Net Wealth across the Euroarea

Why household structure matters and how to control for it

Pirmin Fessler, Peter Lindner, Esther Segalla

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Outline

Motivation ↪ Observed differences in net wealth

Observed differences in the Net Wealth distribution might be due to...

1. differences in methodology of data production
2. institutional differences such as pension systems, taxation or welfare programs
3. historical differences such as land reform or war
4. differences in the structure and behaviour of economic agents as households or individuals

We concentrate on differences in the wealth distribution **due to variation in the form of the HFCS unit of observation**, the household, and its different structure across countries. **Show impact** and **propose way for sufficient (bias) as well as efficient (variance) control**.

Motivation ↪ Individuals vs. households

- Net wealth is usually surveyed for households, not individuals.
  - Possession of or access to resources instead of ownership of an individual inside a household
  - Might be impossible to allocate all assets inside a household to individuals
  - Control over some assets inside a household might differ from the ownership structure
- Net wealth is accumulated and owned by individuals not households
- $\longrightarrow$ Household structure matters

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Example

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.

Related Literature

- Treats households as homogeneous across countries, 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))
- Bover (2010) estimates counterfactual US net wealth distributions relying on the Spanish household structure
- Given the large number of different countries and the heterogeneity of household structures observed in a dataset like the HFCS this topics deserves more attention.
- Close to approach by Bover (2010) but much more flexible. DiNardo, Fortin, and Lemieux (1996) type reweighting using non-parametric approach to generate weights (no functional assumptions). Also close to Chernozhukov, Fernandez-Val, and Melly (2009) or Fortin, Lemieux, and Firpo (2009)

Estimation Strategy ↪ Problem

- Very different types of household are observed
- Patterns also differ between countries (e.g. below 20% in Portugal to about 40% one person households in Finland)
- Which share of differences in the overall distribution and for different distributional measures are due to different household types?
- Insufficient control of household structure leads explanatory power to show up somewhere else
- Of course household structure is endogenous (basically true for all applications) but age and gender is strictly exogenous on the personal level (of accumulation)
- $\longrightarrow$ No claim of any causal effect but a "standardization" of differences in the unit of observation

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.
- Let $P^{ea}(W, H)$ denote the overall distribution of (W, H)
- Identify 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, formally...

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

Estimation Strategy ↪ Reweighting II

We can rewrite the counterfactual distribution in equation 1,

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

where the re-weighting function Ψ_H is defined as

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

Note that differences between $P^c(W)$ and $P^c_{ea}(W)$, as well as differences between all measures $\nu(P^c(W))$ and $\nu(P^c_{ea}(W))$ are the differences which are due to household structure.

Estimation Strategy ↪ Household Types

- 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.
  - Includes by definition all household structures observed in all countries
  - Minimizes the overall need for reweighting as it is the weighted average

- 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 are at the same time small enough to ensure enough overlap between the countries.

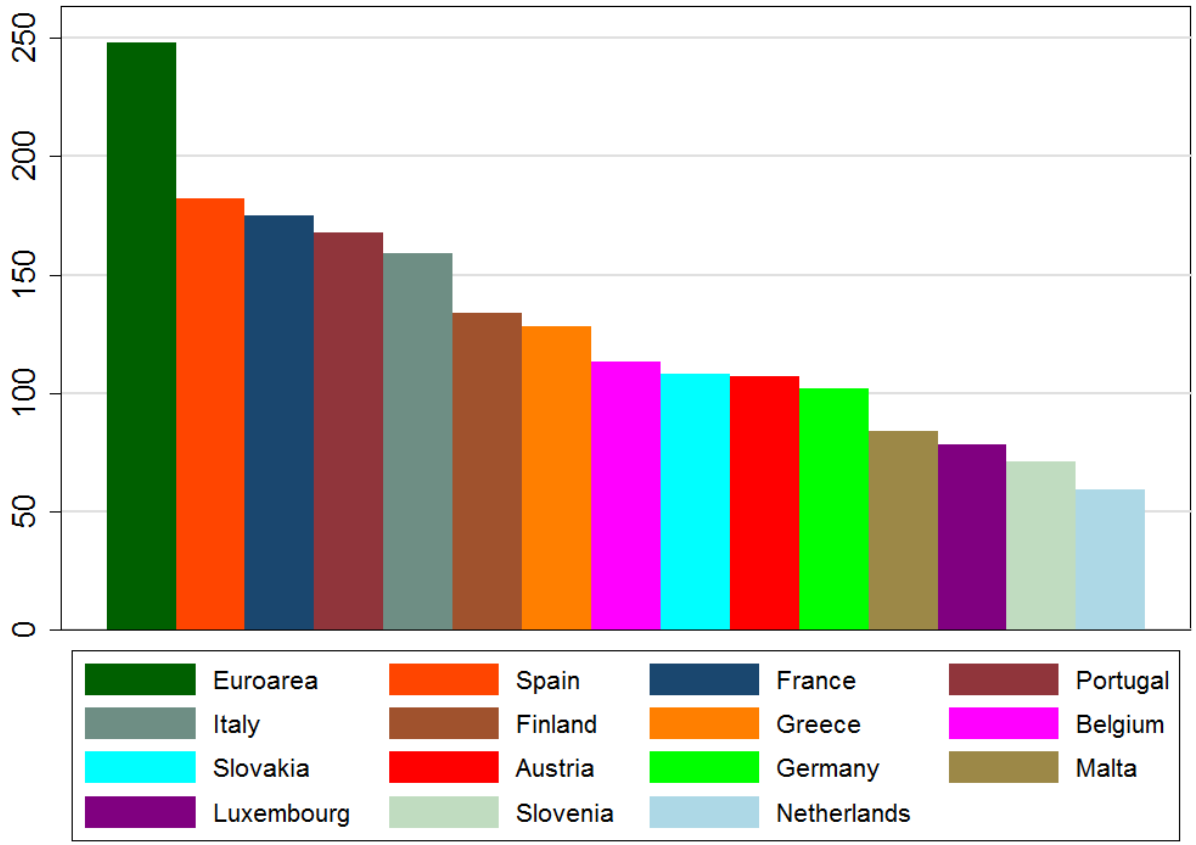
Estimation Strategy ↪ Household Types II

Definition

Household Types: All possible combinations of 4 age categories $([;15];[16;34];[35;64];[65;+])$ *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.

$\longrightarrow$ Results in 329 possible household types of which 249 are observed at least once in the Euroarea

Results ↪ Household Types

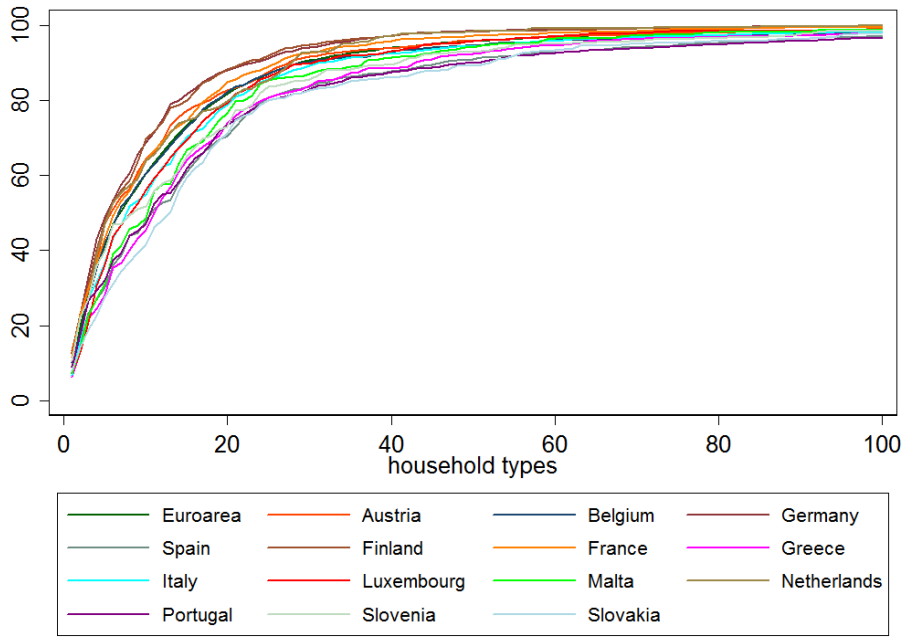


Results ↪ Household Types

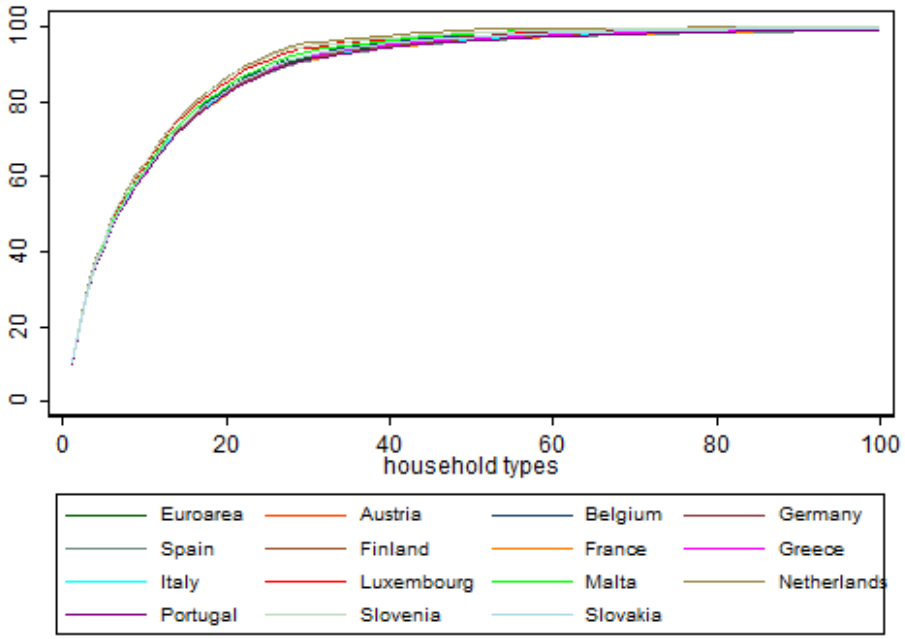
Table: Occurance of Top 10 countrywise household types among the euroarea top 30 household types in Percent of the respective household populations

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

Results ↪ Distribution of Household Types in the Euroarea

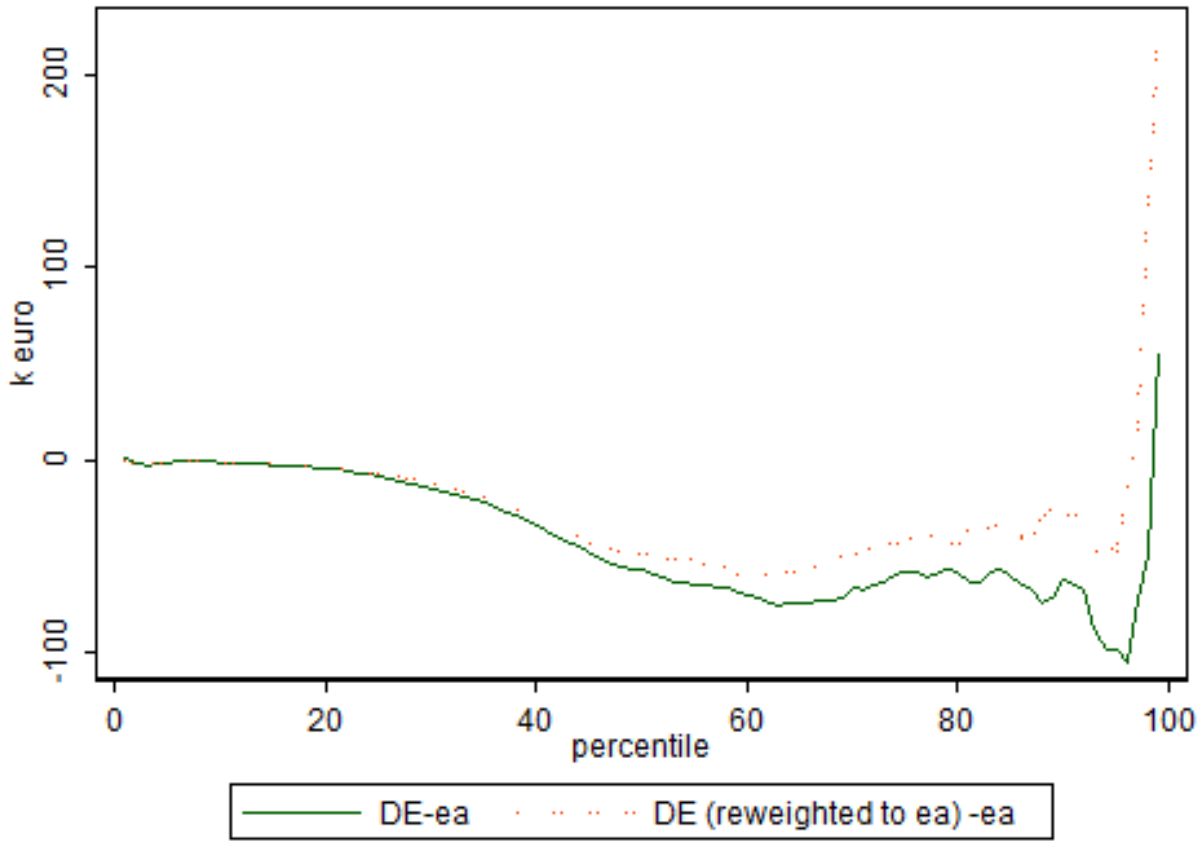


(a) Distributions

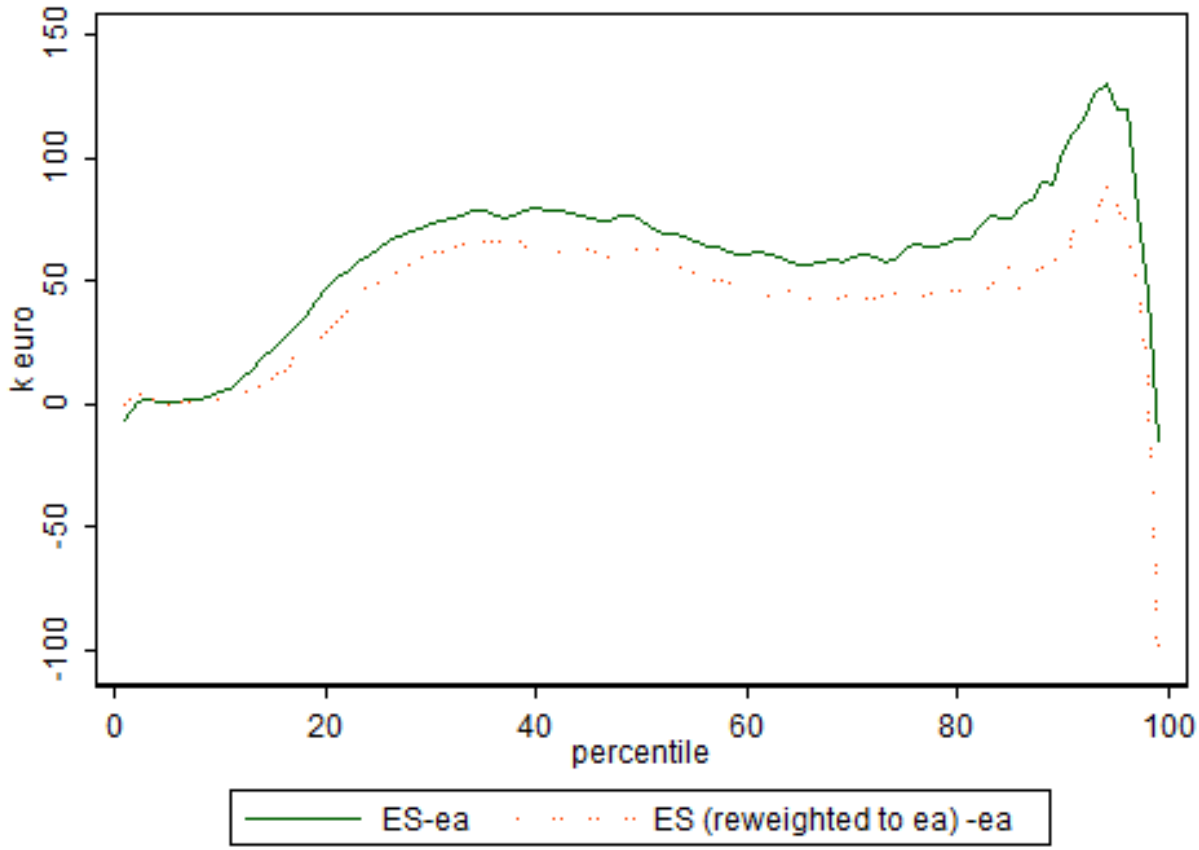


(b) Reweighted Distributions

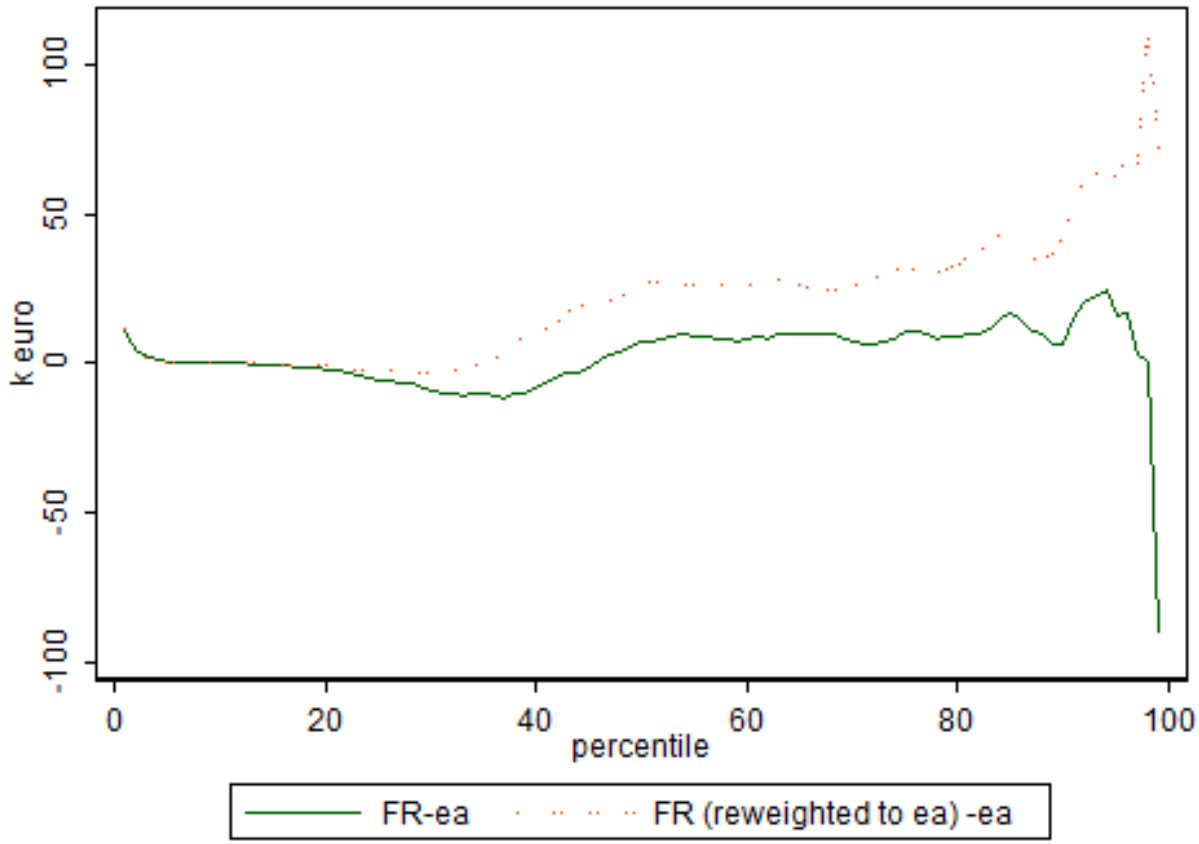
Results ↪ Germany



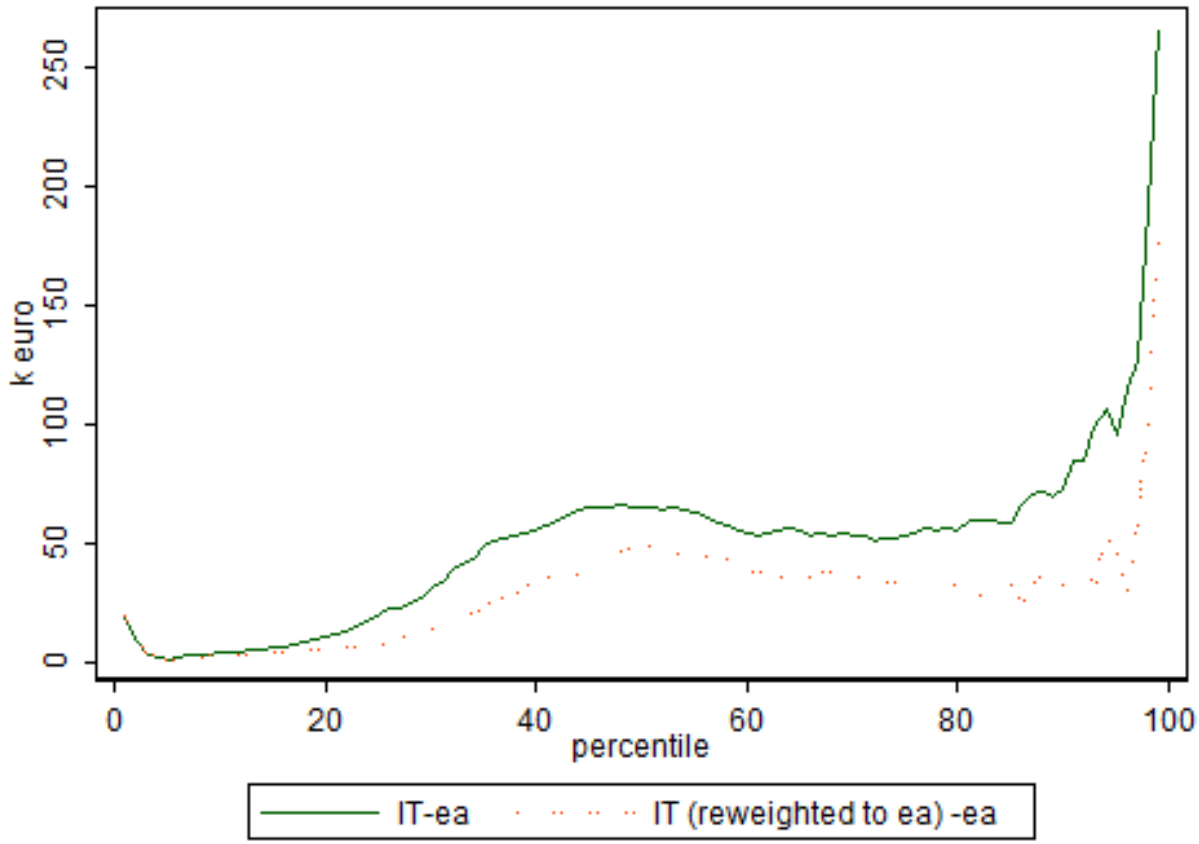
Results ↪ Spain



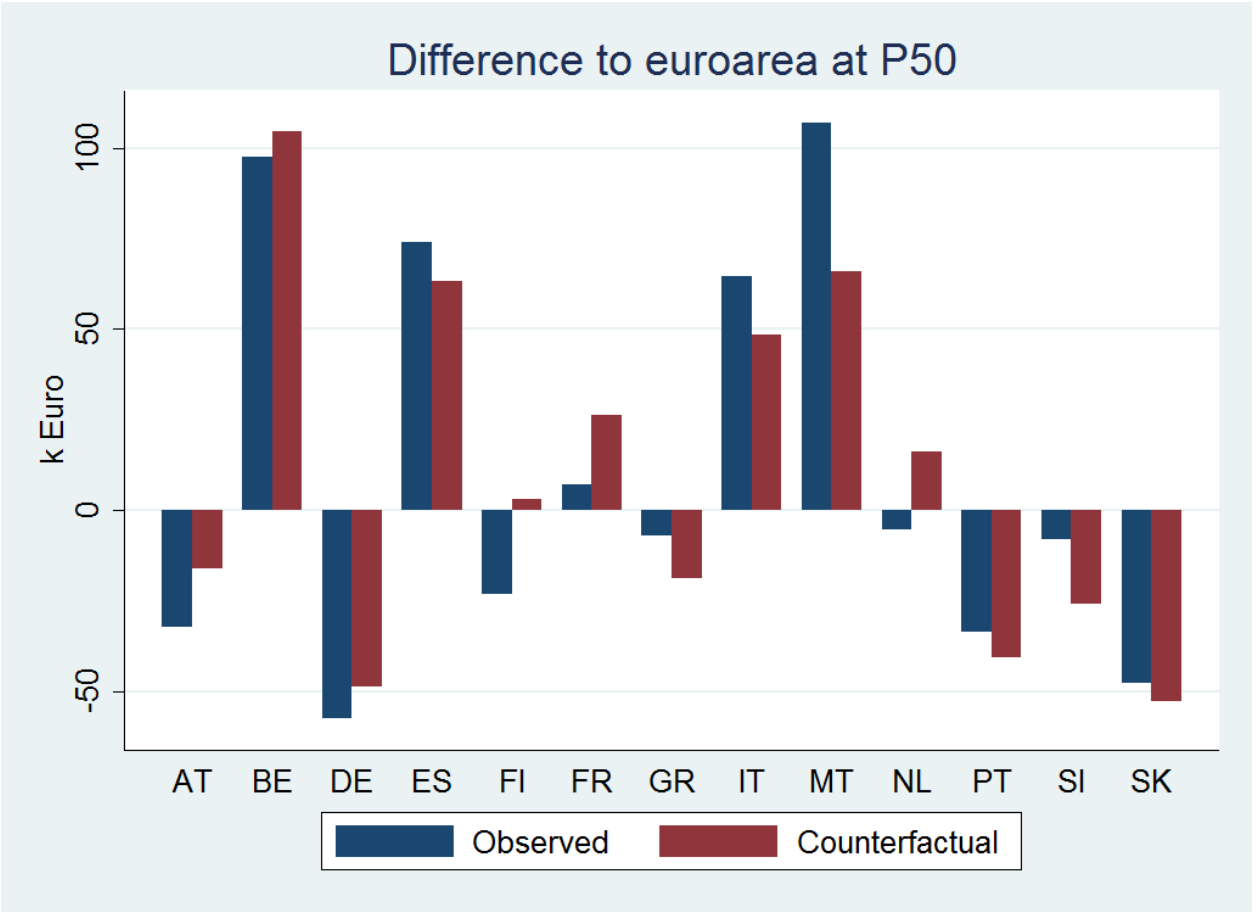
Results ↪ France



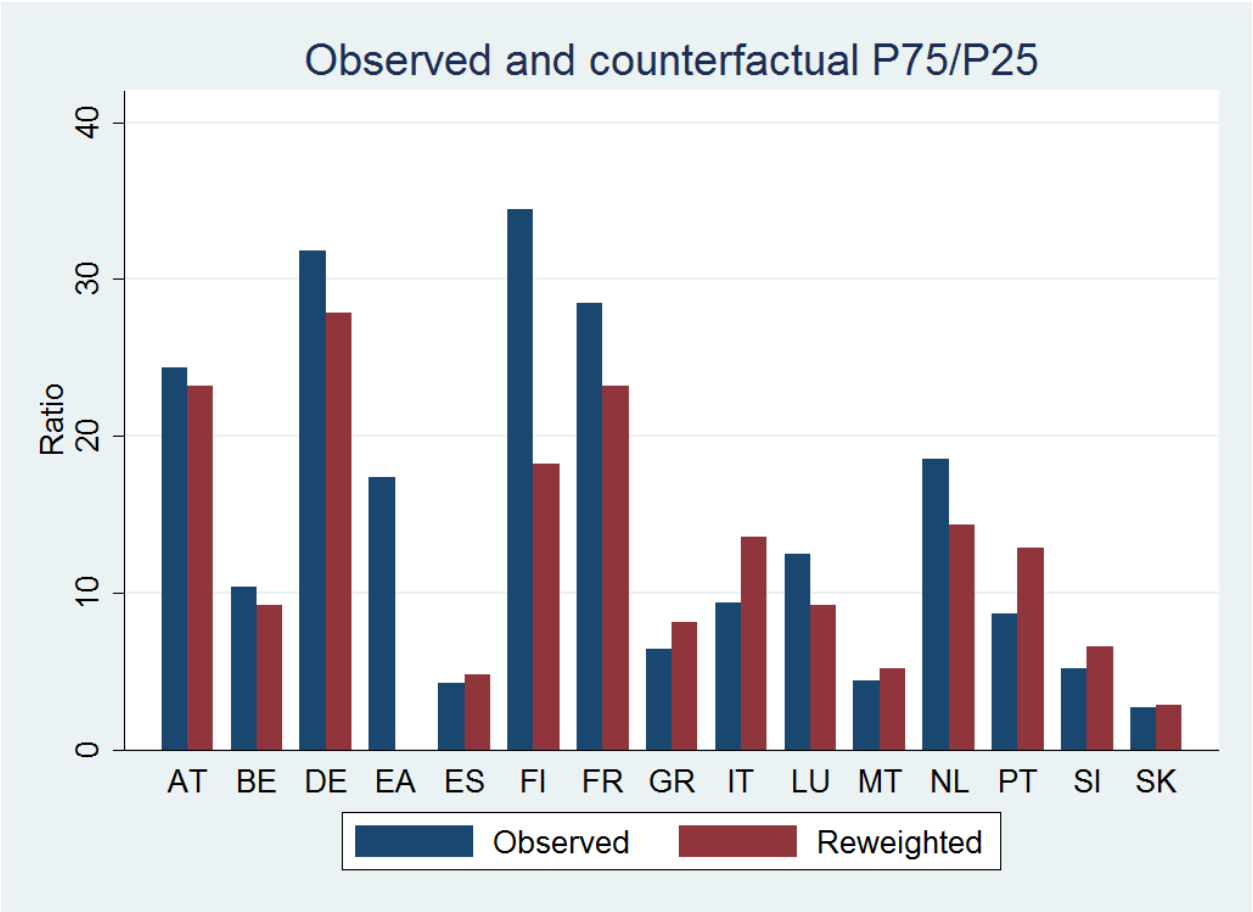
Results ↪ Italy



Results ↪ Medians



Results ↪ P75/P25



Summary of Results↪ Mean

- **Austria, Belgium, France** and **Luxembourg** already have an **above euro area** mean of net wealth but **move even further away** through reweighting.
- **Spain, Italy and Malta** also have an **above euro area** mean but **move closer** to the euro area. In the case of **Spain** around **23%** of the difference to the euro area 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 euro** area mean and **move up towards the euro area** mean. Around **43%** of the difference to the euro area mean is explained for **Germany**, **39%** for **Finland** and about **32%** for the **Netherlands**.

▸ More

Summary of Results↪ Median and Inequality

- Large parts of the differences to euro area 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.
- For the most robust measure P75/P25, all countries but Belgium, Luxembourg (further away) and the Netherlands (switches position) get closer to the euro area measure.
- For **Finland** which has a P75/P25 ratio of 34 as opposed to only 17 for the euro area **95%** of the difference can be explained by household structure. About **27%** for **Germany**, **48%** for **France** and **53%** for **Italy**.
- Effects are large for many countries, and again they are different for different inequality measures.

▸ More

Conclusions

- Variation in the form of the unit of observation matters
- Large amount of differences in net wealth distributions between countries are due to different household structures
- Effect of household structure is heterogenous along the distributions
- Flexible controls for these variation in order, i.e. adding dummies for household size and/or age and/or age squarred of a "reference person" will not be enough if the goal is to control for differences in household structure
- We propose the (additional) use of a set of hh-type fixed effects (like the top-30 populated household types) when controling for household structure in regression analysis. It can be shown that they include information not covered by standard controls.
- Gini masks differences along the distribution (as in Bover 2010)

ANNEX

Main Results

Table: 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

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