

What explains wealth inequality in Estonia? The role of wealth components, household size and region

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What explains wealth inequality in Estonia?

The role of wealth components, household size and regions

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Abstract

This paper analyses the wealth inequality of Estonian households, employing data of the Household Finance and Consumption Survey (HFCS). Income inequality in Estonia is close to the euro area average, but wealth is distributed less evenly than in most of the other euro area countries. Two of the most commonly used measures of wealth inequality are the Gini coefficient and the share of wealth belonging to the richest households. The inequality of net wealth is among the highest in the euro area according to both of these measures in Estonia. The three waves of the HFCS conducted in Estonia cover the years 2013–2021, during which time the estimated Gini coefficient of wealth inequality rose slightly from 0.70 to 0.71. The share of wealth owned by the top 5% of households increased from 43.3% to 47.7%. Although the point estimates of both inequality measures increased, these changes were not statistically significant.

We carry out a decomposition of wealth inequality to estimate which components of net wealth increase or decrease inequality and how the intertemporal changes in the structure of wealth have affected it. An increase in the value of the household main residence had an equalising effect on wealth, whereas growth in the share of business wealth and an increase in the loan burden had the opposite impact. The positive and negative effects of these changes were of the same magnitude and their net effect on the Gini coefficient of net wealth was close to zero. We complement the analysis of the effects of different wealth components by looking at the impact of two demographic trends on wealth inequality in Estonia, the first being internal migration from rural areas to Tallinn and its surrounding regions and the second the increase in the share of single-member households. Although these demographic changes have been substantial, our estimations show that they had no significant impact, since the wealth inequality in wealthier regions and among single-member households did not differ substantially from that in other regions or households.

Most of the wealth components in the Estonian HFCS data are register-based and register data are collected at the individual level, so wealth inequality can be measured at two different levels of disaggregation. We exploit this feature of the dataset and estimate wealth inequality at the individual level in addition to household-level estimates. Wealth inequality estimates at the individual level are higher than household-level estimates – the Gini coefficient of net wealth is larger by about 0.05. The wealth components and demographic trends have similar effects on wealth inequality at both levels of disaggregation.

JEL classification: D31, G51, D13

Keywords: Estonia, net wealth, wealth inequality, decomposition, wealth inequality within households

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

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Non-technical summary

This paper analyses the wealth inequality of Estonian households employing data of the Household Finance and Consumption Survey (HFCS). Three waves of the HFCS have so far been run in Estonia, in 2013, 2017 and 2021. Similar surveys are conducted in the other euro area countries besides Estonia, and in Croatia (which has been in the euro area since 2023), Hungary and Poland. We provide an overview of the level of wealth inequality in Estonia over time and in comparison to other euro area countries. As the next step, we carry out a decomposition of wealth inequality to estimate which components of net wealth increase or decrease inequality and how the intertemporal changes in the structure of wealth have affected it. We complement the analysis of the effects of different wealth components by looking at the impact of two demographic trends on wealth inequality in Estonia, the first being internal migration from rural areas to Tallinn and its surrounding regions and the second the increase in the share of single-member households. We also analyse whether the wealth inequality at the household level is different from the inequality at the individual level.

The paper focuses on wealth inequality in Estonia and the factors that can explain it. We also give an overview of wealth inequality in other euro area countries for comparative purposes. Our analysis is related to two strands of the literature on the subject. We provide a detailed description of the explanatory factors of wealth inequality for a particular country, so widening the country coverage in that strand of research. We also complement the earlier literature by analysing the role of changes in the wealth structure for the dynamics of wealth inequality. Contributing to the second strand of related literature, we provide estimates of wealth inequality at two levels of disaggregation, i.e. the household level and the individual level. This analysis is related to earlier empirical findings in the literature that point to inequality being wider at the individual level than at the household level. Wealth inequality can usually only be measured at the household level by employing survey data, and individual-level estimates are rare in the literature. The Estonian HFCS dataset has a unique feature because it contains two alternative sets of estimates of household assets and liabilities, the first of which is based on survey data and the second on register data. The data from the registers are collected at the individual level, which permits individual-level estimation of wealth inequality.

Income inequality in Estonia is close to the average for the euro area, but wealth is distributed more unequally than in most other euro area countries. The Gini coefficient of net wealth was 0.71 in 2017 in Estonia, which was the fifth highest among the euro area countries. Estonia stands out for its wealth inequality among the Central and Eastern European (CEE) countries that share a similar economic history and have similar income levels, but generally have relatively low levels of wealth inequality. Wealth inequality in Estonia was relatively stable in 2013–2021, as the Gini coefficient remained more or less the same during that time. The share of wealth owned by the wealthiest 5% of households increased from 43.3% to 47.7%, but this difference was not statistically significant (i.e. taking into account the confidence intervals, these estimates are not significantly different).

We also estimate wealth inequality across different asset classes in this paper. These estimations demonstrate that inequality is very heterogeneous across different types of asset. The value of the household main residence (HMR) is the most equally distributed, and its Gini coefficient is 0.48. The least equally distributed assets are the actively-owned business holdings of households, i.e. the assets of businesses where household members are employed. The Gini coefficient of this asset class is 0.93, which is close to the level of 1 that indicates complete

inequality. The extremely high level of inequality in the distribution of business assets is also evident from alternative measures, such as the share of assets owned by the richest households. The wealthiest 10% own over 90% of the wealth in this class, and the wealthiest 1% own around half.

The share of actively-owned business assets in total assets in Estonia is considerably larger than the euro area average — these figures were 23% and 9%, respectively, in 2017. Since business assets are unequally distributed, their large share in total assets is one possible cause of the wide wealth inequality in Estonia. On the other hand, the share of HMR in total assets is relatively low in Estonia. It makes up only 45% of total assets on the aggregate, which is the fourth smallest share among the euro area countries. We assessed the cross-country correlation between the share of actively-owned business assets in total assets and wealth inequality in the 22 countries that conducted the HFCS survey. The correlation coefficient was 0.57, indicating a strong positive relationship between these variables. We also calculated the correlation coefficient between the aggregate home ownership rate and wealth inequality for the same group of countries, and it was strongly negative with a point estimate of -0.72 .

We applied the decomposition method to assess which components of net wealth increase or decrease wealth inequality and what has been the impact of intertemporal changes in the structure of assets and liabilities on wealth inequality. The decomposition shows for Estonia that an increase in the value of the HMR had an equalising effect on net wealth, whereas growth in the share of business wealth and an increase in the loan burden had the opposite impact. The positive and negative effects of these changes have been of the same magnitude and their net effect on the Gini coefficient of net wealth has been close to zero.

The impacts of various net wealth components on wealth inequality are estimated as elasticities, i.e. we evaluate the percentage change in the Gini coefficient in response to an increase of 1% in the share of a given component of net wealth. The elasticity depends on three factors: how large the share of a given component is in the total value of net wealth, how equally or unequally the given component is distributed and how strongly this component is correlated with net wealth.

Among real assets, an increase in the share of the HMR within net wealth reduces inequality, while an increased share of business wealth widens it. Both the reductive effect on inequality of the HMR and the amplificatory effect of business wealth have increased. The effect that the HMR reduces inequality in net wealth arises because there is less inequality within that asset class than there is in total wealth, while business wealth increases inequality because there is more inequality within that asset class. The effects of the two components on the inequality of net wealth are similar in size: an increase of 1% in the value of the HMR reduces net wealth inequality by 0.138%, while an increase of 1% in business assets increases net wealth inequality by 0.099%. There is wide variation in the probability of owning these assets, as the home ownership rate was 79% in 2021 while the ownership rate for actively-owned businesses was only 15%. However, the average value of business assets is much larger than the value of the HMR and business assets are much more unevenly distributed, and so the magnitudes of the effects of changes of 1% in the values of those two asset classes are about the same.

The share of liabilities in net wealth is positively correlated with inequality. Wealthier households are typically less indebted, which means that an increase in the loan burden has a stronger impact on less affluent households and widens inequality as a result. This effect is mainly encountered with mortgage loans, while other types of liability have only marginal

impacts on inequality. When the share of HMR mortgages in net wealth increases by 1%, the inequality of net wealth widens by 0.044%.

We also analysed the impact of the share of financial assets in total assets on net wealth inequality. An increase in the share of deposits reduced inequality somewhat, but this effect was very small in comparison to that of business assets or the HMR. Other financial assets had a negligible impact on net wealth inequality.

We complement the analysis of the effects of different wealth components by looking at the impact of two demographic trends on wealth inequality in Estonia, the first being internal migration from rural areas to Tallinn and its surrounding regions and the second the increase in the share of single-member households. These demographic changes have been substantial, but our estimation shows that they had no significant impact since the wealth inequality in wealthier regions and between single-member households did not differ substantially from that in other regions or households.

Migration has mostly occurred from other regions towards Tallinn and its surroundings and towards other larger towns. The share of households that are in Tallinn and Harjumaa increased over the three waves of the survey by 2.5 percentage points in total, while the share of households living in Pärnumaa increased by 1.3 percentage points. The biggest declines were of 1.5 percentage points in the share of households living in Ida-Virumaa and of 1.2 percentage points in the share in Lääne-Virumaa. The movement has generally been from the poorest regions with the highest unemployment towards the wealthiest regions. The decomposition shows that these structural changes play a vanishingly small role in net wealth inequality in Estonia. Most of the dynamics in net wealth inequality come from uneven development within regions, not from structural changes between regions.

The share of single-member households increased over the three waves of the survey by 6.5 percentage points, while the share of households with two, three or four members declined by almost the same amount. This structural change again plays a vanishingly small role in the dynamics of inequality, largely because the dynamics of inequality within size groups for households have been quite volatile over time, and so it is not possible to identify reliable trends. As with the regional changes, the structural changes in the size of households explain only 1–2% of the dynamics of net wealth inequality, and the differences mainly come from changes within the household size groups.

Net wealth can be estimated both at the household level and at the individual level from the Estonian HFCS data, and so we also analyse inequality at the individual level. These additional assessments indicate that the choice of the disaggregation level can affect the estimates. Wealth inequality at the individual level is wider than that at the household level: the Gini coefficient is higher by about 0.05. This means that wealth is not distributed equally within households, and failing to account for inequality within households could lead to an underestimation of wealth inequality. The components of wealth and the demographic trends have a similar impact on inequality at both the individual and household levels.

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1. Introduction

This paper analyses the wealth inequality of Estonian households, employing data of the Household Finance and Consumption Survey (HFCS). Three waves of the HFCS have so far been run in Estonia, in 2013, 2017 and 2021. Similar surveys are conducted in the other euro area countries besides Estonia, and in Croatia (which has been in the euro area since 2023), Hungary and Poland. We describe the level of wealth inequality in Estonia over time and in comparison to that in other euro area countries. As the next step, we carry out a decomposition of wealth inequality to estimate which components of net wealth increase or decrease inequality and how the intertemporal changes in the structure of wealth have affected it. We complement the analysis of the effects of different wealth components by looking at the impact of two demographic trends on wealth inequality in Estonia, the first being internal migration from rural areas to Tallinn and its surrounding regions, and the second the increase in the share of single-member households. We also analyse whether the wealth inequality at the household level is different from the inequality at the individual level.

The HFCS is the only micro-level dataset in Estonia that provides information on the assets and liabilities of households, as well as the level and distribution of net wealth. Three waves of the HFCS have been conducted so far, extending over a period of nine years and covering a large part of the previous decade. Economic growth was very dynamic in Estonia during this period, and the value of the wealth of households increased strongly. The median value of net wealth increased by around 50% in 2013–2021, the average nominal wage rose by 60%, and the Gini coefficient of household income declined gradually to reach 0.31 in 2021, which is close to the euro area average.

The paper focuses on wealth inequality in Estonia and the factors that can explain it. We also give an overview of wealth inequality in other euro area countries for comparative purpose. Our analysis is related to two strands of the literature on the subject. We provide a detailed description of the explanatory factors of wealth inequality for a particular country, so widening the country coverage in that strand of research. The factors explaining wealth inequality in the euro area have already been reviewed by Lindner (2015) for example, but that analysis does not cover Estonia. Factors explaining wealth inequality in Eastern European countries including Estonia have been analysed by Brzezinski and Salach (2021), but they do not cover all asset types and focus on the household main residence as an explanatory factor. We are also able to extend this literature by analysing the role of structural changes in the dynamics of wealth inequality.

For the second strand, we provide estimates of wealth inequality at two levels of disaggregation — the household level and the individual level. This analysis is related to earlier empirical findings in the literature that point to inequality being wider at the more granular individual level. Estimates by Kukk et al. (2022) for example show that the individual-level Gini coefficient of net wealth in the euro area countries is 0.03 higher than the household-level measure. Fremereaux and Leturcq (2020) find that inequality at the individual level has increased faster in recent decades than that at the household level, and this has been partly because of an increase in the share of single-member households within total wealth, and partly because of increased wealth inequality within households, as a smaller and declining share of household wealth is held in joint ownership. Wealth inequality can usually only be measured at the household level when survey data are used, and individual-level estimates are rare in the literature. The Estonian HFCS dataset has a unique feature as it contains two alternative sets of

estimates of household assets and liabilities, with one based on survey data and the other on register data. The data from the registers are collected at the individual level, which permits individual-level estimation of wealth inequality.

Income inequality in Estonia is close to the average for the euro area, but wealth is distributed more unequally than in most other euro area countries. The Gini coefficient of net wealth was 0.71 in 2017 in Estonia, which was the fifth highest figure in the euro area countries (see Section 4). Wealth inequality in Estonia was relatively stable in 2013–2021, as the Gini coefficient remained more or less the same during that time. The share of wealth owned by the wealthiest 5% of households increased from 43.3% to 47.7%, but this difference was not statistically significant.

Decomposing the Gini coefficient by different wealth components allows the causes of inequality to be evaluated, i.e. it is possible to assess which asset types have an impact that increases wealth inequality and which have an impact that decreases it. This analysis implies that the main cause of the relatively wide wealth inequality in Estonia is the large share of business assets in total assets. Business assets are the most unequally distributed asset class and their share in total assets is more than twice as large in Estonia as it is in the euro area on average. The share of business wealth in total wealth has also been rapidly increasing in Estonia, which has widened wealth inequality.

The most equally distributed component of wealth is the value of home or household main residence (HMR). The share of homeowners within the population is higher in Estonia than in the euro area on average and has also increased over time, and that trend together with the general rise in real estate prices has acted against business wealth to reduce inequality. These two asset classes have the largest influence on wealth inequality, but as they affected inequality in 2013–2021 in opposite directions, the Gini coefficient of net wealth in Estonia remained more or less the same in those years. Changes in the structure of households across regions and in the size of households have not particularly affected net wealth inequality. It is possible though that structural changes affect inequality over a longer time than the nine years that the three survey waves cover.

We find inequality to be greater at the individual level than at the household level, implying that assets and liabilities are not equally distributed within households. The Gini coefficient of inequality is 0.05 higher at the individual level in Estonia than at the household level. Individual-level inequality is explained by the same components as household-level inequality, and the dynamics of inequality and the factors behind it are similar at both levels.

The rest of the paper proceeds as follows: Section 2 reviews the literature on the topic; Section 3 describes the data used in the analysis; Section 4 gives an overview of household wealth inequality in Estonia and in the euro area; Section 5 analyses how the components of net wealth and the structure of households affect household wealth inequality; and Section 6 focuses on an analysis of individual-level inequality.

2. Literature review

Wealth inequality declined steadily in advanced economies during the 20th century, but the downward trend had ended by the 1980s and inequality has been gradually increasing since

then (Piketty, 2014; Davies and Di Matteo, 2021). The level of inequality is heterogeneous across countries. The wealthiest 1% of households in Europe own about 10–20% of total wealth for example, while in the USA they own 40%, and the Gini coefficients of wealth can range from 0.5 to 0.9 (Cowell et al., 2018; Balestra and Tonkin, 2018; Bricker et al., 2016). Countries where income inequality is low do not necessarily have low levels of wealth inequality. An example of this is the Nordic countries, where income inequality is low but wealth inequality relatively large. The Gini coefficients of income are lower in Denmark, Sweden, Norway and Finland than in Estonia, at 0.25–0.27 versus 0.31 (Eurostat table ILC_DI12). Wealth inequality is at about the same level in those countries as it is in Estonia though, or even a little higher, as the Gini coefficient of net wealth is 0.71 in Estonia, 0.63 in Norway, 0.68 in Finland, 0.81 in Denmark, and 0.89 in Sweden (Davies, 2011; Cowell et al., 2018). Davies (2011) disputes whether wealth inequality necessarily means inequality in welfare, as the welfare states in the Nordic countries ensure that households with low incomes thrive and have social security, reducing the need for individuals to save and to invest in assets.

The HMR and less risky financial assets are components of wealth that reduce inequality, while business assets and risky financial assets increase it (Lindner, 2015). The key component in explaining wealth inequality is the HMR. The homeownership rate and the share of the value of the HMR in total assets are typically the most relevant factors for explaining differences in inequality between countries, as well as the trends in inequality within countries. A rise of 1% in the value of the HMR as a share of total wealth reduces wealth inequality by an average of 0.06% in the euro area. The second most influential factor is business wealth. Its share in total wealth increasing by 1% causes wealth inequality to increase by 0.04% (Lindner, 2015). Lindner (2015) only looks at assets in his analysis and does not consider liabilities. Most of the households in Central and Eastern European countries owned their HMR, and the large share of homeowners there explains over 40% of the differences in wealth inequality across countries (Brzezinski and Salach, 2021)¹. A low homeownership rate is also one reason why wealth inequality in Sweden is wide even though income inequality is low (Cowell et al., 2018).

Differences in the structure of assets can also explain the cross-country heterogeneity in wealth inequality. Households in the USA hold more wealth in risky assets and loans for example, which partly explains why inequality is greater there (Davies, 2011). Real estate prices in the USA fell after the financial crisis in 2009 and Davies et al. (2017) argue that this was the main reason why wealth inequality increased there, while it remained unchanged in Canada, where real estate prices were rising steadily in the same period.

Estonia stands out in the group of CEE countries for its wide wealth inequality, which is the largest in the region even though the share of homeowners is relatively large. One possible factor in explaining wealth inequality that has not been considered so far is the large share of business assets in household wealth in Estonia. Business wealth plays a particular role in wealth inequality because although only a small share of households own businesses, the very unequal distribution of business assets means that they are as important in shaping inequality as the HMR is. Business assets can even play a larger role than the HMR in explaining inequality in countries like Austria and Germany, where homeownership is not as common as in other countries of the euro area (Lindner, 2015).

¹ The share of homeowners is typically higher in CEE countries than in other European countries because it was possible to privatise the dwellings of households during the transition period of the 1990s in this region (see e.g. Meriküll and Rõõm, 2016).

Business assets are often underestimated in surveys and in register data, since the wealthiest business owners can move their assets out of their home countries and into tax heavens to minimise their tax liabilities. Alstadtaeter et al. (2019) argue that the wealthiest 0.01% of Scandinavian households avoid a quarter of their taxes by holding their assets in low-tax jurisdictions. They use documents leaked from HSBC (Hongkong and Shanghai Banking Corporation) and the Panama papers to show that the estimated wealth inequality in Scandinavia is greater if assets held in low-tax jurisdictions are included: the wealthiest 0.01% of households own 5% of total wealth if tax heaven assets are included and 4% if they are not. These results are surprising because Scandinavian countries are known for their moral rectitude in tax payments and in the effectiveness of tax administration. It may be assumed that tax avoidance by the super-rich in other countries is even more widespread. Alstadtaeter et al. (2018) say that the wealthiest 0.01% of households in Russia own 12% of total assets for example, but this would only be 5% if the assets held in low-tax jurisdictions were not considered.

As well as studying the role of wealth components, the literature has also analysed the impact of household structure on wealth inequality across countries. The youth in Northern Europe, the United Kingdom and the USA leave the parental home earlier, and it is less common for multiple generations to live together in the same household. People in Mediterranean countries by contrast leave the parental home later and multiple generations often live together. Single-member households make up 44% of the total in Sweden for example, but only 17% in Spain (Bover, 2010). Bover finds that if the structure of households in the USA were the same as that in Spain, with markedly fewer single-member households, then the wealth inequality of US households would be much smaller in the lower part of the wealth distribution and larger in the higher part. The two contradictory effects in the lower and upper parts of the wealth distribution mean the Gini coefficient of net wealth in the USA would remain the same even if the structure of households were to be similar to that in Spain. Cowell et al. (2018) reach the same conclusion, that the size of the family explains a small part of the differences between countries in wealth inequality, and the cross-country disparities in inequality stem mostly from the specific features of individual countries. It has also been found that differences in the age structure do not play a major role in explaining differences in wealth inequality between countries, at least in comparisons of advanced economies (Almas and Mogstad, 2011).

A branch of literature that is related to the research on household structure and wealth inequality studies the differences in wealth inequality at the household level and at the individual level. Theoretical models typically assume that households act as a single unit, where the incomes of all the household members are added together and there are no within-household differences in individual utility functions or budget restrictions (Doss, 1996). However, the empirical literature is increasingly finding that these assumptions do not apply in practice (Vogler et al., 2006; Pahl, 2008). Men tend to create and own the majority of business wealth, while women rarely appear in the lists of the super-rich, and mainly do so through inheritance (Edlund and Kopczuk, 2009). The wealth inequality within households is consequently particularly large among the super-rich. Meriküll et al. (2021) find that the gender gap in wealth is even in favour of women in the lower deciles of the wealth distribution, but men have considerably more wealth in the top tail of the net wealth distribution and the gender gap in wealth among the richest mainly stems from business assets. The large gender gap in the top tail of the distribution also means that the average level of net wealth is higher for men than it is for women.

There are only a few estimates of net wealth inequality at the individual level in the literature, and the main reason for this is the shortage of the individual-level data that this would require.

Surveys mainly record assets and liabilities at the household level, with only a few exceptions. Before now, it has only been possible to estimate wealth inequality at the individual level in a few individual countries, including Germany (see eg Grabka et al., 2015) and France (see eg Fremeaux and Leturcq, 2020), while the distribution of wealth within households in Estonia can be estimated from register data (Meriküll et al., 2021). Fremeaux and Leturcq (2020) find that when wealth inequality is estimated with the assumption of equal distribution of assets within the household, it is under-measured. Kukk et al. (2022) divide the assets found from the household-level survey between the household members following the patterns of asset ownership of single-member households, and find that the Gini coefficient of net wealth is 0.03 lower at the household level than at the individual level in the euro area. Earlier research consequently shows that inequality can be wider at the individual level than it is at the household level. This paper employs the register data from the Estonian HFCS dataset and provides estimates of wealth inequality at both levels of disaggregation, i.e. at the household level and at the individual level. We also analyse whether various wealth components affect individual-level and household-level wealth inequality differently.

3. Data description

The HFCS is a harmonised survey that collects data on the assets and liabilities of households. It is carried out in all the euro area countries plus Poland, Hungary and Croatia (Croatia has been in the euro area since 2023). The HFCS is conducted at regular intervals and has a panel structure in about half of the countries that run it, including Estonia. The first wave was carried out in 2008–2011, and most countries ran the survey in 2010. Estonia joined the survey later, after it joined the euro area, and it has since run three waves of the HFCS, in 2013, 2017 and 2021. Appendix 1 provides an overview of the classification and coverage of assets and liabilities in the HFCS and describes the sources of data for various wealth components in the survey.

Wealth is distributed unequally, much more so than incomes are. Given the unequal distribution, the estimates of mean wealth and the wealth distribution can be strongly affected by the non-response rate among the richest households surveyed and by the value of assets of the few very rich households that are covered by the survey. To improve the statistical accuracy of the estimates, wealthier households are oversampled in the Estonian HFCS. As there are no register data in Estonia for wealth, the identification of wealthier households for oversampling purposes is made using information on income from the previous year's income tax statements, and applying stratified random sampling.

To categorise households by demographic characteristics such as age or level of education, we identify a household reference person by applying the Canberra Group definition (UNECE, 2011). For most households this definition means that the person with the highest income is chosen as the reference person². Some of the variables in the Estonian HFCS are collected by the household survey, but the source of most of the data on assets and liabilities is various registers. Appendix 2 lists which variables in the 2021 survey came from the survey and which from other sources. The missing observations, i.e. the questions that households did not answer,

² A fixed set of sequential criteria are applied to all the members of the household until one of them is identified as the household reference person. These criteria are: 1) one of the married or cohabiting partners who has dependent children; 2) one of the married or cohabiting partners who does not have dependent children; 3) single parent with dependent children; 4) the person with the highest income; 5) the oldest person.

were replaced with imputed values. Multiple imputation was used and five imputates were created for each missing observation.

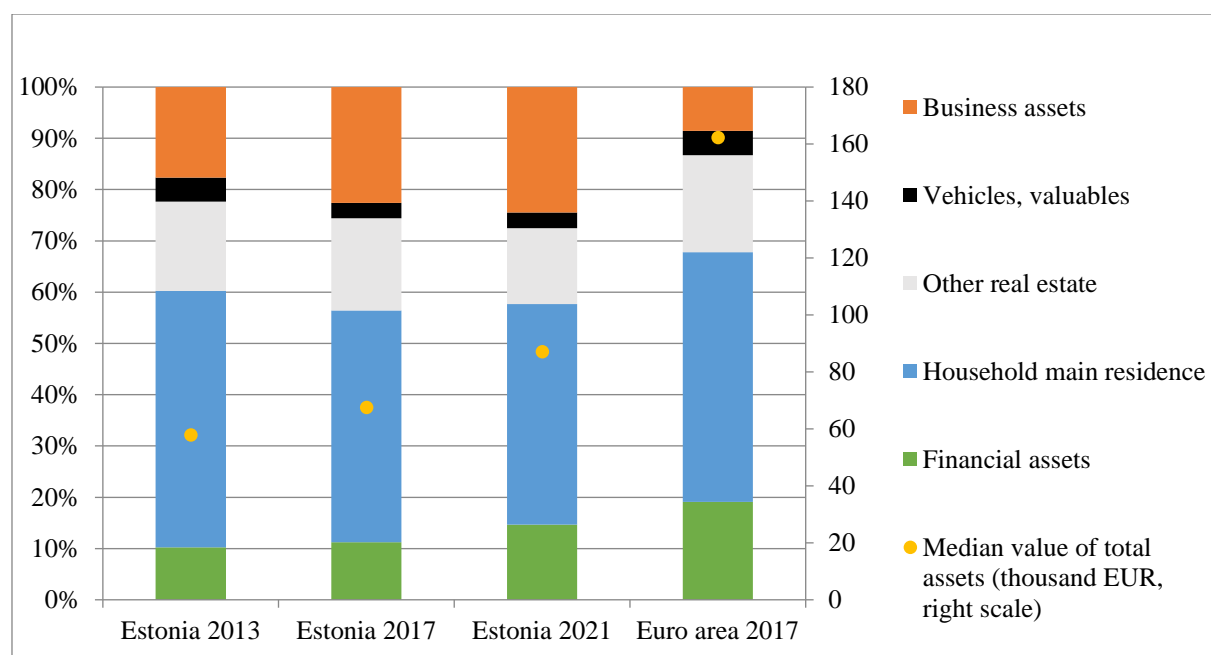
The HFCS in Estonia is run as a rotating panel survey, and households can be in the sample for a maximum of four consecutive survey waves. The final sample size was 2220 households in the 2013 survey wave, 2679 in 2017, and 2247 in 2021. The survey methodology is reviewed in more detail in Eesti Pank Occasional Paper no. 1/2023 (Korastel'jov et al., 2023). Appendixes 3 and 4 give an overview of the structure of households in Estonia by various characteristics such as household income, the age and education level of the reference person, etc. These figures are compared with the euro area averages and over time, in a comparison covering the three survey waves from 2013 to 2021. Wealth inequality can be affected by changes in the size of households and by whether they live in larger towns or rural regions. There were two evident trends in Estonia in 2013–2021 for household structure. First, the share of people living alone increased considerably, as the percentage of single-member households within the total grew from 36% in 2013 to 42% in 2021. Second, this period was characterized by an internal migration from other regions towards the bigger towns, i.e. to Tallinn and its surroundings, Tartu and Pärnu. The regions that lost most population were Lääne-Virumaa and Ida-Virumaa. How these trends affect the inequality of net wealth is covered in Section 5 of this paper.

We next present the estimated structure of assets based on the HFCS data, and a comparison of the ownership rates for the main asset classes in Estonia and in the euro area (see Figure 1). We focus on the asset classes that have the largest impact on wealth inequality in Estonia by comparing them with their equivalents in other euro area countries and by showing their dynamics over time. We employ the data from the 2017 HFCS for this comparison, since that is the most recent survey wave for which data for all euro area countries were publicly available at the time of writing of this paper.

The asset shares presented in Figure 1 show that the structure of household assets in Estonia diverges from the euro area average in two main aspects — the share of financial assets is smaller than its equivalent in the euro area and the share of business assets is substantially larger. It is notable that the share of financial assets has converged towards the euro area average over time, while the disparity with the euro area in business assets has grown. Business assets made up 23% of total assets in Estonia in 2017 and 9% in the euro area, i.e. their share in Estonia was about 2.5 times the euro area average. Figure 2 illustrates how the structure of assets varies across net wealth quintiles. It shows that business assets are close to 0 as a share of wealth in the four lower quintiles, but in the fifth quintile they are around 35% of total wealth.

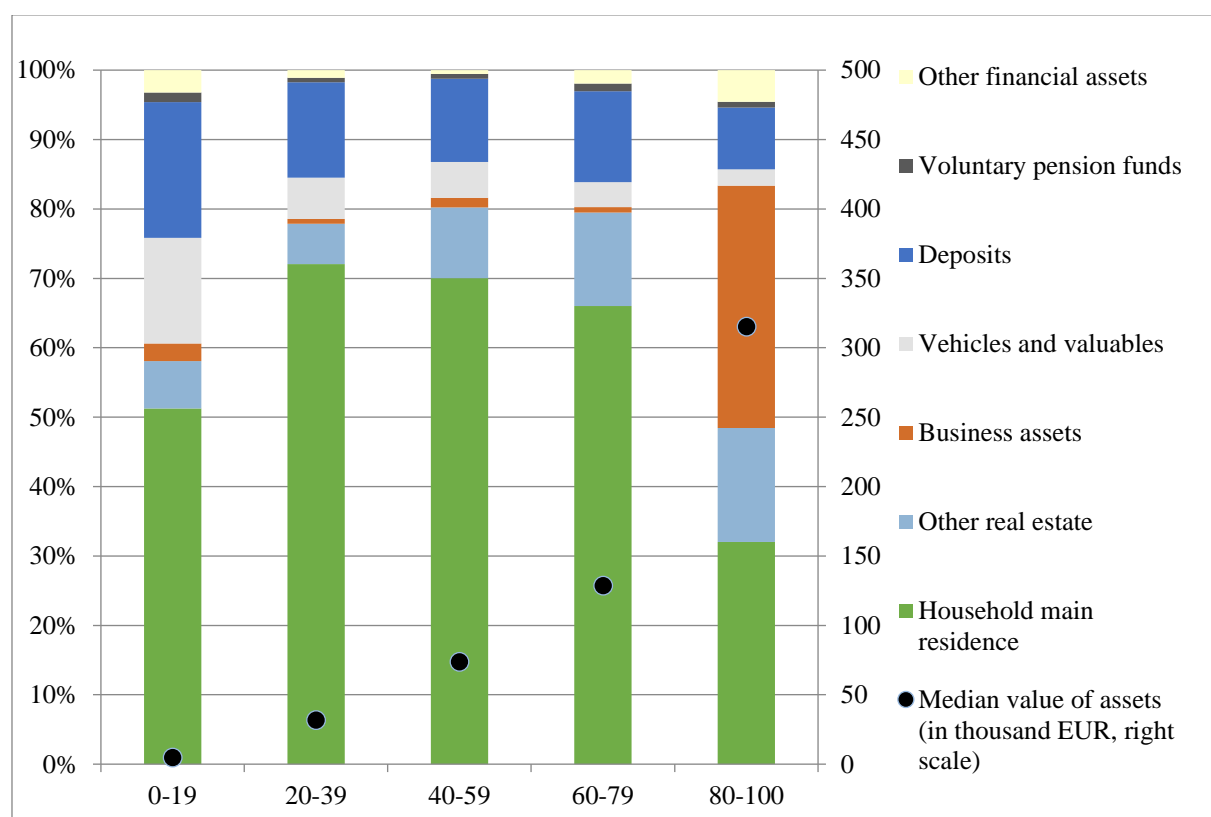
The share of financial assets in the structure of wealth of Estonian households has changed over time to be more similar to that of the euro area, while the share of business assets has moved further away from that in the euro area. Business assets made up 23% of total assets in Estonia in 2017 and 9% in the euro area, meaning the Estonian level was around two and a half times that in the euro area. Figure 2 illustrates how the structure of assets varies between households in different quintiles for net wealth. It shows that the share of business assets is negligible in lower four quintiles, while they make up around 35% of total wealth in the fifth quintile.

Figure 1. Structure of household assets in Estonia and in the euro area



Notes: The figure shows the shares of different asset classes in total assets (left scale) and the median value of total assets in thousands of euros (right scale)

Figure 2. The asset structure of Estonian households by net wealth quintiles



Notes: The figure shows the average shares of different asset classes in per cent on the left scale, and the median value of assets in thousands of euros on the right scale by quintiles (percentiles 0–19 correspond to the first quintile, etc). Households are divided into quintiles by the value of their net wealth.

Figures 3 and 4 illustrate the shares of business assets and the value of the HMR in total wealth across the euro area countries. Estonia stands out for the large share of business assets, which is the second largest in the euro area after that in Cyprus. By contrast, the share of the HMR in total wealth in Estonia is one of the smallest in the euro area countries, as it is the fourth smallest after the shares in Germany, Spain and Cyprus. In the next section we show that business assets are the most unequally distributed asset class in Estonia, while the HMR has the least unequal distribution among the asset classes. This pattern is typical in other countries as well (Carroll et al., 2014). The peculiarities of the asset structure described above therefore imply that assets are relatively unequally distributed in Estonia.

The figures in Appendix 5 compare the frequency of ownership of business assets or the household main residence in Estonia with the frequencies in other euro area countries. The ownership rates for both asset classes in Estonia were above the euro area average in 2017. Ownership rates for both business assets and the main residence have risen since the first HFCS in Estonia, with the rise occurring between the second and third waves of the survey and ownership rates remaining more or less stable between the first two waves of the survey. The ownership rate for business assets rose from 12% in 2017 to 15% in 2021, while the rate for the main residence rose from 75% to 79%.

Figure 3. The share of business assets in total household assets (%), HFCS 2017

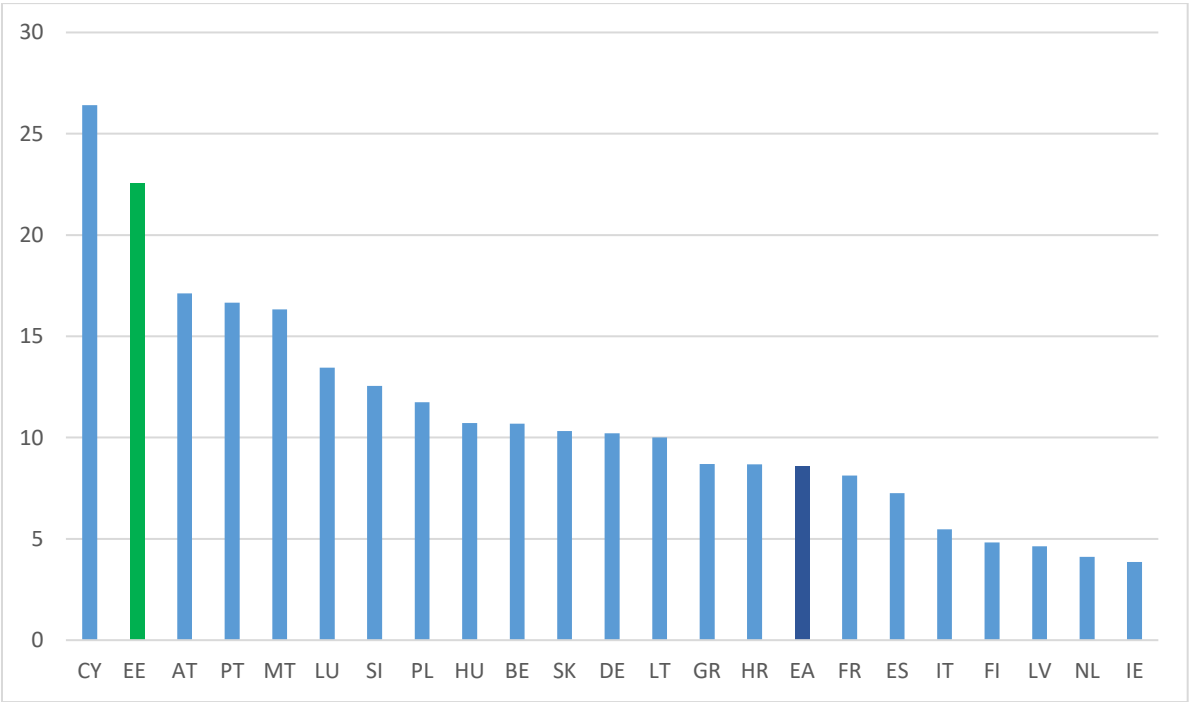
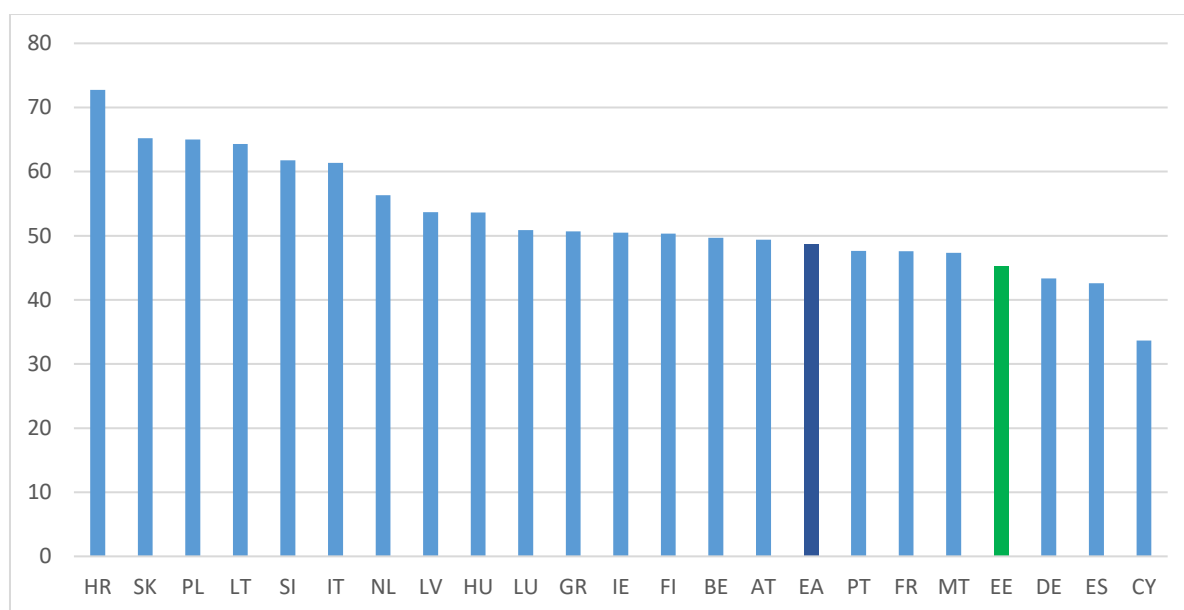


Figure 4. The share of the HMR value in total household assets (%), HFCS 2017



4. Wealth inequality

We next look at how unequally net wealth is distributed in Estonia and what the main trends in wealth inequality were in 2013–2021. Table 1 shows estimates of various indicators for inequality such as the Gini coefficient, the share of wealth owned by the wealthiest 5% of households, etc.

The most commonly used measure of inequality is the Gini coefficient. It ranges between 0 and 1, where 0 means total equality (i.e. each household has the same net wealth), and 1 implies total inequality (i.e. all of the wealth is owned by one household). A more detailed description of the estimate of the Gini coefficient and the Lorenz curve that underpins it can be found in the review of the 2013 Estonian HFCS (Meriküll and Rõõm, 2016). The data presented in Table 1 show that the Gini coefficient of net wealth has been stable in the years covered by the HFCS in Estonia. It rose a little from 0.69 in 2013 to 0.71 in 2017, but that movement is not statistically significant. The point estimate did not change in 2017–2021, and it remained at 0.71.

The other indicators of inequality shown in Table 1 have had heterogeneous dynamics over time. Other commonly used measures of inequality besides the Gini coefficient are the shares of wealth owned by various subsets of the richest households. These measures indicate that wealth inequality was following an upward trend in Estonia in 2013–2021. The share of wealth owned by the richest 10% increased from 55.7% in 2013 to 59% in 2021, while the share owned by the top 5% increased from 43.3% to 47.7% in that period. The ratios for the net wealth of households at different percentiles of the wealth distribution (e.g. 90/50 and 80/20) declined by contrast in 2017–2021. The ratio of the net wealth of the 80th and 20th percentiles fell strongly from 18.9% to 11.4%. It is likely that this was caused by the growth in household savings following the outbreak of the Covid-19 pandemic. Bank deposits make up a large part of the wealth of households in the lower deciles of the wealth distribution, and so their additional

savings affected the value of their wealth relatively more, narrowing the ratio of net wealth between the 80th and 20th percentiles.

Table 1. Indicators of inequality in the net wealth of Estonian households

	2013	2017	2021
Shares (%)			
Net wealth of the wealthiest 5% of households	43.3	45.5	47.7
Net wealth of the wealthiest 10% of households	55.7	58.1	59.0
Net wealth of the 50th-90th percentiles of households	36.9	35.1	33.6
Ratios			
Ratio of the 90th and 50th percentiles	4.5	4.7	4.3
Ratio of the 80th and 20th percentiles	17.9	18.9	11.4
Gini coefficient	0.69	0.71	0.71

Notes: The first rows of the table show the share of the net wealth that is owned by the given subgroup, for example the wealthiest 5% of households. The ratios illustrate differences in the levels of net wealth at different points of its distribution. The ratio of the 90th percentile to the 50th shows for example how much more wealth a household at the 90th percentile of the net wealth distribution owns than the median household. The changes in the point estimates of the indicators of net wealth inequality between the different waves of the survey are not statistically significant within 90% confidence bounds, except for the change in the 80/20 percentile ratio between 2017 and 2021.

Table 2 gives an overview of wealth inequality across different asset classes according to the Estonian 2021 HFCS survey. The figures presented show that the level of inequality differs markedly across different types of asset. The most equally distributed asset is the value of the HMR. This result is expected, since households typically own one house (respondents to the survey had to specify one residence where they mostly live) and therefore the inequality for this asset class can only stem from differences in real estate prices. The Gini coefficient of the value of the HMR is 0.48.

Business assets are the most unequally distributed type of asset among the wealth components covered in Table 2. The Gini coefficient of this asset class is 0.93, which is close to the level of 1 that stands for perfect inequality. The highly unequal distribution of this asset class is also evident from other measures of inequality, such as the share of wealth owned by the richest households. The wealthiest 10% own over nine tenths of the assets in this class, and the wealthiest 1% own around half.

Figures 5 and 6 illustrate how wide the inequality in wealth is in Estonia in comparison to that in other countries covered by the HFCS. They show the estimated Gini coefficients of net wealth and the share of wealth owned by the richest 5% of households in 22 countries using the data from the 2017 HFCS. Net wealth in Estonia is relatively unevenly distributed. Estonia has the fifth highest Gini coefficient and the second highest share of wealth owned by the top 5% of households among the countries shown in Figures 5 and 6. These two indicators taken together show Cyprus to be the only country where wealth is more unevenly distributed than it is in Estonia, while the Gini coefficient shows that wealth inequality is higher in Cyprus, the Netherlands, Germany and Austria than in Estonia. Estonia stands out for its wealth inequality among the countries of Central and Eastern Europe that share a similar economic history and have similar income levels, but that generally have relatively low wealth inequality (see also Brzezinski and Salach, 2021).

Table 2. Inequality of household wealth across different asset classes, Estonian HFCS 2021

	Gini coefficient	Assets of the wealthiest 10% (%)	Assets of the wealthiest 5% (%)	Assets of the wealthiest 1% (%)
Net wealth	0.709	59.0	47.7	30.4
Total assets	0.685	56.2	44.9	28.3
Non-financial assets	0.671	55.4	44.7	29.1
Household main residence	0.483	32.9	21.4	6.3
Business assets	0.935	91.6	82.8	48.4
Financial assets	0.796	67.7	53.8	30.4
Deposits	0.771	63.1	48.6	24.7

Notes: Columns 3-5 of the table show the share of the assets in the asset class in Estonia that is owned by the households defined, for example the wealthiest 5% of households. Gini coefficients are calculated for the households that own the given asset.

Figure 5. Gini coefficient of household net wealth, HFCS 2017

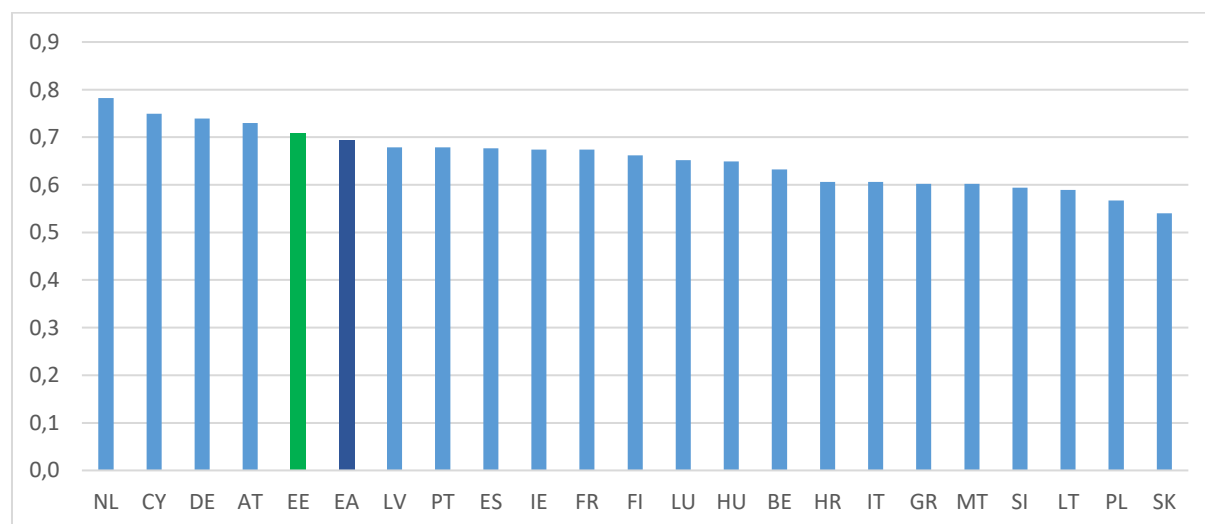
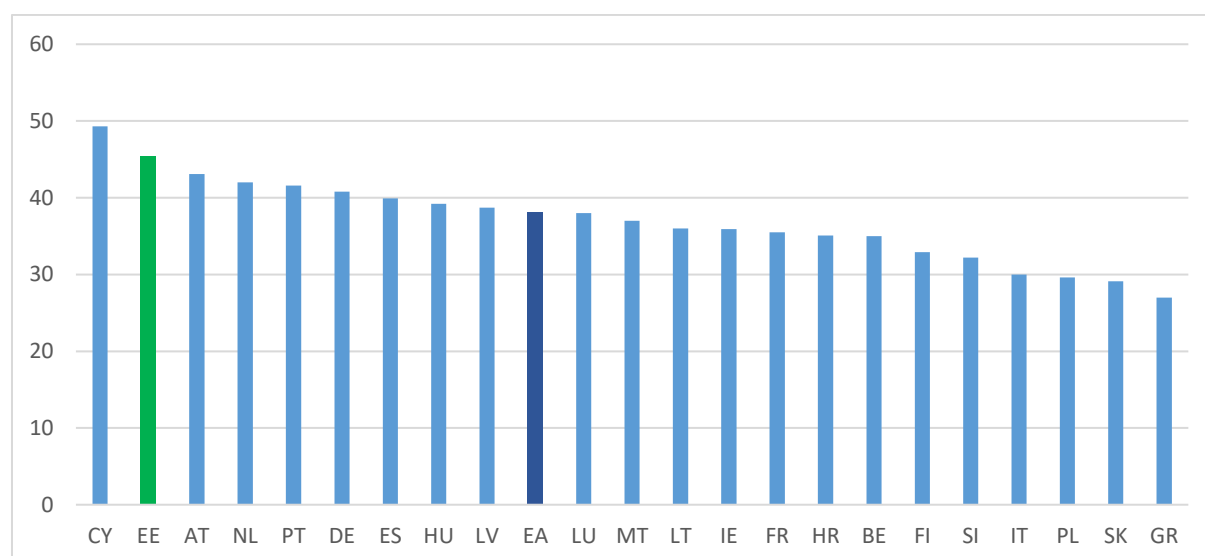


Figure 6. Share of net wealth owned by the richest 5% of households (%), HFCS 2017



What are the causes of differences in wealth inequality across countries? Wealth consists of accumulated savings and the value of wealth depends on how profitably those savings have been invested. Therefore net wealth inequality depends above all on factors like retrospective income inequality, the relationship between savings rates and incomes, and access to different options for saving and investment depending on the level of income. Income inequality is affected by equality of opportunity in general, such as equal access to education and to finding work, and by the extent that a given state redistributes incomes within a country through its system of taxes and benefits.

The main way for the average household to invest is to purchase real estate. This means that wealth inequality is affected substantially by the share of households that has access to real estate loans, and by differences in real estate prices. The most valuable asset that the typical household owns is its residence, and those who own their homes are on average considerably wealthier than those who rent (HFCS, 2013 and 2016). Net wealth inequality consequently depends on the share of the population that owns its own home. In most of the CEE countries it was possible to privatise household dwellings during the transition period; the only exception to this was East Germany. A large share of households in those countries consequently own their home, and wealth inequality is on average smaller than it is in Western European countries. Figure 7 illustrates the macro-level relationship between the share of homeowners and the Gini coefficient of net wealth with a scatterplot for those two variables and a linear least squares regression line. It demonstrates that there is a strong negative correlation between the homeownership rate and wealth inequality, as the correlation coefficient of the variables in the figure is -0.72 . The share of homeowners also correlates negatively with the share of wealth owned by the richest 5% of households, but the correlation between those two variables is weaker and the correlation coefficient is -0.34 .

The cross-country differences in wealth inequality can also stem from disparities in the structure of assets. As the Estonian data made evident, the level of inequality can vary substantially across asset classes. Given that business assets are the most unequally distributed class of assets, it may be expected that the share of business assets in total assets at the aggregate level will be positively correlated with wealth inequality. The scatterplot shown in Figure 8 provides evidence that these two variables are indeed positively correlated. Across the countries covered by the 2017 HFCS, the share of net wealth owned by the richest 5% of households and the share of business wealth in total wealth are strongly positively correlated (the correlation coefficient is 0.57). The same variable correlates positively with the Gini coefficient of net wealth as well, but this correlation is weaker (the correlation coefficient is 0.19).

Figure 7. The relationship between net wealth inequality and the home ownership rate, HFCS 2017

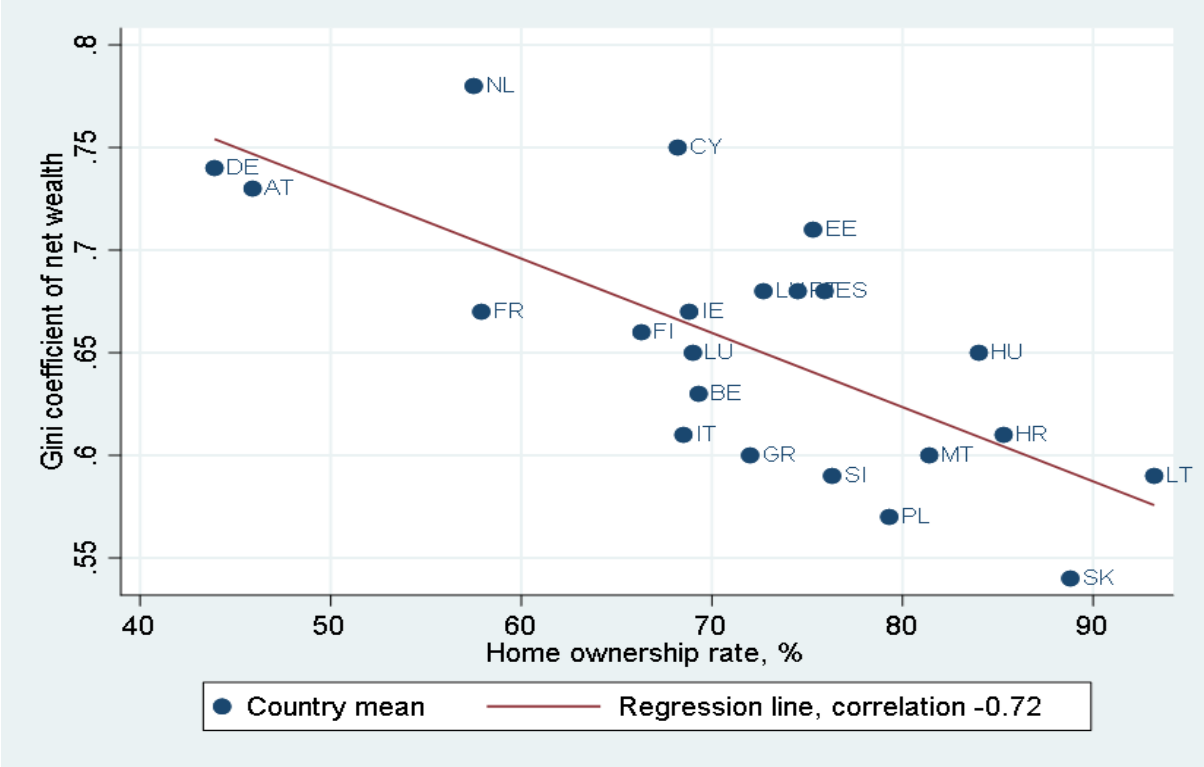
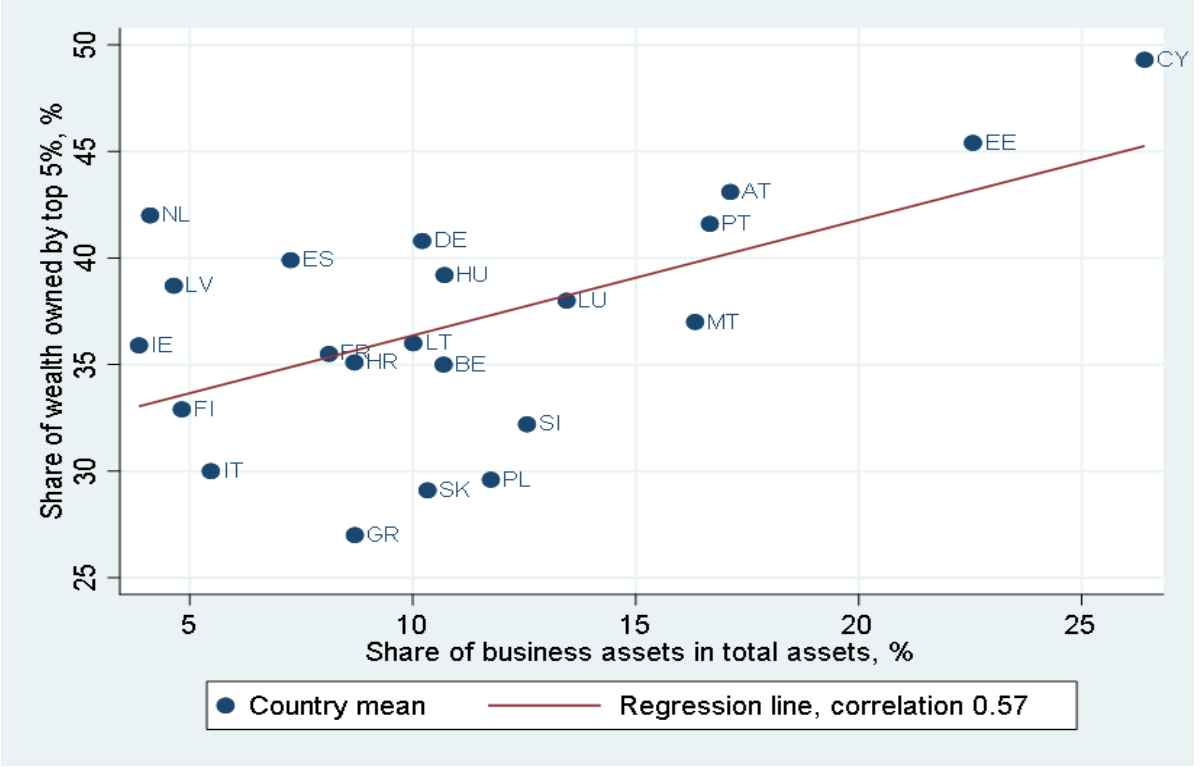


Figure 8. The relationship between net wealth inequality and the share of business assets in total assets, HFCS 2017



What are the reasons why the level of wealth inequality is high in Estonia in comparison to the levels in the other countries covered by the HFCS? The primary reason seems to be the structure of assets. Business assets make up a notably larger share of total assets in Estonia than in the euro area on average (22.6% and 8.6% respectively, according to the 2017 HFCS). As shown above, there is a strong positive relationship between business wealth and inequality.

A second possible reason is the large variation in real estate prices across different regions within Estonia. Real estate in Tallinn and its surrounding regions is notably more expensive than elsewhere in Estonia, and this causes wide differences in the value of net wealth across different regions (see Appendix 6). We cannot make any international comparison for the regional variation in net wealth, as the harmonised HFCS dataset does not contain regional identifiers within countries.

A third factor that can affect inequality, as we discussed earlier, is the share of homeowners in the population. The home ownership rate is relatively high in Estonia, and this has a dampening effect on wealth inequality, *ceteris paribus*. Despite that, inequality is wide in Estonia because of other factors. Figure 7 illustrates that Estonia lies substantially above the regression line, which means that inequality is larger than in other countries with similar home ownership rates.

Wealth and income inequality change slowly over time. Inequality is dependent in the long run on the progressivity of the tax system³. The Estonian tax system differs from the systems in most other medium and high-income countries because it is more regressive. It notably has a high effective tax rate on consumption and a relatively light capital tax burden (Anspal et al., 2021; see Appendix 7)⁴. Consumption taxes are regressive, and taxes on corporate income and wealth are typically progressive. The personal income tax in Estonia is also only moderately progressive.

For these reasons the tax system as a whole (considering the total combined effect of taxes) is likely to be regressive rather than progressive, which is exceptional among countries that have comparable or higher levels of income. Lower taxation of business income than of other types of income and consumption is one possible reason why the share of business assets in Estonia is one of the largest in the euro area and why it has grown rapidly over time. Business wealth is also very unevenly distributed in Estonia.

There may be other reasons alongside the features of the tax system for why the share of business wealth is so large. The low taxation of business income meant that until recently it was cheaper in Estonia to make financial investments through a company rather than as a private individual. A part of the business wealth in Estonia consequently consists of shares and other financial assets that should be classed as financial assets rather than business assets under the methodology of the HFCS. It is not possible to identify from the survey data though how much of the business wealth in Estonia consists of publicly traded shares and other financial assets.

³ A tax system is progressive when low-income households give away a lower share of their incomes as taxes than high-income households do, i.e. income and the tax burden are positively related. A tax system is regressive when the relationship between income and the tax burden is negative.

⁴ The tax burden on capital is low in Estonia as there is no corporate income tax in the traditional sense and companies do not pay tax on undistributed profits, meaning the effective tax rate on corporate income is small. The tax burden for rental income is also small. Wealth taxes are lower in Estonia than in other countries as well, since there are no real estate and inheritance taxes, land under a residential property is not taxed, and the effective tax burden on land is light.

Economic growth in Estonia has been dynamic in recent decades, exceeding the average in the EU as well as that in the euro area because of income convergence. Estonian GDP in 1995 at purchasing power parity was 36% of the EU average, but by 2021 this had risen to 87%. This has been accompanied by rapid entrepreneurial development, and there are probably more first-generation entrepreneurs who work for their own companies in Estonia than there are in other countries of the euro area⁵. There has also been a start-up boom in Estonia in recent decades, and start-up companies are typically owned by their managers. These trends have contributed to the increase in the share of business wealth in total wealth in Estonia.

It cannot be estimated from the data and methodology used in this paper how much of wealth inequality is a consequence of the Estonian tax structure, and how much of it has resulted from the dynamic economic growth of recent decades. Further research on this topic will hopefully shed more light on these questions. However, it is possible to analyse on the basis of the HFCS data how changes in the structure of assets in Estonia have affected wealth inequality. The next section provides an overview of this analysis.

5. Decomposition of net wealth inequality

The Gini coefficient of net wealth was stable over the time period covered by the three waves of the HFCS survey in Estonia, while the structure of assets changed. Different wealth components may have opposing effects on wealth inequality, and therefore their total net effect on the Gini coefficient can be close to zero.

We next assess the role of various net wealth components in determining wealth inequality and how the effects of various components have changed over time. We cover all the main components of real assets, financial assets and liabilities, and Table 3 lists all the net wealth components covered and shows their share in total net wealth together with their impact on wealth inequality in 2013, 2017 and 2021. The impact of each component is measured as an elasticity, i.e. we evaluate the percentage change in the Gini coefficient when a given component's share increases by 1%⁶. Elasticity depends on three factors: the share of a given component in net wealth, how equally or unequally that component is distributed, and the strength of the correlation between that component and net wealth.

Within the class of real assets, the share of the HMR in net wealth has decreased, while the share of business assets has increased. At the same time, both the reductive effect on inequality of the household residence and the amplificatory effect of business wealth have increased. The effect that the household residence reduces inequality in net wealth arises because that asset class is more equally distributed than total wealth, while business wealth increases inequality because it is less equally distributed than wealth as a whole. The effects of the two components on the inequality of net wealth are of the same magnitude, as an increase of 1% in wealth from the main residence reduces net wealth inequality by 0.138%, while an increase of 1% in business assets increases net wealth inequality by 0.099%. There is wide variation in the probability of owning these assets (79% of households owned their own home in 2021, while 15% owned business assets belonging to a company where some household members worked), but as the average value of business assets is so much larger than the value of the main

⁵ Active ownership, i.e. the assets of companies where household members work, is classed in the HFCS under real assets.

⁶ We use the Gini decomposition of Lerman and Yitzhak (1985) and the Van Kerm (2020) `sgini` command in Stata.

residence, and business assets are much more unevenly distributed, a change of 1% in the values of those two asset classes affects net wealth inequality by about the same magnitude.

Table 3. The effect of net wealth components on the Gini coefficient of net wealth, household-level estimates

	2013		2017		2021	
	Share of the component in net wealth	Effect of the component on the net wealth Gini, elasticity	Share of the component in net wealth	Effect of the component on the net wealth Gini, elasticity	Share of the component in net wealth	Effect of the component on the net wealth Gini, elasticity
Household main residence	0.545	-0.104	0.496	-0.126	0.472	-0.138
Other real estate properties	0.190	0.007	0.197	0.007	0.162	0.006
Vehicles	0.043	-0.012	0.026	-0.009	0.028	-0.011
Valuables	0.007	0.000	0.006	-0.001	0.006	-0.001
Self-employment business assets	0.192	0.069	0.247	0.088	0.268	0.099
Deposits	0.075	-0.018	0.087	-0.021	0.112	-0.020
Mutual funds	0.003	0,001	0.005	0,001	0.009	0.002
Debt securities	0.000	0.000	0.000	0.000	0,001	0.000
Private no-self-employment business assets	0.011	0.003	0.010	0.003	0.004	0,001
Shares, publicly traded	0.002	0.000	0.007	0,001	0.016	0.004
Assets in managed accounts	0.000	0.000	0.000	0.000	0.000	0.000
Money owed to the household	0.010	0,001	0.004	-0.001	0.002	-0.001
Other financial assets	0,001	0.000	0.000	0.000	0.007	0,001
Voluntary pension funds	0.009	-0.001	0.010	-0.001	0.010	-0.001
HMR mortgages	-0.075	0.044	-0.070	0.039	-0.078	0.044
Mortgages on other properties	-0.009	0.005	-0.015	0.005	-0.008	0,001
Credit line / overdraft	0.000	0.000	0.000	0.000	0.000	0.000
Credit card debt	-0.001	0.000	-0.002	0.002	-0.001	0,001
Other non-mortgage debt	-0.004	0.005	-0.009	0.011	-0.009	0.012

Owning real estate does not always reduce net wealth inequality however, as an increase of 1% in other real estate increases the inequality of net wealth by 0.007%. Other real estate holdings are more unequally distributed than the HMR.

The subcomponent of financial assets that has the largest impact on wealth inequality is deposits. The value of deposits has increased considerably between the two most recent survey waves and this has had a dampening effect on inequality. Other asset classes besides deposits that have the effect of decreasing inequality are loans to other households and voluntary pension assets, but their role is much smaller than that of deposits. The share of riskier financial assets in net wealth has increased as well and this asset class has the effect of widening inequality. The total share of financial assets in net wealth has increased over the survey waves, and the more evenly distributed deposits grew by more than the less equally distributed riskier financial assets did. It may therefore be expected that changes in financial assets have reduced wealth inequality between the survey waves.

Liabilities have the effect of increasing inequality. Since the net wealth is the difference between assets and liabilities, liabilities are added to the decomposition with a minus sign. Wealthier households typically have fewer loans and therefore an increase in the loan burden has a stronger effect on less wealthy households and leads to an increase in inequality. Mortgages are the loan type that has the largest impact on inequality, and their impact is more than twice that of deposits and is only below that of the HMR and business assets.

We next summarise how each component affected the dynamics of net wealth inequality between the waves of the survey. We use a non-parametric Shapley decomposition,⁷ which enables us to assess what the net wealth inequality in the next period would be if the distribution and values of one component had not changed between the periods. This allows one-by-one estimation of the roles of all the components in net wealth dynamics by comparing the actual inequality in the next period with the imputed inequality, with one component kept constant. Table 4 provides the results of the decomposition. We show for each net wealth component the difference between the two Gini coefficients, i.e. the actual coefficient and the imputed coefficient when the given component is held constant.

As expected, the household main residence has the strongest effect on the dynamics of net wealth inequality among the net wealth components. The Gini coefficient would have grown by 0.029 from 2013 to 2017 and by 0.047 from 2017 to 2021 if the values of the HMR had remained constant on average. This implies that the dynamics of the HMR value reduced inequality. However, the dynamics of self-employment business assets increased inequality. The Gini coefficient of net wealth would have been 0.018 lower in 2017 and 0.029 lower in 2021 if the value of self-employment business wealth had remained at the same level as in the previous period. The third component that had a significant effect on inequality was debt. The growth of consumer loans increased inequality between the first two waves of the survey and an increase in the outstanding value of HMR mortgages had the same effect between the second and third waves.

Although the Gini coefficient did not change between the two most recent waves of the survey, the net wealth components changed substantially. In one direction, rising real estate prices reduced wealth inequality, while in the other, the growth in business wealth and housing loans increased it. These opposite effects were of the same magnitude and so their net impact on the Gini coefficient was close to zero.

⁷ We use the Stata command `adecomp` written by Azevedo et al. (2012).

Table 4. The effects of net wealth components on the dynamics of the Gini coefficient, household-level estimates

	2017 versus 2013	2021 versus 2017
Total change in the Gini coefficient	0.709 – 0.691 = 0.018	0.709 – 0.709 = 0
Household main residence	–0.029	–0.047
Other real estate properties	0.006	0.002
Vehicles	0.005	–0.004
Valuables	0.002	0,001
Self-employment business assets	0.018	0.023
Deposits	–0.002	–0.004
Mutual funds	0.002	0,001
Debt securities	0,001	0,001
Private no-self-employment business assets	0.002	0.000
Shares, publicly traded	0.002	0.004
Assets in managed accounts	0,001	0,001
Money owed to the household	0,001	0,001
Other financial assets	0,001	0,001
Voluntary pension funds	0,001	0,001
HMR mortgages	0.003	0.025
Mortgages on other properties	0.002	0.000
Credit line / overdraft	0.003	0,001
Credit card debt	0.007	0,001
Other non-mortgage debt	0.018	0.006

The dynamics of net wealth can also be affected by changes in the structure of the population of households. We next analyse how the inequality of net wealth is affected by the migration of households between Estonian regions and by changes in the structure of households across different household sizes.

Table 5 presents the estimated shares of households who dwell in each region and the Gini coefficients of net wealth across 15 Estonian regions and Tallinn, the capital city. It is evident from the statistics presented that the internal migration mainly took place from other regions to Tallinn and its surrounding areas, and to other larger cities. The share of households residing in Tallinn and Harjumaa increased over the three waves of the survey by 2.5 percentage points in total, while the share of households living in Pärnumaa increased by 1.3 percentage points. The regions that experienced the biggest population declines were Ida-Viru and Lääne-Viru, where the share of households declined by 1.5 percentage points and 1.2 percentage points correspondingly. The households have mainly migrated from regions with lower incomes and high unemployment to wealthier regions.

The results of the decomposition demonstrate that the effect of this structural change on the inequality of net wealth in Estonia is very small. The dynamics of this variable are mostly caused by changing inequality within regions, not by structural changes between regions.⁸ Net

⁸ The impact of structural change on inequality can be decomposed for inequality indicators by using the generalised entropy measure of inequality GE(2), which allows the decomposition to be carried out even when

wealth inequality increased notably in Tallinn in 2013–2017 for example, and that increased overall inequality. It should be emphasised, however, that the estimates of the Gini coefficient across regions have wide confidence bounds. The 95% confidence bounds for Tallinn (the largest region) are ± 0.05 for example. We employ dispersion analysis as an alternative method and it provides similar results, indicating that regional differences have no explanatory power for net wealth dispersion in Estonia, as the differences between regions explain only 1% of the dispersion of net wealth, while the majority of the variation in net wealth is caused by the dispersion within regions.

Table 5. The Gini coefficient of net wealth across Estonian regions, household-level estimates

	2013		2017		2021	
	Share of households	Gini coefficient	Share of households	Gini coefficient	Share of households	Gini coefficient
Tallinn	0.316	0.598	0.328	0.698	0.334	0.711
Harjumaa excluding Tallinn	0.107	0.666	0.106	0.632	0.113	0.638
Hiiumaa	0.006	0.538	0.007	0.692	0.006	0.649
Ida-Virumaa	0.116	0.656	0.117	0.597	0.101	0.664
Jõgevamaa	0.025	0.572	0.024	0.663	0.023	0.673
Järvamaa	0.025	0.766	0.024	0.726	0.022	0.571
Läänemaa	0.021	0.634	0.020	0.686	0.014	0.577
Lääne-Virumaa	0.056	0.693	0.044	0.683	0.043	0.640
Põlvamaa	0.017	0.663	0.020	0.620	0.018	0.638
Pärnumaa	0.057	0.640	0.062	0.777	0.070	0.699
Raplamaa	0.025	0.791	0.025	0.656	0.024	0.544
Saaremaa	0.024	0.626	0.027	0.687	0.028	0.650
Tartumaa	0.117	0.786	0.109	0.671	0.113	0.673
Valgamaa	0.028	0.657	0.023	0.610	0.023	0.589
Viljandimaa	0.034	0.640	0.042	0.658	0.041	0.578
Võrumaa	0.026	0.612	0.021	0.524	0.026	0.626

We next analyse the role of the structure of households in the dynamics of inequality, and present the results in Table 6. The share of single-member households increased over the waves of the survey, while the share of households with two, three or four members declined. More precisely, the share of single-member households increased over the three waves of the survey by 6.5 percentage points, while the share of households with two, three or four members declined by almost the same amount⁹. This structural change again plays a vanishingly small role for inequality, largely because the dynamics of inequality within size groups for households have been quite volatile over time, and so it is not possible to identify reliable trends. As with

some net wealth observations are negative. We use the `ineqdeco0` command in Stata to find the GE(2) indicators for regions, and we use shift-share analysis. The Gini coefficient is not suitable for such additive decomposition, but as we have used it as a measure of inequality throughout this analysis, we present the Gini coefficients across regions in Table 5. The shift-share analysis that is based on the Gini coefficient yields very similar results to those using the generalised entropy measure GE(2).

⁹ This trend is in line with the calculations of Statistics Estonia. Their data show that the share of households with one adult member increased by 7.3 percentage points from 2013 to 2021 and the share of households with 2–4 members fell by the same amount (see Statistics Estonia Table LEM 04).

the regional changes, household size explains only 1–2% of the dynamics of the dispersion of net wealth, and the differences mainly come from the dispersion within the household size groups.

Table 6. The Gini coefficient of net wealth across household size groups, household-level estimates

	2013		2017		2021	
	Share of households	Gini coefficient	Share of households	Gini coefficient	Share of households	Gini coefficient
One member	0.358	0.706	0.391	0.663	0.422	0.676
Two members	0.298	0.612	0.272	0.711	0.265	0.732
Three members	0.163	0.616	0.158	0.652	0.142	0.582
Four members	0.127	0.743	0.123	0.666	0.111	0.695
Five or more members	0.054	0.614	0.056	0.643	0.059	0.649

In summary, net wealth inequality remained unchanged because the components of net wealth affected it in opposite directions. The role of the HMR as a component that reduces inequality has increased in relevance for example, while the importance of business wealth as a component that reduces inequality has grown simultaneously. At the same time, the structural changes of the general population across regions and across household size were not large enough and did not systematically incline towards a structure with greater or lesser inequality, so the changes in household structure had no significant effect on net wealth inequality.

6. Wealth inequality at the household level versus the individual level

Assets and liabilities are not distributed evenly between household members. Therefore it is relevant to study the extent of inequality not only at the household level, but also at the individual level. Beyond evaluating net wealth inequality, it is also important to learn whether its explanatory factors remain the same at different levels of disaggregation.

Table 7 presents the Gini coefficients of net wealth and the shares of wealth owned by the richest 1% and 5% at the household and individual levels. Both estimates are shown together with the 90% confidence bounds. The analysis of inequality at the individual level covers adult household members who are at least 24 years old, and household members aged 16–24 are included only if they are not in work and still live with their parents.

Inequality is estimated to be wider at the individual level than at the household level for all measures of inequality. The Gini coefficient is 0.04–0.06 higher at the individual level than at the household level, the share of wealth owned by the richest 1% is 2–3 percentage points higher at the individual level, and the share of the wealthiest 5% is 3–4 percentage points higher. The differences that we find between the measures of inequality at the individual and household levels are even greater than that found with an imputed estimate of individual-level net wealth inequality for the whole population, which used a subgroup of single-member households (Kukk et al., 2022). This is to be expected, as forecasts of inequality from models like those in Kukk et al. (2022) underestimate the actual level of inequality (Meriküll and Rõõm, 2022).

There are substantial differences between the degrees of inequality at the household and individual levels, and in 2017 those differences were also statistically significant. The most downward biased estimate of inequality at the household level in percentage terms is for the share of the wealthiest 1% of households. This is also to be expected, as that is where the distribution of net wealth is affected most by business assets, which are often not equally distributed within a household.

Table 7. Inequality estimates at the household and individual levels based on register data

	Households			Individuals			Difference at the household and individual levels	Difference at the household and individual levels, %
	Point estimate	Lower confidence bound, 90%	Upper confidence bound, 90%	Point estimate	Lower confidence bound, 90%	Upper confidence bound, 90%		
Gini, 2013	0.705	0.664	0.745	0.762	0.731	0.794	0.058	8.2
Gini, 2017	0.667	0.653	0.681	0.722	0.711	0.733	0.055	8.3
Gini, 2021	0.674	0.649	0.698	0.715	0.695	0.734	0.041	6.1
Top 1%, 2013	20.3	11.0	29.6	23.3	14.1	32.4	3.0	14.8
Top 1%, 2017	12.7	11.4	14.0	15.2	13.7	16.6	2.4	18.8
Top 1%, 2021	17.8	13.4	22.1	19.5	15.2	23.8	1.7	9.8
Top 5%, 2013	40.0	32.6	47.3	43.5	36.5	50.5	3.5	8.9
Top 5%, 2017	33.7	31.9	35.6	37.6	35.9	39.4	3.9	11.6
Top 5%, 2021	37.7	33.7	41.6	40.5	36.8	44.2	2.8	7.5

Notes: The figures in bold indicate statistically significant differences between the estimates of inequality at the household and individual levels.

Next, we carry out an analysis that is similar to that reported in Section 5, but with the estimations carried out at a different level of disaggregation. We evaluate the role of net wealth components and study the effects on inequality of structural changes across regions and households at the individual level.

The results are generally very similar to those found at the household level. Table 8 shows how the components of net wealth affect the Gini coefficient at the individual level, and the results it presents are similar to those in Table 3. Wealth inequality is affected most by the household main residence, which reduces inequality. Business wealth and housing loans also have a strong impact on inequality by increasing it. An important difference at the individual level is that business assets have less of an impact on inequality than they do at the household level. This however is caused by the use of register data for this analysis instead of the survey data that were used before. The estimate from register data at the household level for how business wealth affects inequality is of the same magnitude as the estimate shown in Table 3 (see Appendix 8). We also find that the effect of loans on inequality was larger in the register data in the first wave of the survey than in the survey data. This difference is caused by changes in the HFCS methodology: the data on loans were collected from household interviews in the first wave of the survey, but the survey data were gradually replaced as a source of this information

by register data in the subsequent waves. Earlier studies have shown that households underreport their liabilities in surveys (Meriküll and Rõõm, 2020).¹⁰

Table 8. The effect of net wealth components on the Gini coefficient of net wealth, individual-level estimates

	2013		2017		2021	
	Share of the component in net wealth	Effect of the component on the Gini for net wealth, elasticity	Share of the component in net wealth	Effect of the component on the Gini for net wealth, elasticity	Share of the component in net wealth	Effect of the component on the Gini for net wealth, elasticity
Household main residence	0.468	-0.125	0.520	-0.089	0.477	-0.101
Other real estate properties	0.364	-0.019	0.337	-0.008	0.295	0.006
Vehicles	0.030	-0.016	0.027	-0.015	0.032	-0.017
Self-employment business assets	0.167	0.033	0.074	0.021	0.121	0.037
Deposits	0.094	-0.023	0.107	-0.024	0.114	-0.023
Investment funds	0.003	0.000	0.006	0.002	0.007	0.001
Debt securities	0.000	0.000	0.000	0.000	0.001	0.000
Private no-self-employment business assets	N/A	N/A	0.037	0.005	0.035	0.006
Shares, publicly traded	0.003	0.000	0.007	0.001	0.017	0.004
Other financial assets	0.000	~	0.000	0.000	0.000	0.000
Voluntary pension funds	0.011	-0.003	0.013	-0.002	0.009	-0.002
HMR mortgages	-0.099	0.105	-0.083	0.070	-0.077	0.059
Mortgages on other properties	-0.026	0.028	-0.032	0.023	-0.022	0.017
Credit line / overdraft	0.000	0.001	0.000	0.000	0.000	0.000
Credit card debt	-0.004	0.004	-0.002	0.002	-0.001	0.001
Other non-mortgage debt	-0.012	0.016	-0.010	0.013	-0.008	0.010

Notes: N/A indicates that no estimate can be found from the 2013 dataset. It was not possible in that wave of the survey to differentiate between self-employment business assets and other business assets when using the register data, and all business wealth was recorded as self-employment business assets. ~ indicates that no household in the sample in that year owned the given asset.

¹⁰ The 2013 Estonian HFCS was the only survey wave run entirely in parallel, with information taken both from the survey and from registers for all the components of net wealth, and therefore it is the only survey wave that is suitable for comparing register data and survey data. The data in Meriküll and Rõõm (2022) show that the survey data underestimate the inequality in net wealth relative to the register data. Subsequent waves of the HFCS in Estonia have gradually replaced survey data with register data, and so the results of those surveys can no longer be used for comparing the two sets of data. Register data have always been collected in the same way in each wave of the survey, and those data are better suited than survey data for making comparisons across different waves of the survey.

Table 9, similarly to Table 4, gives an overview of how different components of wealth have affected the dynamics of net wealth inequality across the waves of the survey. The results are again similar to the estimates at the household level since the only difference is that the impact of business wealth is smaller, but it is confirmed that the impact of housing loans as a factor that increases inequality has grown over time.

Table 9. The effect of net wealth components on the dynamics of the Gini coefficient of net wealth, individual-level estimates

	2017 versus 2013	2021 versus 2017
Total change in the Gini coefficient	$0.722 - 0.762 = -0.041$	$0.715 - 0.722 = -0.007$
Household main residence	-0.023	-0.060
Other real estate properties	-0.008	0.005
Vehicles	-0.003	-0.007
Self-employment business assets	-0.003	0.015
Deposits	-0.008	-0.010
Investment funds	0.000	0,001
Debt securities	0.000	0.002
Private no-self-employment business assets	-0.001	0.002
Shares, publicly traded	0.000	0.004
Other financial assets	0.000	0.002
Voluntary pension funds	0.000	0.000
HMR mortgages	0.004	0.039
Mortgages on other properties	0.004	0.009
Credit line / overdraft	-0.001	0.003
Credit card debt	-0.001	0.003
Other non-mortgage debt	0.000	0.005

As we did in Table 5, we can also estimate here how inequality is affected by migration within the country from the poorest regions to the wealthiest, but this time at the individual level; the results are shown in Table 10. It is again not evident that migration takes place towards regions with greater inequality and that that could explain part of the dynamics of net wealth inequality in Estonia. As we did with the survey data, we find that wealth inequality in Tallinn has narrowed and that the fall in the Gini coefficient for Tallinn at the individual level between the first two waves of the survey was statistically significant at the 90% confidence level. The share of individuals living in Tallinn increased by less than a percentage point though, and so the structural change is so small that it can explain only a small part of the decline in net wealth inequality. Although the structural change reduced inequality, it had a vanishingly small effect, as most of the decline in net wealth inequality came from the dynamics of inequality within regions, not from an increase in the share of people in regions with less inequality.

Table 10. The Gini coefficient of net wealth across regions, individual-level estimates

	2013		2017		2021	
	Share of individuals	Gini coefficient	Share of individuals	Gini coefficient	Share of individuals	Gini coefficient
Tallinn	0.317	0.711	0.325	0.657	0.336	0.661
Harjumaa, excluding Tallinn	0.112	0.721	0.113	0.706	0.117	0.717
Hiiumaa	0.006	0.726	0.008	0.812	0.006	0.805
Ida-Virumaa	0.120	0.653	0.111	0.680	0.103	0.763
Jõgevamaa	0.024	0.670	0.025	0.664	0.024	0.704
Järvamaa	0.021	0.754	0.022	0.793	0.022	0.598
Läänemaa	0.021	0.888	0.020	0.787	0.014	0.633
Lääne-Virumaa	0.054	0.769	0.043	0.787	0.041	0.729
Põlvamaa	0.016	0.729	0.021	0.671	0.018	0.729
Pärnumaa	0.058	0.735	0.063	0.701	0.068	0.644
Raplamaa	0.022	0.737	0.026	0.679	0.024	0.556
Saaremaa	0.026	0.630	0.027	0.672	0.028	0.651
Tartumaa	0.111	0.806	0.109	0.713	0.115	0.736
Valgamaa	0.028	0.736	0.024	0.671	0.020	0.674
Viljandimaa	0.033	0.707	0.038	0.655	0.037	0.690
Võrumaa	0.032	0.785	0.025	0.661	0.027	0.680

As with the structural changes across regions, we estimate how changes in the structure of households affected inequality at the individual level, and the results are shown in Table 11. The differences in the shares of individuals and in the Gini coefficient of inequality are substantially different here from those in the household-level analysis shown in Table 6. The first difference is that the shares at the individual level are different from those at the household level. In 2013, the share of single-member households was about 33%, while a fifth of all individuals lived in a household with one adult. In 2021, the share of single-member households had risen to 42%, while 25% of all people lived in a household with one adult.

The second important difference is that inequality at the individual level clearly increases when the household grows. This is also to be expected, as inequality is the same at the individual level and the household level for single-member households, while there are two layers for households with multiple members, since within-household inequality should be added to the household-level inequality to estimate the inequality at the individual level. The larger the household is, the greater the chance of differences in wealth levels between household members being wider. Comparing Tables 6 and 11 shows that wealth inequality within households in 2021 was widest for households that had 3–5 members or more. The Gini coefficient at the individual level for the largest households is almost 0.80, and 0.15 of that comes from inequality within the household. As net wealth inequality is clearly wider at the individual level in larger households, a reduction in the share of larger households also reduces inequality.

Table 11. The Gini coefficient of net wealth across household size groups, individual-level estimates

	2013		2017		2021	
	Share of individuals	Gini coefficient	Share of individuals	Gini coefficient	Share of individuals	Gini coefficient
One member	0.206	0.708	0.227	0.694	0.253	0.674
Two members	0.324	0.676	0.301	0.670	0.304	0.691
Three members	0.211	0.774	0.208	0.729	0.197	0.701
Four members	0.170	0.865	0.167	0.771	0.150	0.749
Five or more members	0.089	0.823	0.096	0.814	0.096	0.798

It can be said in summary that although there is greater inequality in net wealth at the individual level than at the household level, the components of net wealth that explain inequality are very similar at both levels of analysis. It is confirmed that the HMR reduces inequality, while business wealth and the value of loans increase it. Analyses at the individual and household levels also yield similar results for migration within the country not particularly affecting the dynamics of net wealth inequality. The only significant difference between the two levels of analysis comes from the effect of the size structure of households on inequality; inequality is wider in larger households at the individual level, as this level of analysis takes within-household inequality into account, and that form of inequality increases with household size. This means it would be misleading to assume that assets and liabilities are distributed evenly within households, and not accounting for inequality within the household leads to an underestimation of inequality within society.

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Appendixes

Appendix 1. Definition of the assets and liabilities of households in the HFCS

ASSETS	LIABILITIES
Real assets:	Mortgage loans:
Household main residence (HMR)	HMR mortgages
Other real estate properties	Mortgages on other properties
Self-employment business assets	
Vehicles	
Valuables	
Financial assets:	Other loans:
Demand deposits	Credit line / overdraft
Savings and other deposits	Credit card debt
Debt securities	Other non-mortgage loans
Investments in mutual funds	
Private no-self-employment business assets	
Shares, publicly traded	
Loans to other households	
Voluntary pension funds, life insurance	
Other (derivatives, precious metals, licence fees, etc)	

Notes: Assets do not include cars with a current lease contract and second pension pillar assets. Liabilities do not include lease payments for cars. The net wealth of households is found by subtracting their liabilities from their assets.

Appendix 2. Data sources for household assets and liabilities in the Estonian HFCS

	HFCS 2017	HFCS 2021	Data source for data from registers
Real assets:			
Household main residence	Interview	Interview	
Other real estate properties	Interview	Interview	
Self-employment business assets	Interview	Interview	
Vehicles	Interview	Interview	
Valuables	Interview	Interview	
Financial assets*:			
Demand deposits	Register, interview	Register, interview	Commercial banks
Savings and other deposits	Register, interview	Register, interview	Commercial banks
Investments in mutual funds	Register, interview	Register, interview	Commercial banks, Central Register of Estonian Securities
Debt securities	Register, interview	Register, interview	Commercial banks, Central Register of Estonian Securities
Shares, publicly traded	Register, interview	Register, interview	Commercial banks, Central Register of Estonian Securities
Private no-self-employment business assets	Interview	Interview	
Loans to other households	Interview	Interview	
Voluntary pension funds	Register	Register	Central Register of Estonian Securities
Life insurance contracts	Register	Register	Life insurance companies
Other financial assets	Interview	Interview	
Mortgage loans:			
HMR mortgages	Interview	Register	Commercial banks, Tax and Customs Board
Mortgages on other properties	Interview	Register	Commercial banks, Tax and Customs Board
Other loans**:			
Credit line / overdraft	Register, interview	Register	Commercial banks
Credit card debt	Register, interview	Register	Commercial banks
Other non-mortgage loans	Register, interview	Register, interview	Commercial banks

Notes: * Data on the financial assets held in Estonia are taken from register data, those on assets held abroad are from the interviews. The volume of assets held abroad is very small. ** Data on consumer loans and other unsecured loans are taken from registers. Data on loans from private individuals are taken from the questionnaire.

Appendix 3. Structure of households in Estonia and the euro area (%)

	Estonia 2013	Estonia 2017	Estonia 2021	Euro area 2017
All households	100.0	100.0	100.0	100.0
Household size				
1	35.8	39.1	42.2	34.6
2	29.8	27.2	26.5	31.6
3	16.3	15.8	14.2	15.4
4	12.7	12.3	11.1	12.9
Five or more	5.4	5.6	5.9	5.6
Ownership status of residence				
Homeowner (no loan)	57.8	57.2	55.9	39.8
Homeowner (with a loan)	18.7	18.1	23.0	20.5
Renting or other	23.5	24.7	21.1	39.7
Age of reference person				
16–34	20.0	18.8	18.4	14.1
35–44	17.6	16.8	17.2	17.0
45–54	18.0	18.0	17.8	20.3
55–64	17.5	17.8	17.4	18.3
65–74	13.5	13.5	15.4	14.8
75+	13.5	15.0	13.8	15.5
Employment status of reference person				
Waged employee	57.4	60.4	59.4	50.3
Self-employed	5.1	4.8	6.3	8.7
Retired	26.8	26.7	27.0	30.1
Other not employed	10.7	8.1	7.3	11.0
Education level of reference person				
Basic education or lower	16.5	14.9	12.0	30.5
Secondary education	49.5	47.2	46.1	40.6
Higher education	34.0	37.9	41.9	28.9

Notes: The table presents the weighted average shares of the sub-groups of households in the population by their demographic characteristics. The Canberra Group definition (UNECE, 2011) is applied for choosing household reference person. The category of 'other not working' covers households where the reference person is unemployed or is inactive for reasons other than retirement, such as studying, raising children, or doing military service. Basic education in the euro area also covers the 0.1% for whom there is no information about the level of education.

Appendix 4. Regional distribution of households (%)

	2013	2017	2021
Harjumaa	42.3	43.5	44.8
Ida-Virumaa	11.6	11.7	10.1
Jõgevamaa	2.5	2.4	2.3
Järvamaa	2.5	2.4	2.2
Läänemaa	2.1	2.0	1.4
Lääne-Virumaa	5.6	4.4	4.3
Põlvamaa	1.7	2.0	1.8
Pärnumaa	5.7	6.2	7.0
Raplamaa	2.5	2.5	2.4
Hiiumaa and Saaremaa	3.0	3.4	3.4
Tartumaa	11.7	10.9	11.3
Valgamaa	2.8	2.3	2.3
Viljandimaa	3.4	4.2	4.1
Võrumaa	2.6	2.1	2.6

Notes: Hiiumaa and Saaremaa are shown together because of the low number of observations.

Appendix 5. Ownership rates of business wealth and household main residence

Figure A5.1. Ownership rate of business assets (%), HFCS 2017

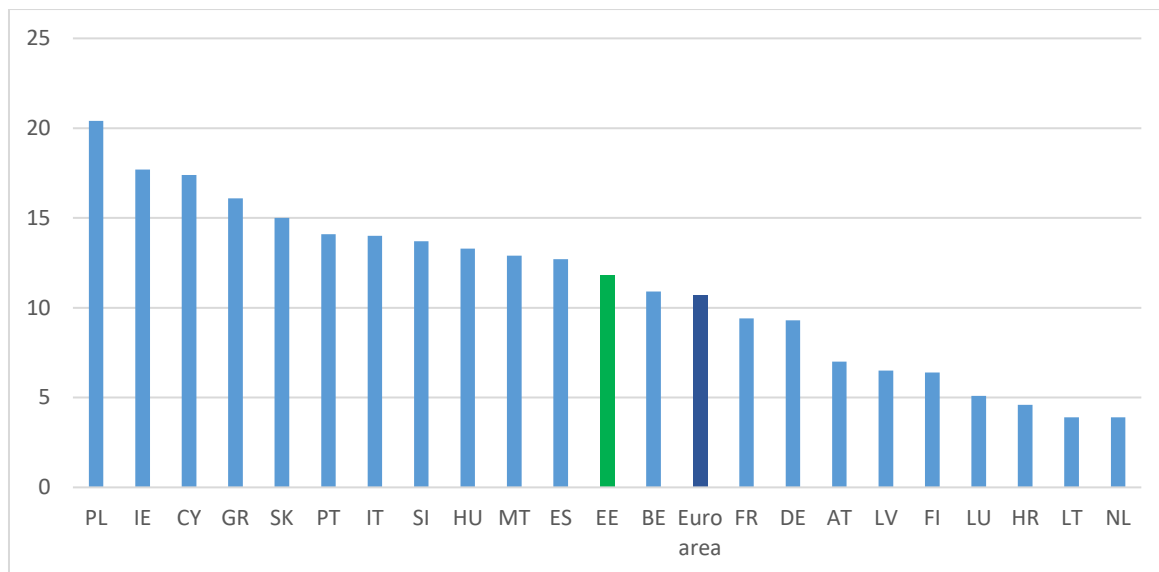
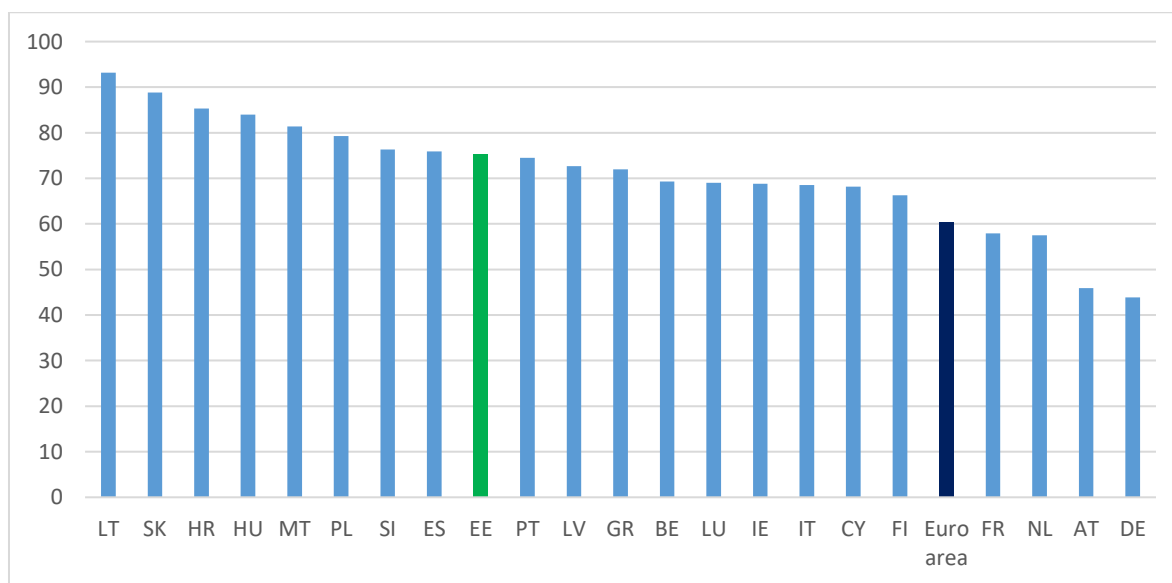
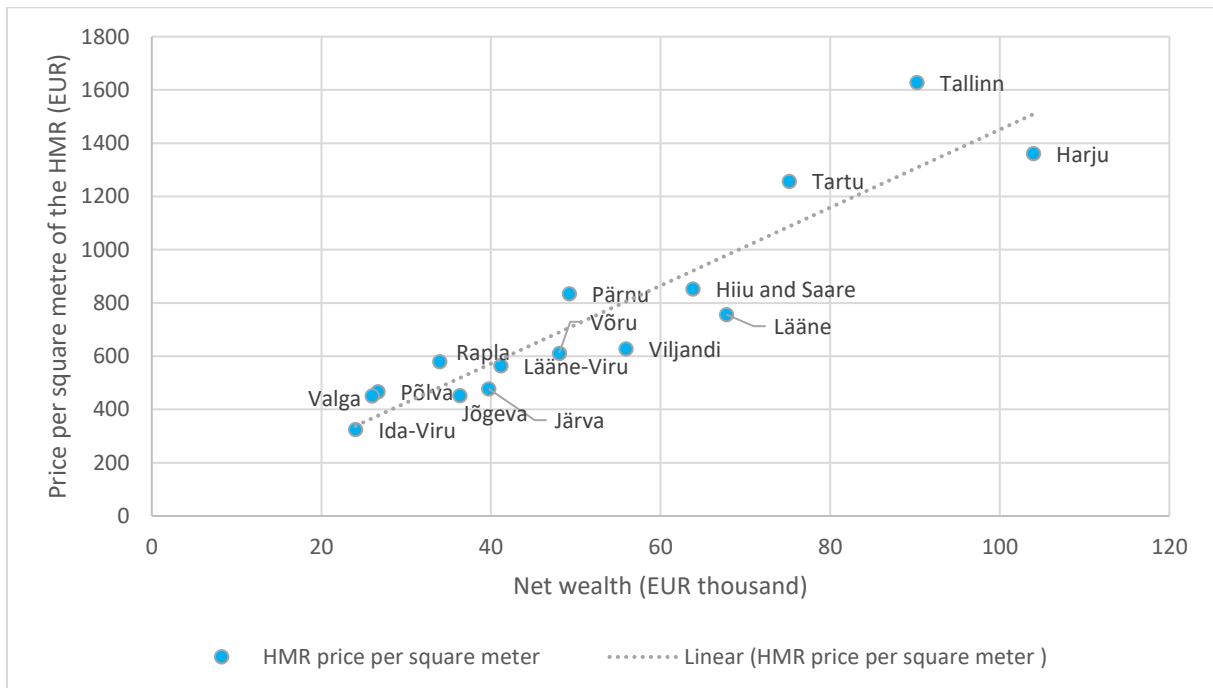


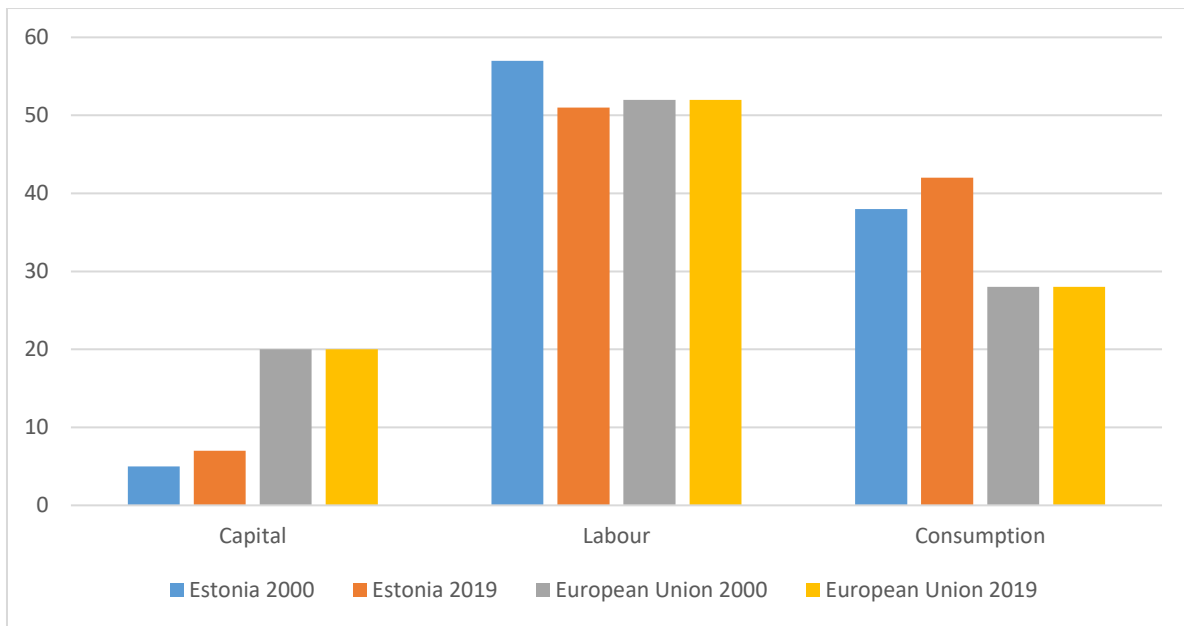
Figure A5.2. Ownership rate of household main residence (%), HFCS 2017



Appendix 6. The relationship between the HMR price per square metre and household net wealth by regions, Estonian HFCS 2021



Appendix 7. The tax structures in Estonia and the European Union



Notes: The figure presents the share of taxes on capital, labour and consumption within total tax revenues.
Source: Anspal et al. (2021).

Appendix 8. The effect of net wealth components on the Gini coefficient of net wealth, household-level estimates based on register data

	2013		2017		2021	
	Share of the component in net wealth	Effect of the component on net wealth Gini, elasticity	Share of the component in net wealth	Effect of the component on net wealth Gini, elasticity	Share of the component in net wealth	Effect of the component on net wealth Gini, elasticity
Household main residence	0.465	-0.147	0.519	-0.109	0.476	-0.127
Other real estate properties	0.366	0.000	0.337	0.015	0.296	0.023
Vehicles	0.031	-0.015	0.027	-0.013	0.032	-0.017
Self-employment business assets	0.166	0.045	0.073	0.026	0.121	0.043
Deposits	0.095	-0.019	0.107	-0.020	0.114	-0.017
Investment funds	0.003	0.001	0.006	0.002	0.007	0.002
Debt securities	0.000	0.000	0.000	0.000	0.001	0.000
Private no-self-employment business assets	N/A	N/A	0.037	0.008	0.035	0.008
Shares, publicly traded	0.003	0.000	0.007	0.002	0.017	0.005
Other financial assets	0.000	~	0.000	0.000	0.000	0.000
Voluntary pension funds	0.011	-0.002	0.012	0.000	0.009	-0.001
HMR mortgages	-0.098	0.098	-0.082	0.060	-0.076	0.057
Mortgages on other properties	-0.025	0.023	-0.032	0.016	-0.022	0.012
Credit line / overdraft	0.000	0.001	0.000	0.000	0.000	0.000
Credit card debt	-0.004	0.003	-0.002	0.002	-0.001	0.001
Other non-mortgage debt	-0.012	0.014	-0.010	0.012	-0.008	0.010

Notes: N/A indicates that no estimate can be found from the 2013 dataset. It was not possible in that wave of the survey to differentiate between self-employment business assets and other business assets using the register data, and all business wealth was recorded as self-employment business assets. ~ indicates that no household in the sample in that year owned the given asset.

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Sünne Korasteljev, Annika Laarmaa, Jaanika Meriküll ja Tairi Rõõm. Assets and liabilities of Estonian households: results from the 2021 survey