneous observations lead to biased estimators in a variance analysis. Errors are found not just in survey data, but also in the administrative data. Using several examples, the authors demonstrate that the administrative data are biased, so that it must not be assumed that the administrative data fully capture reality. To sum it up, income data from both survey and administrative sources are subject to errors; the resulting bias of the

³ Information on the Luxembourg Income Study Group (LIS) may be found at <http://www.lisdatacenter.org/> (retrieved on 22 June 2012).

⁴ For further information, see <http://www.census.gov/cps/> (CPS) and <http://www.census.gov/sipp/> (SIPP).

⁵ The authors use the Income Distribution Survey (IDS).

⁶ Information on these data is available at http://www.scb.se/Pages/Product_34441.aspx (LINDA) and <http://www.share-project.info/index.php?id=98&L=0> (SHARE).

estimators should be low; and, in most studies, the differences between the data result from specification differences (definitions of the unit of collection, of types of income, etc.).

The literature has not produced as many findings on stocks of the household balance sheet. As early as in 1988, Avery et al. (1988) were the first to compare aggregate estimates based on survey data with national accounts data (i.e. flow-of-funds statistics). The authors showed that aggregate savings deposits as documented by the Survey of Consumer Finance (SCF) amounted to less than 50% of aggregate savings deposits as captured by the flow-of-funds statistics. However, this difference is offset by the discrepancy between the two data sources with regard to the wealth of households, which is held in the households' main residence if they own it rather than rent it. Thus the estimate of households' gross assets is quite similar in both data sources. In a more recent paper based on the same data, Henriques and Hsu (2012) additionally show that the changes in the aggregate values have broadly synchronized over time. Similarly to Avery et al. (1988), Antoniewicz et al. (2005) examined the coverage of financial assets and liabilities of the household sector in three surveys performed for Italy, the U.S.A., and to some extent for Canada. With regard to Canada, for which data were available for 1999, the micro data on deposits and total liabilities were around 30% lower than the macro data. This result is echoed by the micro data for Italy, which are based on the Survey on Household Income and Wealth (SHIW): the estimate for total financial assets in the SHIW came to 31% of the corresponding macro data. However, an adjustment for underestimation and nonresponse produces a significant improvement of underreporting. In the United States, the survey data (Survey on Consumer Finances – SCF) are closer to the flow-of-funds data. Sierminska et al. (2006) compare the data of the Luxembourg Wealth Study (LWS)⁷ for several countries with national statistics. The authors show that the varied sources on which the LWS database is based capture between 13% and 117% of per capita household wealth. The administrative data are subject to some problems, so that an estimate of per capita household wealth in the LWS database equalling 117% of the estimate based on national statistics is not necessarily a sign of a lack of quality of the surveys used. With a ratio of the LWS database to the national balance sheet of between 65% and 117%, the match between micro and macro data of nonfinancial assets is closer than that of financial assets (with an LWS to NBS ratio of between 13% and 52%). Finally, Johansson and Klevmarken (2007) used information from the administrative LINDA database and from two surveys conducted

⁷ For further information on this data source, see <http://www.lisdatacenter.org/our-data/lws-database/> [retrieved on 2 December 2013].

in Sweden⁸ to identify measurement error, their correlation with the volume of assets, and the effects on regression analyses. The authors come to the conclusion that measurement error correlated with the volume of assets occurs above all at the tails of the distribution. In an independent effort at approximately the same time that this paper is written Kavonius and Honkkila (2013) looked at the comparison of the HFCS with National Accounts for Finland, Italy and the Netherlands. However, Kavonius and Honkkila (2013) also only look at a comparison of aggregated values. The analysis below extends the literature on the one hand by looking at detailed categories in terms of asset ranges and banking sectors and on the other hand by simulating the potential impact of the highest saving levels on commonly used statistics.

3. Data and definitions

This analysis is based on two different datasets from Austria,⁹ data derived from the Household and Finance and Consumer Survey (HFCS) and administrative banking statistics used to compile the financial accounts. Both types of data are compiled and managed by the OeNB. In the section below, the data sources are described in more detail.

The HFCS in Austria

The HFCS is the most comprehensive survey on household assets and debt conducted in Austria. Out of a stratified cluster random sample of 4,436 households, 2,380 households agreed to participate in the voluntary survey and were interviewed personally (CAPI¹⁰) among other things about the different components of household assets and liabilities. The field phase was conducted from the third quarter of 2010 to the second quarter of 2011. Most of the missing information (i.e. information not provided by respondents) was imputed using a Bayesian-based multiple imputation procedure (this is explained in more detail below). On the basis of sample design weights and after nonresponse adjustment, the final household weights used in the evaluations in this analysis were post-stratified both by regional distribution of the households and by distribution of household size.¹¹ In particular, this means that the weights were not adjusted to meet the aggregates or the structure of wealth and debt positions of an

⁸ However, as both surveys refer to Swedish residents aged 50 and over, the results are not fully transferable to the general population.

⁹ Given the ex ante harmonisation of the HFCS, it may be assumed that the results for Austria are similar to those for other countries.

¹⁰ Computer-assisted personal interviewing.

¹¹ For a detailed documentation of the HFCS datasets, see Albacete et al. (2012) and Fessler et al. (2012).

administrative data source. Hence, differences between the two separate data sources are to be expected; they have not been reduced or ruled out ex ante in the production process.

The financial accounts in Austria

The financial accounts are an integral part of the national accounts and as such compiled “in accordance with the rules of the European System of Accounts 1995 – ESA 95”¹² based on data derived from a variety of administrative sources. In particular, the following components are used for the compilation of the data on deposits:

- The OeNB’s financial statements, MFI (monetary financial institution) balance sheet statistics,
- supervisory statistics of banks resident in Austria,
- quarterly/annual balance of payments and international investment position data.

We used the financial accounts data for the reporting date 31 December 2010 (i.e. in the middle of the field phase of the HFCS) for comparison with the HFCS results. The focus of our analysis is not just on establishing the discrepancies between the aggregate values – as documented in the literature for similar international surveys – but above all on assessing the allocation of deposits to small ranges of volume and to the different sectors of the Austrian banking system. These data from the banking statistics are an important component of the financial accounts. This approach allows for the documentation of new and more detailed findings on the similarities and differences between macro and micro data.

Definition of the unit of collection

The household represents the unit of collection in the HFCS. All households in Austria (except institutionalized households living e.g. in a home for the elderly, monastery, military compound, or prison) are part of the target population, irrespective of their nationality, and thus have a positive probability of being selected for the HFCS sample.

By contrast, the banking statistics in the financial accounts capture the information on (euro-denominated) savings accounts not by households but by accounts. These accounts can be allocated to the sector of (domestic) households and self-employed persons. The reports cover the accounts of all Austrian residents (persons or institutional units). The household sector includes consumer households, self-employed persons and sole proprietorships. The

¹² Sector Accounts in Austria 2010. OeNB (2011) page 51.

household sector consists of both households that perform entrepreneurial activities (self-employed businesses) and consumer households. Financial assets and liabilities for the self-employed businesses are shown on a gross basis in the financial accounts. In the HFCS, wealth of self-employed persons and sole proprietorships is classified as net wealth in self-employment business, i.e. total assets (real and financial) minus liabilities, and is thus not recorded as part of the financial wealth but rather are part of real assets.

Specification of cross-checking data

The data available allowed for a comparison not only of the aggregate values, but also of transferable deposits (F.22) and savings deposits (as a subcomponent of other deposits, F.29) in a particularly detailed way. Exploiting this detailed information from administrative sources provides the opportunity to extend the results in the literature, investigating financial assets not only total values but also the distribution over asset ranges and banking sectors.

The HFCS in Austria includes one question on sight accounts and two sets of questions on savings accounts. First, households are asked to specify the total amount of their savings deposits, broken down by (i) savings other than savings with building societies and (ii) savings with building societies.¹³ Second, households are asked to indicate which banks they use¹⁴ based on a predefined list of the largest 21 banks and an additional verbatim recording for other institutions (up to five banks could be reported) and to specify how much money they hold in savings accounts and custody accounts at these banks, starting with the bank at which they hold the highest amount. The data from the first survey method are contained in the dataset published by the ECB as current account and savings account (including savings in building societies) information and therefore are used as the cross-checking basis for this study. However, the ECB dataset does not contain any information about the allocation of households' savings to the individual sectors of the Austrian banking system which is only available internally. The cross-checking results from the second set of questions (amounts held at different banks) are in the appendix to this study as a sensitivity analysis and in general confirm the findings of the paper.

As explained, households were asked in the HFCS to indicate which banks they use rather than specifying the amounts held on individual accounts. If a household has several accounts

¹³ Note that life insurance funds must be subtracted from variable HD1210 of the version of the HFCS in Austria published by the ECB (this variable covers savings accounts) to ensure comparability with the values in the financial accounts (deposits on savings accounts and savings with building societies).

¹⁴ Respondents were asked: "At which Austrian bank does your household have a deposit account (e.g. sight account, savings account, savings plan with a building society) or a securities custody account?"

at one and the same bank, the dataset records a customer relationship with a single bank. If a household has accounts at different banks, the dataset reflects customer relationships with several banks. The overwhelming majority of Austrian households use only a single bank – more than 91% of respondents in the HFCS – and only 2% of households have accounts with more than two different banks. However, households can be expected to have more than a single account with their so-called house bank. The first bank recorded, i.e. the one at which the household holds the highest volume of funds,¹⁵ is also the one to which households are classified for the results here.

The deposit aggregates may be subdivided into sight accounts and savings deposits by bank sectors on the basis of the administrative account data that Austrian banks report to the OeNB. In addition, the total in savings accounts (only totals of domestic nonbanks, which include the self-employed and sole proprietorships) may be further subdivided by deposit ranges. Data of the following bank sectors may be separately analysed both on the basis of the banking statistics data and on the basis of the information provided on customer relationships in the HFCS:

- Joint stock banks
- Savings banks
- Raiffeisen credit cooperatives
- Volksbank credit cooperatives
- State mortgage banks
- Other (national)

Building societies are classified under the respective sector of the households' (house) bank, as customers associate their building society savings plans with their (house) bank (even though legally speaking, the deposits are held with a bank other than their house bank). The category "other (national)" is differently defined for the results from the HFCS and the banking statistics. In the HFCS, the households could choose to have a customer relationship with a bank from a predefined list of the 21 largest banks in Austria. In case the household wanted to state a different bank, a verbatim recording was available. If a respondent left the verbatim recording blank, the relationship was classified in the "other (national)" category, since these responses could not be classified to a banking sector ex post.¹⁶ In the banking

¹⁵ In the alternative calculation in the annex, households are mapped with the amounts held in the respective banks with the possibility to report up to five different banks.

¹⁶ In addition, this category contains two households that provided information about a nonresident bank.

statistics, “other” refers to special purpose banks and banks as defined in Article 9 Austrian Banking Act (credit institutions from EU Member States). If a household has provided information about one of these banks in the verbatim text field, it was also classified to the category “other”. Given the different definitions, no comparisons of this category were made; it is provided simply for the sake of completeness. Deposits can be allocated to the following ranges based on the administrative account data (the HFCS permits any type of classification):

- Up to €10,000
- €10,000 to €20,000
- €20,000 to €50,000
- €50,000 to €100,000
- €100,000 to €500,000
- €500,000 to €1,000,000
- €1,000,000 to €3,000,000
- Over €3 million

With data available in the banking statistics on both the number of accounts and the total volume of deposits, it is possible to calculate the average deposit holdings per account in a given deposit range for each and every bank sector separately. This average can be compared with the HFCS results for individual households. Due to the differences in the unit (account vs. household), however, one is expecting differences in the overall statistics since (potentially) several accounts are held by a single household (as explained above). Given the structure of the HFCS, where all accounts of a household are totalled, it might be expected that average deposits tend to be higher.

Historical background and imputations

In the Austrian financial landscape, savings accounts used to enjoy a special position for a very long time, as depositors were able to hold numbered accounts and thus remain anonymous. Opening anonymous accounts has been prohibited by law since 2000;¹⁷ since then customers have been required to provide identification when opening an account. In theory, it is still possible to hold anonymous accounts even today, as the requirement imposed on banks is to identify accounts only if there are withdrawals or payments into the account. Additionally, the identification of existing savings accounts is reported to the Austrian Federal

¹⁷ See Austrian Federal Ministry of Finance at http://www.bmf.gv.at/finanzmarkt/geldwschereiuundterr_2675/grundlageninsterreich/dasverbotanonymersp_2681/start.htm [retrieved on 6 June 2012].

Ministry of the Interior only for withdrawals from deposit accounts with an amount of above €15,000. The historical development of identification requirements for savings accounts and the tradition of keeping information about household wealth, especially savings, confidential – households consider this information personal and sensitive – explains households’ reticence in providing information on the volume of holdings in savings accounts in the survey.

Table 1: Share of imputed observations

	Number	Share
Not applicable (no value due to use of filter)	295	12,4%
Value collected, complete observation	1.321	55,5%
Edited, value collected was incorrect	2	0,1%
Imputed, originally - Don't know	83	3,5%
Imputed, originally - No answer	244	10,3%
Imputed, originally not collected due to higher order missing	38	1,6%
Imputed, originally collected from a range or from brackets	381	16,0%
Imputed, collected value deleted or value not collected due to CAPI error	16	0,7%
Total	2.380	100%

Source: HFCS Austria 2010, OeNB.

Based on the flags¹⁸ used for the variable for deposits on savings accounts (HD1210), table 1 shows that (only) about 56% of respondent households provided the exact amount of holdings in savings accounts. Approximately 4% of households could not (“don’t know”) and about 10% did not want to (“no answer”) provide data. An additional 16% of households provided range estimates, as they were unable to indicate specific amounts. This shows that in a voluntary survey like the HFCS, not just unit nonresponse (refusal to participate) but also item nonresponse (refusal to answer particular questions) represents a difficulty, especially when questions cover such sensitive issues.¹⁹ As the (partial) lack of answers cannot be considered purely random, the exclusion of these households (commonly referred to as “listwise deletion” or “complete case analysis” in the literature) results in a distortion of the estimators. Thus, in line with the procedures applied in the recent literature, the missing information in the HFCS was imputed using Bayesian-based multiple imputation²⁰ and was then used in the estimations taking into account the multiple imputation structure in this study.

¹⁸ The flags are used to describe the origin of every observation, i.e. whether data was collected (exactly or as an interval), edited or imputed.

¹⁹ A related topic to the (partial) missingness of information is measurement error in surveys. This issue is already addressed in the literature (see e.g. Finally, Kapteyn and Ypma (2006) for information on income, and Johansson and Klevmarken (2007) for information on assets [discussed in section 2]). It is, however, out of the scope of this paper, since there is no possibility to link observations from the survey with administrative records for financial wealth and hence measurement error cannot directly be evaluated.

²⁰ See Albacete et al. (2012) for an in-depth explanation of the imputation procedure applied. Five imputation samples are provided in the HFCS and used in the estimations in this paper.

4. Results of the comparison of HFCS and financial accounts data

4.1. Aggregates

It is possible to estimate the major aggregate components of financial assets classified in the financial accounts from the HFCS as well. The definitions of the information collected in the HFCS and reflected in the macro statistics of the financial accounts are broadly comparable. We will here only point towards Kavonius and Törmälehto (2010), which have documented the link between the HFCS variables and the ESA definitions in detail rather than explaining the links again. The following picture emerges for Austria²¹ (table 2), with the top part of the table showing the comparable components including the share of each component in terms of total comparable financial wealth and the bottom part showing the components that are not covered by one of the two data sources.

Table 2: Comparison of HFCS and financial accounts aggregates

	HFCS		Financial accounts			HFCS/financial accounts ratio
	Total, € million	Share	Total, € million	Share	ESA	
Sight accounts	11.847	7%	16.543	4%	AF.22	72%
Savings accounts (excluding life insurance)	60.287	34%	150.849	38%	AF22/AF.29	40%
			36.405	9%		n.a. ²
			1.043	0%	AF.331	
Bonds and other debt securities	13.635	7%	40.515	10%	AF.332	33%
Shares, publicly traded	5.384	3%	18.153	5%	AF.511	30%
Net wealth in business, non self-employment and not publicly traded (HD1010)	2.249	1%	3.372	1%	AF.512	67%
Funds	20.852	12%	40.976	10%	AF.52	51%
Life insurance policies	38.571	22%	67.765	17%	AF.611	57%
Pension wealth	20.531	11%	16.238	4%	AF.612	126%
Value of any other financial asset (HD1920)	1.650	1%	8.794	2%	AF.7/AF.34	19%
Comparable financial assets	175.006	100%	400.654	100%		44%
Components not contained in one of the data sources						
			16.863	4%	AF.21	
			120	0%	AF.41	
			38.620	8%	AF.513	
			9.612	2%	AF.62	
Debt to households	6.151	3%				
Managed accounts	5	0%				
Total financial assets ³	181.161	100%	465.749	100%		39%

Source: HFCS Austria 2010, OeNB; OeNB financial accounts.

¹ In the financial accounts, savings accounts also include non-euro savings accounts, which accounts for a small discrepancy between this aggregate and the comparable value in table 5. Some roughly €6.8 billion on other accounts in the household sector are included in "Other accounts" here.

² The special item "other accounts" of total accounts in the financial accounts includes all time deposits that cannot be assigned to sight or savings accounts as well as savings abroad. To improve comparability, they were stated separately as part of savings deposits.

³ This definition of financial assets includes household assets owned under occupational and private pension schemes; therefore, it is not in line with the definition the ECB uses in the HFCS.

Comparing estimated aggregates is a common analysis tool to identify differences and similarities between data sources. As in other countries, the comparison of HFCS and financial account aggregates indicates underreporting of comparable household financial wealth in the HFCS in Austria. Table 2 indicates that the HFCS aggregate for comparable

²¹ A comparison of the aggregate values in a pilot project for the HFCS – the financial wealth survey of the OeNB (2004) – with the administrative data of the financial accounts is also available in Andreasch et al. (2006).

household financial wealth in Austria runs to about 44% of the financial accounts aggregate (the ratio is 39% for total financial wealth). This value may be considered fairly high in an international comparison with other surveys (see also section 2).²² The origins of this difference can be manifold; on the one hand the survey estimates might not cover the totality of the financial assets (as we will see later in more detail), but on the other hand the financial accounts data do not solely reflect financial wealth of households as they include self-employed business assets and single person companies and thus overestimate financial wealth of the households. However, the table indicates that (i) the allocation of financial wealth reflected by HFCS data broadly mirrors the financial accounts patterns and that (ii) the coverage ratio of the HFCS compared with the financial accounts varies considerably for individual financial instruments and components. As a case in point, the HFCS/financial accounts coverage ratio comes to 72% for sight accounts, whereas it comes to 19% for other claims (n.i.e.).

The HFCS/financial accounts coverage ratio for savings deposits runs to 40%. It must be noted, though, that the administrative records on total deposits also include the deposits of self-employed persons and sole proprietorships, which the HFCS classifies as net investment in self-employment business, i.e. classified as real assets. In the HFCS, the volume of life insurance holdings is calculated as the accumulated premia over the time span of the contract up to the time of the interview, i.e. the amount paid into the life insurance so far. The financial accounts data are based on insurance technical reserves²³. The HFCS captures premia, but not any profit participation or service charges of the insurance providers. In addition, the value of life insurance holdings can fluctuate in the case of unit- and index-linked life insurance contracts. The financial crisis led to a depreciation of assets, which, however, was not reflected in the HFCS. The pension wealth component is high in the HFCS (HFCS/financial

²² Table 5 in Sierminska et al. (2006) shows ratios ranging from 13% (United Kingdom, BHPS 2000) to 52% (Norway, IDS 2002). The Survey of Consumer Finances (United States), which is considered the highest-quality survey of household finance, gives a ratio of 38% for 2001. This paper shows estimates in per capita terms, which is, however, equivalent to comparing aggregate values since the estimates from both sources are simply divided by a constant, i.e. the size of the population. Mathä et al. (2012) indicate a ratio of 35% for the HFCS in Luxembourg (table 18 in their publication).

²³ Insurance technical reserves may comprise provisions for prepayments of premia (the difference between premia recognized and premia earned) and actuarial reserves (current value of expected future benefits); they may also include life insurance provisions if policyholders bear the investment risk. Thus, insurance technical reserves represent the total of the premia paid and the profit share net of benefits received and of service charges. In addition, the portion of the value that is unit- and index-linked may fluctuate on account of market price changes, a circumstance that would apply to about one-fifth of all life insurance policies. (See also Council Directive 91/674/EEC of 19 December 1991 on the annual accounts and consolidated accounts of insurance undertakings and Council Regulation (EC) No 2223/96 of 25 June 1996 on the European system of national and regional accounts in the Community Annex III "Insurance".)

accounts coverage ratio of 126%). The reason is the financial account definition of pension wealth in the financial accounts, which currently covers claims on pension funds of single-employer and multi-employer occupational pension funds and of the OeNB, but not companies' technical pension provisions (some €13 billion) or the claims on severance funds (some €3.5 billion). These amounts are shown under other claims in the financial accounts. If these amounts are added to pension wealth as shown in the financial accounts, the ratio decreases to 65%. Additionally, for respondents in the HFCS the classification of certain wealth components as voluntary private pension wealth seemed to be difficult, e.g. special saving plans for the retirement could be seen as voluntary private pension provisions or wealth in savings accounts.

Certain subcomponents are not covered by either of the two data sources. For instance, in the financial accounts, financial wealth resulting from debt of a household to the respondent's household is not covered, as relevant data are not available. However, the HFCS shows that this component has a non-negligible volume. Assets held in managed accounts are not a separate component of the financial accounts, as they are covered by one of the other categories. In the HFCS, their value is negligible at €5 million. The HFCS did not include a question on cash holdings, as this question was considered to be too sensitive to be posed during a personal interview. In the financial accounts, cash holdings are covered as a separate category (separate from deposits)²⁴ and are not classified under "other claims". Another category not covered by the HFCS is that of agreed nonlife insurance claims that have not been paid out yet. The financial accounts distinguish between holdings of shares (quoted and unquoted) and other equity. In the financial accounts, it is not possible to explicitly capture work of a household member in the business owned by the household. However, for the financial accounts, it is assumed that if a household owns a limited liability company (GmbH), it is likely that household members work in this company. The financial accounts data are adjusted for this type of financial wealth to make the equity data compatible with the definitions underlying the HFCS.

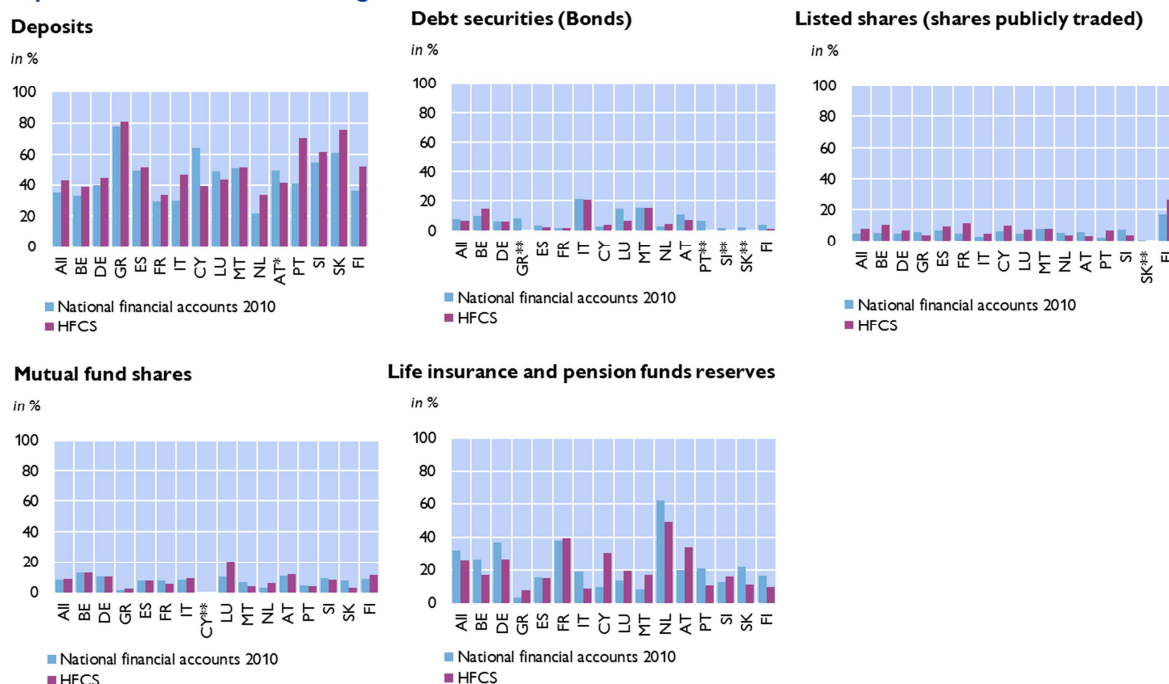
The distribution of the individual components of comparable financial assets is relatively similar in both data sources. For example, about 7% of financial assets are assigned to sight accounts in the HFCS versus about 4% in the financial accounts. Considering the additional 4% of cash holdings in the financial accounts and adding it up with the equally liquid wealth

²⁴ Cash holdings of households are calculated based on the estimated proportion of total financial assets adjusted by the change in cash requirements for consumption.

in the sight account the figures in both sources match almost exactly. In the case of investment in publicly traded shares, the respective shares are 3% (HFCS) and 5% (financial accounts). The relative shares of the categories bonds, other equity shares and funds are also very similar in both data sources. The biggest discrepancy arises with respect to pension wealth, which accounts for 11% of financial assets in the HFCS (pension wealth) and 4% in the financial accounts (pension fund reserves). This discrepancy is the result of the difficulty described above in capturing pension assets both in the HFCS and in the financial accounts.²⁵ Moreover, it must be pointed out that sight deposits and savings deposits together account for some 41% of financial wealth in the HFCS and some 42% in the financial accounts. Thus, these combined holdings make up the largest share of financial assets. Consequently, the analysis of this component of financial wealth has a greater explanatory weight.²⁶ As mentioned above the (ex ante) harmonisation of the HFCS points towards the transferability of these results (and likely the other results below) to the other countries

Chart 1

Proportion of financial asset categories as share of total financial assets



Source: Eurostat, Eurosystem HFCS. * excluding life insurance; ** marked with "N"

²⁵ Analysing pension wealth and comparing various data sources might be an important further research project. The specific issues and complexities of pension wealth, however, are not the focus of this study and hence not elaborated on further. Chart 1, however, shows that Austria might in this regards be an exception with respect to other countries in the HFCS. To our knowledge so far there is no in depth comparison of pension wealth in surveys with administrative records using the HFCS.

²⁶ See Andreasch et al. (2009) for a comparison of survey data and administrative data on investments in self-employment businesses.

conducting the survey. Chart 1 shows the relative importance of the major components of financial wealth for all countries covered in the HFCS.

With some exceptions the structural pattern in other countries seems to reflect broadly what is found in Austria. Hence we are convinced that also the remaining results in this study are a reasonable indication for other countries as well. The results on the aggregate statistics are in line with the literature (see also section 2). In what follows we are able to extend the literature by making use of the detailed administrative records with respect to sight and savings accounts.

4.2 Sight accounts

The account data in the banking statistics and in the HFCS allow for a comparison of the average amounts (per account) held in sight accounts by Austrian households. The banking statistics show that there are some 4.4 million such accounts. In the HFCS, households are queried directly about their holdings on sight accounts. As described above, the accounts are classified to that bank at which the household holds the highest amounts. Table 3 shows both the arithmetic mean and the standard error of holdings on sight accounts by banking sector. Data availability allows the standard error of the arithmetic mean to be calculated only for the HFCS; it is based on the resampling weights used to calculate variance estimation in the HFCS.²⁷

Table 3: Average holdings in sight accounts by banking sectors

	Mean	HFCS Relative to total	Mean	Banking statistics Relative to total
Total	3.171	100%	3.739	100%
(Std Err)	377			
Joint stock banks	2.994	94%	4.539	121%
(Std Err)	759			
Savings banks	3.102	98%	3.282	88%
(Std Err)	703			
Raiffeisen credit cooperatives	3.566	112%	3.480	93%
(Std Err)	615			
Volksbank credit cooperatives	1.923	61%	3.177	85%
(Std Err)	449			
State mortgage banks	5.917	187%	3.917	105%
(Std Err)	8.783			
Other (national)	2.932	92%	48.163	1288%
(Std Err)	1.072			

Source: HFCS Austria 2010, OeNB; OeNB banking statistics.

²⁷ 1,000 replicate weights were used to estimate variance. For details on use of weights, see Albacete et al. (2012).

The sight account means of the HFCS (3,171) and the financial accounts (3,739) are fairly similar, in particular if the standard error of 377 from the survey data is taken into account. The higher banking statistics values of the account data in the individual banking sectors may be attributable to the fact that the HFCS could not capture the households with the highest sight account holdings. Nevertheless, the values according to the banking sectors derived from the administrative records is frequently²⁸ within the 95% confidence interval of the HFCS estimator. The mean of the sight account deposits at mortgage banks has a very high standard error, signalling both the uncertainty of the estimator and the large range of the holding values in the mortgage bank sector. Moreover, table 3 shows that the relative sizes of the means in the individual banking sectors are similar for both data sources. For example, the smallest mean in both data sources is to be found in the Volksbank credit cooperative sector. The biggest differences is seen for the sector of state mortgage banks for which the standard error in the HFCS is enormous and hence the variability of the data very high. For the banking statistics the average holdings in sight account in joint stock banks is relatively high. This might be due to the high share of pension accounts in this sector assuming that the elderly population has a higher liquidity preference. Summing up, no huge differences between the HFCS data and the administrative data can be found in the structure of average holdings in the sight accounts over the banking sectors.

4.3 Comparison of savings deposits

Comparison of number of accounts

The banking statistics of the financial accounts documented roughly 23.5 million savings accounts as at end-2010, and according to information provided by Statistics Austria, some 8.4 million persons (3.7 million households according to the HFCS estimate) live in Austria. Hence, many persons (and households) have several savings accounts, but the amounts held in these accounts are fairly small (see table 4: roughly 81% of accounts contain deposits of less than €10,000). The reasons for having more than one savings account can be summed up as follows:

- Savings plans with building societies are separate savings accounts subject to special tax treatment. Therefore, many persons (Austrian citizens) have at least two

²⁸ Table 6 shows that this is the case in particular in the sectors with the highest holdings.

savings accounts, one being a savings plan with a building society and the other a standard savings account.²⁹

- Furthermore, security deposits for rental apartments are frequently kept on a separate savings account.
- As account maintenance charges are low (some Austrian banks do not charge any maintenance fees for accounts), people often have several savings accounts so that they can react quickly to interest rate differentials.
- Separate savings accounts (and partly also savings plans with building societies) are also kept for children; in the HFCS, these are obviously counted as part of household wealth.
- In addition, some account holders may have in fact forgotten they have accounts with very small holdings, so that the banking statistics may overrepresent actively held savings accounts.³⁰

Table 4 shows the distribution of the number of savings accounts by deposit holdings.

Table 4: Number of customer relationships with a bank/savings accounts

	HFCS		Banking statistics	
	Total	Share	Total	Share
All accounts	4.205.802	100,0%	23.463.618	100,0%
Up to €10,000	2.653.396	63,1%	19.058.885	81,2%
€10,000 to €20,000	637.071	15,1%	3.207.943	13,7%
€20,001 to €50,000	533.765	12,7%	798.045	3,4%
€50,001 to €100,000	212.675	5,1%	271.481	1,2%
€100,001 to €500,000	166.324	4,0%	119.911	0,5%
€500,001 to €1,000,000	2.570	0,1%	5.019	0,0%
€1,000,001 to €3,000,000	. ¹	.	1.963	0,0%
Over €3,000,000	.	.	371	0,0%

Source: HFCS Austria 2010, OeNB; OeNB banking statistics.

¹ No observation in this category.

The number of savings accounts is not explicitly asked for in the HFCS. However, the number of customer relationships households in Austria have with different banks can be estimated. The result of this calculation on the basis of HFCS data is displayed in the first column of table 4, which indicates the number of customer relationships broken down by deposit ranges and the sum total of about 4.2 million of these relationships. This compares with the sum total of accounts as captured by the financial accounts, which runs to about 23.5 million. Moreover, the table shows that the aggregation of a potentially many accounts results in the

²⁹ As described above, customers typically attribute their building society savings plan to their house bank even though legally speaking, the deposits are held with another bank (a building society).

³⁰ These forgotten accounts are by law kept alive for 30 years upon which they expire if no bank transfer (apart from interest payment) occurs in this period.

HFCS in a higher percentage of customer relationships with higher deposits than in the banking statistics: Some 81% of all accounts belong to the lowest category (holdings of up to €10,000) in the banking statistics, whereas only about 63% of the accounts captured by the HFCS have holdings in this range. This difference is then spread among the next-highest categories. As the individual accounts in the banking statistics cannot be assigned to individual households, it cannot be determined whether the aggregation of accounts within a household explains the totality of the discrepancy.

The HFCS does not capture accounts with holdings above €1 million. Oversampling of wealthy households could improve the coverage of savings deposits in the HFCS.³¹ On account of the random selection of households in the stratified multi-stage clustered random sampling of the HFCS, the probability of a household having savings deposits of over €1 million is highly unlikely, as only a total of about 0.03% of savings accounts are classified in the top three categories³². Conversely, the HFCS covered a sufficient number of households with savings deposits of up to €500,000, and few households in the range in between. One has to keep in mind, however, that accounts in the highest ranges might belong to (self-employment) business assets or sole proprietorships in the banking statistics.

Savings deposits aggregate

The overwhelming majority of total savings deposits of domestic nonbanks in Austria (i.e. roughly €150 billion of 96%) can be attributed to households in the financial accounts (see table 5).

Table 5: Volume of savings deposits by collection unit in the financial accounts

Total volume € million	Households € million	Other € million	Share held by households %
156.217	149.456	6.761	95,7

Source: OeNB banking statistics.

However, this total after the separation of the household sector as derived from the banking statistics cannot be broken down further into individual ranges and into banking sectors for the household sector. Therefore, the value of about €156 billion for total domestic nonbanks is used for the analysis, even though this leads to an overestimation (on the side of the administrative data) of the total volume of savings deposits of households.

³¹ See section 6 for an intuitive evaluation of the influence of this underrepresentation using a microsimulation.

³² Only about 0.0099% of savings accounts are classified in the top two categories in the banking statistics.

Table 3 has already shown that the aggregate savings deposits of households in Austria are underestimated in the HFCS by comparison to the administrative records on banking statistics. Table 6 shows where the biggest differences between HFCS and banking statistics data are by banking sector and deposit range. In the first row, total savings deposits in all banking sectors are shown in the HFCS³³ (panel 1) and in the banking statistics (panel 2). The third panel combines the values in panels 1 and 2 to show the respective HFCS to banking statistics ratio of each value.

Table 6: Aggregate savings deposits at individual banking sectors and deposit ranges
HFCS - total deposits, €million

	Total	Up to €10,000	€10,000 to €20,000	€20,001 to €50,000	€50,001 to €100,000	€100,001 to €500,000	€500,001 to €1,000,000	€1,000,001 to €3,000,000	Over €3,000,000
Total	60,287	7,766	8,378	14,214	11,025	17,545	1,359	.	.
Joint stock banks	18,135	2,048	2,173	4,067	2,898	6,947	.	.	.
Savings banks	14,360	1,744	2,389	4,137	2,897	2,564	628	.	.
Raiffeisen credit cooperatives	17,187	2,589	2,577	3,595	2,944	5,144	338	.	.
Volksbank credit cooperatives	4,214	605	529	957	978	1,144	.	.	.
State mortgage banks	1,587	185	155	127	198	700	222	.	.
Other (national)	4,805	594	555	1,330	1,111	1,045	171	.	.

Banking statistics - total deposits, €million

	Total	Up to €10,000	€10,000 to €20,000	€20,001 to €50,000	€50,001 to €100,000	€100,001 to €500,000	€500,001 to €1,000,000	€1,000,001 to €3,000,000	Over €3,000,000
Total	156,217	40,859	43,431	24,667	18,425	20,180	3,308	3,004	2,345
Joint stock banks	39,032	11,168	15,100	3,931	3,051	3,504	651	740	887
Savings banks	41,490	10,935	10,709	6,308	4,973	5,536	1,058	1,086	885
Raiffeisen credit cooperatives	56,118	13,744	12,379	11,682	7,997	8,194	1,057	745	319
Volksbank credit cooperatives	13,724	4,137	3,747	1,783	1,561	1,817	318	227	134
State mortgage banks	5,765	861	1,476	944	827	1,115	219	204	120
Other (national)	87	13	20	19	16	13	4	2	0

HFCS - deposits, share in % of banking statistics figure

	Total	Up to €10,000	€10,000 to €20,000	€20,001 to €50,000	€50,001 to €100,000	€100,001 to €500,000	€500,001 to €1,000,000	€1,000,001 to €3,000,000	Over €3,000,000
Total	38.59%	19.01%	19.29%	57.62%	59.84%	86.94%	41.09%	.	.
Joint stock banks	46.46%	18.34%	14.39%	103.46%	94.99%	198.23%	.	.	.
Savings banks	34.61%	15.95%	22.31%	65.58%	58.26%	46.31%	59.36%	.	.
Raiffeisen credit cooperatives	30.63%	18.84%	20.82%	30.77%	36.81%	62.78%	31.96%	.	.
Volksbank credit cooperatives	30.70%	14.62%	14.12%	53.68%	62.64%	62.98%	.	.	.
State mortgage banks	27.53%	21.48%	10.50%	13.46%	23.95%	62.79%	101.51%	.	.

Source: HFCS Austria 2010, OeNB; OeNB banking statistics.

Note: Savings plans with building and loan association are aggregated to the appropriate sectors.

¹ No observation in this category.

As explained in the section on households' customer relationships with banks, the HFCS does not contain information about the two highest deposit categories. Consequently, assets in this part of the distribution are underestimated. The volume of savings deposits is also underestimated in the HFCS in the lower categories. For instance, in the savings deposit

³³ As described in section 3, the following tables are based on the information provided on savings deposits; this data is attributed to banking sectors on the basis of the bank at which a household holds the highest amount of deposits. The appendix contains equivalent tables based on national deposit variables.

category €100,000 to €500,000, HFCS coverage comes to nearly 87% of the total aggregate, but to only 19% of total of savings deposits up to €10,000. This underestimation is attributable above all to the aggregation of savings accounts at the household level in the HFCS rather than the account level, as is the case in the banking statistics. This pattern is similar across all banking sectors. The higher estimate for the aggregate value (HFCS) in the middle savings deposit categories in the joint stock banking sector is also a consequence of the difference between unit of collection at the household and at the account level. The banking statistics data show a relatively larger number of deposit accounts among the lower deposit categories. These banking statistics data are not suited to show the distribution of savings by households in Austria, but only by accounts. So we see with the Austrian HFCS data not only the – already in the literature documented – underestimation of aggregates in surveys (see sections 2 and 4.1), but also see in particular coverage rates in the different deposit categories and in the different banking sectors.

Table 7 additionally provides an analysis of the shares of individual banking sectors and deposit categories in total savings deposits. The left part shows the percentage share of savings by banking sector in the HFCS and in the banking statistics. The right part of the table shows the percentage share of the deposit holdings in each of the ödeposit value ranges.

Table 7: Allocation of deposits to banking sectors and deposit ranges

	HFCS	Banking statistics		HFCS	Banking statistics
<i>Banking sectors</i>			<i>Deposit ranges</i>		
Joint stock banks	30%	25%	up to €10,000	13%	26%
Savings banks	24%	27%	€10,001 to €20,000	14%	28%
Raiffeisen credit cooperatives	29%	36%	€20,001 to €50,000	24%	16%
Volksbank credit cooperatives	7%	9%	€50,001 to €100,000	18%	12%
State mortgage banks	3%	4%	€100,001 to €500,000	29%	13%
Other (national)	8%	0%	€500,001 to €1,000,000	2%	2%
			€1,000,001 to €3,000,000	¹	2%
			over €3,000,000	.	2%

Source: HFCS Austria 2010, OeNB; OeNB banking statistics.

Note: Savings plans with building and loan association are aggregated to the appropriate sectors.

¹ No observation in this category.

The allocation of deposit holdings to the individual banking sectors is broadly the same in the HFCS and in the financial accounts. For instance, the smaller banking sectors (the industrial credit cooperatives and the mortgage banks) account for deposit shares of 7% and 3% according to HFCS data. The comparable banking statistics values are 9% and 4%, respectively. Both data sources also show the three banking sectors holding the higher market shares of deposits. Only joint stock banks are shown to have a lower share and Raiffeisen banks a somewhat higher share in total deposits in the banking statistics.

The right half of table 7 indicates that more than two-thirds (roughly 70% in total) of all savings deposits are in savings accounts with holdings of less than €50,000 according to the banking statistics. Because household assets are aggregated in the HFCS, as was mentioned before, whereas the financial accounts cover individual accounts, the HFCS column features larger percentages of deposit holdings in higher categories than the comparable banking statistics categories. Thus, more than two-thirds of total savings deposits (71%) are held in the categories spanning the range from €20,000 to €500,000. This is yet another area in which the household-level data from the survey complement the banking statistics data, as the preferred unit of evaluation is usually the household, not the individual account. Although deposits in the range from €500,001 to €1,000,000 account for 2% of the total volume in both data sources, the two top categories (4% of the total volume in the banking statistics) are not covered in the HFCS. This means in particular that nearly 7% of the total undercoverage in the HFCS can be attributed to the top two categories.

Accounts with MFIs/customer relationships with banks in the HFCS

To explore further similarities and differences between the two data sources beyond the aggregates and aggregate shares, we analyse the allocation of customer relationships with banks in the HFCS and of the numbers of accounts in the banking statistics. The results are shown in table 8. Once again, the share of all customer relationships of households in Austria and of accounts are broken down by banking sectors and by deposit holding categories.

The first row in the HFCS panel (“total”) differs marginally from the results in table 4, as the percentages cover only the customer relationship with the bank with the highest deposit holdings.

Table 8: Allocation of customer relationships/accounts to banking sectors and deposit ranges

HFCS - share of customer relationships

	Total	Up to €10,000	€10,000 to €20,000	€20,001 to €50,000	€50,001 to €100,000	€100,001 to €500,000	€500,001 to €1,000,000	€1,000,001 to €3,000,000	Over €3,000,000
Total	100%	61%	17%	14%	5%	3%	0%	¹	.
Joint stock banks	28,9%	17,9%	4,8%	3,8%	1,3%	1,3%	,	.	.
Savings banks	23,5%	13,2%	4,8%	3,7%	1,2%	0,4%	,	.	.
Raiffeisen credit cooperatives	30,2%	19,1%	5,3%	3,6%	1,4%	0,9%	,	.	.
Volksbank credit cooperatives	7,1%	4,5%	1,0%	0,8%	0,5%	0,3%	,	.	.
State mortgage banks	1,9%	1,1%	0,3%	0,2%	0,1%	0,1%	,	.	.
Other (national)	8,4%	5,2%	1,2%	1,4%	0,5%	0,2%	.	.	.

Banking statistics - share of accounts

	Total	Up to €10,000	€10,000 to €20,000	€20,001 to €50,000	€50,001 to €100,000	€100,001 to €500,000	€500,001 to €1,000,000	€1,000,001 to €3,000,000	Over €3,000,000
Total	100,0%	81,2%	13,7%	3,4%	1,2%	0,5%	0,0%	0,0%	0,0%
Joint stock banks	32,9%	27,2%	4,9%	0,6%	0,2%	0,1%	0,0%	0,0%	0,0%
Savings banks	26,1%	21,3%	3,4%	0,9%	0,3%	0,1%	0,0%	0,0%	0,0%
Raiffeisen credit cooperatives	30,5%	24,4%	3,8%	1,6%	0,5%	0,2%	0,0%	0,0%	0,0%
Volksbank credit cooperatives	8,3%	6,7%	1,1%	0,2%	0,1%	0,0%	0,0%	0,0%	0,0%
State mortgage banks	2,3%	1,7%	0,5%	0,1%	0,0%	0,0%	0,0%	0,0%	0,0%
Other (national)	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%

Source: HFCS Austria 2010, OeNB; OeNB banking statistics.

Note: Savings plans with building and loan association are aggregated to the appropriate sectors.

¹ No observation in this category.

The distribution of customer relationships (HFCS) in the individual cells is very similar to the distribution in banking statistics. For example, 32.9% of accounts are held in the joint stock banking sector according to banking statistics, and 28.9% of households have accounts in the joint stock banking sector according to HFCS data. The gap in the Raiffeisen credit cooperative sector is even smaller at 30.5% (banking statistics) versus 30.2% (HFCS). A broad view of all categories in the individual sectors reveals that the middle categories in all sectors are somewhat overestimated whereas the categories at the upper and lower ends are underestimated. This difference is again attributable to choice of unit of collection. It must be pointed out that fewer than 1% of accounts as shown by the banking statistics are in the category from €100,000 to €500,000 and that the HFCS estimates for this category are generally also of the same order (with the exception of the category joint stock banks). Hence, the HFCS appears to cover the customer relationship patterns quite well up to a level of about €500,000.

According to the banking statistics, all categories above €500,000 contain a maximum of 0.01% of accounts across all banking sectors (and as a total). The HFCS contains nearly no observations above the level of €500,000. These figures once again show how unlikely it is to obtain (enough) households with savings deposit holdings in excess of €500,000 since there are very few accounts in these ranges. Oversampling more affluent households might increase

the chance of capturing the right tail of the distribution. One can see in section 5 the potential impacts of the inclusion of households in these ranges in the HFCS in Austria.

Average deposit holdings in banking statistics/in the HFCS

As the banking statistics data show both the volume of deposits and the number of accounts, the average holdings per accounts can be calculated. The arithmetic mean of deposits in households including the standard error of the estimator can also be estimated on the basis of the survey data.³⁴ Table 9 shows the average deposit holdings broken down by deposit ranges and banking sectors for the banking statistics and for the HFCS data, allowing for a comparison. For the HFCS data, the calculation of the standard error of the respective mean in a cell is based on 1,000 resampling weights contained in the HFCS data.

Table 9: Average deposit holdings by banking sectors and deposit ranges
HFCS - average deposit holdings

	Total	Up to €10,000	€10,000 to €20,000	€20,001 to €50,000	€50,001 to €100,000	€100,001 to €500,000	€500,001 to €1,000,000	€1,000,001 to €3,000,000	Over €3,000,000
Total	18.333	3.869	14.737	31.943	68.297	167.958	679.387	. ¹	.
(Std Err)	1.751	107	184	529	2.190	10.648	x ²	.	.
Joint stock banks	19.070	3.488	15.091	32.131	68.050	166.741	.	.	.
(Std Err)	2.582	197	353	1.263	3.296	18.881	.	.	.
Savings banks	18.610	4.012	15.091	33.647	72.815	176.697	.	.	.
(Std Err)	2.801	220	346	1.092	5.336	23.938	.	.	.
Raiffeisen credit cooperatives	17.280	4.122	14.852	30.554	64.917	174.409	.	.	.
(Std Err)	2.506	178	397	1.409	3.691	24.678	.	.	.
Volksbank credit cooperatives	18.025	4.047	15.641	35.216	65.442	136.913	.	.	.
(Std Err)	2.905	439	1.069	3.111	6.181	36.368	.	.	.
State mortgage banks	25.942	4.965	14.771	24.420	60.936	161.124	.	.	.
(Std Err)	12.610	694	1.256	4.302	x	55.421	.	.	.
Other (national)	17.387	3.493	14.120	29.461	70.794	179.427	518.000	.	.
(Std Err)	2.987	303	751	1.403	5.457	64.323	x	.	.

Banking statistics - average deposit holdings

	Total	Up to €10,000	€10,000 to €20,000	€20,001 to €50,000	€50,001 to €100,000	€100,001 to €500,000	€500,001 to €1,000,000	€1,000,001 to €3,000,000	Over €3,000,000
Alle	6.658	2.144	13.539	30.909	67.867	168.288	659.002	1.530.099	6.319.995
Joint stock banks	5.057	1.753	13.126	30.305	68.117	166.951	663.942	1.564.715	7.709.296
Savings banks	6.787	2.186	13.411	31.058	66.302	172.241	664.159	1.565.499	6.319.543
Raiffeisen credit cooperatives	7.852	2.405	14.029	30.726	67.828	163.988	645.182	1.440.230	4.906.600
Volksbank credit cooperatives	7.078	2.616	13.901	32.504	71.089	172.677	664.868	1.445.637	5.601.417
State mortgage banks	10.644	2.219	13.977	31.921	71.279	179.325	677.077	1.684.248	4.446.296
Other (national)	17.556	4.944	13.805	31.903	70.347	184.056	848.000	1.660.000	.

Source: HFCS Austria 2010, OeNB; OeNB banking statistics.

Note: Savings plans with building and loan association are aggregated to the appropriate sectors.

¹ No observation in this category.

² Standard errors cannot be estimated on account of the small number of observations.

Table 9 highlights two important aspects, namely (i) the total average of deposit holdings (column 2) is higher according to the HFCS data than according to the banking statistics, and (ii) amounts beyond €500,000 are not covered, a confirmation of the known finding. The

³⁴ Although it would be desirable to compare the whole distribution (or at least also the median), such a comparison cannot be made, as the banking statistics lack the relevant information.

higher means are the result of the aggregation of individual accounts to household deposit holdings in the HFCS. The table shows clearly that the average amount of deposits in an account does not correspond to the average of Austrian households' savings deposit holdings, as households may have several accounts.

In the individual categories covered by the HFCS, the mean value of both data sources is similar. As a case in point, the average holdings of deposits in the range from €100,001 to €500,000 come to about €168,000 according to HFCS data (the standard error is roughly €19,000), thus matching the banking statistics average of about €168,000. Only in the first category – deposits up to €10,000 (and to a much lesser extent in the second category as well) – are the averages according to the banking statistics data far lower than the corresponding HFCS values. Savings accounts with very low deposits are responsible for this discrepancy. In the HFCS, these are added to other accounts within a household, whereas in the financial accounts, they remain data on accounts (with potentially no movements³⁵). No large differences across banking sectors are observed, as the data from both sources confirm.

5. Simulation of the impact on some key indicators in the HFCS

Finally, a look at the theoretical impact of coverage of the top deposit categories in the HFCS on commonly used statistics could provide some insights. The following simple simulation makes it possible to quantitatively assess how some indicators would change if the HFCS sample contained households with savings in the two top categories (savings of over €1 million). The HFCS already includes observations – albeit very few – in the category with savings of €500,001 to €1,000,000.

The procedure simulates a few households with average holdings in the top two categories as available from the banking statistics. The households are assigned a weight, and the distributional indicators are then calculated with and without these households. The household simulation is performed on the basis of the following assumptions: Two households with average holdings of €6,320,000 (average in the highest deposit range in the banking statistics) and four households with average savings deposits of €1,530,000 (average in the second-highest deposit range in the banking statistics) are imputed. The assumption of the number of

³⁵ By law, accounts (usually ones with very low holdings) expire after a period of 30 years after the last movement has been registered. Therefore, especially in the lowest deposit categories, the number of accounts is distorted upward in the banking statistics of active accounts.

households is ad hoc, but is justified for two reasons: First, the assumption reflects the higher amount of accounts in the second-highest deposit range in the banking statistics, and second, it allows for the assignment of different weights to the households. Assuming that every household in Austria has the same number of savings accounts, there are roughly 330 households with accounts in the second-highest category and only about 60 households with accounts in the highest category. Hence, the nonresponse-adjusted weights are assumed to be very low³⁶, i.e. for the households in the top deposit range, the weight is 175, or approximately the smallest weight in the original sample, and two households in the second-highest deposit range, the weight is 300, or roughly the smallest percentile of these weights in the original sample. For the remaining two households, the weight is set at 750, or roughly the fifth percentile in the original sample. To influence the preparation of the survey as little as possible, the HFCS post-stratification process in Austria was repeated with these newly simulated households. This last step in defining the final household weights is based on the nonresponse-adjusted weights as well as information on household size and the geographical distribution of households in Austria. For the simulated households, the information on household size and geographical location required for the post-stratification process are randomized³⁷ (uniform distribution). In the procedure, the weights of the new total of 2,386 households are adapted in line with the distribution of household size and geographical location in Austria as taken from the Statistics Austria microcensus.³⁸ After post-stratification, the weights of the simulated households average³⁹ 423 (408 prior to post-stratification), whereas all other households have an average weight of around 1,600. This procedure simulates the relatively low number of accounts in these categories in the banking statistics. However, assuming an even distribution of the accounts, the six simulated households with an average weight of over 400 tend to overrepresent the roughly 400 households cited above. Thus, it must be assumed that the simulation results represent the upper limit of the possible change.

In a next step, some of the most widely used indicators of the new sample can be compared with the estimators of the sample without the imputed households. The results are shown in table 10.

³⁶ Increasing these weights does not necessarily exert a clearly defined effect on the estimators, as the nonresponse-adjusted weights are post-stratified.

³⁷ This means that the simulated households are assigned a random size of between one and six members (this corresponds to the minimum and maximum numbers of adult members in the households represented in the HFCS) and are assigned randomly to an Austrian province.

³⁸ See the HFCS documentation for Austria in Albacete et al. (2012).

³⁹ The range of the weights changes from 150 – 750 to 159.6 – 721.3, i.e. the range becomes smaller.

Table 10: Simulation results

	HFCS		
	Original sample	Simulated sample	Change from original sample (%)
Mean	18.333	19.974	8,9%
Median	6.985	6.994	0,1%
Gini	0,681	0,706	3,7%
P90/P10	64,68	64,57	-0,2%
P90/P50	6,23	6,23	-0,1%
P10/P50	0,10	0,10	0,0%
Aggregate (€ million)	60.287	65.731	9,0%

Source: HFCS Austria 2010, OeNB.

Not surprisingly, aggregate total savings deposits in Austria and average savings deposits are higher in the simulated sample. While the increase by 9% is economically significant, it cannot fully explain the entire underrepresentation (see table 2 in section 4). However, the quality of the simulation is also reflected by the absolute rise by some €5 billion, so that the aggregate in the top two categories of the banking statistics is fully covered. The impact on robust statistics such as the median or the percentile ratios is very small: The median of savings deposit amounts rises by just 0.1%, for example. The impact on the ratios of the percentiles is also negligible in all parts of the distribution. The minimal reduction of P90/P10 and P90/P50 can be explained by the fact that the 90th percentiles increase less than the 10th and 50th percentiles on account of the simulation. Conversely, non-robust statistics such as the Gini coefficient or the arithmetic mean of savings deposits change more strongly. Factoring in the simulated households causes the Gini coefficient to go up by some 2.5 points (about 4% of the rise in inequality as measured by the Gini coefficient). The reason for this fairly strong effect is the widening of the wealth bandwidth in deposits. In the original calculation, the Gini coefficient is calculated for a bandwidth of €0 to less than €1 million. The inclusion of the simulated households with holdings over €6 million has an effect on the Gini coefficient, even if these households have a low weight.

Overall, the simulation exercise shows that the HFCS is very well suited to capturing most of the distribution (see percentiles) even without generating information on the upper ranges of savings deposits. With respect to the other indicators, oversampling of the wealthy households – and thus achievement of a higher probability of capturing very high savings deposits – would be desirable, but the current indicators still deliver the best estimators for these statistics. Capturing the households with the holdings in the highest savings deposit ranges would, if anything, increase (but not decrease) the estimators for the aggregate, for the

arithmetic mean and for the inequality of savings deposits as measured by the Gini coefficient.

6. Concluding remarks

This paper examines the similarities and differences between data derived from surveys and from administrative sources, focusing on savings deposits as the main category of households' financial wealth in Austria. To this end, we compare the aggregate values, in line with the approach commonly described in the literature, and additionally cross-check a very detailed breakdown of deposits by banking sectors and by deposit ranges which has not been documented in the literature so far. Given the ex ante harmonization of the HFCS and the relatively similar structure of the relative importance of the components of financial wealth (see Chart 1), results are expected to be similar in other euro area countries. The main results of this analysis and what can be learnt from them may be summarised as follows: The HFCS is well suited to identify the (basic) deposit patterns, but estimates of total wealth are distorted downward, as has already been previously shown in the literature (and is discussed in section 2). The reasons for this underestimation are the underrepresentation of deposits across all banking sectors and deposit ranges and the lack of information on the highest deposit ranges. Oversampling in the HFCS may contribute to closing this information gap at the tail of the distribution in the future (although due to the extremely low number of accounts in the highest ranges it is by no means guaranteed). The aggregate measures derived from administrative sources should provide a reliable estimator. In addition, we consider the effects of the different units of aggregating savings deposits in the banking statistics (accounts based) and in the HFCS (household based). The banking statistics do not allow individual accounts to be allocated to households. The aggregation of accounts to the level of households, which is done in the HFCS, results in a shift across deposit ranges. This shift indicates that even the data reported by the banks in the banking statistic cannot be used to analyse individual households, so that the HFCS provides highly useful additional information to the aggregates. Furthermore, the distribution across banking sectors and asset ranges of deposits is relatively similar in both data sources. Consequently, the two data sources are not meant to replace each other; much rather, they serve as complementary sources for analysing households in an economy where reliable distributional estimates can be calculated from the HFCS and aggregate values from the financial accounts. A final simulation of the top savings ranges

indicates that the estimators (such as the Gini coefficient or the arithmetic mean) from the HFCS represent at least a lower bound for the true parameters, and that some indicators, in particular robust statistics such as the median and percentiles are affected to a fairly low extent. The survey data provide a wealth of information that complement the administrative data and that are needed in particular to analyse certain groups of the respective target population.

Many other areas of the household accounts were not examined in this study, which focuses on financial assets and in particular savings deposits. Future research could be devoted to other components of financial wealth, such as equity wealth, or the debt-side of the household balance sheet. A more in-depth comparison of data on real assets would also be desirable. However, very little useful administrative data on real assets is available. Furthermore, the investigation of measurement error that could not be achieved with the administrative records at hand should yield interesting insights.

References

- Albacete, N., P. Lindner, K. Wagner and S. Zottel. 2012. Eurosystem Finance and Consumption Survey 2010: Methodological Notes for Austria. Addendum to Monetary Policy and the Economy Q3/12.
- Andreasch, M., C. Beer, P. Mooslechner, M. Schürz and K. Wagner. 2006. Zur Aussagefähigkeit der Makrodaten der GFR und der Mikrodaten der OeNB-Geldvermögensbefragung: ein methodischer Vergleich (The Explanatory Power of Financial Accounts and the OeNB Survey on Households' Financial Wealth: A Methodical Comparison). Statistiken – Daten & Analysen Q3/06.
- Andreasch, M., P. Fessler and M. Schürz. 2009. Austrian Households' Equity Capital – Evidence from Microdata. Monetary Policy and the Economy Q4/09.
- Antoniewicz, R., R. Bonci, A. Generale, G. Marchese, A. Neri, K. Maser and P. O'Hagan. 2005. Household Wealth: Comparing Micro and Macro Data in Canada, Italy and United States. Paper prepared for the LWS Workshop: "Construction and Usage of Comparable Microdata on Wealth: the LWS", Banca d'Italia, Perugia, Italy, 27-29 January 2005, retrievable from <http://www.lisproject.org/lws/introduction/files/antoniewiczrevised.pdf> (retrieved on 6 November 2012).
- Avery, R.B., G.E. Elliehausen and A.B. Kennickell. 1988. Measuring Wealth with Survey Data: An Evaluation of the 1983 Survey of Consumer Finance. Review of Income and Wealth, Series 34, No. 3. December 1988.
- Bricker, J. and G.V. Engelhardt. 2007. Measurement Error in Earnings Data in the Health and Retirement Study. Center for Retirement Research at Boston College Working Paper No. 2007-16, Boston College, October 2007.
- Davis, P.S. and L.T. Fisher. 2008. Measurement Issues Associated with Using Survey Data Matched with Administrative Data from the Social Security Administration. Section on Government Statistics – JMS 2008.
- Henriques, A.M. and J.W. Hsu. 2012. Analysis of Wealth Using Micro and Macro Data: A Comparison of the Survey of Consumer Finances and Flow of Funds. Chapter in forthcoming NBER book Measuring Economic Sustainability and Progress. Editors: Dale W. Jorgenson, J. Steven Landefeld, and Paul Schreyer, retrievable from <http://www.nber.org/chapters/c12829> (retrieved on 2 December 2013).
- Johansson, F., and A. Klevmarken. 2007. Comparing Register and Survey Data. Chapter 2 in Fredrik Johansson, Essays on Measurement Errors and Nonresponse, Economic Studies 103, Department of Economics, Uppsala University, Dissertation, 2007.
- Kapteyn, A. and J.Y. Ypma. 2006. Measurement Error and Misclassification: A Comparison of Survey and Register Data. RAND Labor and Population Working Paper Series, No. 283-1, November 2006.
- Fessler, P., M. Kasy and P. Lindner. 2012. Survey mode effects on income inequality measurement. Paper prepared for the 32nd General Conference of The International Association for Research in Income and Wealth, retrievable from <http://www.iariw.org/papers/2012/LindnerPaper.pdf> (retrieved on 2 December 2013).

Fessler, P., P. Mooslechner and M. Schürz. 2012. In Focus: Eurosystem Household Finance and Consumption Survey 2010 – First Results for Austria Monetary Policy and the Economy Q3/12.

Kavonius, I. K. and J. Honkkila 2013. Reconciling Micro and Macro Data on Household Wealth: A Test Based on Three Euro Area Countries, *Journal of Economic and Social Policy* Vol. 15: Iss. 2, Article 3.

Kavonius, I. K. and V-M. Törmälehto. 2010. Integrating Micro and Macro Accounts – The Linkages between Euro Area Household Wealth Survey and Aggregate Balance Sheets for Households. Prepared for the 31st General Conference of the International Association for Research on Income and Wealth. St. Gallen, 22–28 August 2010. <http://www.iariw.org/papers/2010/7aKavonius.pdf>

Kavonius, I. K. and V-M. Törmälehto. 2003. Household Income Aggregates in Micro and Macro Statistics. *Statistical Journal of the United Nations Economic Commission for Europe*, Vol. 20, pp. 9-25, 2003.

Mathä, T.Y., A. Porpiglia and M. Ziegelmeyer. 2012. The Luxembourg Household Finance and Consumption Survey (LU-HFCS): Introduction and Results. *Cahier D'Études Working Paper Nr. 73*, Banque Centrale Du Luxembourg, August 2012.

OeNB. 2011. Sector Accounts in Austria 2010. An Integrated Presentation of Financial and Non-Financial Accounts for Households, Corporations, General Government and the Financial Sector in Austria's National Accounts OeNB, June 2011.

Roemer, M. 2002. Using Administrative Earnings Records to Assess Wage Data Quality in the March Current Population Survey and the Survey of the Income and Program Participation. U.S. Census Bureau Technical Paper No. TP-2002-22, November 2002.

Sierminska, E., A. Brandolini and T.M. Smeeding. 2006. Comparing Wealth Distribution across Rich Countries: First Results from the Luxembourg Wealth Study. *Luxembourg Wealth Study Working Paper Series No. 1*, August 2006.

Stiglitz, J. E., A. Sen, and J.-P. Fitoussi. 2009. Report by the Commission on the Measurement of Economic Performance and Social Progress, CMEPSP, September, 2009, retrievable from http://www.stiglitz-sen-fitoussi.fr/documents/rapport_anglais.pdf (retrieved on 2 December 2013).

Törmälehto, V.-M. 2011. Comparing National Accounts Income Aggregates with Income Aggregates based on LIS Micro-Data. *LIS Technical Working Paper Series No.2*. Revised Version November 2011.

7. Appendix

The appendix features three tables that repeat the calculations in tables 6, 8 and 9 on the basis of the second way the information on the amounts (savings deposits) held at different banks was surveyed in the HFCS (see section 3, subsection “Specification of data for comparison”). The use of data from this alternative survey method in the HFCS does not change the basic findings of the comparison of the HFCS and the financial accounts data. The appendix simply provides a sensitivity analysis for the classification of a household to a bank and for the different coverage methods of savings deposits.

Table A1: Aggregate savings deposits at individual banking sectors and deposit ranges
HFCS - total deposits, €million (variables for Austria)

	Total	Up to EUR 10,000	EUR 10,000 to EUR 20,000	EUR 20,001 to EUR 50,000	EUR 50,001 to EUR 100,000	EUR 100,001 to EUR 500,000	EUR 500,001 to EUR 1,000,000	EUR 1,000,001 to EUR 3,000,000	Over EUR 3,000,000
Total	67.799	6.179	5.830	12.037	9.619	19.103	8.308	n.a. ¹	²
Joint stock banks	15.826	2.045	1.609	3.197	3.198	5.014	.	.	.
Savings banks	14.943	1.470	1.609	3.374	1.911	4.715	.	.	.
Raiffeisen credit cooperatives	22.440	1.986	1.839	3.831	2.705	4.023	n.a.	n.a.	.
Volksbank credit cooperatives	5.049	524	441	1.092	831	n.a.	.	.	.
State mortgage banks	1.527	168	164	n.a.	.	.	.	.	.
Other (national)	8.015	578	630	1.260	967	2.240	n.a.	.	.

Banking statistics - total deposits, €million

	Total	Up to EUR 10,000	EUR 10,000 to EUR 20,000	EUR 20,001 to EUR 50,000	EUR 50,001 to EUR 100,000	EUR 100,001 to EUR 500,000	EUR 500,001 to EUR 1,000,000	EUR 1,000,001 to EUR 3,000,000	Over EUR 3,000,000
Total	156.217	40.859	43.431	24.667	18.425	20.180	3.308	3.004	2.345
Joint stock banks	39.032	11.168	15.100	3.931	3.051	3.504	651	740	887
Savings banks	41.490	10.935	10.709	6.308	4.973	5.536	1.058	1.086	885
Raiffeisen credit cooperatives	56.118	13.744	12.379	11.682	7.997	8.194	1.057	745	319
Volksbank credit cooperatives	13.724	4.137	3.747	1.783	1.561	1.817	318	227	134
State mortgage banks	5.765	861	1.476	944	827	1.115	219	204	120
Other (national)	87	13	20	19	16	13	4	2	0

HFCS - deposits, share in % of Banking statistics figures

	Total	Up to EUR 10,000	EUR 10,000 to EUR 20,000	EUR 20,001 to EUR 50,000	EUR 50,001 to EUR 100,000	EUR 100,001 to EUR 500,000	EUR 500,001 to EUR 1,000,000	EUR 1,000,001 to EUR 3,000,000	Over EUR 3,000,000
Total	43,401%	15,123%	13,423%	48,798%	52,207%	94,665%	251,184%	.	.
Joint stock banks	40,547%	18,311%	10,656%	81,328%	104,819%	143,075%	.	.	.
Savings banks	36,016%	13,443%	15,025%	53,484%	38,429%	85,167%	.	.	.
Raiffeisen credit cooperatives	39,987%	14,450%	14,855%	32,794%	33,824%	49,095%	.	.	.
Volksbank credit cooperatives	36,789%	12,666%	11,771%	61,257%	53,224%	.	.	.	.
State mortgage banks	26,486%	19,503%	11,110%	.	.	.	.	.	.

Source: HFCS Austria 2010, OeNB; OeNB banking statistics.

Note: Savings plans with building and loan association are aggregated to the appropriate sectors.

¹ Fewer than six observations in this cell; the value is not shown.

² No observations in this category.

Table A2: Allocation of customer relationships/accounts to banking sectors and deposit ranges

HFCS - share of accounts (variables for Austria)

	Total	Up to €10,000	€10,000 to €20,000	€20,001 to €50,000	€50,001 to €100,000	€100,001 to €500,000	€500,001 to €1,000,000	€1,000,001 to €3,000,000	Over €3,000,000
Total	100%	65%	13%	13%	5%	4%	0%	n.a. ¹	. ²
Joint stock banks	40,40%	22,60%	3,60%	3,50%	1,50%	0,80%	.	.	.
Savings banks	31,20%	16,20%	3,60%	3,40%	0,80%	0,90%	.	.	.
Raiffeisen credit coope	39,40%	20,30%	4,20%	4,20%	1,30%	0,80%	n.a.	n.a.	.
Volksbank credit coop	10,00%	5,00%	0,90%	1,10%	0,40%	n.a.	.	.	.
State mortgage banks	2,60%	1,50%	0,40%	n.a.	.	.	.	.	.
Other (national)	14,20%	6,20%	1,40%	1,40%	0,50%	0,40%	0,001	.	.

Banking statistics - share of accounts

	Total	Up to €10,000	€10,000 to €20,000	€20,001 to €50,000	€50,001 to €100,000	€100,001 to €500,000	€500,001 to €1,000,000	€1,000,001 to €3,000,000	Over €3,000,000
Total	100%	81%	14%	3%	1%	1%	0%	0%	0%
Joint stock banks	32,90%	27,20%	4,90%	0,60%	0,20%	0,10%	0,00%	0,00%	0,00%
Savings banks	26,10%	21,30%	3,40%	0,90%	0,30%	0,10%	0,00%	0,00%	0,00%
Raiffeisen credit coope	30,50%	24,40%	3,80%	1,60%	0,50%	0,20%	0,00%	0,00%	0,00%
Volksbank credit coop	8,30%	6,70%	1,10%	0,20%	0,10%	0,00%	0,00%	0,00%	0,00%
State mortgage banks	2,30%	1,70%	0,50%	0,10%	0,00%	0,00%	0,00%	0,00%	0,00%
Other (national)	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%

Source: HFCS Austria 2010, OeNB; OeNB banking statistics.

Note: Savings plans with building and loan association are aggregated to the appropriate sectors.

¹ Fewer than six observations in this cell; the value is not shown.

² No observations in this category.

Table A3: Average deposit holdings by banking sectors and deposit ranges
HFCS - average deposit holdings (variables for Austria)

	Total	Up to €10,000	€10,000 to €20,000	€20,001 to €50,000	€50,001 to €100,000	€100,001 to €500,000	€500,001 to €1,000,000	€1,000,001 to €3,000,000	Over €3,000,000
Total	23.696	3.328	15.513	32.021	72.074	189.965	669.254	n.a. ¹	²
(Std Err)	4.252	147	323	793	2.429	16.553	65.978	n.a.	.
Joint stock banks	13.687	3.168	15.747	31.665	73.795	220.952	,	.	.
(Std Err)	2.276	205	562	1.374	4.783	31.335	,	.	.
Savings banks	16.709	3.165	15.747	34.210	80.422	190.145	,	.	.
(Std Err)	4.478	241	503	1.399	5.453	33.717	,	.	.
Raiffeisen credit cooperatives	19.889	3.424	15.314	31.712	70.449	173.165	n.a.	n.a.	.
(Std Err)	4.463	217	558	1.254	3.747	27.152	n.a.	n.a.	.
Volksbank credit cooperatives	17.693	3.650	16.386	35.654	69.600	n.a.	,	.	.
(Std Err)	7.986	468	1.006	3.068	7.513	n.a.	,	.	.
State mortgage banks	21.049	3.986	14.329	n.a.	,	,	,	.	.
(Std Err)	21.541	844	1.384	n.a.	,	,	,	.	.
Other (national)	19.822	3.241	15.660	31.757	66.150	180.061	n.a.	.	.
(Std Err)	7.028	393	717	1.698	4.991	38.976	n.a.	.	.

Banking statistics - average deposit holdings

	Total	Up to €10,000	€10,000 to €20,000	€20,001 to €50,000	€50,001 to €100,000	€100,001 to €500,000	€500,001 to €1,000,000	€1,000,001 to €3,000,000	Over €3,000,000
Total	6.658	2.144	13.539	30.909	67.867	168.288	659.002	1.530.099	6.319.995
Joint stock banks	5.057	1.753	13.126	30.305	68.117	166.951	663.942	1.564.715	7.709.296
Savings banks	6.787	2.186	13.411	31.058	66.302	172.241	664.159	1.565.499	6.319.543
Raiffeisen credit cooperatives	7.852	2.405	14.029	30.726	67.828	163.988	645.182	1.440.230	4.906.600
Volksbank credit cooperatives	7.078	2.616	13.901	32.504	71.089	172.677	664.868	1.445.637	5.601.417
State mortgage banks	10.644	2.219	13.977	31.921	71.279	179.325	677.077	1.684.248	4.446.296
Other (national)	17.556	4.944	13.805	31.903	70.347	184.056	848.000	1.660.000	.

Source: HFCS Austria 2010, OeNB; OeNB banking statistics.

Note: Savings plans with building and loan association are aggregated to the appropriate sectors.

¹ Fewer than six observations in this cell; the value is not shown.

² No observations in this category.