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ESTONIAN HOUSEHOLD FINANCE  
AND CONSUMPTION SURVEY:  
RESULTS FROM THE 2017 WAVE

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# **Estonian Household Finance and Consumption Survey: Results from the 2017 wave**

Jaanika Meriküll and Tairi Rõõm \*

This report covers the results of the Estonian Household Finance and Consumption Survey (HFCS) from 2017. The estimated values of the assets, liabilities and net wealth of Estonian households in 2017 are compared to the values in 2013 and to the values in the other euro area countries. It is found that the average net wealth of households increased by 12.1% in real terms between 2013 and 2017 and that the increase was faster for wealthier households than for the rest. The debt burden remained largely the same and Estonian households are still less indebted than euro area households are. Demand for credit has increased and there is evidence of a modest increase in credit constraints. Around one third of households are living hand-to-mouth and do not accumulate any substantial savings. The second pillar pension assets are the main financial asset of 74% of second pillar participants and there is no evidence that people who chose not to join the second pillar voluntarily have compensated for this by saving more through other channels.

JEL Codes: D14 (Household Saving, Personal Finance); D31 (Personal Income, Wealth, and Their Distributions); E21 (Consumption, Saving, Wealth)

Keywords: household finance, Estonia, assets, liabilities, net wealth, financial fragility, credit constraints, hand-to-mouth households

The views expressed are those of the authors and do not necessarily represent the official views of Eesti Pank or the Eurosystem.

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## **Nontechnical summary**

This paper discusses the main results of the Household Finance and Consumption Survey. This survey has been conducted twice in Estonia, in 2013 and in 2017. We analyse the results from the 2017 wave and compare them with the results from the 2013 wave, as well as with the results for other euro area countries from 2013 or 2014. The main focus of this review is on the distribution of net wealth and its various components for Estonian households. We also analyse the financial burden of households and the prevalence of credit constraints. The two final sections cover specific topics. The first of them takes a closer look at hand-to-mouth households and the second describes people's expectations for retirement and the potential impact of the intended II pillar pension reform.

Household assets can be divided into two main categories – real and financial assets. The bulk of household wealth consists of real assets, both in Estonia and in the euro area as a whole. Real assets made up 89% of total assets in Estonia according to the 2017 survey. The largest component of real assets was real estate holdings, which made up 71% of total real assets, while the largest proportion of financial assets consisted of deposits, which composed 71% of total financial assets. On the liabilities side, the largest share of debt consisted of mortgages, which accounted for 88% of total debt in 2017.

Estonian households own more business wealth than the euro area average. Self-employment business assets made up 20% of the portfolio of total real assets in 2013 (26% in 2017), while in the euro area this share was 12%. Financial asset holdings are less diversified in Estonia than in the euro area, and they mostly consist of deposits in Estonia, whereas in the euro area a larger share of financial assets are made up of riskier assets such as bond and stock holdings and voluntary pension fund assets. However, the share of bonds, stocks and mutual fund holdings in the total portfolio of financial assets increased between 2013 and 2017 from 5% to 10% in Estonia.

Like in other economies, the distribution of wealth is strongly skewed in Estonia. If the population is sorted by increasing level of net wealth and divided into 100 equal groups, or percentiles, then the tenth percentile value of net wealth was about 400 EUR in 2017. This was more than 100 times less than the value at the 50<sup>th</sup> percentile, or the median, which was 47 700 EUR. The value at the 80<sup>th</sup> percentile was 119 000 EUR and the value at the 90<sup>th</sup> percentile was 223 000 EUR. The households in the lower half of the net wealth distribution owned 7% of all the wealth, while the upper 5% owned almost half of all the wealth (46%).

The mean level of net wealth increased by 12.1% in real terms between 2013 and 2017. Across wealth groups, the growth was fastest for the 20% of households with the highest level of net wealth (the upper net wealth quintile). The value of the household main residence also increased the most for this group of households. The growth was 21% for the upper quintile, whereas for the lowest two quintiles the value of the household main residence decreased. This was mainly caused by the divergent developments in real estate prices, which grew by more for high-end properties. A similar pattern could be observed for financial assets, but the differences in the growth rates across net wealth quintiles were even more pronounced for this asset class. The value of deposits increased by as much as 90% for the highest quintile, while it declined slightly for the lowest quintile. As a consequence of the faster growth in the value

of assets for wealthier households, the estimated inequality of the net wealth distribution also increased between 2013 and 2017. The share of wealth belonging to the richest 5% of households increased from 43% to 45% and the Gini coefficient of net wealth rose from 0.69 to 0.71. Although the point estimates increased for both of these measures of inequality, their changes remained within the margin of the measurement error.

The value of net wealth depends on age. According to the life-cycle theory (Modigliani (1966)), people gradually accumulate wealth until retirement age and then start divesting their savings, which implies that the age profile of net wealth should be hump-shaped and should peak around the retirement age. This is exactly the pattern that can be observed for the other euro area countries, but not for Estonia. Whereas the age profile of net wealth peaks for the euro area in the 65–74 age group, the peak occurs much earlier for Estonia, in the 35–44 age group according to the 2013 survey and in the 45–54 age group according to the 2017 survey. The reason why younger cohorts are relatively wealthier in Estonia is that they also have higher incomes. That is the consequence of the economic transition, which rendered obsolete the human capital accumulated during the soviet era. The younger cohorts, who gained their education and labour market experience after the economic transition, are better positioned in the labour market and earn relatively high incomes compared with those of the older cohorts in Estonia and the youth in western European countries. As more time passes from the economic transition, the cross-sectional age profile of net wealth in Estonia should become closer to that of the euro area.

A common feature for Estonia and for the other euro area countries is that households who own their homes are usually much wealthier than households who rent the dwellings where they live. The differences in median net wealth between home owners and renters are substantial. In Estonia in 2017 the median value of net wealth for home owners without a mortgage was 65 thousand EUR, whereas for renters it was 1.9 thousand EUR. In the euro area the corresponding figures in 2013/2014 were 241 thousand EUR and 9.1 thousand EUR. These differences reflect the prominent role that the household main residence has among household assets. It is by far the main asset that home-owners have and mortgages collateralised by the household main residence make up the largest share of households' loans.

The debt burden of Estonian households was below the euro area average. The median debt-to-asset ratio was 15% and the debt-to-income ratio was 22% in Estonia in 2017, while the corresponding figures for the euro area were 26% and 72% in 2013/2014. These indicators are calculated for indebted households only, i.e. they are conditional on the households having debt. While the debt burden was lower, the financial buffers of Estonian households were also below the euro area average. The net liquid assets-to-income ratio for the median Estonian household was 8% relative to gross annual income, about twice lower than the euro area median value in 2013/2014. This corresponds to a ratio of approximately 13% relative to net income, i.e. the median household in Estonia had liquid savings that were worth roughly 1.6 times net monthly income.

The share of credit-constrained households in Estonia was similar to the euro area average. It increased moderately between 2013 and 2017 from 6.8% to 7.7%. This increase was caused by stronger credit demand, as the share of households that applied for credit increased from 19% to 26%, and to a lesser extent by a modest deterioration in the credit supply, as the share

of households that were declined a loan grew from 7% to 8%. The share of households that were refused credit was strongly dependent on income – it was considerably higher among households in the two lowest income quintiles than among the more affluent households. Credit demand was also dependent on income, but in this case the relationship was reversed – households with higher incomes were much more likely to apply for credit than households in the lower income quintiles were. Credit demand was strongly dependent on the age of the household reference person as well. Younger people were much more likely to apply for credit than people in the older age cohorts were.

The share of hand-to-mouth households is similar in Estonia to what it is in the US and the euro area countries. Households that have less liquid assets than half of their monthly income are defined as hand-to-mouth, i.e. they consume most of their income and do not accumulate savings. They make up roughly one third of all the households in Estonia and three quarters of them are the wealthy hand-to-mouth, who have illiquid wealth such as real estate and voluntary pension assets. Unlike in other developed countries, the status of the wealthy hand-to-mouth is more persistent over time in Estonia, and 60% of households who were classified as wealthy hand-to-mouth in 2013 were also in this category in 2017. This is somewhat different from poor hand-to-mouth households, i.e. those that do not have any illiquid assets, since they are mostly young households who exit this status quickly. The tendency to consume all the income without accumulating any savings is more a reflection of the lifestyle of a small group of wealthy households than something that occasionally happens to everyone. An important implication of the prevalence of hand-to-mouth households for monetary policy is that as they have a high marginal propensity to consume, their high rate of prevalence increases the sensitivity of the economy to monetary policy or transitory fiscal shocks. Comparative studies have shown that the Estonian reaction to monetary policy is relatively stronger than the reactions in the other euro area countries are (Almgren et al. (2019)).

The section on the specific topic of pensions shows first that the expectations about pensions in Estonia do not overlap well with the statutory pension entitlements. People expect their pension entitlements to be similar to those for people currently retiring, but do not take into account that the variation in replacement rates will decrease in the future and pensions will depend much more on lifetime income than on years in employment. As many as 62% of respondents state that they plan never to stop working for pay, which reflects uncertainty about the pension entitlements. Being active in the labour market as long as possible seems to be the dominant strategy for retirement-age income.

We analyse the possible implications of making the contributions to the second pillar pension funds voluntary. Young people have a strong incentive to stop contributing to the second pillar and to take out these assets because they are the most credit constrained. Middle-aged people with an average value of second pillar assets have a strong incentive to do the same because they have few liquid assets and are frequently living hand-to-mouth. We also compare the assets and liabilities of those who joined the second pillar voluntarily with those of the people who chose not to join. The results show that there is no statistically significant difference in net wealth between the II pillar participants and non-participants if people's savings in the II pillar are not accounted. However, there is a large difference in net wealth in favour of second pillar participants after we take these assets into account. The second pillar assets are the main financial asset for as many as 74% of the second pillar participants. This

analysis does not show that people who chose not to participate in the second pillar have compensated for their non-participation by accumulating more savings through other channels.



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## **1. Introduction**

This article gives an overview of the main findings from the 2017 wave of the Estonian Household Finance and Consumption Survey (HFCS). The HFCS is a joint project conducted by 21 European central banks and the ECB. It involves all the national central banks of the euro area and two non-euro area EU member states, Poland and Hungary. This survey provides detailed household-level data on the assets and liabilities of households, together with information on household structure, the demographic characteristics of household members, their incomes, employment and consumption. It provides information on the balance sheets of households in a harmonised form that can be compared across countries. The main focus of the HFCS is on charting households' wealth and providing information that is important for financial stability, such as various indicators of their financial burdens and how credit constrained they are.

The HFCS is a multi-wave survey that is carried out at regular intervals. The first wave of the survey was run in 2008–2011, and most countries conducted their surveys with 2010 as the reference year. Since Estonia joined the euro area in 2011, it started participating in the HFCS from the second wave. The fieldwork for the first Estonian survey was carried out in 2013 and almost all the other countries conducted their second-wave surveys in 2013 or 2014. The second Estonian survey, which is the focus of the current study, was run in 2017, i.e. there was a four-year interval between the first and second surveys in Estonia. The aim was to have the survey in the same year that most of the other participating countries had their third wave surveys, as this allows for better cross-country comparison of the results. It is planned that in future the surveys will continue to be carried out at three-year intervals, so that the next waves will be conducted in 2020, 2023, etc.

This article presents descriptive statistics on the real and financial assets, collateralised and non-collateralised debt, and net wealth of Estonian households. We describe how the value of net wealth and its main components changed between 2013 and 2017 and make comparisons with the values for the euro area. We also discuss wealth inequality and its dynamics between the two waves of the survey and analyse the financial fragility of households, showing how the values of the main indicators for their financial burdens have evolved over time.

The paper is structured as follows. The second section provides the description of the survey. The third and fourth sections analyse the structure of households' assets and liabilities. The fifth section focuses on net wealth and its inequality. The sixth section provides an overview of various financial burden indicators. The seventh section assesses the extent of households' credit constraints. The eighth section discusses the prevalence of hand-to-mouth households in Estonia. The ninth section analyses people's expectations for retirement and the potential impact of the intended II pillar pension reform.

## **2. Survey description**

The fieldwork for the second wave of the Estonian HFCS took place from March to June 2017. The reference period was the time of the survey for the value of various assets and liabilities and the calendar year 2016 for income and consumption. The survey had a panel

component, i.e. all the households that participated in the first wave survey of 2013 were re-contacted. To account for panel attrition, an additional sample of contact persons older than 18 was drawn from the Population Register by stratified random sampling. The sampling design for the additional sample was similar to that applied to the first wave of the survey, please see Meriküll and Rõõm (2016) for a description.

The survey had two parts – household-level and personal interviews. Household interviews were carried out with financially knowledgeable persons (FKP), while personal interviews were held with all household members aged 16 or over. Other family members could provide answers for people who were not present at the time of the interview. The interview mode was CAPI (Computer Assisted Personal Interviews). The final sample size of the 2017 survey was 2679 households, which consisted of 1722 panel households and 957 households from the additional sample. Data were collected from 5429 individuals in total. The response rate was 81.8% for panel households and 60.7% for the additionally sampled households. The response rate for the whole sample was 72.8%.

In the current article we report mostly household-level data. The reference population is all private households, excluding people living in institutions (collective homes, prisons, etc.). When households are classified by demographic characteristics such as age, education or labour market status, then this classification is based on one individual household member who is defined as the household reference person. Following the practice in the reports on the first and second wave results of the HFCS by the HFCN (Household Finance and Consumption Network (2013b), Household Finance and Consumption Network (2016)), we use the Canberra Group definition of the reference person (UNECE (2011)).

Wealth is unequally distributed and a small fraction of wealthy households can hold a substantial share of the wealth in a society. To gain better coverage of the top tail of the wealth distribution, the survey was targeted to oversample wealthy households. Since there are no register data on wealth in Estonia, the oversampling was based on income, so that 20% of the sample was selected from the highest income decile and 80% from the rest of the population. This oversampling scheme was applied to the initial selection of the individuals whose households were in the first wave of the survey, and to the selection of the additional sample for the second wave.

Despite the rich being oversampled, coverage of the wealthiest households is likely to remain incomplete because wealthier households are less likely to answer questions about wealth in surveys (Meriküll and Rõõm (2019), Vermeulen (2016)). This is why the following overview of the Estonian HFCS results mainly uses indicators that are less affected by the problem of the missing top tail, such as medians and quintile values, and only sparingly uses indicators that depend on the upper part of the distribution, such as means and totals. Since it is likely that the top tail of the wealth distribution is not well covered by the survey, the estimated wealth inequality may be downward biased.

Some of the variables covered by the Estonian HFCS are reported by the households and some are collected from various registers and from commercial banks. An overview of which variables are collected by the survey and which come from alternative sources is provided in Appendix 3. Responses to questions about various wealth, income or consumption items that households did not answer have been imputed. The multiple imputation technique is applied,

by which five imputates are estimated for each missing observation. Replicate weights are used to adjust for sample selection probability and for imputation. The standard errors reported in the tables in the following sections capture sampling and imputation variability.

In the following analysis we compare the wealth structure of Estonian households with the euro area. To make these comparisons we use the results of the second wave HFCS for the other euro area countries as a reference. In most other countries the second wave surveys were conducted in 2013 or in 2014. (The only exception was Spain where the survey was conducted in 2011.) Therefore we compare the euro area results with those of the first Estonian survey, which was conducted in 2013, but we also show the results of the 2017 Estonian survey. The reason for making these comparisons with an earlier survey and not with the third wave survey, which was conducted in 2017 in most countries, is that the results of the most recent survey are not yet available for all the euro area countries. They will be published by the end of 2019, after the publication of this report.

In comparisons of the dynamics of the various wealth components between the first and second waves of the Estonian survey, the nominal values for the first-wave data are adjusted for inflation. To make this adjustment we use the cumulative growth of the Harmonised Index of Consumer Prices (HICP) between 2013 and 2017, which was 2.9%. Inflation-adjusted first-wave data are labelled “in 2017 EUR” in all tables and figures.

Table 1 illustrates the structure of households in the two waves of the Estonian HFCS, and these statistics are compared with the corresponding euro area figures from the 2013–2014 HFCS survey. The first section of the table shows the shares of households of different sizes. There are more single-person households in Estonia than in the euro area and the share of such households increased from 2013 to 2017.

The second section of Table 1 groups households by their housing status. There are substantially more households in Estonia than in the euro area that are outright owners, i.e. who own their homes in full without having mortgages on them. The share of such households in Estonia is 57% while it is 42% in the euro area. Correspondingly, the share of households renting their homes is substantially smaller in Estonia, while the proportion of households owning their homes and holding mortgages on them is very similar to the euro area average. The main reason for a high share of outright owners is that it was possible to privatise dwellings during the economic transition period in the 1990s. Like in Estonia, the share of house owners is higher than the euro area average in other central and eastern European countries that also applied large-scale housing privatisation programmes.

The third section of Table 1 describes the age structure of households. The share of households in the youngest age group in Estonia decreased slightly between 2013 and 2017 and the share in the oldest age group increased, reflecting the ageing of the population. There are more households in Estonia than in the euro area where the reference person is in the youngest age group of 16–34. The probable reason for this difference is that young people in Estonia have relatively high incomes (Meriküll and Rõõm (2016)) and so can afford to live separately from their parents at a younger age than their European counterparts do.

Table 1. Household structure in the Estonian HFCS and in the euro area (weighted average)

	<b>Estonia 2013</b>	<b>Estonia 2017</b>	<b>Euro area 2013–2014</b>
<b>All Households</b>	100	100	100
<b>Household size</b>			
1	35.8	39.1	32.9
2	29.8	27.2	31.7
3	16.3	15.8	16.1
4	12.7	12.3	13.9
5 and More	5.4	5.6	5.4
<b>Housing status</b>			
Owner-Outright	57.8	57.2	41.5
Owner-with Mortgage	18.7	18.1	19.7
Renter or Other	23.5	24.7	38.8
<b>Age of Reference Person</b>			
16–34	20	18.8	14.8
35–44	17.6	16.8	17.9
45–54	18	18.0	20
55–64	17.5	17.8	17.9
65–74	13.5	13.5	14.4
75+	13.5	15.0	15
<b>Work Status of Reference Person</b>			
Employee	57.4	60.4	48.9
Self-Employed	5.1	4.8	8.6
Retired	26.8	26.7	30.7
Other Not Working	10.7	8.1	11.8
<b>Education of Reference Person</b>			
Primary or No Education	16.5	14.9	31.5
Secondary	49.5	47.2	41.1
Tertiary	34	37.9	26.5

Notes: This table reports the percentages of different household subgroups in the population, classified by demographic characteristics. In the first section the households are classified by the number of household members. In the second section the households are classified by housing status, differentiating between home owners without a mortgage (“Owner-Outright”), home owners who have a mortgage on their home (“Owner-with Mortgage”), and renters. In the third section households are classified by the age of the reference person. The fourth section distinguishes households by the labour market status of the reference person and the category “Other Not Working” includes households where the reference person is unemployed or inactive for other reasons besides retirement (studying, staying at home with children, doing military service, etc). The fifth section classifies households by the education level of the reference person. The household reference person is defined using the concept developed by the Canberra Group (UNECE (2011)).

The fourth section of Table 1 shows the shares of households with different labour market statuses for the reference person. The proportion of families where the reference person is employed increased between the two waves in Estonia. This is in correspondence with the aggregate statistics, since the aggregate employment rate also increased from 2013 to 2017. Relative to the euro area average, more people in Estonia are salary earners and slightly fewer are self-employed. The share of retired people is smaller in the Estonian HFCS. This is also in accordance with the aggregate statistics, which show the share of employed people who are older than the retirement age to be larger in Estonia than in most other European countries.

The final section of Table 1 divides households by the reference person's education. There are fewer people in Estonia than in the euro area who have only primary education level, and more people with tertiary education. The proportions of people with primary and secondary education declined slightly in Estonia between 2013 and 2017, while the share of people with tertiary education increased.

### **3. Assets**

This section presents the statistics on the asset holdings of households. Household assets consist of real and financial assets, which in turn are divided into different asset types. Please see Appendix 1 for a description of household balance sheets, which provides a complete list of the different assets households can hold. We first present the composition of total assets and then describe real and financial assets in more detail.

#### **3.1 Total assets**

This subsection focuses on the composition of total assets. Table 2 shows the division of total assets into real and financial assets. These proportions are found for the two waves of the Estonian HFCS. For comparative purposes, we also show the average division of total assets into real and financial assets for the euro area countries from the second wave of the HFCS, which was mostly conducted in 2013 and 2014. Real assets have the dominant role in the portfolio of households' assets and their share remained relatively stable between the two waves of the Estonian HFCS. They made up approximately 90% of the portfolio of total assets in 2013 and 89% in 2017. This share was larger than the euro area average, which was 82% in the second wave HFCS. The median value of total assets in Estonia was about 50 000 EUR in 2013 and 57 000 EUR in 2017. The growth in total assets in nominal terms was 14.7% and the inflation-adjusted growth rate was 11.5%.

Table 2. The composition of total assets in Estonia and in the euro area

	<b>Estonia 2013</b>	<b>Estonia 2017</b>	<b>Euro area 2013–2014</b>
Total assets	100.0	100.0	100.0
Real assets	89.8	88.8	82.2
Financial assets	10.2	11.2	17.8

Notes: The table presents the shares of different types of assets in total assets.

Figure 1 shows the structure of the portfolio of households' assets across net wealth quintiles in Estonia. Quintiles are obtained by first ranking households by their net wealth and then dividing them into five equal groups, where the first group contains households with the lowest level of net wealth, and so forth. The mean values of assets and their composition in different asset types are presented for each quintile. The upper panel of Figure 1 shows these statistics for 2013 and the lower panel for 2017. Several notable features are evident from this figure. First, assets are unevenly distributed, with the mean values for the lower quintiles being relatively low and then increasing sharply for the upper quintiles. Second, when the values for 2013 and 2017 are compared then it is evident that the value of total assets increased substantially for the upper 20% of households (from 360 000 to 427 000 EUR), but increased only moderately for the middle three quintiles and even declined for the lowest quintile. This implies that the distribution of assets became more unequal between 2013 and 2017. Third, looking at the composition of assets reveals that real assets make up the dominant part of the asset portfolio across all net wealth quintiles. The largest component of assets are real estate holdings, with the household main residence making up more than half of the total value of assets for the middle three net wealth quintiles. The share of business assets in total assets increases with wealth, and is the highest among the households in the upper net wealth quintile.

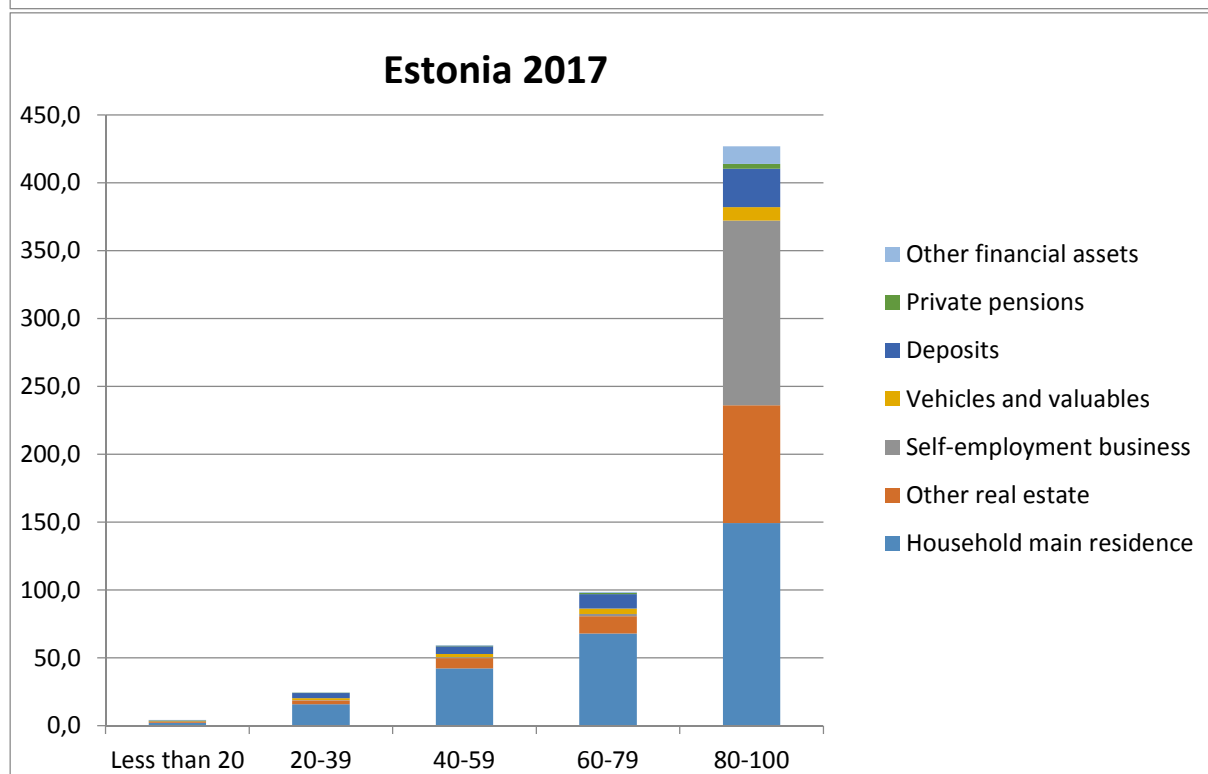
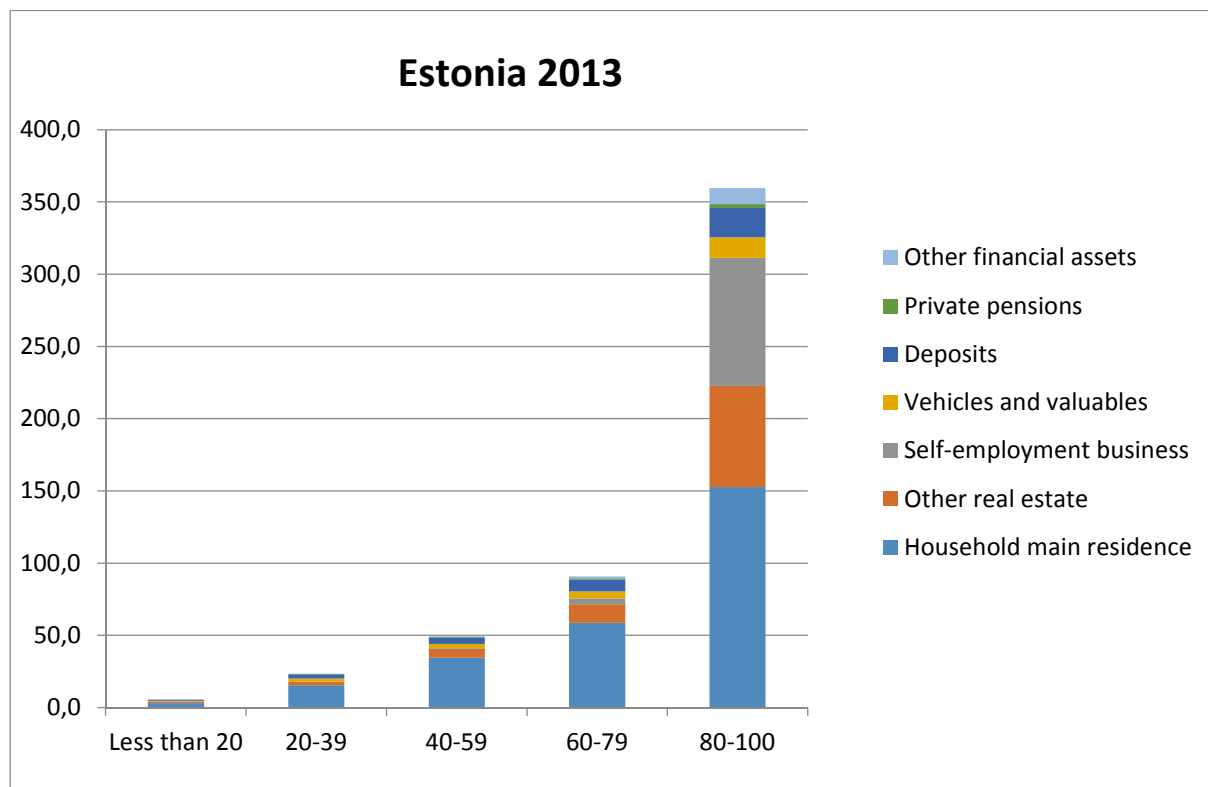


Figure 1. The portfolio of total assets by net wealth quintiles

Notes: The table presents the mean values (in thousands of EUR) of various types of asset across subgroups of households divided into different groups by their net wealth (the lowest fifth, 20–39%, etc).



### 3.2 Real assets

Real assets are classified into five categories: household main residence (HMR), other real estate property, vehicles, valuables, and self-employment business wealth. Valuables consist of valuable jewellery, antiques and art. Only those vehicles (cars, motorbikes, etc), that do not have a lease contract on them are considered as the household’s property. A self-employment business is an enterprise where at least one household member is employed.<sup>1</sup>

Figure 2 compares the composition of real assets in the two Estonian surveys and in the euro area. Relative to the euro area, Estonian households own proportionally more business wealth and its share increased between 2013 and 2017. The share of business wealth in total real assets was 20% in Estonia in 2013 and 26% in 2017, while it was 12% in the euro area in the second wave of the HFCS. The share of the household main residence in total real assets is smaller in Estonia than in the euro area and its weight declined from 2013 to 2017.

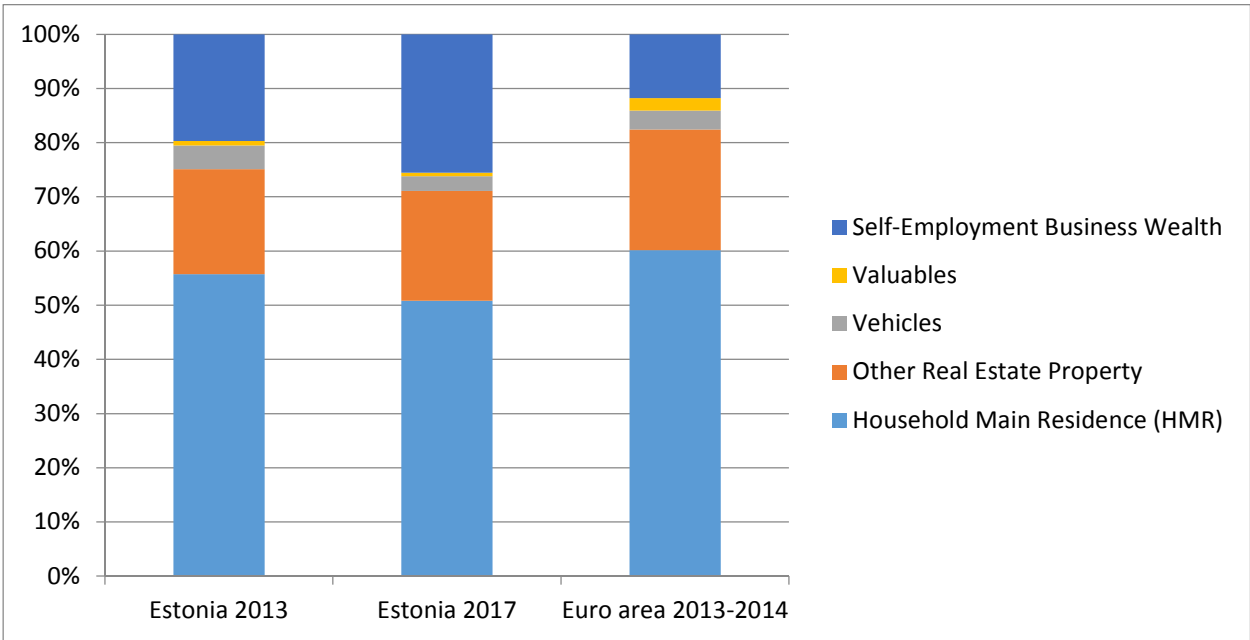


Figure 2. The composition of real assets in Estonia and in the euro area  
 Notes: The figure presents the shares of different types of real assets in total real assets.

Table 3 shows how the median values of different types of real asset changed from 2013 to 2017. The values of assets in 2013 are inflation-adjusted. The median value of total real assets increased by 12% in real terms between the two waves of the Estonian survey and reached 60 000 EUR in 2017. The asset class that saw the most growth in value was the HMR, where the value increased by 20%. Surprisingly, the median value of vehicles owned by households declined by 15%. The estimated median value of valuables also declined substantially, but

<sup>1</sup> Note that this classification does not cover durable goods (refrigerators, TV-sets, etc.) or furniture (except antique furniture).

this was the result of a change in the survey question about them. In the 2013 wave, households were asked to account only for valuables with an estimated value exceeding 500 EUR, while in 2017 no such lower threshold was set.

Table 3. Growth in the median value of real assets

	<b>Total Real Assets</b>	<b>Household Main Residence (HMR)</b>	<b>Other Real Estate Property</b>	<b>Vehicles</b>	<b>Valuables</b>	<b>Business Wealth</b>
Median value in 2013 (in 2017 EUR)	53.5	46.2	28.0	4.1	2.1	12.0
Median value in 2017	60	55.5	30.0	3.5	1.0	12.3
Growth in the median value	12.1%	20.1%	7.2%	-15.0%	-51.4%	2.2%

Notes: The table presents the median values (in thousands of EUR) of different types of real assets and growth in their inflation-adjusted value from 2013 to 2017. The median values of different types of assets are estimated conditionally on households having a given asset.

Figure 3 shows the value of real assets across net wealth quintiles. Like Figure 1, it presents the median values for each quintile. The statistics presented in Figure 3 imply that the presents real assets are unevenly distributed and their distribution became more unequal between 2013 and 2017. The value of real assets increased most for the upper quintile, while it declined slightly for the lower two quintiles.

To understand better what is behind these developments we looked at the distribution of asset values across quintiles of net wealth for the two major asset classes – HMR and self-employment business wealth. These statistics are presented in Figures 4 and 5. The dynamics of the distribution of HMR-wealth between 2013 and 2017 display a similar pattern to those of the total value of real assets. Namely, the value of the HMR increased more for the upper net wealth quintiles, while it decreased slightly for the lower two quintiles. By contrast, the value of self-employment business wealth displays a different pattern - it declined in the upper two quintiles between 2013 and 2017, while slightly increasing for the middle quintile. (The two lowest net wealth quintiles of business assets cannot be reported due to a small number of observations.) Consequently, the increase in the inequality of real assets can be attributed to divergent developments in real estate prices, by which richer households gained more from the growth in the value of their real estate than poorer households did.

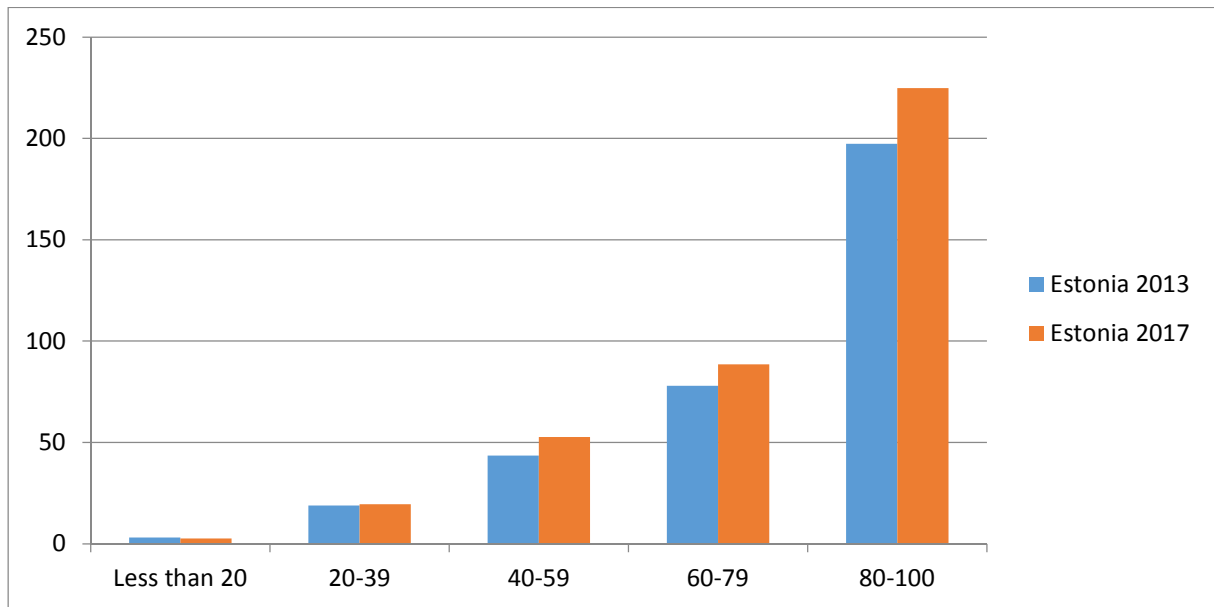


Figure 3. The value of real assets by net wealth quintiles

Notes: The table presents the median values (in thousands of EUR) of household real assets across subgroups of households divided into different groups on the basis of their net wealth (the lowest fifth, 20–39%, etc). The figures for 2013 are adjusted for inflation.

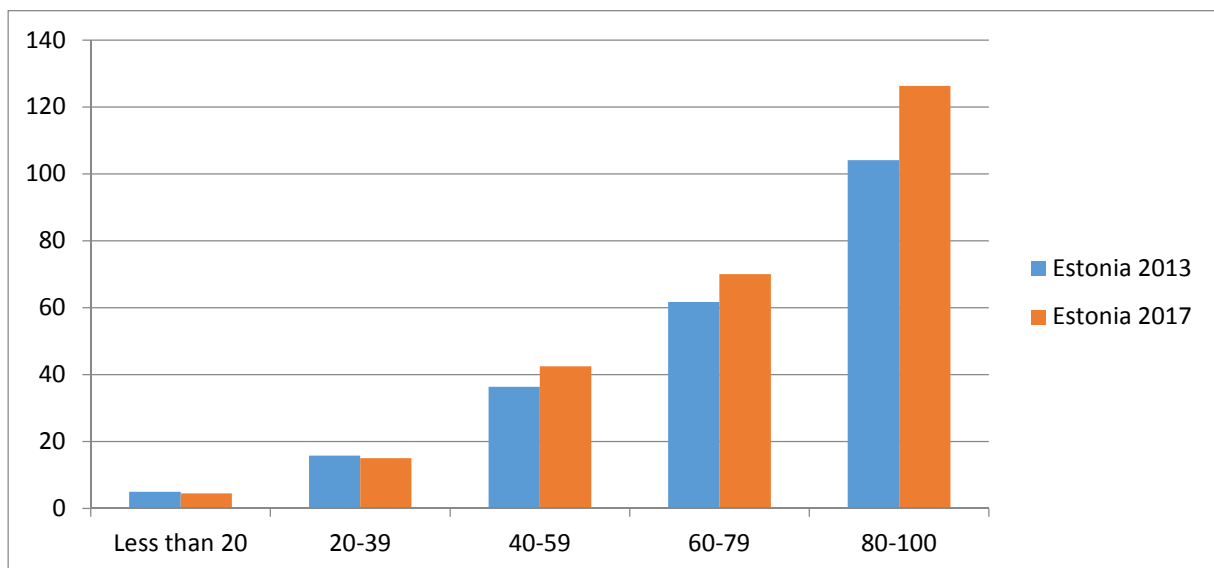


Figure 4. The value of the household main residence by net wealth quintiles

Notes: The table presents the median values (in thousands of EUR) of household main residences across subgroups of households divided into different groups on the basis of their net wealth (the lowest fifth, 20–39%, etc). The figures for 2013 are adjusted for inflation. The median values of household main residences are estimated conditionally on households owning them.

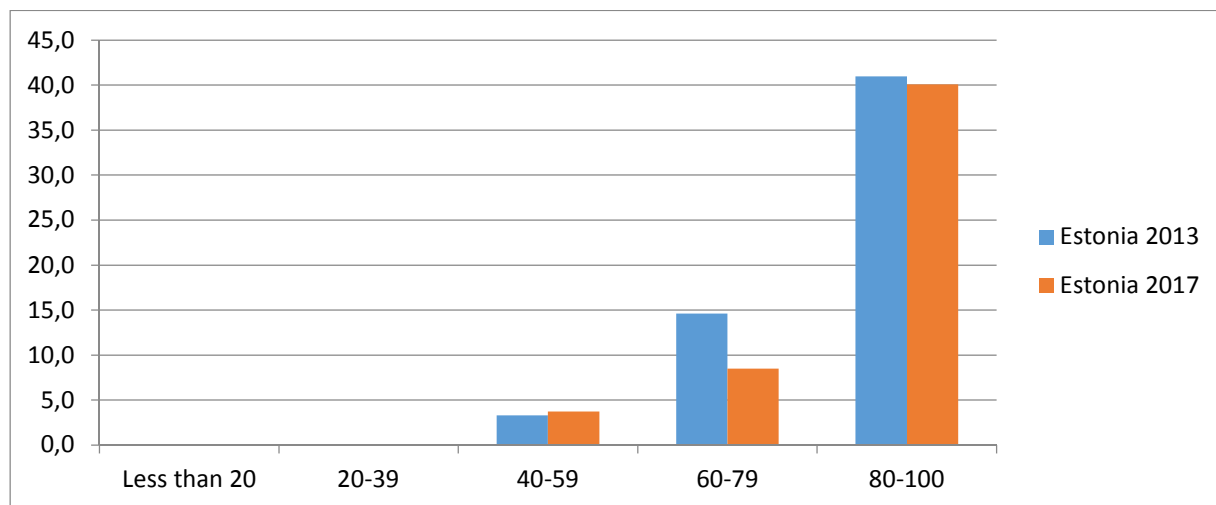


Figure 5. The value of self-employment business wealth by net wealth quintiles

Notes: The table presents the median values (in thousands of EUR) of household self-employment business assets across subgroups of households divided into different groups on the basis of their net wealth (the lowest fifth, 20–39%, etc). The figures for 2013 are adjusted for inflation. The median values of self-employment business assets are estimated conditionally on households owning them.

In the last part of this subsection we analyse the participation in various types of real assets. The related statistics are presented in Figure 6. The participation rates (i.e. the shares of households owning a particular asset) stayed relatively constant between the two waves of the Estonian survey for most types of real assets. The only exception to this is vehicles, as the share of households owning them declined between 2013 and 2017. The most commonly owned asset in Estonia is the household main residence, followed by vehicles, while only about 10% of households own business wealth. Relative to the euro area average, Estonian households are more likely to own real estate and less likely to own vehicles.

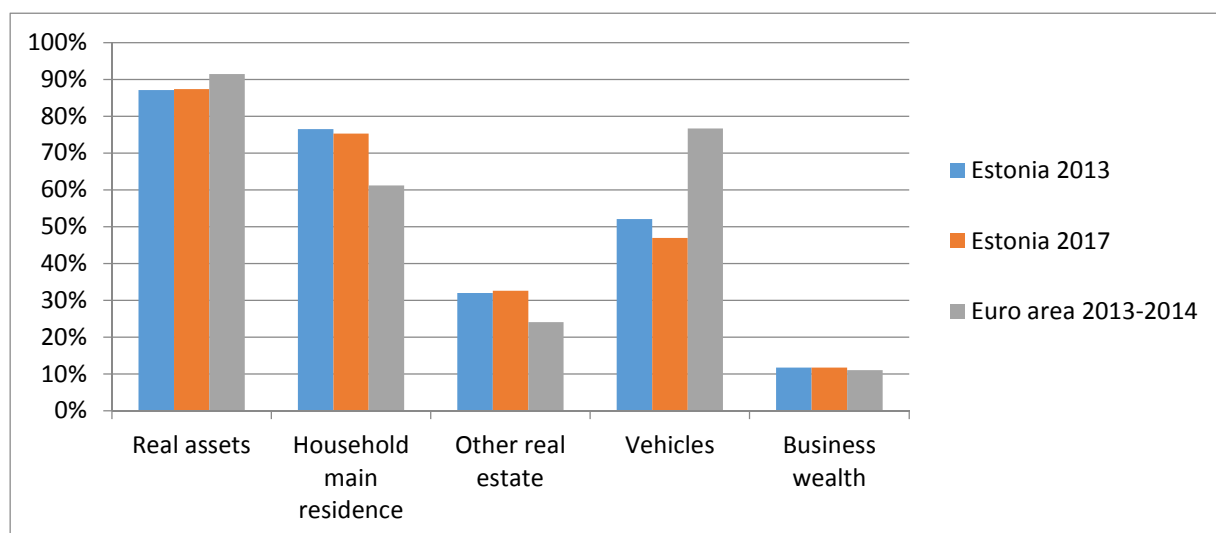


Figure 6. Participation rates in real assets in Estonia and in the euro area

Notes: The figure presents the percentage shares of households who own a given type of asset.

### 3.3 Financial assets

Financial assets are divided into five categories in this report: bank deposits; holdings of bonds, shares and mutual fund assets; voluntary pensions or whole life insurance assets<sup>2</sup>; money owed to households; and other types of financial assets. The latter category includes the value of businesses other than self-employment, managed accounts, holdings of financial derivatives, precious metals, etc.

Figure 7 illustrates the composition of financial assets in Estonia and in the euro area. Deposits are by far the most dominant form of financial assets in Estonia. In 2017 Estonian households held proportionally more of their financial assets in deposit accounts than they did in 2013. The share of bonds, stocks and mutual fund assets also increased, while the proportion of money owed to households decreased.

The portfolio of financial assets is less diversified in Estonia than in the euro area. The assets are mostly kept in the form of deposits, which made up more than two thirds of total financial assets (68% in 2013 and 71% in 2017), whereas the share of deposits was 44% in the euro area. Relative to the euro area, Estonian households hold a substantially smaller share of their financial wealth in the form of voluntary pensions or as bonds, stocks or mutual funds. The structure of financial assets implies a strong preference for investments with minimal financial risk among Estonian households. This is confirmed by households' assessments – 73% of households are not willing to take any financial risk according to the 2017 survey. However, the structures of financial assets in Estonia and the euro area became more similar between 2013 and 2017, as the share of bonds, stocks and mutual funds in total financial holdings increased and the share of money owed to households decreased.

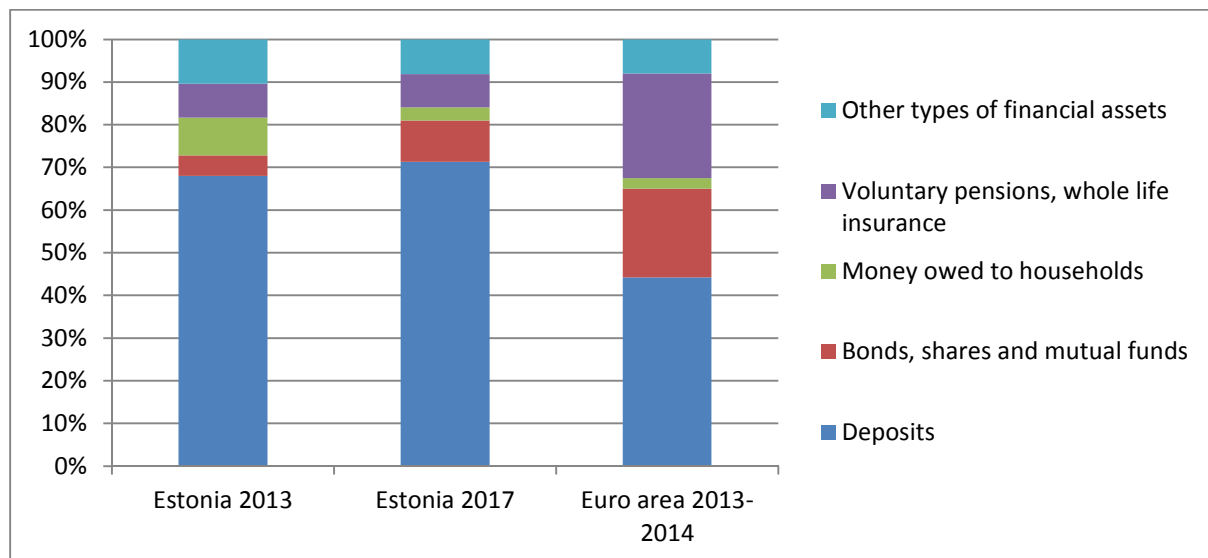


Figure 7. The composition of financial assets in Estonia and the euro area

Notes: The figure presents the shares of different types of financial assets in total financial assets.

<sup>2</sup> Since this asset category mostly consists of voluntary pension assets, we refer to it later as “voluntary pensions”.

Table 4 presents the median values of different types of financial assets and their growth rates. The growth in total financial assets between 2013 and 2017 was substantial. Their median amount increased from an inflation-adjusted value of 2200 EUR to 2800 EUR, which was an increase of 30% in real terms. The fastest-growing category of financial assets was bonds, shares and mutual funds, which grew by 131%, followed by deposits, which grew by 54%. The increase in voluntary pension assets was also significant, with a growth rate of 37%.

Table 4. Growth in the median value of financial assets

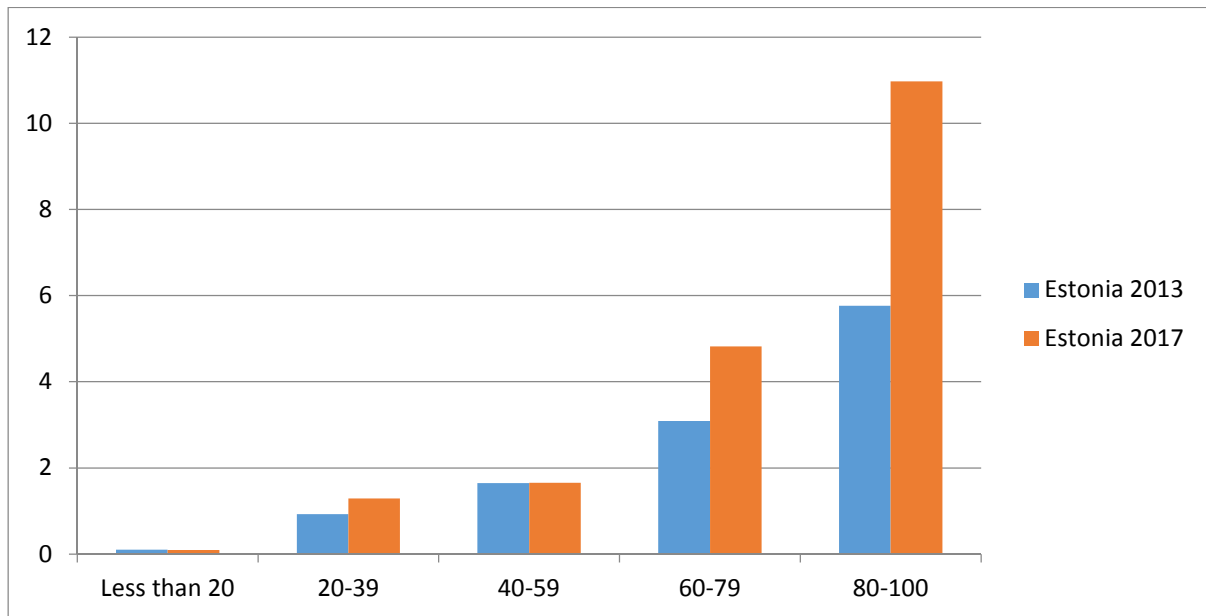
	<b>Total Financial Assets</b>	<b>Deposits</b>	<b>Bonds, shares and mutual funds</b>	<b>Money Owed to Households</b>	<b>Voluntary Pensions, Whole Life Insurance</b>	<b>Other Financial Assets</b>
Median value in 2013 (in 2017 EUR)	2.2	1.2	1.6	0.6	2.3	2.6
Median value in 2017	2.8	1.9	3.8	0.7	3.1	1.1
Growth in the median value	29.6%	53.9%	130.8%	13.4%	36.9%	-57.2%

Notes: The table presents the median values (in thousands of EUR) of different types of financial assets and growth in their inflation-adjusted value from 2013 to 2017. The median values of different types of assets are estimated conditionally on households having a given asset.

Studying further the origins of the growth in financial assets reveals that it was mostly the wealthier households who benefited from it. Figure 8 presents the distribution of deposits across net wealth quintiles and Figure 9 shows a similar distribution for voluntary pension assets. It can be seen from these graphs that the increase in these two asset types from 2013 to 2017 was very heterogeneous. While the value of deposits remained more or less the same for the lower three net wealth quintiles and even declined in the case of voluntary pensions, the upper two quintiles experienced substantial growth in the value of these assets. The increase in deposits was especially strong for the upper 20% of households, and their median value grew by 90% for this quintile.

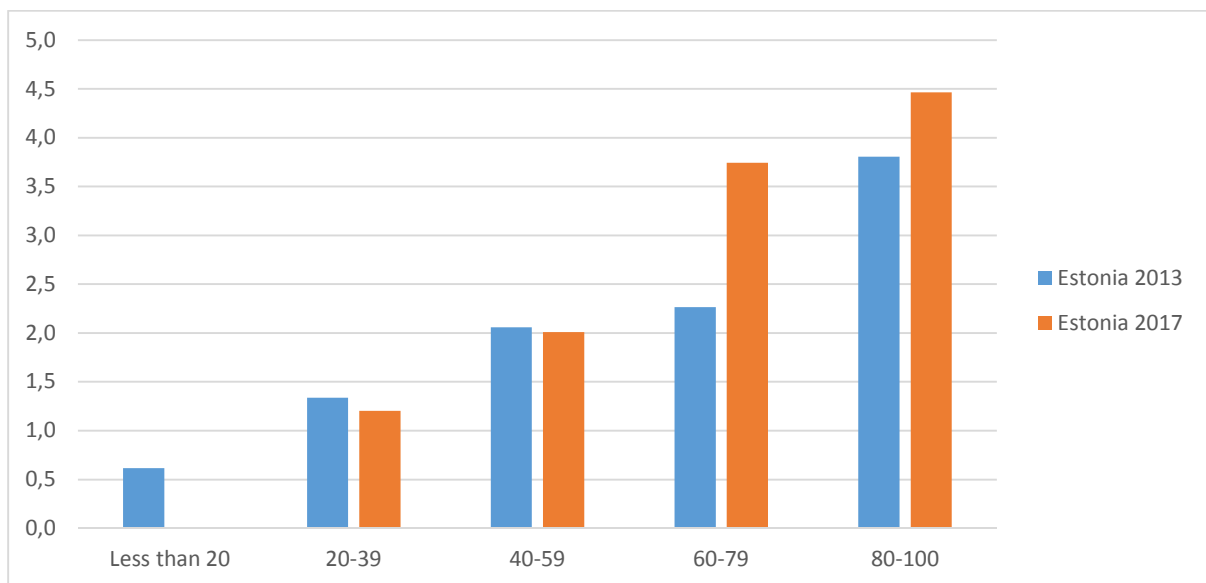
Table 5 presents the shares of households that have particular types of financial assets. The participation rate is by far the largest for deposits, both in Estonia and in the euro area, as almost all households have deposit accounts. The share of such households was somewhat larger in Estonia than in the euro area at the time of the first Estonian survey (98.6% vs 96.9%) and it slightly increased between the two surveys, reaching 99.6% in Estonia in 2017.

Holdings of bonds, shares and mutual funds are less common in Estonia than in the euro area. The same applies to voluntary pensions – while about 30% of households in the euro area had voluntary pensions in 2013–2014, in Estonia about a fifth of households did. Holdings of bonds, shares and mutual funds became slightly more prevalent in Estonia between 2013 and 2017, while the share of households with voluntary pensions declined somewhat.



**Figure 8. The value of deposits by net wealth quintiles**

Notes: The table presents the median values (in thousands of EUR) of household deposit holdings across subgroups of households divided into different groups on the basis of their net wealth (the lowest fifth, 20–39%, etc). The figures for 2013 are adjusted for inflation. The median values of deposits are estimated conditionally on households having deposits.



**Figure 9. The value of voluntary pensions / whole life insurance assets by net wealth quintiles**

Notes: The table presents the median values (in thousands of EUR) of household voluntary pensions and whole life insurance assets across subgroups of households divided into different groups on the basis of their net wealth (the lowest fifth, 20–39%, etc). The figures for 2013 are adjusted for inflation. The median values of these assets are estimated conditionally on households having voluntary pensions /whole life insurance assets. The median value for the first net wealth quintile in 2017 is not reported since there were fewer than 20 observations in this group.

Table 5. Participation rates in financial assets in Estonia and in the euro area

	<b>Estonia 2013</b>	<b>Estonia 2017</b>	<b>Euro area 2013–2014</b>
Financial assets	98.8%	99.6%	97.2%
Deposits	98.6%	99.6%	96.9%
Bonds	0.1%	0.4%	4.6%
Shares	3.6%	4.4%	8.8%
Mutual funds	3.2%	3.4%	9.4%
Money owed to households	12.4%	10.3%	7.9%
Voluntary pensions	19.8%	18.5%	30.3%
Other financial assets	3.6%	3.3%	7.5%

Notes: The table presents the percentage shares of households who own a given type of asset.

## 4. Liabilities

This section gives an overview of households' liabilities, i.e. the outstanding balances of various types of debt. Total debt is divided into mortgage debt and non-collateralised debt. Mortgage debt consists of mortgages on the household main residence (HMR) and mortgages on other real estate items. Non-collateralised debt is divided into bank credit line or overdraft debt, credit card debt and other non-collateralised debt (which includes consumer loans, instalment loans, private loans etc). We first provide statistics on the composition of debt, then discuss the outstanding values and prevalence of debt.

### 4.1 Total liabilities

As shown in Table 6, most of the outstanding balance of debt consists of mortgages. They made up 95% of the debt in Estonia in 2013 and 86% in the euro area according to the second wave HFCS. The vast majority of mortgage debt is made up of mortgages on the HMR, and more so in Estonia than in the euro area.

The share of non-collateralised debt increased in Estonia between 2013 and 2017. This increase came mainly from growth in other non-collateralised debt, which grew from 4% to 10%. However, these results may be at least partly driven by a change in the methodology between the two waves of the Estonian HFCS. In the first wave, the data on consumer loans issued by the banks were obtained from the survey, while in the second wave this information was taken from the commercial banks. Households who were interviewed for the HFCS had a tendency not to report all their consumer loans, especially those that had small outstanding balances.<sup>3</sup> Because of this underreporting of bank-issued consumer loans in the Estonian 2013

<sup>3</sup> Underreporting of consumer loans is evident from a comparison of the data obtained from the banks with those from the survey. The data on consumer loans were collected both from households and from commercial banks in both waves of the Estonian HFCS. The data collected from the households were reported in the dataset of the



HFCS, the proportion of other non-collateralised debt increased between 2013 and 2017. This change in methodology was also at least partly the reason why the median balance of non-collateralised debt increased significantly between the two Estonian surveys (see Table 7) together with the share of households that had non-collateralised debt (see Table 8).

Table 6. The composition of debt

	<b>Estonia 2013</b>	<b>Estonia 2017</b>	<b>Euro area 2013–2014</b>
Mortgage debt	94.7%	88.2%	85.8%
... HMR mortgages	84.5%	73.0%	65.7%
... Other real estate mortgages	10.2%	15.1%	20.1%
Non-collateralised debt	5.3%	11.8%	14.3%
... Bank credit line / overdraft	0.4%	0.2%	1.1%
... Credit card debt	0.7%	2.0%	0.2%
... Other non-collateralised debt	4.2%	9.6%	13.0%

Notes: The table presents the shares of different types of debt in the total outstanding balance of debt.

The median outstanding balance of debt in Estonia adjusted for inflation was 6600 EUR in 2013 and 4900 EUR in 2017 (see Table 7). In real terms the median value of debt declined by 26%. The reason for the estimated decline could be the change in the methodology described above. Obtaining information about consumer loans from the banks instead of using the survey data resulted in an increase in the number of households with small outstanding balances of debt, and this might have caused a decline in the median value of debt. The increase in mortgage debt between the two waves of the Estonian survey was 8%, which was mainly caused by growth in the value of non-HMR mortgages. The median value of non-collateralised debt increased by 80%, and this large estimated increase is also the result of the change in the survey methodology.

Table 7. Growth in median outstanding balances of debt

	<b>Total debt</b>	<b>Mortgage debt</b>	<b>HMR mortgage</b>	<b>Other real estate mortgage</b>	<b>Non-collateralised debt</b>
Median value in 2013 (in 2017 EUR)	6.6	27.8	28.4	22.4	0.7
Median value in 2017	4.9	29.9	28.2	29.2	1.3
Growth in the median value	-26%	8%	-1%	30%	80%

Notes: The table presents the median values (in thousands of EUR) of different types of debt and growth in their inflation-adjusted value from 2013 to 2017. The median values of debt are estimated conditionally on households having a given type of debt.

2013 HFCS. As it appeared that consumer loans were underreported, the decision was taken to replace the survey data on consumer loans with the data obtained from commercial banks in the dataset of the 2017 HFCS.

The share of indebted households was somewhat lower in Estonia in 2013 than in the euro area (37% vs 42%, see Table 8). The estimated share grew significantly between the two waves of the Estonian survey from 37% to 48%, but this increase is again mostly the result of a change in the survey methodology that was described above. The estimated prevalence of mortgage debt, which was not affected by this change in methodology, was essentially constant, as 21% of households had mortgage loans in both 2013 and 2017 in Estonia.

Relative to their euro area counterparts, Estonian households were less likely to have either mortgage debt or non-collateralised debt according to the second wave HFCS. Such comparisons for the subsequent HFCS waves may be hampered because the data on loans have been obtained from different sources. While the information on loans is partially based on the data from commercial banks in the Estonian HFCS, other countries rely on survey data. As we discussed above, the survey data in Estonia underestimated the actual amount of non-collateralised loans. Since this may also be the case in the other countries, the Estonian results are not well comparable with the euro area average after the switch from the survey to the commercial banks as the data source.

Table 8. Percentage of households holding debt in Estonia and in the euro area

	<b>Estonia 2013</b>	<b>Estonia 2017</b>	<b>Euro area 2014</b>
Total debt	36.8%	48.0%	42.4%
Mortgage debt	20.7%	20.9%	23.3%
HMR mortgage	18.7%	18.1%	19.7%
Other real estate mortgage	2.7%	3.7%	5.2%
Non-collateralised debt	25.1%	40.3%	28.2%

Notes: The table presents the percentage shares of households that have outstanding balances of different types of debt.

## 4.2 Mortgages

The participation in mortgage debt is strongly dependent on income, as households in the upper income quintiles are significantly more likely to have mortgage debt than low-income households are (see Figure 10). This dependency on income is stronger in Estonia than in the euro area. The share of Estonian households that have mortgages increased somewhat in the third and fourth income quintiles between 2013 and 2017, while it declined in the lowest and highest quintiles.

Figure 11 presents the participation in mortgage debt across age groups. It illustrates that the share of households with mortgage debt has a hump-shaped pattern over age, peaking for the 35–44 age group. This pattern is consistent with the life-cycle theory of consumption, according to which households smooth consumption over their life cycle (Modigliani and Brumberg (1954)). As income also follows a concave function over age, people borrow more when they are young in anticipation of future income growth. People also obtain mortgage loans at a relatively young age since these loans have a long duration.

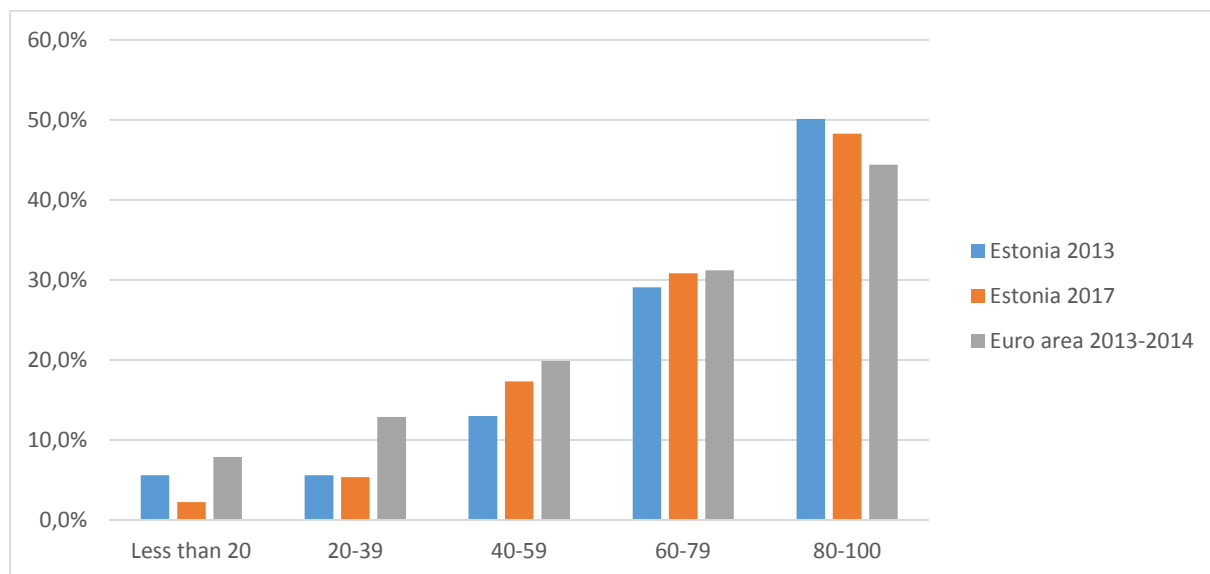


Figure 10. Share of households holding mortgage debt by income quintiles

Notes: The figure presents the percentage shares of households who have outstanding balances of mortgage debt. Households are divided into subgroups on the basis of their income (the lowest fifth, 20–39%, etc.).

The age profiles of mortgage debt participation in Estonia and in the euro area exhibit similar concave patterns that peak in the 35–44 age group, but there are also significant differences when Estonia is compared with the euro area. Younger households, where the reference person is under 45 years old, are more likely to have mortgage loans in Estonia, while older households are less likely to do so. The reasons for these divergences in the age profile are discussed in Meriküll and Rõõm (2016). The low participation rate for households in older age groups has two main causes. First, commercial banks started offering mortgage loans to households on a large-scale basis only after the turn of the century. Since these loans have long durations, older households were not able to take them. Second, many older households had no need to borrow money to buy their houses, since they were able to privatise their dwellings during the economic transition in the 1990s.

These differences in the age profiles of debt participation between Estonia and the euro area may potentially have long-term implications for financial stability. Currently, the younger cohorts in Estonia are more likely to have mortgage loans than their euro area counterparts, so as these cohorts age, then debt participation rates for older age groups in Estonia are likely to exceed the euro area averages as well. Given the current age profile of debt market participation, we may expect that the mortgage debt burden in Estonia will grow in the coming decades.

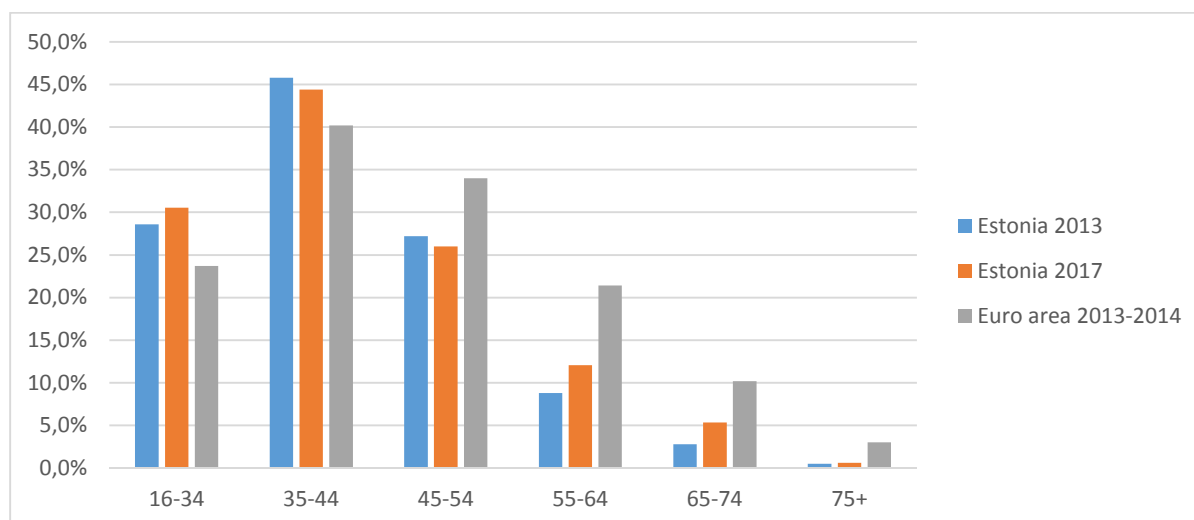


Figure 11. Share of households holding mortgage debt by age groups

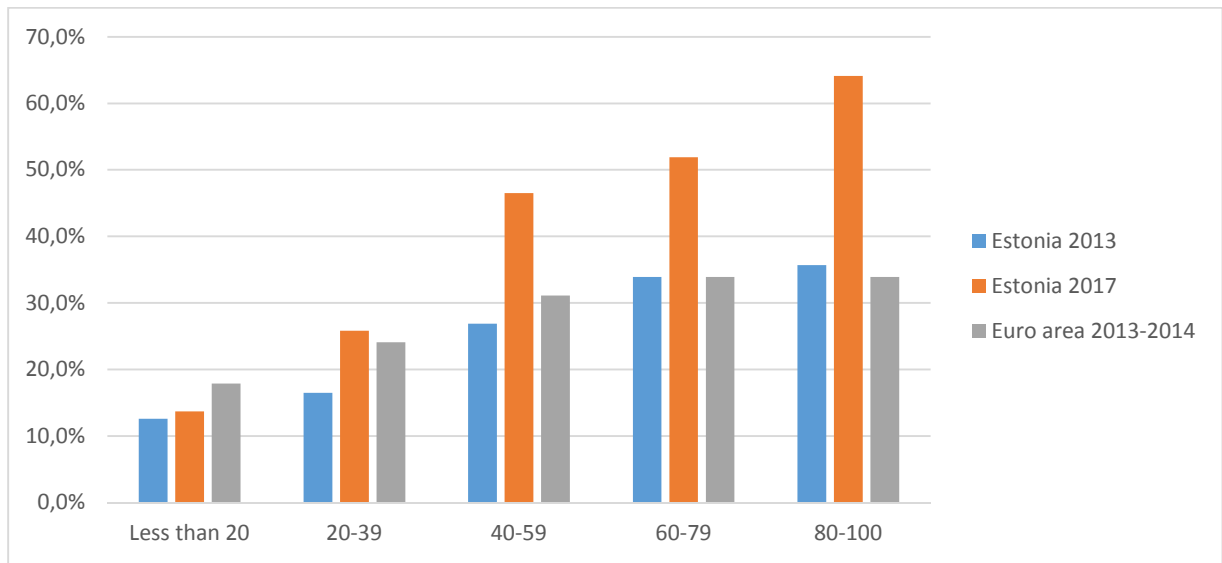
Notes: The figure presents the percentage shares of households who have outstanding balances of mortgage debt. Households are grouped on the basis of the age of the reference person. The household reference person is defined using the concept developed by the Canberra Group (UNECE (2011)).

### 4.3 Non-collateralised loans

Figure 12 presents the shares of households that have non-collateralised loans across income groups. Like with mortgages, there is a positive relationship between the level of income and the likelihood of a household having non-collateralised loans, but it is not as strong, and it is weaker in the euro area than in Estonia.

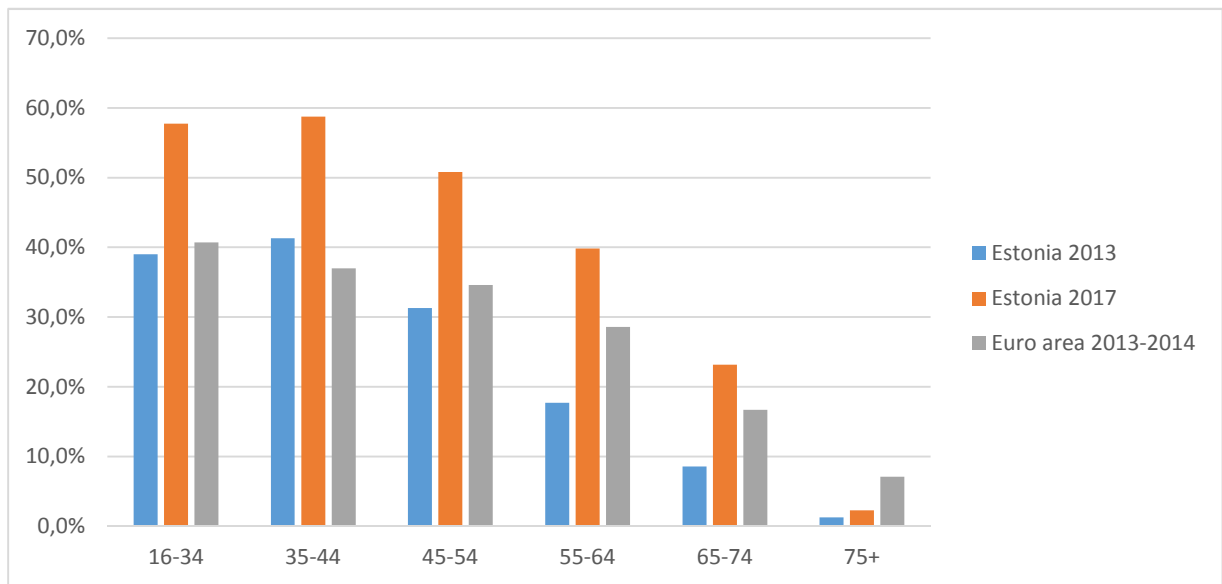
The estimated proportion of households with non-collateralised loans increased in Estonia between 2013 and 2017 and this growth seemed to be stronger for higher income quintiles. However, this outcome is influenced by the change in the survey methodology discussed above, which resulted in the increase in the participation rate for the non-collateralised loans being overestimated.

Figure 13 presents the shares of households with non-collateralised loans across age groups. Like with mortgages, the age profile of participation in non-collateralised debt has a hump-shape pattern in Estonia, peaking for the 35–44 age group. The share of households with non-mortgage debts declines with age in the euro area. The estimated share of households with non-collateralised debt seemed to increase between 2013 and 2017 in Estonia across all age groups. This result is once again caused to a large extent by the change in the survey methodology discussed above, and it overestimates the actual increase in participation rates.



**Figure 12. Share of households holding non-collateralised debt by income quintiles**

Notes: The figure presents the percentage shares of households who have outstanding balances of non-collateralised debt. Households are divided into subgroups on the basis of their income (the lowest fifth, 20–39%, etc).



**Figure 13. Share of households holding non-collateralised debt by age groups**

Notes: The figure presents the percentage shares of households who have outstanding balances of non-collateralised debt. Households are grouped on the basis of the age of the reference person. The household reference person is defined using the concept developed by the Canberra Group (UNECE (2011)).

## 5. Net wealth

### 5.1 The median level of net wealth across various characteristics

In this section we discuss the level and distribution of net wealth, which is calculated by deducting the outstanding balance of total liabilities from the value of total assets. The median level of net wealth in Estonia was 43 500 EUR in 2013 and 47 700 EUR in 2017. The growth of median net wealth was 9.7% in nominal terms and 6.6% in real terms. Figure 14 depicts the median values of net wealth in the euro area countries plus Poland and Hungary using the results of the second wave HFCS. The median level of net wealth in the euro area was 104 100 euros, which was more than two times higher than the Estonian level of 2013. The median level of household net wealth was the highest in Luxembourg, followed by Belgium and Malta. It was the lowest in Latvia and Hungary. The Estonian median level of net wealth was the third lowest among the participating countries.

The mean level of net wealth in Estonia was 97 000 EUR in 2013 and 111 900 EUR in 2017. The growth of mean net wealth was 15.4% in nominal terms and the inflation-adjusted growth was 12.1%. The result that the mean level of net wealth increased by more than the median indicates that the distribution of net wealth became more unequal in Estonia during this period.

Figure 15 shows the distribution of net wealth in Estonia, presenting the percentile values in 2013 and 2017. The distribution of net wealth is strongly skewed. Approximately 4.5% of households had negative net wealth in 2017 (3.2% in 2013), meaning that they had more liabilities than assets. The value of the tenth percentile of net wealth was about 400 EUR in 2017, meaning the poorest 10% of households had less net wealth than this. The level of net wealth grew gradually up to the 70<sup>th</sup> percentile and then started to increase rapidly. The value of the 80<sup>th</sup> percentile was 119 000 EUR and the value of the 90<sup>th</sup> percentile was 223 000 EUR in 2017. The growth in net wealth between 2013 and 2017 was the largest for the top decile, which also shows that the distribution of wealth became more unequal between the two waves of the HFCS in Estonia.

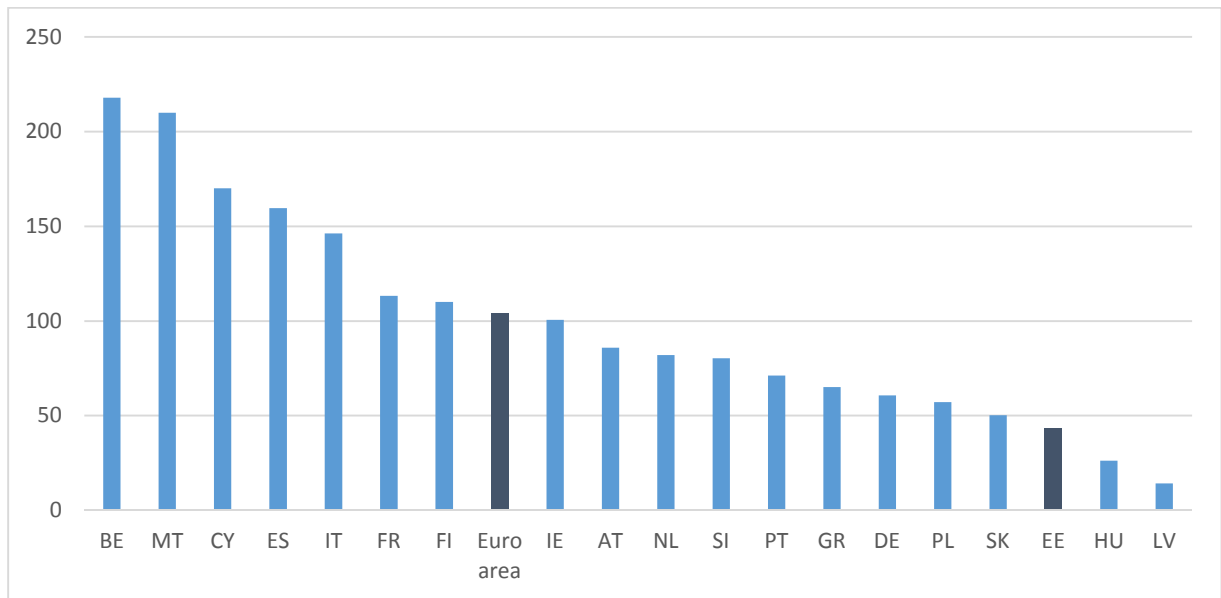


Figure 14. Median level of net wealth, HFCS second wave

Notes: The figure depicts the median values of net wealth (in thousands of EUR) in the euro area countries (except Lithuania and Luxembourg) and in Poland and Hungary, based on the second wave HFCS. Lithuania did not conduct the HFCS. Luxembourg is not included to keep the maximum scale on the Y-axis at 250 thousand EUR. The median net wealth in Luxembourg was 438 thousand EUR.

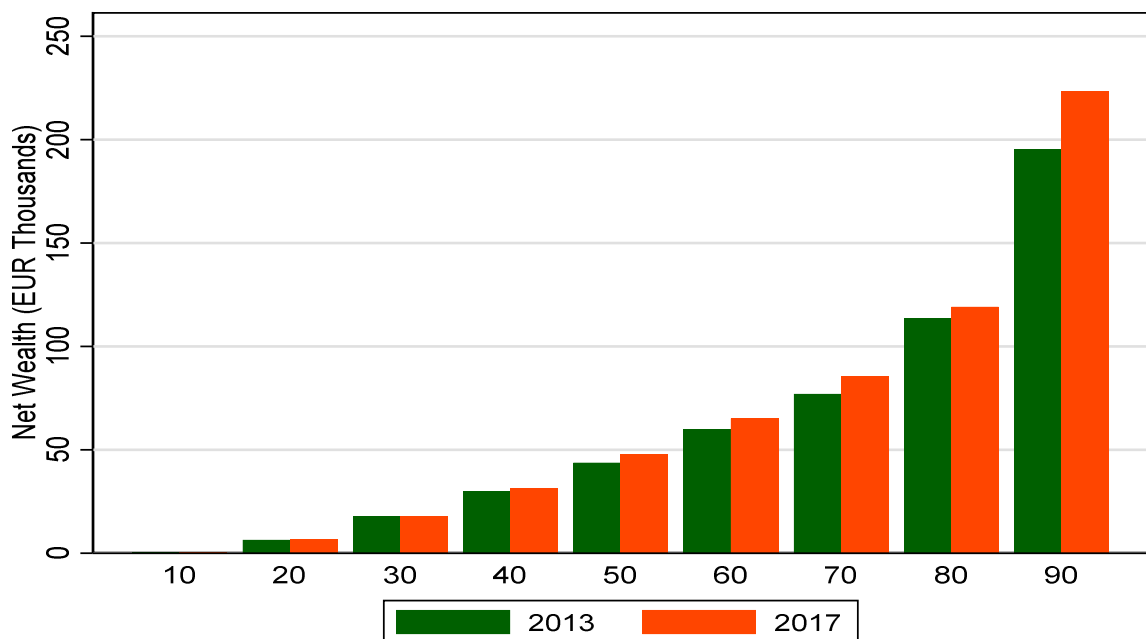


Figure 15. Net wealth by percentiles in Estonia, 2013 and 2017

Notes: The figure presents the percentiles of net wealth in thousands of EUR. The horizontal axis shows percentiles of the distribution, e.g. 10 implies the point in the wealth distribution where 10% of households are poorer and 90% are richer; 50 is the point in the wealth distribution where 50% are poorer and 50% richer, which is the median; 90 is the point in the wealth distribution where 90% are poorer and 10% are richer, etc.

Figure 16 presents the age profile of net wealth. The patterns of net wealth across age are hump-shaped both in Estonia and in the euro area, but they peak for different age groups. In the euro area the age profile follows a pattern that is in accordance with the life-cycle theory (Modigliani (1966)), i.e. the median value of net wealth increases until the retirement age and starts falling after that. In Estonia the cross-sectional age profile peaks at an earlier age, as the peak is in the 35–44 age group in the 2013 survey and the 45–54 age group in the 2017 survey.

The reason why younger cohorts are relatively wealthier in Estonia is that they also have higher incomes. This is a consequence of the economic transition, which rendered the human capital that had been accumulated during the soviet era obsolete. The younger cohorts, who gained their education and labour market experience after the economic transition, are better positioned in the labour market and earn relatively high incomes compared with those of the older cohorts in Estonia and of the youth in western European countries. It is noticeable that the peak in the pattern of net wealth across age shifted to the right between 2013 and 2017. As more time passes since the economic transition, the age profile of net wealth in Estonia should become closer to that of the euro area.

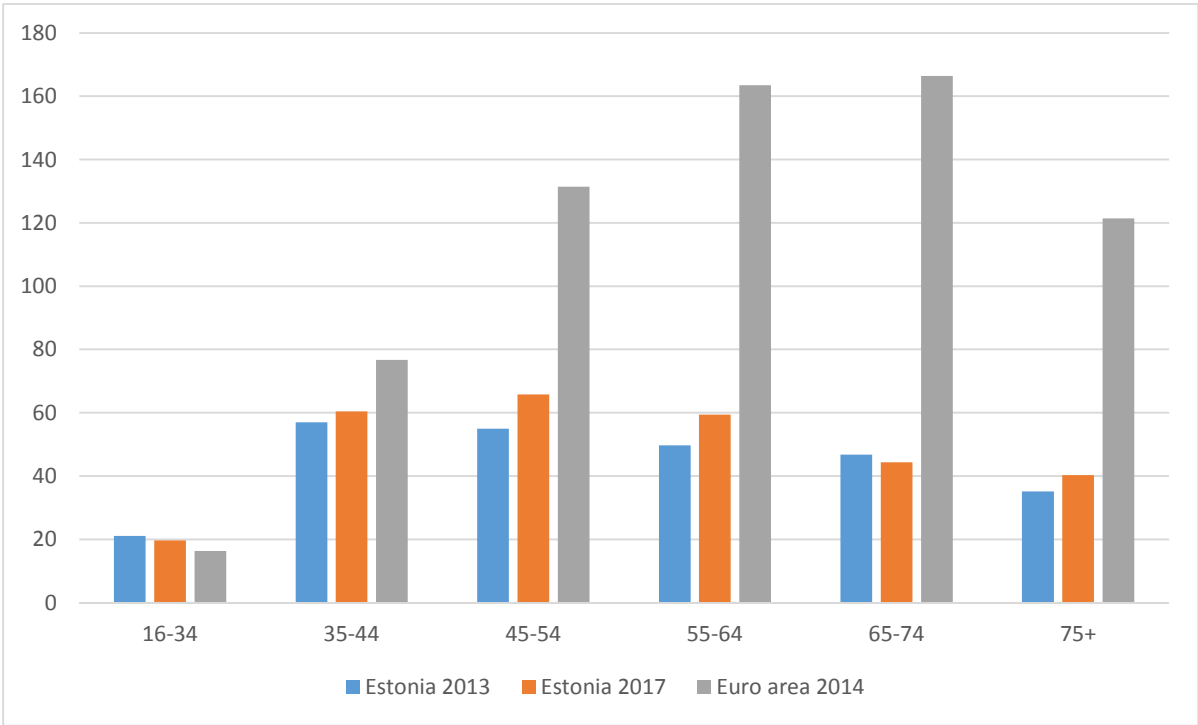


Figure 16. The median value of net wealth by age groups  
 Notes: The figure presents the median values (in thousands of EUR) of net wealth. Households are grouped on the basis of the age of the reference person. The household reference person is defined using the concept developed by the Canberra Group (UNECE (2011)).



Table 9 illustrates a feature that is common for Estonia and for the other euro area countries, which is that as a general rule, households who own their homes are wealthier than households who rent the dwellings that they live in. The differences in median net wealth between home owners and renters are substantial. In Estonia in 2013 the median value of net wealth for home owners without a mortgage was 56 600 EUR, whereas for renters it was 1500 EUR. In the euro area the corresponding figures were 241 200 EUR and 9100 EUR. These differences reflect the prominent role that the household main residence has among household assets. It is by far the most important asset that home-owners have, and mortgages collateralised by the household main residence make up the largest share of households' loans.

Table 9. Median level of net wealth by housing status

	<b>Estonia 2013</b>	<b>Estonia 2017</b>	<b>Euro area 2013– 2014</b>
Owner-Outright	56.6	65.1	241.2
Owner-with Mortgage	69.5	67.7	171.1
Renter	1.5	1.9	9.1

Notes: The table presents the median values of net wealth (in thousand EUR). Households are classified by their housing status, differentiating between home owners without a mortgage (“Owner-Outright”), home owners who have a mortgage on their home (“Owner-with Mortgage”), and renters.

Figure 17 illustrates the distribution of wealth across Estonian regions. It uses a colour scheme to show the ranges of median net wealth for different counties. The country's capital Tallinn and its surrounding county Harjumaa are the richest region in Estonia, followed by Tartumaa county, where the second biggest city Tartu is. The regional disparities in wealth increased from 2013 to 2017, and it is notable that the median level of net wealth increased in this period in the two richest regions, while it remained the same or even declined in the rest of the country.

Figure 17. The median value of net wealth by Estonian regions

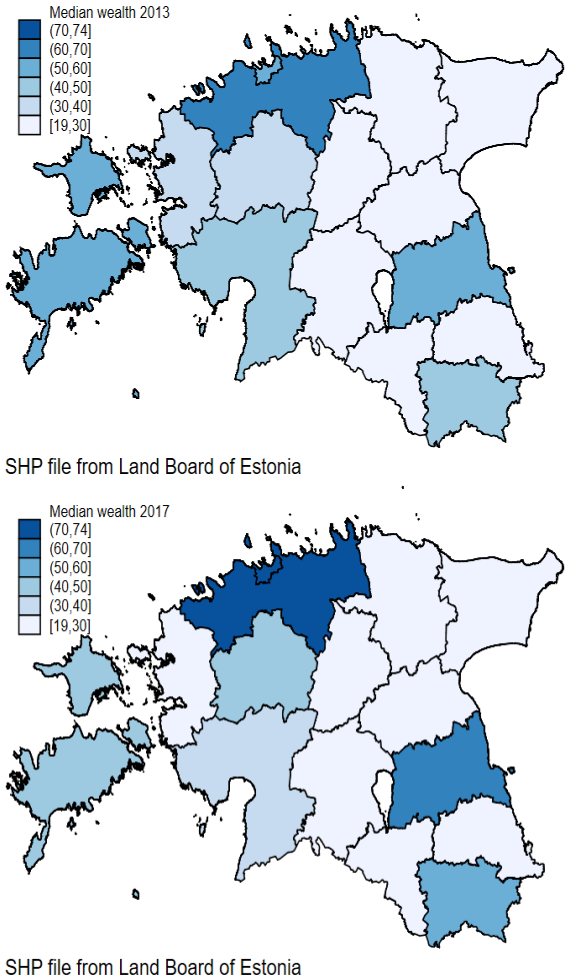


Figure 17. The median value of net wealth by Estonian regions

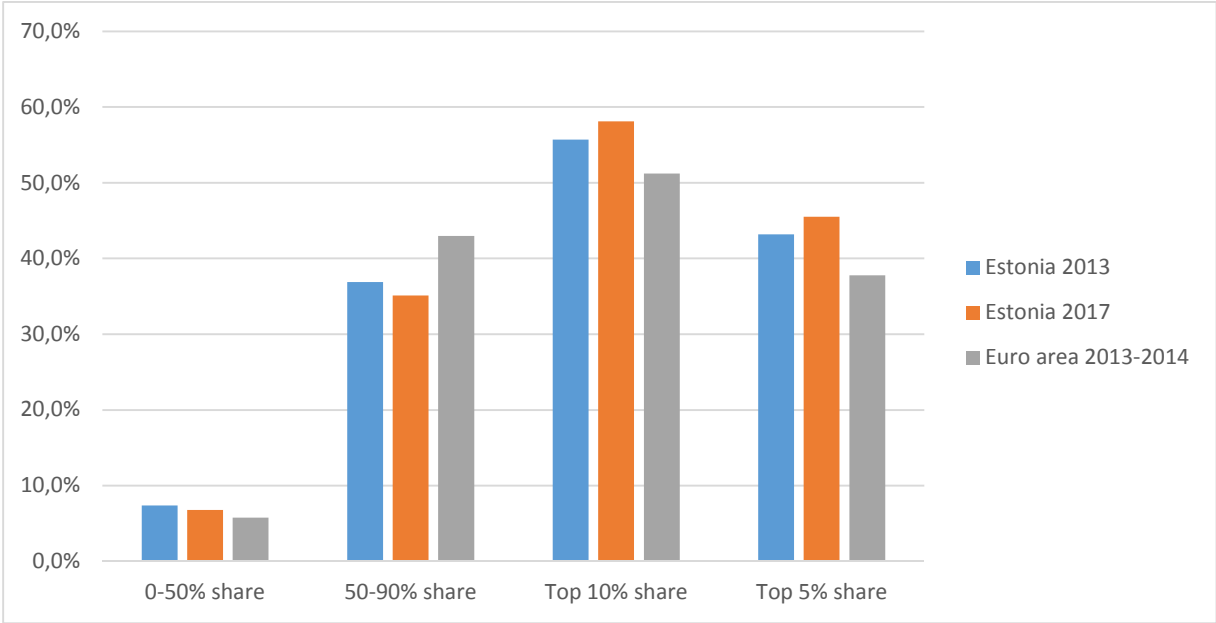
Notes: The figure presents the median ranges of net wealth (in thousand EUR) across Estonian regions. The upper panel presents the data from 2013 and the lower panel presents the data from 2017.

**5.2 Inequality of net wealth**

There are several ways to measure inequality, among which the Gini coefficient is the most commonly used indicator. The distribution of wealth is typically heavily skewed, with a relatively small proportion of households owning a large share of wealth. Therefore the shares of wealth owned by the richest 1%, 5% or 10% of households are also often used as measures of wealth inequality.

Figure 18 shows the shares of total aggregate net wealth owned by different net wealth percentiles. The households in the lower half of the net wealth distribution owned 7% of the

wealth in Estonia in 2013, while the upper 5% owned 43%. The corresponding figures for the euro area were 6% and 38%. This comparison implies that net wealth is less equally distributed in Estonia than in the euro area as a whole. The shares held by the upper 10% and 5% in Estonia increased between 2013 and 2017, while the shares decreased for the rest of the wealth distribution. This implies that the growth of net wealth has been the quickest for the richest 10%.



**Figure 18. Share of total net wealth owned by segments of the wealth distribution**  
 Notes: this figure presents the percentage shares of total wealth owned by groups of households in the different parts of the net wealth distribution.

Figure 19 illustrates the Gini coefficients of net wealth across the euro area countries. The estimated value of the Gini coefficient for Estonia was 0.69 in 2013, which was close to the estimate for the whole euro area. The highest Gini coefficient in the euro area countries was in Latvia, followed by those in Germany and Ireland. The lowest were in Slovakia, Malta and Poland. The Gini coefficient increased in Estonia between 2013 and 2017, and its estimated value in the 2017 survey was 0.71. The standard error of the Gini coefficient was 0.019, implying that although the point estimate of the Gini coefficient increased, this growth was not statistically significant.

Figure 20 provides a comparison of wealth inequality across the euro area countries that is based on the share of net wealth held by the top 5%. The ranking of countries by this measure is similar to the one based on the Gini coefficient, but there are also some differences. The top 5% of households own the largest share of wealth in Latvia, which is followed by Germany and Cyprus. This share is the lowest in Slovakia, Malta and Poland.

It is surprising that wealth inequality is relatively high in Estonia compared to other euro area countries. It could be expected to be lower for two main reasons coming from Estonia's

economic history. First, countries that have high home ownership rates tend to have low wealth inequality (Carroll et al. (2014)). In Estonia the share of households owning their homes is above the euro area average (see Figure 6), but wealth inequality is relatively high. An important reason for the high rate of home ownership was that Estonian households could privatise their dwellings during the economic transition period in the 1990s. Second, Estonian households, like those in other post-socialist countries, have only been able to accumulate private wealth since the fall of the socialist regime, i.e. for approximately three decades. As they have had considerably less time to accumulate wealth than households in western European countries have, it could be expected that wealth inequality would also be lower. Wealth inequality is indeed relatively low in some central European post-socialist countries, such as Slovakia and Poland, but it is higher in the two Baltic States covered by the HFCS, Estonia and Latvia.

One factor that may contribute to wealth inequality is entrepreneurial wealth. Business assets tend to be less equally distributed than most other types of assets are and a high share of business assets in total wealth should lead to higher wealth inequality. The share of business assets in total real assets in Estonia is almost twice the euro area average (20% vs 12%, see Figure 2). The relatively high importance of business assets in the total portfolio of assets is in line with the finding that wealth inequality is above the euro area level. Second, the regional disparities of wealth are quite wide in Estonia (see Figure 17), mainly because real estate prices in the largest cities diverge sharply from those in the rest of the country. This is an additional factor that impacts wealth inequality.

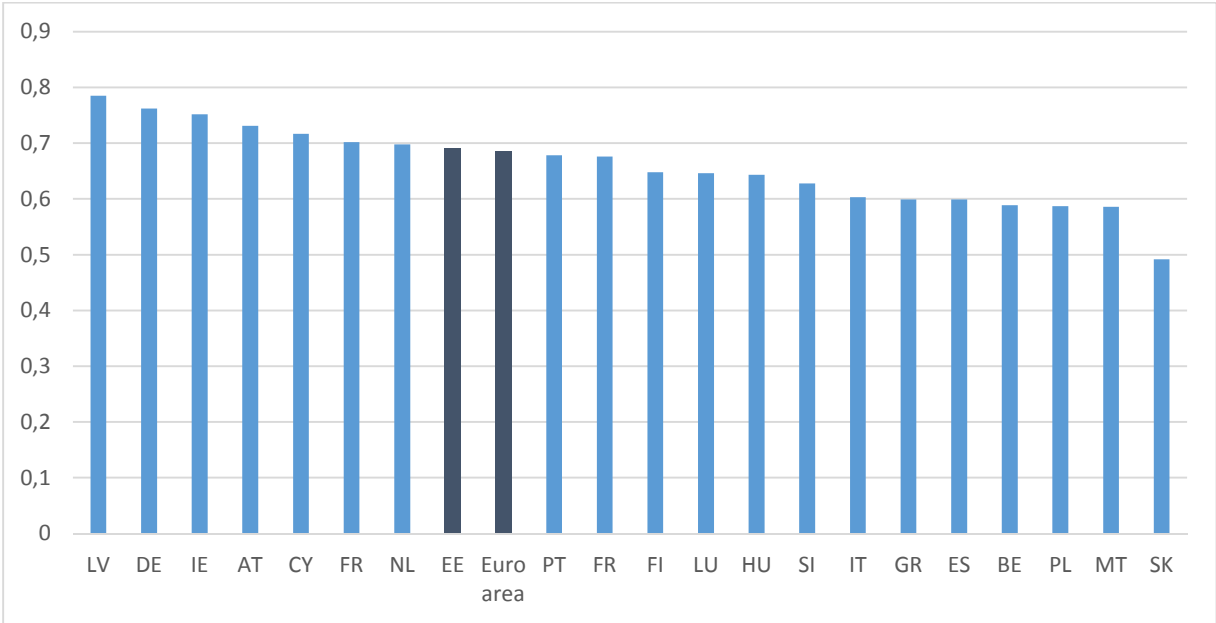


Figure 19. The Gini coefficient of net wealth, HFCS second wave

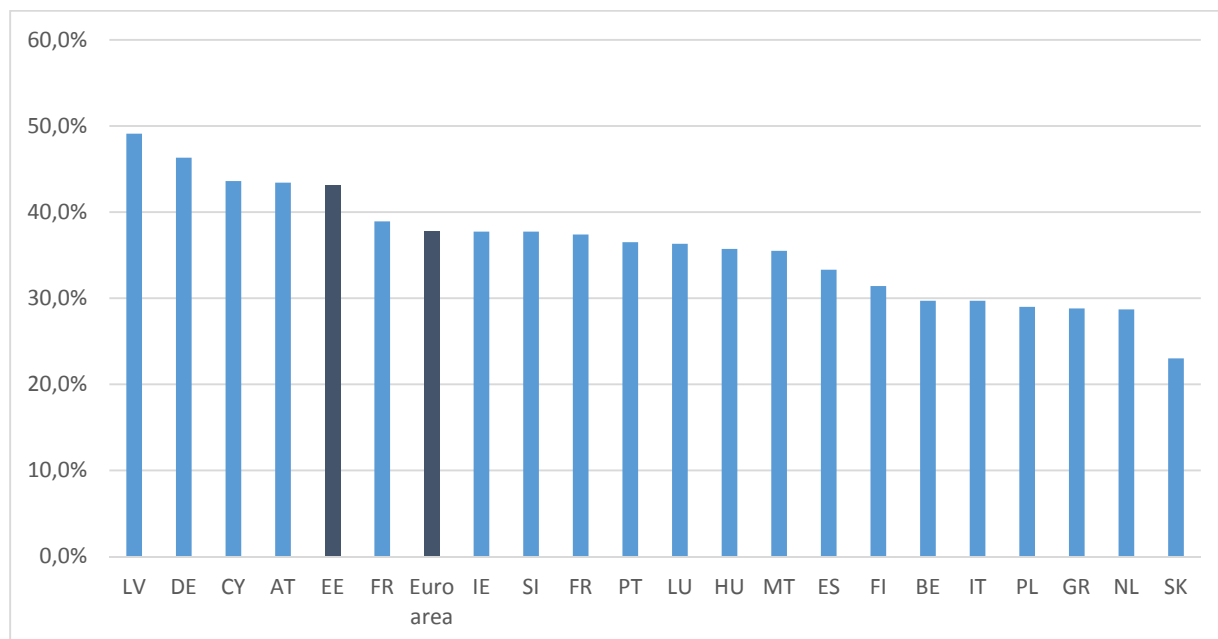


Figure 20. Share of net wealth held by the top 5% of the distribution, HFCS second wave

Above we have provided a comparison of inequality measures that are based on the survey data. However, recent research has shown that survey data tend to underestimate wealth inequality since the households in the top tail of the wealth distribution are often not covered by the wealth surveys, either because they refuse to participate in the survey or because they do not answer questions about wealth (Vermeulen (2016), Meriküll and Rõõm (2019)). This problem of the “missing rich” in wealth surveys can be corrected by complementing the household survey data with wealth information for the richest people from rich lists, which are regularly published by local business newspapers or by other entities. These data are added to the survey data and the top tail of the wealth distribution is imputed through application of the Pareto distribution. This methodology was first used by Vermeulen (2016, 2018) and has thereafter been applied in some subsequent studies for European countries. Notably, an analysis by Bach et al. (2018) provides corrected wealth inequality estimates using this methodology for France, Spain and Germany, and a study by Brzezinski et al. (2019) does the same for the central and eastern European (CEE) countries that participated in the second wave HFCS, i.e. for Slovakia, Hungary, Poland, Latvia and Estonia.

In order to see, how much Estonian survey-based estimates of wealth inequality are affected by the “missing rich” problem, we provide estimated inequality indicators together with the corrected measures for selected CEE countries from the paper by Brzezinski et al. (2019). These estimates are shown in Table 10. The figures provided in this table indicate that the correction methodology, by which the top values of the wealth distribution are imputed using supplementary data from the rich lists, affects the inequality indicators for Estonia more strongly than those for the other CEE countries covered. As a result of this correction, the estimated shares of wealth belonging to the richest 0.1%, 1%, 5% and 10% of people in Estonia are the highest in this group of countries and the corrected Gini coefficient is the

second highest after Latvia. These estimates imply that wealth inequality is relatively high in Estonia among a group of countries with similar income levels and economic history.

Table 10. Inequality measures for household net wealth distributions in the CEE countries that participated in the second wave HFCS

	<b>Estonia</b>		<b>Hungary</b>		<b>Latvia</b>		<b>Poland</b>		<b>Slovakia</b>	
	HFCS	HFCS + rich list	HFCS	HFCS + rich list	HFCS	HFCS + rich list	HFCS	HFCS + rich list	HFCS	HFCS + rich list
Top 0.1%	9	17.7	5.4	10.8	5.6	16.5	2.9	8.3	3.3	11.1
Top 1%	21.4	36	17.3	24.3	23.6	33	12.1	20.3	9.5	22.5
Top 5%	43.3	54.8	35.7	42.8	49.2	52.6	29.1	37.9	23	38.3
Top 10%	55.7	65.1	48.5	54.5	63.4	64	41.9	49.6	34.6	48.4
Gini	0.691	0.755	0.641	0.681	0.785	0.792	0.587	0.639	0.492	0.597

Note: The table presents the share of total net wealth (in %) belonging to the top 0.1%, 1%, etc. households and the Gini coefficients. “HFCS + rich list” refers to HFCS data with top values imputed using data from the given country’s list of the richest people.

Source: Brzezinski et al. (2019).

## 6. Measures of debt burden and financial fragility

The HFCS data can be used to analyse the debt burden of households and assess their financial fragility. As these assessments are based on micro data, it is possible to identify segments of households that are particularly vulnerable to economic and financial risks. In this section, we follow the practice in the reports of the HFCS first and second wave results by the HFCN (Household Finance and Consumption Network (2013b), Household Finance and Consumption Network (2016)) and provide an analysis using a set of measures of the debt burdens and financial liquidity of households. The indicators of the debt burden we use are the debt-to-asset ratio, the debt-to-income ratio, the debt service-to-income ratio, and the loan-to-value ratio of the HMR. All these ratios are estimated as the median values conditional on households having debt. In addition, we provide a measure of how large the financial buffers of households are. This is measured by the net liquid assets-to-income ratio. A description of how all these ratios are calculated is given in Appendix 2.

Table 11 shows the median values of the debt burden and financial liquidity indicators for Estonia and for the euro area. By most measures, the debt burden of Estonian households is lower than it is in the euro area, but the Estonian households also have lower financial buffers. The median level of the net liquid assets-to-income ratio in Estonia is about half that in the euro area.

Table 11. Debt burden and financial fragility indicators

	<b>Debt-Asset Ratio</b>	<b>Debt-Income Ratio</b>	<b>Debt Service- Income Ratio</b>	<b>Loan-Value Ratio of HMR</b>	<b>Net Liquid Assets-Income Ratio</b>
Estonia 2013	15.3	38.3	9.7	44	8.7
Estonia 2017	15.3	21.7	8.5	39.9	7.9
Euro area 2013–2014	21.8	62	13.9	37.3	18.6

Notes: The table presents the median ratios (in %) of different measures of the debt burden and liquidity. The various measures of the debt burden are estimated for the subsample of indebted households.

The first indicator presented in Table 11 is the debt-to-asset ratio, which shows how large a household's total assets are relative to the outstanding value of all its debts. It is a measure of financial solvency that reflects the total amount of resources a household has available to manage its debt. A value above 100% for this indicator signals a high risk of insolvency, since the amount of assets that can be depleted when faced with financial difficulties is not sufficient to pay back all the debts. The median values of this ratio remain well below the 100% threshold both in Estonia and in the euro area, at 15.3% for Estonia and 21.8% for the euro area. Looking across net wealth quintiles reveals that the same conclusion applies for most of the net wealth distribution except for the first quintile, which is the poorest fifth of households (see Figure 21). The median value of the debt-to-asset ratio for the wealth-poor was about 100% in Estonia and 117% in the euro area, which is well above the level that is considered safe.

The second indicator in Table 11, the debt-to-income ratio, sheds light on the capacity of households to service their debts on the basis of their current income. This ratio is calculated by dividing the outstanding balance of debt by gross annual income. Net income is often used in the related literature as it reflects better the ability of households to service debt. However, the HFCS, which is harmonized across countries, collects information on gross income only. The same applies to the next measure presented in Table 11, i.e. debt service-to-income ratio, which is also provided relative to gross income, not net income.

The median values of the debt-to-income ratio were 38% in Estonia (2013 survey) and 62% in the euro area. During the four-year period between the two surveys in Estonia, the debt-to-income ratio declined substantially and reached 22% in 2017. There is no universally determined threshold in the literature above which the debt-to-income ratio should indicate a high risk of financial insolvency. Levels above 100% are usually considered to be a signal of vulnerability, but this threshold is given against net income, not gross income, which is used as the base in the current study. Measured against this yardstick, the Estonian value of 22% for the debt-to-gross-income ratio should indicate that the median household has a relatively safe financial position. This level corresponds to a debt-to-net-income ratio of roughly 37%, which is well below the 100% threshold.

Looking across income quintiles, the debt-to-income ratio was the highest for the first quintile, i.e. for the 20% of households with the lowest incomes (see Figure 23). It was close

to 100% for this quintile both in Estonia (2013 survey) and in the euro area, indicating financial vulnerability. However, this ratio declined substantially for the lowest income quintile between 2013 and 2017 in Estonia, falling to 40%. So according to this measure, the financial situation of indebted households in Estonia who are income-poor improved in recent years.

In line with the theory of consumption smoothing across the life cycle, the debt burden is the highest for the households in the youngest age group, and it declines with age. This is evident from looking at the debt-to-asset ratios across age groups (see Figure 22). Debt-to-income ratios have a hump-shaped pattern and are the largest for the 35–44 age group both in the euro area and in Estonia (see Figure 24). The debt burden of the youngest households (the 16–34 age group) is close to the euro area level in Estonia, but remains significantly below it for the older cohorts, with the difference increasing with age. The reasons for this diverging pattern are similar to those discussed in Section 4.2 with reference to mortgage loans, as the bulk of the loan burden consists of mortgages. First, older cohorts were not able to get mortgage loans, since they started to be offered by commercial banks on a large-scale basis only after the turn of this century in Estonia. Second, older cohorts were able to privatise their homes in the 1990s and therefore did not need mortgages to purchase homes. However, these strong disparities in the loan burden across age cohorts may also reflect different preferences for borrowing. Households in older cohorts may be less willing to take loans as they were not accustomed to doing so when they were younger.

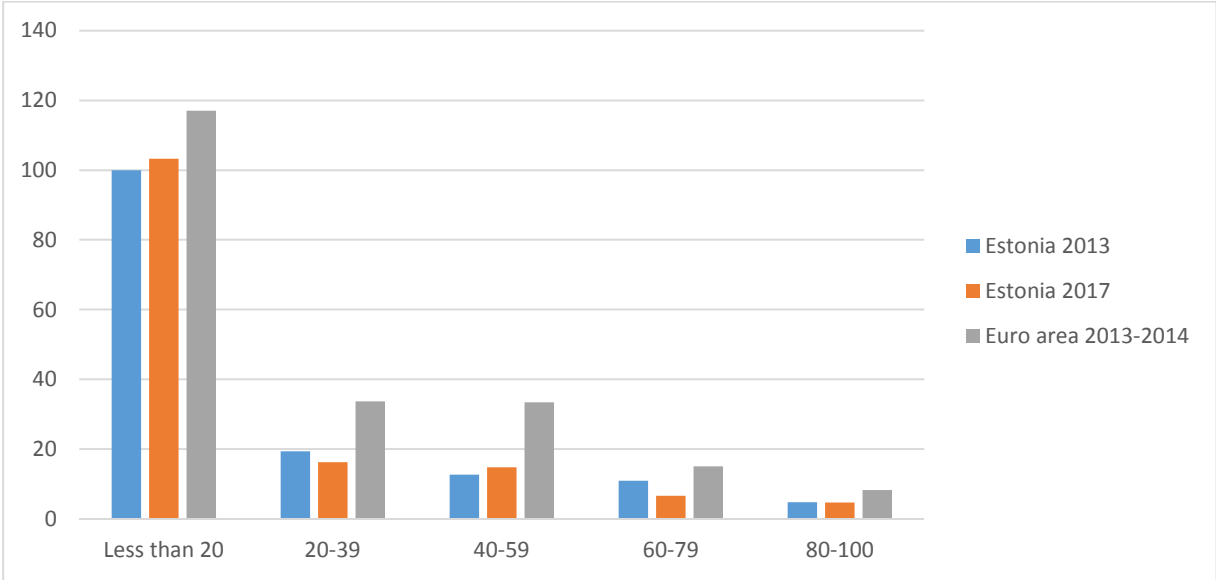


Figure 21. Debt-to-asset ratio across net wealth quintiles

Notes: The figure presents the median debt-to-asset ratios (in %) across quintiles of net wealth, estimated for indebted households only.



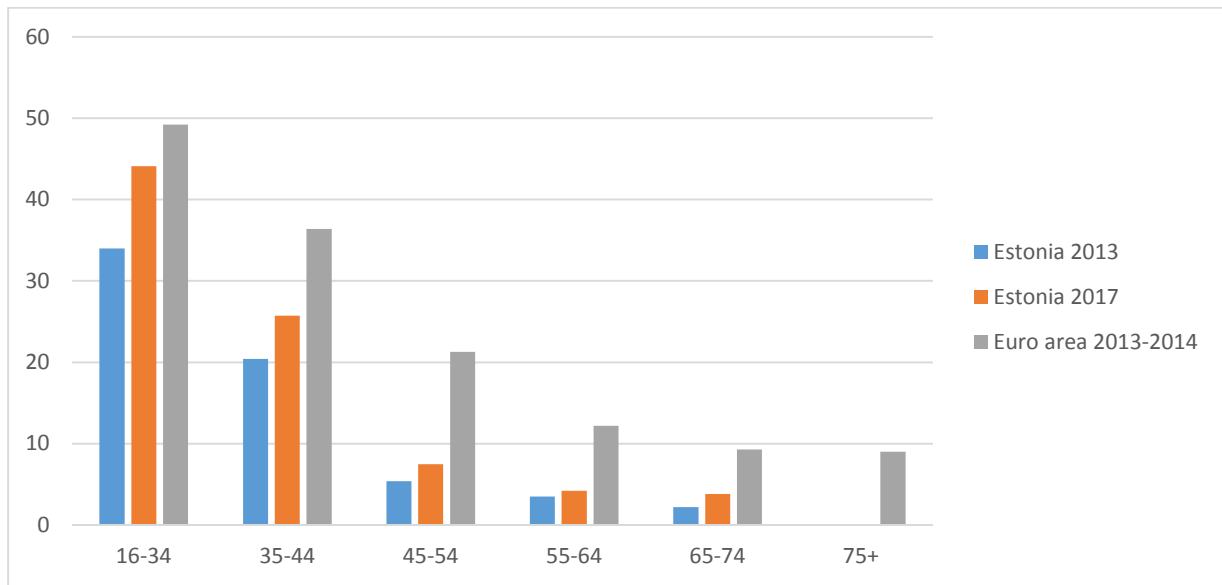


Figure 22. Debt-to-asset ratio across age groups

Notes: The figure presents the median debt-to-asset ratios (in %) across age groups, estimated for indebted households only. The debt-to-asset ratios for the 75+ age group for Estonia are missing because there were not enough observations to provide these estimates.

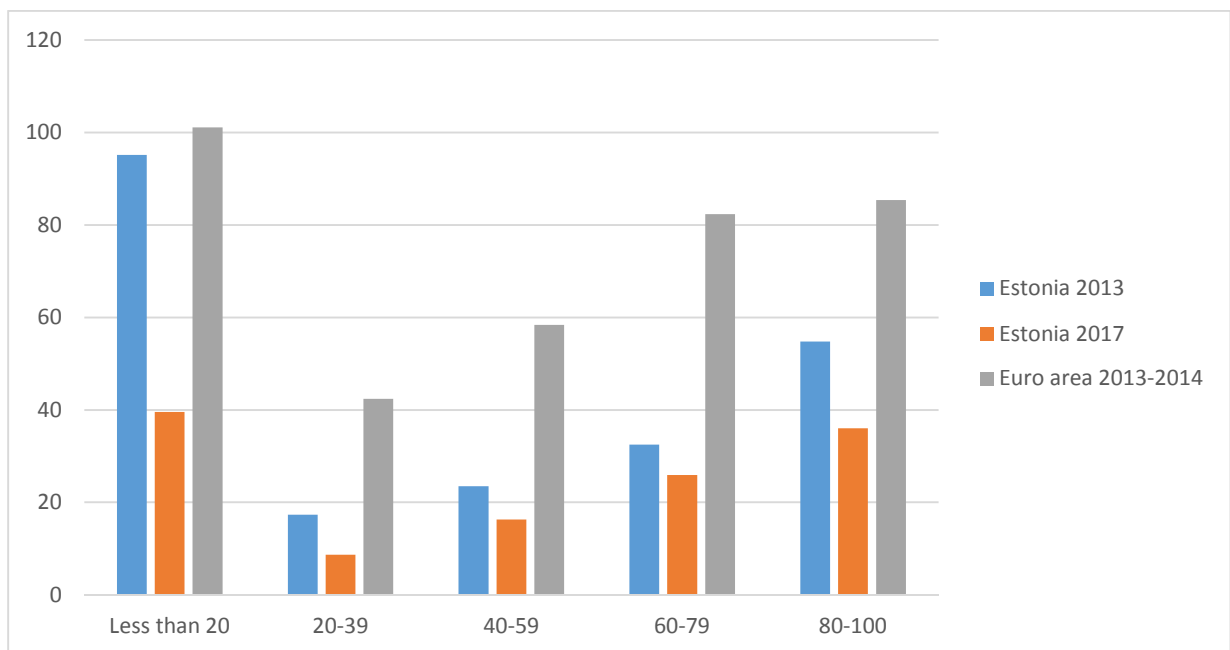


Figure 23. Debt-to-income ratio across income quintiles

Notes: The figure presents the median debt-to-income ratios (in %) across quintiles of income, estimated for indebted households only.

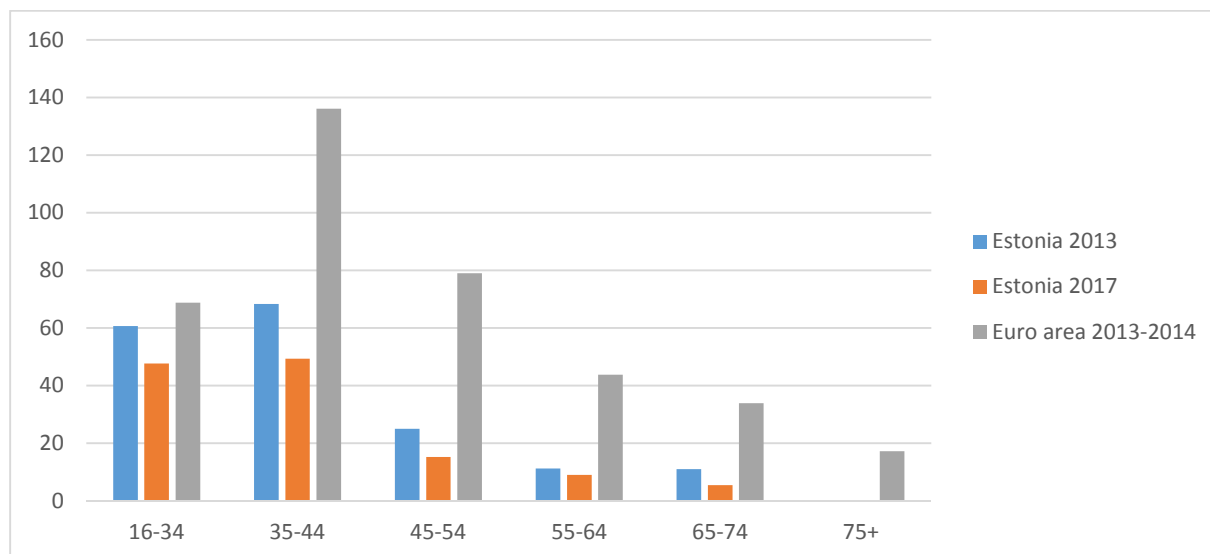


Figure 24. Debt-to-income ratio across age groups

Notes: The figure presents the median debt-to-income ratios (in %) across age groups, estimated for indebted households only. The debt-to-income ratios for the 75+ age group for Estonia are missing because there were not enough observations to provide these estimates.

The last column of Table 11 presents the ratios of net liquid assets to income. These ratios measure the level of liquid assets, from which non-collateralised liabilities are deducted, divided by the value of gross annual income. The median value of the net-liquid-assets-to-income ratio was 8.7% in Estonia in 2013 and it had declined to 7.9% by 2017. These figures are provided relative to gross income and they correspond to roughly 15% and 13% relative to net income. To express this in monthly terms, the median Estonian household had net liquid assets worth approximately 1.7 months of net income in 2013 and 1.6 months of net income in 2017. This shows that Estonian households have small financial buffers, especially given that the safety net in the form of unemployment benefits or disability payments is relatively modest in Estonia compared to western European standards. The median euro area household has almost twice as much in liquid assets relative to income as an Estonian household has.

Looking at the net-liquid-asset-to-income ratios across age groups shows that liquidity buffers increase with age (see Figure 25). However, they do not peak for the pre-retirement age group as would be expected from the life-cycle theory of consumption. Rather, they increase monotonically until the oldest age group. The differences in this ratio across age groups are stronger in Estonia than in the euro area. In Estonia, younger households (those who belong to 16–34 and 35–44 age groups) have almost no net liquid assets at the median level. The ratio of net liquid assets to income is significantly above the euro area level for the 75+ age group.

The net-liquid-assets-to-income ratios exhibit very different patterns over income in Estonia and in the euro area (see Figure 26). While this ratio increases with income in the euro area, as might be expected, in Estonia it initially declines with income and starts rising only from the fourth quintile (2013 survey) or from the third quintile (2017 survey). This

surprising pattern could be explained by the age profile of this ratio. In Estonia pensioners are relatively poor, so that the households where the reference person is retired tend to be in the lower two income quintiles. At the same time, the liquid savings of people who have reached retirement are substantially higher relative to their income than are the savings of the younger cohorts (see Figure 25). These two features in combination contribute to the pattern of the net-liquid-assets-to-income ratio presented in Figure 26 for Estonia.

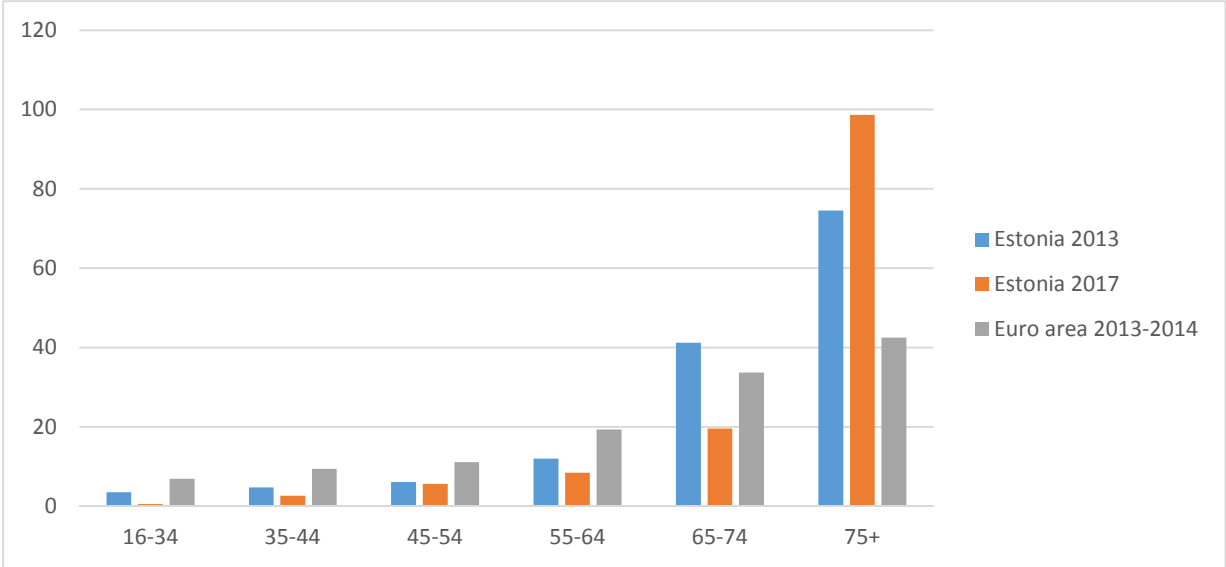


Figure 25. Net-liquid-assets-to-income ratio across age groups

Notes: The figure presents the median net-liquid-assets-to-income ratios (%) across age groups.

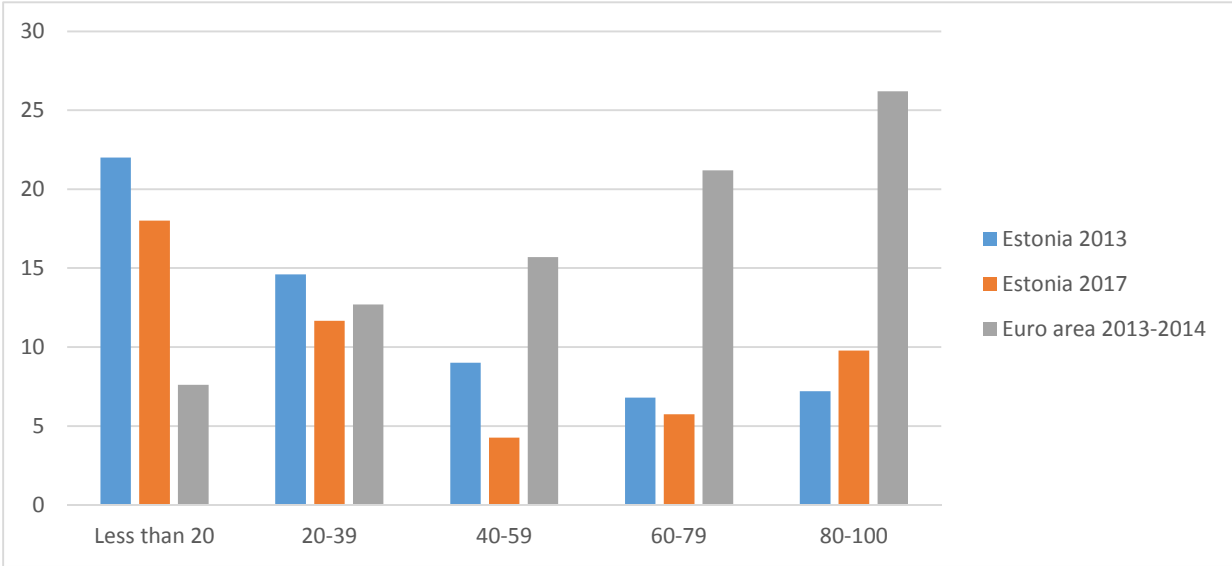


Figure 26. Net-liquid-assets-to-income ratio across income quintiles

Notes: The figure presents the median net-liquid-assets-to-income ratios (%) across quintiles of income.

## 7. Credit constraints

Households can be divided into two groups on the basis of their ability to borrow. The first group consists of households that can borrow and smooth consumption, while the second group is formed of credit-constrained households. The demand for consumption goods reacts differently to economic shocks for these two groups. The share of credit-constrained households is relevant for the efficiency of monetary policy.

In this section we examine the extent to which households are credit-constrained. This measure is based on the households' own perception of whether they faced borrowing constraints during the previous three years. Table 12 provides statistics on credit-constrained households. First, it shows the share of households that had applied for credit within the previous three years. This share can be interpreted as a measure of credit demand. Second, it shows the proportion of households that did not apply for credit because they believed that they would not get it. The third column of Table 12 gives the share of households among those who applied for credit that were refused credit by one or more suppliers. This illustrates the credit supply<sup>4</sup>. The last column presents the share of credit-constrained households, which is calculated by adding up the share of households who did not apply for credit due to a perceived credit constraint and the share of households who were refused credit or got a reduced amount of credit among the total population of households.

The share of credit-constrained households in Estonia in 2013 was somewhat lower than the euro area average, 6.8% and 8.0%, respectively. The share of households facing borrowing constraints increased in Estonia between the two survey waves and reached 7.7% by 2017. This increase was mainly caused by stronger demand for credit, as the share of households that applied for credit increased from 19% to 26% between 2013 and 2017. It was also caused by a modest deterioration in the credit supply, as the share of households who were declined a loan increased during this time period from 7% to 8%.

Table 12. The share of credit-constrained households (%)

	<b>Applied for credit within the previous three years</b>	<b>Not applying for credit due to perceived credit constraint</b>	<b>Refused or only reduced credit (among those applying in the previous three years)</b>	<b>Credit-constrained household</b>
Estonia 2013	18.8	5.5	6.9	6.8
Estonia 2017	25.6	5.6	8.1	7.7
Euro area 2013–2014	18.6	6.4	8.6	8.0

<sup>4</sup> Our measure of credit supply differs somewhat from the measure used in the ECB reports on the HFCS data. According to our categorization, households were refused to obtain credit when they got a refusal at all times when they applied for credit. In the ECB reports, households were classified into this category when they were at least once refused to obtain credit. Our measure allows to derive the percentage of credit constrained households as the sum of those not applying due to perceived constraints and those who applied and were refused to obtain credit.

Figure 28 provides statistics on the share of households that applied for credit within the three years prior to the survey across age groups. The first takeaway from this figure is that the increase in credit demand between 2013 and 2017 was the largest for younger cohorts in Estonia. The share of households that applied for credit increased from 34% to 48% for 16–34 age group and from 30% to 40% for 35–44 age group, i.e. almost half of the households belonging to these age groups demanded credit during the three-year period before 2017. The shares reached in 2017 exceeded significantly the euro area shares for the same age groups (28% and 27%, accordingly). Credit demand also grew for older cohorts, up to the age group of 75+, but to a lesser extent.

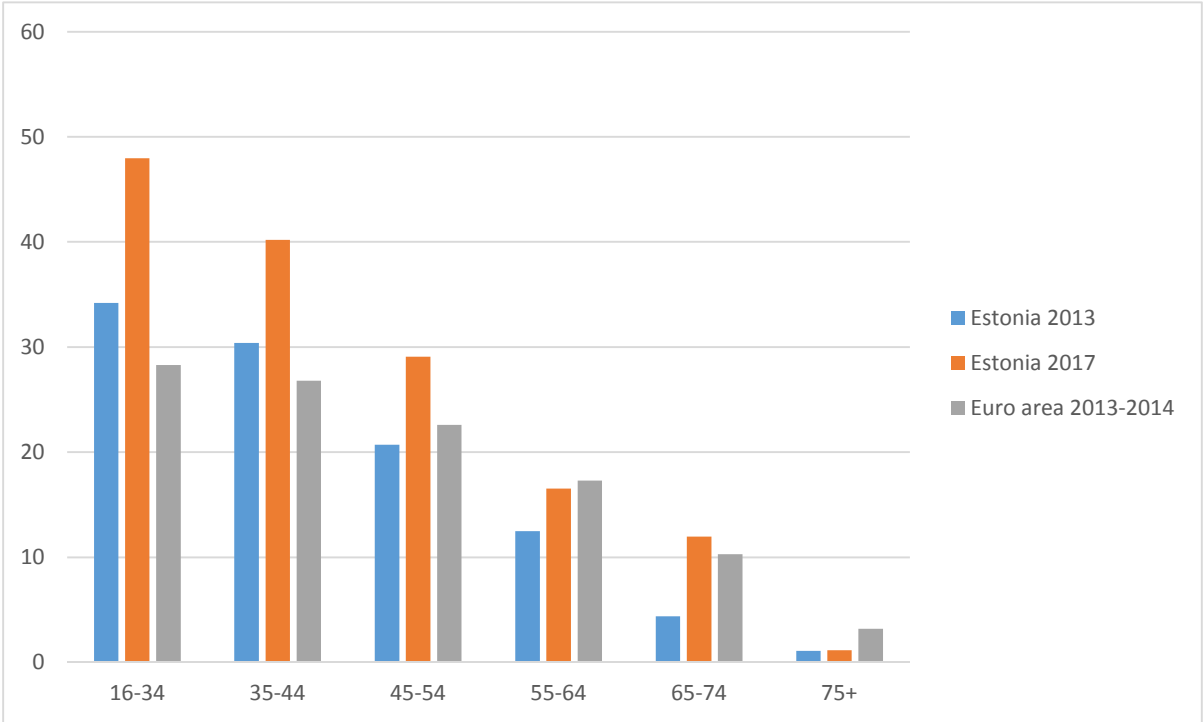


Figure 28. The share of households that applied for credit within the previous three years, %

Figure 29 presents the shares of credit-constrained households across the countries that participated in the second wave of the HFCS. This share was largest in Ireland, followed by Slovenia and Spain. It was the lowest in Malta, Austria and Belgium. The Estonian level of credit-constrained households was below the euro area average.

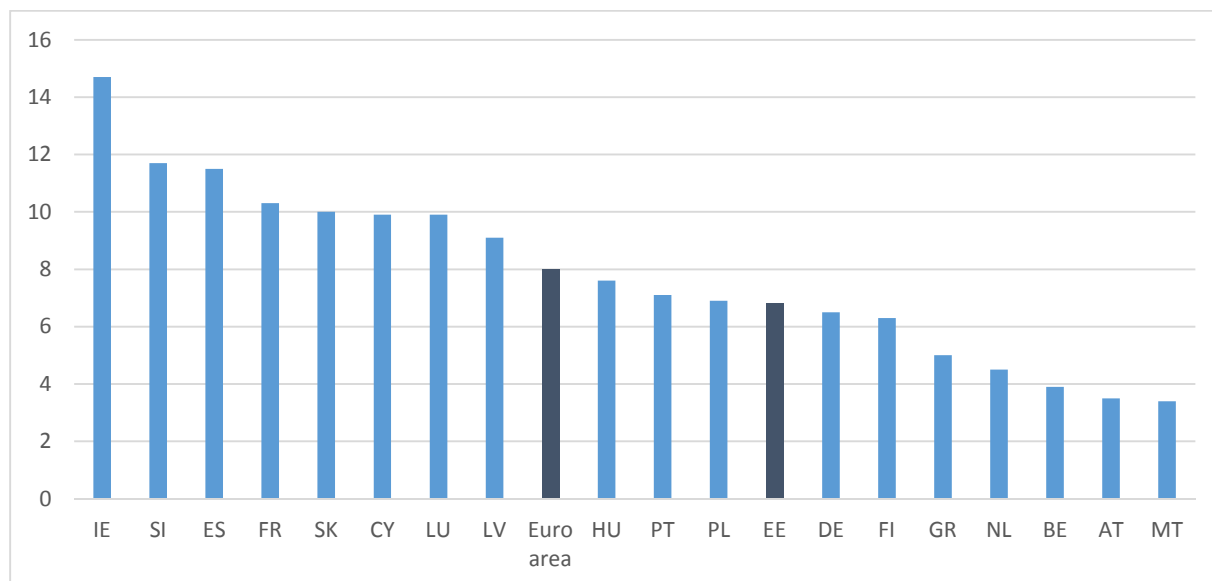


Figure 29. The share of credit-constrained households (in %), HFCS second wave

Table 13 presents statistics on credit constraints across various household characteristics on the basis of the Estonian survey data for the 2017 wave. A few notable features are evident from this table. First, renters appear to face stronger credit constraints than home-owners do. Second, the share of households who were refused credit was strongly dependent on income – it was considerably higher among the households in the two lowest income quintiles than among the more affluent households. Third, credit demand was also dependent on income, but in this case the relationship was reversed – households with higher incomes were much more likely to apply for credit than households in the lower income quintiles were. Fourth, credit demand was strongly dependent on the age of the household reference person. Younger people were much more likely to apply for credit than people in the older age cohorts were. Finally, education played a role in getting loans. Credit rationing or credit refusal was negatively related to the level of education, while credit demand was positively related to it.

Table 13. The share of credit-constrained households (%) across various characteristics, Estonia 2017

	<b>Applied for credit within the previous three years</b>	<b>Not applying for credit due to perceived credit constraint</b>	<b>Refused or only reduced credit (among those applying in the previous three years)</b>	<b>Credit-constrained household</b>
<b>All Households</b>	25.6	5.6	8.1	7.7
<b>Housing status</b>				
Owner-Outright	17.0	3.9	6.3	5.0
Owner-with Mortgage	55.4	7.4	5.3	10.4
Renter or Other	23.7	8.4	15.9	12.1
<b>Percentile of Income</b>				
Less than 20	7.2	1.0	42.8	4.0
20–39	10.4	5.0	18.2	6.9
40–59	29.2	7.5	7.9	9.8
60–79	33.9	8.9	3.8	10.2
80–100	47.4	5.7	3.8	7.6
<b>Age of Reference Person</b>				
16–34	47.7	10.4	9.0	14.7
35–44	39.9	9.0	8.6	12.5
45–54	28.8	6.5	6.7	8.5
55–64	16.6	4.4	5.6	5.3
65–74	12.0	0.6	8.6	1.6
75+	1.1	0.7	25.1	1.0
<b>Work Status of Reference Person</b>				
Employee	35.7	7.6	8.1	10.4
Self-Employed	31.2	6.6	4.7	8.1
Retired	5.4	0.6	10.0	1.2
Other Not Working	13.2	7.1	11.4	8.6
<b>Education of Reference Person</b>				
Primary or No Education	15.9	5.9	9.0	7.3
Secondary	25.3	6.8	8.6	8.9
Tertiary	29.8	4.1	7.4	6.3

Notes: Please see the notes for Table 1.

## 8. Hand-to-mouth households: who are they and what do they imply for monetary policy?

Hand-to-mouth households have recently become topical in the discussions of policy-makers and academics. These are the households that consume all their income every month without accumulating any savings. Bank of Estonia has pointed out that despite the steady increase in aggregate deposits in Estonia (deposits have more than doubled since the great recession, see Bank of Estonia statistics table 3.5.1), as many as one fifth of households do not have any substantial deposits, i.e. they have less than 100 EUR on their bank account (Kattai (2019)). As was discussed in Section 6 of the current article, the liquidity buffers of Estonian households are smaller than those in the euro area and there are more high-income households that have little liquidity in Estonia. Policymakers have expressed concerns that hand-to-mouth households are not ready for a crisis, should one occur.

While the concept of hand-to-mouth households is in itself nothing new, it entered the academic debate after the seminal papers by Kaplan and Violante (2014) and Kaplan et al. (2014). The article by Kaplan et al. (2014) pointed out that the majority of these households are not poor, but rather that they are wealthy and often have substantial amounts of illiquid assets such as real estate and pension funds. The fraction of hand-to-mouth households is around one third in developed countries (Kaplan et al. (2014), Park (2017)) and lower in some middle income countries such as China (Cui and Feng (2017)). The majority of this group are wealthy hand-to-mouth households, which make up roughly 60-90% of the total. These households share many similarities with other wealthy households, but unlike their wealthy peers and like poor hand-to-mouth households, they have high marginal propensity to consume (Kaplan et al. (2014)). This has important implications for transitory fiscal shocks and for the transmission of monetary policy shocks. Countries with a high share of hand-to-mouth households have a stronger reaction to fiscal shocks (Kaplan and Violante (2014)) and monetary policy shocks (Cloyne et al. (2019)).

This section aims to shed light on hand-to-mouth households in Estonia, and more particularly on how many of them there are, who they are, and what the implications for monetary policy are. First, comparative evidence is given about the share of hand-to-mouth households over time and relative to the euro area in Estonia. A tighter focus is taken on Estonia – the age, income, labour market status, education and household size profile of hand-to-mouth households are studied. Second, given the recent academic literature on hand-to-mouth households, their emergence and implications for monetary policy are discussed. We use the HFCS data from 2013 and 2017 and the second wave HFCS data for the euro area to analyse the patterns in relation to hand-to-mouth households.

Table 14 summarises the share of hand-to-mouth households in Estonia in 2013 and 2017 and in the euro area. Our definition of hand-to-mouth households follows Kaplan et al. (2014) and considers households as hand-to-mouth if their accumulated net liquid assets make up less than half of their monthly income<sup>5</sup>. The definition of net liquid assets is the sum of

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<sup>5</sup> The baseline definition in Kaplan et al. (2014) proceeds from bimonthly payment frequency and defines households as hand-to-mouth if their liquid assets are less than half of their bimonthly income. They also show



deposits, cash, mutual funds, and directly owned bonds and stocks, minus the sum of credit line/overdraft and credit card debt. The definition of net illiquid assets is the sum of real estate and voluntary pension funds, minus the sum of loans collateralised with real estate. Income is defined as the sum of employee and self-employment income, and income from pensions and from regular public and private transfers. The definitions of net liquid assets and income differ somewhat from the HFCS baseline definitions used in previous sections, and we follow Kaplan et al. (2014) as closely as possible to ensure better comparability of our analysis with their study.

There are alternative ways of detecting households that are short of liquid assets. The HFCS has a question where households can state whether their regular expenses were higher than, lower than, or about the same as their income during the past year. Besides looking at the share of hand-to-mouth households as defined above, we also estimate the percentage of households who stated that their expenses exceeded income. An alternative way to get this estimate is to calculate the share of households whose average expenditures on non-durable goods exceeded their average monthly income.

The estimated shares of hand-to-mouth households are presented in Table 14. These estimates imply that the fraction of hand-to-mouth households in Estonia was similar to that in the euro area, (35% vs 41% according to second wave HFCS). The slightly lower share in Estonia can be explained by cash holdings that are taken as part of liquid assets in Estonia (like in the original definition by Kaplan et al. (2014)), but which are not available in the euro area data. The estimated shares of households for which expenditures on non-durable goods exceeded income were very similar in Estonia and in the euro area, and the fractions of households who state that their expenses exceeded income were also similar in magnitude. We conclude from the estimations presented in Table 14 that the share of hand-to-mouth households has been stable over time in Estonia and is at a similar level to the euro area average.

Table 14. The fraction of hand-to-mouth households in Estonia and in the euro area

	<b>Estonia 2013</b>	<b>Estonia 2017</b>	<b>Euro area 2014</b>
Less liquid assets than half of monthly income, hand-to-mouth	0.348	0.357	0.410
... poor hand-to-mouth households	0.085	0.096	0.104
... wealthy hand-to-mouth households without a mortgage	0.180	0.174	0.210
... wealthy hand-to-mouth households with a mortgage	0.084	0.087	0.096
Expenses exceeded income in the past 12 months	0.146	0.075	0.110
Expenses about the same as income in the past 12 months	0.637	0.622	0.629
Expenditures on consumer goods and durables larger than income	0.158	0.160	0.159

Note: The baseline estimates for Estonia also cover cash as part of liquid assets, which is not covered in the euro area data. If we exclude cash from the Estonian data, the share of hand-to-mouth households would increase to a similar level to that of the euro-area.

results for the monthly payment frequency, which gives a higher share of hand-to-mouth households as it sets the threshold of liquid assets higher.

Table 14 splits the hand-to-mouth households into three groups: the poor, the wealthy without a mortgage, and the wealthy with a mortgage. The poor hand-to-mouth households are defined as hand-to-mouth households without illiquid assets (real estate or voluntary pension assets) and the wealthy ones as hand-to-mouth households with illiquid assets. Wealthy hand-to-mouth households (Almgren et al. (2019)) and those with a mortgage (Cloyne et al. (2019)) matter the most for monetary policy transmission. Like in other countries, the majority of hand-to-mouth households are wealthy in Estonia. About three quarters of households are wealthy hand-to-mouth, and this is similar to their fraction in the euro area. Roughly 8–9% of households are wealthy hand-to-mouth with a mortgage.

Figure 30 presents the distribution of hand-to-mouth households over age and Figures 31–34 over income, labour market status, education and household size. The patterns are similar to those found for the US (Kaplan et al. (2014)). Wealthy hand-to-mouth households without a mortgage are similar to the non-hand-to-mouth households in their labour market status and household size, but have slightly lower income and less education. The distribution of hand-to-mouth households with a mortgage across age has steep curvature and their frequency peaks for age groups at between 30 and 44. They have the highest income of all the groups studied, are the most economically active, have the largest families, and have the same educational distribution as non-hand-to-mouth households. Poor hand-to-mouth households are concentrated in young age groups and there is stable low proportion of these households starting from the age of 40. They stand out as the group with the lowest income, the lowest economic activity, the lowest level of education, and the smallest households.



Figure 30. Fraction of hand-to-mouth households by age groups, 2013 and 2017

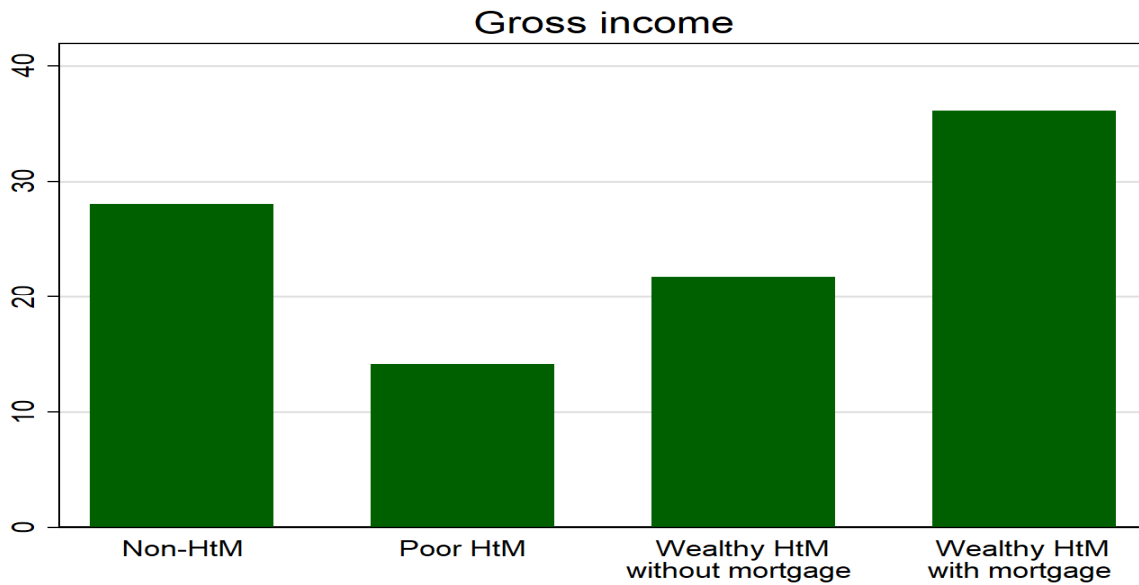


Figure 31. Income levels across subgroups of hand-to-mouth (HtM) and non-hand-to-mouth households, 2013 and 2017

Notes: Gross income refers to total yearly gross income including social taxes in thousands of euros and in the prices of 2017. Labour market status and education refer to those of the reference person.

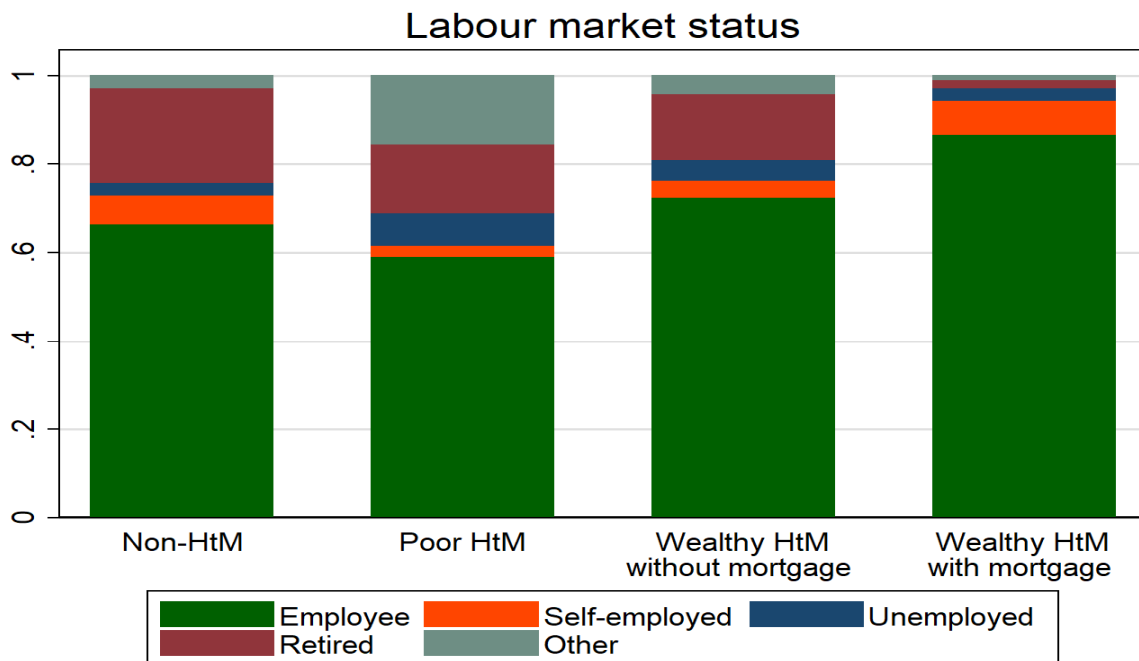


Figure 32. Labour market status across subgroups of hand-to-mouth (HtM) and non-hand-to-mouth households, 2013 and 2017

Note: Labour market status refers to the status of the reference person.

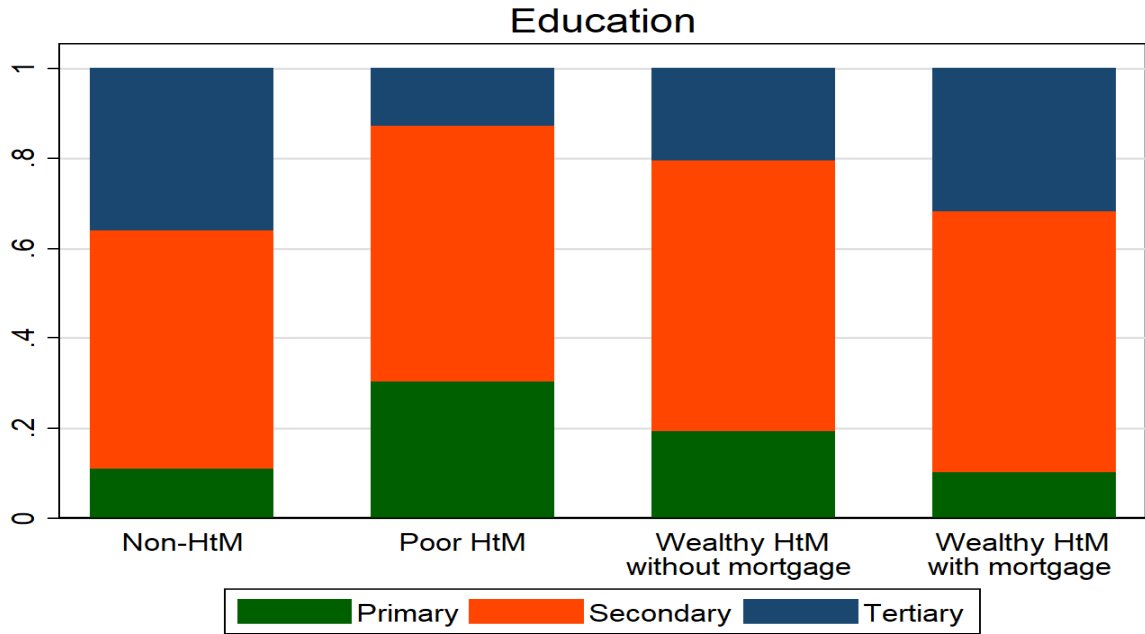


Figure 33. Education across subgroups of hand-to-mouth (HtM) and non-hand-to-mouth households, 2013 and 2017

Note: Education refers to the education of reference person.

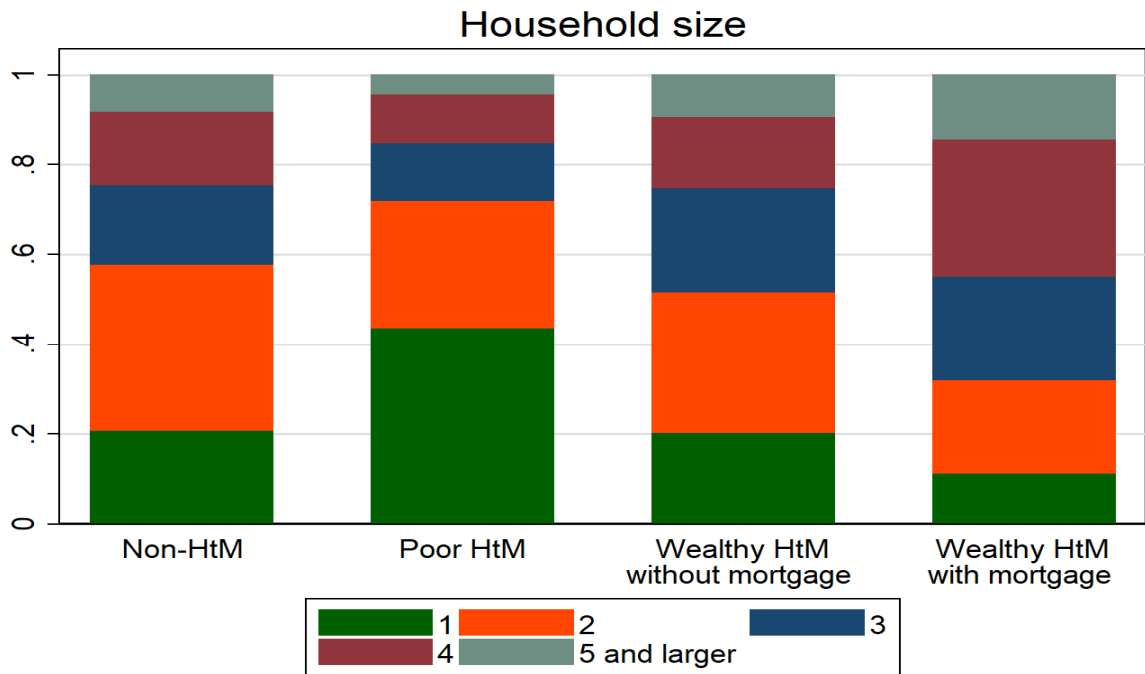


Figure 34. Household size across subgroups of hand-to-mouth (HtM) and non-hand-to-mouth households, 2013 and 2017

The study by Kaplan et al. (2014) showed that the status of being a hand-to-mouth household is quite persistent over time and more so for the poor hand-to-mouth than for the wealthy. We replicate this exercise on Estonian data using the panel of households between 2013 and 2017, and Figure 35 presents the results. The surprising difference from the US data is that while the status of being a poor hand-to-mouth household is more persistent in the US than the status of being a wealthy hand-to-mouth household, with a difference of roughly 10 percentage points in the probability of this status being maintained over time, it is the other way round in Estonia. As many as 60% of the wealthy hand-to-mouth have the same status after four years in Estonia, while 46% had the same status over two years in US. The status of wealthy hand-to-mouth households tends to be quite persistent over time in Estonia, meaning it is the same group of households over the years, or a largely overlapping group, that are consuming all their income without accumulating any savings, rather than this being something that occasionally happens among a larger group of households. This is different for poor hand-to-mouth households, where there are large differences between the young and old, and the probability of retaining this status increases with age from 30–40% to 80%. The young are frequently without illiquid wealth and savings but can exit the status of hand-to-mouth quickly, while the old rarely have the status of hand-to-mouth, but are persistently trapped in it when they do.

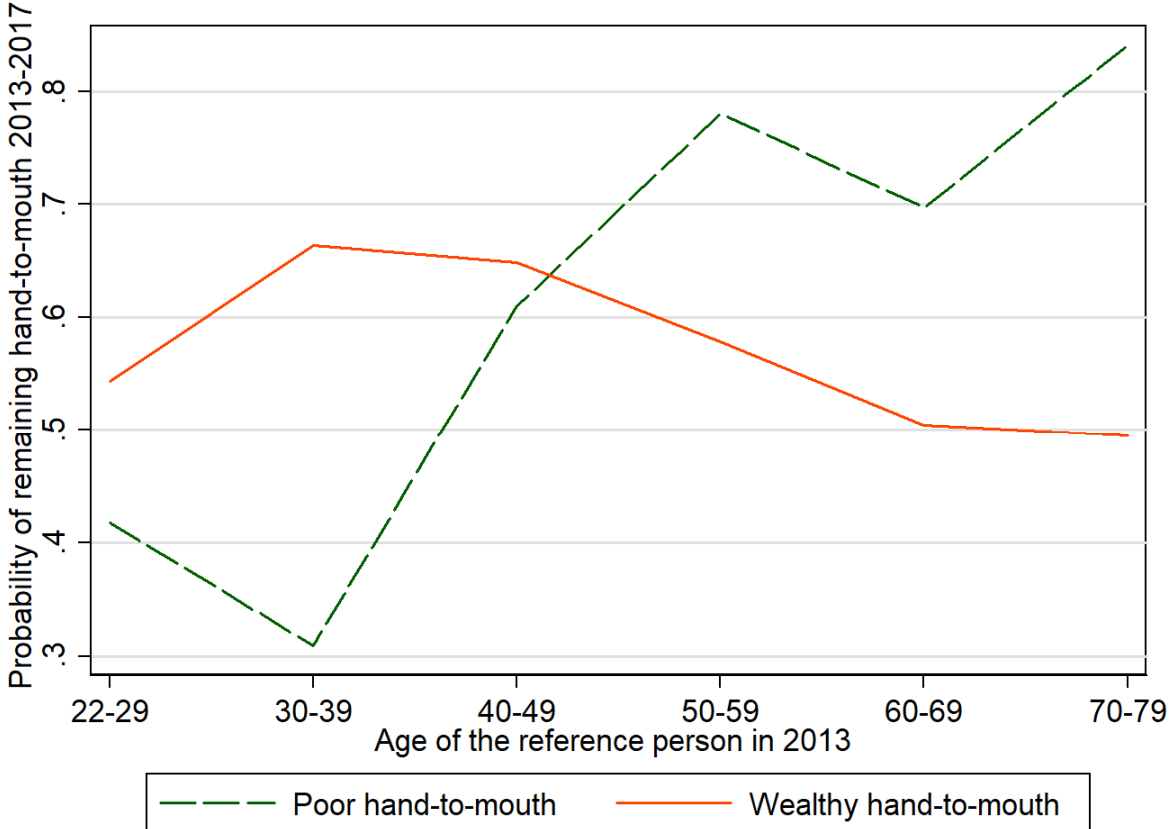


Figure 35. Probability of households remaining with the status of hand-to-mouth over time by age groups, 2013 and 2017

Unfortunately, there is no way to estimate the marginal propensity to consume from the Estonian HFCS data, as the panel is too short for this exercise and there is no hypothetical question about consumption out of windfall gains. However, there is information on liquidity constraints, credit constraints and the loan burden in the Estonian HFCS. Table 15 presents liquidity and credit constraints together with descriptive statistics for the debt burden. The HFCS contains a question about whether it is possible to get 5000 euros of financial assistance from friends or relatives outside the household. Households who answer “no” to this question are considered to be liquidity-constrained. Only 14% of households who are poor hand-to-mouth and 16% of the wealthy hand-to-mouth households without a mortgage can get this assistance. There are many fewer liquidity constrained households among non-hand-to-mouth households and wealthy hand-to-mouth households with a mortgage. It may be expected that households with liquidity constraints have a higher marginal propensity to consume and react more strongly to transitory income shocks. These results show how important it is to distinguish between hand-to-mouth mortgagors and non-mortgagors.

The share of credit-constrained households is substantially higher among hand-to-mouth households than among non-hand-to-mouth households, but it does not vary much across subgroups of hand-to-mouth households. The higher prevalence of credit constraints among hand-to-mouth households is an additional reason for expecting that these households have a higher marginal propensity to consume. The mortgage-related debt servicing and loan-to-value ratios are similar for non-hand-to-mouth mortgagors and hand-to-mouth mortgagors, while the overall debt burden from consumer loans is substantially higher for hand-to-mouth mortgagors. It seems that hand-to-mouth households with a mortgage are different from the rest of the hand-to-mouth households, as they have the highest income and are economically the most active, but they also have a strong preference for consumption that makes them frequent users of consumer loans and incapable of accumulating savings.

Table 15. Liquidity constraints and the debt burden of hand-to-mouth households, 2013 and 2017

	<b>Non-HtM</b>	<b>Poor HtM</b>	<b>Wealthy HtM without mortgage</b>	<b>Wealthy HtM with mortgage</b>
Not able to get 5000 EUR financial assistance	0.686	0.865	0.836	0.654
Credit-constrained	0.049	0.127	0.125	0.142
Median mortgage-debt-service-to-income ratio	0.090	NA	NA	0.090
Median debt-service-to-income ratio	0.071	0.037	0.022	0.120
Median loan-to-value ratio of the main residence	0.422	NA	NA	0.399

Notes: Debt service-to-income ratios are based on gross income including social taxes; the debt servicing ratios based on net income are close to twice as high.

What does the prevalence of hand-to-mouth households imply for monetary policy? The model of Kaplan and Violante (2014) introduced an important modification to household models by replacing the conventional one-asset model with a model with two assets, one liquid and one illiquid. Households have an incentive to invest in illiquid assets because these assets have higher returns than liquid assets. The illiquid assets, unlike the liquid ones, have transaction costs such as from selling a house or liquidating a pension fund, and this makes households reluctant to sell these assets in response to small negative shocks. As a result, it is rational to invest in illiquid assets and not to accumulate any liquid assets. The model offers a nice theoretical framework for understanding why households choose this status of being wealthy but not having any liquidity buffers. There have also been alternative explanations for why households become wealthy hand-to-mouth, for example that households invest in illiquid wealth as a measure of self-control, to prevent themselves from overconsuming (see the discussion in the paper by Kaplan et al. (2014)). The main implication for these households is that as they have a high marginal propensity to consume, they react strongly to transitory income changes coming from fiscal stimulus (Kaplan and Violante (2014)) or to expansionary monetary policy (Kaplan et al. (2018) and Cloyne et al. (2019)). This model helps explain the large heterogeneity in the marginal propensity to consume over households and the high aggregate marginal propensity to consume observed in the data.

Kaplan et al. (2018) suggest another model that incorporates their two-asset household model in the traditional New Keynesian model used for analysing monetary policy. An important result from this model is that most of the reaction to monetary policy comes from the general equilibrium effect of increased income and not from the direct effect of reallocating consumption intertemporally because of a change in the interest rate. This result is driven by the wealthy hand-to-mouth households, whose consumption reacts to income shocks but not to interest rate changes. Cloyne et al. (2019) highlight the importance of mortgagors in the transmission of monetary policy empirically and support the findings of Kaplan et al. (2018). They show that all types of household have their income increased by an interest rate cut, but mortgagors' consumption reacts much more strongly to the shock than does that of other households. They demonstrate that most of this consumption by mortgagors is a result of their higher marginal propensity to consume out of additional income rather than the direct windfall gains from lower interest rates. Their results point to the importance for monetary policy transmission of the consumption pattern of wealthy hand-to-mouth households, rather than to the direct interest rate channel of mortgagors.

The results of Cloyne et al. (2019) also imply that whether a country has adjustable or fixed rate mortgages is less important for monetary transmission than the prevalence of mortgagors with a high marginal propensity to consume. The windfall gains from the reduced interest rates are just so much smaller than the income gains from the general equilibrium effect. They use US and UK data and show that even though the UK has a much larger fraction of mortgages with adjustable interest rates, a strong reaction by consumption to a monetary policy shock was similarly prevalent among mortgagors in the UK and in the US. However, they also discuss that these results hold for temporary shocks and that the reaction to persistent shocks may be different. This is also in line with the model of Kaplan and Violante (2014) for fiscal stimulus, in which wealthy hand-to-mouth households react much

less to stimulus if the income shock is severe. In that case they might be willing to pay the transaction costs to liquidate some of their illiquid assets and to smooth the income shock.

These results shed light on monetary policy transmission in Estonia as well. As Estonia has one of the highest shares of mortgages with adjustable interest rates in the euro area, the monetary policy pass-through is relatively strong in Estonia (see e.g. Meriküll and Rõõm (2017)). The recent literature emphasises the general equilibrium effect of monetary policy, i.e. the importance of changes in economic activity and investments that lead to changes in income and consumption. This implies that the large fraction of households with a high marginal propensity to consume matters more for monetary policy than the large fraction of mortgages with adjustable interest rates does. The empirical estimates on the euro area show that countries where there are larger fractions of wealthy hand-to-mouth households, who have a high marginal propensity to consume, have a stronger reaction to monetary policy (Almgren et al. (2019)). Estonia is among the countries where there are relatively more wealthy hand-to-mouth households and where there is a relatively stronger reaction to monetary policy. So in addition to the concerns of policymakers that hand-to-mouth households cannot service their debts during a crisis and so threaten financial stability, they are also more likely to cut their consumption and contribute to recoveries being sluggish (see also Kukk (2016)).

## **9. What to expect from future pensions?**

Reforming pension systems has been a policy focus in many developed countries of late. Increasing life expectancy and declining birth rates have forced many countries to start increasing the retirement age and increasing private contributions to pensions (OECD (2017)). Estonia is no exception in this, as it has switched from the pay-as-you-go system of the 1990s to a combination of pay-as-you-go with a mandatory system based on defined contributions in more recent decades. Discussions about the design of pension systems are still lively in Estonia and have now reversed towards abolishing the mandatory defined contribution part.

This section uses the HFCS data on pension expectations to look at what Estonians think about the replacement rate, i.e. their expected pension compared to their last wage, and about when they plan to retire. We also perform quantitative analysis of the possible impact of making the mandatory defined contribution part of the pension system voluntary. The analysis in this section is done at the individual level, and not at the household level used in previous sections. This also means that it is based on the register data instead of the survey data for variables such as assets, liabilities and net wealth, as otherwise it would not be possible to disentangle the wealth between the household members (see Meriküll and Rõõm (2017) for a comparison of estimates based on register and survey data).

### **9.1 Expectations about retirement**

Studies of the Estonian pension system have shown that while there is currently very low inequality in pension income, it will increase in the future after all the pension reforms have been introduced (Piirots and Võrk (2019)). The reason for increased inequality is that a larger proportion of pensions will depend on individual contributions or individual wages. The



simulations also show that the average replacement rate will increase slightly in the future. The average net replacement rate was 43% in 2014 (Piirits and Vörk (2019)) but it is expected to be 48% for people retiring in 2045 (Piirits and Vörk (2019)) and 57% for people retiring in 2060 (OECD (2017))<sup>6</sup>. The reason for this increase is increased private savings for retirement. The generations entering the labour market in 2016 (the year of the analysis) and retiring in 2060 will contribute to the mandatory defined-contribution system throughout their working life.

Another implication of the Estonian pension reforms away from the pay-as-you-go system of the 1990s is that the heterogeneity in replacement rates will decline (Piirits and Vörk (2019)). The new system will increase the role of the private defined-contribution part and pensions will depend more heavily on lifetime wages than before. The replacement rates are higher for low wage earners and lower for high wage earners and the differences will decline over time. People retiring in 2060 should expect their pensions to be 74% of their last wage if they earn half of the average wage, 57% if they earn the average wage and 51% if they earn 1.5 times the average wage (OECD (2017)).

We assess whether the expected pension replacement rates follow these patterns proposed by analysts. People expect that their pensions will be 41% of their last employment income according to the HFCS<sup>7</sup>, and this fraction is close to the current actual replacement rate. However, as many as 22% of respondents could not give their expected replacement rates and left this question unanswered. People with higher wages should expect lower replacement rates and younger people higher replacement rates. Figure 36 plots the replacement rates over age groups and for people earning half of the average wage, the average wage and 1.5 times the average wage (following the calculations by OECD (2017)). There is no evidence that younger people expect the replacement rates to be higher or that high-wage earners expect lower replacement rates.

It is noticeable that people closer to the retirement age have more accurate expectations of the replacement rate – people with high incomes expect it to be lower and people with low incomes expect it to be higher. The youngest cohorts have the most puzzling expectations as they seem to underestimate their expected income on retirement, with average wage earners expecting a rate of 42% rather than the OECD prediction of 57%, while high wage earners expect replacement rates to be higher than low wage earners do in contradiction of the actual pension rights. In sum, it seems that with the exception of those in their 60s, who are very close to the retirement age, people have quite a poor understanding of their pension entitlements. They seem to project the current average replacement rate for themselves rather than acknowledging the variation in the replacement rate caused by their wage level and age.

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<sup>6</sup> All these calculations are based on the laws in force in 2016 and for a person working full time from the age of 20 to the statutory retirement age. These analyses are based on the regulations that were valid in 2016, so they do not take into account the increased weight of tenure and reduced weight of wages in the first pillar and the extension of the retirement age, as these were decided later.

<sup>7</sup> The question on the replacement rate does not specify whether to report the net or gross replacement rate, as the respondents are asked to report the expected percentage of final labour income that they expect to receive upon retirement. It is taken that respondents interpret it rather as the net replacement rate.

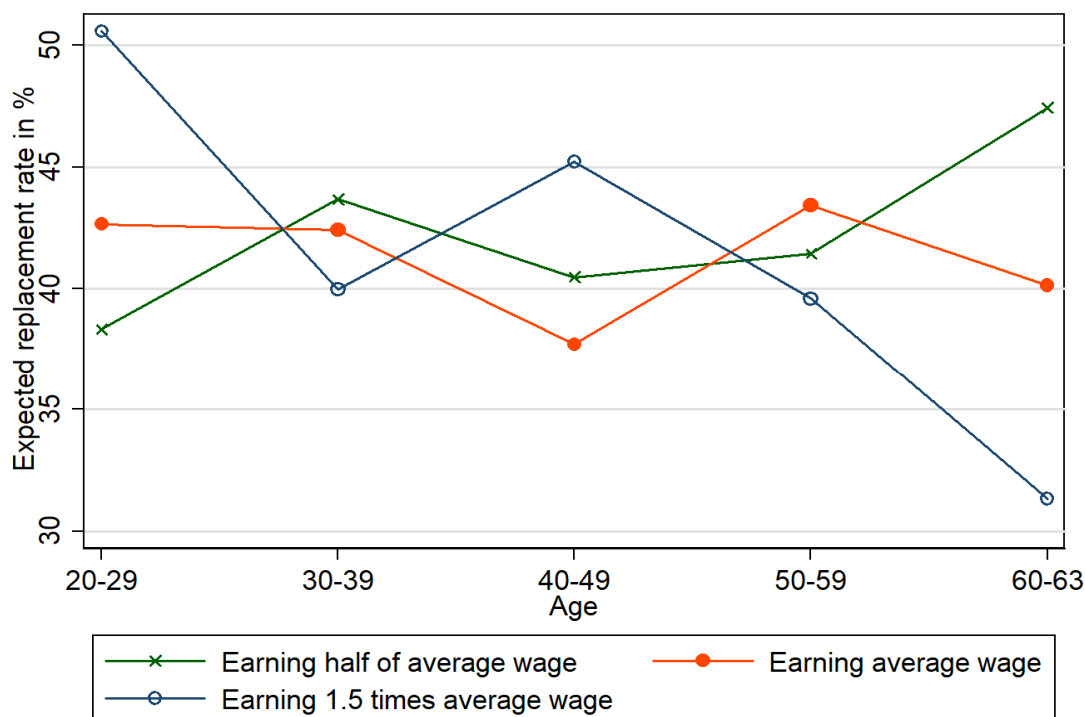


Figure 36. Expected replacement rates over age and the wage level, 2017

Notes: All wage groups also include people earning 10% under and 10% above the threshold, so the group of average wage earners includes people earning between 10% less than the average and 10% more than the average. People already retired have been excluded.

Another qualitative question in the HCFS about future pensions is what age people expect to retire at, i.e. to stop working for pay. Surprisingly, 62% of people in Estonia answer this question saying that they expect never to retire. The share of such people is very stable over age and income categories. It is highly unlikely that the majority of people are going to work throughout their lives without retiring, as it is an option for sustaining a higher level of income in retirement but is hardly feasible for everyone and forever. This response can be taken rather as a sign of the low level of trust in the statutory pension system. Additionally, 7% of people answer that they do not know when they will retire and only 31% of people give a numerical answer to the question about the age they plan to retire at. The answers about the retirement age are again intriguing, as the expected retirement age is lower for younger cohorts, despite the opposite actual trend in the age at which people start receiving the state pension, see Figure 37. The pension age is increasing from 63 to 65 between 2017 and 2026<sup>8</sup>. So a large fraction of the population plan never to stop working for pay, while among the smaller fraction of the population that plan to retire at a certain age the expected retirement age is lower for younger cohorts.

<sup>8</sup> The survey was conducted in 2017, and the option of raising the retirement age further dependent on life-expectancy was introduced in 2018.

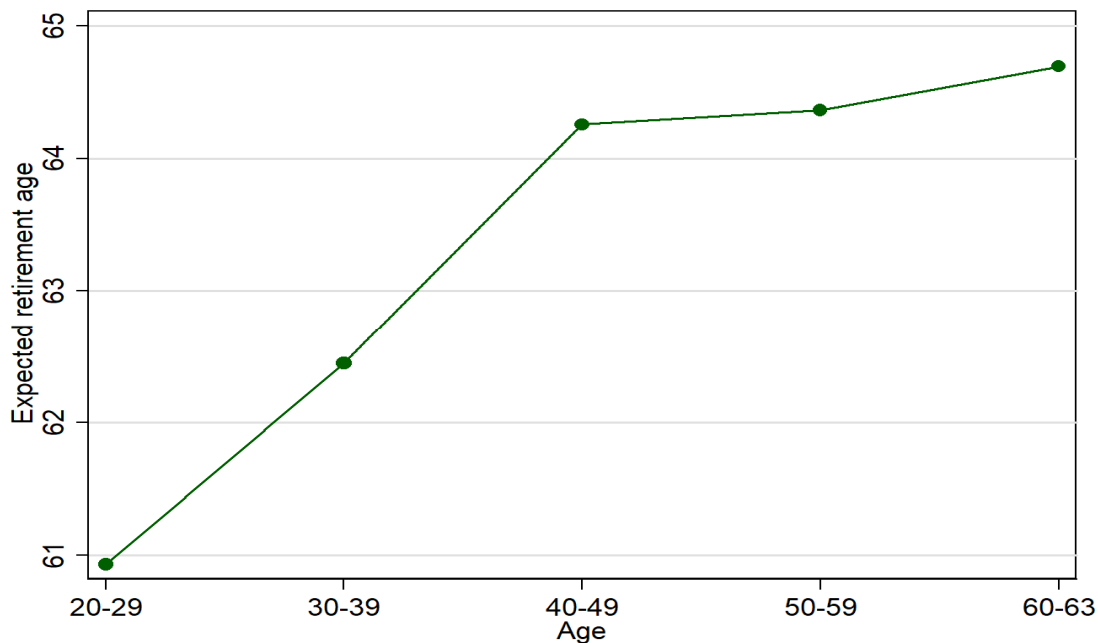


Figure 37. Expected retirement age over age groups, 2017

Notes: People who have already retired have been excluded.

The descriptive results so far have shown that people do not have a good understanding of their pension rights and have a low level of trust about their pension entitlements. In the second part of this chapter we analyse what the consequences would be of abolishing the mandatory defined contribution part of the pension system, known as the second pillar.

## 9.2 The implications of making participation in the second pillar voluntary

The current coalition government in Estonia is preparing a reform of the pension system that will make participation in the second pillar of the pension system voluntary and will allow people to withdraw their second pillar savings. The aim of this section is to analyse the possible impacts of this policy change. We consider the participation rates and accumulated savings in the second pillar pension funds and analyse which types of household are the most likely to withdraw money from their second pillar accounts. In addition, we assess whether people who do not currently have second pillar savings have compensated for that by saving more through other channels.

The importance of payments from the second pillar funds for pension income will increase over time, as it is estimated that they will make up 20% of the pensions of people born in the 1960s and 45% of the pensions of people born in the 1990s (Piirots and Võrk (2019)). This means for younger cohorts that the payments from the second pillar funds will form a substantial part of their old-age income.

The stock of investments accumulated in the second pillar increased substantially between the two waves of the HFCS. The average value of investments conditional on participation

was 2900 euros in 2013 and 5500 euros in 2017. Figure 38 shows the participation rates and the value of second pillar funds in 2017, conditional on participation. The middle age groups from 35 to 64 have the highest stocks of investments in the second pillar and also quite high participation rates. It was mandatory for people aged 34 or younger to participate in the second pillar at the time of the survey. The participation rate is close to 100% for the 25–34 age group, but it is lower for younger people of whom many have not yet started their working life. As younger cohorts have had little time to contribute to the second pillar, their investments in it are also lower than those of older cohorts. The median value of second pillar investments was 4200 euros and the mean was 5500 euros in 2017. People in the lowest quintile of second pillar assets had on average 500 euros and people in the highest quintile had 14000 euros in second pillar funds.

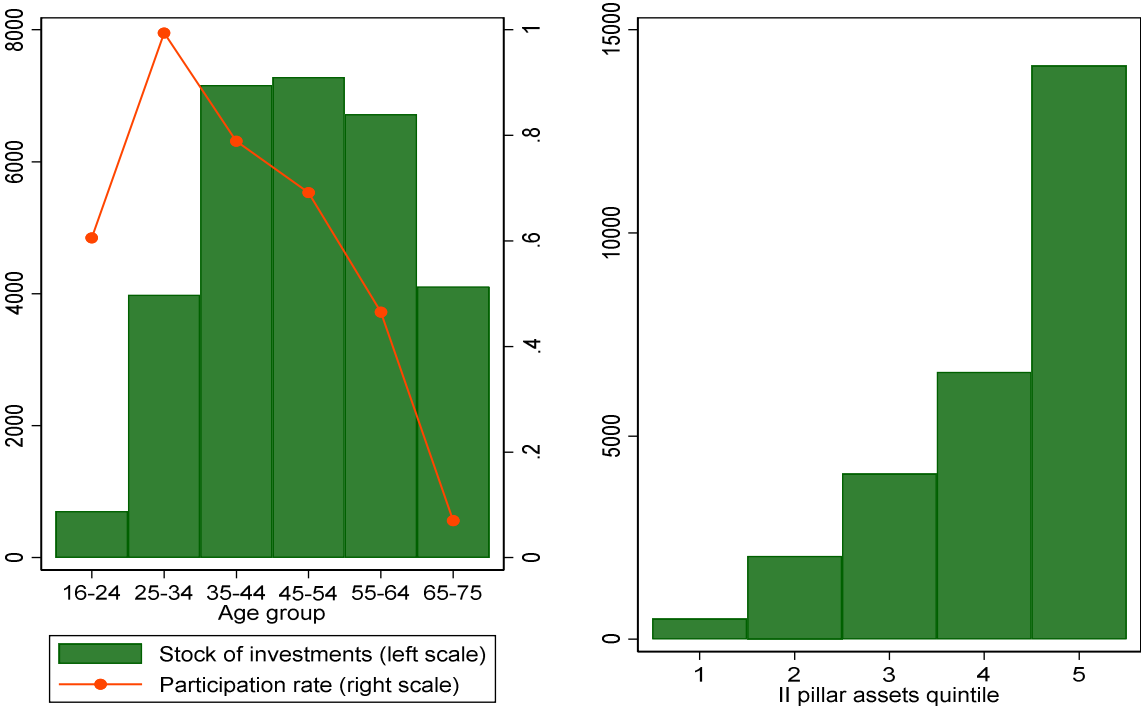


Figure 38. Participation rates and investments in the second pillar, 2017

Next, we analyse who would find it most tempting to quit contributing to the second pillar and to consume those investments instead. It is likely that these are people with high liquidity and credit constraints and few savings. Figures 39 and 40 plot the shares of credit-constrained and liquidity-constrained people, the share of hand-to-mouth people, and the share of people who have fewer liquid assets than assets in the second pillar. We plot these indicators over age groups and over the value of second pillar assets. The best proxy for liquidity constraints in the HFCS is the question about the ability to get 5000 euros of financial assistance from

friends or relatives outside the household<sup>9</sup>. We can expect that people who have access to such assistance are not liquidity constrained and have a low motivation to liquidate and consume the second pillar investments if they need liquid assets. A similar feature to the liquidity constraints is credit constraints<sup>10</sup>. We can expect that people who need credit but cannot get it may use their second pillar investments to meet their demand for credit. Credit-constrained people are defined as those who have applied for a loan or credit but have been turned down, plus people who have not applied because they expected that they would not get credit. We find that 62% of second pillar participants are liquidity constrained and 11% are credit constrained. If we look at the prevalence of liquidity and credit constraints together, there is no clear pattern over age (Figure 38), but there is a clear declining pattern over the value of second pillar assets (Figure 39). Since they have the lowest constraints in accessing finance, people with the largest stock of second pillar investments are the least likely to consume their pension investments when this is made possible by the second pillar reform.

People with a low level of savings have stronger incentives to consume their second pillar investments than people with abundant savings. We find that 34% of second pillar participants live hand-to-mouth, i.e. have fewer liquid assets than half of their monthly income. As many as 74% of people have less in liquid assets than they have in investments in the second pillar, i.e. the second pillar is their main financial asset. The middle-aged and people with a medium amount of second pillar investments have the lowest savings and are therefore the likeliest to spend their second pillar investments if allowed to do so.

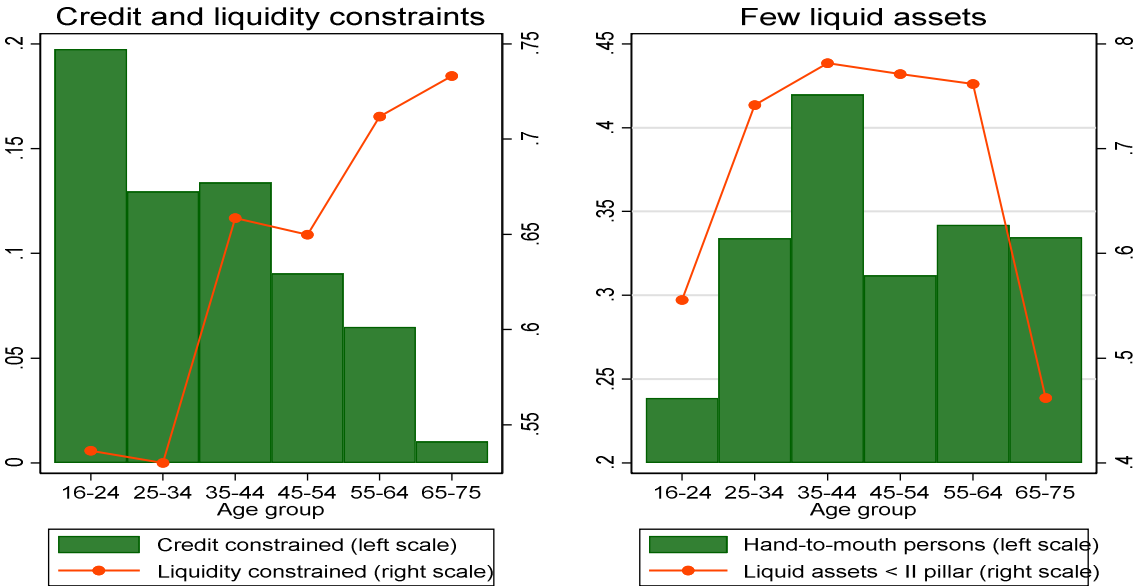


Figure 39. Liquidity constraints and the liquid assets of second pillar participants over age, 2017

<sup>9</sup> This question is collected at the household level, so it refers to whether the household to which a person belongs has access to such assistance.

<sup>10</sup> The data on credit constraints are also collected at the household level.

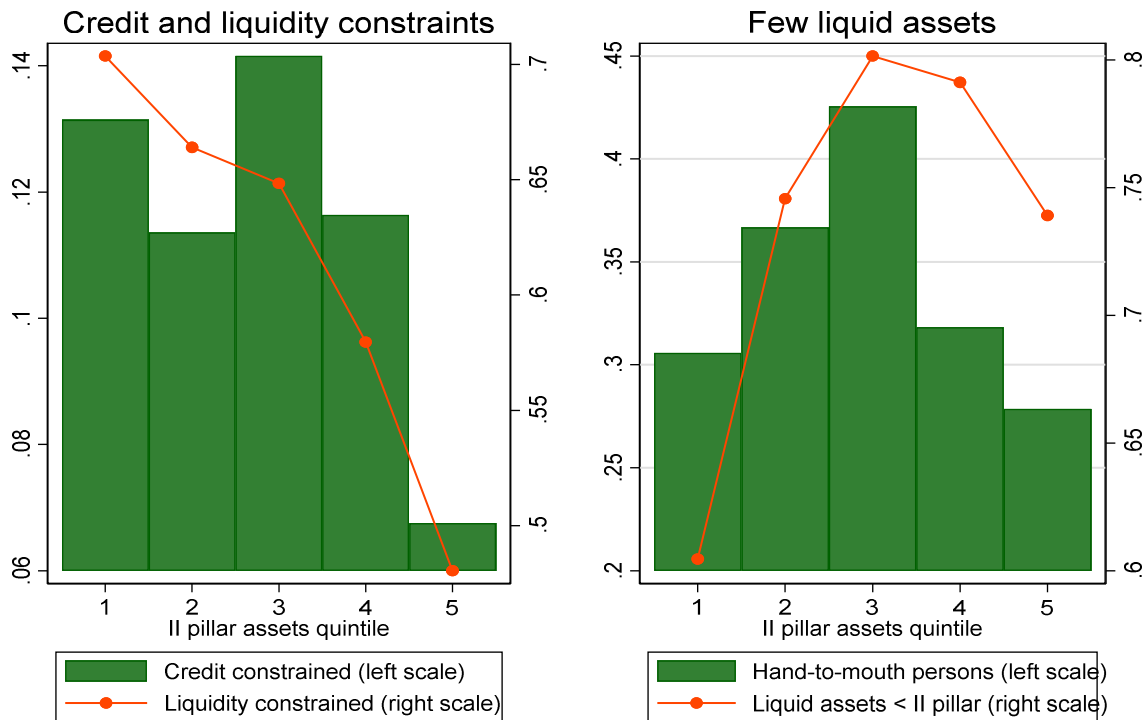


Figure 40. Debt, liquid assets and liquidity constraints of second pillar participants over stock of second pillar assets, 2017

It is difficult to forecast how many people will consume their second pillar investments if they get access to those assets. Surveys so far have shown that approximately 50% of people plan to take their money out from the second pillar if this option becomes available, and 50% of those who withdraw the money plan to continue investing privately<sup>11</sup>. We have contributed to this discussion by showing that different population subgroups have different incentives for withdrawing and consuming these assets. While the main incentive for younger people with few second pillar assets to withdraw money is their poor access to credit financing, the main incentive for middle-aged people with a medium value of second pillar assets is their hand-to-mouth position and shortage of liquid assets.

We have also shown that there are many people for whom the second pillar is their main financial asset. Table 16 demonstrates these statistics in more detail, showing how much people have in liquid assets and how large their second pillar investments are over deciles of liquid assets. Many second pillar participants do not have substantial savings in any other form, and 30% have less than 200 euros of liquid assets. At the same time, the 30<sup>th</sup> percentile value of second pillar assets is approximately 3000 euros. Half of the second pillar partici-

<sup>11</sup> Please see the survey conducted by Turu-uuringute AS and ordered by ERR: <https://www.err.ee/943684/uuring-teise-pensionisamba-vabatahtlikuks-muutmisel-on-rohkem-toetajaid-kui-vastaseid>

participants have liquid assets of less than 800 euros. The median value of liquid assets is 804 euros, which is considerably less than the median value of the second pillar funds of 4173 euros. Another takeaway from these descriptive statistics is that the inequality of liquid assets is much higher than the inequality of second pillar assets, so the second pillar also has a role in making the distribution of financial assets more equal.

Table 16. Distribution of the financial assets of the second pillar participants, 2017

	<b>Liquid assets</b>	<b>Deposits</b>	<b>Second pillar assets</b>
1st decile	10.2	3.6	2 976.2
2nd decile	48.3	23.1	2 980.0
3rd decile	129.3	66.7	3 707.9
4th decile	276.6	167.9	4 034.1
5th decile	569.3	404.1	4 687.8
6th decile	1 149.1	911.8	5 307.6
7th decile	2 201.3	1 590.9	5 888.7
8th decile	4 289.5	3 357.6	5 913.2
9th decile	8 857.3	6 641.4	7 907.8
10th decile	56 715.0	28 469.0	11 319.9
Average	7 398.2	4 146.6	5 463.3
Median	804.0	390.0	4 173.0

Notes: The table presents the average values of liquid assets, deposits and second pillar assets across deciles of liquid assets, conditional on having second pillar investments. Liquid assets are defined as the sum of deposits, mutual funds, bonds, the value of non-self-employment businesses, shares, other financial assets and cash per adult household member.

Lastly, we ask whether people would continue investing privately for their retirement after exiting the second pillar funds. For that purpose, we compare the saving behaviour of people who participate in the second pillar with the behaviour of non-participants. From this comparison, we can evaluate whether people who do not have second pillar savings have compensated for that by saving more through alternative channels.

We replicate the analysis in Meriküll (2019), which was based on the HFCS data from 2013, using the more recent data from 2017. The methodology is the same, and we perform the analysis only for cohorts who did not have to participate in the second pillar, i.e. those born between 1942 and 1983, who were aged 34-75 at the time of the survey. As the choice of whether to join the second pillar was not random for these cohorts, we perform matching analysis that lets us compare the financial position of second pillar participants and non-participants by taking account of the differences in their observed characteristics such as age, income, tenure, labour market status, education and other socio-demographic variables. As a result of the matching analysis we can expect that the treatment group of second pillar participants and the control group of non-participants are comparable.

Table 17 presents the results. The columns headed “after matching” present the results of the matching analysis, comparing second pillar participants and non-participants after re-weighting the groups, which should ensure better comparability. The non-participants have slightly more in financial assets, some 281 euros extra, but the difference is small and statistically insignificant. There is one type of financial assets that the second pillar participants have statistically significantly more than non-participants, which is the voluntary third pension pillar investments. So people that invest voluntarily for their pension through the second pillar are also more likely to do it through the third pillar.

The non-participants in the second pillar have significantly less in real assets than the participants do. This applies to two main categories of real assets, i.e. to real estate holdings and business assets, only the value of vehicles is similar for these two groups of people. We also observe that the non-participants have less debt, but not enough to compensate for their worse position on the asset side. The difference in net assets is statistically insignificant, showing that after matching, there is no statistically significant difference between the net wealth of second pillar participants and non-participants. The difference becomes significantly in favour of second pillar participants only after we add the second pillar assets to net wealth.

The results are similar to those that were obtained from the data from the 2013 wave, though the value of assets and liabilities has increased meanwhile and the differences in some categories have become larger and statistically significant. The most important difference from the analysis of the data of the 2013 wave is that net wealth together with the second pillar assets is now statistically significantly larger for participants than for non-participants. (The difference was quantitatively large but statistically insignificant according to the previous wave data). The investments in the second pillar increased substantially between the two waves and the difference turned statistically significant. The second pillar participants had on average 15000 euros more in net assets, of which 8500 euros came from the second pillar assets in 2017. So roughly 15 years after the beginning of the contributions to the second pillar, the non-participants have not compensated for their non-participation with private investments for their pensions<sup>12</sup>. These results do not support the argument that people will start or continue investing for their retirement privately when they stop participating in the second pillar.

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<sup>12</sup> It should be noted that a person makes a 2% contribution to the second pillar from their gross wage, while an additional 4% comes from their social tax payments and reduces their pension rights from the first, pay-as-you-go, pillar. So if a person chooses not to contribute to the second pillar, it will be partly compensated by the first pillar. However, our analysis does not indicate that even the private 2% contribution, which makes up one third of a person’s total second pillar investments, is compensated by the private investments of non-participants.



Table 17. Assets and liabilities of second pillar participants and non-participants, in euros in 2017

Asset/liability	Before matching			After matching		
	Average for II pillar participants	Average for II pillar non-participants	Difference	Average for II pillar participants	Average for II pillar non-participants	Difference
Financial assets	8201.5	7206.9	994.6	8201.5	8482.7	-281.2
Deposits	5933.8	6413.2	-479.4	5933.8	7148.8	-1215.1
III pillar	1629.1	392.9	1236.2***	1629.1	732.3	896.8***
Other financial assets (stocks, bonds, etc)	638.7	400.9	237.8	638.7	601.7	37.0
Real assets	70514.6	53847.6	16667.0***	70514.6	60800.2	9714.4**
...real estate	63030.1	49485.9	13544.2***	63030.1	55669.6	7360.5*
...vehicles	2050.2	1603.9	446.3***	2050.2	2353.2	-302.9
...business assets	5434.3	2757.8	2676.5***	5434.3	2777.7	2656.8**
Liabilities	11638.2	3307.7	8330.5***	11638.2	8944.6	2693.6***
...loans from banks	11333.8	3227.5	8106.3***	11333.8	8816.7	2517.1**
...credit card debt, credit line/overdraft	304.3	80.1	224.2***	304.3	127.9	176.4***
Net wealth = financial assets + real assets - liabilities	67077.9	57746.9	9331.1***	67077.9	60338.4	6739.6
Net wealth = financial assets + real assets + II pillar assets - liabilities	75624.0	57746.9	17877.1***	75624.0	60338.4	15285.6***

Notes: The poorest 1% and the wealthiest 1% have been excluded from the analysis. \*, \*\*, \*\*\* refer to statistical significance at 10, 5 and 1%. The number of observations is 3224.

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## Appendixes

### Appendix 1

Table A1. Household balance sheet

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<b>HOUSEHOLD BALANCE SHEET</b>	
<b>ASSETS</b>	<b>LIABILITIES</b>
<b>Real assets:</b>	<b>Collateralised debt:</b>
Household main residence (HMR)	Mortgages on main residence
Other real estate property	Mortgages on other real estate property
Ownership of self-employed businesses	
Vehicles	
Valuables	
<b>Financial assets:</b>	<b>Uncollateralised debt:</b>
Sight accounts	Bank overdrafts
Saving accounts	Credit card debt
Life insurance policies	Other uncollateralised loans
Mutual funds	
Bonds	
Publicly traded stocks	
Ownership of non-self-employed businesses	
Money owed to household	
Voluntary pension funds, whole life insurance policies	
Other (financial derivatives, precious metals, royalties, etc)	

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## Appendix 2.

Indicators of financial fragility – definitions<sup>13</sup>

**Debt-to-asset ratio:** Ratio of total liabilities (debt) to total assets. Defined for indebted households.

**Debt-to-income ratio:** Ratio of total liabilities to total annual gross household income. Defined for indebted households.

**Debt service-to-income ratio:** Ratio of total monthly debt payments to household gross monthly income. Defined for indebted households. The debt payments for credit lines/overdraft debt and credit card debt are not covered, since this information was not collected in the HFCS.

**Loan-to-value ratio of the HMR:** Ratio of the outstanding balance of the household main residence (HMR) mortgage to the current value of the HMR. Defined for households with HMR mortgages.

**Net-liquid-assets-to-income ratio:** Ratio of net liquid assets to total annual gross household income. Net liquid assets are calculated as the sum of the value of deposits, mutual funds, bonds, non-self-employment business wealth, and publicly traded shares; net of credit line / overdraft debt, credit card debt and other non-mortgage debt. Defined for all households.

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<sup>13</sup> The source of the definitions is “The Eurosystem Household Finance and Consumption Survey Results from the First Wave”, published by the Eurosystem Household Finance and Consumption Network, 2013.

## Appendix 3

### Data sources for household balance sheet items in Estonian HFCS

	HFCS 2013	HFCS 2017	The data source when the data are taken from the register
<b>Real assets:</b>			
Household main residence (HMR)	Survey	Survey	
Other real estate property	Survey	Survey	
Ownership of self-employed businesses	Survey	Survey	
Vehicles	Survey	Survey	
Valuables	Survey	Survey	
<b>Financial assets*:</b>			
Sight accounts	Register , survey	Register , survey	Commercial banks
Saving accounts	Register, survey	Register, survey	Commercial banks
Life insurance policies	Register, survey	Register, survey	Life insurance companies
Mutual funds	Register, survey	Register, survey	Commercial banks, Central Securities Depository
Bonds	Register, survey	Register, survey	Commercial banks, Central Securities Depository
Publicly traded stocks	Register, survey	Register, survey	Commercial banks, Central Securities Depository
Ownership of non-self-employed businesses	Survey	Survey	
Money owed to household	Survey	Survey	
Voluntary pension funds	Register, survey	Register, survey	Commercial banks, Central Securities Depository
Other (financial derivatives, precious metals, royalties, etc)	Register, survey	Register, survey	Central Securities Depository
<b>Collateralised debt:</b>			
Mortgages on main residence	Survey	Survey	
Mortgages on other real estate property	Survey	Survey	
<b>Uncollateralised debt**:</b>			
Bank overdrafts	Survey	Register, survey	Commercial banks
Credit card debt	Survey	Register, survey	Commercial banks
Other uncollateralised loans	Survey	Register, survey	Commercial banks

Notes: \* The data on financial assets managed in Estonia are taken from the registers, the data source for assets managed abroad is the survey. The size of the assets hold abroad is mostly negligible.

\*\* The information about uncollateralised loans taken in Estonia comes from the registers, the data source for debt taken abroad is the survey. The data source for loans from non-bank entities and private individuals is the survey.