THE DISTRIBUTION OF DEBT ACROSS EU COUNTRIES:
The role of individual characteristics, institutions and credit conditions

Olympia Bover, José María Casado, Sonia Costa, Philip Du Caju, Yvonne McCarthy, Eva Sierminska, Panagiota Tzamourani, Ernesto Villanueva, Tibor Zavadil

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• **The new HFCS micro data reveal striking differences in the incidence, amount, and cost of debt across countries in the EMU**

• **Moreover, the patterns of debt by age and income are substantially different across countries**

• **Distribution of debt across households of different characteristics play a role on how aggregate shocks affect the macroeconomy**

. e.g. interest rate changes within a monetary union can have different consequences on aggregate consumption in member states depending on proportion of indebted households and their characteristics

Purpose of this paper:

1. **Document country differences in the relationship between household characteristics and debt**

   (i) Holding debt

   (ii) Quantity of debt (at various quantiles)

   (iii) Interest rate

   by means of country-specific regressions of these debt outcomes on set of household characteristics (age, schooling, labour status, etc)

2. **Study the extent to which these differences are associated with differences in institutions and credit conditions**

   Legal enforcement of contracts

   Tax treatment of mortgage payments

   Regulatory LTV ratios

   Prevalence of Fixed Rate Mortgages

   Information about borrowers

   Financial Literacy

Comments:

• **We consider many institutions**

• **Assess predictive power of each institution by examining its impact on three separate debt outcomes (extensive margin, intensive margin, cost)**

→→ this provides indications about the channel through which each institution affects borrowing behaviour

• **The approach we follow leads to effects of institutional variables on household debt which have causal validity under less restrictive conditions than pooling data across countries using interactions of household characteristics and institutional variables**

→→ we allow for endogeneity with respect to unobserved country effects, both additive and interacting with the remaining household characteristics

(more later)

Main findings:

- **Demographics**

    - age, income, education are important predictors of secured debt holdings within countries

    - in contrast, unsecured debt mainly depends on number of adults

    - in some countries i-rate varies with income

    - differences across countries in the estimated age, income, education profiles

- **Institutions**

    - length of repossession best predicts the differences in debt distributions across countries

    →→ for countries with one standard deviation longer repossession period:

    Fraction of borrowers is 16% smaller

    Amount borrowed is lower among the youngest (12% lower than RG)

    i-rate paid by high income households is 0.3 pp lower

    - remaining institutions deliver less robust results

• **The HFCS is a Eurosystem initiative aimed at collecting comparable micro-level information (common core questionnaire, variable definitions...)**

• **It collects information on household income, assets, liabilities and lots of information on household characteristics**

• **The first wave of HFCS was conducted in 15 euro area countries**
  → our analysis is based on the data for 11 of these countries*

• **The first wave of the survey was conducted between end-2008 and mid-2011**

• **Total sample size of just over 62,000 households**

[*Finland excluded because debt information not comparable; Cyprus not included because education (and marital status) collected only for the respondent; Malta not included although we have now received private information on continuous age variables; Slovakia excluded from interest rate analysis because of highly imprecise estimates]

Debt variables

- **Holding debt**
    i.   Secured: mortgages or loans using HMR as collateral or other properties as collateral
    ii. Unsecured: credit line/overdraft balance or credit cards or other non-collateralised loans

- **Debt balance**
    i.   Log (secured debt)
    ii. Log (unsecured debt)

- **Interest rate**
    i.   On HMR mortgage
    ii. Not enough information in the data for i-rates on unsecured debt

→→ **We distinguish secured from unsecured to avoid conditioning on endogenous outcomes (e.g home-ownership)**

[To correct for differences in fieldwork periods across countries: (i) We convert all debt balances to 2010 values by adjusting by the country-specific HICP, (ii) Interest rate adjusted by the change of Euribor multiplied by the % of adjustable rate mortgages]

Household-Country Regressions   1st step: $Y_{h,c} = \alpha_{0,c} + \alpha_{1,c} X_{1h,c} + \alpha_{2,c} X_{2h,c} + \varepsilon_{h,c}$

Country Regressions   2nd step: $\alpha_{k,c} = \beta_{k0} + \beta_{k1} INST_c + v_{kc}$ $(k = 0, 1, 2)$

- This procedure (eg for k = 1) is identical to running the partially pooled regression

$$Y_{h,c} = \alpha_{0,c} + (\beta_{10} + \beta_{11} INST_c) X_{1h,c} + \alpha_{2,c} X_{2h,c} + u_{h,c}$$

which in the estimation of β_{11} allows for endogeneity of $INST_c \times X_{1h,c}$ with respect to omitted country variables and reverse causality captured by $\alpha_{0,c}$ and $\alpha_{2,c}$

- Alternatives would collapse all 2nd steps into a fully pooled regression:

$$Y_{h,c} = \beta_{00} + \beta_{01} INST_c + (\beta_{10} + \beta_{11} INST_c) X_{1h,c} + (\beta_{20} + \beta_{21} INST_c) X_{2h,c} + u_{h,c}$$

or one pooling slopes but not intercepts, so that additive country effects are still allowed:

$$Y_{h,c} = \alpha_{0,c} + (\beta_{10} + \beta_{11} INST_c) X_{1h,c} + (\beta_{20} + \beta_{21} INST_c) X_{2h,c} + u_{h,c}$$

- Two-step estimated effects of institutions and household characteristics have causal validity (and validity as unbiased predictors) under less restrictive conditions than either of these two alternatives. The reason is that two-step estimates control for unobserved country effects in a more flexible way than the pooled regressions.

$$1^{st} \text{ step: } \boxed{Y_{h,c}} = \alpha_{0,c} + \alpha_{1,c} X_{h,c} + \varepsilon_{h,c}$$

- **Three different specifications where the dependent variable is a different debt outcome**

  - Holding vs not holding debt (logit)

    Odds ratio (invariant to values of $X_{h,c}$)

    Holding debt probability of a common reference group across countries (levels comparison)

  - Quantity of debt held conditional on holding debt (OLS,conditional variance, quantile regression)

  - Interest rate (OLS, conditional variance, quantile regression)

$$1^{st} \text{ step: } Y_{h,c} = \alpha_{0,c} + \alpha_{1,c} \boxed{X_{h,c}} + \varepsilon_{h,c}$$

- **Core members of the household socio-demographic characteristics**

  - the respondent to the survey and his/her partner (if any)

  - when there is only one core member we include his/her characteristics

  - in the case of couples we include information on both core members and relate their characteristics to each other

- **Age**
    i. age of the oldest core household member (five intervals: 16 to 34, 35 to 44, 45 to 54, 55 to 64, and over 64)
    ii. we take into account the age of the other core member by including the age difference between the two

- **Education**
    i. we consider the education of the more educated core member (three dummy variables: low education, medium, and high)
    ii. we take into account the education of the other core member by including a binary variable to indicate if the two members have attained different education levels (i.e. if the other core member has a lower education than the most educated)

- **Labour status**
    i. labour status of the core member with the highest income (employee, self-employed, retired, and unemployed and other inactive)
    ii. a binary variable denoting if the other member is working

Socio-demographic characteristics

• **By defining characteristics of core couples in this way we directly focus on the importance of difference between the two members and do so in a more parsimonious way as compared to defining the full set of dummies for the two partners**

• **More fundamentally, this is an attempt to focus on the traits of the household as a group and their distribution without requiring to define a "reference person" ex ante, all of whose characteristics would then be emphasized relative to other members**

• *In addition*: **couple dummy, log(nº of adults), log(total income)**

$$2^{nd} \text{ step: } \alpha_{1,c} = \beta_0 + \beta_1 INST_c + \varepsilon_c$$

- **We regress each of the estimated effects from the first step (slopes and intercept) on each of the institutional variables of interest**
  - . we analyze the effect of each institution separately.
  - . multivariate analysis (hold constant other relevant institutions)

- **We focus on the institutions that have tended to be highlighted in the existing theoretical or empirical literature of household debt outcomes**

[Estimations use all 5 implicates and are weighted by (i) population weights in part one and (ii) country sample size in part two]

1. SECURED DEBT:

- EXTENSIVE MARGIN: The Probability of Holding Debt

- INTENSIVE MARGIN: The Amount of Debt Held

- PRICE: Interest Rate of Secured Debt

2. UNSECURED DEBT: Extensive and Intensive Margin

1. SECURED DEBT:

- **EXTENSIVE MARGIN: The Probability of Holding Debt**

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- UNSECURED DEBT: Extensive and Intensive Margin

Figure in next slides shows:

- Country specific odds ratios relative to the omitted category for each group
- Probability of holding secured debt for the reference group

• in general, relationship between secured debt holding and age has the expected hump shape

• higher income, higher levels of education and employment are also associated with a greater likelihood of holding secured debt

• household size and composition matter

• obvious differences in the effects across countries of higher education, difference in education between household core members and most significantly of age and income

$$1^{st} \text{ step: } Y_{h,c} = \alpha_{0,c} + \alpha_{1,c} X_{h,c} + \varepsilon_{h,c}$$

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lincome

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•EXTENSIVE MARGIN: The Probability of Holding Debt

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• UNSECURED DEBT: Extensive and Intensive Margin

Figure in next slide shows:

- country level OLS estimates and their confidence interval (red dots and grey lines)

• across all countries:

    . the amount of secured debt is highest for households aged 16 to 34

    . higher income is associated with higher debt

• again, as in the case of holding debt or not, the most significant differences across countries occur in the estimated effects of age and income
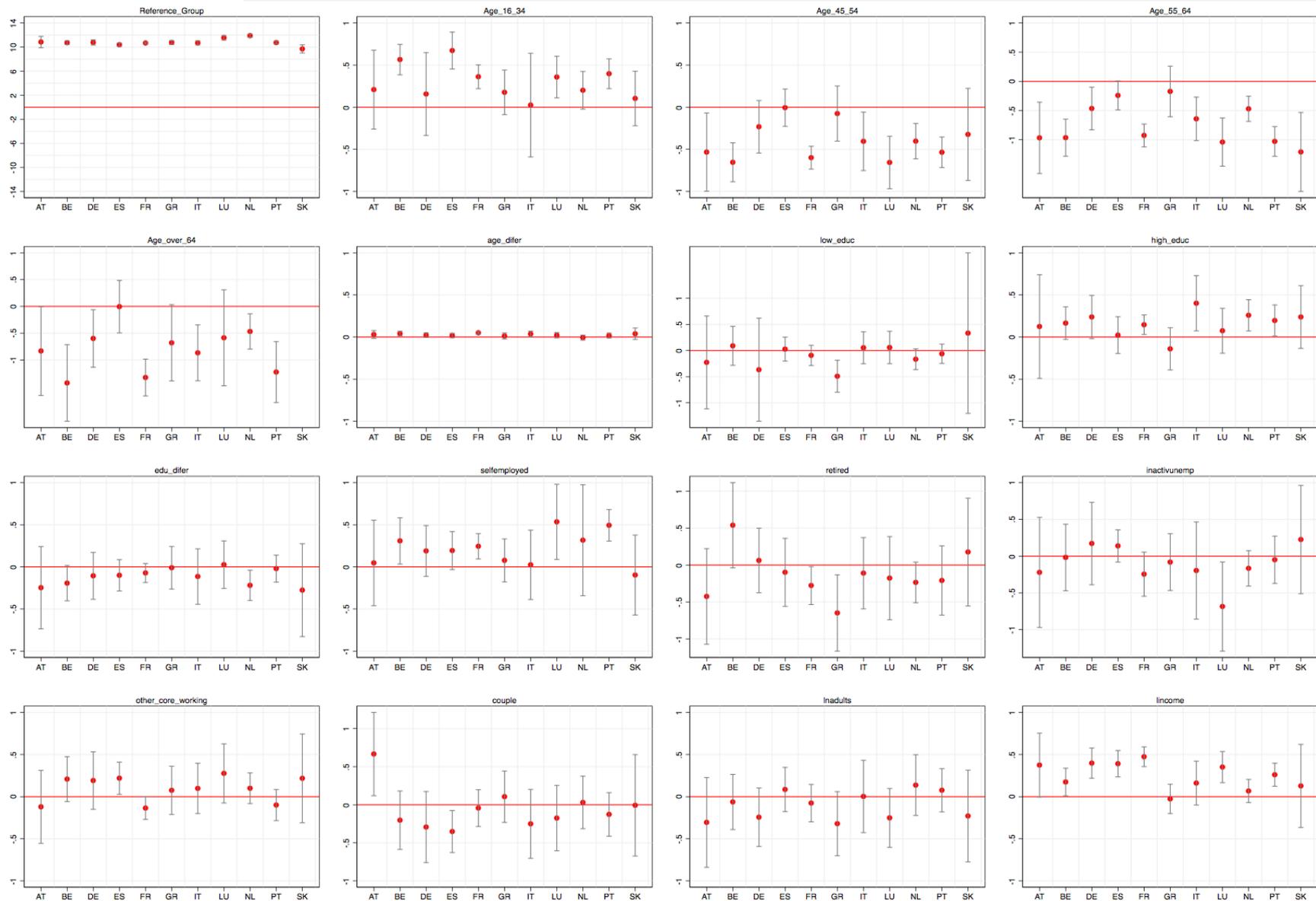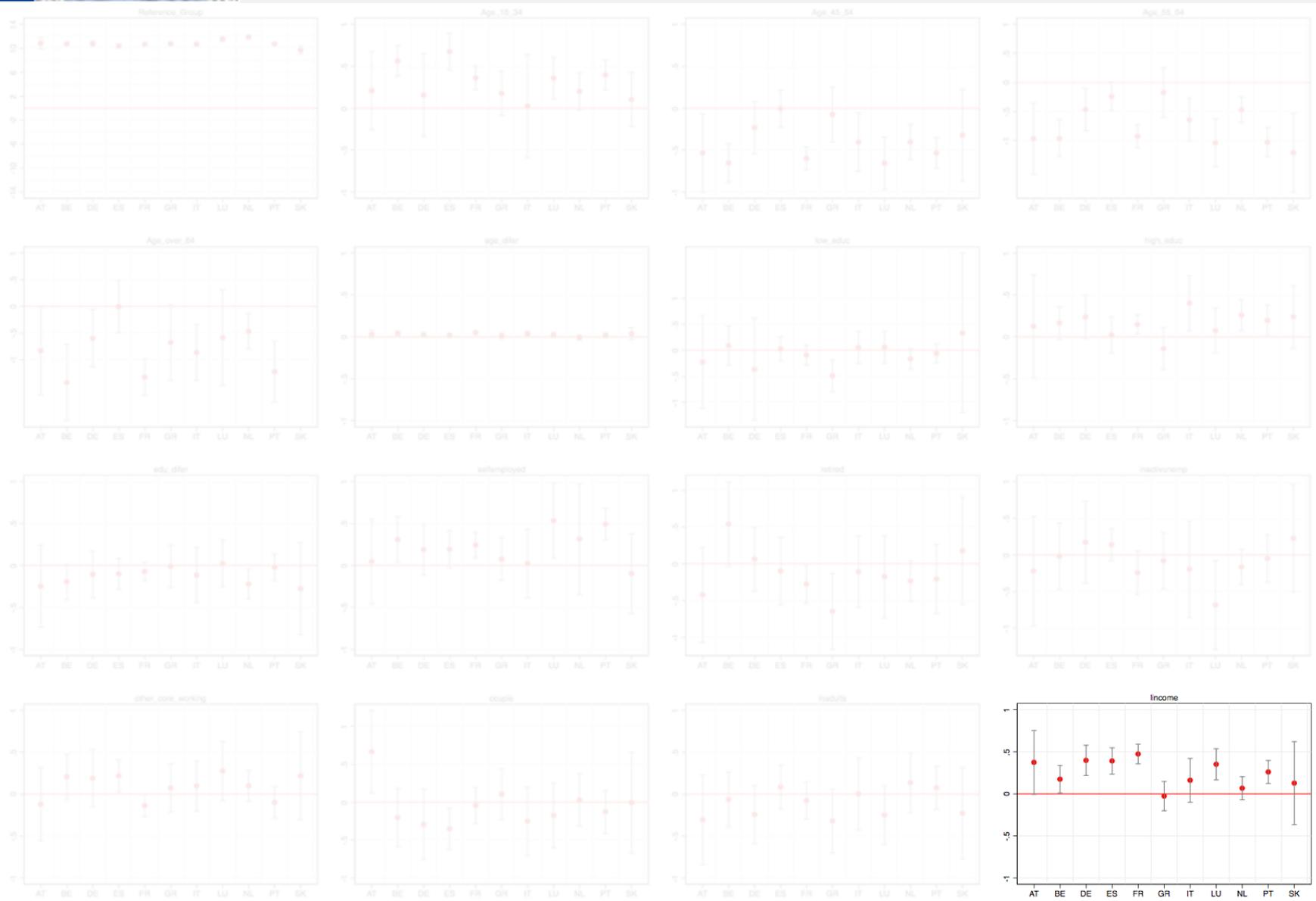
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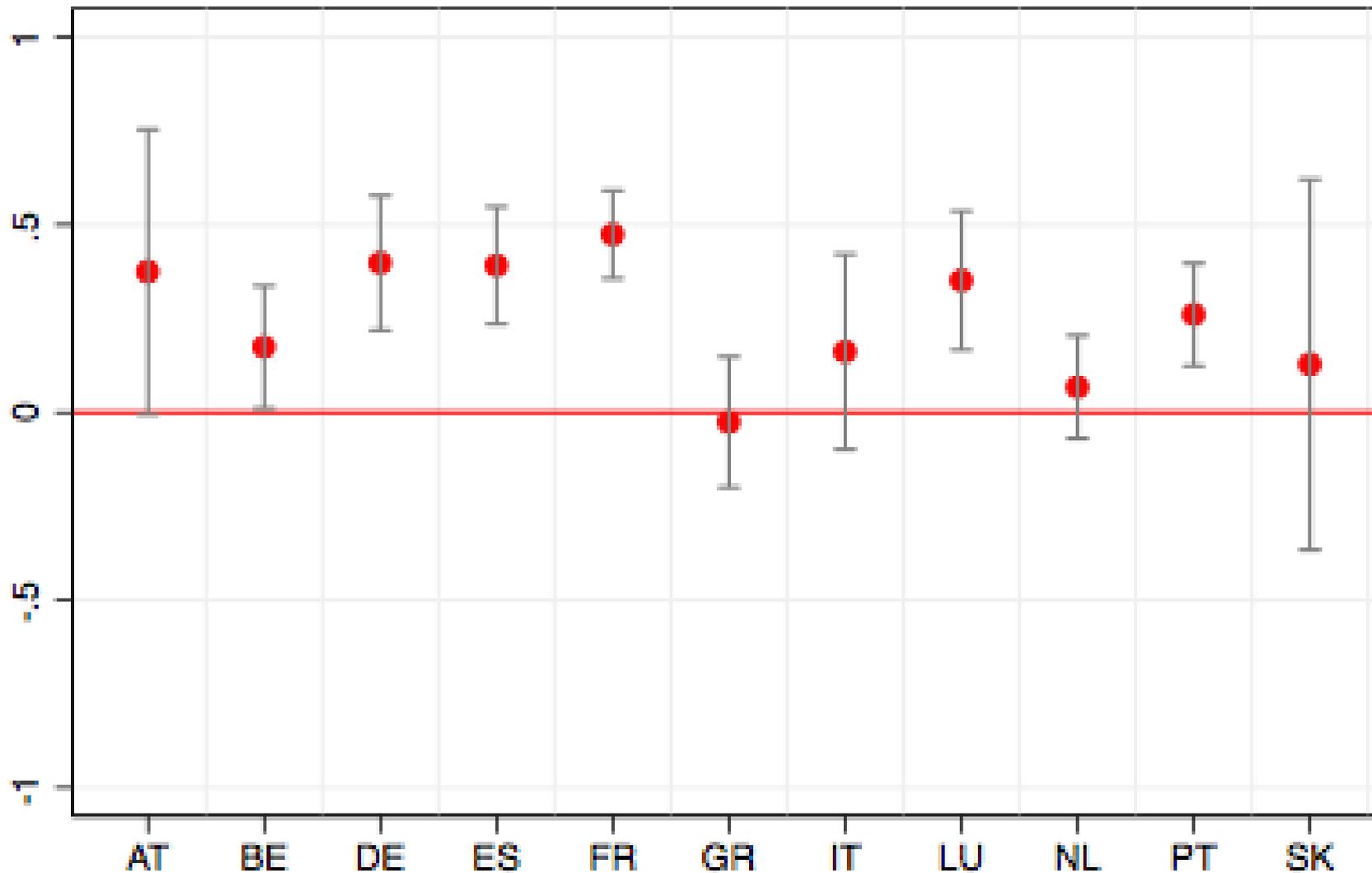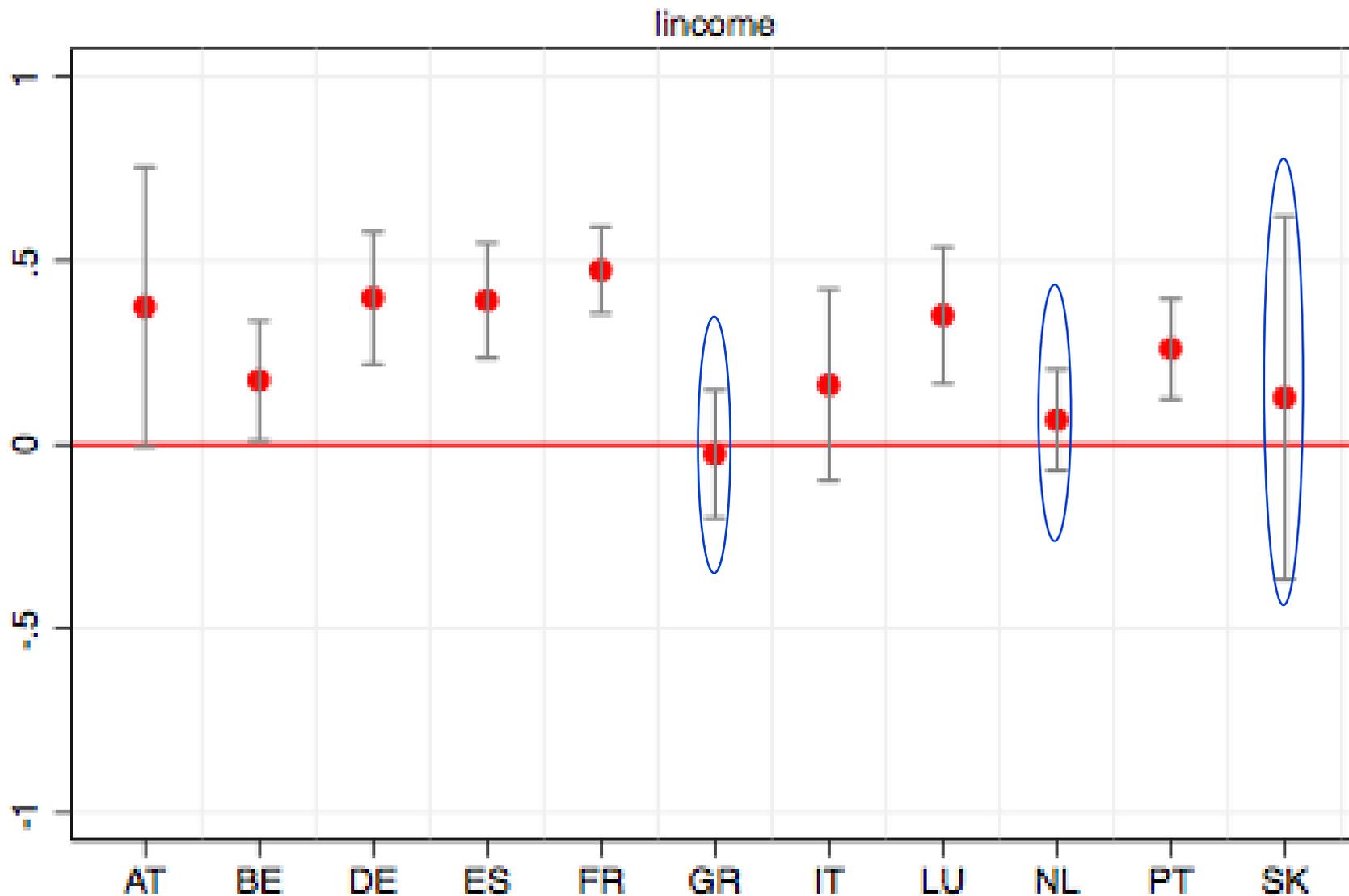
Next two slides:

-**To check if the effects of the covariates vary across the distribution of debt we estimate quantile regressions as well**

• **in general the QR results do not deviate too much from the OLS estimates**

• **there are some exceptions**

• **but it is worth noting that most of the variation across the distribution can be captured by the location-scale model**

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Legend: AT — BE — DE — ES — FR — GR — IT — LU ·· NL ·· PT ·· SK

1. SECURED DEBT:

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- UNSECURED DEBT: Extensive and Intensive Margin

Figure in next slide shows:

- country level OLS estimates and their confidence interval (red dots and grey lines)

• **rates across countries for RG range from 2.4 (LU) to 4.6 (DE)**

• **differences across countries by age although not generally significant**

• **higher income is associated with lower rates in many countries but not all**
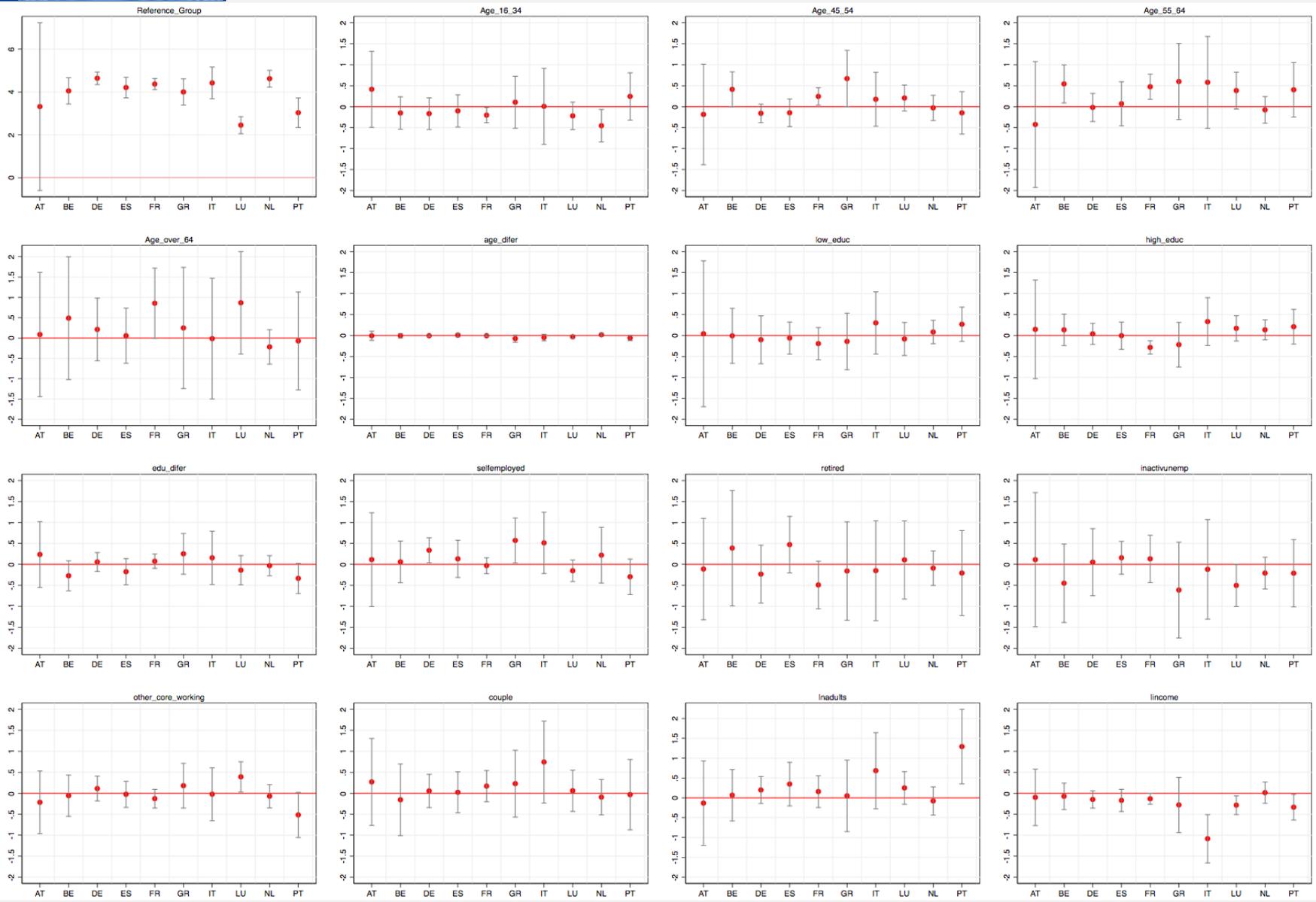
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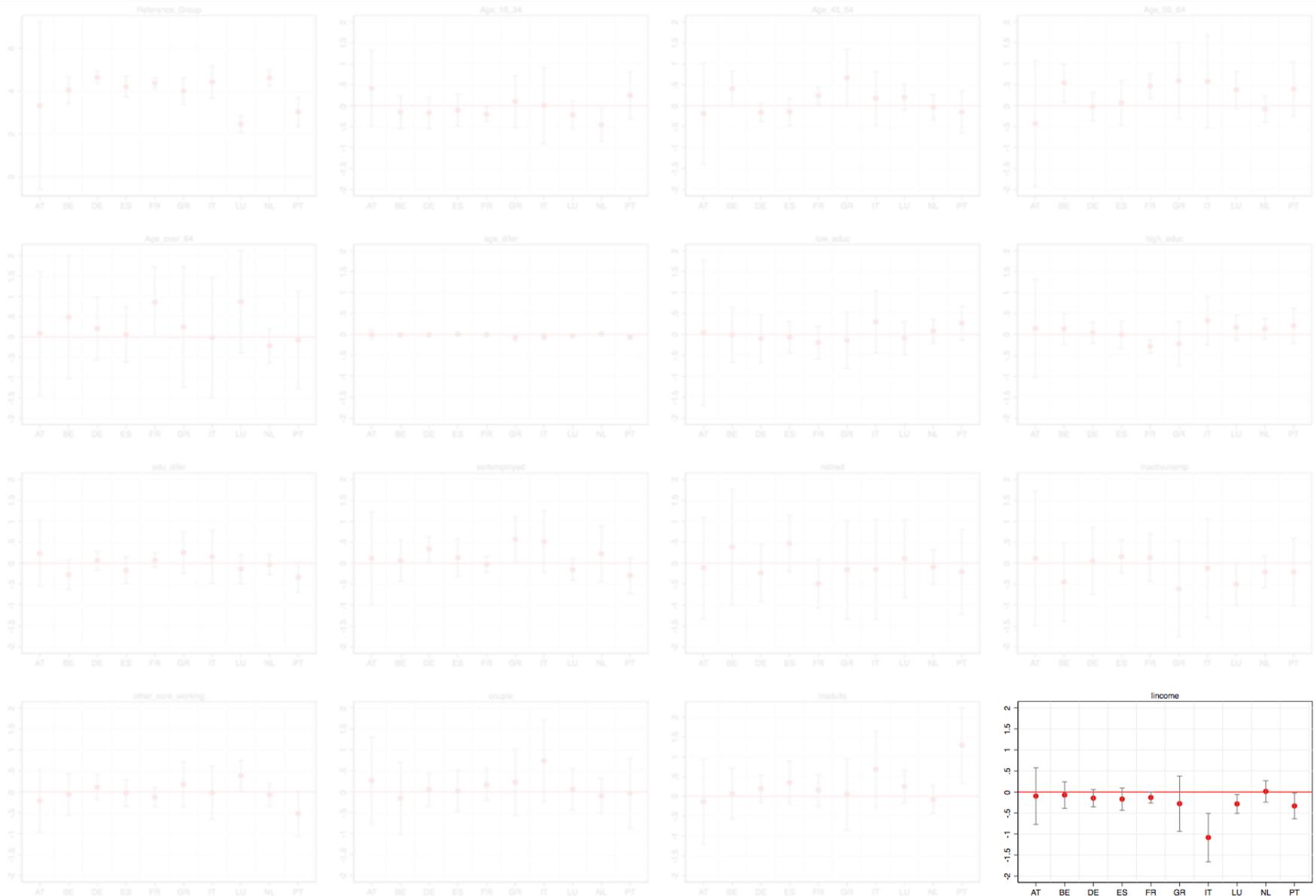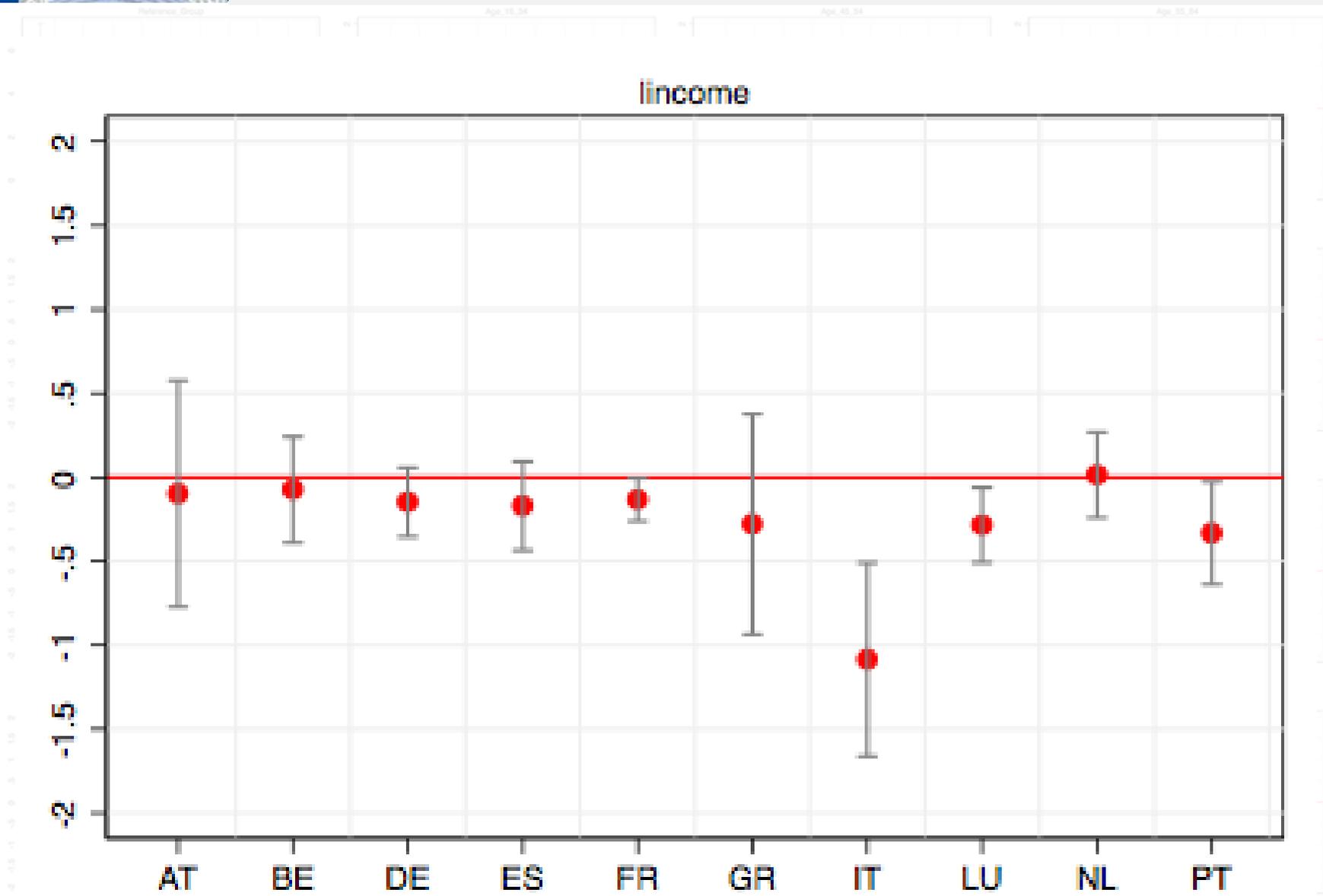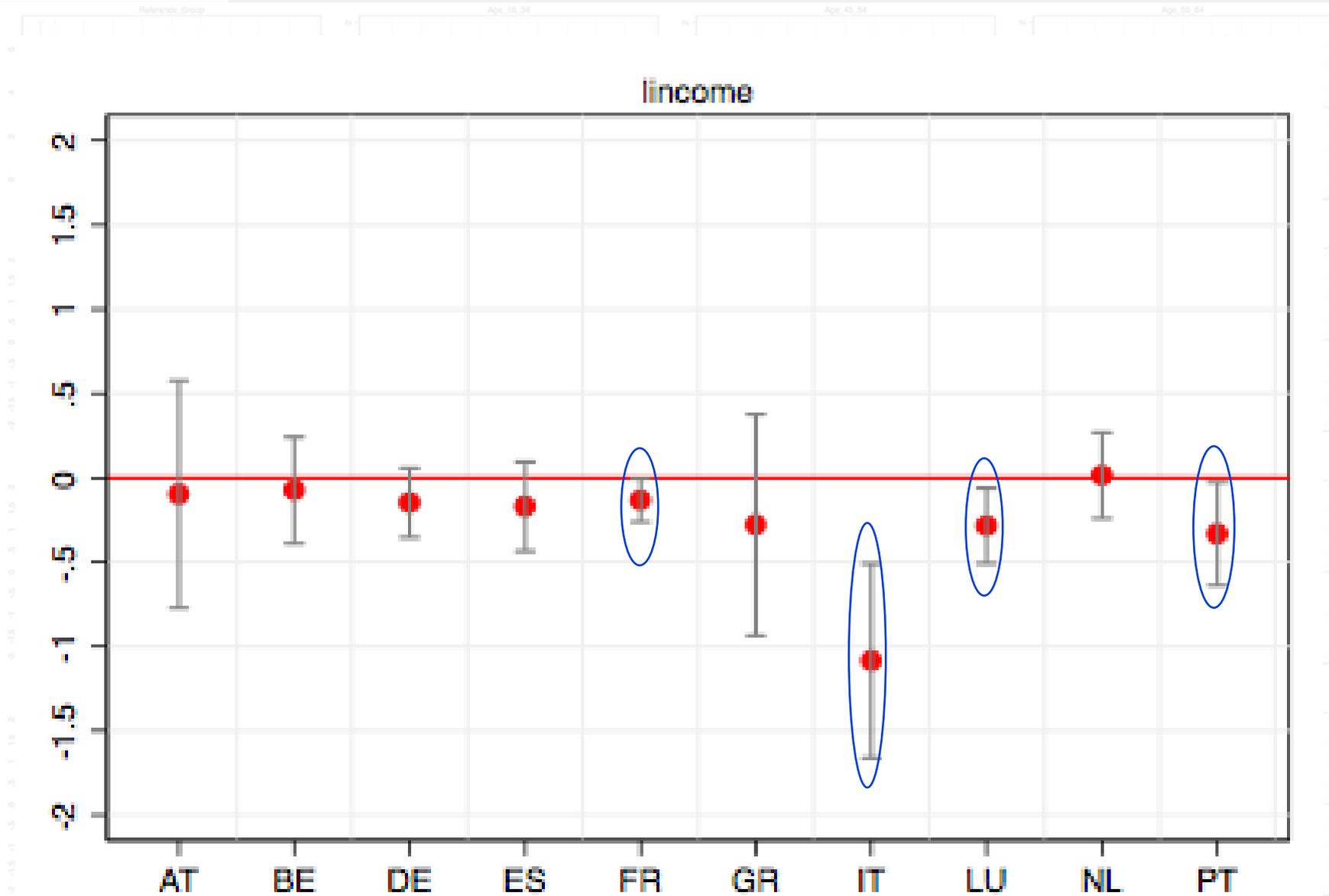
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• **UNSECURED DEBT:** Extensive and Intensive **Margin**
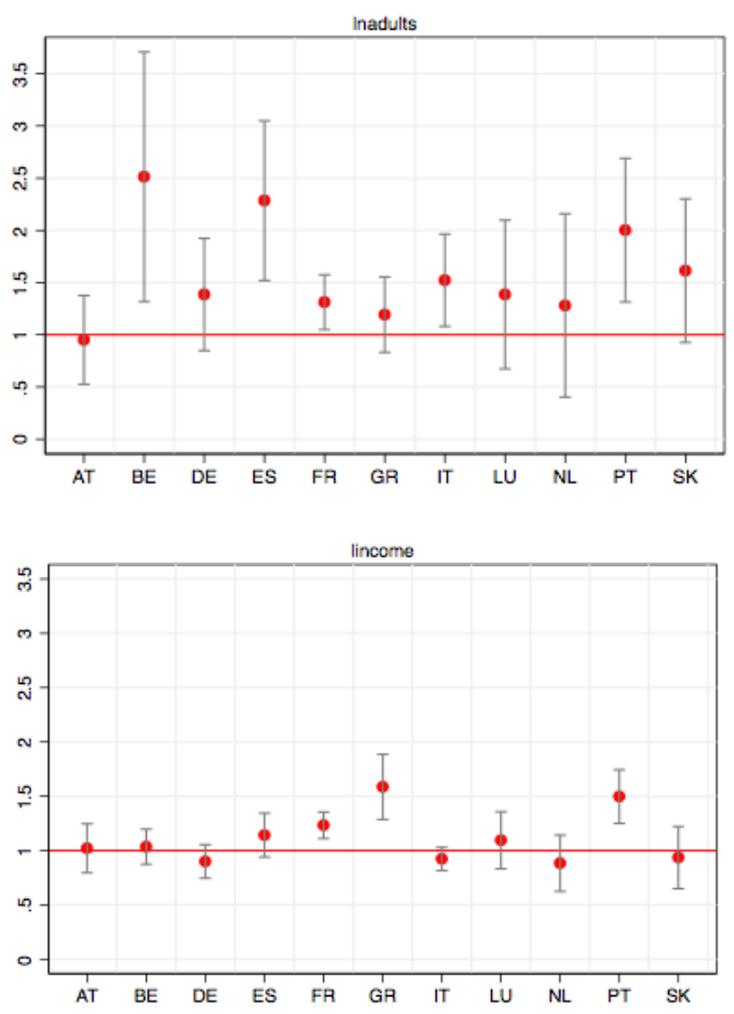
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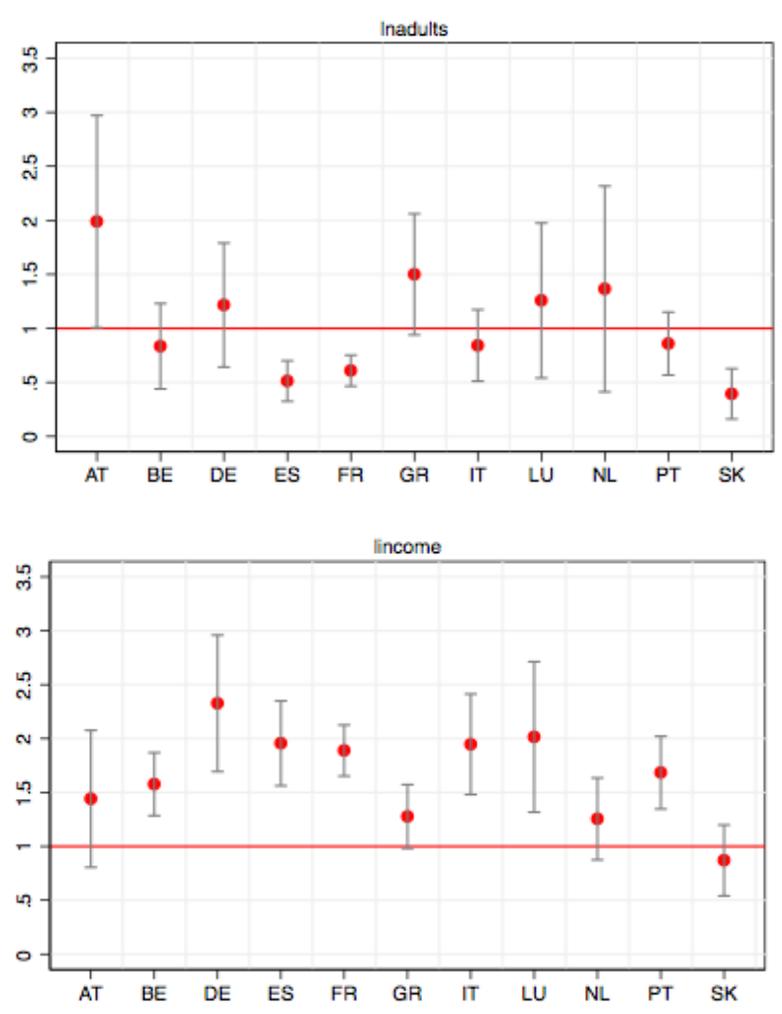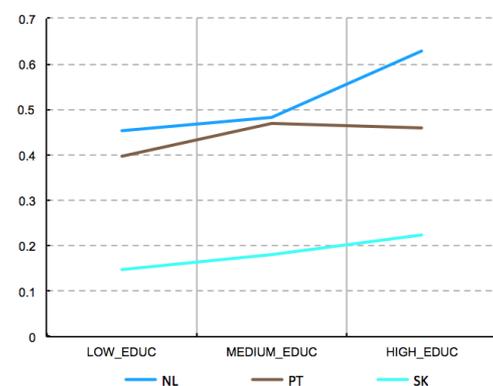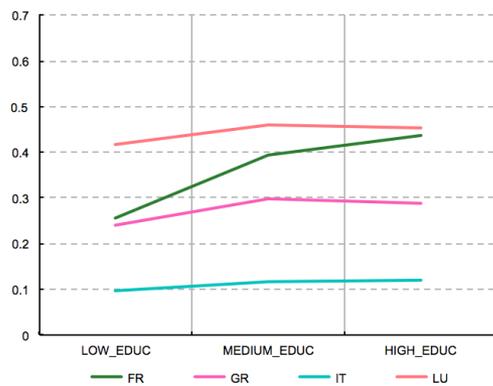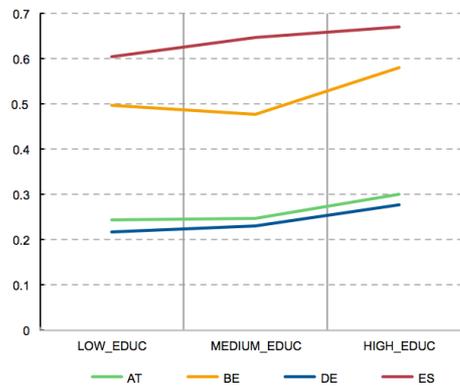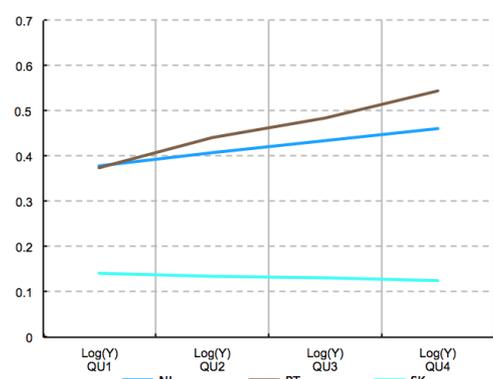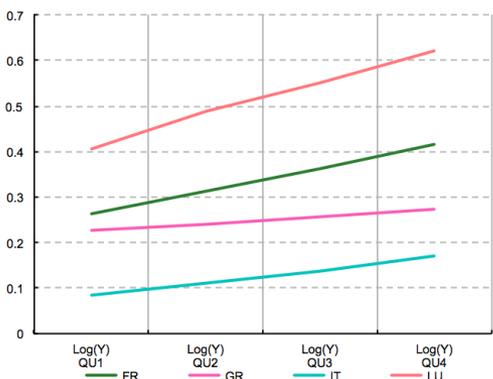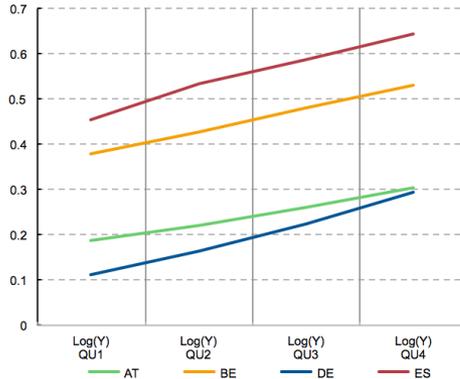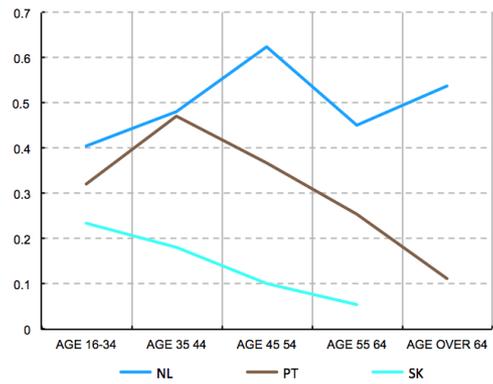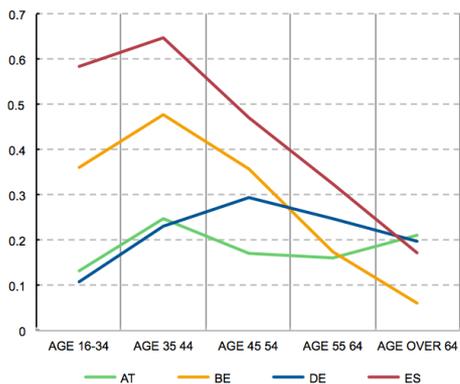
Coefficients from first step on institutions

- **Holding debt**

. probability for a reference/comparable group across countries to study level effects (reference group: age 35-44, medium education, employee, couple, no difference in age nor in education, other core member working, 2 adults, median income of the country)

. odd-ratios

- **Debt balance**

. mean for the same reference group

. OLS coefficients to see effect of institutions on age profile, income profile, etc.

[effects on quantile regression coefficients but not shown]

- **Interest rate**

. mean for the same reference group

. OLS coefficients

- **Effects considered (left-hand side)**

. constant/level, age, education, income, self-employment

Institutions

A. Legal enforcement

   A.1. Duration of foreclosure (months)

B. Regulation: fiscal and macro-prudential framework

   B.1. Taxation on mortgage payments: (i) wedge between market interest rate and the after tax cost of housing, (ii) deductibility or not, no limit on deductibility

   B.2. Regulatory LTV: existence of regulatory limit on LTV, regulatory limit (%)

C. Credit conditions

   C.1. Fixed-interest rate (if % of mortgages FMR for period longer than 10 years > 50%)

   C.2. Conditions that reduce initial payments:

   interest only payments (if % of i-only mortgage loans >10 %)

   C.3. Financial development proxy: depth of information on borrowers (0 to 6), math score (PISA)

Institution by institution

- **We analyze the effects of each institution separately, usually by simple regressions**

- **In some cases, an institution is captured by two complementary variables in particular:**

    . deductibility of mortgage payments and, in case of deductibility, whether there is a limit on the deductibility or not

    . existence of a regulatory LTV limit and, in case of existence, value of such limit

- **Also multivariate results allowing for various institutions**

Presentation of the results of the second part

- graphs where we group the charts into three columns

- first column shows impact of the institutional variables on the probability of holding debt of the reference group (in first row) and on the odds ratios of each of the socio-demographic characteristics as compared to the omitted category (from second to last row)

- second column shows the effect of institutions on the (log) amount of secured debt held (dependent variables by rows are the OLS coefficients from first part). Similarly, we also analyze the effect of institutions on the amount of debt held at various points of the distribution (10th, 50th, 90th percentile) but these are not shown

- third column shows the effect of institutions on the level of interest rate of the household main residence mortgage (dependent variables by rows are the OLS coefficients from first part)

Remark:

• **Slovenia not included in part two because very noisy estimates in the first part (as expected given number of indebted households in the sample)**

A.1. Duration of foreclosure: theory

• **Longer durations decrease bank recovery value in the case of non-repayment**

    . Somehow similar to the "existence of bankrupcy"

• **Theory focuses on consequences on *unsecured* debt, we study *secured* debt**

    . Costly repossession may turn secured debt into unsecured

• **Bankrupcy causes higher probability of non-repayment "priced in" group-specific higher lending rates (relative to European-style situation)**

    . Tertilt et al (2007), Hintermeier and Koeniger (2011), Chatterjee et al. (2007)

• **Simulations suggest bankrupcy makes US households less likely to borrow**

    . Young US households (mid-30s) specially affected

    . Low current income, high income risk, costly to accumulate assets

    . End up facing higher interest rates and borrowing less

A.1. Duration of foreclosure: measurement

- **Data available through European Mortgage Federation (data from 2007)**
  - . Source: questionnaires sent to national experts.

- **Questionnaire identifies comparable steps in the process of repossession in case of non-repayment in some EU countries.**
  - . Each step identified by minimum and maximum legal duration
  - . Ask for an assessment of typical duration.

- **Repossession periods in the sample vary between 5 months (NL) and 56 (IT)**
  - . Short durations in ES (8 months), AT or DE (9 months) or LU (10 months)
  - . Long durations in PT or GR (24 months), FR (20 months) or BE (18 months)

- **Length of repossession periods are persistent over time**
  - . Source: Study of EMF of periods in 1990 for a subsample of countries.
  - . Correlation between durations in 1990 and in 2007 is .83

A.1. Duration of foreclosure: comments on results

- **In countries where the repossession process takes longer, the reference group is less *likely to hold secured debt***

  . a one-month delay in the time to repossess leads to a 0.7 percentage point reduction in the chances of holding debt (statistically significant)

- **In terms of the *amount of debt held*, the impacts vary across the debt distribution, in particular the impact is larger in absolute value among youngest households**

- **Evidence supporting the notion of a differential *interest rate* treatment of high income borrowers**

  . longer foreclosures associated with relatively higher interest rates for low income households (effect precisely estimated)

A.1. TYPICAL DURATION OF FORECLOSURE (MONTHS)

REFERENCE GROUP

Holding Debt: -.00727
Debt Balance: -.00144
Interest Rate: -.00365

AGE

Holding Debt: .00609, -.00002, -.00175, -.00561
Debt Balance: -.00841, -.00224, -.00157, -.00673
Interest Rate: .00548, .01, .0184, .00496

INCOME

Holding Debt: .00139
Debt Balance: -.0046
Interest Rate: -.0168
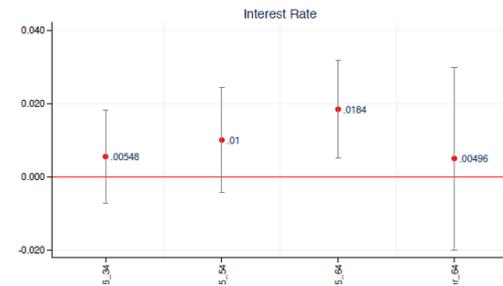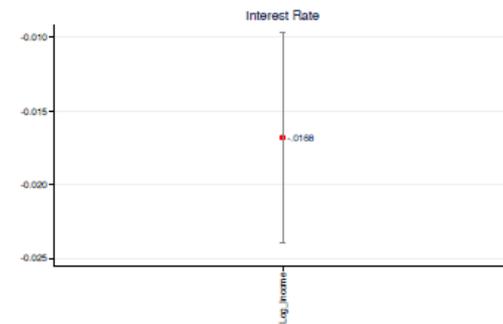
B.1. Taxation of mortgage payments: theory

- **Gervais (2002): OLG model with a down payment and housing consumption**
    - . Mortgage deduction + low taxation on imputed rents increase relative return on housing investments
    - . Incentive to overconsume housing over life-cycle

- **Generates age and income borrowing profiles in the US**
    - . Youth save to benefit from incentive early in the life-cycle.
    - . Mostly high income households able to save and afford down payment
    - . Progressivity of income taxes should reinforce the income profile

- **Interest rates are endogenous but not group specific**

B.1. Taxation of mortgage payments: measurement

FIRST MEASURE

- **Taxation on mortgage payments incentives measured using two dummies, so use a bivariate regression.**

- **An indicator for the existence of some tax deduction to mortgage payments.**
  - Countries without mortgage tax deductions: DE, SK

- **An indicator for countries without a limit to mortgage tax deductions**
  - The only country without any limit to tax deductions is NL

  Source: ECB (2009) Structural Issues Report

SECOND MEASURE

- **A continuous measure of housing tax incentives developed by Johanson (Source: OECD WP, forthcoming)**
  - . Wedge between market interest rate and the after tax cost of housing
  - . 100% LTV, a house worth 6 times the average wage, single, median income

B.1. Taxation of mortgage payments: comments on results (continuous measure)

- **Positive association between tax relief and the chances that RG holds debt**

- **Tax relief also positively correlated with higher amounts of debt by RG**

- **Tentative evidence of a pass-through of the tax relief into higher i-rates**

- **Basic prediction about age profile not confirmed**
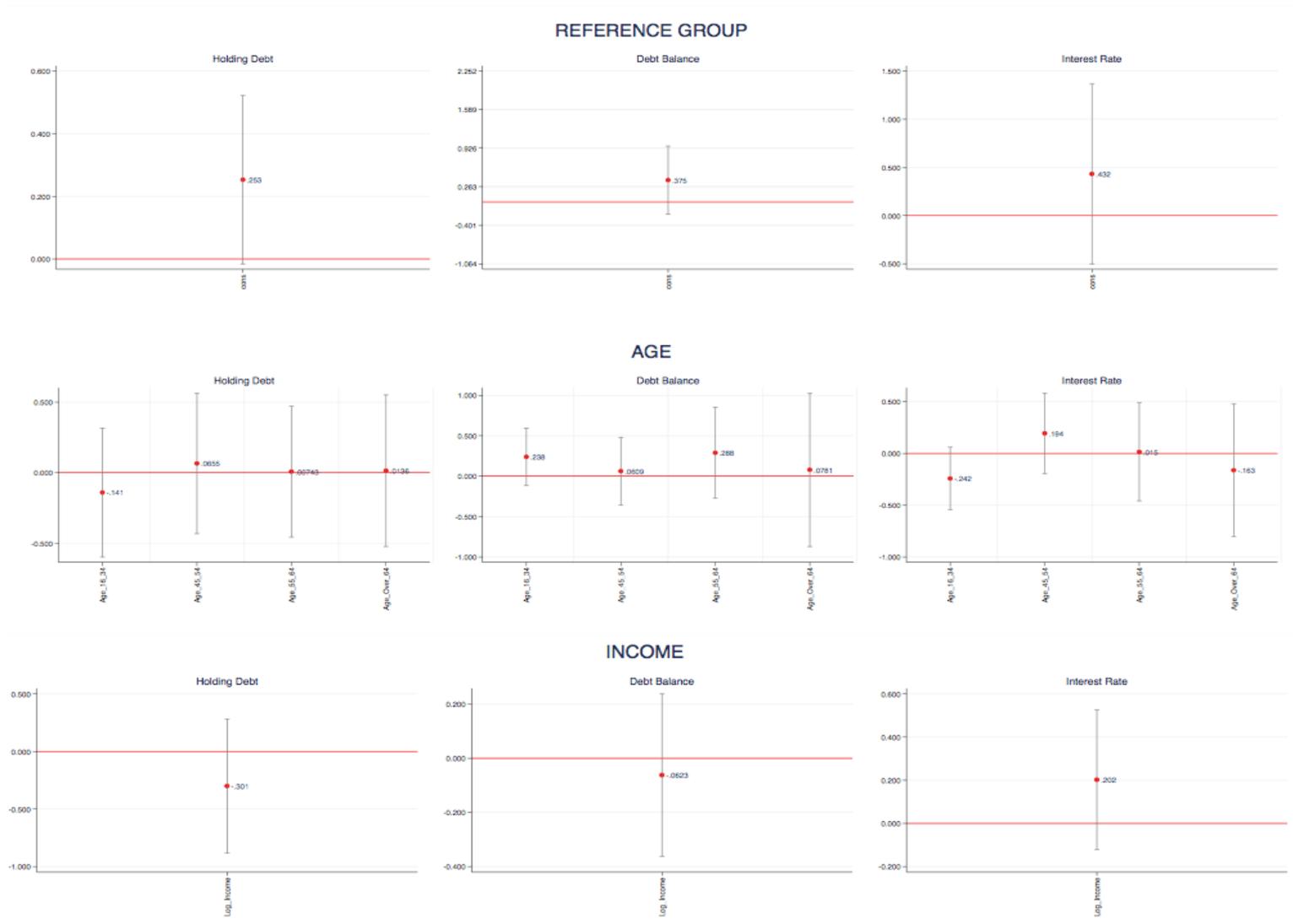
B.1. Taxation of mortgage payments: comments on results (two dummies)

(Bivariate regression: one slide with results for each variable)

- **The reference group in countries with tax exemption on mortgage payments is 17 pp more *likely to hold secured debt* (not precise)**

- **When examining the *amount of debt*, the absence of a limit to tax deductibility further increases the amount of debt held by the reference group in countries with tax exemption (although very imprecise), specially at the top decile of the debt distribution (not shown)**

- **There is actually evidence of an age profile in the response of the probability of having debt and some age profile can also be detected in the response of the debt amount** (not when using the continuous measure by Johanson)

- **No evidence of response of the income profiles to mortgage tax relief**
  - *.* may be partially explained by the positive (but not significant) correlation between interest rates and income for countries without a limit on deductions?
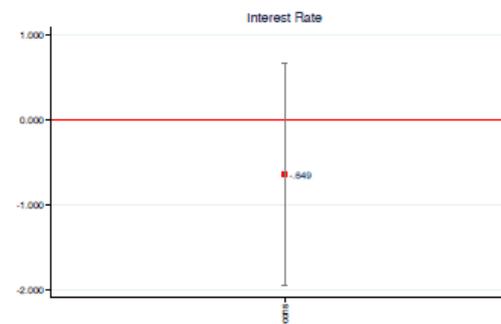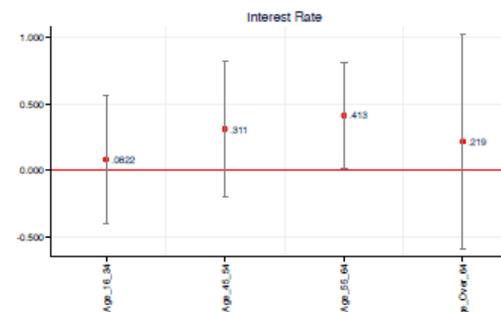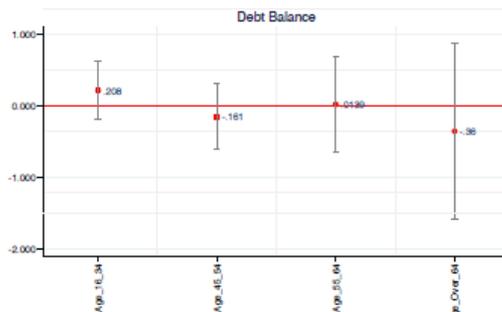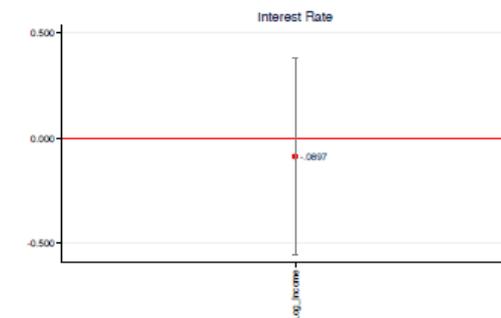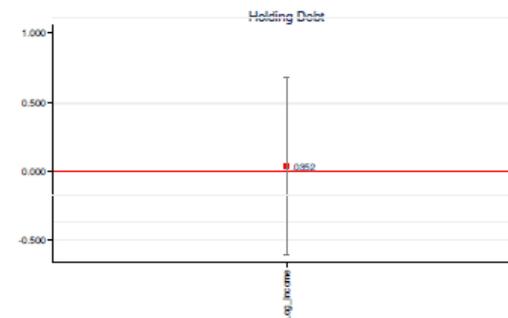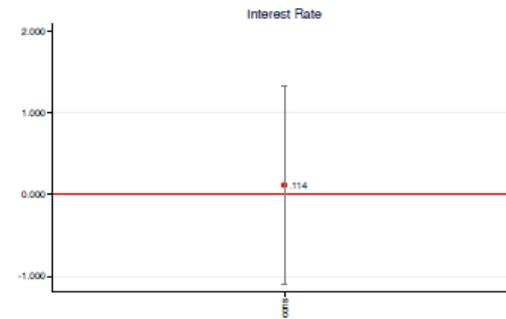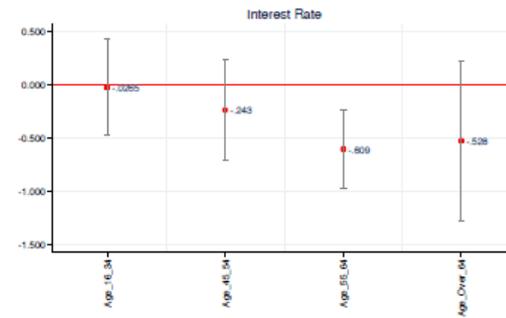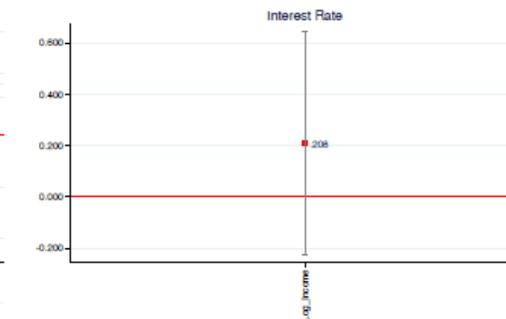
B.2. Regulatory Loan-to-Values: theory

- **Ortalo-Magné and Rady (1999,2006): OLG model with a housing ladder**
  - . Credit constraints for the youth
  - . Interest rates are exogenous
  - . Supply of housing is inelastic
- **The relaxation of LTVs alters the age profile of borrowing**
  - . Low-income youth -who would otherwise rent- borrow and purchase flats
  - . Sold by the elderly
- **Higher LTVs increases the amount of debt**
  - . Among the youths (mechanically, higher LTV)
  - . Unclear pattern among older households

- **Simulations by Chambers et al (2009a,b) emphasize that overall increases in LTVs mainly increase (non group-specific) interest rates**
  - . Little impact on age profiles

B.2. Regulatory of Loan-To-Values: measurement

- **Loan to Values measured using two variables**

1. **Existence of a threshold above which:**

   . Extra provisioning needed under Basel II or

   . Limits applying for bonds to be eligible as collateral for covered or mortgage bonds.

   > . All euro area countries have a regulatory limit but BE, NL, LU and AT (for the first three, the source is ECB, 2009).

2. **Within the set of countries with a maximum Loan to Value, the lowest threshold between extra provisioning and limit for covered bonds**

   Variation between 60% (DE, FR) and 80% (IT,ES)

→→ **Bivariate regression with two different dummies**

   . One slide per variable

B.2. Regulatory of Loan-To-Values: comments on results
(Bivariate regression: one slide with results for each variable)

- **No robust effects on the probability of holding secured debt for the RG**

  . but an overall positive effect of an increase in the value of the LTV limit on debt holding by the very young is present in the data

- **Still, differences in LTV are useful to understand a handful of facts about the *distribution of debt amounts***

  . the average debt held by the reference group in a country with a maximum LTV limit is 49% lower than in a country with no such limit

  . the decrease in the amount of debt held in those countries is larger among the youngest than among the 45 to 54 years old

  . we find some effects suggesting that low income households expand their borrowing the most when the maximum LTV ratio increases

- **We find little evidence that either the absence of a regulatory maximum LTV or an increase in the value of the limit result in higher i-rates charged to the RG (but find it for the very young)**
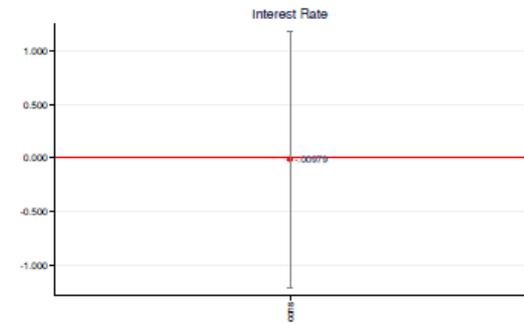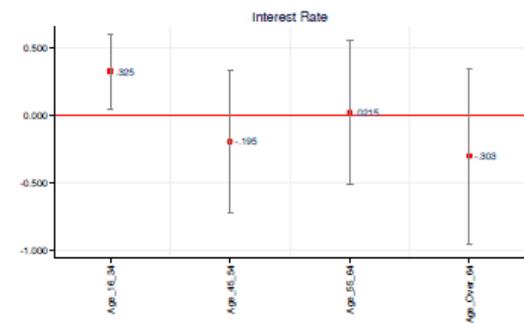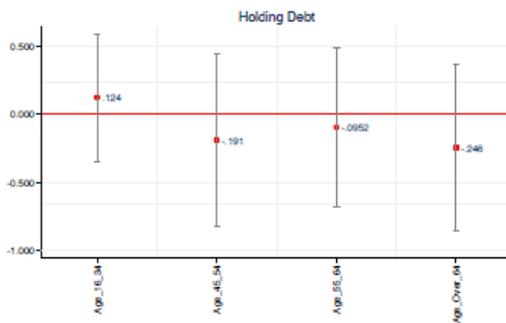
REFERENCE GROUP

AGE

INCOME
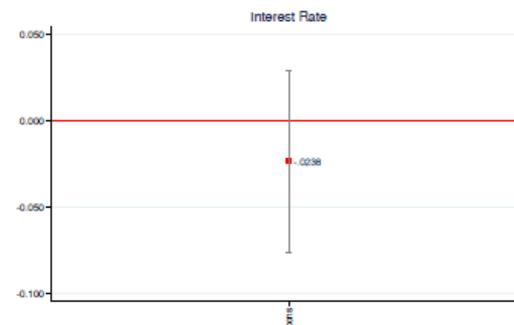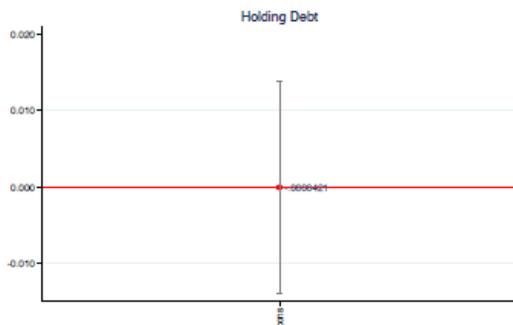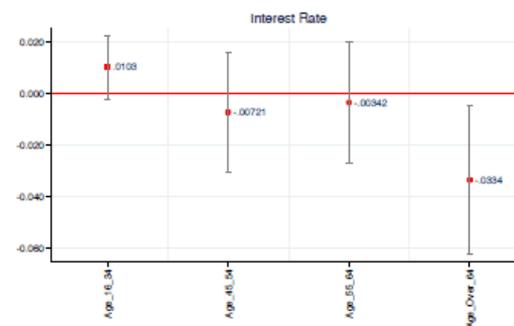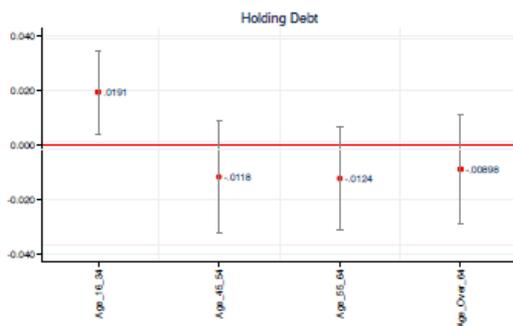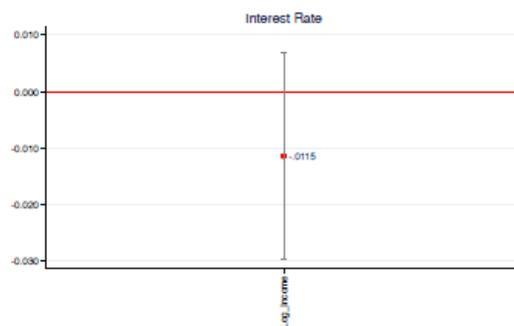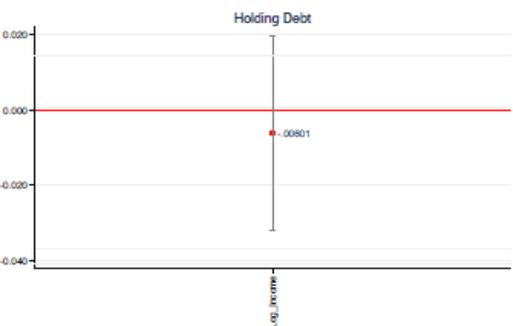
C.1. % mortgages with fixed interest rate: theory

- **Campbell and Cocco (2003) simulate household's welfare under FRM and ARM**
  - . Calibrated to US

- **FRM's main advantage is low income risk – at the cost of substantial capital risk.**
  - . If households unable to borrow short-term, fluctuations in ARM installments cause disutility

- **Prevalence of FRMs should increase access to borrowing among risky households**
  - . Self-employed, low schooling
  - . Fixed term contracts?

- **Unclear predictions about the *amount* borrowed**

C.1. % mortgages with fixed interest rate: measurement

- **Prevalence of FRMs measure taken from ECB (2009)**
    - . Proportion of loans with first fixed interest rates period of at least 10 years.
    - . Survey in 2007 to institutions lending in the euro area.

- **Members of euro area can be divided into ARM- countries and FRM- countries (IT and DE are mixed cases)**
    - . FRM: BE, NL, FR
    - . ARM: PT, ES, GR, SK,

- **Prevalence probably reflects situation in 2007, not when the average loan in our sample was taken.**
    - . Given the patterns above, we present results with a dummy "prevalence above 50%".
    - . Results similar if we use prevalence in 2007.

C.1. % mortgages with fixed interest rate: comments on results

- **Focus on self-employed (and other income risk households e.g. low educated)**

    . prevalence of FRMs is associated with a greater likelihood of holding secured debt by those groups

- **Prevalence of FRM is reflected in higher i-rates for the reference group (as such products entail larger risks for financial institutions)**

    . countries with prevalence of FMR mortgages charge i-rates 74 basis points higher (s.e. 30bp)

    . interestingly, no effect of higher interest rates to self-employed

- **Propensity of the RG to hold debt not much affected by the prevalence of FMR**
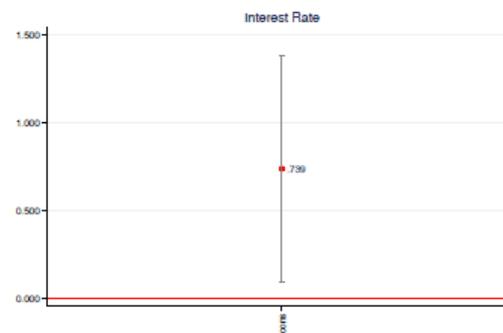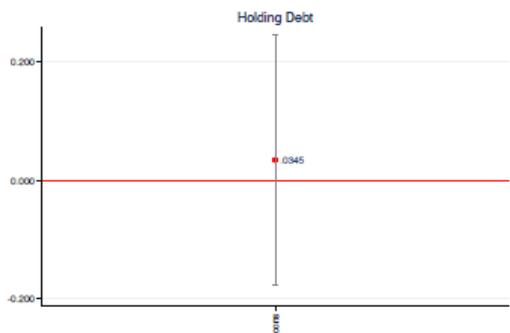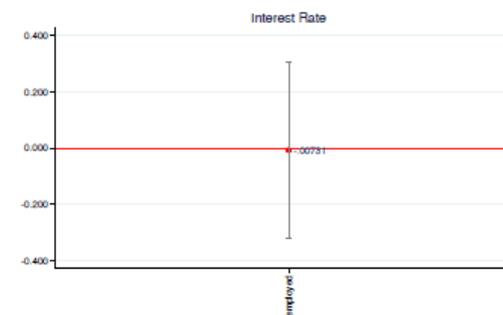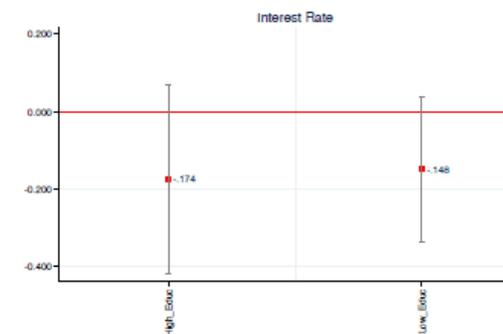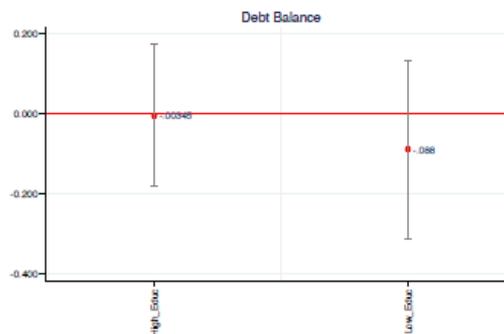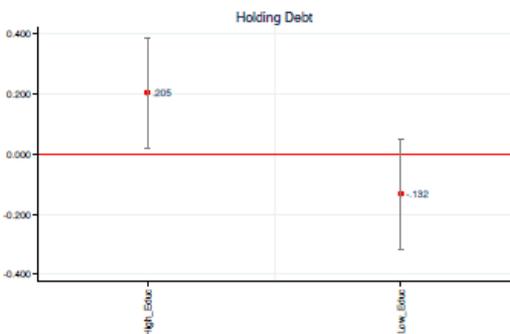
C.1. Credit conditions that reduce initial payments: theory

- **Basic permanent income model: credit constrained households borrow if (early) mortgage installments are low**

- **Instruments allowing lower initial payments change profiles of borrowing**
    - . Increase borrowing among youths or low income households.
    - . Caveat: age profile hard to detect in a cross-section, as those institutions also delay repayment of principal.

- **Expand borrowing among highest income growth households**
    - . College

- **Chambers et al (2009) confirm age and income profiles using OLG models (with i-only mortgages rolled into fixed rate mortgages)**

C.1. Credit conditions that reduce initial payments: measurement

- **The source of information is ECB (2009)**
    - . Questionnaire to survey experts,

- **Fraction of mortgages with interest only payments in the first three years**
    - . Varies between 0% (IT) and 33% (NL)
    - . Rare in DE (0.9%), GR (1.5%) or FR (3.5%), more common in AT (18%) or PT (10%)

- **Use indicator of whether the fraction exceeds 10%.**

Comments on results in next slide

- **No significant patterns found; impacts are not precise**

- **Similar imprecision when we use long maturities or products that allow unilateral maturity extension**

C.1. Credit conditions that reduce initial payments: comments on results

• No significant patterns found; impacts are not precise

• Similar imprecision when we use long maturities or products that allow unilateral maturity extension

REFERENCE GROUP

Holding Debt · .0575

Debt Balance · .335

Interest Rate · -.538

INCOME

Holding Debt · -.296

Debt Balance · -.0586
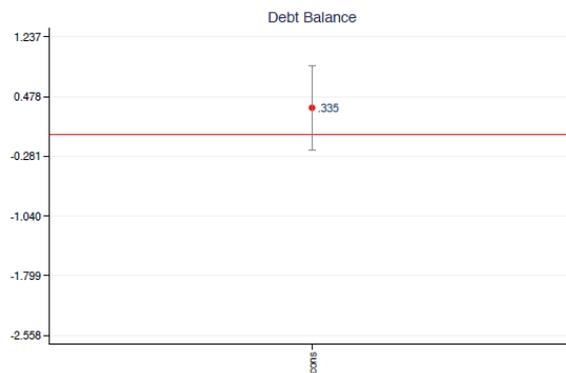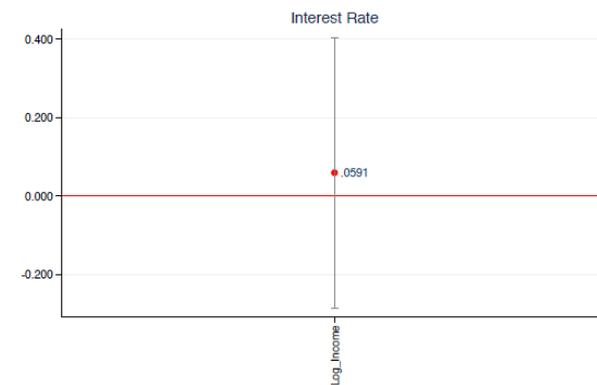
Interest Rate · .0591

C.3. Information on borrowers
(proxy for financial development)

- **Ability to process information about borrowers should allow banks to price risk properly**

    . increase interest rates for default-prone households

    . otherwise not observed being granted credit

- **The cross-sectional variance of interest rates should increase (Edelberg, 2009)**

- **Unclear effect on propensity to hold debt or amount of debt held**

- **Measure from the Getting Credit index of the World Bank**

    . Index varies from 1 to 6

C.3. Information on borrowers: comments on results

- In countries with (one point) deeper information on borrowers (e.g. credit registries) the RG has a lower probability of having secured debt (7%, not precise)

- Better information about borrowers permits "better" pricing of loans to young households; probably as a consequence, we see a precisely estimated age profile of the amount borrowed

- Higher i-rates for default-prone households (that we identify as the young or self-employed) when there is more information about borrowers
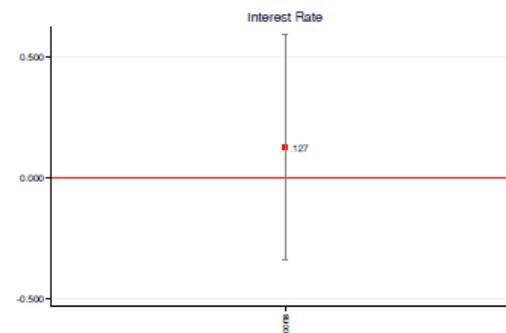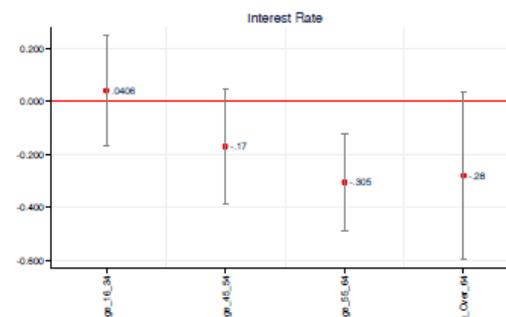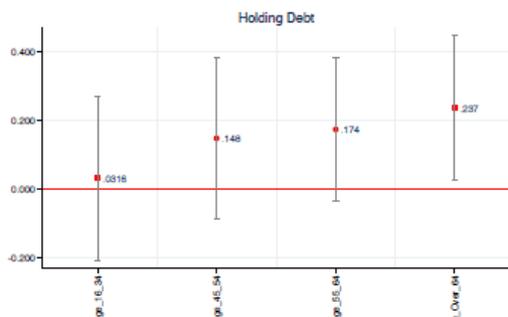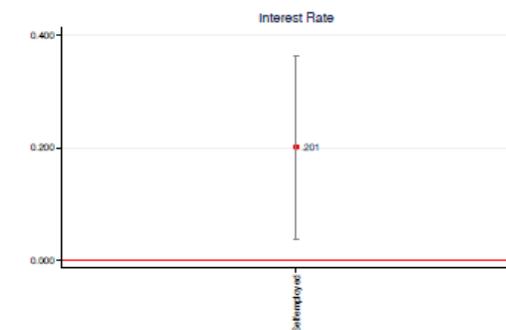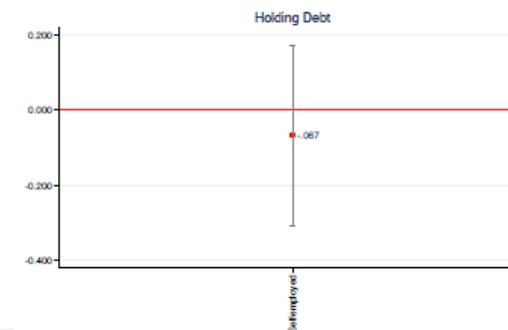
Multivariate analysis

- **So far we have reported simple cross-country regressions of debt-related magnitudes on institutions following theoretical literature**

    . treating the set of countries as a (small sample) of an underlying population of countries

    . standard errors reflect (i) variance of the coefficients across the population of countries and (ii) sampling variance of the first step estimates

- **We also perform a multivariate analysis to (i) control for share of FRM, (ii) analyze the relative importance of various institutions**

    . we take the within sample regressions of the first stage coefficients on each institution as the quantities of interest

    . s.e. only reflect sampling error in the first stage coefficients

    . comparable to the conventional standard errors calculated by default in the pooled version of the 2nd stage estimator

Multivariate results: sample-average multiple regressions

Table 4.1. Multivariate analysis: HOLDING DEBT

CONTROL VARIABLES	RG	AGE				EDUCATION		SELFEMP	INCOME
		16_34	45_54	55-64	Over_64	Low	High		
time_foreclosure_15	-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)
tax_ded_20	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)
tax_ded_nolimit_21	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)
ltv_dummy_32	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)
ltv_31_bis	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_dummy_8	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_information_27	-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 4.2. Multivariate analysis: DEBT BALANCE

CONTROL VARIABLES	RG	AGE				EDUCATION		SELFEMP	INCOME
		16_34	45_54	55-64	Over_64	Low	High		
time_foreclosure_15	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)
tax_ded_20	-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)
tax_ded_nolimit_21	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)
ltv_dummy_32	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)
ltv_31_bis	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_dummy_8	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_information_27	-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 4.3. Multivariate analysis: INTEREST RATE

CONTROL VARIABLES	RG	AGE				EDUCATION		SELFEMP	INCOME
		16_34	45_54	55-64	Over_64	Low	High		
time_foreclosure_15	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)
tax_ded_20	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)
tax_ded_nolimit_21	-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)
ltv_dummy_32	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)
ltv_31_bis	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_dummy_8	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_information_27	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)

1. t-values in parentheses
2. Constant included in all specifications but not reported

Summary on institution effects
(Holding other institutions constant)

- **Time to repossession correlates strongly with many of the patterns of interest.**

    Longer time to repossession:

    . diminish chances that RG has secured debt (+1 month, -1pp)

    . diminish relatively less the chances of borrowing of the over 45

    . affect pricing of loans (relatively higher i-rates to low income households)

- **Mortgage tax exemptions**

    . conditional on borrowing, average secured debt amount held by RG is 1.38 points larger in countries without a limit on mortgage deductibility

    . no effect on probability of holding secured debt

    . some positive correlation between i-rates charged to RG and tax deductibility

Summary on institution effects (cont.)
(Holding other institutions constant)

- **Regulatory LTVs**

  . once all other institutions are taken into account, variation in regulatory LTV does not correlate with the fraction of borrowers or the amount borrowed

  . may be consequence of the (counter-intuitive) positive correlation found between existence of LTV limit and higher i-rates

- **Prevalence of FRMs**

  . consistent with simple supply side effects, correlates with higher i-rates charged to RG

- **Socio-economic and demographic factors are important correlates of household debt**

  . But considerable heterogeneity in the relative importance of these factors across countries

- **Among the institutions we consider, length of repossession best explains these differences**

  . One standard deviation longer time to repossess (15 months) associated with

    . 10 to 16 percent lower chances that the RG holds secured debt.

    . varying impact on amounts by age/cohort (falls by 12% among households 18-34 and 6% among over 45).

    . interest rates paid by lower-income households are 30 bp higher.

- **Absence of limits to tax deductibility accounts for higher debt amount**

- **Variation in LTVs, depth of information about borrowers or in low-initial payment mortgages → do not account for the distribution of debt across countries and groups of the population.**

THANK YOU

SAMPLE SIZE: HOLDING SECURED AND UNSECURED DEBT

COUNTRY	WHOLE SAMPLE	HAS SECURED DEBT		HAS UNSECURED DEBT	
		N° of obs	%	N° of obs	%
AUSTRIA	2,380	413.0	17.4	475.8	20.0
BELGIUM	2,327	696.2	29.9	534.8	23.0
GERMANY	3,565	1,003.6	28.2	1,148.6	32.2
SPAIN	6,197	1,610.0	26.0	1,399.8	22.6
FINLAND	10,989	4,061.0	37.0	6,263.0	57.0
FRANCE	15,006	3,837.0	25.6	4,452.0	29.7
ITALY	7,951	723.0	9.1	1,318.0	16.6
LUXEMBOURG	950	405.0	42.6	358.2	37.7
NETHERLANDS	1,301	722.4	55.5	409.4	31.5
PORTUGAL	4,404	1,116.8	25.4	797.2	18.1
SLOVAKIA	2,057	243.0	11.8	453.4	22.0

Figure 1: OVERVIEW OF DEBT OUTCOMES ACROSS EUROZONE COUNTRIES
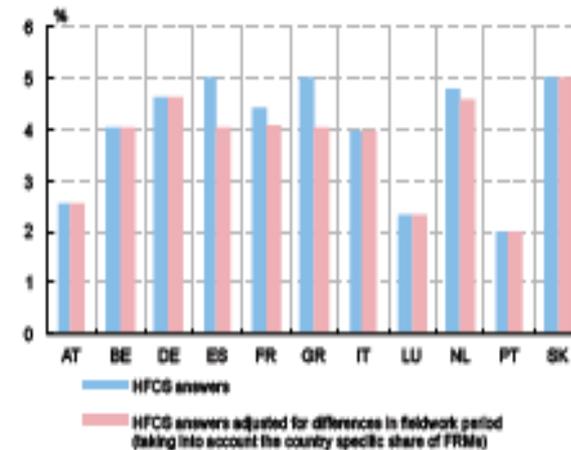
COUNTRY / INSTITUTIONAL VARIABLES	AT	BE	DE	ES	FR	GR	IT	LU	NL	PT	SK
A. Legal enforcement											
A.1. Foreclosure procedures											
Typical duration of a foreclosure procedure (in months)	9	18	9	8	20	24	56	12	5	24	...
Typical cost of foreclosure (% of loan)	8	19	8	10	10	16	...	9	4	8	...
B. Regulation: 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

Source: BSCB, IMD, OECD, World Bank.