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The Top Tail of the Wealth Distribution in Germany, France, Spain, and Greece

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Outline

Background and motivation

Data

HFCS

Forbes and national rich lists

Estimation and imputation of the top wealth distribution

Results for the adjusted top wealth concentration

Discussion Paper:

Stefan Bach, Andreas Thiemann, Aline Zucco: [The Top Tail of the Wealth Distribution in Germany, France, Spain, and Greece](#). DIW Berlin Discussion Papers 1502, 2015.

Background and motivation

Rising inequality in income and wealth, in particular at the top

Poor information on the top tail of household wealth

Household surveys

- German Socio-Economic Panel ([SOEP](#)), 2002, 2007, 2012
- Household Finance and Consumption Survey ([HFCS](#)) 2009-11
- Underrepresentation of top income and wealth
 - Sampling error (“non observation bias“)
 - Selectivity (“non response bias“, “middle class bias“)

Administrative data

- Wealth and estate taxation: Selectivity due to tax rules
- Family owned firms, foundations, family offices: Non-disclosure

Rich lists of the big fortunes: [Forbes World’s billionaires](#), national rich lists

National and financial accounts: macro aggregates

Estimation of top wealth concentration in Germany, France, Spain, and Greece

Integration of HFCS *and* rich lists

Estimation of Pareto distribution for the top tail

- following [Vermeulen \(2014\)](#)

Imputation of the missing rich

Table 1: Sample Size and Oversampling Rate in the HFCS

	Gross sample size	Interviewed households	Response rate, in percent	Effective oversampling rate of the top 10%, in percent
Austria	4,436	2,380	56	1
Belgium	11,376	2,364	22	47
Cyprus	3,938	1,237	31	81
Finland	13,525	10,989	82	68
France	21,627	15,006	69	129
Germany	20,501	3,565	19	117
Greece	6,354	2,971	47	-2
Italy	15,592	7,951	52	4
Luxembourg	5,000	950	20	55
Malta	3,000	843	30	-5
Netherlands	2,263	1,301	58	87
Portugal	8,000	4,404	64	16
Slovakia	n. a.	2,057	n. a.	-11
Slovenia	965	343	36	22
Spain	11,782	6,197	57	192

Source: ECB (2013a: 41).

Table 2: Summary statistics of the national rich lists in Germany, France, Spain, and Greece

In billion Euro

Country	Rich list	N	Mean	Std. Dev.	Min	Max
Germany	<i>mm 200 - corrected</i>	200	1.52	1.87	0.56	17
	<i>mm 200 - original</i>	200	1.91	2.29	0.55	17
	<i>Forbes</i>	52	3.27	3.22	0.76	18
France	<i>Challenge 200</i>	200	1.08	2.60	0.16	23
	<i>Forbes</i>	11	5.47	6.35	0.81	20
Spain	<i>El mundo list</i>	74	1.49	2.06	0.50	16
	<i>Forbes</i>	12	2.06	3.29	0.679	12
Greece	<i>Greek Rich list</i>	29	0.194	0.331	0.038	2
	<i>Forbes</i>	18	2.14	1.91	0.48	7

Source: manager magazin (2011), the corrected mm 200 adjusts the rich list entries by the number of households per entry, Challenge (2010), El mundo (2009), Greek Rich List (2009) and Forbes (2009, 2010, 2011, 2014), own calculations.

Pareto distribution

Good approximation of the top tail of income and wealth

Pareto (1896), Kuznetzs (1955), Piketty & Saez (2003)

Based on two parameters (Representation in appendix)

Minimum wealth and „Pareto-alpha“

Net Household Wealth (HFCS Definition)

Total household assets (excluding pension wealth)

- Total outstanding household's liabilities

= Household net wealth

Figure 5: Tail wealth distribution by rich list and minimum wealth, Germany

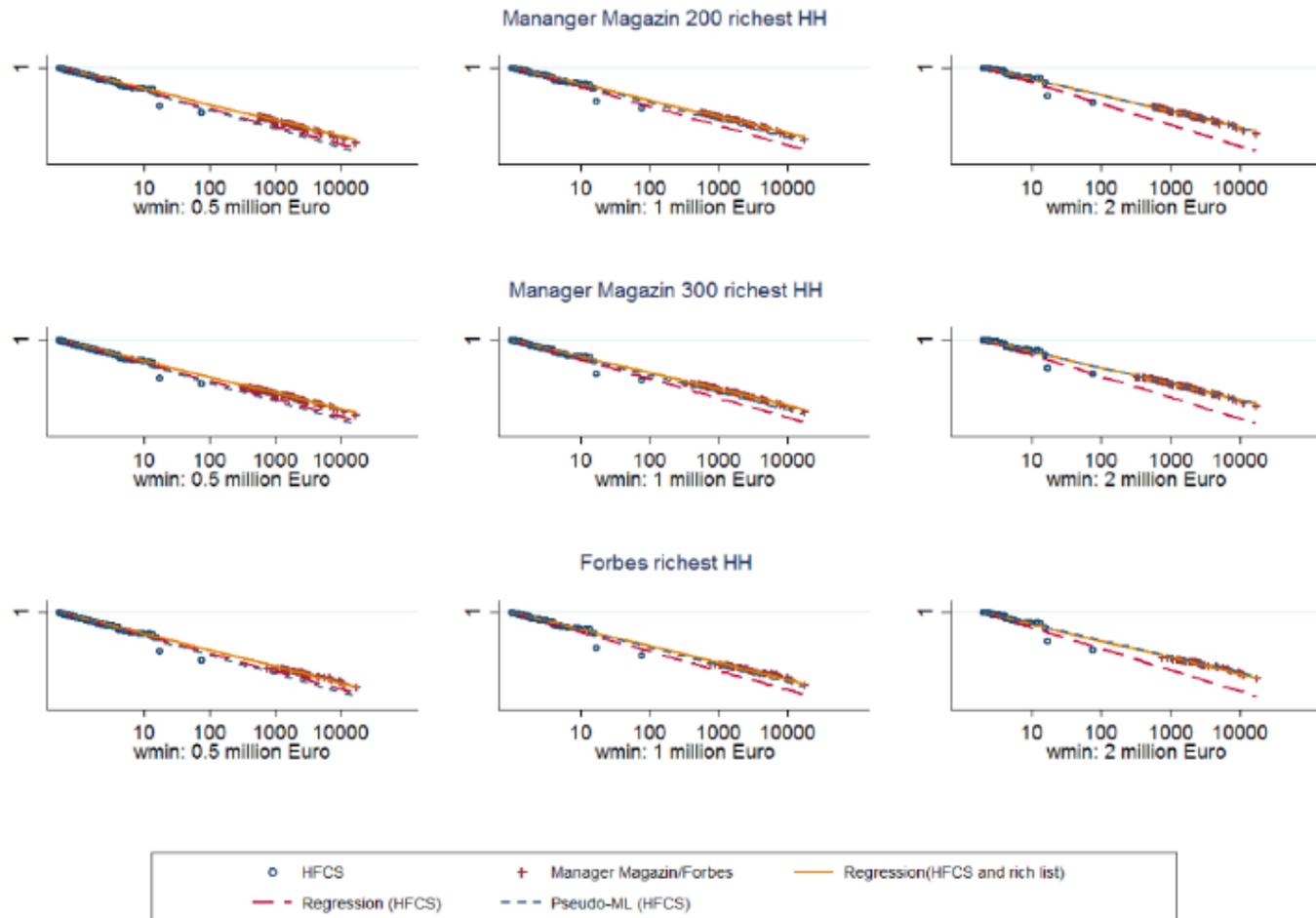


Figure 6: Tail wealth distribution by rich list and minimum wealth, France

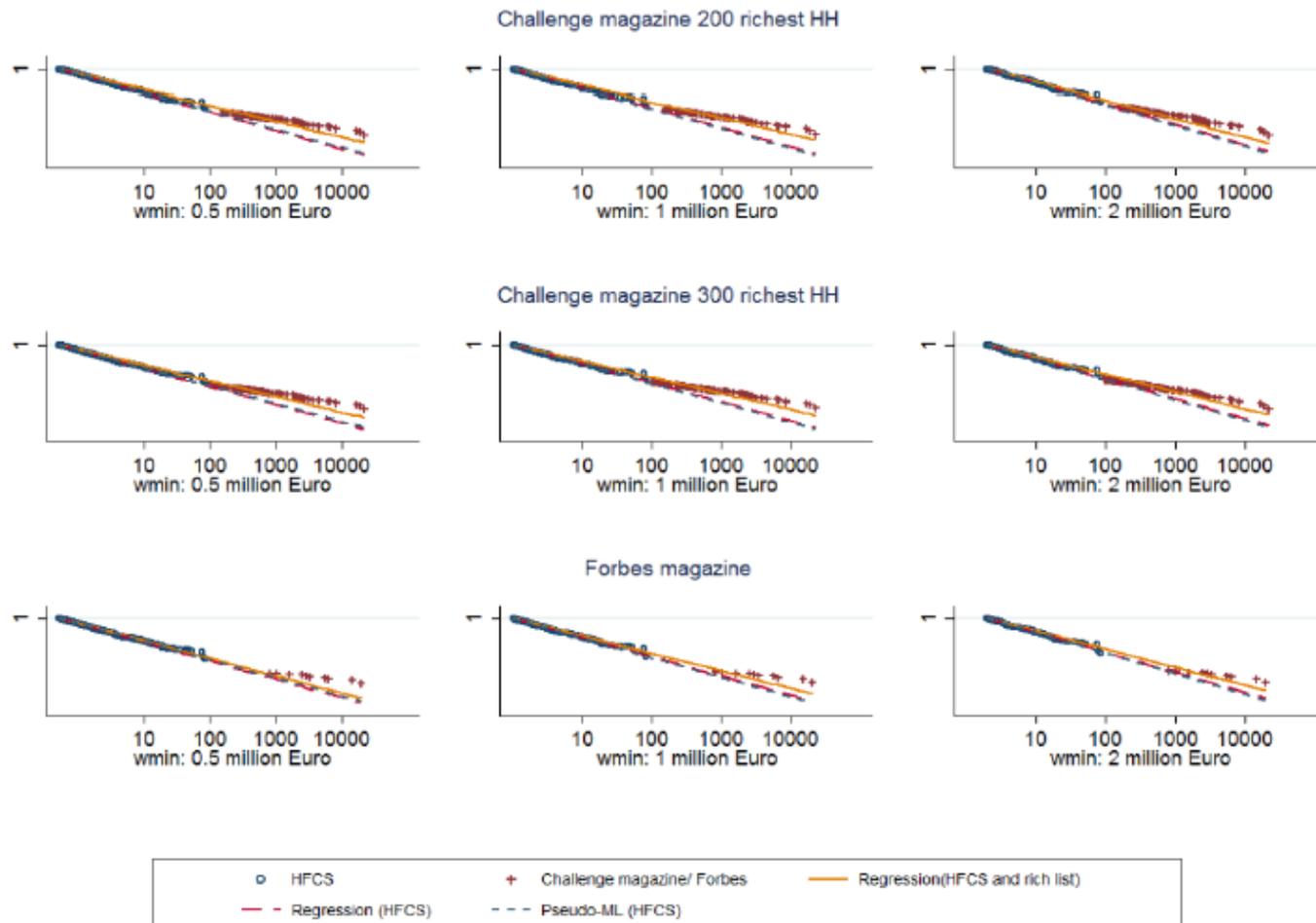
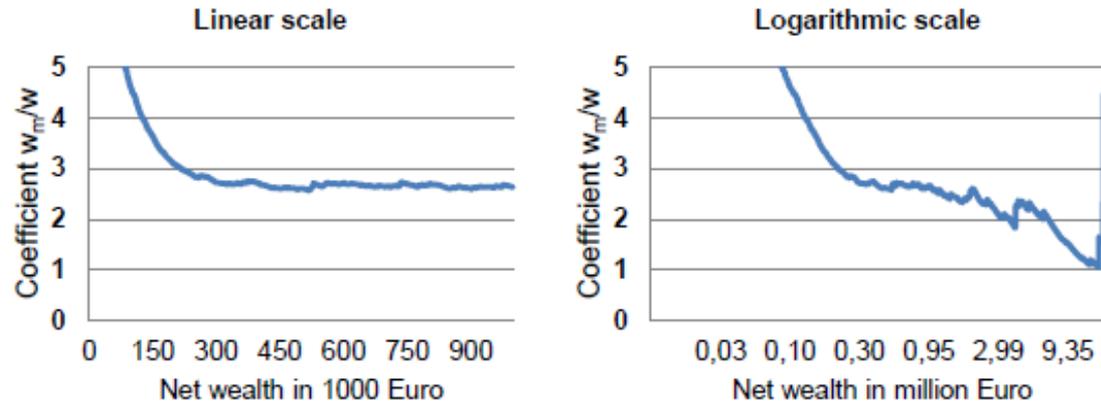


Figure 1: Ratio mean wealth above w divided by w , w_m/w , Germany



Source: HFCS, own calculations.

Figure 2: Ratio mean wealth above w divided by w , w_m/w , France

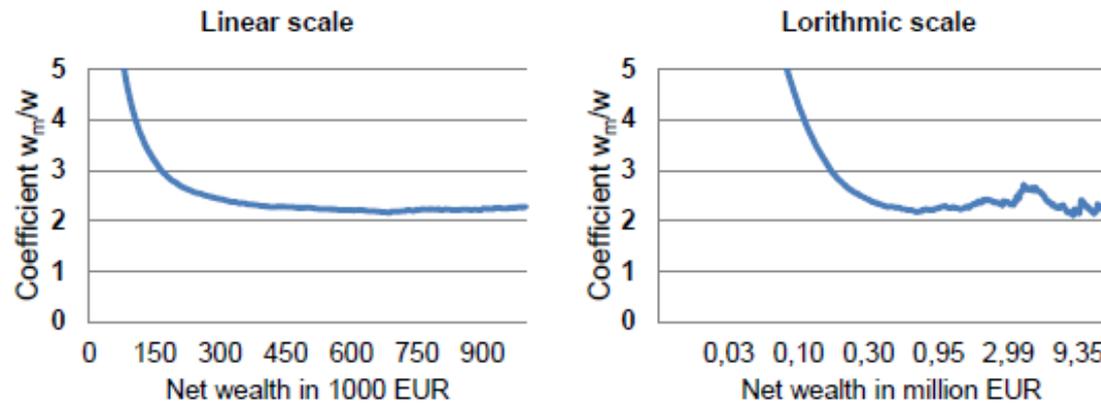


Table 3: Estimated α -coefficients for different subsamples, Germany

W_{\min}	Excluding the rich list		Including the rich list			
			MM top300	MM top200	MM top100	Forbes (top52)
	α_{PML}	α_{Reg}	α_{Reg}	α_{Reg}	α_{Reg}	α_{Reg}
0.5 million Euro	1.597	1.535 (0.042)	1.374 (0.001)	1.370 (0.001)	1.378 (0.003)	1.408 (0.005)
1 million Euro	1.451	1.613 (0.094)	1.361 (0.002)	1.358 (0.002)	1.365 (0.003)	1.396 (0.005)
2 million Euro	1.342	1.767 (0.186)	1.342 (0.005)	1.340 (0.005)	1.347 (0.005)	1.379 (0.006)

Note: Robust standard errors are reported in brackets. α_{PML} refers to the Pseudo-ML estimate and α_{Reg} to the estimate based on OLS.

Source: HFCS, Forbes list, manager magazin list; own calculations.

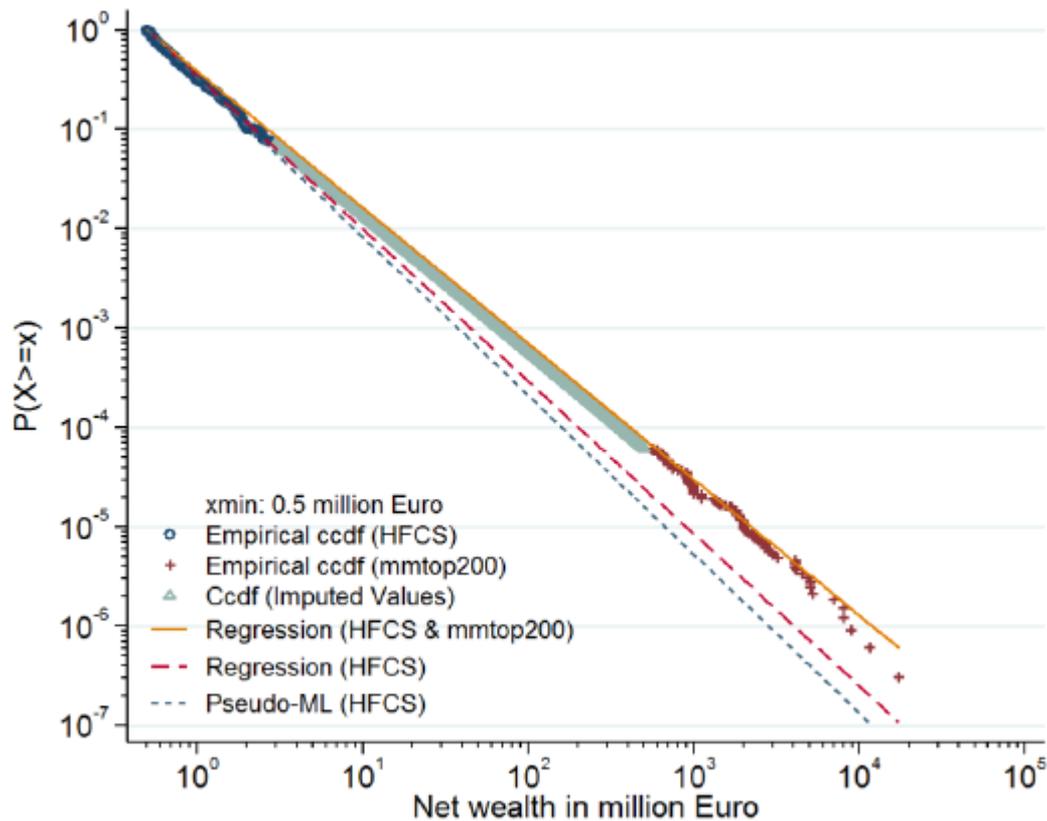
Table 4: Estimated α -coefficients for different subsamples, France

W_{\min}	Excluding the rich list		Including the rich list			
			Challenges top300	Challenges top200	Challenges top100	Forbes (top11)
	α_{PML}	α_{Reg}	α_{Reg}	α_{Reg}	α_{Reg}	α_{Reg}
0.5 million Euro	1.783	1.819 (0.006)	1.569 (0.008)	1.545 (0.008)	1.534 (0.011)	1.722 (0.026)
1 million Euro	1.804	1.763 (0.011)	1.506 (0.008)	1.473 (0.008)	1.443 (0.009)	1.613 (0.033)
2 million Euro	1.689	1.650 (0.019)	1.437 (0.009)	1.403 (0.008)	1.362 (0.008)	1.487 (0.033)

Note: Robust standard errors are reported in brackets. α_{PML} refers to the Pseudo-ML estimate and α_{Reg} to the estimate based on OLS.

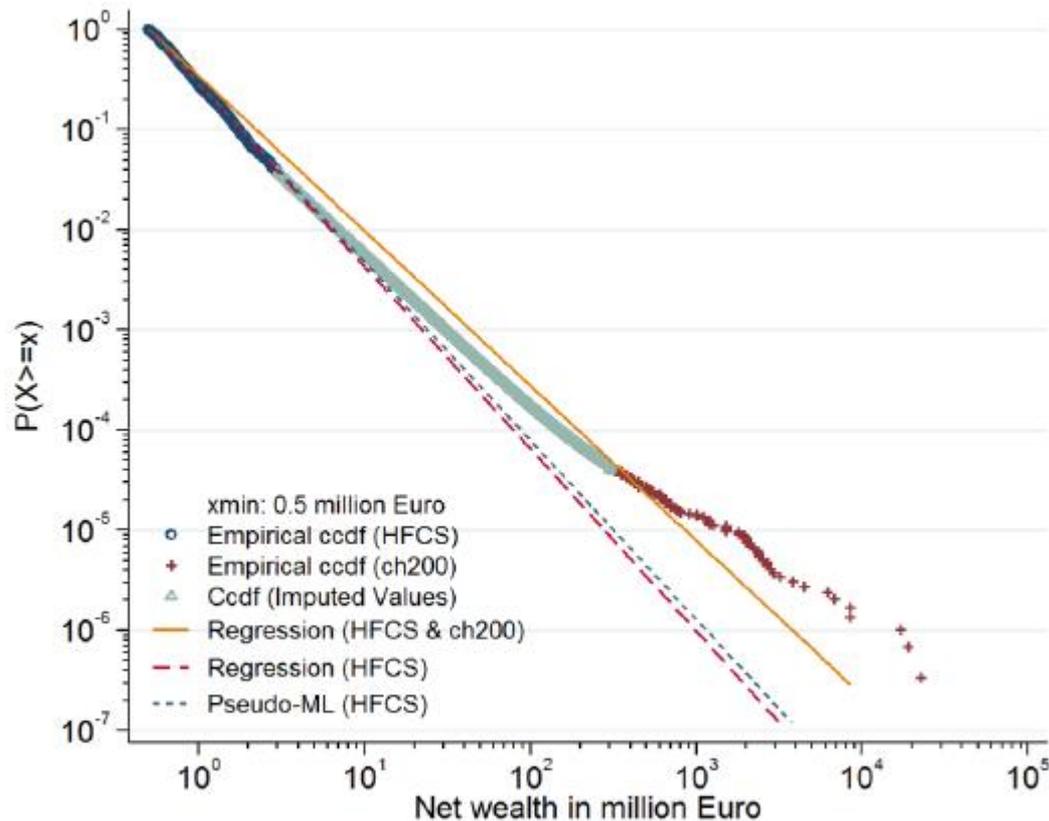
Source: HFCS, Forbes list, Challenges list; own calculations.

Figure 7: Adjusted tail wealth distribution, Germany



Source: HFCS, manager magazin; own calculations.

Figure 8: Adjusted tail wealth distribution, France



Source: HFCS, Challenges magazine; own calculations.

Table 11: Share of net wealth held by the top when tail is replaced by the synthetic household and by rich list entries by various w_{\min}

	HFCS Data	Excluding rich lists			National rich list			Forbes		
		> 0.5m	> 1m	> 2m	> 0.5m	> 1m	> 2m	> 0.5m	> 1m	> 2m
Share of net wealth held by the top 5%										
Germany	45.4	48.7	47.7	46.2	51.7	51.9	52.1	50.8	50.9	52.4
France	36.3	31.0	31.1	31.5	38.8	39.3	39.8	36.7	37.4	38.7
Spain	30.6	26.0	26.2	26.5	32.1	32.9	33.7	29.9	30.4	32.8
Greece	25.1	22.1	22.1	23.8	28.2	29.5	40.5	36.2	40.1	38.6
Share of net wealth held by the top 1%										
Germany	23.9	28.4	27.0	24.9	32.7	32.9	33.2	31.3	31.5	33.6
France	17.8	12.5	12.7	13.2	21.0	21.6	22.3	18.3	19.1	20.9
Spain	14.8	9.6	9.8	10.1	16.7	17.7	18.7	13.9	14.6	17.5
Greece	7.9	6.4	6.3	8.4	11.7	13.3	26.8	21.5	26.3	24.4
Share of net wealth held by the top 0.1%										
Germany	3.9	12.8	11.4	9.4	17.3	17.6	17.9	15.8	16.1	18.1
France	6.9	3.8	4.0	4.4	10.2	10.8	11.4	7.3	8.2	9.9
Spain	5.9	2.7	3.0	3.2	8.0	9.0	9.9	5.2	5.8	8.6
Greece	1.4	1.0	1.0	2.3	4.7	6.0	13.9	14.3	18.7	17.0

Notes: The national rich lists are: Manager Magazine 200 (Germany), Challenges 200 (France), El mundo rich list (Spain) and the Greek Rich List (Greece).

Source: HFCS, 2011, National rich lists, own calculations.

Table 7: Distribution of household net wealth in Germany

Fractiles household net wealth	Database HFCS			Database HFCS including imputed top wealth distribution		
	Percentile	Total		Percentile	Total	
	1 000 Euro	bill. Euro	%	1 000 Euro	bill. Euro	%
1 st - 5 th decile	\	222	2.9	\	222	2.5
6 th decile	52	294	3.8	52	294	3.4
7 th decile	99	501	6.5	99	501	5.7
8 th decile	165	847	10.9	165	847	9.7
9 th decile	262	1 313	17.0	262	1 313	15.0
10 th decile	438	4 567	59.0	438	5 578	63.7
Total	\	7 743	100.0	\	8 755	100.0
Top 7,5%	525	4 061	52.5	525	5 073	57.9
Top 5%	668	3 517	45.4	668	4 529	51.7
Top 2,5%	1 063	2 694	34.8	1 063	3 705	42.3
Top 1%	1 887	1 847	23.9	1 887	2 859	32.7
Top 0,5%	3 317	1 363	17.6	3 400	2 369	27.1
Top 0,1%	13 581	306	3.9	10 900	1 516	17.3
Summary inequality measures of household net wealth						
Gini coefficient	0.7461			0.7751		
Entropy meas. ¹⁾						
GE(1)	1.2894			1.8493		
GE(2)	5.5693			326.84		
1) GE(1) is the Theil index, and GE(2) is half the square of the coefficient of variation.						

Source: HFCS, 2011, own calculations.

Table 8: Distribution of household net wealth in France

Fractiles household net wealth	Database HFCS			Database HFCS including imputed top wealth distribution		
	Percentile	Total		Percentile	Total	
	1 000 Euro	bill. Euro	%	1 000 Euro	bill. Euro	%
1 st - 5 th decile	\	359	5.5	\	359	5.3
6 th decile	118	411	6.3	118	411	6.1
7 th decile	177	578	8.9	177	578	8.5
8 th decile	240	781	12.0	240	781	11.5
9 th decile	331	1 139	17.5	331	1 139	16.8
10 th decile	517	3 235	49.7	517	3 499	51.7
Total	\	6 503	100.0	\	6 767	100.0
Top 7,5%	615	2 843	43.7	615	3 107	45.9
Top 5%	762	2 363	36.3	762	2 627	38.8
Top 2,5%	1 096	1 736	26.7	1 096	2 000	29.6
Top 1%	1 779	1 159	17.8	1 779	1 423	21.0
Top 0,5%	2 676	866	13.3	2 676	1 130	16.7
Top 0,1%	7 010	448	6.9	7 200	692	10.2
Summary inequality measures of household net wealth						
Gini coefficient	0.6730			0.6857		
Entropy meas. ¹⁾						
GE(1)	1.0107			1.2694		
GE(2)	5.9386			485.76		
1) GE(1) is the Theil index, and GE(2) is half the square of the coefficient of variation.						

Source: HFCS, 2011, own calculations.

Conclusion

Top wealth concentration in Germany, France, Spain, and Greece

Underrepresentation in household surveys

Integration of the big fortunes from rich lists

- broader base of national rich lists compared with Forbes

Imputation of the missing rich by Pareto distribution

Adjustment substantially increases top wealth concentration

Top percentile share increases

- from 24 to 33 percent in Germany
- from 18 to 21 percent in France
- from 15 to 17 percent in Spain
- (from 8 to 12 percent in Greece)

National rich lists instead of Forbes increase top wealth concentration

- especially in France and Spain

Research perspectives

Data quality: Surveys and rich lists

Tax files from wealth taxes, estate taxes, financial statements of firms and foundations

Microsimulation analyses of wealth taxation

Distribution analyses of household wealth and income

Thank You for Your Attention!

Back-up slides

Pareto distribution

Idea and representation

Top wealth distribution follows a power-law function

- for any wealth w_i that exceeds a threshold w_{min} , specified by the Pareto coefficient α

Density function

$$f(w_i) = \begin{cases} \frac{\alpha w_{min}^\alpha}{w_i^{\alpha+1}} & \text{if } w_i \geq w_{min} \\ 0 & \text{if } w_i < w_{min} \end{cases} \quad (1)$$

Distribution function

$$P(W \leq w_i) = F(w_i) = \int_{w_{min}}^w f(t) dt = 1 - \left(\frac{w_{min}}{w_i}\right)^\alpha; \quad \forall w_i \geq w_{min} \quad (2)$$

Complementary cumulative distribution function (ccdf)

$$P(W > w_i) = 1 - P(W \leq w_i) = \left(\frac{w_{min}}{w_i}\right)^\alpha; \quad \forall w_i \geq w_{min} \quad (3)$$

Interpreted as ranking (“Zipf’s law”, Zipf/zeta distribution)

$$\frac{n(w_i)}{n} \cong \left(\frac{w_{min}}{w_i}\right)^\alpha; \quad \forall w_i \geq w_{min} \quad (4)$$

$$\ln \frac{n(w_i)}{n} = -\alpha \ln \frac{w_i}{w_{min}} \quad (5)$$

Pareto distribution: Density and distribution function, complementary cumulative distribution function (ccdf)

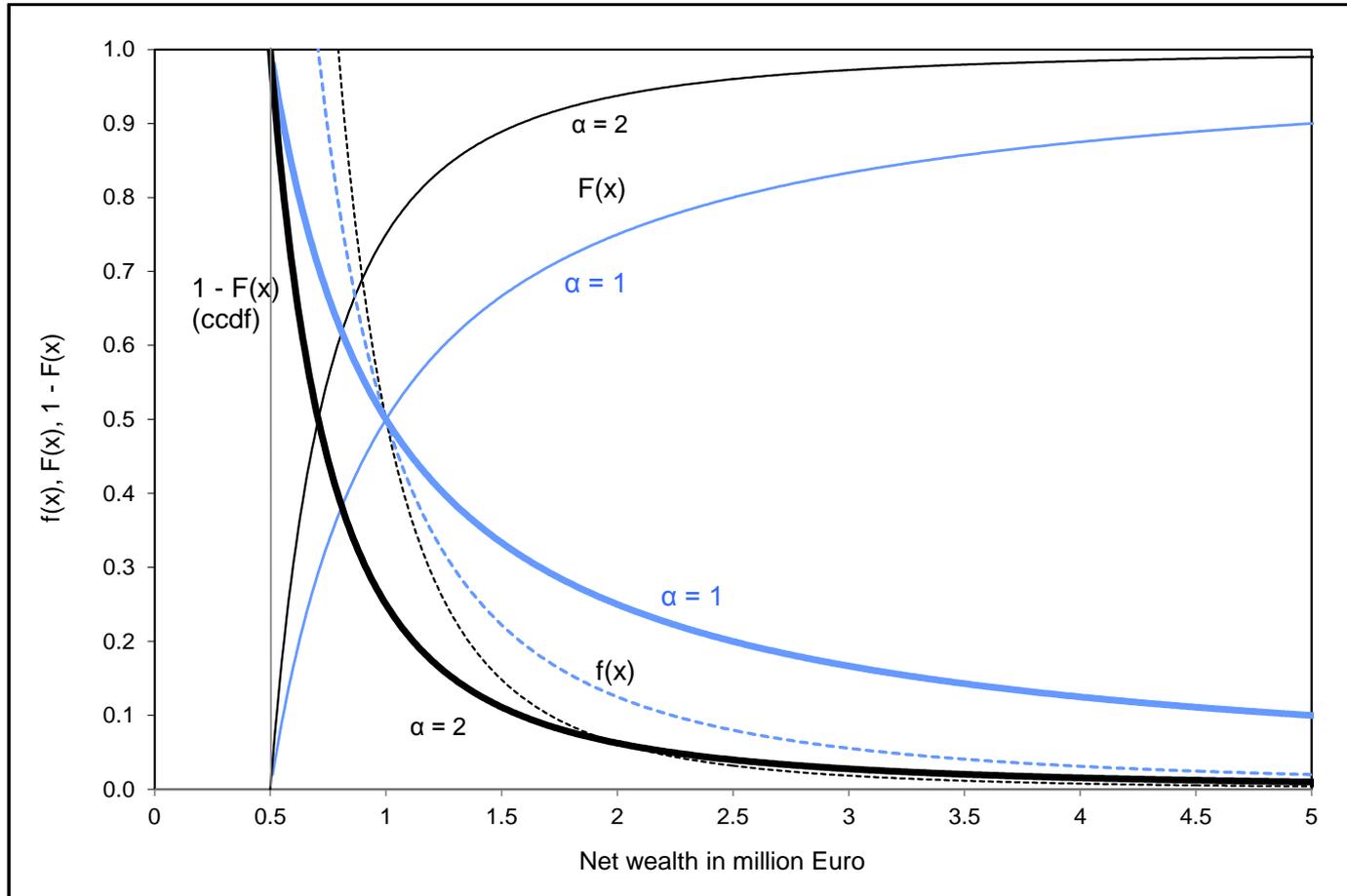


Table 5: Estimated α -coefficients for different subsamples, Spain

W_{\min}	Excluding the rich list		Including the rich list	
			El mundo (top74)	Forbes (top12)
	α_{PML}	α_{Reg}	α_{Reg}	α_{Reg}
0.5 million euro	1.858	1.880 (0.010)	1.569 (0.013)	1.812 (0.019)
1 million euro	2.152	1.761 (0.013)	1.445 (0.010)	1.689 (0.021)
2 million euro	1.809	1.651 (0.022)	1.345 (0.006)	1.590 (0.025)

Note: Robust standard errors are reported in brackets. α_{PML} refers to the Pseudo-ML estimate and α_{Reg} to the estimate based on OLS.

Source: HFCS, Forbes list, Challenges list; own calculations.

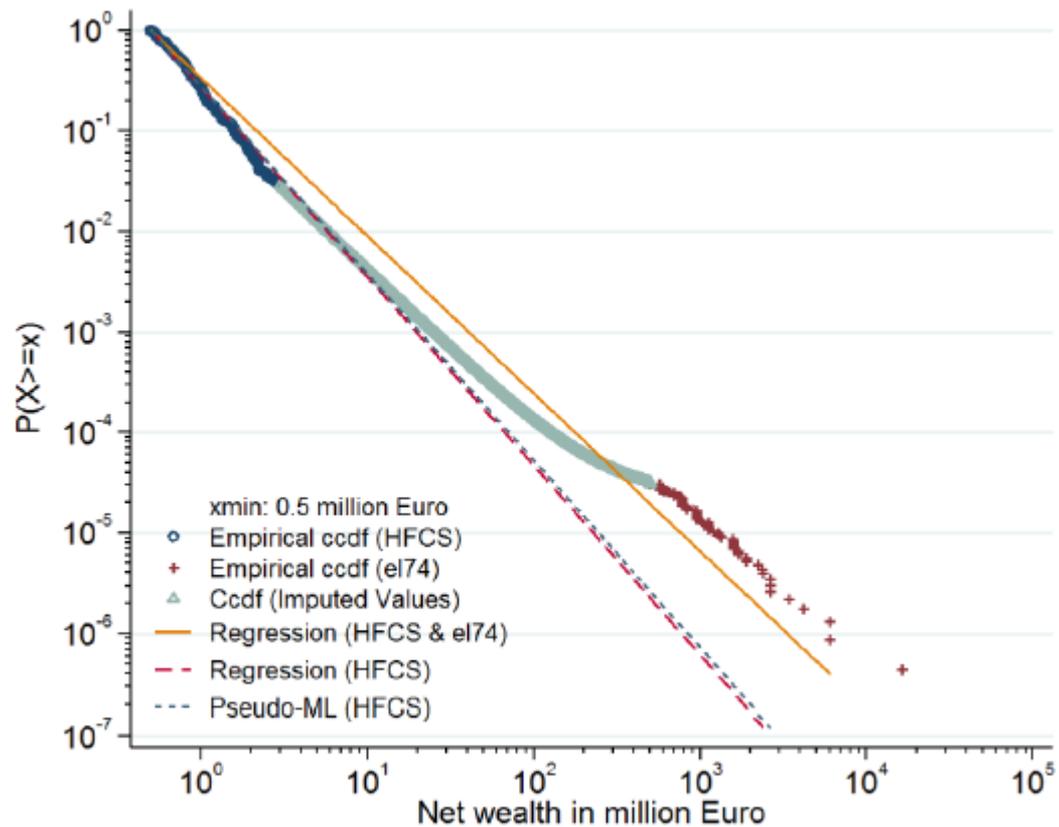
Table 6: Estimated α -coefficients for different subsamples, Greece

W_{\min}	Excluding the rich list		Including the rich list	
			Greek Rich List (top29)	Forbes (top18)
	α_{PML}	α_{Reg}	α_{Reg}	α_{Reg}
0.5 million euro	2.638	3.117 (0.071)	1.720 (0.033)	1.220 (0.017)
1 million euro	3.761	3.190 (0.139)	1.476 (0.038)	1.018 (0.021)
2 million euro	11.378	3.069 (0.345)	1.083 (0.094)	0.738 (0.091)

Note: Robust standard errors are reported in brackets. α_{PML} refers to the Pseudo-ML estimate and α_{Reg} to the estimate based on OLS.

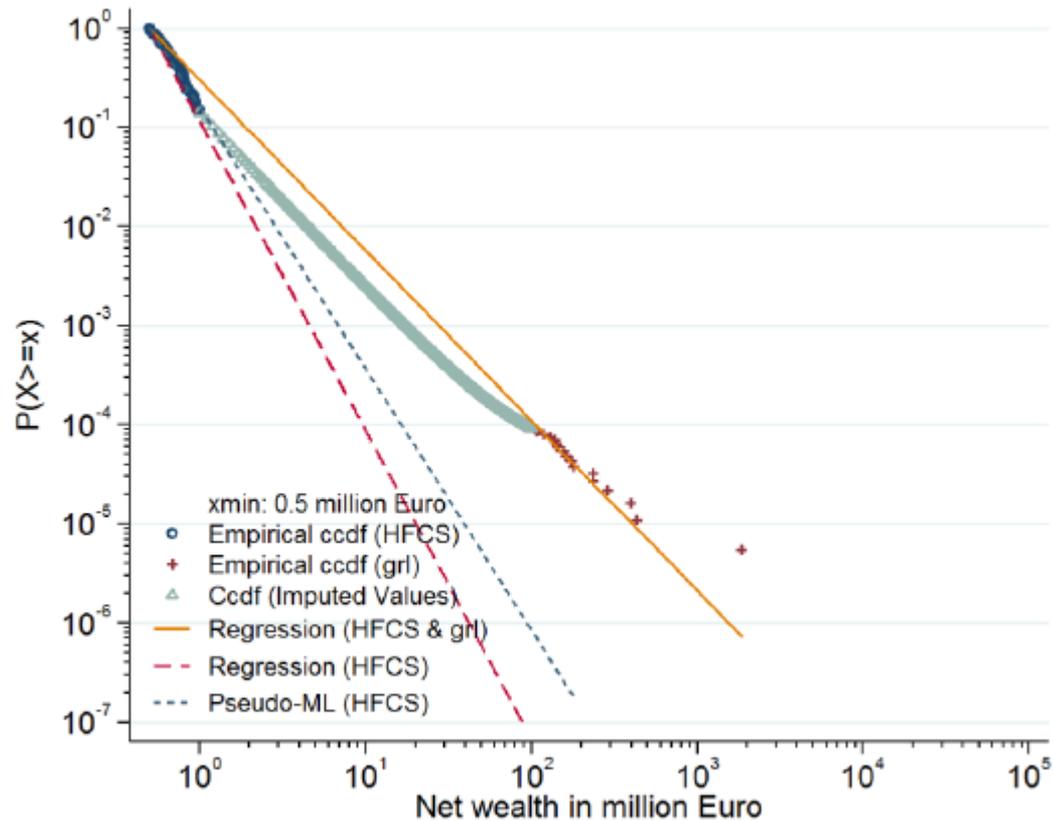
Source: HFCS, Forbes list, Challenges list; own calculations.

Figure 9: Adjusted tail wealth distribution, Spain



Source: HFCS, El mundo magazine; own calculations.

Figure 10: Adjusted tail wealth distribution, Greece



Source: HFCS, Greek Rich List; own calculations.