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Eurosystem Household Finance and Consumption Survey 2017

First results for Austria

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This report presents results from the third wave of the Eurosystem Household Finance and Consumption Survey (HFCS) for Austria. The report focuses on the wealth components of the household balance sheet but we also discuss the main findings of the survey in terms of balance sheet robustness. We analyze the pattern of findings that are in line with international results as well as peculiar but stable findings which specifically apply to Austrian households. As the joint distribution of income, consumption and wealth is of particular interest for many international institutions we match the HFCS data with European Union Statistics of Income and Living Conditions (EU-SILC) and with Household Budget Survey (HBS) data.

Pirmin Fessler,
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Since its first wave in 2010 the Eurosystem Household Finance and Consumption Survey (HFCS) has become a key resource for analyzing households' debt behavior as well as their saving and investment behavior, reaching far beyond the areas for which it had been designed (see ECB, 2009). The availability of harmonized micro-data on household balance sheets in the euro area and beyond (the second-wave HFCS was also conducted in Poland and Hungary)[2] has fostered extensive knowledge production. The HFCS data have been used extensively by the Eurosystem, international organizations such as the OECD and the IMF as well as numerous academic researchers for a large variety of topics.[3] In Austria, the collection of HFCS data made it possible for the first time to estimate the distribution of net wealth among households. For the corresponding first results report of the second wave and for a detailed summary of the history of the HFCS and for measurement issues such as coverage and underreporting problems of wealth surveys see Fessler et al. (2016).

In the past decades of research on household finance some main findings emerged which seem to be common across almost all countries and datasets. On the basis of the third wave of the HFCS in Austria we are able to robustly compare our main findings with international household finance research and to identify common patterns as well as differences.

Since the seminal report of the Stiglitz-Sen-Fitoussi Commission (2009) it has been state of the art to analyze the distribution of income, consumption and wealth jointly. However, it is hardly possible to conduct one single household survey where all three items are covered in appropriate detail and with suitable care. The HFCS for example has a strong focus on wealth and also gathers gross income data with great detail, but measures consumption only very roughly and does not include net income measures at all.[4] Other surveys focus on income, such as the EU-SILC (European Union Statistics on Income and Living Conditions), and yet others

on consumption, such as the Household Budget Survey (HBS, Konsumerhebung). Eurostat currently works on experimental statistics combining all three surveys to estimate the joint distribution of income, consumption and wealth. We deliver such estimates for Austria based on a statistical matching of all three surveys (HFCS, EU-SILC and HBS) and compare the results with estimates resulting from using the HFCS alone.

The remainder of this report is structured as follows. We discuss the results for net wealth and its components in section 1. In section 2 we compare main findings of the international literature on household finance with the results for Austria. Section 3 presents estimates on the joint distribution of income, consumption and wealth that are based on a statistical procedure matching EU-SILC data on income and HBS data on consumption with the HFCS data on wealth. Section 4 summarizes and concludes.

1 Net wealth and its components

This chapter resembles the main part of the first result report of the second wave (Fessler et al., 2016) but provides the information in a more concise way. We deliver some basic definitions in subsection 1.1, present measures of perceptions and preferences in subsection 1.2, describe the distributions of real assets, financial assets, debt and net wealth in subsection 1.3 and discuss the share of households holding certain wealth components and conditional values thereof in subsection 1.3.
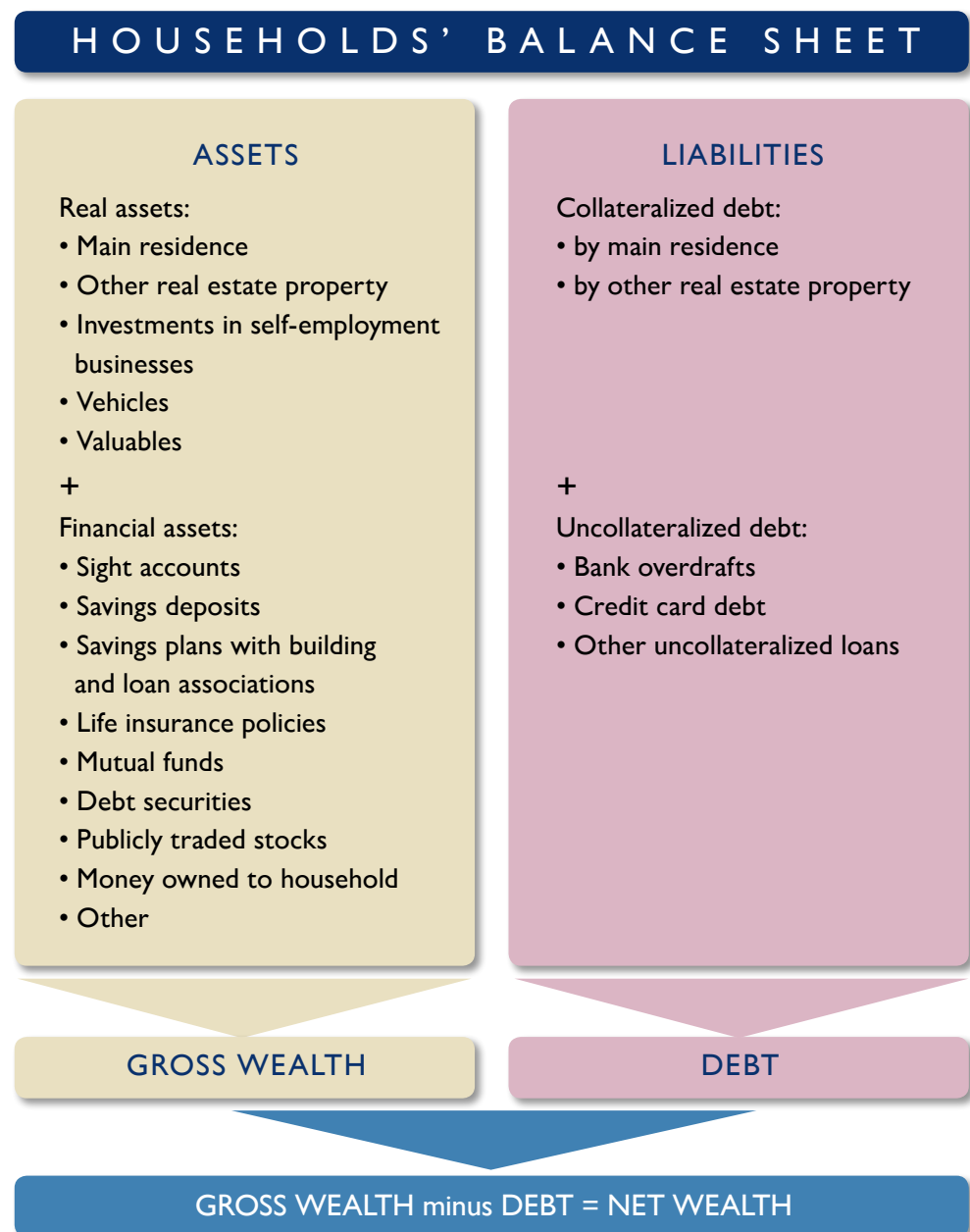
1.1 Definitions

A complete overview of the relevant definitions is provided in the reports on the first (2010) and second (2014) waves of the HFCS (Fessler et al., 2012; Fessler et al., 2016; ECB, 2016a and 2016b; Albacete et al., 2018b). For the sake of brevity, let us mention here only that the primary units of analysis of the HFCS are households. A household can be a person living alone, or a group of people who live together in the same private dwelling and share expenditures, including the joint provision of the essentials of living. The target population excludes households or individuals in institutions, i.e. hospitals, nursing homes, old persons' homes, student residences, boarding schools, convents, correctional facilities, barracks or the like. The definition of household as the unit of research in the Eurosystem HFCS is not only driven by theoretical considerations but also pragmatically oriented on the information households can reasonably be expected to provide in a voluntary survey.

The main aggregates are real assets, financial assets and debt. Gross wealth is the sum of real assets and financial assets; net wealth is gross wealth minus debt. The key components of the household balance sheet are as listed in infographic 1 (reproduced from Fessler et al., 2016).

1.2 Perceptions and preferences

Perceptions and preferences are crucial for understanding individual economic behavior. Therefore, we start our analysis with the perspective of the households themselves. Chart 1 shows the answers to a question regarding the households' self-assessment with regard to their own position in the wealth distribution in waves 2 and 3:

HOUSEHOLDS' BALANCE SHEET

ASSETS

Real assets:
- Main residence
- Other real estate property
- Investments in self-employment businesses
- Vehicles
- Valuables

+

Financial assets:
- Sight accounts
- Savings deposits
- Savings plans with building and loan associations
- Life insurance policies
- Mutual funds
- Debt securities
- Publicly traded stocks
- Money owned to household
- Other

LIABILITIES

Collateralized debt:
- by main residence
- by other real estate property

+

Uncollateralized debt:
- Bank overdrafts
- Credit card debt
- Other uncollateralized loans

GROSS WEALTH

DEBT

GROSS WEALTH minus DEBT = NET WEALTH

"Looking at your household's entire net wealth, where in the distribution would you classify your household on a scale from 1 to 10 (1 denotes the bottom 10% category with the lowest wealth and 10 the top 10% with the highest wealth in Austria)?"

As in the second wave of the HFCS, respondents tended to misclassify their household with a strong bias towards the middle of the distribution.[5] At the same time, even more households placed themselves not just below the middle (5th or 4th decile) but in the 3rd decile. While in the second wave about 43% of households put

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[5] *References to individuals are references to the so-called financially knowledgeable person, who was the intended survey respondent.*

Chart 1

Self-assessment of household's position in net wealth distribution

% of households

Net wealth deciles

Wave 2　　Wave 3　　Real share
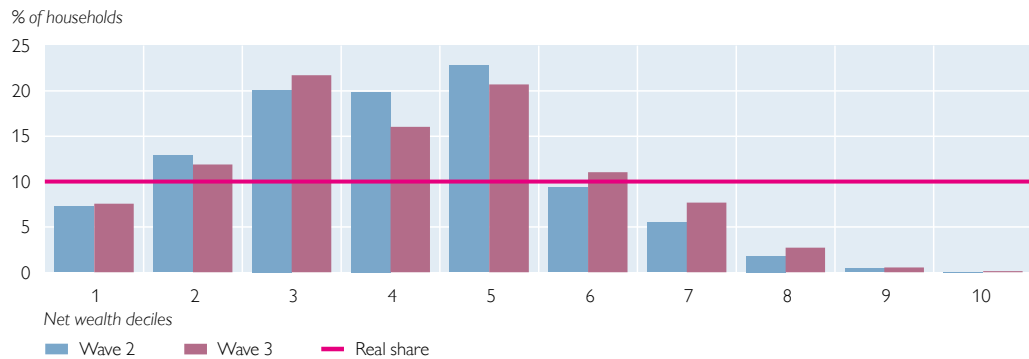
Source: HFCS Austria 2014, HFCS Austria 2017, OeNB.

themselves in the 4th or 5th decile and only about 20% in the 3rd decile, in the third wave we already find 22% in the 3rd decile and only about 37% in the 4th or 5th decile. One hypothesis to explain this shift are concerns about downward mobility among households in the lower middle class.

The more wealth a household has, the lower the probability of a correct self-assessment. Households at the lower end of the distribution overestimate the wealth decile they belong to, whereas those in the middle (from the 4th decile onwards) and at the top underestimate it. The average estimated decile is 3 for the lower two deciles; 4 for deciles 4 to 7; 5 for deciles 8 and 9; and 6 for decile 10 (see table 1).

As a next step, we illustrate the relationship between households' perceived wealth position and the savings rate across equalized net income, which is the most important determinant of the savings rate.[6] We distinguish three groups of households: households that overestimate their position in the net wealth distribution, households that underestimate their wealth position, and households who estimate their wealth position correctly.

Chart 2 calculates average saving rates by vingtiles, i.e. 20 equal-size groups, of the household equalized net incomes. In order to filter out age and gender effects we apply a regression approach controlling for the financially knowledgeable persons' age and age squared and gender first.[7] Chart 2 shows that the average savings rate of those who underestimate their wealth position is generally above the saving rates of those who overestimate or correctly estimate their wealth decile.

Table 1

Self-assessment by net wealth deciles

	All households	Households with incorrect self-assessment	
	Correct self-assessment	Average misestimation deciles	Average estimated decile
Actual decile	%		
1	38.9	2.3	3
2	26.4	1.2	3
3	37.8	0.6	4
4	21.6	−0.5	4
5	19.4	−1.2	4
6	10.7	−1.9	4
7	10.2	−2.6	4
8	2.8	−3.2	5
9	0.6	−3.6	5
10	0.0	−4.2	6

Source: HFCS Austria 2017, OeNB.

[6] For a deeper discussion of saving and the savings rate in Austria, see Fessler and Schürz (2017).

[7] We use the binscatter command in Stata provided by Michael Stepner (MIT).

While income is the key determinant of the savings rate, households underestimating their wealth position save more than other households across all income levels. Thus, households that underestimate their position appear to try to catch up. The effect is stronger for households with higher equalized net incomes. These are the households that are more able to adapt their savings rate by limiting consumption.

Chart 3 shows answers to four questions on views and preferences of respondents related to wealth:

1. Do you think it is a good idea to buy things using debt or borrowed money?
2. Do you think that it is possible to start poor, work hard and become rich in Austria?
3. Are you in favor of introducing a wealth tax?
4. Inheritance tax was abolished in Austria in 2008. Are you in favor of re-introducing inheritance taxation in Austria?

While overall about 17% consider borrowing money to buy things a good idea, the share rises with net wealth. About 43% think that it is possible to start poor and get rich through work in Austria. However, while this share is about 30% for households in the lowest wealth quintile it rises to almost 60% for households in the highest quintile. Interestingly also people in households that have received an inheritance say that one can become rich through work more often than those without inheritances (47% vs. 40%). About 46% of respondents are in favor of a wealth tax. While the share is above 50% in the lowest wealth quintile, acceptance decreases to below 45% in the 5th quintile. Only about 20% of the reference

Chart 2

Perceived wealth position and savings by equalized household income

Savings rate

(Log) Equivalized household income

○ Underestimated   □ Correctly estimated
◇ Overestimated
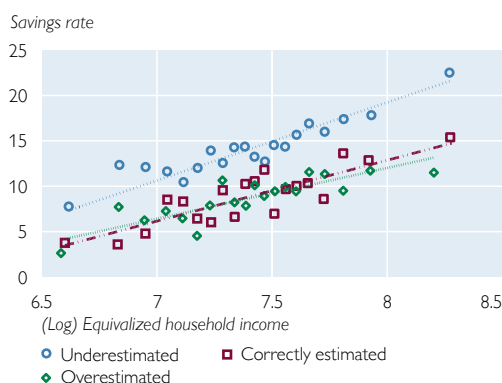
Source: HFCS Austria 2017, OeNB.

Chart 3

Views and preferences of the financially knowledgeable person across net wealth quintiles

Net wealth quintiles

Share in %

■ Inheritance tax should be reintroduced   ■ Wealth should be taxed
■ One can become rich through hard work in Austria   ■ Financing consumption with debt is a good idea

Source: HFCS Austria 2017, OeNB.

persons[8] would support the re-introduction of an inheritance tax. Interestingly this result is rather stable across all wealth quintiles.

1.3 The distribution of wealth

As a next step, we present the main components of net wealth in the charts below. Charts 4 through 7 show the distribution of household real assets, financial assets, debt and net wealth.
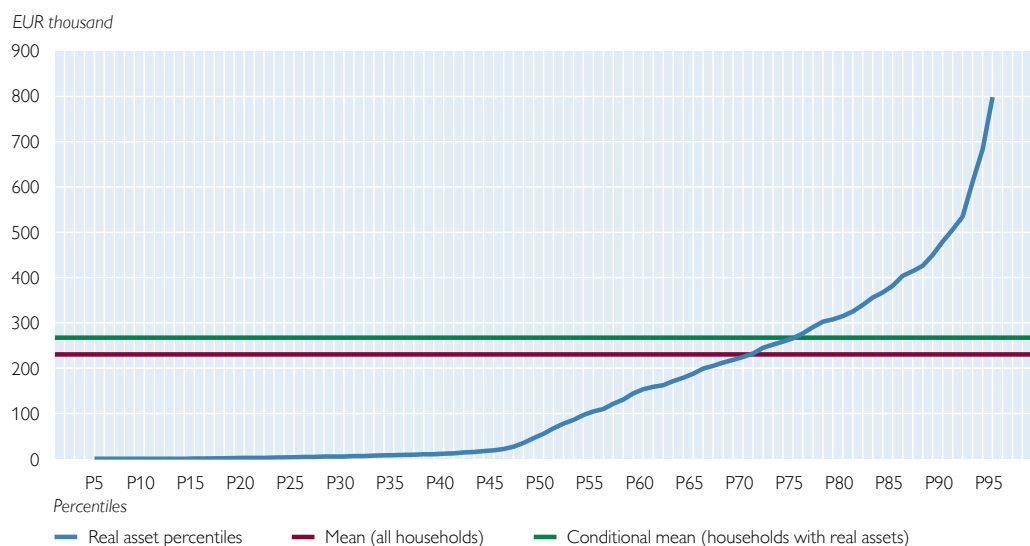
Household net wealth is calculated by summing up real assets and financial assets and subtracting debt from the total.

Chart 4 shows the distribution of real assets from the 5th to the 95th percentile. The calculation covers all households, with households that do not own any real assets having been assigned a real asset value of zero. We select the interval from the 5th to the 95th percentile for the chart to avoid coverage problems at the upper and lower tails of the distribution (see Vermeulen, 2016, for a discussion) and uncertainties arising from the strong positive skewness of the distribution (see Fessler et al., 2016, for a detailed discussion of this issue).[9]

Zero ownership of real assets is reported by a fairly large number of households (13.8%). This may reflect the underreporting of less valuable items. In particular, the low rate of reported valuables may reflect a growing anxiousness to disclose information about valuables kept at home (see table 2). Not until the middle of the distribution do real asset holdings begin to increase markedly. Below the middle of the distribution vehicles are the only dominant type of real asset. The 45.9% of households that own their main residence are almost all in the upper half of the net

Chart 4

Distribution of real assets

EUR thousand

Legend: Real asset percentiles — Mean (all households) — Conditional mean (households with real assets)

Percentiles

Source: HFCS Austria 2017, OeNB.

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[8] *We use the financially knowledgeable person — who answers all household level questions in the HFCS — as a reference person.*

[9] *Although coverage problems affect different parts of the balance sheet differently, we show all results based on the interval from the 5th to the 95th percentile in order to be consistent.*
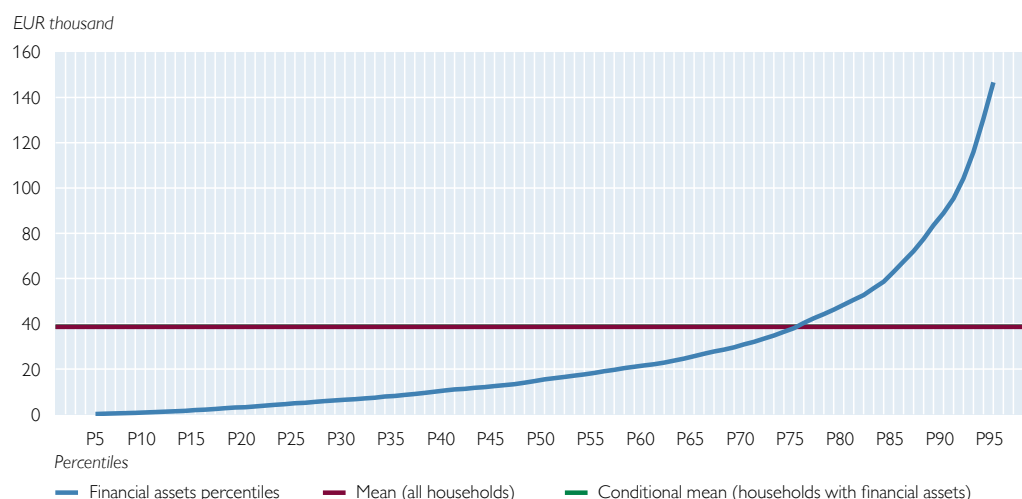
wealth distribution.[10] The conditional mean of real assets,[11] which is calculated on the basis of households with real assets only, comes to about EUR 267,000. Real asset holdings rise evenly between the middle and the 90th percentile, reflecting the relatively evenly distributed current values of households' main residences. Real asset values rise noticeably more from the 90th percentile, especially the values above the 95th percentile, which the chart does not show. In this range of the distribution, other real estate property and investments in self-employment businesses begin to play a key role in addition to main residences. Ownership of agricultural property of farmers is also to be found in this segment of the distribution.

To sum it up in broad terms, about half of all households own only low volumes, if any, of real assets. An additional 40% own their main residence and little else. Some 10% have real assets totaling more than EUR 480,000 that – besides household main residences – consist mainly of other real estate property and investments in self-employment businesses.

Chart 5 shows the distribution of financial assets. Only very few households (0.3%) own no financial assets at all. For this reason, the conditional and unconditional means are nearly identical at around EUR 39,000. Once again, both these values are far higher than the (unconditional) median (some EUR 15,000), which indicates a pronounced positive skewness of the distribution. The financial wealth of roughly three-quarters of all households falls short of the mean, and fewer than 10% have financial assets of more than EUR 89,000. Underreporting is especially high for financial wealth in general, and the degree of understatement is most likely to be largest in the upper range of the distribution (see also Andreasch and Lindner, 2016; Vermeulen, 2016).
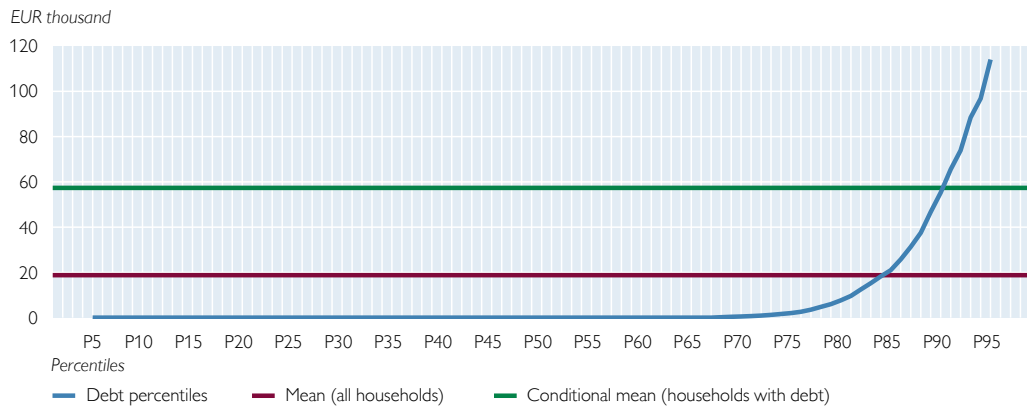
Chart 5

Distribution of financial assets

EUR thousand

Percentiles

— Financial assets percentiles   — Mean (all households)   — Conditional mean (households with financial assets)

Source: HFCS Austria 2017, OeNB.

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[10] *The microcensus ratio for people owning their main residence is 47.8%. The HFCS also includes not registered households likely to be renters.*

[11] *The mean as measured in the survey likely understates the true mean in the population, due to the effective undercoverage of very wealthy households.*

Chart 6

**Distribution of debt**

EUR thousand

Source: HFCS Austria 2017, OeNB.

Chart 6 shows the distribution of debt from the 5th to the 95th percentile. While debt tends to be positively correlated with wealth, top-wealth households, which are underrepresented in the HFCS, are rare to have particularly severe debt. Therefore, underrepresentation of the upper tail of the debt distribution of the HFCS is less problematic. However, we show the distribution of debt also from the 5th to the 95th percentile for consistency. More than two-thirds of Austrian households (67.3%) do not have any debt. The conditional mean of debt comes to approximately EUR 57,000. Small liabilities are primarily unsecured loans or, in few instances, secured loans that have been almost paid off. Large debt amounts mainly reflect mortgage loans at various stages of repayment.

Chart 7 shows the distribution of net wealth for the third and for the second wave. In 2017 (wave 3) some 4.7% of households have negative or no net wealth. As real assets predominate among net wealth, the result is similar to that in chart 2. At about EUR 250,000, the mean is considerably higher than the median of around EUR 83,000. Net wealth of over EUR 1 million is observed only in the top 5% of households, which are not shown in the chart. Compared to 2014 the distribution of net wealth between the 5th and 95th percentile stayed almost the same. If anything, there seems to be a little shift towards lower values in 2017 for percentiles between P50 and P89 and higher values above P89. In fact, the values for the lower half (up to P49) are slightly higher in 2017 but hardly visible in the chart. The corresponding lines therefore intersect already two times between the 5th and the 95th percentile, namely between P49 and P50 and between P89 and P90.

While in the lower part of the distribution households may try to accumulate more precautionary wealth (P10 is at about EUR 2,000 in 2017 compared with about EUR 1,000 in 2014, P20 at about EUR 8,000 in 2017 compared with about EUR 6,000 in 2014), households have slightly less wealth in the middle while they have more wealth in the top decile. Relative increases, however, are largest in the lower part of the wealth distribution. This might likely be a cause of rising uncertainty and (expected) decreases in welfare state activity (see Fessler and Schürz, 2018a). More than 70% of households have less wealth than average wealth at about EUR 250,000 and only 10% have more than EUR 500,000. Net wealth millionaires can be found only inside the top 5% of the net wealth distribution.

Chart 7

Distribution of net wealth 2014 and 2017

EUR thousand

Net wealth percentiles 2017 ——— Mean 2017 ——— Net wealth percentiles 2014 ——— Mean 2014
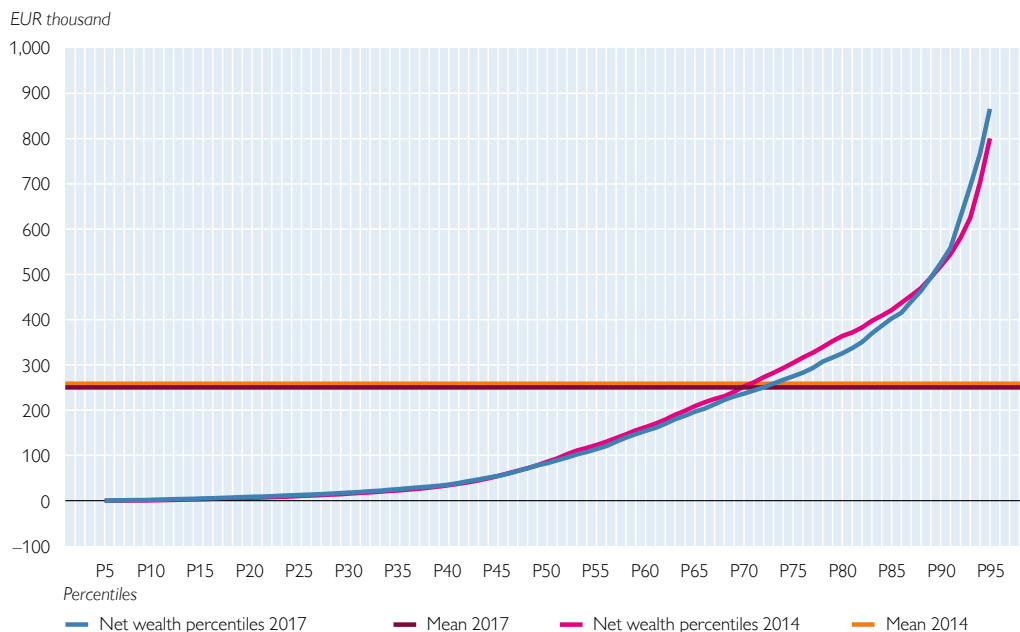
Source: HFCS Austria 2014, HFCS Austria 2017, OeNB.

The three components of net wealth (real assets, financial assets, debt) can be analyzed in detail at the level of their subcomponents. We perform this analysis in two steps: first, we determine household participation in a specific wealth component, i.e. we establish how many households have a given asset or liability. Second, we compute the median and the mean for the households with this component. Thus, these values are conditional. The median divides the conditional distribution into two halves. The arithmetic mean is the value that would result for every household owning such an item if the entire volume of wealth were equally distributed. The median is a statistically robust measure while the mean is not. Additionally, the mean-to-median ratio is computed as an indicator of the skewness of the distribution within the wealth component under review.[12]

1.4 The components of wealth

Table 2 provides an overview of the key components of net wealth. The further the mean is away from the median, the more skewed the distribution is. All wealth components have a positively skewed distribution. Accordingly, the mean is higher than the median.

Vehicles are by far the most common real asset among households in Austria. More than three-quarters of Austrian households own at least one vehicle. The average value of such vehicles is about EUR 13,000. The mean-to-median ratio of 1.6 indicates a relatively equal distribution of wealth.

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[12] *For reasons of simplicity, we state the mean-to-median ratio here as a simple division of the estimated mean by the estimated median. The underlying means and medians were estimated on the basis of the five multiply imputed datasets.*

Table 2

Components of net wealth

	Participation	Conditional median	Conditional mean	Mean-to-median ratio
	%	EUR thousand	EUR thousand	
Real assets				
Vehicles	78.7	8.0	13.1	1.6
Main residence	45.9	250.0	289.1	1.2
Other valuables	17.6	5.0	13.9	2.8
Other real estate property	13.0	123.7	296.5	2.4
Investment in self-employment business (incl. farms)	7.0	108.1	661.5	6.1
Financial assets				
Sight accounts	99.5	1.3	3.6	2.8
Savings accounts	86.6	13.4	28.6	2.1
Savings plan with building and loan associations	48.0	4.0	5.8	1.4
Life insurance contracts	35.2	11.0	22.4	2.0
Voluntary private pension plans	12.3	8.5	22.9	2.7
Mutual funds	8.5	15.2	40.6	2.7
Money owed to household	6.9	2.0	9.1	4.6
Stocks	5.0	10.1	23.1	2.3
Bonds	2.6	16.9	37.5	2.2
Other financial assets	1.4	12.4	91.6	7.4
Debt				
Collateralized debt	16.5	64.6	100.2	1.6
Main residence	15.6	64.8	98.6	1.5
Other real estate property	1.4	50.8	85.2	1.7
Uncollateralized debt	20.3	2.3	11.0	4.9
Overdrafts	11.8	0.8	1.5	1.9
Uncollateralized loans	11.2	7.4	18.3	2.5
Loans from family and friends	4.1	4.0	14.0	3.5
Outstanding balance on credit cards	0.7	0.4	0.9	2.1

Source: HFCS Austria 2017, OeNB.

Some 46% of households at least partially own their main residence. In this component of wealth, the median value of the main residence of owner households is around EUR 250,000, and the average value of the main residence of owner households amounts to about EUR 289,000. Main residence ownership represents the most important asset in terms of volume for the owners.

About 18% of households own other valuables, such as gold, works of art, jewelry, collections, etc. With the median value being around EUR 5,000, the values in this class are rather low.

About 13% of households own real estate assets other than the household main residence, above all houses, apartments and undeveloped land. In the HFCS in Austria, real estate property of farming households that is part of their agricultural business is recorded under investments in self-employment businesses rather than under other real estate property. However, some real estate assets also qualify as property for business use. This caveat should be considered when analyzing businesses-related assets. With a conditional mean[13] of some EUR 297,000 – about two-and-a-half

[13] In the calculation of the conditional mean only households owning the particular asset are considered.

times the median – this component of wealth exhibits a relatively unequal wealth distribution compared to that of main residences.

Around 7% of households have investments in self-employment businesses (including agricultural businesses), i.e. businesses in which at least one household member is actively involved. Both the median (around EUR 108,000) and the mean (around EUR 662,000) of this component of wealth are comparatively high. Silent partnerships, defined as (full or partial) ownership of a business in which no household member is actively involved, qualify as financial assets.

Sight accounts are the most common financial asset and the one with the lowest values. Almost all households (99.5%) have at least one sight account. The median of this component of financial wealth is no more than around EUR 1,300, whereas the mean value is around EUR 3,600.

Savings accounts, which in the HFCS Austria include savings plans with building and loan associations and life insurance contracts, are by far the most common savings variant. About 87% of households have at least one savings account, 48% have at least one savings plan with a building and loan association, and 35% have at least one life insurance contract. The median of savings accounts comes to around EUR 13,000 and the mean to some EUR 29,000.

Roughly, 12% of households have made voluntary private pension provisions. This component of wealth contains state-sponsored retirement provision plans and other dedicated private savings plans for retirement. The median runs to roughly EUR 9,000 and the mean to about EUR 23,000, which does not differ that much from the values for savings accounts.

Some 9% of households have invested in mutual funds. The median of this component of wealth is around EUR 15,000 and the mean value about EUR 41,000.

Money owed to households represents another component of financial wealth. About 7% of households state that they have lent money to others. The sums involved (median: about EUR 2,000; mean about EUR 9,000) are not negligible.

Stocks are held by some 5% of households, bonds by around 3%. The medians run to about EUR 10,000 (stocks) and around EUR 17,000 (bonds), which compares with corresponding means of about EUR 23,000 (stocks) and around EUR 38,000 (bonds). The residual measure "other financial assets," for which about 1.4% of households reported values, comprises financial assets that are not recorded in any other category. This includes, for instance, silent partnerships, deferred compensation, trademark rights and accounts managed by trustees. The median amounts to about EUR 12,000 and the mean to some EUR 92,000.

About 17% of households have debt for which they use their home as collateral. The difference between the median of about EUR 65,000 and the mean of around EUR 100,000 reflects variations across households both in the original amounts borrowed and the repayment of loans over time.

Only about 1% of households have taken out loans using other real estate property as collateral; in terms of their values, however, these loans are similar in size to loans using the main residence as collateral.

About 20% of households have uncollateralized debt.[14] The distribution is significantly more skewed than that of collateralized debt. And about 12% of

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[14] *This category includes loans taken out to finance the purchase of a vehicle. Leasing contracts, however, are not included as the HFCS does not collect information on the outstanding balance of leasing contracts.*

households have overdrawn at least one of their sight accounts by a median of about EUR 1,000; the average value of this component is EUR 1,500. Other uncollateralized other loans, amounting to an average of about EUR 18,000, represent the largest component of uncollateralized debt. Outstanding credit card balances play a minor role in Austria, with only about 1% of households holding such debt and with the median and the mean coming to a comparatively low level of around EUR 400 and EUR 900, respectively. Austrians generally continue to use credit cards rather like debit cards, settling their bills in full every month.

Annex 2 (tables A1–A6) provides breakdowns of wealth according to socio-economic characteristics.

2 Ten findings about household finance in Austria

In this section, we will discuss ten findings which are robust across all three waves of the HFCS in Austria and therefore can be regarded as solid characterizations of household balance sheets and the wealth distribution in Austria. The first five findings are related to the international literature on household finance. The second five results deal with important Austrian peculiarities.

Almost 20 years ago Davies and Shorrocks (2000, p. 607) described five "stylized facts" about the distribution of wealth:

1. *"Wealth is distributed less equally than labour income, total money income or consumption expenditure. While Gini coefficients in developed countries typically range between about 0.3 and 0.4 for income, they vary from about 0.5 to 0.9 for wealth. Other indicators reveal a similar picture. The estimated share of wealth held by the top 1% of individuals or families varies from about 15-35%, for example, whereas their income share is usually less than 10%."*
2. *"Financial assets are less equally distributed than nonfinancial assets, at least when owner-occupied housing is the major component of nonfinancial assets. However, in countries where land value is especially important, the reverse may be true."*
3. *"The distribution of inherited wealth is much more unequal than that of wealth in general."*
4. *"In all age groups there is typically a group of individuals and families with very low net worth, and in a number of countries, including the US, the majority have surprisingly low financial assets at all ages."*
5. *"Wealth inequality has, on the whole, trended downwards in the twentieth century, although there have been interruptions and reversals, for example in the US where wealth inequality has increased since the mid-1970s."*

Against this scientific background, what are related findings for Austria?

Finding 1: Wealth is less equally distributed than income

Chart 8 shows the Lorenz curves of gross income and net wealth. As elsewhere, in Austria net wealth is distributed more unequally than income. The HFCS is designed to provide better estimates of gross than of net income. However, net income is distributed more equally than gross income.

Chart 8

Lorenz curves of gross income and net wealth

Gross income and net wealth shares in %

Population share in %

— Gross income — Net wealth — Line of equality
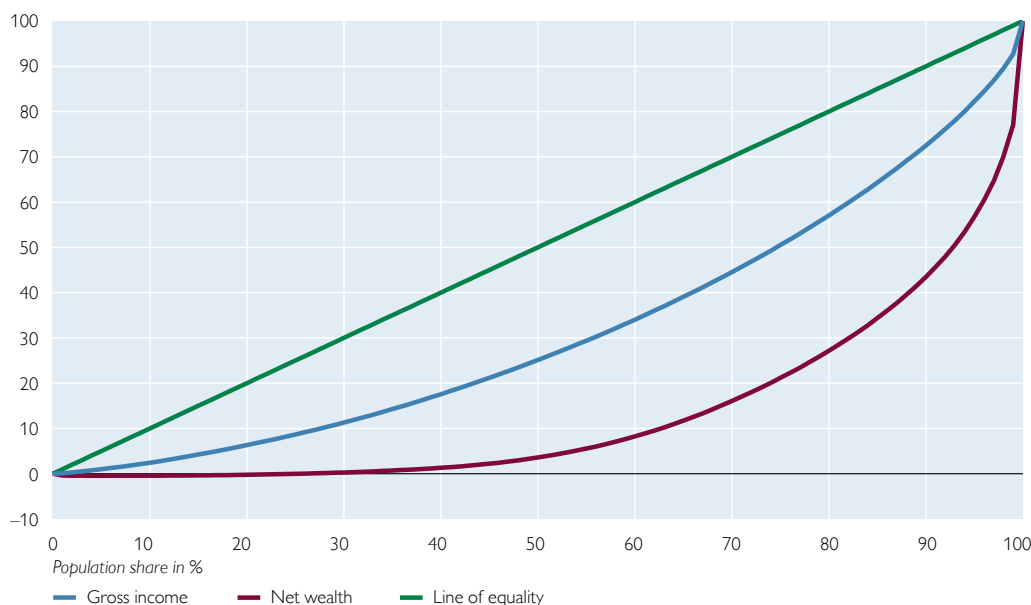
Source: HFCS Austria 2017, OeNB.

Finding 2: In Austria, the distribution of nonfinancial assets is about as unequal as the distribution of financial assets and not more equal, as is the case in many other countries

Owner-occupied housing is the major component of nonfinancial assets in Austria. But the general finding of the international literature that financial assets are less equally distributed than real assets cannot be confirmed for Austria.

Chart 9 shows Lorenz curves of financial assets and real assets. Real assets are more unequally distributed than financial assets. This is mainly due to the fact that homeownership is concentrated in the upper half of the net wealth distribution and that more than half of the population does not own the household's main residence.

Finding 3: In Austria, the distribution of inherited wealth is much more unequal than that of wealth in general

About 62% of households have not received an inheritance yet, while among the remaining 38% who have inherited something most households have inherited comparably small amounts. Chart 10 shows the Lorenz curves of inheritances as they are collected in the HFCS, that is with the value at the time of ownership transfer, as well as the present value assuming a nominal interest of 3% and taking the time passed since the inheritance into account, and compares these amounts to net wealth. However, this exercise does not take into account differences of changes in prices of particular items inherited such as the development of the real value of money in a savings account vs. real estate wealth. Fessler and Schürz (2015) additionally show that the number of households that have received an inheritance is higher among households with higher levels of net wealth and income.

Chart 9

Lorenz curves of financial assets and real assets
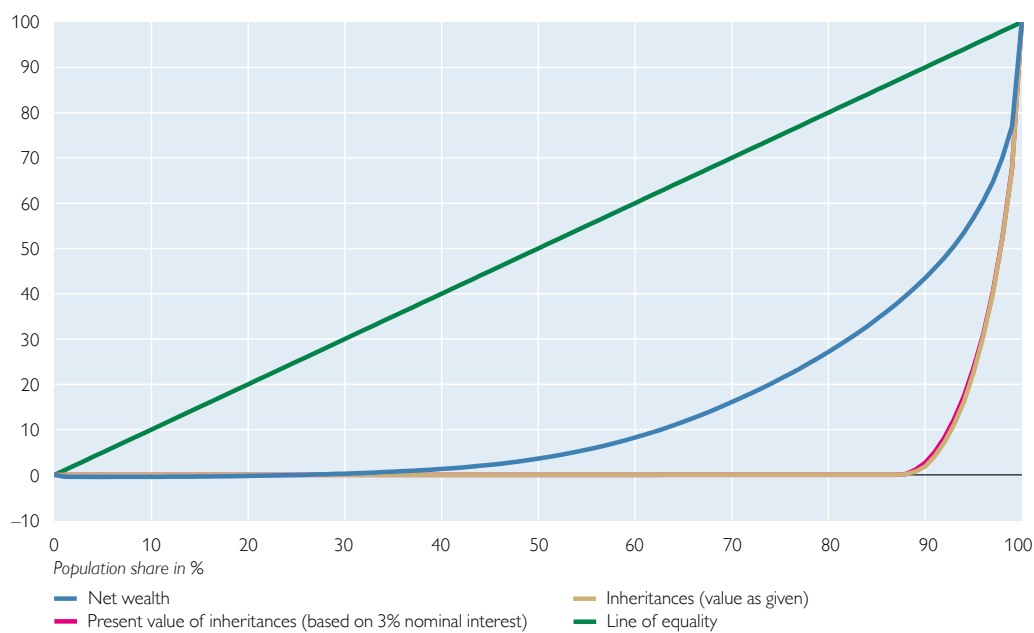
Financial assets and real asset shares in %

Population share in %

— Financial assets   — Real assets   — Line of equality
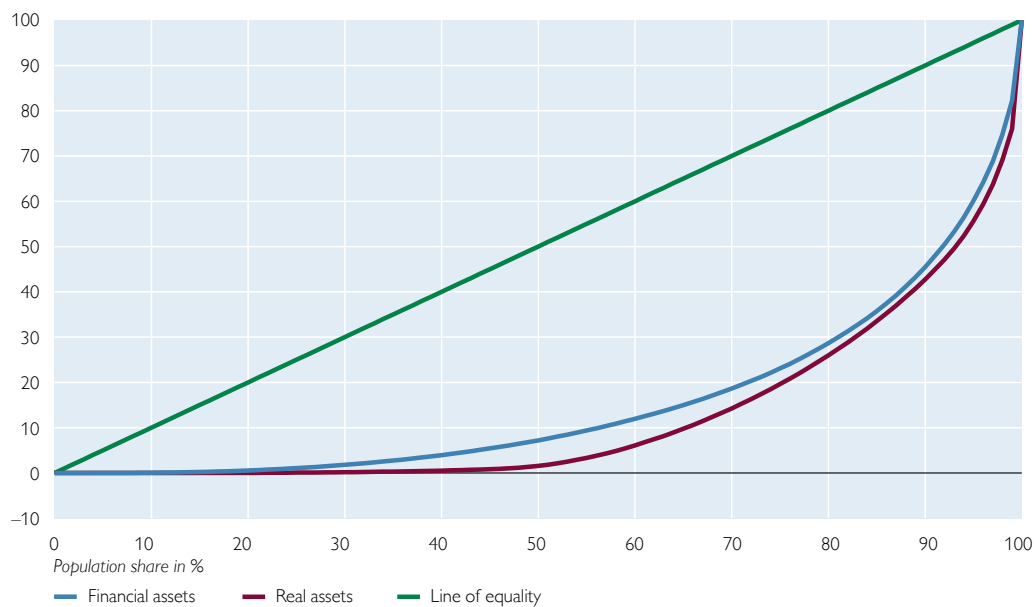
Source: HFCS Austria 2017, OeNB.

Chart 10

Lorenz curves of inheritances and net wealth

Inheritances and net wealth shares in %

Population share in %

— Net wealth   — Inheritances (value as given)
— Present value of inheritances (based on 3% nominal interest)   — Line of equality
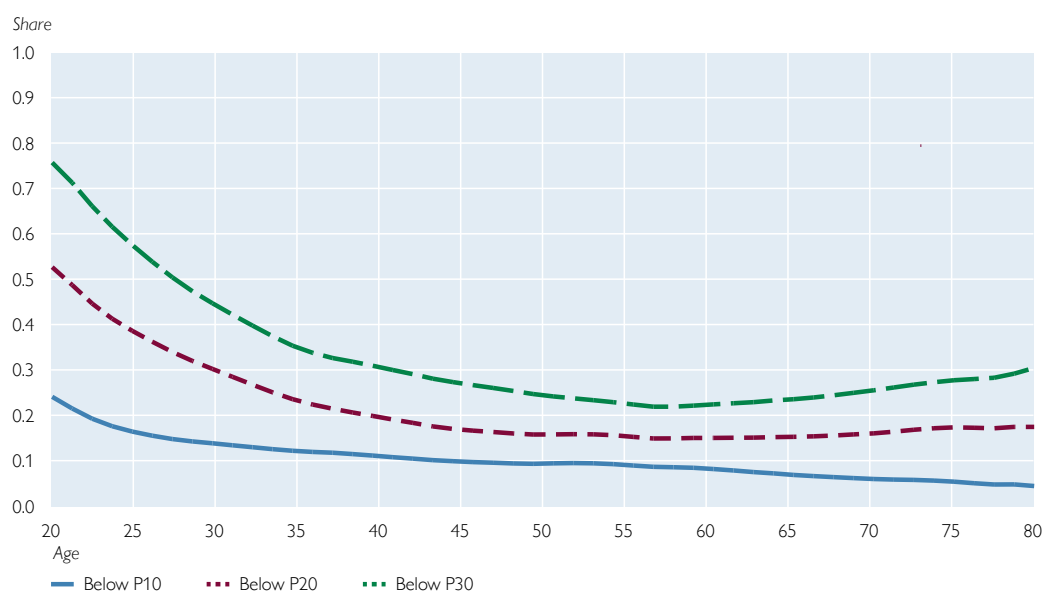
Source: HFCS Austria 2017, OeNB.

Finding 4: In Austria, households with very low net wealth can be found in all age groups
Chart 11 shows the share of households below a certain wealth percentile (in the overall wealth distribution) across the age of the reference person. Even though the share of households belonging to the lowest net wealth decile is higher for households with younger reference persons and lower for households with older reference persons it remains well above zero over the whole life cycle (see chart 11). The share belonging to the lowest two deciles is particularly large for the young but remains almost constant above 15% from age 45 onwards. The share belonging to the lowest three deciles even increases again and is above average (above 30%) for the elderly. Thus, households with low wealth levels can indeed be found in all age groups.

Chart 11

Households in lower percentiles by age of reference person

Source: HFCS Austria 2017, OeNB.

Finding 5: For the short period for which data are available, wealth inequality was rather stable in Austria
When we compare HFCS data across all three waves, we find that wealth inequality remained rather stable in Austria. As is evident from table 3, different measures of inequality move in different directions. Kennickell (2018) showed that this finding is expected especially without oversampling of the top tail of the wealth distribution. However, in most cases the observed differences are not statistically significant. Furthermore, wealth surveys generally suffer from problems of coverage and under-reporting. This leads to severe biases and an underestimation of the true wealth inequality (see Vermeulen, 2016). On top of that misreporting of households likely differs for different wealth items. While debt undercoverage appears to be relatively low, undercoverage is rather large for financial assets. There is a high degree of uncertainty especially with regard to estimates for which the right tail of the distribution is important.

Table 3

Inequality measures 2010–2017

	2010		2014		2017	
	Gross wealth	Net wealth	Gross wealth	Net wealth	Gross wealth	Net wealth
Inequality measures						
Gini coefficient	0.73	0.76	0.71	0.73	0.71	0.73
GE(2)	4.0	4.5	10.2	11.5	7.4	8.5
P75/P25	22.4	24.3	27.0	28.6	21.7	21.6
P90/median	6.2	7.1	5.4	6.0	5.7	6.3
P90/P10	233.7	581.1	251.8	521.2	171.9	262.0
Top shares	%					
Top 1	21.7	22.9	23.9	25.4	21.4	22.6
Top 5	45.5	47.6	41.6	43.4	41.2	43.1
Top 10	58.8	61.1	53.5	55.5	54.2	56.4
Top 20	74.4	76.6	70.0	72.1	70.9	72.8
Bottom 50	3.9	2.8	4.0	3.2	4.3	3.6

Source: HFCS Austria 2010, HFCS Austria 2014, HFCS Austria 2017, OeNB.

Note: The Gini coefficient may take a value greater than 1 if the data contain negative values. GE(2) is a generalized entropy index with $\alpha = 2$.

To sum up, three of the five main findings of the international literature on household finance reported in the seminal book chapter of Davies and Shorrocks (2000) can be confirmed for Austria. One, the downward trend of wealth inequality since the second world war and its upward trend since the 1970s, can neither be confirmed nor falsified because of a lack of data.

For Austria, the HFCS is the only survey that includes wealth for the full population of households, but the HFCS has only been available since 2010, which is too short to capture the wealth distribution over the longer horizon. In the absence of inheritance taxation, there are also no register data on inheritances, which could be used to estimate the tail of the wealth distribution. Even estimates of the income distribution in Austria have to use survey data (mostly EU-SILC), as an integrated register of labor and capital income at the household or individual level does not exist.

For the period from 2010 to 2017, the data point towards a rather stable distribution of net wealth in Austria. However, the international finding that financial assets are less equally distributed than nonfinancial assets does not seem to hold for Austria. This is likely related to our finding 8 (see below).

Finding 6: The distribution of net wealth in Austria is among the most unequal in Europe

Austria and Germany are both at the top with regard to the inequality of the wealth distribution and at the bottom with regard to median net wealth. This finding is a rather robust and valid result, reflecting the fact that the well-developed welfare state in both countries offers state pensions and health and other state-organized insurances against the contingencies of life as substitutes for private wealth. Most importantly, social housing plays a major role in Austria. About 12% of all households live in homes owned by the state and another 17% in cooperative housing usually also subsidized by the state. For a substantial part among those 18% that rent on the "free market," rents are regulated by the state. Wealth inequality would likely decrease if state social security were decreased — because households in the lower part of the wealth distribution would have strong incentives to insure themselves against contingencies of life (for a more detailed discussion see Fessler and Schürz, 2018a).

Finding 7: The share of households holding risky assets is particularly low in Austria; conditional on holding risky assets, the share of wealth invested in risky assets does not increase with wealth

Austrian households typically put money into savings accounts or save money under savings plans with building and loan associations or life insurance companies. Very few households hold riskier assets – i.e. assets that are riskier than a simple savings account – such as mutual funds, stocks or bonds.[15] The share of households doing so increases with wealth, but stays at low levels even for the wealthy, namely at about 20% for mutual funds and at about 10% for stocks and even less for bonds at the 90th percentile of the net wealth distribution (see left panel of chart 12). On top of that, conditional on participating in risky asset markets, wealthier households do not invest a higher share of their financial assets than households with low wealth (see right panel of chart 12). A large share of wealthy households in Austria does not invest in risky assets at all, and if they do, they do not invest more than low wealth households.
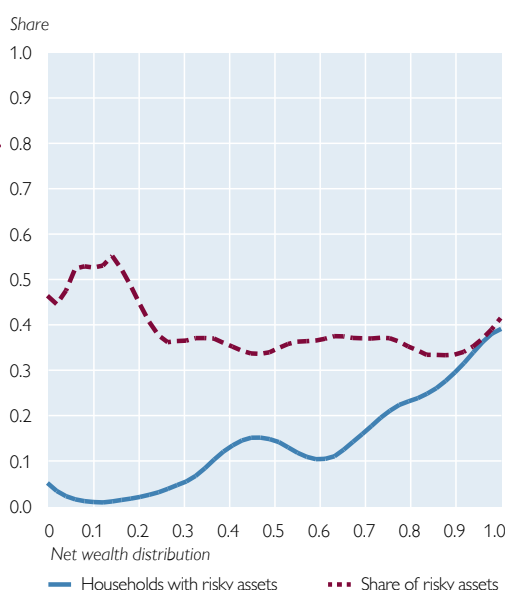
Chart 12

Investment in risky assets
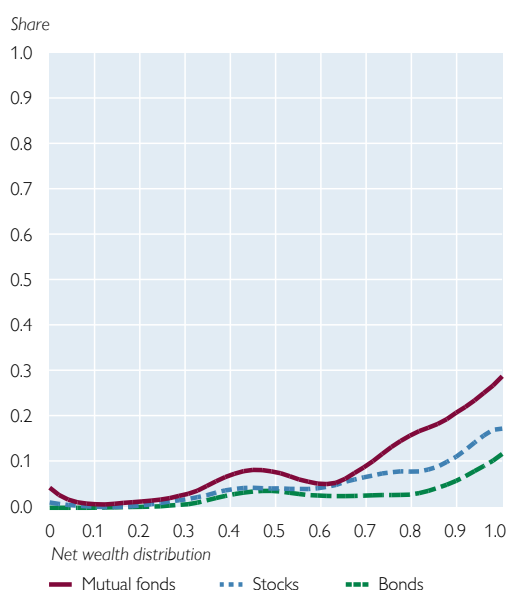
Share of households holding risky assets | **Conditional share of risky assets in financial wealth**

Source: HFCS Austria 2017, OeNB.

Finding 8: The share of owner-occupiers is particularly low and decreasing in Austria

The share of owner-occupiers is estimated at about 46% in the third wave of the HFCS. In the first wave in 2010 it was estimated at 48%. This is the second lowest share of owner-occupiers in the euro area. The trend for the HFCS estimate is similar to Statistics Austria's microcensus estimate (50.1% in 2010 and 47.8% in 2017). Hence, the rate of owner-occupiers in Austria is low and decreasing. Austria has a

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[15] We define risky assets to include mutual funds, stocks, and bonds, as is commonly done in the literature.
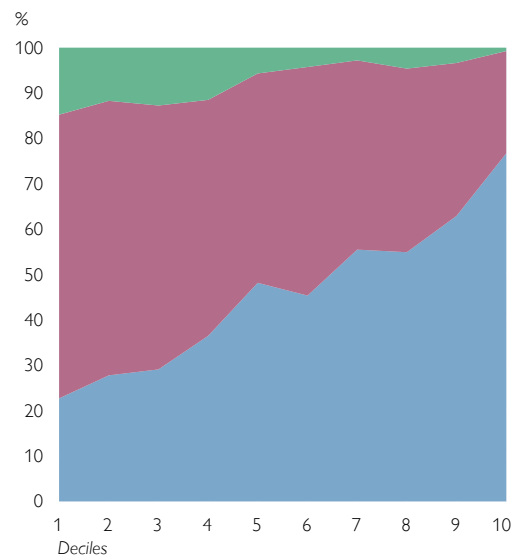
Chart 13

Tenancy types

Tenancy type across net wealth deciles
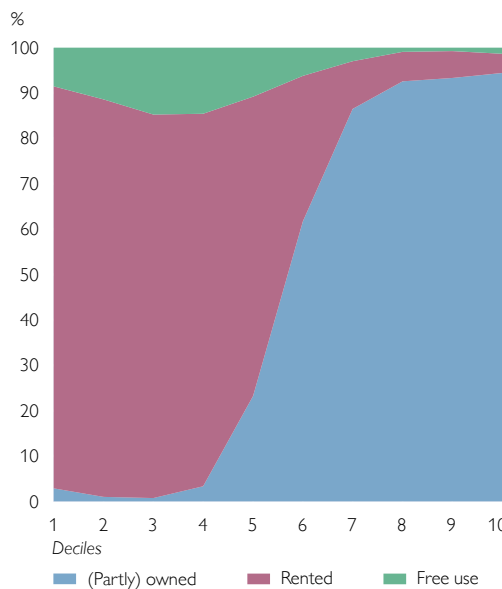
Tenancy type across gross income deciles

Source: HFCS Austria 2017, OeNB.

large rental market, which allows for rather easy household formation as opposed to having to buy a house or apartment when forming a new household. That is the reason for the relatively large number of young single-person households existing in Austria. This is also the main reason why overindebtedness is rather limited in Austria, which is helpful for financial stability. Those households that cannot accumulate the necessary downpayment through savings and do not inherit the relevant assets stay in rented apartments and houses – which are available and (still) relatively affordable. One reason why Austria and Germany did not suffer from large problems in housing markets during the recent financial and economic crisis was this strong selection into ownership. Particularly in the capital of Vienna, less than 20% of households are owner-occupiers and of those who are only a fraction (less than one-third) has any debt. Homeownership in Austria is particularly strongly correlated with wealth and income (see chart 13).

Finding 9: The extensive and intensive margins of debt are particularly low in Austria

The level of indebtedness of Austrian households is rather low. More than two-thirds of Austrian households (67.3%) do not have any debt. Collateralized mortgage debt is the form of debt which is relevant for financial stability, because it reaches higher absolute levels, is almost exclusively held by households in the upper part of the net wealth distribution (see table 4 and Albacete et al., 2018a, for a comprehensive overview of indebtedness of Austrian households). In Austria, almost every household who is an owner-occupier can also afford to be one. Uncollateralized debt on the other hand is more relevant for the lower half of the net wealth distribution and might be worrisome in size for low wealth households (see table 4). However, also uncollateralized debt does not pose a threat to financial stability in Austria as it is largely spread across the wealth distribution and as the conditional medians remain are rather low (below EUR 5,000 across all deciles).

Table 4

Extensive and intensive margins of debt by net wealth deciles

Net wealth deciles	Debt	Collateralized debt		Uncollateralized debt	
	Participation	Participation	Conditional median	Participation	Conditional median
	%	%	EUR thousand	%	EUR thousand
1	53.0	2.8	—[1]	51.8	4.5
2	21.2	1.0	–	20.1	0.9
3	21.7	1.2	–	21.3	1.6
4	21.4	2.4	–	19.8	1.9
5	23.1	11.1	85.7	14.8	3.1
6	33.1	23.2	62.6	18.8	2.8
7	34.2	26.3	71.3	13.3	1.9
8	41.9	35.8	60.8	13.0	2.6
9	38.0	31.4	48.0	12.9	2.9
10	39.6	30.0	62.6	16.5	3.4

Source: HFCS Austria 2017, OeNB.

[1] – denotes missing estimates due to too few observations.

Finding 10: Social classes and accompanying functions of wealth align well with the wealth distribution

A way to identify social classes of households is to examine important functions of wealth.

We define three classes of households, which align with major functions of wealth (see annex 1, infographic A1):

1. Renters who do not own their home and mainly hold (financial) wealth for precautionary reasons.
2. Owners who are owner-occupiers and therefore use wealth by living in their own house or apartment. In the vast majority of cases, this house or apartment is also their single most valuable asset. They do not pay rent; much rather, living in their own home generates a rent, the imputed rent, which is a form of non-cash capital income.
3. Capitalists who own their home and either rent out additional real estate and/or own a business to generate cash income from wealth.

Chart 14 shows the corresponding incidence patterns across the net wealth distribution. One can clearly see that renters are predominantly located at the bottom, owners in the middle and capitalists at the top of the wealth distribution. While the incidence of capitalists at the top is predicted by theory as only successful companies will survive in the market, the rather straightforward sorting of renters and owners is less clear. Theoretically, households should be indifferent between renting and owning a home under the standard assumptions (strict life cycle preferences, no bequest motives, no credit constraints, rational behavior etc.). In practice, however, the conditions of the standard model are violated. Households care about bequests (both as recipients and as givers), face borrowing constraints (like downpayment requirements) and show less-than-fully-rational behaviour, and on top of that the tax system often favors ownership over renting.

In Fessler and Schürz (2018b) we show that these patterns emerge in all countries in Europe for which data are available as well as the U.S.A. The points in the distributions where owners become more dominant than renters and capitalists

Chart 14

Social Classes in Austria regarding wealth
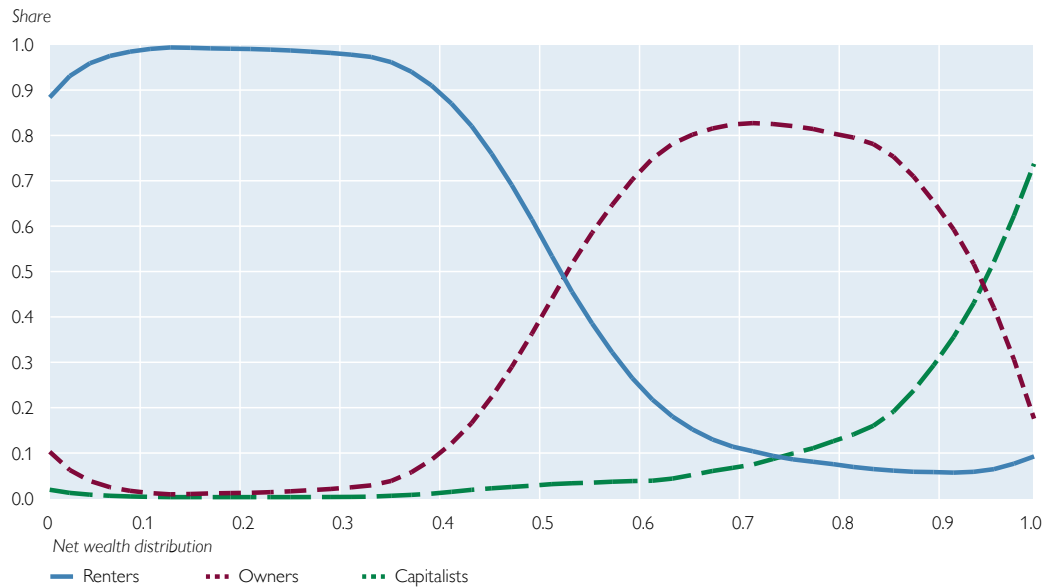
Source: HFCS Austria 2017, OeNB.

become more prevailing than owners differ substantially across countries and are likely influenced by institutional differences. In countries where high leverage is more common when buying a home and rental markets are less developed one also finds more owners at the very bottom of the distribution. Using the U.S.A., for which wealth surveys from the 1960s are available, as an example, one can also illustrate the rise of the middle class, which is shown by an increasing share of owners in the middle of the distribution.

3 The joint distribution of income, consumption and wealth

The seminal report of the Stiglitz-Sen-Fitoussi Commission (2009) analyzing income, consumption and wealth jointly is considered state of the art in household finance research. The Commission's recommendation number 3 was to "consider income and consumption jointly with wealth" at the household level in order to comprehensively analyze the well-being of households. On the one hand, income is partly used to save and thus generates wealth. On the other hand, accumulated wealth generates income directly through cash income from wealth accumulated in savings accounts, stocks or other financial assets as well as real assets which are rented out. On top of that, accumulated housing wealth produces noncash income in the form of imputed rent through owner-occupied housing (see our finding 10 above).

While the HFCS does include all three items, it cannot deliver all of them in equally great detail, because of the extensive burden such an approach would put on respondents and in view of the resulting problems with unit nonresponse and item nonresponse.

That is why an international effort organized and coordinated by the OECD and Eurostat has been trying for years to bring together several microdata sources with a different focus to shed some light on the joint distribution of wealth, income,

and consumption (see also an older paper by OECD, 2013). This effort aims at statistically matching the available data sources to generate a comprehensive view of household finances. The term statistical matching refers to a procedure that combines multidimensional information collected from similar households and stored in different data sources. Producing an exact match in the sense of sourcing the whole range of information from a single household is not possible.

The so-called Haig and Simons definition measures income (Y) as equal to consumption (C) plus the change in net wealth δNW realized over an income accounting period.[16] This is a measure of potential consumption. It defines the amount one could consume or transfer without changing total net wealth. Thus, according to the Haig and Simons definition:

$$Y = C + \delta NW$$

However, it is difficult to measure the real change in net wealth as substantial amounts of assets will not be realized or distributed. Thus, the change is not covered in surveys. It is easier to focus on net wealth by using the HFCS data, income data from EU-SILC and consumption data from the HBS.

An important result of a common consideration of C, Y and NW for a household is the following: Measures of onedimensional inequality understate the level of inequality and the growth of inequality.

The following section is built on the matching procedure used by Eurostat (see also Lamarche, 2017), which we slightly adapted to our purpose of describing income and consumption jointly with wealth as proposed by the Stiglitz-Sen-Fitoussi Commission (2009). See the annex 3 for details on the matching procedure.[17]

We use the findings derived from matching the data from the HFCS, the Austrian part of the EU-SILC as well as the HBS in Austria for cross-checks with the findings from the HFCS alone.

Table 5 reports the share of households as well as the level of net wealth depending on the position of a household in the joint distribution of income and consumption. We group households for both income and consumption into three groups: the bottom 20%, the middle 60% and the top 20% of the distribution. This yields nine cells.

According to the results of the matching process, most households (35%) are in the middle 60% of both the income and the consumption distribution, with the net wealth levels selected to the 60%/60% cell spanning the broad range from about EUR 3,000 for the 10th percentile to about EUR 510,000 for the 90th percentile. The distribution around this middle of the income and consumption space shows an interesting symmetry: roughly the same share of households – namely 5% to 6% – was mapped to the top 20% income/top 20% consumption corner as well as to the bottom 20% income/bottom 20% consumption corner. Only 2% to 3% of all households were classified in the top 20% income/bottom 80% consumption corner and vice versa. Net wealth levels are relatively diverse across the board. However, they generally increase with both consumption and income. We accordingly

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[16] Note that this definition of income differs from the income used in the analysis, as e.g. developments in the valuation of real estate or transfers are not taken into account in the income concept in the empirical analysis.

[17] We use the hotdeck command in Stata provided by Adrian Mander for the matching procedure.

Table 5

Joint distribution of wealth, income and consumption

Income	Consumption		
	Bottom 20%	Middle 60%	Top 20%
Bottom 20%	%		
Share of households	5.3	10.4	2.8
	EUR thousand		
P10 net wealth	−0.4	0.7	2.4
Median net wealth	9.8	25.0	74.3
Mean net wealth	55.2	109.7	197.8
P90 net wealth	165.8	285.9	459.6
Middle 60%	%		
Share of households	11.3	35.0	10.3
	EUR thousand		
P10 net wealth	0.5	3.1	10.8
Median net wealth	28.7	92.3	202.9
Mean net wealth	152.1	243.2	392.9
P90 net wealth	371.0	512.7	723.5
Top 20%	%		
Share of households	2.0	10.9	5.7
	EUR thousand		
P10 net wealth	1.1	5.6	19.0
Median net wealth	66.6	191.2	272.8
Mean net wealth	175.4	331.5	512.4
P90 net wealth	472.8	737.4	941.0

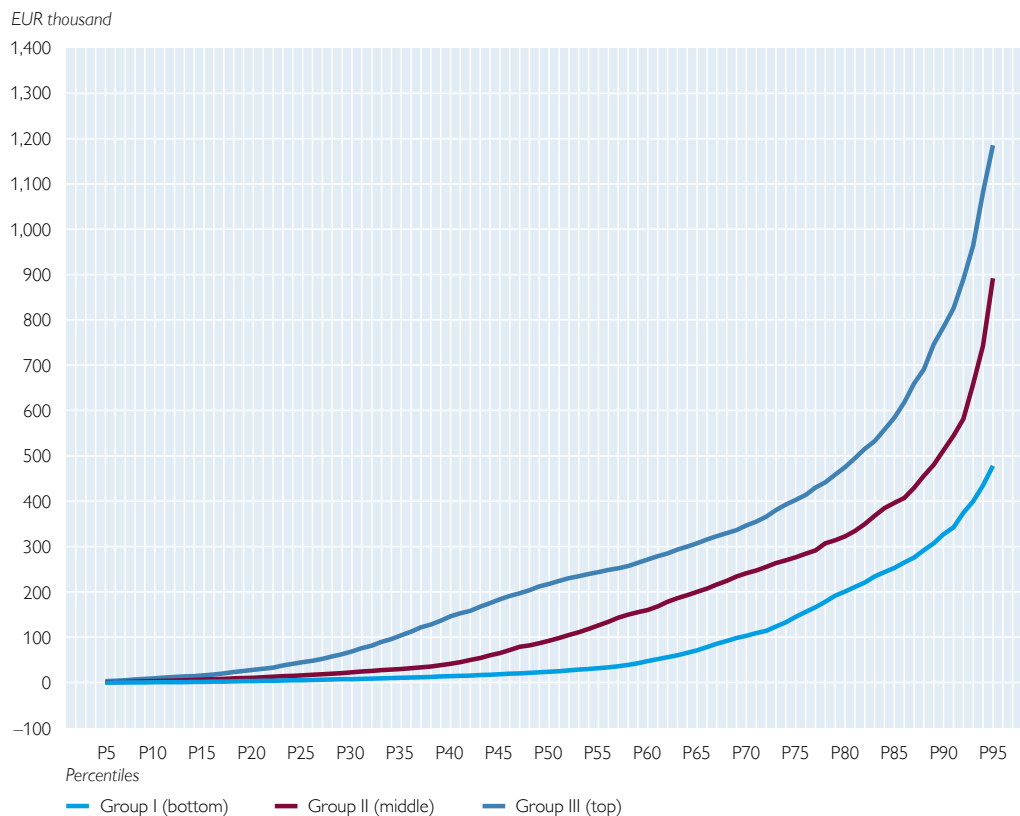*Source: HFCS Austria 2017, OeNB; EU-SILC 2016, HBS 2014/15, Statistics Austria.*

Note: This table shows net wealth levels as reported in the HFCS by group of income and consumption based on EU-SILC and HBS data. A complete match of the underlying micro data is not possible with the described matching strategy, hence the share of households does not sum up to 100%. Income and consumption information are equivalized based on the OECD method.

find the highest levels of wealth in the cell with the highest level of income and consumption. A case in point is the 90th percentile with close to EUR 1 million in this cell, which is also the cell with the highest median (around EUR 270,000).

Looking at the whole distribution of net wealth (chart 15) we group households in the following way. The first group (denoted as group I) is defined as belonging to the bottom 20% in either income or consumption and comprises about 32% of the total household population. Therefore, this group combines households in the first row and column of table 5. The second group (denoted as group II) is given by the households belonging to the middle of the distribution in both dimensions (middle cell with about 35% of households). All remaining households (about 27% of the household population) form the third group (denoted as group III).

The wealth levels of households are very diverse across all three groups in terms of both income and consumption. In each of the three categories, the distribution of wealth starts in the negative range and goes up to more than EUR 1 million. Belonging to a higher stratum in terms of income and consumption comes with relatively higher levels of net wealth. The line for group III (dark blue) in chart 15 lies above the one for group II (red), which in turn is above group I (light blue line). The latter, however, merely reflects a positive correlation of the three

Chart 15

Joint distribution: net wealth by income-consumption groups

EUR thousand

Source: HFCS Austria 2017, OeNB; EU-SILC 2016, HBS 2014/15, Statistics Austria.

indicators under consideration. The result seems to be more pronounced for the higher wealth levels.

Investigating the same information based solely on the HFCS (see annex 3, table A9) reveals a higher share of households, relative to the matched data, in the two extremes of the bi-dimensional distribution of income and consumption (bottom-bottom as well as top-top). It seems that some form of mean tendency is inherent in the matching technique even if the information available in all underlying datasets allows for a relatively fine stratification in the matching procedure. The result for the diversity of wealth levels across the three groups defined by the income-consumption space, however, remains largely unchanged.

4 Concluding remarks

The HFCS data are informative for analyses of the wealth distribution. Wealth is a lot more unequally distributed than income. A large heterogeneity across households is a main feature of the distribution of wealth.

Wealth inequality in Austria is high in comparison to other European countries and has remained rather stable across the three waves of the HFCS from 2010 to 2017. The share held by the top 10% of households in total net wealth was 56.4% in 2017, which is a slight increase compared with the second wave in 2014.

The level of indebtedness of Austrian households is rather low. More than two-thirds of Austrian households do not have any debt.

Subjective perceptions of income and wealth have become increasingly important in economics. We show the importance of households' self-perception of wealth for their saving behavior. With regard to preferences, re-introducing an inheritance tax in Austria – as recommended by the OECD – was opposed by a majority of reference persons.

In Austria, even wealthy households tend to invest rather conservatively. The largest share of wealthy households in Austria does not invest in risky assets at all, and if they do so, they do not invest a higher share of their financial assets than low wealth households.

For the first time, Austrian data on income, consumption and wealth coming from different surveys have been matched. Qualitatively the results based on the HFCS alone were found to be very similar to the findings obtained with the matching exercise. Thus, our conclusion is that the HFCS is adequate for an analysis of the joint distribution of income, consumption and wealth, but that further theoretical work is needed.

An issue that remains is that the HFCS is fraught with serious difficulties regarding the measurement of the top of the wealth distribution.

References

Albacete, N., M. Andreasch and P. Lindner. 2018a. Verschuldung der privaten Haushalte in Österreich. Statistiken Sonderheft. OeNB.

Albacete, N., S. Dippenaar, P. Lindner and K. Wagner. 2018b. Household Finance and Consumption Survey 2017. Methodological Notes for Austria (third wave). OeNB.

Andreasch, M. and P. Lindner. 2016. Micro- and macrodata: a comparison of the Household Finance and Consumption Survey with financial accounts in Austria. In: Journal of Official Statistics 32(1).

Davies, J. B., and A. F. Shorrocks. 2000. The distribution of wealth, In: Atkinson, A. and F. Bourguignon (eds.). Handbook of income distribution. Elsevier. Chapter 11. 605–75.

D'Orazio, M., M. Di Zio, and M. Scanu. 2006. Statistical matching – theory and practice, John Wiley & Sons Ltd. West Sussex. England.

Dimmel, N., Hofman, J., Schenk, M. and M. Schürz 2017. (eds.) Handbuch Reichtum. Neue Erkenntnisse der Ungleichheitsforschung. Studienverlag.

ECB. 2009. Survey data on household finance and consumption. Research summary and policy use. Occasional Paper Series 100. January.

ECB. 2016. The Household Finance and Consumption Survey: results from the second wave, Statistical Paper Series. December (18).

ECB. 2016b. Methodological Report. Statistical Paper Series. December (17).

Fessler, P., P. Lindner and M. Schürz. 2016. Eurosystem Household Finance and Consumption Survey 2014 – first results for Austria (second wave), In: OeNB Monetary Policy & the Economy Q2/16. 34–95.

Fessler, P., P. Mooslechner and M. Schürz. 2012. Household Finance and Consumption Survey of the Eurosystem 2010 – first results for Austria. In: OeNB Monetary Policy & the Economy Q3/12. 24–62.

Fessler, P. and M. Schürz. 2015. Reich bleiben in Österreich in: Wirtschaft und Gesellschaft 39 (3). 343–360.
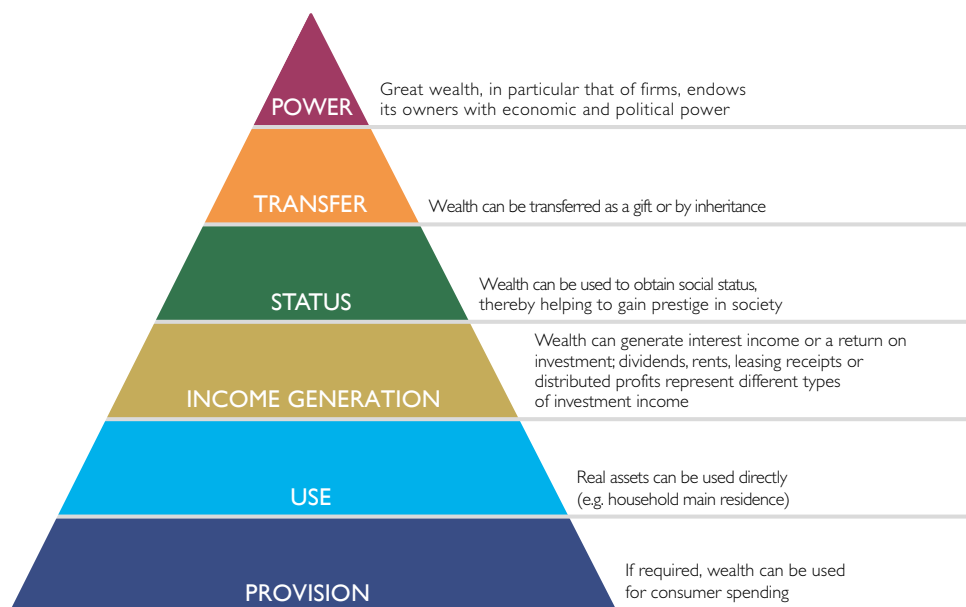
Fessler, P. and M. Schürz. 2017. Zur Verteilung der Sparquoten in Österreich. In: OeNB Monetary Policy & the Economy Q3/17. 13–33.

Fessler, P. and M. Schürz. 2018a. Private wealth across European countries: the role of income, inheritance and the welfare state. In: Journal of Human Development and Capabilities 19 (4). 521–49. https://www.tandfonline.com/doi/full/10.1080/19452829.2018.1507422.

Fessler, P. and M. Schürz. 2018b. The functions of wealth: renters, owners and capitalists across Europe and the US. OeNB Working paper 223.

Kennickell, A. B. 2018. The tail that wags: differences in effective right tail coverage and estimates of wealth inequality. Mimeo.

Lamarche, P. 2017. Measuring income, consumption and wealth jointly at the micro-level. Mimeo.

OECD. 2013. OECD framework for statistics on the distribution of household income, consumption and wealth. OECD Better Life Initiative.

OECD. 2017. Economic Surveys. Austria.

OECD. 2018. The role and design of wealth taxes.

Statistics Austria. 2017. Standard-Dokumentation Metainformationen (Definitionen, Erläuterungen, Methoden, Qualität) zu EU-SILC 2016.

Statistics Austria. 2018. Standard-Dokumentation Metainformationen (Definitionen, Erläuterungen, Methoden, Qualität) – Konsumerhebung 2014/15. Forthcoming.

Stiglitz-Sen-Fitoussi Commission. 2009. Report by the Commission on the measurement of economic performance and social progress. www.insee.fr/fr/publications-et-services/dossiers_web/stiglitz/doc-commission/RAPPORT_anglais.pdf.

Vermeulen, P. 2016. Estimating the top tail of the wealth distribution. ECB Working Paper 1907.

Annexes
Annex 1

Functions of wealth

Level	Description
POWER	Great wealth, in particular that of firms, endows its owners with economic and political power
TRANSFER	Wealth can be transferred as a gift or by inheritance
STATUS	Wealth can be used to obtain social status, thereby helping to gain prestige in society
INCOME GENERATION	Wealth can generate interest income or a return on investment; dividends, rents, leasing receipts or distributed profits represent different types of investment income
USE	Real assets can be used directly (e.g. household main residence)
PROVISION	If required, wealth can be used for consumer spending

Note: As wealth increases, the number of the possible functions of wealth also tends to increase.

Annex 2
Net wealth over socio-economic characteristics

Net wealth by size of household

	Share	Median	Mean	Mean-to-median ratio
	%	EUR thousand	EUR thousand	
Singles	37.0	19.7	147.9	7.5
Two persons	35.1	141.5	246.7	1.7
Three persons	12.7	159.8	322.4	2.0
Four persons	9.6	208.5	338.0	1.6
5+ persons	5.6	242.5	634.8	2.6

Source: HFCS Austria 2017, OeNB.

Net wealth by age of main respondent

	Share	Median	Mean	Mean-to-median ratio
	%	EUR thousand	EUR thousand	
16–29 years	10.3	14.0	140.2	10.0
30–39 years	15.2	41.4	138.8	3.4
40–49 years	17.3	124.6	291.3	2.3
50–64 years	28.5	158.8	370.3	2.3
65–74 years	15.9	106.4	223.4	2.1
75+ years	12.8	76.4	182.8	2.4

Source: HFCS Austria 2017, OeNB.

Net wealth by education of main respondent

	Share	Median	Mean	Mean-median ratio
	%	EUR thousand	EUR thousand	
Compulsory education or below	14.8	30.8	128.2	4.2
Apprenticeship, vocational school	38.8	53.1	171.9	3.2
Upper secondary, school-leaving certificate	33.5	108.8	286.7	2.6
University, technical college	12.9	228.2	531.9	2.3

Source: HFCS Austria 2017, OeNB.

Net wealth by gender of single households

	Share	Median	Mean	Mean-to-median ratio
	%	EUR thousand	EUR thousand	
Male	15.7	24.7	154.2	6.3
Female	21.3	16.7	143.3	8.6

Source: HFCS Austria 2017, OeNB.

Net wealth by household main residence ownership structure

	Share	Median	Mean	Mean-to-median ratio
	%	EUR thousand	EUR thousand	
Owner	45.9	278.9	476.3	1.7
Renter	46.8	14.4	57.3	4.0
Free usage	7.2	19.1	63.8	3.3

Source: HFCS Austria 2017, OeNB.

Net wealth by occupation of main respondent

	Share	Median	Mean	Mean-to-median ratio
	in %	in Tsd EUR	in Tsd EUR	
Self-employed	5.3	254.0	812.0	3.2
(Skilled) blue-collar worker	15.3	34.4	137.2	4.0
White-collar worker	29.1	82.4	233.9	2.8
Civil servant	3.3	215.0	301.0	1.4
Farmer	1.0	896.5	1.993.8	2.2
Pensioner	36.6	97.6	198.7	2.0
Unemployed	4.9	3.1	74.7	23.7
Other	4.6	81.4	284.8	3.5

Source: HFCS Austria 2017, OeNB.

Annex 3
Matching procedure

With a view to measuring the joint distribution of various indicators, all required information would ideally be collected in a single source of data. However, this approach is not always feasible, for various reasons including constraints on the survey response burden. Asking all the questions of the HFCS and all Household Budget Survey questions in one interview would definitely put a lot of the burden onto respondents. If some of the desired information cannot be asked in a single survey but is available from other data sources, matching techniques are an option to generate a single dataset for analysis (if it is not possible to link the data directly using common respondent identifiers, which would be the best of all second-best solutions).

D'Orazio et al. (2006) introduce and summarize the different matching techniques used in the literature. Statistical matching of a pair of datasets uses a type of modeling strategy to assign values from one dataset to another, based on the similarity of characteristics observed in the same way in both datasets. Thus, the accuracy of the match depends on the nature and strength of the relationship between the common variables and the variables to be matched. Generally, such matches are made with uncertainty, and when certain key variables are not available for matching, the matches may also exhibit a bias.

We follow the approach laid out in Lamarche (2017) applying a so-called stratified random hotdeck procedure. For this procedure we generate precisely defined boxes based on the stratification information and then randomly pick one observation from the donor data and attach it to an observation of the recipient dataset of the same stratification box. A donor observation can be picked multiple times, and if there is only one observation in a particular stratum in the donor dataset this observation is picked. This procedure results in a dataset that includes all the desired information.

In our application we take the HFCS and statistically match first the Austrian part of the EU-SILC 2016 and then the most recent HBS (2014) for Austria.[18]

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[18] See Statistics Austria (2017 and 2018) for the survey documentation for both EU-SILC and HBS.

Matching information

	Description	Number of categories	Coding	Used in the matching of
Matching information				
Age	Age of household head	8	Up to (but excluding) 20 20 to (but excluding) 30 30 to (but excluding) 40 40 to (but excluding) 50 50 to (but excluding) 60 60 to (but excluding) 70 70 to (but excluding) 80 80 and above	HFCS-EU-SILC
	Age of household head	3	Up to (but excluding) 30 30 to (but excluding) 60 60 and above	HFCS-HBS
Education	Level of education of household head	3	Max. apprenticeship Middle eduction level (with a labor market-relevant qualification) University	HFCS-EU-SILC HFCS-HBS
Household structure	Type of household classified with respect to age of household members and their relationship	6	Single – no children Couple – no children More than 3 adults – no children Single with children Couple with children Three or more adults with children	HFCS-EU-SILC HFCS-HBS
Tenure status	Ownership structure of main residence	2	Owner (including free usage) Renter	HFCS-EU-SILC HFCS-HBS
Income	Disposable household income	5	1st quintile 2nd quintile 3rd quintile 4th quintile 5th quintile	HFCS-HBS
Wealth indicator	Size of main residence	5	1st quintile 2nd quintile 3rd quintile 4th quintile 5th quintile	HFCS-EU-SILC HFCS-HBS

Source: HFCS Austria 2017, OeNB; EU-SILC 2016, HBS 2014/15, Statistics Austria.

The stratification is done as outlined in table A7. We take all the appropriate available information into account, which implies that the set of information for stratification is dataset-dependent. Generally, the matching is based on the age and education of the main income earner (household head), household structure, tenure status and information on income and wealth. As we need to categorize continuous information such as income we use quintiles or age brackets for example.

Matching information

There is a tradeoff between how granular the stratification (number of specific boxes as strata) can be and the number of empty strata implying a loss of information due to the lack of donor observations. The loss of information implies a bias in any analysis based on the matched data. Using only very broad and thus fewer strata introduces a bias from the matching process. In this exercise, we aim at having as many strata as possible without losing too many observations, using as much information for stratification as possible and ensuring that matching will yield approximately

Table A8

Number of matching strata

	Matching HFCS and EU-SILC	Matching HFCS and HBS
Number of possible strata	1,440	2,700
Occupied strata in the HFCS	591	819
Occupied strata in donor data	719	1,039
Number of strata in HFCS without any complete cases in donor data	70	164
Number of strata with only 1 complete case	177	348
Number of strata with only 2–5 complete cases	238	356
Approximate number of households with missing matched information	79	159

Source: HFCS Austria 2017, OeNB; EU-SILC 2016, HBS 2014/15, Statistics Austria.

Table A9

Joint distribution of wealth, income and consumption

	Consumption		
	Bottom 20%	Middle 60%	Top 20%
Income	%		
Bottom 20%			
Share of households	7.5	12.0	0.5
	EUR thousand		
P10 net wealth	0.0	0.0	−2.5
Median net wealth	6.6	12.2	17.8
Mean net wealth	78.3	90.8	259.4
P90 net wealth	235.4	262.4	817.8
Middle 60%	%		
Share of households	11.2	41.7	7.1
	EUR thousand		
P10 net wealth	4.2	4.4	8.0
Median net wealth	85.8	75.3	188.5
Mean net wealth	166.6	191.8	310.7
P90 net wealth	422.2	416.2	725.9
Top 20%	%		
Share of households	1.3	11.7	7.0
	EUR thousand		
P10 net wealth	10.0	18.6	20.8
Median net wealth	204.2	219.0	340.6
Mean net wealth	505.7	443.9	760.5
P90 net wealth	1,127.1	932.0	1,445.5

Source: HFCS Austria 2017, OeNB.

Note: This table shows net wealth levels by group of income and consumption based on the HFCS alone. Income and consumption information are equivalized based on the OECD method.

the same number of missing observations from both data sources (EU-SILC and HBS) due to the lack of donor observations. This general idea yields the stratification laid out in table A7.

Table A8 (below) indicates the number of possible, occupied, and empty strata in the matching procedure. The product of the categories used in the stratification

implies a possible or maximum number of strata that is fixed. On average, are about 80 to 160 households (varying across implicates of imputations and depending on the dataset to be matched) with missing matched information. This means that in these cases the stratification from above will not produce any donor household in the donor dataset for matching income and consumption information to the HFCS.

Raw observations without using survey information (i.e. independent of weights and imputation methods) and equivalence scales are the foundations of the matching process. Results in the main paper are based on equalized income and consumption based on the OECD equivalence scale.

Since the joint distribution is based on three datasets, problems related to the statistical matching procedures are likely to multiply.

About 7% of households cannot be matched. However, since their wealth levels range from EUR 1,500 (P10) to EUR 500,000 (P90), they are not concentrated in a particular section of the net wealth distribution.

Table A9 shows the information on the joint distribution based solely on HFCS data and is discussed in the main text.

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