The Distribution of Debt Across Euro Area Countries:

The Role of Individual Characteristics, Institutions and Credit Conditions*

Olympia Bover[a§], Jose Maria Casado[a], Sonia Costa[b], Philip Du Caju[c], Yvonne McCarthy[d], Eva Sierminska[e], Panagiota Tzamourani[f], Ernesto Villanueva[a] and Tibor Zavadil[g ‡]

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Abstract

The aim of this paper is twofold: first we present an up-to-date assessment of the differences across euro area countries in the distributions of various measures of debt conditional on household characteristics. We consider three different outcomes: the probability of holding debt, the amount of debt held and, in the case of secured debt, the interest rate paid on the main mortgage. Second, we examine the role of legal and economic institutions in accounting for these differences. We use data from the first wave of a new survey of household finances, the Household Finance and Consumption Survey, to achieve these aims. We find that the patterns of secured and unsecured debt outcomes vary markedly across countries. Among all the institutions considered, the length of asset repossession periods best accounts for the features of the distribution of secured debt. In countries with longer repossession periods, the fraction of people who borrow is smaller, the youngest group of households borrow lower amounts (conditional on borrowing), and the mortgage interest rates paid by low-income households are higher. Regulatory loan-to-value ratios, the taxation of mortgages and the prevalence of interest-only or fixed-rate mortgages deliver less robust results.

Keywords: Household debt and interest rate distributions, Time to Foreclose, Taxation, Loan-to-Value ratios, Fixed rate mortgages, Financial literacy.

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§Corresponding author: Olympia Bover. *email* bover@bde.es

‡(a) Banco de España, (b) Banco de Portugal (c) Banque Nationale de Belgique (d) Central Bank of Ireland (e) CEPS / INSTEAD Research Institute (f) Bank of Greece (g) National Bank of Slovakia.

1 Introduction

New micro data reveal striking differences in the incidence, amount and cost of debt held by comparable households across countries in the Euro area. Not only the aggregate use of secure and unsecure debt varies but also the age-cohort profiles are markedly different for different countries. For example, nearly half of all Dutch households hold secure debt while only one in ten Italian households do (hold such debt). Debt-to-income ratios of Austrian debt holders are three times smaller than those of Dutch households. Age-cohort profiles of debt holding itself are flat in Italy, steeply decreasing in Spain, and increasing in the Netherlands. The purpose of this paper is to document these differences and to find out to what extent they are associated with cross-country differences in legal and economic institutions.

We use the new Household Finance and Consumption Survey (HFCS), a harmonized survey that contains information on household demographics, debt, wealth and income across euro area countries. We also use quantitative indicators of institutions and credit conditions in the different countries. We proceed in two steps. In the first one, we run country–specific regressions of secured debt outcomes on a parsimonious set of household characteristics that includes age, schooling, labor status of core household members as well as household income and size. We examine three secured debt outcomes: the fraction of households with debt, the average amount borrowed and the interest rate on the mortgage that financed the house of residence. In a second stage, we relate such country–specific estimates to various institutions and credit conditions. The country specific estimates we use are the probability, the average amount of debt held and the interest rate paid by the reference group household as well as measures of the age-cohort, income, self-employment and schooling profiles.[1] The institutions whose role we analyze are legal enforcement of contracts − measured by the time needed to repossess a house −, several indicators of the tax treatment of mortgage payments, regulatory loan-to-value ratios (LTVs) at origination, depth of information about borrowers and credit conditions, including the prevalence of fixed rate mortgages or products that result in low initial mortgage repayments.[2] We first conduct a separate analysis of each institution and then examine the robustness of the results in a multivariate setting.

We note three advantages of our strategy. Firstly, the two-step approach we follow leads to effects of the institutional variables on household debt which have causal validity under less restrictive conditions than a pooling of the data across countries with interactions of key household characteristics and institutional variables. Specifically, when estimating the cross effects of institutions and household characteristics we allow for endogeneity with respect to unobserved country effects, both additive and interacting with the remaining household characteristics.

[1]The reference group is a two-person household with the median income in the country, where both members are aged between 35 and 44 years, have mid schooling levels, where the core member with the highest earnings is an employee, and the other core member works. In addition, the HFCS is a cross-section, so in the remainder of the paper we use the shorthand age-profile for what really is an age-cohort profile.

[2]ECB (2009), World Bank (2012) or Andrews and Caldera (2011) report the substantial heterogeneity of these institutions across countries in the Euro area.

Secondly, we consider many institutions. We conduct one-by-one analyses of the impact of institutions on various debt outcomes which permits an assessment of the merits of each institution in accounting for age and income profiles of borrowing. Additionally, this allows us to assess how our results connect to the theoretical and quantitative papers in the literature that typically deal with one institution at a time. We also propose a multivariate analysis to establish which institutions matter most. Given the limited number of countries used, we make inference considering that the moments of interest are the within sample (i.e. Euro area) regressions of the first stage coefficients on each institution.

Finally, we assess the explanatory power of each institution by examining its impact on three separate debt outcomes: the extensive margin (the fraction of households who borrow secured or, in a separate specification, unsecured), the intensive margin (the amount of secured or unsecured debt borrowed, conditional on borrowing), and the cost of secured debt. The advantage of this approach is that it provides indications about the channel through which each institution affects borrowing behavior. For example, Chiuri and Jappelli (2003) document that in countries with higher down-payment requirements young adults become home owners later in the life cycle supporting models that emphasize the presence of quantity restrictions in the credit market. Nevertheless, high down-payments, or a low use of debt may be due to credit rationing or to a high interest rate. Information on the determinants of cross country variation in interest rates allows disentangling between those alternative explanations.

On the downside, our second stage is based on correlations using a sample of only eleven countries. This is necessarily so, because at the end of the day, that is the variation available in the data. The situation would be exactly the same in a pooled regression. Nevertheless, as with other studies performing this type of inference, we supplement our evidence using scatter – plots of the results and looking at a variety of outcomes – trying to rule out the case that an institution correlates with a particular debt outcome "by chance".

The findings of the first stage show marked differences in the patterns of debt holding across euro area countries. In terms of explaining debt holdings within countries, we find the age, income and education level of household members to be important demographic considerations. In this context, we find evidence of a hump-shaped profile of secured debt holding over age-cohort groups. Specifically, the propensity to borrow peaks for cohorts aged 35-44 at the time of the survey, before the (cross-sectional) income profile peaks, possibly suggesting a role for secured debt in smoothing household consumption. Nevertheless, cross-country differences in the age, income and education profiles of borrowers are substantial. There is also substantial heterogeneity in how mortgage interest rates are related with income or age across countries.

Our findings from the second stage suggest that among all the institutions we consider, the length of repossession periods best explains the features of the distribution of debt we analyze. In countries with one standard deviation longer repossession procedures, the fraction of borrowers is 16 per cent smaller, the amount borrowed by the youngest set of households (conditional on borrowing) is 12 per cent lower, and the interest rates paid by low (high) income households are

0.3 percentage points higher (lower). These results are robust to the inclusion of other institutions. Perhaps surprisingly, given the macro evidence in other studies that examine corporate and household debt jointly, the availability of information about borrowers does not robustly correlate with the patterns we study. Our measures of the impact of the remaining institutions – regulatory LTVs, the taxation of mortgages and the prevalence of interest-only or fixed-rate mortgages (FRMs) –, or of country-level financial literacy delivers less robust results.[3]

One interpretation of our results is that the supply of secured debt is affected by legal processes that delay the recovery of collateral in case of non-repayment. We also find that banks react to expected losses due to longer repossession periods not necessarily by rationing quantities or rejecting applications but also by pricing secured debt differently across income groups and charging relatively higher interest rates to low income households.

Theoretical and quantitative models have stressed the role of each of these institutions in shaping the distribution of debt outcomes among age or income groups. In particular, the models of Chambers et al.(2009a) and Ortalo-Magné and Rady (1999, 2006) analyze the impact of Loan- to- Value ratios on the chances of young and low-income households holding debt. Another strand of the literature discusses how the supply and distribution of debt is affected by bank losses in the event of non-repayment, measured as the opportunity and uncertainty costs of longer repossession processes (Jappelli et al, 2005), or by the presence of the bankruptcy option - Livshits et al (2007), or Chatterjee et al (2007). Gervais (2002) uses an OLG model to show that tax exemption for the implicit rents of owner occupied housing and mortgage payments leads mid- and high-income households to anticipate housing consumption over the life cycle. Regarding the role of depth of information, Edelberg (2006) discusses the consequences of the increased possibilities of credit scoring that occurred during the 1990s in the US on the pricing of default risk. As default risk varies across observable groups of the population, improved information has differential effects on different groups. Chambers et al (2009b) simulate a strong impact of mortgage products that result in low initial payments mostly on the borrowing behavior of young or low-income adults. Finally, Campbell and Cocco (2003) use simulations suggesting that the fixed rate mortgages are most attractive for the borrowing behavior of households with riskier income profiles. In sum, the studies mentioned stress that variation in each institution -legal enforcement, bankruptcy, taxation or Loan to Values- has heterogeneous impacts on the debt outcomes of different households.

Previous empirical studies have fitted cross country regressions of total private sector debt-to-GDP ratios to indicators of law enforcement, information about borrowers and legal origins to disentangle their relative importance in determining cross-country variation in debt levels (Djankov et al, 2007, Jappelli et al 2005). As mentioned above, the theoretical literature stresses that those institutions affect not only aggregate debt outcomes, but also the composition of borrowers along dimensions like income levels, age or the riskiness of borrowers' income profiles.

[3] We also conducted the second step for unsecured debt, by regressing country specific coefficients on measures of the depth of information or on financial literacy. Neither of those institutions was systematically correlated with the features of the distribution of unsecured debt we analyze.

In addition, economic theory also predicts that the (individual-specific) price of debt changes with differences in legal enforcement or the depth of information about borrowers. In sum, analyzing how cross-country variation in legal enforcement, taxation of mortgages or regulation of credit markets correlates with different age or income profiles of debt outcomes allows a deeper understanding of "what institutions matter most".

An alternative empirical approach pools observations from different provinces or states within the same country to test if more generous state-level bankruptcy exemptions in the US - Gropp et al (1997)- or lengthier of repossession periods across Italian provinces -Fabbri and Padula (2003)- result in a lower amount of debt granted to low-asset households. Those studies interact wealth with the institution of interest. However, the theoretical models mentioned predict that banks use all available information to price loans Therefore, variation in repossession periods may affect the age or income profile, unlike what is assumed in those empirical studies. Georgarakos et al. (2010) specify country-specific models linking household characteristics to subjective measures of financial distress, arguing that a higher financial burden increases financial distress relatively more in European countries with less expanded credit markets. Crook and Hochguertel (2007) document large differences in income and demographics in country-specific models of loan application rejections and of the amount of debt, interpreting that institutions may explain cross-country variation in coefficients.

The rest of this paper is structured as follows. The next section presents an overview of the data used in this paper. In Section 3 we discuss the empirical approach employed to examine debt across euro area countries. Section 4 presents the results from the first part of our empirical investigation. In Section 5 we present the results from the second part of the empirical analysis, where we assess the impact of institutions and credit conditions on the first stage results and compare the economic magnitude of our results to the previous literature. Finally, in Section 6, we conclude.

2 Data and descriptive statistics

This paper uses newly available data from the first wave of the Household Finance and Consumption Survey (HFCS) to study household debt in euro area countries. The HFCS is a Eurosystem initiative aimed at collecting comparable micro-level information on household balance sheets. It is a unique survey in that it collects information on household income, assets, liabilities and consumption that is comparable across euro area countries.[4] The first wave of the survey was conducted between end-2008 and mid-2011, with the majority of countries carrying the survey out in 2010. Fifteen euro area countries are included in the first wave of the survey. However, the analysis in this paper is based on the HFCS data for only eleven of these countries since some of the variables important to this study are missing from four of the country datasets.[5]

[4]Further information on the survey can be found at http://www.ecb.int/home/html/researcher_hfcn.en.html

[5]In the case of Cyprus, we are missing information on the education level and marital status of core household members (excluding the reference person). For Malta, public information on the age of household members is

Full details of the sampling methodology employed for the HFCS are available in HFCN (2013), but here we set out some of the main features. The HFCS was conducted to provide nationally representative information for each country in the dataset, resulting in a total sample size of just over 62,000 households. The surveys in each country were conducted under the responsibility of the respective central banks while the European Central Bank coordinated the effort across countries. The surveys follow common methodological guidelines for their implementation, in particular for the definition of the variables and the preparation of the data for analysis.

2.1 Questions on household debt

The HFCS includes a number of questions on household debt, and these form the basis for the analysis in this paper. In relation to secured debt, households are asked to provide detailed information on the quantity and terms of debt secured on the household's main residence, and separately for loans secured on other properties. Specifically, respondents are asked to provide information about the loan terms at the time of origination as well as current information such as the amount outstanding, the current interest rate and the monthly repayment. For the purposes of this paper, we focus on the current outstanding balance of debt secured against the main residence or some other property, as well as the current interest rate applying to the first important loan that, according to the respondent, is collateralized by the primary dwelling. In the case of unsecured consumer loans respondents are asked to provide similar information.[6] Additionally, the HFCS includes information on the amounts outstanding on credit cards and credit line/overdrafts. For unsecured debt, the analysis that follows employs information on the current outstanding balance of all these types of unsecured debt.

Figure 1 shows the proportion of households with secured or unsecured debt, the average balances on such debt (as a proportion of household income), and the average current interest rate chargeable on the main mortgage, across the countries in the HFCS dataset.[7] It is clear that debt holding varies quite a bit across euro area countries. In the case of secured debt, the proportion of households with such debt ranges from a low of around 10 per cent in Italy or Slovakia to a high of almost 45 per cent in the Netherlands. For unsecured debt, the proportions range from a low of 17 to 18 per cent in Italy and Portugal to a high of just over 35 per cent in the Netherlands and Luxembourg. These results are in keeping with the findings from other data sources. For example, using data from the European Community Household Panel survey, Georgarakos et al (2010) find a relatively low proportion of households in countries like Italy, Spain and Greece with secured debt, despite the fact that home ownership rates are particularly high in these countries. Conversely, they find relatively high rates of mortgage take-up in the Netherlands.

missing (and the number of indebted households in the sample is low). The Finnish dataset does not include disaggregated data on secured and unsecured lending. Finally, we exclude Slovenia from the analysis since there are so few households in the sample with outstanding debt.

[6]In the HFCS there is no information for the credit card interest rates neither for the outstanding debt associated with leasing contracts.

[7]In Figure 1 we do not control for differences in fieldwork period across countries (but do so in our econometric analysis).

The second chart in Figure 1 reports the median debt-to-income ratio for secured and unsecured debt across households in the euro area. It is clear that there is considerable heterogeneity across countries in the amount of debt held. Households in the Netherlands hold the largest amount of secured and unsecured debt, as a proportion of their income, while households in Austria hold the lowest amount of secured debt. Unsecured debt holdings, relative to income, are lowest in Austria, Germany and Slovakia.

There is also quite a bit of variability across countries in the interest rate payable on the mortgage that financed the house of residence. The third chart in Figure 1 shows that the median rate is lower than average in Portugal, Luxembourg, and Austria.

Finally, Tables 1.1 and 1.2 present an overview of the debt holdings, socio-economic and demographic characteristics of households in the sample. Table 1.1 shows the data that was reported above in Figure 1, along with estimated standard deviations. Table 1.2 reports the proportion of households with various socio-economic and demographic characteristics. The percentage of households whose reference person is below 35 years of age varies markedly across countries in the sample. While less than 9% of Italian or Portuguese households have a reference person aged below 35, the percentage exceeds 17% in France, Germany, Greece or Slovakia. Furthermore, there is quite a bit of variability in the distribution of educational attainment across countries. In Austria, for example, 16.2 per cent of households have a "core" member with a tertiary education level.[8] At 43.8 per cent, this figure is much higher in Belgium.

The labour status variables show the current working status of core household members. The Netherlands reports the highest proportion of inactive or unemployed core members; almost 30 per cent of households in the Netherlands have a core household member with this status. Slovakia reports the highest proportion of households where the other core member is also employed (i.e. if the household comprises a couple, the other member of the couple is employed). The final row in Table 1 reports the median household income across the countries in the sample. Median household income levels are highest in Luxembourg, at almost 65,000 euros, and lowest in Slovakia, at 11,200 euros.

3 Empirical methodology

This paper has two aims; first, to identify differences across euro area countries in the relationship between household characteristics and debt holdings; and second to examine the role of institutions in accounting for these differences. To achieve these aims, our empirical approach includes two parts. In the first part, we estimate the role of socio-economic and demographic factors in driving the likelihood of holding debt, the amount of debt held, and the interest rate

[8] We define the "core" members of the household as the respondent to the survey and his or her partner (if any). In examining the characteristics of "core" household members, we focus on the characteristics of that person with the highest value (i.e. in the case of age, we focus on the eldest core member, in the case of education, we focus on that person with highest education level, etc.). "Core" household members will be explained in further detail in Section 3.

payable on debt. This is done by estimating country-specific equations, thus allowing for country effects both in intercepts and slopes. In the second part, we regress a selection of the first-step coefficients on relevant country-level legal and financial institutions, credit conditions and financial literacy variables. We focus on those coefficients from the first part – typically age, income and education – that, as we discuss in Section 3.1. and in Section 5, are most likely to be affected by cross-country variation in these institutions. In what follows we discuss the specification of the model.

3.1 Modelling background

The most stylized version of the permanent income model predicts that consumer's desired non-durable consumption is proportional to his or her stream of future earnings, discounted at the lending or borrowing rate - with a proportionality factor that depends on the degree of consumer's patience and on his or her willingness to transfer consumption across periods.[9] Holding such preference shifters constant, the desired amount of debt is then determined by household's current income and by the discounted stream of future earnings.[10] Cross-country variation in the share of young households -whose income is typically below their discounted stream of future earnings- or in the share of individuals with high education levels –who typically expect higher income growth- would then account for differences in the distribution of debt. In addition, as collateralized debt is the main component of household debt and housing is a good consumed jointly by all household members, the demographic characteristics of both core members is likely to affect the amount borrowed. The exposure to high income risk –proxied by employment status- may attenuate the incidence, amount or even the response of debt outcomes to current and future income, but the main patterns described above are likely to remain unaffected –see Blundell and Stoker (1999).

However, uncertainty about the borrower's ability to repay debt makes it likely that the distribution of the amount borrowed is not driven exclusively by demand factors –see Dynan and Kohn, 2007. Lenders typically limit the amount of debt granted to an individual as a fraction of the value of the asset purchased or as a fraction of her current income. More generally, the optimal pricing of debt sets higher interest rates to groups that, according to the information available, are more likely to default on their loans. Chatterjee et al (2007) prove that the menu of contracts offered to borrowers entails different combinations of debt amounts and interest rates to groups with different ages, earning capacity or current assets. Cross-country differences in the degree of legal enforcement or in access to past information about borrowers is likely to generate different ways of pricing non-repayment risk, thus altering the distribution of the incidence and the amount of debt across groups of the population.

[9] Those predictions are not specific of models without housing consumption. For example, if housing consumption could be adjusted without cost, and individuals had homothetic preferences for non-durable goods and for housing services, the desired amount of both items would also depend on the discounted stream of future income.

[10] Preference factors are likely to vary across countries –impatience or the curvature of the utility function. Such preferences alone would also explain cross-country differences in the prevalence or amount of debt. Unfortunately, self-reported information on the degree of patience or risk aversion were not collected in countries like Finland or France, so we do not control for them in our study

Our implicit assumption is that the cross-country variation in legal enforcement, taxation, mortgage regulation or information about borrowers generates varying distributions of the fraction of households indebted, the amount and the cost of debt across groups of the population. Our approach does not attempt to recover credit demand or credit constraints but relies instead on reduced-form separate regressions of the three outcomes of interest on the set of socio-demographic determinants mentioned above. The country-specific estimates of the age, income or schooling profile of debt outcomes we estimate reflect a mixture of supply and demand factors. In a second step, we examine how country-specific institutions affect those coefficients separately. That strategy permits inferring if an institution affects debt outcomes through demand or supply channels. For example, if shorter repossession periods result in higher amounts of debt by some groups while they do not increase the cost of debt, one could infer that speedier repossessions operate mainly by increasing the supply of loans.

There are factors that may enter the demand of debt or that banks use to price loans that we do not consider. We deliberately leave out variables related to household wealth and changes in aggregate housing prices. House ownership is mechanically linked to debt holding through the budget constraint, as most collateralized loans require purchasing or already owning a home. Similarly, financial wealth varies systematically around the moment of house purchase –see Ejarque and Leth-Sorensen, 2009- so holding financial wealth constant in the analysis would confound the debt response to increased collateral with distance since house purchase. In a similar vein, we do not include housing price dynamics, as variation in the institutions we analyze in the second step have a separate impact on housing prices through the credit market –see Ortalo-Magné and Rady, 2006 on how variation in Loan to Value restrictions alter house price dynamics.[11] In sum, we mostly confine the set of regressors to socio-demographic variables that are least likely to be determined by credit market developments.

The independent variables used at the first stage of the analysis are shown in Table 2.

3.2 Modelling strategy

Namely, our first step is to run separate regressions on the micro-data of each country to obtain estimates $\widehat{\beta}_{0c}, \widehat{\beta}_{1c}, \widehat{\beta}_{2c}$ for each country c in an equation of the form (here there are only two household characteristics x_{1hc}, x_{2hc} for the sake of simplicity):

$$y_{hc} = \beta_{0c} + \beta_{1c}x_{1hc} + \beta_{2c}x_{2hc} + \varepsilon_{hc} \quad (c = 1, ..., C)$$

[11] On the other hand, the inclusion of housing prices amounts to taking a position on whether housing prices determine borrowing or the opposite, an issue that is unsettled in the literature (see Mian and Sufi, 2011 vs Adelino et al. 2012 for recent discussions in the US).

Where y_{hc} denotes one of three different outcomes in three different sets of regressions.[12] In a first specification, the outcome is $1(D_{hc} = 1)$, a dummy variable indicating the ownership of debt for household h in country c (where $c = AT, BE, DE, ..., SK$). In this particular case, as detailed below, the model is non-linear, specifically a Logit. In a second specification, the dependent variable is $log(D_{hc})$, the logarithm of the outstanding debt amount for those households with debt. Finally, in a third specification, the dependent variable is i_{hc} the interest rate payable on the first loan that, according to the household, is secured by the household's primary residence.[13] x_{1hc} and x_{2hc} reflect the socio-economic and demographic characteristics discussed in the previous subsection for household h in country c.

Our second step is to run a sequence of regressions on country-level data (11 observations), one for each β in the first step. For example, we obtain estimates $(\widehat{\gamma}_{20}, \widehat{\gamma}_{21})$ from a regression of the $\widehat{\beta}_{2c}$ on z_c , our measure of country-specific legal and financial institutions, credit conditions or financial literacy

$$\widehat{\beta}_{2c} = \gamma_{20} + \gamma_{21} z_c + v_{0c},$$

Where v_{0c} is an error term that captures unobserved country-level variables, as well as possible specification errors.

The estimates $(\widehat{\gamma}_{20}, \widehat{\gamma}_{21})$ are identical to the estimates one would obtain from running a regression at household level, pooling all the countries, including country fixed effects not only as intercepts but also interacted with x_{1ic}. Such pooled regression would be as follows:

$$y_{hc} = \beta_{0c} + \beta_{1c} x_{1hc} + \gamma_{20} x_{2hc} + \gamma_{21} z_c x_{2hc} + u_{hc} \tag{1}$$

This regression (and our second step estimates) takes into account that the institutional variables z_c may affect the impact of other socioeconomic characteristics simultaneously. Those effects are subsumed within the country effects β_{0c} and β_{1c}, which capture all country differences both observed and unobserved in the relationship, except for those operating through x_{2hc}.The coefficient of the interaction $z_c x_{2hc}$ on household debt would not be biased by either reverse causality or omitted country-level variables that operate through additive country effects β_{0c} or slope country effects β_{1c}.

An alternative to our two-step approach would be a pooled regression with, for example, additive country fixed effects but constraining $\beta_{kc} = \gamma^*_{k0} + \gamma^*_{k1} z_c$, where $k = 1, 2$.

$$y_{ic} = \beta^{**}_{0c} + \gamma^*_{01} z_c + \gamma^*_{10} x_{1hc} + \gamma^*_{11} z_c x_{1hc} + \gamma^*_{20} x_{2hc} + \gamma^*_{21} z_c x_{2hc} + u^*_{hc} \tag{2}$$

[12] All models are weighted by the population weights for each country and take into account the five implicate data sets obtained from multiple imputation (see HFCN, 2013).

[13] To correct for differences in fieldwork periods across countries, we make some adjustments to the specifications when using the log debt amount and the interest rate as dependent variables. In the case of the debt amounts specification, we convert all monetary amounts to 2010 values by adjusting by the country-specific HICP index. In the case of interest rates, we adjust the reported interest rate by the change of the *Euribor* rate between the fieldwork period and the first quarter of 2010 multiplied by the country-specific share of adjustable mortgages.

Note that in this case the estimated effects $\widehat{\gamma}_{11}^{**}$ or $\widehat{\gamma}_{21}^{**}$ will have causal validity only under more restrictive conditions than $\widehat{\gamma}_{11}$ or $\widehat{\gamma}_{21}$. For example $\widehat{\gamma}_{11}^{**}$ and $\widehat{\gamma}_{21}^{**}$ allow for additive country effect endogeneity but not for country-effect endogeneity operating interactively through other household characteristics.

There are two possible interpretations of the estimates γ_{20} and γ_{21}. A weak interpretation of $\widehat{\gamma}_{01}, \widehat{\gamma}_{11}, \widehat{\gamma}_{21}$ is that these reflect unbiased predictive (not causal) effects of the corresponding $\beta \prime s$. In our view, assessing the predictive ability of institutional variables in explaining differences in debt held by comparable households across Euro-area countries is in itself of considerable economic interest.[14] An alternative and stronger claim is that γ_{21} reflects the causal impact of the institution z_c on the borrowing profile defined by x_{2hc}. That interpretation requires ruling out endogeneity with respect to interacted country effects, arguably present in an observational cross-sectional setting such as ours. We note two points here. Firstly, as mentioned above the two step procedure we follow implies that each individual coefficient γ_{21} would be biased if an omitted institution were correlated with the interaction $z_c x_{2hc}$, but not if it were correlated with other country fixed effect or slope country effect. In that sense each individual estimated effect has a stronger claim to causal validity than any effect estimated from, for example, the pooled regression (2). Secondly, we check for the relevance of confounding country-specific factors by regressing $\widehat{\beta}_{2c}$ on several institutions z_c at the same time. By comparing the estimated the impact of z_c on $\widehat{\beta}_{2c}$ across univariate and multivariate specifications we obtain indications of whether the estimated γ_{21} is causal.

Regarding inference, Appendix A.1 shows that the standard errors of $(\widehat{\gamma}_{20}, \widehat{\gamma}_{21})$ in our two-step regression can be decomposed into two parts. The first part is associated to the variance of v_{0c}, a source of error that arises if we interpret the 2nd stage as estimating regressions in an underlying super population of countries. The second part takes into account the first step estimation error $\widehat{\beta}_c - \beta_c$. The conventional standard errors in second-step regressors for results that consider one institution at a time reflect uncertainty in the estimated coefficients in the first step and in the fit of the second stage. However, in a separate specification, we regress $\widehat{\beta}_c$ on as many as seven institutions. In that case, we present standard errors that take into account only the sampling variability due to estimated $\widehat{\beta}_c - \beta_c$, implicitly assuming that the moment of interest is the within-sample regression of the first step coefficients on a set of country-specific institutions. Our second step results in that case would have little to say about the relationship in the population of countries. The standard errors that only take into account that the $\widehat{\beta}_c$ are estimated coefficients are comparable to the conventional standard errors calculated by default in the pooled version of the 2nd stage estimator as described in equation (1).

[14] To fix ideas, assume that there is a country-specific omitted characteristic like "thrift" that results both in a lower regulatory Loan to Value and in a smaller response of the debt amount of young households to Loan to Values. In such scenario, our estimate of γ_{21} would not reflect a causal impact of Loan to values on the indebtedness of the youth. However, the statement that "holding income and a wide set of demographics constant, in Euro area countries with lower Loan to Values indebted youths borrow less" would still be correct.

3.3 The first step: models of debt outcomes

In the first step, as mentioned above, we employ three different specifications where the dependent variable is a different debt outcome in each specification. In the first specification, we model the ownership of debt as a function of the socio-economic and demographic features of households in the sample. To avoid potential endogeneity problems, we model the holding of secured and unsecured debt separately since the decisions to hold debt and to purchase a house are potentially linked. In the case of secured debt, the dependent variable equals one if the household has a loan that is secured on the primary residence or some other property. For unsecured debt, the dependent variable equals one if the household has unsecured debt such as credit cards, overdrafts, consumer loans or loans from informal sources such as family and friends. Since the dependent variable is binary, we use discrete dependent variable techniques and employ a logit model of the following form:

$$P(Has(Un)SecDebt_{hc} = 1|X_{hc}) = \frac{exp(B_c^T X_{hc})}{1 + exp(B_c^T X_{hc})}$$

$$\text{Where:} \quad B_c^T X_{hc} = B_{1c} + B_{2c} * Age16\_34_{hc} + B_{3c} * Age45\_54_{hc} + ... + B_{16c} * Log(Y_{hc})$$

$$\text{and} \quad c = AT, BE, DE, ..., SK$$

In comparing the results across countries, we focus on the odds ratio for each variable of interest since, in the case of a Logit, this parameter is invariant to different values of the covariates. We also examine the probability of a common reference group holding debt across the countries in our sample. This group is defined as those households comprising two core members in a couple and no other adults in the household, where the relevant core members are aged 35 to 44 years, have a medium education level, are both employed, and the household has the median income level in their country.

In the second specification, we use OLS techniques to model the quantity of debt held, conditional on holding debt.[15] We also use quantile regression techniques to assess if the impacts of the independent variables on the quantity of debt held differ across the conditional debt distribution. To some extent the quantile model also captures potential nonlinearities due to the fact that the quantity of debt cannot be negative. The third and final specification in this first part of the analysis sets the interest rate payable on the mortgage for the household's principal dwelling as the dependent variable. As with the second specification, we employ OLS techniques and a location-scale model that accounts for potential heteroscedasticity.

[15] Furthermore, we employ a location-scale model to take heteroscedasticity into account.

We include those demographic characteristics of "core" household members that are thought to be important determinants of debt holdings, as well as information on household composition and household income. We define the core members of the household as the respondent to the survey and his or her partner (if any). When there is only one core member we include his / her characteristics but in the case of couples we include information on both core members and relate their characteristics to each other. We do this by first defining the person of interest in the couple as that person with the highest value on the relevant independent variable, and then capturing the difference between the two core members. So, for example, in the case of age, we include the age (mainly in dummy form covering 10-year bands) of the eldest core member. Additionally, we include a continuous variable capturing the difference in age between the eldest core member and the other person in the couple.

In the case of education, we include the education level (in dummy form specifying basic or college education) of the person with the highest level of education in the couple and we also include a dummy variable indicating if the other member has a lower level of education. Finally, in the case of labour market status, we include the status of that person with the highest income as well as a dummy variable indicating if the other core member is employed. By defining the characteristics of core couples in this way, we can assess the importance of differences among core household members in a more parsimonious way than if we were to include a full set of variables for each person. More importantly, this way of modelling is an attempt to focus on the traits of the household as a group and their distribution without requiring the definition of a "reference person" ex ante, all of whose characteristics would then be emphasized relative to other members.

3.4 The second step: the impact of institutions on first step coefficients

In the second step of our analysis, we regress each of the estimated effects from the first step covariates on each of the institutional variables of interest. The precise institutions that we examine, along with the data sources, are shown in Table 3.1 while the actual data are provided in Table 3.2. As discussed in the Introduction, we focus on those institutions that have tended to be highlighted in the existing theoretical or empirical literature on household debt outcomes. It should be noted that while we examine cross-country variation in the fraction of borrowers with debt, the amount of debt held and the interest rate payable on that debt, these variables are as of 2009-2010. The institutions, however, are measured as of 2007. Arguably, we would need to measure institutions at the time at which the "representative" mortgage was signed. We mitigate this problem in two ways. Firstly, in discussing age profiles, we focus mainly on those age profiles up to 55 years of age, as these groups will arguably have borrowed using secured debt originated under current legislation. Secondly, to the extent that the institutions have been stable over time, the problem of different time periods is lessened. During the process of compiling the institution-level data, we noted that the presence of an institution (such as the existence of tax deductibility of mortgage repayments) was a much more stable feature of legislation than quantifications, in this case the exact measure of the amount of tax relief available). As such, where possible we confirm the impact of each institution using both measures.

3.5 Age versus cohort effects

In the second stage of our analysis, we compare the differential response of different age groups to cross country variation in institutions. Since the HFCS dataset includes only a cross section of households from different countries, we are thus comparing responses across age cohorts that may differ in other dimensions, such as lifetime resources. While we cannot fully solve for this, we make three notes that make us relatively confident in the interpretation of a life-cycle component. Firstly, as mentioned before, our discussions focus on groups below 54 years of age and, in some instances, below 44 years of age. By limiting the age range, we examine groups that are likely to have borrowed recently and that have had similar exposure to the institutions that affect credit markets. Secondly, our baseline specification controls for income and schooling, variables that correlate with cross-cohort variation in lifetime resources. Finally, one way of separating cohort and life-cycle effects in our context would be to use country datasets with many survey waves and different point-in-time measures of institutions. Regressing home ownership on aggregate downpayment measures, Chiuri and Jappelli (2003) document that their results do not quantitatively change when repeated surveys are used and are qualitatively similar when country fixed effects are added.

3.6 Comparing interest rates across countries

We obtain insights about the distribution of the cost of debt across groups of the population by examining how interest rates vary with the main covariates. While mortgage interest rates can be safely interpreted as reflecting differences in the cost of debt that households face, interpreting them as arising from different debt pricing is complicated by differential fixation modes across countries in the Euro zone.[16] Interest rates in FRMs reflect the risk that the household defaults, the possibility of early cancellation to acquire a new mortgage when interest rates drop as well as the lender's expectations about the future path of interest rates. The interest rate of an Adjustable Rate Mortgage (ARM) also reflects household default risks and a reference rate, but not the expected path of future rates at the time of origination. Hence, interest rates in different countries partly reflect not only differences in household default risk but also expected macroeconomic factors at origination.

This version of the paper makes no attempt at isolating the various components of interest rates for various reasons. Firstly, previous studies have obtained very limited success at parsing the default and repayment risk components.[17] Secondly, by including country specific intercepts and slopes we control in a very flexible way for country-specific effects like the difference in

[16] The fraction of mortgages originated in 2007 as FRMs in AT, ES, GR, PT and SK was below 5%, according to ECB (2009), while FRM originations exceeded 69% in FR, NL or BE. IT, LU and DE are intermediate cases.

[17] Using survey data from the US, Campbell and Cocco (2003) make an attempt to isolate default and repayment risks components by subtracting from the observed FRM interest rate the 10-year Treasury bond yield to maturity.

prevalence of FRMs. Within countries, there is no much heterogeneity as 8 out of 11 countries are basically specialized in one type of mortgage. In that case, the second step regression of the country-specific effects (intercepts and slopes) in the interest rate model on the share of FRMs is informative about how much of the variation in FRMs accounts for variation in the cost of borrowing.

4 First-stage results: the association between debt holdings and household characteristics

4.1 Secured debt

The probability of holding debt

The results of the first specification, where the dependent variable is binary and captures people who hold secured debt versus those who do not have secured debt, are shown in Figure 2 (and Table 4). We present the probability for the reference group, the country-specific odds ratios and the associated confidence intervals. The odds ratios should be interpreted relative to the omitted category for each group (as detailed in Table 2). For example, in the case of the Netherlands, the odds ratio for the "high education" variable is about 1.7. Since the omitted category here is "medium education", this implies that the odds of holding secured debt among households where the reference person has a high level of education is about 1.7 times that of households where the reference person has a medium level of education.

Firstly, the chart in the top left corner of Figure 2 shows the probability of holding debt among the reference group specified earlier. This group displays markedly different probabilities of holding secured debt across countries in the sample. The probability is highest for this type of household in Spain, where the probability of holding secured debt is approximately 65 per cent. The probability is lowest in Italy where this type of household has about a 10 per cent probability of holding secured debt.

In terms of the other charts in Figure 2, the first point of note is that the results are in keeping with the existing literature on household debt; in general, the relationship between secured debt holding and age displays a humped shape, where the likelihood of holding secured debt generally increases up to the ages of 35 to 44 years and decreases thereafter. Higher income, higher levels of education and employment are also associated with a greater likelihood of holding secured debt. Finally, household size and composition matter; in several countries, the greater the number of adults in a household, the higher are the chances that the household will hold secured debt. Furthermore, households where the reference person is part of a couple tend to be associated with a higher probability of holding secured debt.

Similarly, they subtract the 1-year yield from the observed ARM rates, obtaining strikingly similar spreads in FRM and ARMs. They end up assuming that the repayment risk component amounts to 100 bp in FRMs.

The schooling profile is consistent with the basic life cycle model if one assumes that households with higher education are more likely to have higher future income. But these profiles display significant heterogeneity across countries.

Turning to the country specific results, there are obvious differences in the effects of the independent variables across countries. In the case of Austria, France, Germany or Portugal, for example, a head of household who is aged between 16 and 34 years has a lower chance of holding secured debt relative to 35 to 44 year olds (the omitted group); the odds ratio in these cases is around 0.5. In the Netherlands or Slovakia, however, the profile is much flatter. The odds ratio is higher than 1 in the latter case, suggesting that the odds of holding secured debt are greater for households where the head is aged between 16 and 34 years relative to those aged between 35 and 44 years. The fraction of borrowers does not change much with household income in the Netherlands and Slovakia but the income profile is much stronger in Germany, Spain, and Luxembourg.

Moving next to the labour market status variables, the most obvious differences across countries are for the inactive/unemployed group. In general, the likelihood of holding secured debt is lower for this group relative to the employed group. However, the extent of this varies widely across countries. In Austria, Slovakia or Greece, the odds ratio for these groups is just below 1, whereas in Belgium, France, Germany or Luxembourg the odds ratio is less than 0.5. Another labour market variable that seems to matter to varying extents across countries is the "other_core_working" variable. This dummy variable equals one if the core household member with the lowest income is working, and zero otherwise. While this variable has a positive impact across most countries, its effect ranges from a high of close to 2 (odds ratio) in Belgium to a low of 0.9 in Spain.

Finally, we show the pseudo R-squared from our estimated regressions in the final chart in Figure 2. It is clear that this value varies across the country level regressions. Interestingly, it is relatively high in Belgium, at a value of close to 0.3. It is lowest in Greece, at just under 0.1, suggesting that the current specification does not fit the data in Greece as well as it does for the Belgian data.

As a final step at this stage of the analysis, we explore an alternative empirical model that is broadly in line with a life cycle model with human capital accumulation and credit constraints. Such a model would predict that within the group of young households, those with higher expected income growth, i.e. those with a college education, would have a higher demand for secured debt. In this case, the role of human capital should be less important for older households, since the higher income growth due to a college education is most likely to have already materialized by age 50. Hence, as a test of an expanded life cycle model with credit constraints and human capital, we re-run our previous Logit model of secured debt holding, but this time we also include interactions between each age dummy and an indicator of "college education". We constrain the interaction of college and age to be the same for groups aged more than 45. In

Table 7, we report the odds ratios for these interaction terms, along with the estimated standard errors.

The results in the top row of Table 7 indeed suggest that, among young households, those with a college degree have higher chances of borrowing secured; the odds ratio is above 1 in eight out of the eleven countries. However, the odds ratios for older age groups are also above 1, contrary to the notion that the interactions between age and college degree capture higher expected income growth early in the life cycle.

The amount of debt held

Next we model the quantity of outstanding secured debt as a function of the same socio-economic and demographic variables used above. We employ two approaches at this stage; first we use OLS regression techniques to assess the effect of the independent variables on the log of secured debt and we also use a location-scale model to account for potential heteroscedasticity. Second, to check if the effect of the covariates varies across the distribution of secured debt, we use quantile regression techniques. However, in what follows, we only briefly comment on the quantile regression results and instead report the full set of results in a web appendix.[18]

The country level results for the OLS regressions are presented in Figure 3 (and Table 5) where we show the estimated coefficients and their confidence intervals, as well as the results from the location-scale model that provides a test of heteroscedasticity. The omitted categories for the dummy variables are as detailed previously in Table 2. The first chart on the top row of Figure 3 reports the results for the reference group.

Across all countries, the amount of secured debt holdings is highest for households where the reference person is aged 16 to 34 years. In almost all cases, households with heads older than 45 years tend to hold lower amounts of debt relative to the omitted group, 35 to 44 year olds.

Turning to the coefficients on the education variables, it is clear that higher education is associated with higher debt levels relative to those with lower education levels. In Germany, Italy, the Netherlands or Slovakia, high educated households hold at least 23% larger debt than the reference group. The impact is smaller in Spain, Luxembourg, and Greece, in keeping with the lower extensive margin response.

The cross-country differences in the income profile of the amount of secured debt held are relatively similar to those corresponding to the fraction of borrowers. In particular, the amount borrowed in France, Luxembourg, Germany, and Spain is more responsive to income than in the Netherlands, Slovakia or Greece.

The coefficients on the labour market variables suggest that labour market status has an important link with the level of outstanding debt. Relative to employees, in general the retired,

[18]Web appendix is available at https://www.dropbox.com/s/wie95bwb1pi90vb/web_appendix.pdf

inactive and unemployed groups tend to have lower outstanding balances of secured debt while the self-employed tend to have higher balances. Again, there is some variability in these effects across countries, though the variability is not too large.

The coefficients on the household composition variables vary across countries. In most cases, households where the reference person is part of a couple tend to hold lower balances of secured debt relative to those where the reference person is not part of a couple, though the size of this effect varies across the countries in our sample. Similarly, the number of adults in a household impacts the level of outstanding debt to varying degrees across countries, though in general the effect is negative.

Finally, we show the R-squared value for the estimated regressions in the final chart of Figure 4 (and Table 5). Similar to the first specification shown in Figure 2, we find that the value of the R-squared varies quite a bit across countries. For this model, it ranges from a low of 0.11 for Italy and Spain to a high of 0.32 for Luxembourg.

In terms of the quantile regression results, Figure 4 reports the estimated effects for each of the countries in our sample. In general, the results do not deviate too much from the OLS estimates presented above. In most cases, the estimates remain within the 95 per cent confidence interval from the OLS regressions (not shown, but available in a web appendix).[19] Moreover, we find that most of the variation in the effect of household characteristics across the debt distribution is captured by the location scale model shown in Figure 3. Indeed, the most noticeably straight upward or downward slopes observed in some quantile functions reflect a significant scale parameter (indicated by the dark blue dots shown in Figure 3).

Cost of secured debt

The results on the impact of household characteristics on the cost of mortgage debt are shown in Figure 5 (and Table 6). In most cases, variables capturing household composition, age, or the education or work status of household members have only a limited impact on the interest rate. There are a few exceptions. In Greece and Italy, for example, the results show that self-employed people tend to pay higher interest rates, all else equal, than employees, while inactive or unemployed people tend to pay lower rates. In France, interest rates are about 2 basis points lower for households in the 16 to 34 year age group, relative to households in the 35 to 44 year age group. French households in the 55 to 64 year age group, on the other hand, pay an interest rate that is approximately 5 basis points higher than the reference group. In a number of countries interest rates on secured debt fall with household income, but this income profile varies across

[19] However, there are some exceptions. Notably, in a number of countries the age effects vary along the debt distribution, and on occasion the estimates move outside the OLS 95 per cent confidence interval bounds. In the case of Spain, for example, at the lower end of the distribution, the coefficient on the 16 to 34 year old dummy variable is positive and close to 1.3, indicating that the level of outstanding debt tends to be higher among households where the head is in this age group relative to households where the head is aged 35 to 44 years. At the upper end of the debt distribution, however, this coefficient falls close to zero, suggesting almost no difference between these two groups.

countries. In Austria, Belgium, France and the Netherlands, the differences in interest rates are similar across income groups. On the other side of the spectrum, the income profile of interest rates is most noticeable in Greece, Italy, Luxembourg and Portugal. A move of two standard deviations along the country specific income distribution decrease interest rates by 60 basis points in Italy, 24 in Portugal, 140 in Luxembourg and 32 in Greece.

Finally, the interest rate payable by the reference group varies from a low of about 2.4 per cent in Luxembourg, to a high of 4.6 per cent in Germany. The R-squared value also varies across countries, from about 0.03 in Spain to 0.12 in Italy.[20]

4.2 Unsecured debt

The probability of holding debt

Turning to the results for unsecured debt, we present the country-specific odds ratios and the associated confidence intervals in Figure 6. As with the results for secured debt, the odds ratios should be interpreted relative to the omitted category for each.

The first chart shows the probability of holding unsecured debt among the reference group. This varies quite a bit across countries. The probability of this group holding unsecured debt is highest in Luxembourg, while it is lowest in Austria. Furthermore, in some countries the probability of holding unsecured debt among the reference group is higher than for secured debt (shown earlier in Figure 2); this applies in Germany, France, Italy and Slovakia.

Relative to the omitted categories, in general the results suggest that the chances of holding unsecured debt fall once the household reference person moves beyond the 35 to 44 year age group, once they achieve a high level of education and once they enter retirement. On the other hand, the chances of holding unsecured debt increase as the number of adults in the household rises. The impact of the other covariates varies across countries. For example, households where the reference person is self-employed have a higher chance of holding unsecured debt, relative to households where the reference person is employed, in Italy, the Netherlands and Slovakia. In the remaining countries, this group has the same or lower chances of holding unsecured debt. Similarly, the impact of income varies quite a bit across countries. In Germany, Italy, the Netherlands and Slovakia, below average income lowers the odds of holding unsecured debt, albeit only mildly, while in most other countries it increases or has a limited effect on these odds.

[20]We have also examined how the covariates affect the probability of holding an ARM using country-specific Logit model within the set of indebted households. In all countries of the sample, the odds of having an ARM are unaffected by whether the household is below 35 years of age –a covariate we discuss in the second step. Similarly, the education level of the member of a highest schooling level or the fact that the core member with highest income is self-employed has virtually no impact on the choice between ARM and FRM. We do find some variation in the impact of income on the choice of the ARM, being positive in ES or IT, and negative in PT or NL. However, neither estimate is statistically different from zero at the 5% confidence level. While the issue merits further investigation, it does not seem likely that the age, income or self-employment profiles of debt outcomes that we examine are influenced by endogenous choices of ARM vs FRM.

Comparing the results from Figure 6 to the corresponding results for secured debt shown earlier (Figure 2), the most obvious differences in the impact of the covariates appears to be for the youngest age cohort (aged 16 to 34), the high education group and income. In the case of secured debt, households in the 16-34 year age group had a much lower chance of holding debt relative to the 35 to 44 year olds; in the case of unsecured debt, this group has a similar or, in some cases a higher, chance of holding debt. Furthermore, in the case of secured debt, a high level of education is associated with a higher chance of holding debt relative to a medium level of education. In contrast, for unsecured debt this group has a lower relative chance of holding debt. Finally, higher income substantially increases the chances of holding secured debt in most countries, while in the case of unsecured debt, in many countries above median income has a limited impact on the chances of holding debt.

A possible interpretation of these results is that secured debt is a derived demand of housing showing a strong income profile while the probability of holding unsecured debt has weaker income or schooling profiles. The results in Arrondel et al. (2013) and Teppa et al. (2013) point in the same direction, the former showing the demand for real assets strongly growing with income while the later finds a counterbalancing negative effect of income in the case of consumption debt. In contrast, the probability of holding unsecured debt varies with the number of adults in the household, likely tied to other types of consumption.

The amount of debt held

Next we model the quantity of outstanding unsecured debt as a function of the socio-economic and demographic variables. We follow the same approach as for secured debt, first using OLS methods to model the effect of the independent variables on the log of unsecured debt, then using quantile regression techniques to check if the effect of the covariates varies across the distribution of unsecured debt. The country level results for the OLS regressions are presented in Figure 7 where we show the estimated coefficients, their confidence intervals and the results from the location-scale model that accounts for heteroscedasticity.

The first chart shows the average balance of (log) unsecured debt held by the reference group across countries. Similar to the case of secured debt, the constant term varies across countries; it ranges from a low of 6.97 in Slovakia to a high of 9.35 in the Netherlands.

From Figure 7, it is clear that the effect of the covariates on the amount of unsecured debt held varies substantially across countries. In some countries, for example, the relationship between age and debt amounts exhibits an almost inverted U-shape, where the amount of unsecured debt held increases up to ages 35 to 44 years, and falls thereafter. This pattern can be observed in Austria. In other countries, there is very little variability in debt holdings across age groups – France, Italy and Luxembourg, for example. In other countries still, the relationship between age and debt amounts is more erratic, sometimes decreasing up to age 35 to 44, increasing for ages 45 to 54 and then falling off again (e.g. the Netherlands, Portugal and Slovakia).

In terms of the impact of education on the quantity of unsecured debt held, again this impact varies across countries. In a number of countries, the education level of the household reference person does not have much impact on the quantity of debt held – this applies in Austria, Belgium, Germany, Spain and Luxembourg. Similarly, in most of these countries the difference in education variable does not appear to have much impact on the quantity of debt held. However, in some other countries the education level appears to be quite important. In Portugal and Slovakia, for example, households where the reference person has a low level of education tend to hold higher levels of unsecured debt than households where the reference person has a medium level of education. However, the amount of debt held by households with a high level of education in these countries is also higher than the medium education households. The difference in education variable also appears to be quite important in the Netherlands and Slovakia, indicating that varying education levels amongst core household members matters for the quantity of debt held.

The coefficients on the labour market variables suggest that labour market status is an important determinant of the level of outstanding unsecured debt in all countries. Furthermore, in many countries the impact of these variables on the level of debt is similar to the case of secured debt; in general the results suggest that, relative to employees, the self-employed tend to hold larger amounts of debt, while in many countries the retired, inactive and unemployed groups tend to hold lower or similar amounts. In cases where the other core household member is working, this tends to have a positive, albeit small, impact on the amount of unsecured debt held.

In terms of the effect of household composition on the quantity of debt held, the relevant variables tend to have a small positive effect on debt amounts in the majority of countries. In most cases, for example, households where the reference person is part of a couple tend to hold higher balances of unsecured debt relative to those where the reference person is not part of a couple. Finally, the coefficient on the income variable shows that higher income is associated with higher outstanding unsecured debt levels, a result that is in keeping with the earlier results for secured debt.

We also use quantile regression techniques to check if the effects of the covariates on the amount of unsecured debt vary across the debt distribution. In the majority of countries the results, (which are available in Figure 8 and for each country separately in a web appendix), show almost no difference between the estimates from the quantile regressions and those from the OLS regressions presented above. In most countries, the estimates from the quantile regressions remain within the 95 per cent confidence interval from the OLS regressions.

4.3 Summary

In summary, the results thus far suggest that socio-economic and demographic factors are important determinants of debt holdings, though the precise impact of these variables differs across countries. As a simple illustration of this fact, in Figure 9 we plot a selection of predicted probabilities of holding secured debt, by country, for key covariates in our regressions.

The chart shows three patterns. Firstly, cross-country differences in the fraction of borrowers with secured debt are most noticeable when we compare the reference groups. Secondly, the strong age-cohort effects in Spain, Belgium, Luxembourg or Portugal contrast with much flatter profiles in Austria, Italy, the Netherlands or Slovakia. Finally, while the fraction of borrowers increases rather slowly with current income in the Netherlands or Slovakia, the schooling profile of lending is relatively strong in these countries. On the other hand, the strong income profile of borrowing in Luxembourg, or Spain contrasts with their weak schooling profile. A possible interpretation, if one takes schooling as a proxy for permanent income, is that banks in different countries value the household's earnings capacity in different horizons. The second step of the analysis examines the role of country level institutions in driving these differences.

5 Second stage results: the influence of institutions and credit conditions

5.1 The effect of institutions

The previous charts highlight the varying impacts of the socio-economic and demographic factors in explaining household debt behaviour across euro area countries. In this section, we examine the role of institutions and credit conditions in driving the heterogeneity in these patterns. To do this, we regress each of the estimated effects from the first step covariates on each of the institutional variables of interest. Details of the institutions we use may be found in Tables 3.1 and 3.2.

In keeping with the presentation of the first stage results, we present the results of this stage in graphical form where we group the charts into three columns. In all of the figures that follow, the first column of charts shows the impact of the institutional variables on the log odds of holding debt (the dependent variables correspond to the estimated coefficients shown in Figure 2 from the first step). The second column of charts reports the effect of institutions on the amount of debt held (the dependent variables are the estimated OLS coefficients from the first step). The third and final column of charts reports the effect of institutions on the interest rate on the household's primary mortgage. The charts show the point estimates from the regressions, and the 95 per cent confidence intervals associated with these estimates. At this stage we present only a selection of the results, focussing mainly on those coefficients from the first step that are particularly interesting from a theoretical or empirical perspective.

Duration of foreclosure

Factors that increase the incidence and cost of lender's asset recovery process in the event of non-payment have an important impact on household debt holdings. Duration of repossession and bankruptcy are similar institutions in that respect. Chatterjee et al (2007), Livshits et al (2007) and Hintermeier and Koeniger (2011), for example, simulate the general equilibrium behaviour of US consumers in a world with bankruptcy and in another in which no such option is available. Their results suggest that lenders react to the increase in uncertainty in repayment in a world where bankruptcy is allowed by charging group-specific interest rates to unsecured loans. Due to their limited ability to save, the youth should be a riskier subpopulation, so lenders price this risk in by charging higher interest rates to this group.

We focus on the time required to foreclose on secured debt and the typical cost of foreclosure. In terms of the expected impact of these institutions on our results, it is important to bear in mind that the existing literature (mentioned above) focuses on unsecured debt holding, rather than secured debt. Our implicit assumption to take these predictions to the data is that long times to repossess make secured debt look like unsecured debt.

The results are presented in Figure 10 where we show the output from regressions of the first step coefficients on the typical duration of foreclosure (measured in months). In countries where the repossession process takes longer, the reference group is less likely to hold secured debt relative to countries with shorter repossession times. The first chart in Figure 10, for example, shows that a one-month delay in the time to repossess leads to a 0.7 percentage point reduction in the chances of holding secured debt, and this result is statistically significant at the 95 per cent confidence level. In terms of the amount of debt held, an increase in the duration of foreclosure tends to lead to a modest reduction in debt amounts held by the reference group.

Conditional on borrowing, the results show that the youngest households borrow lower amounts than the reference group in countries where the repossession period is longer; in countries where the repossession period is longer by a month, the youngest age group borrows 0.8 percentage points less than the reference group. On the other hand, the amounts borrowed by other age groups, up to age 64, tend to be unaffected by the repossession time (relative to the reference group). The most pronnounced drop in the amount of debt held by the 16-34 age group – conditional on borrowing- is consistent with simulations in Livshits et al's (2007), who show that bankruptcy diminishes most the –unconditional- amount borrowed by households around 30 years of age.

Intuitively, one would expect that when repossession costs are higher, banks restrict their borrowing to "safe", high income households. There is some evidence of this effect in the results; a one month longer repossession period increases the relative chances of holding debt among high income households, albeit the result is not significant. At the same time, a one month longer repossession period is associated with a relatively lower interest rate among high income households (when the difference between high and low income households is measured by the coefficient of log income). A possible interpretation of this result is that in situations when the losses in the event of non-repayment are larger, banks react by charging relatively higher interest rates to riskier (low income) households. The latter effect is precisely estimated[21].

[21] There is some evidence in the existing literature that supports the interpretation of the variation in the effect of the time to repossess as reflecting a better willingness of banks to lend to households with higher income growth –or alleviating credit constraints. For example, Gerardi et al (2010) argue that lifting credit constraints permits high income growth households to access the credit market. The schooling profile of debt holding gives some

It is worth noting that the three patterns we have highlighted in the text are also noticeable in the scatterplots in Figure 10a, 10b and 10c. The chart in the first column displays the negative relation between the fraction of secured debt holders in the reference group and time to repossess. The chart in the second column of Figure 10b shows the negative relation between time to repossess and the amount of debt held by the youth while its negative link with interest rates for high income households is shown in the last chart of Figure 10c. For example, the long repossession periods in Italy, Greece and Portugal result in a steep income profile of interest rates charged to households, while the short repossession periods in the Netherlands, Austria, Germany or Spain result in comparatively modest interest rate-income profiles.

Taxation of mortgage payments

We employ two measures of institutions relating to mortgage related taxation exemptions; firstly we examine cases where a tax deduction on mortgage interest payments exists. We generate a dummy variable which equals one if such an exemption exists, and zero otherwise. Only two countries do not have such an exemption – Germany and Slovakia. Secondly, for those countries where an exemption exists, we generate a dummy variable which equals one if there is no limit on the amount of interest payments subject to deductibility, and zero if a limit exists. We then regress the first step coefficients on both dummy variables in a bivariate regression. The results for the indicator of "exemption exists" are presented in Figure 11.1. In Figure 11.2 we present the results for the indicator "no limit exists".

Gervais (2002) predicts that the introduction of a (partial) tax exemption on mortgage interest rate payments increases housing consumption and home ownership over the life cycle. Furthermore, compared to a situation where such incentives are not present, the increase in housing consumption happens through an anticipation of housing purchases over the life cycle.

The results shown in Figures 11.1 and 11.2 are broadly in line with the predictions of Gervais (2002), though in many cases, the estimates are not very precise. The results suggest that interest payment tax deductibility increases the chances that the reference household will hold secured debt by 17 percentage points, a large but imprecisely estimated coefficient (first chart, row 1, Figure 11.1). Turning to the amount of debt held by the reference group, the existence of interest payment deductibility increases the amount of debt held, but the effect is not too sizeable. Finally, the reference group pays a lower interest rate on secured debt in those countries where a tax exemption for mortgage repayments exists. If there is no limit on the amount of deductibility, this does not impact much the chances that the reference group will hold secured debt, but it increases slightly the amount of debt held.

insights about the issue, since the absence of credit constraints should reinforce the role of permanent income in explaining the distribution of borrowers. The results (not shown) support this interpretation: regardless of the measure of repossession costs (in terms of time or money), higher costs reduce the chances of holding debt by college educated households the most.

The charts in the second row of Figures 11.1 and 11.2 suggest an age profile in the probability of holding secured debt in countries with tax relief for mortgage interest payments. Older households are less likely to hold secured debt, relative to the reference group. Furthermore, some age profiles can also be detected in the response of the debt amount, where the youngest group of households tends to hold more debt than the reference households, while older households tend to hold less.

The fourth row of charts in Figures 11.1 and 11.2 focuses on the income coefficients from the first step. Interestingly, there is no evidence of an income profile in the results. This is contrary to Gervais' predictions as any tax incentive would reinforce the role of higher marginal taxes. A possible explanation of the similarity of income profiles on the chances of holding debt across countries with and without limits on tax deductions is that high income households pay relatively higher interest rates in countries without a limit on mortgage tax deductions. This finding could be due to indirect mechanisms – it's possible, for example, that rich households use the exemption to increase their leverage and banks may thus wish to limit the supply of loans to high income groups. Nevertheless, the differences in the estimated income profile of interest rates are imprecise.

To obtain additional sources of variability in the measure of tax treatment of secured borrowing, we examine an indicator generated by Johansson (forthcoming), who estimates the difference between the pre- and after-tax interest rate on mortgages; the results are available in a web appendix.[22] When we employ this measure as our taxation institution, we find a positive association between interest tax relief and the chances that the reference group holds debt. In addition, the tax relief measure correlates with higher amounts of secured debt holdings by the reference group. Finally, there is tentative evidence of a pass-through of the tax relief into higher interest rates paid by households. On the other hand, the basic prediction of an age profile is not fully confirmed by the new measure. Furthermore, when we employ this measure, we no longer observe the youngest households having a higher probability of holding secured debt in countries with a more generous mortgage tax relief. Nevertheless, we still find that among young households with secured debt, the amount of debt held is largest in countries with generous mortgage tax deductions[23].

Financial regulation

Next we examine the role of institutions relating to financial regulation, focussing specifically on regulatory loan-to-value (LTV) ratios. From a theoretical perspective, the models of Ortalo-Magné and Rady (OM-R) (1999, 2006) provide some predictions about the impact of LTV

[22] Johansson compiled data on the following variables in OECD countries: the average marginal income tax, the interest rate, the country specific tax treatment of mortgage payments, whether the tax relief is on housing, as well as information on whether tax exemptions exist. Making further assumptions about the relationship between house prices and mean income in the country, she is able to discount the stream of tax deductions into a continuous measure of each country's "tax relief" for mortgage payments.

[23] Nevertheless, the measure by Johansson includes country-specific interest rates, among other components. The inclusion of interest rates as explanatory variables is at odds with our current strategy of examining whether institutions affect debt amounts and prices separately

ratios on homeownership and secured debt holdings. In their model, a relaxation of the LTV ratio increases secured debt holding by individuals with a lower ability to save, the young, and especially those with lower income levels. Furthermore, the increased demand for first-time purchases by the credit-constrained young must be met by the property sales of older agents. Although OM-R do not discuss the issue, the house sales would presumably lead to debt repayments by the elderly. Hence, the relaxation of the LTV increases the fraction of borrowers among the youth and could diminish borrowing among the elderly, thereby generating an age profile of debt holding. Even though the OM-R model does not aim to model the distribution of the amount of secured debt held, in their setup, a relaxation of the LTV ratio would mechanically lead to higher debt amounts among the youth.

Conversely, the simulations by Chambers et al. (2009) argue that general equilibrium effects on the interest rate may dampen the impacts previously mentioned – these effects are ignored in the OM-R models, where the authors assume that interest rates are constant and exogenously determined.

We run a regression on two variables at this stage; the first variable is the existence of a regulatory LTV limit. Among the sample of countries, such a limit exists in all but four countries – Austria, Belgium, the Netherlands and Luxembourg. Second, for those countries that have a regulatory LTV limit, we examine if the level of that limit helps to explain the variation in the effects of the socio-economic and demographic variables from the first stage regressions. The respective results are shown in Figures 12.1 and 12.2.

The top row of charts in Figure 12.1 focuses on the reference group. The results suggest that the existence of a regulatory LTV limit reduces slightly the chances of holding debt, though this impact is not very precisely estimated (the first chart in row 1). On the other hand, the existence of a regulatory LTV reduces the amount of debt held by the reference group (middle chart in row 1). Specifically, the average debt held by the reference group in a country with a maximum LTV limit is 67 per cent lower than in a country with no maximum LTV limit.

Turning to the same group of charts in Figure 12.2, here we assess the impact of the level of the LTV limit for those countries in which it exists. The charts show that an increase in the regulatory LTV limit (which implies a decrease in the amount of down-payment required by the customer), has a negligible impact on the chances of holding secured debt or the amount of debt held by the reference group.

The charts in the second row of Figure 12.1 highlight the impact of LTV limits in explaining the variation in the step 1 age effects. In contrast to the theoretical predictions of OM-R, there is limited evidence that a maximum LTV limit affects the age profile of debt holding. However, there is some evidence of an impact on the age profile when considering the amount of debt. Specifically, the middle chart on row 2 shows that a limit on the LTV ratio reduces the amount of debt held among the youngest households in the sample.

Focussing on the same group of charts in Figure 12.2, we see that in those countries in which an LTV limit exists, an increase in this limit raises the chances of holding debt for the youngest age cohorts, while it has a negative impact for older age groups. This finding is in keeping with the basic prediction of the OM-R model.[24] In terms of the amount of debt held (middle chart), higher LTVs do not appear to have a noticeable impact among the younger age cohorts. On the other hand, they appear to be associated with an increase in debt amounts for the older age groups.

We also focus on the role of a regulatory LTV limit on the varying income coefficients from the first stage regressions. As already discussed, theory suggests that maximum LTV ratios, and changes to these, should have an important effect on the role of income in explaining debt holdings. We would expect, for example, that the introduction of a maximum LTV ratio, or reductions in the ratio if it already exists, would exert downward pressure on the chances of holding debt among low income groups if credit constraints are binding, while the effects should not be as pronounced for higher income groups, who should be able to better afford the larger down payment. However, the results (shown in the fourth row of Figures 12.1 and 12.2) do not fully support this. There is no evidence, for example, that the LTV limit impacts the chances of holding secured debt in a statistically significant way. Furthermore, the existence of a limit does not appear to have much impact on the quantity of debt held. On the other hand, we do find some effect from the level of the LTV limit in explaining the income profile of the debt amount from the first step. The results (fourth row, Figure 12.2) suggest that low income households expand their borrowing the most when the maximum LTV ratio increases. The OM-R model does not have a prediction regarding this effect.

Finally, there is not much evidence that either the existence of a regulatory maximum LTV limit, or increases in this limit, result in higher interest rates being charged to the reference group – in that sense, the channel stressed by Chambers et al (2009) does not seem to operate. Furthermore, among those countries with a maximum LTV ratio, a 10 per cent higher ratio is associated with a *drop*, not an increase, in the interest rate charged to the reference group of 24 basis points, a quantitatively large, but imprecisely estimated effect. In summary, there is little cross-country evidence that less strict regulatory LTV ratios result in higher cost mortgages[25].

[24] Further evidence that LTVs can cause credit constraints is available from the schooling profile of debt holding. In countries where there is no regulatory limit on LTV ratios, college educated households are more likely to borrow. This pattern is consistent with the prediction by Gerardi et al (2010) mentioned above; in countries with lower credit constraints, indicators of high income growth (a college degree, for example) are good predictors of the chances of borrowing. However, the pattern is not present when we examine the effects of increases in the maximum LTV ratio.

[25] The age profile of interest rates does not support the hypothesis that variation across countries in regulatory LTV ratios results in higher interest rates paid by indebted young households: in countries with a maximum LTV (all but AT, BE, LU and NL) indebted young households actually pay 32 basis points higher interest rates on their main mortgage than comparable young adults in other countries.

Fixed interest rates

Campbell and Cocco (2003) solve a dynamic life-cycle model of the optimal consumption and mortgage choice. In principle, borrowers with adjustable rate mortgages are exposed to income risks. These risks can be particularly large when interest rates are high and borrower income is relatively low. They show that borrowers who are risk averse or who have uncertain income may find fixed rate mortgages to be a more attractive mortgage choice.

In the context of the current study, the main empirically testable condition of the Campbell and Cocco model is that in countries where fixed rate mortgages are more prevalent, the households most exposed to income risk would have a higher chance of borrowing. To test this, the independent variable in our model is a dummy variable indicating if the proportion of mortgages on fixed interest rates for a period of longer than ten years is over 50 per cent.[26] For the dependent variable, we use the self-employment status of the reference person, taking this as a proxy for income risk. As a tentative check, we also examine the age, education level and income of the reference person, on the basis that low education or age could imply a higher exposure to unemployment risk. The results are presented in Figure 13.

The first row of charts shows that the propensity to hold secured debt within the reference group is not much affected by the prevalence of fixed-interest rate mortgages. If anything, the reference group holds a higher amount of (log) debt in countries where the share of FRMs is above 50 per cent: conditional on borrowing, the amount of debt held by the reference group is 16 percentage points larger.

The third chart in the first row of Figure 13 shows that when comparing countries where FRMs account for over 50 per cent of the mortgage stock and those countries where FRMs account for a lower proportion the interest rate for the reference group is 72 basis points higher in the first set, with a standard error of about 30 basis points. Campbell and Cocco (2003) argue that, unconditionally, FRMs involve a higher interest rate than ARMs because of the term premia and because, in the United States, credit suppliers may price the borrower's option to repay in full if interest rates fall[27]. All these effects would lead to a greater prevalence of FRMs being associated to higher interest rates.

Next we examine the results for the age profiles. Aside from possibly being credit constrained, young households are arguably more exposed to income risk than older households, and so we would expect to see younger households with a higher probability of holding secured debt in countries with more FRMs. However, this is not the case. Rather, we observe younger households who are less likely to hold secured debt in countries where FRMs are more prevalent, and older households (the 45-54 and the 55-64 groups) who are relatively more likely to borrow in these countries. Campbell and Cocco argue that variable rate mortgages are less attractive

[26] We also used the actual share of mortgages with maturity over 30 years (as of 2007) as an independent variable and obtained similar results.

[27] In our case, most surveys were conducted in 2010, when 1-year or sixth-months interest rates were very low.

for households who hold a large mortgage (for example the youth, as they cannot afford a large down payment). From that perspective, the age profile appears to be somewhat surprising. On the other hand, it could be that supply side effects are at play whereby banks in FRM countries charge higher interest rates to the youth, thereby discouraging demand for secured debt among that group. Indeed, the results in the third column support this hypothesis; we see that the youngest households pay higher rates in countries where FRMs are more prevalent. The results show that in countries where the prevalence of FRMs exceeds 50% the interest rate paid by the group of households between 16 and 34 years of age is 48 basis points higher.[28]

The third row of charts shows the impact of the prevalence of FRMs on the education profile. Interestingly, low education households are less likely to hold secured debt in countries with a greater proportion of FRMs, and this result is statistically significant. Similar to the case of the age profile, this finding is again inconsistent with Campbell and Cocco's basic proposition that increased unemployment risk (in this instance, among low-education households) can increase the chances of holding fixed rate debt contracts[29].

The charts in the final row focus on the self-employed profile. A greater prevalence of FRMs is associated with a 27.6 percentage point greater likelihood of holding secured debt relative to the reference group, a result that is in line with the predictions of Campbell and Cocco (2003). Furthermore, in these countries, the self-employed hold somewhat higher debt levels relative to countries with less prevalence of FRMs. On the other hand, however, the cross-country variation in FRM proportions does not seem to impact the interest rates charged to the self-employed. The higher demand for secured debt among the self-employed is not directly translated into higher interest rates.

Finally, the discussion about the relevance of FRMs raises a cautionary note. On the one hand, there is substantial variation in the share of FRMs across countries, and as we have shown, this variation will mechanically change interest rates. However, such a change may be correlated with that of other institutions. It is also worth noting that changes in the prevalence of FRMs do not substantially alter the income or self-employment profiles of interest rates. At any rate, the discussion highlights the need to control for several institutions at a time, which we discuss later.

Conditions that reduce initial debt repayments

The basic permanent income model predicts that conditions that reduce initial mortgage repayments allow credit constrained households to expand their housing consumption by borrowing relatively more (see Attanasio et al, 2008 for an application to the demand for loans to purchase

[28]This is computed as follows: (.739-.281). The other features of the age profile of interest rates and secured debt holding are harder to interpret. A higher prevalence of FRMs results in the 45-64 year group paying higher interest rates on their secured debt but they also have a relatively higher take-up of secured debt loans.

[29]Of course, it could be the case that the education profile is not fully capturing income risk. As such, the result could be verified with reference to other variables such as whether or not the household member has a fixed-term contract.

cars). Conversely, households with perfect access to credit markets should not respond to such an incentive since, for them the timing of payments is less important. In their study of homeownership in the US, Chambers et al (2009) calibrate an OLG model and find evidence in support of this hypothesis. They find that the introduction of mortgage products that reduce the initial repayments, like interest only mortgages, increase home ownership among young and low income groups, as credit constraints are most relevant for those groups.

Motivated by Chambers et al (2009), we consider an indicator measuring whether the proportion of mortgages with interest only payments for the first three years of the mortgage exceeds 10 per cent (in 2007). The results, which are presented in Figure 14, show that the chances of holding secured debt increase for the reference group as the proportion of loans on interest only arrangements rises. The impacts are imprecise but are roughly of the same magnitude as the effects of LTVs or time to foreclosure shown earlier.[30] We find little or no evidence of an age profile in the results although, by definition institutions that reduce initial repayments lead to higher debt levels later in life, thereby making it difficult to detect true age profiles in the results.[31]

The final row of chart 14 focuses on the impact on the income coefficients from the first step regressions. The results show that interest only repayments decrease the income effect when considering the amount of debt held –although the estimate is not very precise. This suggests a relatively larger response of debt holdings among low income households relative to higher income households. Such a finding is consistent with the notion that low income households are credit constrained and profit the most from lower initial mortgage payments.

Information on borrowers

Edelberg (2006) argues that better information allows banks to discriminate among borrowers and, possibly, to price in, at higher interest rates, consumers that may otherwise have their credit applications rejected.[32] Without information on borrowers, banks may use "one size fits all" mortgages, whereby they reject the petitions of riskier profiles. With improved information,

[30] With the exception of the Netherlands, the variation across countries in the share of interest only mortgages does not exceed 15 per cent. Multiplying 15 per cent by the impact of the share of interest-only mortgages on the probability of holding debt (.009) results in 13.5 percentage points. That magnitude is lower than the 17 percentage point impact of the existence of a mortgage deduction, and similar to the 14 percentage point impact of 20 months shorter time to foreclose. Nevertheless the effects of "time to foreclose" are generally more precise. Furthermore, a 10 percentage point increase in the share of interest only mortgages increases the debt amount held by 34 percentage points, while the existence of an LTV limit diminishes debt holding by 50 percentage points, and the absence of a limit to mortgage tax deduction increases debt by 73 percentage points.

[31] In a web appendix, we experiment with alternative institutions, like the spread of long mortgage maturities or of mortgages that permit borrowers to extend the maturity. The results are similar: the availability of products that permit either "suspending payments" or "extending maturities" does not increase the chances that the reference group holds secure debt. In addition, higher shares of "mortgages that allow for maturity extensions" result in a lower share of high-income or high-education households in the pool of borrowers. Part of the explanation could come from the fact that the spread of those products is associated with higher interest rates for that reference group. For example, in countries where more than 30 per cent of mortgages allow for maturity extension, interest rates are 53 basis points higher for the reference group.

[32] See Magri and Pico (2010) for an application of Edelberg's methods to Italy.

banks develop better scoring mechanisms, so that riskier profiles can now be observed borrowing, paying above-average interest rates.

In this case, to the extent that age, self-employment and income are correlated with the risk of loan arrears, one might expect an age or income profile when considering the impact of borrower information on the chances of holding debt. It is less clear how borrower information might impact the amount of debt held once a borrower's credit application has been accepted. On the one hand amounts borrowed by riskier profiles may increase because of improved information on borrowers. On the other hand, however, the higher interest rate which these risky borrowers face could discourage borrowing, reducing the amount borrowed.

To account for borrower information, we employ a six-point "depth of credit information index" from the World Bank. The results are shown in Figure 15 and 16 for secured and unsecured debt, respectively. The first chart in row 1 shows the impact of information on the chances that the reference group will hold secured debt. A one-point increase in the information scale (an improvement in knowledge) reduces the probability of having secured debt by 7 per cent for this group, while the corresponding reduction for unsecured debt is 3.5 percentage points. However, the middle chart shows that once borrowers hold a debt product (whether secured or unsecured), the amount borrowed increases with improved knowledge.

The third column shows the impact of borrower information on the various profiles for interest rates. The results support the hypothesis that improved borrower-level information is associated with a better pricing of the loans for young households if, for example, such households would have their credit application rejected in the absence of information. The chart suggests that a 1 point increase in the depth of information raises interest rates charged to young households by 4 basis points and lowers those charged to 45-54 year olds and 55-64 year olds by 17 and 31 basis points, respectively –all estimates relative to the impact on the reference group. The age profiles of secured debt holding and the amount of debt held are shown in the second row of Figure 15. Interestingly, the knowledge variable has a statistically significant effect on the age profile; as the age of the reference person increases, better information about borrowers has a less negative effect on the chances of holding debt and, it has a stronger positive effect on the amounts of secured debt held. We do not find that depth of information affects the age profile of the probability or amount of unsecured borrowing (Figure 16). Unfortunately, the information about interest rates for unsecured debt is not very reliable due to large fraction of missing values in some countries, so we cannot investigate further.

We show the self-employed profile on the fourth row of Figure 15. The results are in keeping with those for the age profile; specifically, we see that "riskier" borrowers pay higher interest rates in countries where the level of borrower information is better. The interest rate charged on mortgages for households where the reference person is self-employed is 20 basis points higher in countries with (one point) better information.

Finally, the income profile is shown in the third row of Figure 15. Contrary to the expectation that improvements in borrower information might lessen the importance of current income in accessing credit, the results show a negligible impact of information on the chances of holding secured debt. Furthermore, the results suggest that more information on borrowers does not alter the mortgage interest rates charged to high income households – those borrowers who, in principle, are less likely to have problems repaying their debt. Finally, deeper information increases the relative amount of unsecured debt held by low income households. Overall, the evidence with income profiles is less supportive of the predictions tested by Edelberg than the results of the age or self-employment profiles.

Financial literacy

Finally, we examine the role of cross-country differences in financial literacy in explaining the impacts of the covariates from the first step. Lusardi and Tufano (2009) show that financially illiterate households are more likely to engage in costly transactions and to underestimate the impact of interest rates on debt amounts. At face value, such behavior should result in a negative correlation between financial literacy and unsecured debt holdings. On the other hand, using Swiss household data, Brown and Graf (2013) documents that higher financial literacy is correlated with higher chances of having a mortgage.

We use a measure of financial literacy from the World Competitiveness Yearbook as reported in Figure 1 of Jappelli (2010). A one-point increase in financial literacy (in a scale from 1 to 10) increases the probability of holding either secured or unsecured debt within the reference group only by about 1 to 2 percentage points, a small and imprecisely estimated effect (see Figures 17 and 18). Conditional on holding each type of debt, an increase of 1 point of financial literacy results in an 18 per cent increase in the amount of secured debt held and a 23 per cent increase in the amount of unsecured debt. Albeit not very precise, these results suggest that, if anything, the amount of debt held by the reference group is higher in countries with higher financial literacy.

Interestingly, a higher level of financial literacy strongly reinforces the role of schooling in the probability of holding secured debt, a finding we discuss below. Higher financial literacy increases the relative chances of households aged 45-54, relative to 35-44 year-old households, having either secured or unsecured debt holdings. Nevertheless, the youngest set of households seems to increase their chances of holding unsecured debt in more financially literate countries, but these results are not precise. One interpretation of this set of results is that higher levels of financial literacy result in greater chances of borrowing among relatively less vulnerable households, defined as those with a college degree or as those whose income is closest to the peak of the income profile.[33]

Overall, we place less confidence in our results of financial literacy than in the rest of the institutional measures. Firstly, the measure varies at the country level, but there is substantial

[33] When we use a measure of literacy based on PISA match scores the result on the steeper schooling profile is unchanged, but the age profile is no longer significant.

heterogeneity in financial literacy across the population. Secondly, financial literacy is likely to be affected by past experiences in the debt market, so it is hard to assess the direction of causality.

5.2 The effects of institutions: controlling for the share of fixed rate mortgages.

The previous analysis examined the impact of one institution at a time on the various debt outcomes. A summary table of these results may be found in Table 8. This "univariate" analysis is a necessary first step mainly because of the limited number of countries analyzed, but also because the theoretical papers that acted as an informal guide also isolate the contribution of each institution separately. It would nevertheless be desirable to hold at least some specific institutions constant when analyzing the impact of others.

An institution that varies markedly across Euro area countries is the prevalence of FRMs that, as we reported, alters the interest rate charged to the reference household. Such difference in the cost of debt may confound the impact of other institutions on the fraction of households that borrow. Furthermore, to understand which institutions are most successful at explaining the variation in the derivative effects documented, we need to assess the relative explanatory power of one institution against another reasonable alternative. We start our robustness exercise by adding the share of FRM as an additional regressor in each second step regression in the present Subsection -the results are summarized in Appendix Table A.4. and conduct a fully multivariate analysis in Section 5.3.

The quantitative impacts of longer repossession periods on age and income profiles do not noticeably change when the share of FRM is included as an additional control in the second step. Longer repossession periods diminish the fraction of borrowers within the reference group, result in lower debt amounts held by younger households and increase the income gradient of mortgage interest rates. Regarding tax treatment of mortgages, once we compare countries with similar prevalence of FRMs we still find that the absence of a limit to mortgage payment exemptions increases the amount of debt held by the reference group –the rest of the impacts were imprecise to start with.

Similarly, conditional on including the share of FRMs in the second step, in countries with deeper information on borrowers, less riskier households –those between 45 and 54 age or employees- pay relatively lower mortgage interest rates than young households or than the self-employed –arguably households with riskier income profiles. In addition, households between 45 and 54 years of age are more likely to borrow and owe higher debt amounts. Those results are broadly similar to those obtained in the univariate second step.

On the contrary, once we compare countries with a similar prevalence of FRMs, we no longer detect a statistically significant impact of the existence of a regulatory LTV on the amount of debt held by the reference group or of higher regulatory Loan to Values on the increased propensity to borrow among the youngest set of households.[34]

In sum, the results in Table A.8 suggest that once we control for the prevalence of FRMs the "univariate" impacts on the age and income profiles of debt outcomes of longer repossession periods and on information about borrowers remain basically unchanged. Moreover, the result that the absence of a limit to mortgage payment exemption increases the amount borrowed by the reference group still holds.

5.3 Which institutions matter the most?

We conduct a robustness analysis including "time to repossess", "taxation", "loan to value ratios", an indicator for "fixed rate mortgages exceeding 50 per cent of originations" and "depth of information". The first two institutions are chosen because cross-country variation in these measures correlates with the fraction of households in the reference group that borrow, with the age or income profiles of borrowers and with the amount of secured debt held. The effects of "loan to value" are less robust across specifications, but variation in this institution correlates with the amount of debt held. Finally, both "depth of information" and "Fixed Rate Mortgages" correlate with the variation in interest rates, and are thus representing potentially confounding factors. On the other hand our preferred specification omits "low initial repayments" and "financial literacy". The prevalence of interest–only mortgages correlates only weakly with the patterns we study. Financial literacy is omitted because we do not trust the measure much, and because the results were not particularly strong at explaining the variation in debt outcomes across groups of the population. Additionally, our preferred specification uses an indicator of the share of FRMs exceeding 50 per cent, rather than the actual share. The reason is that the comparable information we have reflects the situation in 2007. An indicator of prevalence above 50 per cent is more likely to be stable over time.[35]

Tables 9.1 to 9.3 show multivariate results allowing for various institutions. Variation in time of repossession correlates strongly with many of the patterns of interest. A one month longer repossession period diminishes the chances that the reference group has secured debt by 1 per cent. Longer repossession periods have a relatively weaker negative impact on the borrowing chances of households above 45 years of age.[36] Finally, in terms of the amount borrowed (conditional on borrowing), while a one month increase in repossession periods does not affect the amount borrowed by households in the reference group, this does reduce the amount granted to the youngest households by 0.008 log points (0.005-0.013). The existing literature has argued that longer repossession periods lead banks to ration credit by setting higher down-

[34] The rest of institutions examined, including "prevalence of interest-only mortgages" or "financial literacy" did not correlate strongly with the age, income or age profiles in the univariate analysis and they still fail to do so when we control for the share of FRMs.

[35] The main results discussed below are not sensitive to modelling the share of FRMs as a dummy or as a share. The exception is the impact of the share of FRMs on the higher interest rate charged on the house of main residence; this result is less precise when we use the actual share.

[36] The age profile by which older groups are less affected by repossession does not hold in the univariate specification, so it must be taken with care.

payment requirements. We discuss this issue below, but note now that our results suggest that longer repossession periods affect the pricing of loans. In countries with longer repossession periods, banks charge relatively higher interest rates to low-income households, who, in principle, are most likely to default.

Mortgage tax exemptions do not robustly predict changes in the participation rate in the secured credit market. Nevertheless, conditional on borrowing, the average debt amount held by the reference group is 1.38 log points larger in countries without a limit on mortgage tax exemptions. The effect of tax deductions should, in principle, operate through demand-side effects.[37] Weak evidence for such a channel is provided by the positive correlation between interest rates charged to the reference group and tax deductibility of mortgage payments, consistent with an increase in demand and an upward-sloping supply curve.[38]

The role of other regulations is less clear-cut. We mention above that a literature has discussed that variation in LTVs introduces quantity rationing in the credit market and shapes the distribution of secured borrowing. Once all institutions are taken into account, if anything, the absence of regulatory LTVs diminishes the chances of borrowing and the amount borrowed by the reference group. The existence of a maximum LTV correlates with statistically significant higher interest rates for the reference group, but that higher cost of debt does not seem to strongly inhibit the demand for secured credit.

Similarly, and consistent with the existence of simple supply-side effects, the prevalence of FRMs correlates with higher interest rates charged to the reference group - the effect is 200 basis points, perhaps too large to be credible. Nevertheless, the fraction or the amount borrowed is not affected. Possibly, as Campbell and Cocco suggest, there may be a trade-off between relatively higher costs of FRMs and the stable stream of payment - especially for households with risky income profiles.

5.4 Economic magnitude of the responses

Guided by the discussion of our multivariate results, we next assess the economic impact of "time to repossess". Taxation of mortgages also seemed important to understand the distribution of debt amounts, but delivered imprecise results along a number of important margins – such as the fraction of borrowers or the distribution of interest rates. In addition, there are important components of housing taxation that we cannot measure properly – imputed rents or the value-added tax, for example.

In what follows, we gauge the economic magnitude of the response of various debt outcomes to a one standard deviation increase in the number of months needed to repossess. That magnitude is 15 months and is equivalent in distance between the 5 months needed in the Netherlands

[37] Nevertheless, some analysts claim that the supply of secured credit in NL is organized around the generous tax exemptions to mortgage lending –see Rabobank, 2012.

[38] Both the increased income of borrowers and the increase in interest rates are present when we replace the tax dummies with Johansson's tax relief measure.

and the 20 months needed in France. Fifteen months longer repossession periods decrease the probability of holding secured debt by between 10 and 16 percentage points – depending on whether we focus on the univariate or the multivariate estimate. The overall standard deviation of the predicted probability of holding secured debt by the reference group is also 16 percentage points, suggesting that the variation in "time to repossess" accounts for most of the variation in the chances of borrowing secured within that reference group.

Regarding the amount of secured debt held, the impacts of time to repossess vary substantially across cohort/ age groups. Conditional on obtaining a secured loan, a 15 months longer repossession period decreases the amount of debt held by the youngest set of households by 12 per cent.[39] Conversely, a one standard deviation increase in the time to repossess reduces the amount of secured debt borrowed by the 45-54 or 55-64 age groups by 6 per cent. As mentioned above, the simulations of the OLG models in Livshits et al (2007) or Hintermeier and Koeniger (2011) deliver relatively similar results: the introduction of bankruptcy reduces most the amount borrowed by households in their 30s and to a lesser extent among older households.

Finally, we estimate the impact on interest rates paid by households of a one standard deviation increase in the repossession period, evaluated at the 10th centile of the income distribution, as computed in the combined sample of countries used in the second step. To that end, we replace the (country-specific) first-stage income coefficient in the regression with interest rates in the left hand side by its projection on a constant and on the number of months to repossess – i.e., the fitted value in the second stage. A 15 months longer repossession period increases the interest rates paid by 0.30 percentage points.[40] A similar 0.28 percentage point estimate is obtained when we evaluate income at the 90th centile of the income distribution.

5.5 A comparison to some previous empirical literature on the impact of "time to repossess"

Using a cross-country and a cross-Italian province panel dataset, Djankov et al (2007) and Jappelli et al (2005) respectively assess the impact of various measures of legal enforcement, for which "time to repossess" is a proxy, on private sector debt-to-GDP ratios. Djankov et al control, at the same time, for depth of information about borrowers. In both cases the authors document that aggregate debt-to-GDP ratios diminish with measures of the number of days needed to enforce a contract; a one year increase in the time to enforce a contract increases debt-to-GDP ratios by more than 7 percentage points. Our results suggest that, even though "depth of information" correlates with certain features of the distribution of household debt when

[39] This estimate is obtained by multiplying the impact of one month of repossession on the amount borrowed by the 16-34 year age group by 15. In turn, the latter impact is obtained by adding the -0.013 coefficient for 16-34 year age group to the 0.005 estimate for the reference group – see Table 9.2, first row, first and second columns.

[40] This estimate is obtained by multiplying the -0.019 coefficient in the last column first row of Table 9.3 by 15 months (the standard deviation in the time to repossess) times the difference between the 10th centile of the log-income distribution (9.27) and the median (10.28). We note that log income in the first stage is the difference between log income of the household and the log median income in the country.

introduced alone in the second stage specification, variation in "time to repossess" is a much more robust determinant of household debt outcomes across groups of the population in the Euro zone.

A study that is methodologically related to ours is Chiuri and Jappelli (2003). The authors derive country-specific age profiles for home ownership, and then relate these profiles to cross-country variation in the time to repossess. They document that in countries with longer repossession processes, the rate of home ownership of households below 45 years of age is relatively lower. Our results about whether time to repossess affects the age profile of holding debt are mixed. In the univariate version, we find that longer repossessions result in a drop in access to mortgages for all age groups. A possible explanation for the discrepancy regarding the fraction of borrowers is that we control for a number of covariates at the household level on top of age – income, labor market status, education and so on. We also note that the interpretation of the results differs across studies: while Chiuri and Jappelli stress the role of quantity restrictions (the down-payment), our results suggest that banks price in the risk of non-repayment by charging relatively higher mortgage interest rates to low income households.

On a related note, Fabbri and Padula (2003) document that in Italian provinces with a higher backlog of judicial cases, higher wealth households borrow relatively larger amounts. Gropp et al (1997) compare US states with different bankruptcy exemption levels and document that greater exemptions imply that households in the bottom quartiles of the wealth distribution borrow relatively lower amounts of debt – conditional on borrowing. While we chose not to study wealth because of simultaneity biases, it is worth noting that we find little evidence that, for example, longer repossession periods result in a stronger income profile of the amount of secured debt held. As mentioned in the introduction, a source of discrepancies between our study and those mentioned above is that we allow for a differential effect for each single covariate in each country, as theory predicts that differences in bankruptcy institutions affect the distribution of debt along many dimensions.

Finally, our results on the variation in interest rates complement previous evidence. Gropp et al (1997) find that an increase in 45.000 dollars bankruptcy exemption across US states increases interest rates on car loans by 2.5 percentage points for low-wealth households. On the other hand, however, using a pool of countries, Jappelli et al (2005) document a close-to-zero correlation between average mortgage interest rate spreads and judicial costs. Regarding the latter study, our results stress that longer times to repossess increase the income profile of interest rates, but that does not necessarily result in a different aggregate rate. Compared to Gropp et al (1997), our estimates suggest that 15 months longer repossession periods increase the interest rate paid by households in the bottom income decile by 0.30 percentage points. Of course, the longer duration of mortgages relative to car loans makes the pricing of potential non-repayment different.

6 Conclusions

This paper has studied the distribution of household debt outcomes across euro area countries and examined the role of institutions in explaining the heterogeneity in the impact of household socio-economic and demographic characteristics on these debt outcomes. In particular, we analyze the role of legal enforcement of contracts, of tax treatment of mortgage payments, loan-to-value ratios and of information about borrowers in shaping the distribution of the fraction of borrowers, the amount borrowed and, in the case of secured debt, the mortgage interest rate paid. To that end, we use a novel household dataset - the Household Finance and Consumption Survey, a coordinated effort of 15 countries to collect ex-ante harmonized data on household wealth, debt and income.

In terms of explaining secured debt holdings within countries, our results show that the age, income and education level of household members are important demographic considerations. In this context, we find evidence of a hump-shaped profile of secured debt holding over age-cohort groups; the chances of borrowing peak for cohorts aged 35-44 years, before the (cross-sectional) income profile peaks, possibly suggesting a role for secured debt in smoothing household consumption.

We find that while these socio-economic and demographic factors are important correlates of household debt outcomes, there is considerable heterogeneity in the relative importance of these factors across the countries in our sample.

While our results show a number of country-level institutions to be correlated with these effects, in a multivariate setting we find that the length of repossession periods best explains the features of the distribution of debt that we analyze. In countries with one standard deviation longer repossession procedures, we find that the proportion of households with debt is 16 percentage points smaller, the amount borrowed by the youngest set of households (conditional on borrowing) is 12 per cent lower, and the interest rates paid by low income households are 0.3 percentage points higher. These results are robust to the inclusion of other institutions.

One interpretation of our results is that the supply of secured credit is affected by legal processes that delay the recovery of collateral in the case of non-repayment. In this case, banks react to expected losses due to longer repossession periods not necessarily by rationing quantities or rejecting applications but also by pricing secured debt differently across income groups and charging relatively higher interest rates to low income households.

Finally, we have documented substantial heterogeneity in the distribution of household debt across countries. Such diversity has implications for a wide array of outcomes that includes macroeconomic policy - the consequences of an interest rate increase depend on the fraction and the characteristics of indebted households - as well as financial stability issues – arrears depend on the income, age and household structure of indebted households. Those outcomes merit further research.

Appendix A.1.: On the calculation of standard errors in second-stage regressions of group effects

In the second stage we regress an estimated intercept or slope $\widehat{\beta}_c$ on country-level institutional indicators z_c (including a constant term) to get

$$\widehat{\gamma} = \left(Z'Z\right)^{-1} Z'\widehat{\beta}$$

where $Z'Z = \sum_{c=1}^{C} z_c z_c'$ and $Z'\widehat{\beta} = \sum_{c=1}^{C} z_c \widehat{\beta}_c$.

The quantity $\widehat{\beta}_c$ has been estimated using a sample of household survey data of size N_c from country c. There are C countries in total. The number of countries is small in comparison with the number of households sampled per country. Here we focus on households and countries, but the same analysis would apply to micro data on other units with a group structure.

The variance of the second stage estimates is given by the "sandwich" formula

$$Var\left(\widehat{\gamma}\right) = \left(Z'Z\right)^{-1} \left(\sum_{c=1}^{C} Var\left(\widehat{\beta}_c\right) Z_c' Z_c\right) \left(Z'Z\right)^{-1},$$

the precise form of which depends on how $Var\left(\widehat{\beta}_c\right)$ is calculated.

In general,

$$\widehat{\beta}_c = \beta_c + \widehat{e}_c$$

where β_c is the intercept or slope in the population of households of country c and $\widehat{e}_c$ is the corresponding first-stage estimation error. Moreover,

$$\beta_c = z_c'\gamma + v_c$$

where γ is the regression coefficient of β_c on z_c in the population of countries and v_c is the error term.

Thus,

$$Var\left(\widehat{\beta}_c\right) = Var\left(v_c\right) + Var\left(\widehat{e}_c\right).$$

$Var\left(\widehat{e}_c\right) = \omega_c^2$, say, is the first-stage sampling variance of $\widehat{\beta}_c$ and it is therefore of order $1/N_c$. It differs across countries and is estimated as part of first-stage estimation output. $Var\left(v_c\right) = s^2$ is treated as a constant for simplicity (no heteroskedasticity in the regression of β_c on z_c). An estimate of s^2 is the residual variance of the second stage regression $\widehat{\sigma}^2$ minus the average of estimated ω_c^2's: $\overline{\omega_c^2} = \sum_{c=1}^{C} \widehat{\omega}_c^2 / C$. Putting together these ingredientes we get

$$\widehat{Var}\left(\widehat{\gamma}\right) = \widehat{\sigma}^2 \left(Z'Z\right)^{-1} + \left(Z'Z\right)^{-1} \left(\sum_{c=1}^{C} \widehat{\omega}_c^2 Z_c' Z_c\right) \left(Z'Z\right)^{-1} - \overline{\omega_c^2} \left(Z'Z\right)^{-1} \equiv \widehat{V}_A + \widehat{V}_B - \widehat{V}_C.$$

V_A is the formula on which conventional calculation of second-stage standard errors is based, ignoring the heteroskedasticity induced by the fact that the $\widehat{\beta}_c$'s are estimated. V_B is a valid formula if β_c only depends on observable institutions (under the assumption that $\beta_c = z_c'\gamma$). Finally, V_C is a correction to avoid over-adjusting for sample error in the $\widehat{\beta}_c$'s.

Note that if ω_c^2 are constant across countries $V_B = V_C$, so that $Var(\widehat{\gamma}) = V_A$. Since in fact we are using least squares weighted by country sample size we would expect heteroskedasticity to play a minor role.

When the number of institutions is close or equal to the number of countries, there are no degrees of freedom to allow for unobservables in the relationship between β_c and z_c. In those circumstances the only standard errors available are the ones based exclusively on the standard errors of the $\widehat{\beta}_c$'s under the assumption that $\beta_c = z_c'\gamma$, based on the formula

$$\widehat{V}_B = \left(Z'Z\right)^{-1}\left(\sum_{c=1}^{C}\widehat{\omega}_c^2 Z_c' Z_c\right)\left(Z'Z\right)^{-1}.$$

Sample-average estimands and population-average estimands So far we have been concerned with estimands that are defined as quantities such as γ, which are measured in a population of countries. Specifically,

$$\gamma = \left[E\left(z_c z_c'\right)\right]^{-1} E\left(z_c \beta_c\right)$$

where the expectations are taken with respect to a population of countries (of which our country data are regarded as a representative sample). For example, if $z_c = 1$ then γ is just the population mean of β_c:

$$\gamma = E\left(\beta_c\right).$$

An alternative estimand is a sample-average version of the previous population measure:

$$\gamma_C = \left(\frac{1}{C}\sum_{c=1}^{C} z_c z_c'\right)^{-1} \frac{1}{C}\sum_{c=1}^{C} z_c \beta_c.$$

If β_c were observable one could calculate γ_C without estimation error, but since β_c is only estimated, $\widehat{\gamma}$ is also subject to sample error as an estimate of γ_C, although $\widehat{\gamma}$ will typically be a much more accurate estimate of γ_C than is of γ.

In this light, $\widehat{V}_B$ is the basis for the calculation of standard errors of $\widehat{\gamma}$ as estimates of γ_C whereas $\widehat{V}_A$ or $\widehat{V}_A + \widehat{V}_B - \widehat{V}_C$ are the basis for calculating standard errors of $\widehat{\gamma}$ as estimates of γ.

Using weighted least squares For the weighted least squares estimator we have

$$\widetilde{\gamma} = M_{zz}^{-1} \sum_{c=1}^{C} N_c z_c \widehat{\beta}_c$$

where $M_{zz} = \sum_{c=1}^{C} N_c z_c z_c'$.

$$Var\left(\widetilde{\gamma}\right) = M_{zz}^{-1} \left(\sum_{c=1}^{C} Var\left(\widehat{\beta}_c\right) N_c^2 z_c z_c' \right) M_{zz}^{-1}.$$

Assuming now that $Var\left(v_c\right) = s^2/N_c$ (no heteroskedasticity in the regression of $\sqrt{N_c}\beta_c$ on $\sqrt{N_c}z_c$) and letting $\omega_c^2 = \phi_c^2/N_c$ (or $SE\left(\widehat{\beta}_c\right) = \phi_c/\sqrt{N_c}$), we get

$$\widehat{Var}\left(\widetilde{\gamma}\right) = \widetilde{\sigma}_{\xi}^2 M_{zz}^{-1} + M_{zz}^{-1} \left(\sum_{c=1}^{C} \widehat{\phi}_c^2 N_c z_c z_c' \right) M_{zz}^{-1} - \overline{\phi_c^2} M_{zz}^{-1} \equiv \widehat{V}_A + \widehat{V}_B - \widehat{V}_C.$$

where

$$\widetilde{\sigma}_{\xi}^2 = \frac{1}{C-k} \sum_{c=1}^{C} N_c \left(\widehat{\beta}_c - z_c'\gamma\right)^2.$$

Note that if ϕ_c^2 is constant for all c then $\widehat{Var}\left(\widetilde{\gamma}\right) = \widetilde{\sigma}_{\xi}^2 M_{zz}^{-1}$.

To conclude, we are considering two very different ways of calculating second-stage standard errors:

1. $\widetilde{\gamma}$ as an estimate of a population-average estimand. Here there are two possibilities:

   (a) If $\beta_c = z_c'\gamma + v_c$ and ϕ_c^2 constant across countries:

   $$\widehat{V}_A = \widetilde{\sigma}_{\xi}^2 M_{zz}^{-1}.$$

   (b) If $\beta_c = z_c'\gamma + v_c$ and ϕ_c^2 non-constant:

   $$\widehat{V}_A + \widehat{V}_B - \widehat{V}_C.$$

2. $\widetilde{\gamma}$ as an estimate of a sample-average estimand:

   $$\widehat{V}_B = M_{zz}^{-1} \left(\sum_{c=1}^{C} \widehat{\phi}_c^2 N_c z_c z_c' \right) M_{zz}^{-1}.$$

$\widehat{V}_B$ can be calculated as $M_{zz}^{-1}\left(W'W\right)M_{zz}^{-1}$ where W is a matrix with rows $w_c' = SE\left(\widehat{\beta}_c\right) N_c z_c'$. For example, if $z_c' = (1, foreclos_c, \ell tv_c)$, we have $w_c' = \left(SE\left(\widehat{\beta}_c\right) N_c, SE\left(\widehat{\beta}_c\right) N_c \times foreclos_c, SE\left(\widehat{\beta}_c\right) N_c \times \ell tv_c\right)$.

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Table 1.1: SUMMARY STATISTICS (% of households, unless otherwise stated)[1]

		COUNTRIES										
VARIABLES		AT	BE[2]	DE	ES	FR	GR	IT	LU	NL[2]	PT	SK
SAMPLE SIZE		2380	2327	3565	6197	15006	2971	7951	950	1301	4404	2057
DEBT MEASURES												
Holding Debt (%)	*Secured*	18.4	30.5	21.5	32.5	24.4	17.5	10.8	38.8	44.7	26.7	9.6
		(1.0)	(1.1)	(0.7)	(1.1)	(0.5)	(1.1)	(0.5)	(1.6)	(0.9)	(1.1)	(0.6)
	Unsecured	21.4	24.0	34.6	30.7	31.6	26.1	17.8	36.9	37.3	18.3	19.9
		(1.2)	(1.2)	(1.3)	(1.1)	(0.6)	(1.6)	(0.6)	(1.8)	(1.9)	(0.9)	(1.1)
Debt Balance (Median)	*Secured*	37.5	69.3	80.0	60.0	55.9	41.0	60.0	127.3	131.0	48.8	25.0
(EUR thousands)		(11.4)	(5.3)	(5.2)	(2.3)	(2.4)	(4.2)	(5.0)	(10.9)	(4.4)	(2.6)	(1.9)
	Unsecured	3.0	5.1	3.2	7.2	5.7	4.3	5.7	10.0	13.7	3.3	1.0
		(0.4)	(0.6)	(0.3)	(0.6)	(0.3)	(0.5)	(0.4)	(1.0)	(2.4)	(0.4)	(0.2)
Interest Rate (Median)	*of the HMR mortgage*	2.6	4.1	4.6	5.0	4.4	5.0	4.0	2.4	4.8	2.0	5.0
		(1.64)	(0.03)	(0.08)	(0.02)	(0.06)	(0.10)	(0.08)	(0.07)	(0.08)	(0.03)	(0.15)
	Adjusted[2]	2.6	4.1	4.6	4.0	4.1	4.0	4.0	2.4	4.6	2.0	5.0
		(1.64)	(0.03)	(0.08)	(0.02)	(0.06)	(0.10)	(0.08)	(0.07)	(0.08)	(0.03)	(0.15)

1. Standard Error in parentheses which were calculated with the Rao-Wu rescaled bootstrap method using replicate weights provided by the countries (1,000 replicates).
2. The reported interest rate was adjusted for the change of the Euribor between the fieldwork period and the first quarter of 2010 multiplied by the country-specific share of adjustable mortgages.

Table 1.2: SUMMARY STATISTICS (% of households, unless otherwise stated)[1]

		COUNTRIES										
VARIABLES		AT	BE[2]	DE	ES	FR	GR	IT	LU	NL[2]	PT	SK
SOCIO-DEMOGRAPHIC CHARACTERISTICS												
Age (%)	*16-34*	17.7	16.0	17.9	12.0	18.1	18.0	8.0	16.9	12.7	8.8	20.9
	35-44	17.4	19.0	16.7	22.6	18.9	20.9	19.1	21.9	20.8	20.1	19.1
	45-54	20.2	20.0	20.8	21.0	16.8	16.8	20.7	22.6	22.6	19.3	22.5
	55-64	19.2	17.1	15.1	16.0	19.3	17.2	18.1	16.3	20.6	20.0	17.0
	Over 64	25.5	27.9	29.5	28.3	26.9	27.1	34.0	22.3	23.3	31.8	20.4
	Age difference (Median)	0	0	0	1	0	2	1	1	0	2	1
Education (%)	*No education or primary*	13.4	20.6	10.6	49.3	31.3	39.6	47.9	30.4	24.4	73.5	5.5
	Secondary	70.3	35.6	54.4	19.9	40.8	36.0	37.9	40.2	39.2	13.9	74.0
	Tertiary	16.2	43.8	35.0	30.8	27.9	24.4	14.2	29.4	36.4	12.6	20.5
	Educational difference	15.7	25.5	21.6	25.1	25.0	21.8	24.5	24.0	22.8	20.9	11.0
Labour Status (%)	*Employee*	47.0	46.7	51.5	44.9	47.5	39.2	42.8	59.0	39.3	44.5	56.6
	Self-employed	9.4	5.2	7.2	10.7	7.3	18.9	12.8	5.6	6.7	10.2	10.7
	Retired	36.4	33.5	30.1	23.8	34.3	32.6	32.2	26.6	25.2	35.7	25.3
	Inactive or Unemployed	7.3	14.6	11.1	20.7	11.0	9.3	12.2	8.8	28.8	9.6	7.3
	Other Core Member Working	27.6	28.3	27.5	31.2	28.7	23.1	22.7	29.6	24	32.4	37.7
Couple (%)		51.6	56.3	52.4	66.7	55.1	63.7	63.5	58.9	51.3	69.8	58.6
Number of Adults (Median)		2	2	2	2	2	2	2	2	2	2	2
Total Income (Median) (EUR thousands)		32.3 (1.2)	33.7 (0.7)	32.5 (0.7)	24.8 (0.5)	29.2 (0.3)	22.0 (0.4)	26.3 (0.3)	64.8 (1.8)	40.6 (1.5)	14.6 (0.3)	11.2 (0.2)

1. Standard Error in parentheses which were calculated with the Rao-Wu rescaled bootstrap method using replicate weights provided by the countries (1,000 replicates).
2. Some observations in Belgium and Netherlands had no information on labour status and were dropped from our estimations (22 in Belgium and 140 in Netherlands).

Table 2: OVERVIEW OF INDEPENDENT VARIABLES

Variable	**Definition**
Age_16_34	Dummy variable indicating that the eldest of the core household members is aged between 16 to 34 years.
Age_35_44	Omitted category.
Age_45_54	Dummy variable indicating that the eldest of the core household members is aged between 45 and 54 years.
Age_55_64	Dummy variable indicating that the eldest of the core household members is aged between 55 and 64 years.
Age_Over_64	Dummy variable indicating that eldest of the core household members is older than 64 years.
Age_Differ	Continuous variable indicating the difference (in years) between the eldest core household member and the youngest core household member.
Low_Educ	Dummy variable indicating if the most highly educated core household member has a low level of education.
Med_Educ	Omitted category.
High_Educ	Dummy variable indicating if the most highly educated core household member has a high level of education.
Educ_Differ	Dummy variable indicating if the other core member in the couple has a lower education level than the member captured by the previous dummy variables, where a couple exists.
Self_Employed	Dummy variable indicating if the highest income earner among core member is self-employed.
Employee	Omitted category.
Retired	Dummy variable indicating if the highest income earner among core members is retired.
Inactive_Unemp	Dummy variable indicating if the highest income earner among core members is inactive or unemployed.
Other_Core_Working	Dummy variable indicating if the other core member is employed.
Couple	Dummy variable indicating that the household has a couple of core household members.
LnAdults	Log of the number of adults in the household
LnIncome	Log of total household gross income. This includes income from employment, pensions, social welfare, investments / savings, private transfers and other sources.

Table 3.1: INSTITUTIONS AND CREDIT CONDITIONS: DEFINITIONS AND SOURCES

Variable	Definition	Source
A. Legal enforcement		
A.1. Foreclosure procedures		
Duration of foreclosure	The period typically required for the completion of foreclosure proceeding, taking into account the time needed for the completion of court proceedings, the sale of the asset and the distribution of the proceeds to the creditors; measured in number of months.	ESCB[1]
Cost of foreclosure	The typical cost of a foreclosure procedure, i.e. the total cost of the enforcement procedure borne by the buyers (e.g. legal, registration, administration or auctioneers' fees), as a percentage of the loan value.	ESCB[1]
B. Regulation: Fiscal and macro-prudential framework		
B.1. Taxation of mortgage financing		
Deductibility of payments	Main features of the deductibility of mortgage payments (interest and/or principal) from personal income tax, measured as the (non) existence of such deductibility.	ESCB[1]
Limit on deductibility	Limitations to the deductibility above, in terms of time and or amount (fixed amount, percentage or ceiling), measured as the (non) existence of such a limit.	ESCB[1]
Tax relief	The tax favouring of owner-occupied housing with respect to debt financing, looking at whether the interest payments on mortgages are deductible from taxable income and if there are limits on the allowed period of deduction or on the deductible amount, and looking at whether tax credits on mortgage loans are available. The indicator estimates the difference between the market interest rate and the after-tax debt financing cost of housing, in percentage points.	OECD[2]
B.2. Regulatory loan-to-value ratio		
Existence of LTV limit	Formal restrictions, threshold loan-to-value ratios above which banks are required to provision more capital under Basle II, or limits applying for loans to be eligible as collateral for covered bonds or mortgage bonds, measured as the (non) existence of such limits.	ESCB[1]
LTV limit	The value of the limit above, measured as a percentage of the value of the property.	ESCB[1]
C. Credit conditions		
C.1. Prevalence of fixed interest rates		
Fixed-rate mortgages	The prevalence of housing loans with a longer-term fixation of interest rates. Because of the variability over time of the share of variable-rate loans (rate fixation up to one year) and loans with relatively short periods of fixed rates, this variable is measured as the share of loans with very long periods of fixed rates (over ten years), as a percentage of all housing loans. As such, fixed-rate countries are Belgium, Germany, France and The Netherlands.	ESCB[1]
C.2. Conditions that reduce initial payments		
Interest-only payments	Interest-only system, defined as a periodical payment of interest with full capital reimbursement at the end of the contract, measured as the share of such loans in the total being below or above 10%.	ESCB[1]
Long maturities	Longer-maturity products with an initial maturity of more than 30 years, measured as the percentage share of these loans in the total.	ESCB[1]
C.3. Financial development and literacy		
Credit information	The depth of credit information on borrowers, i.e. the rules and practices affecting the coverage, scope and accessibility of credit information available through either a public credit registry or a private credit bureau, measured on a scale from 0 to 6.	WB[3]
Financial literacy	Senior business leaders' evaluation of the statement: "Economic literacy among the population is generally high", measured on a scale from 0 to 10.	IMD[4]
Mathematical literacy	Students' performance on the mathematical scale of the Programme for International Student Assessment (PISA).	OECD[2]

Sources: ESCB, IMD, OECD, World Bank.

[1] The information comes from the Structural Issues Report: Task Force of the Monetary Policy Committee of the European System of Central Banks, "Housing Finance in the Euro Area", ECB Occasional Paper N° 101, March 2009; and from the replies from National Central Banks and commercial banks to ad hoc questionnaires that alimented this report. Data refer to originations in 2007.

[2] The tax data are taken from Figure 3 in: Andrews, Dan and Aida Caldera Sánchez, "The Evolution of Homeownership Rates in Selected OECD Countries: Demographic and Public Policy Influences", OECD Journal: Economic Studies, Vol. 2011/4, pp 207-243; and are based on the OECD Housing Market Questionnaire presented in Johansson, Asa, "Housing Policies in OECD and Candidate for Accession Countries: Survey-Based Data and Implications", OECD Economics Department Working Papers, OECD, Paris, forthcoming. Data refer to 2009. Students' performance in mathematics is taken from the 2009 PISA.

[3] Data from Chapter 5.5 on financial access, stability and efficiency of: World Bank, "World Development Indicators 2012". The indicator is based on information from banking supervision authorities and surveys on the public credit registry's or private credit bureau's structure, laws and associated rules, administered to the entity itself. It refers to 2011.

[4] Data from the World Competitiveness Yearbook (WCY) of the International Institute for Management Development (IMD), averages for the period 1998-2005, as reportd in Figure 1 of Jappelli (2010).

Table 3.2: INSTITUTIONS AND CREDIT CONDITIONS: DATA USED

INSTITUTIONAL VARIABLES / COUNTRY	AT	BE	DE	ES	FR	GR	IT	LU	NL	PT	SK
A. Legal enforcement											
A.1. Foreclosure procedures											
Typical duration of a foreclosure procedure (in months)	9	18	9	8	20	24	56	12	5	24	...
Typical cost of foreclosure (% of loan)	8	19	8	10	10	16	...	9	4	8	...
B. Regulation: Fiscal and macro-prudential framework											
B.1. Taxation of mortgage financing											
Existence of tax exemption	1	1	0	1	1	1	1	1	1	1	0
Absence of a limit to deductibility	1	0	0	0	0	0	0	0	1	0	0
B.2. Regulatory loan-to-value ratio											
Existence of LTV limit	0	0	1	1	1	1	1	0	0	1	1
LTV limit	0	0	60	80	60	75	80	0	0	75	70
C. Credit conditions											
C.1. Prevalence of fixed interest rates											
Dummy indicating if % of mortgages on FR for a period longer than 10 years > 50%	0	1	1	0	1	0	0	0	1	0	0
C.2. Conditions that reduce initial payments											
Dummy indicating if % of mortgages with i-only-payments for the first 3 years > 10%	1	0	0	0	0	0	0	0	1	1	0
Dummy indicating if % of mortage with maturity of more than 30 years > 25%	0	0	1	1	0	1	0	0	1	1	...
C.3. Financial development and literacy											
Depth of credit information index (0-6)	6	4	6	5	4	5	5		5	4	4
Score on the mathematics scale (PISA)	496	515	513	483	497	466	483	489	526	487	497

Sources: ESCB, IMD, OECD, World Bank.

Table 4: HAS SECURED DEBT
Logit Regressions
Odds-Ratios

Each column shows the country-specific odds-ratio estimates and standard errors (in parentheses) of a Logit model with the probability of holding secured debt as a dependent variable and the covariates in the rows as independent variables. The sample includes all households in the country HFCS. All estimates are weighted by population weights and averaged across the five implicates.

COUNTRY / CONTROL VARIABLES	AT	BE	DE	ES	FR	GR	IT	LU	NL	PT	SK
Age_16_34	0.467	0.680	0.412	0.770	0.413	0.623	0.873	0.694	0.736	0.532	1.401
	(0.105)	(0.154)	(0.108)	(0.140)	(0.042)	(0.118)	(0.203)	(0.182)	(0.252)	(0.106)	(0.284)
Age_45_54	0.633	0.635	1.438	0.483	0.804	0.959	0.835	0.548	1.516	0.662	0.519
	(0.119)	(0.137)	(0.268)	(0.072)	(0.068)	(0.170)	(0.137)	(0.133)	(0.389)	(0.101)	(0.120)
Age_55_64	0.588	0.238	1.155	0.256	0.555	0.855	0.508	0.623	0.910	0.390	0.257
	(0.134)	(0.059)	(0.237)	(0.046)	(0.057)	(0.191)	(0.100)	(0.197)	(0.238)	(0.066)	(0.094)
Age_Over_64	0.757	0.072	0.833	0.113	0.218	0.296	0.187	0.196	1.139	0.149	...
	(0.258)	(0.034)	(0.276)	(0.027)	(0.035)	(0.102)	(0.057)	(0.099)	(0.424)	(0.038)	...
Age_Differ	1.004	1.011	1.005	0.991	0.986	0.982	1.054	1.079	0.987	0.998	0.999
	(0.018)	(0.025)	(0.020)	(0.020)	(0.010)	(0.019)	(0.018)	(0.033)	(0.028)	(0.016)	(0.032)
Low_Educ	0.899	1.092	0.888	0.826	0.533	0.745	0.797	0.853	0.855	0.740	0.788
	(0.240)	(0.307)	(0.283)	(0.130)	(0.051)	(0.123)	(0.129)	(0.203)	(0.175)	(0.114)	(0.849)
High_Educ	1.382	1.489	1.322	1.112	1.204	0.944	1.029	0.999	1.733	0.950	1.318
	(0.282)	(0.241)	(0.202)	(0.166)	(0.089)	(0.145)	(0.156)	(0.224)	(0.337)	(0.166)	(0.252)
Educ_Differ	0.883	0.889	0.911	1.156	0.944	0.939	1.259	1.270	1.152	1.538	1.424
	(0.168)	(0.166)	(0.148)	(0.161)	(0.070)	(0.144)	(0.180)	(0.300)	(0.238)	(0.200)	(0.350)
Self_Employed	1.163	1.067	1.325	0.876	1.300	0.804	1.018	0.800	0.782	0.732	1.712
	(0.259)	(0.353)	(0.334)	(0.148)	(0.125)	(0.128)	(0.167)	(0.243)	(0.359)	(0.124)	(0.387)
Retired	0.447	0.617	0.537	0.630	0.717	1.134	0.772	0.332	0.645	0.568	0.242
	(0.127)	(0.239)	(0.151)	(0.140)	(0.092)	(0.290)	(0.199)	(0.136)	(0.206)	(0.118)	(0.260)
Inactive_Unemp	0.810	0.365	0.418	0.704	0.362	1.009	0.719	0.315	0.665	0.558	0.816
	(0.260)	(0.099)	(0.116)	(0.116)	(0.051)	(0.282)	(0.204)	(0.142)	(0.186)	(0.111)	(0.396)
Other_Core_Working	1.802	1.989	1.291	0.940	1.763	1.206	1.607	1.524	1.548	1.457	1.340
	(0.356)	(0.416)	(0.231)	(0.128)	(0.139)	(0.182)	(0.242)	(0.372)	(0.349)	(0.202)	(0.357)
Couple	0.957	0.783	0.601	0.343	0.577	0.443	1.103	1.857	0.490	0.908	0.265
	(0.241)	(0.222)	(0.160)	(0.066)	(0.072)	(0.092)	(0.239)	(0.637)	(0.183)	(0.169)	(0.094)
LnAdults	1.989	0.835	1.216	0.513	0.609	1.500	0.842	1.258	1.365	0.859	0.394
	(0.501)	(0.202)	(0.293)	(0.096)	(0.073)	(0.286)	(0.169)	(0.366)	(0.486)	(0.149)	(0.119)
LnIncome	1.441	1.577	2.327	1.956	1.889	1.277	1.947	2.015	1.255	1.684	0.870
	(0.324)	(0.149)	(0.323)	(0.201)	(0.121)	(0.151)	(0.238)	(0.356)	(0.194)	(0.172)	(0.168)
Cons	0.326	0.881	0.299	1.847	0.646	0.422	0.133	0.870	1.014	0.898	0.218
	(0.073)	(0.229)	(0.070)	(0.339)	(0.066)	(0.074)	(0.026)	(0.260)	(0.293)	(0.179)	(0.063)
Pseudo-R^2	0.139	0.289	0.211	0.229	0.208	0.091	0.149	0.203	0.114	0.211	0.119

Table 5: DEBT BALANCE OF SECURED DEBT
OLS estimates

Each column shows the country-specific estimates and standard errors (in parentheses) of an OLS model where the logarithm of the amount of secured debt is the dependent variable and the covariates in the rows are the independent variables. The sample includes only the households who report holding secured debt. All estimates are weighted by population weights and averaged across the five implicates.

COUNTRY / CONTROL VARIABLES	AT	BE	DE	ES	FR	GR	IT	LU	NL	PT	SK
Age_16_34	0.209	0.566	0.157	0.673	0.362	0.177	0.026	0.358	0.201	0.398	0.104
	(0.239)	(0.092)	(0.251)	(0.112)	(0.072)	(0.135)	(0.314)	(0.126)	(0.114)	(0.090)	(0.165)
Age_45_54	-0.533	-0.654	-0.232	-0.006	-0.599	-0.076	-0.405	-0.656	-0.403	-0.535	-0.323
	(0.237)	(0.118)	(0.159)	(0.113)	(0.069)	(0.167)	(0.177)	(0.159)	(0.107)	(0.093)	(0.279)
Age_55_64	-0.967	-0.964	-0.464	-0.241	-0.926	-0.172	-0.642	-1.040	-0.470	-1.028	-1.209
	(0.312)	(0.162)	(0.186)	(0.126)	(0.100)	(0.221)	(0.190)	(0.210)	(0.110)	(0.130)	(0.345)
Age_Over_64	-0.833	-1.429	-0.599	-0.005	-1.328	-0.680	-0.867	-0.586	-0.468	-1.226	...
	(0.423)	(0.365)	(0.274)	(0.250)	(0.175)	(0.363)	(0.266)	(0.457)	(0.168)	(0.290)	...
Age_Differ	0.030	0.040	0.023	0.018	0.050	0.013	0.037	0.022	-0.007	0.018	0.039
	(0.024)	(0.015)	(0.013)	(0.014)	(0.007)	(0.018)	(0.017)	(0.017)	(0.016)	(0.015)	(0.035)
Low_Educ	-0.227	0.090	-0.367	0.027	-0.093	-0.492	0.054	0.059	-0.166	-0.062	0.333
	(0.453)	(0.190)	(0.503)	(0.117)	(0.099)	(0.156)	(0.156)	(0.158)	(0.101)	(0.094)	(0.784)
High_Educ	0.125	0.165	0.238	0.023	0.146	-0.140	0.401	0.075	0.258	0.196	0.238
	(0.314)	(0.099)	(0.131)	(0.111)	(0.059)	(0.128)	(0.167)	(0.136)	(0.095)	(0.094)	(0.190)
Educ_Differ	-0.248	-0.194	-0.107	-0.101	-0.073	-0.011	-0.115	0.026	-0.220	-0.021	-0.277
	(0.249)	(0.107)	(0.142)	(0.095)	(0.058)	(0.129)	(0.168)	(0.144)	(0.091)	(0.082)	(0.281)
Self_Employed	0.046	0.308	0.189	0.193	0.244	0.076	0.024	0.534	0.316	0.493	-0.097
	(0.259)	(0.140)	(0.154)	(0.115)	(0.077)	(0.130)	(0.210)	(0.228)	(0.336)	(0.096)	(0.242)
Retired	-0.426	0.538	0.061	-0.099	-0.278	-0.649	-0.111	-0.178	-0.236	-0.210	0.175
	(0.330)	(0.294)	(0.223)	(0.235)	(0.131)	(0.263)	(0.246)	(0.287)	(0.140)	(0.239)	(0.372)
Inactive_Unemp	-0.221	-0.018	0.172	0.139	-0.245	-0.081	-0.196	-0.685	-0.166	-0.049	0.226
	(0.382)	(0.231)	(0.286)	(0.112)	(0.153)	(0.197)	(0.337)	(0.309)	(0.123)	(0.164)	(0.376)
Other_Core_Working	-0.121	0.208	0.191	0.219	-0.136	0.075	0.098	0.276	0.100	-0.100	0.217
	(0.221)	(0.136)	(0.174)	(0.098)	(0.068)	(0.146)	(0.152)	(0.179)	(0.093)	(0.094)	(0.269)
Couple	0.666	-0.203	-0.293	-0.352	-0.044	0.106	-0.251	-0.175	0.030	-0.127	-0.007
	(0.279)	(0.196)	(0.238)	(0.141)	(0.123)	(0.172)	(0.231)	(0.219)	(0.176)	(0.146)	(0.340)
LnAdults	-0.306	-0.063	-0.244	0.085	-0.076	-0.321	0.002	-0.252	0.137	0.076	-0.230
	(0.272)	(0.167)	(0.177)	(0.134)	(0.113)	(0.194)	(0.219)	(0.178)	(0.184)	(0.131)	(0.278)
LnIncome	0.374	0.174	0.398	0.391	0.474	-0.027	0.161	0.351	0.067	0.260	0.127
	(0.194)	(0.083)	(0.092)	(0.080)	(0.060)	(0.089)	(0.133)	(0.094)	(0.070)	(0.070)	(0.252)
Cons	10.840	10.720	10.770	10.390	10.670	10.750	10.690	11.540	11.890	10.740	9.693
	(0.481)	(0.156)	(0.222)	(0.152)	(0.089)	(0.169)	(0.175)	(0.198)	(0.144)	(0.128)	(0.347)
R-Squared	0.188	0.265	0.152	0.112	0.240	0.234	0.111	0.316	0.255	0.266	0.128

Table 6: CURRENT INTEREST RATE OF HMR MORTGAGE
OLS estimates

Each column shows the country-specific estimates and standard errors (in parentheses) of an OLS model where the interest rate is the dependent variable and the covariates in the rows are the independent variables. The sample includes only the households who report holding secured debt. All estimates are weighted by population weights and averaged across the five implicates.

COUNTRY / **CONTROL VARIABLES**	AT	BE	DE	ES	FR	GR	IT	LU	NL	PT
Age_16_34	0.413	-0.153	-0.168	-0.103	-0.204	0.105	0.006	-0.221	-0.456	0.243
	(0.462)	(0.198)	(0.193)	(0.196)	(0.092)	(0.316)	(0.463)	(0.167)	(0.198)	(0.288)
Age_45_54	-0.187	0.411	-0.160	-0.148	0.243	0.668	0.175	0.205	-0.030	-0.150
	(0.612)	(0.214)	(0.113)	(0.168)	(0.106)	(0.344)	(0.328)	(0.158)	(0.154)	(0.258)
Age_55_64	-0.427	0.541	-0.020	0.069	0.474	0.598	0.578	0.382	-0.078	0.401
	(0.766)	(0.232)	(0.171)	(0.268)	(0.153)	(0.463)	(0.558)	(0.224)	(0.162)	(0.331)
Age_Over_64	0.086	0.489	0.211	0.056	0.855	0.248	-0.015	0.866	-0.219	-0.073
	(0.780)	(0.770)	(0.393)	(0.346)	(0.441)	(0.760)	(0.757)	(0.642)	(0.216)	(0.614)
Age_Differ	-0.007	-0.007	-0.006	0.009	-0.005	-0.075	-0.049	-0.030	0.018	-0.059
	(0.055)	(0.026)	(0.011)	(0.022)	(0.012)	(0.045)	(0.040)	(0.019)	(0.017)	(0.032)
Low_Educ	0.041	-0.008	-0.101	-0.061	-0.194	-0.142	0.300	-0.083	0.083	0.268
	(0.887)	(0.335)	(0.291)	(0.195)	(0.196)	(0.344)	(0.378)	(0.201)	(0.142)	(0.208)
High_Educ	0.146	0.135	0.040	-0.005	-0.284	-0.219	0.331	0.170	0.135	0.209
	(0.600)	(0.192)	(0.128)	(0.166)	(0.080)	(0.271)	(0.291)	(0.154)	(0.121)	(0.211)
Educ_Differ	0.235	-0.273	0.058	-0.175	0.075	0.251	0.156	-0.139	-0.033	-0.334
	(0.400)	(0.183)	(0.114)	(0.159)	(0.087)	(0.248)	(0.324)	(0.177)	(0.122)	(0.184)
Self_Employed	0.113	0.059	0.336	0.131	-0.031	0.570	0.513	-0.152	0.219	-0.296
	(0.571)	(0.253)	(0.152)	(0.226)	(0.096)	(0.273)	(0.373)	(0.131)	(0.339)	(0.216)
Retired	-0.112	0.387	-0.233	0.470	-0.491	-0.159	-0.151	0.106	-0.091	-0.208
	(0.617)	(0.702)	(0.352)	(0.344)	(0.289)	(0.598)	(0.608)	(0.476)	(0.210)	(0.517)
Inactive_Unemp	0.112	-0.450	0.053	0.157	0.131	-0.613	-0.119	-0.503	-0.209	-0.212
	(0.816)	(0.477)	(0.408)	(0.200)	(0.288)	(0.583)	(0.605)	(0.257)	(0.193)	(0.409)
Other_Core_Working	-0.216	-0.058	0.112	-0.025	-0.130	0.180	-0.024	0.391	-0.071	-0.517
	(0.381)	(0.251)	(0.151)	(0.159)	(0.114)	(0.272)	(0.321)	(0.184)	(0.142)	(0.275)
Couple	0.270	-0.156	0.055	0.023	0.170	0.228	0.744	0.060	-0.093	-0.033
	(0.529)	(0.436)	(0.202)	(0.249)	(0.190)	(0.406)	(0.499)	(0.251)	(0.215)	(0.428)
LnAdults	-0.134	0.066	0.197	0.346	0.156	0.050	0.683	0.249	-0.080	1.291
	(0.543)	(0.331)	(0.173)	(0.280)	(0.204)	(0.459)	(0.490)	(0.210)	(0.182)	(0.479)
LnIncome	-0.098	-0.074	-0.148	-0.170	-0.133	-0.279	-1.085	-0.285	0.014	-0.333
	(0.344)	(0.161)	(0.105)	(0.135)	(0.066)	(0.335)	(0.294)	(0.114)	(0.130)	(0.156)
Cons	3.318	4.053	4.641	4.208	4.370	4.002	4.423	2.452	4.622	3.033
	(1.997)	(0.312)	(0.150)	(0.244)	(0.132)	(0.312)	(0.379)	(0.202)	(0.200)	(0.351)
R-Squared	0.047	0.060	0.043	0.029	0.049	0.068	0.124	0.110	0.034	0.092

Table 7: HAS SECURED DEBT: EXPLORING LIFECYCLE MODEL WITH HUMAN CAPITAL
Logit Regressions (Odds-Ratios)

Each column shows the country-specific odds-ratios and standard errors (in parentheses) of the interactions between age group and an indicator that the core household member with the highest schooling has a college degree. The dependent variable takes value 1 if the household has secured debt, and zero otherwise. The model is estimated using a Logit. The covariates in Table 4 are included, but not shown.

	Countries										
Variables[2]	AT	BE	DE	ES	FR	GR	IT	LU	NL	PT	SK
High_Educ*Age16_34	1.21	1.76	2.04	1.19	1.41	0.66	1.12	0.87	2.82	0.85	1.05
	(0.57)	(0.60)	(0.94)	(0.37)	(0.24)	(0.22)	(0.54)	(0.37)	(1.93)	(0.32)	(0.28)
High_Educ*Age35_44	0.95	2.04	1.29	1.07	1.17	0.77	1.05	1.27	2.03	1.08	2
	(0.30)	(0.65)	(0.37)	(0.25)	(0.14)	(0.20)	(0.28)	(0.46)	(0.77)	(0.32)	(0.63)
High_Educ*Age_over_44	1.79	1.17	1.26	1.11	1.14	1.24	1	0.92	1.45	0.93	1.16
	(0.49)	(0.25)	(0.23)	(0.20)	(0.11)	(0.26)	(0.18)	(0.28)	(0.30)	(0.19)	(0.40)

Table 8: SUMMARY OF THE EFFECTS OF INSTITUTIONS (One Institution at a time; secured debt)

Each cell shows the OLS estimate and the standard error (in parentheses) of an OLS regression where the dependent variable is the country-specific constant (first row) or selected first step coefficients described in the row. The independent variable is the institution described in the column. For a given institution, each outcome (use, level or cost) denotes a different regression. In the cases of "Taxation of Mortgage Payments" and "Regulatory LTVs", the institution is measured using two variables, and the coefficients of the bivariate regression are shown in adjacent columns. The sample contains 11 countries. This table is a summary of Figures 10 to 18.

	DURATION OF FORECLOSURE (number of months)			TAXATION OF MORTGAGE PAYMENTS						REGULATORY LTV					
	Use	Level	Cost	Use		Level		Cost		Use		Level		Cost	
				Existence	Limit	Existence	Limit	Existence	Limit	Existence	Limit	Existence	Limit	Existence	Limit
REFERENCE GROUP	-0.0073	-0.0014	-0.0037	0.1740	-0.0509	0.2920	0.5420	-0.6490	0.1140	-0.1220	0.0000	-0.6700	-0.0050	-0.0098	-0.0238
	(0.0025)[2]	(0.0058)	(0.0194)	(0.1770)	(0.2050)	(0.2830)	(0.3700)	(0.6490)	(0.6150)	(0.2160)	(0.0068)	(0.3720)	(0.0117)	(0.6110)	(0.0257)
AGE															
Age_16_34	0.0061	-0.0084	0.0055	-0.1630	-0.0497	0.2080	-0.1390	0.0822	-0.0265	0.1240	0.0191	-0.1210	-0.0007	0.3250	0.0103
	(0.0034)	(0.0033)	(0.0065)	(0.2750)	(0.3150)	(0.2210)	(0.2500)	(0.1720)	(0.2290)	(0.2400)	(0.0075)	(0.2700)	(0.0084)	(0.1420)	(0.0091)
Age_45_54	0.0000	-0.0022	0.0100	-0.3610	0.2040	-0.1610	-0.0606	0.3110	-0.2430	-0.1910	-0.0118	0.3420	0.0144	-0.1950	-0.0072
	(0.0057)	(0.0048)	(0.0073)	(0.2330)	(0.3060)	(0.2490)	(0.2820)	(0.2780)	(0.2400)	(0.3240)	(0.0100)	(0.2330)	(0.0071)	(0.2680)	(0.0115)
EDUCATION															
High_Educ	-0.0054	0.0060	0.0012	-0.2010	0.3860	-0.0763	0.0102	-0.0888	0.1890	-0.4270	-0.0098	0.0202	0.0019	-0.0585	0.0134
	(0.0034)	(0.0022)	(0.0065)	(0.1440)	(0.1740)	(0.1580)	(0.1800)	(0.2400)	(0.2060)	(0.1510)	(0.0046)	(0.1860)	(0.0057)	(0.1630)	(0.0067)
INCOME	0.0014	-0.0046	-0.0168	0.0352	-0.4530	0.0190	-0.0518	-0.0897	0.2080	0.1950	-0.0060	0.0221	-0.0117	-0.2820	-0.0115
	(0.0057)	(0.0030)	(0.0037)	(0.3490)	(0.3960)	(0.1790)	(0.2090)	(0.2560)	(0.2210)	(0.4060)	(0.0124)	(0.1560)	(0.0050)	(0.2120)	(0.0087)
SELF-EMPLOYED	-0.0012	-0.0040	0.0019	-0.4140	-0.0242	0.1340	-0.0764	-0.2850	0.1260	-0.0251	-0.0205	-0.2170	-0.0047	0.0801	0.0044
	(0.0048)	(0.0027)	(0.0074)	(0.2410)	(0.2810)	(0.1630)	(0.1910)	(0.2620)	(0.2260)	(0.2340)	(0.0073)	(0.1810)	(0.0060)	(0.2610)	(0.0107)

	FIXED INTEREST RATE			CONDITIONS THAT REDUCE INITIAL DEBT REPAYMENTS (i-only-payments)			INFORMATION ON BORROWERS			FINANCIAL LITERACY		
	Use	Level	Cost	Use	Level	Cost	Use	Level	Cost	Holding	Level	Cost
REFERENCE GROUP	0.0345	0.1600	0.7390	0.0575	0.3350	-0.5380	-0.0695	0.0926	0.1270	0.0082	0.1730	0.1270
	(0.1080)	(0.2130)	(0.3270)	(0.1450)	(0.2730)	(0.4570)	(0.0794)	(0.1530)	(0.2380)	(0.0682)	(0.1250)	(0.2200)
AGE												
Age_16_34	-0.3050	0.0546	-0.2810	-0.0967	-0.0007	0.1710	0.0316	-0.0916	0.0406	-0.0582	0.0046	-0.1000
	(0.1240)	(0.1320)	(0.1080)	(0.2130)	(0.1790)	(0.1630)	(0.1230)	(0.0973)	(0.1060)	(0.0992)	(0.0839)	(0.0704)
Age_45_54	0.2430	-0.2220	0.1250	-0.0071	-0.1200	-0.2570	0.1480	0.1790	-0.1700	0.1270	-0.0250	0.0067
	(0.1520)	(0.1250)	(0.1690)	(0.2320)	(0.1910)	(0.1860)	(0.1210)	(0.0901)	(0.1100)	(0.0999)	(0.0909)	(0.0939)
EDUCATION												
High_Educ	0.2050	-0.0035	-0.1740	0.0394	0.0165	0.2350	0.0236	0.0134	0.0998	0.1840	-0.0332	0.0361
	(0.0935)	(0.0907)	(0.1250)	(0.1550)	(0.1220)	(0.1430)	(0.0877)	(0.0692)	(0.0927)	(0.0392)	(0.0560)	(0.0738)
INCOME	0.1820	0.1740	0.2040	-0.2960	-0.0586	0.0591	0.1030	-0.0465	-0.0041	-0.0604	0.0151	0.1170
	(0.2030)	(0.0867)	(0.1320)	(0.2670)	(0.1390)	(0.1760)	(0.1580)	(0.0785)	(0.1090)	(0.1320)	(0.0654)	(0.0691)
SELF-EMPLOYED	0.2760	0.0901	-0.0073	-0.2760	0.1620	-0.1510	-0.0670	-0.0934	0.2010	0.0841	-0.0050	0.0718
	(0.1380)	(0.0949)	(0.1590)	(0.2020)	(0.1220)	(0.1800)	(0.1230)	(0.0646)	(0.0833)	(0.1000)	(0.0626)	(0.0815)

Table 9.1: Multivariate analysis: HAS SECURED DEBT

Each column shows the OLS estimates and the t-statistics (in parentheses) of an OLS regression where the dependent variable is the probability of holding secured debt by the reference group (RG column) or the odds ratio of a specific coefficient of the first step (rest of columns) and the covariates are the institutions in the rows. A constant is included in all regressions, but not reported. The sample contains 11 countries.

	RG	AGE				EDUCATION		SELFEMP	INCOME
CONTROL VARIABLES		16_34	45_54	55-64	Over_64	Low	High		
Duration of Foreclosure	-0.011	0.002	0.006	0.004	0.001	-0.001	-0.002	0.004	0.001
	-(13.000)	(0.505)	(2.239)	(2.026)	(0.827)	-(0.178)	-(0.382)	(0.921)	(0.249)
Existence of Tax Exemption	0.061	0.182	-0.860	-0.486	-0.665	-0.322	0.004	0.519	-0.261
	(0.427)	(0.511)	-(1.713)	-(1.217)	-(1.393)	-(0.674)	(0.008)	(0.880)	-(0.420)
Existence of Limit to Deductibility	0.033	-0.012	0.833	0.432	1.008	-0.253	0.204	-0.408	-0.122
	(0.160)	-(0.019)	(0.951)	(0.786)	(1.107)	-(0.410)	(0.243)	-(0.430)	-(0.230)
Existence of Regulatory LTV Limit	0.321	0.397	0.573	0.147	0.330	-0.313	-0.010	-0.378	0.538
	(1.555)	(0.653)	(0.655)	(0.267)	(0.362)	-(0.507)	-(0.011)	-(0.399)	(1.012)
Value of LTV Regulatory Limit	0.019	0.033	0.020	-0.009	0.009	0.012	0.014	-0.030	0.013
	(0.092)	(0.055)	(0.023)	-(0.017)	(0.010)	(0.020)	(0.016)	-(0.031)	(0.024)
Fixed Interest Rate	0.158	0.391	0.484	0.064	0.214	-0.026	0.451	0.127	0.376
	(0.764)	(0.643)	(0.553)	(0.117)	(0.235)	-(0.042)	(0.539)	(0.134)	(0.707)
Depth of Credit Information Index	-0.109	0.103	-0.089	0.070	-0.024	0.013	0.054	0.297	0.108
	-(0.529)	(0.169)	-(0.101)	(0.127)	-(0.026)	(0.022)	(0.065)	(0.314)	(0.204)

Table 9.2: Multivariate analysis: SECURED DEBT BALANCE

Each column shows the OLS estimates and the t-statistics (in parentheses) of an OLS regression where the dependent variable is the country-specific constant (RG column) or the specific coefficient of the first step (rest of columns) and the covariates are the institutions in the rows. A constant is included in all regressions, but not reported. The sample contains 11 countries.

	RG	AGE				EDUCATION		SELFEMP	INCOME
CONTROL VARIABLES		16_34	45_54	55-64	Over_64	Low	High		
Duration of Foreclosure	0.005	-0.013	-0.009	-0.009	-0.018	0.002	0.008	-0.003	-0.004
	(1.267)	-(2.241)	-(2.381)	-(2.328)	-(2.752)	(0.464)	(2.398)	-(0.830)	-(1.398)
Existence of Tax Exemption	-0.817	0.273	0.349	0.692	0.613	0.082	-0.494	-0.712	0.196
	-(1.610)	(0.654)	(0.980)	(1.514)	(0.728)	(0.116)	-(1.438)	-(1.712)	(0.808)
Existence of Limit to Deductibility	1.380	-0.394	-0.256	-0.336	0.171	0.041	0.458	0.373	-0.015
	(3.091)	-(1.198)	-(0.735)	-(0.791)	(0.211)	(0.102)	(1.520)	(0.488)	-(0.067)
Existence of Regulatory LTV Limit	0.572	0.037	0.558	0.874	1.556	0.243	0.227	0.115	0.068
	(1.282)	(0.114)	(1.606)	(2.058)	(1.927)	(0.600)	(0.753)	(0.150)	(0.300)
Value of LTV Regulatory Limit	0.031	0.011	0.024	0.040	0.071	0.022	0.014	0.009	-0.011
	(0.069)	(0.034)	(0.069)	(0.094)	(0.088)	(0.055)	(0.045)	(0.011)	-(0.049)
Fixed Interest Rate	0.430	0.072	0.267	0.682	0.891	0.293	0.178	-0.134	0.015
	(0.962)	(0.218)	(0.768)	(1.605)	(1.103)	(0.726)	(0.593)	-(0.175)	(0.068)
Depth of Credit Information Index	-0.338	-0.033	0.306	0.517	0.573	-0.079	-0.150	-0.402	0.047
	-(0.758)	-(0.099)	(0.880)	(1.217)	(0.710)	-(0.195)	-(0.498)	-(0.526)	(0.207)

Table 9.3: Multivariate analysis: HMR INTEREST RATE

Each column shows the OLS estimates and the t-statistics (in parentheses) of an OLS regression where the dependent variable is the country-specific constant (RG column) or the specific coefficient of the first step (rest of columns) and the covariates are the institutions in the rows. A constant is included in all regressions, but not reported. The sample contains 11 countries.

	RG	AGE				EDUCATION		SELFEMP	INCOME
CONTROL VARIABLES		16_34	45_54	55-64	Over_64	Low	High		
Duration of Foreclosure	0.005	0.002	0.008	0.012	-0.002	0.007	0.006	0.009	-0.019
	(0.357)	(0.152)	(0.775)	(0.637)	-(0.067)	(0.586)	(0.675)	(0.723)	-(1.970)
Existence of Tax Exemption	1.578	-0.320	0.923	0.174	1.403	-0.799	-0.901	0.645	0.120
	(1.162)	-(0.427)	(1.299)	(0.187)	(0.885)	-(1.019)	-(1.461)	(0.988)	(0.254)
Existence of Limit to Deductibility	-0.324	-0.143	-0.715	-0.416	-1.093	0.513	0.363	-0.326	-0.120
	-(0.417)	-(0.278)	-(1.475)	-(0.708)	-(0.882)	(0.903)	(0.877)	-(0.520)	-(0.335)
Existence of Regulatory LTV Limit	1.517	-0.785	-0.423	-0.041	-0.747	0.116	-0.013	0.219	-0.275
	(1.949)	-(1.529)	-(0.873)	-(0.070)	-(0.603)	(0.205)	-(0.032)	(0.350)	-(0.765)
Value of LTV Regulatory Limit	0.060	-0.037	-0.013	0.002	-0.056	0.016	0.021	0.016	-0.013
	(0.078)	-(0.071)	-(0.028)	(0.003)	-(0.045)	(0.028)	(0.052)	(0.025)	-(0.036)
Fixed Interest Rate	2.262	-0.985	0.254	0.160	0.083	-0.197	-0.156	0.550	-0.064
	(2.906)	-(1.919)	(0.524)	(0.272)	(0.067)	-(0.347)	-(0.376)	(0.877)	-(0.177)
Depth of Credit Information Index	0.949	-0.129	0.292	-0.105	0.372	-0.311	-0.248	0.547	-0.054
	(1.219)	-(0.252)	(0.602)	-(0.178)	(0.300)	-(0.547)	-(0.600)	(0.872)	-(0.149)

Figure 1: OVERVIEW OF DEBT OUTCOMES ACROSS EUROZONE COUNTRIES

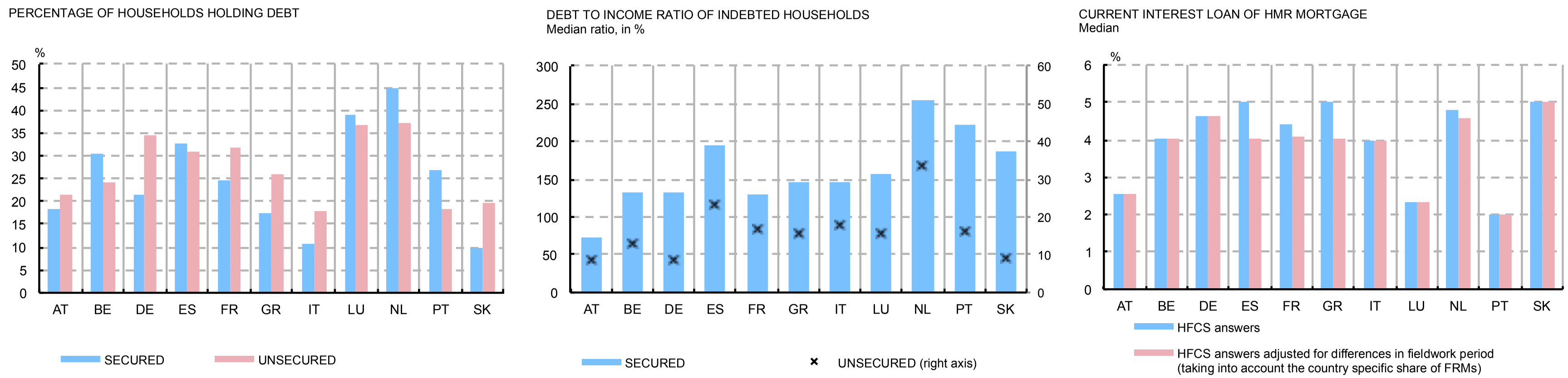
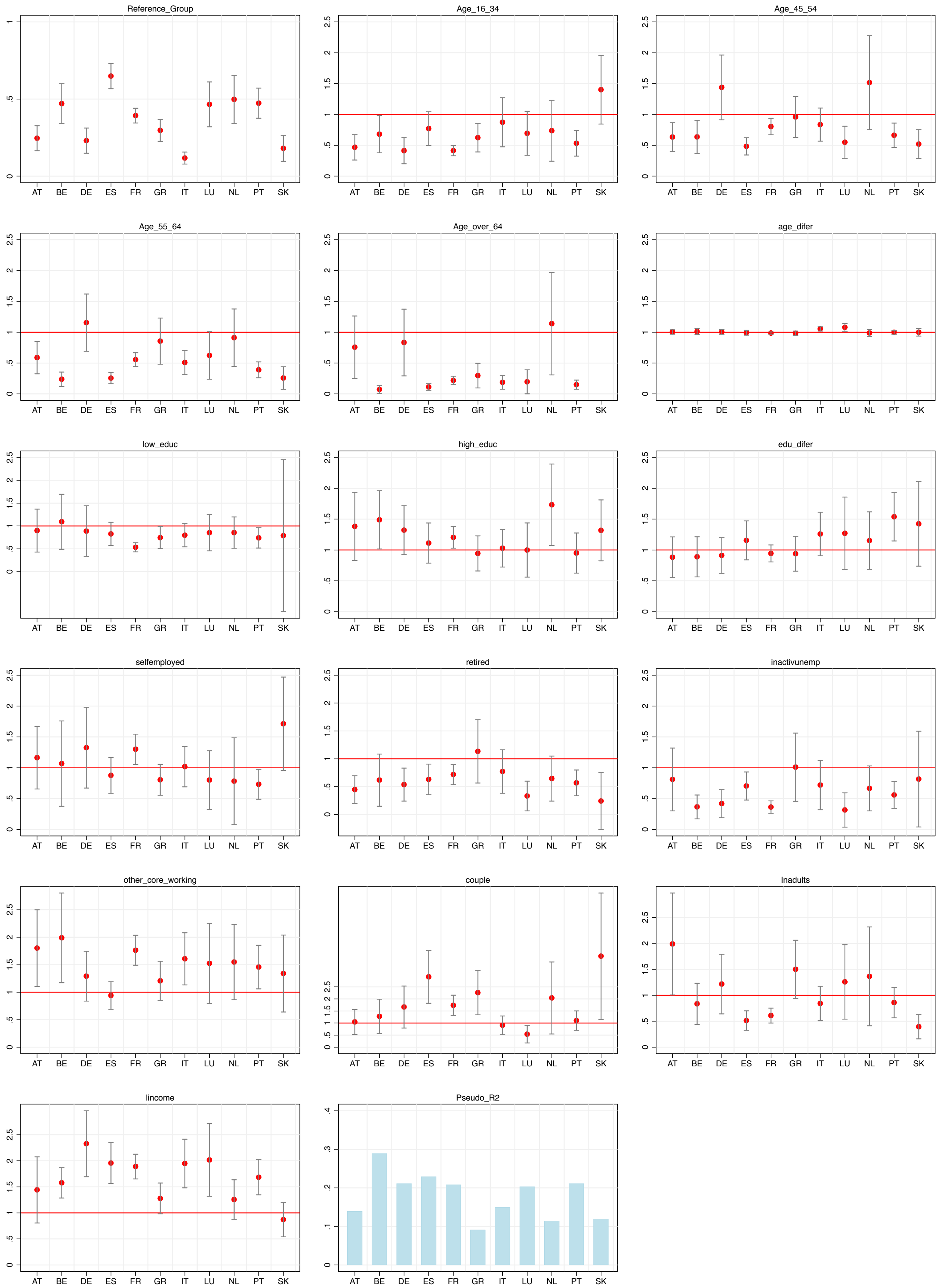
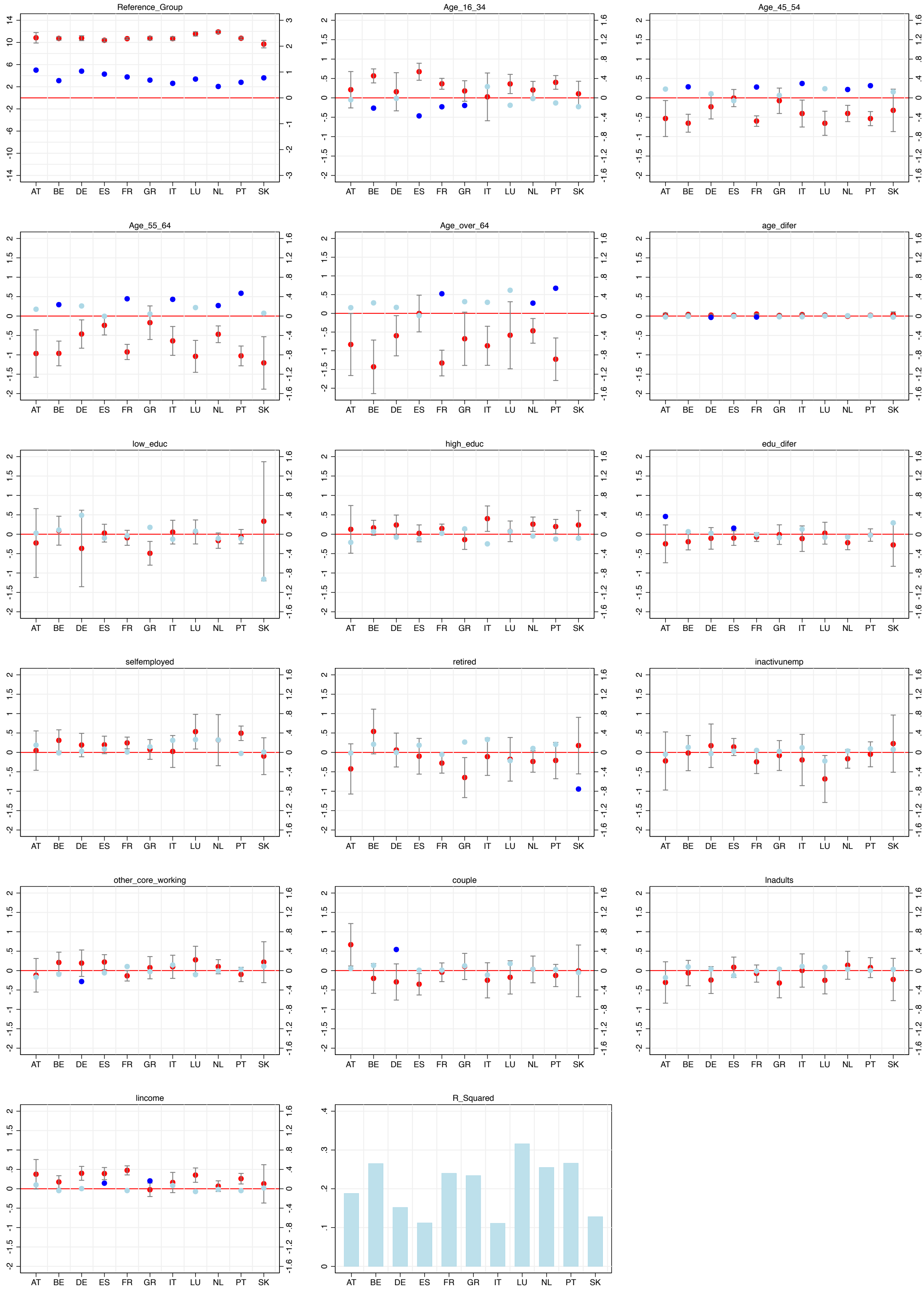


Figure 2: HAS SECURED DEBT. Logit Regressions. Odds-Ratios



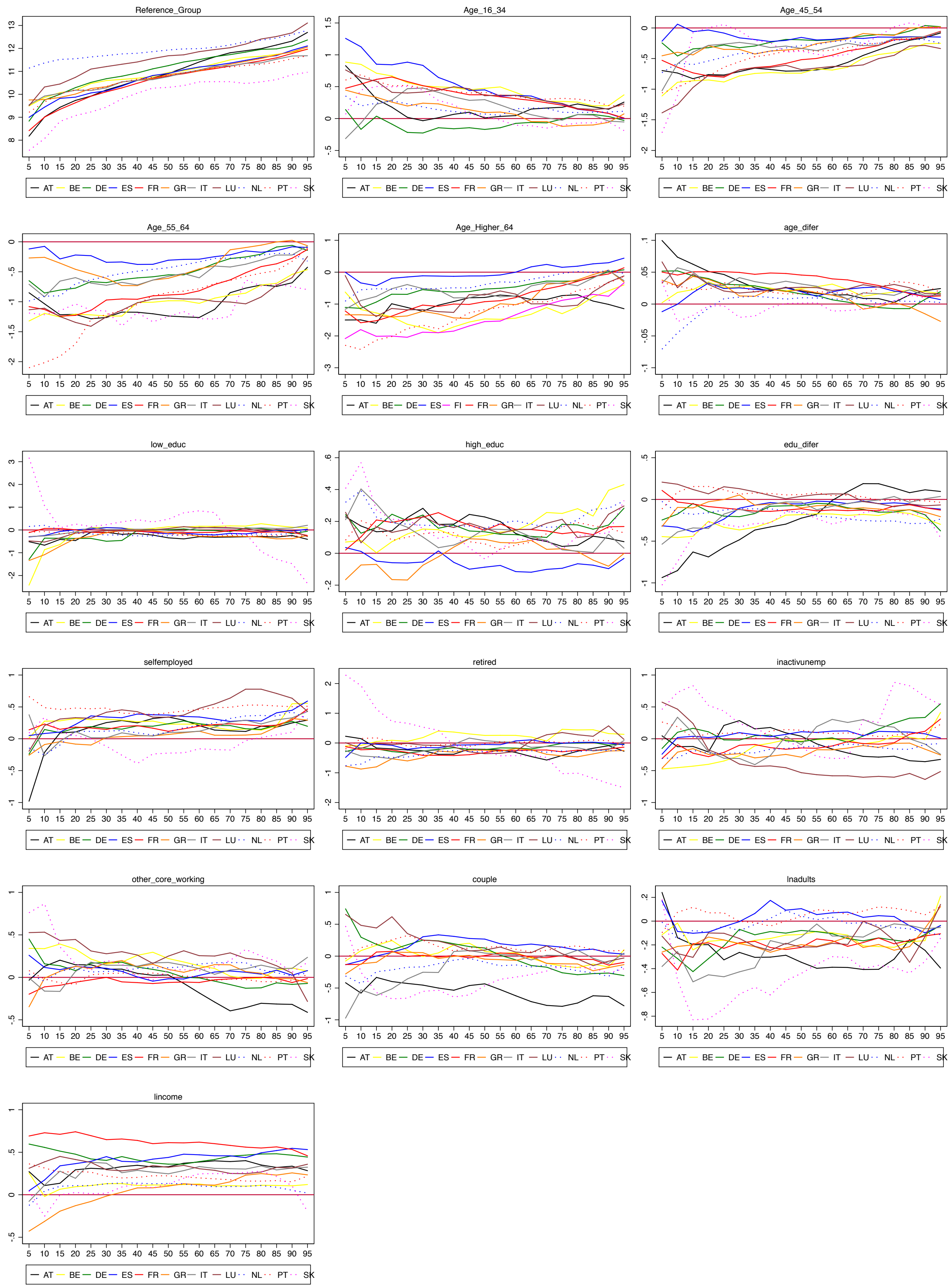
Odds-ratio estimates and standard errors shown in Table 4. The first panel on the left plots the predicted probability of holding secured debt for the reference group in each country.

Figure 3: DEBT BALANCE OF SECURED DEBT. (Location-scale model)



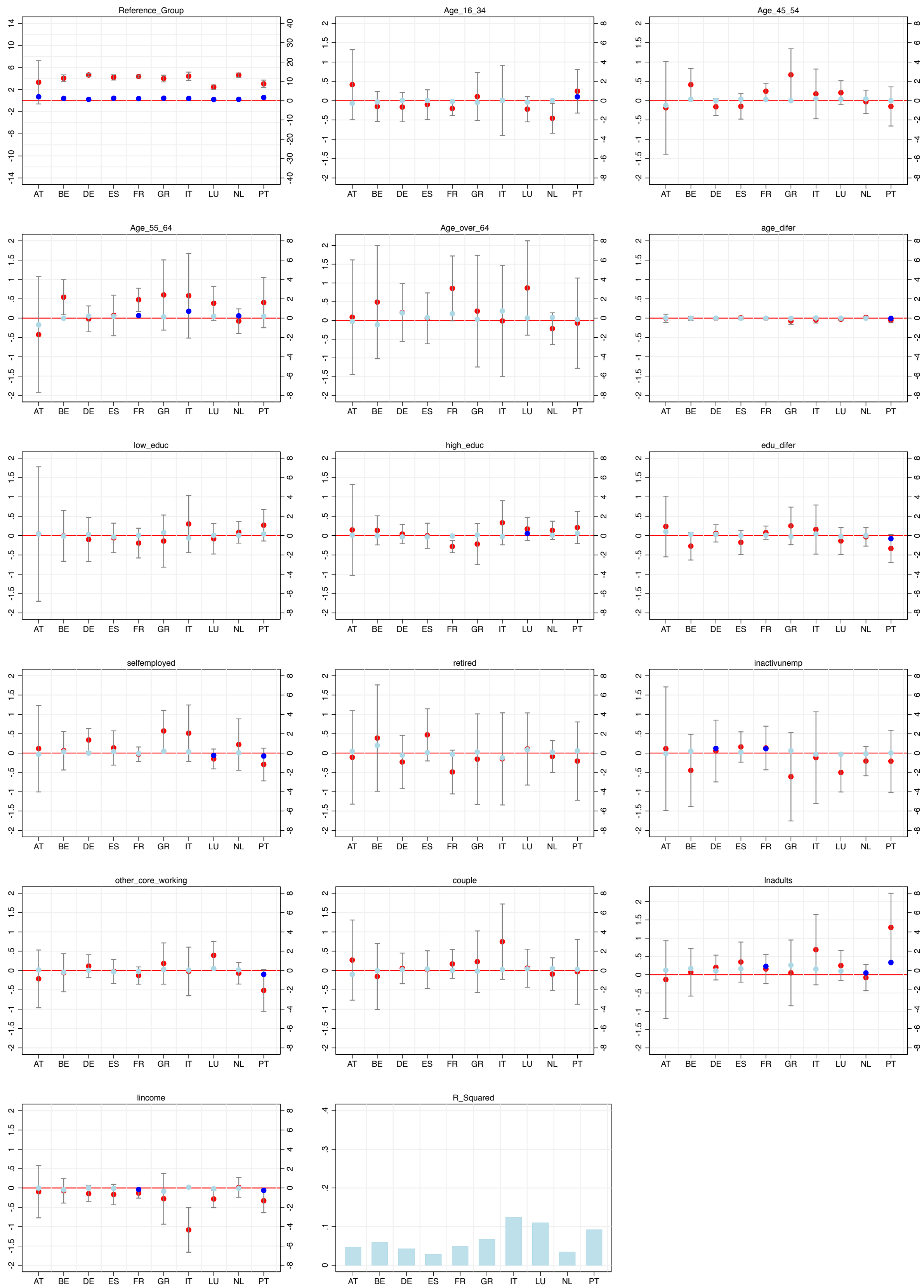
OLS estimates and standard errors in Table 5. The blue dots are the coefficients of a regression of the absolute value of the OLS residual on the covariates shown in Table 2. Dots in dark blue denote that the estimate is statistically different from zero at the 5% confidence level.

Figure 4: DEBT BALANCE OF SECURED DEBT. Quantile Regressions



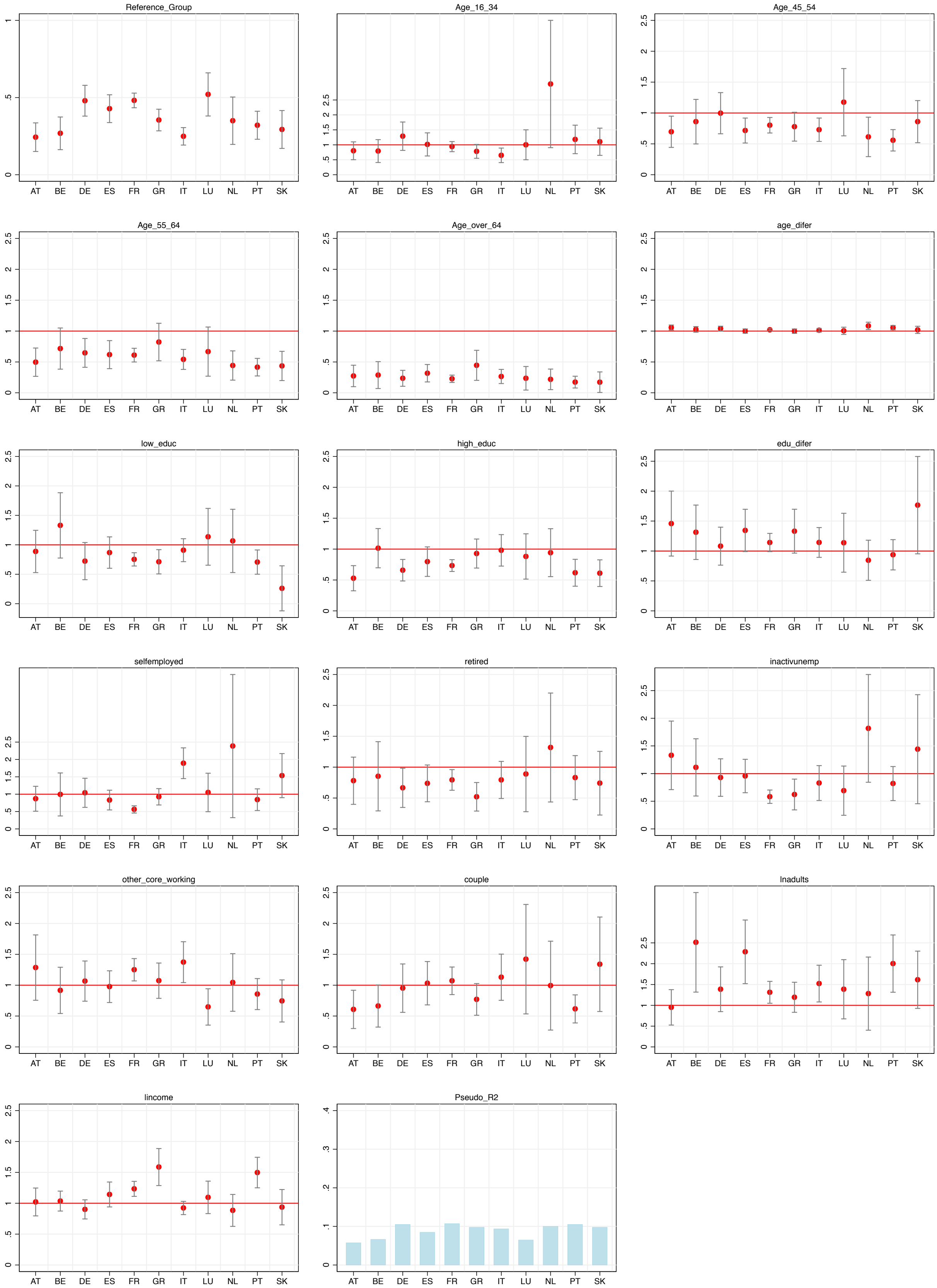
Country-specific quantile regression functions of the log-amount of secured debt on each covariate.

Figure 5: CURRENT INTEREST LOAN OF HMR MORTGAGE. (Location-scale model)



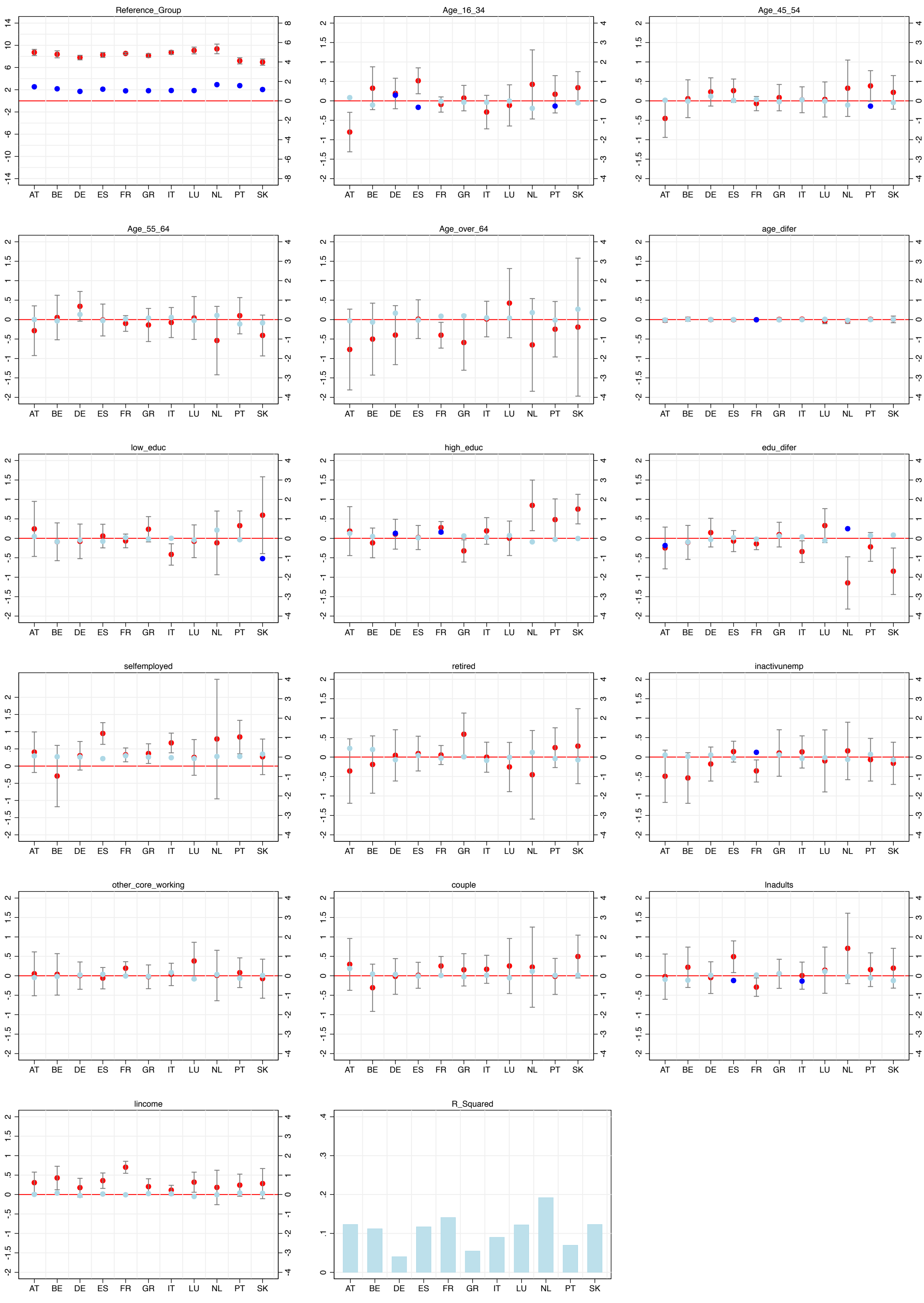
OLS estimates and standard errors shown in Table 6. The blue dots are the coefficients of a regression of the absolute value of the OLS residual on the covariates shown in Table 2. Dots in dark blue denote that the estimate is statistically different from zero at the 5% confidence level.

Figure 6: HAS UNSECURED DEBT. Logit Regressions. Odds-Ratios



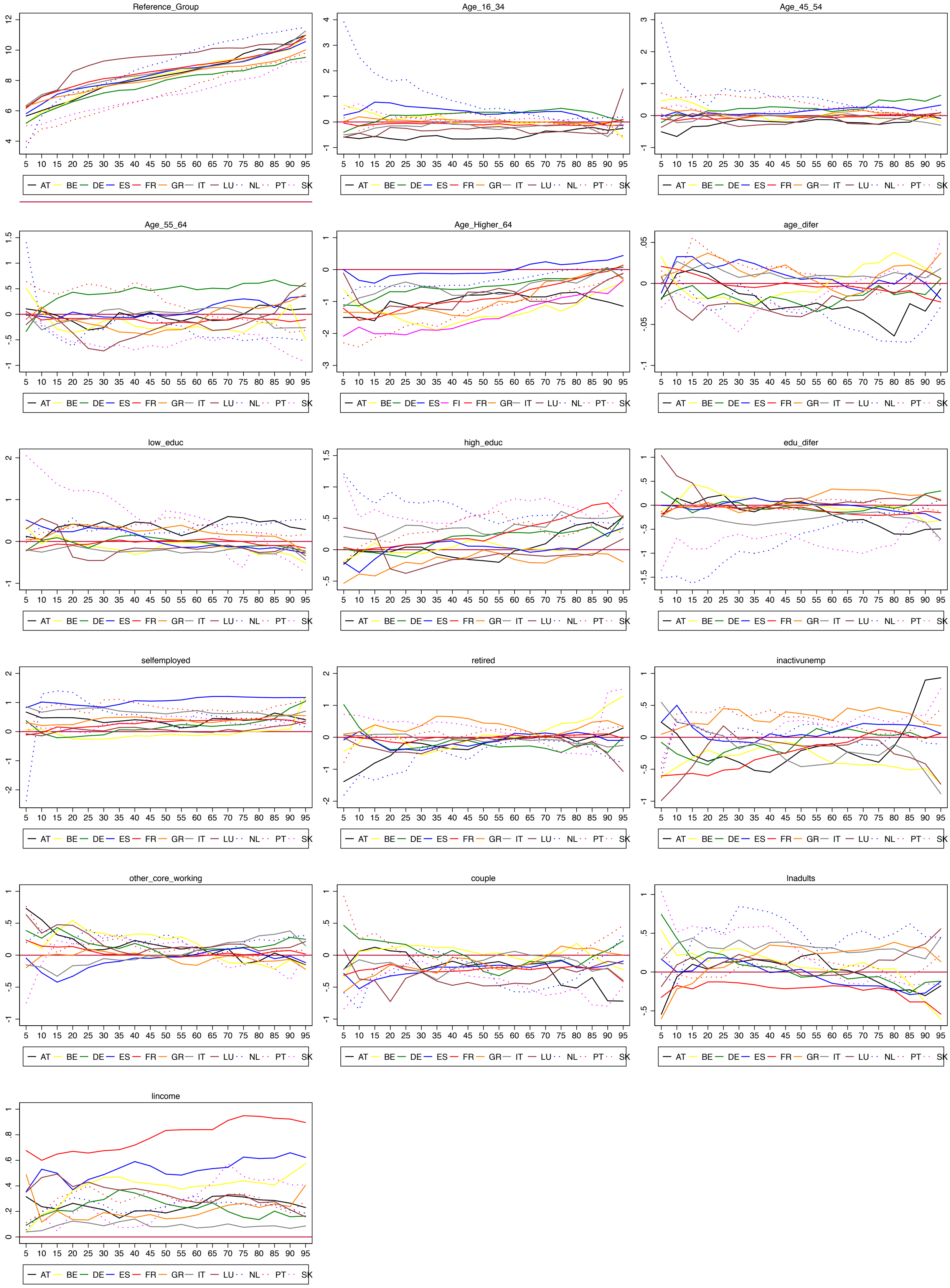
Country-specific odds-ratios and standard errors in a Logit model of the probability of holding unsecured debt. The first panel in the left plots the predicted probability of holding unsecured debt for the reference group in each country

Figure 7: DEBT BALANCE OF UNSECURED DEBT
(Location-scale model)



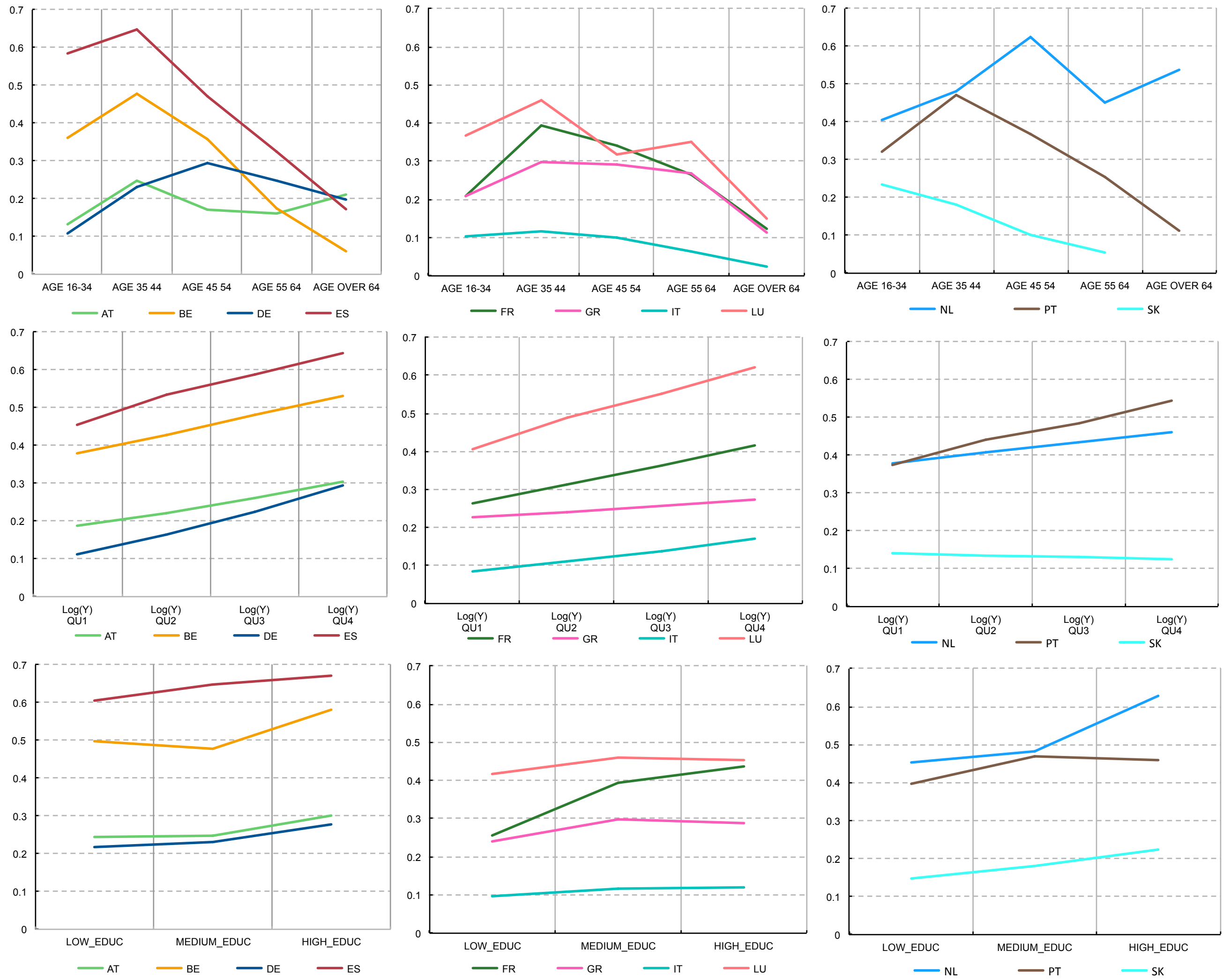
OLS estimates and standard errors in a model of the log-amount of unsecured debt held. The blue dots are the coefficients of a regression of the absolute value of the OLS residual on the covariates shown in Table 2. Dots in dark blue denote that the estimate is statistically different from zero at the 5% confidence level.

Figure 8: DEBT BALANCE OF UNSECURED DEBT
Quantile Regressions



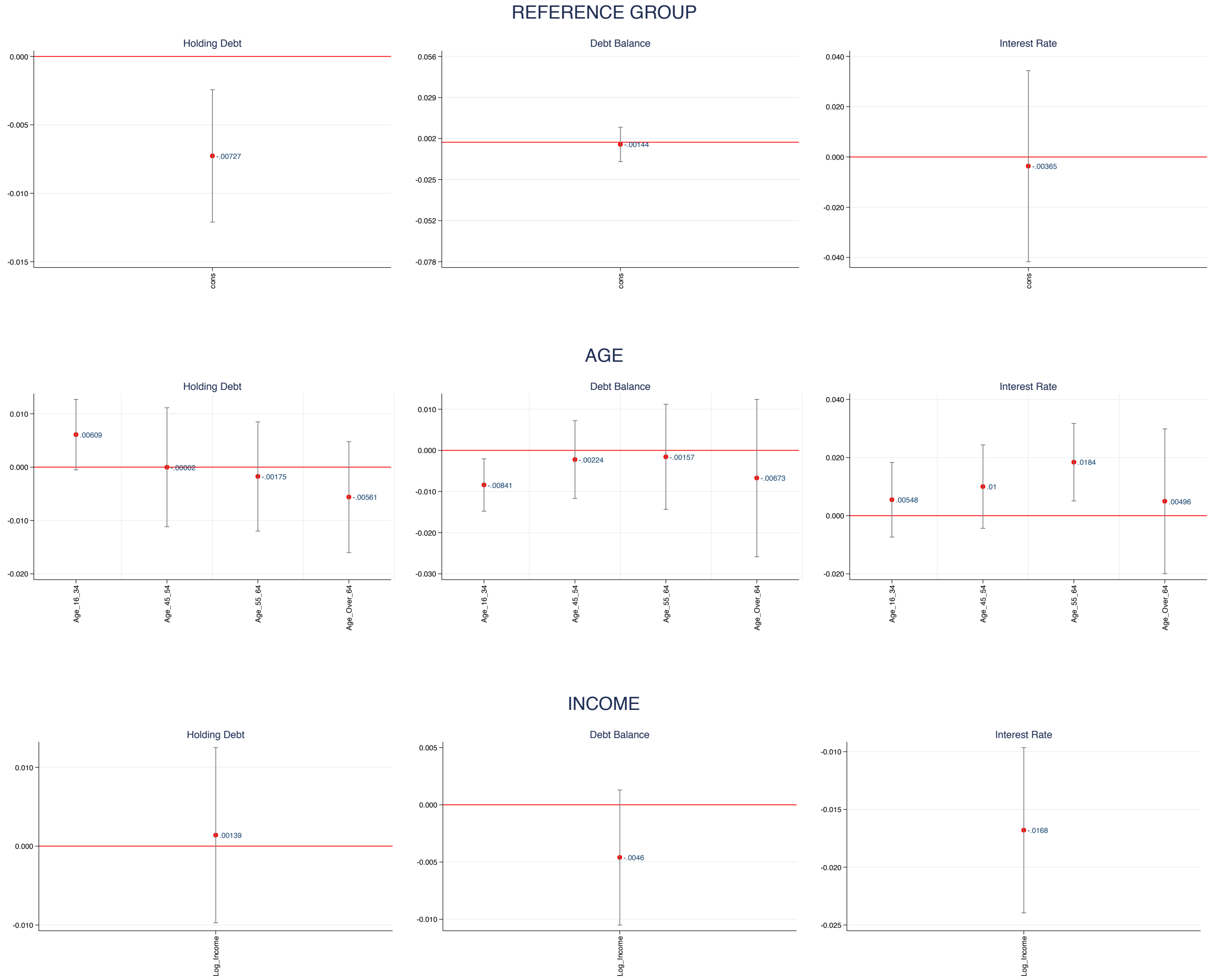
Country-specific quantile regression functions of the log-amount of unsecured debt on each covariate

Figure 9: ESTIMATED PROFILES OF THE PROBABILITY OF HOLDING DEBT



The Figure shows the predicted probability of holding secured debt for various groups of the population. The top three charts evaluate the probability at different ages of the oldest person in the household. The charts in the middle evaluate the chances of holding secured debt at different income quartiles and the bottom ones at different education levels. The rest of the covariates are those of the reference group.

Figure 10: DURATION OF FORECLOSURE (number of months)



Each graph shows the OLS coefficient and its 95% CI in a regression of the first-step coefficient of the variable in the horizontal axis on the institution that gives title to the figure. The estimates and standard errors are shown in Table 8.

Figure 10a: Time to Foreclosure (number of months)

Holding Debt Scatterplot

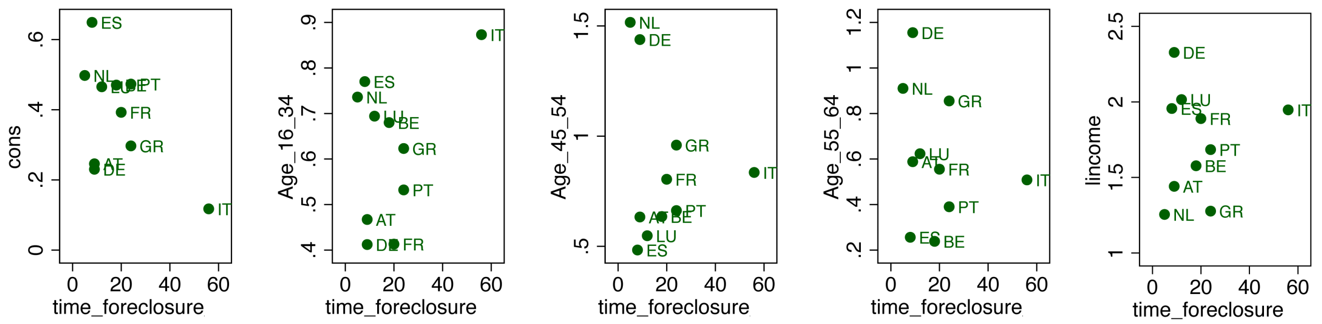


Figure 10b: Time to Foreclosure (number of months)

Secured Debt Balance Scatterplot

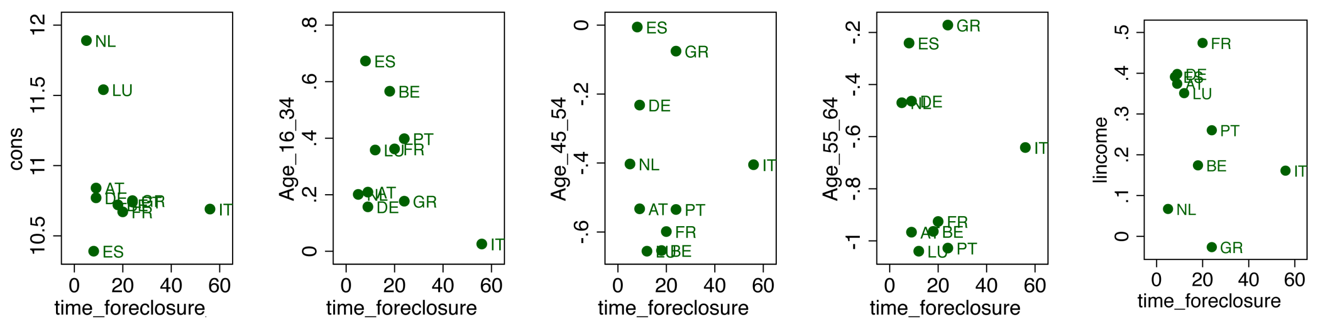


Figure 10c: Time to Foreclosure (number of months)

Current HMR Interest Rate

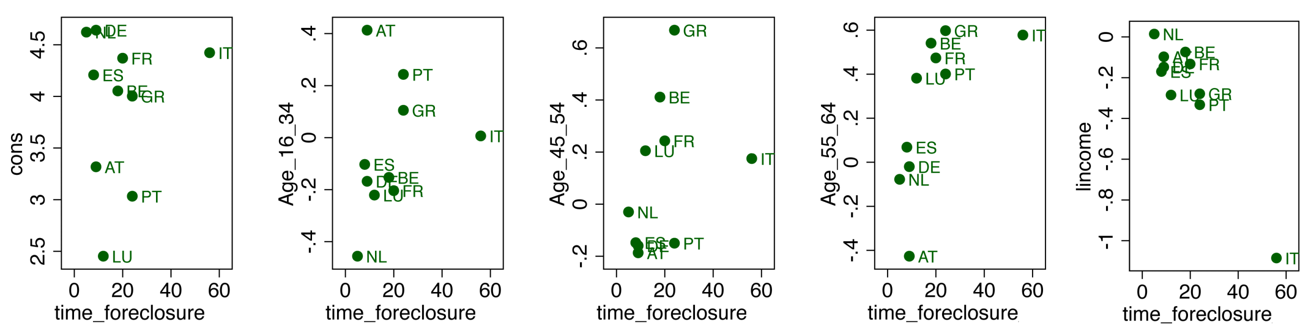
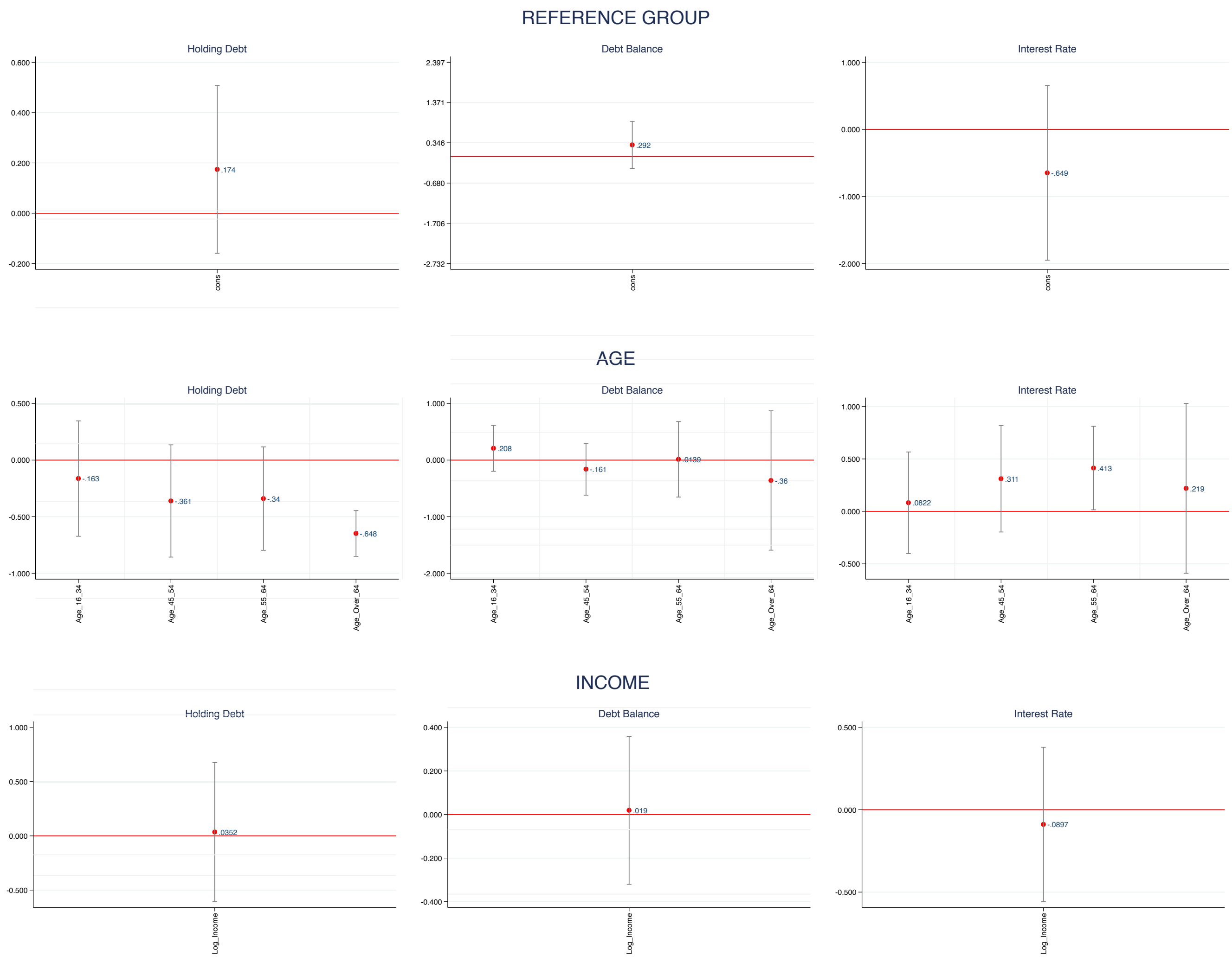


Figure 11.1: TAXATION OF MORTGAGE PAYMENTS.

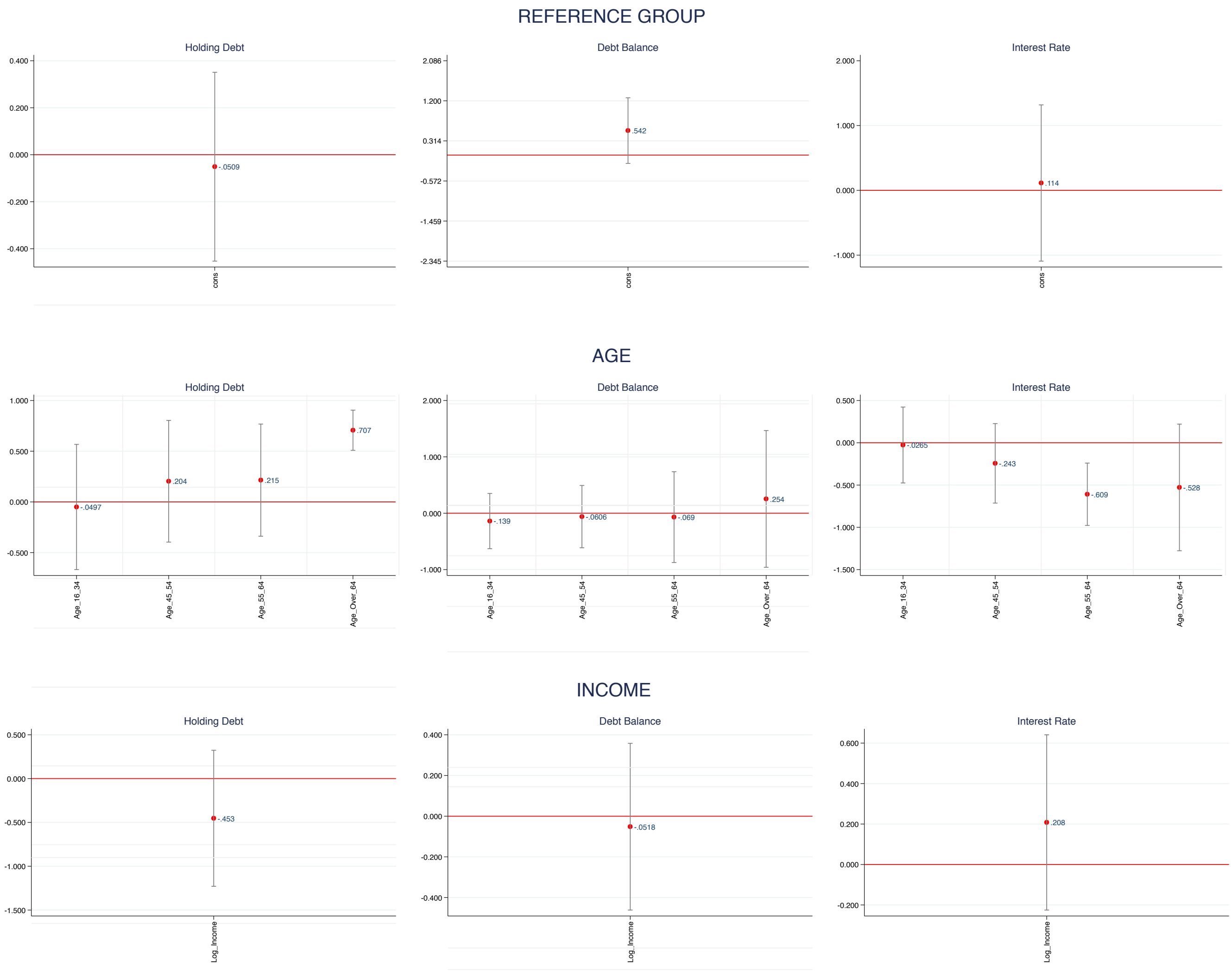
Existence of tax exemption (controlling for the existence of limit to deductibility)



Each graph shows the OLS coefficient and its 95% CI in a regression of the first-step coefficient of the variable in the horizontal axis on the institution that gives title to the figure. The estimates and standard errors are shown in Table 8.

Figure 11.2: TAXATION OF MORTGAGE PAYMENTS.

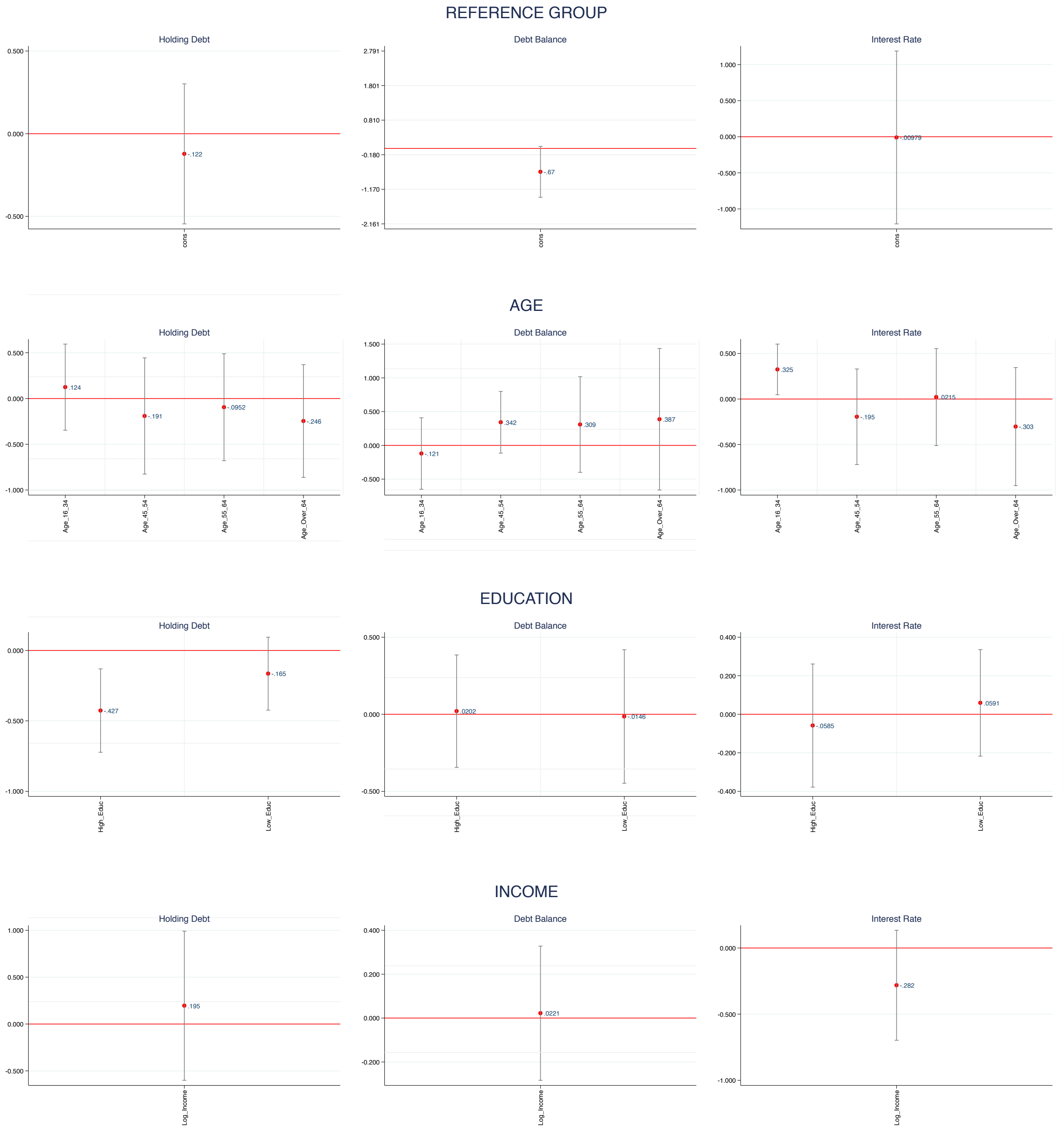
Absence of a limit to tax deductibility (controlling for the existence of tax exemption)



Each graph shows the OLS coefficient and its 95% CI in a regression of the first-step coefficient of the variable in the horizontal axis on the institution that gives title to the figure. The estimates and standard errors are shown in Table 8.

Figure 12.1: REGULATORY LOAN TO VALUES RATIO

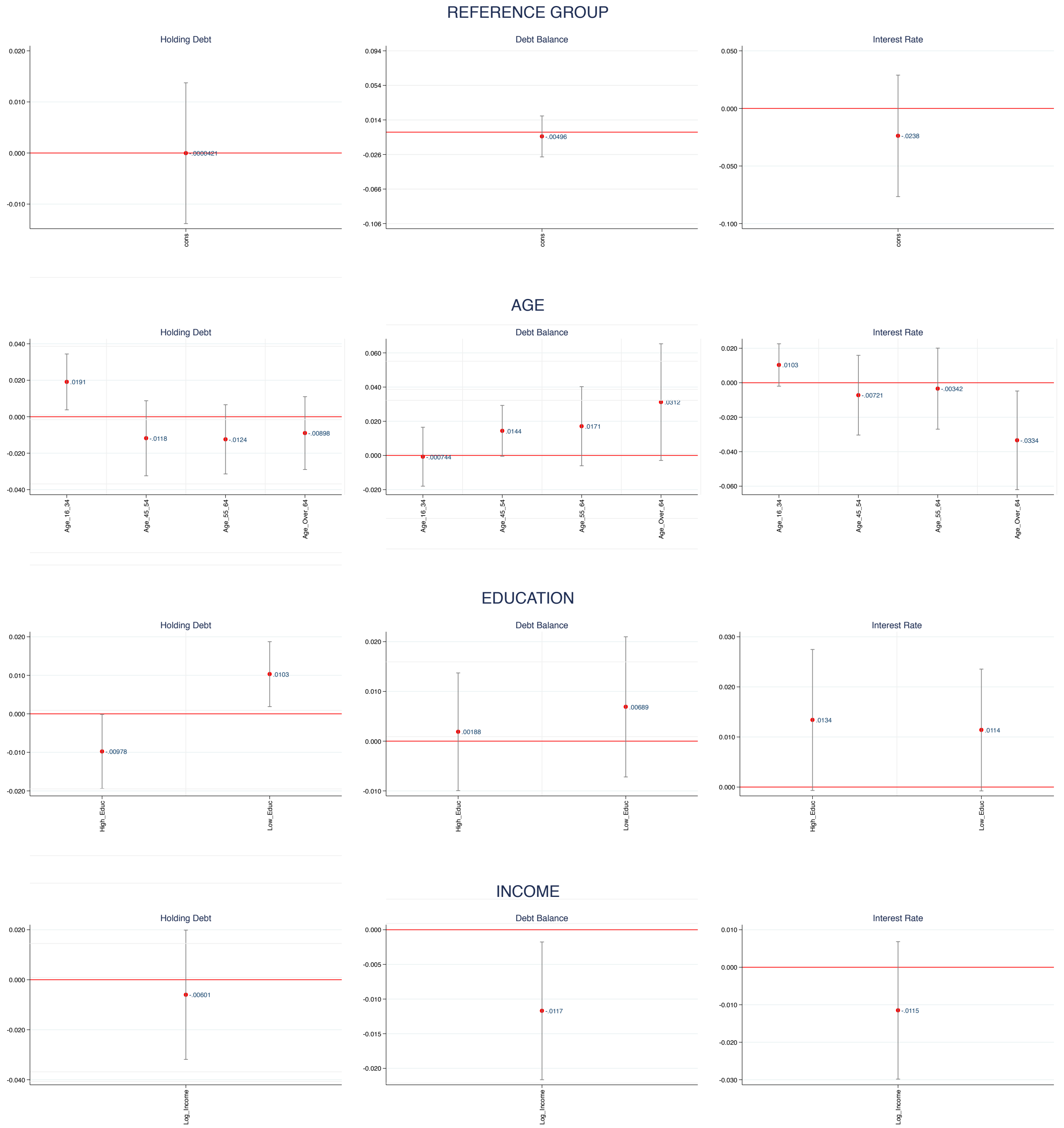
Existence of a regulatory LTV limit (controlling for the value of LTV regulatory limit)



Each graph shows the OLS coefficient and its 95% CI in a regression of the first-step coefficient of the variable in the horizontal axis on the institution that gives title to the figure. The estimates and standard errors are shown in Table 8.

Figure 12.2: REGULATORY LOAN TO VALUES RATIO

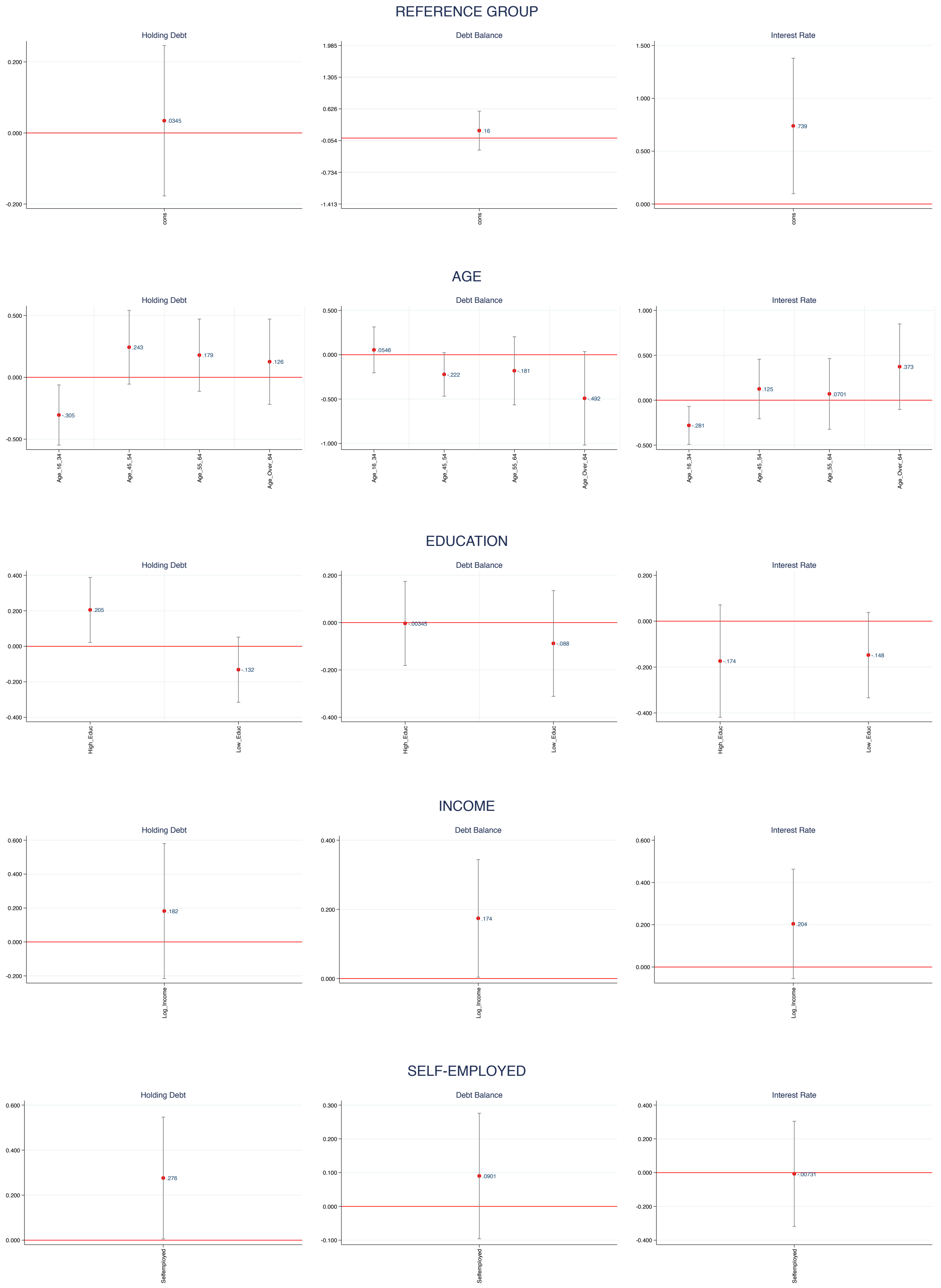
Value of LTV regulatory limit (controlling for the existence of a regulatory LTV limit)



Each graph shows the OLS coefficient and its 95% CI in a regression of the first-step coefficient of the variable in the horizontal axis on the institution that gives title to the figure. The estimates and standard errors are shown in Table 8.

Figure 13: FIXED INTEREST RATE

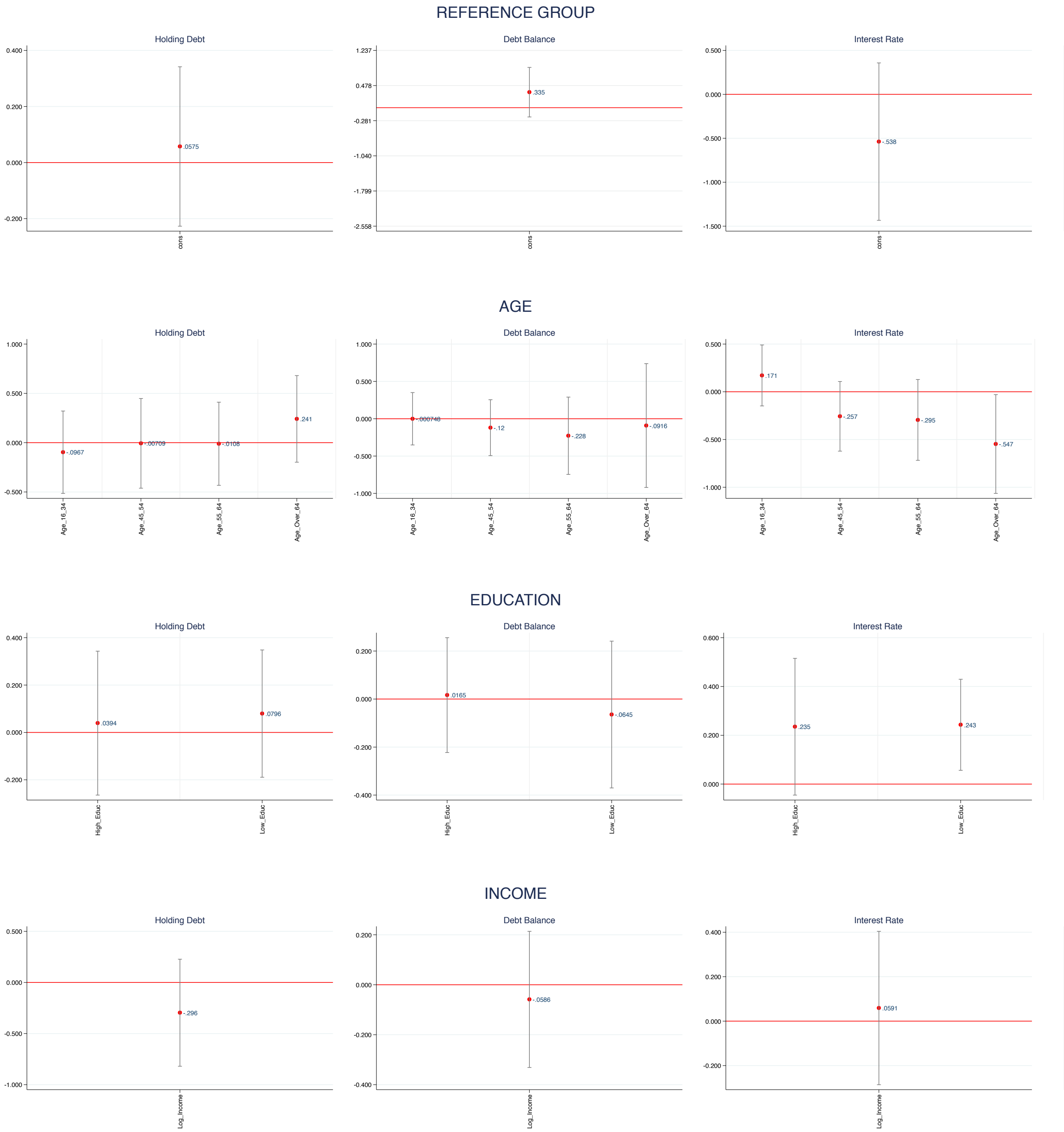
Dummy indicating if % of mortgages on FR for a period longer than 10 year is > 50%



Each graph shows the OLS coefficient and its 95% CI in a regression of the first-step coefficient of the variable in the horizontal axis on the institution that gives title to the figure. The estimates and standard errors are shown in Table 8.

Figure 14: CONDITIONS THAT REDUCE INITIAL DEBT REPAYMENTS

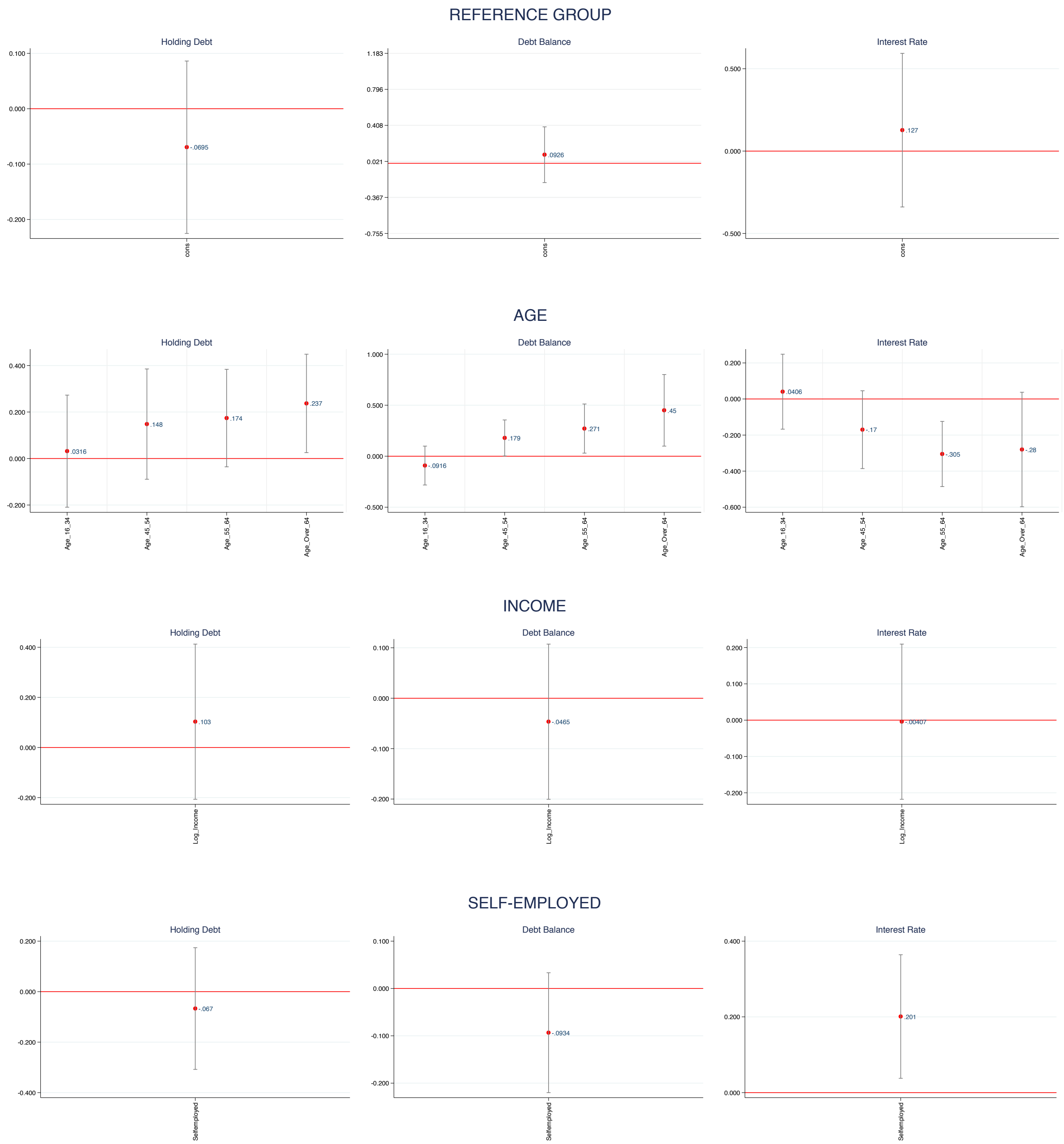
Dummy indicating if % of mortgages with i-only-payments for the first 3 years > 10%



Each graph shows the OLS coefficient and its 95% CI in a regression of the first-step coefficient of the variable in the horizontal axis on the institution that gives title to the figure. The estimates and standard errors are shown in Table 8.

Figure 15: INFORMATION ON BORROWERS

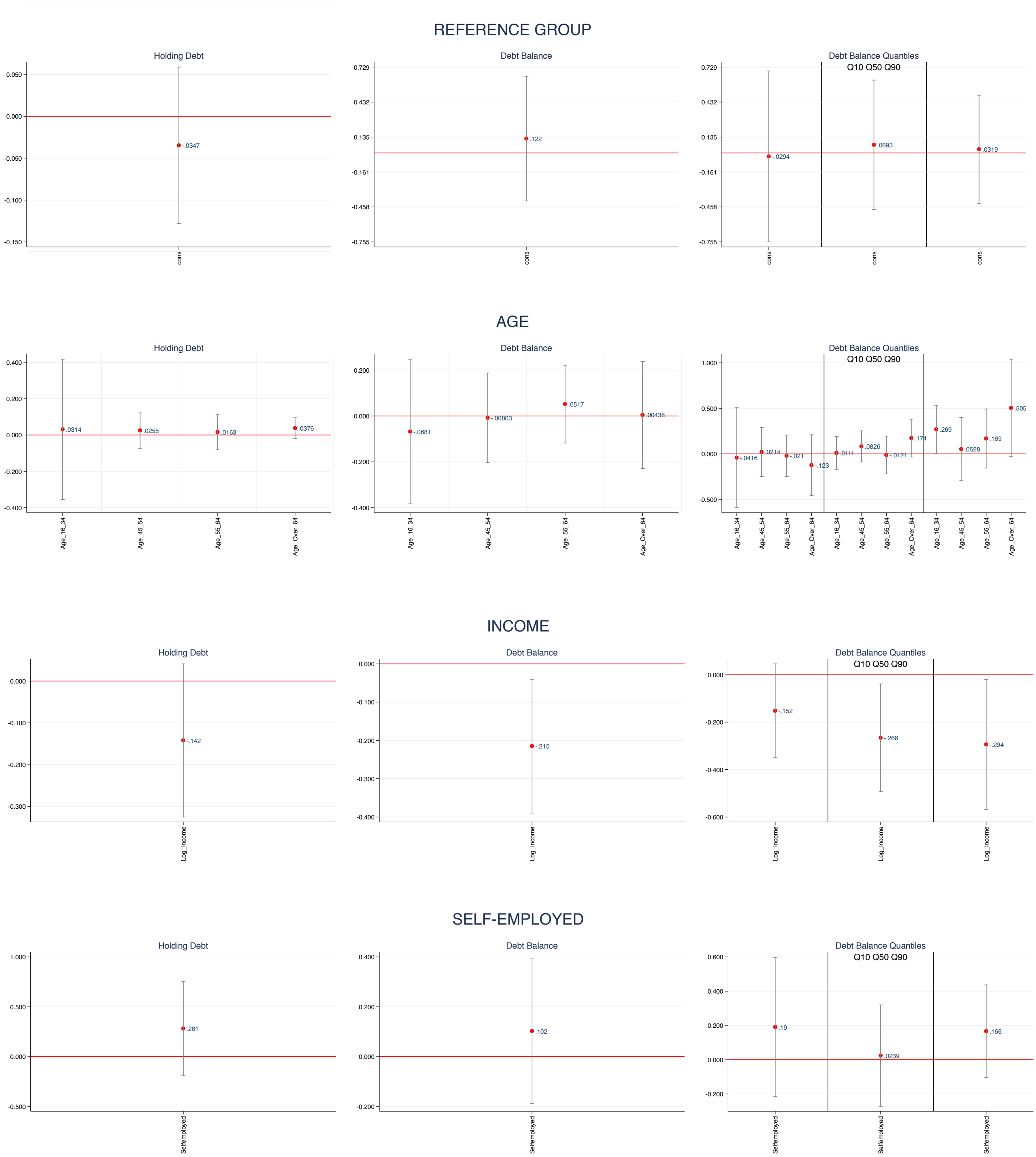
Depth of credit information index (0-6)



Each graph shows the OLS coefficient and its 95% CI in a regression of the first-step coefficient of the variable in the horizontal axis on the institution that gives title to the figure. The estimates and standard errors are shown in Table 8.

Figure 16: INFORMATION ON BORROWERS

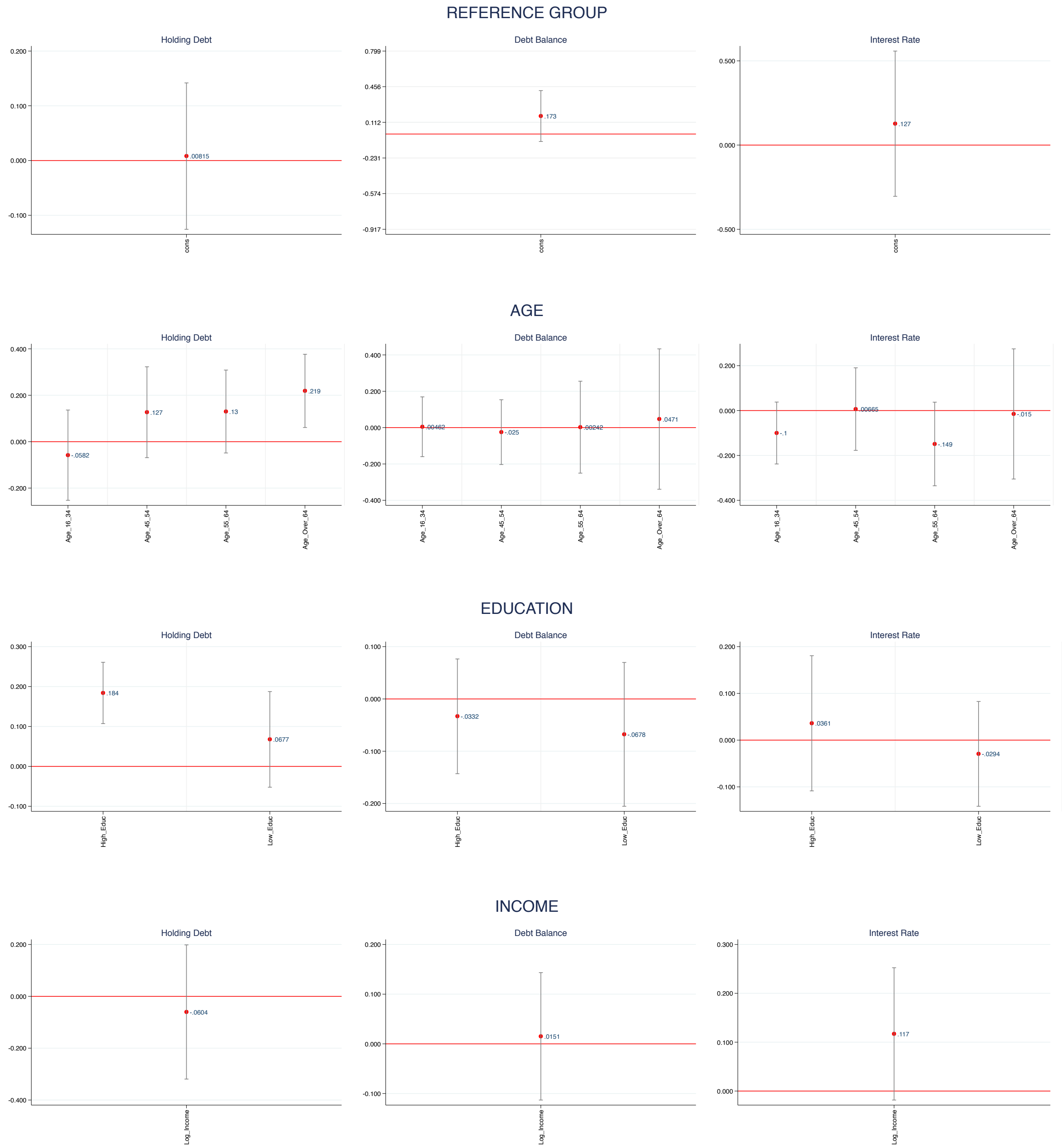
Depth of credit information index (0-6)
UNSECURED DEBT



Each graph shows the OLS coefficient and its 95% CI in a regression of the first-step coefficient of the variable in the horizontal axis on the institution that gives title to the figure. The estimates and standard errors are shown in Table 8.

Figure 17: FINANCIAL LITERACY

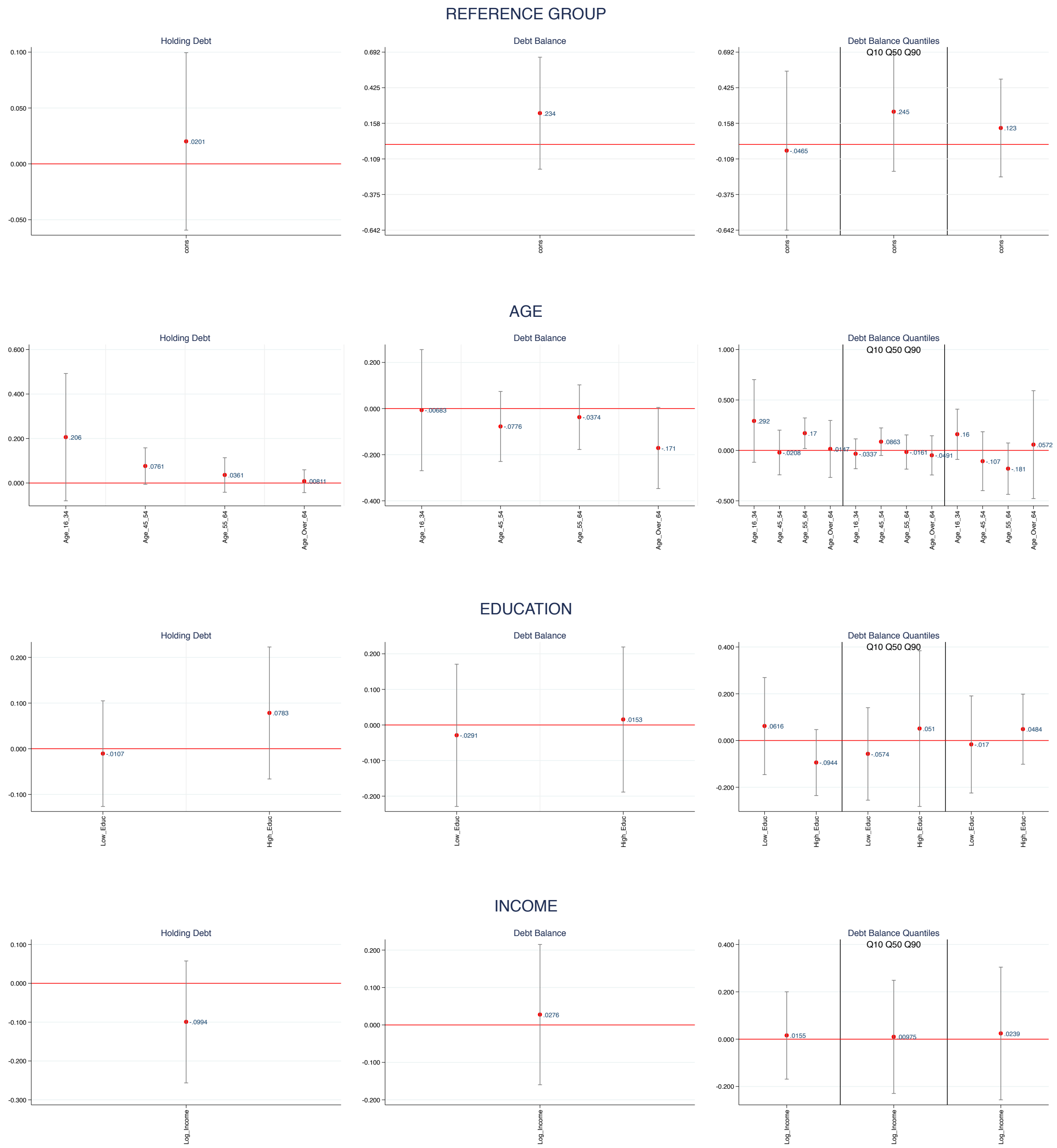
WCY Measure of financial literacy (0-10)



Each graph shows the OLS coefficient and its 95% CI in a regression of the first-step coefficient of the variable in the horizontal axis on the institution that gives title to the figure. The estimates and standard errors are shown in Table 8.

Figure 18: FINANCIAL LITERACY

WCY Measure of financial literacy (0-10)
UNSECURED DEBT



Each graph shows the OLS coefficient and its 95% CI in a regression of the first-step coefficient of the variable in the horizontal axis on the institution that gives title to the figure. The estimates and standard errors are shown in Table 8.