Keeping up with the Novaks? Income Distribution as a Determinant of Household Debt in CESEE

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Experiences and Challenges in Measuring Income and Wealth in CIS Countries and Eastern Europe
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Introduction and Motivation

- Importance of determinants of household debt:
  - Rapid increase in household lending in CESEE[1] before 2008 (up to 40%)
  - Since then: debt to GDP ratio nearly constant (26% nonweighted average), lower than Euro Area
  - Financial stability concern: household debt levels above 30% of GDP could threaten macrofinancial stability (IMF 2017)
- Is the distribution of income a determinant of household consumption?
  - Standard theories (e.g. life-cycle hypothesis) suggest that permanent income decreases should lead to lower consumption and borrowing
  - Consumption of poor US households increases with higher top income / consumption levels, especially visible goods (Bertrand & Morse, REST 2016)
  - Households invest in status goods to reveal their income rank, with a stronger effect in regions with higher income inequality (Bricker, Ramcharan, Krimmel 2014)

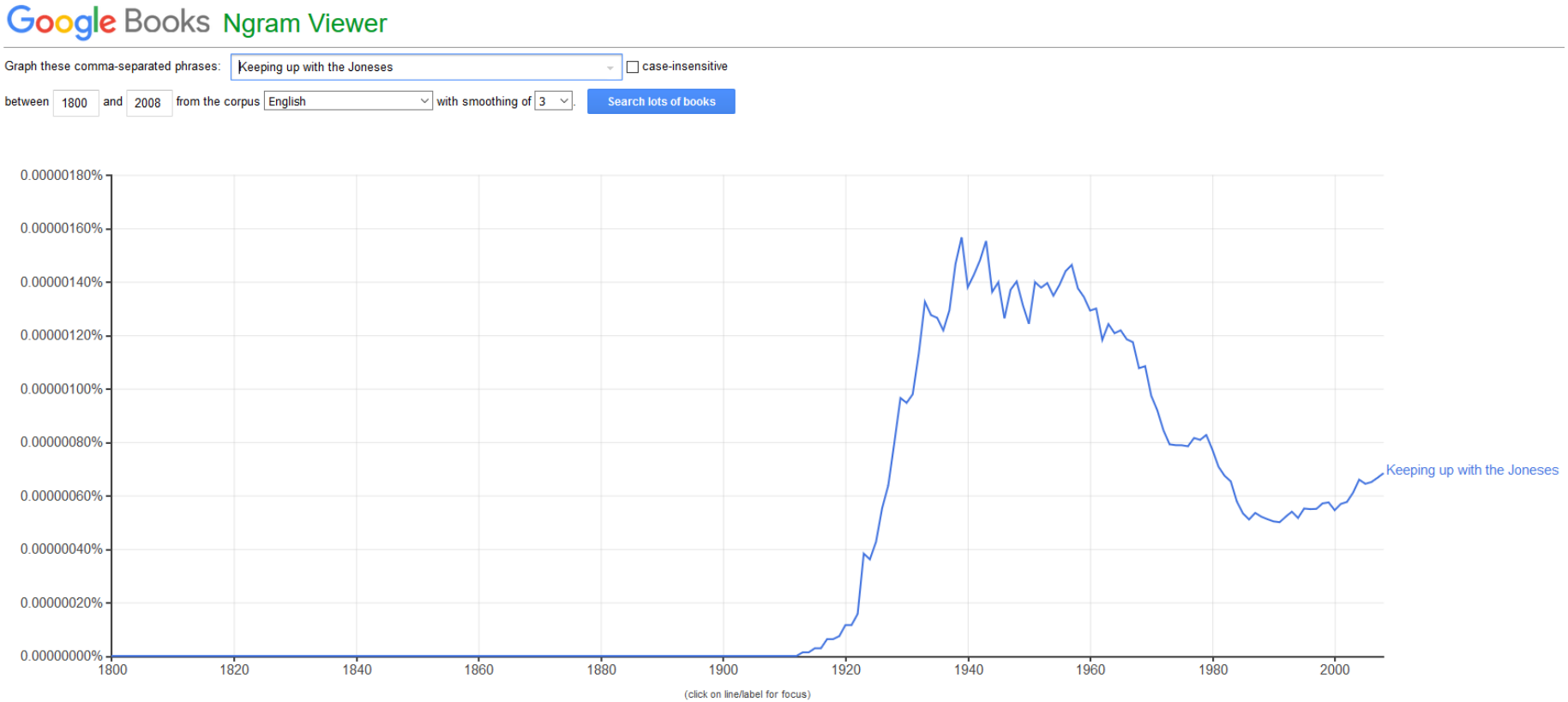
[1] Bulgaria, the Czech Republic, Croatia, Hungary, Poland, Romania, Albania, Bosnia and Herzegovina, FYR Macedonia and Serbia.

Introduction and Motivation

- Is the distribution of income a determinant of household consumption?
  - ▷ Overall: solid empirical support, also from quasi-experiments from lotteries (Kuhn et al. AER 2011)

- Why does the distribution of income affect household consumption:
  - ▷ Relative income hypothesis (Veblen 1899, Duesenberry 1949): own utility and consumption depends on consumption/income of others
    $\rightarrow$ Interaction with more affluent reference groups drives up spending: **"Keeping up with the Joneses"**
  - ▷ Conspicious / positional consumption, expendidure cascades (Frank et al. 2014)

Keeping up with the Joneses



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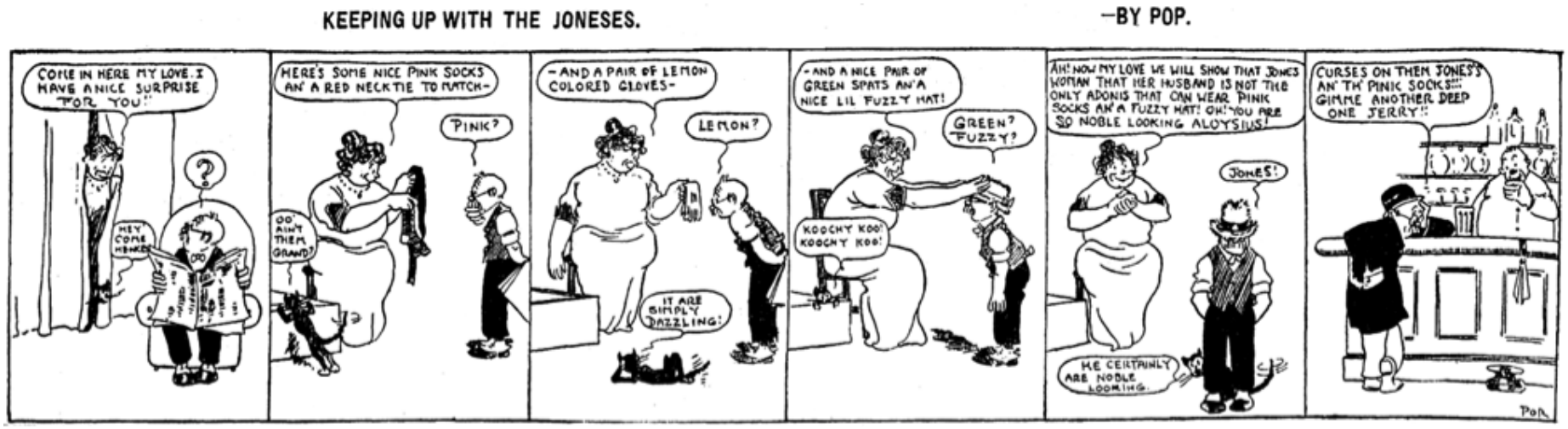


Introduction and Motivation

Does "Keeping Up with Joneses" also extend to consumer **credit?**

- Inequality increases, high income households consume relatively more than low-income households, who try to maintain high levels of consumption funded by debt
- Morgan and Christen (2005): Strong effect of Gini on debt relative to income (US 1980-2000), interaction with supply side effects (financing plans for consumer goods)
- The "race" for increased social standing explains greater financial risk taking (Gaba and Kalra 1999).

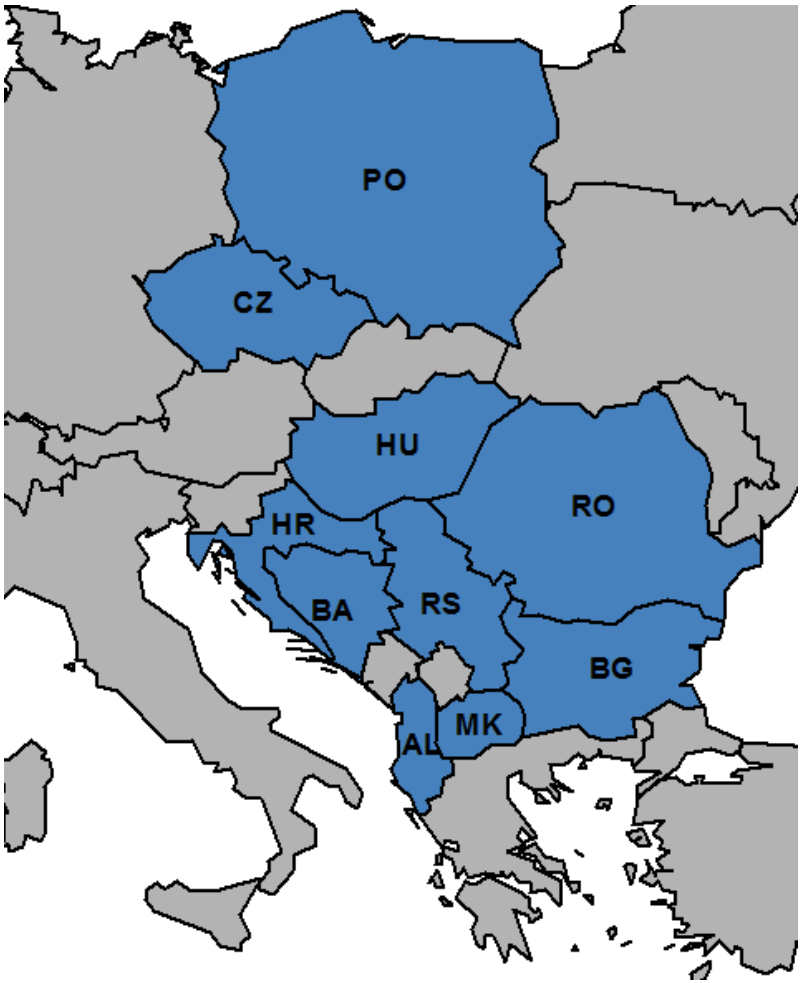
Introduction and Motivation

- Inequality & credit: Supply side channel
  - Coibion et al. (2014): low-income households in high inequality regions accumulate **less relative debt** than those in low inequality regions.
  - In high inequality regions, the price of credit is higher $\rightarrow$ credit supply channel
  - In high-inequality regions, low-income households were more likely to be denied mortgage credit than low-income households in low-inequality regions
  - In high-inequality regions, bank branches physically closer to high-income households than in low-inequality regions
  - Mechanism: As income inequality rises, banks target (cheaper) lending toward higher-income households (it becomes easier for banks to differentiate between low- and high-risk households)
    $\rightarrow$ supply and demand side channels are usually activated simultaneously, and the aggregate effect could go either way (Bazillier and Hericourt 2017)
  - Similar findings for Italy: Richer housheolds have a higher probability of being indebted in high inequality regions (Loschiavo 2016)

Our contribution

- Is the income distribution relevant for household debt?
- Focus on 10 CESEE countries 2009-2018
- Contributions:
  - Scarce evidence for non-industrial countries, including eastern Europe
  - Novel measure of upward-looking income distribution (mean income of richer households)
  - Granular analysis: Purpose of the loan
  - Income distribution measures from Belabed and Hake (2018) - first-time endeavor for some countries and years

Data - OeNB Euro Survey



- **6 EU countries** (Bulgaria, Czech Republic, Croatia, Hungary, Poland, Romania)
- **4 non-EU countries** (Albania, Bosnia and Herzegovina, North Macedonia, Serbia)
- Samples consist of **1,000 randomly selected respondents per country** and represent the population over 14 years.
- **Samples are representative** with respect to age, gender and regional distribution.
- From 2007 to 2014, surveys were conducted twice a year, in April/May and in October/November. In 2015, the survey frequency was reduced to once a year (autumn).

Data

- "What is the total monthly **income of the household after taxes**?". Income in 20 categories, at most 10% of respondents are in each category (2009-2016), since 2017 exact amounts

- Income is calculated in EUR PPP to guarantee comparability across countries and time

- OECD weighting method to obtain equivalized income

- Several corrections needed to calculate measures of income inequality:
  1. Missing income data (21% of all observations, unit non-response) $\rightarrow$ Imputation
  2. Under-representation of "rich" $\rightarrow$ Pareto-shaped distribution $\rightarrow$ time/country-variant Pareto parameter, corrected top 20% of the income distribution
  3. Bootstrapping

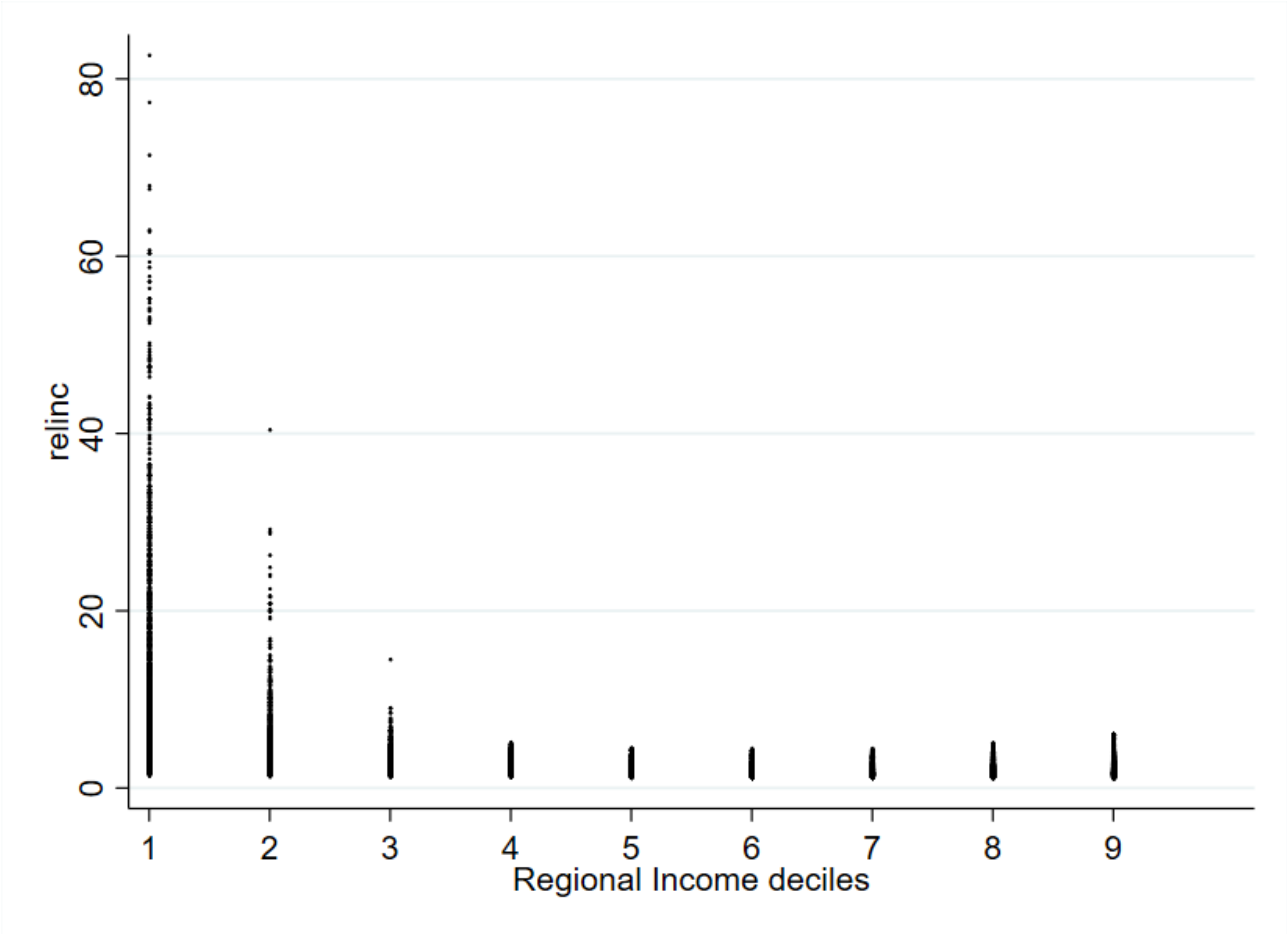
Data

Income inequality measure: household's relative income (i.e ratio between the mean income of respondents above respondent's decile of income distribution in the same region to the household's own income (in line with Drechsel-Grau & Schmid, 2014) $\rightarrow$ **relative reference income**:

$$relinc_i = \frac{1}{K} \sum_{\substack{j=1 \\ D_j > D_i}}^{K} (Y_j) \frac{1}{Y_i} \tag{1}$$

where $i = 1, ..., N$ and $j = 1, ..., K$ are households, D_i is the income decile of household i, and Y_i is the income of household i.

Relative Reference Income



Data

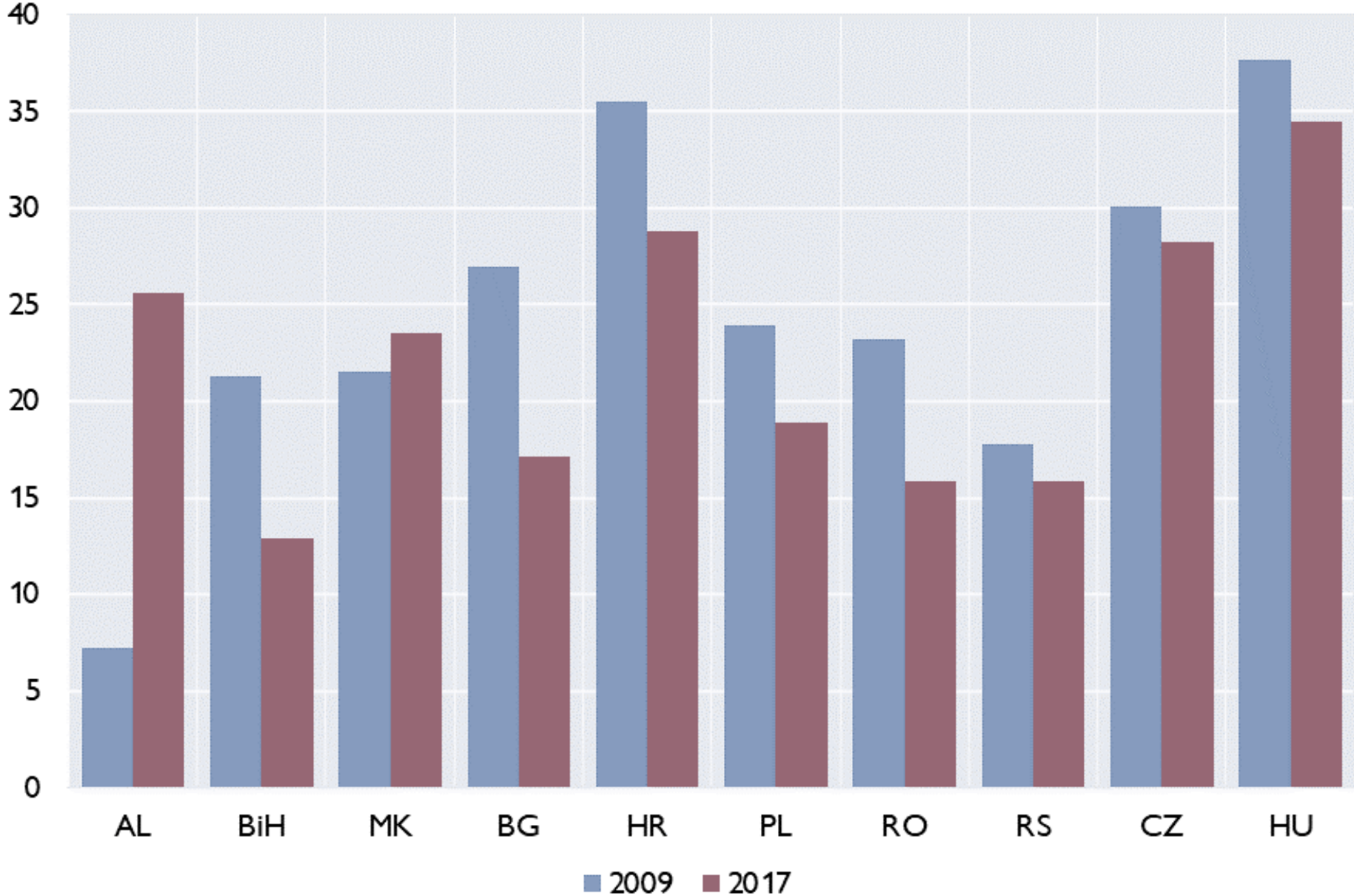
Loan questions

- 'Do you, either personally or together with your partner, currently have any loans that you are still paying off?'
- In case of having a loan, the respondents have been asked to give information on the purpose of the loan : 'to finance a house or apartment", 'for consumption goods (furniture, travelling, household appliances', 'to finance a car' and 'for other purposes')

Dependent variable - Binary dependent variables of (i) current (existing) loans, (ii) purpose of the loan *i*, period 2009-2017, no panel on the household level

Share of respondents with a loan

% of all respondents



Source: OeNB Euro Survey. Authors' calculations.

Empirical strategy

- We apply multilevel models (e.g Rabe-Hesketh and Skrondal, 2008), which account for the multi-layer nature of the data.
- Two levels: individual and regional $\rightarrow$ random effects at regional
- Why multilevel models?
  - systemic analysis of cross-level interaction
  - correction for biases of both parameters and standard errors
  - correction due to the violated independence assumption (i.e assumption of no autocorrelation $\rightarrow$ no relation between error terms for different cases)
- The main contribution of random effects multilevel models is to account for the presumed similarity shared by different members of the same cluster

Empirical Strategy

$$Pr(loan_{ir} = 1|X_{ir}, U_r) = H(X_{ir}\beta + Z_{ir}U_r) \quad (2)$$

- $r = 1, ...76$ clusters, in our case regions...
- ... consisting of $i = 1, ..., i_n$ households
- X_{ir} is a $1 \times p$ vector of covariates
- β is a vector of regression coefficients
- $1 \times p$ vector Z_{ir}: random effects both in intercepts and coefficients.
- U_r denotes the random effects. $H(.)$ is the standard normal cumulative distribution function.
- *Loan* refers to having a loan
- Covariates include relative *relative reference income* and socio-demographics: Age, gender, household size, household composition, education, employment status

Baseline Results

	(1) const	(2) no interaction	(3) baseline	(4) low ineq reg	(5) high ineq reg	(6) 2011-2018	(7) wealth
Income Distribution							
1th decile# relincome			-0.014***	-0.027***	-0.006*	-0.011**	-0.014***
			(0.004)	(0.009)	(0.003)	(0.005)	(0.005)
2nddecile#relincome			-0.023***	-0.047***	-0.003	-0.019*	-0.024
			(0.008)	(0.016)	(0.009)	(0.010)	(0.010)
3rd decile#relincome			-0.008	-0.018	0.004	-0.006	-0.010
			(0.010)	(0.015)	(0.012)	(0.012)	(0.013)
4th decile#relincome			0.015	-0.004	0.029*	0.027	0.017
			(0.012)	(0.017)	(0.017)	(0.018)	(0.019)
5th decile#relincome			0.031**	0.017	0.034**	0.050**	0.033
			(0.012)	(0.020)	(0.017)	(0.020)	(0.024)
6th decile#relincome			0.050***	0.048**	0.036*	0.056***	0.040*
			(0.014)	(0.020)	(0.020)	(0.020)	(0.021)
7th decile#relincome			0.068***	0.055**	0.060***	0.077***	0.065**
			(0.015)	(0.027)	(0.018)	(0.023)	(0.028)
8th decile#relincome			0.090**	0.067**	0.076***	0.102***	0.097***
			(0.017)	(0.027)	(0.020)	(0.025)	(0.026)
thdecile#relincome			0.086***	0.080**	0.040**	0.105***	0.095***
			(0.019)	(0.034)	(0.020)	(0.030)	(0.034)
Reference income		-0.015**					
		(0.004)					
Income		0.000***	-0.000**	-0.000***	0.000**	-0.000*	-0.000**
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Wealth proxies							
Savings							0.010
							(0.016)
House							0.040***
							(0.028)
Car							0.150***
							(0.022)
Sociodemographics							
Female		0.027***	0.026***	0.020	0.042***	0.029**	0.048***
		(0.010)	(0.010)	(0.014)	(0.014)	(0.014)	(0.014)
Age		0.105***	0.105***	0.103***	0.112***	0.108***	0.105***
		(0.004)	(0.004)	(0.005)	(0.006)	(0.005)	(0.005)
Age squared		-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Children		0.134***	0.134***	0.152***	0.106***	0.140***	0.138***
		(0.013)	(0.012)	(0.015)	(0.018)	(0.014)	(0.014)
Education		0.141***	0.134***	0.102***	0.191***	0.127***	0.110***
		(0.017)	(0.017)	(0.021)	(0.027)	(0.022)	(0.022)
Unemployed		-0.327***	-0.305***	-0.193***	-0.422***	-0.352***	-0.340***
		(0.029)	(0.029)	(0.040)	(0.024)	(0.035)	(0.036)
Self-employed		-0.007	-0.006	0.031	-0.101	-0.022	-0.048
		(0.031)	(0.031)	(0.034)	(0.064)	(0.041)	(0.046)
Student		-0.694***	-0.692***	-0.753***	-0.579***	-0.671***	-0.675***
		(0.059)	(0.059)	9(0.098)	(0.062)	(0.071)	(0.079)
Retired		-0.120***	-0.117***	-0.154***	-0.107***	-0.133***	-0.108**
		(0.025)	(0.025)	(0.035)	(0.033)	(0.040)	(0.042)
cons	-3.443***	0.016***	0.016***	0.015***	0.014***	0.019***	0.020***
	(0.0850)	(0.002)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
ICC (regional)	0.038	0.015	0.016	0.015	0.014	0.019	0.019
N	119085	105301	65341	39960	58135	49164	49164

Dependent variable: binary response indicating if respondents have a loan. Estimation method: multi-level modeling. Country and time fixed effects for 2009-2018 included in all estimations. Intraclass correlation coefficient denotes the explained portion of the variance by inclusion of the regional (second) level covariates. Robust standard errors in parentheses. Variables are defined in Appendix.

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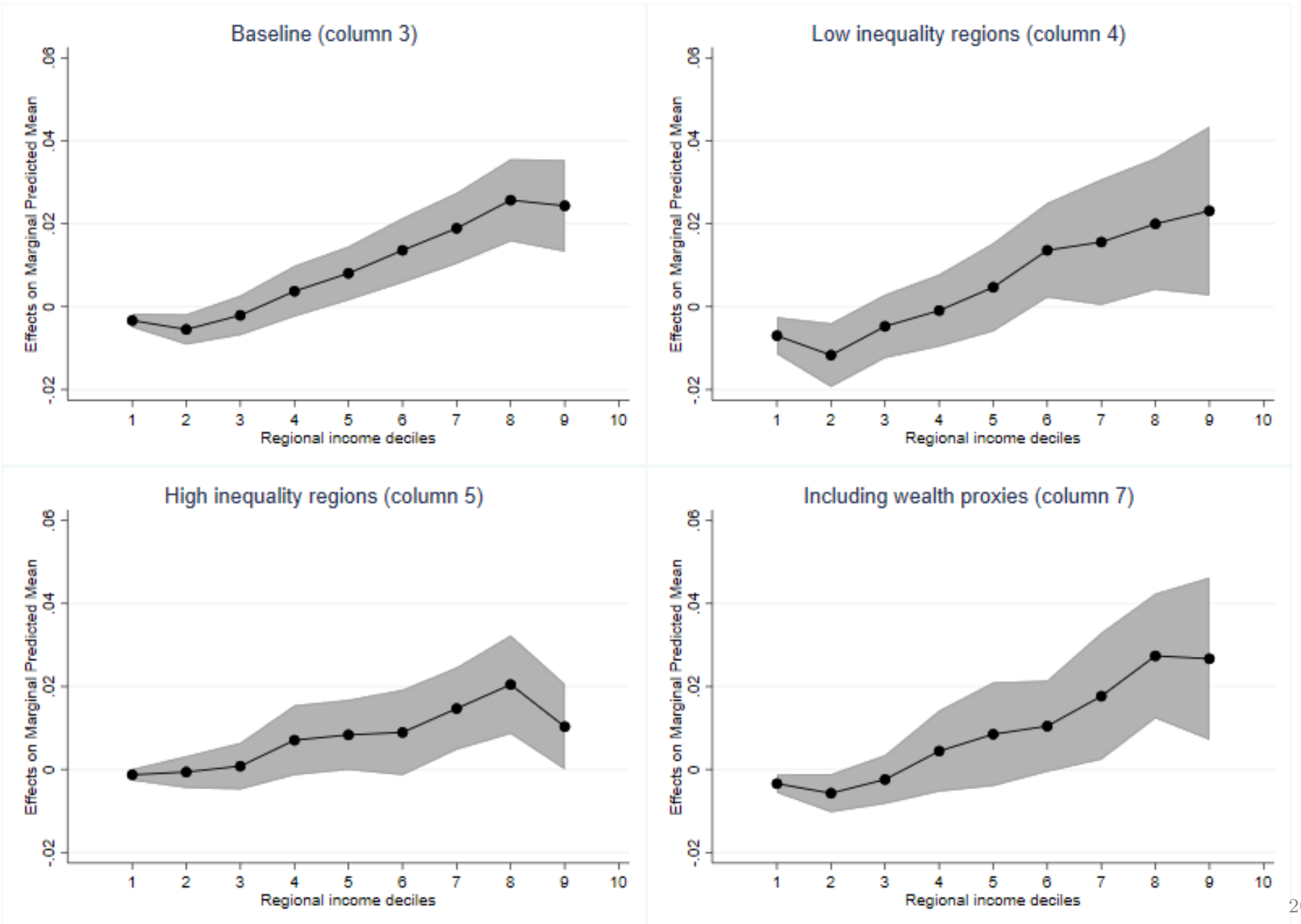
Baseline Results - Marginal Effects

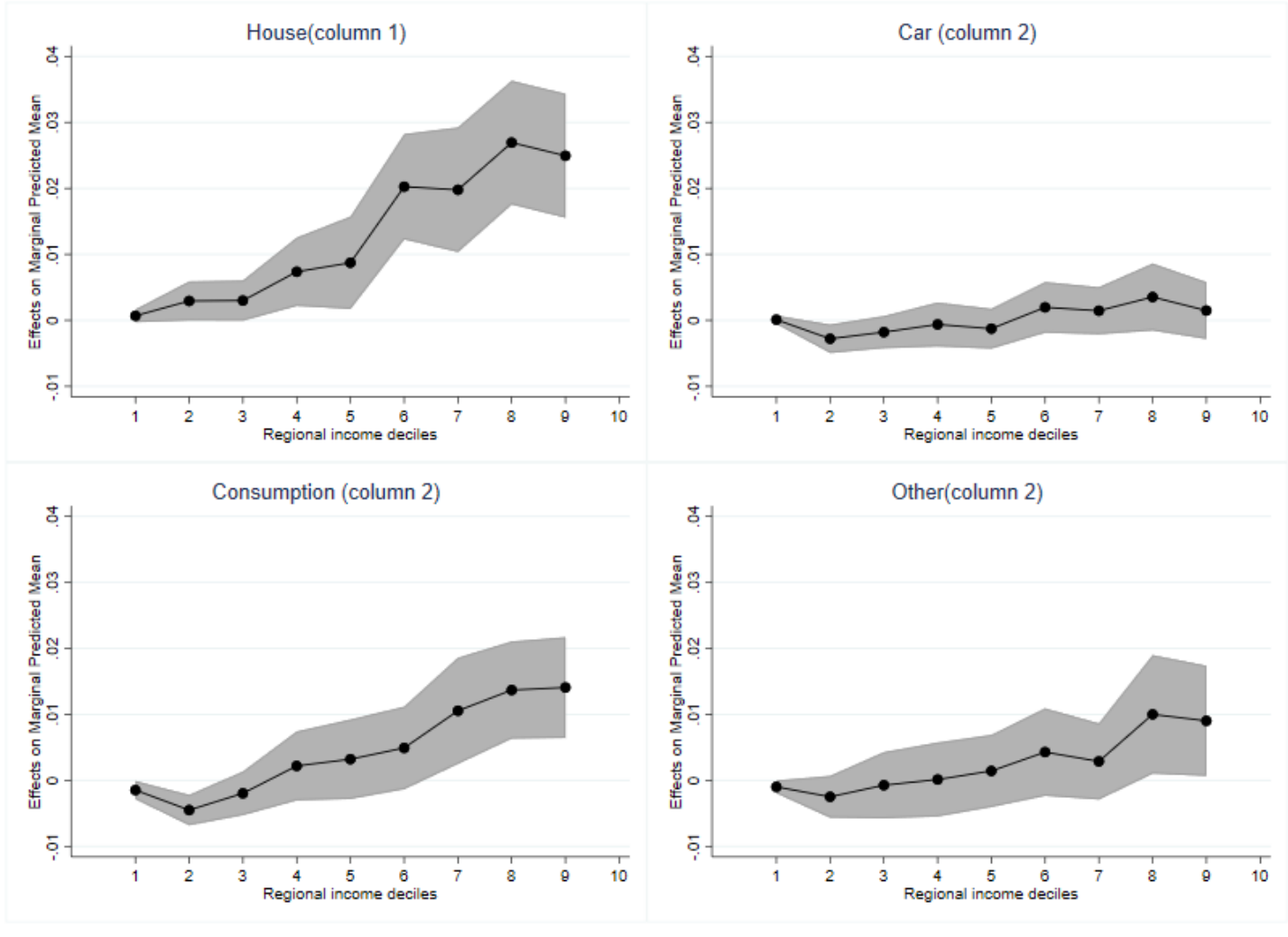


Baseline Results

What have we learned so far?

- Negative association between probability of having a loan and reference income in bottom deciles (signaling effect prevails)
- Positive association between probability of having a loan and reference income in top deciles (Possibly both signaling and "Keeping up with the Novaks" effects at work)

Loans by purpose



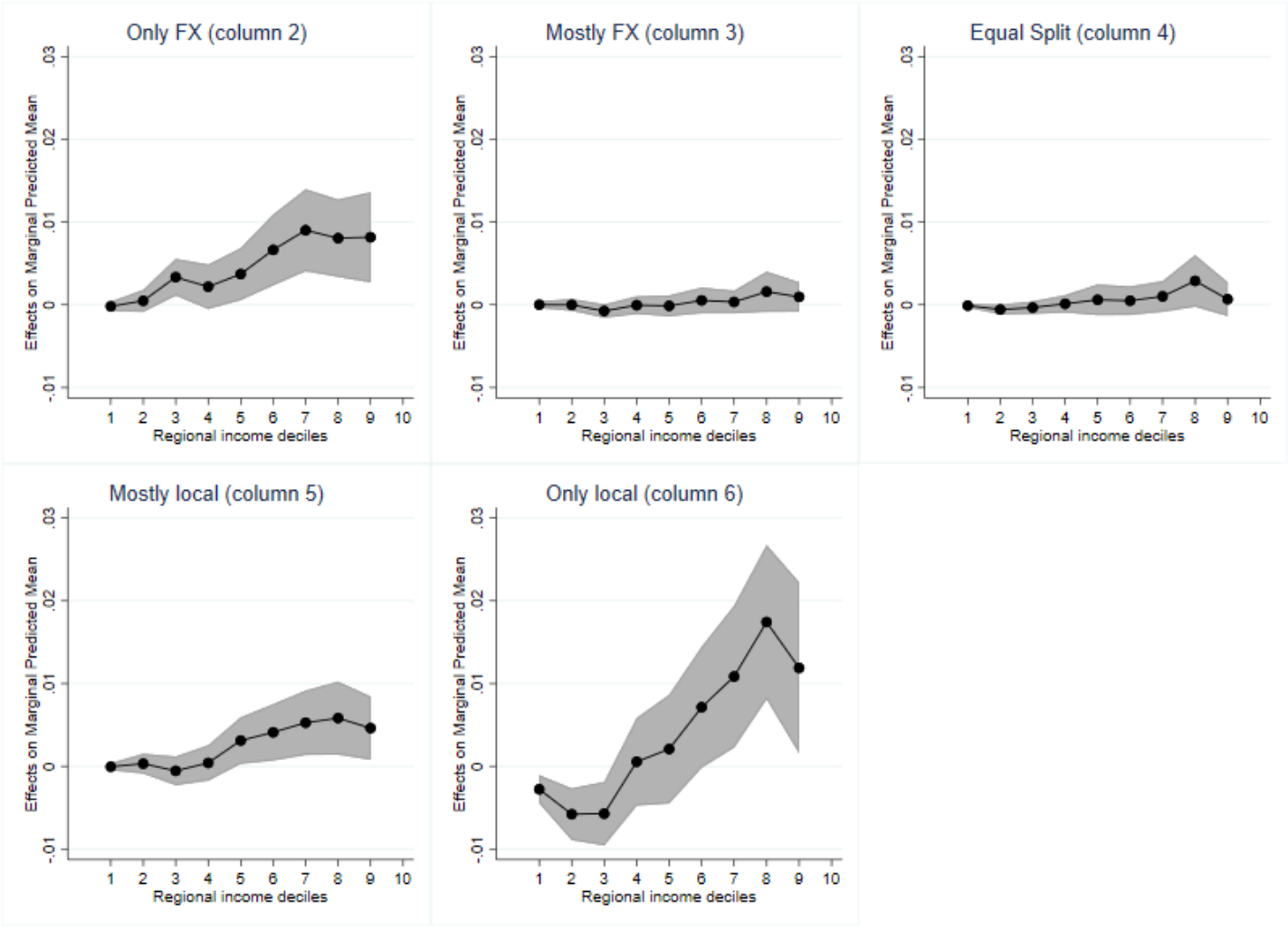
Loans by purpose

- Positive association in higher deciles for mortgages (CESEE: high share of home-owners without mortgage)
- Consumption loans effect
- No effect on other loans (e.g. education, cash loans) - hints at demand effect
- No effect on car loans

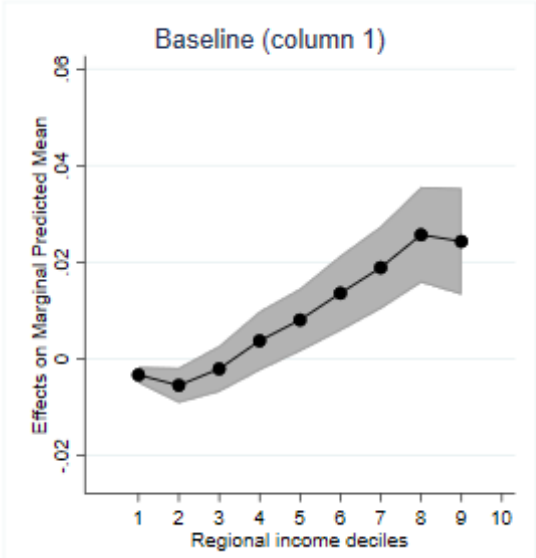
Currency composition of household loans

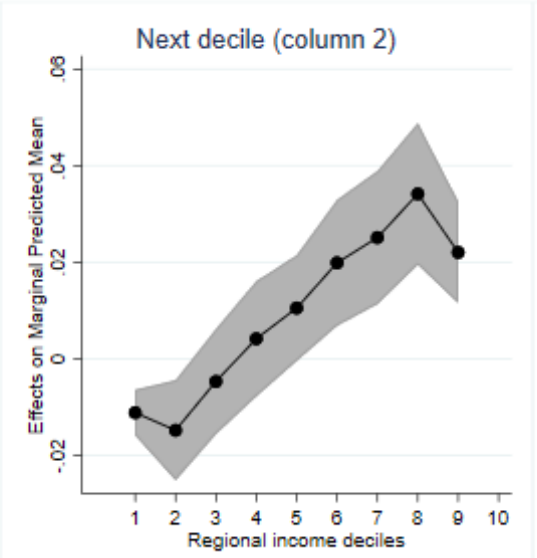
- Concern: Omitted variable bias / endogeneity
- Inclusion of year and country dummies
- Closer look at currency denomination
- E.g.: More favourable local economic conditions lead to credit supply growth and higher relative reference income $\rightarrow$ this kind of effect should affect *local* currency supply
- $\rightarrow$ If foreign currency loans are nil, we should be concerned

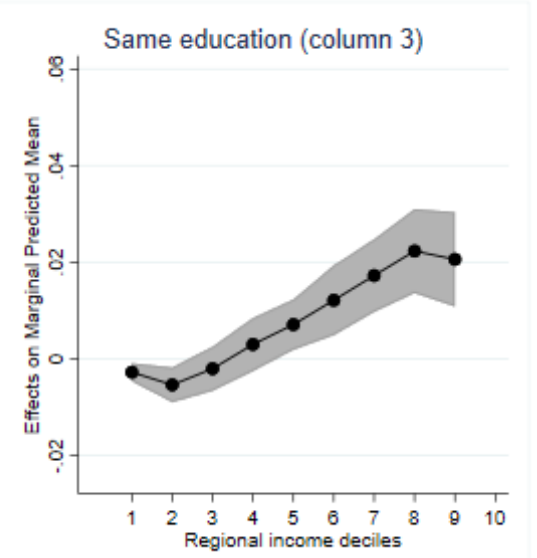
Currency composition of household loans

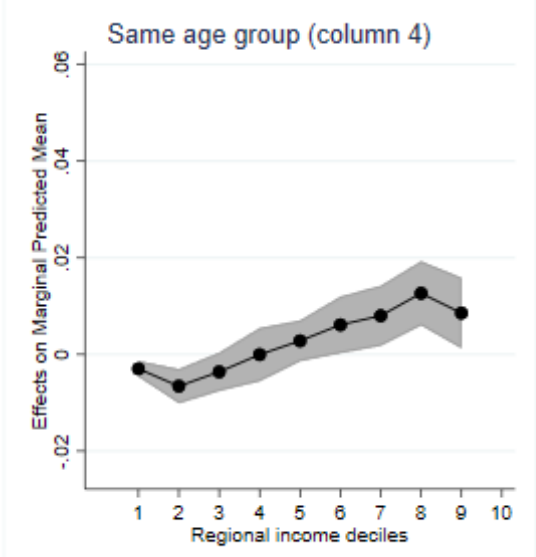


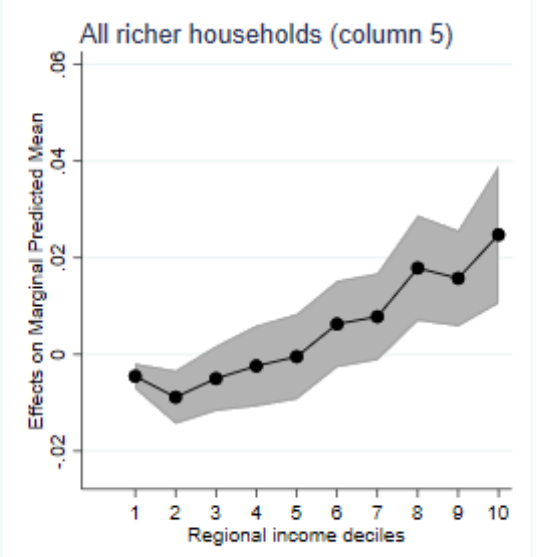
Robustness 1 - Alternative reference income definitions











Robustness 2 - Other inequality measures

	(1) Gini	(2) P90/P10	(3) P75/P25	(4) Top1%	(5) Top5%	(6) Top10%	(7) Bottom10%	(8) Bottom20%	(9) logP90-logP10
1st decile#ineq	-0.264	-0.022***	-0.069**	-1.983***	-0.604**	-0.213	-1.800	-1.129	-0.078**
	(0.170)	(0.005)	(0.030)	(0.493)	(0.243)	(0.193)	(1.991)	(0.894)	(0.031)
2nd decile#ineq	-0.117	-0.013***	-0.045	-1.347***	-0.344*	-0.084	-1.916	-1.035	-0.052*
	(0.154)	(0.004)	(0.029)	(0.323)	(0.200)	(0.174)	(1.966)	(0.885)	(0.029)
3rd decile#ineq	0.010	-0.007*	-0.024	-0.870***	-0.128	0.107	0.209	-0.201	-0.014
	(0.165)	(0.004)	(0.030)	(0.336)	(0.218)	(0.186)	(1.875)	(0.858)	(0.029)
4th decile#ineq	0.126	0.000	-0.007	-0.316	0.091	0.202	-0.339	-0.329	0.001
	(0.164)	(0.004)	(0.029)	(0.344)	(0.216)	(0.184)	(1.929)	(0.864)	(0.029)
5th decile#ineq	0.190	0.003	0.001	0.082	0.238	0.274	0.244	-0.145	0.013
	(0.183)	(0.004)	(0.030)	(0.469)	(0.262)	(0.214)	(2.021)	(0.885)	(0.032)
6th decile#ineq	0.272	0.008**	0.016	0.256	0.369	0.397**	1.286	0.343	0.034
	(0.178)	(0.004)	(0.030)	(0.398)	(0.240)	(0.195)	(1.752)	(0.801)	(0.030)
7th decile#ineq	0.345*	0.010**	0.024	0.898**	0.540**	0.509**	1.173	0.334	0.050*
	(0.179)	(0.004)	(0.030)	(0.408)	(0.250)	(0.209)	(1.955)	(0.865)	(0.030)
8th decile#ineq	0.456**	0.017***	0.041	1.314***	0.724***	0.655***	1.617	0.630	0.079**
	(0.185)	(0.004)	(0.031)	(0.446)	(0.252)	(0.213)	(1.865)	(0.819)	(0.032)
9th decile#ineq	0.381**	0.013***	0.028	0.991**	0.597**	0.515***	0.691	0.217	0.054*
	(0.176)	(0.003)	(0.029)	(0.407)	(0.245)	(0.196)	(2.061)	(0.897)	(0.028)
10th decile#ineq	0.566***	0.020***	0.053**	1.792***	0.965***	0.777***	1.634	0.706	0.092***
	(0.180)	(0.004)	(0.027)	(0.556)	(0.281)	(0.227)	(2.325)	(0.996)	(0.027)
_cons	-3.483***	-3.438***	-3.426***	-3.431***	-3.461***	-3.497***	-3.442***	-3.425***	-3.443***
	(0.103)	(0.090)	(0.112)	(0.087)	(0.092)	(0.101)	(0.102)	(0.107)	(0.106)
ICC (regional)	0.016***	0.016***	0.016***	0.016***	0.016***	0.015***	0.015***	0.015***	0.015***
N	119085	119085	119085	119085	119085	101049	101049	101049	101049

Dependent variable: binary response indicating if respondents have a loan. Estimation method: multi-level modeling. Country and time fixed effects for 2009-2018 included in all estimations. Intraclass correlation coefficient denotes the explained portion of the variance by inclusion of the regional (second) level covariates. Socioeconomic variables included in all estimations. omitted in the table. Robust standard errors in parentheses. Variables are defined in appendix.

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

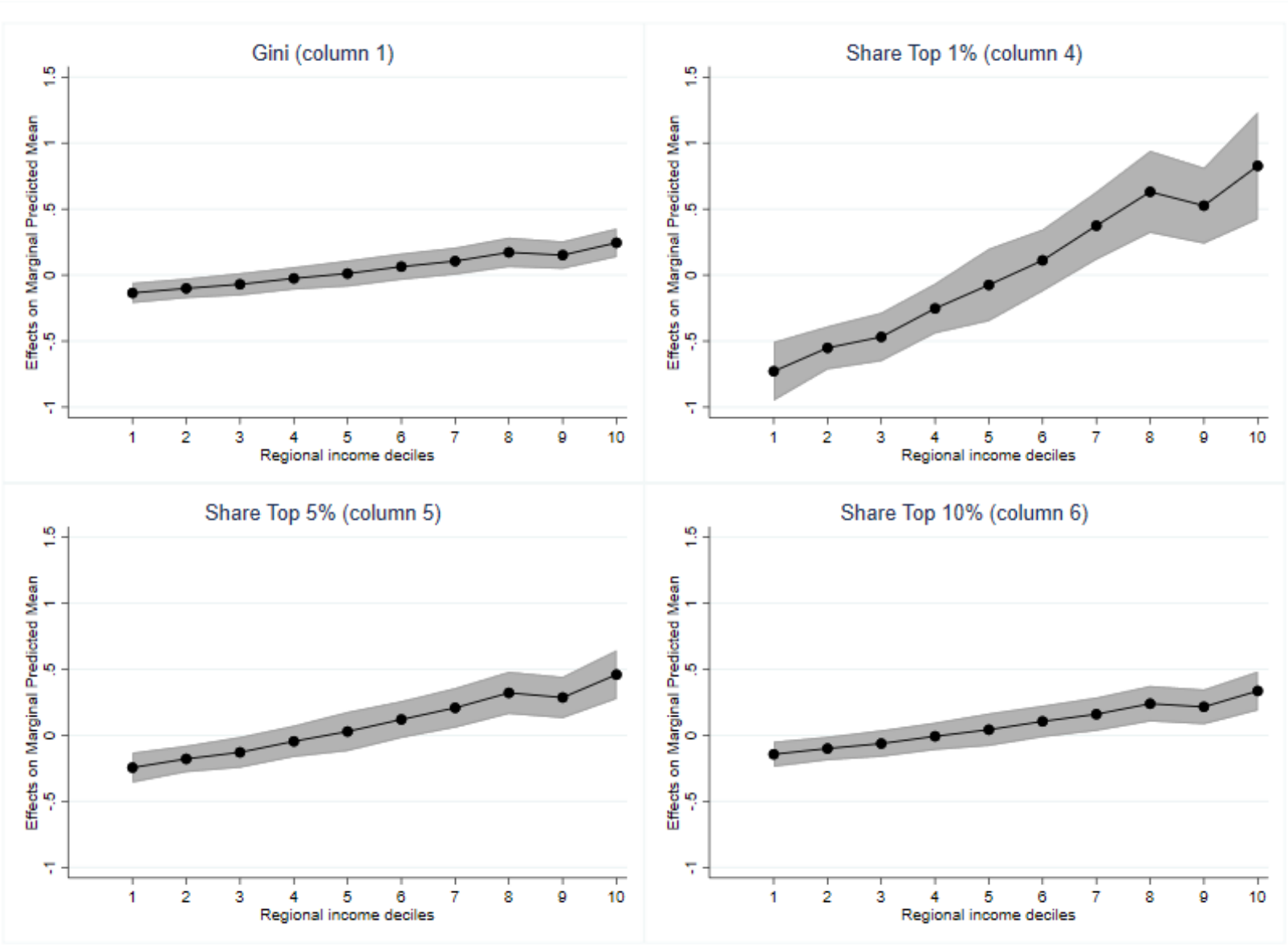
Robustness 2 - Other inequality measures

	(1) Gini	(2) P90/P10	(3) P75/P25	(4) Top1%	(5) Top5%	(6) Top10%	(7) Bottom10%	(8) Bottom20%	(9) logP90-logP10
1st decile#ineq	-0.264	-0.022***	-0.069**	-1.983***	-0.604**	-0.213	-1.800	-1.129	-0.078**
	(0.170)	(0.005)	(0.030)	(0.493)	(0.243)	(0.193)	(1.991)	(0.894)	(0.031)
2nd decile#ineq	-0.117	-0.013***	-0.045	-1.347***	-0.344*	-0.084	-1.916	-1.035	-0.052*
	(0.154)	(0.004)	(0.029)	(0.323)	(0.200)	(0.174)	(1.966)	(0.885)	(0.029)
3rd decile#ineq	0.010	-0.007*	-0.024	-0.870***	-0.128	0.107	0.209	-0.201	-0.014
	(0.165)	(0.004)	(0.030)	(0.336)	(0.218)	(0.186)	(1.875)	(0.858)	(0.029)
4th decile#ineq	0.126	0.000	-0.007	-0.316	0.091	0.202	-0.339	-0.329	0.001
	(0.164)	(0.004)	(0.029)	(0.344)	(0.216)	(0.184)	(1.929)	(0.864)	(0.029)
5th decile#ineq	0.190	0.003	0.001	0.082	0.238	0.274	0.244	-0.145	0.013
	(0.183)	(0.004)	(0.030)	(0.469)	(0.262)	(0.214)	(2.021)	(0.885)	(0.032)
6th decile#ineq	0.272	0.008**	0.016	0.256	0.369	0.397**	1.286	0.343	0.034
	(0.178)	(0.004)	(0.030)	(0.398)	(0.240)	(0.195)	(1.752)	(0.801)	(0.030)
7th decile#ineq	0.345*	0.010**	0.024	0.898**	0.540**	0.509**	1.173	0.334	0.050*
	(0.179)	(0.004)	(0.030)	(0.408)	(0.250)	(0.209)	(1.955)	(0.865)	(0.030)
8th decile#ineq	0.456**	0.017***	0.041	1.314***	0.724***	0.655***	1.617	0.630	0.079**
	(0.185)	(0.004)	(0.031)	(0.446)	(0.252)	(0.213)	(1.865)	(0.819)	(0.032)
9th decile#ineq	0.381**	0.013***	0.028	0.991**	0.597**	0.515***	0.691	0.217	0.054*
	(0.176)	(0.003)	(0.029)	(0.407)	(0.245)	(0.196)	(2.061)	(0.897)	(0.028)
10th decile#ineq	0.566***	0.020***	0.053**	1.792***	0.965***	0.777***	1.634	0.706	0.092***
	(0.180)	(0.004)	(0.027)	(0.556)	(0.281)	(0.227)	(2.325)	(0.996)	(0.027)
_cons	-3.483***	-3.438***	-3.426***	-3.431***	-3.461***	-3.497***	-3.442***	-3.425***	-3.443***
	(0.103)	(0.090)	(0.112)	(0.087)	(0.092)	(0.101)	(0.102)	(0.107)	(0.106)
ICC (regional)	0.016***	0.016***	0.016***	0.016***	0.016***	0.015***	0.015***	0.015***	0.015***
N	119085	119085	119085	119085	119085	101049	101049	101049	101049

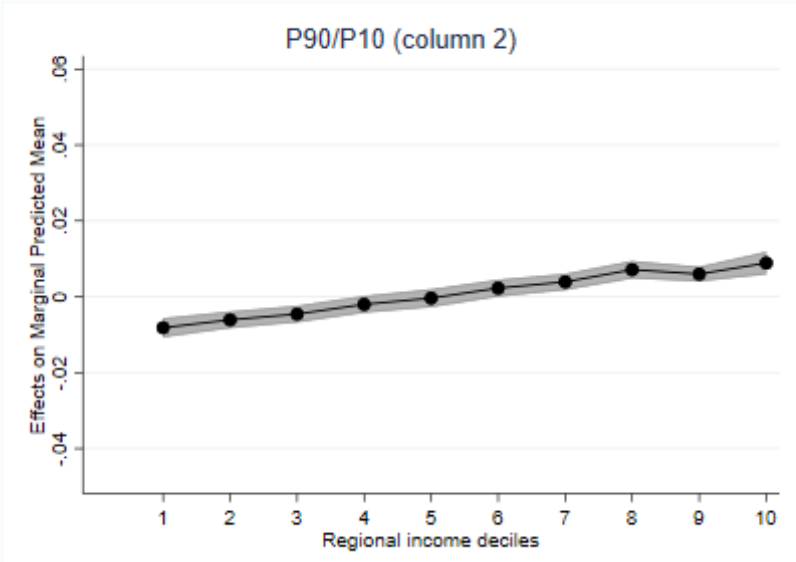
Dependent variable: binary response indicating if respondents have a loan. Estimation method: multi-level modeling. Country and time fixed effects for 2009-2018 included in all estimations. Intraclass correlation coefficient denotes the explained portion of the variance by inclusion of the regional (second) level covariates. Socioeconomic variables included in all estimations. omitted in the table. Robust standard errors in parentheses. Variables are defined in appendix.

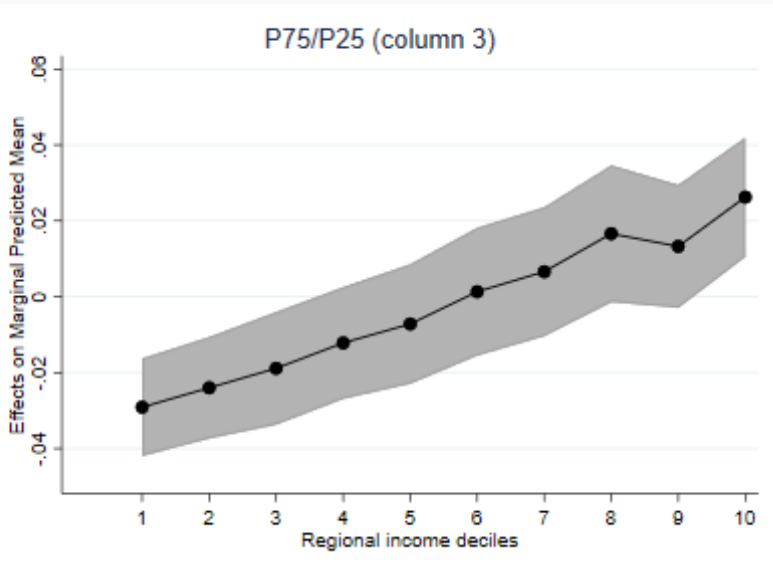
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

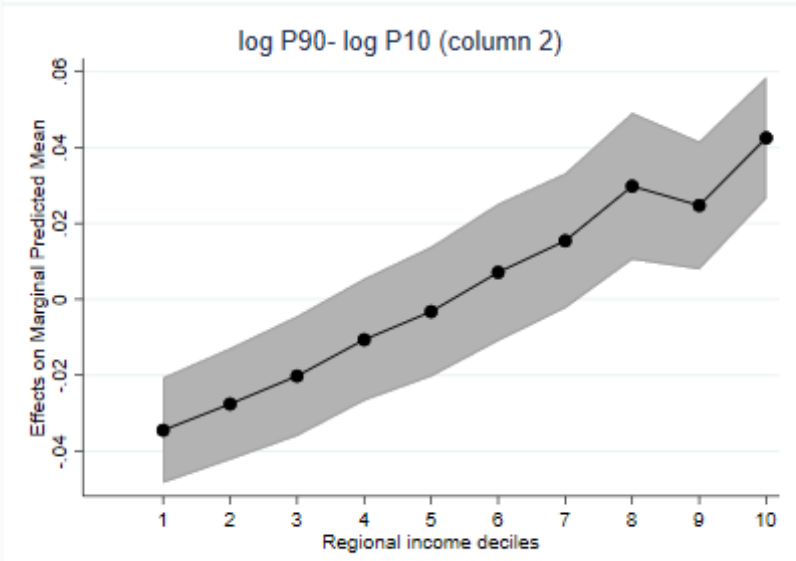
Robustness 2 - Alternative Inequality Measures



Robustness 2 - Alternative Inequality Measures







Zooming in on loan plans

- Disentangling demand and supply factors than determine loans is demanding
- Data on loan intentions $\rightarrow$ zoom in on demand side
- Another advantage: *Current* loan plans and *current* reference income jointly determined (existing loans made in the past)
- Disadvantage: Loan plans may not "translate" into actual loans

Loan plans

	(1) const	(2) all	(3) house	(4) car	(5) consumption	(6) other	(7) regions low	(8) regions high
1th decile# relincome		0.004	0.006	0.004	0.001	-0.005	0.032	0.005
		(0.006)	(0.004)	(0.006)	(0.009)	(0.008)	(0.043)	(0.004)
2nddecile#relincome		-0.028*	-0.012	-0.028*	-0.001	0.013	-0.009	0.015
		(0.017)	(0.015)	(0.017)	(0.026)	(0.014)	(0.040)	(0.010)
3rd decile#relincome		0.040*	-0.007	0.040*	0.022	-0.028	-0.005	0.013
		(0.023)	(0.026)	(0.023)	(0.029)	(0.026)	(0.048)	(0.015)
4th decile#relincome		-0.008	-0.063**	-0.008	0.034	0.009	-0.011	0.039*
		(0.030)	(0.029)	(0.030)	(0.036)	(0.031)	(0.050)	(0.021)
5th decile#relincome		0.029	-0.004	0.029	0.028	-0.019	0.003	0.079***
		(0.032)	(0.031)	(0.032)	(0.045)	(0.031)	(0.050)	(0.027)
6th decile#relincome		0.015	0.010	0.015	0.038	0.034	-0.022	0.027
		(0.025)	(0.025)	(0.030)	(0.041)	(0.037)	(0.055)	(0.030)
7th decile#relincome		0.044*	0.022	0.044*	0.034	0.014	0.008	0.046*
		(0.038)	(0.038)	(0.025)	(0.041)	(0.034)	(0.057)	(0.025)
8th decile#relincome		0.026*	0.007	0.026	0.023	-0.004	-0.008	0.065**
		(0.025)	(0.025)	(0.025)	(0.045)	(0.035)	(0.055)	(0.032)
9th decile#relincome		0.064**	0.005	0.064**	0.022	-0.006	0.014	0.045**
		(0.027)	(0.33)	(0.027)	(0.038)	(0.035)	(0.054)	(0.022)
_cons	-1.423***	-1.556***	-1.556***	-2.135***	-0.743***	-0.105	-1.591***	-1.94***
	(0.025)	(0.132)	(0.132)	(0.175)	(0.132)	(0.133)	(0.166)	(0.166)
ICC (regional)	0.039	0.013	0.013	0.013	0.017	0.014	0.015	0.012
N	113722	71322	71322	71322	71322	76297	76297	23390

Dependent variable: the share of respondents, who plan a loan in the following 12 months (dummy variable). Estimation method: multi-level modeling. Country and time fixed effects for 2009-2018 included in all estimations. Intraclass correlation coefficient denotes the explained portion of the variance by inclusion of the regional (second) level covariates. Robust standard errors in parentheses. Variables are defined in appendix.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Loan plans

- Positive association between reference income and loan plans for the top third of the distribution
- $\rightarrow$ Evidence for the "Keeping up with the Novaks"-channel
- Driven by car loan plans (high visibility good)
- Driven by high inequality regions
- Additional results:
- More loan plans if better sentiments regarding financial situation of the household and country
- Women less likely to plan a loan
- Self-employed plan loans in more equal regions

Summary & Conclusions

- Income inequality and household debt in CESEE correlated
- Bottom of the income distribution: Negative relation (Bank "Signalling Channel" seems to prevail)
- Top of the income distribution: Positive relation (Both "Signalling" and "Keeping up with the Novaks" possible)
- Strongest effect for mortgages
- Robust to other income inequality measures
- Loan plans positively affected by reference income at the top of the distribution
- loan plans driven by high-inequality regions