

Socioeconomic structures of the Austrian wealth distribution

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Abstract

This paper provides insights into the socioeconomic specifics of the Austrian wealth distribution. Based on data from the Household Finance and Consumption Survey (HFCS) 2010, we explore patterns of household characteristics underlying the wealth dispersion. Due to their pronounced nonlinear relationship, we rely on quantile regressions to analyze the joint distribution between specific characteristics and a household's net wealth position. Our findings emphasize the role of age, education, the ownership of main residence and company stakes in order to figure out generic households across the distribution. If we look at the top, our results indicate a special role of working as a manager or in self employment as well as the receipt of inheritances.

JEL Classification: C31, D31.

Keywords: Wealth distribution, quantile regression, household structure.

1 Introduction

Research on economic inequality mostly focuses on income inequality. This strand of empirical research has received increased attention in the past decade, which can be attributed to a higher availability of income data and computational means to provide access to data and tools to a wider range of researchers (see Atkinson and Piketty, 2007; Alvaredo et al., 2013). These evolutions have generated insights into income inequality both within and between countries (see Piketty and Saez, 2006; Bach, Corneo, and Steiner, 2007; Atkinson, Piketty, and Saez, 2011).

While income has evolved as a primary target for research on economic inequality, other related fields have similarly gained in importance, such as consumption, health or education inequalities (see Wagstaff, Paci, and Van Doorslaer, 1991; Lipman, 2004; Krueger and Perri, 2006). Apart from these topics, research on wealth inequality has only slowly gained momentum.

Wealth (next to income) inequality might be economically important for several reasons. First and foremost, accumulated assets provide means of intertemporal smoothing of consumption possibilities. Extending this argument wealth (and a lack thereof) can account for differing access to housing, schooling or health services dependent on socioeconomic groups. Furthermore a highly skewed wealth distribution can also reflect political power or means to influence public opinion. Given these crucial links to social, economic and political issues, the distribution of wealth inequality has been underrepresented in related research areas due to a lack of data.

Existing studies on the distribution of wealth have mainly focused on two areas. On the one hand, there is an exhaustive investigation of the concentration of wealth as such, wherever data is available. This is closely linked to the discussion about the consequences for social cohesion as well as to implications for tax policies and redistribution (see Keister, 2000; Eckerstorfer et al., 2013; Vermeulen, 2014). On the other hand, a subfield has addressed the composition of private wealth, i.e. the various kinds of assets that are held by households with certain characteristics at different positions on the wealth distribution (see Wolff, 1998; Fessler, Mooslechner, and Schürz, 2012; Deutsche Bundesbank, 2013). However, this research field is even more restricted by the available data, since the availability of sociodemographic characteristics in wealth data is scarce.

As an exception, seminal studies focus on the United States: an early article of Radner (1989) estimates wealth data based on surveys and describes wealth inequality between *the Aged and the Nonaged*. More substantially, Avery and Kennickell (1991) investigate the net wealth of private households by socioeconomic characteristics like age, occupation, education, labor market position of the head of the household, family income, family structure and ethnic background. Similarly, a methodological study by Juster, Smith, and Stafford (1999) explores data from the Survey of Consumer Finances (SCF), though with a special interest in the demographic structure and the education level of households. Wolff (1994) and Wolff (2004) observe the evolution of US household wealth from the 1960ies on. The author shows that the wealth gap between different ethnic backgrounds has widened in this period.

Studies for other regions depend on data availability and thus are mostly limited on the decomposition of wealth by age and education. Especially for the case of Australia, the Household, Income and Labour Dynamics in Australia (HILDA) provides an appropriate data source for such analyses. Using this data set Marks, Headey, and Wooden (2005) and Headey, Marks, and Wooden (2005) are able to investigate the distribution of different kinds of assets as well as the socioeconomic structure of households by age, marital status, household type and education. Besides descriptive statistics, the authors apply least squares regressions to assess the effect of these characteristics on the formation of capital. The results suggest that mainly households with a male reference person, some 55 years of age, are able to accumulate capital. Moreover, household heads with tertiary education exhibit up to 30 percent higher wealth than their counterparts without university degrees. In contrast, single households, and especially single women, show a below-average formation of capital.

While there is only little evidence for the case of Europe, Brandolini et al. (2004) are able to exploit the Survey of Household Income and Wealth (SHIW) of the Italian central bank. The focus of this article lies on a time dimension, however, the authors also explore the effects of age and household structure. Azpitarte (2008) and Bover (2010) inspect the wealth of Spanish households. The first author decomposes wealth inequality for variables like age, employment status and house ownership into within- and between-group effects. The results show that the bigger part of wealth inequality arises from the cohort of 45 to 54 years of age. Moreover, households with self-employed reference persons account for up to 95% of total wealth inequality.

This paper is devoted to a similar analysis and therefore concerned with socioeconomic patterns throughout the wealth distribution. We explicitly focus on the case of Austria, where only the implementation of the Household Finance and Consumption Survey (HFCS) by the Austrian National Bank in 2010 made such investigations possible. Besides a variety of variables concerning the detailed wealth composition of private households, these data also provide a number of sociodemographic factors. In this study we exploit this information to estimate quantile regressions in order to depict the joint distribution of net wealth and households socioeconomic characteristics.

The remainder of the paper is structured as follows. In section 2, we present the HFCS data and the choice of characteristics under consideration. Section 3 provides descriptive univariate results, before we apply a quantile regression to analyze the joint distribution of household characteristics and the household’s position in the net wealth distribution in section 4. Finally, section 5 concludes.

2 Data description

The Household Finance and Consumption Survey (HFCS) 2010 is coordinated by the European Central Bank and collects household-level data on finances and consumption in the member states of the Eurozone. In particular its focus lies on the balance sheets of private households, including their wealth portfolio and liabilities. Moreover, the survey enfold important information on income and consumer behavior. The sampling units are private households, several variables regarding personal characteristics of the household members are included. Based on a two-stage stratified probability sample, the survey obtains a representative sample of all non-institutionalized households in Austria. For a detailed methodological and descriptive report of the HFCS data, see Albacete et al. (2012), Eurosystem Household Finance and Consumption Network (2013), and Humer et al. (2013).

In 2010 the total wealth of private households amounted to 1,000 bn. Euro, which was roughly 3.5 times the total economic activity in Austria. The wealth share of the bottom half of the distribution added up to 3%, while the wealthiest 5% of households held about half of all assets. Eckerstorfer et al. (2013) argue that these values underestimate the actual concentration since the most affluent households are underrepresented in the HFCS data for two reasons. First, the number of the so-called “*Super-Rich*” is small and the probability for these households to be part of a random sampling is minor. Second, the non-response rate of rich households is notably above average. By means of common statistical methods to identify the underlying distribution function, it is possible to augment the underrepresented upper tail. Vermeulen (2014) for European countries and Eckerstorfer et al. (2013) for Austria address this underrepresentation by assuming an approximation of the upper tail to a Pareto distribution. However, since this approach cannot handle subordinate wealth components, we adhere to the original HFCS data in this paper.

Furthermore, we focus on the wealth and liabilities of households. Wealth may be decomposed into tangibles (properties including main residence, other properties, vehicles, the holding of a company stake, etc.) and financial assets (deposits, savings, funds, bonds and shares, etc.). A detailed description of the wealth components gathered in the HFCS data is provided by Fessler, Mooslechner, and Schürz (2012).

The investigation of socioeconomic properties of households conditional on their position in the net wealth distribution entails substantial challenges. While some characteristics like total wealth, household size, or household structure are bound to the household level, other attributes

like age, educational attainment, or occupation are only available on the individual level. If these properties differ between household members, the identification of one single representative value is not straightforward. A common strategy in the literature is to determine a single reference person whose characteristics are used to classify the household. Such properties often are related to age, income or educational attainment. Some papers rely on a combination of these and other variables to determine the representative household member (cf. Moser et al., 2013). Even though this approach has its legitimacy and entails several advantages, it reduces the available information on the household structure and may lead to an underestimation of household heterogeneity. Alternatively, the socioeconomic characteristics of all household members could simultaneously be regarded in a regression analysis (Bover, 2010) or they could be incorporated via (re)weighting, especially if the aim is an international comparison (Fessler, Lindner, and Segalla, 2013).

In the HFCS data, reference persons have to be constructed ex post based on the household information that has been collected during the interview (Albacete et al., 2012; Eurosystem Household Finance and Consumption Network, 2013). Fessler, Mooslechner, and Schürz (2012) and Andreasch et al. (2012) suggest to nominate the Financially Knowledgeable Person (FKP) as reference person, since this is the person with the best insights into the financial situation of the household. However, the authors emphasize that this selection criterion is arbitrary to some degree.¹

Our approach to analyze household wealth include the following household and individual characteristics:

Household size The household size is directly derived from the number of persons who live in one household. The bulk of observations consists of single and two-person households, while the average size is 2.1 persons. The largest household in the HFCS data comprises 9 members.

Household structure In order to account for the specifics that are associated with the household composition, we distinguish between singles, couples and single parents. Furthermore the category of families subsumes traditional families as well as households where siblings or several generations live together.

Education The education variable in the HFCS data refers to the common ISCED classification with six levels which we subsume to four. Our first level comprises ISCED levels 0 and 1 which represent primary education (elementary school and preschool education). Level 2 is lower secondary education (ISCED 2) and comprises the Austrian “Hauptschule” and “AHS–Unterstufe”, while we sum up upper secondary degree and apprenticeship (ISCED 3 and 4) in level 3. All degrees of tertiary education (ISCED 5 and 6) are captured in level 4.

Labor market status & Employment status Both labor market status and employment status provide information on the working lives of the respondents. The former variable consists of 9 different groups. For the sake of simplicity, we subsume unemployed, students, pupils, unpaid interns, individuals on maternity leaves, permanently disabled, and individuals in compulsory

¹In order to take this specific type of uncertainty into account, we robustify our analysis using other reference person selection rules (i.e. based on age, income and education). Since results remain qualitatively robust with regard to the selection of the reference person, these scenarios are not reported in paper. Corresponding results and figures are available upon request.

military service or equivalent social service in one category of transfer beneficiaries. All these individuals are assumed to rely on public and private transfers. The employment status variable indicates the type of employment for all economically active respondents. We merge both variables and derive five employment classifications that are of interest to us: employees, self-employed, transfer beneficiaries, retirees and a small group of others (including, for instance, unpaid family workers).

Economic sector of company stakes According to the HFCS data, only few households own company stakes. The data include information on the economic sector of these assets based on the Austrian NACE classification (ÖNACE-08). We aggregate all economic sectors into the three main groups. The primary sector comprises the retrieval and production of raw materials corresponding to NACE codes A & B. The secondary sector enfoldes the transformation of raw or intermediate materials into goods corresponding to NACE codes C – F. Finally, the tertiary sector is the supply of services to consumers and businesses corresponding to NACE codes G – U.

3 Univariate analysis

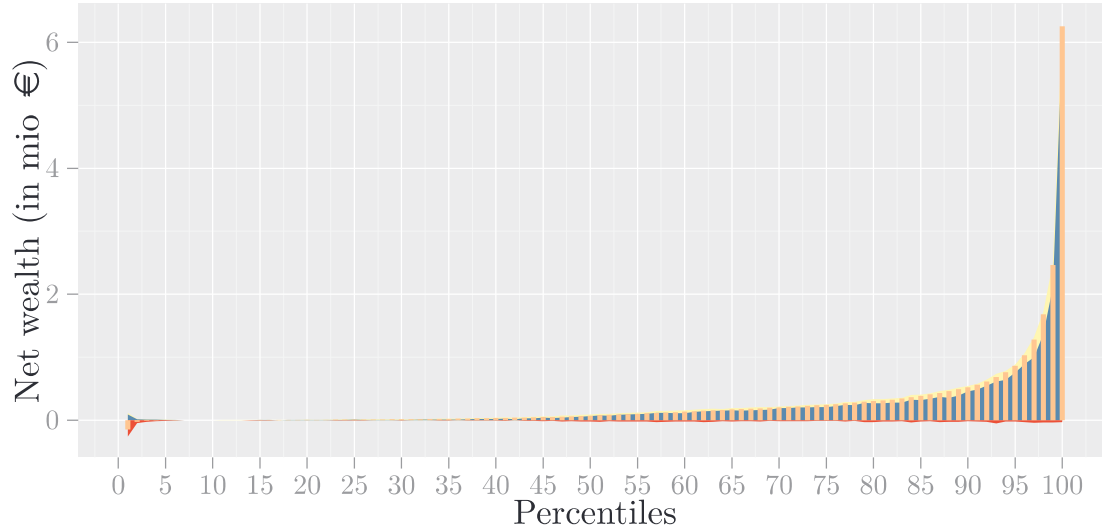


Figure 1: Average of assets by percentiles
Blue: Tangibles, Yellow: Financial assets, Red: Liabilities, Orange: Net wealth. Source: HFCS, own calculations

Figure 1 shows the mean of main wealth components for the percentiles of the net wealth distribution. As shown, the bottom 40% practically do not own any noteworthy assets at all. This applies to both gross and net wealth. In the following percentiles wealth gradually increases. However, the biggest leap occurs at the top 1% with an average net wealth of roughly 6 million €. Tangibles like properties or company stakes (blue bars) account for the major part of wealth across the distribution, while financial assets increasingly gain in importance for the upper tail. The numerical values for this illustration are provided in Table 1.

Furthermore, the bottom 5% of the net wealth distribution differ clearly from the following

four deciles. These households own tangibles and financial assets close to the median household, however, their liabilities considerably exceed their possessions. Mortgages are the predominant type of liabilities of these households indicating recent purchases or constructions of housings, while the remaining part of the bottom half does not own its main residence. Hence, the bottom 5% of households exhibit characteristics that in fact correspond to the middle of the distribution rather than to the bottom half. As a consequence, this group of households needs specific attention in all our results.

In the subsequent deciles, the average value of the main residence is remarkably small. According to the lower part of Table 1, the number of households owning assets in this wealth component is vanishingly low at the bottom of the distribution. The share of property owners increases not until the 5th and 6th decile and further levels off at some 90%. Company stakes are even more concentrated, since the bottom 80% hardly own any business assets while one of two households in the top 10% does. In addition, business ownership in agriculture and forestry² is particularly accumulated at the upper tail. Practically, only the richest decile participates in this wealth category whereof 27% own businesses.

²The respondents are asked to assess the market value or current price of these wealth component in the HFCS. Fessler, Mooslechner, and Schürz (2012) emphasize that it is more difficult to estimate the value of the main residence, other properties or business assets than gather the current bank account balance. For this reason, the self-estimated current value is a hypothetical figure.

Table 1: Composition of the Austrian Wealth Distribution

Average wealth (in 1000€)															
		Real assets				Financial assets				Liabilities		Total assets			
		Residence	Estate	Vehicles	Business	Total	Safe	Risky	Others	Total	Mort.	Non-mort.	Total	Gross	Net
0-5	19.17	3.31		3.07	0.69	26.49	6.19	0.56	1.27	8.02	-46.74	-24.69	-71.43	34.51	-36.93
5-10	0.00	0.58		0.15	0.00	0.74	0.61	0.03	0.05	0.69	-0.78	-0.33	-1.11	1.44	0.32
10-15	0.20	0.62		0.92	0.01	1.85	2.06	0.04	0.13	2.23	-1.04	-1.15	-2.19	4.08	1.89
15-20	0.04	0.40		2.16	0.00	2.91	3.32	0.02	0.12	3.46	-0.53	-1.28	-1.81	6.37	4.56
20-25	2.24	0.10		2.93	0.00	5.58	5.38	0.11	0.27	5.77	-2.28	-0.98	-3.25	11.35	8.10
25-30	1.02	0.17		4.23	0.02	6.25	8.01	0.04	0.27	8.33	-1.00	-1.17	-2.18	14.58	12.40
30-35	1.91	0.16		6.42	0.41	9.63	11.21	0.39	0.52	12.12	-1.55	-1.58	-3.13	21.75	18.62
35-40	5.26	0.56		8.57	0.42	16.25	15.41	0.55	1.15	17.12	-4.31	-0.60	-4.91	33.37	28.46
40-45	11.96	2.81		9.32	0.69	27.19	21.16	1.22	1.49	23.87	-7.49	-1.65	-9.14	51.06	41.91
45-50	34.08	5.36		7.31	0.34	50.14	27.16	1.29	0.82	29.27	-15.65	-1.49	-17.15	79.41	62.27
50-55	67.19	5.12		7.21	2.11	83.80	24.80	2.11	0.68	27.60	-17.26	-2.32	-19.59	111.40	91.81
55-60	95.74	6.59		7.93	1.00	113.15	28.77	3.19	1.26	33.22	-22.38	-1.51	-23.89	146.37	122.48
60-65	116.18	16.18		8.24	2.28	145.39	28.06	3.94	2.17	34.16	-18.44	-3.34	-21.78	179.55	157.77
65-70	143.53	6.58		10.92	3.55	167.19	34.37	4.89	0.39	39.65	-14.77	-1.21	-15.98	206.84	190.86
70-75	176.36	12.58		10.16	2.06	203.58	34.98	2.59	0.18	37.75	-11.60	-1.04	-12.64	241.33	228.69
75-80	208.31	22.73		12.27	3.94	249.52	41.68	5.45	3.18	50.31	-15.66	-4.18	-19.85	299.83	279.98
80-85	225.90	39.56		15.66	8.56	294.58	61.51	7.87	5.66	75.03	-20.49	-1.28	-21.77	369.62	347.85
85-90	301.09	33.81		19.32	25.11	383.07	85.03	10.43	7.79	103.25	-20.51	-2.00	-22.52	486.32	463.80
90-95	388.06	88.94		23.50	102.12	608.90	88.64	25.79	1.76	116.20	-24.42	-2.08	-26.50	725.10	698.60
95-100	661.79	364.64		35.65	1211.16	2295.45	140.29	140.09	24.06	304.45	-34.05	-0.91	-34.97	2599.89	2564.93
Participation rates															
0-5	12.1	4.4		53.8	0.7	57.2	78.2	7.4	24.7	80.7	12.6	91.2	100.0	88.4	100.0
5-10	0.0	0.7		9.2	0.0	11.4	85.4	0.5	5.4	86.9	0.5	18.1	18.1	90.9	91.6
10-15	0.4	0.5		39.1	0.2	47.1	96.3	1.1	9.5	96.4	0.8	32.8	33.3	100.0	100.0
15-20	0.1	0.3		52.9	0.0	63.4	96.0	0.9	7.8	96.2	0.3	28.2	28.4	100.0	100.0
20-25	1.9	1.8		64.2	0.0	75.6	98.5	3.0	8.8	99.0	2.0	14.6	16.1	100.0	100.0
25-30	1.6	1.5		65.1	0.5	77.2	99.1	2.1	11.6	100.0	1.0	17.3	17.9	100.0	100.0
30-35	3.8	1.4		74.9	4.3	87.3	98.3	5.8	13.2	99.2	1.3	25.8	26.7	100.0	100.0
35-40	8.2	2.8		82.5	2.3	88.5	98.4	6.8	13.3	98.5	5.8	14.2	18.9	100.0	100.0
40-45	17.2	7.7		79.6	2.5	91.9	97.7	10.7	12.8	97.8	8.5	21.6	27.8	100.0	100.0
45-50	41.7	9.4		77.4	3.7	97.6	98.1	12.8	15.6	98.1	17.1	21.8	31.4	100.0	100.0
50-55	68.9	9.3		75.6	2.8	98.1	97.3	12.8	8.9	98.1	31.1	21.9	43.3	100.0	100.0
55-60	79.5	10.0		84.6	2.6	98.9	97.7	18.8	12.1	99.2	32.3	15.0	38.6	100.0	100.0
60-65	80.6	20.2		85.6	5.4	99.8	99.0	18.3	12.4	99.0	28.9	13.2	34.6	100.0	100.0
65-70	86.4	11.0		89.4	8.6	100.0	100.0	23.1	7.4	100.0	32.7	15.5	43.0	100.0	100.0
70-75	92.4	13.8		93.6	4.2	99.9	100.0	12.0	3.4	100.0	32.0	13.1	38.9	100.0	100.0
75-80	93.0	27.1		93.1	4.2	99.4	99.7	20.5	7.8	99.7	31.4	10.2	38.0	100.0	100.0
80-85	87.3	29.1		91.9	9.3	99.4	98.0	23.1	9.7	99.1	27.8	10.5	34.6	100.0	100.0
85-90	94.2	29.7		93.0	21.3	99.4	98.5	30.4	8.9	99.2	33.0	13.0	40.4	100.0	100.0
90-95	94.5	37.0		96.3	39.9	100.0	99.7	42.3	11.0	99.7	30.1	19.6	39.8	100.0	100.0
95-100	90.2	50.9		96.7	67.3	99.9	98.6	39.0	24.0	98.6	38.5	11.6	44.0	100.0	100.0

Source: HFCS, own calculations. Safe financial asset: Deposits and voluntary pension plans or whole life insurance. Risky financial assets: Mutual funds, bonds and publicly traded shares. Other financial assets: Managed accounts, non-self employment private businesses, money owed to other households and all other assets.

In a first step, we analyze the univariate distribution of net wealth and a variety of household characteristics which are shown in Table 2. The table contains values at selected percentiles in relation to the overall value for an attribute. If the value in a certain percentile equals exactly the figure of the whole sample, the value in the table yields 1. Values below 1 signal that the respective share is smaller than the overall average, values above 1 imply an overrepresentation at a certain position of the distribution.

Table 2: Household characteristics at different points of the wealth distribution

	Overall	Quantile				
		10%	25%	50%	75%	90%
Gender						
Female	0.56	1.18	1.13	1.34	1.06	0.84
Age						
Age	50.98	0.88	0.99	1.02	1.14	1.07
Education						
Primary	0.00			8.10		
Secondary I	0.18	1.88	1.17	1.24	1.54	0.54
Secondary II	0.68	0.89	1.02	0.99	0.85	1.07
Tertiary	0.14	0.54	0.72	0.72	1.09	1.27
Type						
Singles	0.39	1.46	1.52	1.27	0.59	0.41
Couples	0.29	0.29	0.61	0.63	1.26	1.26
Single parent	0.06	2.50	1.37	1.04	2.05	0.67
Families	0.27	0.75	0.64	1.00	1.08	1.68
Size						
All members	2.12	0.94	0.80	0.98	1.08	1.28
Children	0.30	1.80	0.96	1.45	0.85	1.64
Income flows						
Wages	23,545 €	0.45	0.78	0.92	1.01	1.05
Income self-emp.	4,736 €	0.07	0.10	0.15	0.32	2.03
Pensions	11,065 €	0.46	0.68	0.70	2.22	1.44
Transfers	1,740 €	1.61	1.52	1.47	0.63	1.04
Main residence						
Owner	0.48		0.08	1.13	1.95	2.01
Inheritances						
Money & more (I)	0.20	0.49	0.87	1.26	0.99	1.39
Main residence (II)	0.13			1.54	2.02	2.08
Main residence & more (I+II)	0.02			1.84	1.33	4.59
None	0.65	1.46	1.28	0.81	0.80	0.53

The table shows several socioeconomic characteristics of household main respondents at different positions of the distribution of net wealth among private households. Cells of the first column indicate the share of households with a specific characteristic or its mean in case of numeric variables. All other values are expressed in relation to the overall mean value. Source: HFCS 2010, own calculation.

The first attribute of interest is the household size. The HFCS 2010 survey comprises 2,380 successful household interviews representing about 3.77 million households in Austria. In the survey sample, roughly one third are single households and another third are two-person households. The data show that the amount of wealth owned by a household increases notably with the household size (cf. Fessler, Mooslechner, and Schürz, 2012). The average household size at the bottom of the distribution is below the overall average, however, households at the top are bigger. Furthermore, the share of single households decreases strongly from the 10th to the 90th percentile. In contrast, the share of two-person households increases along the distribution and

reaches its maximum in the 7th decile. In the upper half, families become increasingly dominant and account for 45% of all households at the top decile point. Compared to their overall share of 27%, they are considerable overrepresented. Single parents are mostly found at the other tail of the distribution. At the 10th quantile of the net wealth distribution the share of single parents is 2.5 times higher than in the overall sample. 56% of all reference persons in the HFCS 2010 data are women. Our results show that households with a female reference person dominate up to the 75th percentile. However, women are underrepresented at the top of the wealth distribution.

Furthermore an analysis of educational attainments provides interesting patterns in the distribution of wealth. As anticipated, wealth and education levels share a positive relationship, boosted by the nexus between education and income (cf. Fessler, Mooslechner, and Schürz, 2012). There is almost no observation with only primary school in the HFCS sample. The share of households with upper secondary education along the net wealth distribution oscillates more or less around the total share in the sample. In contrast, the share of households with tertiary education increases from 7% at the 10th percentile up to 17% at the 90th percentile compared to 14% in the total sample. We observe a reverse trend for lower secondary education where the share is disproportionally high at the bottom of the distribution. At the 90th percentile only 9% of the reference persons have a lower secondary degree.

Figure 2 presents the shares of the employment status by percentiles of net wealth.³ As already mentioned before, the bottom 5% of the distribution show remarkable peculiarities. The households with net debt are predominantly economically active while the next percentiles with almost no assets are not. Moreover, only very few self-employed households are among this indebted group.

Clearly, households with employed or retired reference persons prevail in the distribution since they are the biggest social classes. Households with transfer beneficiaries as reference persons are mostly found in the bottom third of the net wealth distribution. Not until the 90th percentile of the net wealth distribution, self-employed households increasingly start to dominate and displace employees and retirees. As a result their share amounts to about 50% in the top 5%. In contrast, the portion of employed households strictly decreases in the top decile and equals roughly 10% at the top percentile.

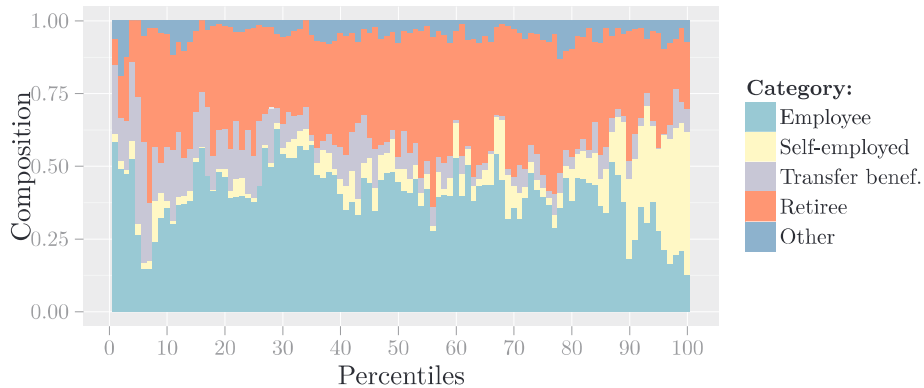


Figure 2: Relative wealth position with regard to employment status

³Percentile plots for all other socioeconomic attributes under investigation are available on request.

As mentioned, business ownership is very skewed particularly at the top, where two out of three households among the richest 5% hold business stakes. Roughly 10% of all households participate in this wealth component. Figure 3 reveals that business ownership predominantly matters for the top decile. The agriculture and service sectors are prevailing while there are few company stakes in the industrial sector. There is a remarkable increase of primary sector business at the top of the distribution. In the top 5%, more than a fourth of all households own such assets.

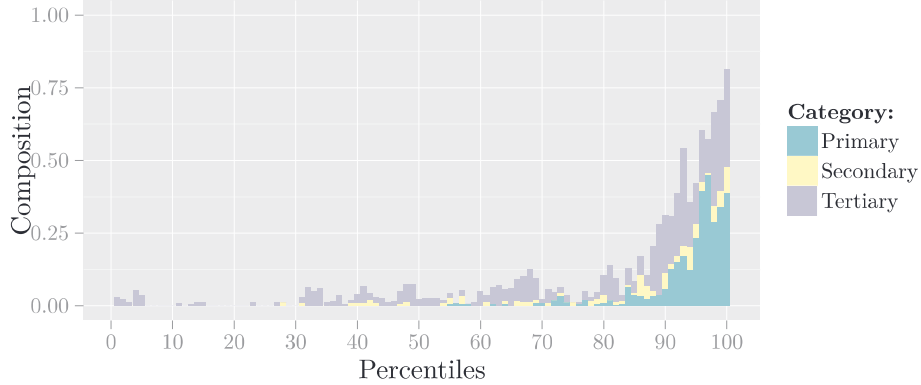


Figure 3: Relative wealth position with regard to economic sectors of business wealth

An obvious nexus exists between annual incomes and the stock of wealth. The annual mean wage in the sample amounts to some 23,500 €. Clearly, households earning less are found at the bottom of the wealth distribution and the richest earn above-average. This is also true for the income of self-employed households and for pension incomes. Furthermore, inheritances and gifts are essential for the accumulation of wealth in Austria. Table 2 shows the share of households that have already received wealth transmissions in terms of inheritances or gifts according to the HFCS 2010 data. In Austria, the inheritance of the main residence is of particular importance (cf. Fessler, Mooslechner, and Schürz, 2010). Therefore, we distinguish between the transmission of solely the main residence, the transmission of the main residence and additional wealth components and the transmission of all wealth components except the main residence. Generally, there is a strong link between the amount of wealth and its transmission: the wealthier a household the higher is the probability of having received inheritances or gifts. Two thirds of households in the richest quintile have benefitted from at least one wealth transfer. Since the bottom half of the wealth distribution does not own its main residence, there are no inheritances evident in that part of the distribution. The correlation between the position in the net wealth distribution and the receipt of inheritances is strongly positive.

4 Joint distribution of household characteristics and wealth position

The descriptive statistics in the previous chapter provide insight in the univariate relationship between socioeconomic characteristics and a household's position in the net wealth distribution. A multivariate approach can be used to analyze the joint distribution of socioeconomic factors and wealth. Ordinary least squares regression is the common tool to assess the relationship between several covariates and a dependent variable. However, the univariate analysis has shown that the composition of household characteristics change significantly with respect to the wealth posi-

tion. We therefore expect to find a pronounced nonlinear relationship between the socioeconomic characteristics and households rank on the wealth distribution. Averaging-out this patterns with a regression to the mean does not seem to be the adequate strategy and would not be entirely conclusive. We therefore apply quantile regressions (Koenker and Bassett, 1978; Koenker and Hallock, 2001). In this setting, quantiles of the conditional distribution of the response variable are expressed as functions of observed covariates. Hence, we are able to measure the effect of the socioeconomic characteristics conditional on the position in the wealth distribution. Given a random variable Y with the cumulative distribution function

$$F(y) = P(Y \leq y),$$

the empirical quantile function for quantile $\tau \in [0, 1]$ is defined as an inverse function

$$Q(\tau) = F^{-1}(\tau) = \inf(y : F(y) \geq \tau).$$

According to Koenker and Bassett (1978), the τ th quantile of the random sample $\{y_1, y_2, \dots, y_n\}$ can be calculated by

$$\min_{\xi \in \mathbb{R}} \sum_{i=1}^n \rho_{\tau}(y_i - \xi) \quad (1)$$

where $\rho_{\tau}(\cdot)$ is the so-called “check function”. This function is based on the absolute deviations of the residuals $|y_i - \xi|$ which are weighted by τ if the term is positive and by $(1 - \tau)$ if it is negative. Hence $\rho_{\tau} = \tau \cdot I(y_i > \xi) + (1 - \tau) \cdot I(y_i < \xi)$. Analogue to the estimation of the unconditional mean for a random sample which minimizes the sum of squared residuals, this applies to the linear conditional mean function $E(Y|X = x) = x'\beta$ by solving

$$\hat{\beta} = \arg \min_{\beta \in \mathbb{R}^p} \sum_{i=1}^n (y_i - x_i'\beta)^2. \quad (2)$$

Given the linear conditional quantile function $Q(\tau|X = x) = x_i'\beta(\tau)$, we estimate

$$\hat{\beta}(\tau) = \arg \min_{\beta \in \mathbb{R}^p} \sum_{i=1}^n \rho_{\tau}(y_i - x_i'\beta). \quad (3)$$

Our focus lies on the relative net wealth position of Austrian households. Consequently, the dependent variable is the household position on the net wealth distribution evaluated from the weighted empirical distribution function. The observed variation of this variable is set into relation to the socioeconomic characteristics as described in the univariate analysis above. We estimate

the following specification:

$$\begin{aligned}
\text{CDF}_{net} = & \beta_0 + \beta_1 \text{Female} + \beta_2 \text{Age} + \beta_3 \text{Tert. Edu.} + \beta_4 \text{Couples} + \beta_5 \text{Single par.} + \beta_6 \text{Families} \\
& + \beta_7 \text{Manager} + \beta_8 \text{Services} + \beta_9 \text{Agric.} + \beta_{10} \text{Size} + \beta_{11} \text{Children} + \beta_{12} \text{Liabilities} \\
& + \beta_{13} \text{Inc. empl.} + \beta_{14} \text{Inc. self.} + \beta_{15} \text{Inc. pens.} + \beta_{16} \text{Inc. trans.} + \beta_{17} \text{Main residence} \\
& + \beta_{18} \text{Business} + \beta_{19} \text{Inheritance} + \epsilon
\end{aligned} \tag{4}$$

Most of the variables are dummies with the exception of age, household size, number of children, liabilities and the income variables which are measured at their levels. The dummy variables *main residence*, *business* and *inheritance* indicate the participation in the respective wealth component. In accordance with similar empirical studies, we estimate the model based on the whole sample but do not report results for the top and bottom 5% percentiles in Figure 4 due to the already mentioned specifics in the data for these extreme groups.

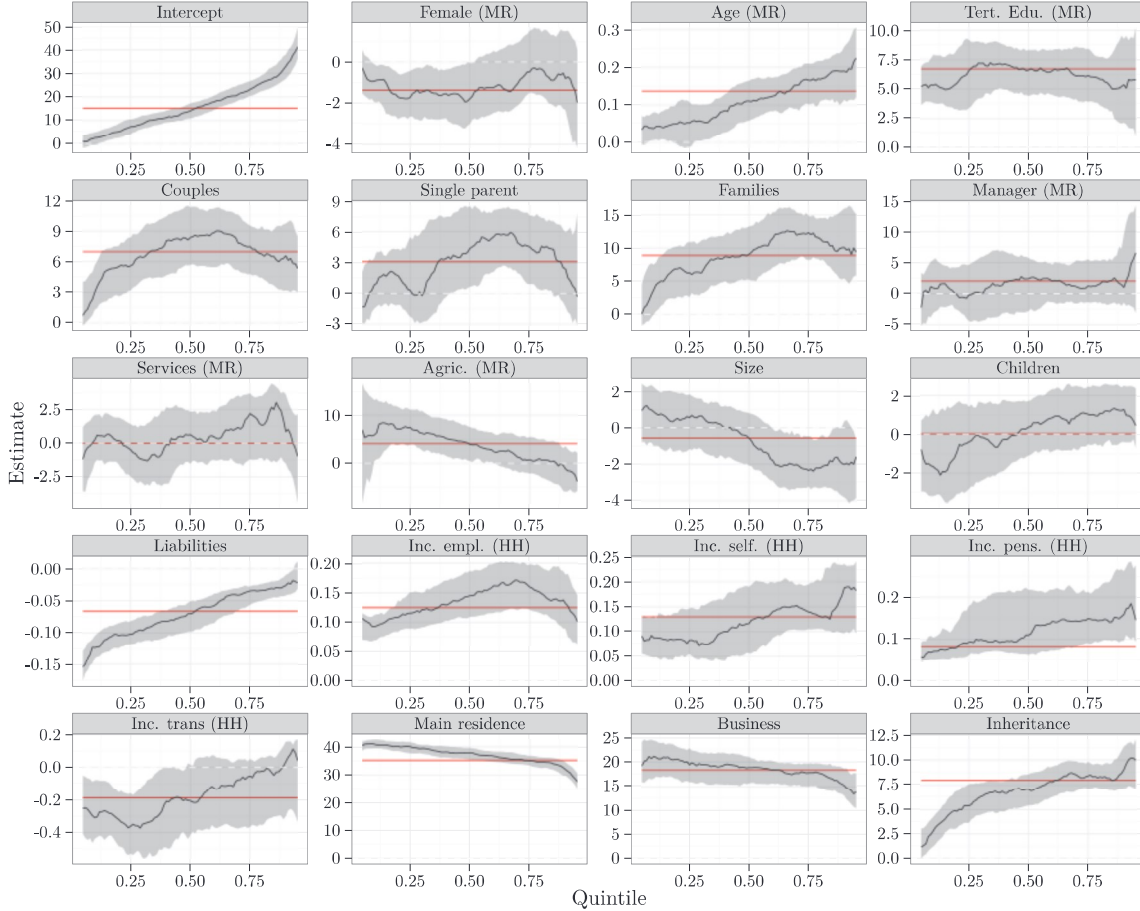


Figure 4: Quantile Regression Estimates – Socioeconomic determinants of relative net wealth (OLS estimates indicated by red lines)

Among the household characteristics, tertiary education shows a particularly strong and consistently positive relationship with the net wealth position. The correlation tends to be moderately lower at both tails of the distribution but it is stable at the level of a regular OLS fit (6–7 ad-

ditional percentiles) for the rest of the distribution. The strong interrelation between education and wealth has already been indicated by the descriptive analysis. Clearly, there is also a robust positive nexus between the net wealth position and the major mechanisms of wealth accumulation, income and inheritances. The correlation of income and wealth is consistent for both employees and self-employed, however, the movement in opposite directions at the top is remarkable. This is consistent with the observation that self-employed households are overrepresented in the wealthiest decile. Receiving transfer incomes corresponds to a downgrade in the net wealth position which is significant for the bottom half.

While inheriting is generally positive for an household's net wealth position, the effect varies throughout the distribution. More specifically, the relation between the receipt of inheritances and the size of wealth is strengthening along the distribution and is significantly stronger for affluent households than for their poorer counterparts. This is closely linked to empirical findings of wealth persistence where richer households receive higher inheritances, while poorer households inherit less frequent and smaller amounts (Piketty, 2014). Further variables with a strong and stable connection to wealth include the ownership of main residence and businesses. Owning a main residence corresponds to roughly 30 to 40 additional percentile points depending on the net wealth position. Similarly, households with business stakes are about 15 to 20 percentiles above their counterparts without businesses.

Other household characteristics seem to correlate with the wealth position, however, they are only partially significant across the distribution. For instance, households with female reference persons have significant disadvantages concerning the net wealth position particularly in the bottom half. Regarding the household structure with single households as reference group, the findings show interesting patterns. Controlled for all other attributes, couples and families obtain higher positions in the wealth distribution than single households. Surprisingly, even lone parents seem to be better-off in the upper half. Although working as a manager is just weakly significant over the whole wealth distribution, the sharp increase at the top is notable.

Finally, liabilities have by definition a negative effect on net wealth. This can also be observed in the regression estimates where 10,000€ in liabilities mean a maximum of 1.5 percentile loss of a household's position in the distribution. The correlation varies across the quantiles such that households on the lower tail are much more affected than households on the other end.

5 Conclusions

The distribution of private wealth has recently become a subject of intensive economic research. New data sources have opened a broad field for investigation and enable policy makers to take private household wealth into account for policy propositions. However, analyzing the wealth distribution in an aggregate manner often disregards the underlying sociodemographic structure since additional household variables are rare. For the case of Austria the HFCS 2010 data for the first time allow the observation of household characteristics related to the wealth distribution. We extend previous work that has dealt with the skewness of the wealth dispersion and focus on the joint distribution of wealth and socioeconomic specifics in order to identify generic households at certain positions in the net wealth distribution.

A univariate approach shows a positive relationship between household size and net wealth. Single households and in particular single parents can hardly be found among the richest in the distribution, whereas households with three members or more — mainly multi-generation families

— dominate the upper tail. Furthermore, we find a distinct tendency that higher educational attainments correlate with a better position in the wealth distribution.

Based on the results of the descriptive approach, it is evident that the socioeconomic patterns in the wealth distribution are anything but linear. We therefore rely on quantile regressions to analyze the skewed joint distribution of wealth and household characteristics. A number of household variables, like tertiary education, show a stable positive relation with the net wealth position. Others, like the value of main residence, business ownership or receipt of inheritances, show strictly positive but non-linear effect.

There are no archetypal rich or poor households that serve as representative household for certain wealth levels. However, there are certain characteristics that are more common in one segment of the distribution than in another. We have shown that self-employed households and households with business stakes in the primary sector tend to emerge in the richest decile. On the other hand, this article provides evidence that the bottom 5% of the net wealth distribution show characteristics similar to households found in the middle of the distribution rather than the subsequent four deciles. All these findings should be considered with regard to economic policies affecting the distribution of wealth.

Since the HFCS 2010 survey was conducted by the European Central Bank in all member states of the European Monetary Union, future research may reveal different socioeconomic patterns of the wealth distribution across countries. We emphasize the important role of different household structures across Europe that must be taken into consideration for European comparisons between wealth distributions. However, the identification of generic households across the wealth distribution is a decisive precondition to assess the social target groups of economic policies concerning the redistribution of wealth.

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