Foreign Currency Borrowing and Knowledge of Exchange Rate Risk

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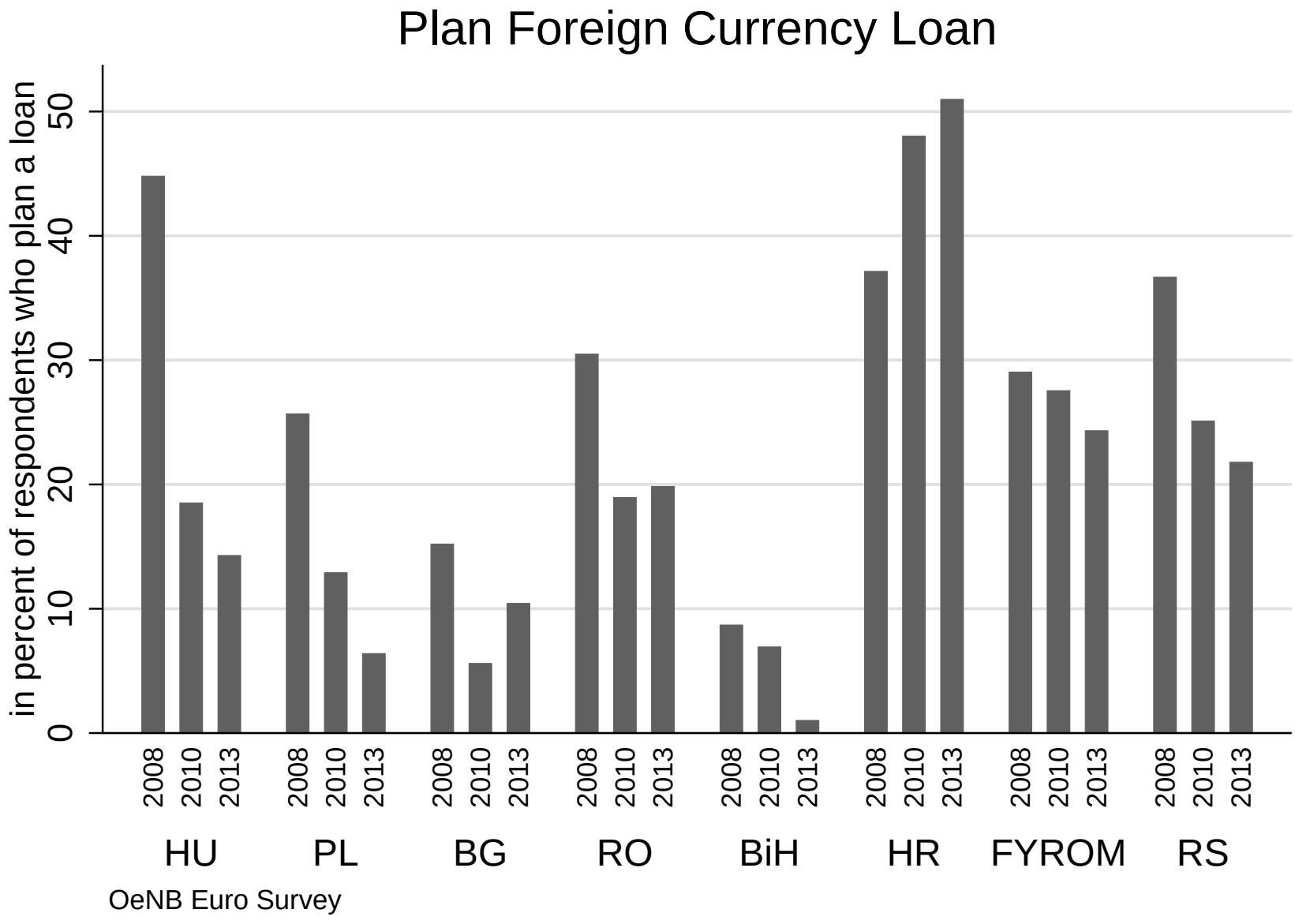
Motivation

- Foreign currency borrowing widespread:
  25% in Latin America, 40% in Middle East,
  above 50% in Central Eastern and Southeastern Europe.
- Can be optimal and conducive to economic growth but ...
- Global financial crisis highlighted the financial stability risks associated with foreign currency borrowing.
  - Increases in NPLs, refinancing problems ▸ Map
  - Demand for foreign currency loans remains among unhedged borrowers.

$\rightarrow$ Do borrowers not (fully) understand the exchange rate risk of foreign currency loans?

- Choice of optimal loan complex even in domestic currency (Campbell, 2006).

Plans for FX Loan



Contribution

1. Survey evidence on exchange rate literacy: measure of households' awareness of exchange rate risk

2. Micro-data based model of demand for FC borrowing $\rightarrow$ is demand for FCL driven by lack of knowledge?

- Representative comparable dataset for 8 CEECs
- Information on loans and financial literacy
- Disentangle demand from supply-side drivers
- Individual-level information on monetary expectations (i.e., exchange rate expectations)

Literature on Foreign Currency Borrowing

FC borrowing result of optimal decision

- of households $\rightarrow$ demand driven
- of banks $\rightarrow$ supply driven

Empirical evidence:

- Macro-data based studies: Interest rate differential, (relative) volatility of inflation and exchange rate (minimum variance portfolio), deposit dollarization, role of foreign banks
- Micro-data based studies can distinguish demand and supply factors:
  - Supply: currency structure of assets & liabilities, securitization, bank competition, not: easier access to FC funding (Brown and de Haas 2011, Brown, Ongena and Kirschenmann 2014, Brown, Ongena, Yesin 2011).
  - Demand: FC borrowing of households driven by lack of credibility of LCs, in some regions expectations about euro adoption and income in euro are important (Fidrmuc, Hake, Stix 2013).

Literature on Financial Literacy

- Growing literature which studies interrelationship between financial illiteracy & household indebtedness
  - Underestimation of cost of borrowing (Stango and Zinman, 2009), tend to overborrow, incur higher fees (Lusardi and Tufano, 2009), higher cost borrowing (Lusardi and de Bassa Scheresberg, 2013), more likely to default (Gathergood, 2012; Disney and Gathergood, 2013).
- Only relatively few studies identify a causal relationship between financial literacy and financial outcomes (cf. Lusardi and Mitchell, 2014).
  - Instrumental variables or field experiments (van Rooij et al., 2013, Behrmann et al., 2012, Klapper et al., 2013, Cole, 2011, Collins, 2013)
- Only studies which control for financial literacy in the context of FC loans:
  - Beer, Ongena, Peter (2010) for AT and Pellényi and Bilek, 2009) for HU.

  $\rightarrow$ general measure of literacy (not targeted at exchange rate), no causal interpretation.

Data and Sample - "OeNB Euro Survey"

- Repeated cross-sectional surveys among individuals in CEECs
  - → collect information about the role of the euro in households' portfolios.
- Basic information on households' financial portfolios
  - existence of loans and currency denomination
  - plans to take out a loan (next 12 months)
  - measure of attractiveness of FC loans
- Detailed information on monetary expectations, socio-economic variables, etc....
- Sample: Respondents aged 19 years and older, 3 survey waves (fall 2011-fall 2013)
- Data from HU, PL, BG, RO, BiH, HR, FYROM, RS

→ Survey data fit well with data from monetary statistics (Brown and Stix, 2014; Beckmann et al. 2011).

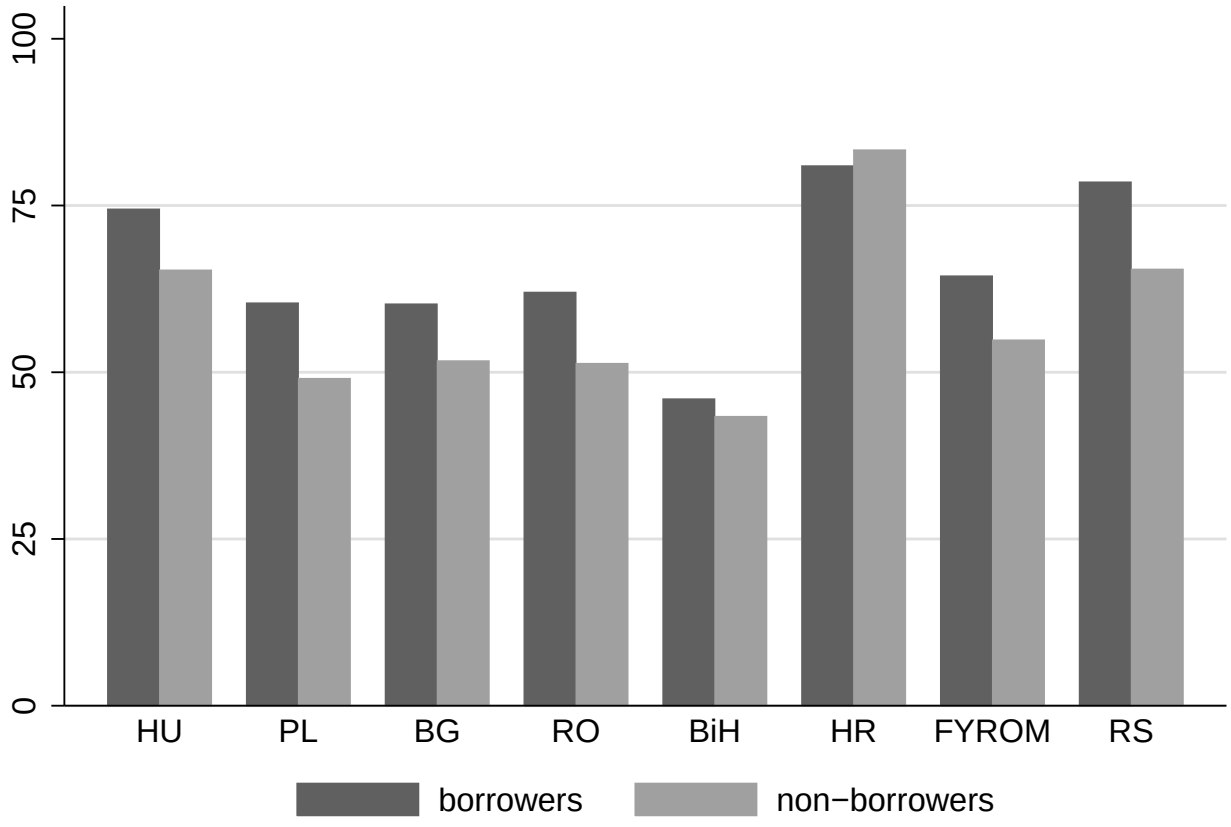
Exchange Rate Literacy

In addition to standard literacy questions (Lusardi and Mitchell, 2011), new question:

Suppose you have taken a loan in euro. Then the exchange rate of the [local currency] depreciates against the euro. How does this change the amount of [local currency] you need to make your loan installments?

Answer	Frequency	Percent	Coding of Dummy
Increases	14,252	59	1
Stays the same	2,821	12	0
Decreases	2,050	9	0
Don't Know	4,197	18	0
No Answer	638	3	missing

Exchange Rate Literacy



OeNB Euro Survey, 2011−2013.

→ in 7 countries majority of borrowers gives correct answer.

- Literacy measures correlated ▸ Other

Who is Exchange Rate Literate?

Results of correlation analysis yields results that are in line with previous literature

+ Age, education, males, students, savings, risk aversion
+ Experience with financial products, loans
0 No effect of individual level euroization (i.e., FC deposit account, FC loan)

+ Impact of memory of inflation

  Learning from "financial" life-experience (cf. Malmendier and Nagel, 2011), increase in financial literacy during recent economic crisis (Klapper et al., 2013).

Estimation

Does exchange rate literacy cause a behavioral response?

Estimation poses several challenges

1. Choice of relevant target sample
   - should consist of HH for which question of loan currency is of actual relevance, i.e. HH with a loan or with plans for a loan
   - banks influence the currency denomination of loans

     information on existing loans could be confounded by supply effects

   → use survey measure of planned loans next 12 months (Fidrmuc et al., 2013)

   → Heckman selection model:

   1st stage planned loan (yes/no),
   2nd stage demand for FC loan (yes/no)

Estimation

2. Choice of "demand for FC loan"
   - use binary measure of stated preferences "perceived attractiveness of EUR loans"

     Taking everything into account: Loans in euro are more attractive than [local currency] loans.
     Please tell me whether you agree on a scale from 1 (strongly agree) to 6 (strongly disagree) with this statement.

   - high correlation with outcome based measure

Controls

Model includes information on respondents'

- expectations regarding the exchange rate and its volatility
- FC saving preferences
- financial position and hedging capabilities
  - bank account, savings
  - income in euro
  - proxies for household wealth: owns house, owns second residence
- socio-economic characteristics: age, gender, head of household, size of household, education, employment status, household income, risk aversion
- country*time fixed effects (interest rate differentials)
- Variables used for identification: indicator for existing bank relationship, employment status, individual-level expectations about economic situation

Attractiveness of FCLs and Exchange Rate Literacy

dependent variable	FC loans attractive			
sample	respondents who plan a loan		respondents who do not have a loan	
	(1)	(2)	(3)	(4)
exchange rate literate	-0.093**		-0.136***	
	(0.042)		(0.050)	
expect depreciation	-0.081**		-0.114**	
	(0.033)		(0.056)	
country & time fixed effects	yes		yes	
N(selection equation)	13681		10060	
N(outcome equation)	769		477	
P(FC attractive=1)	0.44		0.44	
$H_0 : a = b$				
p-Value				

Attractiveness of FCLs and Exchange Rate Literacy

dependent variable	FC loans attractive			
sample	respondents who plan a loan		respondents who do not have a loan	
	(1)	(2)	(3)	(4)
FC deposit preference	0.101**		0.085	
	(0.041)		(0.056)	
expect volatile XR	0.031		0.037	
	(0.036)		(0.043)	
network effect weak	-0.123***		-0.111	
	(0.047)		(0.072)	
income in euro	0.266		0.198	
	(0.164)		(0.199)	
country & time fixed effects	yes		yes	
N(selection equation)	13681		10060	
N(outcome equation)	769		477	
P(FC attractive=1)	0.44		0.44	
$H_0 : a = b$				
p-Value				

- Unobserved variables could be correlated with both exchange rate literacy and demand for FCLs.
- Difficult to find valid instruments in cross-sectional data

$\rightarrow$ Alternative identification strategy

Expected depreciation should not affect the borrowing behavior of agents who do not understand the consequences of a depreciation, i.e. who are not exchange rate literate.

$\rightarrow$ Utilize information about agents' depreciation expectations and interact this information with exchange rate literacy

H_0: not exchange rate literate:

expect no depreciation $= 0$

expect depreciation $= 0$

H_0: exchange rate literate:

expect depreciation $<$ expect no depreciation

expect depreciation < 0

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	(0.033)		(0.056)	
not lit. & expect depreciation		**-0.025**		**-0.043**
		(0.074)		(0.107)
lit. & expect no depreciation (a)		-0.062		-0.099*
		(0.056)		(0.060)
lit. & expect depreciation (b)		-0.167***		-0.241***
		(0.046)		(0.066)
$H_0 : a = b$		5.09		4.44
p-Value		0.02		0.04

Attractiveness of FCLs and Exchange Rate Literacy

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p-Value		0.02		0.04

Robustness Analysis

dependent variable	FC loans attractive 0/1			
sample	all respondents + IR literacy	IR literate respondents	floating ER regime	(quasi-) fixed ER regime
	(1)	(2)	(3)	(4)
not lit. & expect depreciation	-0.029	-0.073	-0.151	0.010
	(0.074)	(0.099)	(0.150)	(0.089)
lit. & expect no depreciation (a)	-0.059	-0.069	-0.215*	-0.006
	(0.055)	(0.061)	(0.125)	(0.043)
lit. & expect depreciation (b)	-0.162***	-0.194***	-0.310***	-0.125**
	(0.047)	(0.075)	(0.111)	(0.058)
IR literate	-0.030			
	(0.044)			
$H_0 : a = b$	5.00	3.23	2.03	3.03
p-Value	0.03	0.07	0.15	0.08
N(outcome equation)	768	479	322	447
P(FC attractive=1)	0.44	0.43	0.40	0.48

Conclusions

Knowledge about exchange rate risk significantly reduces demand for FCLs.

$\rightarrow$ Making borrowers aware of exchange rate risk is a worthwhile goal for policy makers.

But the majority of borrowers already understands exchange rate risk associated with FCLs.

$\rightarrow$ Lack of understanding of exchange rate risk is not the main cause of widespread FC borrowing.

Appendix