The Middle Class in the Joint Distribution of Income and Wealth: Luxembourg in Comparative Perspective

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Abstract

This paper uses harmonized microdata on net worth and disposable income from the Luxembourg Wealth Study, and newly gathered data on household wealth from Luxembourg, to examine the level of economic resources in Luxembourg compared to Germany, Italy, Sweden and the United States. Using an income-based definition of the middle class, we also compare the distribution of net worth among all persons with that for the middle class.

   We model the joint distribution of income and wealth to assess the shape and strength of the association of income and wealth, and to be able to abstract from systematic differences in demographic structure across countries. By so doing, we are able to examine to what extent economic resources are associated in different countries with different background characteristics, such as educational level, family structure and age, and how income and net worth are associated conditional on such characteristics.

1   Introduction

Social indicators such as the Gini coefficient, quintile shares, poverty rates are routinely computed by researchers and policy analysts to monitor social cohesion, both when looking at progress over time and in cross-national comparisons. They are almost always computed from data on household income and pick up inequality in the stream of income that people can draw on (Jenkins & Van Kerm, 2009). Far less is known about other measures of economic well-being such as inequality in consumption expenditure or wealth and asset holdings. However, there should be little dispute that the latter is a relevant measure of living standard too, and one which is probably able to capture long-term economic resources better than do monthly or annual income flows. The main reason for the unbalance between the use of income-based social indicators and wealth-based indicators is probably the availability of reliable data, income being much more easily collected. Some conceptual and measurement issues also make measurement of inequality in wealth somewhat more challenging – these include the presence of a substantial fraction of negative net worth in most sample data on wealth, the strong skewness and the fat tails of the distributions with extreme data that make some traditional measures of inequality inadequate (Cowell & Victoria-Feser, 1996; Jenkins & Jäntti, 2005).

Relatively little is known too about the dependence between income and wealth, especially outside the United States (Kennickell, 2009; Jäntti et al., 2008). While there is an obvious link between income and net wealth accumulation though savings and borrowing constraints, the dependency between these two variates cannot be summarized simply. The relationship is mitigated by, e.g., wealth portfolio allocation choices, life-cycle effects, intergenerational transfers (inheritance), past income streams and their volatility, etc. There is however interest in capturing and understanding better how these measures of economic well-being covary. This would provide a broader portray of social inequality than measures focusing on just one or the other variable can make. It is not entirely clear — empirically and theoretically – if there is some trade-off between them (think of a miserly millionaire) or if they tend to be strongly positively associated thereby reinforcing social inequality overall. Better knowledge about the joint distribution of income and wealth is also relevant for the design of taxation and redistribution policies as well as for better identification and targeting of vulnerable population groups. This paper aims at providing new evidence for Luxembourg and for selected LWS participating countries for which comparable wealth data are available.

This paper takes a first look at the newly collected data on household wealth in Luxembourg in 2008. The data, which was collected as a module to the PSELL survey, has been partially harmonized for inclusion in the Luxembourg Wealth Study (LWS) database. We put the distribution of wealth and income in Luxembourg in context by comparisons to selected LWS countries, namely Germany, Italy, Sweden and the United States.

The paper proceeds as follows. In the next section, we discuss at some length the design of the LWS database, and then specify what specific choices we have made for this study. The section also attempts to provide some contextual information about the datasets we use. In Section 3, we take a look at the composition and dsitribution of net worth and its main components. We also relate

both net worth and disposable income to selected covariates (age, education, household structure) by estimating quantile regressions for the 10th, 50th and 90th percentiles. In Section 4 examines the joint distribution of net worth and disposable income, first descriptively and then by running simple bivariate regressions and examining the joint distribution of the residuals. Section 5 offers concluding remarks.

2 Data

In this section, we first describe the Luxembourg Wealth Study database (LWS), relate the wealth data for Luxembourg to the LWS harmonized template, and then explain the selections we have made for the the analyses in this paper. The surveys in LWS differ by purpose and sampling frame (for details see Sierminska et al., 2006). Certain surveys have been designed for the specific purpose of collecting wealth data (i.e. Canada, , Italy, and the SCF in the United States), whereas others cover different areas and have been supplemented with special wealth modules (i.e. Germany and the PSID in the United States). Some surveys over-sample the wealthy and provide a better coverage of the upper tail of the distribution (Canada, Germany and the SCF in the United States), but at the cost of higher non-response rates. And not all oversample evenly, as only the US SCF uses a list sample of tax authority records and a large sample of high wealth persons. Others ask only a small number of broad wealth questions, but achieve good response rates (e.g., US-PSID). Germany applies a special case of bottom-coding as financial assets, durables and collectibles, and non-housing debt are only recorded when their respective values exceed 2,500 euros) – and better comparability can be achieved by imposing the same bottom-coding to the records of other countries.

Definitions are also not uniform across surveys: In general, the unit of analysis is the household, but it is the individual in Germany, and the nuclear family (i.e. a single adult or a couple plus dependent children) in Canada. A household is defined as including all persons living together in the same dwelling, but sharing expenses is an additional requirement in Italy, Sweden and the United States. This implies that demographic differences reflect both the definition of the unit of analysis and true differences in the population structure. The household's head is defined as the main income earner in most surveys, but as the person most knowledgeable and responsible for household finances in Germany, and Italy. The United States is the only country where the head is taken to be the male in mixed-sex couples. The surveys included in the LWS archive differ in many other respects, and some aspects more closely related to wealth variables are discussed in the next Section. Full documentation of each survey's features is an important constituent of the LWS archive. The LWS documentation also reports which of these differences in the original surveys were corrected for in the harmonization process, and which were not. See http://www.lisproject.org/lwstechdoc.htm for more on these idiosyncrasies.

LWS variables and income and wealth classifications   The number and definition of recorded wealth variables vary considerably across surveys. The number of wealth categories ranges from 7 in the UK-BHPS (which is not used here) to 30 or more in the IT-SHIW and the US-SCF. These dif-

ferences compound with the detail of the questions: in some surveys, there are few simple summary questions; in other surveys, the very high level of detail leads to a considerable multiplication of the number of separate recorded items. The US-SCF is by far the most detailed survey of those included in the LWS database: checking accounts, for instance, are first separated into primary and secondary accounts, and then distinguished according to the type of bank where they are held.

The great variation in the amount of recorded information makes the construction of comparable wealth aggregates a daunting task. This problem has been approached by defining an ideal set of variables to be included in the LWS database. This starts with a general classification of wealth components, from which totals and subtotals are obtained by aggregation. This set is then integrated with demographic characteristics (including health status) and income and consumption aggregates, plus a group of variables particularly relevant in the study of household wealth: realized lump-sum incomes (e.g., capital gains, inheritances and inter-vivo transfers) and "behavioural" variables such as motives for savings, perceptions about future events (e.g., bequest motivation), attitude towards risk, and so forth.

This ideal list has been pared down after a comparison with the information actually available in the LWS surveys. With regards to wealth, this process has led to identify the following categories:

- Financial assets: Transaction and savings accounts; Certificate of Deposits; Total bonds; Stocks; Mutual and investment funds; Life insurance; Pension assets; and other financial assets.

- Non-financial assets: Principal residence; Investment in real estate; Business equity; Vehicles; Durables and collectibles; and other non-financial assets.

- Liabilities: Home secured debt – i.e. the sum of principal residence mortgage, other property mortgage, and other home secured debt (including lines of credit); Vehicle loans; Installment debt (including credit card balance); Educational loans; other loans from financial institutions; and informal debt.

- Net worth: Financial plus non-financial assets less Liabilities.

These LWS aggregates are broadly comparable, but this fall far short of perfect comparability, since underlying definitions and methods vary across surveys. Moreover, these aggregates fail to capture important wealth components, such as business equity and pension assets. As their importance differs across countries, cross-national comparisons are bound to reflect these omissions. Some indication on the size of these omissions is provided by comparing LWS definitions and the national accounts definitions of households' net worth. The LWS database includes the variables which are part of the national accounts concept but are excluded from the LWS definition. This allows users to reconcile the different definitions. As Sierminska et al. (2006) demonstrate, once the missing items are included back in net worth, the LWS figures closely approximate those released in the national accounts. On the other hand, and more worryingly, the weight of these omissions is significant and varies considerably across countries: it goes from about a half in the two North-American nations to

less than a fourth in the three European nations of Table A.3 in Sierminska et al. (2006). This evidence is a salutary warning of the currently high cost of cross-country comparability: until a greater standardization of wealth surveys is achieved ex ante, we have to trade off higher comparability against a somewhat incomplete picture of national wealth. For now, I stick to the definition that is less inclusive in that it includes business equity but that is available for more countries.

Further comparability issues   Other methodological differences, in addition to the definitional issues described above, affect comparability. Some relate to the way assets and liabilities are recorded (i.e. as point values, by brackets, or both) and to their accounting period. Wealth values generally refer to the time of the interview, but in four countries end-of-year values are registered. Moreover, in many of the surveys included in the LWS database the reference period for income differs from that for wealth.

The criteria to value assets and liabilities may differ too (see Atkinson & Harrison, 1978, pp. 5-6). In most cases, wealth components are valued on a "realization" basis, or "the value obtained in a sale on the open market at the date in question" (Atkinson & Harrison, 1978, p. 5), as estimated by the respondent. But there are exceptions, the most relevant being the valuation of real property in Sweden and Norway, which are valued on a "taxable" basis. In the case of Sweden, Statistics Sweden calculates the ratios of purchase price to tax value for several types of real estate and geographical locations, and then use them to inflate the tax values registered in the survey. No adjustment of tax values is applied in Norway, although Statistics Norway estimated that the taxable value of houses in the 1990s was less than a third of their market value (see Harding et al., 2004, pp. 15-6, fn. 10). These diverse choices are likely to affect comparisons between the two Scandinavian countries as well as between them and the other countries relying on valuation at market prices as estimated by respondents.

Lastly, there are different patterns of non-response and different imputation procedures. For instance, the overall response rate of the IT-SHIW is rather low, about 36% of units in the 2002 wave were not found at the available address, but item non-responses are few. Similarly, LWS net worth cannot be derived for 14% of the households in the UK-BHPS. Banks et al. (2002) have applied a "conditional hot-deck" imputation method at the benefit unit level to alleviate the missing information problem, but it is still to be determined whether LWS will follow the same methodology. In the US-PSID, financial assets as well as housing equity are imputed. Discussions are under way whether this imputation method can be followed to obtain values for the principal residence and mortgages that would reduce the overall proportion of missing values. In the US-SCF, item non-response is tackled by using a sophisticated multiple imputation procedure (Kennickel, 2000), while in the GE-SOEP it is currently treated by simply replacing missing values with the overall mean (a complex imputation procedure is under study).

Sierminska et al. (2006) provide a synthetic assessment of the information contained in the LWS database by comparing the LWS-based estimates with their aggregate counterparts in the national balance sheets of the household sector (which include non-profit institutions serving households and small unincorporated enterprises). In all countries where the aggregate information is available,

the LWS wealth data account for between 40 and 60% of the aggregate wealth. Not all of the discrepancies should be attributed to the deficiency of the LWS data. They reflect not only the under-reporting in the original micro sources, but also the dropping of some items in the LWS definitions to enhance cross-country comparability as well as the different definitions of micro and macro sources.

To sum up, despite the considerable effort put into standardizing wealth variables, there remain important differences in definitions, valuation criteria and survey quality that cannot be adjusted for. Moreover, the degree to which LWS-based estimates match aggregate figures varies across surveys. These observations have to be borne in mind in reading the results discussed in the next section. The most reassuring thing about the LWS surveys is that the LWS income data are almost identically to the LIS income measures available on the LIS income surveys (Niskanen, 2007). This should come as no surprise because for Germany, Italy and Sweden, the data are from the same surveys.

Comparability of income and wealth across populations   What particular deflator, purchasing power parity (PPP) exchange rate and equivalence scale to use for income on the one hand and wealth on the other used involves judgement. For one thing, it is far from certain that the best choice of, say, deflator for income is the same as that for wealth. There are reasonably standard choices on how to treat incomes for comparative analyses: e.g., to use a consumer price index to deflate incomes to a common base year and to "standard" PPPs to render incomes comparable in purchasing power terms (Gottschalk & Smeeding, 1997). While there are many equivalence scales to choose from, there is little debate as to the appropriateness of using one that takes some kind of household economies of scale into account. Typically, either the "old" OECD or the so-called "square root scale" are used.

Whether or not the same set of choices is appropriate for the distribution of wealth is an open question and depends on what we think the wealth has been accumulated for. Suppose, for instance, that the bulk of wealth is held to smooth consumption during periods of low income. In that case, the purpose is to be able to draw down on wealth to finance consumption for (more or less) the current household and the same kind of choices that apply to income are appropriate. That is, the value of wealth is in its capacity to finance the consumption of the current household something that consumer price deflators, PPPs and an equivalence scale that is supposed to translate the capacity to generate wellbeing of a given sum of money across households of different structures.

On the other hand, suppose wealth is accumulated to finance consumption after retirement. While that wealth too is held to finance consumption, it is the consumption not of the current household but one that will exist at some future point in time. Presumably, for instance, offspring who at this point in time are minors will by then be self-supporting adults in their own households. So using an equivalence scale based on the current household structure may undervalue the capacity of the wealth held now to finance future consumption.

For the superrich, the purpose of holding wealth is unlikely to be (solely) to finance consumption, but presumably some element of the capacity of wealth to yield status and power to its holder is involved. In that case, cross-country comparison might reasonably rely on exchange rates, not PPPs. Presumably, for instance, the Forbes list of billionaires in the world relies on comparison of portfolios based on exchange rates.

Choices made in this paper   The wealth data for Luxembourg were gathered in 2008 as a special module to the PSELL, a longitudinal dataset now its Xth wave. The data used in the current version of the paper are based on a preliminary (pre-edited, pre-imputed) version of the PSELL wealth data. The data have been partially harmonized into the LWS wealth template. However, some differences remain. In particular, the PSELL collects less information on mortgages and other home secured debt than enters the LWS variable template, and we also have less information there on other types of debt than the LWS template specifies. On the asset side, we lack information on pension assets, what the LWS template labels "other financial assets" and vehicles. Some of these differences between what the LWS template specifies and the PSELL data contain can be repaired in future versions of the harmonized data. However, for now, we have chosen in this version of the paper to use the national definitions of total financial assets. Thus, while the data contain the same major components of wealth and debt, the net worth concepts are not fully harmonized across countries.

We have chosen to compare the Luxembourg data to Germany, Italy, Sweden and the United States (see Table 2). This choice of comparison group can be defended as providing one member each from a broad typology of welfare state regimes. They are also the datapoints that are most recent in the LWS database, although unfortunately they do stem from quite different years.

We provide some contextual information in Table 1 taken from the the OECD Economic Outlook (OECD, 2010). Panel A shows real GDP growth rates and Panel B unemployment rates across the LWS years used here for our included countries. The German data for 2002 were taken during a year of zero GDP growth, while the Italian in 2004 stems from a higher growth year, as does the Swedish in 2002. The US data for 2006 stem from a reasonably high growth years, while in Luxembourg, the wealth data are measured during a zero growth year.

Panel C shows for the LWS year and the latest available year selected information from household balance sheets. The numbers shown are the ratio of the household sector's holding of assets/liabilities relative to nominal household disposable income, based on national accounts. We see that in Germany and Italy, all wealth components increased relative to income while liabilities declined. In the US, the ratio of net wealth (and all other wealth components) to income declined substantially across two years, while liabilities also declined somewhat. (Data for Sweden and Luxembourg were not available.)

Thus, the macroeconomic context from which each of our datasets stems varies substantially. This should be born in mind when comparing across datasets.

Since this paper is concerned with the distribution of well-being in a sense closely related to the tradition of income distribution research, we opt to use quite standard methods. In particular, we use the OECD's price deflator for Actual Final Consumption. We have converted all currencies to international dollars using the PPPs for personal consumption in 2005 as published by the OECD, having first used national price deflators for personal consumption to express national currencies in year 2005 prices. All income and wealth components are further adjusted for the current household's economies of scale using the square-root scale.

The US (SCF) is exceptionally good at capturing wealth at the very top of the distribution. This, unfortunately, creates some comparability problems as other surveys tend to be less good at getting

Table 1 Contextual information – real GDP growth, unemployment rates and household balance sheet information

A. Real GDP growth								
	2002	2003	2004	2005	2006	2007	2008	2009
Germany	0.0	-0.2	0.7	0.9	3.4	2.6	1.0	-4.9
Italy	0.5	0.1	1.4	0.8	2.1	1.4	-1.3	-5.1
Luxembourg	4.1	1.5	4.4	5.4	5.6	6.5	0.0	-3.4
Sweden	2.5	2.5	3.7	3.1	4.6	3.5	-0.6	-5.1
United States	1.8	2.5	3.6	3.1	2.7	2.1	0.4	-2.4

B. Harmonised unemployment rates								
	2002	2003	2004	2005	2006	2007	2008	2009
Germany	8.4	9.3	9.8	10.6	9.8	8.4	7.3	7.5
Italy	8.6	8.5	8.0	7.7	6.8	6.2	6.8	7.7
Luxembourg	2.6	3.8	5.0	4.6	4.6	4.2	4.9	5.4
Sweden	6.0	6.6	7.4	7.7	7.1	6.1	6.2	8.3
United States	5.8	6.0	5.5	5.1	4.6	4.6	5.8	9.3

C. Household balance sheet data		
Country	LWS year	Latest
Germany	2002	2007
Net wealth	533.7	628.6
Net financial wealth	145.9	198.7
Non-financial assets	387.8	430.0
Financial assets	257.9	300.6
Liabilities	112.1	101.9
Italy	2004	2008
Net wealth	793.9	818.0
Net financial wealth	297.6	253.7
Non-financial assets	496.3	564.3
Financial assets	364.3	333.2
United States	2006	2008
Net wealth	650.1	475.7
Net financial wealth	350.2	254.6
Non-financial assets	299.9	221.1
Financial assets	485.4	385.9
Liabilities	135.2	131.4

Source: OECD (2010), Annex Tables X, Y and 58.

Table 2 LWS datasets analysed

- Germany (GSOEP 2002)

- Italy (SHIW 2004)

- Sweden (2002)

- United States (SCF 2006)

Table 3 Sample sizes and outliers

	Germany	Italy	Luxembourg	Sweden	US (SCF)
Pre-shaving	12692	7976	18895	17954	4418
Post-shaving	12116	7703	17885	16849	3494
Difference	576	273	1010	1105	924

the very rich to respond. To increase the comparability of the datasets across countries, we "shave" off both the top and the bottom of the bivariate distribution. Specifically, we include those persons whose adjusted household disposable income and net worth is within the inner 98 percent of both marginal distributions. Table 3 shows the sample sizes pre and post applying the "shaving" procedure and Table 4 shows the estimated percentiles in the pre-shaved data.

We use a very simple definition of the middle class, by defining it to consist of persons whose income falls between the 25th and 75th percentiles of adjusted household disposable income.

Table 4 Pre-shave percentiles

	Percentiles				
	1	10	50	90	99
Income					
Germany	2519	9537	20105	38155	73652
Italy	1494	7068	15500	31287	69867
Luxembourg	9569	19027	34786	62922	130972
Sweden	3675	10634	19105	31738	53107
US (SCF)	−11	8557	23233	56176	256975
Wealth					
Germany	−28731	0	41832	285800	932815
Italy	391	9015	110240	363436	1184568
Luxembourg	−836	0	230167	631681	1975602
Sweden	−51608	−11253	18613	146494	443530
US (SCF)	−24398	0	54313	462268	3346692

3 The distribution and composition of net worth

We show in Table 5 the sample-weighted proportions negative, zero and positive holders of net worth and its main components in each dataset in both the full dataset (Panel A) and the shaved dataset (Panel B). We note that Luxembourg and Italy stand out as having very few with negative net worth, and Italy none in the shaved dataset. The shaving does not dramatically alter the cross-country patterns of non-zero wealth holdings. There is reason to suspect that where Luxembourg stands out – it has fewer holding positive amounts of financial assets and fewer with positive amounts of debt (except for Italy) than other countries – this may in part be accounted for differences in the country-specific wealth components.

We next take a look at how the likelihood of holding an asset, and the amounts held, vary between the full sample and our "middle class", defined as consisting of the 2nd and 3rd quartile groups of disposable income (see Table 6). In Luxembourg, the middle class is almost as likely to hold both financial and non-financial assets, and a little more likely to hold debt, than the average. This is different in one respect from the other countries, namely that in all other rcountries, the middle classes are more likely to hold financial assets than the average. The amounts held, shown in the lower panel, are in Luxembourg strikingly high. While we should keep in mind that in having "shaved" off the bottom and the top of the distribution, which lowers the average especially in the US quite dramatically, the Luxembourgish wealth holdings are still very high. It may be useful to recall that, although Luxembourg is a very rich country, the Luxembourg data stem from a later year (2008) than any other dataset, and the Luxembourg may not have suffered from a collapse in property prices in the wake of the financial crisis. The numbers in Panel B suggest that, at this level of aggregation, the portfolio composition of the middle classes is not very different from that of the average person.

Table 7 shows the 90th percentile and median of net worth and its main components for all persons and those who belong to the middle classes. Unsurprisingly, the 90th percentile of wealth among the middle classes is lower than that among all persons (suggesting that net worth and disposable income covary positively). For the median, shown in Panel B, the net worth of the middle classes is higher in all countries.

What then of the distribution of net worth? While the presence of varying proportions of negative net worth make comparisons based on traditional measures of relative inequality, such as the Gini coefficient, mildly uninformative, it is all the same instructive to take a look at the patterns. Table 8 shows the estimated Gini coefficients among all and the middle classes, again for net worth and its main components. Sweden turns out to have the highest level of net worth inequality thus measured, followed by the US, Germany, and Italy, and Luxembourg the least. (see also Jäntti et al., 2008). Once we narrow interest down to just the middle classes, the order remains, except that now net worth is most equally distributed among the Italian middle classes.

Table 5 Proportions negative, zero, and positive

A. All data

	Germany	Italy	Luxembourg	Sweden	US (SCF)
Net worth					
Negative	6.6	0.7	2.5	26.4	9.9
Zero	14.8	0.0	9.8	3.1	3.2
Positive	78.6	99.3	87.7	70.5	86.9
Financial assets					
Zero	24.1	16.1	46.3	16.9	31.6
Positive	75.9	83.9	53.7	83.1	68.4
Non-financial assets					
Zero	44.3	0.0	20.6	33.4	6.4
Positive	55.7	99.9	79.4	66.6	93.6
Debt					
Zero	58.9	73.0	55.2	20.6	17.5
Positive	41.1	27.0	44.8	79.4	82.5

B. Shaved data

	Germany	Italy	Luxembourg	Sweden	US (SCF)
Net worth					
Negative	5.8	0.0	1.4	25.9	9.1
Zero	15.2	0.0	9.8	3.2	3.3
Positive	79.0	100.0	88.8	71.0	87.6
Financial assets					
Zero	24.0	15.7	46.0	16.8	32.1
Positive	76.0	84.3	54.0	83.2	67.9
Non-financial assets					
Zero	44.9	0.0	19.9	33.4	6.3
Positive	55.1	100.0	80.1	66.6	93.6
Debt					
Zero	59.7	73.3	55.5	20.9	17.7
Positive	40.3	26.7	44.5	79.1	82.3

Table 6 Proportion with positive and mean wealth and debt holdings – all and middle income classes

A. Proportion with positive amounts

Proportion positive	Net worth	Fin. assets	Non-fin. assets	Debt
Germany				
all	79.0	76.0	55.1	40.3
Middle Income	88.0	86.9	62.5	47.4
Italy				
all	100.0	84.3	100.0	26.7
Middle Income	100.0	93.3	100.0	28.5
Luxembourg				
all	88.8	54.0	80.1	44.5
Middle Income	94.6	58.4	84.6	47.3
Sweden				
all	71.0	83.2	66.6	79.1
Middle Income	75.1	90.0	78.2	88.0
US (SCF)				
all	87.6	67.9	93.6	82.3
Middle Income	92.1	81.3	98.0	91.2

B. Average

Average	Net worth	Fin. assets	Non-fin. assets	Debt
Germany				
all	79937	19822	77670	17556
Middle Income	83140	20517	80208	17584
Italy				
all	120842	10706	113859	3723
Middle Income	123877	11046	116797	3965
Luxembourg				
all	228063	13804	237572	23314
Middle Income	246821	13053	259224	25456
Sweden				
all	37223	12871	43580	19227
Middle Income	34337	11405	45275	22343
US (SCF)				
all	128729	50035	128872	50177
Middle Income	105340	36360	124347	55368

Table 7 Quantiles of wealth and debt – all and middle income classes

A. 90th percentile

90th perc	Net worth	Fin. assets	Non-fin. assets	Debt
Germany				
all	219202	51205	213778	58965
Middle Income	208035	50034	186968	58695
Italy				
all	274801	25929	258380	11137
Middle Income	262450	25271	242611	12356
Luxembourg				
all	489200	38254	486607	84902
Middle Income	479242	34810	459158	89744
Sweden				
all	114496	35654	112841	48631
Middle Income	102402	29398	101132	47573
US (SCF)				
all	328569	129407	295531	121648
Middle Income	251512	95710	254671	107734

B. Median

Median	Net worth	Fin. assets	Non-fin. assets	Debt
Germany				
all	33222	8253	22272	0
Middle Income	47700	11739	54920	0
Italy				
all	85497	3705	82503	0
Middle Income	97402	4940	93054	0
Luxembourg				
all	180068	587	195706	0
Middle Income	213582	1772	226968	0
Sweden				
all	15410	3454	27363	11098
Middle Income	17316	3544	35148	18195
US (SCF)				
all	40902	3933	74517	22362
Middle Income	53957	10205	94011	43269

Table 8 Gini coefficients wealth and debt – all and middle income classes

A. Gini coefficient

Gini coefficient	Net worth	Fin. assets	Non-fin. assets	Debt
Germany				
all	67.0	68.3	68.6	82.1
Middle Income	61.6	60.7	63.2	76.7
Italy				
all	52.4	71.1	52.3	89.7
Middle Income	44.7	63.2	45.5	88.4
Luxembourg				
all	51.4	84.1	48.1	79.5
Middle Income	45.0	80.3	41.3	78.4
Sweden				
all	77.7	73.7	62.4	61.6
Middle Income	76.1	72.4	52.9	50.5
US (SCF)				
all	72.5	83.3	62.5	67.2
Middle Income	61.7	75.2	46.5	52.0

Quantile regressions for net worth and disposable income

In order to explore how net worth is associated with observed characteristics of the households persons live in, and how this association varies across its distribution, we estimate descriptive quantile regressions. We estimate regressions of the 10th, 50th (i.e., the median), and 90th percentiles against age of household head (less tham 30, 30-50, 50-70 and 70+), education of household head (Low, Medium and High) and household structure (couple with no children, couple with children, lone childless, lone parent, other). In order to facilitate the interpretation of the results, we estimate the same equations for both disposable income and net worth. The estimates were obtained using the package `quantreg` in the statistical package **R** (Koenker, 2005; Ihaka & Gentleman, 1996).

Figure 1 Median regressions: Coefficient estimates and 95% CI

A. Disposable income
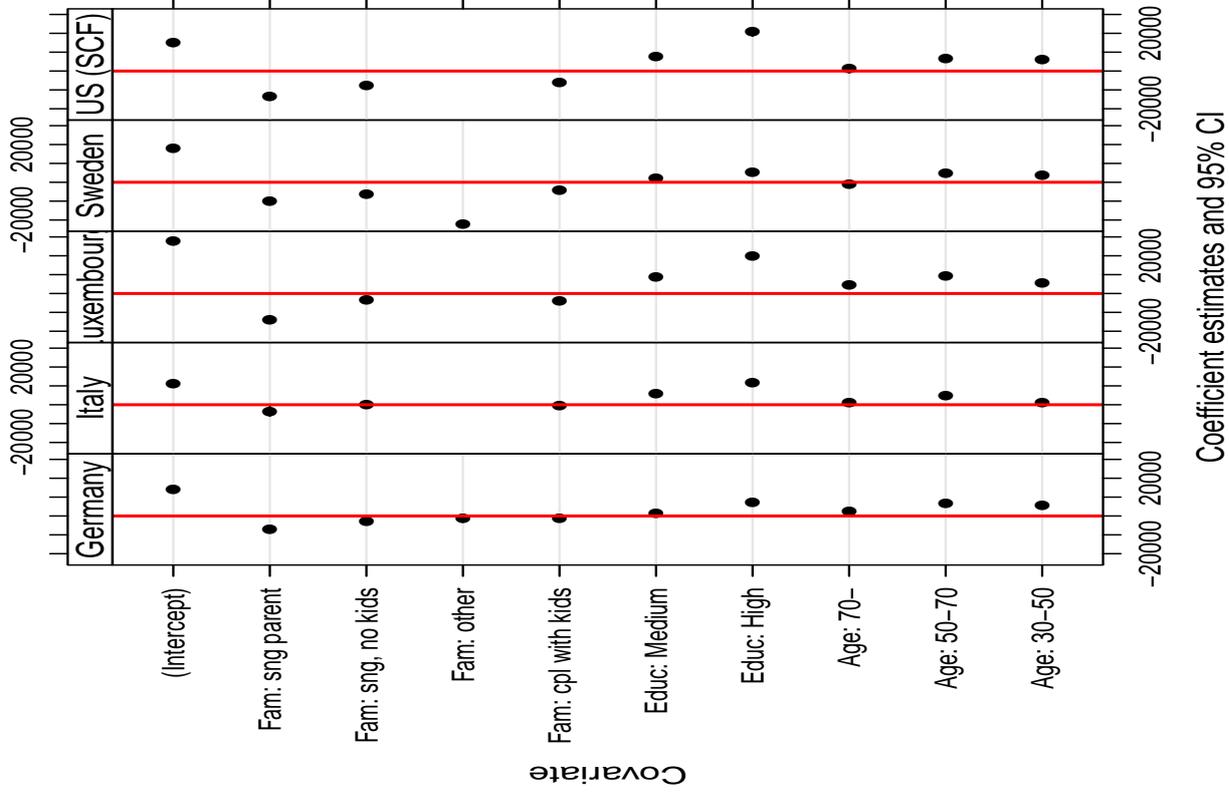
B. Net worth
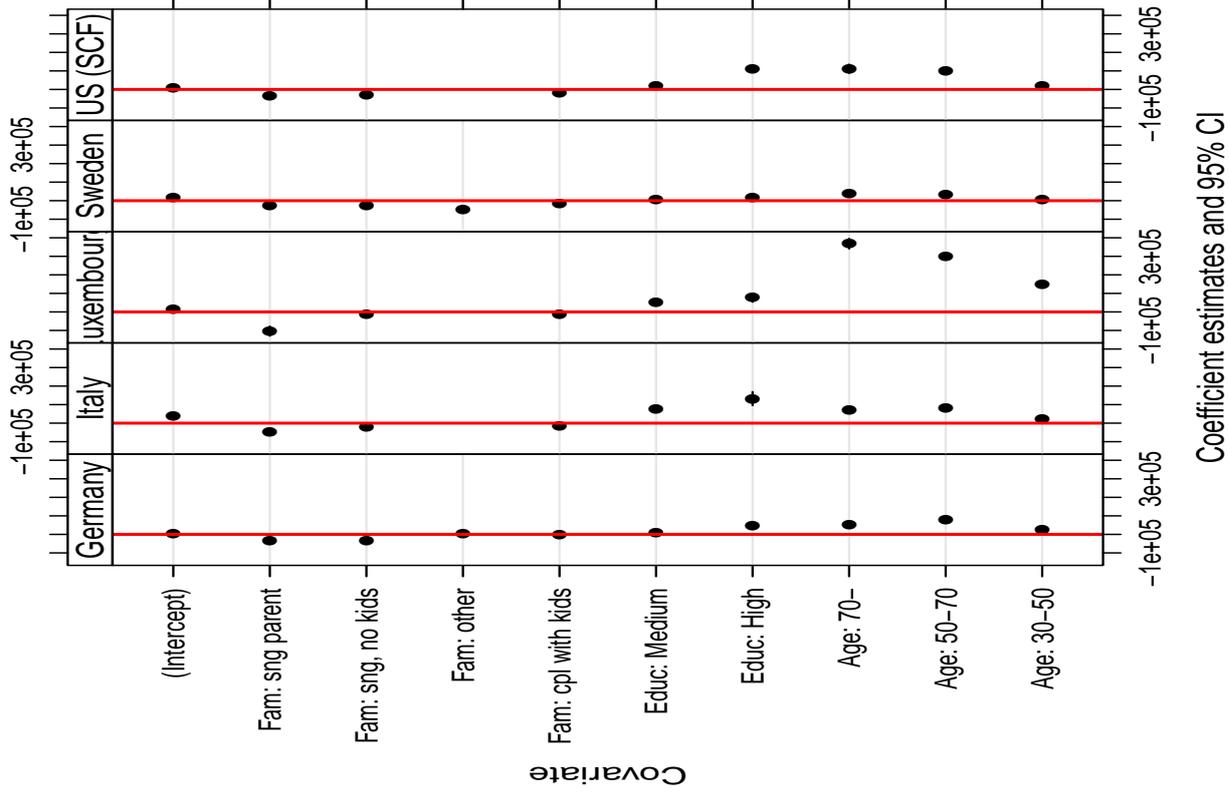
Table 9: Quantile regression results: Disposable income

A. Germany

Covariates	0.1	0.5	0.9
(Intercept)	$5.72e+03$ $(4.09e+02)$	$1.41e+04$ $(6.09e+02)$	$2.48e+04$ $(1.03e+03)$
AgeH30-50	$2.81e+03$ $(3.75e+02)$	$5.59e+03$ $(4.92e+02)$	$9.36e+03$ $(9.42e+02)$
AgeH50-70	$3.93e+03$ $(3.62e+02)$	$6.85e+03$ $(5.18e+02)$	$1.30e+04$ $(8.55e+02)$
AgeH70-	$3.87e+03$ $(3.60e+02)$	$2.56e+03$ $(4.95e+02)$	$5.98e+03$ $(7.92e+02)$
Famtypecouple with children	$1.17e+03$ $(3.62e+02)$	$-1.32e+03$ $(4.08e+02)$	$-5.20e+03$ $(9.52e+02)$
Famtypeother	$-2.66e+03$ $(5.04e+02)$	$-1.48e+03$ $(9.47e+02)$	$-8.11e+03$ $(1.03e+03)$
Famtypesingle, no children	$-1.97e+03$ $(2.79e+02)$	$-2.94e+03$ $(3.89e+02)$	$-6.27e+03$ $(8.20e+02)$
Famtypesingle parent	$-2.76e+03$ $(4.48e+02)$	$-7.18e+03$ $(4.74e+02)$	$-1.34e+04$ $(1.27e+03)$
Education.headMedium	$1.92e+03$ $(3.30e+02)$	$1.55e+03$ $(3.40e+02)$	$3.74e+03$ $(7.42e+02)$
Education.headHigh	$4.56e+03$ $(3.68e+02)$	$7.42e+03$ $(4.47e+02)$	$1.40e+04$ $(8.75e+02)$

B. Italy

Covariates	0.1	0.5	0.9
(Intercept)	7903.466 (696.328)	11057.081 (605.431)	19054.415 (1341.480)
AgeH30-50	30.035 (667.611)	1171.012 (591.052)	3769.858 (1314.441)
AgeH50-70	689.730 (675.665)	4788.090 (613.839)	8909.170 (1333.954)
AgeH70-	414.273 (677.282)	1168.606 (575.681)	1337.237 (1409.907)
Famtypecouple with children	-1811.370 (336.959)	-570.800 (406.196)	497.558 (800.776)
Famtypesingle, no children	-1739.882 (326.667)	37.392 (329.884)	1908.825 (983.294)
Famtypesingle parent	-4527.981 (1144.127)	-3484.506 (1334.628)	-8149.103 (1818.149)
Education.headMedium	2656.186 (294.460)	5809.653 (383.082)	8242.007 (910.391)
Education.headHigh	6733.253 (1072.573)	11960.930 (1012.038)	19376.076 (1911.288)

C. Luxembourg

Table 9 Continued

Covariates	0.1	0.5	0.9
(Intercept)	19331.65 (524.36)	27583.32 (903.93)	43802.35 (1171.96)
AgeH30-50	2797.75 (281.63)	5856.48 (869.04)	10504.84 (1056.49)
AgeH50-70	2784.90 (682.12)	9335.58 (873.43)	17286.75 (1403.81)
AgeH70-	3463.87 (493.32)	4532.52 (919.87)	7982.70 (1020.80)
Famtypecouple with children	−3331.84 (553.04)	−4153.32 (468.05)	−7435.20 (1266.96)
Famtypesingle, no children	−4585.42 (475.62)	−3152.61 (529.95)	−3990.58 (840.34)
Famtypesingle parent	−11320.11 (1360.76)	−13692.27 (1021.29)	−18225.42 (1572.22)
Education.headMedium	6269.63 (708.30)	9034.32 (390.73)	11923.49 (846.14)
Education.headHigh	11069.96 (1262.97)	19750.91 (700.33)	39850.94 (2086.48)

D. Sweden

Covariates	0.1	0.5	0.9
(Intercept)	$8.31e+03$ $(2.84e+02)$	$1.80e+04$ $(2.76e+02)$	$2.66e+04$ $(4.93e+02)$
AgeH30-50	$5.05e+03$ $(2.27e+02)$	$3.97e+03$ $(2.45e+02)$	$5.29e+03$ $(3.82e+02)$
AgeH50-70	$5.88e+03$ $(2.19e+02)$	$4.82e+03$ $(2.51e+02)$	$6.69e+03$ $(4.00e+02)$
AgeH70-	$4.00e+03$ $(2.64e+02)$	$-9.83e+02$ $(2.60e+02)$	$-2.28e+03$ $(4.53e+02)$
Famtypecouple with children	$-1.31e+03$ $(2.24e+02)$	$-3.95e+03$ $(2.09e+02)$	$-6.70e+03$ $(4.17e+02)$
Famtypeother	$-1.11e+04$ $(5.21e+03)$	$-2.24e+04$ $(1.06e+04)$	$-3.62e+04$ $(1.78e+04)$
Famtypesingle, no children	$-4.41e+03$ $(1.54e+02)$	$-6.25e+03$ $(1.52e+02)$	$-8.60e+03$ $(3.07e+02)$
Famtypesingle parent	$-4.95e+03$ $(2.93e+02)$	$-1.01e+04$ $(2.89e+02)$	$-1.44e+04$ $(6.55e+02)$
Education.headMedium	$1.85e+03$ $(1.90e+02)$	$1.90e+03$ $(1.74e+02)$	$2.27e+03$ $(3.41e+02)$
Education.headHigh	$2.81e+03$ $(2.57e+02)$	$5.44e+03$ $(2.38e+02)$	$9.37e+03$ $(4.50e+02)$

E. US (SCF)

Table 9 Continued

Covariates	0.1	0.5	0.9
(Intercept)	$5.09e+03$	$1.50e+04$	$2.43e+04$
	$(8.33e+02)$	$(1.01e+03)$	$(2.10e+03)$
AgeH30-50	$3.62e+03$	$5.99e+03$	$1.18e+04$
	$(5.78e+02)$	$(7.13e+02)$	$(1.11e+03)$
AgeH50-70	$2.77e+03$	$6.88e+03$	$2.26e+04$
	$(6.45e+02)$	$(9.59e+02)$	$(2.47e+03)$
AgeH70-	$1.47e+03$	$1.15e+03$	$7.07e+03$
	$(1.09e+03)$	$(1.06e+03)$	$(2.13e+03)$
Famtypecouple with children	$-1.41e+03$	$-5.84e+03$	$-6.89e+03$
	$(6.75e+02)$	$(9.43e+02)$	$(1.74e+03)$
Famtypesingle, no children	$-3.83e+03$	$-7.86e+03$	$-1.16e+04$
	$(7.16e+02)$	$(8.33e+02)$	$(2.04e+03)$
Famtypesingle parent	$-5.55e+03$	$-1.37e+04$	$-1.92e+04$
	$(9.44e+02)$	$(9.14e+02)$	$(1.52e+03)$
Education.headMedium	$4.18e+03$	$7.49e+03$	$1.24e+04$
	$(4.44e+02)$	$(5.85e+02)$	$(1.70e+03)$
Education.headHigh	$9.65e+03$	$2.07e+04$	$4.97e+04$
	$(9.89e+02)$	$(1.15e+03)$	$(4.00e+03)$

Table 10: Quantile regression results: Net worth

A. Germany

Covariates	0.1	0.5	0.9
(Intercept)	$-1.76e+03$	$1.58e+03$	$6.32e+04$
	$(9.66e+02)$	$(4.47e+03)$	$(1.13e+04)$
AgeH30-50	$1.65e+03$	$2.52e+04$	$1.04e+05$
	$(9.87e+02)$	$(2.71e+03)$	$(9.55e+03)$
AgeH50-70	$1.76e+03$	$7.75e+04$	$2.63e+05$
	$(9.66e+02)$	$(4.67e+03)$	$(1.33e+04)$
AgeH70-	$1.76e+03$	$5.42e+04$	$2.69e+05$
	$(9.66e+02)$	$(7.15e+03)$	$(1.99e+04)$
Famtypecouple with children	$1.06e+02$	$2.07e+02$	$-1.54e+04$
	$(2.41e+02)$	$(3.90e+03)$	$(1.22e+04)$
Famtypeother	$0.00e+00$	$2.21e+03$	$1.84e+04$
	$(0.00e+00)$	$(8.26e+03)$	$(2.45e+04)$
Famtypesingle, no children	$0.00e+00$	$-3.55e+04$	$-6.17e+04$
	$(0.00e+00)$	$(4.21e+03)$	$(1.16e+04)$
Famtypesingle parent	$-1.57e+03$	$-3.35e+04$	$-8.89e+04$
	$(3.88e+02)$	$(4.27e+03)$	$(2.11e+04)$
Education.headMedium	$0.00e+00$	$1.14e+04$	$2.65e+04$
	$(0.00e+00)$	$(3.62e+03)$	$(1.01e+04)$
Education.headHigh	$3.12e+02$	$4.70e+04$	$9.61e+04$
	$(3.06e+02)$	$(4.66e+03)$	$(1.39e+04)$

B. Italy

Covariates	0.1	0.5	0.9
(Intercept)	$3.63e+03$	$4.03e+04$	$1.70e+05$
	$(4.27e+03)$	$(8.51e+03)$	$(5.36e+04)$
AgeH30-50	$3.19e+03$	$2.28e+04$	$4.22e+04$
	$(4.13e+03)$	$(7.41e+03)$	$(5.21e+04)$
AgeH50-70	$1.07e+04$	$8.36e+04$	$1.68e+05$
	$(4.14e+03)$	$(7.82e+03)$	$(5.30e+04)$
AgeH70-	$1.04e+04$	$7.30e+04$	$1.44e+05$
	$(4.14e+03)$	$(8.57e+03)$	$(5.28e+04)$
Famtypecouple with children	$-1.76e+03$	$-1.27e+04$	$-2.90e+04$
	$(1.98e+03)$	$(6.36e+03)$	$(1.81e+04)$
Famtypesingle, no children	$-6.39e+03$	$-1.90e+04$	$-1.89e+04$
	$(2.01e+03)$	$(7.09e+03)$	$(1.85e+04)$
Famtypesingle parent	$-5.60e+03$	$-4.77e+04$	$-7.88e+04$
	$(2.74e+03)$	$(8.36e+03)$	$(7.05e+04)$
Education.headMedium	$1.16e+04$	$7.43e+04$	$1.59e+05$
	$(1.89e+03)$	$(5.70e+03)$	$(1.86e+04)$
Education.headHigh	$3.42e+04$	$1.32e+05$	$3.33e+05$
	$(6.24e+03)$	$(1.91e+04)$	$(2.79e+04)$

C. Luxembourg

Table 10 Continued

Covariates	0.1	0.5	0.9
(Intercept)	$-1.41e+04$	$1.29e+04$	$1.94e+05$
	$(2.27e+04)$	$(8.56e+03)$	$(2.08e+04)$
AgeH30-50	$1.41e+04$	$1.51e+05$	$3.20e+05$
	$(2.11e+04)$	$(8.28e+03)$	$(1.48e+04)$
AgeH50-70	$2.84e+04$	$2.97e+05$	$5.73e+05$
	$(2.45e+04)$	$(7.75e+03)$	$(2.29e+04)$
AgeH70-	$4.63e+04$	$3.68e+05$	$5.65e+05$
	$(3.04e+04)$	$(1.43e+04)$	$(4.70e+04)$
Famtypecouple with children	$0.00e+00$	$-1.28e+04$	$-1.03e+05$
	$(1.15e+04)$	$(9.95e+03)$	$(2.02e+04)$
Famtypesingle, no children	$-1.42e+04$	$-1.29e+04$	$4.52e+04$
	$(7.85e+03)$	$(8.50e+03)$	$(2.92e+04)$
Famtypesingle parent	$-1.42e+04$	$-1.04e+05$	$-1.94e+05$
	$(7.85e+03)$	$(1.37e+04)$	$(3.72e+04)$
Education.headMedium	$1.42e+04$	$5.09e+04$	$5.64e+04$
	$(8.46e+03)$	$(8.55e+03)$	$(1.37e+04)$
Education.headHigh	$1.42e+04$	$7.67e+04$	$8.24e+04$
	$(7.78e+03)$	$(1.22e+04)$	$(2.13e+04)$

D. Sweden

Covariates	0.1	0.5	0.9
(Intercept)	$-1.40e+04$	$1.66e+04$	$6.22e+04$
	$(1.05e+03)$	$(1.62e+03)$	$(5.89e+03)$
AgeH30-50	$2.83e+03$	$8.04e+03$	$3.84e+04$
	$(8.63e+02)$	$(7.99e+02)$	$(4.00e+03)$
AgeH50-70	$1.26e+04$	$3.46e+04$	$1.09e+05$
	$(8.99e+02)$	$(1.68e+03)$	$(5.47e+03)$
AgeH70-	$1.80e+04$	$4.10e+04$	$1.29e+05$
	$(9.52e+02)$	$(1.68e+03)$	$(6.27e+03)$
Famtypecouple with children	$5.71e+02$	$-1.65e+04$	$-2.71e+04$
	$(7.92e+02)$	$(1.59e+03)$	$(4.81e+03)$
Famtypeother	$9.32e+03$	$-4.70e+04$	$-1.70e+05$
	$(4.55e+03)$	$(2.27e+04)$	$(8.09e+04)$
Famtypesingle, no children	$-4.00e+03$	$-2.75e+04$	$-4.56e+04$
	$(6.75e+02)$	$(1.48e+03)$	$(3.89e+03)$
Famtypesingle parent	$7.87e+02$	$-2.76e+04$	$-6.70e+04$
	$(1.14e+03)$	$(1.61e+03)$	$(5.39e+03)$
Education.headMedium	$-3.10e+02$	$4.59e+03$	$1.22e+04$
	$(6.27e+02)$	$(7.74e+02)$	$(4.17e+03)$
Education.headHigh	$-6.00e+03$	$1.45e+04$	$6.14e+04$
	$(8.23e+02)$	$(1.30e+03)$	$(5.08e+03)$

E. US (SCF)

Table 10 Continued

Covariates	0.1	0.5	0.9
(Intercept)	$-6.48e+03$	$6.15e+03$	$8.77e+04$
	$(1.61e+03)$	$(6.32e+03)$	$(3.91e+04)$
AgeH30-50	$7.18e+03$	$2.19e+04$	$1.12e+05$
	$(1.39e+03)$	$(2.75e+03)$	$(2.59e+04)$
AgeH50-70	$1.07e+04$	$9.94e+04$	$3.87e+05$
	$(2.06e+03)$	$(9.06e+03)$	$(4.51e+04)$
AgeH70-	$1.22e+04$	$1.12e+05$	$3.67e+05$
	$(3.48e+03)$	$(1.23e+04)$	$(4.25e+04)$
Famtypecouple with children	$-9.82e+02$	$-1.62e+04$	$-7.62e+04$
	$(1.60e+03)$	$(6.49e+03)$	$(3.52e+04)$
Famtypesingle, no children	$-5.70e+03$	$-2.68e+04$	$-8.48e+04$
	$(2.31e+03)$	$(6.28e+03)$	$(3.24e+04)$
Famtypesingle parent	$-4.25e+03$	$-3.39e+04$	$-1.15e+05$
	$(1.89e+03)$	$(6.53e+03)$	$(4.14e+04)$
Education.headMedium	$1.45e+03$	$2.05e+04$	$4.37e+04$
	$(1.07e+03)$	$(2.75e+03)$	$(1.94e+04)$
Education.headHigh	$7.69e+03$	$1.12e+05$	$4.74e+05$
	$(2.36e+03)$	$(8.75e+03)$	$(6.29e+04)$

The median regression coefficient estimates for both disposable income and for net worth are shown in Figure 1 (the red vertical line is drawn at zero). The full set of quantile regression results – for the 10th, 50th and 90th percentiles – are shown in Tables 9 to 10.

Panel A of Figure 1 shows the point estimates for the median regression of disposable income on age, education and household structure. A few of the estimates for Luxembourg stand out as being different from the patterns in other countries. One is the age profile of disposable income. The income advantage enjoyed by persons in in households with heads aged 50-70, all else equal, this group is somewhat larger in Luxembourg than in other countries. The education premia in Luxembourg are about as large as those in the the US, closely followed by Italy. The US and Luxembourg also have larger income disadvantage for persons in lone parent households than other countries.

The point estimates for the 10th and 90th percentile regressions, in addition to the 50th/median (which are also reported in Figure 1), are shown in Table 9. The income advantage for higher education groups in Luxembourg increases on moving up to the 90th percentile (see Panel C). There is a tendency across countries for the educational premia to increase across the distribution. Households with children are at an increasing income disadvantage across the whole distribution, and especially the lone parent income penalty increases in absolute magnitude as one moves higher up in the distribution.

Panel B of Figure 1 shows the point estimates for the median regression of net worth on the covariates. Here coefficient estimates for Luxembourg are in line with those in other countries, except that the age profile of wealth is much steeper than in other countries. The net worth advantage enjoyed by the older age groups is substantially higher than in other countries. Net worth differences across educational groups are similar in magnitude to those in the US and Italy, and the net worth disadvantage for lone parent households is somewhat larger than elsewhere.

Table 10 shows for each country the estimated regression coefficients for the 10th, 50th and 90th percentiles. The point estimates for Luxembourg (in Panel C) suggest that the pronounced age-net worth profile less steep on moving up the distribution of net worth, so is steeper at the 10th percentile and flattens up to the 90th. Couples with children and lone parents are at an income disadvantage that increases across the distribution, while the net worth differences across educational groups increase steeply from the 10th to the 50th, but not very much thereafter. These patterns of increasing differences across groups as one moves to higher percentiles is commono across countries, although the point estimates at the 10th and 90th percentiles are in some instances quite imprecisely estimated.

# 4   The joint distribution of net worth and disposable income

To get a first impression of the shape of the bivariate distribution of income and wealth, we show in Figures 2 and 3 the cross-tabulation of quartile groups of both resources variables. (The figures show the same numbers, but Figure 2 groups all countries in quartile group cells, whereas Figure 3 shows the full set of conditional probabilities for each country.)

There are some similarities across countries. In particular, the probabilities that second income quartile group persons end up in different wealth quartile groups are remarkably similar across all countries, and vary relatively little (see Figure 2).

Sweden stands out as being a little different from looks quite different from the other countries in the lowest and highest quartile groups. For instance, it is less likely that a Swedish lowest income quartile group person is also found in the lowest wealth quartile group than elsewhere. In Sweden, that likelihood is about 0.07, as compared to more than 0.10, in Luxembourg, Italy, Germany and the US. Similarly, it is somewhat more likely that a Swedish top income quartile person is in the bottom of the wealth distribution.

Figure 3 allows one to see how similar the shape of the German, Italian and US bivariate distributions are the Luxembourgish one (the figure is drawn such that the first four bars show the probabilities of a first quartile income group person being in the bottom to top wealth quartile groups). The first four bars decline sharply and the last four increase sharply, signalling a strong positive correlation of net worth with income. The Figure allows one to see clearly how well Luxembourg conforms to the pattern of these other countries.

Figure 2 Income-wealth quartile groups

Proportion / Wealth across the top
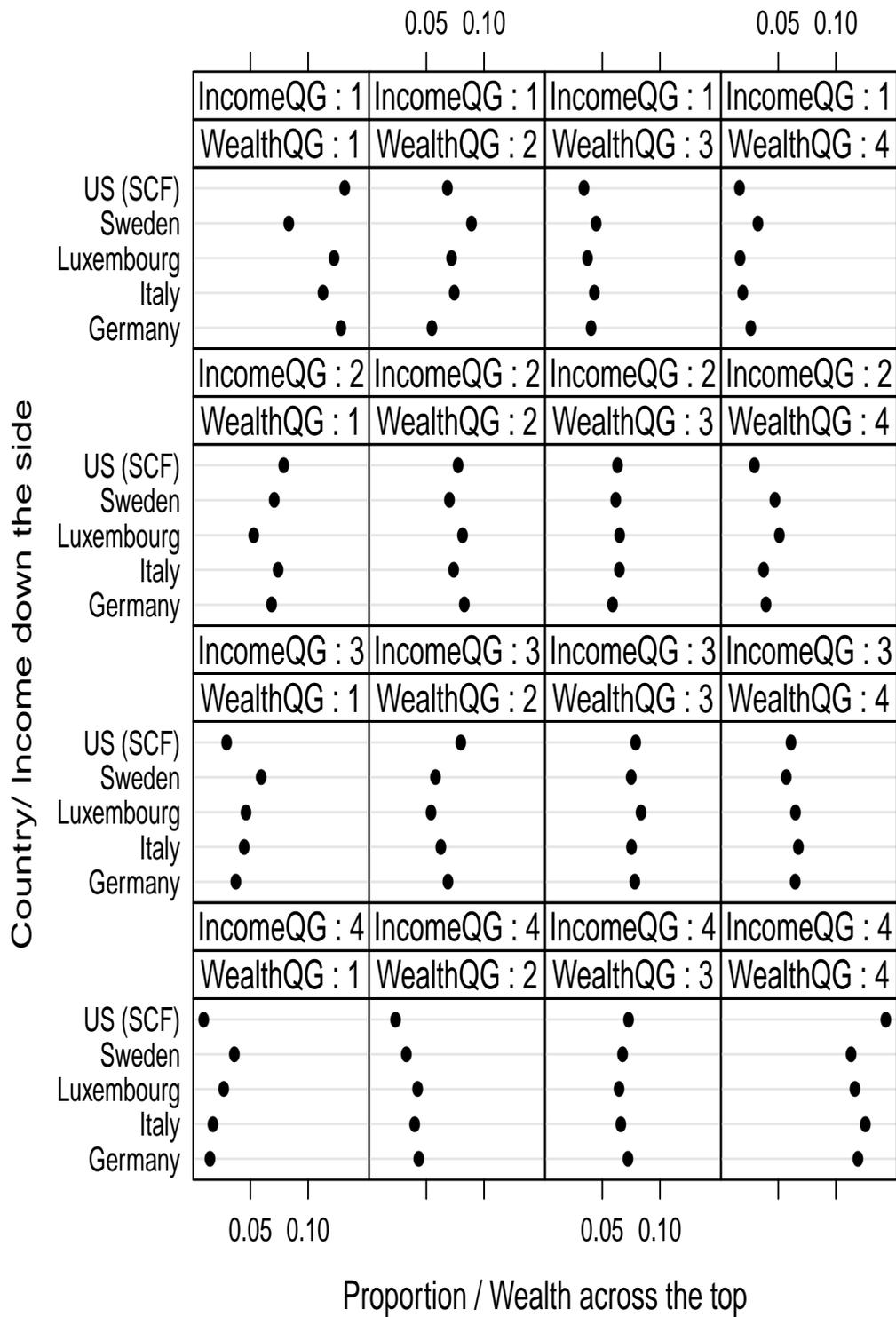
Figure 3 Income-wealth quartile groups
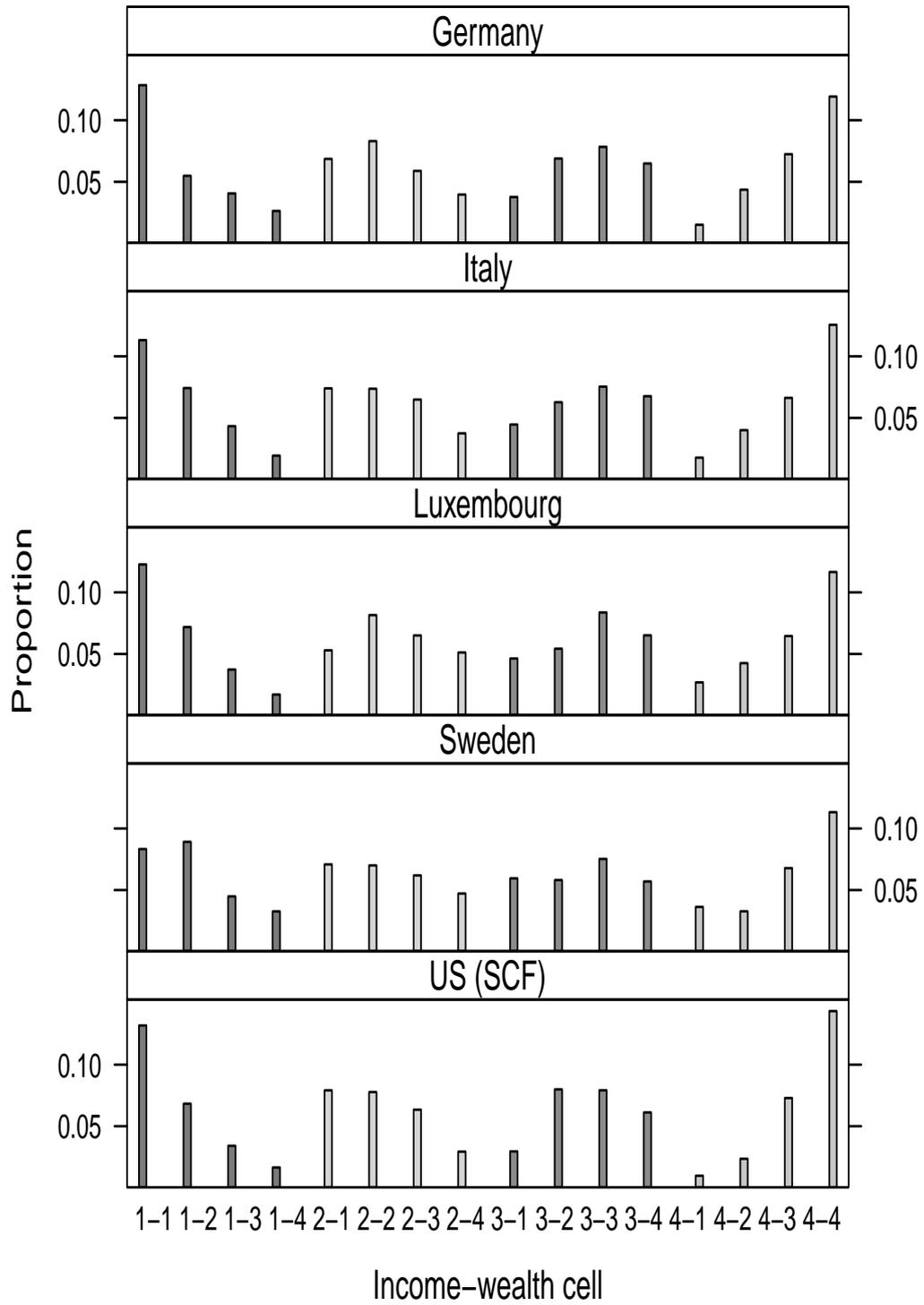
The conditional correlation of income and wealth

In order to continue to explore the nature of the bivariate distribution, we estimate descriptive bivariate regressions of disposable income and net worth, including the same set of covariates as in the quantile regressions in Section 3, namely the age and education of the household head and household structure. The purpose of these regressions is to see if the differences in the positive covariation of income and wealth is evident also conditional on a few key covariates of both income and wealth. The regressions are estimated using the `gls` function in the package `nlme` in the statistical package **R** (Pinheiro & Bates, 1999). The descriptive regressions are estimated directly on the levels of disposable income, rather than on the log or some other standard transformation. This non-standard procedure has the benefit of allowing for very simple interpretations of the coefficients in terms of 2005 international dollar differences between groups (all covariates are dummy variables). The intercept case (i.e., the omitted groups are) consists of persons in households with a young head (under the age of 30), low education and a household consisting of a couple with not children.

The bivariate regression results are reported in Table 11 and Figures 4 to 7. The coefficient estimates are shown in Table 11. Figure 5 shows the point estimates and confidence intervals for each country and Figure 4 summarizes the share of the variance of disposable income and net worth, respectively, that is captured by the covariates. Figure 6 again shows the residual standard deviations of disposable income and net worth, and Figure 7 displays the residual correlation of the two.

The proportion of variance in disposable income and net worth that is captured by the age, education and household structure covariates are shown in Figure 4. Sweden has the highest "R^2" for disposable income followed by Luxembourg, and the US and Luxembourg have the highest for net worth. For disposable income, the three sets of dummy variables capture more than a third in Sweden and a quarter in Luxembourg of the variance of income. For net worth, more than one fifth of the variance is capture in both the US and Luxembourg. The regressions capture least of the variance of either resource variable in Germany and Italy.

The coefficient estimates for income are quite similar in shape to those found for the median regression (see Table 11 and Panel A of Figure 5). Lone parent households are at a more marked income disadvantage in Luxembourg compared to other countries. Luxembourg also has the second largest educational income premia and the next highest age-income profile.

Differences in net worth across educational groups are, by contrast to income, quite small in Luxembourg compared to other countries (see Panel B of Figure 5). In the US, having a high education is associated with much higher wealth. All else equal, the point estimate in Table 11 suggests more than 400,000 international USD higher wealth. This difference for Luxembourg – relatively large educational differences in income, but small in net worth – should be further investigated, as it may be informative about differences in wealth accumulation processes across countries. In Luxembourg, on the other hand, wealth differences across age groups are the most pronounced, with households with heads aged 70 or more having more then 400,000 international USD higher wealth than the youngest heads.

Figure 6 shows the estimated standard deviations of income and net worth. Here, the US stands

Table 11 Regression results: net worth and disposable income (GLS estimates)

	Germany	Italy	Luxembourg	Sweden	US (SCF)
Disposable income					
Intercept (DPI)	16467.7 (459.6)	12610.1 (588.9)	28879.2 (468.1)	16919.3 (242.5)	12460.5 (2331.1)
AgeH30-50	6065.3 (401.5)	2137.2 (578.0)	6026.4 (448.5)	6236.0 (212.5)	11600.2 (1833.7)
AgeH50-70	7192.6 (399.6)	4252.1 (570.0)	10925.7 (467.0)	7031.6 (211.8)	18354.8 (1873.6)
AgeH70-	3043.7 (449.2)	1336.0 (586.1)	7445.8 (580.1)	989.9 (248.4)	8457.3 (2284.8)
Education.headHigh	9806.8 (316.0)	12505.2 (364.9)	21834.7 (325.4)	7966.1 (175.4)	36609.5 (1722.4)
Education.headMedium	2200.7 (291.1)	5868.1 (229.9)	10399.9 (336.6)	2761.1 (162.3)	10542.0 (1628.1)
Famtypecouple with children	−1892.4 (280.8)	−696.1 (265.6)	−7291.1 (341.3)	−5616.7 (183.5)	−4402.7 (1484.8)
Famtypeother	−3489.8 (699.3)	n.a.	n.a.	−26062.0 (7584.0)	n.a.
Famtypesingle, no children	−5326.5 (283.9)	−1294.4 (259.4)	−5741.7 (339.9)	−7014.3 (143.9)	−11598.2 (1422.3)
Famtypesingle parent	−8432.4 (480.0)	−5859.6 (757.6)	−15595.3 (571.1)	−11919.3 (303.3)	−17796.9 (2043.3)
Net worth					
Intercept (NW)	−1274.8 (5496.9)	36254.9 (10717.0)	36228.8 (7301.8)	−3925.2 (2198.4)	−69637.8 (33025.8)
AgeH30-50	40959.2 (4802.7)	45790.0 (10519.4)	106315.0 (6996.7)	16102.5 (1926.8)	94826.6 (25979.1)
AgeH50-70	102591.5 (4779.8)	108894.9 (10374.3)	317441.9 (7284.4)	53725.5 (1919.6)	321801.1 (26543.6)
AgeH70-	103314.5 (5372.7)	107157.9 (10666.9)	381569.4 (9049.7)	67601.1 (2251.6)	354593.5 (32369.5)
Education.headHigh	61437.1 (3779.3)	158751.0 (6641.9)	58455.5 (5075.7)	24719.7 (1590.0)	418776.0 (24401.8)
Education.headMedium	22261.5 (3481.7)	79108.3 (4183.7)	62460.2 (5250.5)	9143.7 (1470.9)	98674.8 (23065.5)
Famtypecouple with children	−5407.0 (3358.3)	−21200.8 (4833.6)	−60460.7 (5324.5)	−13547.1 (1663.9)	−57134.1 (21035.2)
Famtypeother	777.9 (8364.4)	n.a.	n.a.	−49813.1 (68750.9)	n.a.
Famtypesingle, no children	−43837.3 (3396.0)	−18199.4 (4721.5)	−50520.4 (5302.2)	−22155.9 (1304.3)	−138742.9 (20150.4)
Famtypesingle parent	−50320.4 (5741.4)	−48551.8 (13788.7)	−110127.1 (8908.7)	−25859.3 (2749.6)	−128366.8 (28947.4)
Diagnostics					
n	23520	15406	35770	33698	6988
k	20	18	18	20	18
σ	1e+04	8e+03	2e+04	8e+03	3e+04
logLik	-3e+05	-2e+05	-4e+05	-4e+05	-9e+04
AIC	6e+05	4e+05	9e+05	8e+05	2e+05

Figure 4 Regression results: share of variance explained
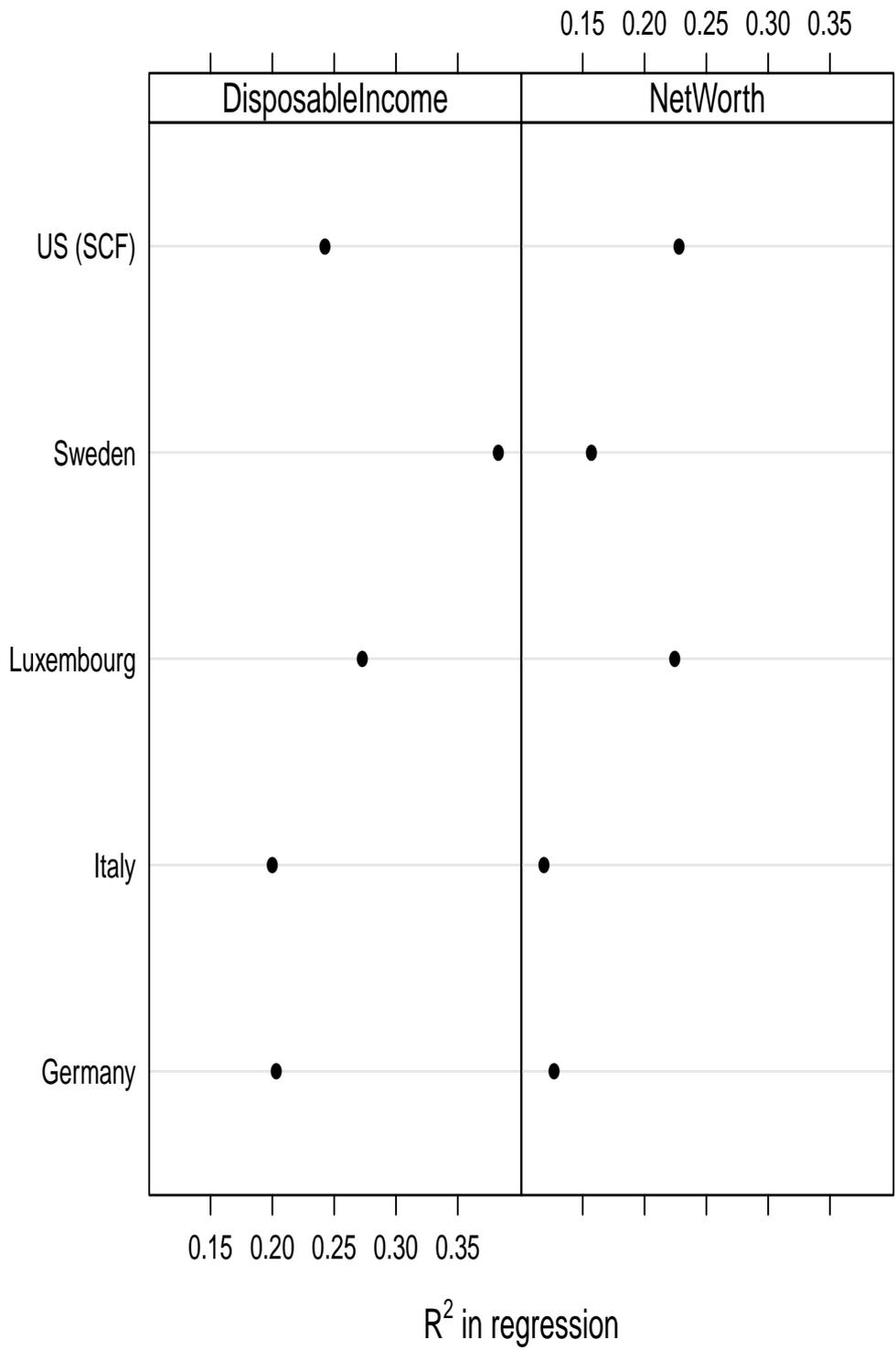
Figure 5 Regression results: Coefficient estimates and confidence intervals

A. Disposable income
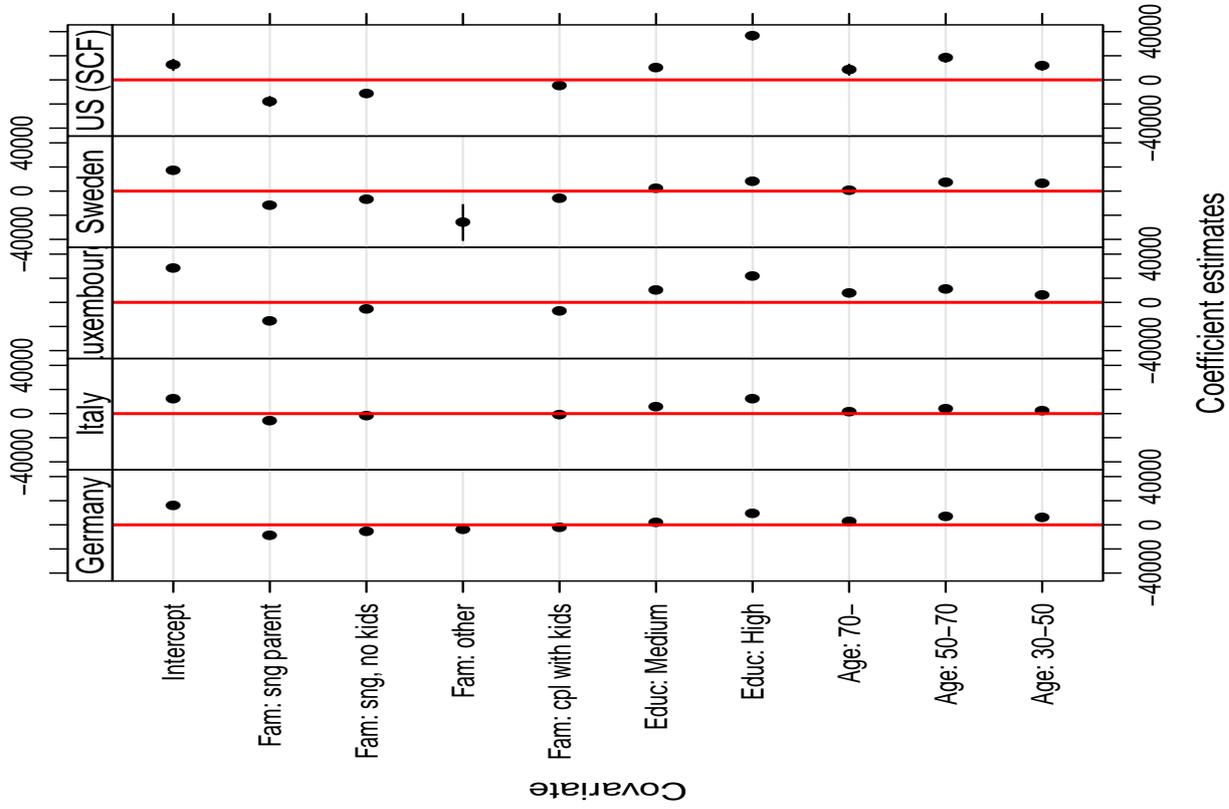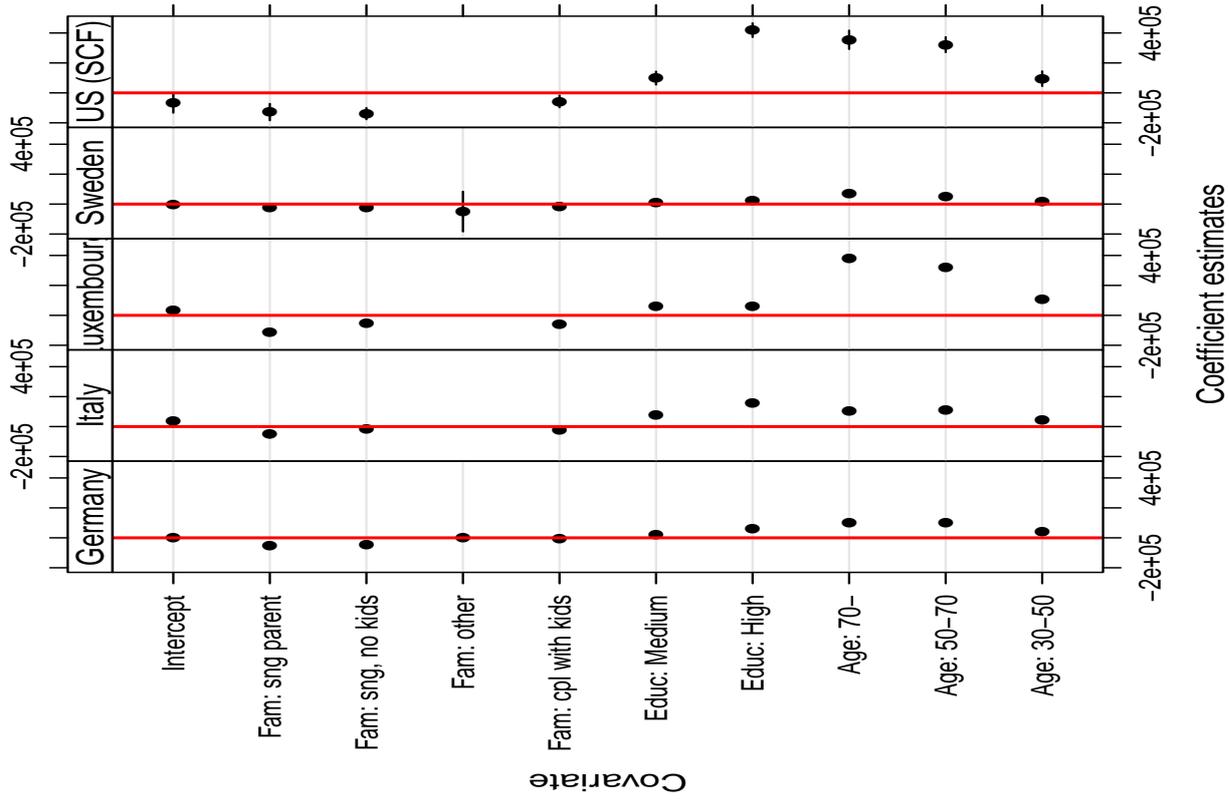
B. Net worth

Figure 6 Residual standard deviation

A. Disposable income
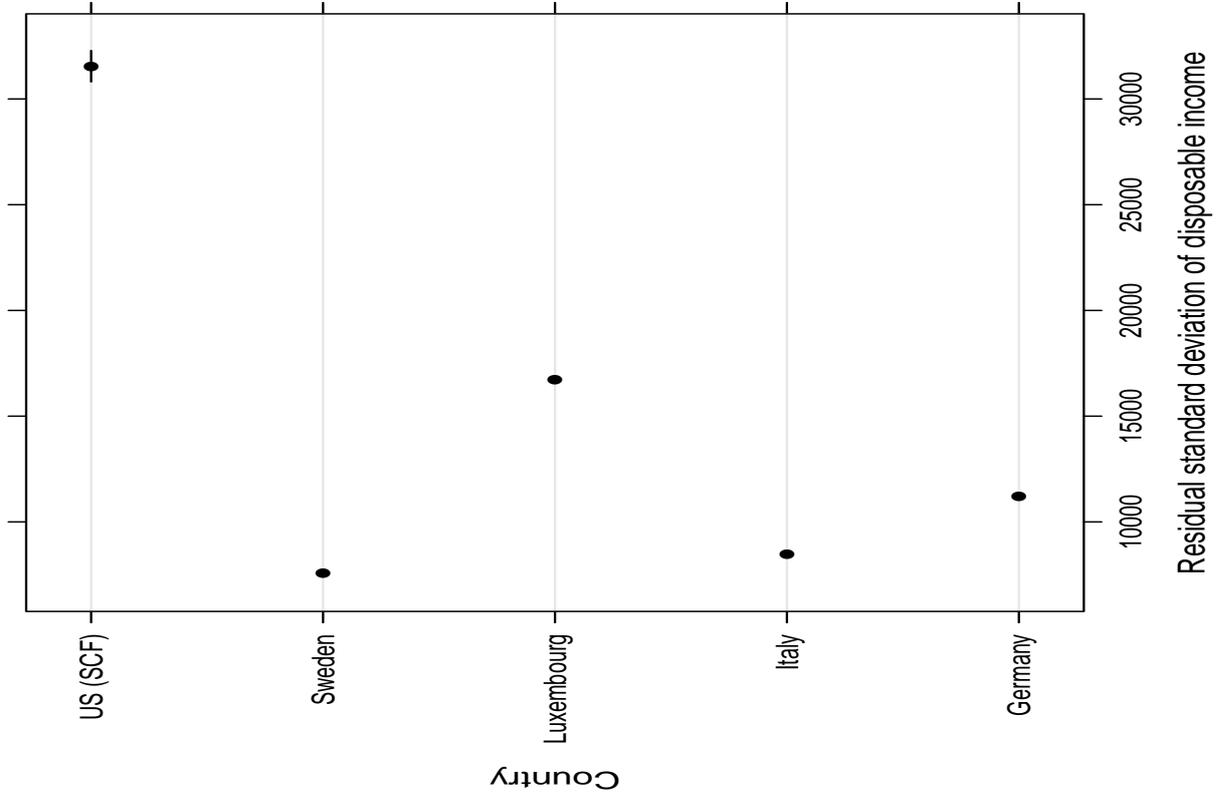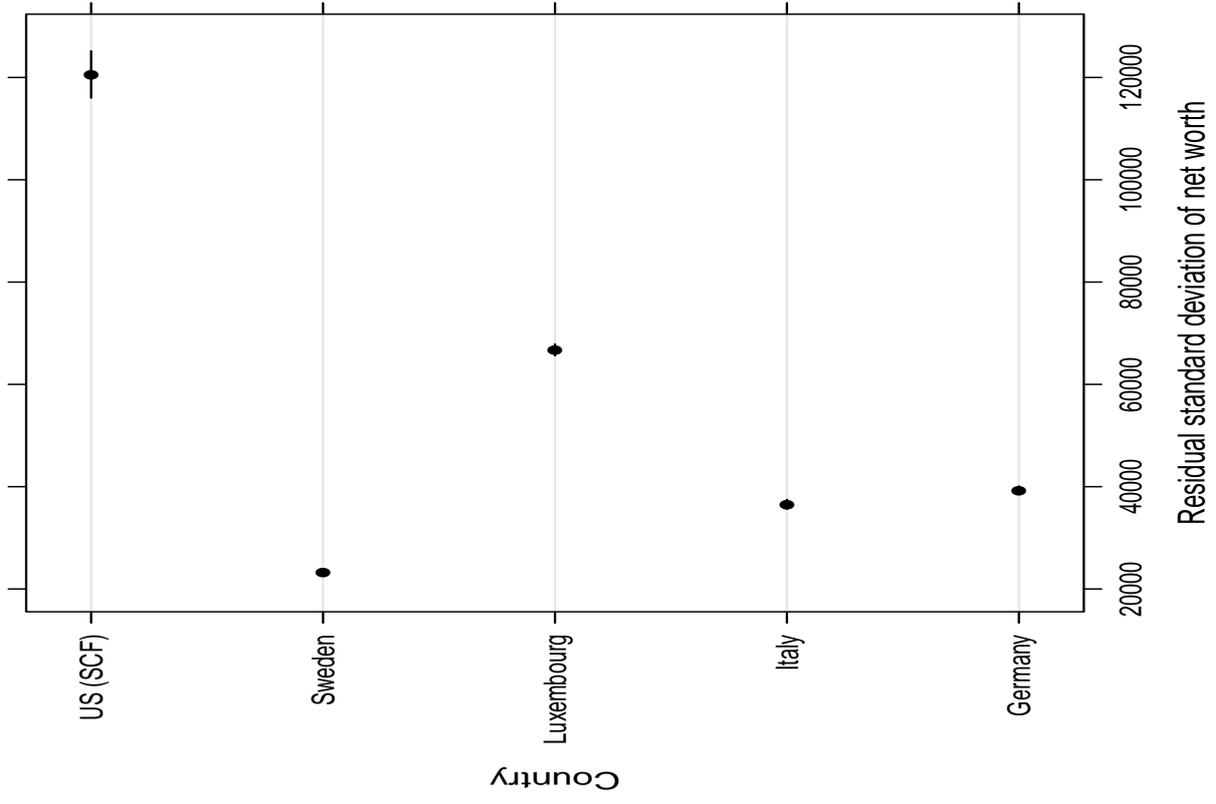

B. Net worth

Figure 7 Residual correlation of disposable income and net worth

Residual correlation of disposable income and net worth
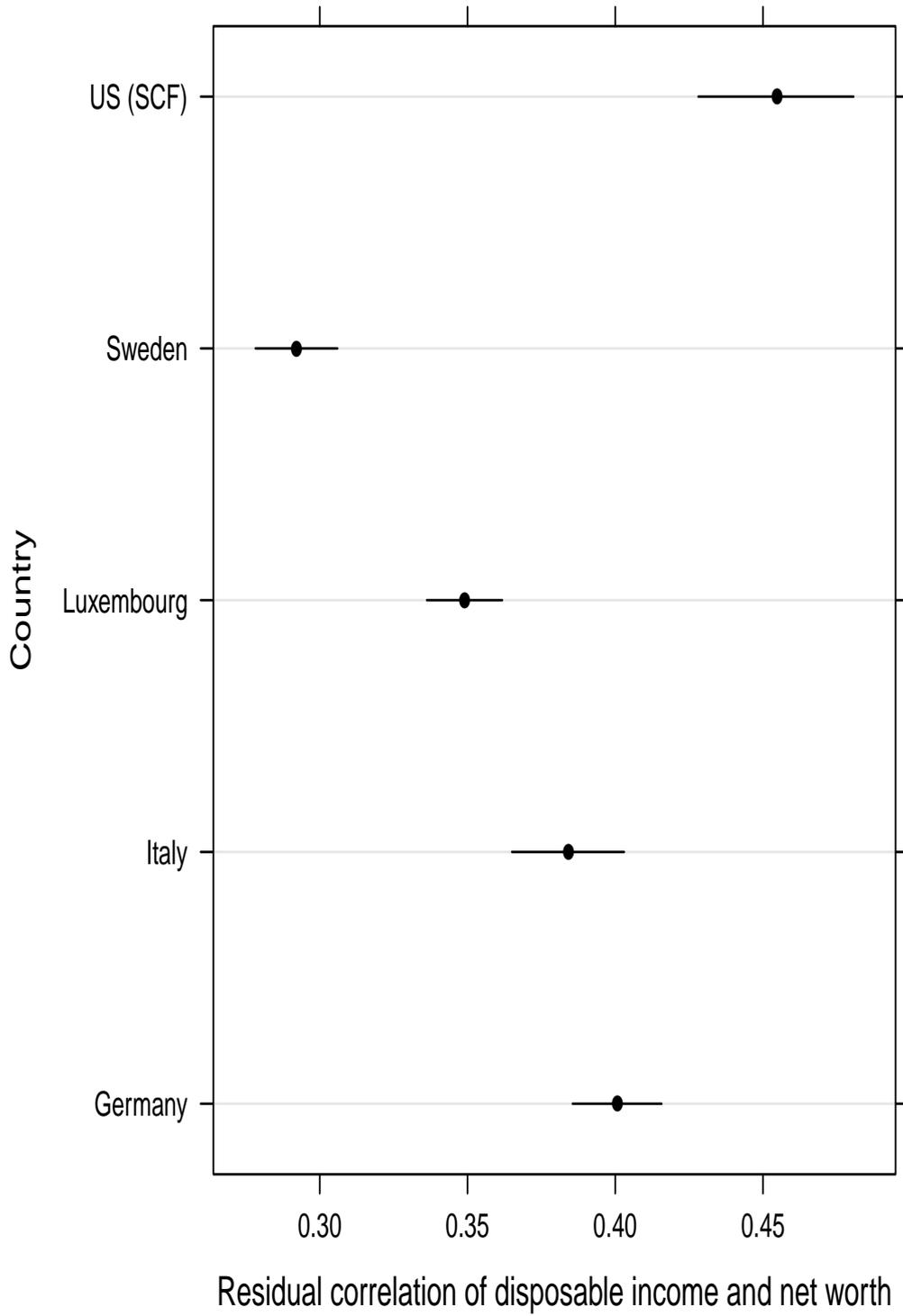
out as having by far the highest standard deviation, at more than 30,000 international USD for income and 120,000 international USD for net worth. Second, however, is Luxembourg, at 17,000 and 70,000 international USD for income and net worth, respectively.

The pattern we saw with the descriptive graphs of the bivariate distribution in Figure 3 is evident also in the estimates of the correlation between the residuals from the income and wealth regressions, shown in Figure 7 for each of the countries. That correlation is about 0.45 in the US, and around 0.4 in both Germany and Italy. The point estimate for Sweden, at around 0.29, is lowest, but Luxembourg is the second lowest with a correlation of about 0.35. This appears to be consistent with the cross-tabulation of quartile groups of net worth and income in Figure 2.

5   Concluding remarks

We have taken a first look at the newly gathered data on household wealth in Luxembourg and compared it to household wealth and income data in Germany, Italy, Sweden and the United States. The Luxembourg data stem from a more recent year and were surveyed at the outset of the financial crisis so the levels of net worth are very high. We have highlighted ways in which the distribution of net worth, and to some extent disposable income, is similar and in which it is different in Luxembourg compared to other countries. What most strongly comes out from these results, however, is how broadly similar the patterns of covariation of wealth and income are across the countries included, including the very rich country of Luxembourg.

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