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Annals of Economics and Statistics, Number 136, December 2019

WEALTH INEQUALITY AND HOMEOWNERSHIP IN EUROPE

LEO KAAS[a], GEORGI KOCHARKOV[b] AND EDGAR PREUGSCHAT[c]

The recently published Household Finance and Consumption Survey has revealed large differences in wealth inequality between the countries of the Euro area. We document a strong negative correlation between wealth inequality and homeownership rates across countries. We show that this negative relationship is robust to controlling for other observables using a counterfactual decomposition of cross-country inequality differences based on a recentered influence function regression. Furthermore, by decomposing the Gini coefficient across owners and renters we argue that the negative relationship is mostly driven by large inequality between the two groups. We also find that the cross-country differences in the homeownership rate and its negative correlation with wealth inequality are to a large extent driven by households in the lower half of the wealth distribution. Thus, not only the top percentiles but also the lower tail is important in accounting for overall wealth inequality.

JEL Codes: D31, E21, G11.
Keywords: Wealth Inequality, Homeownership, Housing, Euro Area.

1. INTRODUCTION

The issues of wealth inequality, its determinants, and their international differences have re-entered the center stage of discussion among academics and the general public with the publication of Piketty (2014). In this paper we take a comparative view on wealth inequality by examining the Household Finance and Consumption Survey (HFCS) recently published by the European Central Bank (2013, 2016). It is the first high-quality survey of household wealth data that is ex-ante harmonized across Euro area countries.[1] The survey has been conducted twice so far, with data for the first wave being collected around the year 2010 and for the second wave around the year 2014.[2]

Focusing on the nine largest countries of the survey, we document significant differences in wealth inequality as measured by the Gini coefficient, which ranges from 0.76 in Germany to 0.56 in Greece. At the same time, there are pronounced differences in homeownership rates. For example, Greece has a homeownership rate of 72%, whereas it is only 44% in Germany.[3] Indeed, we find that there is a strong negative correlation between the Gini coefficients of net wealth and homeownership rates. While the value of

We thank Don Schlagenhauf and the audiences at the HFCS User Workshop in Frankfurt 2015 and the SFB 649 Workshop on "Interaction between Housing and the Economy" in Berlin 2015 for comments and useful suggestions. The opinions expressed in this paper are those of the authors and do not necessarily reflect the views of the Deutsche Bundesbank.

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[1]The first cross-country data set of household wealth is the Luxembourg Wealth Study, which is harmonized ex-post (see Sierminska, Brandolini, and Smeeding (2006)).

[2]Some countries have been surveyed a year earlier or later. Since only some of the countries have interviewed the same households in the second wave, we ignore the panel dimension. Reported numbers are (deflated) averages over the two waves unless noted otherwise.

[3]See Tables I and VII and Figure 1.

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the main residence constitutes by far the most important component of an average household's portfolio, it is not a priori clear how homeownership and wealth inequality are related. For lower housing wealth in principle could be compensated by higher holdings of non-housing wealth. This study makes progress on understanding this correlation by pinpointing the relevant features of the joint distribution of homeownership and wealth and by controlling for alternative explanatory factors.

To analyze the relationship between wealth inequality and homeownership, we perform a decomposition analysis. As a preliminary step, we decompose the Gini coefficient of net wealth into the within group components of homeowners and renters and the between-group component. The homeowner group and the between-group components account largely for the Gini coefficients in all countries. However, only the between-group component is relevant for the negative relationship between the Gini coefficient and the homeownership rate. This is due to the fact that the average renter is much poorer than the average owner in all countries.

We then conduct a counterfactual decomposition of inequality differences based on a regression of the recentered influence function (RIF) of the Gini coefficient developed by Firpo, Fortin, and Lemieux (2009). Unlike previous decomposition techniques, this approach allows to isolate the contribution of individual controls. The regression coefficients on homeownership turn out to be the most important ones, showing a large negative effect on the Gini coefficient for all countries; these coefficients also have a similar magnitude across countries. The counterfactual decomposition confirms that the homeownership rate is the most important factor in accounting for the differences in the Gini coefficient across countries.

Our analysis suggests that the savings behavior of households in the bottom half of the wealth distribution is crucial for understanding the overall negative relationship between homeownership rates and wealth inequality. The cross-country variation of wealth inequality is much higher for the poorer half than for the households above the median and below the 90th wealth percentile.[4] At the same time, the largest differences in homeownership rates between countries are for households in the bottom half of the wealth distribution. Moreover, particularly households in the bottom half are richer in those countries where homeownership rates are higher. One interpretation of these facts is that in countries with high homeownership, households have higher incentives to save, possibly due to different incentives to buy a home.[5] This lifts the wealth levels of the poorer households relative to the richer households, thereby lowering inequality. We briefly investigate the cross-country differences in housing market institutions and find evidence that housing market associated taxes seem to be related to homeownership and wealth inequality. An alternative and complementary explanation is put forward by Pham-Dao (2019) who emphasizes the means-testing feature of public insurance that lowers incentives to save for households with low income. Regardless of which interpretation is the most important one, our findings highlight the fact that not only top percentiles are important to account

[4] As explained further below, the HFCS, like all household survey data sets, have issues with non-response and underreporting at the top of the wealth distribution. Therefore, we exclude the top decile in several robustness checks, and we separately consider households between the 50th and 90th percentiles as the "50-90 group".

[5] For a study of savings incentives of low-income households in the U.S., see Kaymak and Poschke (2016).

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for wealth inequality and its differences across countries.

As this study is interested in the determinants of wealth inequality, we do not aim to explain differences in homeownership rates.[6] Clearly, the homeownership rate is a highly endogenous object which ultimately needs to be explained itself. The issues of endogeneity in the context of estimating the determinants of wealth accumulation and inequality are intricate, and only few papers have addressed them.[7] Regarding the explanatory factors for homeownership, only a small portion of the differences in homeownership rates can be attributed to observable differences in demographic characteristics given by our dataset, in particular age and the number of children.[8] In a companion paper Kaas, Kocharkov, Preugschat, and Siassi (2019) we analyze the role of several institutional features for understanding the low homeownership rate in Germany on the basis of a structural housing market model. A structural model would also be useful to evaluate the role of policies for the homeownership–inequality relationship. One well-known challenge for such a model, however, is to quantitatively match the empirical wealth distribution and achieve significant effects from shifters of the homeownership rate (see Diaz and Luengo-Prado (2010) and Cho and Francis (2011)). The recent working paper by Kindermann and Kohls (2018) is a first step in this direction.

Our paper relates to the empirical literature concerned with cross-country comparisons of wealth accumulation and wealth inequality.[9] The negative relationship between homeownership rates and wealth inequality across countries in the HFCS data set was first noted in the study by Bezrukovs (2013). Mathä, Porpiglia, and Ziegelmeyer (2017) analyze HFCS data to examine cross-country variation in wealth holdings and point to the important role of homeownership to explain differences in wealth levels. While they also look at different wealth quantiles, they do not explore the determinants of the cross-country inequality differences. Bover (2010) compares the impact of the household structure on differences in the wealth distributions between the U.S. and Spain. Imposing the Spanish household structure on the U.S., she estimates a counterfactual wealth distribution, using the nonparametric approach of DiNardo, Fortin, and Lemieux (1996) and finds small effects on the Gini coefficient. Fessler, Lindner, and Segalla (2014) confirm the relatively small effect of household structure using HFCS data, but show that this masks strong effects in different segments of the overall wealth distribution. Different household structures across countries (e.g. a higher share of adult children living with their parents in the Southern European countries) could bias our measure of the homeownership rate. We therefore also include detailed controls regarding household structure for our RIF regressions as a robustness check. The study by Christelis, Georgarakos, and Haliassos (2013) evaluates comparable data from health and retirement surveys for the U.S. as well as for several European countries and also conduct a decomposition analysis for quantiles of

[6] In a cross-country context, Christelis, Georgarakos, and Haliassos (2013) examine the determinants of asset market participation and asset holdings, including housing.

[7] See Chernozhukov and Hansen (2004) for an exception. They analyze the effects of participation in a retirement savings program on wealth quantiles, using an instrumental quantile regression approach. Kaas, Kocharkov, and Preugschat (2019) estimate the causal effect of homeownership on net wealth for the subsample of inheritors by using inherited homes as an instrument.

[8] See for instance the first stage regressions in Kaas, Kocharkov, and Preugschat (2019).

[9] A recent study that constructs a measure of *global* wealth inequality using different micro data sources is Davies, Sandström, Shorrocks, and Wolff (2011).

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different portfolio components, but do not examine wealth inequality differences.[10]

The following section describes the data set and presents some important facts on wealth holdings and inequality as well as its relationship with homeownership rates, and at the end of this section we decompose the Gini coefficient by homeownership status. Then, in Section 3 we present a cross-country decomposition based on a RIF regression of the Gini coefficient. Section 4 shows the importance of the bottom half of the wealth distribution when accounting for the variation in both homeownership rates and wealth inequality and discusses the role of housing market policies. Section 5 concludes.

2. DATA AND BASIC FACTS

Our data sources are the first two waves of the Eurosystem Household Finance and Consumption Survey (HFCS) published by the European Central Bank in 2013 and 2016, which provide household-level data in 15 Euro area countries for the first wave and 20 countries for the second wave.[11] These data are collected in a harmonized way for a sample of households in the periods 2009-2011 and 2011-2014 for the two waves, respectively.[12] We restrict the sample to the nine largest countries of the Euro area: Austria, Belgium, France, Germany, Greece, Italy, the Netherlands, Portugal, and Spain, which include about 46,000 households in each wave.[13] For our descriptive statistics and the inequality measures reported in this section we average over waves by deflating monetary values to 2014 Euro values.

Our wealth measure of interest is total net wealth of a household. Net wealth is all household wealth, including financial assets, real estate, stakes or ownership in businesses, and valuables minus total debt. Net wealth includes voluntary pension plans, but excludes occupational pension plans and promised entitlements to public retirement payments.In Table I we present some statistics of net wealth for the nine countries in our sample. Median net wealth differs considerably across countries, whilst the dispersion of mean net wealth is a bit less pronounced. The varying gap between median and mean wealth levels reflects large differences in net wealth inequality across countries. The Gini coefficient of net wealth ranges from 0.58 in Greece to 0.76 in Germany. Other measures such as the ratios of the 90th to the 50th quantile and the wealth share owned by households between the median and the 90st percentile relative to share owned by the bottom half (i.e. the ratio s90/s50) in Table I follow a similar pattern across countries. It is noteworthy that in particular the 90/50 ratio follows quite closely the pattern of Gini coefficients across countries. Piketty (2014) argues that differences in top percentiles are more

[10]Methodologically, their approach is based on conditional quantile regressions developed by Machado and Mata (2005).

[11]Some of the additional countries of the second wave have not yet adopted the Euro.

[12]See Tiefensee and Grabka (2016) for a detailed discussion of the limitations of cross-country comparisons using the HFCS.

[13]The HFCS data come in five samples. Each sample contains a different realization of imputations for missing or incorrect values. We follow Rubin (1987) to produce point estimates from the data by averaging over the separate estimates from each implicate. Standard errors for the regressions in the later sections of this paper are obtained by computing bootstrapped variances for each implicate using 200 of the provided replicate weights and by combining the within and between implicate variances as shown in Rubin (1987). Tiefensee and Grabka (2016) analyze the degree of imputation and find that for the selected countries most variables have less than 10% missing values. One important exception is the value of housing wealth for France, which is only based on reported ranges and therefore fully imputed.

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TABLE I

SUMMARY STATISTICS FOR HOUSEHOLD NET WEALTH AND MEASURES OF INEQUALITY

Country	Mean	Median	Mean/Med.	90/50	s90/s50	Gini
Austria (AT)	253905	78925	3.26	6.58	16.66	.75
Belgium (BE)	322029	204527	1.58	3.32	5.36	.60
Germany (DE)	200421	54944	3.66	8.16	17.87	.76
Spain (ES)	265223	160587	1.65	3.36	4.31	.59
France (FR)	231414	111153	2.09	4.57	9.42	.68
Greece (GR)	121375	80321	1.53	3.47	5.23	.58
Italy (IT)	240739	153508	1.57	3.40	5.72	.61
Netherlands (NL)	153804	88655	1.74	4.39	23.78	.68
Portugal (PT)	149731	70893	2.11	4.53	6.59	.67

Notes: All values are averages over the two waves. We use sampling weights for all statistics. Levels are all in 2014 Euros, deflated by the country-specific CPIs. Source: HFCS 2013-2016.

meaningful measures of wealth inequality than the Gini coefficient or the 90/50 decile ratio, given that wealth is highly concentrated at the top. However, as with other household survey data, important issues are the lower response rates and underreporting of wealth for top percentile households. For seven of the countries in our sample, Vermeulen (2016) estimated the error at the top using Pareto tails and finds that the gap between the corrected and reported share of the top 1% net wealth varies between 1 and 11 percentage points, depending on the country.[14]

For our analysis, an inequality measure that summarizes features of the whole wealth distribution is more adequate. In what follows, we focus on the Gini coefficient, which is also the most common inequality measure in the macroeconomic literature on wealth inequality. Because of the difficulty of measuring the top percentiles of wealth, we repeat our analysis for the subsample of households in the lower nine deciles of the net wealth distribution and find that all the main results remain unchanged (see Appendix D).

Next, we look at the importance of housing wealth for the average household's portfolio and its impact on inequality. We divide wealth into the components of net own housing wealth, net financial wealth, net real wealth, and business wealth and compute their shares. The first component consists of the value of the house that is owned by the household and used as a primary residence minus the amount of mortgage debt for that house. Net financial wealth is all financial wealth minus all debt that is not in the form of mortgages. Net real wealth includes items such as cars and valuables and other real estate net of mortgage debt. The last item, business wealth is the net value of a (self-employment) business. We have chosen these categories as they refer to different economic functions. For instance, own housing wealth is different from financial investments, as wealth in form of a primary residence also has a direct use value. Further, business wealth reflects an important economic choice individuals undertake, i.e. whether or not to become an entrepreneur. Table II shows the portfolio shares of the four components for each country.

[14]See also Eckerstorfer, Halak, Kapeller, Schütz, Springholz, and Wildauer (2015) for the Austrian subsample of the HFCS and Bach, Thiemann, and Zucco (2015). The limited validity of the HFCS for top wealth households is also reflected by the observation that the mean of net wealth is below the one estimated from national accounts (see European Central Bank (2013)).

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TABLE II

PORTFOLIO SHARES

Country	Net own housing	Net financial	Net real	Net business	Net wealth< 0
AT	48	14	19	19	6
BE	48	25	18	8	3
DE	40	24	23	13	9
ES	48	15	28	9	4
FR	44	19	24	14	2
GR	52	60	35	7	3
IT	61	11	20	7	2
NL	53	29	16	2	14
PT	37	13	34	16	5
Average	**48**	**17**	**24**	**11**	**5**

Notes: Values in percentages. All values are averages over the two survey waves. Sample weights are used. Source: HFCS 2013-2016.

As these averages include households with non-positive wealth holding, we also report in the last column the share of households with zero or negative wealth.[15]

We see that the shares of net own housing wealth are strikingly high even for countries with low homeownership rates, such as Austria and Germany. On average, own housing contributes around one half of all wealth, with the lowest share being slightly below 40%. The second most important component is net real wealth, partly reflecting the importance of other real estate holdings. Net financial wealth and business wealth play a smaller role. In Appendix B we show that the contribution of each portfolio item roughly reflects its contribution to the overall Gini coefficient of a given country. Specifically, we find that the housing component contributes on average 42% to the overall Gini coefficient.

While these numbers indicate that housing wealth is very important for overall wealth, we now show that it also helps to understand the differences in wealth inequality between countries. Not only wealth inequality but also homeownership rates differ strongly across our sample of countries. Homeownership rates range from 44% in Germany to 82% in Spain. In Figure 1 we plot the homeownership rates against the Gini coefficients across countries, showing a remarkably strong negative correlation.[16]

To better understand this negative relationship between the Gini coefficient and the homeownership rate, we conduct a decomposition of the Gini coefficient which accounts for the contributions of the subgroups of homeowners (o) and renters (r), as well as between-group inequality. The overall Gini coefficient of a given country can be decomposed in the following way (see e.g. Lambert and Aronson (1993)):

$$G = P_o S_o G_o + P_r S_r G_r + \bar{G} + \mathcal{R},$$

where G_i is the Gini coefficient within the group i, P_i is the population share and S_i the wealth share of group i. The term $\bar{G}$ is the Gini coefficient of between-group differences.

[15]Note that the presence of households with negative wealth holdings affects the Gini coefficient, which in such a case can theoretically exceed the value of one.

[16]This fact is robust to including the smaller Euro area countries in the HFCS. The correlation is then -0.85.

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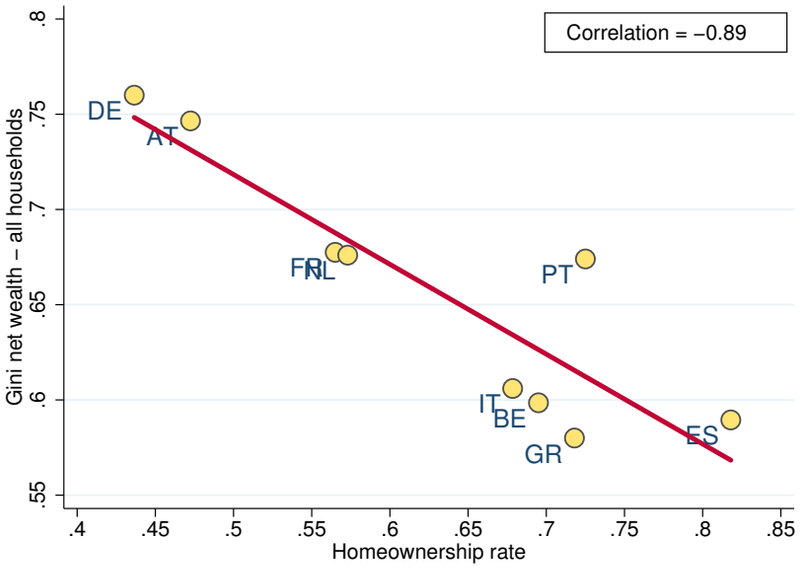
It is based on the average wealth of the two groups taking into account the shares of each group of the total population. Finally, the last term $\mathcal{R}$ is a residual (or so-called overlap) term which is positive only if the wealth distributions of the two groups overlap and zero otherwise.[17] In Table III we report the contributions of the within-group components (owners and renters), the between-group component and the residual as a fraction of the overall Gini coefficient.

Figure 1: Wealth inequality and homeownership



Note: Values are averaged over the two survey waves. Source: HFCS 2013-2016.

Two important messages can be derived from this decomposition: First, the subgroup of owners and the between-group component account for the majority of overall wealth inequality in all countries (on average 47% and 42%, resp.), whereas the other two components play only a minor role. Second, the between-group component of the Gini coefficient correlates negatively with the homeownership rate across countries: it is highest in low-homeownership countries Austria and Germany, and lowest in high-homeownership countries Belgium, Greece, Portugal and Spain. On the other hand, the within-owner contribution to the Gini coefficient correlates *positively* with homeownership rates, and hence does not help to account for the negative relationship between wealth inequality and homeownership rates that we document in Figure 1.[18] In summary, both the owner component and the between-group component are quantitatively important. However, only the latter one accounts for the negative relationship of the overall Gini coefficient with the homeownership rate. The important fact that drives this negative correlation is that in all countries renters are on average much poorer than homeowners.

[17] In general, the residual term makes the interpretation of the decomposition less clear-cut. As $\mathcal{R}$ turns out to be small and does not differ much across countries, it is less of a concern in our case (see e.g. Lambert and Aronson (1993) for a discussion).

[18] The correlations of the homeownership rate with the levels of the components $P_o S_o G_o$ and $\bar{G}$ are 0.91 and -0.99, respectively.

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TABLE III

RELATIVE CONTRIBUTION OF SUBGROUPS TO THE OVERALL GINI COEFFICIENT

Country	Owners	Renters	Between	Residual
AT	31	7	55	7
BE	50	4	37	10
DE	29	9	56	6
ES	70	1	23	6
FR	39	5	50	6
GR	54	3	36	7
IT	50	2	44	4
NL	39	6	47	8
PT	59	3	30	9
Average	47	5	42	7

Notes: Values in percentages. All values are averages over the two survey waves. Sample weights are used. Source: HFCS 2013-2016.

In the following section we investigate this relationship further by means of a counterfactual decomposition of cross-country differences of the Gini coefficient in which we account for several potential explanatory variables.

3. CROSS-COUNTRY DECOMPOSITION

To take the potential impact of observable household characteristics on differences in the Gini coefficient into account, we conduct cross-country decompositions based on recentered influence function (RIF) regressions. At the end of the section we comment on how the results of this section correspond to the findings from the last section.

3.1. *RIF-Gini Regression*

The RIF regression approach developed by Firpo, Fortin, and Lemieux (2009) can be used to estimate the marginal effect of covariates on distributional statistics, such as quantiles or the Gini coefficient. The RIF regression is based on the influence function (IF) of a statistic, which gives the change of the statistic when there is a marginal increase in the probability mass of one particular value in the support of the distribution.[19] The IF of a given statistic is recentered by adding the statistic itself, implying that the expectation of the RIF equals the statistic. What is important for our purpose is that the RIF approach can isolate the partial effects of different covariates on the Gini coefficient (see Appendix C for further details).

We regress $\text{RIF}^{Gini}(w)$, where w is the net wealth of a household, on a set of covariates for each country separately. In addition to homeownership status we control for household income, household size, number of children of age less than or equal to 20 years, and the

[19]More precisely, the IF gives the change of the statistic if the weight at one particular element within the support of the distribution is increased. A regression of the RIF on covariates gives the effect of a marginal shift in the covariate distribution on the statistic. In the case of discrete variables, the RIF coefficients can be interpreted as "generalized average partial effects" (see Rothe (2009) and Rothe (2012)).

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following attributes of the reference person in the household (RP): age, self-employment status (conditional on having at least one employee), a dummy variable for tertiary education, and marital status. Table VII in the Appendix provides descriptive statistics for these variables. Our set of regressors resembles those used in the literature on wealth regressions. Our experiments with other sets of regressors do not show significant improvements or changes. In particular, we included the first 24 of the household structure dummies given in Table 3 of Fessler, Lindner, and Segalla (2014). The household structure is potentially important as there is evidence that in Southern European countries more adult children live with their parents, thereby potentially lowering the share of young renters.[20] It turns out that the additional controls are mostly insignificant and have only minor effects. One important exception, however, is the inclusion of the value of an inherited main residence. Inheriting a home is highly correlated with homeownership, so that its inclusion in the regressions reduces the effect of homeownership on the Gini coefficient. Since not all countries report inherited wealth information, we decided not to include it. As a further robustness check we also added to the regressions individual house price changes, as in the study by Mathä, Porpiglia, and Ziegelmeyer (2017). While different countries have experienced varying magnitudes of house price appreciation, the effect on inequality is relatively modest and not significant on average (see Table XII in Appendix C). One reason could be that the countries with larger price increases are also the ones with higher homeownership rates. Thus, a majority benefits from the capital gains and the relative wealth positions do not change significantly.

All of our regressors are likely to be important for wealth accumulation and indirectly for wealth inequality. Income clearly affects wealth, as savings are mostly taken from labor income.[21] A larger household can smooth income differences across individuals better than a smaller household. On the other hand, children can have ambiguous effects on wealth accumulation. They tend to reduce the resources left for savings, but can also give a motive for a higher savings rate. Our measure of self-employment mostly covers business owners. A higher share of entrepreneurs might increase inequality as entrepreneurship is a risky activity. Tertiary education might be important for wealth accumulation independent of income, e.g. if education is correlated with more prudent investment behavior.

In Table IV we report the coefficient estimates for the first wave.[22] It is noteworthy that most coefficient estimates are fairly similar across countries. With only few exceptions, the signs of a given regressor are the same for all significant and near-significant estimates, and they are also of the same order of magnitude. In particular, the coefficients for homeownership are negative, (strongly) significant and similar across countries. It should be noted that the observables altogether have only limited explanatory power for the Gini coefficient which is similar to the results from wealth regressions in other studies.[23]

To interpret the regression results it is necessary to take a closer look at the regressand, the recentered influence function of the Gini coefficient as a function of the wealth level, w. It turns out that this function is U-shaped in all countries. On average, the RIF is

[20] See e.g. Martins and Villanueva (2009).

[21] We have experimented with a proxy for lifetime labor income using household work years and current labor income, to better capture the income history. The results do not change much, but we would have to drop Italy from the sample due to data limitations.

[22] The corresponding table for the second wave is in Appendix C.1. The results are quite similar.

[23] See e.g. Christelis, Georgarakos, and Haliassos (2013).

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higher than the Gini coefficient for wealth levels below the 40th as well as above the 97th percentile, whereas it is below the Gini coefficient for wealth levels in between. Consequently, increasing the mass of households with low or very high wealth levels increases the Gini coefficient while adding mass to medium wealth levels tends to decrease the Gini coefficient. Covariates that are positively (negatively) correlated with net wealth within the lower/middle part of the support will decrease (increase) the Gini coefficient as the RIF is downward sloping in this region. Only for covariates that are mostly correlated with the upper tail of the wealth distribution, the signs are reversed, as the RIF is upward sloping in that region.

We now turn to the regression estimates given in Table IV. The coefficients for homeownership are large and negative. That is, an increase in the probability of homeownership for each individual in the distribution has a strong negative effect on wealth inequality measured by the Gini coefficient.[24] For example, a coefficient of -0.4 implies that the Gini coefficient would go down by .04 if we would increase the probability of becoming an owner by 10%.

Turning to the other coefficients, current household income positively impacts the Gini coefficient. The positive sign is likely to come from a strong positive correlation between income and wealth for the upper wealth deciles. Further, household size tends to have a negative effect, which is due to a positive correlation between household size and net wealth. Self-employment status has mostly positive coefficients, likely because self-employed households with employees are concentrated in the upper percentiles of the net wealth distribution. The number of children varies positively with the Gini coefficient in most countries, whilst age of the reference person has a small and ambiguous impact. Tertiary education tends to reduce inequality. Higher levels of education may be related to an overall increase of financial literacy and a more prudent investment behavior. Finally, marriage has a negative effect, which could be due to additional insurance and income stability.

3.2. *Decomposition of Cross-Country Differences*

We now turn to the cross-country decomposition. The RIF regression allows us to perform a decomposition of between-country Gini coefficient differences, similar in spirit to the standard Oaxaca-Blinder decomposition of earnings differences.[25] The decomposition divides the effects corresponding to each covariate used in the RIF regressions by country into three effects, which are called the endowment effect, the coefficient effect, and the interaction effect. Formally, the decomposition is given by

$$\overline{\text{RIF}}_A^G - \overline{\text{RIF}}_B^G = (\bar{X}_A - \bar{X}_B)'\beta_B + \bar{X}_B'(\beta_A - \beta_B) + (\bar{X}_A - \bar{X}_B)'(\beta_A - \beta_B),$$

where $\overline{\text{RIF}}_i^G$ is the predicted Gini coefficient for country i, $\bar{X}_i$ is the vector of averages of covariates in country i, and β_i is the vector of coefficient estimates for country i. Each of the three summands represents the endowment, coefficient, and interaction ef-

[24] In Appendix E we take another perspective on this effect and conduct a RIF regression of wealth quantiles. The relative effect of homeownership is higher for lower quantiles, meaning that homeownership lowers inequality by lifting up wealth levels of the poorer households.

[25] See Firpo, Fortin, and Lemieux (2007) and the references therein. For a critical discussion of this approach see Rothe (2015).

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Table IV: RIF regression of the Gini coefficient

	AT	BE	DE	ES	FR	GR	IT	NL	PT
Homeownership	-0.313**	-0.414***	-0.330***	-0.450***	-0.467***	-0.426***	-0.457***	-0.375***	-0.411***
	(0.0693)	(0.0197)	(0.0294)	(0.0297)	(0.0232)	(0.0184)	(0.0128)	(0.0498)	(0.0422)
HH Income	0.0417	0.0375	0.265	0.713**	0.891***	0.212*	0.446***	0.125	2.097
	(0.0687)	(0.0287)	(0.152)	(0.265)	(0.194)	(0.0924)	(0.0967)	(0.0885)	(1.126)
HH Size	0.00962	-0.0476*	-0.0680	-0.0706*	-0.111***	-0.0283*	-0.0303	-0.0167	-0.120
	(0.0410)	(0.0197)	(0.0398)	(0.0294)	(0.0282)	(0.0135)	(0.0243)	(0.0495)	(0.0618)
No Children	0.0228	0.0584*	0.0763	0.0715*	0.0802**	0.00297	0.0171	-0.0164	0.133**
	(0.0382)	(0.0236)	(0.0436)	(0.0312)	(0.0304)	(0.0147)	(0.0270)	(0.0547)	(0.0515)
Age RP	-0.00107	-0.000604	-0.000763	0.00198*	-0.00165***	0.00109	0.00202***	-0.00803***	0.00420***
	(0.00118)	(0.000578)	(0.000429)	(0.00100)	(0.000494)	(0.000576)	(0.000509)	(0.00184)	(0.00123)
Selfemployed RP	0.213	0.196	0.536	0.123**	0.190	0.0551	0.205	-0.00455	0.430**
	(0.290)	(0.138)	(0.273)	(0.0424)	(0.184)	(0.0508)	(0.114)	(0.209)	(0.155)
Tert edu RP	-0.106*	-0.0154	-0.140*	-0.0454	-0.152**	-0.0331	0.00870	0.0756	-0.435
	(0.0446)	(0.0240)	(0.0567)	(0.0566)	(0.0475)	(0.0246)	(0.0355)	(0.0392)	(0.347)
Married RP	-0.0656	0.00992	-0.0101	-0.0496*	-0.0584**	-0.0129	-0.0227	-0.0516	-0.0882*
	(0.0584)	(0.0307)	(0.0327)	(0.0233)	(0.0187)	(0.0155)	(0.0195)	(0.0650)	(0.0407)
Constant	0.951***	0.980***	0.959***	0.796***	0.947***	0.839***	0.725***	1.270***	0.617***
	(0.107)	(0.0431)	(0.0341)	(0.0609)	(0.0513)	(0.0420)	(0.0430)	(0.133)	(0.0907)
R^2	0.066	0.112	0.085	0.044	0.144	0.453	0.149	0.257	0.140
Observations	2380	2327	3565	6197	15006	2971	7951	1301	4404

Dependent variable: RIF of the Gini coefficient. Coefficients give the average partial effects on the Gini coefficient. Sample weights are used. Bootstrapped standard errors in parentheses. Income is in current 100000s Euros. Standard errors are computed using replicate weights and by accounting for imputation variance using Rubin's formula. Results for first wave. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Source: HFCS 2013.

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fect, respectively. Here we focus on the endowment effect, which is often referred to as the "explained" part of the decomposition. Note that we cannot easily correct for potential endogeneity bias. However, as long as we maintain an "ignorability" assumption that any such bias is similar across the countries of our sample, the cross-country comparison remains meaningful.

As the reference country we choose Germany, which attains the highest value for the Gini coefficient. The results are shown in Table V. The first two rows show the predicted Gini coefficients of the reference country and the comparison country.[26] The next set of rows gives the total difference and the totals of the endowment, coefficient, and interaction effects. For almost all countries the endowment effect is the most important one and is highly significant. The next block of rows shows the separate endowment effects for all covariates. The endowment effects of homeownership are the largest ones in almost all countries and have the highest significance levels. The magnitude of the homeownership contribution is also quite high relative to the difference of the Gini coefficients, often exceeding 50% of the overall difference. As a result, the RIF-based decomposition shows that the negative relationship between homeownership rates and the wealth Gini coefficient in the raw data holds true even if we control for other observables.

We can compare this decomposition to the decomposition by subgroups at the end of Section 2. There we have shown that the driving force for the overall negative relationship between homeownership and wealth inequality is the inverse relation between the homeownership rate and the between-group Gini coefficient. That is, the overall negative correlation is based on marked inequality *between* the groups of owners and renters. The RIF-based decomposition, on the other hand, attributes differences in the Gini coefficients to homeownership differences because of large negative regression coefficients for homeownership. As we argued above, these negative regression coefficients reflect strong differences in *within*-group inequality between owners and renters. However, the RIF regression does not allow us to separate the contributions of within-group and between-group effects.

4. DISCUSSION

Homeownership and Inequality in the Bottom Half.

The focus of the recent discussion on wealth inequality has been on top wealth inequality, i.e. the upper 1% and above (e.g. Piketty (2014)). As discussed before, the survey data of the HFCS do not allow us to evaluate the contribution of the very top wealth holders to inequality, and in any case their impact has little to do with homeownership. Given these limitations, we emphasize the role of households below the median of the net wealth distribution for overall wealth inequality. In what follows, we highlight several facts indicating that cross-country differences in wealth inequality are largely accounted for by the bottom half of the wealth distribution and that these differences seem to be channeled through homeownership.[27]

[26] These values differ slightly from the sample Gini coefficients given in Table I due to approximation errors of the RIF.

[27] All of the following statistics are averages over the two survey waves.

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TABLE V

DECOMPOSITION OF EXPLAINED POPULATION AND COEFFICIENT EFFECTS

	AT	BE	ES	FR	GR	IT	NL	PT
OVERALL								
Predicted Gini	0.762***	0.608***	0.580***	0.679***	0.561***	0.609***	0.654***	0.670***
	(0.0402)	(0.0106)	(0.0114)	(0.00720)	(0.00788)	(0.00978)	(0.0180)	(0.0176)
Difference	0.00369	-0.150***	-0.177***	-0.0788***	-0.197***	-0.148***	-0.104***	-0.0878***
	(0.0426)	(0.0176)	(0.0181)	(0.0157)	(0.0164)	(0.0171)	(0.0226)	(0.0228)
Endowments	0.0137	-0.0905***	-0.144***	-0.0454**	-0.138***	-0.102***	-0.0569***	-0.142**
	(0.0151)	(0.0112)	(0.0419)	(0.0150)	(0.0382)	(0.0235)	(0.0108)	(0.0453)
Coefficients	-0.00842	-0.0393*	0.107*	0.0269	-0.0273	0.0105	-0.0586*	0.465
	(0.0390)	(0.0171)	(0.0536)	(0.0221)	(0.0254)	(0.0250)	(0.0240)	(0.254)
Interaction	-0.00155	-0.0198	-0.141*	-0.0603**	-0.0318	-0.0570*	0.0117	-0.411
	(0.0180)	(0.0125)	(0.0633)	(0.0204)	(0.0446)	(0.0286)	(0.0164)	(0.248)
ENDOWMENTS								
Homeownership	-0.0113*	-0.0838***	-0.125***	-0.0365***	-0.0934***	-0.0802***	-0.0441***	-0.0900***
	(0.00459)	(0.00848)	(0.0116)	(0.00384)	(0.00843)	(0.00764)	(0.00400)	(0.00919)
HH Income	0.000765	0.0159	-0.0323	-0.0175	-0.0420	-0.0243	0.00622	-0.0615
	(0.00955)	(0.00989)	(0.0172)	(0.00945)	(0.0222)	(0.0130)	(0.00532)	(0.0324)
HH Size	-0.00556	-0.0181	-0.0433	-0.0135	-0.0405	-0.0332	-0.0117	-0.0450
	(0.00355)	(0.0102)	(0.0245)	(0.00762)	(0.0229)	(0.0188)	(0.00660)	(0.0254)
No Children	0.00173	0.0109	0.0109	0.0142	0.00821	0.00980	0.0124	0.0146
	(0.00188)	(0.00689)	(0.00707)	(0.00893)	(0.00520)	(0.00621)	(0.00785)	(0.00919)
Age RP	0.000709	-0.000246	-0.000570	-0.000144	0.00150	-0.00300	-0.0000113	-0.00246
	(0.000530)	(0.000233)	(0.000454)	(0.000136)	(0.000903)	(0.00175)	(0.000198)	(0.00143)
Selfemployed RP	0.00528	-0.00353	0.0431	-0.000772	0.0170	0.00532	-0.0145	0.0160
	(0.00545)	(0.00373)	(0.0237)	(0.00233)	(0.0101)	(0.00402)	(0.00802)	(0.00940)
Tert edu RP	0.0218*	-0.0121*	0.00483	0.00811*	0.0125*	0.0249*	-0.00613*	0.0282*
	(0.00860)	(0.00519)	(0.00276)	(0.00348)	(0.00511)	(0.00974)	(0.00301)	(0.0110)
Married RP	0.000280	0.000332	-0.000986	0.000636	-0.00129	-0.00125	0.000828	-0.00159
	(0.000957)	(0.00112)	(0.00326)	(0.00211)	(0.00426)	(0.00414)	(0.00275)	(0.00526)
COEFFICIENTS								
Homeownership	0.00759	-0.0367*	-0.0525**	-0.0601***	-0.0421**	-0.0554***	-0.0195	-0.0355
	(0.0324)	(0.0159)	(0.0177)	(0.0157)	(0.0156)	(0.0142)	(0.0251)	(0.0226)
INTERACTION								
Homeownership	0.000607	-0.0213*	-0.0455**	-0.0152***	-0.0273**	-0.0308***	-0.00597	-0.0221
	(0.00267)	(0.00933)	(0.0154)	(0.00406)	(0.0101)	(0.00798)	(0.00767)	(0.0142)

Notes: Standard errors in parentheses: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Reference country is Germany. RP refers to reference person. Income is in current 100,000s Euros. Sampling weights are used. Variances of a given implicate are computed following Jann (2008). Overall variances are computed using Rubin's formula. Predicted Gini coefficient of Germany is 0.760. Coefficients and Interaction estimates only shown for homeownership. Source: HFCS 2013.

First, regarding homeownership rates there is a marked difference between the bottom half and the households in the 50-90 group of the net wealth distribution. Homeownership rates for the group of households below the median vary strongly across countries, with a coefficient of variation of 0.54. In contrast, the homeownership rates for the 50% richest households are much more similar across countries, with a coefficient of variation of 0.08. Thus, the cross-country variation in homeownership rates is mainly driven by households in the bottom half. In fact, the correlation of overall wealth inequality with homeownership rates in the lower half is almost the same as the one with the overall homeownership rates.

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Second, net wealth in the 50-90 group of households is less dispersed than in the bottom half of the wealth distribution. The average of the Gini coefficients across the nine countries for the below-median group is 0.88, whereas it is 0.22 for the 50-90 group. Furthermore, the cross-country variation in wealth inequality is higher for households below the median of net wealth. The coefficient of variation is 0.73 for the bottom half, and 0.18 for the four deciles above the median. Thus, the cross-country differences in wealth inequality can to a large extent be accounted for by inequality of the poorer half of the households.[28]

By providing a detailed view of the joint distribution of net wealth and homeownership across countries, our analysis lends support to the claim that the correlation between homeownership and wealth inequality is more than a pure coincidence. In countries with low homeownership rates, households do not substitute housing wealth by financial wealth as much as simple portfolio choice theories would predict. That is, in countries with high homeownership rates the poorer households save relatively more. This lifts up their wealth relative to the richer households and hence makes the distribution of wealth more even.

The Role of Housing Market Institutions.

If these observations given in the previous paragraph are not a mere reflection of differences in savings preferences across countries, the likely interpretation is that there are different savings incentives across countries which are channeled through homeownership. One possible explanation is that the social safety net (in particular redistributive policies and public pensions) differs across countries, leading to different (precautionary) savings patterns over the life-cycle.[29] These savings are then invested in housing, perhaps due to the lack of other suitable savings vehicles.

Another, complementary, possibility is that countries differ by their incentives to invest into housing. In particular, mortgage markets and the amount of explicit or implicit subsidies to owning the house that is used as a main residence significantly differ across countries. Such subsidies not only affect homeownership rates per se, but at the same time might lead to implicit redistribution of wealth. Moreover, life-cycle savings profiles are likely to be different when there are higher incentives to buy a home since mortgage contracts often put constraints on the savings profile.

To account for the impact of differential housing policies on homeownership and wealth inequality differences across countries, we take a look at a list of housing market indicators. Table VI summarizes the cross-country differences in mortgage loan-to-value ratios (LTV), the presence of taxes on imputed rent for homeowners, the possibility of mortgage interest rate tax deductions and the value-added tax (VAT) rate on new home purchases. The average downpayment requirement for home purchases varies from 10% in the Netherlands to around 40% in Austria. Four countries do not tax the imputed rent and do not allow for mortgage deductions: Austria, France, Germany and Spain. Within the five countries with highest homeownership rates, four (Belgium, Greece, Italy and Portugal) have imputed rent taxation and mortgage deductions. The VAT on new homes is not

[28] As it is the case for the overall population, wealth inequality for households below the median is negatively correlated with homeownership rates for this group.

[29] See Pham-Dao (2019) for details on this mechanism. As mentioned before, however, Christelis, Georgarakos, and Haliassos (2013) argue that pensions do not affect much investment in housing assets.

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levied in Portugal and reaches its peak in Belgium (21%).

TABLE VI

HOUSING MARKET INDICATORS AND CORRELATIONS OF THE COEFFICIENT EFFECTS OF A OAXACA-BLINDER DECOMPOSITION OF THE HOMEOWNERSHIP RATE AND THE WEALTH GINI COEFFICIENT

Country	Loan-to-value ratio (in %)	Imputed rent taxation	Mortgage interest rate deduction	VAT on new homes (in %)
AT	60	No	No	11
BE	83	Yes	Yes	21
DE	70	No	No	19
ES	70	No	No	7
FR	75	No	No	20
GR	75	Yes	Yes	19
IT	50	Yes	Yes	4
NL	90	Yes	Yes	19
PT	75	Yes	Yes	0
Correlation(CE HOR, Indicator)	0.031	0.335	0.335	-0.448
Correlation(Gini coeff., Indicator)	-0.521	-0.521	-0.524	0.181

Notes: LTV ratios are taken from Calza, Monacelli, and Stracca (2013). The indicator for taxation of imputed rent is from De Vries (2010), p. 76. The remaining numbers come from Dol and Haffner (2010). Coefficient effects (CE) refer to decompositions of homeownership rate (HOR) differences (see Appendix F).

In what follows we examine whether the pattern of such policies across countries is consistent with the observed differences in homeownership and wealth inequality. First, we follow the approach of Christelis, Georgarakos, and Haliassos (2013) who take the estimated differences in coefficient effects from a Oaxaca-Blinder decomposition that isolates the effects coming from "institutions" and relates them to country level indicators. Because we are interested in the effect of institutions on homeownership, we perform a Oaxaca-Blinder decomposition on the decision of owning a home across countries.[30] Cross-country differences in homeownership are attributed to differences in observed characteristics (endowment effects) or differences in estimated coefficients (coefficient effects). We then correlate the coefficient effects of homeownership with the housing indicators. In addition, we also report the direct correlations of the housing market indicators with the Gini coefficient.

The second to the last row of Table VI presents the cross-country correlations between the corresponding housing market indicator and the estimated coefficient effects of the homeownership decomposition. These correlations suggest that tax policies seem to be related to homeownership rate differences, while credit market conditions, given by the LTV ratios have no visible effect. Countries with imputed rent taxation and mortgage deductions experience more pronounced positive coefficient effects on homeownership. Finally, higher VAT rates on new houses are associated with negative coefficient effects. Turning to the direct correlation between the housing market indicators and the Gini coefficient, we find that these directly reflect the correlations with homeownership coefficient effects (with opposite sign). Thus, this simple exercise suggests that differences in tax policies can be an important candidate to account for the cross-country differences in homeownership and wealth inequality that we document in this paper.[31]

[30]We use as control variables the same characteristics as in the RIF regressions with the exception of homeownership status. See Appendix F for details.

[31]Naturally, our exercise cannot rule out cases of reverse causality. For instance, countries with high

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A more elaborate study of these policy channels, however, would require more detailed data on such policies and their (frequent) changes over time for each country, as it is crucial to take into account which individuals in the income and wealth distribution are affected by the policies. Moreover, several of the mentioned policies interact in complex ways: subsidies to promote homeownership might be muted if credit markets are too restrictive for potential homeowners to benefit from the subsidies. In Kaas, Kocharkov, Preugschat, and Siassi (2019), we make a first step towards this goal by exploring the determinants of homeownership decisions within a detailed structural model that we calibrate to Germany.

5. CONCLUSIONS

In this paper we provide evidence for a strong negative relationship between homeownership rates and wealth inequality across the nine largest Euro area countries and we analyze its determinants. A Gini decomposition across homeownership status attributes this relationship mainly to between-group (owners versus renters) wealth inequality. By employing a cross-country decomposition based on a RIF regression, we take household observables into account and confirm the important role of homeownership rates for accounting for cross-country inequality differences. The variation of both homeownership rates and wealth inequality across countries is most pronounced for the group of households below the median of net wealth. Thus, differences in incentives to become a homeowner might account for differences in wealth inequality across Euro area countries.

homeownership rates may like to tax imputed rents in order to increase tax revenue.

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APPENDIX A: DESCRIPTIVE STATISTICS

TABLE VII

DESCRIPTIVE STATISTICS BY COUNTRY - ALL HOUSEHOLDS

Country	Observations	Year	Net Wealth	Homeownership (%)	HH Inc	Size	N^o Child.	Age	Selfemp.(%)	Tert. ed. RP (%)	Married (%)
First Wave											
AT	2380	2011	265033	47.2	43929	2.1	.44	51.0	4.7	13.6	47.3
BE	2327	2010	338647	69.1	49536	2.3	.56	52.2	3.1	37.8	46.8
DE	3565	2011	195170	43.7	43531	2.0	.42	51.9	3.8	29.2	50.1
ES	6197	2009	291352	81.6	31329	2.7	.56	52.7	11.8	25.7	59.8
FR	15006	2010	233399	54.8	36918	2.2	.60	52.1	3.6	23.4	43.8
GR	2971	2009	147757	72.0	27661	2.6	.52	49.9	6.9	20.3	62.8
IT	7951	2010	275205	68.0	34344	2.5	.55	55.9	4.8	11.4	62.5
NL	1301	2010	170244	57.1	45792	2.2	.58	51.9	1.1	33.6	42.0
PT	4404	2010	152920	71.0	20310	2.7	.61	55.1	6.7	9.1	65.8
Second Wave											
AT	2997	2014	258414	47.3	43334	2.1	.43	53.1	4.7	18.2	50.0
BE	2238	2014	330266	69.9	51957	2.3	.56	54.9	3.0	39.5	45.1
DE	4461	2014	214259	43.6	48390	2.0	.40	52.4	3.1	29.8	47.8
ES	6106	2011	273579	82.0	31856	2.6	.56	53.8	11.8	28.7	58.6
FR	11953	2014	243130	58.1	37417	2.2	.57	53.3		27.6	41.6
GR	3003	2014	104199	71.6	21213	2.5	.51	52.7	4.4	17.8	60.6
IT	8156	2014	226389	67.7	33374	2.5	.48	57.0	3.5	13.5	56.3
NL	1284	2013	151059	57.5	50259	2.2	.52	52.3	1.3	36.6	46.1
PT	6207	2013	155956	74.0	21546	2.6	.55	55.6	6.9	14.4	60.3

Note: Monetary values are in current Euros. Sampling weights are used. Source: HFCS 2013-2016.

TABLE VIII

DESCRIPTIVE STATISTICS BY COUNTRY - OWNERS VS. RENTERS

	Country	Net Wealth	HH Inc	HH size	Children	Age RP	Self-emp. (%)	Tert. ed.RP (%)	Married RP (%)
Owners									
	First Wave								
	AT	487008	54378	2.4	.48	54.4	7	13.7	63.9
	BE	455415	57116	2.4	.57	55.2	3.5	42.1	56.2
	DE	384331	57899	2.3	.45	56.4	5.7	34.8	67.1
	ES	341022	32931	2.7	.55	53.9	12.1	26.2	63.0
	FR	381878	44964	2.4	.60	56.0	5.2	26	57.4
	GR	190789	29448	2.8	.50	53.2	7.4	19.1	68.9
	IT	383138	38111	2.6	.51	58.1	5.1	12.7	66.0
	NL	261507	52044	2.6	.74	51.8	1.2	38.1	57.4
	PT	199446	22031	2.8	.58	56.5	8.1	9.2	71.3
	Second Wave								
	AT	485280	52732	2.5	.51	55.8	5.9	22.2	63.4
	BE	425338	59328	2.5	.62	55.5	3.4	44.1	52.3
	DE	423450	64588	2.3	.43	57.3	5.3	36.7	66.6
	ES	318726	33729	2.6	.53	55	11.8	29.6	61.7
	FR	379195	45101	2.3	.56	57.5		29.5	54.1
	GR	134542	22435	2.6	.48	56.4	4.9	16.9	64.9
	IT	316538	38606	2.5	.44	59.4	4.4	14.6	61.1
	NL	238786	60385	2.5	.66	53.2	1.6	41.2	60.9
	PT	194504	24236	2.7	.54	56.1	8.6	16.0	66.6
Renters									
	First Wave								
	AT	66908	34602	1.9	.41	48.0	2.8	13.6	32.5
	BE	77384	32578	2.0	.54	45.6	2.2	28.2	25.9
	DE	48198	32368	1.8	.39	48.4	2.3	24.8	36.9
	ES	70358	24198	2.6	.59	47.0	10.3	23.9	45.8
	FR	53587	27173	2.1	.61	47.4	1.7	20.3	27.4
	GR	36936	23057	2.4	.59	41.7	5.7	23.3	47.2
	IT	45392	26322	2.5	.62	51.0	4.0	8.5	54.9
	NL	48841	37476	1.7	.36	52.1	0.8	27.5	21.4
	PT	38979	16094	2.6	.68	51.9	3.5	8.7	52.4
	Second Wave								
	AT	54630	34893	1.8	.36	50.6	3.7	14.6	38.0
	BE	109066	34807	1.9	.42	53.6	2.1	28.9	28.2
	DE	52570	35870	1.8	.37	48.6	1.4	24.5	33.3
	ES	67237	23295	2.6	.67	48.3	11.3	24.7	44.0
	FR	54440	26762	2.0	.58	47.5		25.0	24.3
	GR	27806	18139	2.3	.60	43.2	3.3	20.2	49.8
	IT	37339	22402	2.4	.56	51.9	1.8	11.0	46.4
	NL	32481	36572	1.7	.33	51.1	0.9	30.2	26.3
	PT	46409	13900	2.4	.58	54.3	2.2	10.1	42.5

Notes: Monetary values are in current Euros. Sampling weights are used. Source: HFCS 2013-2016.

APPENDIX B: GINI DECOMPOSITION BY PORTFOLIO COMPONENTS

To gauge the importance of the portfolio components for wealth inequality, we decompose the Gini coefficient into contributions coming from each component: $w = w_h + w_f + w_r + w_b$, where h, f, r, and b denote net housing, financial, real and business wealth, respectively. Following the methodology developed by Lerman and Yitzhaki (1985), the Gini coefficient (G) can be decomposed as:

$$G = \sum_k G_k S_k R_k,$$

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with $k \in \{h, f, r, b\}$. G_k is the Gini coefficient for wealth component k, and S_k is the k-component share out of total net wealth. Given the overall net wealth distribution $F(w)$ and component-specific distributions $F_k(w_k)$, $R_k \equiv cov(w_k, F)/cov(w_k, F_k)$ is the "Gini correlation" between wealth component k and the total net wealth.[32] We decompose the total Gini coefficient for each country accordingly and report the relative contribution of each component, i.e. $R_k G_k S_k / G$, in Table IX.

TABLE IX

RELATIVE CONTRIBUTION OF WEALTH COMPONENTS TO OVERALL INEQUALITY

Country	Net own housing	Net financial	Net real	Business
AT	42	12	18	28
BE	38	32	21	10
DE	38	20	25	18
ES	38	16	33	14
FR	39	21	25	15
GR	44	7	42	7
IT	55	11	24	11
NL	52	32	14	2
PT	31	12	37	20
Average	42	18	26	14

Notes: Values in percentages. All values are averages over the two survey waves. Sampling weights are used. Source: HFCS 2013-2016.

The decomposition provides a clear message. Net own housing is by far the most important contribution to overall inequality, accounting on average for about 42%. The second most important source is net real wealth, with an average contribution of 26%. While the relative contributions partly reflect the portfolio shares, the two other factors, namely the within-component Gini coefficient (G_k) and the Gini correlation (R_k) are also quantitatively important for this result.

As we show in the paper, there is a negative correlation between overall inequality and the homeownership rate, which partly translates into a negative correlation between overall inequality and the share of housing wealth. This also implies that in countries with high homeownership, the portfolio component of financial wealth tends to be higher. As financial wealth bears high return risk, it is likely to contribute to wealth inequality. In fact, the absolute contribution to the Gini of the financial component is negatively correlated with the homeownership rate. However, as the share of financial wealth is relatively low, it is not likely to account for much of the overall negative correlation.[33]

APPENDIX C: RIF GINI REGRESSION

The RIF of the Gini coefficient is given by:

$$\text{RIF}^{Gini}(w) \equiv 1 + \frac{w}{\mu_w}(1 - G) - \frac{2}{\mu_w}[w(1 - F(w)) + GL(p(w); F)] \,,$$

where $F(w)$ is the cumulative probability of net wealth, μ_w is the average wealth level, and $GL(p(w); F)$ is the generalized Lorenz ordinate defined by $GL(p(w); F) \equiv \int_{-\infty}^{F^{-1}(p(w))} z dF(z)$, with $p(w) \equiv F(w)$.[34] The RIF values can easily be approximated using our data on net wealth.

[32]The correlation R_k takes on the value 1 (-1) if the wealth component k monotonically increases (decreases) with total net wealth. At the other extreme, if the wealth component does not change at all with net wealth, then $R_k = 0$ and this particular source does not contribute to inequality.

[33]Relatedly, Bilias, Georgarakos, and Haliassos (2017) test the influence of access to stock holdings on wealth inequality in the U.S. using changes in stock market participation and find no significant effect.

[34]The underlying definition of the Gini coefficient here is: $G \equiv 1 - \frac{2}{\mu_w} \int_0^1 GL(z; F) dz$. See e.g. Monti (1991) for a derivation of the influence function of the Gini coefficient and Firpo, Fortin, and Lemieux

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C.1. *Results for the second wave*

In the following we repeat the RIF regression for the second survey wave.

TABLE X

RIF REGRESSION - SECOND WAVE

	AT	BE	DE	ES	FR	GR	IT	NL	PT
Homeownership	-0.431***	-0.462***	-0.313***	-0.401***	-0.436***	-0.355***	-0.505***	-0.423***	-0.299***
	(0.0737)	(0.0355)	(0.0206)	(0.0296)	(0.0228)	(0.0294)	(0.0190)	(0.0371)	(0.0165)
HH Income	0.953	0.287	0.202**	1.193***	0.941**	0.00691	0.317**	0.112	0.0575
	(0.953)	(0.190)	(0.0664)	(0.222)	(0.203)	(0.139)	(0.0949)	(0.0999)	(0.0847)
HH Size	-0.190	-0.0129	-0.00412	-0.0875***	-0.128***	0.0160	-0.0138	-0.0366	-0.0180
	(0.191)	(0.0217)	(0.0497)	(0.0250)	(0.0290)	(0.0175)	(0.0101)	(0.0374)	(0.0135)
No Children	0.155	-0.0180	0.0116	0.0833**	0.126***	-0.000987	0.0294	0.0742	0.0181
	(0.159)	(0.0333)	(0.0537)	(0.0292)	(0.0289)	(0.0230)	(0.0209)	(0.0577)	(0.0161)
Age RP	0.000338	-0.000620	-0.000932*	0.000569	-0.000958	-0.00120	0.00118***	-0.00524***	-0.00128
	(0.00186)	(0.000797)	(0.000432)	(0.000763)	(0.000321)	(0.000743)	(0.000549)	(0.00142)	(0.000715)
Selfemployed RP	0.358	0.131	0.267*	0.0936		0.00101	0.202**	0.666	0.273**
	(0.344)	(0.126)	(0.118)	(0.0570)		(0.0695)	(0.0815)	(0.794)	(0.0832)
Tert edu RP	-0.0410	-0.0845	-0.0730*	-0.235***	-0.137**	-0.0000892	0.0188	0.116**	-0.00365
	(0.136)	(0.0512)	(0.0308)	(0.0582)	(0.0381)	(0.0288)	(0.0272)	(0.0384)	(0.0413)
Married RP	-0.0378	-0.0291	-0.0318	-0.0782**	-0.0562	-0.0428	-0.0496**	-0.0193	-0.0486**
	(0.0600)	(0.0369)	(0.0305)	(0.0288)	(0.0190)	(0.0251)	(0.0139)	(0.0614)	(0.0176)
Constant	0.851***	0.880***	0.881***	0.804***	0.908***	0.901***	0.810***	1.157***	1.006***
	(0.122)	(0.0838)	(0.0682)	(0.0590)	(0.0230)	(0.0531)	(0.0353)	(0.0927)	(0.0557)
R^2	0.086	0.191	0.071	0.195	0.109	0.165	0.215	0.144	0.054
Observations	2997	2238	4461	6106	11953	3003	8156	1284	6207

Notes: Income is in current 100,000s Euros. Sampling weights are used. Standard errors in parentheses: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Source: HFCS 2016.

C.2. *Robustness: Including price changes*

The following table shows the RIF regression including individual house price changes. Mathä, Porpiglia, and Ziegelmeyer (2017) also include house price changes, but smooth individual price changes to take an average for a given duration of homeownership. We do not smooth price changes in order to allow for idiosyncratic capital gains at the individual level which might affect inequality. However, we take out property values below 25,000 Euros which often have extreme rates of appreciation. The data for France do not allow us to calculate price changes, thus we exclude this country. The table shows results for the first wave, the second wave leads to very similar results. Coefficient estimates turn out to be similar to the baseline RIF regressions without controlling for price changes.

APPENDIX D: ROBUSTNESS: RESTRICTION TO HOUSEHOLDS WITH NET WEALTH BELOW THE 90TH PERCENTILE

In this appendix we repeat the analysis for all households with net wealth below the 90th percentile in their respective country. The main purpose is to address issues of top coding of high wealth levels which may differ between countries and therefore bias our findings. In the following we only report the main finding, i.e. the simple correlation and the Oaxaca-Blinder decomposition based on the RIF-Regression.[35] We find that qualitatively the results are quite similar. In fact, the negative correlation between homeownership and the Gini coefficient is equally strong for this subset of households, as can be seen in Figure 2 . The Oaxaca-Blinder decomposition also confirms the findings for the full sample (see Table XIII). The coefficients on the endowment effect of homeownership are similar and slightly higher. That is, the contribution of the homeownership rate to country differences in Gini coefficients is slightly stronger. This is intuitive given that homeownership rates differ more for households in the bottom half, as we discuss in Section 4. Another difference is that the endowment effects of income and tertiary eduction are now significant for almost all country comparisons (but they remain relatively small).

(2007) for the corresponding RIF of the Gini.

[35]Further results are available upon request.

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TABLE XI

OB-DECOMPOSITION - SECOND WAVE

	AT	BE	DE	ES	FR	GR	IT	NL
OVERALL								
Predicted Gini	0.731***	0.589***	0.599***	0.683***	0.599***	0.603***	0.698***	0.678***
	(0.0307)	(0.0146)	(0.0157)	(0.00856)	(0.00925)	(0.00703)	(0.0224)	(0.00836)
Difference	-0.0305	-0.173***	-0.163***	-0.0788***	-0.163***	-0.158***	-0.0636**	-0.0834***
	(0.0329)	(0.0184)	(0.0190)	(0.0140)	(0.0143)	(0.0131)	(0.0242)	(0.0141)
Endowments	-0.0104	-0.0833***	-0.135***	-0.0718***	-0.135***	-0.100***	-0.0478***	-0.135***
	(0.00593)	(0.0126)	(0.0306)	(0.0121)	(0.0294)	(0.0213)	(0.00667)	(0.0306)
Coefficients	0.0406	-0.0453*	0.227***	0.0862***	-0.0639	0.0157	-0.00704	0.0300
	(0.0783)	(0.0214)	(0.0626)	(0.0228)	(0.0384)	(0.0236)	(0.0306)	(0.0254)
Interaction	-0.0607	-0.0443**	-0.254***	-0.0931***	0.0360	-0.0737**	-0.00878	0.0220
	(0.0550)	(0.0145)	(0.0641)	(0.0210)	(0.0458)	(0.0273)	(0.0137)	(0.0374)
ENDOWMENTS								
Homeownership	-0.0116***	-0.0824***	-0.120***	-0.0454***	-0.0875***	-0.0754***	-0.0434***	-0.0950***
	(0.00208)	(0.00666)	(0.00844)	(0.00348)	(0.00569)	(0.00536)	(0.00287)	(0.00668)
HH Income	-0.0102*	0.00724	-0.0334**	-0.0221**	-0.0549**	-0.0303**	0.00382	-0.0542**
	(0.00401)	(0.00382)	(0.0111)	(0.00740)	(0.0180)	(0.0101)	(0.00312)	(0.0178)
HH Size	-0.000501	-0.00126	-0.00254	-0.000822	-0.00205	-0.00183	-0.000687	-0.00244
	(0.00596)	(0.0150)	(0.0302)	(0.00976)	(0.0244)	(0.0217)	(0.00816)	(0.0290)
No Children	0.000410	0.00190	0.00183	0.00196	0.00132	0.000932	0.00143	0.00179
	(0.00190)	(0.00875)	(0.00847)	(0.00904)	(0.00609)	(0.00430)	(0.00658)	(0.00824)
Age RP	-0.000668	-0.00240*	-0.00137	-0.000875*	-0.000263	-0.00429*	0.0000519	-0.00301*
	(0.000475)	(0.00114)	(0.000744)	(0.000423)	(0.000414)	(0.00200)	(0.000189)	(0.00141)
Selfemployed RP	0.00441	-0.000208	0.0231*	-0.00822*	0.00362	0.00121	-0.00463	0.0102*
	(0.00264)	(0.00162)	(0.0109)	(0.00386)	(0.00271)	(0.00136)	(0.00251)	(0.00491)
Tert edu RP	0.00852*	-0.00705*	0.000832	0.00165	0.00876*	0.0119*	-0.00491*	0.0112*
	(0.00376)	(0.00325)	(0.00118)	(0.000959)	(0.00389)	(0.00517)	(0.00224)	(0.00489)
Married RP	-0.000706	0.000864	-0.00341	0.00198	-0.00406	-0.00271	0.000530	-0.00397
	(0.000813)	(0.000977)	(0.00343)	(0.00200)	(0.00407)	(0.00272)	(0.000669)	(0.00398)
COEFFICIENTS								
Homeownership	-0.0515	-0.0652***	-0.0386*	-0.0539***	-0.0184	-0.0839***	-0.0481**	0.00590
	(0.0335)	(0.0192)	(0.0159)	(0.0113)	(0.0123)	(0.0123)	(0.0183)	(0.0109)
INTERACTION								
Homeownership	-0.00438	-0.0394***	-0.0341*	-0.0179***	-0.0118	-0.0464***	-0.0153**	0.00411
	(0.00291)	(0.0117)	(0.0141)	(0.00384)	(0.00790)	(0.00697)	(0.00585)	(0.00758)

Notes: Income is in current 100,000s Euros. Standard errors in parentheses: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Sample weights used. Source: HFCS 2016.

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TABLE XII

RIF REGRESSION WITH PRICE CHANGES

	AT	BE	DE	ES	GR	IT	NL	PT
Homeownership	-0.315**	-0.422***	-0.329***	-0.473***	-0.426***	-0.460***	-0.369***	-0.404***
	(0.0719)	(0.0194)	(0.0333)	(0.0308)	(0.0186)	(0.0130)	(0.0511)	(0.0438)
Price change	0.0603	0.0160	0.00186	0.0322*	0.0205	0.00768	-0.0159	0.0445
	(0.0376)	(0.0110)	(0.0191)	(0.0149)	(0.0106)	(0.00591)	(0.00979)	(0.0321)
HH Income	0.0408	0.0366	0.265	0.698**	0.208*	0.442***	0.127	2.093
	(0.0713)	(0.0281)	(0.152)	(0.261)	(0.0921)	(0.0970)	(0.0880)	(1.127)
HH Size	-0.0138	-0.0510*	-0.0682	-0.0741*	-0.0307*	-0.0306	-0.0160	-0.124*
	(0.0398)	(0.0202)	(0.0396)	(0.0293)	(0.0133)	(0.0243)	(0.0495)	(0.0609)
No Children	0.0433	0.0651**	0.0766	0.0737*	0.00624	0.0184	-0.0179	0.139**
	(0.0388)	(0.0244)	(0.0440)	(0.0312)	(0.0150)	(0.0269)	(0.0545)	(0.0506)
Age RP	-0.00145	-0.000878	-0.000774	0.00169	0.000985	0.00193***	-0.00761***	0.00380**
	(0.00121)	(0.000570)	(0.000460)	(0.000948)	(0.000578)	(0.000513)	(0.00184)	(0.00129)
Selfemployed RP	0.240	0.200	0.535	0.121**	0.0536	0.207	-0.00906	0.421**
	(0.284)	(0.139)	(0.273)	(0.0418)	(0.0503)	(0.114)	(0.208)	(0.154)
Tert edu RP	-0.101*	-0.0172	-0.140*	-0.0594	-0.0361	0.00773	0.0748	-0.435
	(0.0449)	(0.0241)	(0.0569)	(0.0540)	(0.0242)	(0.0356)	(0.0392)	(0.347)
Married RP	-0.0500	0.00608	-0.0101	-0.0514*	-0.0113	-0.0239	-0.0496	-0.0903*
	(0.0540)	(0.0312)	(0.0326)	(0.0238)	(0.0152)	(0.0196)	(0.0645)	(0.0406)
Constant	0.997***	0.997***	0.960***	0.827***	0.848***	0.731***	1.247***	0.647***
	(0.107)	(0.0435)	(0.0354)	(0.0571)	(0.0418)	(0.0432)	(0.134)	(0.0934)
Observations	2380	2327	3565	6197	2971	7951	1301	4404

Notes: Dependent variable: RIF of the Gini coefficient. Bootstrapped standard errors in parentheses. income in 100,000s. Standard errors are computed using replicate weights and by accounting for imputation variance using Rubin's formula. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Sample weights are used. Source: HFCS 2013.

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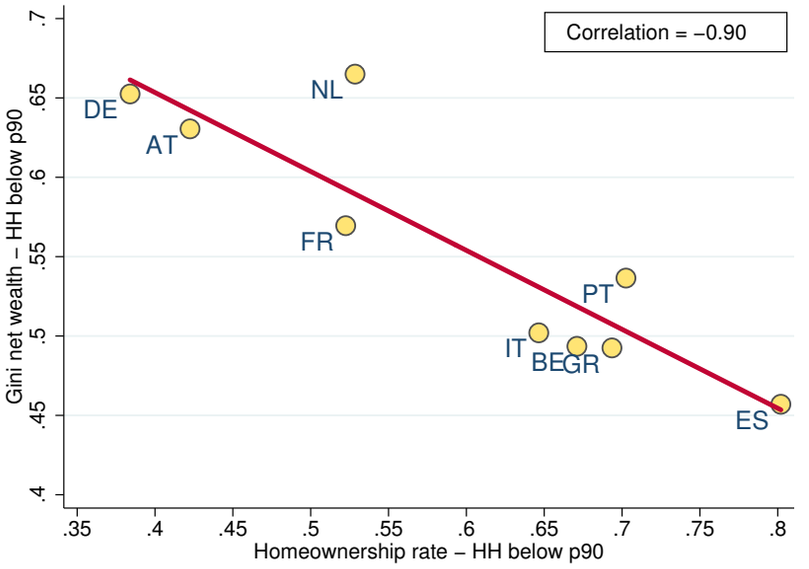
Figure 2: Gini and homeownership rates for HHs below the 90th net wealth percentile



Note: Values are averaged over the two survey waves. Source: HFCS 2013-2016.

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TABLE XIII

DECOMPOSITION OF EXPLAINED POPULATION EFFECTS FOR NET WEALTH BELOW THE 90TH PERCENTILE

	AT	BE	ES	FR	GR	IT	NL	PT
OVERALL								
Predicted Gini	0.640***	0.503***	0.453***	0.578***	0.478***	0.495***	0.639***	0.515***
	(0.0298)	(0.00912)	(0.00797)	(0.00431)	(0.00531)	(0.00525)	(0.0264)	(0.00804)
Difference	-0.0118	-0.148***	-0.198***	-0.0735***	-0.173***	-0.157***	-0.0129	-0.136***
	(0.0294)	(0.0126)	(0.0115)	(0.00926)	(0.00976)	(0.00972)	(0.0271)	(0.0115)
Endowments	-0.00676	-0.127***	-0.150***	-0.0278***	-0.0945***	-0.0867***	-0.0635***	-0.0759***
	(0.00942)	(0.00941)	(0.0131)	(0.00591)	(0.0113)	(0.00938)	(0.00578)	(0.0142)
Coefficients	-0.0128	-0.000888	0.00998	-0.0339***	-0.0311**	-0.0326***	0.0390	-0.0418**
	(0.0233)	(0.0108)	(0.0161)	(0.00885)	(0.0118)	(0.00953)	(0.0290)	(0.0150)
Interaction	0.00772	-0.0208**	-0.0586***	-0.0118*	-0.0473***	-0.0376***	0.0116	-0.0184
	(0.00922)	(0.00766)	(0.0172)	(0.00542)	(0.0135)	(0.00954)	(0.0188)	(0.0176)
ENDOWMENTS								
Homeownership	-0.0146**	-0.106***	-0.158***	-0.0458***	-0.119***	-0.101***	-0.0537***	-0.114***
	(0.00552)	(0.00732)	(0.00845)	(0.00374)	(0.00592)	(0.00591)	(0.00352)	(0.00772)
HH Income	-0.00195	-0.0148**	0.0202***	0.0117***	0.0245***	0.0150***	-0.0117***	0.0390***
	(0.00515)	(0.00457)	(0.00396)	(0.00247)	(0.00454)	(0.00297)	(0.00329)	(0.00692)
HH Size	-0.000260	-0.00209	-0.00473	-0.00151	-0.00421	-0.00359	-0.00134	-0.00490
	(0.000669)	(0.00498)	(0.0112)	(0.00359)	(0.00999)	(0.00851)	(0.00316)	(0.0116)
No. Children	0.0000125	0.00238	0.00252	0.00303	0.00157	0.00208	0.00278	0.00312
	(0.000403)	(0.00270)	(0.00288)	(0.00343)	(0.00179)	(0.00236)	(0.00316)	(0.00354)
Age RP	0.000783	0.0000244	-0.00190*	-0.000337	0.00246**	-0.00809***	0.000641	-0.00675***
	(0.000987)	(0.000664)	(0.000960)	(0.000445)	(0.000908)	(0.00168)	(0.000680)	(0.00143)
Selfemp. RP	-0.00101	-0.0000335	-0.00855**	0.000223	-0.00369*	-0.00121	0.00190*	-0.00262*
	(0.000947)	(0.000807)	(0.00310)	(0.000564)	(0.00155)	(0.000764)	(0.000839)	(0.00118)
Tert_ educ. RP	0.00975***	-0.00631**	0.00258*	0.00361**	0.00580**	0.0121***	-0.00370**	0.0137***
	(0.00276)	(0.00207)	(0.00127)	(0.00126)	(0.00178)	(0.00328)	(0.00140)	(0.00366)
Married RP	0.000519	0.000616	-0.00190	0.00118	-0.00236	-0.00235	0.00163	-0.00300
	(0.000741)	(0.000867)	(0.00250)	(0.00155)	(0.00310)	(0.00309)	(0.00215)	(0.00394)
COEFFICIENTS								
Homeownership	-0.0205	-0.0435***	-0.0422***	-0.0371***	-0.0469***	-0.0515***	-0.0162	-0.0209*
	(0.0225)	(0.00929)	(0.00981)	(0.00726)	(0.00871)	(0.00741)	(0.0307)	(0.00815)
INTERACTION								
Homeownership	-0.00205	-0.0317***	-0.0456***	-0.0116***	-0.0380***	-0.0355***	-0.00592	-0.0164*
	(0.00245)	(0.00693)	(0.0107)	(0.00240)	(0.00708)	(0.00524)	(0.0113)	(0.00643)

Standard errors in parentheses: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: Reference country is Germany. RP refers to reference person. Variances of a given implicate are computed following Jann (2008). Overall variances are computed using Rubin's formula. Predicted Gini coefficient of Germany is 0.651. Coefficients and Interaction estimates only shown for homeownership. Sample weights are used. Source: HFCS 2013.

APPENDIX E: QUANTILE EFFECTS OF HOMEOWNERSHIP

To explore the impact of homeownership on different parts of the wealth distribution, we look at specific quantiles. We run a RIF regression using the same regressors but estimate the effect on the RIF of different net wealth quantiles instead of the Gini coefficient.[36] We then divide the marginal quantile coefficient of the homeownership dummy by the level of the corresponding wealth quantile. This ratio is akin to a semi-

[36] Again see Firpo, Fortin, and Lemieux (2009) for details. As a robustness check we also estimate the quantile coefficients using the standard quantile regression. The pattern of coefficients is then strictly increasing in the level of the quantile, but the ratio exhibits a very similar pattern as with the RIF regression.

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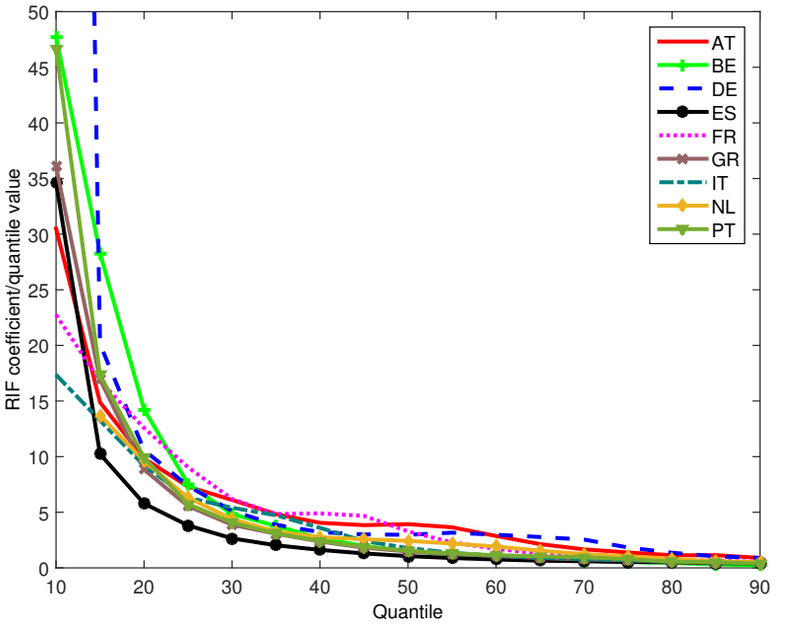
elasticity. In Figure 3 we plot the ratios for the 10th to 90th quantile fore each country for the first wave.[37] The figure exhibits a clear pattern of positive but declining relative effects across quantiles for each country. That is, the effect of homeownership on wealth relative to the current wealth level is much higher for lower quantiles than for higher quantiles. Thus, homeownership equalizes the wealth distribution by lifting up the wealth of the lower percentiles.

Figure 3: RIF quantile coefficients of homeownership relative to quantile values. Source: HFCS 2013.



APPENDIX F: DECOMPOSITION OF CROSS-COUNTRY DIFFERENCES IN HOMEOWNERSHIP

Here we perform a standard Oaxaca-Blinder decomposition of cross-country differences in homeownership. We employ a probit model which is estimated for each country separately. Then, the standard decomposition is employed with Germany as the reference country. The decomposition attributes the differences in the probability of owning a home to an endowment effect (differences in household characteristics) and coefficient effect (differences in estimated coefficients). The basic results of the decomposition are presented in Table XIV.

[37]The second wave gives very similar result and is not reported. For the case of the Netherlands the value at the 10th quantile is omitted as the quantile value is negative. The other denominators are all positive.

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Table XIV: Decomposition of explained population and coefficient effects on homeownership

	AT	BE	ES	FR	GR	IT	NL	PT
Predicted homeownership	0.471***	0.689***	0.816***	0.545***	0.718***	0.680***	0.571***	0.709***
	(0.0118)	(0.0122)	(0.00897)	(0.00525)	(0.00854)	(0.00764)	(0.0175)	(0.00853)
Predicted homeownership in DE	0.434***	0.434***	0.434***	0.434***	0.434***	0.434***	0.434***	0.434***
	(0.0116)	(0.0116)	(0.0116)	(0.0116)	(0.0116)	(0.0116)	(0.0116)	(0.0116)
Difference	0.0364*	0.255***	0.382***	0.111***	0.284***	0.245***	0.137***	0.275***
	(0.0165)	(0.0169)	(0.0147)	(0.0128)	(0.0144)	(0.0139)	(0.0211)	(0.0144)
Endowments	-0.0112	0.0249**	0.0268	-0.0243***	0.00142	0.0455***	0.00256	0.00953
	(0.0101)	(0.00836)	(0.0144)	(0.00565)	(0.0143)	(0.0108)	(0.00715)	(0.0163)
Coefficients	0.0345*	0.224***	0.400***	0.139***	0.258***	0.235***	0.127***	0.270***
	(0.0171)	(0.0171)	(0.0157)	(0.0127)	(0.0179)	(0.0146)	(0.0203)	(0.0187)
Interaction	0.0131	0.00592	-0.0452**	-0.00336	0.0248	-0.0356**	0.00749	-0.00434
	(0.00838)	(0.00872)	(0.0158)	(0.00585)	(0.0179)	(0.0116)	(0.0108)	(0.0207)

Standard errors in parentheses: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: Reference country is Germany. Variances of a given implicate are computed following Jann (2008). Overall variances are computed using Rubin's formula. Source: HFCS 2013.

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REFERENCES

BACH, S., A. THIEMANN, AND A. ZUCCO (2015): "The top tail of the wealth distribution in Germany, France, Spain, and Greece," *DIW Berlin Discussion Paper*, (1502).

BEZRUKOVS, D. (2013): "The role of housing in wealth inequality in Eurozone countries," Master's thesis, University of Frankfurt.

BILIAS, Y., D. GEORGARAKOS, AND M. HALIASSOS (2017): "Has greater stock market participation increased wealth inequality in the US?," *Review of Income and Wealth*, 63(1), 169–188.

BOVER, O. (2010): "Wealth inequality and household structure: U.S. vs. Spain," *Review of Income and Wealth*, 56(2), 259–290.

CALZA, A., T. MONACELLI, AND L. STRACCA (2013): "Housing finance and monetary policy," *Journal of the European Economic Association*, 11, 101 – 122.

CHERNOZHUKOV, V., AND C. HANSEN (2004): "The effects of 401 (k) participation on the wealth distribution: An instrumental quantile regression analysis," *Review of Economics and Statistics*, 86(3), 735–751.

CHO, S.-W. S., AND J. L. FRANCIS (2011): "Tax treatment of owner occupied housing and wealth inequality," *Journal of Macroeconomics*, 33(1), 42–60.

CHRISTELIS, D., D. GEORGARAKOS, AND M. HALIASSOS (2013): "Differences in portfolios across countries: Economic environment versus household characteristics," *The Review of Economics and Statistics*, 95(1), 220–236.

DAVIES, J. B., S. SANDSTRÖM, A. SHORROCKS, AND E. N. WOLFF (2011): "The level and distribution of global household wealth," *The Economic Journal*, 121(551), 223–254.

DE VRIES, P. (2010): *Measuring and explaining house price developments*, vol. 36. IOS Press.

DIAZ, A., AND M. J. LUENGO-PRADO (2010): "The wealth distribution with durable goods," *International Economic Review*, 51(1), 143–170.

DINARDO, J., N. M. FORTIN, AND T. LEMIEUX (1996): "Labor market institutions and the distribution of wages, 1973-1992: A semiparametric approach," *Econometrica*, 64(5), 1001–1044.

DOL, K., AND M. HAFFNER (2010): "Housing statistics in the European Union 2010," *Delft University of Technology*.

ECKERSTORFER, P., J. HALAK, J. KAPELLER, B. SCHÜTZ, F. SPRINGHOLZ, AND R. WILDAUER (2015): "Correcting for the missing rich: An application to wealth survey data," *Review of Income and Wealth*, 62(4), 605–627.

EUROPEAN CENTRAL BANK (2013): "The Eurosystem Household Finance and Consumption Survey - Results from the first wave," Discussion paper, European Central Bank.

——— (2016): "The Household Finance and Consumption Survey: results from the second wave," .

FESSLER, P., P. LINDNER, AND E. SEGALLA (2014): "Net wealth across the Euro area - why household structure matters and how to control for it," *ECB Working Paper Series*, 1663.

FIRPO, S., N. FORTIN, AND T. LEMIEUX (2007): "Decomposing wage distributions using recentered influence function regressions," Working Paper, University of British Columbia.

FIRPO, S., N. M. FORTIN, AND T. LEMIEUX (2009): "Unconditional quantile regressions," *Econometrica*, 77(3), 953–973.

JANN, B. (2008): "A Stata implementation of the Blinder-Oaxaca decomposition," *Stata Journal*, 8(4), 453–479.

KAAS, L., G. KOCHARKOV, AND E. PREUGSCHAT (2019): "Does homeownership promote wealth accumulation?," .

KAAS, L., G. KOCHARKOV, E. PREUGSCHAT, AND N. SIASSI (2019): "Low homeownership in Germany - a quantitative exploration," forthcoming.

KAYMAK, B., AND M. POSCHKE (2016): "The evolution of wealth inequality over half a century: the role of taxes, transfers and technology," *Journal of Monetary Economics*, 77, 1–25.

KINDERMANN, F., AND S. KOHLS (2018): "Rental markets and wealth inequality in the Euro-Area," unpublished manuscript.

LAMBERT, P. J., AND J. R. ARONSON (1993): "Inequality decomposition analysis and the Gini coefficient revisited," *The Economic Journal*, 103(420), 1221–1227.

LERMAN, R. I., AND S. YITZHAKI (1985): "Income inequality effects by income source: A new approach and applications to the United States," *The Review of Economics and Statistics*, 67(1), 151–156.

MACHADO, J., AND J. MATA (2005): "Counterfactual decomposition of changes in wage distributions using quantile regression," *Journal of Applied Econometrics*, 20(4), 445–465.

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MARTINS, N., AND E. VILLANUEVA (2009): "Does high cost of mortgage debt explain why young adults live with their parents?," *Journal of the European Economic Association*, 7(5), 974–1010.

MATHÄ, T. Y., A. PORPIGLIA, AND M. ZIEGELMEYER (2017): "Household wealth in the euro area: The importance of intergenerational transfers, homeownership and house price dynamics," *Journal of Housing Economics*, 35, 1–12.

MONTI, A. (1991): "The study of the Gini concentration ratio by means of the influence function," *Statistica*, 51(4), 561–577.

PHAM-DAO, L. (2019): "Public insurance and wealth inequality - a Euro area analysis," unpublished manuscript.

PIKETTY, T. (2014): *Capital in the twenty-first century*. Harvard University Press.

ROTHE, C. (2009): "Unconditional partial effects of binary covariates," *TSE Working Paper*, 9.

——— (2012): "Partial distributional policy effects," *Econometrica*, 80(5), 2269–2301.

——— (2015): "Decomposing the composition effect: The role of covariates in determining between-Group differences in economic outcomes," *Journal of Business and Economic Statistics*, 33(3), 323–337.

RUBIN, D. B. (1987): *Multiple imputation for nonresponse in surveys*, vol. 307. John Wiley & Sons.

SIERMINSKA, E., A. BRANDOLINI, AND T. M. SMEEDING (2006): "The Luxembourg Wealth Study–A cross-country comparable database for household wealth research," *The Journal of Economic Inequality*, 4(3), 375–383.

TIEFENSEE, A., AND M. M. GRABKA (2016): "Comparing wealth–data quality of the HFCS," in *Survey Research Methods*, vol. 10, pp. 119–142.

VERMEULEN, P. (2016): "Estimating the top tail of the wealth distribution," *The American Economic Review*, 106(5), 646–650.

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