The functions of wealth: renters, owners and capitalists across Europe and the United States

Pirmin Fessler, Martin Schürz

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The functions of wealth: renters, owners and capitalists across Europe and the United States [*]

Pirmin Fessler[†] and Martin Schürz[‡]

Abstract

Piketty (2017) argues in favor of a multidimensional and relational approach to the analysis of wealth inequality. Specifically, he suggests that social classes should be analyzed in terms of the power and production relations between social groups, not just the percentiles in statistical distributions into which various groups fall. We propose such a relational approach by focusing on different functions of wealth. We operationalize functions of wealth by empirically analyzing the groups of renters, owners, and capitalists. Employing recent European and US data, we find that classifying households based on these decisive functions of wealth aligns well with the wealth distribution, in ways that vary considerably across countries. We discuss many potential advantages of this class typology in measuring and analyzing wealth and wealth inequality in particular.

JEL Classifications: D14, D15, D31, D63, Z13
Key Words: wealth, inequality, households, survey data, class, economic stratification

Non-technical summary

The most popular contemporary form of analysis of wealth inequality is one-dimensional: it separates a group of the rich from the rest, defined by having more wealth than the others. Typically this is the group of the wealthiest top 10%, top 5%, or top 1%. The share of this group in total wealth is estimated and compared across countries and time.

This one-dimensional approach is agnostic with regard to the fact that differences in quantities might imply qualitative changes with regard to the prospects that come with wealth. Further, the approach ignores the fact that the meaning of wealth levels and wealth shares also depend on the context in society at a certain point in time. In particular, pension systems and other institutions of welfare states are different over time and across countries.

Looking at the wealth distribution alone provides an incomplete picture of the social implications of wealth inequality. Additional insight can be gained by classifying households based on decisive functions of their wealth holdings. The heterogeneity of wealth inequality cannot be reflected by a one-dimensional focus on net wealth. We instead look at structured wealth inequality. The social structure concerning wealth can be characterized by roughly three classes which align well with the wealth distribution. First, renters, who mainly have wealth for precautionary reasons. Second, owners, who additionally to precautionary reasons also use their wealth to live in by means of owner occupation, and therefore generate non-cash income (imputed rent) from their wealth. Third, capitalists, who not only own their home, but additionally rent out further real estate and/or have self-employed business wealth.

Bringing these definitions to the data, we find renters in the bottom, owners in the middle, and capitalists at the top of the wealth distribution. The country patterns likely differ due to institutional settings, tax law, history, the welfare state, and many other conditions. As an example, different policies for owner-occupiers target different groups in different countries. The bottom 50 shares of wealth in one country can consist mostly of renters' precautionary wealth while it can comprise mainly of the homes of owners in another country. This alignment of social classes and the wealth distribution holds even if one controls for socioeconomic characteristics used in class analysis such as education and occupation or main determinants of wealth accumulation such as age.

This demonstrates that percentile and top share analyses and comparisons might be misleading, as the functions of wealth and corresponding relations between social groups are different across the wealth distribution in different countries. A class-based approach has advantages with regard to the measurement and analysis of wealth. However, the main advantage is that implicitly assumed links to power and production relations – which are the foundation of contemporary interpretation of top shares (Piketty, 2013; OECD, 2015)

– are made explicit. On top of that, such an approach can be directly linked to questions of justification of wealth inequality and allows us to distinguish between wealth as a means of capitalist production and other forms of wealth such as private wealth as a substitute for public wealth (precautionary wealth) and private wealth as a source for non-cash income (housing wealth used).

1 Introduction

So far, the two main questions in empirical research in economics on private wealth were about its definition, i.e. "What should we consider, when we are analysing private wealth?" (Jenkins, 1990; Davies and Shorrocks, 2000; OECD, 2013), as well as its distribution, i.e. "Who holds how much of private wealth?" (Sierminska et al., 2006; Kennickell, 2012). This literature mainly used surveys to analyse the wealth distribution.

In the most prominent recent strand of the literature, using administrative tax data, the main focus was wealth concentration and the evolution of top-shares. Piketty (2013) and others extensively document the evolution of the concentration of income (Alvaredo et al., 2013) and inheritances (Piketty, 2011) as a source of flows into wealth as well as the stock of wealth itself (Kopczuk and Saez, 2004). This literature follows a quantitative-counting logic of more and less, has no reference to power or production relations, and seems to have no normative ingredients. This statistical approach is agnostic with regard to the fact that (i) differences in quantities might imply qualitative changes with regard to the functions of wealth and that (ii) the meaning of wealth levels and/or wealth shares, depends on the context in a certain society at a certain point in time.

The agnostic stance of the literature, however, stands in sharp contrast to common interpretations of the statistical results. Recent examples include Piketty (2013) who argues to prevent extensive capital concentration for the sake of democracy, a tax on wealth ought to be implemented to slow down the process of wealth concentration. So he relates large top-shares to power, which could endanger democracy. The OECD (2015) argues that, higher inequality drags down economic growth and harms opportunities, and that specifically high wealth inequality limits investment opportunities and therefore growth. In discussions about wealth inequality there is not enough precautionary saving at the bottom, not enough wealth or to high income taxes for the downpayment to buy a home in the middle, and too much wealth concentration for a functioning democracy at the top. Such ideas are implicitly based on drawing a distinction between different functions wealth can have for its owners. The pure counting logic of the current approach to analyze wealth does not justify such interpretations.

The main contribution of our paper is to make these implicitly assumed functions of wealth – which are necessary for meaningful interpretations – explicit already in the statistical analysis. Too often wealth analyses hide behind deciles, percentiles and top shares. Without narratives about power and production relations between social classes which are only added afterwards in interpretations they would hardly make a lot of sense. To make these relations explicit in the statistical analysis of wealth inequality is a step towards a more transparent and consistent analysis of wealth inequality as a social reality.

While in the 19th century the antagonism between those who owned the means of production ("capitalists") and those who did not ("workers") was dominant, the rise of the welfare state in the 20th century changed social class structures by adding a social class in between as documented by Piketty (2013), Wright (2005), Therborn (2012) and others. Therefore we define three social classes of households. First, renters, who mainly have wealth for precautionary reasons. Second, owners, who additionally to precautionary reasons also use their wealth to live in by means of owner occupation, and therefore generate non-cash income (imputed rent) from their wealth. Third, capitalists, who not only own their home, but additionally rent out further real estate and/or have self-employed business wealth. The work most closely related to ours — we are aware of — is Hugrée et al. (2017), which share the cross-country perspective on social classes when analyzing the wealth distribution.

We use data from the Household Finance and Consumption Survey (HFCS) for Europe and the Survey of Consumer Finances (SCF) for the United States to apply this approach. We find, that in every country renters are dominantly located in the bottom, owners in the middle and capitalists at the top of the wealth distribution. But at the same time, the two points in the wealth distribution where there are more owners than renters and - at a higher wealth level - more capitalists than owners varies considerably across countries. As we illustrate this is likely a result of institutional differences. We produce income and wealth relations at the household level, and calculate social class specific capital to income ratios. Capital to income ratios based on class medians are well bellow 1 for renters and usually well above 5 and up to 13 for capitalists. In the annex we show that indeed the pattern already existed in the US in 1962, however less clear cut and a smaller owner class, just as the literature suggests.

The rest of this paper is structured as follows. Section 2 includes the theoretical reasoning behind our empirical approach. Section 3 introduces the data. Section 4 presents empirical results. Section 5 concludes.

2   Functions of Wealth

In this section we shortly discuss the theoretical background of our approach. In subsection 2.1 we introduce the definition of wealth we use. Subsection 2.2 discusses the theoretical reasoning behind a relational approach to the analysis of wealth based on the functions of wealth. Finally, subsection 2.3 includes the definition of the typology we introduce based on the functions of wealth.

2.1 Definition of wealth

Currently, most researchers mean non-human assets minus debt when they talk about private wealth. Most of the time they also exclude any intangible assets like pension rights or social security wealth and basically any other rights to uncertain future benefits (Davies and Shorrocks, 2000). Even though they are very important for the welfare of the individuals, problems with such rights are manifold. Davies and Shorrocks (2000) use the term "augmented wealth" to refer to a broader definition of (net) wealth (net worth), also including entitlements to future pension streams, and at the same time point to a number of problems involved with such a broader definition (risk adjustments, discount rates, borrowing constraints, etc.). Earlier studies have generated some key facts about the distribution of private household wealth (among them Jenkins (1990), Davies and Shorrocks (2000), Sierminska et al. (2006) and Kennickell (2012)): Net wealth is very concentrated and distributed much more unequally than income. The bottom 50 percent in the wealth distribution of households holds only a tiny fraction of aggregate wealth. Nonfinancial assets outweigh financial assets and consist mainly of households' main residences. Finally, the distribution of financial assets is substantially more unequal across households than the distribution of nonfinancial assets. Household wealth was lower during the period from the 1950s to the 1970s than in later decades, reflecting among other things recovery from World War II destruction. Saez and Piketty (2012) mention also anti-private capital policies including rent control, financial repression and nationalization policies. Politics were reversed in the 1980s and 1990s via liberalization, deregulation "and large wealth transfers from public to private hands through cheap privatization" (p.9). Thus the rise of private wealth is partly due to a decline of public wealth. Recently the OECD (OECD, 2013) has defined household net wealth as the monetary value of all assets minus its liabilities. In the OECDs definition wealth has to be transferable. It therefore also excludes all forms of public pension entitlements. We follow the literature and the recommendation of the OECD and stick to the definition of marketable wealth as our variable of interest. See Fessler and Schürz (2015) for a more comprehensive discussion of the definitions of private and public wealth.

2.2 Towards a relational and multidimensional analysis of wealth

Recent literature of wealth concentration focuses on wealth alone. Also Piketty (2013), Kopczuk and Saez (2004), Saez and Zucman (2016) and many others follow the same one-dimensional approach and focus on the share of an arbitrary group of top wealth holders. The favored focus on the top tail of the richest 1% (Alvaredo et al., 2017; Piketty, 2013; Alvaredo et al., 2013; Piketty, 2011) implicitly proposes that the rich are different form the rest of the

society. But it cannot provide arguments for such a claim as it uses only percentiles of the net wealth distribution. Furthermore, the one-dimensional approach suggests that we do not know about the forms wealth takes and different functions wealth has across the distribution. However, this is only a common data restriction of administrative data. And it suggests that it is negligible how the composition of the top-1% share changes over time and that the concept of shares of percentiles will be useful in any case. As a specific perspective on the data has to be taken, in order to analyse – and even gather – them, the chosen perspective in any case influences what we see and what we do not see. What we can do, however, is to try to make the data analyses a priori as transparent and as informative as possible with regard to how it is connected to the interpretation of the results. With regard to wealth that means linking wealth to it's functions, right from the start of the analysis.

Looking at the wealth distribution alone only provides an incomplete picture of the social implications of wealth. Additional insight can be gained by classifying households based on decisive functions of their wealth holdings. Our way of organizing the data integrates theoretical considerations from the social sciences and moves beyond an abstract statistical concept. As we will show, its focus on functions of wealth allows a coherent organization of the data justified by social stratification right from the beginning. In other words: it makes the implicit explicit.

Figure 1 shows a schematic illustration of a potential structure of functions of wealth across the wealth distribution. The more wealth, the more functions are potentially available.

At the very bottom, associated with low amounts of usually very liquid wealth holdings the main function of wealth is provision. Households save for all kinds of precautionary reasons among them the motive of "saving for a rainy day" such as the necessary replacement of a washing machine or car repairs, but also for unexpected unemployment, sickness or vacation. The necessity of this precautionary wealth accumulation heavily depends on welfare state policies and to which degree they insure these contingencies of life in an organized way. With increasing wealth, use becomes more prevalent. The main item in household wealth, which is used and therefore provides non-cash income is home ownership. Theoretically, households should be indifferent between renting or owning a house under the standard assumptions (strict life cycle preferences, no bequest motives, no credit constraints, rational behaviour etc.). In practice, however, all of the conditions of the standard model are violated. Households care about bequests (both as recipients and as givers), they face borrowing constraints (like downpayment requirements), they show less-than-fully-rational behaviour and in addition the tax system often favours ownership vis-a-vis renting. As we will see later, all of these factors lead to a situation in which renters of their home are mostly found at the very bottom of the distribution - which stands in sharp contrast to what standard economic
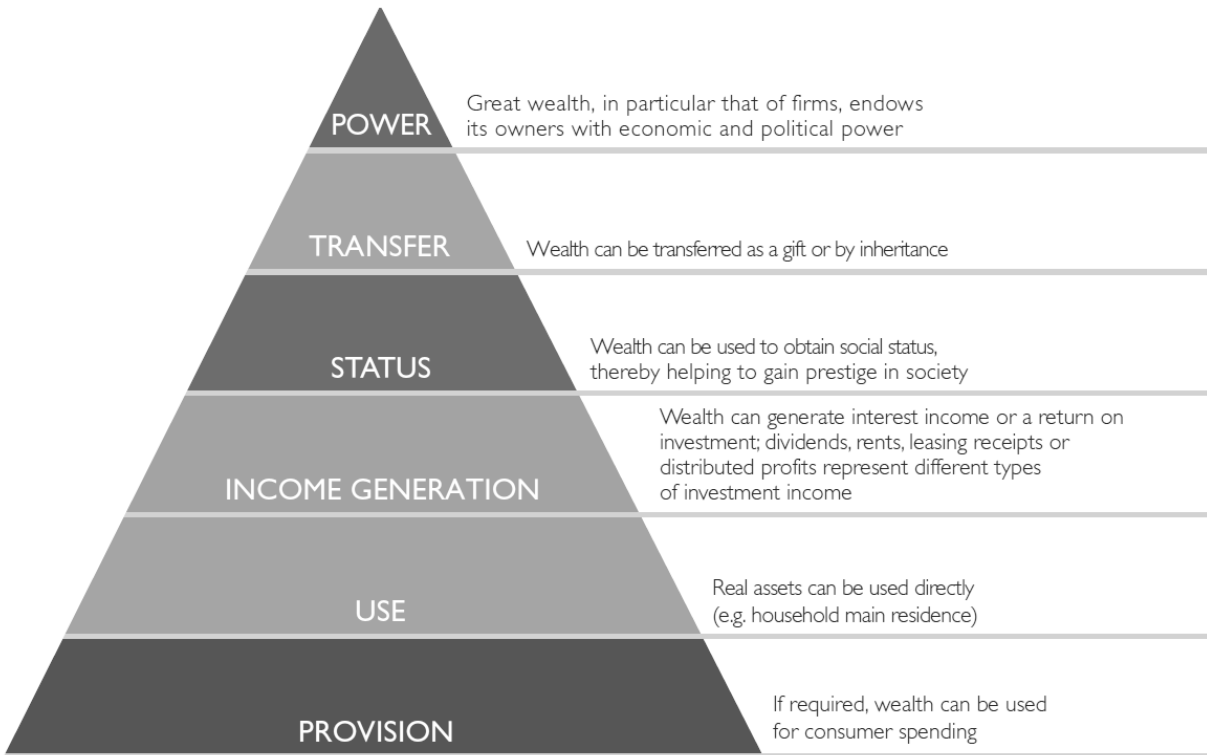
theory would predict. With even higher wealth the function of income generation becomes more important. This function is more dominant for households with considerable ownership of true "means of production", in the sense that they own self-employed businesses and/or real estate wealth they rent out to earn capital income. These three decisive functions of wealth we use as a base for our relational approach. Of course there exist other functions of wealth, like status, transfer and power. Of course, not all functions of wealth are additive as this illustration might suggest. Despite that higher net wealth implies more possible functions of wealth for wealth holders, the precise actual functions have to be studied empirically. Some wealth functions are substitutes, some are complimentary. Some, such as power, might be available inside smaller reference groups also with lower wealth but at the level of the society only with very large wealth of certain types. Many of them are hard or even impossible to measure in a survey. But we are confident, that these three decisive functions we use are a step towards a more transparent and consistent analysis of wealth inequality as a social reality. They provide an informed way to analyze wealth (shares) of different social classes in society which are related in their economic lifes.

2.3   Renters, owners and capitalists

Property and in particular "the means of production" are a core concern of economics and sociology since the beginning of capitalism. They served as a key to identify different economic systems and to build theories of social classes. The distribution of asset ownership shapes society as it determines to a large degree inequality in income, consumption as well as different forms of human and social capital (Bourdieu, 2002) and therefore individual power relations, production relations and class locations. The classical one-dimensional notion implies an antagonism of those who have capital ("capitalists") and those who don't ("workers"). But, due to the rise of the middle-class in the 20th century a large amount of assets were accumulated which do not directly relate to "means of production" but fulfil other functions. The welfare state strongly shapes these social relationships and therefore the meaning of asset ownership in different societies. Whenever feasible, it makes therefore sense, to include these functions directly when analysing the wealth distribution. Also recent sociological is aware of the importance of wealth in the process of social stratification.

Already Spilerman (2000) and Keister and Moller (2000) emphasized the importance to take all the households resources and in particular household wealth into account when describing social stratification. Recently Killewald et al. (2017) argued that by now it is widely accepted that wealth is an important and independent dimension of social stratification. As one promising avenue Killewald et al. (2017) mention that, "decisions about appropriately

Figure 1: Functions of wealth

POWER — Great wealth, in particular that of firms, endows its owners with economic and political power

TRANSFER — Wealth can be transferred as a gift or by inheritance

STATUS — Wealth can be used to obtain social status, thereby helping to gain prestige in society

INCOME GENERATION — Wealth can generate interest income or a return on investment; dividends, rents, leasing receipts or distributed profits represent different types of investment income

USE — Real assets can be used directly (e.g. household main residence)

PROVISION — If required, wealth can be used for consumer spending

Notes:

(i) This graph shows an illustration of the additive functions of wealth. The pyramid suggests the increasing prevalence with increasing wealth.

(ii) *Source:* Own Illustration.

operationalizing net worth are not merely a methodological concern; they may significantly shape substantive conclusions. We encourage using transformations that permit coverage of the entire range of net worth values (e.g., percentiles) and that align with the analytic intent."

That is exactly what we try to deliver. We try to identify social classes of households who have access to the three most important functions of wealth, precaution, use, and income generation and who are linked through power relations. We use a class typology of three social classes of households based on these functions:

1. **Renters.** Renters are those who do not own their home. They mainly hold wealth for precautionary reasons. They need to pay a rent to capitalists (or the state) to life in their houses or apartments.

2. **Owners.** Owners (additionally) use wealth by living in their own house or apartment. In the vast majority of cases this house or apartment is also their single most valuable asset. They do not pay a rent to life in their houses or apartments. Living in their own apartment generates a rent, the imputed rent, which is a form of non-cash capital income.

3. **Capitalists.** Capitalists (additionally) either rent out their further real estate to the renters and/or own a business and make profit by using renters and owners as workforce and selling goods or services to them or other capitalists (or businesses).

These definitions make the (power) relations between these classes already explicit: While renters have to sell their labor force to pay for their home, they rent from the capitalists, owners are less dependent as they have at least some capital income via the imputed rent. As they do not have to pay rent, they are important consumers as well. However they still earn the income they can use for consumption by selling their labor to capitalists. Capitalists on the other hand employ both, renters and owners, and sell goods to both, while they only rent out to renters. If our social class definition is useful, it should align with the wealth distribution. As we show in section 4 we dominantly find renters in the bottom, owners in the middle and capitalists at the top of the wealth distribution. How clear-cut these definitions work along the wealth distribution, in the sense that the overlap is small, and at which point in the distribution the switch from renters to owners and from owners to capitalists occurs depends on several factors. This approach allows to distinguish between private wealth as a substitute for public wealth (precautionary wealth), private wealth as a source for non-cash income (housing wealth used), and private wealth as a mean of production generating profit (business wealth and rental income from housing wealth beyond the home).

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In Appendix D we show that this pattern was already the same in the US in 1962, however less clear cut and a smaller owner class.

In Appendix C we provide robustness checks with regard to this definition. One could argue for the classical definition and define all self-employed business owners as capitalists (not only owner-occupiers) and split the rest of the population into owners and renters to take the rise of the middle class into account. Then we would have capitalists who also pay rent to other capitalists. As one can see in Appendix C, this would lead to more "capitalists" who are renters in the lower part of the distribution and to less "capitalists" in the upper part as in our preferred definition also owner occupiers who rent out further real estate are defined as "capitalists". We think our preferred definition is useful as it excludes mostly very small self-employed businesses (freelancers) who are renters but includes very wealthy real estate owners who rent out their further real estate in the "capitalists" definition. However, as one can see in Appendix C, the analysis is rather robust to such changes in definition. Furthermore in Appendix C we also show, that our definition is also robust in aligning with the wealth distribution if age (squared age, cubed age) and education, which are main drivers of wealth accumulation as well as social stratification, are filtered out.

3   Data

We use the two most comprehensive wealth surveys for the United States and Europe to illustrate our relational approach of analyzing wealth and wealth inequality.

The Survey of Consumer Finances (SCF) in its current form surveys United States households every three years since the 1980ies. It is the gold standard of wealth surveys using state of the art techniques in all steps of data production (Kennickell, 2012, 2011). The Board of Governors of the Federal Reserve System runs the SCF and provides detailed documentation (https://www.federalreserve.gov/econres/scfindex.htm [accessed on 17th May 2018]). The net sample size is about 6000 households representing about 120 million US households. We use the 2013 wave of the SCF.

The Household Finance and Consumption Survey (HFCS) of the European Central Banks (ECB) started in 2010 and gathers information for all Euroarea countries. We use the second wave, which was mostly collected 2014 and 2015. i.e relatively close to the collection period of the SCF wave we use. The HFCS is a large scale a priori harmonized wealth

survey following closely the US SCF. The survey consists of country-level surveys which are coordinated at the ECB and follow closely the common rules with regard to all steps of data production. All the data are then validated at and provided by the ECB. The net sample size for the Euroarea is about 85,000 households representing about 145 million European households. As Hungary and Poland also joined the effort to produce comparable household balance sheet statistics, we include these countries in all country-level analyses. A detailed overview of the first results of the second wave of the HFCS is presented in ECB (2016a), while ECB (2016b) delivers a detailed methodological report including information about data gathering, sampling, editing and multiple imputation. The HFCS data has already been used by the Eurosystem, international organisations like the OECD and the IMF as well as many academic researchers on a large variety of topics. For information and a bibliography see https://www.ecb.europa.eu/pub/economic-research/research-networks/html/researcher_hfcn.en.html [accessed on 17th May 2018].

Both, the SCF and the HFCS produce population weights to reweight samples to the overall household population as well as multiple imputations to account for item non-response and provide replicate weights to produce variance estimates which take into account the complex survey design. To illustrate our approach to analyze wealth and wealth inequality we use multiple imputations and apply complex survey weights. As we do not engage in variance estimation we do not need to use replicate weights in this paper.

We summarize basic information on the surveys in table 1. It shows country-level survey information on fieldwork, net sample size, response rate, number of households and survey mode.

Table 1: Survey Information

	Fieldwork	Net sample size	Response rate	# of hh	Mode
Austria	2014/2015	2997	49.8	3,862,526	CAPI
Belgium	2014/2015	2238	30	4,796,647	CAPI
Cyprus	2014	1289	60.4	303,242	CAPI
Estonia	2013	2220	63.9	571,857	CAPI
Finland	2014	11030	64.1	2,622,499	CAPI (2.5%) CATI (97.5%)
France	2014/2015	12035	65	29,017,678	CAPI
Germany	2014	4461	19	39,672,000	CAPI
Greece	2014	3003	40.8	4,266,745	CAPI
Hungary	2014	6207	38.5	4,127,671	CAPI (68.6%) CAWI(31.5%)
Ireland	2013	5419	59.7	1,690,073	CAPI
Italy	2015	8156	43.3	24,694,122	CAPI (92.9%) PAPI(7.1%)
Latvia	2014	1202	52.9	828,907	CAPI
Luxembourg	2014	1601	23.4	210,965	CAPI
Malta	2014	999	35.4	159,427	CAPI (83%) PAPI(17%)
Portugal	2013	6207	54.2	4,017,981	CAPI
Poland	2014	3483	54.2	13,492,882	PAPI
Slovakia	2014	2136	53.4	1,855,392	CAPI
Slovenia	2014	2553	40.5	820,541	CAPI
Spain	2011/2012	6106	31.7	17,429,812	CAPI
The Netherlands	2014	1284	32	7,590,228	CAWI
United States	2013	6015	70 (33)^{ii}	123,000,000	CAPI

Notes:
(i) Computer-assisted personal interview (CAPI); paper based personal interview (PAPI); computer-assisted web interview (CAWI).
(ii) for the SCF 70% response rate refers to the area probability sample and 33% refers to the list sample oversampling the wealthy.
(iii) *Source:* HFCS 2014 for European countries. SCF 2013 for the United States.

4 Results

In this section we bring our relational approach to analyze wealth and wealth inequality to the data. In subsection 4.1 we show the prevalence of our social class typology across all countries and the Euroarea. Subsection 4.2 includes the estimation of the prevalence of renters, owners and capitalists across the net wealth distribution in the United States and the Euroarea. Finally subsection 4.3 extends the analysis to include also income and presents class shares of wealth and income as well as class specific wealth-to-income ratios.

4.1 Prevalence of renters, owners and capitalists

Figure 2 shows the shares of renters, owners and capitalists (as defined in subsection 2.3) in all countries we analyze as well as the Euroarea as a whole. The share of renters in the Euroarea is about 39%, but it ranges from about 15% in Slovakia to about 56% in Germany. In the US the share of renters is 35%. The share of owners ranges from roughly 30% in Germany to about 73% in Slovakia and lies at about 47% in the Euroarea and 50% in the US. The share of capitalists is lowest in The Netherlands with about 2.7% and largest in Ireland, where more than 23% of the household population fall into that category. In the US about 15% of households are classified as capitalists and in the Euroarea, about 14% of households are capitalists. Generally, whereas the variety across countries is rather large, the US and the Euroarea as a whole are rather similar.

As Figure 2 is sorted by the share of renters, one can clearly see that countries in which a lot of social housing exists and the welfare state is generally stronger, the share of renters is usually larger. See also figure B.2 in Appendix B, which illustrates the role of institutions in shaping class sizes by plotting the share of renters against social security expenditure across countries.

4.2 Prevalence across the net wealth distribution

Formally, we observe cross-sections with draws from the country-distribution functions P^c of the vector (W, Y, T) consisting of net wealth W, gross income Y and household types T. One can also think of T as consisting of three indicator variables t^j, where $j = \{1, 2, 3\}$, indicates if t identifies renters ($j = 1$), owners ($j = 2$) or capitalists ($j = 3$). We also use the cross section draw P^{ea} which refers to the union $\bigcup_{c \in C^{ea}} P^c$ of the collection of Euroarea country level draws $\{P^c : c \in C^{ea}\}$, and therefore the Euroarea – all countries in our sample but the United States, Hungary and Poland.

Figure 2: Renters, owners and capitalists
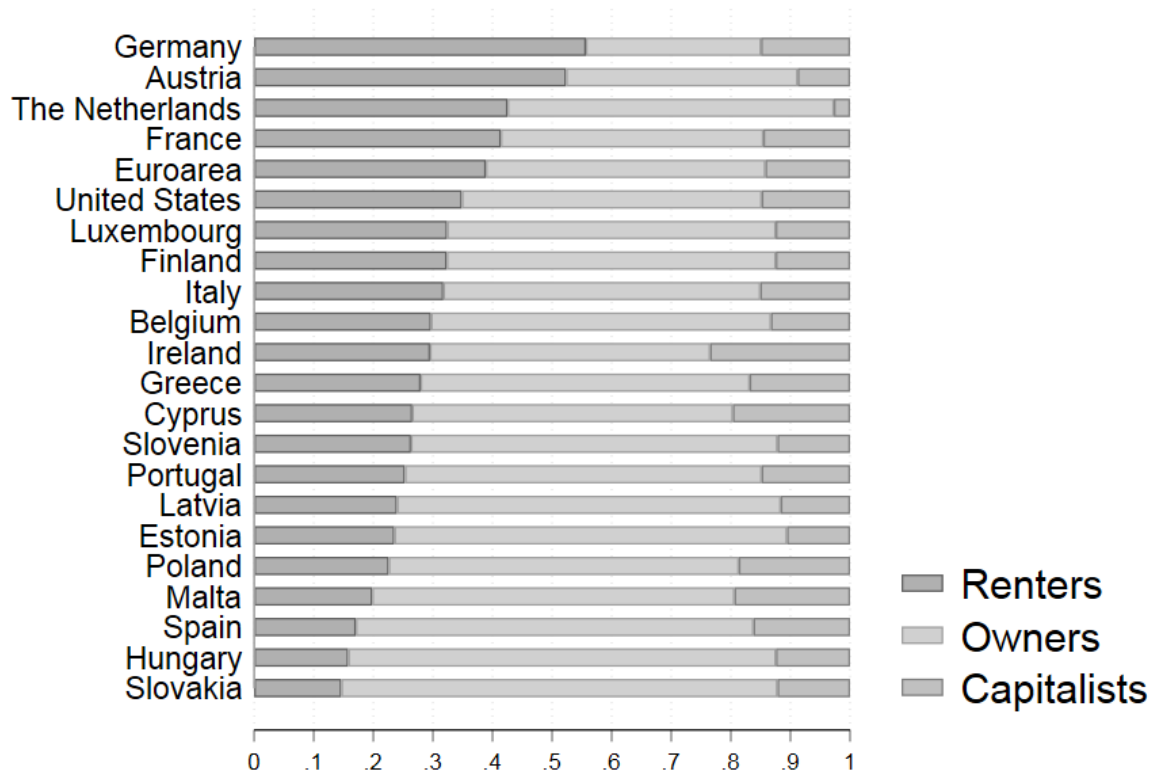
As a first step, we use the cumulative distribution function (cdf) of net wealth, $F_W(w) = P(W \leq w)$ combined with a local linear regression of the form $t = m(w) + u$, where $m(\cdot)$ is a conditional mean function and the estimate of $m(w)$ at $w = w_0$ is a locally weighted average of t_i^j, which is indicating that household i is of type j. So formally

$$\hat{m}(w_0) = \sum_{i=1}^{N} \mu(w_i, w_0, h) t_i^j \qquad \forall j \in J, \qquad (1)$$

where the weights $\mu(\cdot)$ sum to one and increase with decreasing distance $\|w_i - w_0\|$. Specifically we employ a locally weighted least squares estimator to obtain a regression estimate by minimizing at $w = w_0$,

$$\sum_{i=1}^{N} K\left(\frac{w_i - w_0}{h}\right)\left[t_i^j - \alpha_0 - \beta_0\left(w_i - w_0\right)\right]^2 \qquad \forall j \in J, \qquad (2)$$

where $K(\cdot)$ is the epanechnikov kernel, h is the bandwith and α_0 and β_0 are the constant and slope parameters. Note that we use a rather small bandwith of 0.05 to closely follow the data instead of smoothing too much.

Figure 3 shows the resulting estimates for renters, owners and capitalists in the United States and the Euroarea. The lines can be interpreted as probability, that a household with wealth $w = w_0$ is a renter, owner or capitalist. Renters are mostly found in the lower half of the wealth distribution, owners mostly in the upper-middle part and capitalists dominantly in the very upper part. In both, the United States and the Euroarea, the turning point where it is more likely to be a owner than a renter is just below the 40th percentile – marginally lower in the United States than in the Euroarea. The switch where it is more likely to be a capitalist than a owner is just below the 95th percentile. Only few capitalists are found to be in the lower part of the wealth distribution and only few renters are found in the upper part of the wealth distribution. However, there is an increase in owners at the very bottom of the distribution, which is more pronounced in the United States. This is due to the possibility to use high loan to value ratios to finance home ownership. Some of those households end-up having negative net wealth, which shows up in this increase of owners at the very bottom. This illustrates another way how country level institutions interact with the location of social classes. In this case, the Banking culture and/or regulatory rules in a country directly influences the shape of the curve measuring the prevalence of owners across the wealth distribution. The lower loan-to-value ratio standards are, the more likely the increase of owners at the very bottom of the wealth distribution.

Renters, owners and capitalists align well with the wealth distribution in both, the United

States and the Euroarea as a whole. But is this result a rather clear-cut observed sorting into social classes along the net wealth distribution or a statistical artefact? For the Euroarea this could be driven by the fact that in some countries with generally lower wealth levels there are more renters, and in other countries with higher private wealth levels more owners or capitalists. If so it would be misleading at the Euroarea level as it would be mostly a sorting due to differences between countries instead of differences between social classes.

However, this is not the case. Figures A.1, A.2 and A.3 in appendix Appendix A show analogous estimates for all Euroarea countries. Figure A.4 includes the estimates for Hungary and Poland. Similar patterns emerge in all countries. The only difference being that in some countries the overlap is a little larger and in others smaller and the switching points where owners become more dominant than renters and, in the upper part of the distribution, where capitalists become more dominant than owners are at different percentiles of the respective country level net wealth distribution.

We hypothesize that different institutions and more specifically different degrees of welfare state interventions shape the profiles of this social class typology across the wealth distribution. In particular, state pension systems, public health provision, public education, unemployment insurance and other forms of public welfare are substitutes to the precautionary function and therefore will partly crowd out the accumulation of private wealth, especially in the lower parts of the wealth distribution (see Feldstein (1974), Jappelli (1995), Alessie et al. (2013), and Fessler and Schürz (2015)). The tax system, rental-subsidies, tenancy laws and social housing likely influence the treshold at which renters turn into owners. And inheritance, property and capital income taxes, labor market conditions as well as the environment for small enterprises might be relevant for the concentration of business capital and therefore the prevalence of capitalists across the distribution. Historical events such as war or land reform, but also the collapse of the Eastern bloc and the following different paths of transition towards market economies, shaped the patterns of this typology across the wealth distribution. While most households in eastern Germany became renters of their homes formally owned by the state, most slovak households became homeowners. The impact on the prevalence of renters in the contemporary German and Slovak societies is still very pronounced and, lead to the largest share of renters in Germany and to the lowest share of renters in Slovakia among all observed countries (see figure 2).

In Appendix D we show that this pattern was already the same in the US in 1962, however less clear cut and a smaller owner class. Today the classes are even more aligned with the wealth distribution. In the US there are fewer renters in the middle and at the top and fewer capitalists in the bottom an the middle than in 1962. Generally, owners are also more likely to be found in the middle today. However, due to the availability of mortgage credit

with very low downpayment we find also more owners at the very bottom of distribution compared to 1962.

4.3   Income and wealth

As a next step we analyze income and wealth jointly. This relation is helpful for several reasons:

First, the form of income plays a major role in the definition of our social classes. Capitalists use their capital via businesses to generate capital income and/or use their real estate wealth to do so by renting to renters. Renters pay this rent from their income, whereas owners use their capital (homes) to live in and do not have to pay rent for it, but generate the non-cash income in form of imputed rent (which is not included in our definition of gross income).

Second, the capital-to-income ratio prominently used by Piketty (2017) is a major measure of capital accumulation and the importance of inherited wealth versus wealth created in a lifetime. The wealth income relation we can look at at the micro level shows us how this relation varies for different social classes inside and between countries. Third, our survey data allows us to analyse wealth and income jointly. Income is a major source of wealth and – besides generating income – it is a major function of wealth to serve as a resource of consumption in times with low or no income.

One perspective on income and wealth shares is to relate them to the actual population shares. That relates closely to the usual calculation of top 1%, top 5%, top 10% or sometimes bottom 50 % shares of wealth and income, as at the center is also the relation between the share in wealth or income and the population share. A top 5% share of 30% in income means, that the income share is 6 times the population share and therefore strongly overproportional. Similarly, figure 4 relates the share in gross income (*a*) as well as the share in net wealth (*b*) to the respective population shares of renters, owners and capitalists. In both graphs countries are sorted by the ratio of owners which is in all countries and for both, income and wealth, closest to one, which means that their share in income and wealth is closest to their population share. Capitalists have in all countries an overproportional share in income and wealth, whereas renters have in all countries an underproportional share of income and wealth. As the wealth distribution is more unequal than the income distribution, wealth ratios generally show higher variation than income ratios. For income the ratios are smallest for renters in the United States (0.47) and highest for capitalists in the United States (2.5). Inside Europe they are smallest for renters in Finland (0.60) and highest for Capitalists in Latvia (2.12). For wealth they are smallest for renters in Finland (0.1) and largest for

Figure 3: Renters, owners and capitalists in the United States and the Euro area
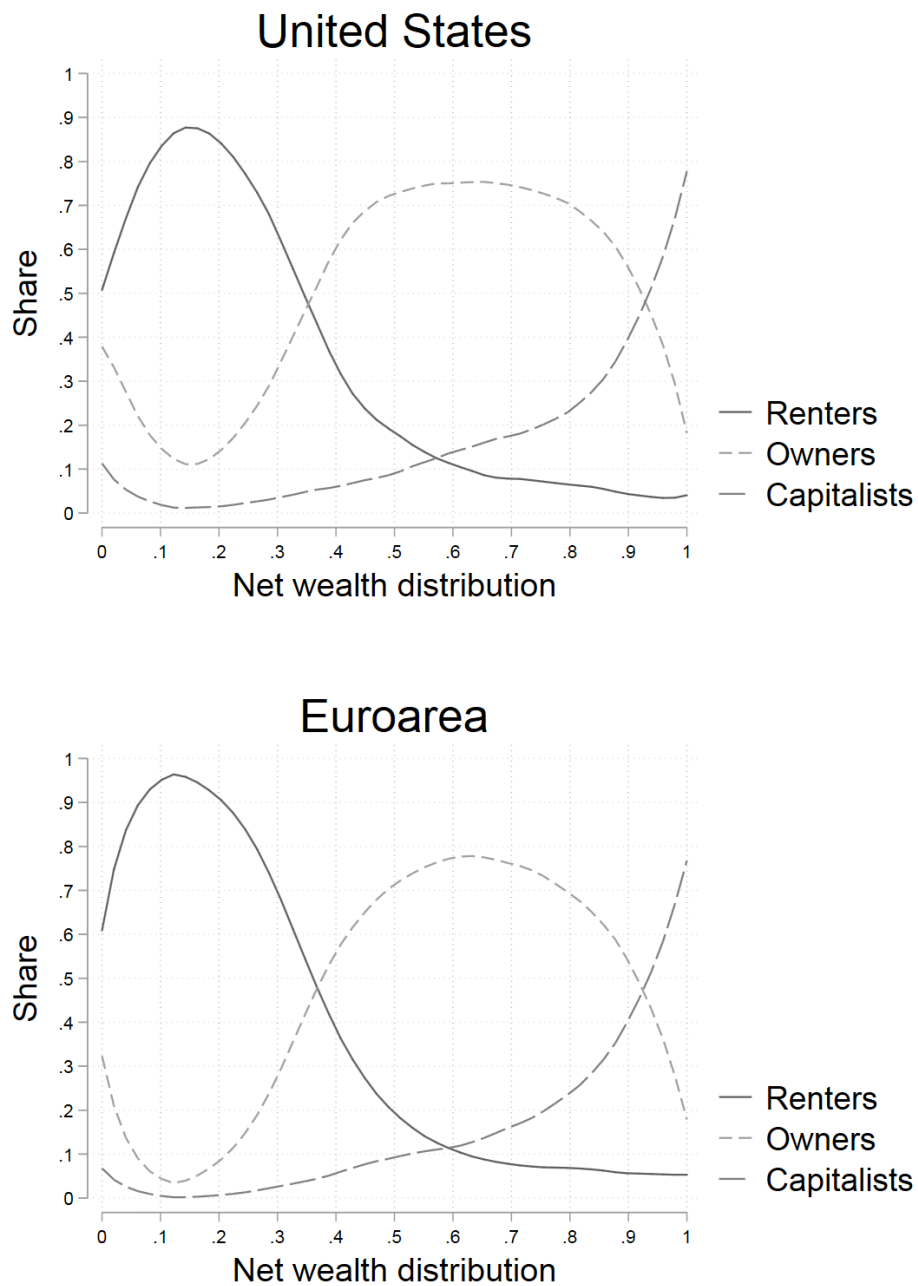
United States

Euroarea

Notes:

(i) This graph shows the prevalence of renters, owners and capitalists over the net wealth distributions of the United States and the Euroarea. We use a local polynomial estimator with an epanechnikov kernel, a bandwith of 0.05 and degree 1 to prevent boundary bias as it allows for any trends also close to the endpoints.
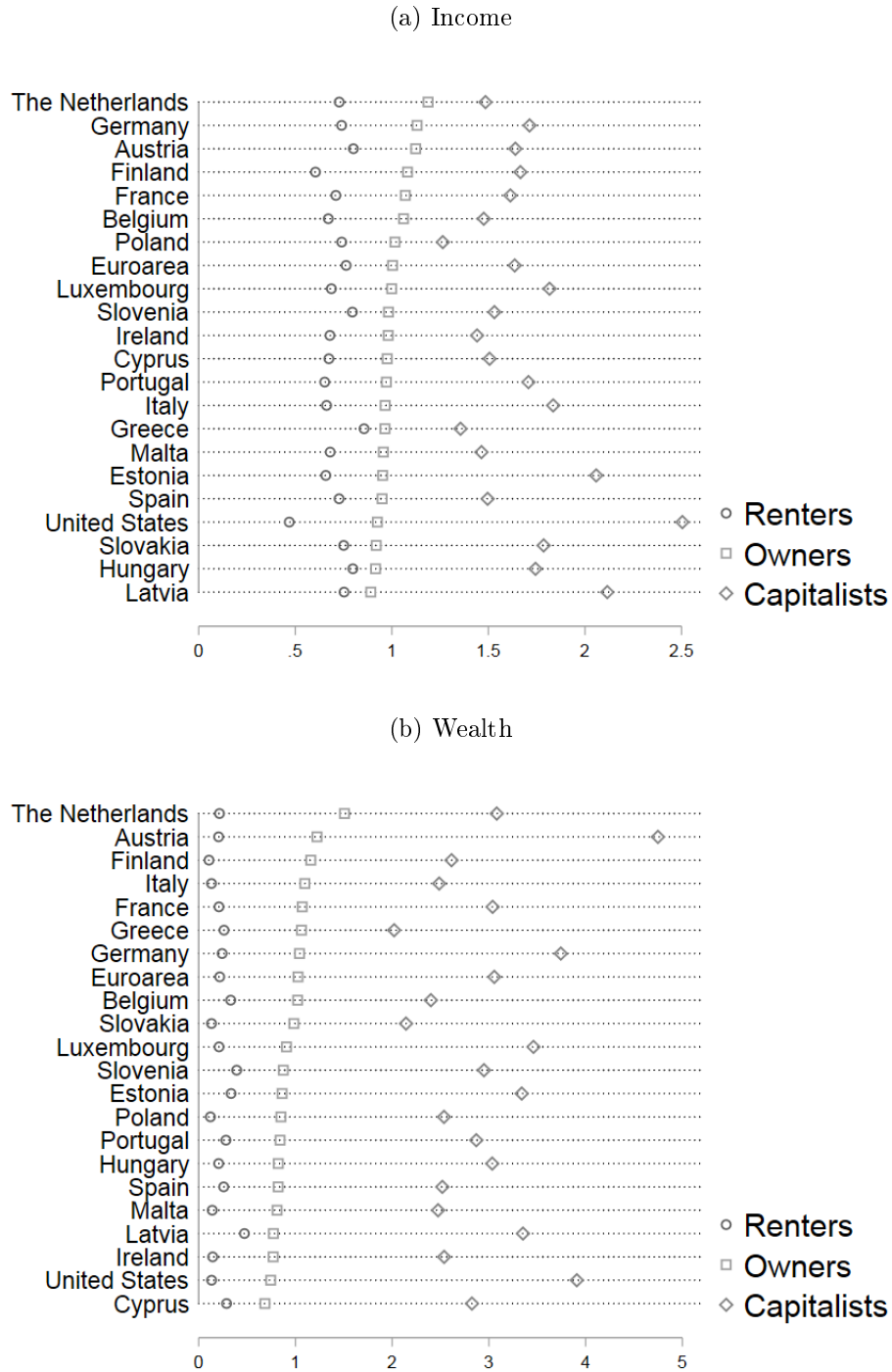
(ii) *Source:* SCF 2013. HFCS 2014.

capitalists in Austria (4.7).

Differences in country patterns are rather large. Wealth distances between renters and capitalists are largest in Austria, the United States, Germany and Luxembourg, but with regard to income they are among the smallest in Austria, Germany and Luxembourg – whereas by far the largest in the United States. Given the tax system and the progressive taxation of labor income in Austria and Germany one can expect even smaller distances for net income, which is unfortunately not covered by our data.

Figure 5 shows class specific wealth-to-income ratios, similarly to the economy wide capital-to-income ratios provided by Piketty (2017) and others. The wealth-to-income ratios are to be interpreted as a form of disaggregated capital-to-income ratios, which are usually defined as the capital stock divided by national income of an economy. Panel (a) shows wealth-to-income ratios based on means, which are analogous to the economy-wide capital-to-income ratios commonly used. Again we sort the countries by the wealth-to income ratio of the owners, which lies between 8.9 (Malta) and 2.4 (Latvia). Renters have substantially lower wealth-to-income ratios in all countries, whereas capitalists have substantially higher ones. For some countries, such as Cyprus, Malta, Austria or Luxembourg these differences are particularly large, while for others, such as Latvia, Slovakia, The Netherlands, Finland or Greece they are rather low. Panel (b) of figure 5 shows measures based on class-specific medians of wealth and income. This measure is more robust than means based measures and provides information closer to a typical household of the respective social class. Renters' ratios lie between 0.03 for Latvia and 1.08 for Malta. In the Euroarea the ratio for renters is 0.39, implying that median wealth of renters is roughly 40% of median yearly income. In the United States this ratio lies at about 0.20. For Owners the ratios lie between 2.07 in Latvia and 8.05 in Luxembourg, implying that owners have roughly 2 to 8 times their yearly gross income in net wealth. This measure shows how expensive home-ownership is relative to a typical income of an owner. In the United States the wealth-to-income ratio of owners is rather low (2.8) compared to the Euroarea (5.4), even though the share of owners is rather similar (about 47% in the Euroarea compared to about 50% in the United States). Capitalists' wealth-to-income ratios based on medians lie between 4.08 in Latvia up to 15.60 in Cyprus.

Figure 6 takes this analysis a step further and relates the median wealth of capitalists to median income of renters. It therefore directly speaks to an important social relation in society. It answers the question of how much typically priced years of labor a capitalist, who has relevant cash income from wealth, can buy from a renter who relies completely on labor income and does not have relevant cash- (income from renting out real estate or self-employed business) or non-cash (owner occupation) income. This measure of social distance

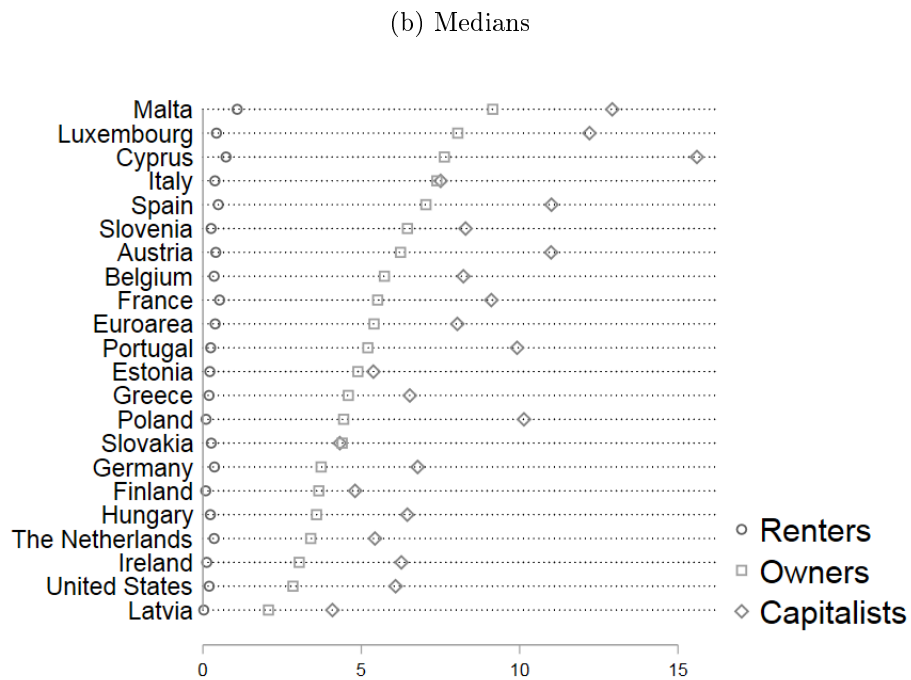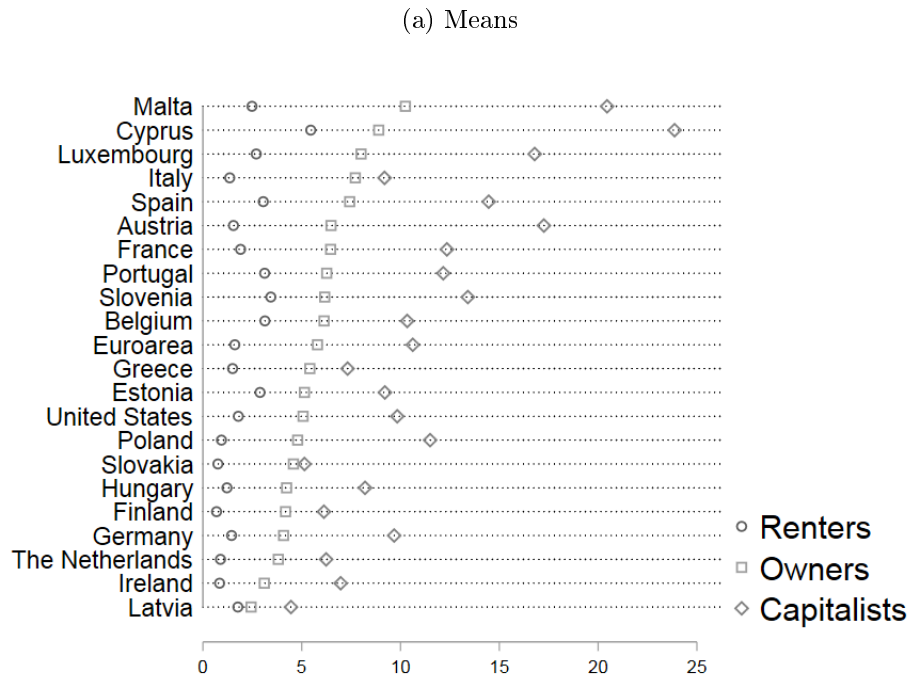Figure 4: Shares of wealth and income in relation to population share

(a) Income

The Netherlands
Germany
Austria
Finland
France
Belgium
Poland
Euroarea
Luxembourg
Slovenia
Ireland
Cyprus
Portugal
Italy
Greece
Malta
Estonia
Spain
United States
Slovakia
Hungary
Latvia

0   .5   1   1.5   2   2.5

○ Renters
□ Owners
◇ Capitalists

(b) Wealth

The Netherlands
Austria
Finland
Italy
France
Greece
Germany
Euroarea
Belgium
Slovakia
Luxembourg
Slovenia
Estonia
Poland
Portugal
Hungary
Spain
Malta
Latvia
Ireland
United States
Cyprus

0   1   2   3   4   5

○ Renters
□ Owners
◇ Capitalists

Notes:
(i) These graphs show shares of income and wealth in relation to the population share of renters, owners and capitalists across countries.
(ii) *Source:* SCF 2013. HFCS 2014.

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Figure 5: Wealth to income ratios of renters, owners and capitalists

(a) Means

(b) Medians

varies from 33 years of median renters' income a (median wealth) capitalist is able to afford in Luxembourg to only about 8 years in Slovakia. In the United States this measure is about 20 years whereas it is roughly 17 years in the Euroarea.

Figure 6: Capitalists' median wealth in years of renters' median income

More directly as economy wide capital-to-income ratios these social class specific wealth-to-income ratios as well as the relation between capitalists' wealth and renters' income measure the relevance of inheritances as well as the potential of social mobility through labor income in a society. Therefore they are measures of inequality directly linked to social realities.

5 Conclusion

Usually the wealth distribution is analysed by deciles, percentiles and top-shares of wealth in a one-dimensional way. But, looking at the wealth distribution alone only provides an incomplete picture of the social implications of wealth. We gained additional insight by classifying households based on decisive functions of their wealth holdings and combined the approach with a joint analysis of wealth and income.

We proposed a relational approach by focusing on different functions of wealth and operationalized it by analysing renters, owners and capitalists empirically. While in the 19th century the antagonism between those who owned the means of production ("capitalists") and those who did not ("workers") was dominant, the rise of the welfare state in the 20th century changed social class structures by adding a class in between. Therefore we defined renters as those who rent their home and have to pay others (capitalists or the state) in order to live in their home. We defined owners as those who own their home and therefore generate some income from wealth via the imputed rent. And we defined capitalists as those who own their home but also generate capital income through owning a self-employed business or having rental income from other real estate properties.

Employing data on household balance sheets for Europe and the US we showed that our relational approach based on decisive functions of wealth aligns well with the wealth distribution but in ways that vary considerably across countries. In every country we consider renters are dominantly located in the bottom, owners in the middle and capitalists at the top of the wealth distribution. But at the same time, the two switching points in the wealth distribution where upwards there are at every point more owners than renters and – at a higher wealth level – more capitalists than owners varies considerably across countries.

We further showed that income is the decisive economic variable for renters. This is missed when analyzing the wealth distribution in a one-dimensional way. We produced income and wealth relations at the household level, and calculated social class specific wealth to income ratios. Regardless of the large differences in the share of renters, median yearly gross income is (mostly substantially) larger than median net wealth of renters. In most cases yearly income is about 2-5 times larger than net wealth, which translates to capital income ratios of 0.2 to 0.5. For owners that relationship is already turned around. Median wealth is larger than median yearly income for all owner populations in all countries. In most cases median wealth is 3-8 times as large as median yearly income. Also for capitalists median wealth is larger than median income in all countries. For most countries ratios rise to about 5-13.

All in all we see dominant forms of wealth for different parts of the wealth distribution.

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Financial wealth of renters in the bottom, real estate wealth of owners in the middle and business wealth and further real estate wealth for capitalists at the top of the wealth distribution. This corresponds to different wealth levels. But there is also a link between forms of wealth and functions of wealth. To exercise power in society neither a savings book nor an owned main residence is decisive.

We showed that social class is key in order to understand wealth inequality. Too often wealth analyses hide behind deciles, percentiles and top shares. Without narratives about power and production relations between social classes which are only added afterwards in interpretations they would hardly make a lot of sense. A class-based approach has advantages with regard to the measurement and analysis of wealth. However, the main advantage is that implicitly assumed links to power and production relations – which are the foundation of contemporary interpretation of top shares (Piketty, 2013; OECD, 2015) – are made explicit. On top of that, such an approach can be directly linked to questions of justification of wealth inequality and allows us to distinguish between wealth as a means of capitalist production and other forms of wealth such as private wealth as a substitute for public wealth (precautionary wealth) and private wealth as a source for non-cash income (housing wealth used).

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Appendix A   Country level figures

Prevalence across the net wealth distribution.   Figures A.1, A.2 and A.3 show the prevalence of renters, owners and capitalists across the net wealth distribution in all Euroarea countries. Figure A.4 those in Hungary and Poland. All are produced analogously to figure 3 in section 4. The points in the distribution at which there are more owners than renters and - at a higher level of wealth - more capitalists than owners differ considerably. We hypothesize that this has likely to do with historical developments and differences in institutions such as the degree of rental subsidies and general welfare state spending. Public welfare is a substitute for private wealth accumulation, especially in the lower part of the distribution (Fessler and Schürz, 2015). See also figure B.2.

Figure A.1: Renters, owners and capitalists in euroarea-countries

Figure A.2: Renters, owners and capitalists in euroarea-countries
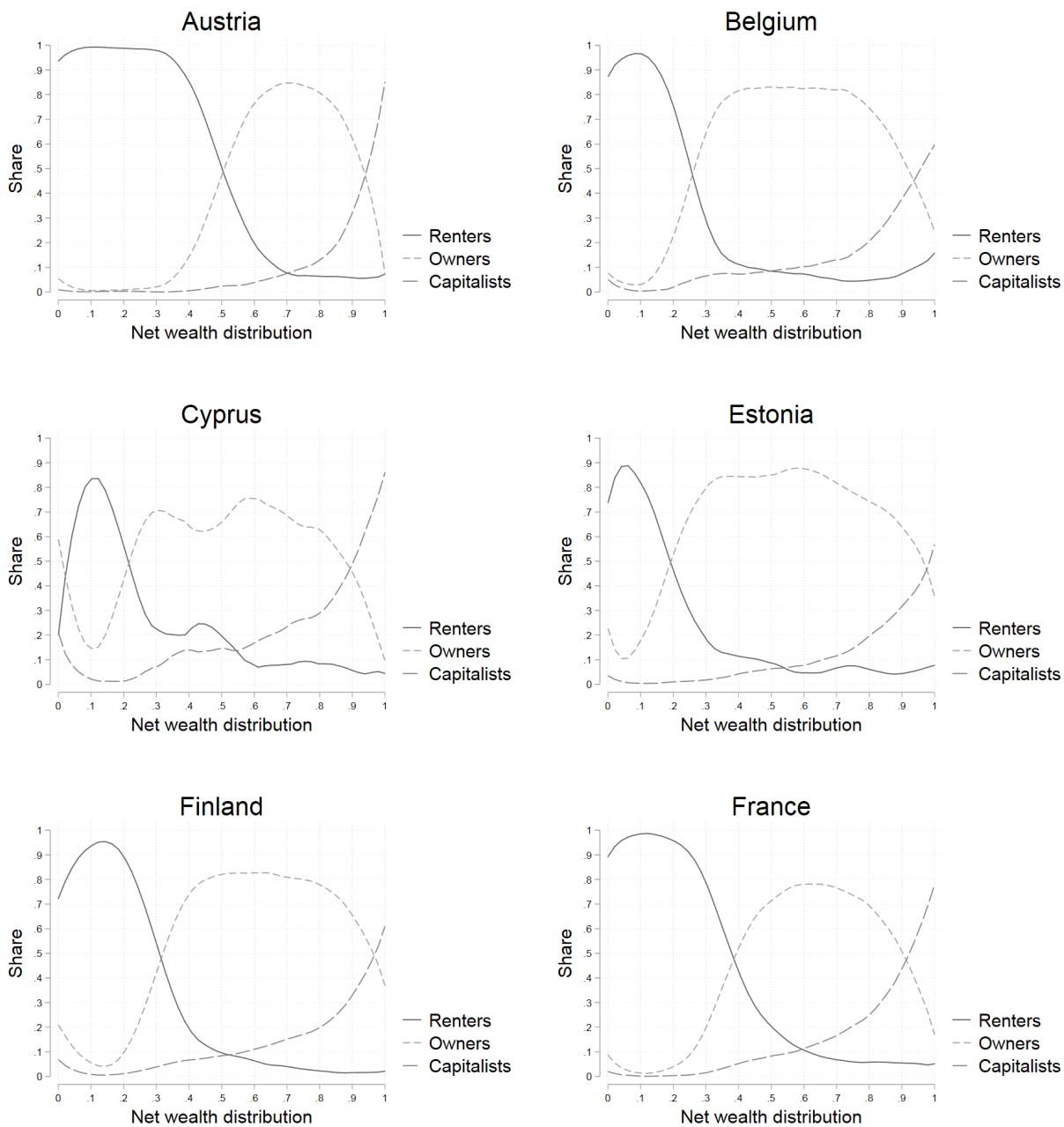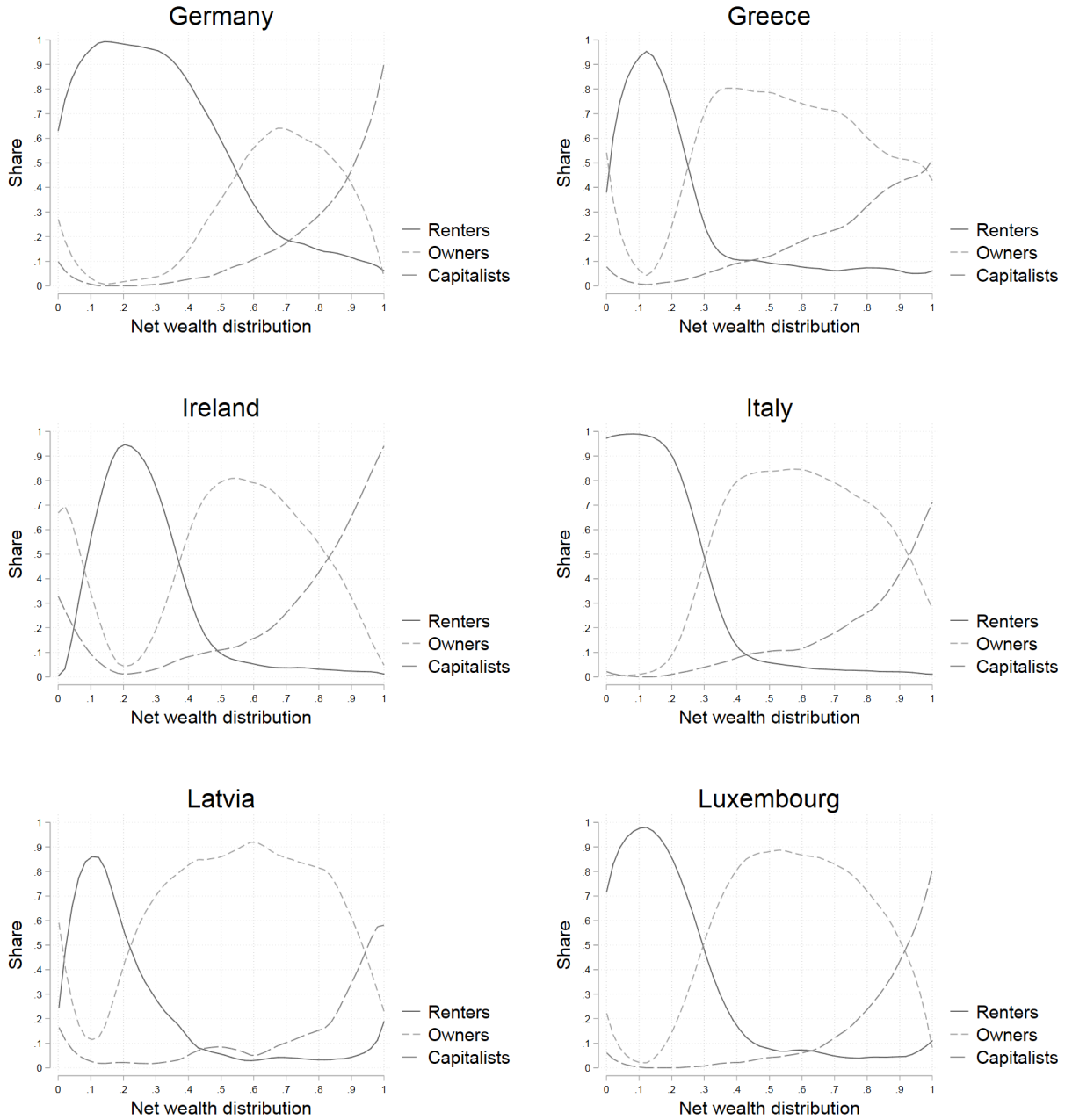
Notes:

(i) These graphs show the prevalence of renters, owners and capitalists over the net wealth distribution for different countries. We use a local polynomial estimator with an epanechnikov kernel, a bandwith of 0.05 and degree 1 to prevent boundary bias as it allows for any trends also close to the endpoints.

(ii) *Source:* HFCS 2014.

Figure A.3: Renters, owners and capitalists in euroarea-countries

Figure A.4: Renters, owners and capitalists in Hungary and Poland

Appendix B   Cross country figures

Prevalence of renters and social security expenditure   Figure B.2 shows the prevalence of renters as well as social security expenditure per capita across countries. As social security expenditure serves as substitute for private wealth accumulation. one can see a clear positive relationship. Especially Austria and Germany seem to have a large share of renters. In both countries there exists a relatively large share of social housing and rent control mechanisms.

Figure B.1: Capitalists' and top 5% shares in income and wealth
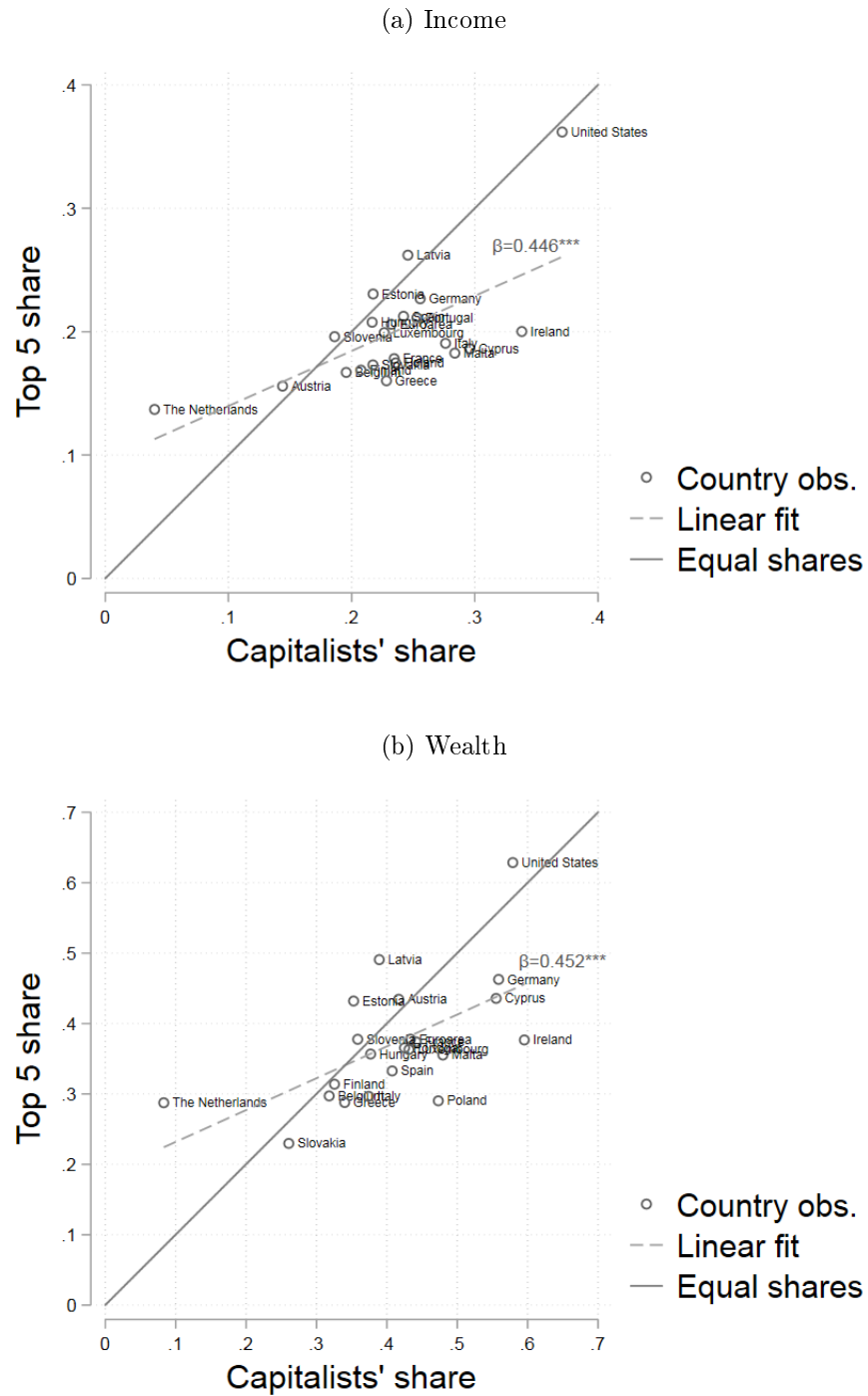
(a) Income

(b) Wealth

Notes:
(i) These graphs show shares of of the top 5% groups as well as the capitalists in income and wealth.
(ii) *Source:* SCF 2013. HFCS 2014.

Figure B.2: Share of renters and social security expenditure

Appendix C Robustness of class definition

To check the robustness of our approach we compare our definition of renters, owners and capitalists with a more classical approach, where all households with self-employed businesses are the capitalists, no matter if they are owner occupiers and split all others into renters or owners. As one can see in figure C.1 that does not change the result qualitatively. In both, the US and the Euroarea, still renters are located dominantly in the bottom, owners in the middle and self-employed at the top. However, we think our preferred specification fits social reality better, as the self-employed who are renters tend to be the ones which are self-employed because they have atypical contracts rather than businesses. Furthermore our definition of capitalists includes also households who own other real estate they rent out and are therefore also able to generate relevant income out of wealth. As one can see they are typically located in the upper part of the distribution (see difference between our capitalists and the self-employed group in the upper part of the distribution).

Figure C.1: Typology Comparison

(a) US (b) Euroarea

Notes:
(i) This shows the prevalence of renters, owners and capitalists in the euroarea and euroarea countries according to our preferred and an alternative typology, where all business owners are considered as capitalists disregarding of their status as owner occupiers and the rest of the population is sorted according to their owner occupier status.
(ii) *Source:* SCF 2013. HFCS 2014.

We also check if the alignment between our definition and the wealth distribution is driven by age or education. While age is particularly relevant for wealth accumulation, education is particularly relevant for social stratification. To control if those indirectly drive the rela-
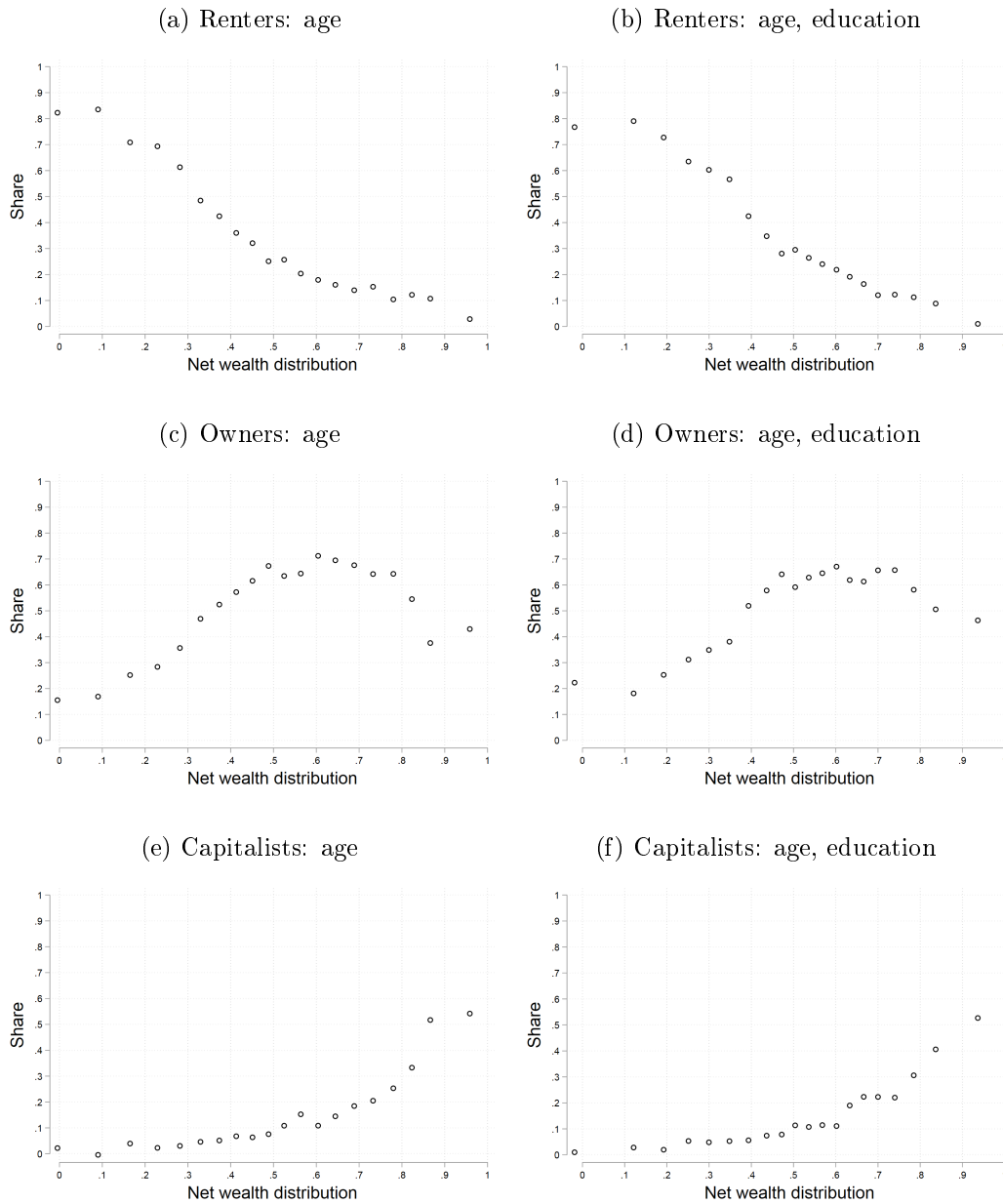
tionship between our typology and wealth we produce residualized binned scatter plots. We regress both, the dummy variables identifying renters, owners and capitalists (separately) as well as the cdf of net wealth on age, age squarred and age cubed as well as education. Education is controlled for by 4 education dummies. By use of the Frisch-Waugh-Lovell theorem we then take the residuals of these regressions, where the influence of age as well as education is filtered out and plot them against each other. We do so by calculating the mean of the residuals and adding the means of the respective variables across vingtiles of net wealth.

Figure C.2 shows the resulting binned scatter plots[1] for renters (a,b), owners (c,d), and capitalists (e,f) for the US and figure C.3 shows analogous binned scatter plots for the Euroarea. One can clearly see that the main patterns of prevalence of renters, owners and capitalists hold. In case of filtering out age, age squarred, age cubed and education categories the patterns for renters and owners are slightly less pronounced. However it is rather striking that even educational and age controls do not change the alignment of the class typology with the wealth distribution qualitatively. So even inside the same age groups and educational groups our classification sorts household well along the wealth distribution.

Note, that one can also show the intergenerational dimension of this class approach. Owners inherited more often than renters, and capitalists inherited more often than owners. Especially inherited businesses play a major role in becoming a capitalist. So often class location has a dynastic component. Similar arguments can be made by the well known strong intergenerational correlation of education.

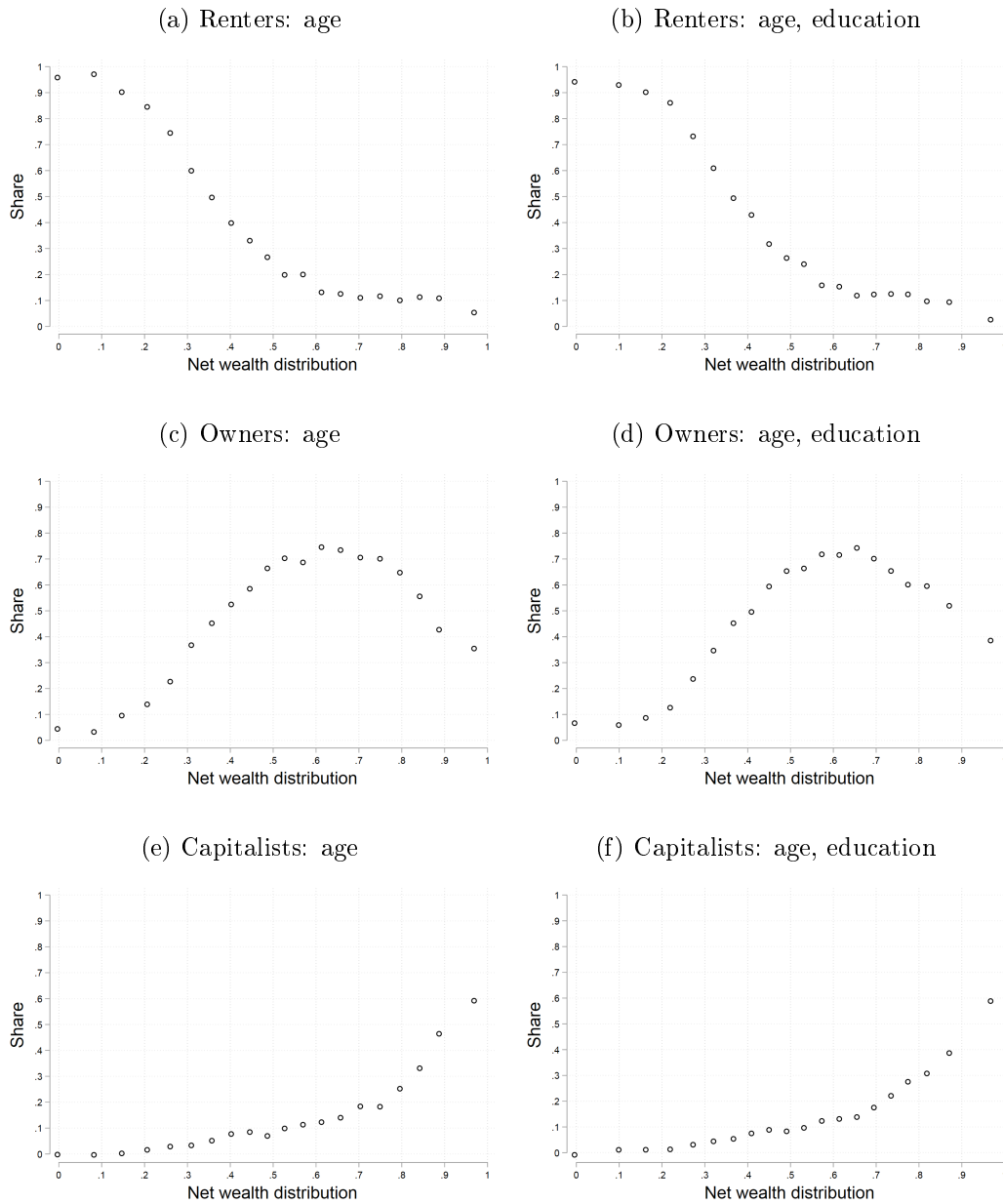[1]We use the binscatter STATA command written by Michael Stepner, MIT

Figure C.2: US: Estimated shares for renters, owners and capitalists - controlled for age and education

(a) Renters: age

(b) Renters: age, education

(c) Owners: age

(d) Owners: age, education

(e) Capitalists: age

(f) Capitalists: age, education

Notes:
(i) These graphs show estimated shares of renters, owners and capitalists across the net wealth distribution, but controlled for age, age squarred and age cubed of the household head, as well as education.
(ii) Using the Frisch-Waugh-Lovell theorem, we first separately regress the identifier as well as the cdf of net wealth on age, age squarred, age cubed and additionally education dummies. Then, we add means to the residuals and plot the residuals against each other to show the relationship after filtering out the dependent variables from the regressions. We use the binscatter STATA command written by Michael Stepner, MIT.
(iii) *Source:* SCF 2013.

Figure C.3: Euroarea: Estimated shares for renters, owners and capitalists - controlled for age and education

(a) Renters: age

(b) Renters: age, education

(c) Owners: age

(d) Owners: age, education

(e) Capitalists: age

(f) Capitalists: age, education

Notes:

(i) These graphs show estimated shares of renters, owners and capitalists across the net wealth distribution, but controlled for age, age squarred and age cubed of the household head, as well as education.

(ii) Using the Frisch-Waugh-Lovell theorem, we first separately regress the identifier as well as the cdf of net wealth on age, age squarred, age cubed and additionally education dummies. Then, we add means to the residuals and plot the residuals against each other to show the relationship after filtering out the dependent variables from the regressions. We use the binscatter STATA command written by Michael Stepner, MIT.

(iii) *Source:* HFCS 2014.

Appendix D   Time robustness

We employ data from the merged 1962 Survey of Financial Characteristics of Consumers and 1963 Survey of Changes in Family Finances (https://www.federalreserve.gov/econres/scf_6263.htm [accessed on 4th July 2018]) to estimate the prevalence of classes across the net wealth distribution for the United States in 1962. It allows us to get an idea of how stable our observed pattern is.

Figure D.1 shows that the main pattern of alignment between social classes and the wealth distribution already existed in the early 1960ies. However, some differences are observable. The share of renters and owners moderately increased from 31% renters in 1962 to 34% renters in 2013 and 41% owners in 1962 to 50% owners in 2013. The share of capitalists was cut in half from 28% capitalists in 1962 to 14% capitalists in 2013. At the same time the pattern of alignment with the wealth distribution is much more pronounced in 2013 than it was in 1962. While the share of renters is below 10% above the 60th percentile of net wealth in 2013 in was above 10% even above the 80th percentile of net wealth in 1962. While the Capitalists share at median wealth was above 20% in 1962 it is well below 10% today. Also the increase of owners at the very bottom due to the availability of mortgage debt with high loan-to-value ratios was not there in 1962.

Figure D.1: Renters, owners and capitalists in the United States 1962
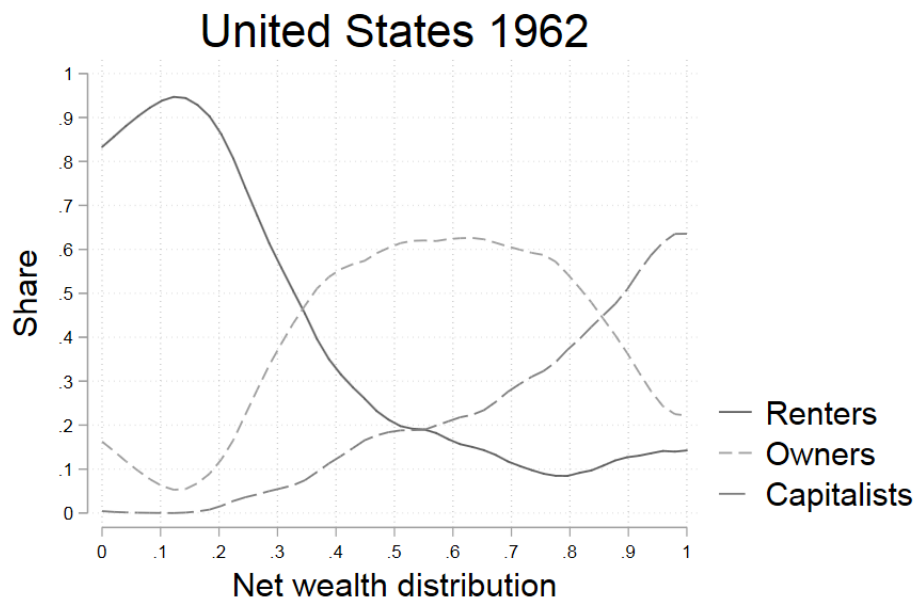
United States 1962

Notes:
(i) This graph shows the prevalence of renters, owners and capitalists over the net wealth distributions of the United States 1962. We use a local polynomial estimator with an epanechnikov kernel, a bandwith of 0.05 and degree 1 to prevent boundary bias as it allows for any trends also close to the endpoints.
(ii) *Source:* SCF 1962/1963.

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