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### The impact of homeownership on wealth inequality: A cross-country empirical analysis based on HFCS data

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## The impact of homeownership on wealth inequality: A cross-country empirical analysis based on HFCS data

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### Abstract

This study analyzes the impact of homeownership on wealth inequality across Germany, Spain, France, and Italy. By running a regression of the recentered influence function (RIF) of the unconditional quantile of equalized net household wealth on the explanatory variables, the effect of homeownership with and without mortgage on different quantiles of the net wealth distribution is estimated. Further, I use a RIF decomposition to compute the effect of differences in homeownership on the cross-country gap of equalized net household wealth at different parts of the wealth distribution. The empirical analysis is based on the second wave of the Household Finance and Consumption Survey (HFCS). The results of this study suggest that the cross-country gap in equalized net household wealth is the largest at the median of the distribution. Homeownership is the major factor that contributes to the large differences in equalized net household wealth.

Keywords: homeownership rate, wealth inequality, RIF regression, RIF decomposition

This paper uses data from the Eurosystem Household Finance and Consumption Survey.

### 1. Introduction

Economic growth and productivity can be negatively impacted by high levels of inequality. Most research focuses on income or wage inequality. In the past, little research has been done on wealth inequality and even less studies take distributional differences into account. This study shows that the distribution of net household wealth strongly differs across the Euro area, which is mainly caused by the housing structure of the countries. Traditionally, regulators were interested in high homeownership rates, as this was seen as a key for a successful pension provision and an instrument to secure social stability (Alvaredo et al. 2018, Doling and Ronald 2010). Due to increased labor mobility, other options of investing private wealth, and evolving government regulations, this pattern has changed. However, the wealth of households below the median still consists mainly of housing wealth (Kaas et al. 2015).

The study is based on the second wave of the Household Finance and Consumption Survey (HFCS). In line with further literature, equalized net household wealth is chosen as the dependent variable, whereby the OECD equivalence scale is applied in order to make households comparable. In the HFCS, net wealth is defined as the difference between total household assets, excluding public and occupational pension wealth, and total outstanding household liabilities.<sup>1</sup> The major factor of influence is the household's main residence (HMR). If a household owns all or part of a residence, the household is defined as homeowner, whereas just a share of 3% of the data refers to partial ownership. In 2014, only 44% of German households were living in a property they owned, compared to 68% in Italy. Since then, homeownership rates across Europe have developed. However, in 2017, Germany is still at the bottom of the list, with a homeownership rate of 51.4%, compared to Spain where 77.1% of the households are homeowners. The corresponding rates of Italy, and France are 72.4%, and 64.4% (Statista 2019). The cross-country differences are even more pronounced when analyzing homeownership across the wealth distribution. Knoll et al. (2017) find that homeowners and renters are not located on the same part of the income distribution so that changes in the cost of renting compared to homeownership impacts inequality. The results of this study show that this relation is also true for the wealth distribution. Thus, only 7% of German households belonging to the bottom quintile of the wealth distribution own the place they are living in. In contrast, this share is 38% in Spain. So, how much of cross-country wealth inequality can be explained by differences in the housing structure?

In this study, Euro countries with high homeownership rates are compared to countries with low homeownership rates. Based on the average homeownership rate of 70.6% in the EU28, Bouyon (2015) defines three categories: First, countries with homeownership rates between the average and 80% (e.g. Belgium, Italy, Portugal, and Spain). Second, countries with homeownership rates above 80% (e.g. Czech Republic, Latvia, and Slovakia). Third, countries with rates below 70% (e.g. France and Germany). This paper analyzes homeownership and its impact on differences in equalized net household wealth across four major Euro nations, namely Germany, France, Italy, and Spain. The research of Kaas et al. (2015) on "Wealth inequality and homeownership in Europe" is used as reference study. The authors analyze the first wave

<sup>&</sup>lt;sup>1</sup> Kaas et al. (2015) explain that public pension wealth differs strongly in the cross-country comparison, depending on the pension system a state chooses. For example, Bönke et al. (2017) use different wealth aggregates and take the different pension systems into account to estimate wealth inequality between Germany and the US. However, public pension wealth cannot be invested in other assets if wanted, or even inherited if a person dies early. Hence, public pension wealth is not guaranteed, but related to several factors of uncertainty and is therefore excluded in this paper.

of the HFCS and find that homeownership rates and Gini coefficients of net wealth are negatively correlated across Europe. Hence, the higher the ratio of homeowners, the lower the wealth inequality within a particular country. The negative correlation is mostly driven by large between-group inequality across renters and owners. Thus, wealth inequality is lower in countries with less renters, as the average renter is much poorer than the average owner. However, as the literature suggests, there are large differences in net wealth and homeownership rates across the distribution, so that the Gini coefficient cannot properly comply with these underlying structures. Further, the Gini coefficient is not an optimal measure to determine wealth inequality in surveys as the data includes households with negative wealth holdings. In general, the application of the Gini coefficient is narrowed to distributions with non-negative values. Kaas et al. (2015) admit the fact that the existence of negative wealth values affects the Gini coefficient, which then exceeds the value of one (see Chen et al. 1982, Berebbi and Silber 1985). After including the zero or negative values in the calculation for the descriptive statistics, they report the share of households with negative wealth holdings or zero wealth.

In order to take the distributional effects into account, this study runs a regression of the recentered influence function (RIF) of the unconditional quantile of equalized net household wealth on the covariates. Using this method, I estimate the effect of a small increase in the probability that a household is an owner instead of a renter on the distribution of equalized net household wealth. Additionally, I perform a gap decomposition of the 10<sup>th</sup>, 50<sup>th</sup>, and 90<sup>th</sup> percentiles of the unconditional distribution of equalized net household wealth using the German coefficients as a reference. Kaas et al. (2015) find that variations in homeownership rates at the bottom half of the wealth distribution contribute strongly to the cross-country differences. My results suggest an even larger cross-country gap of equalized net household wealth at the median of the distribution. A huge part of the cross-country wealth gap is explained by homeownership. This is in line with the findings of Mathä et al. (2014), who analyze the first wave of the HFCS and perform a RIF decomposition.

The importance of housing in wealth inequality is also shown by Kuhn et al. (2017). The authors find that the 2007 crash of the so-called housing bubble led to the largest increase in wealth inequality in the US since the end of the Second World War. The study shows that the major group affected by rising wealth inequality were US American households located between the 25<sup>th</sup> and 75<sup>th</sup> percentile of the wealth distribution. The deviation of the development of wealth across the distribution can be explained by different compositions of household wealth. Thus, wealth concentration at the top rose due to gains in housing wealth that especially benefitted the middle class, whereas at the same time incomes stagnated at any point of the distribution. Dustmann et al. (2018) show that German households who belong to the bottom income quintile suffer disproportionally more from increases in the income share of housing expenditures between 1993 and 2013. The authors argue that one reason for this phenomenon is an increase in the relative cost of renting versus homeownership.

According to Kaas et al. (2015) the cross-country variation of wealth inequality is due to the variation in savings behavior of households which belong to the bottom half of the wealth distribution. Especially for these households, homeownership is the major wealth component. The authors argue that differences in savings are channeled through housing wealth. For the US, Saez and Zucman (2016) show that wealth inequality is rising due to increasing inequality in savings. They argue that savings depend a lot on the amount of wealth left after housing.

The structure of this paper is as follows: First, a broad overview over the differences in the housing markets of the four countries is given, focusing on the extremely low homeownership rate in Germany. Second, I describe in detail the special features of the HFCS data. The third paragraph describes the descriptive statistics that already show the underlying pattern. In the methodological part, the theory of the RIF regression model and the decomposition method is presented, followed by the description of the results. In the last paragraph, I discuss the results and conclude with an outlook on further research options.

### 2. Institutional background

The homeownership rate has an immense impact on cross-country wealth inequality. The German housing market is characterized by an extremely low homeownership rate of 44% in 2014, which is even lower for households belonging to the bottom of the wealth distribution. The following paragraph depicts an overview of the differing housing markets in Germany, Spain, France, and Italy. According to Kholodilin (2015) there are mainly four dimensions of housing policies that are to be considered: Tenant protection, rent controls, social housing provision, and rationing of housing.<sup>2</sup> Further influencing factors are subsidies to homeowners and taxation of residential property and income of landlords. In the beginning, the paragraph focuses on the main reasons contributing to the very low homeownership rate in Germany. Afterwards, some major peculiarities of the other three countries are explained.

#### 2.1 The housing market in Germany

In Germany, households are less flexible in obtaining access to loans, which is due to several regulations. One major reason are stricter lending requirements in Germany. The average loanto-value (LTV) ratio for Germany was 70% in 2007, which is low compared to an average rate of 80% in the EU member states (ECB 2009, SVR 2013). If banks require higher down payments, households need to raise more equity to buy a house.<sup>3</sup> Thus, the demand for mortgage credit is lower in Germany due to the low rate of homeowners (SVR 2013, Voigtländer 2014). Additionally, a subprime lending market and mortgage equity withdrawal, which was the major reason for the crash of the housing bubble in the US in 2007 but provides a cheap opportunity to get access to a loan, is not permitted in Germany (see Mian and Sufi 2011). Hence, German mortgage regulations entail a self-selection of applicants who are wealthy enough to meet the requirements and therefore are part of the households which belong to the higher end of the wealth distribution. Refusing especially households at the bottom of the wealth distribution access to loans strongly affects the less equal distribution of homeownership (SVR 2013, Voigtländer 2014). Typically, Germans only buy one house at an older age in their lifetime, whereas other nations' citizens buy more houses at a later stage in life (Behring and Helbrecht, 2002). Another minor factor of influence are early repayment penalties. These are high in Germany, such that the percentage of stock affected by early repayment was close to zero in

 $<sup>^{2}</sup>$  Kholodilin (2015) describes an increase of all classes of regulations in Germany during the 2010s. This is partly caused by increasing migration flows in combination with housing scarcity in larger cities.

<sup>&</sup>lt;sup>3</sup> Andrews and Sánchez (2011) find that higher rates of homeownership among households that are creditconstrained can be reached through the relaxation of down payments and better rent regulations. In contrast, the authors describe mortgage interest deductibility as a regressive measure as it tends to crowd-out low-income households by house price capitalization.

Germany in 2007 (ECB 2009). The option of paying an interest premium in order to exclude prepayment costs, so-called fixed-rate loans with a call option are in general not offered to loan takers.

Voigtländer (2009) goes back to the 1950s to base his argumentation for the low homeownership rate in Germany on large subsidies for social rental housing after WWII. As there was a substantial shortage of housing, the German government started to construct social housing and could quickly improve the housing supply by including private investors in the subsidization scheme. After few years, the government permitted the adjustment of rents towards the market price, which further promoted the development of the rental market. Today, the German rental market is fully provided by private or for-profit institutions (OECD 2018a). Subsidies are given to investors if the rent stays below the market rate for 20 years, before including the dwellings into the private rental market. Kemp and Kofner (2010) find that in 2014, the social rents sector accounted only for 4%. The number of social housing units had halved since 2002 (Gedaschko 2016). Additionally, since the 1990s, social housing provided by municipalities has also been sharply decreasing, as more money is gained when selling the dwellings and privatizing them. The number of new social rental dwellings added through acquisition and construction of dwellings per thousand inhabitants increased from 0.13 in 2013 to 0.17 in 2015, which is still extremely low. And total government spending on housing allowances was just as high as 0.52% of GDP in 2015 (OECD 2018a).

Since the abolishment of the taxation of the imputed rents in 1986, the HMR is treated as a consumption good in Germany. Since then, income tax deductibility of mortgage interest payments also does not exist anymore, whereby a relief of financing costs for renters still applies (ECB 2009, Wolswijk 2005). Even if tax benefits for homeowners are less favorable, the housing market is characterized by a less rigid regulation compared to other countries, which has made it profitable for private homeowners to keep renting their property instead of selling it (Voigtländer 2009). There exist only weak restrictions on rents for new contracts so that rent prices rose by 15% in real terms between 2010 and 2016 (Dustmann et al. 2018, Knoll et al. 2017). In contrast, according to German regulations, rents for existing contracts can just be increased by 20% over a three-year period and landlords are supposed to not set them higher than comparable rents in the local area. Also, the protection against dismissal is stable on a high level compared to the global average (Kholodilin et al. 2018). Hence, sitting tenants benefit from below market price costs of renting and restrictions for the landlord to end the tenancy prematurely (Voigtländer 2009). However, there are special regulations for the allocation of modernization costs faced by the owner. In Germany, renters can be forced to pay up to 11% of these costs without any limit. Dustmann et al. (2018) find that housing costs for renters in Germany steadily increased, whereas housing costs for owners with mortgage decreased since 2003 (see also Schier and Voigtländer 2015).<sup>4</sup> This can be partly explained by decreasing mortgage interest rates since the late 2000s as well as increasing rent prices. Figure 1 shows the continuous rise of rental price indices for Germany, Spain, France, and Italy. Between 1994 and 2018, the German rent price index ranged above the other indices, except for the years in the aftermath of the financial crisis that took place in 2007, where the rent price indices of Spain, Italy, and even France, rose above the German rent price index.<sup>5</sup> However, when looking at the

<sup>&</sup>lt;sup>4</sup> Hiebert and Sydow (2011) show a decline in the cost of rent versus homeownership in major Euro-countries since the mid-1990s, with one exception: Germany.

<sup>&</sup>lt;sup>5</sup> For Spain, the housing bubble is also visible in the rent prices that increase strongly around 2007 before falling again in later years.

whole period of time, the developments of the German rent price index (Figure 1) and the house price index (Figure 2) show the lowest volatility compared to the other Euro nations (see also Dustmann et al. 2018 as well as Voigtländer 2014). Since 2010, there has been a positive development of house prices in Germany, but the real house prices have just reached the level of the early 1990s. But recently house prices in the major cities have risen quickly due to increasing demand and low interest rates (Deutsche Bundesbank 2017).<sup>6</sup>

In summary, the German housing market is characterized by a large share of high-quality rental dwellings, with long-term renters benefitting from a wide range of regulations. At the same time, access to mortgages is mainly restricted to high-income households and social housing is hardly available. These factors of influence contribute to a very low homeownership rate in Germany.

#### 2.2 The housing market in Spain

Among the four countries considered in the study, Spain has the highest homeownership rate ranging at 83%. In Spain, a special form of extended co-residence has emerged, as strong intergenerational transfers are gained when several children inherit the home of the family. The share of owners without a mortgage within a family results in high rates of outright ownership (Alvaredo et al. 2018). Voigtländer (2009) explains the high share of homeownership by an extremely regulated housing market until 1994. Before, rental agreements could be bequeathed to two generations and landlords were not permitted to increase rents that were set before 1964. Moreover, maintenance costs could not be passed on to renters, which made it unprofitable for investors to rent their houses. In 1994, the government restricted the minimum rental agreement term to five years. In consequence, landlords prefer not to rent their properties, but to wait until they can sell their house, mostly to other homeowners who do not find good investment alternatives (Alvaredo et al. 2018). The ratio of vacant properties was 13.7% in Spain in 2011, which is far above the average in the EU (ECB 2019).<sup>7</sup> As the return on capital is not satisfying for landlords when renting their dwelling, the supply of rental dwellings is decreasing, and households are forced to buy property. The government provides an aid program for low income households which aims to facilitate the access to rental housing (OECD 2018a).

In general, there is no taxation of imputed rents in place, so that the HMR is treated as a consumption good. Mortgage interest tax relief was abolished after 2012. Before, such subsidies existed, although decreasing over time and with ceilings (Wolswijk 2005). However, in Spain, there exists a 15% tax credit for qualifying loans financing expenses on the home up to a maximum of €9,040 (EC 2014).<sup>8</sup>

Another factor that strongly impacts the homeownership rate are house prices. As shown in Figure 2 house prices increased dramatically during the noughties and the financial crisis of 2007 in Spain, reflecting the credit boom that resulted in a housing bubble, only to sharply fall

<sup>&</sup>lt;sup>6</sup> Due to demographic change, Westermeier and Grabka (2017) expect a strong increase in house prices in urban areas and a fall in house prices in more remote regions by 2030. The authors also point out the corresponding negative effects on wealth inequality.

<sup>&</sup>lt;sup>7</sup> The German vacancy rate was 7.9% in 2014.

<sup>&</sup>lt;sup>8</sup> Frick et al. (2010) explain that especially uncapped mortgage interest payment tax relief schemes increase inequality as benefits are provided to owners with a mortgage who are less in need as their income is mostly above average. Hilber and Turner (2014) analyze how homeownership in the US is affected by mortgage interest relief depending on the local housing supply.

again afterwards.<sup>9</sup> During this time, the LTV ratio also decreased. With 72.5% in 2007, the ratio was not much higher than the German one (ECB 2009). As a consequence of the booming housing investment that took place before the financial crisis, housing stock has increased and is comparatively large in southern Europe (Andrews et al. 2011). According to the ratio of mortgage to total assets of 20%, households in Spain are mostly able to pay back their loans (ECB 2009).<sup>10</sup> Thus, 8% of the total stock was affected by early repayment in 2007, which indicates that the high penalties that apply in Germany are not existent in Spain. Furthermore, the rate for mortgages for purposes other than financing a house is relatively high in Spain (5%), compared to 1% in the other countries. During the year of analysis, 2011, the house price index fell dramatically in Spain.

Decreasing house prices and mortgage interest rates in combination with tax credit for qualifying loans and a very low supply of rental dwellings increases the demand for owning property. This explains the high rate of homeownership in Spain.

### 2.3 The housing market in France

In France, there are several special regulations that do not exist in the other three countries so that the homeownership rate ranged at 59% in 2014. 44% of outstanding loans for house purchase are guaranteed by a private insurance contract, and 14% are guaranteed by governmental institutions (ECB 2009). In the cross-country comparison, these rates are very high, as both percentages are close to zero for the other countries. This impacts LTV ratios in a positive way, as part of the risk the banks bear is transferred. Hence, the loan-to-value ratio ranges at 91% in France, so that households must raise far less private equity in order to obtain a loan for the purchase of a house. This facilitates becoming a homeowner instead of continuing as a renter. As in Spain, early repayment is less strongly punished, since 8% of the total stock was affected by early repayment in 2007.

Moreover, the dwelling is treated as a consumption good, so that there is no taxation of the imputed rent (ECB 2009, Wolswijk 2005). But since 2000, property buyers do not profit from debt interest tax reliefs anymore. However, this tax deduction was replaced by other financial policies. From 2007 to 2010, homeowners in France benefitted from a tax credit equal to 20% of interest payments (up to maximum €3,750 per year), which was double as high for couples. Afterwards, the French government implemented subsidized loan schemes that apply to special groups of households. These include low-income earners, first-time buyers, purchases of new housing, and housing shortage areas (EC 2014, EMF 2015).

In France, another important factor of influence for the homeownership rate is government spending on social rental housing. In 2015, 0.29% of GDP was invested in social rental housing, which is comparably high among the OECD member states. Further, the total social housing stock accounted for 19% in 2000 and decreased just slightly to 18.7% in 2015. These dwellings are fully provided by not-for-profit suppliers (OECD 2018a).<sup>11</sup> In general, house and rent prices in France have developed moderately since the year of analysis, 2014. And even if Figure 2

<sup>&</sup>lt;sup>9</sup> According to Miles and Pillonca (2008) higher population growth was one reason for the strong increase in rapid house price growth in the early 2000s.

<sup>&</sup>lt;sup>10</sup> The ratio of mortgage to total assets is 30% in the Netherlands and, thus, the highest in the Euro area.

<sup>&</sup>lt;sup>11</sup> However, the extensive social housing sector decreases labor mobility due to a right to stay for life, which may have a negative impact on productivity (Trevien 2014).

illustrates that French house prices were affected by the financial crisis, the eruption was far less severe than in Spain and Italy.

In France, homeownership is strongly enhanced by government guarantee schemes, a high LTV ratio, and subsidized loan schemes. Whereas, for households who do not own their home, the government provides a wide range of social housing units. The latter might decrease the need to buy a house, so that the homeownership rate in France ends up ranging between the rates of Germany, which is characterized by very a low rate, and Spain and Italy, which both show high rates of homeownership.

### 2.4 The housing market in Italy

With a homeownership rate of 68% in 2014, Italy ranks second among the four Euro countries analyzed in this paper. This high rate can be partly explained by the fact that homeownership is profitable in terms of tax subsidies. Up to a maximum interest payment of €4,000, 19% of the debt interest tax can be deducted from taxable income (EC 2014). Imputed rents are taxed in Italy, but there are wide-ranging exceptions homeowners benefit from (Wolswijk 2005). Van den Noord (2005) estimates the effective property tax rates per country and calculates a rate of 0.5% for Italy, which is the same as in Spain and France, but less than in Germany (1.5%).

Again, house prices impact the homeownership rate. The cheaper prices are in combination with very low interest rates, the more profitable it is to buy a dwelling. Figure 2 unveils that the Italian house price development is similar to the Spanish one. Between 1998 and 2007, the house price index increased by 51 base points and has since then been on a decreasing path. In 2014, house prices were falling but the development became more moderate over the last years. Recently, Italian house prices have still been decreasing, whereas house prices in Spain and France have been increasing since 2013 and 2015.

Like in Spain, the average loan-to-value ratio was low during the financial crisis in 2007, around 65%. So even if there are in general no formal restrictions on the LTV ratio in Italy, the ratio was the lowest in the cross-country comparison.<sup>12</sup> In 2007, the stock that was affected by early repayment as well as the share of mortgages for purposes other than financing a house was 1% (ECB 2009). In 2014, after three years, the demand for new loans to purchase a house rose again and housing transactions with a mortgage increased by 12.7% compared to 2013, while interest rates were continuously decreasing (EMF 2015). Banks use several instruments to lower the default risk. On average, there is a shorter mortgage maturity and a very low rate of mortgage to total assets (13%). The provision of a guarantee scheme by the government or a private insurance contract, which exists in France, is very uncommon in Italy (ECB 2009).

Due to tax subsidies and low housing expenses for homeowners (decreasing house prices and mortgage interest rates), Italy profits from a high homeownership rate.

<sup>&</sup>lt;sup>12</sup> However, there exists a threshold of 80% that applies to provisioning and capital requirements on loans related to housing (the same applies in Spain).

### 3. Data

The analysis conducted in this study is based on the second wave of the Household Finance and Consumption Survey (HFCS). The year of analysis is 2014 for Germany, France and Italy, but 2011 for the respondents from Spain. So far, the HFCS has been conducted twice by the Household Finance and Consumption Network (HFCN), which consists of specialists from the European Central Bank, the Eurosystem's national statistic institutes and national central banks.<sup>13</sup> The network collects micro-level data on Euro area households' consumption and finances. The HFCS is based on wealth surveys that were conducted by participating institutions, like national statistical institutes, within the Euro system. A great advantage of the Household Finance and Consumption Survey is that it contains a great variety of information on wealth and housing of households living in the Euro area. This allows the construction of a comprehensive measure for net wealth and the analysis of the impact of homeownership on net wealth at different quantiles of the distribution.

To adjust for different sizes of households, the wealth measure is equalized using the OECD equivalence scale. This means that net household wealth is divided by a specific weight, which is computed as follows: the reference person is weighted by 1, further adults living in the household aged 14 or above are weighted by 0.5, and children under 14 are weighted by 0.3. The reference person is not necessarily the head of household, but rather the person who is interviewed by the household screener. In the analysis, the focus lies on individuals who are at least 20 years old and therefore are in the working age (see Dustmann et al. 2018). However, compared to the analysis of income, wealth is accumulated over years and continues being an important source of consumption after retirement. Therefore, it is not useful to eliminate people who are retired (see Ando and Modigliani 1963). People older than 80 reflect up to 5% of the population in the data set, which is similar to the percentage of people younger than 30. Further, quantile regressions are not very sensitive to outliers in the tails compared to other measures, so that it is not necessary to exclude the richest 1% of the households (Frölich and Melly 2010).<sup>14</sup>

In general, survey data suffers from large numbers of missing values. One way of dealing with missing data is multiple imputation. In the HFCS data, this stochastic multivariate method is used to estimate five values to replace missing values in the data, which are needed to compute total household income, consumption, and wealth. In addition, imputed values for some other variables are provided, but the selection of these variables is country specific. The aim of applying multiple imputation is to replace the missing data by the best possible estimates of the true value. This is done by a simulation of the sampling distribution of the missing observations. Like this, multiple imputation reduces nonresponse bias and increases efficiency in estimation. Flags indicate the imputed values. As the French and Italian data has a very high degree of unit response, the multiple imputation method is not allied to this data. To keep the structure, there are also five implicates included in the French and Italian data, which are all identical. Montalto and Sung (1996) suggest researchers to use information from all multiple imputations to make valid inferences and tests of significance. I follow Kaas et al. (2015), who base their study on

<sup>&</sup>lt;sup>13</sup> The survey vintage of the first wave of the HFCS was 2009 for France and Spain, and 2010 for Germany and Italy.

<sup>&</sup>lt;sup>14</sup> Recently, several authors focused on the top 1% or 0.1% to compute inequality as these outliers strongly affect the outcome of the Gini coefficient (e.g. Piketty 2014). Due to this reason, an unconditional quantile regression that is not outlier-sensitive is performed in this paper.

Rubin (1987) and combine all results across implicates after analyzing each data set by complete-data methods.

In the HFCS, rich households are oversampled. To address the issue of differential unit nonresponse and unequal probability of the household being selected, the HFCS data includes cross-sectional weights for each household. Hence, the weights reflect the inverse of the probability of the household being selected into the sample. As the weights are constructed based on the household composition, the weight for each household member is equal to the household weight.<sup>15</sup> It is crucial to take the weights into account when estimating means and ratios. To be consistent, I continuously use weights in all calculations and regressions.

Additionally, the countries contributing to the HFCS data provide 1,000 replicate weights using a bootstrap replication method. I use 100 replicate weights for the calculation of the descriptive statistics and the RIF regression, such as 50 for RIF decomposition and the RIF regression robustness checks. By taking the replicate weights into account, consistent estimates of the variance of the sample can be calculated.

The following provides a short explanation of missing values in the data. In the final data set, the variable for equalized net household wealth is missing in 410 cases. In these cases, the wealth measure could not be calculated due to missing information on 'outstanding balance of mortgage debt'. All missing data is from France and mostly from households who are homeowners.<sup>16</sup> As there was no further information given on the reason for the missing data, these 410 cases are dropped from the sample. After excluding these observations from the final data set, there are no more missing values in the covariates or the variables used for the descriptive statistics. If the value of the variable "age" was considered incorrectly, it was imputed or edited<sup>17</sup>. Additionally, I looked at the variable for public pension; however, it was missing in 30% of the data due to no answer being provided in the survey so that it could not be considered in the analysis.

### 4. Descriptive statistics

To better understand the underlying patterns of equalized net household wealth within and across the four countries, the following section gives an overview of the descriptive statistics. The focus is on differences across the net wealth distribution and the homeownership status.

Table 1 shows the summary statistics of household equalized net wealth in Germany, Spain, France, and Italy. There is a large difference in mean net wealth between Germany and Italy, compared to France and Spain. However, the large dispersion of median equalized net household wealth across countries is even more interesting. For Germany, the value is far lower than for the other three countries, which is also reflected in the relationship between mean and median, which is far higher in Germany. The measures of wealth inequality further reflect the cross-country differences. Especially the 50/10 ratio shows that the gap of average net wealth between households who range at the median and households who belong to the bottom decile

<sup>&</sup>lt;sup>15</sup> Individuals who share household expenses are considered members of the household. This is the case for example for children educated away from home or for persons in hospital or on vacation.

<sup>&</sup>lt;sup>16</sup> Most of them are doing regular work for pay, are self-employed, or working in family business. Some are already retired.

<sup>&</sup>lt;sup>17</sup> This applies only to 0.6% of the data within the initial personal data set, hence it is not a decisive number.

of the wealth distribution is huge in Germany. The 90/50 ratio and the 75/25 ratio suggest that the within-country difference in equalized net wealth is lower at the top end of the distribution. Kaas et al. (2015) find a very similar pattern.<sup>18</sup>

The differences of average equalized net household wealth within each country and across countries become more obvious when having a look at Figure 3. Average net household wealth continuously increases from the bottom quintile to the forth quintile and shows a sudden jump between the forth quintile and the top quintile. In general, average net wealth in Germany is the lowest in the cross-country comparison. This pattern is different for the top quintile, where German average equalized net household wealth is the second highest.

The portfolio shares of different components that contribute to equalized net household wealth are presented in Table 2. Following Kaas et al. (2015), four categories are constructed due to their different economic functions: net own housing wealth, net financial wealth, net real wealth, and business wealth. The share of net own housing wealth is calculated by the average value of the household's main residence minus the outstanding balance of HMR mortgages. Net financial wealth consists of average total financial assets (excl. public and occupational pension plans) minus all debt that is not in the form of mortgages.<sup>19</sup> Other real estate property minus mortgage debt for this other property, cars, and valuables are included in net real wealth, whereas business wealth stands for self-employment business wealth. I also report the ratio of households with zero or negative wealth in the last column, which is the largest for Germany.

Table 2 shows that net housing wealth is by far the largest component of net wealth. Even for Germany, which has a lower rate of homeownership than the other countries, net housing wealth describes 40% of total net household wealth. Italy has the highest share of housing wealth at around 63%. For Spain, France, and Italy, the second most important component of wealth is net real wealth, in comparison to Germany, where the share of net financial wealth is slightly higher than the share of net real wealth. On average, net financial wealth is the highest in Germany. Compared to Kaas et al. (2015) who analyze the first wave of the HFCS, net own housing wealth slightly increased in Germany and Italy but slightly decreased in Spain and France, whereas net financial wealth rose across all countries. Net real wealth almost did not change, and business wealth slightly decreased in all countries except France, where it increased.

However, the ratios, such as the importance of homeownership on equalized net household wealth, vary strongly across the net wealth distribution. Figures 4 to 7 illustrate the different compositions of wealth across countries and quantiles. First, Figure 4 shows the composition of equalized net household wealth for the whole wealth distribution in Germany, Spain, France, and Italy. Average equalized net household wealth is the highest in Spain with €166,139, followed by France with €163,393.30, Germany with €144,827.90, and Italy with €141,894.80. The average value of total real estate property (including HMR and other real estate property) is by far the highest in Spain and the lowest in Germany. However, on average German and French households invest more of their wealth in financial assets and self-employment

<sup>&</sup>lt;sup>18</sup> Kaas et al. (2015) do not calculate equalized net household wealth and use wave 1 of the HFCS, which explains small differences in the results.

<sup>&</sup>lt;sup>19</sup> Household surveys tend to underestimate income from capital gains and self-employment business, which may lead to an underestimation of inequality at the top of the distribution (Becker 2014). As the RIF regression method is not outlier-sensitive, the problem is less severe in this study.

business.<sup>20</sup> Average household debt is the lowest in Italy as mortgage debt on other real estate property and non-mortgage debt is very low. At any part of the distribution, French households invest more in valuables than households compared to the other Euro countries.

Especially when looking at the lower parts of the wealth distribution of each country, a totally different pattern appears. In Germany, average equalized net household wealth is even negative for households belonging to the lowest quintile. Figure 5 illustrates that this is mainly due to high mortgage and non-mortgage debt relative to the value of real estate property and financial assets. For households belonging to the bottom quintile of each country's net wealth distribution, average net household wealth is the highest in Spain. These households mainly finance their real estate properties by mortgages. In comparison, the compositions of wealth in France and Italy are much more diverse. In both countries, the average value of real estate property but also mortgage debt is lower than in Germany, so that their average net wealth levels are higher.

For the second quintile of each country's net wealth distribution, the pattern is different. This is shown in Figure 6. Average equalized net household wealth is still the lowest in Germany and German households still do not invest more in housing, but at the same time their level of total debt is very low. However, households belonging to the second quintile of the wealth distributions in France and Italy follow the example of Spain and invest most of their wealth in real estate property, so that average equalized net household wealth increases by a factor of 16.54 in France and by a factor of 18.90 in Italy from quintile 1 to quintile 2.

Compared to households belonging to the second quintile, German households who belong to the third quintile invest far more in homeownership (Figure 7). However, the absolute difference to average equalized net household wealth in Spain is still more than  $\notin$ 50,000. Thus, German households invest far less in homeownership than households in the other countries so that the gap in equalized net household wealth between Germany and the other Euro nations is the largest around the median. However, in terms of financial assets, German and French households invest more. From the third quintile upwards, Italian households keep holding the lowest level of debt.

Figure 8 shows the compositions of equalized net household wealth for the forth quintile. Here, the absolute difference in the value of real estate property is still big between Germany and the other nations, but the relative difference has decreased significantly. At this part of the net wealth distribution, German households' average holdings in financial assets are by far the highest, whereas Spanish households start investing more in other real estate property form this point on. Average equalized net household wealth in France is now almost as high as in Spain.

When reaching the top quintile, Spanish households were overtaken by French and German ones in terms of average equalized net household wealth (Figure 9). Interestingly, the composition of the portfolios of households belonging to the top quintile in each of the four countries is very similar. Their major wealth component is housing wealth, which is on average €350,000, whereas the rest of their wealth is invested mostly in financial assets and self-employed business. Hence, the stock of real estate property of German households is as high as the one of Spanish households, but financial assets and self-employed business wealth is higher in Germany as well as in France. Piketty (2014) argues that wealthier people are less scared of investing their money in more risky assets as they suffer less from losing. Such investments

<sup>&</sup>lt;sup>20</sup> Figures 4 to 9 show that the average value of self-employed business is always the highest in France.

have much higher potential for profits so that richer households are less negatively affected by low interest rates than poorer households that do not hold any savings for speculations. Italian households do not follow this strategy and invest less in financial assets and self-employed business. In Italy, a higher share of net wealth is invested in the HMR and therefore less in other real estate property. On average, their wealth level is the lowest in the cross-country comparison.

As homeownership is of high importance when it comes to cross-country wealth inequality, the following paragraph analyzes the differences between homeowners and renters in Germany, Spain, France, and Italy. Table 3 shows the descriptive statistics for all covariates used in the empirical analysis. The homeownership rate is the lowest in Germany with 44%, followed by France with 59%, and Italy with 68%. Ranging at 83%, the homeownership rate in Spain is by far the highest. This is related to the higher share of German households whose purpose for saving is the purchase of a home (14%), compared to Spain (1%), France (7%), and even Italy (12%). Spanish and Italian households do not just have higher equalized net household wealth, there are also more adults living in one household compared to France and Germany. No matter of which tenure type the house is, French households live in one home for a shorter period of time. In the cross-country comparison, German households are characterized by the highest household income and the lowest number of children and adults living in one household. At the same time, Germany and France show the same low rate of self-employment business of the reference person, which is the highest in Italy (16%). But compared to the high rates of tertiary education in France and Germany (31%), the share of the reference person is the lowest in Italy, with 13%.

Figure 10 shows the share of households with and without mortgages, using the HMR as collateral, and renters across the whole wealth distribution within each of the four countries. The ratio of renters is by far the highest in Germany, which is in line with the homeownership rate of 44% in Table 3 that includes both owners with and without mortgage. After Germany, the highest rate of renters can be found in France (41%). In Spain and Italy, the share of outright owners is similar and ranges at 55% and 59%, correspondingly, whereas ownership with mortgage differs considerably, which is just 10% in Italy, compared to 28% in Spain. Consequently, the Italian homeownership rate is far below the Spanish one. In France, around one third (19%) of all owners use their household main residence as collateral. This rate is 17% for Germany.

Homeownership rates do not just vary strongly in the cross-country comparison, but also across the wealth distribution. Figure 11 shows that especially among the lower quintiles homeownership rates differ extremely. In the lowest quintile, homeownership rates are less than 10% across all countries apart from Spain. With 98% of households renting among the lowest quintile, Italy has the lowest percentage of homeownership across all countries. In Spain, 38% of households who belong to the lowest quintile of the net wealth distribution own their residence, even if the vast majority (27%) relies on a mortgage.<sup>21</sup> In France and Italy, homeownership rates start rising rapidly from the second quintile on, whereas in Germany, the

<sup>&</sup>lt;sup>21</sup> The data shows mostly purchased and inherited property in Spain, only households belonging to the lowest decile do not inherit their home so that their homeownership rate is the lowest within Spain. In Spain, households hardly ever construct their home by themselves.

homeownership rate still ranges at 6%.<sup>22</sup> 88% of Spanish households who belong to the second quintile of the net wealth distribution are owners, out of which 45% are outright owners. For the third quintile, the German homeownership rate jumps to 42%, whereas the homeownership rates of France, Spain, and Italy are 78%, 95%, and 93%.<sup>23</sup> Hence, the cross-country differences in homeownership between Germany and Italy such as Germany and France are the largest around the median of net wealth. For Germany and Spain, the gap in homeownership is the biggest around the second quintile. Although Germany keeps showing the lowest homeownership rates, the cross-country difference is less pronounced in the top two quintiles. Across all four countries the ratio of renters decreases when climbing up the wealth distribution, while the percentage of outright owners is much higher in the top wealth quintile than in the bottom income quintile. Thus, across the net wealth distribution, homeownership rates change strongly.

Tables 4 to 6 show the detailed descriptive statistics for all covariates depending on the type of tenure the households live in. Renters mainly belong to the lower parts of the wealth distributions within each country such that the average level of equalized net household wealth is lower for renters than for owners (Table 4). Among all groups, Italian renters' wealth and equalized total household income is the lowest. With €40,280, German average equalized total household income is the lowest. With €40,280, German average equalized total household income is the lowest of adults, and the share of reference persons who are married, received university education, or have self-employment business is the lowest (1.48), which implies that there is rising demand for housing space per capita. This again increases housing costs per household and person (Dustmann et al. 2018).<sup>24</sup>

The data presented in Table 5 indicates that the group of owners with mortgage is characterized by better education and the highest number of adults living in a household. Further, the highest average equalized net household income gives these households the opportunity to obtain access to a mortgage and allows them to pay the interest. Hence, the group of owners with mortgage is a very selected group of households.

As the share of outright ownership is continuously increasing with net wealth (Figure 11), their average net wealth level is the highest among the three groups (Table 6). It seems logical that the size of their household main residence is also the largest within each country. On average, their equalized household income is the lowest, which is correlated with the fact that the reference person is older (in the early 60s) than in the case of owners with mortgage or renters, so that this group includes more retirees. Interestingly, owners without mortgage tend to have less children, which allows them to invest more of their wealth in homeownership. The share

<sup>&</sup>lt;sup>22</sup> Interestingly, from the second quintile on, the ratio of inherited property is very high in Italy, ranging between 17% and 25%. Also, the average ratio of being given the HMR as a gift is the highest in Italy. Therefore, less households need to construct their own home or purchase a house.

<sup>&</sup>lt;sup>23</sup> Up from the third quintile, German households mostly purchase their home, but some also construct it by themselves or inherit it. The share of each category increases the wealthier the households are. The patterns in France and Germany are very similar.

<sup>&</sup>lt;sup>24</sup> Additionally, I find that average equalized net household savings are far lower for renters than for homeowners within the lowest two quintiles of the wealth distribution in Germany. This is strongly related to the findings of Dustmann et al. (2018) who point out that particularly young households belonging to the bottom quintile of the income distribution save less than older cohorts as they spend more on housing which negatively affects their wealth accumulation.

of reference persons who are married within this group and the length of residency are the highest. There is less need to move if the household owns the HMR.

#### 5. Econometric framework

#### 5.1 RIF regression approach

A general (multiple) OLS regression returns only estimates for the effect of the explanatory variables on the mean of the dependent variable y, without any further information on the effect of the covariates on different parts of the distribution of y. As it was shown in the descriptive statistics, homeownership rates vary strongly across the wealth distribution. Due to this reason, this paper runs an unconditional quantile regression, which was first developed by Firpo, Fortin, and Lemieux (2009). The method can be applied to estimate the effect of the distribution of covariates (X) on the unconditional quantile  $q_{\tau}(Y)$  of the outcome variable Y. To be exact,  $q_{\tau}(Y)$  is the population  $\tau$ -quantile of the unconditional distribution of net household wealth.<sup>25</sup> In this study, the unconditional quantile regression model is applied to measure the impact of a small increase in the probability that a household is the owner (with and without mortgage) of a home (compared to a renter) on the unconditional quantiles of equalized net household wealth, holding all other covariates constant.

The basic model estimates the unconditional quantile partial effect. In this paper, all the covariates are transformed into dummies, whereas the dependent variable, equalized net household wealth, is a continuous variable. For dummy regressors X, the unconditional quantile partial effect is very similar to a probability response model. The only difference is the scaling factor  $1/f_y(q_\tau)$ , which is the inverse of the cumulative distribution function that transforms probabilities into unconditional quantiles:

$$\alpha(\tau) = \frac{1}{f_{y}(q_{\tau})} \left[ P(Y > q_{\tau} | X = 1) - P(Y > q_{\tau} | X = 0) \right]$$
(1)

Firpo et al. (2009) show that  $\alpha(\tau)$  can be estimated by a transformation of the dependent variable Y into the recentered influence function, RIF(Y,  $q_{\tau}$ ). The RIF-regression model is based on the influence function (IF) of a statistic, which measures the marginal effect of an observation at value y on the sample quantile  $\tau$ . At the  $\tau^{th}$ -qantile  $q_{\tau}$ , IF is defined as

$$IF(y; q_{\tau}) = \frac{\tau - \mathbf{1}\{y \le q_{\tau}\}}{f_{y}(q_{\tau})},$$
(2)

where  $1\{y \le q_{\tau}\}$  is an indicator function that equals 1 when the value of an observation of y is less than or equal to the value of the dependent variable at quantile  $\tau$ , 0 otherwise. Hence, the influence function is a dichotomous variable that takes on the value  $\tau/f_y(q_\tau)$ , and  $-(1-\tau)/f_y(q_\tau)$ , when Y is below the quantile  $q_{\tau}$ . An important implication is that quantiles are not outliersensitive, as the influence only depends on whether y lies above or below  $q_{\tau}(Y)$ .

Adding the influence function to the statistic of interest yields the recentered influence function (RIF):

$$RIF(y,q_{\tau}) = q_{\tau} + IF(y,q_{\tau})$$

<sup>&</sup>lt;sup>25</sup> Firpo et al. (2009) define  $q_{\tau} = Q_{\tau}(\cdot)$ , the unconditional quantile operator, as  $Q_{\tau}(\cdot) \equiv inf_q \Pr[\cdot \leq q] \geq \tau$ .

$$= q_{\tau} + \frac{\tau - \mathbf{1}\{y \le q_{\tau}\}}{f_{y}(q_{\tau})}$$

$$= \frac{\mathbf{1}\{y > q_{\tau}\}}{f_{y}(q_{\tau})} + q_{\tau} - \frac{\mathbf{1} - \tau}{f_{y}(q_{\tau})}$$

$$= c_{1,\tau} \cdot \mathbf{1}\{y > q_{\tau}\} + c_{2,\tau}$$
(3)

with  $c_{1,\tau} = 1/f_y(q_\tau)$  and  $c_{2,\tau} = q_\tau - c_{1,\tau}(1-\tau)$ .<sup>26</sup> Both parameters can be estimated using a kernel density estimate of  $f_y(q_\tau)$ , with kernel function  $K_Y(.)$ , the sample estimate of  $q_\tau$  and bandwidth  $b_y$ :

$$\hat{f}_{y}(\hat{q}_{\tau}) = \frac{1}{N \cdot b_{y}} \sum_{i=1}^{N} K_{Y}(\frac{Y_{i} - \hat{q}_{\tau}}{b_{y}}) .$$
(4)

The RIF regression can be specified by conditioning on the explanatory variables because of the Law of Iterated Expectations. In the case of quantiles, the conditional expectation of the RIF is

$$E[RIF(Y, q_{\tau})|X = x] = c_{1,\tau} E[\mathbf{1}\{Y > q_{\tau}\}|X = x] + c_{2,\tau}$$
  
=  $c_{1,\tau} Pr[Y > q_{\tau}|X = x] + c_{2,\tau}$ . (5)  
 $E[\mathbf{1}(Y > q_{\tau})] = Pr(Y > q_{\tau}) = 1 - \tau$ ,

And as

the unconditional expectation of the RIF is equal to the quantile  $q_{\tau}$ :

$$E[RIF(Y, q_{\tau})] = c_{1,\tau} Pr(Y > q_{\tau}) + c_{2,\tau} = q_{\tau} .$$
(6)

Due to the reason that  $E[RIF(Y, q_{\tau})|X = x]$  is a linear function of  $Pr[Y > q_{\tau}|X = x]$ , it can be estimated by a linear probability model, a Logit or a Probit regression. Hence, the binary outcome variable  $1\{y > q_{\tau}\}$  is regressed on X. Firpo et al. (2009) show that the estimates of the unconditional quantile partial effect that can be derived from RIF-OLS and RIF-Logit yield very similar results. Therefore, I perform a RIF-OLS regression, where  $\widehat{RIF}(Y_i, \hat{q}_{\tau})$  is regressed on x

$$m_{(\tau,RIF-OLS)}(x) = x'\gamma.$$
<sup>(7)</sup>

Further, the model developed by Firpo et al. (2009) assumes that the conditional distribution of net household wealth,  $F_{Y|X}(\cdot)$ , is independent from manipulations in the distribution of X. A sufficient condition for this to hold is that X is independent of the error term  $\varepsilon$ .<sup>27</sup>

Due to the design of the HFCS data, which includes five different implicates m for missing values, this study follows the approach of Rubin (1987). I average over the different estimates  $\hat{\beta}_m$  drawn from each of the five imputed samples to derive point estimates,

$$\hat{\beta} = \frac{1}{M} \sum_{m=1}^{M} \hat{\beta}_m \,. \tag{8}$$

<sup>&</sup>lt;sup>26</sup> Through the division by  $f_y(q_\tau)$ , the unconditional density, marginal effects for  $Pr[Y > q_\tau | X = x]$  translate into marginal effects for  $q_\tau$ .

<sup>&</sup>lt;sup>27</sup> However, this assumption is not necessarily true in all cases. See Firpo et al. (2009) for further details and explanations on all properties and corollaries of the RIF.

Further, I use the first 100 of the supplied replicate weights and combine the between and within implicate variances to compute bootstrapped variances  $\hat{v}_m$  for each implicate. These variances are necessary to derive the coefficients and standard errors. First, the between-imputation variances  $\hat{V}_B$  can be derived from aggregating according to the rule

$$\hat{V}_B = \frac{1}{M-1} \sum_{m=1}^{M} (\hat{\beta}_m - \hat{\beta})^2 .$$
(9)

Second, by averaging  $\hat{v}_m$  across imputations, the within-imputation variances  $\hat{V}_W$  are computed

$$\hat{V}_W = \frac{1}{M} \sum_{m=1}^M \hat{v}_m \,. \tag{10}$$

Third, the within and between-imputation variances are combined to obtain the estimated variances  $\hat{V}$ :<sup>28</sup>

$$\hat{V} = \hat{V}_W + (1 + \frac{1}{M})\hat{V}_B .$$
(11)

#### **5.2 Decomposition analysis**

As a final step, I use a RIF decomposition to quantify how much differences in the covariates – the explained part – contribute to the equalized net household wealth gap between Germany and each of the other three Euro area countries, compared to the contribution of differences in the covariates' coefficients – the unexplained part.<sup>29</sup> More specifically, I compute the effect of differences in homeownership on equalized net household wealth at different parts of the wealth distribution for Spain, France, and Italy, with respect to Germany. Germany is chosen as reference country due to the reason that it shows a strong difference in the ownership structure compared to the other three countries in that, until the 75<sup>th</sup> percentile, equalized net household wealth is the lowest among all four countries. Apart from that, Table 1 shows that Germany has the highest level of wealth inequality and is the largest country in the EU regarding total GDP and population (EC 2019a, EC 2019b).

Following the notation of Jann (2008) and Mathä et al. (2014), the two-fold decomposition of the equalized net household wealth gap between Germany (DE) and one of the other countries (CT) is defined as:

$$R = (\bar{X}_{CT} - \bar{X}_{DE})'\beta_{CT} + \bar{X}'_{DE} (\beta_{CT} - \beta_{DE}), \qquad (12)$$

where the first term of the sum defines the explained part, i.e. the endowment effect, and the second part refers to the coefficient effect, the unexplained part. Hence, R reflects the difference in equalized net household wealth across countries,  $\beta$  are estimated parameters and  $\overline{X}$  are average covariate levels. The detailed contribution of each covariate to the gap in equalized net household wealth is calculated by comparing the RIF-regression coefficients of Spain, France, and Italy to Germany.<sup>30</sup> Following Fortin et al. (2011) the decomposition is calculated for the

<sup>&</sup>lt;sup>28</sup> The degrees of freedom are defined as  $df = (M - 1)(1 + \hat{V}_W / (1 + \frac{1}{M})\hat{V}_B)^2$ .

<sup>&</sup>lt;sup>29</sup> The approach is based on the decomposition method developed by Blinder (1973) and Oaxaca (1973).

<sup>&</sup>lt;sup>30</sup> According to Mathä et al. (2014), this is just the best alternative for the decomposition analysis, but not an optimal solution, as the range of realizations of net household wealth in CT includes the range of realizations in the reference country Germany.

10<sup>th</sup>, 50<sup>th</sup>, and 90<sup>th</sup> percentiles of the unconditional distribution of equalized net household wealth.

### 6. Empirical results

#### **6.1 RIF regression results**

The following section describes the RIF regression results (and the results of the RIF decomposition). The coefficient estimates for the 10<sup>th</sup>, 50<sup>th</sup> and 90<sup>th</sup> quantiles for Germany, Spain, France, and Italy are reported in Appendix A. The dependent variable is the RIF of household equalized net wealth. The RIF regression coefficients provide a local approximation for the effect of changes in the probability of being an owner instead of renter on the net wealth distribution. As discussed previously, there are significant differences between owners with and without a mortgage, thus I split the homeownership variable into these two categories. To make the results comparable to the results of Kaas et al. (2015) and other studies, also the RIF regression results for the combined independent variable "ownership" are reported in Appendix B. Based on the reference study, I define the control variables, which influence wealth accumulation and indirectly wealth inequality. Dummies are used for different age groups of the reference person, the number of children living in one household, and the size of the household main residence.<sup>31</sup> The purchase and maintenance of a large HMR requires a higher wealth level. Further, I create dummies that indicate whether the reference person has selfemployment business wealth, received tertiary education, and is married. If the reference person is married and has children, the household is mostly interested in long-term wealth accumulation and might be more interested in the purchase of a house. Kaas et al. (2015) argue that a higher rate of entrepreneurship may increase inequality due to the risk involved in entrepreneurial activity. Tertiary education is an important determinant of income, which again affects wealth accumulation, and married couples might benefit from tax reliefs. To better represent household demographics, I also include the number of adults living in one household (see Dustmann et al. 2018). If more employed adults live in one household, household income increases, which impacts household wealth. In comparison to Kaas et al. (2015), the level of income is not included in the main regression model, as income is a direct input factor for the calculation of net wealth and might therefore have an extremely dominant effect on the regression results. However, as a robustness check, a dummy of whether the household receives labor income or not is included.

Across all countries, homeownership is positively correlated with the RIF of net wealth. In general, the positive correlation is stronger for owners without mortgage than for owners with mortgage. In Germany, Spain, and France, the positive coefficients of outright ownership are continuously increasing when climbing up the wealth ladder. In Italy, the correlation between homeownership (with and without mortgage) and the RIF of net wealth across the distribution is concave. Hence, it is higher for households ranging at the median compared to households ranging at the bottom or the top of the net wealth distribution, i.e. being an outright owner instead of a renter increases the  $50^{\text{th}}$  percentile of net wealth by  $\notin 178,273.45$  in Italy. Interestingly, a similar pattern can be found for France in the case of ownership with mortgage.

<sup>&</sup>lt;sup>31</sup> Due to perfect collinearity between the different levels of the categorical variables, one category is dropped when running the regression. Please find the in-detail description of the covariates in Appendix A.

In Spain, the estimated coefficients for ownership with mortgage are even decreasing when higher net wealth quantiles are reached.

Further, the coefficients of "owner outright" are the lowest for the bottom decile of Germany's net wealth distribution. In Germany, an increase in the probability of being an outright owner instead of a renter, increases the  $10^{th}$  percentile of net wealth by just €8,605.25, compared to Spain, where a rise in the probability of being an outright owner increases the  $10^{th}$  percentile of the net wealth distribution by €100,161.74. However, the effect of a rise in the probability of being an owner without a mortgage is the highest at the 90<sup>th</sup> percentile of the net wealth distribution in Germany. Hence, the correlation increases extremely, especially due to large differences within the lower half of the net wealth distribution.<sup>32</sup> Hence, the correlation increases extremely, especially due to large differences within the lower half of the net wealth distribution. In contrast, the correlation between outright ownership and the RIF of net wealth increases just slightly in Spain. These results strongly confirm that homeownership has different effects on net wealth at different parts of the distribution and across countries.

When running the regression on a dummy for "ownership", without dividing into outright owner and owner with mortgage, I find that the estimated coefficients are highly significant across all countries and quantiles (Appendix B). In general, the aggregated ownership coefficient ranges in between the estimates of "owner outright" and "owner with mortgage". For Germany, Spain, and France the effect of homeownership on net wealth is continuously increasing along the distribution to be the strongest at the high end of the net wealth distribution. Thus, in Germany, a small increase in the probability that a household is owner instead of renter increases the 10<sup>th</sup> percentile of net wealth by €7,090.69, the 50<sup>th</sup> percentile by €132,561.94, and the 90<sup>th</sup> percentile by €201,929.84. In contrast, in Italy the RIF regression results suggest that homeownership has the strongest positive impact on equalized net household wealth at the median. This is in line with the strong increase in homeownership between the second and third quintile of equalized net household wealth (Figure 6 and Figure 7).

An increase in the probability of the reference person holding a university degree or running a self-employment business show strongly positive correlations with the RIF of equalized net household wealth across all countries and percentiles, whereas the coefficients increase when climbing up the wealth latter. Hence, the effect of business wealth and tertiary education on the RIF of net wealth is stronger at the upper end of the wealth distribution. The cross-country variation in the estimated coefficients is the largest for the 90<sup>th</sup> percentile.

In general, small housing size is negatively correlated with the RIF of net wealth. On the other hand, living in a large house shows positive coefficient estimates at the 50<sup>th</sup> and 90<sup>th</sup> percentile of the wealth distribution. This is logical, as higher wealth enables households to rent or buy larger dwellings and, at the same time, owning a large house has a positive impact on equalized net household wealth.

For the number of adults living in a household, my results show a negative coefficient in case of a single household belonging to the lowest net wealth decile in Germany. As it was shown in the descriptive statistics, the number of people living in a household is in general lower in Germany. People at the lower end of the wealth distribution are mostly renters and housing costs for renters are continuously increasing, therefore living in a single household has a negative effect. For households belonging to the 50<sup>th</sup> percentile of the net wealth distribution in

<sup>&</sup>lt;sup>32</sup> This is also found when the combined variable "ownership" is used as covariate (Appendix B).

Spain and Italy, the correlation with the RIF of net wealth is higher for two-adult-households. However, being married almost never shows any significant correlation with the RIF of net wealth across all percentiles and countries. Across all countries, the dummy variable for not having children mostly shows higher positive coefficients than the dummies for having one or two children. As having children is related to more consumption, the results suggest that it is generally more beneficial to not have children.

In most cases, the dummies for the different age groups are positively correlated with the RIF of net wealth. The coefficient estimates are especially large for higher wealth levels and if the age of the reference person is between 60 and 79. This is logical, as wealth is accumulated during the working age and peaks at the age of retirement.

As a robustness check, I first include a dummy that indicates whether the household receives labor income or not. The RIF regression results are reported in Appendix C. For the estimated coefficients of "income", I find significantly positive coefficients across all countries at the bottom half of the net wealth distribution. As income is a major input factor for the calculation of wealth, the positive correlation is not surprising. However, including "income" as an independent variable in the RIF regression does not change the coefficients of "owner outright" or "owner with mortgage" significantly. Following Dustmann et al. (2018), I also create dummies based on different lengths of living in the HMR (Appendix D). The results show strongly positive estimates for households living in their main residence for more than 9 years or 20 years who belong to the bottom decile of the wealth distribution in Spain and Germany, correspondingly. There are ambiguous effects in France. In Italy, my results show just a small change in the homeownership coefficients. Taking the length of residency into account, for the bottom half of wealth distribution in Germany, Spain, and France, the impact of homeownership on the RIF or net wealth tends to slightly decrease.

Additionally, I follow Kaas et al. (2015) and calculate the ratio of the estimated coefficient to the level of the corresponding wealth quantile to then plot the ratio on the quantiles. The resulting Figure 12 shows the effect of homeownership on the distribution of equalized net household wealth. My results are very similar to the ones of the reference study. Hence, homeownership impacts equalized net household wealth relative to the wealth quantile more at the lower end of the distribution. In the cross-country comparison and across the whole distribution, homeownership has the strongest impact on net wealth in Germany.<sup>33</sup>

#### **6.2 RIF decomposition results**

As a cross-country comparison, I perform a RIF decomposition at the first decile, the median, and the ninth decile, which allows the analysis of the specific contribution of various factors of influence. Appendix E provides the tables of results with Germany as the reference country corresponding to group 2 and either Spain (Table E1), France (Table E2), or Italy (Table E3) corresponding to Group 1. The total difference between both countries' equalized net household wealth is reported in the third row, followed by the decomposition of the gap in the explained as well as the unexplained part. In the following block of rows, the detailed composition of the explained part is reported. As a last row, I also include the effect of homeownership on the

<sup>&</sup>lt;sup>33</sup> As the 10<sup>th</sup> percentile of net wealth in Germany is  $\notin 0$ , the ratio becomes extremely large, which is represented by the sharp increase of the graph from the 10<sup>th</sup> percentile on.

unexplained part. In the analysis, the focus is on the explained part of the decomposition, i.e. the endowment effect. Across all countries and percentiles, the endowment effect is more important and is mostly highly significant. To control for further changes in the gap of net wealth across the distribution, I also do the RIF decomposition for all deciles. The results are reported in Appendix F.

By far, homeownership shows the largest effect on the endowment effect and is highly positively significant across all countries and percentiles. Therefore, homeownership explains a big part of the cross-country difference in equalized net household wealth. The magnitude of the homeownership contributions to the explained part even tends to exceed the magnitude of the total explained part. This is due to a counterfactual effect within the unexplained part of the gap.

As discussed above, the homeownership rate in Germany is the lowest, whereas the share of homeowners in Spain is the highest across the four countries. Due to this reason, the average contribution of homeownership to the explained part of the gap in net wealth between Germany and Spain is the highest.<sup>34</sup> Further, Table E1 provides results that indicate that the absolute gap in net wealth is the largest between Germany and Spain for households who range at the median. The value of the absolute gap is €53,679.01. When moving further up or down the net wealth distribution, the wealth gap between Germany and Spain becomes less pronounced. This is also supported by the decomposition results reported in Table F1.

As shown in the descriptive statistics, Table E2 underlines the fact that the richest French households are even more wealthy than the richest Germans (Figure 9). Here, the absolute wealth gap is larger for the 9<sup>th</sup> decile than for the median. The rising absolute gap in net wealth between Germany and France (with a small dip at the 80<sup>th</sup> percentile) is also found in Table F2.<sup>35</sup> However, the relative difference in net wealth between France and Germany is still the highest at the median. For the 50<sup>th</sup> percentile, average equalized net household wealth in France is 1.74 times the German value, compared to a ratio of 1.12 at the 90<sup>th</sup> percentile. This difference becomes obvious when comparing Figure 7 to Figure 9 in the descriptive statistics.

Table E3 presents the decomposition results of the net wealth gap between Germany and Italy. In Italy, households at the median have twice of the net wealth of German households at the median. However, German households ranging at the 90<sup>th</sup> percentile of the net wealth distribution, are more wealthy than Italian households at the 90<sup>th</sup> percentile. This is also illustrated in Figure 9. The gap of equalized net household wealth between Germany and Italy is the largest at the median. The absolute difference is €44,808.28, with the composition effect explaining 81.50% of the gap. Homeownership contributes by far the most to this cross-country difference.<sup>36</sup>

 $<sup>^{34}</sup>$  I suggest the reason for the estimators of the lowest decile in Germany to be insignificant is that the value of the 10<sup>th</sup> percentile of net wealth in Germany is €0. After replacing the lowest and the highest 1% of net wealth by the next value counting inwards from the extremes, the value of the bottom decile of net wealth in Germany changes to €636 and the decomposition coefficient turns out to be significant. However, the conclusions that are drawn from the RIF decomposition do not change.

<sup>&</sup>lt;sup>35</sup> Interestingly, Table F2 shows that the absolute impact of homeownership on the explained part of the gap increases until the median to fall again afterwards and peak at the 9<sup>th</sup> decile of equalized net household wealth.

<sup>&</sup>lt;sup>36</sup> When comparing Germany and Italy, I also find significant and positive coefficients for the contribution of tertiary education of the reference person. As shown in Table 3, the rate is far lower in Italy than in Germany, so that tertiary education has a significant impact on the net wealth gap.

The results of the RIF decomposition show that the large cross-country differences in net wealth are mostly driven by differences in the wealth level at the median. Homeownership strongly affects the cross-country differences in equalized net household wealth. This is also illustrated in the descriptive statistics (Figure 7). Reweighting changes the coefficients of the explained and unexplained part; however, the relations stay the same so that the conclusions drawn from the results do not change. As an additional robustness check, I include a variable that indicates whether the household receives labor income or not, which does not change the coefficients much and therefore does not lead to any other implications.

### 7. Discussion: Homeownership and cross-country wealth inequality

This study compares the levels of equalized net household wealth of Germany, Spain, France, and Italy at different parts of the distribution and analyzes the impact of homeownership on net wealth. The cross-country wealth inequality between Germany and the other Euro nations is especially high around the median of net wealth. This is mainly due to huge differences in homeownership rates across the distribution of equalized net household wealth.

My results are in line with the findings of former studies analyzing the effect of homeownership on wealth inequality across Europe. Mathä et al. (2014) stress that wealth inequality is strongly driven by changes in the housing market. Further, Kuhn et al. (2017) show that for the middle class, the most important wealth factor is housing wealth. According to Kaas et al. (2015), wealth inequality is lower in countries with less renters, as the average renter is poorer than the average owner, which is also presented in Table 4 to Table 6. Additionally, the measures of inequality reported in Table 1 indicate that wealth inequality is lower in countries with higher rates of homeownership. In contrast to the reference study, I find that the cross-country inequality is the largest around the median of equalized net household wealth and not below the median.

The RIF regression results show a significant difference in the coefficients of "owner with mortgage" compared to "owner outright". As described in section 2, the housing markets - such as the access to mortgages – differ strongly across the four Euro countries. The national housing regulations determine the levels of homeownership and eventually the net wealth level. The German housing market is characterized by increasing rent prices, especially due to weak restrictions on rents for new contracts, and strong regulations that benefit sitting tenants. The rate of social housing provided by the German government is extremely low, whereas homeowners profit from decreasing housing costs because of low mortgage interest rates. If less income is left after housing, savings decrease, which lowers the amount of money left for wealth accumulation. The absence of a subprime lending market and mortgage equity withdrawal, in combination with banks requiring higher down payments, restricts access to mortgages to more wealthy households. On the other hand, the rate of single households is the highest in Germany and people have less children than in Spain, France, or Italy. If a household receives high labor income and has less children, the need to accumulate high levels of wealth in order to purchase a house might be less pronounced. Moreover, the German economy (as well as rent and house prices) was far less affected by the financial crisis, so that people may not necessarily recognize the need to accumulate high levels of wealth in the form of housing wealth. Business wealth and financial wealth in Germany is higher than in any of the other three Euro nations. Additionally, household income and the rate of tertiary education of the reference person is the highest in the cross-country comparison and the unemployment rate is extremely low at 3.4%. Whereas many young Spanish employees emigrate as jobs are scarce and the unemployment rate among people under 25 years of age was as high as 53.2% in 2014 - after the country was hit badly by the financial crisis - and still ranged at 15.3% in 2018 (EC 2019c).

In Spain, more people live in a larger house for a longer period of time than in the other countries. The Spanish government strongly regulates the rental market to keep the homeownership rate high and secure social stability. Today, homeowners benefit from tax credit for qualifying loans financing expenses on the house and decreasing house prices and mortgage interest rates. The latter is not just the case in Spain, but across all countries. The extraordinary high rate of homeownership (83%) leads to the highest level of equalized net household wealth across the whole distribution and the lowest within-country inequality (see Table 1).

French households live in a smaller HMR for a shorter period of time with the highest number of children in the cross-country comparison. On average, the reference person has the same high level of tertiary education as in Germany and gains the second highest household income. In France, the level of equalized net household wealth for households belonging to the top quintile of the net wealth distribution is the highest (see Figure 9). The government as well as private insurance companies, guarantee outstanding loans for house purchase, which lowers the risk for banks and lead to very high loan-to-value ratios. Further, subsidized loan schemes are provided by the French government that strongly facilitate becoming a homeowner. In addition, the total stock of social housing is very high and accounted for 18.7% in 2015. As the French government supports the purchase of a house and also provides social housing units, the rate of homeownership is 59% and thus lower than in Spain and Italy, but higher than in Germany. In terms of within-country inequality, France ranges second after Germany.

The Italian government offers the highest tax subsidies for homeowners in the cross-country comparison, so that the effective tax rate is 0.5% (Van den Noord 2005). Additionally, decreasing house prices and low mortgage interest rates further enhance the demand for mortgages and homeownership. Consequently, Italy ranges second in terms of homeownership rates. However, the level of total household income and the ratio of tertiary education of the reference person are lower than in Germany, Spain, or France. Thus, even if housing wealth is the highest in Italy, the overall level of net wealth is lower than in the other countries. When looking at the composition of equalized net household wealth this might also be caused by a lower degree of diversification (see Figure 4); hence, more investment in the HMR, but less investment in other real estate property, financial assets, and self-employed business.

### 8. Conclusion

This study finds that homeownership explains most of the gap in cross-country equalized net household wealth. Wealth inequality across countries is most pronounced at the median of the net wealth distribution. The RIF decomposition results between Germany and Spain such as Germany and Italy strongly underline this finding. The difference in net wealth between France and Germany is less straight-forward. Even if the absolute gap in net wealth is rising with net wealth quantiles, the relative difference in net wealth is the largest around the median. To explain the huge differences in the homeownership rates, the paper provides an overview of the housing markets in Germany, Spain, France, and Italy, and illustrates the compositions of equalized net household wealth across quintiles for each country.

As the research is based on Kaas et al. (2015), I use similar covariates as the reference study; however, apart from controlling for special characteristics of the reference person of the household, it might be interesting to take other household member's education and self-employment business wealth into account when analyzing net wealth on the household level. As the reference person is not necessarily the head of household, limiting several covariates on the reference person might not represent each household properly. Due to limitations in the extent of the paper, this is left for future research.

Cross-country differences in the pension systems also impact household wealth and wealth inequality levels. Logically, households, who are living in countries that do not provide a sufficiently good working public pension system, need to accumulate higher levels of private wealth, whereas in a country with a pay-as-you-go pension system, the implicit wealth depends on the period of time a person can profit from the system, hence how long a person lives. But as pension wealth cannot be withdrawn when needed, there are differing opinions in the literature whether it is reasonable to include pension wealth in the calculation of household wealth or not (Bönke et al. 2017, Cowell et al. 2016). As 30% of the values in the variable for public pension were missing in the underlying HFCS data, it was not considered in the analysis of this paper. To take changes over time into account, future studies based on the HFCS should use the panel component. For the selected countries, there were too few panel components available to construct a sufficiently large panel data set.

As housing prices in urban areas are increasing even more rapidly, less wealthy people who live in cities are forced to spend even more on housing. Therefore, less money is left for wealth accumulation compared to households who live in rural areas. Thus, regional differences between cities and the countryside should be considered when possible. Due to the reason that there is no such variable available in the HFCS data set this study does not control for regional differences. I suggest, in the long run, cities will be even more dominated by rich households as predominantly poorer households will be forced to move out due to increasing housing prices. This development fosters segregation and can have serious effects on social and political stability. In the Euro area, the level of cross-country wealth inequality is of high importance for all member states. Due to free labor movement, the demand for housing in the well-developed western and northern European cities will increase even more, whereas eastern European countries suffer from the emigration of high-quality labor (this further burdens the social security systems). Only the evolution of digital employment opportunities may lower the need of employees to move and therefore counteract the increasing demand of urban housing. As mentioned by Dustmann et al. (2018), the fact that especially young, single households suffer from increasing rent prices and lower savings, which negatively affect wealth accumulation, means that the long-term impact might be even worse (see also Corak 2013). Hence, wealth inequality is a major issue today but has an even stronger impact on the future if it is not mitigated today.

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#### Annex



Figure 1: Rent price indices for Germany, Spain, France, and Italy

Source: OECD (2018b)



Figure 2: Real house price indices for Germany, Spain, France, and Italy

Source: OECD (2018b)

	Number of	Mean (€)	Median (€)	Mean/	50/10	90/50	75/25
	households			Median			
Germany	4457	144828	43333	3.34	37	7.43	37.75
Spain	6102	166139	97000	1.71	26.23	3.01	4.56
France	11904	163393	75506	2.16	33.12	4.79	15.03
Italy	8145	141895	88133	1.61	51.80	3.62	11.46

**Table 1**: Summary statistics of equalized net household wealth in Germany, Spain, France, and Italy, and measures of inequality

Source: Eurosystem Household Finance and Consumption Survey, author calculations.

Figure 3: Average equalized net household wealth across countries and quintiles

Source: Eurosystem Household Finance and Consumption Survey, author calculations. The graph is based on each country's net wealth distribution. Absolute values are shown in Euro.

**Table 2**: Portfolio shares of equalized net household wealth components

	Net own	Net financial	Net real	Business	Net wealth
	housing wealth	wealth	wealth	wealth	$\leq 0$
Germany	40%	25%	23%	12%	7%
Spain	49%	16%	28%	7%	2%
France	44%	21%	24%	11%	2%
Italy	63%	11%	20%	6%	3%

Source: Eurosystem Household Finance and Consumption Survey, author calculations.

<sup>&</sup>lt;sup>37</sup> As the 10<sup>th</sup> percentile of equalized net household wealth is zero for Germany, the 50/10 ratio cannot be computed mathematically. However, when the denominator is close to zero, the fraction becomes extremely large.



Figure 4: Composition of equalized net household wealth across the whole distribution of net wealth within each country

Source: Eurosystem Household Finance and Consumption Survey, author calculations. Absolute mean values in Euro calculated by multiple imputation estimation methods with bootstrapped standard errors using 100 replicate weights.

**Figure 5**: Composition of equalized net household wealth for households belonging to the bottom quintile of the net wealth distribution within each country



Source: Eurosystem Household Finance and Consumption Survey, author calculations. Absolute mean values in Euro calculated by multiple imputation estimation methods with bootstrapped standard errors using 100 replicate weights.



**Figure 6**: Composition of equalized net household wealth for households belonging to the second quintile of the net wealth distribution within each country

Source: Eurosystem Household Finance and Consumption Survey, author calculations. Absolute mean values in Euro calculated by multiple imputation estimation methods with bootstrapped standard errors using 100 replicate weights.



**Figure 7**: Composition of equalized net household wealth for households belonging to the third quintile of the net wealth distribution within each country

Source: Eurosystem Household Finance and Consumption Survey, author calculations. Absolute mean values in Euro calculated by multiple imputation estimation methods with bootstrapped standard errors using 100 replicate weights.



**Figure 8**: Composition of equalized net household wealth for households belonging to the forth quintile of the net wealth distribution within each country

Source: Eurosystem Household Finance and Consumption Survey, author calculations. Absolute mean values in Euro calculated by multiple imputation estimation methods with bootstrapped standard errors using 100 replicate weights.



**Figure 9**: Composition of equalized net household wealth for households belonging to the top quintile of the net wealth distribution within each country

Source: Eurosystem Household Finance and Consumption Survey, author calculations. Absolute mean values in Euro calculated by multiple imputation estimation methods with bootstrapped standard errors using 100 replicate weights.

	Owner	Eq. total	Eq. size	No of	No of	Δαο	Salfam	Tort	Married	Longth of
	ship (0()	Eq. iotal	ef IMD	abildran	no or	DD	played	advastion		Lengui Or
	smp (%)	nousenoia	OI HIVIK	cinidren	aduns	KP	pioyed	education	KP (%)	residency
		income (€)	$(m^2)$				RP (%)	RP (%)		(years)
Germany	44	18739.89	68.42	0.38	1.64	52	9	31	48	18
Spain	83	9834.64	70.05	0.53	2.10	54	14	29	59	24
France	59	11582.27	62.09	0.54	1.68	54	9	31	42	16
Italy	68	9261.66	65.39	0.45	2.01	57	16	13	56	23

Table 3: Descriptive statistics for all covariates across the whole distribution for each country

Source: Eurosystem Household Finance and Consumption Survey, author calculation.

**Figure 10**: Share of tenure types for the whole distribution of equivalized net household wealth for Germany, Spain, France, and Italy



Source: Eurosystem Household Finance and Consumption Survey, author calculations.



Figure 11: Share of tenure types across countries by quintile of equivalized net household wealth

Source: Eurosystem Household Finance and Consumption Survey, author calculations.

Table 4: Descriptive statistics of all covariates fo	r renters across t	the whole of	distribution of
equalized net household wealth for each county			

	Eq. house-	Eq. total	Eq.	No of	No of	Age	Selfem-	Tert.	Married	Length of
	hold net	household	size of	children	adults	RP	ployed	education	RP (%)	residency
	wealth (€)	income (€)	HMR				RP (%)	RP (%)		(years)
Germany	40279.51	16230.90	55.48	0.35	1.48	48	6	26	33	12
Spain	42217.96	8783.21	59.18	0.65	1.95	48	14	24	44	17
France	35965.61	10397.48	48.21	0.55	1.52	48	5	29	25	10
Italy	19370.54	8114.85	54.88	0.53	1.82	52	12	11	46	16

Source: Eurosystem Household Finance and Consumption Survey, author calculations.

**Table 5**: Descriptive statistics of all covariates for owners with mortgage across the whole distribution of equalized net household wealth for each county

	Eq. house-	Eq. total	Eq.	No of	No of	Age	Selfem-	Tert.	Married	Length of
	hold net	household	size of	children	adults	RP	ployed	education	RP (%)	residency
	wealth (€)	income (€)	HMR				RP (%)	RP (%)		(years)
Germany	186444.4	31199.68	77.39	0.75	1.96	50	15	39	71	17
Spain	108011.4	14378.15	60.42	0.94	2.14	43	16	40	69	12
France	157293.3	21483.21	61.01	1.14	1.90	43	15	46	53	8
Italy	136946.5	17688.11	57.94	0.92	2.12	46	28	25	72	11

Source: Eurosystem Household Finance and Consumption Survey, author calculations.

**Table 6**: Descriptive statistics of all covariates for outright owners across the whole distribution of equalized net household wealth for each county

	Eq. house-	Eq. total	Eq.	No of	No of	Age	Selfem-	Tert.	Married	Length of
	hold net	household	size of	children	adults	RP	ployed	education	RP (%)	residency
	wealth (€)	income (€)	HMR				RP (%)	RP (%)		(years)
Germany	329173.7	16344.86	88.97	0.21	1,77	62	12	35	63	32
Spain	233109.8	7878.69	78.19	0.29	2,13	61	13	25	58	32
France	296975	8095.91	77.06	0.25	1,74	64	9	26	54	26
Italy	209033.7	8499.01	72.31	0.34	2,09	62	16	13	59	29

Source: Eurosystem Household Finance and Consumption Survey, author calculations.



Figure 12: Quantile effects of homeownership (following Kaas et al. 2015)

Source: Eurosystem Household Finance and Consumption Survey, author calculations. The y-axis describes the ratio of the estimated coefficient to the level of the corresponding wealth quantile. The x-axis indicates the quantile of the distribution of equalized net household wealth.

#### **Appendix A: RIF regression results**

Tables A1 to A4 show the RIF regression results for the 10<sup>th</sup>, 50<sup>th</sup>, and 90<sup>th</sup> percentile of equalized net household wealth across countries. The dependent variable is defined as the RIF of equalized net household wealth. Further, the underlying variable for "housing size", is divided into three equally large groups within each country so that for each country three categories are defined: small, medium, and large size of the household main residence. The categorical variables "child" and "adult" indicate how many children or adults live in the household, hence "child0" corresponds to no children. "Married RP" and "tert education RP" are further dummies that indicate whether the reference person is married or graduated from university. The age dummies refer to the age of the reference person and include special age ranges. E.g., "age30" corresponds to the reference person being between 30 and 39 years old. "Selfemployed RP" is a dummy, which takes on the value 1 in the case the reference person has self-employed business wealth and 0 if not. Bootstrapped standard errors are reported in parenthesis and are calculated using 100 replicate weights. I account for imputation variance using Rubin's formula (\* p<0.05, \*\* p<0.01, \*\*\* p<0.001). Source: Eurosystem Household Finance and Consumption Survey, author calculations.

### Table A1: RIF regression results for Germany

	10	50	90
	b/se	b/se	b/se
owner outright	8605.249***	144871.320***	289439.990***
	(1941.58)	(13231.13)	(65288.63)
owner with mortgage	4526.951	111752.444***	54022.097
	(2682.75)	(11132.49)	(36416.18)
small housing size	-1495.307	-25175.908***	-3557.604
	(2635.41)	(6028.87)	(20176.39)
large housing size	2392.702	16735.293**	224346.380***
	(1925.99)	(5761.67)	(45045.94)
child0	7959.916	41334.395***	-35080.236
	(6636.26)	(10473.80)	(47912.14)
child1	3549.828	21583.739*	-66008.235
	(7145.43)	(10961.18)	(49734.18)
child2	7063.336	28253.863*	-8302.877
	(7222.89)	(11649.07)	(45740.50)
adult1	-8254.587**	-11506.622	-54342.212
	(3086.50)	(11951.73)	(94778.95)
adult2	-3877.409	-9374.580	-94276.502
	(2478.81)	(11007.27)	(91023.82)
adult3	-1325.376	-14867.079	-98945.905
	(2663.23)	(13020.93)	(97693.25)
tert education RP	4800.496**	30466.312***	123844.564***
	(1478.65)	(4516.19)	(37212.36)
married RP	440.463	4390.082	38649.151
	(1959.14)	(5945.95)	(32944.14)
age30	-1241.332	8412.812	-58146.261*
- ]	(4044.00)	(9438.39)	(28656.11)
age40	5020.748	15487.398	-7270.299
	(4154.27)	(8991.73)	(29679.16)
age50	3706.658	23739.175*	32989.383
	(3841.99)	(9358.06)	(33735.41)
age60	6131.582	15777.958	85283.469
- ]	(3963.24)	(9825.73)	(43741,43)
age70	8226.681	12726.561	104687.844*
	(4239 46)	(9725 38)	(42138 38)
age80	10913 354*	18487 980	-33026 152
ageev	(4545 19)	(12308 52)	(58358 70)
selfemployed PD	1844 583	29642 188***	382243 823***
SCTTEMPTOJEC VL	(1922 92)	(7499 06)	(95944 00)
Constant	-9507 511	-66471 176***	157448 138
constant.	(7010 /5)	(19311 64)	(106533 63)

### Table A2: RIF regression results for Spain

	10	50	90
	b/se	b/se	b/se
owner outright	100161.743***	126073.083***	137974.494***
	(9822.98)	(9310.76)	(35426.03)
owner with mortgage	86251.887***	66027.189***	53854.766*
	(11245.11)	(8552.14)	(26820.07)
small housing size	-7986.470	-16485.502*	-24908.063
	(5010.80)	(6924.96)	(28446.28)
large housing size	4298.457	27958.017***	253574.071***
	(3037.07)	(5936.96)	(49636.01)
child0	6140.906	-6350.776	-22783.514
	(21079.71)	(37831.00)	(41113.37)
child1	4305.525	-24864.940	-70354.430
	(20956.87)	(37498.37)	(41740.73)
child2	-283.679	-29123.811	-68444.825
	(21425.27)	(37555.31)	(42743.40)
adult1	4535.549	47713.509***	42724.404
	(7611.11)	(13219.02)	(69221.52)
adult2	10521.006	50942.430***	127834.960*
	(6054.01)	(10396.89)	(61165.95)
adult3	9211.606	25907.426*	94728.078
	(5908.67)	(11178.15)	(62504.59)
tert education RP	13879.466***	42476.410***	277624.956***
	(3354.33)	(6028.35)	(49267.25)
married RP	3935.391	12200.616	28012.166
	(4757.91)	(8055.23)	(30202.15)
age30	5480.084	4517.585	-108232.030**
	(15002.83)	(14263.74)	(39989.99)
age40	6957.784	25638.792	-11079.309
	(14775.18)	(13875.13)	(40271.92)
age50	10937.562	53569.212***	118072.401*
	(14590.88)	(14996.15)	(50397.72)
age60	9905.078	56079.662***	332035.811***
	(14604.89)	(15502.15)	(67324.88)
age70	11175.408	43202.952**	229359.579***
	(14311.19)	(15192.02)	(60824.73)
age80	17193.052	38053.145*	203579.482**
	(15274.49)	(17282.37)	(75125.55)
selfemployed RP	18590.056***	67847.232***	287643.848***
	(4990.21)	(9305.09)	(65771.81)
Constant	-105057.124***	-87523.307	-105377.973
	(25552.55)	(45333.26)	(107111.48)

### Table A3: RIF regression results for France

	10	50	90
	b/se	b/se	b/se
owner outright	29953.423***	224978.502***	283747.904***
	(1361.82)	(7510.40)	(26673.03)
owner with mortgage	31192.103***	141798.265***	68399.137***
	(1505.04)	(6692.82)	(18179.60)
small housing size	-4727.492**	-16495.190***	10636.771
	(1581.51)	(4342.10)	(13909.70)
large housing size	661.174	23288.228***	202998.796***
	(1003.75)	(3703.69)	(25262.29)
child0	15800.508***	43229.562***	6306.352
	(3409.59)	(6819.20)	(25219.03)
child1	9336.663**	29773.824***	-29999.637
	(3381.17)	(7088.70)	(23982.35)
child2	8585.666*	20350.421**	-24195.891
	(3401.45)	(7367.75)	(24951.77)
adult1	3126.955	15170.906	56826.630
	(5190.07)	(11166.96)	(41613.50)
adult2	8830.689	20638.367	67016.769
	(4748.02)	(10718.37)	(39182.22)
adult3	9090.557	5628.366	56111.436
	(4974.10)	(12276.47)	(44063.54)
tert education RP	6952.579***	33069.751***	217535.342***
	(1171.84)	(3340.09)	(22970.63)
married RP	-436.782	13996.281***	-1822.485
	(1512.58)	(3969.51)	(17622.69)
age30	-1315.048	14625.220*	-15792.318
	(3108.62)	(5748.18)	(16491.35)
age40	-3427.689	50716.553***	34034.134
-	(3106.93)	(5515.88)	(19645.12)
age50	-3602.428	65356.042***	131838.167***
-	(3010.36)	(5632.92)	(23949.44)
age60	-2477.680	65642.907***	191765.451***
-	(2986.14)	(6165.54)	(28902.25)
age70	-251.197	55501.986***	135266.993***
-	(3073.09)	(6546.72)	(32475.66)
age80	637.381	49879.115***	124518.059***
-	(3292.65)	(7841.08)	(31545.52)
selfemployed RP	7868.738***	71438.692***	476847.250***
<u> </u>	(1199.14)	(6079.99)	(51294.25)
Constant	-34641.374***	-165196.254***	-83917.856
	(6663.26)	(15063.06)	(59492.45)

### Table A4: RIF regression results for Italy

	10	50	90
	b/se	b/se	b/se
owner outright	46989.866***	178273.448***	140100.958***
	(2208.58)	(6354.21)	(15713.68)
owner with mortgage	46793.175***	111819.587***	45206.274*
	(2476.90)	(7835.36)	(19835.34)
small housing size	-6734.555***	-49504.882***	-50976.352**
	(1764.82)	(4540.13)	(11864.88)
large housing size	-37.920	40191.986***	190283.285***
	(1396.98)	(4288.95)	(22801.18)
child0	21923.334***	11656.388	-50984.126
	(5614.44)	(9597.91)	(36861.97)
child1	20909.321***	5258.984	-91939.885*
	(5664.27)	(9936.69)	(36557.75)
child2	19472.794***	17137.315	-93347.997*
	(5885.63)	(10810.84)	(37292.56)
adult1	1006.639	26087.114**	5803.794
	(4195.28)	(9291.75)	(30644.06)
adult2	2663.645	38090.177***	34713.414
	(2719.57)	(7486.21)	(24950.58)
adult3	1526.196	17460.167*	-16423.399
	(2847.39)	(8045.09)	(23965.64)
tert education RP	5578.492**	43454.772***	202152.489***
	(1746.94)	(4196.36)	(28753.87)
married RP	2620.123	6591.078	14139.167
	(2395.91)	(4896.18)	(16736.74)
age30	-10121.623	11455.251	37964.202
	(6785.79)	(8423.94)	(29150.97)
age40	-7052.101	25383.298**	52300.563*
	(6292.13)	(8053.99)	(26105.49)
age50	-6052.712	35267.129***	99800.448***
	(6266.59)	(8535.31)	(26881.14)
age60	-6148.917	38167.652***	118547.744***
	(6349.53)	(8386.25)	(29594.15)
age70	-2651.781	34003.696***	133354.531***
	(6364.48)	(8047.44)	(28156.87)
age80	-5594.970	21189.349**	74338.734*
-	(6363.78)	(7844.29)	(30668.39)
selfemployed RP	11628.550***	42855.004***	203862.212***
	(1582.32)	(5067.41)	(24643.91)
Constant	-48808.551***	-106696.342***	82909.563
	(9219.94)	(16646.96)	(55482.97)

### **Appendix B: Robustness check "ownership"**

Tables B1 to B4 present the RIF regression results for the 10<sup>th</sup>, 50<sup>th</sup>, and 90<sup>th</sup> percentile of equalized net household wealth across countries. "Ownership" is the independent variable and the RIF of equalized net household wealth is the dependent variable. The other covariates are defined as before. Bootstrapped standard errors are reported in parenthesis and are calculated using 50 replicate weights. I account for imputation variance using Rubin's formula (\* p<0.05, \*\* p<0.01, \*\*\* p<0.001). Source: Eurosystem Household Finance and Consumption Survey, author calculations.

	10	50	90
	b/se	b/se	b/se
ownership	7090.694***	132561.949***	201929.838***
	(1982.68)	(11787.33)	(50735.23)
small housing size	-1383.152	-24271.304***	2863.855
	(2744.55)	(6038.74)	(21248.83)
large housing size	2476.386	17414.839**	229176.883***
	(1889.34)	(6186.24)	(50851.27)
child0	8495.598	45684.305***	-4174.466
	(6302.90)	(10995.97)	(53429.69)
child1	3776.006	23419.747*	-52961.280
	(6561.33)	(11300.29)	(53077.05)
child2	7130.651	28797.701*	-4429.117
	(7027.74)	(11884.76)	(50810.20)
adult1	-8271.015*	-11654.418	-55503.638
	(3238.16)	(12020.32)	(96036.46)
adult2	-3970.773	-10130.332	-99745.439
	(2706.99)	(10483.16)	(94164.91)
adult3	-1600.842	-17099.541	-114905.809
	(2720.70)	(11885.53)	(97203.59)
tert education RP	4778.448**	30290.188***	122599.200**
	(1647.80)	(5256.10)	(38121.72)
married RP	486.971	4759.701	41262.474
	(2033.00)	(6166.35)	(33875.66)
age30	-1403.180	7098.650	-67495.357*
	(4526.46)	(9802.64)	(29805.43)
age40	4657.702	12546.624	-28181.506
	(4487.96)	(8761.10)	(27297.70)
age50	3575.804	22668.195*	25372.687
	(4244.55)	(9133.85)	(37844.26)
age60	6317.621	17291.712	96049.083*
	(4492.55)	(10166.47)	(45212.34)
age70	8765.369*	17101.131	135786.963**
	(4450.52)	(9994.27)	(48990.04)
age80	11534.760*	23540.313*	2888.060
	(4612.54)	(11915.03)	(56483.62)
selfemployed RP	1863.506	29802.360***	383388.028***
	(2029.24)	(7465.43)	(107574.66)
Constant	-10004.630	-70496.590***	128959.027
	(8126.07)	(18512.42)	(110043.96)

#### **Table B1**: RIF regression results for Germany

### Table B2: RIF regression results for Spain

	10	50	90
	b/se	b/se	b/se
ownership	94422.412***	101297.267***	103266.449***
	(10137.25)	(8102.09)	(26520.28)
small housing size	-7678.247	-15154.656*	-23042.412
	(4867.80)	(6689.07)	(30899.32)
large housing size	5060.830	31250.523***	258187.075***
	(3060.05)	(6447.92)	(48829.29)
child0	7201.734	-1772.310	-16367.010
	(21483.61)	(39438.96)	(42649.69)
child1	4035.876	-26029.455	-71984.714
	(21061.85)	(38724.35)	(39725.28)
child2	-539.776	-30229.671	-69993.160
	(21883.78)	(39353.81)	(40678.63)
adult1	3914.011	45031.769***	38976.084
	(7687.58)	(12631.89)	(66317.62)
adult2	10106.277	49152.074***	125335.380*
	(6123.48)	(10139.47)	(59416.77)
adult3	9158.197	25677.975*	94412.059
	(6018.78)	(10778.06)	(59417.75)
ert education RP	13232.851***	39684.941***	273714.560***
	(3510.55)	(6478.80)	(44729.00)
narried RP	3534.861	10471.870	25589.941
	(4858.44)	(8137.46)	(28562.15)
age30	4604.143	736.397	-113530.077**
	(15222.18)	(15635.18)	(40292.59)
age40	8736.664	33317.766*	-322.202
	(15269.54)	(13767.19)	(39515.91)
age50	14543.897	69136.936***	139886.151**
	(15053.37)	(15806.60)	(47306.78)
age60	15532.373	80368.790***	366063.129***
	(15318.95)	(16362.46)	(65900.81)
age70	17445.709	70269.925***	267276.551***
-	(15255.93)	(16303.03)	(60325.54)
age80	23570.594	65583.054***	242144.076***
-	(15874.60)	(17288.75)	(67849.92)
selfemployed RP	19342.117***	71093.275***	292187.317***
1 2	(4796.22)	(9481.71)	(58934.10)
Constant	-107513.259***	-98125.786*	-120240.581
	(26651.19)	(47118.68)	(104671.52)

### Table B3: RIF regression results for France

	10	50	90
	b/se	b/se	b/se
ownership	30447.828***	191778.105***	197794.019***
	(1388.70)	(6770.29)	(21446.55)
small housing size	-4752.359**	-14825.313***	14959.984
	(1601.41)	(4028.12)	(14181.33)
large housing size	617.273	26236.325***	210631.248***
	(947.82)	(3799.95)	(26516.21)
child0	15638.399***	54115.562***	34489.567
	(3265.30)	(7180.66)	(28647.53)
child1	9279.255**	33628.939***	-20018.969
	(3098.42)	(7663.98)	(25054.39)
child2	8597.536**	19553.356*	-26259.444
	(3258.63)	(7709.42)	(26761.17)
adult1	3117.814	15784.794	58415.952
	(5461.37)	(11661.50)	(38148.44)
adult2	8840.444	19983.317	65320.882
	(5257.14)	(11148.38)	(36906.32)
adult3	9063.072	7474.065	60889.843
	(5433.27)	(12157.95)	(42397.95)
tert education RP	7007.114***	29407.607***	208054.264***
	(1117.74)	(3458.44)	(23531.02)
married RP	-485.620	17275.846***	6668.116
	(1376.22)	(4346.82)	(18453.36)
age30	-1232.436	9077.627	-30154.709
	(3002.93)	(6078.98)	(17221.08)
age40	-3415.952	49928.381***	31993.604
	(2932.22)	(5930.60)	(18901.64)
age50	-3726.755	73704.868***	153452.787***
	(2889.79)	(6273.98)	(25621.36)
age60	-2787.016	86415.519***	245544.527***
	(2840.80)	(6964.78)	(33582.42)
age70	-635.274	81293.651***	202040.104***
	(2991.53)	(7386.98)	(35322.47)
age80	263.163	75008.676***	189577.021***
	(3089.55)	(8090.94)	(35219.78)
selfemployed RP	7864.497***	71723.490***	477584.575***
	(1180.89)	(6265.76)	(51137.71)
Constant	-34413.423***	-180503.677***	-123547.876*
	(7006.95)	(15800.37)	(61023.95)

### Table B4: RIF regression results for Italy

	10	50	90
	b/se	b/se	b/se
ownership	46954.785***	166421.109***	123176.073***
	(2192.61)	(6473.07)	(12239.55)
small housing size	-6737.880***	-50628.126***	-52580.321***
	(1895.70)	(5270.00)	(13372.69)
large housing size	-34.144	41467.931***	192105.307***
	(1337.87)	(3933.41)	(24127.68)
child0	21920.508***	10701.487	-52347.705
	(6275.97)	(9852.98)	(32942.72)
child1	20895.034***	431.904	-98832.852**
	(6186.95)	(10433.75)	(34809.05)
child2	19457.740**	12051.255	-100610.782**
	(6369.84)	(10239.66)	(36075.45)
adult1	994.682	22047.325**	35.063
	(4108.62)	(8221.54)	(32840.90)
adult2	2652.698	34391.578***	29431.895
	(2957.59)	(7225.69)	(24987.14)
adult3	1519.474	15188.979*	-19666.606
	(2928.83)	(7381.47)	(25021.10)
tert education RP	5570.200**	40653.506***	198152.343***
	(1847.25)	(4514.57)	(27542.55)
married RP	2617.625	5747.007	12933.852
	(2497.34)	(4766.37)	(17906.81)
age30	-10140.351	5127.915	28928.902
	(6968.46)	(9887.65)	(25732.56)
age40	-7058.157	23337.327**	49378.960*
	(6922.20)	(8894.04)	(25087.63)
age50	-6051.347	35728.151***	100458.778***
	(6575.22)	(8946.38)	(27337.75)
age60	-6132.465	43726.060***	126485.032***
	(6630.39)	(9125.72)	(29872.16)
age70	-2631.661	40801.451***	143061.579***
	(6843.78)	(9073.76)	(29660.59)
age80	-5574.580	28078.355**	84176.087**
	(6745.15)	(9125.70)	(28533.63)
selfemployed RP	11622.386***	40772.312***	200888.173***
	(1481.29)	(5165.12)	(27076.23)
Constant	-48789.488***	-100255.853***	92106.442
	(10216.74)	(15904.64)	(55160.24)

### Appendix C: Robustness check "income"

The RIF regression results for the 10<sup>th</sup>, 50<sup>th</sup>, and 90<sup>th</sup> percentile of equalized net household wealth across countries are reported in Tables C1 to C4. As before, the RIF of equalized net household wealth is the dependent variable. "Income" is included as independent variable and the other covariates are defined as before. Bootstrapped standard errors are reported in parenthesis and are calculated using 50 replicate weights. I account for imputation variance using Rubin's formula (\* p<0.05, \*\* p<0.01, \*\*\* p<0.001). Source: Eurosystem Household Finance and Consumption Survey, author calculations.

### **Table 1**: RIF regression results for Germany

	10	50	90
	b/se	b/se	b/se
owner outright	8662.823***	145204.630***	288708.803***
	(1884.23)	(12967.23)	(71398.83)
owner with mortgage	4401.530	111025.136***	55606.673
	(2701.91)	(11662.68)	(37549.46)
income	2851.261	16496.038**	-36145.763
	(3137.79)	(5106.10)	(40855.75)
small housing size	-1365.376	-24424.831***	-5206.770
	(2331.71)	(6037.40)	(24431.10)
large housing size	2405.302	16808.492**	224184.973***
	(1815.67)	(5923.70)	(46959.93)
child0	7939.422	41216.879***	-34818.068
	(6364.48)	(11053.49)	(51762.05)
child1	3393.496	20681.081	-64015.146
	(6697.67)	(11921.31)	(54524.51)
child2	6974.389	27736.413*	-7183.896
	(6886.31)	(11446.88)	(48750.54)
adult1	-7037.598*	-4466.932	-69778.056
	(3335.93)	(12138.15)	(99479.94)
adult2	-3276.337	-5894.832	-101890.381
	(2652.55)	(10830.67)	(98971.05)
adult3	-1096.469	-13537.665	-101834.255
	(2708.44)	(12170.50)	(99838.93)
tert education RP	4697.538**	29868.047***	125145.557**
	(1585.88)	(4590.06)	(38944.50)
married RP	519.326	4844.625	37639.725
	(1842.13)	(5640.55)	(34211.80)
age30	-1340.209	7840.562	-56885.989*
	(4213.40)	(8934.39)	(28485.99)
age40	4923.351	14923.073	-6035.746
	(4450.29)	(8446.64)	(29788.76)
age50	3764.747	24074.830**	32256.517
	(4008.92)	(9253.25)	(34855.15)
age60	7066.207	21185.108*	73438.100
	(4059.92)	(9264.69)	(46676.82)
age70	10257.057*	24473.703*	78957.479
	(4397.91)	(9789.22)	(51998.36)
age80	13003.775**	30580.807**	-59524.263
	(4574.88)	(11864.57)	(61144.15)
selfemployed RP	2356.966	32608.504***	375747.023***
	(2160.16)	(7595.00)	(100547.12)
Constant	-12770.117	-85345.532***	198814.195
	(8716.89)	(18865.62)	(119856.64)

### Table C2: RIF regression results for Spain

10 50		90	
b/se	b/se	b/se	
100652.460***	126350.124***	139250.273**	
(10123.21)	(8750.63)	(33257.61)	
85702.139***	65718.665***	52436.546	
(11414.03)	(8565.09)	(30426.21)	
10705.352**	6030.456	27783.897	
(3882.06)	(6155.29)	(44820.06)	
-8023.941	-16506.173*	-25002.768	
(5077.42)	(7081.56)	(29039.07)	
4673.652	28169.514***	254548.735***	
(3265.11)	(6771.50)	(44834.13)	
6506.234	-6154.838	-21891.000	
(20697.45)	(35661.60)	(39103.29)	
4220.450	-24922.715	-70631.245	
(20397.96)	(35821.69)	(40890.26)	
-626.934	-29326.997	-69391.575	
(20618.67)	(34984.24)	(43737.87)	
9110.771	50290.018***	54594.323	
(8024.77)	(12806.19)	(77308.53)	
13207.356*	52455.835***	134807.824*	
(6058.01)	(10200.05)	(62342.87)	
9980.470	26340.573*	96723.679	
(5878.65)	(11104.37)	(62006.36)	
12678.382***	41799.543***	274505.964***	
(3724.00)	(6315.35)	(43533.26)	
4605.724	12577.104	29745.546	
(4996.83)	(7681.73)	(31309.03)	
5284.403	4407.968	-108736.738**	
(13795.04)	(14818.58)	(38847.42)	
7167.632	25756.711	-10535.882	
(14528.08)	(13887.79)	(39125.39)	
11771.082	54038.859***	120237.323*	
(14124.99)	(14677.64)	(46861.33)	
13458.697	58081.767***	341261.863**	
(14573.24)	(15038.89)	(72469.56)	
17460.730	46743.791**	245674.791***	
(14308.41)	(15655.35)	(68434.23)	
23916.271	41840.650*	221031.158**	
(15683.58)	(16291.54)	(76340.86)	
21402.440***	69430.901***	294939.927**	
(4853 27)	(10299 03)	(64551 52)	
-117247 236***	-94380 410*	-136960 816	
11/27/•200 mm	J-300110	10000.010	
	10 b/se 100652.460*** (10123.21) 85702.139*** (11414.03) 10705.352** (3882.06) -8023.941 (5077.42) 4673.652 (3265.11) 6506.234 (20697.45) 4220.450 (20397.96) -626.934 (20618.67) 9110.771 (8024.77) 13207.356* (6058.01) 9980.470 (5878.65) 12678.382*** (3724.00) 4605.724 (4996.83) 5284.403 (13795.04) 7167.632 (14528.08) 11771.082 (14528.08) 11771.082 (14573.24) 17460.730 (14308.41) 23916.271 (15683.58) 21402.440*** (4853.27) -117247.236***	1050b/seb/se100652.460***126350.124***(10123.21)(8750.63)85702.139***65718.665***(11414.03)(8565.09)10705.352**6030.456(3882.06)(6155.29)-8023.941-16506.173*(5077.42)(7081.56)4673.65228169.514***(3265.11)(6771.50)6506.234-6154.838(20697.45)(35661.60)4220.450-24922.715(20397.96)(35821.69)-626.934-29326.997(20618.67)(34984.24)9110.77150290.018***(8024.77)(12806.19)13207.356*52455.835***(6058.01)(10200.05)980.47026340.573*(5878.65)(11104.37)12678.382***41799.543***(3724.00)(6315.35)4605.72412577.104(4996.83)(7681.73)5284.4034407.968(13795.04)(14818.58)7167.63225756.711(14528.08)(13887.79)11771.08254038.859***(14124.99)(14677.64)13458.69758081.767***(14573.24)(15038.89)17460.73046743.791**(14308.41)(15655.35)23916.27141840.650*(15683.58)(16291.54)21402.440***69430.901***(4853.27)(10299.03)-117247.236***-94380.410*	

### Table C3: RIF regression results for France

	10	50	90
	b/se	b/se	b/se
owner outright	30045.148***	224983.662***	283683.040***
	(1456.14)	(8048.71)	(25834.02)
owner with mortgage	30366.383***	141751.813***	68983.050***
	(1507.74)	(6991.50)	(16921.73)
income	12136.794***	682.769	-8582.604
	(1930.08)	(3975.10)	(22845.87)
small housing size	-4551.203**	-16485.273***	10512.107
	(1654.80)	(4114.33)	(13825.84)
large housing size	559.008	23282.481***	203071.044***
	(1046.34)	(3444.08)	(26006.69)
child0	16098.816***	43246.344***	6095.401
	(3321.77)	(6407.20)	(27068.19)
child1	9094.123**	29760.179***	-29828.123
	(3137.50)	(6984.80)	(23037.67)
child2	8488.623*	20344.961**	-24127.266
	(3396.90)	(7721.90)	(25751.57)
adult1	6988.234	15388.126	54096.105
	(5164.17)	(10972.36)	(43913.19)
adult2	10860.405*	20752.551*	65581.443
	(4987.66)	(10406.96)	(38232.09)
adult3	9302.064	5640.264	55961.868
	(5416.50)	(11921.29)	(43796.26)
tert education RP	6230.889***	33029.152***	218045.690***
	(1094.04)	(3312.24)	(22695.03)
married RP	-94.788	14015.521**	-2064.328
	(1440.98)	(4330.06)	(18956.99)
age30	-1230.967	14629.950**	-15851.776
	(3219.07)	(5205.39)	(19494.09)
age40	-3177.715	50730.615***	33857.363
	(3316.94)	(5413.59)	(19659.87)
age50	-2471.664	65419.655***	131038.540***
	(3317.23)	(5380.41)	(23780.59)
age60	3808.666	65996.553***	187320.025***
	(3392.75)	(6760.26)	(30019.42)
age70	9075.838*	56026.689***	128671.326***
	(3743.22)	(7244.43)	(38178.06)
age80	10192.739**	50416.663***	117760.933**
	(3726.95)	(9120.86)	(36888.09)
selfemployed RP	9192.068***	71513.137***	475911.449***
	(1246.49)	(6037.04)	(47768.68)
Constant	-48034.373***	-165949.693***	-74446.919
	(7269.11)	(14936.38)	(65272.89)

### Table C4: RIF regression results for Italy

	10	50	90
	b/se	b/se	b/se
owner outright	46913.371***	178164.549***	140134.314***
	(2171.54)	(6450.22)	(13804.91)
owner with mortgage	46017.276***	110715.013***	45544.610*
	(2351.95)	(8708.63)	(20880.43)
income	10137.163***	14431.318***	-4420.370
	(2040.83)	(4227.63)	(17239.16)
small housing size	-6327.315***	-48925.132***	-51153.932***
	(1843.58)	(5035.03)	(12112.81)
large housing size	65.175	40338.752***	190238.330***
	(1400.83)	(3957.46)	(24910.90)
child0	21746.396***	11404.498	-50906.971
	(6224.10)	(10859.23)	(40778.29)
child1	20010.390***	3979.262	-91547.901*
	(5945.99)	(10675.68)	(42422.70)
child2	18750.266**	16108.720	-93032.934*
	(6547.93)	(11174.46)	(42592.50)
adult1	5504.003	32489.584***	3842.692
	(4377.06)	(8455.22)	(31842.86)
adult2	5693.406*	42403.360***	33392.269
	(2823.74)	(7327.71)	(25513.10)
adult.3	2371.797	18663.969*	-16792.128
	(2608.35)	(7719.24)	(26135.94)
tert education RP	4744.923*	42268.099***	202515.972***
	(1944.17)	(4146.59)	(30620.48)
married RP	2966.268	7083.852	13988.228
	(2527.86)	(4601,93)	(17890.51)
age 30	-10324 828	11165 967	38052 811
agest	(6446 80)	(8808 96)	(27755 23)
age40	-7072 990	25353 560**	52309 672*
agero	(6110 49)	(8568 51)	(25424 82)
20050	-5115 804	36600 917***	(23424.02) 99391 904***
agest	(5912 84)	(8717 44)	(28682 11)
20060	(3912.04)	(0/1/.44)	(20002.44)
ageou	-1/39.390	(2005 10)	(21420 55)
20070	(0043.70)	(099J.10) 13500 017***	(31429.33)
age / 0	4089.007	43399.91/~~~	(22602.20)
0.0	(0232.90)	(9331.01)	(32003.20)
ageou	1473.945	(0402.20)	/1230.292~
	(UJOU.22)	(3402.3U) 47200 205+++	(32203.90)
seilemployed KP	14//1.5U1***	4/329.325***	202491./10***
Canatant	(1491.25)	(3436.43)	(20190.18)
Constant	-60267.309***	-123009.089***	8/906.222
	(9391.48)	(エぉゃ/タ・ス8)	(604//.82)

# **Appendix D: Robustness check "length of living in household main residence"**

The RIF regression results for the 10<sup>th</sup>, 50<sup>th</sup>, and 90<sup>th</sup> percentile of equalized net household wealth across countries are shown in Tables D1 to D4. The RIF of equalized net household wealth is the dependent variable. Additionally, dummies are created that represent four categories of residency length: "length5" (<5 years), "length9" (5-9 years), "length19" (10–19 years), and "length20" (20+ years). The category "length9" is dropped from the regression due to perfect collinearity. The covariates are defined as before. Bootstrapped standard errors are reported in parenthesis and are calculated using 50 replicate weights. I account for imputation variance using Rubin's formula (\* p<0.05, \*\* p<0.01, \*\*\* p<0.001). Source: Eurosystem Household Finance and Consumption Survey, author calculations.

### Table D1: RIF regression results for Germany

	10	50	90
	b/se	b/se	b/se
wner outright	6977.981***	143503.075***	283374.959***
	(2058.56)	(12600.64)	(60965.72)
wner with mortgage	3849.949	110935.299***	55974.686
	(2835.76)	(10532.20)	(35119.27)
ength5	-619.939	-5513.659	24033.901
	(3680.95)	(6138.24)	(27919.41)
ength19	4385.772	1709.892	-40834.598
	(3121.28)	(6896.31)	(33945.70)
ength20	5880.290*	1520.843	32747.859
	(2631.58)	(6940.06)	(39811.95)
mall housing size	-1194.323	-24873.732***	-2819.110
	(2360.16)	(6214.14)	(21936.33)
arge housing size	1940.008	16553.408**	220405.146***
	(1757.49)	(6156.50)	(49174.60)
hild0	8065.874	41963.281***	-41013.405
	(6640.64)	(9646.79)	(44129.80)
hild1	3856.166	22191.402*	-71911.867
	(6900.37)	(10259.71)	(45922.62)
hild2	7172.644	28417.299**	-8323.275
	(7177.84)	(10840.74)	(42586.56)
dult1	-6588.119*	-10225.422	-51706.852
	(3124.88)	(11284.25)	(92952.10)
dult2	-2660.271	-8636.688	-92095.810
	(2661.91)	(9928.03)	(91724.69)
dult3	-1005.271	-14719.836	-99223.302
	(2691.09)	(11204.72)	(93752.48)
ert education RP	5120.407***	30697.638***	123893.435**
	(1484.54)	(4577.04)	(41220.58)
arried RP	442.901	4543.422	37716.034
	(1929.10)	(6311.40)	(35335.21)
ge30	-1809.907	6693.386	-45773.175
2	(4434.46)	(8880.26)	(27225.71)
qe40	3515.136	12990.617	12534.602
2	(4149.67)	(8900.99)	(31972.39)
ae50	1400.228	20405.233*	51557.782
5	(3848.65)	(9579.16)	(39519.14)
ae60	3287.352	12257.662	96316.005*
5	(4284,24)	(10377.65)	(45877.05)
ae70	4641.759	8553.249	114690.590*
90,0	(4431,23)	(10628.83)	(51293.07)
ae80	6713 394	13942 570	-30203 509
9000	(4743 23)	(12190 71)	(61809 34)
elfemployed RP	1811 109	29548 811***	383099 432***
CITCWDIOJCU IVI	(1881 35)	(7218 56)	(99154 30)
onstant	-11246 /31	-64329 635***	142647 006
Jonstant	11240.431	04529.035"^^	14204/.330

### Table D2: RIF regression results for Spain

	10	50	90
	b/se	b/se	b/se
owner outright	93259.379***	126330.133***	140056.516***
	(9530.09)	(10524.18)	(35421.00)
owner with mortgage	85050.248***	65913.665***	50785.641
	(11419.70)	(9490.97)	(32795.24)
length5	-8735.511	5671.437	-4223.454
	(9196.86)	(10324.22)	(37250.84)
length19	17432.076*	24744.148**	29407.140
	(7439.14)	(8546.56)	(33050.32)
length20	19380.063*	1625.169	-15594.058
	(7664.92)	(8023.69)	(41392.18)
small housing size	-8638.994	-15633.566*	-23935.667
	(5001.92)	(6537.92)	(28910.55)
large housing size	4620.564	28326.242***	253998.364***
	(2758.02)	(6055.69)	(49328.34)
child0	7921.219	170.582	-11899.727
	(20562.83)	(37268.91)	(44559.08)
child1	5259.598	-20143.151	-63981.573
	(20280.19)	(36675.97)	(43488.29)
child2	-1544.934	-26813.954	-66147.018
	(21005.23)	(37941.31)	(41571.17)
adult1	6293.416	45142.549***	36643.487
	(7741.12)	(13072.02)	(69685.22)
adult2	12241.917*	50172.985***	125401.675*
	(5831.19)	(10074.87)	(58056.63)
adult3	8754.157	27123.396**	97741.332
	(5947.15)	(10007.42)	(62757.15)
tert education RP	15033.892***	42143.256***	276849.646***
	(3513.88)	(5940.95)	(50171.01)
married RP	4629.137	10178.722	23986.895
	(4700.76)	(7399.18)	(28698.50)
age30	-162.074	284.027	-116910.832**
	(13814.43)	(13183.94)	(43898.86)
age40	-4046.791	18538.796	-22552.238
	(14060.50)	(13947.83)	(42888.50)
age50	-3296.432	48602.954***	111780.912*
	(13544.61)	(14098.54)	(54331.00)
age60	-5138.435	53749.349***	330877.533***
	(14094.07)	(14579.91)	(69803.37)
age70	-4480.433	41949.120**	230442.451**
	(14070.03)	(14198.00)	(72657.25)
age80	317.452	38999.438*	209538.019**
	(14565.63)	(16152.66)	(79365.55)
selfemployed RP	17294.436***	67430.172***	287266.774***
	(4711.56)	(9597.23)	(57778.12)
Constant	-104815.910***	-95457.461*	-104794.079
	(25776.44)	(47556.59)	(102445.87)

### Table D3: RIF regression results for France

	10	50	90
	b/se	b/se	b/se
owner outright	29195.902***	220879.190***	293358.799***
	(1394.67)	(8090.93)	(30176.15)
owner with mortgage	30640.802***	140584.854***	69354.396***
	(1549.66)	(6482.82)	(18111.10)
ength5	-4462.140*	-6860.407	20276.027
	(1958.80)	(4600.42)	(19356.89)
.ength19	-1145.799	17578.699***	10247.445
	(1752.23)	(4811.73)	(20197.55)
ength20	-444.325	9829.926	-24352.075
	(1782.01)	(5436.36)	(25712.10)
small housing size	-4617.563**	-15925.053***	8894.325
	(1626.67)	(3989.47)	(13917.96)
arge housing size	661.168	23081.706***	203580.471***
-	(1035.04)	(3674.94)	(25376.91)
child0	15795.222***	43280.607***	9488.571
	(3281.30)	(6847.13)	(24000.32)
child1	9360.200**	29402.503***	-28760.325
	(3219.70)	(7038.25)	(25150.11)
child2	8444.803**	18937.898*	-23793.957
	(3202.34)	(7633.55)	(25478.92)
dult1	3670.851	18415.865	50864.859
	(5604.26)	(11465.18)	(37538.81)
dult2	9384.805	24193.806*	63046.687
	(5124.54)	(10506.42)	(33491.60)
idult3	9411.951	6908.995	54437.505
	(5480.18)	(11917.51)	(42082.64)
ert education RP	7142.842***	33818.040***	214817.888***
	(1107.66)	(3454.99)	(22341.42)
narried RP	-505.430	13546.735**	-753.315
	(1437.11)	(4174.08)	(17943.86)
age30	-2364.629	12109.066	-10775.278
- 5	(3107.16)	(6473,64)	(16585.97)
age 40	-5209.709	42861.289***	42011.439*
	(3347.16)	(6238,45)	(20348.93)
age 50	-5722.281	54586.678***	144386.963***
3000	(3163.22)	(6038,66)	(27704.58)
age 60	-4821.985	55089.048***	209473.346***
9000	(3293 73)	(6574 09)	(33385 10)
are70	-2744 657	43620 927***	155248 967***
.90.0	(3322 60)	(6999 31)	(36481 91)
uge80	-2045 667	37769 855***	149070 429***
.9000	(3345 40)	(8605 45)	(37791 54)
elfemployed PD	7803 37/***	70963 228***	477121 880***
errembroled vi	(1211 27)	(6554 70)	(19599 23)
Constant	(1411.4/) -31300 073***	(UJJ4./U) -163163 305***	(49099.00) -97608 057
CONSTANT	-JIJUU.UZJ"^^	T00T00.000	

### Table D4: RIF regression results for Italy

	10	50	90
	b/se	b/se	b/se
owner outright	46556.609***	179232.843***	139321.724***
	(2421.65)	(7065.96)	(15201.61)
owner with mortgage	46823.999***	110915.501***	45150.603*
	(2481.20)	(7704.46)	(20108.72)
Length5	-1086.410	-7959.202	-8546.596
	(3661.38)	(6158.77)	(18651.14)
ength19	-158.588	-1046.407	21074.207
	(3107.31)	(5998.75)	(19707.62)
ength20	1522.924	-10501.126*	-1996.723
	(2863.51)	(5248.54)	(21640.88)
mall housing size	-6704.329***	-49889.621***	-51090.845***
	(1723.19)	(5330.05)	(12525.71)
arge housing size	-140.425	40430.142***	190192.131***
	(1367.14)	(3661.92)	(27532.36)
child0	21586.625***	13354.495	-46133.395
	(5886.17)	(9965.32)	(39233.48)
:hild1	20716.136***	5809.952	-88938.267*
	(5925.47)	(9875.83)	(41975.81)
:hild2	19316.539***	16732.499	-95306.290*
	(5758.22)	(10982.32)	(40248.62)
dult1	1617.568	23890.799**	4057.525
	(3970.05)	(8790.74)	(31322.46)
dult2	3049.856	36576.863***	32972.127
	(2888.86)	(7810.58)	(26291.11)
.dult3	1674.159	16836.745*	-17794.895
	(2776.50)	(8119.44)	(26652.93)
tert education RP	5770.740**	43007.675***	201556.241***
	(1836.30)	(4113.82)	(31809.38)
narried RP	2738.221	6381.821	14156.614
	(2498.67)	(4463.86)	(15973.75)
age30	-10145.644	10142.649	36840.163
	(6724.38)	(9333.63)	(27798.65)
age 40	-7331.764	23481.376*	45274.087
	(6415.05)	(9319.68)	(25106.56)
age.50	-6696.675	34414.264***	92389.518**
	(6142.18)	(9606,98)	(28216.65)
age 60	-7125.905	38900.385***	113608.416***
	(6233.51)	(10012.49)	(30985.29)
ae70	-3809.092	35495.729***	129378.110***
	(6346 57)	(9968 30)	(31438 70)
ace80	-6902 873	23266 013*	70812 035*
.9000	(6429 04)	(9829 14)	(32789 93)
elfemployed RP	11694 902***	42849 239***	204746 448***
CITCUDIOJOU NI	(1301 10)	(4961 59)	(29372 69)
'onstant	-48654 489***	-99920 251***	83780 646
CONSTANT	(0220 06)	(17003 52)	(50075 20)

#### **Appendix E: RIF decomposition**

Tables E1 to E3 show the RIF decomposition of differences in the share of homeownership for different percentiles of equivalized net household wealth between the reference country Germany and Spain, France, and Italy. Covariates are grouped into various categories: The variable "housing size" includes three different categories for the size of the household's main residence. "No children" and "No adults" include dummies for the number of children and adults in the household, correspondingly. "Married RP" and "tert education RP" are dummies that indicate whether the reference person is married or graduated from university. "Age RP" includes dummies for different age groups of the reference person (20-29, 30-39, 40-49, 50-59, 60-69, 70-79, 80-89). "Selfemployed RP" is a dummy, which takes on the value 1 in the case the reference person has self-employed business wealth and 0 if not. Bootstrapped standard errors are calculated using 50 replicate weights. Additionally, the standard errors are clustered on the household level and are reported in parenthesis (\* p<0.05, \*\* p<0.01, \*\*\* p<0.001). Source: Eurosystem Household Finance and Consumption Survey, author calculations.

**Table E1:** RIF decomposition of differences in the share of homeownership in equalized nethousehold wealth between Germany (group 2) and Spain (group 1)

	10	50	90
	b/se	b/se	b/se
overall			
group_1	3699.241*	96999.707***	349816.266***
	(1602.92)	(2924.88)	(13859.50)
group_2	1158.263	43320.693***	322061.953***
	(683.02)	(3077.97)	(11730.22)
difference	2540.978	53679.015***	27754.313
	(1742.37)	(4246.03)	(18157.20)
explained	35886.360***	37095.493***	49292.703**
	(2971.12)	(3748.34)	(15348.24)
unexplained	-33345.383***	16583.522***	-21538.390
	(3676.02)	(4062.90)	(19695.78)
explained			
homeownership	34133.448***	39028.567***	40209.704***
	(2739.35)	(2692.62)	(8834.94)
housing size	78.275	4.981	-1471.801
	(178.21)	(634.85)	(4026.25)
No children	-537.312	-3373.044***	-7292.716*
	(528.70)	(1000.37)	(3396.52)
No adults	623.719	-4352.804*	8373.957
	(1075.80)	(1963.60)	(9659.50)
tert education RP	-181.331	-582.381	-4011.772
	(184.45)	(583.18)	(4009.94)
married RP	366.625	1123.247	2720.196
	(476.28)	(782.00)	(3068.42)
age RP	527.360	1770.884	-3485.419
	(991.74)	(1481.79)	(6162.54)
selfemployed RP	875.575**	3476.043***	14250.554***
	(285.25)	(860.33)	(3731.04)
unexplained			
homeownership	36341.216***	-19477.286***	-41465.361**
	(2982.54)	(3729.90)	(16040.64)

Percentile of equalized net household wealth

**Table E2**: Blinder-Oaxaca decomposition of differences in the share of homeownership in equalized net household wealth between Germany (group 2) and France (group 1)

	10	50	90
	b/se	b/se	b/se
overall			
group_1	2321.228***	75531.019***	361215.151***
	(505.70)	(2080.27)	(7430.40)
group_2	1210.990	43320.990***	322062.066***
	(714.10)	(3005.49)	(11752.27)
difference	1110.238	32210.029***	39153.084**
	(875.02)	(3655.20)	(13904.20)
explained	3584.167***	25243.126***	18757.707*
	(485.86)	(3435.86)	(7995.23)
unexplained	-2473.929*	6966.903*	20395.377
	(971.53)	(2833.97)	(12516.22)
explained			
homeownership	4018.206***	28051.881***	28784.607***
	(397.05)	(2548.26)	(3266.39)
housing size	133.045	-283.485	-6940.105**
	(85.28)	(486.09)	(2548.27)
No children	-674.674***	-2914.704***	-4747.568**
	(158.03)	(498.33)	(1634.31)
No adults	156.308	60.731	95.346
	(86.57)	(155.33)	(618.98)
tert education RP	28.077	131.287	918.430
	(72.16)	(337.09)	(2357.22)
married RP	26.744	-1037.509**	-381.988
	(80.28)	(332.24)	(1099.97)
age RP	-49.659	1780.612	4636.608
	(98.75)	(909.17)	(2995.18)
selfemployed RP	-53.881	-545.687	-3607.623
	(48.86)	(489.82)	(3237.86)
unexplained			
homeownership	9311.624***	22460.798***	-332.773
	(870.36)	(3194.84)	(14001.04)

Percentile of equalized net household wealth

**Table E3**: Blinder-Oaxaca decomposition of differences in the share of homeownership in equalized net household wealth between Germany (group 2) and Italy (group 1)

	10	50	90
	b/se	b/se	b/se
overall			
group_1	1699.840*	88129.223***	319225.439***
	(684.12)	(2189.51)	(6340.83)
group_2	1201.702	43320.940***	322062.054***
	(708.63)	(3018.61)	(11749.11)
difference	498.138	44808.283***	-2836.614
	(984.98)	(3729.07)	(13350.94)
explained	9699.206***	36520.728***	10848.946
	(972.70)	(3460.41)	(7691.48)
unexplained	-9201.068***	8287.555**	-13685.561
	(1436.01)	(2899.30)	(12915.42)
explained			
homeownership	10055.162***	39522.242***	29000.300***
	(708.43)	(2385.85)	(2760.97)
housing size	78.489	-218.734	-3312.802
	(90.08)	(1041.42)	(2817.93)
No children	-55.900	-230.670	-2803.890**
	(145.30)	(307.82)	(1041.08)
No adults	-54.111	-2428.138*	-2678.234
	(384.14)	(964.80)	(3498.17)
tert education RP	-850.012**	-6889.049***	-33178.345***
	(292.58)	(870.16)	(4721.52)
married RP	200.982	485.043	1089.757
	(187.11)	(417.29)	(1420.68)
age RP	-369.127	3575.323***	9566.522***
	(484.65)	(899.22)	(2512.77)
selfemployed RP	693.723***	2704.712***	13165.639***
	(119.30)	(456.38)	(2148.81)
unexplained			
homeownership	15808.962***	10437.091***	-33819.511*
	(1092.29)	(3059.52)	(13234.02)

Percentile of equalized net household wealth

### **Appendix F: Robustness RIF decomposition**

Tables F1 to F3 show the RIF decomposition of differences in the share of homeownership for different percentiles of equivalized net household wealth between the reference country Germany and Spain, France, and Italy. Covariates are grouped into various categories: The variable "housing size" includes three different categories for the size of the household's main residence. "No children" and "No adults" include dummies for the number of children and adults in the household, correspondingly. "Married RP" and "tert education RP" are dummies that indicate whether the reference person is married or graduated from university. "Age RP" includes dummies for different age groups of the reference person (20-29, 30-39, 40-49, 50-59, 60-69, 70-79, 80-89). "Selfemployed RP" is a dummy, which takes on the value 1 in the case the reference person has self-employed business wealth and 0 if not. Bootstrapped standard errors are calculated using 50 replicate weights. Additionally, the standard errors are clustered on the household level and are reported in parenthesis (\* p<0.05, \*\* p<0.01, \*\*\* p<0.001). Source: Eurosystem Household Finance and Consumption Survey, author calculations.

Percentile of equaliz	ed net household	wealth							
	10	20	30	4 0	50	60	7 0	8 0	06
	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se
overall									
group_1	3699.241*	28617.413***	51748.589***	71026.355***	96999.707***	122624.278***	162939.418***	219952.815***	349816.266***
	(1602.92)	(2386.19)	(2399.61)	(2608.20)	(2924.88)	(3284.39)	(4334.37)	(6004.55)	(13859.50)
group_2	1158.263	1837.530	7977.942***	19523.002***	43320.693***	77740.621***	121665.374***	192066.406***	322061.953***
	(683.02)	(938.71)	(1038.38)	(1411.79)	(3077.97)	(4395.29)	(5076.16)	(8011.46)	(11730.22)
difference	2540.978	26779.882***	43770.647***	51503.353***	53679.015***	44883.657***	41274.043***	27886.409**	27754.313
	(1742.37)	(2564.19)	(2614.64)	(2965.78)	(4246.03)	(5486.87)	(6674.89)	(10011.90)	(18157.20)
explained	35886.360***	58628.939***	46413.813***	39789.174***	37095.493***	33450.299***	34461.653***	33643.147***	49292.703**
	(2971.12)	(3847.68)	(3473.48)	(3555.13)	(3748.34)	(4145.37)	(5411.95)	(7256.25)	(15348.24)
unexplained	-33345.383***	-31849.056***	-2643.166	11714.179***	16583.522***	11433.358*	6812.391	-5756.738	-21538.390
	(3676.02)	(4155.24)	(3590.94)	(3511.58)	(4062.90)	(4950.12)	(6240.76)	(9507.25)	(19695.78)
explained									
homeownership	34133.448***	54927.573***	45057.917***	41455.546***	39028.567***	37017.792***	36457.643***	34079.556***	40209.704***
	(2739.35)	(3299.39)	(2802.56)	(2635.65)	(2692.62)	(2666.04)	(3239.50)	(4184.97)	(8834.94)
housing size	78.275	142.760	134.360	62.873	4.981	35.380	-137.204	-250.285	-1471.801
	(178.21)	(340.94)	(371.35)	(428.05)	(634.85)	(764.78)	(1214.78)	(1779.60)	(4026.25)
No children	-537.312	-707.125	-1549.130*	-2515.576**	-3373.044***	-2780.031*	-2742.479*	-5440.317**	-7292.716*
	(528.70)	(724.21)	(763.03)	(871.32)	(1000.37)	(1082.40)	(1338.20)	(1836.32)	(3396.52)
No adults	623.719	191.183	-2272.504	-4210.294*	-4352.804*	-6454.232**	-5726.008	-1487.565	8373.957
	(1075.80)	(1433.12)	(1449.88)	(1643.83)	(1963.60)	(2345.43)	(2998.29)	(4248.02)	(9659.50)
tert education RP	-181.331	-270.188	-381.819	-442.237	-582.381	-894.278	-1183.146	-1477.869	-4011.772
	(184.45)	(273.88)	(383.78)	(444.38)	(583.18)	(891.97)	(1180.48)	(1476.85)	(4009.94)
married RP	366.625	658.444	850.430	1658.794*	1123.247	1280.478	1222.214	310.169	2720.196
	(476.28)	(653.22)	(667.96)	(740.22)	(782.00)	(821.15)	(1071.54)	(1505.40)	(3068.42)
age RP	527.360	2069.004	2525.897	1207.095	1770.884	577.514	3.121	-431.202	-3485.419
	(991.74)	(1601.91)	(1437.30)	(1495.19)	(1481.79)	(1763.54)	(2377.99)	(2904.01)	(6162.54)
selfemployed RP	875.575**	1617.287***	2048.664***	2572.973***	3476.043***	4667.676***	6567.513***	8340.659***	14250.554***
	(285.25)	(484.97)	(573.12)	(672.37)	(860.33)	(1100.26)	(1553.52)	(2068.01)	(3731.04)
unexplained homeownership	36341.216***	53846.944***	36405.560***	19711.078***	-19477.286***	-42143.158***	-41248.975***	-58000.149***	-41465.361**
	(2982.54)	(3342.38)	(2849.82)	(CA.96./2)	(3729.90)	(4997.03)	(02.63.50)	(9/./.186)	(l6U4U.64)

**Table F1**: RIF decomposition of differences in the share of homeownership in equalized nethousehold wealth between Germany (group 2) and Spain (group 1)

Percentile of equaliz	ed net household	wealth							
	10	20	30	40	50	60	0.2	80	06
	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se
overall									
group_1	2321.228***	7477.248***	20090.042***	44007.289***	75531.019***	115065.995***	159404.367***	226376.237***	361215.151***
	(505.70)	(633.09)	(822.74)	(1564.35)	(2080.27)	(2438.22)	(2711.65)	(4058.76)	(7430.40)
group_2	1210.990	1837.886	7979.032***	19522.961***	43320.990***	77740.695***	121665.142***	192066.409***	322062.066***
	(714.10)	(982.99)	(1082.70)	(1419.73)	(3005.49)	(4384.10)	(5098.28)	(8013.95)	(11752.27)
difference	1110.238	5639.363***	12111.010***	24484.328***	32210.029***	37325.300***	37739.226***	34309.828***	39153.084**
	(875.02)	(1169.22)	(1359.83)	(2112.54)	(3655.20)	(5016.50)	(5774.55)	(8983.15)	(13904.20)
explained	3584.167***	7456.455***	12689.207***	23668.510***	25243.126***	22607.713***	17571.196***	18133.913***	18757.707*
	(485.86)	(834.56)	(1322.59)	(2670.76)	(3435.86)	(3745.53)	(3804.39)	(5073.02)	(7995.23)
unexplained	-2473.929*	-1817.092	-578.196	815.818	6966.903*	14717.587***	20168.030***	16175.915*	20395.377
	(971.53)	(1193.67)	(1328.02)	(2145.91)	(2833.97)	(3737.22)	(4529.05)	(7476.31)	(12516.22)
explained									
homeownership	4018.206***	7852.330***	12751.183***	24244.302***	28051.881***	26814.608***	23193.408***	25260.934***	28784.607***
	(397.05)	(723.96)	(1151.77)	(2188.37)	(2548.26)	(2469.38)	(2194.26)	(2510.96)	(3266.39)
housing size	133.045	199.486	199.002	14.646	-283.485	-1135.383	-2144.720*	-3775.076*	-6940.105**
	(85.28)	(110.50)	(103.51)	(265.57)	(486.09)	(818.36)	(1017.21)	(1602.50)	(2548.27)
No children	-674.674***	-956.885***	-946.018***	-1595.110***	-2914.704***	-3981.256***	-4189.050***	-4571.454***	-4747.568**
	(158.03)	(184.79)	(188.58)	(330.35)	(498.33)	(646.96)	(713.73)	(958.27)	(1634.31)
No adults	156.308	207.965*	115.146	62.597	60.731	137.425	-18.539	71.495	95.346
	(86.57)	(103.61)	(79.66)	(111.60)	(155.33)	(229.03)	(304.86)	(462.86)	(618.98)
tert education RP	28.077	45.500	63.187	88.421	131.287	190.011	271.559	464.025	918.430
	(72.16)	(116.83)	(162.20)	(227.06)	(337.09)	(487.76)	(696.96)	(1190.90)	(2357.22)
married RP	26.744	111.425	11.638	-361.079	-1037.509**	-857.887*	-726.112	-757.993	-381.988
	(80.28)	(91.18)	(95.76)	(196.30)	(332.24)	(357.39)	(391.44)	(598.66)	(1099.97)
age RP	-49.659	77.901	637.041**	1549.606**	1780.612	2195.285*	2159.977	3197.797	4636.608
	(98.75)	(112.45)	(217.35)	(579.66)	(909.17)	(1094.13)	(1257.46)	(1730.77)	(2995.18)
selfemployed RP	-53.881	-81.266	-141.974	-334.873	-545.687	-755.091	-975.328	-1755.815	-3607.623
	(48.86)	(73.58)	(127.85)	(300.95)	(489.82)	(677.47)	(874.84)	(1574.85)	(3237.86)
unexplained									
homeownership	9311.624***	14331.869***	22841.970***	45646.715***	22460.798***	-2953.306	-12984.260*	-20405.394*	-332.773
	(870.36)	(1120.26)	(1303.84)	(2135.76)	(3194.84)	(4625.23)	(5729.20)	(9265.23)	(14001.04)

**Table F2**: RIF decomposition of differences in the share of homeownership in equalized net household wealth between Germany (group 2) and France (group 1)

Percentile of equaliz.	ed net household	wealth							
	10	20	0 E	40	50	60	02	08	06
	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se
overall									
group_1	1699.840*	7741.952***	29288.450***	60086.281***	88129.223***	118696.122***	154249.619***	206458.236***	319225.439***
	(684.12)	(862.28)	(1572.10)	(2220.61)	(2189.51)	(2355.12)	(2706.30)	(3684.25)	(6340.83)
group_2	1201.702	1837.823	7978.840***	19522.970***	43320.940***	77740.674***	121665.178***	192066.406***	322062.054***
	(708.63)	(975.20)	(1074.85)	(1417.90)	(3018.61)	(4386.25)	(5094.53)	(8013.44)	(11749.11)
difference	498.138	5904.129***	21309.610***	40563.311***	44808.283***	40955.447***	32584.440***	14391.830	-2836.614
	(984.98)	(1301.75)	(1904.41)	(2634.68)	(3729.07)	(4978.53)	(5768.74)	(8819.81)	(13350.94)
explained	9699.206***	19500.456***	42645.790***	49659.104***	36520.728***	28607.732***	20968.199***	15167.519**	10848.946
	(972.70)	(1432.53)	(2733.30)	(3648.60)	(3460.41)	(3538.96)	(3894.68)	(4982.47)	(7691.48)
unexplained	-9201.068***	-13596.327***	-21336.180***	-9095.793**	8287.555**	12347.715**	11616.241*	-775.689	-13685.561
	(1436.01)	(1639.80)	(2376.06)	(2869.02)	(2899.30)	(3866.45)	(4765.77)	(7824.19)	(12915.42)
explained									
homeownership	10055.162***	19468.805***	40998.970***	49258.984***	39522.242***	34028.221***	29491.697***	28715.104***	29000.300***
	(708.43)	(1183.70)	(2393.54)	(2909.57)	(2385.85)	(2127.78)	(1960.68)	(2137.43)	(2760.97)
housing size	78.489	89.550	6.616	-53.365	-218.734	-590.054	-1176.763	-2184.764	-3312.802
	(90.08)	(95.74)	(226.90)	(751.56)	(1041.42)	(1271.70)	(1550.49)	(2038.05)	(2817.93)
No children	-55.900	-255.203	-112.573	-139.573	-230.670	-281.014	-565.680	-1199.011*	-2803.890**
	(145.30)	(152.54)	(189.33)	(291.03)	(307.82)	(328.76)	(383.00)	(550.14)	(1041.08)
No adults	-54.111	-1296.563***	-694.809	-1296.725	-2428.138*	-3332.093**	-4180.087**	-4273.841*	-2678.234
	(384.14)	(331.99)	(535.40)	(886.89)	(964.80)	(1108.65)	(1298.59)	(1849.85)	(3498.17)
tert education RP	-850.012**	-1167.235***	-1865.085***	-3658.620***	-6889.049***	-9278.555***	-13751.993***	-20725.584***	-33178.345***
	(292.58)	(330.01)	(514.61)	(741.34)	(870.16)	(1102.70)	(1531.68)	(2436.02)	(4721.52)
married RP	200.982	669.278***	680.147*	453.190	485.043	671.773	1108.978	771.262	1089.757
	(187.11)	(189.07)	(276.38)	(385.75)	(417.29)	(488.47)	(573.68)	(765.88)	(1420.68)
age RP	-369.127	714.964	1986.982**	2956.725***	3575.323***	3701.193***	5085.864***	6815.900***	9566.522***
	(484.65)	(471.45)	(604.48)	(863.94)	(899.22)	(984.53)	(1189.95)	(1673.02)	(2512.77)
selfemployed RP	693.723***	1276.860***	1645.542***	2138.489***	2704.712***	3688.260***	4956.183***	7248.452***	13165.639***
	(119.30)	(196.31)	(294.51)	(387.53)	(456.38)	(579.77)	(765.09)	(1132.39)	(2148.81)
unexplained									
homeownership	15808.962***	26725.243***	60383.971***	63566.438***	10437.091***	-21190.639***	-28552.446***	-43745.107***	-33819.511*
	(1092.29)	(1368.68)	(2143.82)	(2584.91)	(3059.52)	(4496.94)	(5596.08)	(9022.55)	(13234.02)

**Table F3**: RIF decomposition of differences in the share of homeownership in equalized net household wealth between Germany (group 2) and Italy (group 1)