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Income Inequality and Household Debt Distribution: A Cross-Country Analysis using Wealth Surveys

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Abstract

This paper provides new and unique estimates of households debt leverage along the distribution of income using microdata from wealth surveys. We build a new dataset covering twenty one OECD countries that extends the homogenization of surveys data initiated by the Luxembourg Wealth Study. Most countries of our sample experienced an important increase of households borrowing both in absolute terms and relative to household income. Our analysis provides evidence that countries which have grown more unequal are also the ones where the distribution of debt along the income distribution is the most unbalanced and financially fragile. This link is found persistent after controlling for socio-demographic differences and transitory shocks to income in deciles regression.
JEL Classifications: E21, D31

1 Introduction

Household borrowing has considerably increased, over the past decades, in a number of developed countries, both in absolute terms and relative to households income. This has raised concerns about the sustainability of household debt, and the implications in terms of households vulnerability to shocks and financial instability. In the aftermath of the Great Recession, households deleveraging has become a central question in policy and academic debates on economic recovery. This crisis has highlighted in many ways the importance of household debt and the need to better understand its dynamic and macroeconomic implications.

But the macroeconomic effects of greater indebtedness crucially depend on the distribution of debt across the household sector, whether assets and debt are held by the same households or different ones, whether most indebted households are also the wealthiest ones (in terms of income or assets). In order to shed some light on this issue, the paper provides new estimates and analyses of households leverage along the income distribution. We construct a unique cross-country dataset on households assets and liabilities. It covers twenty one countries and homogenizes wealth survey microdata for the United States, the United Kingdom, Canada, the Netherlands, Germany, France, Italy, Spain, Japan, Finland, Norway, Sweden, Austria, Luxembourg, Belgium, Malta, Portugal, Greece, Slovenia, Slovakia and Cyprus, extending the Luxembourg Wealth Study database. It enables us to explore empirically the nexus between inequality, debt leverage and financial fragility.

In the macroeconomic literature on household debt, much of the recent increase in household borrowing has been attributed to two factors: the decrease in the prevalence of credit rationing that followed from the financial deregulation of the early 1980s, and the reduction in interest rates, both in real and nominal terms (Debelle (2004)). These factors surely have contributed to a significant easing of liquidity constraints on households, which is likely to have allowed households to achieve a more desirable path for lifetime consumption. So far, the literature acknowledge that the increased indebtedness has heightened the sensitivity of the household sector to changes in interest rates, income and asset prices. This would particularly be the case in countries with mainly variable rate mortgages, where the household sector bears the risk of fluctuations in policy interest rates. But for this branch of the literature, increased household indebtedness, in and of itself, is not likely to be the source of a negative shock to the economy. Rather the primary macroeconomic implication will be to amplify shocks to the economy coming from other sources, particularly those that affect household incomes, most notably rises in unemployment, and fall of asset prices.

This literature has mainly evolved separately from the literature on income and wealth distribution. We relate to this literature as we link the rise of household debt distribution to the evolution of the income distribution and more specifically, the rise of top income shares in certain countries (Atkinson, Piketty, and Saez (2011), Atkinson and Piketty (2010), Atkinson and Piketty (2007), Atkinson and Salverda (2005), Piketty and Saez

(2003)).
Our analysis provides evidence that the countries which have grown more unequal are also the one where the distribution of debt along the income distribution is the most unbalanced, in the sense that households at the bottom of the income distribution experienced a high increase in leverage compared to households at the top, without an increase in income mobility. This link is found persistent after controlling for socio-demographic differences, life cycle effects and shocks to households revenue in deciles regressions. A recent literature links increase in income inequality to rise of household debt. One strand of the literature focuses on within income inequality, with rising variance of idiosyncratic shocks leading households to borrow more to smooth consumption from a more volatile income (Krueger and Perri (2006), Iacoviello (2008)). Another strand, to which we relate more closely, focuses on between group income inequality, opposing the top income group to the rest of the income distribution, the bottom. This paper follows closely the empirical analysis led by Kumhof and Ranci`ere (2010) for the United States. They study how high household leverage and financial fragility can arise as a result of changes in the income distribution and provide empirical evidence of such mechanism happening in the decades prior to the Great Depression and the Great Recession. We show that the same pattern is found in the United Kingdom and Canada, countries that experienced similar rise in top incomes and for which we have access to wealth surveys microdata similar to the Survey of Consumer Finances.

The rest of the paper is organized as follow: section 2 presents stylized facts that motivate detailed analysis of the evolution of household debt leverage along the income distribution for each country of our sample in section 3 and more refined econometric analysis of debt leverage in section 4.

2 Motivation

Household borrowing has considerably increased in a number of developed countries over the past decades, both in absolute terms and relative to households income. At the country level, the stock of debt of the household sector has been increasing among most of OECD countries since the early 1990s. Most importantly, the ratio of household debt to gross income has increased for most of them.

Different patterns are observed among these OECD countries. In Germany, Japan, and Switzerland, the stock of loans to gross disposable income of households has been flat or decreasing since 1990. Even though German and Japanese households have very similar stock of loans to income ratio, around 1, they differ a lot from Swiss households whose stock of loans equals around 1,8 times their annual income. Previous to 1990, Japan experienced an increase in households debt to income which stabilized between 120% and 130% since then, while for Germany, the ratio seems to have been rising until 2000, reaching 115%, and then declining over the past decade. Austria, Belgium, Finland, France and Italy are quite similar in the sense that they only experienced a slight and continuous rise of their stock of loans to GDI ratio since 1995 and around similar levels. French households ratio increased by 20 percentage points. Italian households experienced a similar increase from a ratio of almost 30% to 60% in 2009. Meanwhile,

Finnish households leverage increased by slightly less than 50 percentage points.
Austrian households leverage increased from 70% to 90% and Belgian households leverage increased from 60% to almost 80%. Households in this group of countries had a low or moderate leverage in the mid-90s and experienced only a slight increase of this ratio until 2010, their stock of loans remaining below the flow of gross disposable income. Portuguese and Spanish households entered this period at similar leverage levels but experienced a more important increase of their stock of loans to disposable income ratio, reaching 140% in 2007.

Other countries started from a much higher leverage level and experienced important increase of households leverage. Leverage in Anglosaxon countries was already high, around 100%, in 1995, and increased by 40 percentage points for the United States, almost 50 percentage points for Canada, 60 percentage points for the United Kingdom, 90 percentage points in Australia and New Zealand and 100 percentage points in Ireland. Australian leverage rose from 80% on 1995 to 170% in 2007. Canadian leverage rose from 100% in 1995 to almost 150% in 2009. Ireland households leverage increased from 110% in 2001 to 210% in 2008, while New Zealand leverage increased from 90% in 1995 to almost 190% in 2006. Very similar increase is observed in the United Kingdom, from 90% in 1995 to 160% in 2007, and slightly lower in the United States: from 90% in 1998 to 130% in 2007.

Northern countries such as Denmark, Norway and Sweden, and the Netherlands experienced very similar and high increase of households stock of loans to disposable income leverage. In Norway, the ratio increased from from 110% in 1995 to 180% in 2007, in Sweden, it rose from 90% in 1995 to 150% in 2009. While in Denmark and the Netherlands it increased by 150 percentage points between 1995 and 2009, from already high level of 150% for Denmark and 110% for the later. The OECD database also provides information about the evolution of households leverage in Eastern European countries. It appears they started at very low levels in 1995 and increased continuously from 2000 to 2010, reaching a ratio of 60% on average.

These well known stylized facts at the country level have been mostly analyzed as such in specific country studies that we refer too in the next section. Only very few crosscountry studies tackle the existence of this global phenomenon and try to disentangle common factors from country specifics. Debelle (2004) examines these factors and highlights two main influences: first, a decrease in the prevalence of credit rationing that resulted from the deregulation of financial systems that occurred through the 1980s; and second, the decline in interest rates, both in real and nominal terms. In addition to the direct effect of a lower cost of borrowing, the paper highlights that these factors have contributed to a sizeable easing of liquidity constraints on households, allowing them to achieve a smoother consumption path over their life cycle.

In the case of the United States, Reich (2010) and Rajan (2010) argue that, these phenomenons were the results of the longer term phenomenon of rising inequality. Increase in households borrowing is explained as a way for the bottom income group to maintain their consumption level or even increase it ”to keep up with the Jones”, whose

income and share of income has been rapidly increasing over the period. While credit demand is central to Rajan (2010) argument, Acemoglu (2011) emphasizes that increase in credit supply was the actual driving force behind rising inequality and household borrowing. We do not take a stand on the relative importance of each mechanisms in this paper.

Instead, this paper investigates whether the same phenomenon was observed in other OECD countries over the same period. This question arises naturally when increases in household borrowing are confronted to the findings of Atkinson, Piketty, and Saez (2011) on the evolution of income inequality among these countries. The World Top Income Database reports that this increase actually mainly took the form of a rise of the share of top incomes.

In the United States for instance, the share of the top 5% increased from 21.1% in 1980 to 33.8% in 2007. Latest data show it even reached 33.9% in 2011. More generally, like the United States, the group of Anglosaxon countries formed by Australia, Canada, Ireland, New Zealand and the UK, has seen the share of the top income increasing rapidly since 1970. Other countries, namely Northern countries as well as peripherical European countries have experienced milder increases in their top income shares, compared to the former. While France, Germany, Japan mostly stayed at their 1970s levels.

3 Debt Leverage Across the Income Distribution

Aggregate debt and income inequality trends push us to look at household debt at a more disaggregated level, along the income distribution. The following analysis is based on household wealth surveys led in twenty one OECD countries. The surveys we gathered had different purposes, sample design, response rates, and ways to elicit household financial assets. Hence, an important limit of this exercise is the limit of comparability of these data. We describe in details in a companion annex these limits and the work made to ensure comparability across countries (OECD (2013)). On the other hand, using ratios (of debt to income and to wealth) and income ranking (instead of gross value comparison) limits these comparison issues, as our considerations are all relative.

The main contribution of this paper is to build a new and unique cross-country dataset on households finances. It extends the homogenization of microdata from wealth surveys started by the Luxembourg Wealth Studydatabase and covers the United States (1983 to 2010), the United Kingdom (1994 to 2010), Canada (1977 to 2005), the Netherlands (1994 to 2011), Germany (2002 to 2009), France (1991 to 2010), Italy (1991 to 2010), Spain (2002 to 2008), Japan (2004 to 2010), Finland (1994 to 2009), Luxembourg (2007 to 2009) Norway (2002), Sweden (2002), Austria (2004 to 2009) and Cyprus (2002 to 2009), Belgium (2009), Greece (2009), Malta (2009), Portugal (2009), Slovenia (2009) and Slovakia (2009).

In the case of Canada, data on wealth and debt are available in two different surveys: the Survey of Financial Security (SFS) for 1999 and 2005 and the Assets and Debts Survey

(ADS in the Survey of Consumer Finances) for 1984 and 1977. Both are available through the central statistical office (Statistics Canada). The French data are drawn from the Enquˆete Patrimoine, a survey run by the central statistical office (INSEE) that involves over 10,000 households. The Enquˆete Patrimoine over-samples wealthy households, and collects good quality information on many of the socio-economic variables of interest. We consider data for 1991, 1998, 2004 and 2010 as 1986 survey do not provide enough information on the liability side of French households portfolio. For Germany, we access the Socio-Economic Panel (SOEP) by the DIW Berlin. Italian data are drawn from the Survey on Household Income and Wealth (SHIW), a survey run by the Bank of Italy that involves over 7,000 households and cover the period from 1991 to 2011. Although there is a certain amount of under-reporting, financial assets are deemed to be of good quality. Japanese households data are drawn for the Keio Household Panel Survey (KHPS) and cover the period from 2004 to 2009. For the Netherlands, we rely on the CentER Saving Survey (CSS) panel, a survey run by CentER (Tilburg University), involving some 2,000 households. Data cover 1989 to 2010. Spain analysis relies on the Encuesta Financiera de las Familias for the years 2002, 2005 and 2008. UK data are drawn from the Family Resources Survey which provides micro-data on wealth and debt from 1994 to 2010, and also British Household Panel Survey as a secondary source for the years 1995, 2000 and 2005. Finally, we use US household portfolio data drawn from the Survey of Consumer Finances (SCF), a survey run by the Federal Reserve covering over 4,000 households. This is the most detailed survey on household portfolios among all we use. These data cover the period from 1983 to 2011. In addition, we also use the 2013 Household Finance and Consumption Network survey which provides the Eurosystem with harmonized data on households' finances (fifteen countries were surveyed for 2009/2010 as of this first wave).

Microdata analysis from the available wealth surveys allows to identify, at a disaggregated level, which households experienced a rise in their debt leverage to income. It appears that the countries which have grown more unequal are also the one where the distribution of debt along the income distribution is the most unbalanced. Households in the United States, the United Kingdom, Canada and Spain share similar characteristics in the sense that the rise of households debt to income leverage was mainly driven by poor and middle class households of the income distribution. For the United States, the United Kingdom, Canada, both secured and unsecured debt ratio show divergence between top income groups and bottom groups, and the debt to net wealth ratio follows the same pattern. For Spain, the phenomenon is much smaller and is mostly observed for secured debt, unsecured debt to income ratios converge in 2008. In Italy, France, Finland and the Netherlands, all households experienced increase of their debt to income leverage. In the Netherlands, it is concentrated in secured debt while in France it is mostly driven by unsecured debt. Debt to wealth ratios are declining for all households along the income distribution in the Netherlands but are mostly flat in France. While, in Italy, both secured and unsecured debt increased, as well as debt to wealth ratios, although still at much lower level than other countries of the sample. In the case of Germany and Japan, household debt to income and debt to wealth ratios are, on the contrary, flat or slightly declining. In Germany & Japan, microdata suggest it was mostly driven by a decrease in the leverage of the top income group.

3.1 United States

In the case of the United States, Kumhof and Ranci`ere (2010) provide detailed analysis of the nexus between income inequality and the evolution of household leverage along the income distribution. They find that increases in the income advantage enjoyed by high income households translate into higher debt leverage among poor and middle income households, and higher vulnerability to financial crises. They show the nexus was prominent prior to both the Great Depression and the Great Recession.

Their analysis highlights five main empirical regularities relevant to this nexus. First, the large increase in income inequality, in the form of rising top income shares, was highly persistent and was not compensated by more income mobility. Meanwhile, at the aggregate level, household borrowing relative to GDP (or GDI) increased substantially and, from the Survey of Consumer Finances microdata, the increase was driven by the poor and ”middle class” households who form the bottom 95% of the income distribution. This was the case for both secured debt, meaning mortgages, and unsecured debt (credit cards, student loans, etc). Third, they show that, not only has the bottom group been holding higher debt leverage but it has also experienced a decline in its share of wealth. In addition, the paper highlights the increase in the size of the financial sector whose activity increased with the amount of debt being intermediated. Finally, they shed some light on the higher financial instability caused by these higher debt levels, which translated into very high default rates on mortgages and consumer loans during the Great Recession.

Figure 1 shows the increase of the top 1% income share and household aggregate debt to gross disposable income ratio between 1980 and 2011. Similarly to the top 5% income share used by Kumhof and Ranci`ere (2010), the top 1% income share is strongly correlated with the increase in household borrowing. The share of total income (excluding capital gains) commanded by the top 1% of the income distribution increased from 22% in 1983 to 34% in 2007, while the ratio of household debt to GDI almost double.

In figure 2, we reproduce the decomposition of debt to income between the bottom and top income groups from Kumhof and Ranci`ere (2010) with our standardized sample and adding information about the bottom 90% vs top 10% as well as bottom 50% vs top 50% to have a better sense of differences between the poor households and the ”middle class”. Our figure is very similar to KR, the rise in household leverage appears to be driven by the bottom 95% of the income distribution. In this group, the middle class, that is households in between 50% and 95% percentile, experienced the highest increase in their debt to income ratio. Since 1978, the aggregate household leverage, computed with the survey, increased from 75% to 160% in 2009, which is very close to OECD data showing an increase from 80% to 130% at the household sector level (figure 1).

In subfigures (c) and (d), we distinguish between secured debt leverage (mortgages) and unsecured debt (credit cards, student loans, etc). The same divergence is observed between households at the bottom of the distribution and top income households.

Similarly, secured debt increases more importantly for households in between 50% and 95% percentile, ”middle class” households, while unsecured debt to income ratio is the highest for the bottom 50% households, which is likely to be explained by the differences in home ownership.

An important question is wether it actually makes sense to talk about different groups and compare them through time. At the core of this question is income mobility. If income mobility increased over the period in the United States, it could be the case that more households move along the income distribution and borrow against future income while at the bottom of the distribution / in a ”shock period”. In theory, if increasing income inequality was accompanied by an increase in income mobility, the dispersion in lifetime earnings would be much smaller than the dispersion in annual earnings, as agents move up and down the income ladder throughout their lives. This is a potential explanation for why consumption inequality has been lower than income inequality[1]. However, Kopczuk, Saez, and Song (2010), using micro-level social security data, show that measures of short-term income mobility (five year horizon) and long-term income mobility (lifetime mobility) have been either stable or worsening slightly since the 1950s. As a consequence, they infer that the evolution of annual income inequality over time is very close to the evolution of longer-term income inequality, in other terms, income mobility has not been increasing in the United States over the last 40 years, including mobility between the top income group and the remainder.

Subfigure (b) shows the debt to assets ratio for the different income groups. The divergence observed between groups for the debt to income ratio is also prevalent for the debt to asset ratio, the bottom 50% group more than doubling its leverage between 1983 and 2010, from less than 25% to more than 55%. Similar divergence in debt to asset ratio tend to show the increase in leverage was not only a housing bubble phenomenon with household borrowing against increasing value of their houses.

Moreover, we observe a decline of the share of wealth held by the bottom income group. In 1983, the wealth share of the bottom 95% was already at the low level of 57%, in comparison with the other countries of our sample, it declined to around 50% in 2007 and further declined to 46% in 2010. It tends to suggest that the decline in income share translated in decline of net wealth share through increasing indebtedness, limiting the increase in consumption inequality.

3.2 United Kingdom

The United Kingdom experienced a well documented increase in income inequality in the early 1980s followed by a period of stability, and a further rise in inequality, in the late 90s, largely concentrated at the top of the income distribution (Atkinson and Piketty (2007) and Brewer, Sibieta, and Wren-Lewis (2007)). Similarly to the United States, figure 1 shows an increase of the share of the top 1% income share from 7% in the early 80s to more that 14% in 2006 and an increase of aggregate household sector debt to gross disposable income from 60% to 160% around the same time, with a period of stability between 1990 and 2000.

[1] Lemieux, MacLeod, and Parent (2009) and Heathcote, Perri, and Violante (2010)

Over the inequality boom period, especially in the early 1980s, Blundell, Pistaferri, and Preston (2008) note a corresponding sharp rise in consumption inequality, although this tailed off earlier than did the growth in earnings and wage inequality. They note a divergence afterwards, especially in the late 1980s, between income and consumption inequality. This falling covariance between income and consumption inequality, originally documented in Blundell and Preston (1998), is found to be similar to the United States case. Using data from the UK household budget surveys (the Living Cost and Food Survey and its predecessors),

Brewer and ODea (2012) confirm that consumption inequality grew less than income inequality over the period. Furthermore, using consumption and income data, Blundell, Pistaferri, and Preston (2008) provide strong evidence of a spike in the variance of permanent shocks to income in the early 1980s. The two series (income and consumption) grow furthest apart in the late 1980s and early 1990s. Blundell, Pistaferri, and Preston (2008) find strong growth in permanent shocks in early 1980s with in 1990s, and milder growth in transitory shocks in late 1980s and 1990s. Similarly, Jenkins and Van Kerm (2011) studies income mobility in Britain and finds no trend in income mobility over time in the extent to which income mobility would reduce longer-term inequality. According to this finding, immobility was even rising slightly after mid-1990s, while no trend is found is the transitory variance of net household income. Thus, the increase in household debt sector is unlikely to be due to more consumption smoothing in response to transitory shocks.

Using the Family Resources Survey, we are able to look at a disaggregated level and build debt to income ratio along the income distribution of the household sector from 1994 to 2010 (figure 3a). From these data, it appears that leverage is increasing over the period for all households, and more importantly for middle class households. When looking at unsecured debt only (figure 3d), the difference with top households appears to be growing until 2007.

We also use the British Household Panel Survey for the years 1995, 2000 and 2005. From these data, leverage is increasing from 1994 to 2007 for all households, at the aggregate level from 100% to 160%, very close to the level of aggregate borrowing to gross disposable income in figure 1. The households between the 50% and 90% percentile, ”middle class”, experienced the biggest increase during this period from 105% to almost 170%. Although at a lower level, the top income group experienced an important increase in leverage too. From subfigure (c), the divergence between bottom and top groups is mainly driven by differences in unsecured debt leverage since 1998.

In their study for the Institute for Fiscal Studies, Crossley and O’Dea (2010) look at the evolution of the median saving rate across the income distribution from 1975 to 2007, and find an important increase for the top quintile and decrease for the bottom quintile of income, in line with our finding. Subfigure (b) shows a much more pronounced divergence in terms of debt to wealth ratios. While debt to wealth ratio tripled from 50% to 150% for the top 5% or top 10% income group, it was multiplied by 9 and almost 10

for the bottom 95% and bottom 90% respectively over the period. figure 17 shows the share of net wealth held by the bottom 95% of the income distribution was much higher in 1994, 82%, than over 2000-2007 period,with a minimum at 60% in 2007.

3.3 Canada

In the case of Canada, Brzozowski, Gervais, Klein, and Suzuki (2010) find that wage and income inequality have increased substantially over the last 30 years, using the Survey of Family Expenditures and the Survey of Households Spending. The same result is found by Frenette, Green, and Milligan (2006) using Census data. Over the period from 1977 to 2005, the level and trend of wage inequality is found remarkably similar to the United States over the same period of time: wage inequality, as measured by the variance of log wages, doubled. It is interesting to note that while high wage earners have been consistently gaining on the median over the period, low wage earners falling behind the median is the main reason behind the increase in wage inequality in the late 1970's and early 1980's.

Figure 1 shows that similarly to the United States, Canada experienced an important increase of the share of the top 1% income share from 8% in the early 1980s to 14% in 2000 and an increase of aggregate household sector debt to gross disposable income of the same order of magnitude than the United States, from around 60% to 100% in 2000 and 140% in 2010.

According to Brzozowski, Gervais, Klein, and Suzuki (2010), the rise in consumption inequality, on the contrary, has been relatively mild. In their data, the cross-sectional distribution of consumption is found much closer to log-normal than that of income, much like Battistin, Blundell, and Lewbel (2007) findings for the United States and the U.K. Also, they show that, interestingly, wage inequality increases almost linearly over the life-cycle, suggesting the presence of highly persistent wage shocks (Heathcote, Storesletten, and Violante (2004)). They estimate wage and earnings permanent vs. transitory processes with Canadian data and find that a very high fraction of the risk faced by households is accounted for by the permanent component as opposed to the transitory component of the process. Like Blundell, Pistaferri, and Preston (2008) emphasize for U.K. or Kopczuk, Saez, and Song (2010) for the United States, a very high fraction of the overall cross-sectional variance is accounted for by the permanent component.

In the case of Canada, microdata on households assets and liabilities are available in two different surveys: the Survey of Financial Security for 1999 and 2005 and the Assets and Debts Survey (in the Survey of Consumer Finances) for 1984 and 1977. Similarly to the United States and the United Kingdom, the increase in leverage is found much more important for households at the bottom of the income distribution. The debt to income ratio of the bottom 50% increased from 55% in 1984 to 150% in 2004, whereas leverage of the top 5% increased from 40% to 65% (Figure 4a). Aggregate leverage computed using these micro data appears to be slightly underestimated when compared to country statistics: 80% to 110% vs 100% to 140% over the same period. Bottom households

leverage is diverging from top households both for the secured and unsecured debt (Figures 4c and 4d).

The debt to net wealth leverage, figure 4b, is rising on aggregate between 1984 and 1999, from 17% to 22%, then decreasing to 20% in 2005. The bottom 50% debt to net wealth leverage keeps increasing, from 18% in 1984 to 26% in 1999 and a further 29% in 2005. The level and divergence of leverage are much less important than for the United States or the United Kingdom data but the same relative pattern is observed, keeping in mind the limits of assets and liabilities assessment in each surveys.

3.4 Spain

Pijoan-Mas and Sanchez-Marcos (2010) document that, over the period from 1985 to 2000, inequality in individual labor earnings and household income has decreased substantially. However, the inequality reduction has not been monotonic: after a sharp fall of inequality during the economic expansion between the mid eighties and the early nineties, inequality increased during the recession of 1993. Then, in the mid nineties it started to fall again. In contrast, the observed reduction in inequality in consumption has been much smaller than in any measure of income, suggesting that the reduction in income inequality has affected the sources of permanent differences between individuals and households only during the second half of the 80's. They also find that the increase in inequality of earnings at the household level in the recession of the early 90's did affect the upper tail: household earnings at the top percentiles increased with respect to household earnings at the median.

More recently, Bonhomme and Hospido (2012) analyze the evolution of male earnings inequality[2] from 1988 to 2010 using social security records, and also show that they evolved in a countercyclical pattern. For males, the 90/10 percentile ratio experienced a sharp increase around the recession of the early 1990s, followed by a marked decrease until 2007.

During the recent recession after 2008, inequality started to increase again. They find that the magnitude of the yearly increases and decreases in inequality are comparable with that of the yearly inequality increases in the United States (Autor, Katz, and Kearney (2005)) or Germany (Dustmann, Ludsteck, and Schnberg (2009)). In addition, most of the inequality increase in the early 1990s occurred in the upper half of the distribution, while the subsequent decrease and recent increase affected the two halves of the distribution in similar ways

[2]Interestingly, they emphasize the role of the construction sector in the economy. In their data, the share of construction in male employment increased from 14% to more than 20% between 1997 and 2006. Over the same period, construction workers earnings moved from the 30th percentile to the 40th percentile of the aggregate distribution. Since 2007 the employment share has dropped to 13%, less than its 1990 level, while median earnings have remained flat. These findings point to a very special role of the construction sector in the Spanish economy since the end of the 1990s, and suggest that a period of high demand for construction workers was followed indeed by a sharp drop in demand during the recent recession. The role of construction in the Spanish expansion of the early 2000s has been acknowledged by the recent literature. Between 1998 and 2008, the house price index per square meter more than doubled in real terms (Garriga (2010)). The causes of this recent housing boom are still a matter of debate, candidate explanations being low interest rates, the softening of lending standards in the mortgage market, the prevalence of

homeowner tax deductions, and the large migration inflows or the existence of overseas property buyers, all of which may have boosted the demand for housing.

Similarly, the top 1% share did not increase according to theWorld Top Income Database, but the top 0.01% share doubled between 1998 and 2007, reaching 1% of total income, still a much lower increase than the one observed in Canada or the United States. At the aggregate level, figure 1 shows that household sector debt to income ratio only increased slightly in the 1980s, was flat until the late 1990s and then increased continuously from 60% in 1999 to reach 140% in 2008.

Across the income distribution, we also find an increase of debt to income ratio over the period from 2002 to 2008, using the Encuesta Financiera de las Familias, see figure 5. From this survey, aggregate leverage appears to have rose from 60% in 2002 to 110% on average in 2008, which underestimates the increase from 90% to 140% found at the country level. The increase in leverage appears to be significant for all households and a divergence between income groups appears between 2002 and 2005, they afterwards follow parallel trends. The top 5% leverage increased from almost 40% to 60% while the bottom 50% experienced an increase from 70 to 150%. The divergence between bottom and top households appears to be mostly due to the secured debt component of debt (Figure 5c) while for unsecured debt (Figure 5d), households leverage increases more for bottom households between 2002 and 2005 but remains flat afterwards, while it keeps increasing for top income households.

The debt to wealth ratio remained mostly flat over the period, around 12%. It only increased by 2 or 3 percentage points for households at the bottom of the income distribution and 1 or 2 percentage points for top income households. Thus it appears, the aggregate increase in household debt is mostly a consequence of the Spanish housing boom and macroeconomic fundamentals. The share of wealth of the bottom 95% is found quite flat and high over the period: from 79% in 2002 to 80 % in 2005 and 78% in 2008.

3.5 Netherlands

There are not many studies on the dynamics of the Dutch distribution of income, while summary statistics on income inequality render differing views for the Netherlands. Even the simple question of whether income inequality increased or declined in the Netherlands over the last thirty years is not easily answered. Afman (2005) shows that income inequality experienced a marked decrease over the period 1914 - 1975, but remained stable ever since.

This stability - also found for the top-shares by Atkinson and Salverda (2005) - is a remarkable outcome that contrasts with other studies. Further evidence on top-shares shows that in the Netherlands self-employment and capital income have decreased, while wages have increased. Beer (2006) finds that earnings inequality have increased in the Netherlands since 1983. However, he does not find any increasing earnings gap between high educated and low educated workers, rather, he finds it to be mainly due to rising

within-group inequality. The wage dispersion between sectors did however rise by about a third. Nevertheless, this rise in inter-industry wage differentials can only explain a small part of the total rise of earnings inequality from 1995 to 2004. While total variance increased considerably since 1995, the explained variance by standard Mincerian wage equation almost halved since 1987. Hence, the increasing variance is fully due to a rising residual, i.e. unexplained variance.

For the Netherlands, the evolution of top income shares is only documented until 1999 by the World Top Income Database. It appears to be quite flat since 1980, around 5.2% to 5.9% of total income. Aggregate borrowing leverage by household is flat until the early 1990s, around 60% of gross disposable income, then it increases continuously until 2008 where it reaches the very high level of 225%, highest level of our sample.

To analyze household leverage at a more desegregated level, we use the DNB Household Survey from CentERdata. It provides data of interest from 1994 to 2011. Figure 6 shows an aggregate increase in leverage in the microdata too: from 30% in 1994 to 180% in 2007, underestimating the aggregate leverage at country level by 30 to 40 percentage points. Until 2001, leverage of the bottom income groups is lower than top income groups leverage, it then remains higher until 2011, with the exception of 2009. Even though a clear increasing trend is observed, leverage appears very volatile for all groups over the period. It is possible that bottom income group are diverging from top income group from 2004 to 2008, mostly because of increase in secured debt to income ratio, it could also be a volatility observation.

In this respect, a much detailed analysis of demographics, socio-economic characteristics and transitory shocks is needed. The next section provide such analysis. Unsecured debt is quite flat over the period, at the exception of a pic in 2000 for the top 5% and top 10% income groups at respectively 90% and 65% of income.

Subfigure (b) shows the debt to wealth ratio if volatile but flat over the period, around 60% for all households group along the income distribution. It seems that, similarly to the Spanish case, most of the increase in household debt was a consequence of the Dutch housing boom and other macroeconomic fundamentals. They don't appear to have affected household heterogeneously. And the wealth share of the bottom 95% remains very high over the period, between 85% and 90% of aggregate wealth.

3.6 Italy

In the case of the Italy, income, consumption and wealth inequalities have been thoroughly documented by Jappelli and Pistaferri (2010). They find that, between 1980 and 2006, income inequality was higher and has grown faster than consumption inequality. They suggest that labor market reforms of the 1990s are the most plausible explanation for the rise in income inequality. In fact, Italy has experienced late labor market reforms. According to Jappelli and Pistaferri (2010), the 90s in Italy compare to the 80s in the United States and United Kingdom or Anglosaxon countries in general. They find that the rising income inequality in Italy was being driven primarily by the rise

in income volatility, while the wage structure has not changed significantly over the sample period. But the evolution of earnings inequality is very different than the one found in Anglosaxon countries. Hourly wage inequality is found increasing in between 1990 and 1995 and then it follows a very flat path, same is observed for households earnings. In addition, they report that increase in income inequality is largely due to an increase in transitory shocks. Indeed, the variance in transitory shocks more than triples over 1989-98, while the variance of permanent shocks increases only in 1993 (coinciding with a recession year), and is flat afterwards. This fact is also very different from the analysis made in Anglosaxon countries.

The top incomes in Italy have been rising mildly, the top 1% of incomes represented 6% of total income in early 80s and reached 9.5% by the mid-2000s. The aggregate household debt to income is among the lowest in OECD countries. It increased over the period from 10% in 1985 to 80% in 2007.

The Survey of Household Income and Wealth (SHIW) provides assets and liabilities informations on Italian households for the period of 1977 to 2008. These data suggest a very different pattern of the evolution of leverage across the wealth distribution. Until 2000, the aggregate level of debt as percentage of income remains flat at very low level, then it increases from 2000 to 2008 across all income deciles uniformly. Throughout the income distribution, the increase of the debt to income ratio appears to be of the same magnitude, from an average of 10% in 1991 to an average of 50% in 2010, it is of the same order of magnitude as the country aggregate leverage increase: from 30% to 55% over the same period. Even though increasing over the period, Italian households debt to income leverage appears low in comparison to other countries of our sample, which is something already observed in data aggregated at the country level. Bottom and top income groups appear to be very similar in terms of aggregate debt to income ratio. Subfigure (c) shows that secured debt seems to be increasing faster for bottom groups since 2000, from 10% to a pic of 50% in 2008, while it only doubles from 12% to 24% for the top 5% over the same period. Unsecured debt, subfigure (d), is higher for top income households and overall slightly decreasing since 1998. In Figure 7b, the debt to asset leverage was very slightly increasing for all households in the distribution, at very low level (from 2% to 5%). Bottom households reach 10% ratio in 2008 while the top 5% income group falls at 3%, both group converge back in 2010. As for the share of wealth of the bottom 95% group it oscillates between 76% and 81% of total wealth.

3.7 France

Contrary to Anglosaxon countries, there is no evidence that France has experienced any large change in inequality since the mid-seventies. Magnac, Pistolesi, and Roux (2013) document income and consumption inequality drawing life cycle inequality profiles for cohorts born between 1921 and 1975 and observed from 1974 to 2005 from a pseudo-panel of French households. Cross-sectional inequality has not changed much over the period, while the within cohort inequality is found increasing substantially with age. The change in inequality, decomposed into a permanent and a transitory component, shows that income risk increases with age contrary to income uncertainty that remains broadly

constant. The decomposition appears to explain the diverging trend between income and consumption inequality. Consumption inequality has increased because the population gets older and permanent shocks increases with age, while income inequality has not changed because of negative transitory shocks that compensated the permanent shocks. In terms of income mobility, Bonhomme and Robin (2008) have studied lifetime earnings inequality and mobility on panel data over 1990 - 2002, using the French Labour Force Survey. They find that inequality presents a hump-shaped evolution over the period, with a 9% increase between 1990 and 1995 and a decrease afterwards. But when accounting for unemployment, it yields an increase of 11% and the persistence of inequality is found remarkably constant.

The top 1% income share was relatively flat in France until 2007, around 8%, increasing by less than a percentage point between 1997 and 2007. Meanwhile, the aggregate household debt to income ratio was slightly increasing from 85% in 1990 to 100% in 2008. From microdata of the Enquˆetes Patrimoines (Figure 10), all households experienced an increase in their debt to income leverage from 1998 to 2004 and then a decrease from 2004 to 2010 (probably from 2007 to 2010), but this increase appears to be more important at the top of the income distribution. For households in the top 5% , the ratio increased from 50% to more than 200% whereas for the bottom 50% it increased from 30% to 110%. The debt to asset leverage appears to be mostly flat for all households of the income distribution, around 15%.

3.8 Japan

The top 1% income share is mostly flat, for Japan, over the period, around 8%. Like France, it increases by about one percentage point between 1998 and 2006, reaching 9%. The top 0.01% spikes at 0.9% in 1990 from 0.4% in the mid 1980s. It then decreases to 0.5% in the 1990s and slowly rise up again until 2007. While aggregate debt to income ratio of the household sector is increasing from 1980 to 1990, from 80% to 120%, then it is quite flat until 2010 around between 120% and 130%.

Looking at microdata from the Keio Household Panel Survey, on aggregate, households leverage appears to be flat too, around 105%, a level similar to the one observed at country level. The debt to income ratio of households at the top of the income distribution is flat too but much lower than for households of the bottom of the distribution, it oscillates between 60% and 80% for top income households, slightly decreasing, while it remains between 110% and 120% for the bottom groups. The secured debt leverage is more pronounced for households at the bottom of the distribution while unsecured debt leverage is higher for the top of the distribution (Figure 8c and 9d). Moreover, secured debt leverage is decreasing since 2006 for the top households.

The debt to wealth leverage is volatile but mostly flat, for all households, between 50% and 60%. And the share of wealth of the households of the bottom 95% of the income distribution is increasing until 2007, reaching 91% of aggregate wealth, then slightly decreases to the still very high level of 89% in 2009.

3.9 Germany

In Germany, the top 1% income share has been flat until 1998. Bach, Corneo, and Steiner (2011) find an increase in German top income shares starting in the late 1990s. However, they use different sources from the World Top Incomes database, whose last available German data point is 1998. The aggregate debt to income ratio of the household sector is increasing from 1990 to 2000 from 80% to 115% then decreasing from 2000 to 2010, to 90%. In the case of the Germany, income inequality, consumption inequality and wealth inequality have been thoroughly documented by Fuchs-Schundeln, Krueger, and Sommer (2010).

They find that inequality was relatively stable in West Germany until the German reunification, and then trended upwards for wages and market incomes, especially after about 1998. Disposable income and consumption, on the other hand, display only a modest increase in inequality over the same period. And these trends occurred against the backdrop of lower trend growth of earnings, incomes and consumption in the 1990s relative to the 1980s.

They highlight that, compared to the increase in wage inequality in the United States, German wage inequality started to rise about two decades later, and the increase has so far been modest, even if one includes the composition effect stemming from the inclusion of the East German sample in 1991. Using the SOEP data, we observe that, from 2002 to 2007, German households leverage is flat on aggregate, around 90%, slightly under the ratio observed at country level. Debt to income leverage is declining for top households from 125% to 105% and this pattern is the same with secured debt only, the top income leverage declining from 115 to 100%, suggesting that the fall in aggregate debt to income leverage is mainly due to a decrease in secured debt.

Unsecured debt leverage is flat for all the households of the distribution and is 10 percentage points higher for the bottom 50%, at 22% of income. The debt to asset leverage evolution over the period is very similar to the debt to income leverage with an aggregate leverage flat, around 20% and a ratio declining for the very top of the distribution, from 20% to 7%. Unsurprisingly, like Japan, the German sample has very low and stable wealth to income ratio around 3. And the wealth share of the bottom 95% of the income distribution is stable between 2002 and 2007, at 75%.

3.10 Finland

In the case of Finland, the top 1% income share is found to be flat around 6% until late 1990s then slightly increasing, reaching 8% in 2000 then again flat until 2004, according to the World Top Income database. In terms of aggregate debt to income ratio of the household sector , it follows a U-shape over the period. It decreases from 75% in 1990 to 60% in the mid 1990s, stays flat until 2000, then slightly increases back to 80% in 2004.

From the Luxembourg Wealth Study, we have access to assets and liabilities microdata for Finnish households for 1994 and 1998, a period of flat top income shares and flat

aggregate leverage. From the micro data, aggregate leverage is found flat too between 1994 and 1998 at 45%, a ratio close to country data level at 50%. A slight decrease in the debt to income ratio of households at the bottom of the income distribution is observed over the period, from 55% to 35%. From late 90s until 2009, micro data suggest an increase in household leverage for all income groups (Figure 11) between 70% and 90% of annual income.

In terms of debt to wealth leverage, a decline is observed between 1994 and 1998 from 20% to 16%, especially for bottom 50% of the distribution from 25% to 13%. For the top 5%, wealth leverage is mostly stable at 11%.

3.11 Austria

In 2004, in Austria, top households are the most leveraged with respect to income, with a ratio of debt to income higher than 95%, while the bottom 50% if the income distribution is close to 55%. The leverage with respect to wealth is the highest for households between the 50th and 90th percentiles, the ”middle class”, but is fairly homogeneous otherwise, between 30% and 36%. Austria, between 2004 and 2009, appears to follow the German path (Figure 10) with a decline in top income group leverage from 95% to less than 40%, while the aggregate leverage is flat around 60%.

3.12 Norway and Sweden

The Luxembourg Wealth Study provides further data on assets and liabilities of households in Cyprus (2002), Luxembourg (2007), Norway (2002) and Sweden (2002), but the limited time scope, one year for each country, does not allow any analysis of the evolution of leverage. Instead, we can derive information about the distribution of debt along the income distribution and which households are the most leveraged, for these unique years of observation. For Norway in 2002, it appears that the middle class is having the highest debt to income ratio. The top 5% leverage is of 85%, while the bottom 50% is at 95% and the bottom 95% at around 110%. The differences are even more pronounced in terms of debt to wealth, with the top 5% of the income distribution at 35%, the bottom 50% at 62% and the bottom 95% at 80%.

In Sweden, in 2002, the pattern is again different. The households of the top of the distribution appear to be the most leverage with respect to income, at 105%, while the bottom 50% is at 65% of income. The leverage appears to be increasing with income for this country, in 2002. The debt to wealth ratio is still the lowest for the bottom 50%, at about 80% but, is the highest for middle class household, the leverage of the bottom 95% group being close to 130% of net wealth.

The World Top Income database provides information about the evolution of top income shares for Norway and Sweden. Since 1991, the top 1% income share has increased rapidly and almost reached the level of the United States in 2005, at 16.8% of total income. In Sweden, the top 1% income share has been slightly increasing since 1980 but at much lower levels than France, Italy or Japan: from 4% in 1982 to 7.1% in 2008. The Sweden case appears closer to the French case in terms of the debt distribution, with

leverage increasing with income. While, the Norwegian case is closer to Anglosaxon countries, with high income households displaying much lower leverages.

3.13 Cyprus, Luxembourg

For Luxembourg in 2007, the top households are found much less leveraged than the rest of the income distribution. The top 5% debt to income ratio is around 35% while the bottom 95% leverage is higher than 70%. The same pattern is observed for the debt to wealth ratio, although at much lower levels. The top 5% leverage is lower than 5%, while the bottom 95% is higher than 8%. It is likely that the liabilities of households are underreported in this database. The evolution of leverage observe between 2007 and 209 is likely to be the consequence of the Great Recession and is the subject of future research.

Similarly for Cyprus (Figure 12). In 2002, the bottom 50% of the income distribution is much more leveraged than other households, with a debt to income ratio close to 120%, while the top 50% leverage is lower than 60%. But their debt to wealth ratio is only one percentage points higher than the top 50% wealth leverage, around 13%.

4 Further Evidences: Econometric Analysis

We aggregate the microdata in deciles of income for each year and country, creating countryyear-decile cells. For each cell, we determine the debt to income ratio of the cell by dividing the aggregate debt of the decile by its aggregate income. In table 1, we regress this debt to income ratio on the decile number, taking the higher decile as reference. We control for life cycle and demographic characteristics [3] of the decile and transitory shocks[4] affecting the decile: the average age of the decile, its average age square, the likelihood of having a college degree (number of college degree holder decided by the number of households in the decile), the likelihood of being owner, the average size of the households, the average wealth of the decile, the likelihood of being retired and the likelihood of being unemployed.

The first column of table 1 shows the regression for the full sample, then the regression is showed for each country of the sample. In the full sample regression, the debt to income ratio appears to be significantly higher for all deciles, compared to the 10th decile. Moreover,the lower the decile, the higher the coefficient, meaning that leverage decreases along the income distribution, even after controlling for life cycle, demographic characteristics and transitory shocks affecting households such as being unemployed. This pattern is also observed at the country level for the United States, the United Kingdom, Canada, the Netherlands, Italy and the group of Luxembourg Wealth Study countries (Sweden, Norway, Austria, Luxembourg and Cyprus). For Spain, France, Japan and Germany, lower deciles leverage is not statistically different from top decile leverage.

Aggregating the microdata in deciles of income for each year and country enables us to create inequality variables and link the evolution of leverage with the evolution of

inequality, which can be seen as a permanent shock to households income. Our first inequality variable is the income share of the decile. It is constructed by dividing the aggregate income of the decile by the aggregate income of the sample that year. From this variable, we also derive a relative income share variable, dividing and taking the log of the income share of the decile by the income share of the top 10%, documented by the World Top Income database.

This information is not available for the totality of our sample, hence the lower number of observations. A third inequality variable we are able to create is the ratio of the income threshold for the decile to the threshold for the top decile. If the ratio of the income threshold for the decile to the threshold for the top decile decreases, it means inequality is growing between this decile and the top decile. Similarly if the share of the top incomes is increasing, it means the share of other deciles is decreasing, hence a lower share of income is synonymous of higher inequality. We drop the 10th decile observation from our regression so that the our three inequality variables have the same straightforward interpretation: an increase of each one of them means decrease of inequality.

Table 2 shows the following econometric specification and displays results for the main inequality variables: the income share of the decile and the ratio of the income threshold of the decile to the 10_{th} decile threshold.

[3]We also look at , the likelihood of being married, the number of years of education, the average number of kids or dependent individual in the household, the number of income earners.
[4]We also look at the likelihood of being sick or having health issues, the likelihood of having more generally unusually low income or revenues or likelihood of expecting higher income when this variable was available

$$Leverage_{i,t,c} = \alpha \_ IncShare_{i,t,c} + \beta \_ Demographics_{i,t,c} + \gamma_{nw} \_ Wealth_{i,t,c} + \eta \_ TransiShocks_{i,t,c} + 1_y + 1_c + \varrho_{i,t,c}$$

where t is the year of the survey, c the country in which it was conducted and i number of the the income decile being aggregated. The share of income of the decile is the ratio of the aggregate income of the decile to he aggregate income of the sample. The demographic controls, in the baseline, include the average age in the decile, the age^2, the likelihood of being a college graduate, of being an owner, the average household size (results are not sensitive to other controls such as number of kids, dependents or earners, or number of years of education, likelihood of wing married, etc.). The average wealth of the decile are also controlled for. Transitory shocks variable include, in the baseline, the likelihood of being unemployed and retired in this decile. Years, 1_y, and countries, 1_c , fixed effects are also included.

The results of the decile regressions, table 2, are consistent with the theoretical literature on the life cycle evolution of savings. The evolution of the ratio debt to income is indeed closely related to the evolution of the saving rate out of income. The life cycle hypothesis predicts a hump-shape evolution of savings. At the early stages of life, the individual has no savings or negative savings and accumulates out of its income. The individual then de-cumulates to reach zero savings by the end of its life or a little amount if a bequest motive

is introduced. In table 2, we find the debt to income leverage decreases with age and increases with the age square, following thus a u-shape curve, consistent with the hump shape savings curve of the life cycle hypothesis. At the early stages of its life, the individual borrows money to smooth its intertemporal consumption. As the individual saves out of income and reimburse its debt, the stock of debt decreases and even becomes negative as the saving stocks reaches its maximum. And at the end of life, the debt level goes back to zero.

In the decile regressions, we also control for other demographic characteristics of the households composing the decile. While the college education of the sample and share of married households don't seem to affect the debt to income ratio of the decile, a decile with more owners and bigger households translate into a higher leverage. In the overall sample of deciles, the average family size is 2.62, the minimum being 0.71 and the maximum reading

4.33. The percentage of owners varies between 22.5 % and 100% , and on average over the deciles, is of 68.5%. From table 2, an increase of one percentage point of the percentage of owners in the decile translates into an increase of slightly more than 1 percentage point of the debt to income ratio. We also find that, an increase of 1 of the average household size of the decile translates into an debt to income ratio higher by 30 to 40 percentage points.

While the first result is rather intuitive, the second requires a deeper analyses. The positive and significant coefficient for the percentage of owners in the decile can be easily interpreted with the fact, usually, households take on a mortgage when buying a house and then save out income to reimburse it, rather than saving out of income first then buying the house upfront. The fact that bigger households translate into higher leverage is less intuitive as, bigger households can mean more income earners or more children. In the first case, the relationship with leverage would tend to mechanically go the other way with the denominator increasing, but more revenues could also mean being able to afford bigger and better house which correlates with higher mortgage. Then it is not clear which direction the leverage would go. More children mean more expenses but in a rational, consumption smoothing setting, it is not clear either why it would translate into higher debt to income ratio. To deepen the analysis we should look separately as the effect of the number of income earners and the average number of kids.

The positive and significant coefficient for the wealth mean of the decile is intuitive too as more wealth means more collateral to borrow against, hence this coefficient could capture the relaxation of a borrowing constraint.

Further, we find a positive and significant increase in the debt to income ratio when the number of unemployed increases in the decile, which is consistent with the consumption smoothing induced by this transitory shock to income. We also find a negative and significant correlation between the number of retired and the debt to income ratio. When the percentage of unemployed in the decile increases by one percentage point, the decile's leverage increases by 3 to 4 percentage points. Retirement is, on the contrary, a

permanent shock to income, hence should not induce a increase of the debt level but rather, if anything, the opposite. In table 2 , when the percentage of retired in the decile increases by one percentage point, the decile's leverage decreases by 1 percentage point or less.

In table 2, we find that the income share of the decile affects negatively and significantly its leverage, meaning that the lower the income share, the higher the debt to income ratio of the decile. The fact that deciles with lower income share are also the deciles with a lower average income and lower average wealth deciles, younger deciles, deciles with more unemployed and retired households, or less households with college education, is progressively controlled for in the regressions (4) to (6). The second inequality variable reads the same: when the income share of the decile compared to the top income share decreases, the leverage of the decile rises. The coefficient of the ratio of the income thresholds is also negative and significant.

When the ratio decreases by one percentage point, the leverage of the corresponding decile increases by 1 percentage point. All three measures of inequality go in the same direction, meaning a decrease of the variable corresponds to an increase in inequality. In terms of household leverage, it is unclear why such permanent increase in inequality, with the rise of the top incomes, would translate into higher leverage, unless the shock was perceived to be transitory and inequality to come back to lower levels in the future.

Table 3 shows that the same results hold at the country level for the United States, the United Kingdom, the Netherlands and countries of the Luxembourg Wealth Study (Sweden, Norway, Austria, Luxembourg and Cyprus). Our sample size is too small for any significant result for Canada, as we cannot create the unemployed and retirement variables with the Survey of Financial Security (1999 & 2005). For Italy, an important limitation of the data is that we only have the after tax income, not before tax. And for France, Spain, Japan and Germany, the variations in income share over the period are too small to infer any leverage variation from it. The sign of the coefficient of interest is still consistent with previous results.

5 Conclusion

Building a new database of households assets and liabilities, this paper provides new estimates on the nexus between increase of the income share of high income households, increases of debt leverage of households at the bottom of the income distribution and "middle class" households and financial fragility, in twenty one OECD countries. Microdata analysis from the available wealth surveys allowed us to identify, at a disaggregated level, which households experienced a rise in their debt leverage to income. We provided evidence that the countries which have grown more unequal are also the ones where the distribution of debt along the income distribution is the most unbalanced with increased of debt leverage of bottom and "middle class" households. This link is found persistent after controlling for socio-demographic differences and transitory shocks to income in deciles regression.

References

Daron Acemoglu. Thoughts on inequality and the financial crisis. Presentation, 2011 AEA Meetings, Denver, Colorado, 2011.

Emiel Afman. Income distribution in the netherlands in the 20th century: long-run developments and cyclical properties. 2005.

A. B. Atkinson and Thomas Piketty. Top Incomes Over the Twentieth Century: A Contrast Between Continental European and English-Speaking Countries. Oxford University Press, New York, New York, March 2007.

A. B. Atkinson and Thomas Piketty. Top Incomes: A Global Perspective. Oxford University Press, New York, New York, March 2010.

Anthony B. Atkinson and Wiemer Salverda. Top incomes in the netherlands and the united kingdom over the 20th century. Journal of the European Economic Association, 3(4): 883–913, 06 2005.

Anthony B. Atkinson, Thomas Piketty, and Emmanuel Saez. Top incomes in the long run of history. Journal of Economic Literature, 49(1):3–71, March 2011.

David H. Autor, Lawrence F. Katz, and Melissa S. Kearney. Rising wage inequality: The role of composition and prices. 2005.

Stefan Bach, Giacomo Corneo, and Viktor Steiner. Effective taxation of top incomes in germany. Freie Universit¨at Berlin, School of Business & Economics Discussion Paper 2011/18, June 2011.

Erich Battistin, Richard Blundell, and Arthur Lewbel. Why is consumption more log normal than income? gibrat's law revisited. July 2007.

Paul Beer. Why income inequality increased in the netherlands. Paper for the workshop on Inequality measurement, University of Utrecht, January 25, 2006, 2006.

Richard Blundell and Ian Preston. Consumption inequality and income uncertainty. The Quarterly Journal of Economics, 113(2):603–640, May 1998.

Richard Blundell, Luigi Pistaferri, and Ian Preston. Consumption inequality and partial insurance. American Economic Review, 98(5):1887–1921, December 2008.

St´ephane Bonhomme and Laura Hospido. The cycle of earnings inequality: evidence from spanish social security data. 2012.

St´ephane Bonhomme and Jean-Marc Robin. Assessing the equalizing force of mobility using short panels: France 1990-2000. February 2008.

M. Brewer, L. Sibieta, and L.Wren-Lewis. Racing away? income inequality and the evolution of high incomes. 2007.

Mike Brewer and Cormac ODea. Measuring living standards with income and consumption: evidence from the uk. 2012.

Matthew Brzozowski, Martin Gervais, Paul Klein, and Michio Suzuki. Consumption, income, and wealth inequality in canada. Review of Economic Dynamics, Special issue on Cross- Sectional Facts for Macroeconomists, 13(1):52–75, January 2010.

Thomas F. Crossley and Cormac O'Dea. The Wealth and Saving of UK Families on the Eve of the Crisis. Institute for Fiscal Studies, London, United Kingdom, July 2010.

Guy Debelle. Household debt and the macroeconomy. BIS Quarterly Review, March 2004.

Christian Dustmann, Johannes Ludsteck, and Uta Schnberg. Revisiting the german wage structure. The Quarterly Journal of Economics, 124(2):843–881, May 2009.

Marc Frenette, David A. Green, and Kevin Milligan. Revisiting recent trends in Canadian after-tax income inequality using census data. 2006.

N. Fuchs-Schundeln, D. Krueger, and M. Sommer. An equilibrium model of Global Imbalances and Low Interest Rates. Review of Economic Dynamics, 13(1):103–132, 2010.

Carlos Garriga. The role of construction in the housing boom and bust in spain. FEDEA Monograph on The Crisis of the Spanish Economy, 2010.

Jonathan Heathcote, Kjetil Storesletten, and Giovanni L Violante. Two views of inequality over the life-cycle. 2004.

Jonathan Heathcote, Fabrizio Perri, and Giovanni L. Violante. Unequal we stand: An empirical analysis of economic inequality in the united states: 1967-2006. Review of Economic Dynamics, 13(1):15–51, January 2010.

Matteo Iacoviello. Household debt and income inequality, 1963-2003. Journal of Money, Credit and Banking, 40(5):929–965, August 2008.

Tullio Jappelli and Luigi Pistaferri. Does consumption inequality track income inequality in italy? Review of Economic Dynamics, 13(1):133–153, January 2010.

Stephen P. Jenkins and Philippe Van Kerm. Trends in individual income growth: measurement methods and british evidence. 2011.

Wojciech Kopczuk, Emmanuel Saez, and Jae Song. Earnings inequality and mobility in the united states: Evidence from social security data since 1937. The Quarterly Journal of

Economics, 125(1):91–128, February 2010.

Dirk Krueger and Fabrizio Perri. Does income inequality lead to consumption inequality? evidence and theory. Review of Economic Studies, 73(1):163–193, January 2006.

Michael Kumhof and Romain Ranci`ere. Inequality, leverage and crises. IMF Working Paper 10/268, November 2010.

Thomas Lemieux, W. Bentley MacLeod, and Daniel Parent. Performance pay and wage inequality-super-. The Quarterly Journal of Economics, 124(1):1–49, February 2009.

Luxembourg Wealth Study (LWS) Database, http://www.lisdatacenter.org (Austria {2002}, Cyprus {2002}, Finland {1994;1998}, Luxembourg {2007}, Norway {2002}, Sweden {2002}). Luxembourg: LIS.

Thierry Magnac, Nicolas Pistolesi, and S´ebastien Roux. Post schooling human capital investments and the life cycle variance of earnings. 2013.

OECD. Guidelines for micro statistics on household wealth. 2013.

J. Pijoan-Mas and V. Sanchez-Marcos. Spain is Different: Falling Trends of Inequality. Review of Economic Dynamics, 13(1):154–178, 2010.

Thomas Piketty and Emmanuel Saez. Income inequality in the united states, 1913-1998. The Quarterly Journal of Economics, 118(1):1–39, February 2003.

Raghuram G. Rajan. Fault Lines: How Hidden Fractures Still Threaten the World Economy. Princeton University Press, Princeton, New Jersey, May 2010.

Robert B. Reich. Aftershock: The Next Economy and America's Future. Random House, New York, New York, September 2010.

Table 1: Debt to Income Leverage - Decile Regression (By Country)

Variables	All	(USA)	(UK)	(ITA)	(NETH)	(CAN)	(ESP)	(FRA)	(JAP)	(GER)	(LWS)
Dec. 1	1.626***	1.339***	2.376***	7.521***	1.379***	2.392***	3.043	-0.499	0.485	7.434	2.159***
	(0.172)	(0.352)	(0.405)	(2.449)	(0.424)	(0.284)	(2.345)	(0.558)	(0.654)	(21.78)	(0.376)
Dec. 2	0.695***	0.992***	1.461***	5.472**	1.079**	1.196***	2.236	-0.697	0.466	4.179	1.659***
	(0.155)	(0.299)	(0.322)	(2.151)	(0.426)	(0.295)	(1.970)	(0.519)	(0.494)	(15.94)	(0.369)
Dec. 3	0.549***	0.833***	1.158***	4.630**	0.807**	1.206***	2.006	-0.706	0.608	3.098	1.405***
	(0.141)	(0.274)	(0.233)	(1.861)	(0.387)	(0.287)	(1.713)	(0.490)	(0.495)	(10.42)	(0.349)
Dec. 4	0.472***	0.693***	0.952***	4.011**	0.712**	0.868***	1.801	-0.570	0.541	2.848	1.288***
	(0.131)	(0.243)	(0.172)	(1.656)	(0.357)	(0.293)	(1.628)	(0.465)	(0.444)	(8.919)	(0.303)
Dec. 5	0.433***	0.649***	0.765***	3.383**	0.547*	0.707**	1.623	-0.651	0.586	2.968	1.056***
	(0.123)	(0.213)	(0.133)	(1.424)	(0.307)	(0.279)	(1.541)	(0.459)	(0.375)	(8.712)	(0.281)
Dec. 6	0.378***	0.522***	0.572***	2.680**	0.528*	0.531**	1.246	-0.427	0.433	2.858	0.850***
	(0.116)	(0.190)	(0.110)	(1.211)	(0.288)	(0.252)	(1.371)	(0.422)	(0.323)	(6.702)	(0.260)
Dec. 7	0.337***	0.421**	0.416***	1.926*	0.576*	0.431*	0.896	-0.481	0.434	2.345	0.712***
	(0.111)	(0.167)	(0.0958)	(0.958)	(0.303)	(0.230)	(1.189)	(0.390)	(0.287)	(5.550)	(0.236)
Dec. 8	0.298***	0.325**	0.291***	1.176	0.546*	0.339*	0.739	-0.286	0.282	1.793	0.657***
	(0.106)	(0.141)	(0.0875)	(0.769)	(0.292)	(0.204)	(0.960)	(0.324)	(0.229)	(3.902)	(0.221)
Dec. 9	0.199*	0.137	0.179**	0.572	0.267	0.269	0.251	-0.260	0.0549	1.634	0.387**
	(0.102)	(0.111)	(0.0742)	(0.527)	(0.211)	(0.179)	(0.649)	(0.281)	(0.176)	(2.524)	(0.176)
Networth (Mean)	8.93e-08	-3.07e-07***	-2.04e-06**	3.92e-07	7.04e-07	-8.60e-07	-3.14e-07	1.54e-07	-0.000217	6.75e-06	1.99e-07
	(1.05e-07)	(5.42e-08)	(8.98e-07)	(1.74e-06)	(6.15e-07)	(9.83e-07)	(1.35e-06)	(2.46e-07)	(0.000154)	(1.60e-05)	(1.36e-07)
Age (mean)	0.00545	0.0764	-0.0716	4.477**	0.193	-0.122	2.751	-0.00226	-0.805	1.765	-0.509**
	(0.0116)	(0.131)	(0.403)	(2.152)	(0.878)	(0.278)	(2.439)	(0.473)	(0.650)	(35.07)	(0.223)
Age*Age	1.76e-06	-0.00107	0.000613	-0.0525*	-0.00200	0.00180	-0.0295	-0.000799	0.00878	-0.0253	0.00602**
	(3.93e-06)	(0.00159)	(0.00462)	(0.0255)	(0.00947)	(0.00317)	(0.0256)	(0.00508)	(0.00710)	(0.379)	(0.00266)
College Edu (likelihood)	-0.00484**	0.00862**	-0.00256*	0.0254	0.00629	-0.00626*	0.0249	0.00126	0.00570	0.124	0.00509
	(0.00203)	(0.00355)	(0.00133)	(0.0202)	(0.00917)	(0.00368)	(0.0234)	(0.00460)	(0.0101)	(0.259)	(0.00442)
Household Size (mean)	0.0772	-0.0441	0.607***	2.219***	-0.0159	0.782***	0.564	0.988***	0.424	-1.828	0.480***
	(0.0838)	(0.112)	(0.191)	(0.566)	(0.222)	(0.174)	(0.971)	(0.262)	(0.264)	(7.625)	(0.143)
Owner (likelihood)	0.00873***	0.0148***	0.0263***	0.0300	0.00111	0.0147***	0.0193	-0.0153*	0.00579	0.0667	0.0110**
	(0.00213)	(0.00430)	(0.00474)	(0.0245)	(0.0116)	(0.00313)	(0.0199)	(0.00839)	(0.0183)	(0.755)	(0.00431)
Unemployed (likelihood)	-0.0284***	-0.00189	0.00822		0.00967	-0.0950***	-0.0359	0.0265	-0.0136	0.0687	0.662
	(0.00667)	(0.0151)	(0.00650)		(0.0133)	(0.0166)	(0.0209)	(0.0167)	(0.0321)	(0.287)	(0.714)
Retired (likelihood)	-0.0203***	-0.00327	-0.00991		-0.0302**	-0.00714	0.0198	0.0534*	0.0379	-0.293	0.253
	(0.00455)	(0.00294)	(0.00774)		(0.0116)	(0.0122)	(0.0326)	(0.0299)	(0.0455)	(0.379)	(0.734)
Observations	913	100	170	40	100	180	30	34	59	20	70
Years FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
R-squared	0.406	0.949	0.942	0.919	0.762	0.803	0.909	0.913	0.650	0.991	0.762

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2: Debt to Income Leverage - Decile Regression (Full Sample, 10^{th} Decile Excluded)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Income Share (of decile)	-0.0137***	-0.0105**	-0.00919**	-0.0498***	-0.0457***	-0.0501***	
	(0.00516)	(0.00427)	(0.00362)	(0.00677)	(0.00671)	(0.00687)	
P.Decile / P90							-0.0100***
							(0.00115)
Age (mean)				-0.000906	0.000657	-0.00173	-0.000495
				(0.00766)	(0.00871)	(0.00872)	(0.00859)
Age*Age				-4.26e-07	1.32e-07	-6.49e-07	-2.23e-07
				(2.59e-06)	(2.95e-06)	(2.95e-06)	(2.91e-06)
College Edu (likelihood)				-1.19e-05	-0.000895	-0.00138	-0.000588
				(0.00166)	(0.00166)	(0.00167)	(0.00165)
Household Size (mean)				0.0972	0.135**	0.112*	0.123**
				(0.0598)	(0.0610)	(0.0614)	(0.0602)
Owner (likelihood)				0.0105***	0.0117***	0.0118***	0.0123***
				(0.00165)	(0.00163)	(0.00162)	(0.00158)
Unemployed (likelihood)					0.0197***	0.0186***	0.0175***
					(0.00448)	(0.00448)	(0.00442)
Retired (likelihood)					-0.00782**	-0.00850**	-0.0103***
					(0.00335)	(0.00334)	(0.00332)
Wealth (Mean)						4.58e-07***	5.60e-07***
						(1.68e-07)	(1.67e-07)
Observations	821	821	821	821	803	803	803
Countries FE	no	yes	yes	yes	yes	yes	yes
Years FE	no	no	yes	yes	yes	yes	yes
R-squared	0.009	0.356	0.554	0.587	0.613	0.617	0.6276

Table 3: Debt to Income Leverage - Decile Regression (By Country)

Variables	(USA)	(UK)	(CAN)	(ITA)	(NETH)	(ESP)	(FRA)	(JAP)	(GER)	(LWS)
Income Share (of decile)	-0.0324***	-0.0600***	-0.0556	-0.000970	-0.133***	-0.0844	-0.0114	-0.0142	-0.0403	-0.0802***
	(0.0120)	(0.00798)	(0.132)	(0.0135)	(0.0208)	(0.0739)	(0.0120)	(0.0150)	(0.0939)	(0.0226)
Wealth (Mean)	-4.99e-07	1.36e-06	-6.74e-07	2.61e-07	1.80e-06	-1.07e-06	1.02e-06**	-0.000626***	4.10e-06	5.69e-07*
	(4.13e-07)	(2.32e-06)	(3.99e-06)	(8.40e-07)	(1.65e-06)	(2.55e-06)	(4.38e-07)	(0.000188)	(2.73e-06)	(3.00e-07)
Age (mean)	-0.0733	-1.280***	3.144	-3.266	-0.494	2.310	-1.603	-0.481	1.686	-0.296
	(0.234)	(0.287)	(3.395)	(2.027)	(0.326)	(2.366)	(1.264)	(0.505)	(1.845)	(0.250)
Age*Age	0.000988	0.0155***	-0.0344	0.0352	0.00655*	-0.0248	0.0173	0.00504	-0.0187	0.00315
	(0.00290)	(0.00325)	(0.0406)	(0.0220)	(0.00375)	(0.0246)	(0.0143)	(0.00552)	(0.0218)	(0.00299)
College Edu (likelihood)	0.00656	8.72e-05	0.0103	-0.00779	-0.00836	0.0235	0.00677	-0.00650	-0.0421*	0.00258
	(0.00412)	(0.00254)	(0.0423)	(0.00915)	(0.00553)	(0.0166)	(0.00685)	(0.00825)	(0.0225)	(0.00562)
Owner (likelihood)	0.00938***	0.0209***	-0.0502**	-0.00795	0.00521	0.0171	-0.00521	0.0140	-0.00710	0.0119**
	(0.00253)	(0.00164)	(0.0185)	(0.0110)	(0.00465)	(0.0175)	(0.00933)	(0.0117)	(0.0385)	(0.00476)
Household Size (mean)	-0.169	-0.0329	1.441*	0.116	0.977***	-0.367	0.718***	0.554**	2.820***	0.269*
	(0.109)	(0.131)	(0.812)	(0.207)	(0.211)	(0.522)	(0.237)	(0.227)	(0.860)	(0.159)
Unemployed (likelihood)	0.0355***	0.0366***		0.0372***	-0.0167	-0.0158	0.0357***	-0.0165	0.141***	1.261
	(0.0134)	(0.00533)		(0.0117)	(0.0208)	(0.0157)	(0.00982)	(0.0289)	(0.0263)	(0.777)
Retired (likelihood)	0.000641	-0.0438***		0.00425	0.0229	0.00835	0.0430*	0.0510	0.0145	0.175
	(0.00297)	(0.00764)		(0.00926)	(0.0172)	(0.0323)	(0.0233)	(0.0386)	(0.0430)	(0.803)
Observations	90	153	36	90	162	27	30	53	27	63
Years FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
R-squared	0.936	0.928	0.741	0.689	0.651	0.843	0.899	0.582	0.932	0.662

Standard errors in parentheses

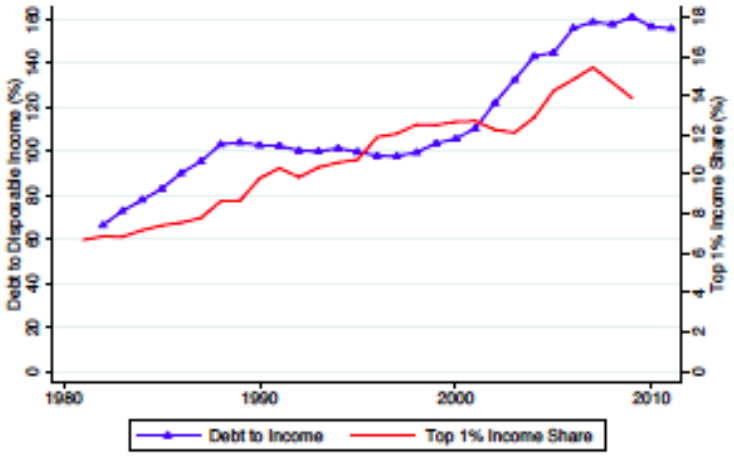
*** p<0.01, ** p<0.05, * p<0.1

APPENDIX: Figures

Figure 1: Households Leverage and Share of Top 1% in Anglosaxon Countries

(a) United States

(b) United Kingdom



(c) Canada

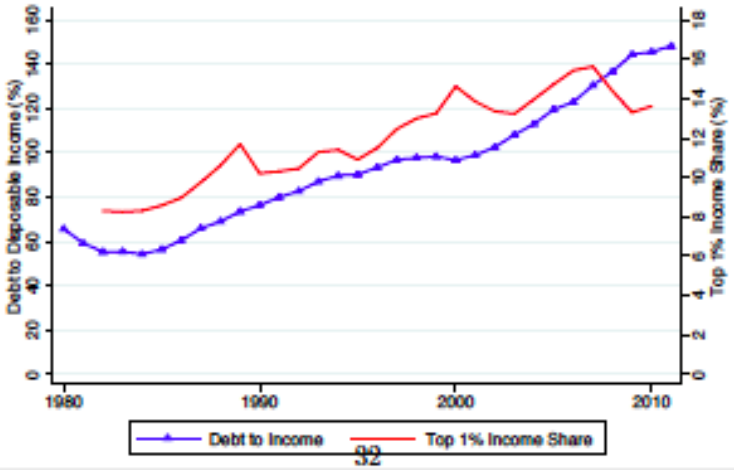
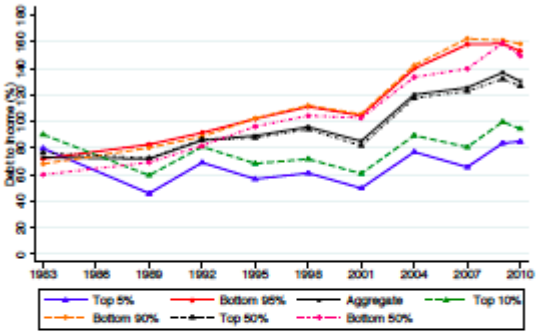
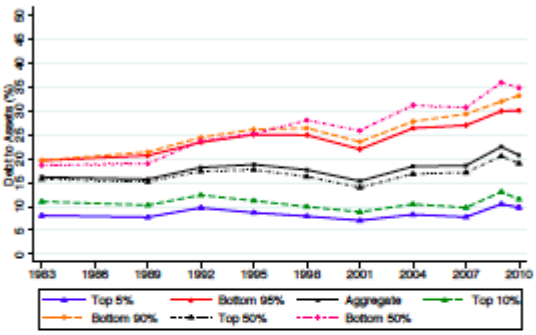


Figure 2: United States

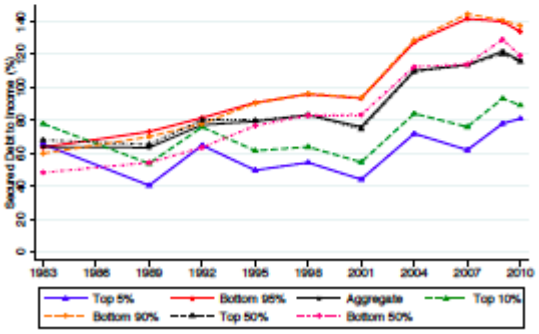
(a) Income Leverage along the Income Distribution



(b) Debt to Assets Ratio



(c) Secured Debt Leverage along the Income Distribution



(d) Unsecured Debt Leverage along the Income Distribution

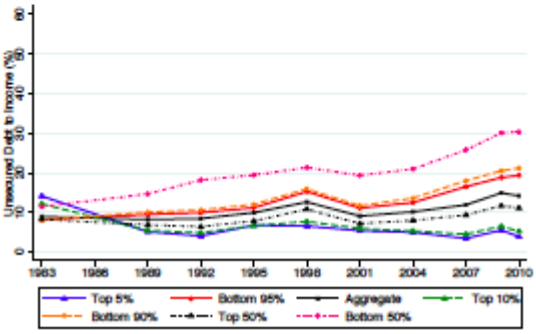
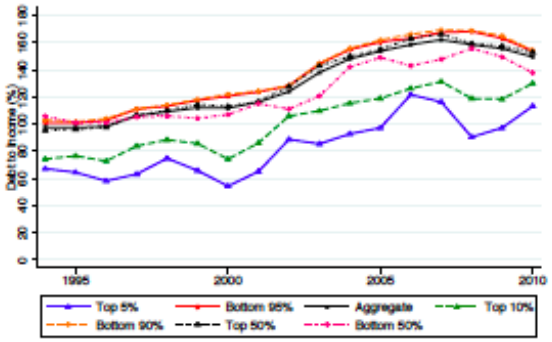
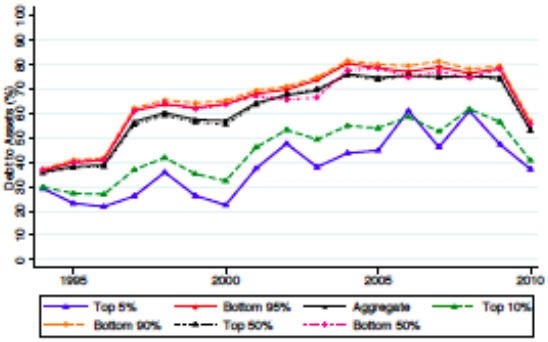


Figure 3: United Kingdom

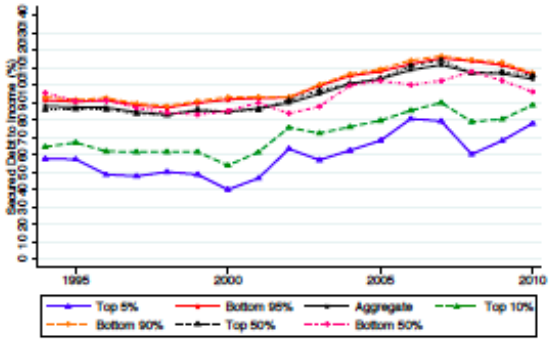
(a) Income Leverage along the Income Distribution



(b) Debt to Assets Ratio



(c) Secured Debt Leverage along the Income Distribution



(d) Unsecured Debt Leverage along the Income Distribution

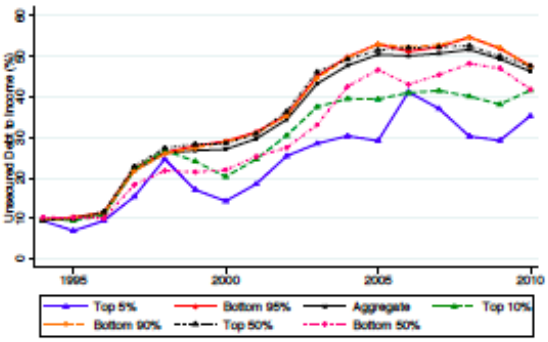
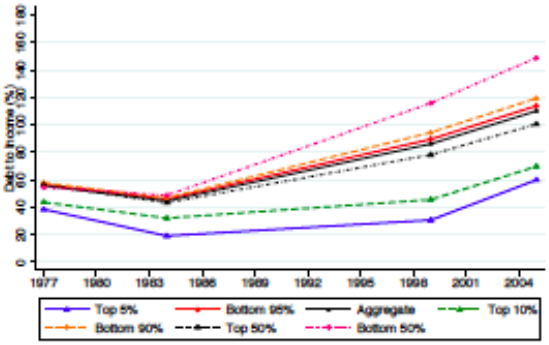
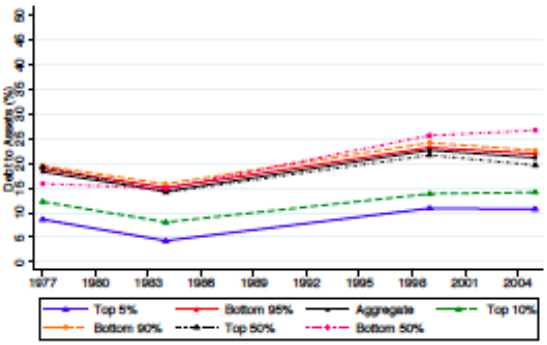


Figure 4: Canada

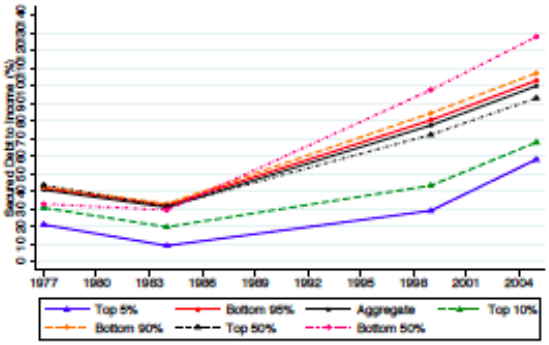
(a) Income Leverage along the Income Distribution



(b) Debt to Assets Ratio



(c) Secured Debt Leverage along the Income Distribution



(d) Unsecured Debt Leverage along the Income Distribution

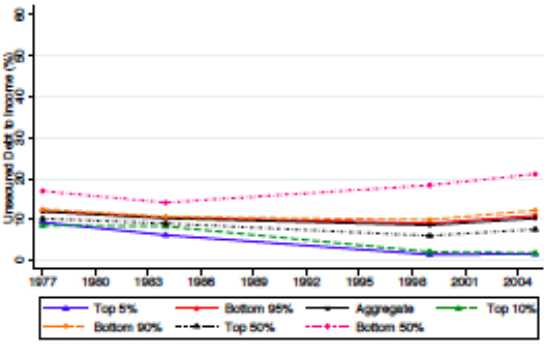
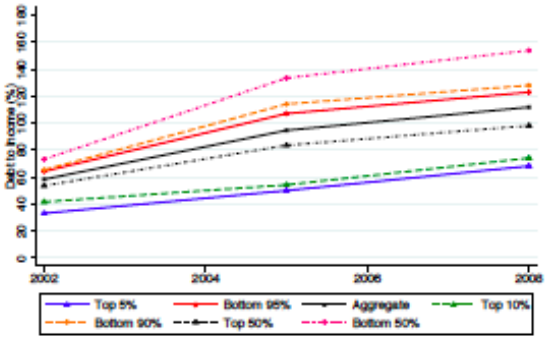
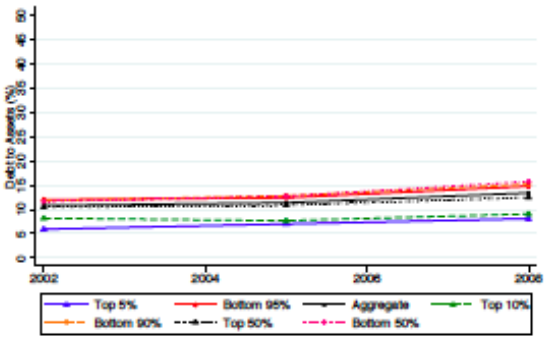


Figure 5: Spain

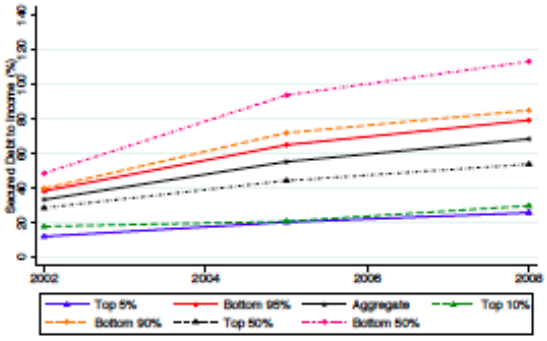
(a) Income Leverage along the Income Distribution



(b) Debt to Assets Ratio



(c) Secured Debt Leverage along the Income Distribution



(d) Unsecured Debt Leverage along the Income Distribution

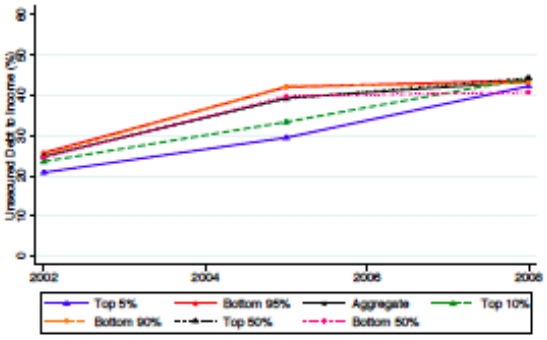
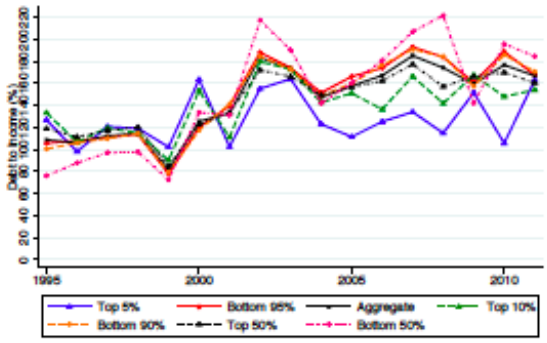
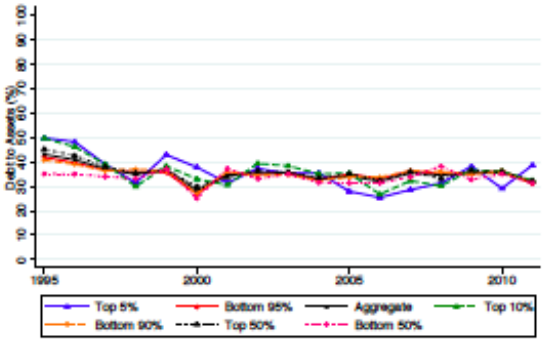


Figure 6: Netherlands

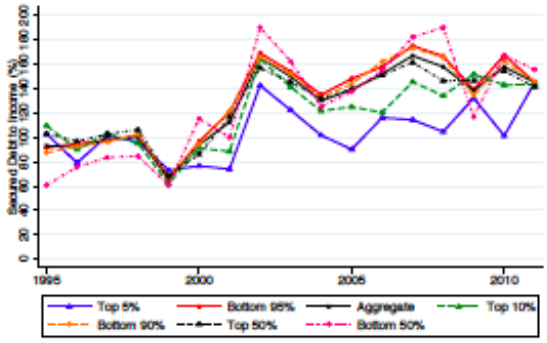
(a) Income Leverage along the Income Distribution



(b) Debt to Assets Ratio



(c) Secured Debt Leverage along the Income Distribution



(d) Unsecured Debt Leverage along the Income Distribution

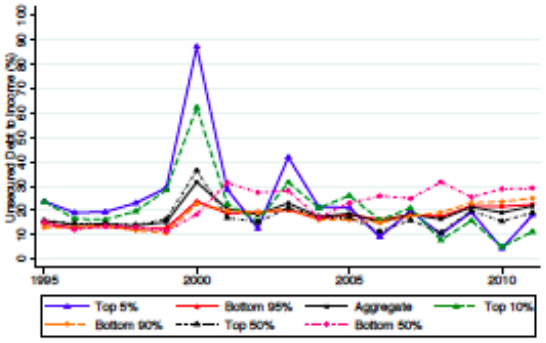
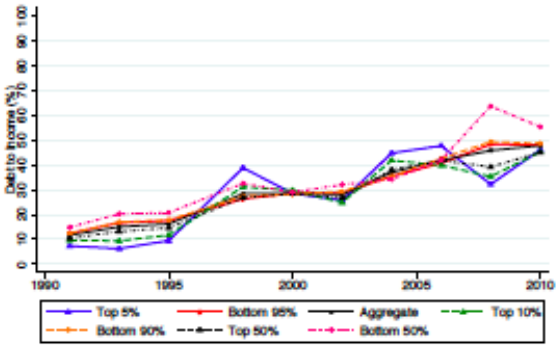
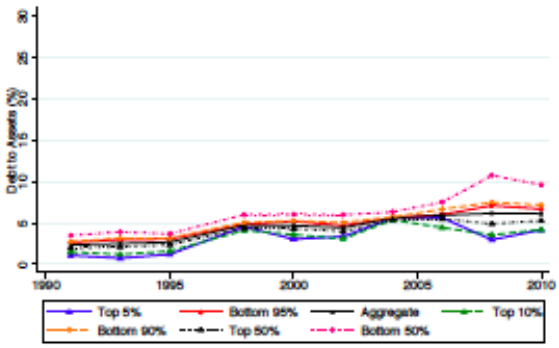


Figure 7: Italy

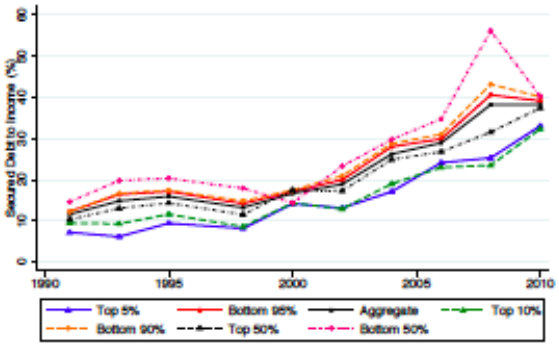
(a) Income Leverage along the Income Distribution



(b) Debt to Asset Ratio



(c) Secured Debt Leverage along the Income Distribution



(d) Unsecured Debt Leverage along the Income Distribution

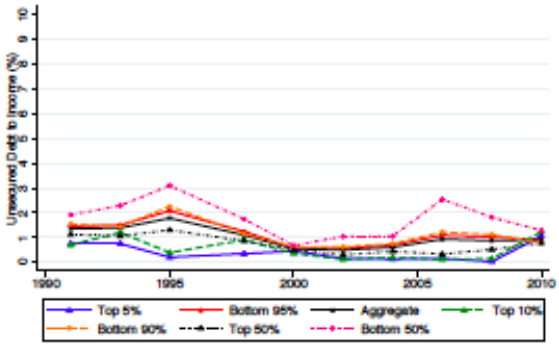
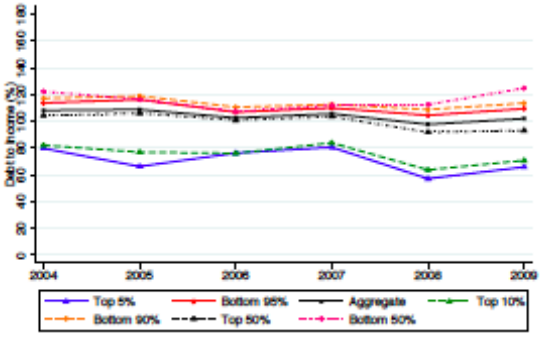
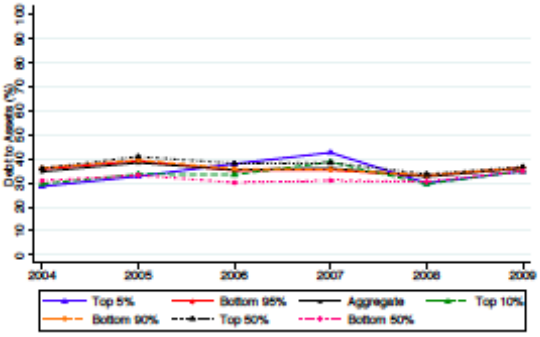


Figure 8: Japan

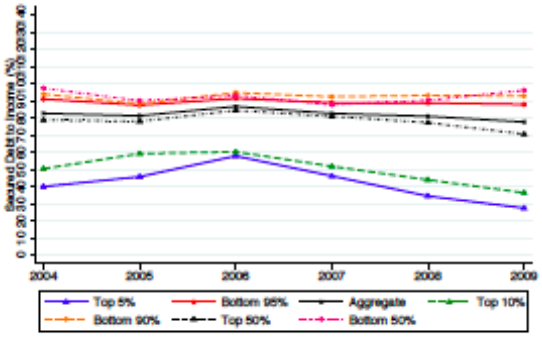
(a) Income Leverage along the Income Distribution



(b) Debt to Assets Ratio



(c) Secured Debt Leverage along the Income Distribution



(d) Unsecured Debt Leverage along the Income Distribution

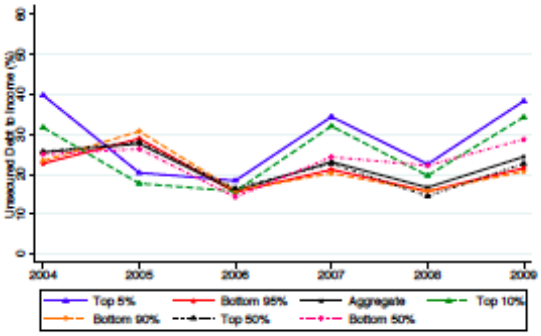
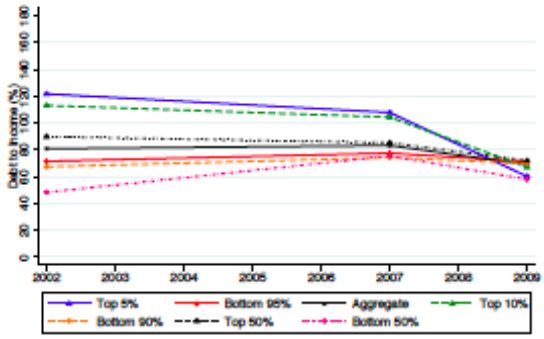
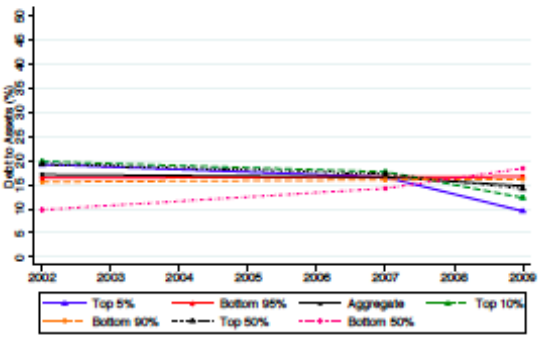


Figure 9: Germany

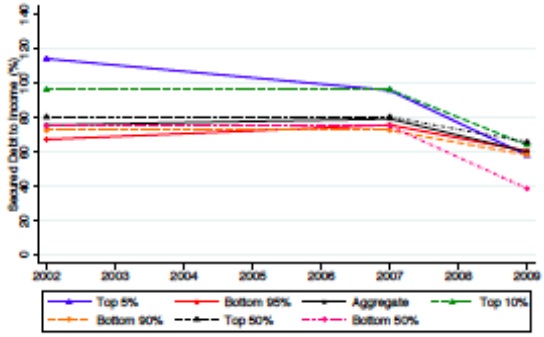
(a) Income Leverage along the Income Distribution



(b) Debt to Assets Ratio



(c) Secured Debt Leverage along the Income Distribution



(d) Unsecured Debt Leverage along the Income Distribution

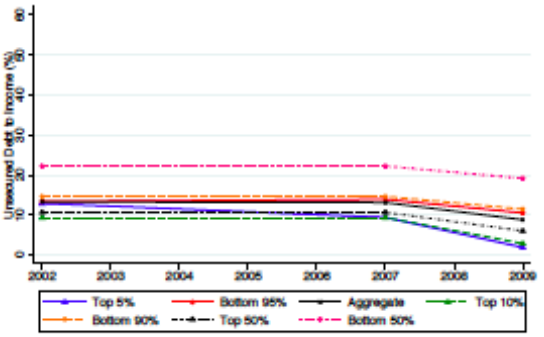
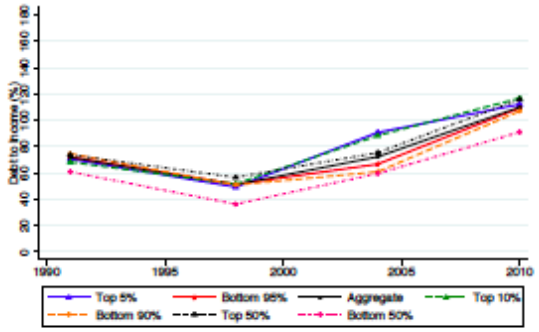
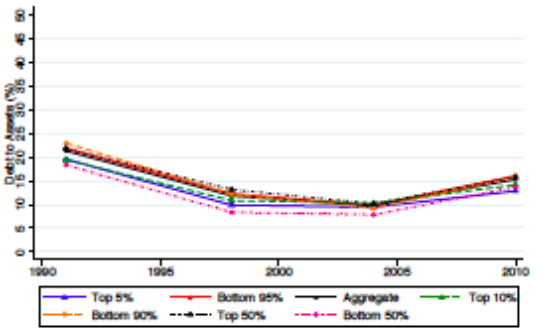


Figure 10: France (top) & Austria (bottom)

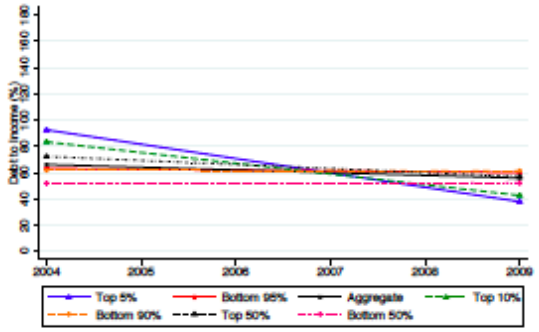
(a) Income Leverage along the Income Distribution



(b) Debt to Assets Ratio



(c) Income Leverage along the Income Distribution



(d) Debt to Assets Ratio

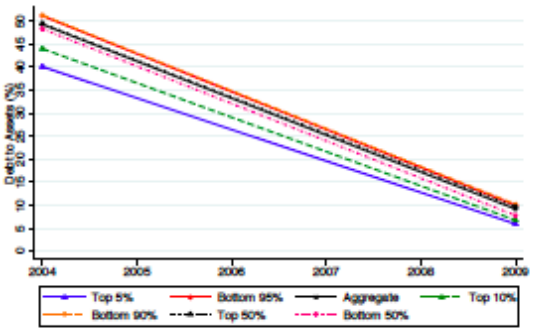
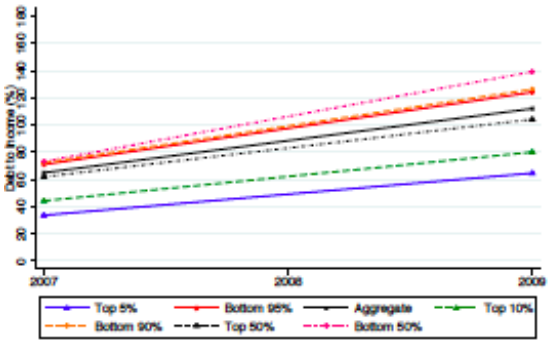
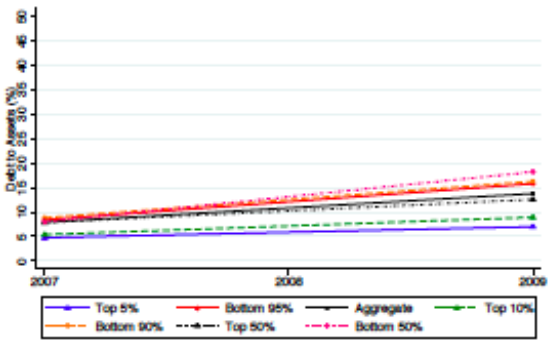


Figure 11: Luxembourg (top) & Finland (bottom)

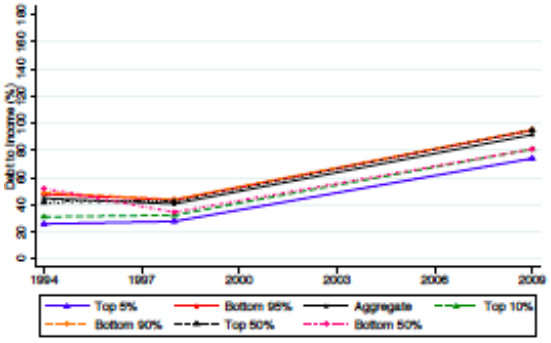
(a) Income Leverage along the Income Distribution



(b) Debt to Assets Ratio



(c) Income Leverage along the Income Distribution



(d) Debt to Assets Ratio

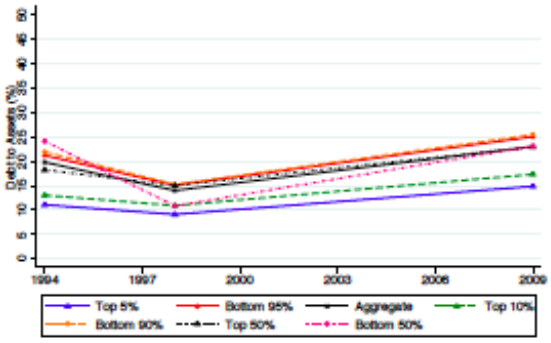
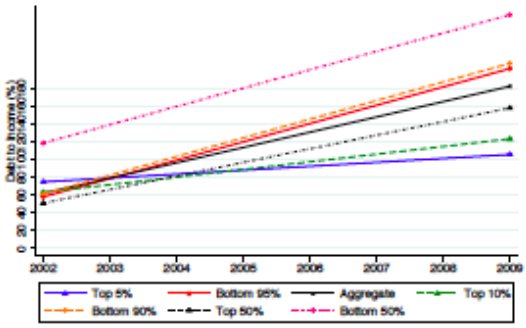


Figure 12: Cyprus

(a) Income Leverage along the Income Distribution



(b) Debt to Assets Ratio

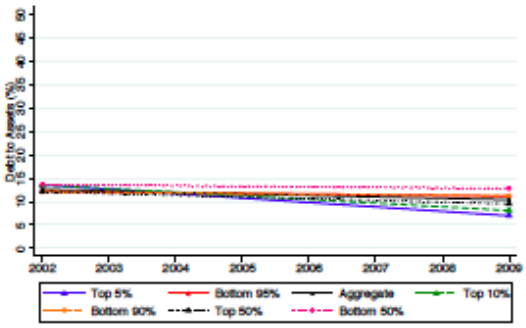
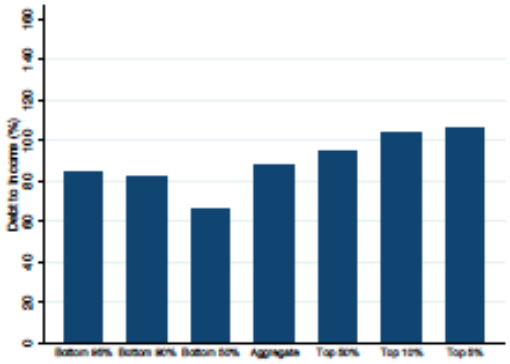
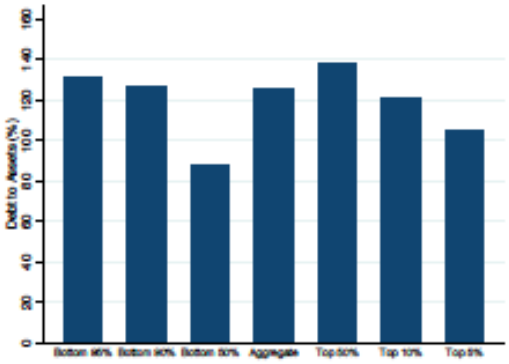


Figure 13: Sweden (top) & Norway (bottom), (2002)

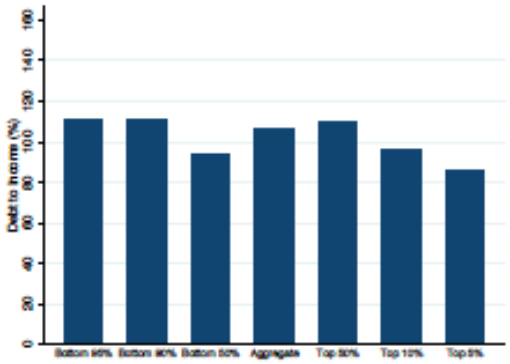
(a) Income Leverage along the Income Distribution



(b) Debt to Assets Ratio



(c) Income Leverage along the Income Distribution



(d) Debt to Assets Ratio

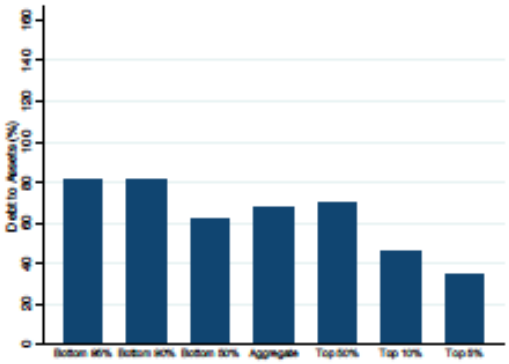
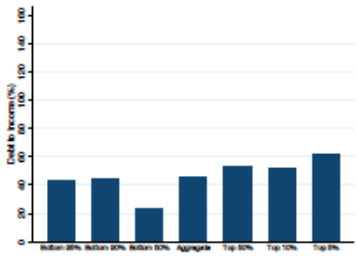
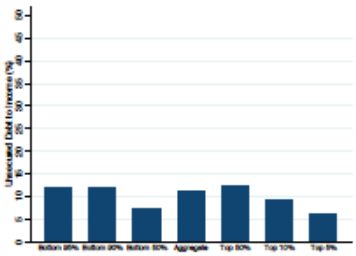


Figure 14: Malta (top) & Belgium (bottom), (2009)

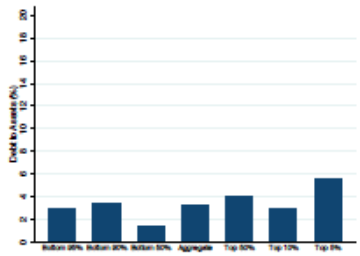
(a) Income Leverage along the Income Distribution



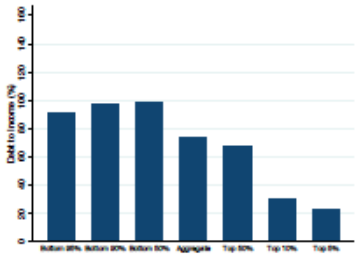
(b) Unsecured Debt to Income



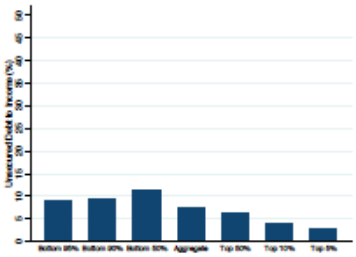
(c) Debt to Assets Ratio



(d) Income Leverage along the Income Distribution



(e) Unsecured Debt to Income



(f) Debt to Assets Ratio

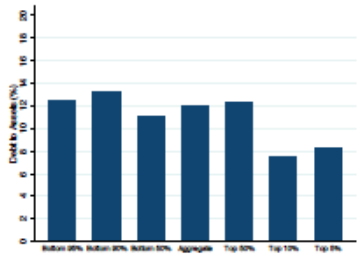
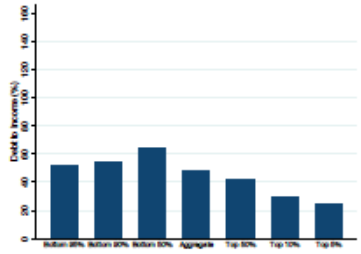
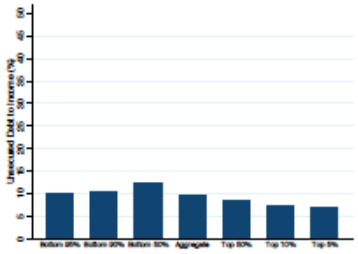


Figure 15: Greece (top) & Portugal (bottom), (2009)

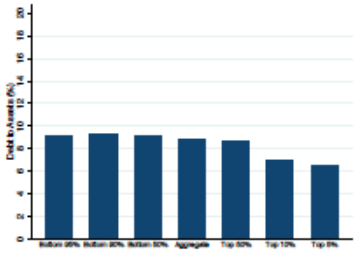
(a) Income Leverage along the Income Distribution



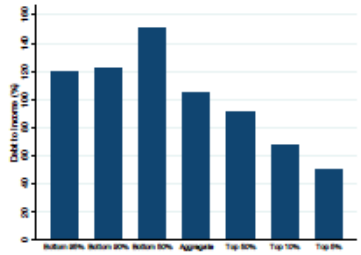
(b) Unsecured Debt to Income



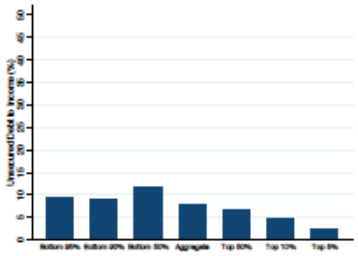
(c) Debt to Assets Ratio



(d) Income Leverage along the Income Distribution



(e) Unsecured Debt to Income



(f) Debt to Assets Ratio

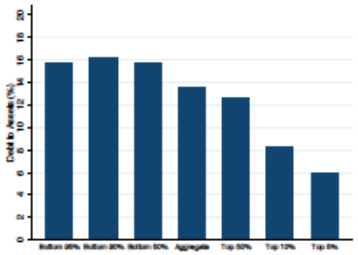
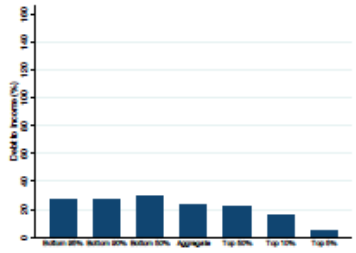
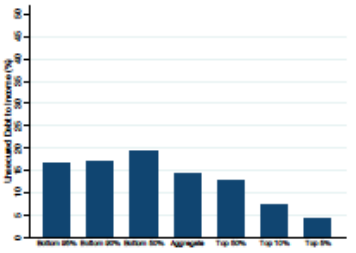


Figure 16: Slovenia (top) & Slovakia (bottom), (2009)

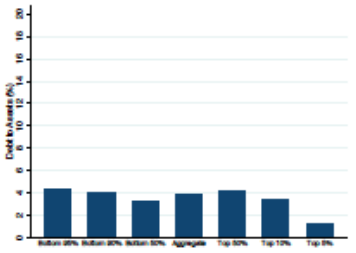
(a) Income Leverage along the Income Distribution



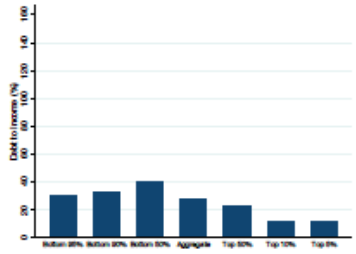
(b) Unsecured Debt to Income



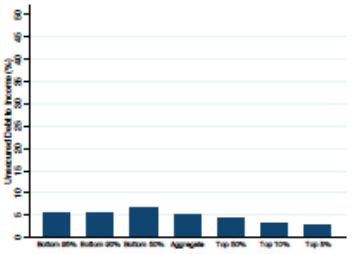
(c) Debt to Assets Ratio



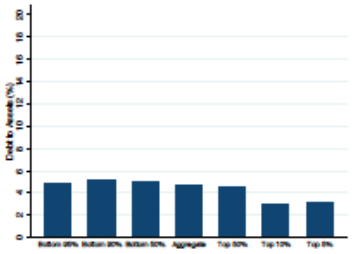
(d) Income Leverage along the Income Distribution



(e) Unsecured Debt to Income



(f) Debt to Assets Ratio



APPENDIX: Methodology

(see companion appendix)

Table 4: Surveys

Country	Surveys
United States	Survey of Consumer Finances
	(1983, 1989, 1992, 1995, 1998, 2001, 2004, 2007, 2009 & 2010)
United Kingdom	Family Resources Survey
	(1994 to 2010)
Canada	Assets and Debts Survey (in SCF) & Survey of Financial Security
	(1977 & 1984) (1999 & 2005)
Netherlands	DNB Household Survey
	(1994 to 2011)
Spain	Encuesta Financiera de las Familias
	(2002, 2005 & 2008)
Italy	Survey on Household Income and Wealth
	(1991, 1993, 1995, 1998, 2000, 2002, 2004, 2006, 2008 & 2010)
France	INSEE Enquête Patrimoine
	(1992, 1998, 2004 & 2010)
Japan	Keio Household Panel Survey
	(2004 to 2010)
Germany	German Socio-Economic Panel Study (SOEP) & HFCS
	(2002 & 2007) (2009)
Finland	LWS / Household Wealth Survey (HWS) & HFCS
	(1994 & 1998) (2009)
Austria	LWS / Survey of Household Financial Wealth & HFCS
	(2004) (2009)
Luxembourg	LWS / Panel Socio Economic "Liewen Zu Letzebuerg" & HFCS
	(2007) (2009)
Norway	LWS / Income Distribution Survey (IDS)
	(2002)
Sweden	LWS / Wealth Survey (HINK)
	(2002)
Cyprus	LWS / Cyprus Survey of Consumer Finances (CySCF) & HFCS
	(2002) (2009)
Belgium	HFCS
	(2009)
Malta	HFCS
	(2009)
Portugal	HFCS
	(2009)
Greece	HFCS
	(2009)
Slovenia	HFCS
	(2009)
Slovakia	HFCS
	(2009)

Table

Table 5: Summary Statistics

Country	Debt / Income	Income Share	Age	College	Married	Owner	Family Size	Retired	Unemployed	Income	Wealth
All	114.7	8.05	44.33	26.94	65.71	66.32	2.58	8.05	3.44	42098.46	118961.3
	(62.4)	(4.44)	(2.88)	(17.07)	(23.79)	(22.27)	(0.70)	(7.49)	(4.63)	(63073.11)	(142361.4)
United States	120.86	6.57	42.58	36.65	77.87	58.92	2.69	10.57	1.07	44112.98	147291
	(32.67)	(4.12)	(2.60)	(17.55)	(41.66)	(22.25)	(0.34)	(7.95)	(1.49)	(30513.72)	(128427.6)
United Kingdom	131.55	7.85	43.65	21.58	55.52	66.84	1.60	8.20	4.77	23218.11	15073.82
	(33.20)	(4.35)	(1.66)	(10.79)	(18.33)	(19.68)	(0.24)	(7.20)	(6.04)	(13705.93)	(11473.7)
Canada	95.95	8.18	41.25	22.69	71.95	61.70	2.77	12.25	7.02	33034.48	142276.8
	(62.49)	(4.86)	(1.89)	(7.35)	(19.69)	(19.61)	(0.56)	(15.36)	(4.00)	(26355.42)	(136790.6)
Netherlands	144.93	8.01	45.18	36.46	57.76	57.60	2.62	7.38	2.41	51552.56	118785.1
	(79.81)	(4.67)	(3.66)	(13.75)	(16.38)	(23.08)	(0.36)	(5.14)	(2.52)	(31376.35)	(73389.07)
Spain	109.57	7.72	47.59	19.66	86.17	79.52	2.92	8.46	9.90	27829.49	184881.9
	(35.64)	(4.11)	(1.22)	(11.18)	(10.01)	(8.63)	(0.35)	(1.62)	(5.93)	(14889.77)	(84234.12)
Italy	49.99	8.62	45.84	9.23	77.34	90.52	3.24	11.68	2.73	24203.55	201720.7
	(28.50)	(3.83)	(1.00)	(4.34)	(9.09)	(2.91)	(0.27)	(6.21)	(3.14)	(12117.59)	(53481.38)
France	107.26	9.43	44.72	39.93	61.68	46.25	2.69	16.04	6.63	72317.84	288149
	(62.90)	(6.12)	(2.12)	(33.33)	(22.28)	(18.18)	(0.47)	(4.64)	(6.20)	(71145.61)	(226850.9)
Japan	111.35	8.83	45.44	36.42	75.15	75.26	3.54	1.68	2.14	597.0192	1174.942
	(23.52)	(4.10)	(2.07)	(9.25)	(16.02)	(10.90)	(0.41)	(1.44)	(1.75)	(268.2622)	(389.7707)
Germany	170.60	8.18	44.16	13.30	64.27	45.18	2.39	7.12	9.08	38180.25	106522.4
	(132.46)	(4.40)	(2.10)	(5.03)	(14.31)	(14.77)	(0.26)	(4.44)	(7.23)	(20905.19)	(56087.38)
Finland	56.29	8.34	41.91	19.05	61.52	63.85	2.52	0.12	0.11	28481.6	52691.43
	(11.17)	(4.28)	(3.46)	(12.16)	(28.27)	(21.95)	(0.79)	(0.06)	(0.11)	(14642.63)	(31828.19)
Austria	67.70	9.28	47.04	39.88	51.59	53.17	2.47	0.26	0.03	29045.18	13151.14
	(12.85)	(4.32)	(1.44)	(11.12)	(23.65)	(11.05)	(0.67)	(0.05)	(0.04)	(12319.35)	(10356.4)
Luxembourg	91.05	8.30	42.94	17.91	69.76	54.63	2.86	0.10	0.05	68052.21	471808.1
	(16.81)	(4.09)	(1.94)	(3.52)	(19.69)	(20.20)	(0.41)	(0.03)	(0.05)	(33272.8)	(206462.2)
Norway	132.88	8.14	41.98	26.85	50.82	62.54	2.42	0.14	0.09	358906.6	91721.67
	(27.23)	(4.45)	(3.45	(8.68)	(32.09)	(23.74)	(0.82)	(0.13)	(0.21)	(211008.1)	(61821.33)
Sweden	101.40	8.35	42.57	20.30	50.34	97.76	2.31	0.10	0.07	306531.3	619907.9
	(47.08)	(4.57)	(3.57)	(5.78)	(31.66)	(0.41)	(0.68)	(0.07)	(0.09)	(167685.7)	(428737.9)
Cyprus	78.47	7.74	43.21	34.56	87.65	86.22	3.62	0.06	0.01	14009.01	62180.18
	(63.27)	(4.16)	(1.71)	(15.33)	(9.54)	(7.54)	(0.28)	(0.05)	(0.01)	(7770.11)	(17693.02)

Table 6: Assets and Liabilities Construction

Country	USA		UK		CAN		ESP	ITA
	SCF 83	SCF 89-10	FRS 94-10	BHPS 95-05	SFS 99&05	ADS 77&84	EFF 02-08	SHIW 91-10
Assets	X	X	Σ	Σ	X	X	X	X
Financial Assets	X	X	X	Σ	Σ	X	X	X
Checking/Savings accounts	X	X	X	X	X	X	X	X
Bonds	X	X	X		X	X	X	X
Stocks	X	X	X		X	X	X	
Mutual & Hedge funds	X	X		X	X	N	X	
Pension accounts	X	X	X		X	X	X	
Other	X	X			X	N	X	
Non Financial Assets	Σ	X	Σ	Σ	Σ	Σ	X	X
House	X	X	X	X	X	X	X	X
Other Real Estate	X	X	X	X	X	X	X	X
Car	X	X	X	X	X	X	N	N
Businesses	X	X			X	X	X	X
Other (antiques, art, etc)	N	X			X	N	X	
Liabilities	X	X	Σ	X	X	X	X	X
Mortgages & HEL on home	X	X	X	X	X	X	X	X
Mortgages & HEL on other RE	X	X	X		X		X	
Installment debt (vehicle loan)	X	X			X	N	X	X
Other lines of credit	X	X			X	N	N	
Credit cards	X	X		X	X	X	N	N
Student loans	X	X	X		X	N	N	N
Other	X	X			X	N	X	

Table 7: Assets and Liabilities Construction (Continued)

Country	NETH	FRA					GER	JAP	LWS	HFCS
	DNB 94-11	86	91	98	04	10		04-09		
Assets	Σ	X	X	X	X	X	Σ	Σ	X	X
Financial Assets	Σ		X	X	X	X	X	Σ	X	X
Checking/Savings accounts	X	X	X	X	X	X	N	X	X	X
Bonds	X	X	X	X	X	X	N		X	X
Stocks	X	X	X	X	X	X	N		X	X
Mutual & Hedge funds	X		X	X	X	X		X	X	X
Pension accounts	X	X	N	X	X	X	X		X	X
Other		X	X	X	X	X			X	X
Non Financial Assets	Σ		Σ	X	X	X	Σ	Σ	X	X
House	X	X	X	X	X	X	X	X	X	X
Other RE	X	X	X	X	X	X	X	N	X	X
Car	X	N	N	N	N	X	N	X	X	X
Businesses			X	X	X	X	X		X	X
Other (antiques, art, etc)		N	N	N	N	X			X	X
Liabilities	Σ	N	X	X	X	X	Σ	X	X	X
Mortgages & HEL on home	X	N	X	N	N	X	X	X	X	X
Mortgages & HEL on other RE	X	N	X	N	N	X	X		X	X
Installment debt (vehicle loan)	X	N	X	N	N	X	N		X	X
Other lines of credit	X	N	N	N	N	N			X	X
Credit cards	X	N	X	N	N	X	X			X
Student loans	X	N	X	N	N	X	N		X	X
Other	X	N	X	N	N	X			X	X

Table 8: Income details

Country	USA	UK	CAN (99 & 05)	CAN (77 & 84)	ESP	ITA	NETH	FRA	GER	JAP	LWS	HFCS
After tax		X	X	X	N	X	X	X	X	N	X	X
Before tax	X	X	X	X	X	N	X	X	X	X	X	
Wage	X	X	X	X		X	X	X	X	X	X	X
Self employment	X	X	X	X						X	X	X
Dividends / Capital gains	X		X	X		X	X	X		X	X	X
Unemployment	X						X	X		X		X
Pension	X	X	X	X		X	X	X	X	N	X	X
Other gov transfers	X	X	X	X		X	X	X	X	X	X	X