Net Wealth across the Euroarea - Why household structure matters and how to control for it. PRELIMINARY AND INCOMPLETE DRAFT*

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August 9, 2013

Abstract

We study the link between household structure and cross country differences in the wealth distribution using a recently compiled household dataset for the euroarea (HFCS). We estimate counterfactual distributions using non-parametric reweighting to examine the extent to which differences in the unconditional distributions of wealth across euroarea countries can be explained by differences in household structure. We find that imposing a common household structure has strong effects on both the full unconditional distributions as well as its mappings to different inequality measures. For the median 50% of the differences are explained for Austria, 15% for Germany, 25% for Italy, 14% for Spain and 38% for Malta. For others as Belgium, France, Greece, Luxembourg, Portugal, Slovenia and Slovakia household structure masks the differences to the Euroarea median and Finland and the Netherlands change their position from below to above the euroarea median. The impact on the mean and percentile ratios is similarly strong and varies with regard to direction and level across countries and their distributions. We can confirm the finding of Bover (2010) that the effect on the Gini is somewhat less pronounced, but might mask relevant information by being a net effect of different accumulated effects along the distribution. Country rankings based on almost all of these measures are severely affected alluding to the need for cautious interpretation when dealing with such rankings. Furthermore the explanatory power of household structure changes along the net wealth distribution. Therefore we argue for more flexible controls for household structure. We provide such a set of controls to account for household type fixed effects which are based on the number of household members as well as possible combinations of age categories and gender.

JEL Classification: D30, D31

Key Words: Wealth Distribution, Household Structure, Survey Methodology, Unconditional Distribution, Non-Parametric Re-Weighting, Counterfactuals

*We thank Markus Knell and Helmut Elsinger as well as the Members of the ECBs Household Finance and Consumption Network for valuable comments and discussions.

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1 Introduction

Using the first apriori harmonized cross country dataset which allows for analyses of net wealth distributions across countries in the Euroarea, we "standardize" the different household structures across countries to estimate the contribution of differences in household structure with regard to differences in the observed net wealth distributions as well as measures based on these distributions. For the median 50% of the differences are explained for Austria, 15% for Germany, 25% for Italy, 14% for Spain and 38% for Malta. For others as Belgium, France, Greece, Luxembourg, Portugal, Slovenia and Slovakia household structure masks the differences to the Euroarea median. The impact on the mean and percentile ratios is similarly strong. We can confirm the finding of Bover (2010) that the effect on the Gini is somewhat less pronounced, but might mask relevant information by being a net effect of different accumulated effects along the distribution. Country rankings based on almost all of these measures are severely affected alluding to the need for cautious interpretation when dealing with such rankings. As household structure matters a lot we argue to use more flexible controls than the standard household size as well as age, age squared and gender of a more or less arbitrarily chosen representative member of the household. We provide such a set of controls to account for household type fixed effects which are based on the number of household members as well as possible combinations of age and gender of all of them.[1]

The most important stylized facts about the distribution of net wealth are well known and well documented. Net wealth is distributed more unequally than income. The distribution of inherited wealth is more unequally distributed than wealth in general; and the differences in wealth distribution across developed countries are large (Davies and Shorrocks (2000)). Despite the fact that net wealth and its distribution - resources and their allocation - is at the heart of economics, theoretical models struggle to reproduce the observed skewness of the distribution and empirical analyses suffer from the lack of comparable data across countries. While consumption smoothing or intergenerational transmission are well covered by theoretical models, the strong differences across countries and the amount of wealth concentration are still a major obstacle for modelling (Cagetti and DeNardi (2005)). It is unclear how much of the empirically observed differences might be accountable (i) to differences in methodology of the underlying data production process, (ii) to institutional differences such as pension systems, taxation or welfare programs, (iii) to historical differences such as land reform or

[1] These controls are a non-parametric and very flexible way to control for household structure and also can be used additionally to the information of a household reference person to further control inside the defined household types. Furthermore we provide the weights to standardize household structure across the Euroarea to further analyze the contribution of household structure of any distribution and any statistic with regard to the set of all HFCS variables using the approach proposed in this paper. The dataset containing dummies for the household types, the weights and variables to merge the dataset to the HFCS as well as Information on the household types can be found here: WEBSITE

war, or (iv) to differences in the structure and behaviour of economic agents as households or individuals.

International comparisons of wealth distributions reliant on post-harmonized data and definitions originally collected through a broad variety of different methodologies are known to lead to differences in the observed wealth distributions and therefore might disguise or exaggerate the true differences. The Luxembourg Wealth Study is the main example for such an harmonization endeavour and the differences in estimates for the US net wealth distribution between the Panel Study of Income Dynamics (PSID) and Survey of Consumer Finances (SCF) illustrate the importance of methodological differences in data production (see Sierminska, Brandolini, and Smeeding (2006) or Bover (2005)).

The Household Finance and Consumption Survey (HFCS) of the Eurosystem is the first project to a priori harmonize the data production process of wealth surveys across the 17 member countries[2] of the Eurosystem and therefore delivers the first large dataset allowing for reasonable cross-country comparison of net wealth among a large number of developed countries (ECB (2013a) and ECB (2013b)).

Whereas remaining methodological differences in this a priori harmonized cross country dataset might still be of importance especially at the tails of the wealth distribution and differences due to institutions, history and behaviour need to be elucidated in future research, we concentrate on differences in the wealth distribution due to variation in the form of the unit of observation - the household - and its different structure across countries. Net wealth is usually surveyed for households, not individuals, and cannot be partitioned to household members without further assumptions. This convention might be useful for different reasons. First, we might be interested in possession of or access to resources instead of ownership of an individual inside a household.[3] Second, the control over some assets inside a household might differ from the ownership structure.[4] Third, it might be impossible to allocate all assets inside a household to individuals. For an economic interpretation of cross-country comparisons these differences in household structure are important. Imagine two countries A and B, both populated with three individuals each endowed with wealth 1 but in country A they form 3 and in country B only two households. In country A we would observe perfect wealth equality measured at the household level while in country B the distribution would be unequal. Additional to the number of household members also age profiles and gender composition might play an important role for the basic form of the household as unit of observation. Previous work on international comparisons either treated households as homogeneous across countries,

[2]The first wave of the HFCS includes only 15 of the 17 member countries, excluding Ireland and Estonia.

[3]Children who live in a house might benefit as much from the house as their parents who own the house and who even have some legal duty to give them shelter.

[4]As for example in the case of subsidized assets which are subsidized only for one individual and therefore often refer to children or elderly which might not be in control of the assets. However, the role of intra-household power structures can not be analyzed with our data.

applied some equalizing such as dividing net wealth by the number of household members or its square root, or compared conditional on certain age bands (Banks, Blundell, and Smith (2004)). However, given the large number of different countries and the heterogeneity of household structures observed in a dataset like the HFCS the topic of household structure deserves more attention. This is true for all household level variables but especially relevant for variables such as net wealth which are ultimately accumulated at the individual level and all main sources such as income and inheritance are phenomena at the individual level.
We estimate counterfactual distributions by imposing a common (the average) household structure on all countries. We do this by using non-parametric reweighting and examine to what extent differences in the unconditional distributions of net wealth between euroarea countries are due to differences in household structure.[5] We further show the effect of these differences on the most common inequality measures and find that imposing a common household structure has strong effects on both, the full unconditional distributions as well as its mappings to different inequality measures. Our paper is closest to the recent papers by Bover (2010) who estimates counterfactual US net wealth distributions relying on the Spanish household structure and Peichl, Pestel, and Schneider (2012) who examine the effect of changes in the german household structure on the income distribution. It differs in using a large dataset of a priori harmonized cross country data and by conducting a more flexible non-parametric approach with regard to the definition of household types.

The rest of this paper is structured as follows. Section 2.1 introduces the dataset and its main properties and differences to existing data. In section 2.2 we discuss the implemented non-parametric estimation strategy to generate the relevant counterfactual distributions. The main part of the paper, section 3, discusses the results reached from our empirical exercise and is split in two parts. First we discuss the differences due to household structure on the full distributions, on wealth inequality measurement and on the ownership of certain assets in section 3.1. Second, in section 3.2 we argue for more flexible controls for household structure in regression analyses than are usually used and provide such controls based on our re-weighting approach. Section 4 discusses the results and concludes.

[5] As a benchmark we divide household wealth and multiply the household weight by the number of household members to produce a measure of the individual wealth distribution under the assumption of equal intra household division of wealth.

2 Data and Estimation Strategy

2.1 Data

We use the first wave of the HFCS, a Euroarea-wide project to gather data on real and financial assets and liabilities of Euroarea households. In the first wave HFCS (2010) more than 62,000 households across the Euroarea were interviewed, leading to a micro dataset which is not only arguably representative at the Euroarea but also at the level of each member state. While the goal was maximized harmonization in terms of questionaire, interview method, editing, multiple imputation and all other aspects of data production, national differences were accounted for by adapting to country specifics where necessary. Table 1 shows basic information such as fieldwork period, net sample size, response rates, oversampling of the wealthy as well as survey mode for all HFCS 2010 country surveys.

Table 1: General Information on the HFCS Wave 1

	Fieldwork period	Net sample Size	Response Rate (%)	Over-sampling	Survey Mode[i]
Austria	2010/2011	2,380	55.7	No	CAPI
Belgium	2010	2,364	21.8	Yes	CAPI
Cyprus	2010	1,237	31.4	Yes	CAPI(12%)/PAPI(88%)
Germany	2010/2011	3,565	18.7	Yes	CAPI
Spain	2008/2009	6,197	56.7	Yes	CAPI
Finland	2009/2010	10,989	82.2	Yes	CAPI(3%)/CATI(97%)
France	2009/2010	15,006	69.0	Yes	CAPI
Greece	2009	2,971	47.2	Yes	CAPI
Italy	2010	7,951	52.1	No	CAPI(85%)/PAPI(15%)
Luxembourg	2010/2011	950	20.0	Yes	CAPI
Malta	2010/2011	843	29.9	No	CAPI(81%)/PAPI(19%)
Netherlands	2010	1,301	57.5	No	CAWI
Portugal	2010	4,404	64.1	Yes	CAPI
Slovakia	2010	2,057	n.a.	No	CAPI
Slovenia	2010	343	36.4	No	CAPI

Notes:
(i) Computer-assisted personal interview (CAPI); paper based personal interview (PAPI); computer-assisted telephone interview (CATI); computer-assisted web interview (CAWI).
(ii) *Source:* Eurosystem HFCS 2010.

Our main variable to illustrate the importance of household structure is net wealth. While in general household structure is important for all variables at the household level and might even be important for variables at the individual level it is crucial for net wealth. Net wealth is ultimately accumulated via savings from income or inheritance (and gifts), which are both (all) phenomena at the level of the individual. At the same time consumption and therefore savings as well as probabilities of inheritances received at the household level are highly dependent on the size of the household and the individuals age profile. Household net wealth is defined as real assets plus financial assets minus debt of a household. Real assets consist of the main residence, other real estate property, investments in self-employed businesses, vehicles and other valuables. Financial assets are current accounts, savings deposits, mutual funds, bonds, stocks, money owed to the household and other financial assets. Debt consists of collateralized debt as well as uncollateralized debt including credit card debt and overdrafts (see table 2).[6]

Table 2: HFCS Household balance sheet

+ Real Assets	Real Estate	Household main Residence
		Other real estate property
	Business	Self-employed
	Other	Vehicles
		Valuables
+ Financial Assets	Deposits	Sight accounts
		Savings accounts
	Shares	
	Bonds	
	Mutual Funds	
	Business	Non-self-employed
	Money owed to households as private loans	
	Private Pension Plans	
	Other	Options, futures, royalities, etc.
- Debt	Collateralized	Household main Residence
		Other real estate property
	Non-Collateralized	Credit Cards/Overdraft
		Other loans
= Net Wealth		

Notes:
(i) *Source:* Eurosystem HFCS 2010.

See the ECB methodological report for detailed information on all HFCS variables (ECB (2013b)). Throughout our paper we use complex survey weights as well as the multiple imputations provided by the HFCS.

[6]The HFCS does not collect information on the outstanding amount for a leasing contract, and hence these form of liability is not included in the debt level.

2.2 Estimation Strategy

Reweighting We observe cross-sections with draws from the country-distribution functions P^c of the vector (W,H) consisting of net wealth W and household structure H. We want to identify and estimate differences in the distribution of wealth $P(W)$, or differences in statistics with regard to the distribution of wealth, $\nu(P(W))$, which are due to differences in household structure H between countries $c \in C$. Whereas in general many statistics ν might be of interest we focus on percentiles, certain percentile ratios, the Gini-coefficient, as well as extensive and intensive margins of components of net wealth.

Let $P^{ea}(W,H)$ denote the overall distribution of (W,H) in the 14 countries surveyed in the first HFCS wave which include all variables necessary for this analysis[7] (henceforth called the Euroarea), and $P^c(W,H)$ the particular distributions for country $c \in C$. We then want to identify the counterfactual distribution $P^c_{ea}(W)$, in which the differences in the distribution of wealth W in a certain country c which are due to differences in the household structure H between the particular country and the Euroarea as a whole are eliminated. The differences between $P^c(W)$ and $P^c_{ea}(W)$, as well as differences between measures $\nu(P^c(W))$ and $\nu(P^c_{ea}(W))$ are the differences which are due to household structure. Formally we can write the counterfactual of interest of country c as,

$$P^c_{ea}(W) := \int_H P^c(W,H)dP^{ea}(H). \tag{1}$$

We can rewrite the counterfactual distribution in equation 1[8]

$$P^c_{ea}(W) := \int_H P^c(W,H)\Psi_H(H)dP^c(H), \tag{2}$$

where the re-weighting function Ψ_H is defined as

$$\Psi_H := \frac{P^{ea}(H)}{P^c(H)} \tag{3}$$

An overview of similar techniques which emerged after the contribution of DiNardo, Fortin, and Lemieux (1996) can be found in Fortin, Lemieux, and Firpo (2011). Instead of using a re-weighting approach we could also directly estimate the counterfactual distributions $P^c_{ea}(W)$ as proposed in Chernozhukov, Fernandez-Val, and Melly (2009). Another possibility recently proposed is the influence function regression approach by Fortin, Lemieux, and Firpo (2009) which is based on the first order approximation of ν, as a function of P^c around P^{ea}. Note

[7] We had to exclude Cyprus because it collects gender only for one household member, see ECB (2013a) page 83.

[8] Note that we could formulate the counterfactual distribution also as $P^c_{ea}(W \le w) = E^1[\mathbf{1}(W \le w)\Psi_H]$ (as e.g. in Bover (2010))

that given the counterfactual distributions $P^c_{ea}(W)$, we can decompose the differences between any measure of the observed distributions $\nu(P^{ea}(W))$ and $\nu(P^c(W))$ in the following way:

$$\nu(P^{ea}(W)) - \nu(P^c(W)) = [\nu(P^{ea}(W)) - \nu(P^c_{ea}(W))] + [\nu(P^c_{ea}(W)) - \nu(P^c(W))], \qquad (4)$$

where the first term reflects the differences remaining after controlling for differences in household structures across countries and the second covers the differences explained by differences in household structure.

We plot the respective quantile functions $Q^c(W)$, $Q^{ea}(W)$, the counterfactual quantile functions $Q^c_{ea}(W)$ as well as the resulting observed differences $d_{obs} := Q^{ea}(W) - Q^c(W)$ and the resulting differences after re-weighting $d_{rew} := Q^{ea}(W) - Q^c_{ea}(W)$. Note that analogous to equation 4 the relation $\frac{d_{obs}-d_{rew}}{d_{obs}}$ is a measure of the observed differences which can be explained by differences in household structure at every quantile u.

Household Structure We use the overall (or weighted average) household structure H^{ea} which refers to the union $\bigcup_{c\in C} H^c$ of the collection of country level household types $\{H^c : c \in C\}$ as a reference. First it includes by definition all household structures observed in all countries. Second it minimizes the overall need for re-weighting as it is the weighted average of country level household structures. However we have to assure that we choose a set of household structures that is large enough to flexibly control for the differences in household structures, i.e. helps us compare "apples to apples" but which is at the same time small enough to ensure enough overlap between the countries. In both extreme cases of a very small, where only one household structure is assumed, or very large number of household structure cells in which every type of household only exists in one certain country, re-weighting to the overall household structure would be without any effect.

We define household types by all possible combinations of 4 age categories and gender for each Individual (Member) up to 4 individuals in each household. We are (i) not taking (a particular order of individuals) or (ii) gender for individuals aged 15 or below into account. Households with 5 or more members are treated as 4 person households and sorted with regard to the first 4 members, the financially knowledgeable person (respondent) and the next 3 persons sorted by descending age. This results in 329 possible household types of which 249 are observed at least once in the Euroarea. A detailed description of the construction of these cells can be found in Appendix B. [9]

[9] We tried several possible definitions to construct household types based on gender as well as age of individuals living in a certain households. Results are robust across a great variety of combinations. Setting the Limit at this 329 possible types is a compromise between ensuring enough flexibility to compare "apples to apples" as well as having enough common support between countries given a certain definition of household types to generate meaningful counterfactuals.

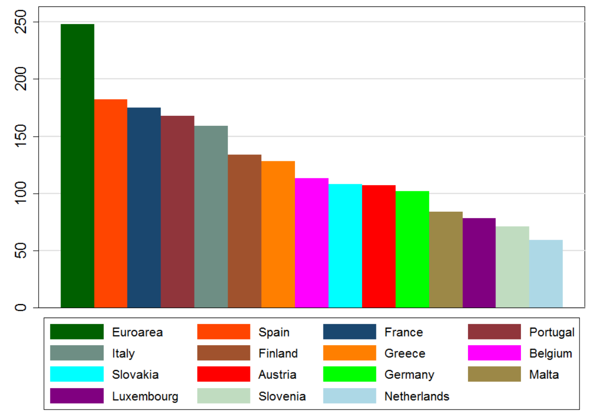
Table 3 shows the top 30 household types that occur most often in the Euroarea and include more than 90% of the observed Euroarea household population and between 82 and 95% in each individual country. It also shows the top 10 categories for each of the countries which all are subsets of the euroarea top 30 household types and include between 48 and 72% of households in all countries. However already large differences can be seen in the occurrence of the top types. The household type code describes the composition of the household. Two numbers for each individual in a household, where the first refers to age category $((1 = [-, 15]; 2 = [16, 34]; 3 = [35, 64]; 4 = [65, +]))$ and the second refers to gender for all individuals aged 16+ $(1 = male; 2 = female; 3 = below\ 16)$. The code is sorted by individual age. The most common household type 3132 is therefore a two person household (4 digits), consisting of a man aged between 35 and 64 (31) and a woman aged between 35 and 64 (32). This category consists of 10.2% of all Euroarea households. Around 9.5% of households are single households consisting of a woman aged 65+, which is the second most common household type. All other household type codes are to be read analogous. As one can see by the distributions of the top ten household categories in each country among the euroarea top 30 categories, certain types which are rather relevant in southern or eastern countries (e.g. type 21223132 make up more than 4% of households in Spain, Greece, Italy, Malta and Slovakia) and are not even in the top ten in northern countries. Also the typical single households are rather different. Whereas middle age singles (types 31 and 32) are very typical for e.g. Austria, Germany, Finland or the Netherlands they are much less important in Spain, Greece or Portugal.

Table 3: Occurance of Top 10 countrywise household types among the euroarea top 30 household types in Percent of the respective household populations

Top 30 EA	HH Size	Categories	EA	AT	BE	DE	ES	FI	FR	GR	IT	LU	MT	NL	PT	SL	SK
1	2	3132	10.2	13.3	10.2	12.7	7.6	12.8	11.6	6.4	6.7	7.2	7.4	9.3	9.0	10.7	8.0
2	1	42	9.5	8.8	7.7	10.2	7.5	10.4	11.3	6.7	9.6	5.7	6.8	8.2	8.5	11.4	6.1
3	2	4142	9.1	7.3	9.4	10.1	8.1	7.6	7.0	8.8	11.2	7.9	8.4	9.1	9.3	5.2	4.9
4	1	31	7.0	7.7	7.9	10.0	3.7	9.2	6.7		4.1	9.8	4.6	12.3		8.8	3.5
5	1	32	5.7	10.0	6.9	5.7		8.0	6.6	3.6	5.2	5.6	3.8	8.1	2.8	3.8	5.2
6	4	13133132	5.6	4.0	4.6	4.7	6.1	4.9	6.0	7.4	6.8	7.6	8.0	5.8	5.1	7.0	
7	1	41	3.6	3.4	5.1	4.3		3.3	4.0		3.4	3.1		2.7			3.6
8	3	133132	3.4				5.2			3.3	4.7		4.3		4.7		
9	1	21	3.3	4.7	3.4	5.3		5.1	3.8								
10	2	2122	3.2	3.3	2.9		3.1	6.2	4.6			3.5		4.9			
11	3	213132	3.0				3.3			4.6	3.8	3.3	7.1		5.2	4.3	4.7
12	2	3241	2.8			3.4				4.0				2.7			
13	1	22	2.6	4.1		4.2		4.0				3.0		3.1			
14	4	21223132	2.4				4.3			4.1	4.3		5.2				5.5
15	3	223132	2.1				3.2						3.8		3.7	3.5	3.6
16	3	132122	2.0						2.8								
17	4	13132122	1.7		2.8												
18	4	13223132	1.6												2.7		
19	4	13213132	1.6												3.0		
20	4	13132231	1.4							3.4							
21	4	21213132	1.4													4.4	3.5
22	3	132231	1.1														
23	2	3142	1.0														
24	4	22223132	1.0													3.3	
25	2	2132	0.9														
26	2	2231	0.9														
27	2	1332	0.8														
28	2	2232	0.7														
29	3	131332	0.6														
30	2	3242	0.5														
Sum of Countrywise Top 10				66.6	60.9	70.5	52.3	71.5	64.4	52.3	59.8	56.7	59.6	66.1	54.0	62.3	48.7
Sum of Euroarea Top 30			90.6	91.7	90.2	94.1	83.7	94.7	92.6	84.0	89.2	89.8	87.1	92.8	82.9	85.6	82.7

Notes:
(i) The household type codes show the age an gender of each household member, i.e. the first character reveals age as $1 = [-, 15]; 2 = [16, 34]; 3 = [35, 64]; 4 = [65, +]$ and the second refers to gender by $1 = male; 2 = female; 3 = below$ 16. Only the Top 10 household types for each country are listed with their relative percentage share inside the country.
(ii) Common support exists for all euroarea top 30 types but household type 131332, which is not observed in Slovenia.
(iii) *Source:* Eurosystem HFCS 2010.

Figure 1: Number of Household Types in the Euroarea

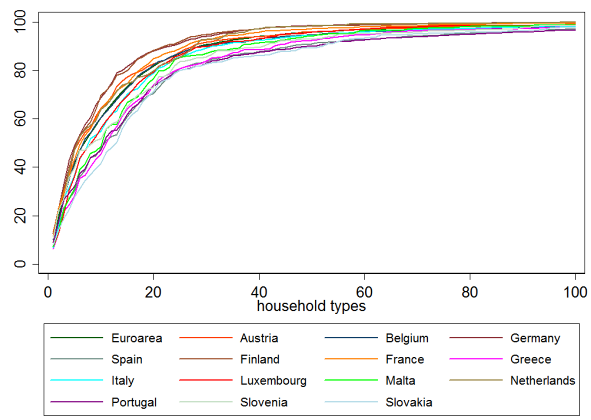


Notes:
(i) This graph shows the number of different household types observed as described in section 2.2.
(ii) *Source:* Eurosystem HFCS 2010.

Figures 1, 2 and 3 show the occurrence of household types across countries and the distributions and re-weighted distributions of the Euroarea top 100 most populated household types respectively. The distributions are sorted by the occurrence of household types in the Euroarea. Figure 1 illustrates the differences in the variety of household types observed across countries. The larger the sample size, the higher the probability that also sparsely populated household types are drawn into the samples. Also certain sampling schemes or interviewer modes (such as CAWI[10] in the Netherlands) might lead to a smaller variety of household types. As can be seen in figure 2 all the top household types are relatively common across the Euroarea. The top 30 Euroarea types include at least about 83% in Portugal and at most about 95% in Finland and Germany. Figure 3 shows the distributions when the data is re-weighted to the Euroarea average as described in section 2.2. As can be seen the common support between countries is large but does not include all household types in all country samples. The country variation is completely eliminated for the first few types and in general strongly reduced but small variation remains (compare figures 2 and 3). This is because for some countries certain household types are not observed at all, implying that they can not be re-weighted which translates to the remaining extrapolation outside the common support (between countries) as discussed in section 2.2.

[10]Computer-assisted web interview.

Figure 2: Distribution of Household Types in the Euroarea

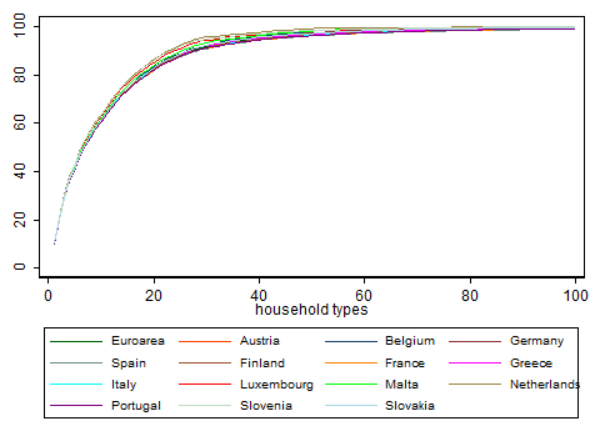


Notes:

(i) This graph shows the distributions of different household types observed as described in section 2.2.

(ii) *Source:* Eurosystem HFCS 2010.

Figure 3: Re-weighted Distribution of Household Types in the Euroarea



Notes:

(i) This graph shows the distributions of different household types observed as described in section 2.2 re-weighted to the Euroarea distribution.

(ii) *Source:* Eurosystem HFCS 2010.

3 Results

3.1 Why household structure matters

Table 4 includes all the main results of the paper. It shows estimates of the mean, selected percentiles as well as selected inequality measures estimated for the observed distributions, $P^{ea}(W)$ and $P^{c}(W)$ as well as estimated for the counterfactual distributions $P^{c}_{ea}(W)$, where Euroarea household structure is imposed using non-parametric re-weighting as described in section 2.2. Differences between any statistic $\nu(P^{c}(W))$ and $\nu(P^{c}_{ea}(W))$ are the differences which can be explained by differences in household structure.

Mean The Euroarea mean is 230 thousand Euro. The means of the Euroarea countries range from as low as 80 thousand Euro (Slovakia) to as high as 710 thousand Euro (Luxembourg). The impact of imposing the Euroarea household structure to all countries is large for many of them. Note that as the household structure of larger countries is more important for the Euroarea they are in general also more stable with regard to this type of re-weighting. There are different groups of countries. Austria, Belgium, France and Luxembourg already have an above Euroarea mean of net wealth but move even further away through re-weighting. Household structure in these countries is dampening means with regard to the average Euroarea household structure. Spain, Italy and Malta also have an above Euroarea mean but move closer to the Euroarea. In the case of Spain around 23% of the difference to the Euroarea is explained only by household structure. For Italy this value is 47% and for Malta even 48%. Germany, Finland and the Netherlands have means below the Euroarea mean and move up towards the Euroarea mean. Around 43% of the difference to the Euroarea mean is explained for Germany, 39% also for Finland and about 32% for the Netherlands. Greece, Portugal, Slovenia and Slovakia all have below Euroarea means and their means decrease even more with re-weighting, implying that the household structure exaggerates their wealth in Euroarea comparisons.

Percentiles The counterfactual percentiles in the second part of table 4 illustrates the variation of the importance of household structure between countries and along the net wealth distribution. In general differences between observed and counterfactual distributions are relatively stronger at the bottom than at the top, but effects are considerable all along the distribution. For example Finland's median is 86 thousand Euro and well bellow the Euroarea median of 109 thousand Euro whereas its re-weighted median 112 thousand Euro already lies above the Euroarea median. Also the Netherlands changes its position from below to above the median. For other countries large parts of the differences to Euroarea medians are explained by household structure (50% for Austria, 15% for Germany, 14% for Spain, 25% for Italy and

38% for Malta) others again move further away. Note especially that for the median it is not the same countries as for the mean where the gap between the Euroarea and their observed distribution is smaller or larger. Austria moves away for the mean but gets closer for the median. Belgium, France, Greece, Luxembourg, Portugal, Slovenia and Slovakia move away from the Euroarea for both. Germany, Spain, Italy and Malta get closer for both. Finland and the Netherlands even change position with regard to the median while both get closer to the Euroarea in case of the mean. Note, that the patterns differ along the distribution for many countries such as Austria, France, Slovenia and Slovakia which move closer for some areas and further away for others. Finland, Greece, The Netherlands and Portugal even switch position with regard to the euroarea in some areas. Belgium and Luxembourg always move away from the euroarea whereas Germany and Italy are always getting closer.

Inequality Measures The third part of table 4 shows the impact of household structure on selected percentile ratios as well as the Gini coefficient of net wealth. Again large parts of the differences the Euroarea measure can be explained by household structure. For the most robust measure $P75/P25$, all countries but Belgium, Luxembourg (further away) and the Netherlands (switches position) get closer to the Euroarea measure. For Finland which has a 34 $P75/P25$ ratio as opposed to only 17 for the Euroarea 95% of the difference can be explained by household structure. About 27% for Germany, 48% for France and 53% for Italy. Again effects are large for many countries, and again they are different for different measures. While $P75/P25$ gets closer to the Euroarea $P90/P10$ moves further away from the Euroarea for France even though in both cases french inequality is reduced by re-weighting. The Gini coefficient seems less sensitive to household structure and about half of the countries move closer to the Euroarea Gini and half of them move further away. However as Bover (2010) mentioned, the Gini masks relevant information by being a net effect of different accumulated effects along the distribution.

The main driving force behind these results are the differences in household size. Values of the re-weighted net wealth distributions for southern and eastern European countries in general are lower than the observed values because of their above average household size and the ones of northern European countries are higher because of their below average household size. Furthermore the size of the impact of imposing the common household structure along the distribution of net wealth also depends heavily on the age and gender structures and occurrence of household types. That leads to the result that the relevance of household structure varies considerably along the distribution and has different patterns across different countries. In all (regression) analyses where controls for household structure (number of household members, age and gender) are desirable this strong variation of the importance of household structure with regard to different countries and along their net wealth distributions

Table 4: Effects of Household Structure Differences Across Countries (in thousand Euro)

Variable Names	EA	AT	BE	DE	ES	FI	FR	GR	IT	LU	MT	NL	PT	SI	SK
Mean	229.84	265.03	338.65	195.17	291.35	161.53	233.40	147.76	275.20	710.09	365.99	170.24	152.92	148.74	79.66
Counterfactual	.	280.50	343.62	210.00	277.05	188.16	255.68	134.46	254.11	729.93	300.59	189.11	141.73	132.02	73.90
P10	1.19	0.98	2.78	0.06	5.66	-0.57	1.58	2.00	5.00	5.04	16.11	-3.80	1.04	4.22	12.92
Counterfactual	.	1.12	2.97	0.16	3.49	0.11	1.87	0.92	4.00	6.51	7.88	-0.06	0.56	2.97	7.76
P25	15.47	10.31	40.24	6.60	77.87	6.38	9.80	30.00	34.24	59.24	88.54	14.10	18.37	40.84	36.45
Counterfactual	.	11.52	46.11	8.10	64.51	13.92	12.97	20.96	22.32	80.31	66.05	20.04	11.67	29.59	32.03
P50	108.85	76.44	206.25	51.36	182.72	85.75	115.80	101.93	173.50	397.84	215.93	103.56	75.21	100.66	61.18
Counterfactual	.	92.74	213.42	59.95	172.12	111.97	135.00	90.02	157.13	417.07	174.81	124.84	68.13	83.04	56.04
P75	268.35	250.47	417.36	209.82	330.98	220.22	279.10	193.27	321.43	738.13	394.09	259.10	160.13	212.09	98.66
Counterfactual	.	266.78	423.84	225.60	311.96	254.06	300.40	171.53	304.04	741.38	345.56	283.37	150.32	192.06	91.15
P90	504.89	542.16	705.14	442.32	607.68	397.32	511.58	331.78	577.13	1,375.37	693.08	427.64	297.23	317.18	151.86
Counterfactual	.	552.55	725.30	475.43	561.16	441.82	549.17	301.90	537.10	1,392.36	624.46	455.55	286.92	300.71	141.29
P75/P25	17.35	24.34	10.39	31.79	4.25	34.49	28.47	6.44	9.39	12.53	4.45	18.53	8.72	5.24	2.71
Counterfactual	.	23.18	9.23	27.86	4.84	18.25	23.17	8.18	13.62	9.24	5.24	14.33	12.90	6.61	2.85
P90/P50	4.64	7.13	3.42	8.62	3.33	4.63	4.42	3.25	3.33	3.46	3.21	4.13	3.95	3.15	2.48
Counterfactual	.	5.98	3.40	7.93	3.26	3.95	4.07	3.35	3.42	3.34	3.57	3.65	4.21	3.62	2.52
P90/P10	424.01	581.05	253.82	7,371.25	107.64	-692.19	323.64	165.89	115.43	274.28	43.33	-162.21	286.92	75.56	11.77
Counterfactual	.	519.28	244.58	3,155.16	160.65	3,909.91	293.80	329.98	134.28	217.16	79.24	#[iii]	513.40	101.61	18.22
Gini	0.68	0.76	0.61	0.76	0.58	0.66	0.68	0.56	0.61	0.66	0.60	0.65	0.67	0.53	0.45
Counterfactual	.	0.75	0.60	0.75	0.60	0.63	0.67	0.58	0.63	0.65	0.59	0.63	0.68	0.54	0.46

Notes:

(i) This table shows (in thousand Euro) the mean, percentiles, and distributional measures (percentile ratios and Gini coefficient) of net wealth in the euroarea. For each statistic, one can see the estimate based on original weights and the counterfactual estimates using the re-weighted households weights controlling for the differences of the household structure.

(ii) For the euroarea there is no counterfactual estimate by definition, thus cells are denoted with a dot.

(iii) In the Netherlands P10 is zero in implicate 1, hence the P90/P10 quantile ratio cannot be estimated.

(iv)*Source:* Eurosystem HFCS 2010.

calls for very flexible controls.

More results of imposing common household structure are shown in the Appendix A. See table B.5 and B.6 for counterfactuals for the extensive and intensive margins of net wealth components. See also figures B.4 to B.17, for country wise comparisons of the countries' net wealth distributions to the Euroarea distribution, the countries re-weighted distribution, the differences between those as well as a comparison of a ad-hoc individual level net wealth distribution where net wealth is divided by and household weights are multiplied by household members for each household.

3.2 How to control for Household Structure

Most empirical papers use the household size as well as age (age squared) and gender of a more or less arbitrarily selected so called reference person or householder - such as the reference person according to the Canberra definition or highest income earner - to control for household structure. This approach implies strong functional assumptions about the relationship of household structure and the variable(s) of interest. Furthermore it ignores age and gender of all other household member in two or more person household, which in all HFCS countries are the majority of households. However for most household level variables as net wealth, household income, participation rates in certain assets, transfers, inheritances and gifts, portfolio choice, and many more, age and gender of all household members will be relevant to the households realization of a certain variable. This fact is already relevant when comparing households within countries but is especially important for cross country comparison if the patterns of household structure are different between countries. While a 3 person household with a reference person aged around 30 living still with her older parents might be relatively common in Spain it is not in Germany, where the three person household with a (female) reference person aged around 30 is more likely to be a couple with a child. Using only household size and a reference persons age and gender information will not differentiate between these household types. The more the occurrence of such household types differs strongly between countries the more explanatory power will be transferred to other variables with cross country differences or country fixed effects, possibly leading to large bias and therefore misleading results.

We argue for taking into account the most relevant characteristics, i.e. age and gender, and possible combinations of all household members when controlling for household structure is desirable. One way to do so is to add a household type fixed effect for most relevant household types (e.g. the top 30 for the Euroarea as shown in table 3).[11] If net wealth is regressed

[11] We provide such a set of dummy variables resulting from our non-parametric procedure to define a set of

on standard household characteristic controls (a set of household size dummies, gender, age, and age squared of the reference person) and the top 30 set of household type fixed effects 22 of the 30 stay significant and the joint F-test on all of them having zero explanatory power is also rejected. Furthermore one can regress each of the household type dummies on the standard household characteristics controls (as above) and then regress net wealth on those residuals, which represent the information in the household type dummies which is orthogonal to the standard household characteristics controls. Again the H_0 of the joint F-test that the explanatory power of the residuals (the information orthogonal to the standard controls) is zero is rejected.

Therefore even with only the Top 30 populated household types in the Euroarea and including a quadratic age term in the standard controls additional explanatory power of the household type fixed effect can be shown. Naturally this result holds for any standard household structure control not including a quadratic age term or assuming linearity along household size. The explanatory power of course increases if all 332 household types are included. However, while such a large number of household type fixed effect are of no concern at the Euroarea level using the full HFCS dataset with more than 62.000 observations, it might be problematic for smaller subsets of the data. Note therefore that a small number - like the top 30 for which illustrated their significance as additional controls - might include already a large proportion of households and the subset of household fixed effects used can be chosen according to their occurrence in the data used. For the full HFCS sample all the 332 household types might be appropriate, whereas for the subset of southern countries another subset of household type fixed effects might be in order than for a northern subset of countries. Even though the explanatory power of using the top 30 household types alone is close to using the standard household characteristic controls we recommend using both together. Additionally household type fixed effects or the re-weights might be used to check robustness of results when for some reasons standard household characteristic controls are preferred.

4 Concluding Remarks

In this paper we highlight the importance of household structure for household level analyses. We use non-parametric re-weighting to impose the Euroarea household structure on all observed Euroarea countries and examine the extent to which differences in the observed unconditional distributions of net wealth between countries are due to differences in the structure of the household as the unit of observation.

We employ the Euroarea Household Finance and Consumption Survey, the first high quality a-priori harmonized dataset which allows for such a cross country comparison across 14

different household types as explained in section 2.2 here: WEBSITE.

Euroarea countries. We find that household structure plays a major role in explaining differences in net wealth distributions as well as their mappings to inequality measures across all countries. Additionally country rankings are severely altered once controlling for household structure. At different parts of the net wealth distribution household structure either accounts for a large part of the differences to the Euroarea net wealth distribution or masks the extent of these differences. These patterns differ between countries with regard to direction and size of the effect of imposing a common household structure.

At the bottom differences between observed and counterfactual distributions are relatively stronger than at the top. For the median 50% of the differences are explained for Austria, 15% for Germany, 14% for Spain, 25% for Italy and 38% for Malta. For others as Belgium, France, Greece, Luxembourg, Portugal, Slovenia and Slovakia household structure masks the differences to the Euroarea median. Finland's median is 86 thousand Euro and well bellow the Euroarea median of 109 thousand Euro whereas its re-weighted median 112 thousand Euro already lies above the Euroarea median. The Netherlands also changes its position from below to above the Euroarea median. Patterns differ along the distribution for many countries such as Austria, France, Slovenia and Slovakia which move closer for some areas and further away for others. Finland, Greece, The Netherlands and Portugal even switch position with regard to the euroarea in some areas. Belgium and Luxembourg always move away from the euroarea whereas Germany and Italy are always getting closer. Beside the direction of the effects also their level changes considerably along countries as well as their net wealth distributions.

The impact on percentile ratios is similarly strong. We can confirm the finding of Bover (2010) that the effect on the Gini is somewhat less pronounced, but might mask relevant information by being a net effect of different accumulated effects along the distribution.

Given those findings we argue for more flexible controls for household structure and illustrate that even a small subset of the top 30 populated of our non-parametrically defined household types adds explanatory power to the standard approach of using information on household size and age and gender of a reference person only. Together with the definition of our household types which can be used flexibly to control for household type fixed effects in regression we provide our re-weighting weights which allow to analyze the relevance of household structure for any HFCS variable.

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Appendix A Cell Construction

We define household types by all possible combinations of 4 age categories and gender for each Individual (Member) up to 4 individuals in each household. We are (i) not taking (a particular order of individuals) or (ii) gender for individuals aged 15 or below into account. Households with 5 or more members are treated as 4 person households and sorted with regard to the first 4 members, the financially knowledgeable person (respondent) and the next 3 persons sorted by descending age. This results in 329 possible household types of which 249 are observed at least once in the Euroarea.

The following shows the construction of the different household types over all countries in the Euroarea.

1. We take the first four members of each household.
2. Each members belongs to one of four age groups:

   1: below 16 years

   2: between 16 and 34 years

   3: between 35 and 64 years

   4: above 64 years
3. Each household member belongs to one of three gender groups:

   1: male

   2: female

   3: children
4. Each household member belongs therefore to a unique age-gender cell.
   Examples:
   - A male, 30 year old household member belongs in the cell [21].
   - A female, 68 year old household member belongs in the cell [42].
5. Each household consists of a unique combination of age-gender pairs of the first four household members. We refer to this combination as the household type code. The household type code describes the composition of the household. Two numbers for each individual in a household, where the first refers to age category ((1 = [-; 15]; 2 = [16; 34]; 3 = [35; 64]; 4 = [65;+])) and the second refers to gender for all individuals aged 16+ (1 = male; 2 = female; 3 = below 16). The code is sorted by individual age. The most

common household type 3132 is therefore a two person household (4 digits), consisting of a man aged between 35 and 64 [31] and a woman aged between 35 and 64 [32].
Examples:

- A household with 2 household members consisting of one male, between 35 and 64 years old and one female, between 35 and 64 years old, belongs then to the unique household cell of [31,32].
- A single household with a female, above 64 year old household member belongs to the unique household cell of [42].
- A household with 2 household members consisting of one male, above 64 years and one female, above 64 years, belongs then to the unique household cell of [41,42].

The above three examples represent the most common household types in the Euroarea.

In order to calculate the number of possible cell combination we start at the person level. One person can be identified by one of the following combinations of age-gender pairs, whereby the first digit reflects the age group and the second the gender of the person. This takes into account that a person below 16 is always a child and a child can never be older than 15 years old.

In the table below in the first rows we see the 7 different person types, that we will observe based on the possible combinations of age and gender groups [A,B,C,D,E,F,G]. Each person falls into one of the 7 categories. For a household size larger than one we may observe different combinations of persons living in such a household. Therefore the permutations for each household size can be determined as, as k (householdsize) combinations out of 7 elements (person characteristics).

$$\binom{n}{k} = \frac{n!}{k!(n-k)!}$$

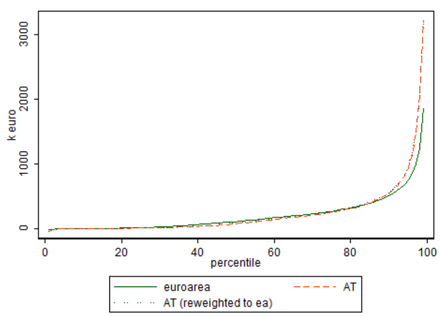
The formula to determine all possible cell combinations for different household sizes is a permutation with repetition without taking the rank order into account. The maximum number of combinations is 329. It allows for combinations of persons living in a household that are very unlikely to be observed in the actual household data e.g. a single household consisting of a minor (below 16 years old). The actual number of household cells observed in the Euroarea are 249 different types.

size							
				7 Combinations			
1	[13] A	[21] B	[22] C	[31] D	[32] E	[41] F	[42] G
				28 Combinations			
2	[A,A]						
	[A,B]	[B,B]					
	[A,C]	[B,C]	[C,C]				
	[A,D]	[B,D]	[C,D]	[D,D]			
	[A,E]	[B,E]	[C,E]	[D,E]	[E,E]		
	[A,F]	[B,F]	[C,F]	[D,F]	[E,F]	[F,F]	
	[A,G]	[B,G]	[C,G]	[D,G]	[E,G]	[F,G]	[G,G]
				84 Combinations			
3	[AAA]	[ABB]	[ACC]	[ADD]	[AEE]	[AFF]	[AGG]
	[AAB]	[ABC]	[ACD]	[ADE]	[AEF]	[AFG]	[BGG]
	[AAC]	[ABD]	[ACE]	[ADF]	[AEG]	[BFF]	[BBD]
	[AAD]	[ABE]	[ACF]	[ADG]	[BEE]	[BFG]	[BBE]
	[AAE]	[ABF]	[ACG]	[BDD]	[BEF]	[BCE]	[BBF]
	[AAF]	[ABG]	[BCC]	[BDE]	[BBC]	[BDG]	[BDF]
	[AAG]	[BBB]	[BCD]	[BEG]	[BCF]	[BCG]	[BBG]
	[CCC]	[CDD]	[CEE]	[CFF]	[CGG]	[DEG]	[EFG]
	[CCD]	[CDE]	[CEF]	[CFG]	[DDD]	[EFF]	[EEE]
	[CCE]	[CDF]	[CEG]	[DFF]	[DDE]	[FGG]	[EEF]
	[CCF]	[CDG]	[DEF]	[DGG]	[DDF]	[FFG]	[EEG]
	[CCG]	[DEE]	[DFG]	[EGG]	[DDG]	[GGG]	[FFF]
				210 Combinations			
4	[AAAA]	[AABB]	[AACC]	[AADD]	[AAEE]	[AAFF]	[AAGG]
	[AAAB]	[AABC]	[AACD]	[AADE]	[AAEF]	[AAFG]	[ABGG]
	[AAAC]	[AABD]	[AACE]	[AADF]	[AAEG]	[ABFF]	[ACGG]
	[AAAD]	[AABE]	[AACF]	[AADG]	[ABEE]	[ABFG]	[ADGG]
	[AAAE]	[AABF]	[AACG]	[ABDD]	[ABEF]	[ACFF]	[AEGG]
	[AAAF]	[AABG]	[ABCC]	[ABDE]	[ABEG]	[ACFG]	[AFGG]
	[AAAG]	[ABBB]	[ABCD]	[ABDF]	[ACEE]	[ADFF]	[AGGG]
	[ABBC]	[ABCE]	[ABDG]	[ACEF]	[ADFG]	[BBGG]	[DDGG]
	[ABBD]	[ABCF]	[ACDD]	[ACEG]	[AEFF]	[BCGG]	[DEGG]
	[ABBE]	[ABCG]	[ACDE]	[ADEE]	[AEFG]	[BDGG]	[DFGG]
	[ABBF]	[ACCC]	[ACDF]	[ADEF]	[AFFF]	[BEGG]	[DGGG]
	[ABBG]	[ACCD]	[ACDG]	[ADEG]	[AFFG]	[BFGG]	[EEGG]
	[BBBB]	[ACCE]	[ADDD]	[AEEE]	[BBFF]	[BGGG]	[EFGG]
	[BBBC]	[ACCF]	[ADDE]	[AEEF]	[BBFG]	[CCGG]	[EGGG]
	[BBBD]	[ACCG]	[ADDF]	[AEEG]	[BCFF]	[CDGG]	[FFGG]
	[BBBE]	[BBCC]	[ADDG]	[BBEE]	[BCFG]	[CEGG]	[FGGG]
	[BBBF]	[BBCD]	[BBDD]	[BBEF]	[BDFF]	[CFGG]	[GGGG]
	[BBBG]	[BBCE]	[BBDE]	[BBEG]	[BDFG]	[CGGG]	[DDFF]
	[CCDF]	[CDEE]	[BBCF]	[BBDF]	[BCEE]	[BEFF]	[DDFG]
	[CCDG]	[CDEF]	[BBCG]	[BBDG]	[BCEF]	[BEFG]	[DEFF]
	[CDDD]	[CDEG]	[BCCC]	[BCDD]	[BCEG]	[BFFF]	[DEFG]
	[CDDE]	[CEEE]	[BCCD]	[BCDE]	[BDEE]	[BFFG]	[DFFF]
	[CDDF]	[CEEF]	[BCCE]	[BCDF]	[BDEF]	[CCFF]	[DFFG]
	[CDDG]	[CEEG]	[BCCF]	[BCDG]	[BDEG]	[CCFG]	[EEFF]
	[DDDD]	[DDEE]	[BCCG]	[BDDD]	[BEEE]	[CDFF]	[EEFG]
	[DDDE]	[DDEF]	[CCCC]	[BDDE]	[BEEF]	[CDFG]	[EFFF]
	[DDDF]	[DDEG]	[CCCD]	[BDDF]	[BEEG]	[CEFF]	[EFFG]
	[DDDG]	[DEEE]	[CCCE]	[BDDG]	[CCEE]	[CEFG]	[FFFF]
	[EEEE]	[DEEF]	[CCCF]	[CCDD]	[CCEF]	[CFFF]	[FFFG]
	[EEEF]	[DEEG]	[CCCG]	[CCDE]	[CCEG]	[CFFG]	[EEEG]

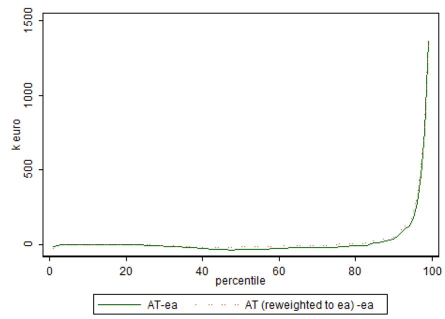
Appendix B Figures and Tables

Figure B.4: Austrian net wealth distribution with relation to the euroarea

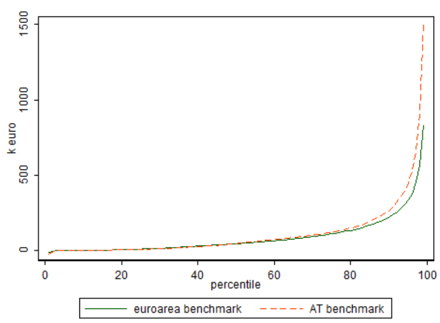
(a) (Reweighted) HH Dist.



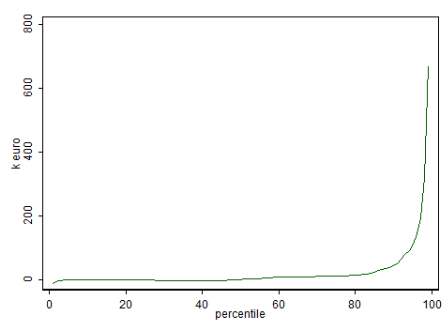
(b) Diff in (reweighted) HH Dist.



(c) Hyp. Personal Dist.



(d) Diff in Hyp. Pers. Dist.



Notes:

(i) Graph (a) shows the net wealth distributions (99 percentiles) of Austria and the euroarea as a whole, as well as a reweighted Austrian net wealth distribution to match euroarea household structure (using non-parametric reweighting as described in section 2.2).

(ii) Graph (b) shows the differences between the net wealth distributions (99 percentiles) of Austria and the euroarea as a whole as well as the differences of the reweighted Austrian distribution (see (i)).

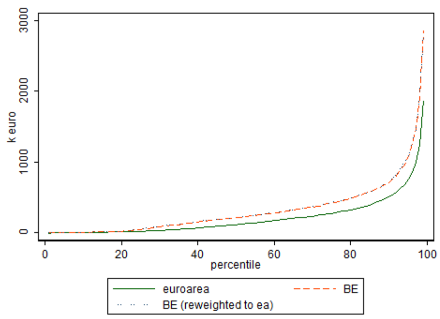
(iii) Graph (c) shows a hypothetical personal net wealth distributions (99 percentiles) of Austria and the euroarea as a whole under the assumption that household wealth is equally shared among all household members.

(iv) Graph (d) shows the differences between the hypothetical personal distributions.

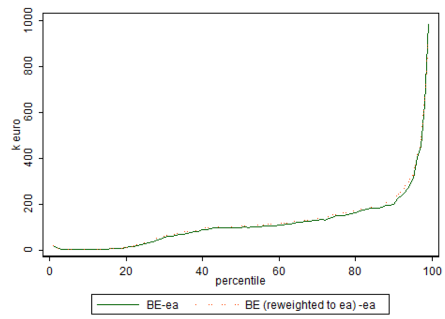
(v) *Source:* Eurosystem HFCS 2010.

Figure B.5: Belgian net wealth distribution with relation to the euroarea

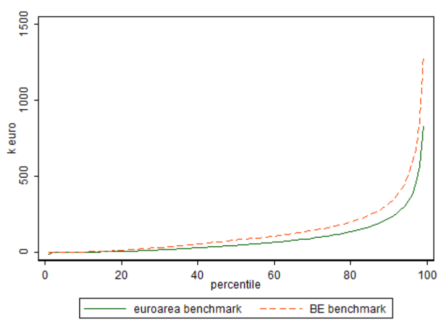
(a) (Reweighted) HH Dist.



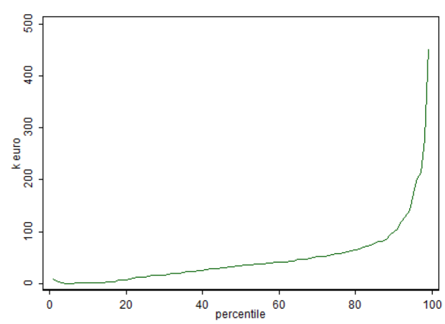
(b) Diff in (reweighted) HH Dist.



(c) Hyp. Personal Dist.



(d) Diff in Hyp. Pers. Dist.



Notes:

(i) Graph (a) shows the net wealth distributions (99 percentiles) of Belgium and the euroarea as a whole, as well as a reweighted Belgian net wealth distribution to match euroarea household structure (using non-parametric reweighting as described in section 2.2).

(ii) Graph (b) shows the differences between the net wealth distributions (99 percentiles) of Belgium and the euroarea as a whole as well as the differences of the reweighted Belgian distribution (see (i)).

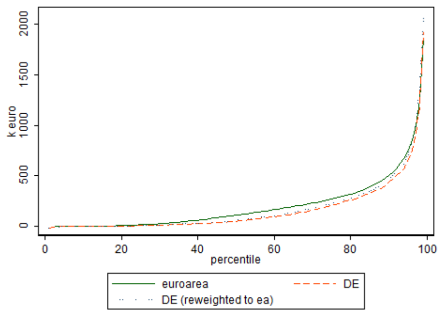
(iii) Graph (c) shows a hypothetical personal net wealth distributions (99 percentiles) of Belgium and the euroarea as a whole under the assumption that household wealth is equally shared among all household members.

(iv) Graph (d) shows the differences between the hypothetical personal distributions.

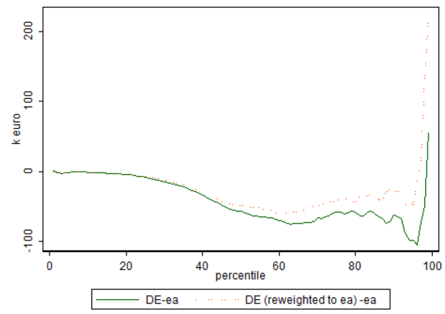
(v) *Source:* Eurosystem HFCS 2010.

Figure B.6: German net wealth distribution with relation to the euroarea

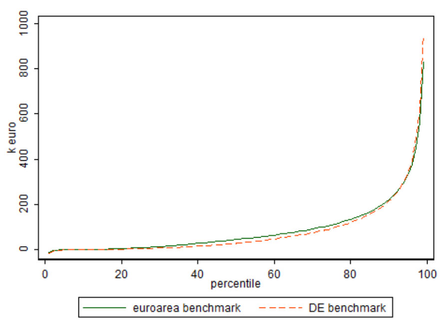
(a) (Reweighted) HH Dist.



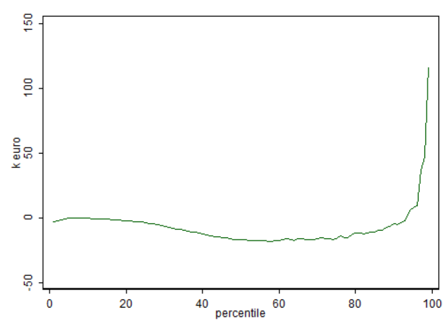
(b) Diff in (reweighted) HH Dist.



(c) Hyp. Personal Dist.



(d) Diff in Hyp. Pers. Dist.



Notes:

(i) Graph (a) shows the net wealth distributions (99 percentiles) of Germany and the euroarea as a whole, as well as a reweighted German net wealth distribution to match euroarea household structure (using non-parametric reweighting as described in section 2.2).

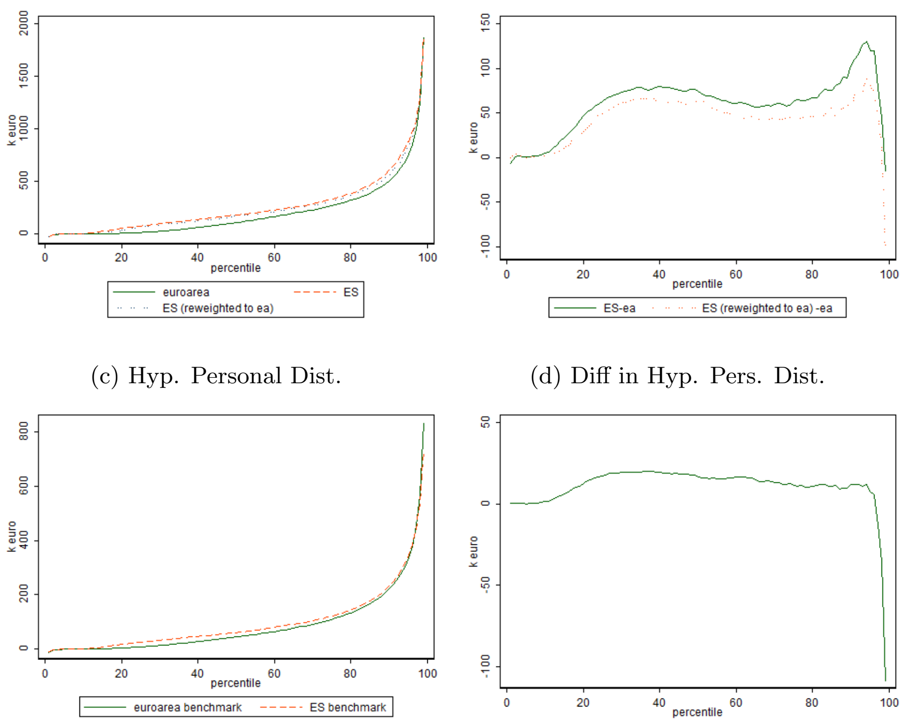
(ii) Graph (b) shows the differences between the net wealth distributions (99 percentiles) of Germany and the euroarea as a whole as well as the differences of the reweighted German distribution (see (i)).

(iii) Graph (c) shows a hypothetical personal net wealth distributions (99 percentiles) of Germany and the euroarea as a whole under the assumption that household wealth is equally shared among all household members.

(iv) Graph (d) shows the differences between the hypothetical personal distributions.

(v) *Source:* Eurosystem HFCS 2010.

Figure B.7: Spanish net wealth distribution with relation to the euroarea



(a) (Reweighted) HH Dist.

(b) Diff in (reweighted) HH Dist.

(c) Hyp. Personal Dist.

(d) Diff in Hyp. Pers. Dist.

Notes:

(i) Graph (a) shows the net wealth distributions (99 percentiles) of Spain and the euroarea as a whole, as well as a reweighted Spanish net wealth distribution to match euroarea household structure (using non-parametric reweighting as described in section 2.2).

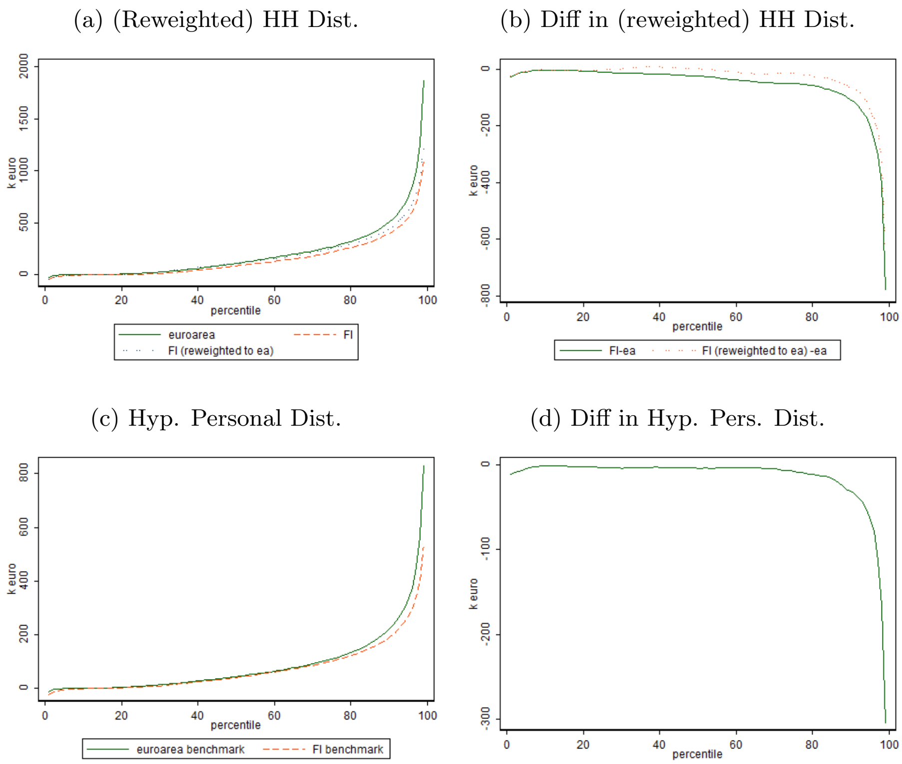
(ii) Graph (b) shows the differences between the net wealth distributions (99 percentiles) of Spain and the euroarea as a whole as well as the differences of the reweighted Spanish distribution (see (i)).

(iii) Graph (c) shows a hypothetical personal net wealth distributions (99 percentiles) of Spain and the euroarea as a whole under the assumption that household wealth is equally shared among all household members.

(iv) Graph (d) shows the differences between the hypothetical personal distributions.

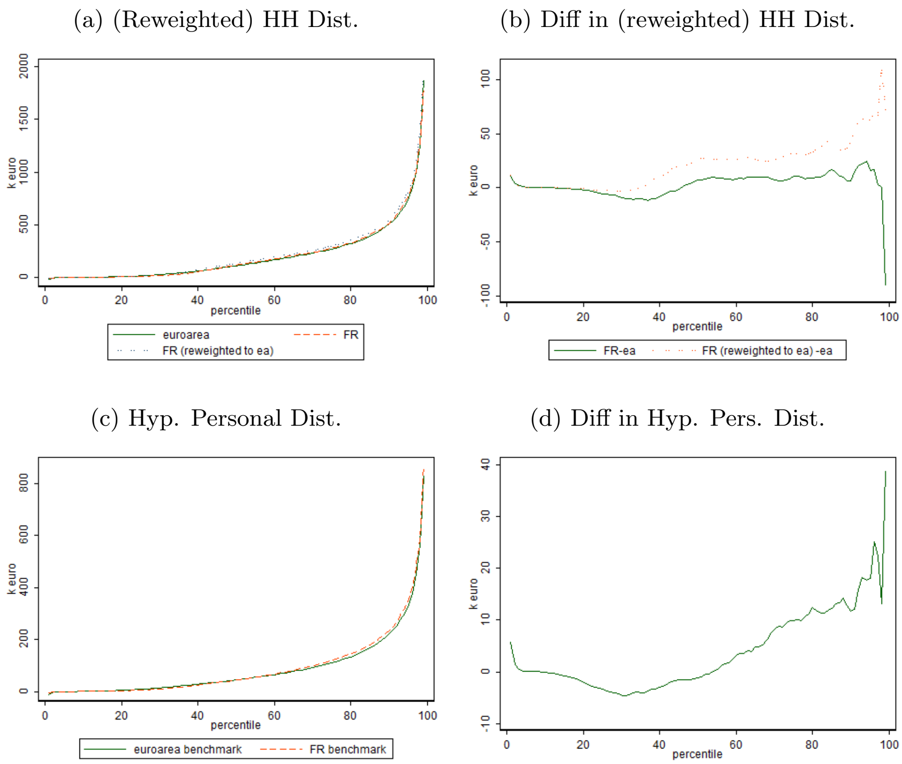
(v) *Source:* Eurosystem HFCS 2010.

Figure B.8: Finnish net wealth distribution with relation to the euroarea



Notes:
(i) Graph (a) shows the net wealth distributions (99 percentiles) of Finland and the euroarea as a whole, as well as a reweighted Finnish net wealth distribution to match euroarea household structure (using non-parametric reweighting as described in section 2.2).
(ii) Graph (b) shows the differences between the net wealth distributions (99 percentiles) of Finland and the euroarea as a whole as well as the differences of the reweighted Finnish distribution (see (i)).
(iii) Graph (c) shows a hypothetical personal net wealth distributions (99 percentiles) of Finland and the euroarea as a whole under the assumption that household wealth is equally shared among all household members.
(iv) Graph (d) shows the differences between the hypothetical personal distributions.
(v) *Source:* Eurosystem HFCS 2010.

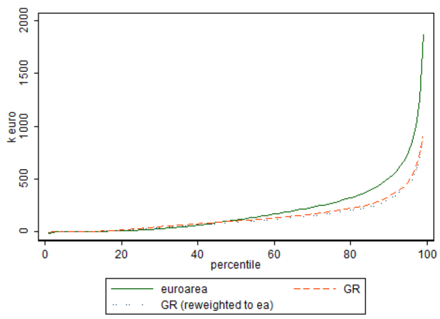
Figure B.9: French net wealth distribution with relation to the euroarea



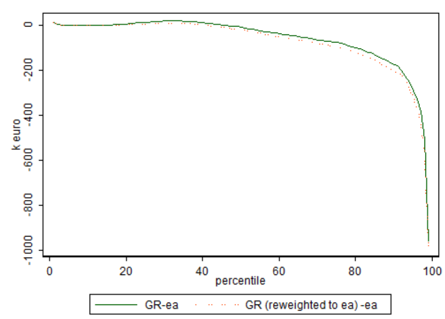
Notes:
(i) Graph (a) shows the net wealth distributions (99 percentiles) of France and the euroarea as a whole, as well as a reweighted French net wealth distribution to match euroarea household structure (using non-parametric reweighting as described in section 2.2).
(ii) Graph (b) shows the differences between the net wealth distributions (99 percentiles) of France and the euroarea as a whole as well as the differences of the reweighted French distribution (see (i)).
(iii) Graph (c) shows a hypothetical personal net wealth distributions (99 percentiles) of France and the euroarea as a whole under the assumption that household wealth is equally shared among all household members.
(iv) Graph (d) shows the differences between the hypothetical personal distributions.
(v) *Source:* Eurosystem HFCS 2010.

Figure B.10: Greek net wealth distribution with relation to the euroarea

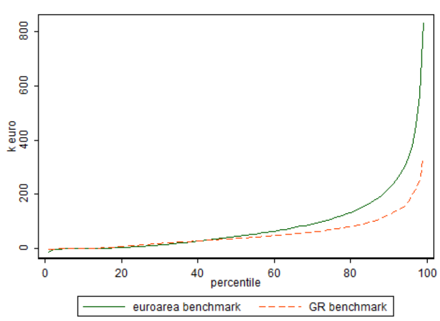
(a) (Reweighted) HH Dist.



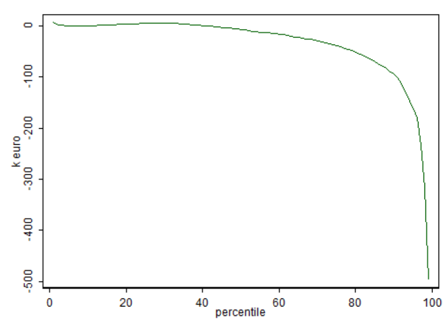
(b) Diff in (reweighted) HH Dist.



(c) Hyp. Personal Dist.



(d) Diff in Hyp. Pers. Dist.



Notes:

(i) Graph (a) shows the net wealth distributions (99 percentiles) of Greece and the euroarea as a whole, as well as a reweighted Greek net wealth distribution to match euroarea household structure (using non-parametric reweighting as described in section 2.2).

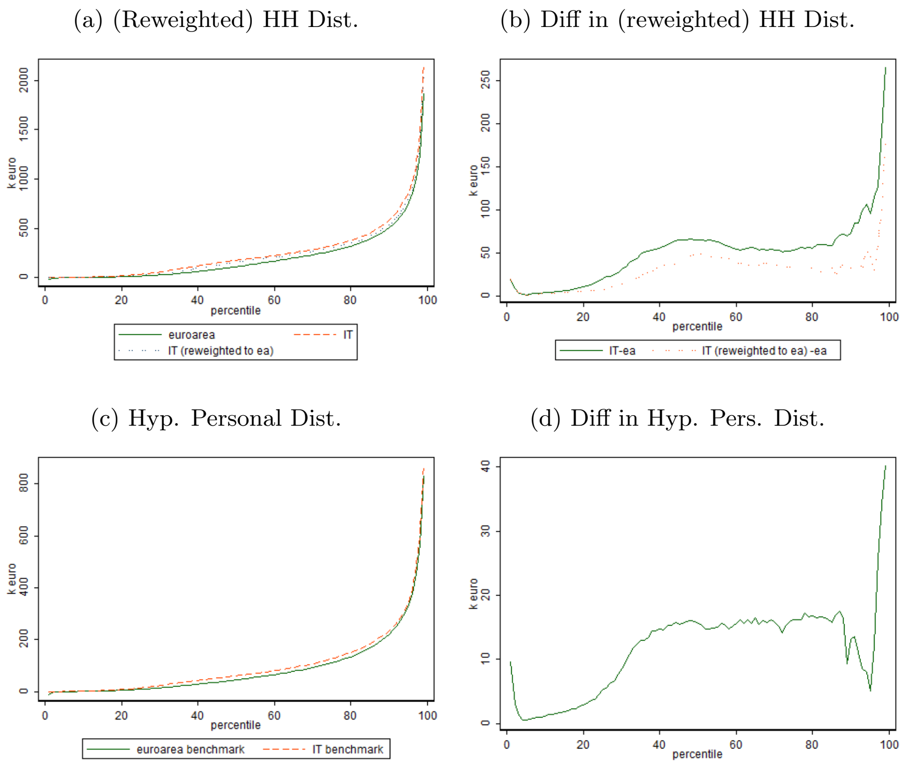
(ii) Graph (b) shows the differences between the net wealth distributions (99 percentiles) of Greece and the euroarea as a whole as well as the differences of the reweighted Greek distribution (see (i)).

(iii) Graph (c) shows a hypothetical personal net wealth distributions (99 percentiles) of Greece and the euroarea as a whole under the assumption that household wealth is equally shared among all household members.

(iv) Graph (d) shows the differences between the hypothetical personal distributions.

(v) *Source:* Eurosystem HFCS 2010.

Figure B.11: Italian net wealth distribution with relation to the euroarea



Notes:

(i) Graph (a) shows the net wealth distributions (99 percentiles) of Italy and the euroarea as a whole, as well as a reweighted Italian net wealth distribution to match euroarea household structure (using non-parametric reweighting as described in section 2.2).

(ii) Graph (b) shows the differences between the net wealth distributions (99 percentiles) of Italy and the euroarea as a whole as well as the differences of the reweighted Italian distribution (see (i)).

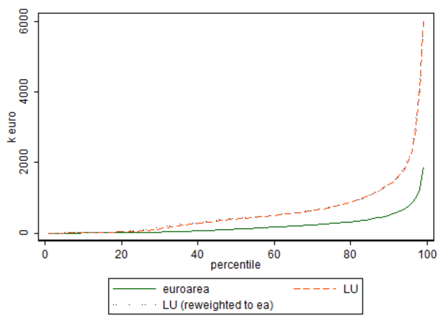
(iii) Graph (c) shows a hypothetical personal net wealth distributions (99 percentiles) of Italy and the euroarea as a whole under the assumption that household wealth is equally shared among all household members.

(iv) Graph (d) shows the differences between the hypothetical personal distributions.

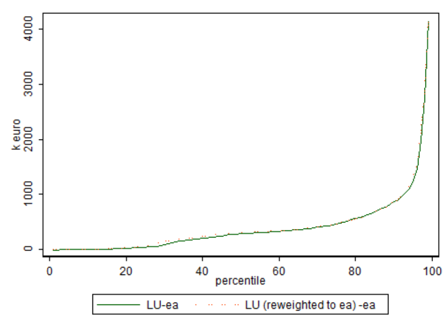
(v) *Source:* Eurosystem HFCS 2010.

Figure B.12: Luxembourgish net wealth distribution with relation to the euroarea

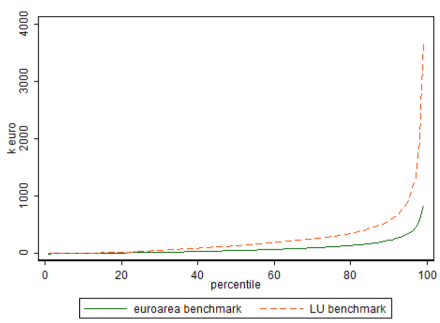
(a) (Reweighted) HH Dist.



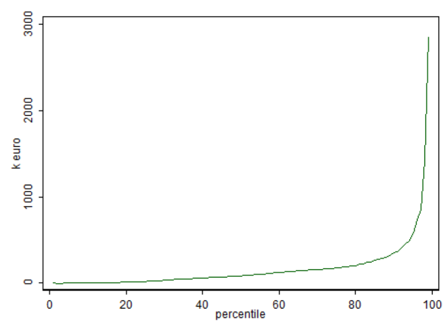
(b) Diff in (reweighted) HH Dist.



(c) Hyp. Personal Dist.



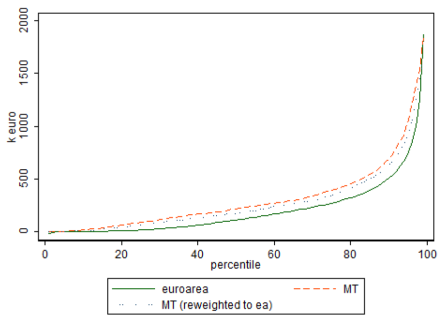
(d) Diff in Hyp. Pers. Dist.



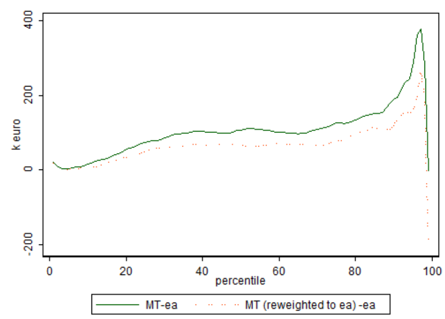
Notes:
(i) Graph (a) shows the net wealth distributions (99 percentiles) of Luxembourg and the euroarea as a whole, as well as a reweighted Luxembourgish net wealth distribution to match euroarea household structure (using non-parametric reweighting as described in section 2.2).
(ii) Graph (b) shows the differences between the net wealth distributions (99 percentiles) of Luxembourg and the euroarea as a whole as well as the differences of the reweighted Luxembourgish distribution (see (i)).
(iii) Graph (c) shows a hypothetical personal net wealth distributions (99 percentiles) of Luxembourg and the euroarea as a whole under the assumption that household wealth is equally shared among all household members.
(iv) Graph (d) shows the differences between the hypothetical personal distributions.
(v) *Source:* Eurosystem HFCS 2010.

Figure B.13: Maltese net wealth distribution with relation to the euroarea

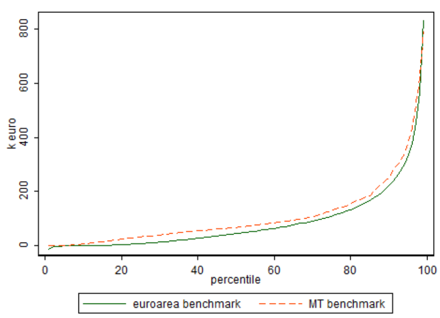
(a) (Reweighted) HH Dist.



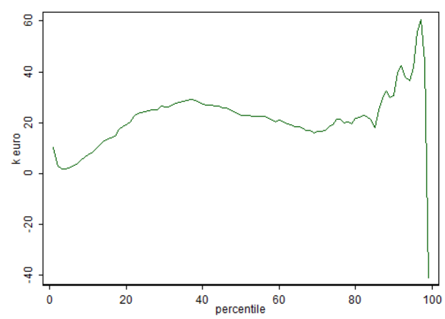
(b) Diff in (reweighted) HH Dist.



(c) Hyp. Personal Dist.



(d) Diff in Hyp. Pers. Dist.



Notes:

(i) Graph (a) shows the net wealth distributions (99 percentiles) of Malta and the euroarea as a whole, as well as a reweighted Maltese net wealth distribution to match euroarea household structure (using non-parametric reweighting as described in section 2.2).

(ii) Graph (b) shows the differences between the net wealth distributions (99 percentiles) of Malta and the euroarea as a whole as well as the differences of the reweighted Maltese distribution (see (i)).

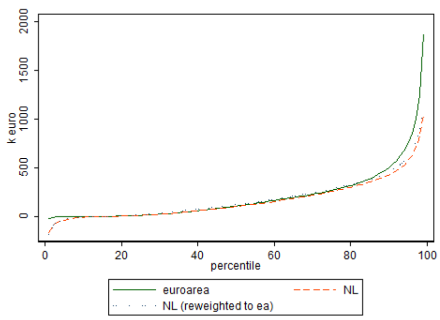
(iii) Graph (c) shows a hypothetical personal net wealth distributions (99 percentiles) of Malta and the euroarea as a whole under the assumption that household wealth is equally shared among all household members.

(iv) Graph (d) shows the differences between the hypothetical personal distributions.

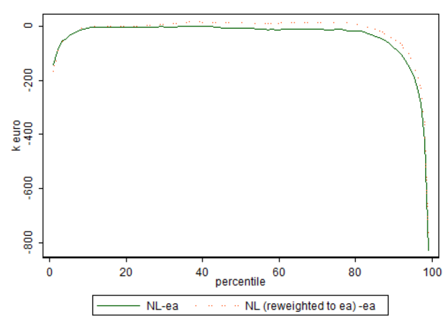
(v) *Source:* Eurosystem HFCS 2010.

Figure B.14: Dutch net wealth distribution with relation to the euroarea

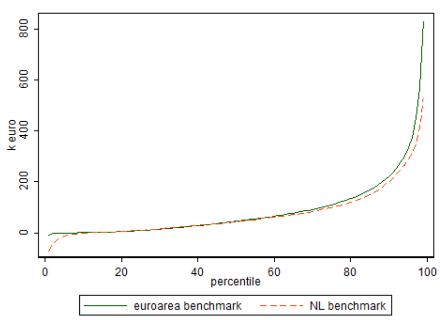
(a) (Reweighted) HH Dist.



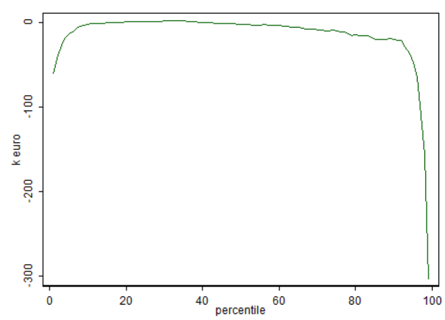
(b) Diff in (reweighted) HH Dist.



(c) Hyp. Personal Dist.



(d) Diff in Hyp. Pers. Dist.



Notes:

(i) Graph (a) shows the net wealth distributions (99 percentiles) of the Netherlands and the euroarea as a whole, as well as a reweighted Dutch net wealth distribution to match euroarea household structure (using non-parametric reweighting as described in section 2.2).

(ii) Graph (b) shows the differences between the net wealth distributions (99 percentiles) of the Netherlands and the euroarea as a whole as well as the differences of the reweighted Dutch distribution (see (i)).

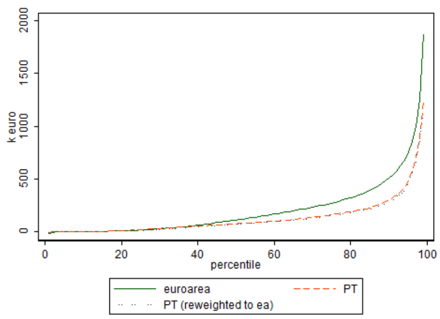
(iii) Graph (c) shows a hypothetical personal net wealth distributions (99 percentiles) of the Netherlands and the euroarea as a whole under the assumption that household wealth is equally shared among all household members.

(iv) Graph (d) shows the differences between the hypothetical personal distributions.

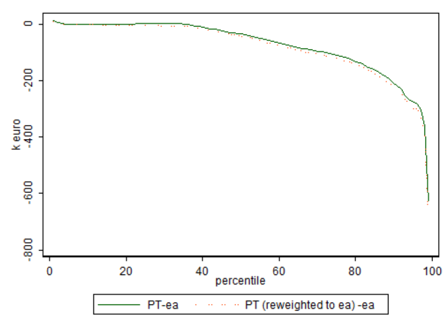
(v) *Source:* Eurosystem HFCS 2010.

Figure B.15: Portuguese net wealth distribution with relation to the euroarea

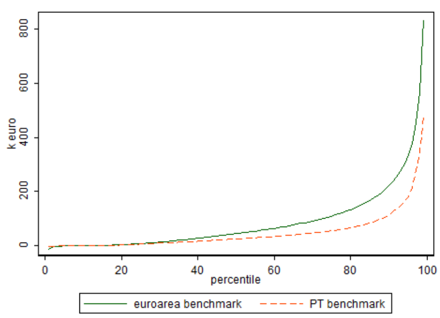
(a) (Reweighted) HH Dist.



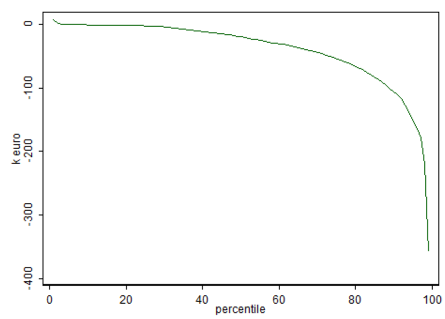
(b) Diff in (reweighted) HH Dist.



(c) Hyp. Personal Dist.



(d) Diff in Hyp. Pers. Dist.



Notes:

(i) Graph (a) shows the net wealth distributions (99 percentiles) of Portugal and the euroarea as a whole, as well as a reweighted Portuguese net wealth distribution to match euroarea household structure (using non-parametric reweighting as described in section 2.2).

(ii) Graph (b) shows the differences between the net wealth distributions (99 percentiles) of Portugal and the euroarea as a whole as well as the differences of the reweighted Portuguese distribution (see (i)).

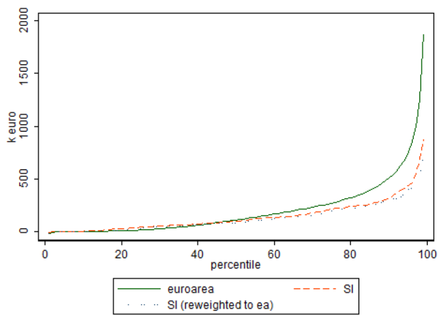
(iii) Graph (c) shows a hypothetical personal net wealth distributions (99 percentiles) of Portugal and the euroarea as a whole under the assumption that household wealth is equally shared among all household members.

(iv) Graph (d) shows the differences between the hypothetical personal distributions.

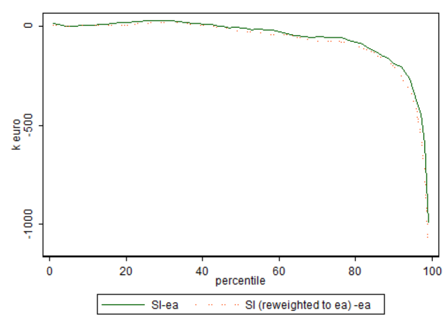
(v) *Source:* Eurosystem HFCS 2010.

Figure B.16: Slovenian net wealth distribution with relation to the euroarea

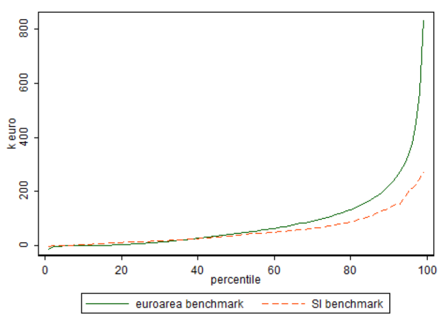
(a) (Reweighted) HH Dist.



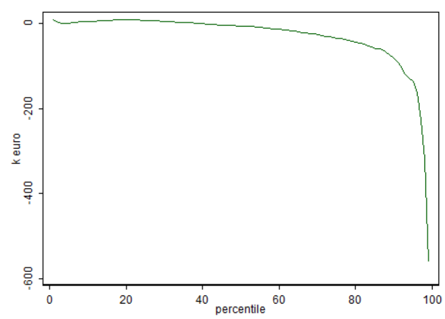
(b) Diff in (reweighted) HH Dist.



(c) Hyp. Personal Dist.



(d) Diff in Hyp. Pers. Dist.



Notes:

(i) Graph (a) shows the net wealth distributions (99 percentiles) of Slovenia and the euroarea as a whole, as well as a reweighted Slovenian net wealth distribution to match euroarea household structure (using non-parametric reweighting as described in section 2.2).

(ii) Graph (b) shows the differences between the net wealth distributions (99 percentiles) of Slovenia and the euroarea as a whole as well as the differences of the reweighted Slovenian distribution (see (i)).

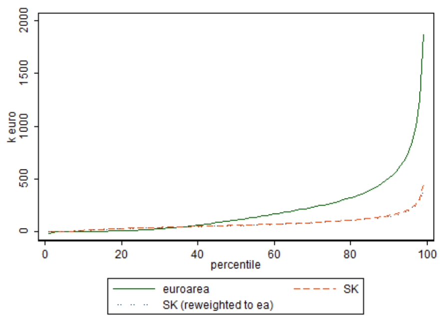
(iii) Graph (c) shows a hypothetical personal net wealth distributions (99 percentiles) of Slovenia and the euroarea as a whole under the assumption that household wealth is equally shared among all household members.

(iv) Graph (d) shows the differences between the hypothetical personal distributions.

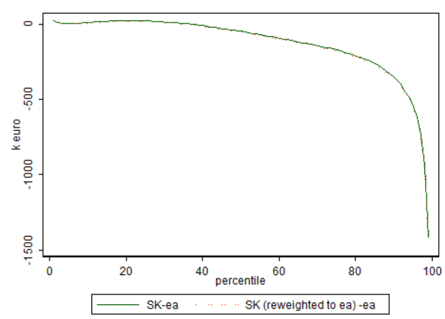
(v) *Source:* Eurosystem HFCS 2010.

Figure B.17: Slovakian net wealth distribution with relation to the euroarea

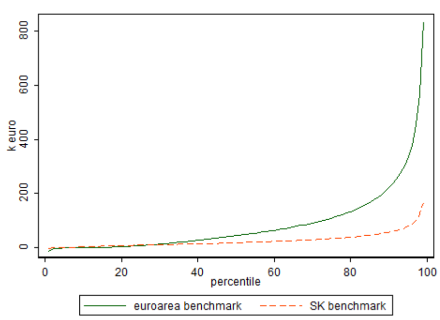
(a) (Reweighted) HH Dist.



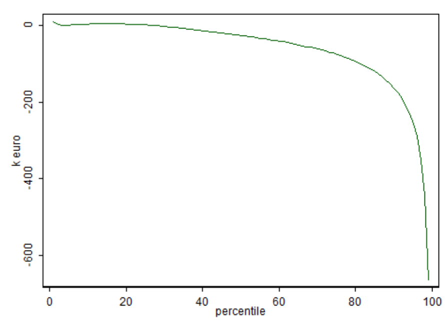
(b) Diff in (reweighted) HH Dist.



(c) Hyp. Personal Dist.



(d) Diff in Hyp. Pers. Dist.



Notes:
(i) Graph (a) shows the net wealth distributions (99 percentiles) of Slovakia and the euroarea as a whole, as well as a reweighted Slovakian net wealth distribution to match euroarea household structure (using non-parametric reweighting as described in section 2.2).
(ii) Graph (b) shows the differences between the net wealth distributions (99 percentiles) of Slovakia and the euroarea as a whole as well as the differences of the reweighted Slovakian distribution (see (i)).
(iii) Graph (c) shows a hypothetical personal net wealth distributions (99 percentiles) of Slovakia and the euroarea as a whole under the assumption that household wealth is equally shared among all household members.
(iv) Graph (d) shows the differences between the hypothetical personal distributions.
(v) *Source:* Eurosystem HFCS 2010.

Table B.5: Effects of Household Structure Differences Across Countries on Extensive Margin

Variable Names	Euro Area	AT	BE	DE	ES	FI	FR	GR	IT	LU	MT	NL	PT	SI	SK
Real Ass Part	0.911	0.848	0.898	0.802	0.953	0.848	1.000	0.922	0.977	0.936	0.948	0.898	0.901	0.962	0.960
Real Ass Count	.	0.863	0.898	0.824	0.937	0.876	1.000	0.907	0.974	0.941	0.924	0.911	0.875	0.953	0.951
HMR Part	0.601	0.477	0.696	0.442	0.827	0.692	0.553	0.724	0.687	0.671	0.777	0.571	0.715	0.818	0.899
HMR Count	.	0.502	0.704	0.468	0.800	0.740	0.582	0.695	0.651	0.695	0.741	0.623	0.674	0.774	0.883
FRE Part	0.238	0.134	0.164	0.178	0.362	0.298	0.285	0.379	0.249	0.282	0.314	0.061	0.271	0.232	0.153
FRE Count	.	0.140	0.165	0.193	0.335	0.339	0.301	0.344	0.225	0.281	0.285	0.076	0.256	0.205	0.133
BUS Part	0.110	0.094	0.066	0.091	0.142	0.138	0.089	0.098	0.180	0.052	0.115	0.048	0.077	0.116	0.107
BUS Count	.	0.090	0.069	0.100	0.122	0.157	0.093	0.083	0.179	0.048	0.093	0.043	0.071	0.097	0.099
Rest Real Part	0.841	0.799	0.802	0.732	0.799	0.679	1.000	0.735	0.951	0.884	0.875	0.826	0.741	0.804	0.685
Rest Real Count	.	0.815	0.803	0.756	0.753	0.717	1.000	0.678	0.946	0.875	0.833	0.834	0.694	0.806	0.632
Fin Ass Part	0.969	0.995	0.980	0.993	0.983	1.000	0.996	0.745	0.920	0.984	0.972	0.978	0.945	0.939	0.917
Fin Ass Count	.	0.995	0.978	0.995	0.984	1.000	0.996	0.735	0.917	0.984	0.959	0.977	0.935	0.937	0.888
Safe Fin Part	0.967	0.994	0.979	0.991	0.982	1.000	0.996	0.739	0.919	0.984	0.969	0.973	0.943	0.936	0.915
Safe Fin Count	.	0.994	0.977	0.992	0.983	1.000	0.996	0.729	0.916	0.984	0.958	0.975	0.932	0.935	0.885
Risky Fin Part	0.201	0.146	0.307	0.230	0.140	0.387	0.217	0.040	0.198	0.258	0.337	0.239	0.065	0.203	0.041
Risky Fin Count	.	0.152	0.318	0.232	0.138	0.408	0.222	0.034	0.189	0.259	0.291	0.243	0.070	0.179	0.043
Rest Fin Part	0.125	0.114	0.106	0.223	0.080	0.000	0.121	0.041	0.049	0.088	0.060	0.107	0.085	0.067	0.103
Rest Fin Count	.	0.106	0.107	0.222	0.078	0.000	0.121	0.039	0.050	0.084	0.056	0.101	0.085	0.062	0.097
Mortgage Part	0.231	0.184	0.305	0.215	0.325	0.328	0.244	0.175	0.108	0.388	0.156	0.447	0.267	0.141	0.096
Mortgage Count	.	0.203	0.309	0.239	0.305	0.345	0.245	0.154	0.109	0.357	0.158	0.492	0.256	0.119	0.102
Non-Mort Part	0.297	0.214	0.242	0.346	0.307	0.512	0.328	0.261	0.178	0.369	0.252	0.373	0.183	0.389	0.199
Non-Mort Count	.	0.212	0.238	0.353	0.280	0.523	0.325	0.241	0.176	0.337	0.224	0.364	0.171	0.345	0.164
Loan Tot Part	0.437	0.356	0.448	0.474	0.500	0.598	0.469	0.366	0.252	0.583	0.341	0.657	0.377	0.445	0.268
Loan Tot Count	.	0.369	0.445	0.494	0.467	0.608	0.467	0.338	0.251	0.541	0.327	0.676	0.358	0.393	0.240

Notes:

(i) This table shows the participations rates of the portfolio components of net wealth in the Euroarea. For each statistic, one can see the estimate based on original weights and the counterfactual estimates using the re-weighted households weights controlling for the differences of the household structure.

(ii) The household portfolio is separated in real assets [Real Ass] (comprising the households' main residence [HMR], further real estate [FRE], self-employment business participation [BUS], and other real assets [Rest Real]), financial assets [Fin Ass] (comprising safe financial assets [Safe Fin], risky financial assets [Risky Fin], and other financial assets [Rest Fin]), and liabilities [Loan Tot] (comprising mortgage [Mortgage] and non-mortgage [Non-Mort] loans).

(iii) For the Euroarea there is no counterfactual estimate by definition, thus cells are denoted with a dot.

(iv)*Source:* Eurosystem HFCS 2010.

Table B.6: Effects of Household Structure Differences Across Countries on Intensive Margin

Variable Names	Euro Area	AT	BE	DE	ES	FI	FR	GR	IT	LU	MT	NL	PT	SI	SK
Real Ass Median	144.60	106.99	220.00	89.20	201.74	143.68	124.14	114.26	176.00	470.49	201.06	198.79	91.88	105.90	61.79
Real Ass Count	.	118.83	222.90	100.84	192.41	160.15	138.68	105.00	161.00	470.60	181.59	213.98	89.00	96.92	58.33
HMR Median	180.30	200.00	250.00	168.00	180.30	127.79	193.82	100.00	200.00	500.00	186.64	240.00	90.00	110.92	55.90
HMR Count	.	200.00	250.00	180.00	180.30	135.50	196.73	100.00	200.00	500.00	180.84	240.00	89.96	101.99	52.43
FRE Median	100.00	94.03	174.00	115.00	120.20	107.57	96.06	61.93	100.00	300.00	120.12	165.53	53.46	52.35	16.40
FRE Count	.	89.29	178.50	120.00	120.20	109.40	98.98	60.00	90.00	300.00	110.47	157.75	53.37	44.21	17.80
BUS Median	30.00	180.60	50.00	19.40	50.84	0.90	53.14	36.18	15.00	97.60	136.51	51.69	47.13	25.48	4.60
BUS Count	.	198.90	50.00	20.40	50.42	0.90	54.05	45.14	10.00	97.60	169.68	50.00	46.38	25.54	5.21
Rest Real Median	7.00	8.57	7.50	7.78	7.19	9.32	4.32	6.00	9.50	18.74	7.08	6.51	5.00	3.31	4.50
Rest Real Count	.	9.05	7.50	8.00	6.01	10.05	4.53	6.00	9.00	18.20	6.44	7.00	5.00	3.00	4.00
Fin Ass Median	11.35	13.47	26.48	17.11	6.00	7.36	10.67	4.37	10.00	27.91	26.23	34.72	4.27	1.72	2.54
Fin Ass Count	.	14.81	27.62	18.54	6.00	8.53	11.43	4.00	8.84	28.60	23.62	39.61	4.08	1.72	2.39
Safe Fin Median	9.14	11.88	20.68	13.16	5.06	5.66	8.91	3.95	7.40	23.06	17.71	30.38	3.83	1.13	2.33
Safe Fin Count	.	13.39	21.78	14.77	4.96	6.63	9.67	3.63	7.00	23.38	16.61	32.62	3.74	0.99	2.25
Risky Fin Median	12.21	12.25	20.14	12.08	12.00	3.72	8.14	7.34	22.44	28.48	21.65	8.22	8.85	3.42	1.11
Risky Fin Count	.	12.62	20.00	12.88	12.00	3.81	8.42	5.26	20.68	31.08	22.05	10.22	8.75	3.25	1.00
Rest Fin Median	3.25	3.39	4.40	2.63	7.00	.	4.00	3.00	10.00	5.00	8.75	2.23	4.30	4.00	1.29
Rest Fin Count	.	4.20	5.00	2.86	6.01	.	4.02	2.00	7.43	5.80	7.00	3.06	4.00	7.00	1.11
Mortgage Median	68.24	37.55	69.25	80.00	60.00	64.40	55.88	40.96	60.00	127.33	35.00	130.97	48.76	6.63	25.04
Mortgage Count	.	42.73	68.55	80.00	60.06	62.43	52.60	43.30	65.00	129.13	38.00	129.20	53.06	8.83	25.99
Non-Mort Median	4.98	3.02	5.16	3.17	7.19	6.78	5.19	4.32	5.70	10.02	4.00	13.71	3.31	3.07	1.05
Non-Mort Count	.	3.32	5.13	3.30	6.00	7.22	5.36	4.00	5.40	10.01	3.34	12.56	3.00	2.54	1.00
Loan Tot Median	21.37	13.78	39.30	12.62	36.00	29.45	18.38	14.57	15.00	73.44	15.67	89.13	31.69	4.34	3.20
Loan Tot Count	.	17.04	40.89	15.00	36.31	33.56	17.97	12.96	15.00	71.84	13.80	97.14	34.98	3.56	5.00

Notes:

(i) This table shows (in thousand Euro) the median of the portfolio components of net wealth in the Euroarea. For each statistic, one can see the estimate based on original weights and the counterfactual estimates using the re-weighted households weights controlling for the differences of the household structure.

(ii) The household portfolio is separated in real assets [Real Ass] (comprising the households' main residence [HMR], further real estate [FRE], self-employment business participation [BUS], and other real assets [Rest Real]), financial assets [Fin Ass] (comprising safe financial assets [Safe Fin], risky financial assets [Risky Fin], and other financial assets [Rest Fin]), and liabilities [Loan Tot] (comprising mortgage [Mortgage] and non-mortgage [Non-Mort] loans).

(iii) For the Euroarea there is no counterfactual estimate by definition, thus cells are denoted with a dot.

(iv)*Source:* Eurosystem HFCS 2010.