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Foreign currency borrowing and knowledge about exchange rate risk

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Editorial

Foreign currency borrowing is widespread in many regions of the world. This raises the question whether unhedged borrowers do not understand the exchange rate risk emanating from such loans. Employing household level micro-data from eight Central and Eastern European countries the authors study how agents' knowledge about exchange rate risk affects the currency denomination of loans. Results show, first, that a majority of respondents is aware that depreciations increase loan installments and, secondly, that knowledge about the exchange rate risk lowers the demand for foreign currency borrowing. To assess the causal effect of literacy on loan demand the authors utilize information on agents' exchange rate expectations. Overall, results suggest that financial literacy exerts a strong impact on the choice of the loan currency. However, from an aggregate perspective, a misunderstanding of the underlying risks is not the main cause of foreign currency borrowing.

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Foreign currency borrowing and knowledge about exchange rate risk

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Abstract

Foreign currency borrowing is widespread in many regions of the world. This raises the question whether unhedged borrowers do not understand the exchange rate risk emanating from such loans. Employing household level micro-data from eight Central and Eastern European countries we study how agents' knowledge about exchange rate risk affects the currency denomination of loans. Results show, first, that a majority of respondents is aware that depreciations increase loan installments. Second, we find that knowledge about the exchange rate risk lowers the demand for foreign currency borrowing. To assess the causal effect of literacy on loan demand we utilize information on agents' exchange rate expectations. Overall, results suggest that financial literacy exerts a strong impact on the choice of the loan currency. However, from an aggregate perspective, a misunderstanding of the underlying risks is not the main cause of foreign currency borrowing.

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1. Introduction

Foreign currency loans are very widespread in many regions of the world with a share of about 25% in Latin America, 40% in the Middle East and above 50% in several Central and Eastern European countries (Ranciere, Tornell and Vamvakidis, 2010). Often such loans are taken by unhedged households which are vulnerable to currency fluctuations. The depreciations that have occurred during the financial crisis in some Central and Eastern European countries (CEECs) and the resulting rises in loan delinquencies have made it clear that this poses a substantial threat to financial stability. Against this background, it is all the more remarkable that demand for such loans has not stalled.[1] This raises the question whether borrowers do not fully understand the exchange rate risk emanating from such loans.

This paper takes a closer look at this question. Given that the choice of an optimal loan is already complex in domestic currency (Campbell, 2006) and the finding that debt literacy is rather low among U.S. consumers (Lusardi and Tufano, 2009), we presume that a lack of knowledge about yet another important decision factor, exchange rates, could be an important determinant of widespread foreign currency borrowing. To assess this conjecture, we utilize data from a survey in eight CEECs, which provides information on the borrowing behavior of individual households and the currency denomination of their loans. To study households' awareness of exchange rate risk, several survey questions provide information on agents' understanding of exchange rate risk and their expectations regarding the exchange rate.

The central question posed to respondents was: "*Suppose that you have taken a loan in euro. Then the exchange rate of the [respective local currency] depreciates against the euro.*

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[1] E.g. "Interest-rate swings in Europe sting borrowers and banks – Households, small firms sink under weight of foreign-currency debts" (The Wall Street Journal, July 29, 2010, p.14). Fidrmuc, Hake and Stix (2013) show survey evidence that demand for foreign currency loans has declined after 2008 but not stalled.

How does this change the amount of local currency you need to make your loan installments?". Based on this survey instrument, we provide evidence on two issues: First, what is the share of people who cannot give a correct answer to this question and, more generally, how does literacy on the exchange rate relate to other financial literacy measures? Second, focusing on the behavioral response of agents, does knowledge about the implications of depreciations affect the demand for foreign currency loans (FCLs)? Answers to both questions are important for assessing the relevance of financial literacy for foreign currency borrowing.

Regarding the first issue, results show that in seven out of eight countries the majority of borrowers understand the risk of exchange rate depreciations—although in some countries the share of respondents with correct answers is close to 50% only. At first sight, this evidence suggests that misinformation of consumers alone cannot be the main source of widespread demand for FCLs. However, to substantiate this statement, one also has to demonstrate that financial literacy actually causes a behavioral response—in other words: a high level of financial literacy would be meaningless unless agents' loan decisions are shown to depend on financial literacy. Therefore, we estimate a model which relates demand for foreign currency loans to factors which have been shown to affect the loan denomination choice. Essentially, this model builds upon results of Fidrmuc, Hake and Stix (2013), accounting for measures of monetary credibility, the risk exposure of borrowers (hedging capabilities), socio-demographic factors and additionally including a measure of exchange rate literacy. Results suggest that exchange rate literacy is robustly related to loan decisions. In particular, a better knowledge about exchange rate risks exerts a negative impact on demand for FCLs. To exclude that we do not misinterpret the direction of causality, we utilize information about agents' depreciation expectations. Interacting this information with

exchange rate literacy, demonstrates that agents behave as predicted by economic reasoning which lends support to our interpretation of the direction of causality.

The findings from the behavioral regressions together with the finding that exchange rate literacy is widespread leads us to conclude that a misunderstanding of underlying risks is not the main cause of foreign currency borrowing.

This paper is related, on the one hand, to the literature on the determinants of FCLs (Basso et al., 2011; Brown and De Haas, 2012; Brown, Kirschenmann and Ongena, 2010; Fidrmuc et al., 2013; Ize and Levy-Yeyati, 2003; Jeanne, 2005; Levy-Yeyati, 2006; Luca and Petrova, 2008). On the other hand, we build on the growing literature which studies the interrelationship between financial literacy and households' indebtedness (Disney and Gathergood, 2013; Klapper et al., 2013, Lusardi, 2013; Gathergood, 2012; Lusardi and Tufano, 2009). Hastings, Madrian and Skimmyhorn (2013) point out that there are only a few papers which identify a causal relationship between financial literacy and financial decision making (e.g. Behrman, Mitchell, Soo and Bravo, 2012; Cole, Sampson and Zia, 2011; van Rooij, Lusardi and Alessie, 2011). Our contribution to these two strands of the literature is that we aim to assess whether demand for FCLs is causally driven by a lack of knowledge about exchange rate risk. We are aware of only one study, Beer, Ongena and Peter (2010), who find no role of financial literacy on demand for FCLs in Austria. However, in contrast to our study their measure of literacy is not targeted at the exchange rate but at general attitudes towards financial services. Moreover, they do not discuss the causal interpretation of their parameter estimate.

2. Data

The surveys used in this paper were conducted between fall 2011 and fall 2013 on commission of the Austrian Central Bank in eight CEECs: Bosnia and Herzegovina, Bulgaria, Croatia, Hungary, Poland, Romania, Serbia and the Former Yugoslav Republic of Macedonia. The survey provides information on financial decisions of households as well as their economic expectations. With regard to borrowing, the survey elicits information about the existence of loans and of loan plans, the currency composition as well as the perceived attractiveness of foreign currency loans vis-à-vis local currency loans. In each country the survey is representative for the respective population and about 1,000 persons aged 14 and older are personally interviewed.[2] For our estimations we exclude persons below the age of 18 and do not impute missing observations, which leaves us with around 13,700 observations altogether. In principle, this survey has been repeated several times prior to fall 2011 and results show that it yields an accurate picture of the financial behavior of private households in these countries (cf. Fidrmuc et al., 2013). The main difference between older surveys and the ones since fall 2011 is that we added questions on financial literacy and on expectations regarding exchange rates and their volatility. A detailed definition of key variables is provided in Table A.1. Table A.2 summarizes descriptive statistics by country.

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[2] In Poland for fall 2011 the sample is only representative for the population in the ten largest cities. The Euro Survey has also been conducted in the Czech Republic and in Albania. We omit these two countries because foreign currency borrowing is of no importance in the former case and because of data problems in the latter case.

3. Exchange rate literacy

3.1. The measurement of exchange rate literacy

The survey question on exchange rate literacy is - to the best of our knowledge - new to the literature. Therefore, we will put the results into perspective by comparing it with results from two standard literacy questions on interest compounding and inflation.

Figure 1 shows the share of respondents who understand that a depreciation will increase installments on FCLs. In all countries except Bosnia and Herzegovina more than 50% of respondents who are currently paying off a loan are exchange rate literate. In Poland, Bulgaria, Romania and FYR Macedonia less than two thirds of respondents are exchange rate literate, whereas in Hungary, Croatia and Serbia 75% to 80% of borrowers correctly answer the exchange rate literacy question. Knowledge about exchange rate risks could differ between borrowers and non-borrowers, as the former have a higher incentive to get informed or as banks raised awareness when the loan was negotiated. With the exception of Croatia, we find that this is the case. One could argue that Hungary, Croatia and Serbia display a high share of literate people because of elevated public awareness due to households' problems with debt repayment caused by a depreciation of the local currency against the euro and the Swiss franc. However, we do not find an increase in exchange rate literacy from fall 2011 to fall 2013 in these countries, which could have been expected given that certain events, e.g. the court ruling against Swiss franc loans in Croatia in July 2013, received substantial media attention.
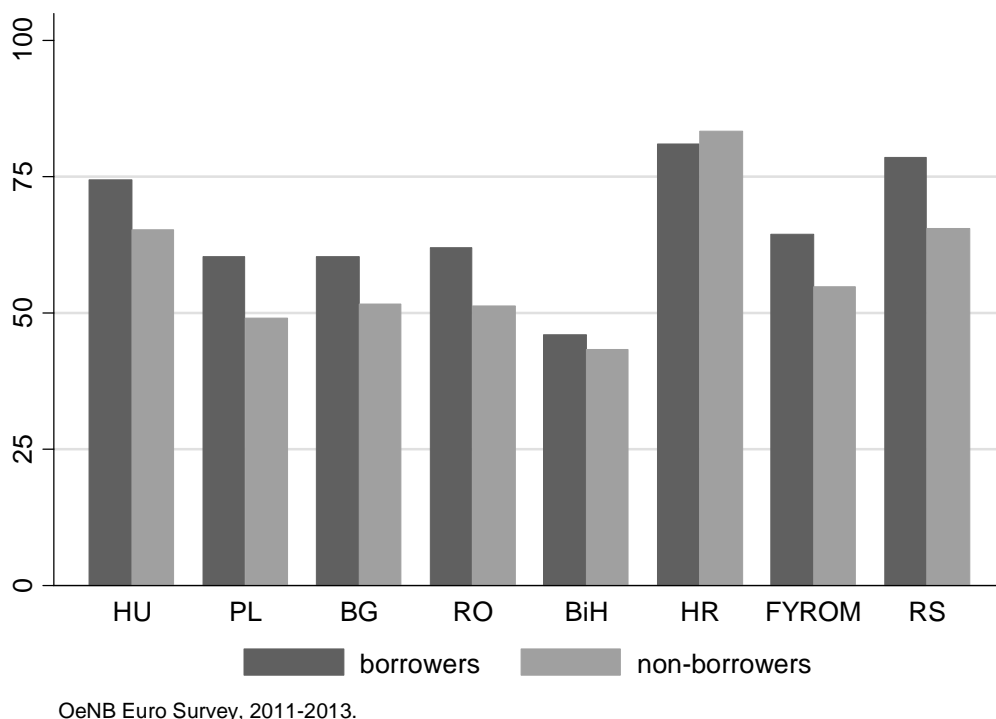
Figure 1. Exchange rate literacy among borrowers and non-borrowers.

To put the evidence on exchange rate literacy into perspective, Figure 2 compares it to answers on two standard literacy questions on the understanding of interest compounding and inflation (Lusardi and Mitchell, 2011a, see Table A.1 *Inf literate* and *IR literate* for wording of the questions). Expectedly, exchange rate literacy is correlated with compound interest literacy and with inflation literacy.[3] In five out of eight countries, exchange rate literacy is higher compared to compound interest and inflation literacy. In Bulgaria, inflation literacy is highest whereas in Bosnia and Herzegovina and in FYR Macedonia, compound interest literacy is highest.

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[3] Previous research has noted the measurement error due to random guessing (van Rooij et al., 2011). Although we cannot rule this out, we note that both the correct answers, the incorrect answers and the "Don't know" responses across the three literacy questions are (highly) correlated, which indicates that random guessing should not be severe.

As the exchange rate literacy question is new, we cannot benchmark it against results from other countries. However, we can conduct such a comparison for the other literacy questions: The percentage of respondents who correctly answer the compound interest literacy question is between results from Mexico (45%) or Chile (46%) (Hastings et al., 2013) and Japan (71%) (Sekita, 2011). For inflation literacy, results are in the range of Russia (50%) at the lower bound (Klapper and Panos, 2011) and the Netherlands (77%) at the upper bound (Alessie et al., 2011).

Altogether, the comparison of the exchange rate literacy evidence with (i) the results from the standard literacy questions from our survey and (ii) from other surveys reassure us that the new question indeed provides meaningful information.
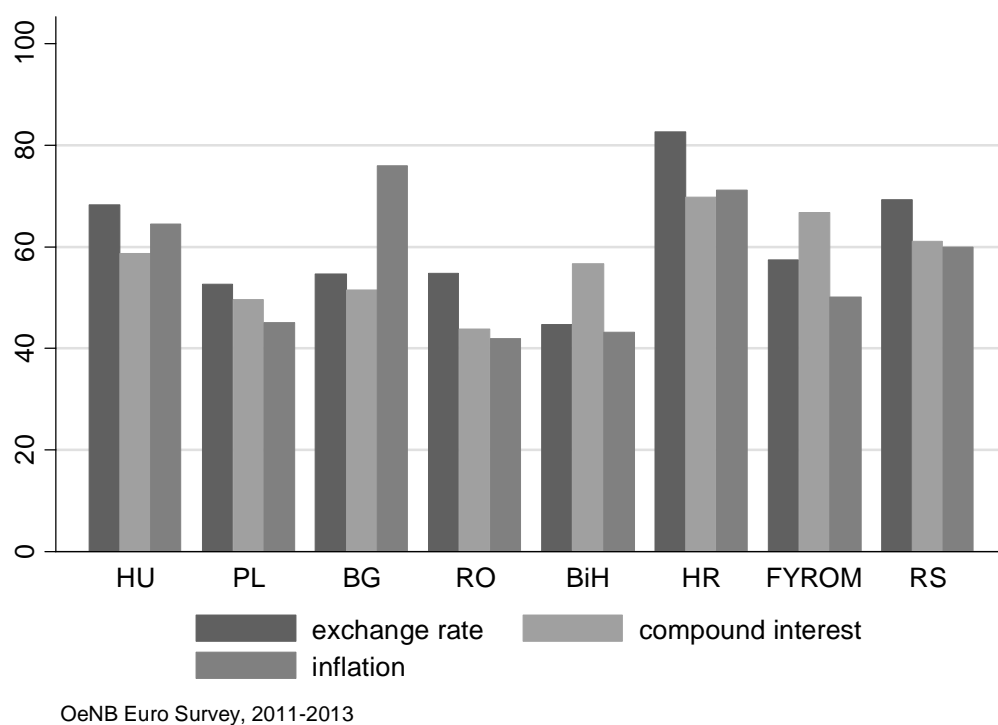

OeNB Euro Survey, 2011-2013

Figure 2. Exchange rate literacy versus interest and inflation literacy.

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3.2 Who is exchange rate literate?

Previous research has shown that financial literacy varies widely across demographic characteristics. Table 1, column 1 relates exchange rate literacy to a set of socio-demographic characteristics. It shows that the age-gap, gender-gap and education-gap which has been demonstrated by previous research on financial literacy (Lusardi and Mitchell, 2011b) also holds for exchange rate literacy. Male respondents and respondents with higher education display significantly higher exchange rate literacy. We further find that the labor market status of respondents influences exchange rate literacy: students are more likely to answer the exchange rate question correctly, while retired respondents are less likely. We do not find evidence that individuals with higher income are more literate, which is contrary to results from e.g. Brown and Graf (2013) but find that those who do not have savings tend to be less literate. In line with results from McCarthy (2011), Gathergood (2012) and Brown and Graf (2013) we find that personal characteristics, in particular risk aversion, are correlated with financial literacy.

Several authors argue that while financial literacy may influence financial behavior, the reverse is also true – experience with financial products increases literacy (e.g. Hastings et al., 2013). We find that financial experience is correlated with higher financial literacy (Table 1, column 2): respondents who have a bank account are 6 percentage points more likely to answer the exchange rate literacy question correctly. Focusing on the experience with loans we include two dummy variables – one for respondents who have a local currency loan and one for respondents who have foreign currency loan. We find that exchange rate literacy is significantly correlated with ownership of local currency loans but not with foreign currency loans. This could reflect reverse causality or the effect of banks on loan denominations.

Some Southeastern European countries in our sample are strongly euroized, both in the form of currency substitution and of deposit substitution. Results of column 3 show that the possession of a foreign currency deposit does not significantly affect exchange rate literacy. Euroization in the countries in our sample in part originates in previous economic turbulence during transition, in particular some countries experienced hyperinflation and banking crises. Columns 1 to 3 indicate a hump-shaped relationship between age and exchange rate literacy, which is in line with results from Brown and Graf (2013) who find that knowledge about inflation is positively correlated with age and knowledge about compound interest is negatively correlated with age. However, if we account for experience of previous economic turbulence, this age effect disappears and we find that those, who remember periods of high inflation (and depreciations) are 6 percentage points more likely to answer the exchange rate question correctly. This indicates that living through economic turbulence has a long-term impact on financial literacy. In fact, Klapper et al. (2013) report an increase in financial literacy (with the exception of interest compounding literacy) for the recent global economic crises.

Our main question is whether widespread foreign currency borrowing can be explained by a lack of understanding of exchange rate risk. In column 5, therefore, we only look at exchange rate literacy among borrowers. We do not find a significant difference in exchange rate literacy for borrowers with a foreign currency loan.

4. Estimation results

4.1. Empirical framework

Our aim to study whether exchange rate literacy affects the currency denominations of loans poses several challenges. The first refers to the choice of the relevant target sample of households, the second to the issue of the direction of causality and the third to the choice of the appropriate dependent variable.

The relevant target sample should consist of households for whom the question of the loan currency is of actual relevance, i.e., households who either have a loan or who plan to have a loan. The literature has shown that banks influence the denominations of granted loans which implies that information on existing loans could be confounded by supply effects (e.g. Brown et al., 2010). Moreover, we want to examine the effect of expectations about monetary conditions and of financial literacy on FCL demand. As decision on existing loans were made in the past while our observed empirical measures on expected monetary conditions are measured at the time when the surveys were conducted, we would face problems of misinterpretation of the direction of causality. For example, expectations about exchange rates could reflect wishful thinking if households already hold a loan in foreign currency.

To circumvent these issues, Fidrmuc et al. (2013) propose to use information on planned loans as an appropriate measure of loan demand. As the survey contains information about whether respondents plan to take out a loan in the next 12 months we will hence focus on this sub-sample throughout all subsequent estimations.

Specifically, we estimate a sample selection model (Heckman, 1979) and analyze the demand for foreign currency loans only if a respondent plans to take out a loan. The selection equation models the probability that a respondent plans to take out a loan,

$$P(L=1) = \Phi_L(\mathbf{X}_L \boldsymbol{\beta}_L + u_L), \tag{1}$$

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while the outcome equation refers to a probit model of the demand of foreign currency loans

$$P(F = 1 \mid L = 1) = \Phi_F \left(\mathbf{X}_F \%\phi + u_F \right),$$ (2)

with the error terms normally distributed, $u_L \sim N(0,1), u_F \sim N(0,1),$ and correlated, $\text{corr}(u_L, u_F) = \rho.$ Both equations will be estimated jointly by maximum likelihood techniques.

The selection equation includes several variables, which are used for identification. In particular, we take three employment categories (student, retired and unemployed) and a variable describing whether households have an existing bank relationship (i.e., a bank account). Moreover, we utilize households' expectations on the economic situation which is a driver of loan demand. These variables are correlated with access to loans, but not with the decision on the loan currency.

4.2. Dependent and explanatory variables

Our dependent variable in the outcome equation is derived from information about respondents' assessment of FCLs. This stated preference measure is based on the question: "*Taking everything into account: Loans in euro are more attractive than [respective local currency] loans*" with answers, which were originally recorded on a six-point scale, converted to a binary indicator.

As to the usefulness of this dependent variable, we note that the data set also contains an outcome measure of the demand for foreign currency loans, i.e., the currency denomination of the planned loan. However, we use the perceived attractiveness for several reasons: First, the sample size is too small and/or contains too little variation to conduct meaningful estimations. Second, some countries have imposed (more or less restrictive) legal measures against foreign currency borrowing. If households are aware of these restrictions and/or if

households do not want to reveal their preference for a foreign currency loan, the outcome based measure would not purely reflect demand for foreign currency loans.[4]

Answers on the perceived attractiveness provide a good proxy for FCL demand: There is a very high correlation of perceived attractiveness with outcome measures – among households who consider FCLs unattractive, only 12% plan a foreign currency loan. The respective share is 29% for households who consider FCLs attractive.[5] In a regression which controls for socio-demographic characteristics and monetary expectations of households as well as for country and time fixed effects, we find that the perceived attractiveness explains more than one half of the variation in loan demand (13 percentage points with a sample mean of 20% who demand a foreign currency loan).

The set of explanatory variables contained in $\mathbf{X}_L$ comprises a measure of exchange rate literacy as well as variables measuring monetary conditions the choice of which is based on previous theoretical and empirical models. Foremost, we include a measure of expected *exchange rate depreciations,* a measure of *expected exchange rate volatility* and a measure of *network effects*. Theoretical and empirical results, e.g. Ize and Levy-Yeyati (2003) and Luca and Petrova (2008), show that exchange rate volatility should exert an impact on the choice of the loan currency. On a general note, these survey based expectations are superior to the use of data derived from actual exchange rates because they reveal a substantial degree of depreciation expectations even in countries with a currency board and in countries which have had a rather stable exchange rate (Table A.2). Similar to Fidrmuc et al. (2013), we

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[4] We think that these considerations apply mainly for small sample sizes. With a large enough sample size, as in Fidrmuc et al. (2013), these restrictions should become less of a problem.

[5] The binary nature of the dependent variable masks the strength of the correlation. If we analyze the original 6-point coding of the variable, we find that demand for foreign currency loans is at only 6% for those who consider FCLs very unattractive whereas it is 38% for those who consider these loans very attractive, with the shares increasing homogenously for the in-between categories.

include a measure of foreign currency saving preferences as a proxy for the minimum-variance foreign currency share, as suggested by Ize and Levy-Yeyati (2003).[6] Interest rate differentials are controlled for by including country-time fixed effects.

4.2. Results

Table 2 presents marginal effects of the outcome equations, i.e., with perceived attractiveness of FCLs as the dependent variable. The corresponding results from the selection equation are summarized in Table A.3. The sample comprises about 13,700 households, among which 770 plan a loan.

The point estimates (marginal effects) in column (1) show that exchange rate literacy exerts a negative, significant and sizeable impact on FCL demand. While about 44% of respondents perceive FCLs as more attractive than local currency loans, knowledge about the exchange rate risk reduces attractiveness by 9.3 percentage points (pp), with the 95% confidence interval ranging from 1 pp to 18 pp.

With respect to the variables which measure monetary conditions, we find that depreciation expectation exert a sizeable negative impact (-8.1 pp). Our results confirm the result of Fidrmuc et al. (2013) that a preference for foreign currency savings exerts a sizeable positive impact on foreign currency borrowing – this measure is interpreted as a theoretically informed proxy for the forward looking assessment of the stability of the local currency relative to the foreign currency (cf. Ize and Levy-Yeyati, 2003; Jeanne, 2005).[7] In contrast,

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[6] Our specification follows closely Fidrmuc et al. (2013), however, with data availability allowing to employ several additional variables: measures of wealth, expected exchange rate volatility, a better proxy for FC saving preferences.

[7] As discussed in Fidrmuc et al. (2013) the literature suggests two interpretations of this variable: First, the model of Ize and Levy-Yeyati (2003) shows that portfolio allocation decisions are symmetric, i.e. that agents

expected exchange rate volatility does not exert a significant impact. Also we find that network effects have an impact on loan demand: a higher level of currency substitution, which is quite common in some countries in our sample, increases demand for foreign currency loans.[8] Among other control variables which are not shown in Table 2, including education, income, age and risk aversion, we find no consistent effects.

One concern regarding this first set of results is that the estimated impact of exchange rate literacy does not reflect causality. In particular, we suspect one mechanism that potentially could generate this reverse causality: some agents could have more knowledge than other agents because they have been already informed about exchange rate risks or because they have had an incentive to get informed (e.g. in some countries loan procedures foresee that loan applicants are made aware of the exchange rate risk by banks). This issue is of particular relevance because a relatively high share of respondents who plan a loan has an existing loan. If this effect was present, it would imply that the estimated coefficient is upward biased because *XR literate* and FCLs are positively correlated, and hence that the true effect is even stronger than suggested by point estimates in Table 2.

We address this issue by analyzing only those respondents who currently do not have a loan (column 3, Table 2). This reduces the sample size in the outcome equation to less than

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who have a preference for savings in foreign currency should also have a preference for loans in foreign currency. According to the minimum variance portfolio (MVP) approach of Ize and Levy-Yeyati (2003), households consider the relative volatility of real returns of assets or liabilities issued in domestic and in foreign currency and hence trade off inflation volatility and real exchange rate volatility. Second, and alternatively, one can view the variable used in the estimation as an individual level indicator of monetary credibility. The inclusion of this variable would then be in line with Jeanne (2005) who argues that a lack of credibility of domestic monetary policy induces borrowing in foreign currency.

[8] We note that results do not change, qualitatively, if we omit either one of the monetary expectation variables.

500 households.[9] Nevertheless, we find a negative and significant coefficient of *XR literate*, which is slightly more negative, as expected. The absolute size of the difference suggests that this particular source of endogeneity does not generate a strong bias.

As our data are cross-sectional we cannot exclude that other unobserved variables are correlated with both exchange rate literacy and demand for FCLs. Ideally, one would employ instrumental variable techniques, which would require finding variables that are correlated with exchange rate literacy and that affect the attractiveness of FCLs solely through its impact on exchange rate literacy. As it is very difficult to find valid instruments in cross-sectional data, we apply an alternative identification strategy which is based on economic reasoning: we utilize information about agents' depreciation expectations and interact this information with our measure of exchange rate literacy.

Specifically, we formulate two hypotheses:

1. Depreciation expectations should not affect the borrowing behavior of agents who do not understand the implications of depreciations, i.e. who are not exchange rate literate. Accordingly, we should find that the point estimates of the interacted variables "*not XR literate & exp. LC depreciation*" and "*not XR literate & exp. no LC depreciation*" should both be zero statistically.

$$H_0: \textit{not XR literate } \& \textit{ exp. LC depreciation } = 0$$
$$\textit{not XR literate } \& \textit{ exp. no LC depreciation} = 0.$$

2. Among households who are exchange rate literate, we should find that agents with depreciation expectations have a lower demand for FCLs than agents without

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[9] We do not have information on whether respondents had a loan in the past that has been fully repaid at the time of the interview. Given that strong loan growth started only in the late 1990s, we presume that this applies only to a small share of the population.

depreciation expectations. Additionally, we should find that the point estimate for "*XR literate & exp. LC depreciation*" should be smaller than zero.[10]

H_0 : *XR literate & exp. LC depreciation* <0
XR literate & exp. LC depreciation $<$ *XR literate & exp.* no *LC depreciation.*

Columns 2 and 4 of Table 2 show results of specifications which include the interacted variables. As the omitted category is "*not XR lit & exp. no LC depreciation*" we can directly test Hypothesis 1 by looking at the coefficient of "*not XR lit & exp. LC depreciation*" which is insignificantly different from zero in both specifications. Concerning hypothesis 2, we find that the point estimate of "*XR lit & exp. LC depreciation*" is negative and significant in all specification with the marginal effect being about twice as large as for the non-interacted variable. Additionally, we test whether "*XR lit & exp. LC depreciation*" is equal to "*XR lit & exp. no LC depreciation*", with test statistics summarized in Table 2 at the bottom. Results show that the null hypothesis of equal coefficients is rejected in both specification. Note that instead of the one-sided test from hypothesis 2, we conduct a more conservative two-sided test. Also, we do not report results from a joint test of both conditions in Hypothesis 2 but only whether the coefficients differ statistically. A joint-test would result in much higher test statistics. Overall, we interpret these results as providing strong support for our interpretation of the direction of causality as it seems difficult to find an unobserved variable that produces the same pattern of results that we observe.

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[10] Note that we do not postulate that the point estimate for "*XR lit & exp. no LC depreciation*" should be zero because literacy itself could exert an impact on FCL demand.

4.3. Robustness analyses

We conduct several robustness tests.[11] We have noted that interest rate literacy is strongly correlated with exchange rate literacy. For policy purposes one could ask whether the behavior regarding FCLs is driven by a general lack of financial knowledge (i.e. interest rate and exchange rate literacy) or by a lack of exchange rate literacy as such. We inquire into this issue by adding interest literacy to the baseline specification (col. 1 of Table 3). Additionally, we estimate the model only for households who are interest rate literate (col. 2). In both cases, our results do not change qualitatively, suggesting that exchange rate literacy exerts an independent effect even if we control for interest rate literacy.[12] As we cannot say much more about the evaluation of literacy programs, we do not want to push policy conclusions too far.[13] At least the finding suggests that special literacy initiatives that target the awareness of the risks of depreciations could be worthwhile.

One could suspect that the effect of exchange rate literacy is affected by the prevailing exchange rate regime. Since 2008 when the crisis hit the region, several countries have experienced depreciations while others have maintained a stable exchange rate. Columns 3 and 4 of Table 3 confirm that the principle pattern of results holds regardless of the exchange rate regime – however, with a word of caution regarding the low number of observations.

Throughout the paper, in line with the literature, we have defined households who give a wrong answer and who answer "don't know" to the respective question as exchange rate illiterate. Results do not change if we exclude "don't know" answers from this definition

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[11] The very low number of observations prevents pushing sample splits too far.

[12] We note that the point estimate of rho in column 2 of Table 3 gives rise to concerns about the low number of observations.

[13] For an example of a randomized field experiment which is informative about the design of financial literacy programs, see Carpena, Cole, Shapiro and Zia (2011).

(column 5 of Table 3). Instead of employing the binary dependent variable "*fcl attractive (0/1)*" we estimate a linear model with "*fcl attractive (1/6)*" as an ordinal variable which takes values from 1 (strongly disagree) to 6 (strongly agree). Again, we find a strong negative effect of exchange rate literacy (column 6 of Table 3). Additionally, we account for the effect of unobserved dependencies between respondents by repeating the estimations with standard errors clustered at the regional level and at the level of the primary sample unit (mostly municipalities). Neither of these extensions affects our main findings, qualitatively.

5. Conclusions

We demonstrate that knowledge about how exchange rate depreciations affect loan installments on foreign currency loans reduces demand for FCLs. This result implies that it could be a worthwhile goal for economic policy to foster financial literacy, i.e. by adapting loan procedures to make borrowers aware of the risks or by initiating appropriate financial literacy programs. However, at the same time, we note that our results show that a majority of borrowers understands the risk of exchange rate depreciations already now. This suggests that a misunderstanding of respective risks is not the main cause of widespread foreign currency borrowing.

References

Alessie, R., van Rooij, M., Lusardi, A., 2011. Financial literacy and retirement preparation in the Netherlands. Journal of Pension Economics and Finance 10(4), 527–545.

Basso, H. S., Calvo-Gonzales, O., Jurgilas, M., 2011. Financial dollarization and the role of foreign-owned banks and interest rates. Journal of Banking and Finance 35, 794-806.

Beer, C., Ongena, S., Peter, M., 2010. Borrowing in foreign currency: Austrian households as carry traders. Journal of Banking and Finance 34, 2198-2211.

Behrman, J. R, Mitchell, O. S., Soo, C. K. and Bravo, D., 2012. How financial literacy affects household wealth accumulation. American Economic Review: Papers & Proceedings 102(3), 300-304.

Brown, M., De Haas, R., 2012. Foreign banks and foreign currency lending in emerging Europe. Economic Policy 69, 57-98.

Brown, M., Graf, R., 2013. Financial literacy and retirement planning in Switzerland. Numeracy 6, Article 6.

Brown, M., Kirschenmann, K., Ongena, S., 2010. Foreign currency loans - demand or supply driven? Discussion Paper 7952, CEPR London.

Campbell J. Y., 2006. Household finance. Journal of Finance 60(4), 1553-1604.

Carpena, F., Cole, S., Shapiro, J. Zia, B., 2011. Unpacking the causal chain of financial literacy. The World Bank Policy Research Working Paper 5798.

Cole, S. Sampson, T., Zia, B., 2011. Prices or knowledge? What drives demand for financial services in emerging markets? Journal of Finance 66(6), 1933-1967.

Disney, R., Gathergood, J., 2013. Financial literacy and consumer credit portfolios. Journal of Banking and Finance 37, 2246-2254.

Fidrmuc, J., Hake, M., Stix, H., 2013. Households' foreign currency borrowing in Central and Eastern Europe. Journal of Banking and Finance 37(6), 1880–1897.

Gathergood, J., 2012. Self-control, financial literacy and consumer over-indebtedness. Journal of Economic Psychology 33(3), 590–602.

Grosjean, P., 2011. The Institutional Legacy of the Ottoman Empire: Islamic Rule and Financial Development in South Eastern Europe. Journal of Comparative Economics 39, 1–16.

Hastings, J., Madrian, B., Skimmyhorn, W., 2013. Financial Literacy, Financial Education and Economic Outcomes. Annual Review of Economics 5, 347-373.

Heckman, J., 1979. Sample selection bias as a specification error. Econometrica 47, 153–161.

Ize, A., Levy-Yeyati, E., 2003. Financial dollarization. Journal of International Economics 59, 323-347.

Jeanne, O., 2005. Why do emerging economies borrow in foreign currency? In: Eichengreen, B., Hausmann, R. (Eds.), Other People's Money. The University of Chicago Press, Chicago, pp. 190-217.

Klapper, L., Lusardi, A., Panos, A.G., 2013. Financial literacy and its consequences: Evidence from Russia during the financial crisis. Journal of Banking and Finance 37, 3904-3923.

Klapper, L., Panos, G.A., 2011. Financial literacy and retirement planning: The Russian case. Journal of Pension Economics and Finance 10(4), 599–618.

Levy-Yeyati, E., 2006. Financial dollarization: Evaluating the consequences. Economic Policy 21, 61-118.

Luca, A., Petrova, I., 2008. What drives credit dollarization in transition economies? Journal of Banking and Finance 32, 858-869.

Lusardi, A., 2013. Financial literacy and high-cost borrowing in the United States. Working Paper 18969, NBER Cambridge MA.

Lusardi, A., Tufano, P., 2009. Debt literacy, financial experiences, and overindebtedness. Working Paper 14808, NBER Cambridge MA.

Lusardi, A., and O. S. Mitchell., 2011a. Financial literacy and planning: Implications for retirement wellbeing. In: Financial Literacy: Implications for Retirement Security and the Financial Marketplace. Oxford Scholarship Online. DOI:10.1093/acprof:oso/9780199696819.003.0002

Lusardi, A., Mitchell O.S., 2011b. Financial literacy around the world: An overview. Journal of Pension Economics and Finance 10(4), 497–508.

McCarthy, Y., 2011. Behavioral Characteristics and Financial Distress. Working Paper 1303, ECB Frankfurt.

Ranciere, R., Tornell, A. and Athanasios V. 2010. Currency mismatch, systemic risk and growth in emerging Europe. Economic Policy 25, 597–658.

Sekita, S., 2011. Financial literacy and retirement planning in Japan. Journal of Pension Economics and Finance 10(4), 637-656.

van Rooij, M., Lusardi, A., Alessie, R., 2011. Financial literacy and stock market participation. Journal of Financial Economics 101(2), 449-472.

Table 1. Determinants of Exchange Rate Literacy

dependent variable	XR literate				
sample	all respondents (cols. 1-4)				resp. with a loan
	(1)	(2)	(3)	(4)	(5)
age	0.048***	0.034**	0.035**	0.016	0.050
	(0.016)	(0.017)	(0.017)	(0.019)	(0.043)
age squared	-0.005***	-0.004*	-0.004**	-0.002	-0.006
	(0.002)	(0.002)	(0.002)	(0.002)	(0.005)
female	-0.026***	-0.027***	-0.026***	-0.025***	-0.046***
	(0.007)	(0.008)	(0.008)	(0.009)	(0.014)
education medium	0.056***	0.050***	0.051***	0.046***	0.052***
	(0.010)	(0.011)	(0.011)	(0.012)	(0.019)
education high	0.088***	0.085***	0.086***	0.080***	0.081***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.020)
self-employed	-0.012	-0.015	-0.013	-0.025	-0.009
	(0.016)	(0.015)	(0.018)	(0.019)	(0.029)
unemployed	-0.032**	-0.019	-0.019	-0.019	-0.021
	(0.015)	(0.015)	(0.015)	(0.014)	(0.023)
student	0.029*	0.043**	0.042**	0.048**	0.026
	(0.017)	(0.018)	(0.019)	(0.024)	(0.065)
retired	-0.041**	-0.041**	-0.040**	-0.044**	-0.017
	(0.018)	(0.019)	(0.019)	(0.018)	(0.027)
no savings	-0.051***	-0.036***	-0.038***	-0.036***	-0.008
	(0.012)	(0.012)	(0.013)	(0.013)	(0.021)
income high	0.021	0.016	0.018	0.021	0.006
	(0.018)	(0.018)	(0.018)	(0.019)	(0.027)
income medium	0.025*	0.020	0.019	0.022	0.000
	(0.014)	(0.014)	(0.014)	(0.014)	(0.030)
income no answer	-0.043***	-0.045***	-0.047***	-0.036**	-0.050
	(0.015)	(0.016)	(0.016)	(0.017)	(0.033)
income in euro	-0.008	-0.008	-0.004	-0.007	0.021
	(0.028)	(0.027)	(0.027)	(0.032)	(0.038)
own house	0.018	0.013	0.012	0.012	-0.009
	(0.015)	(0.014)	(0.014)	(0.015)	(0.027)
own car(s)	0.020*	0.016	0.016	0.019	0.023
	(0.012)	(0.011)	(0.012)	(0.014)	(0.027)
2 person household	0.017	0.014	0.011	0.014	0.016
	(0.015)	(0.015)	(0.016)	(0.016)	(0.031)
3+ person household	0.007	0.003	0.002	0.005	0.018
	(0.015)	(0.016)	(0.016)	(0.018)	(0.039)
head of household	-0.019**	-0.024**	-0.025**	-0.024**	-0.060***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.017)
risk averse	0.183***	0.181***	0.179***	0.174***	0.110***
	(0.024)	(0.023)	(0.023)	(0.023)	(0.029)
bank account		0.058***	0.062***	0.060***	0.020
		(0.015)	(0.016)	(0.019)	(0.044)
FC loan		0.006	0.007	0.012	-0.016
		(0.021)	(0.021)	(0.020)	(0.027)
LC loan		0.042**	0.037**	0.033**	
		(0.017)	(0.017)	(0.016)	
FC deposit			-0.038	-0.045	-0.089**
			(0.029)	(0.031)	(0.037)
memory of inflation				0.060***	0.078***
				(0.012)	(0.019)
country & time fixed effects	yes	yes	yes	yes	yes
Log-L	-11912.8	-11656.8	-11438.6	-9925.7	-2402.8
N	19636	19306	18980	16681	4215
P(XR literate=1)	0.64	0.64	0.64	0.65	0.70

Notes: The dependent variable is a dummy variable that takes the value one if a respondent is exchange rate literate. P(XR literate=1) denotes the sample probability. Marginal effects of a probit model. Standard errors in parentheses are adjusted for clustering at the country and time level; ***, **, and * denote significance at the 1%, 5% and 10% level.

Table 2. Demand for Foreign Currency Loans

dependent variable	FC loans attractive			
sample	respondents who plan a loan		respondents who do not have a loan	
	(1)	(2)	(3)	(4)
XR literate	-0.093**		-0.136***	
	(0.042)		(0.050)	
exp. LC depreciation	-0.081**		-0.114**	
	(0.033)		(0.056)	
not lit. & exp. LC depreciation		-0.025		-0.043
		(0.074)		(0.107)
lit. & exp. no LC depreciation (a)		-0.062		-0.099*
		(0.056)		(0.060)
lit. & exp. LC depreciation (b)		-0.167***		-0.241***
		(0.046)		(0.066)
FC deposit preference	0.101**	0.100**	0.085	0.082
	(0.041)	(0.041)	(0.056)	(0.056)
exp. volatile XR	0.031	0.029	0.037	0.035
	(0.036)	(0.036)	(0.043)	(0.044)
network effect weak	-0.123***	-0.124***	-0.111	-0.111
	(0.047)	(0.047)	(0.072)	(0.073)
income in euro	0.266	0.262	0.198	0.189
	(0.164)	(0.165)	(0.199)	(0.202)
country & time fixed effects	yes	yes	yes	yes
Log-L	-3239.7	-3239.1	-2035.6	-2035.1
N(selection equation)	13681	13681	10060	10060
N(outcome equation)	769	769	477	477
P(FC attractive=1)	0.44	0.44	0.44	0.44
Rho	-0.01	-0.01	0.19	0.18
$H_0 : a = b$		5.09		4.44
p-Value		0.02		0.04

Notes: The dependent variable is a dummy variable that takes the value one if a respondent considers FC loans attractive. P(FC attractive=1) denotes the sample probability. Rho denotes the correlation between the selection and the outcome equation. Coefficients report the marginal effects at the mean. The reported coefficients are based on a Heckman sample selection probit model, where the selection refers to respondents who plan a loan (see Table A.3). Standard errors in parentheses are adjusted for clustering at the country and time level; ***, **, and * denote significance at the 1%, 5% and 10% level. Results for socio-demographic characteristics, indicators of wealth and risk aversion not shown.

Table 3. Robustness Analysis

dependent variable	FC loans attractive 0/1					FC loans attractive 1/6
sample	all respondents + IR literacy	IR literate respondents	floating ER regime	(quasi-) fixed ER regime	all respondents literacy "don't know" missing	all respondents
	(1)	(2)	(3)	(4)	(5)	(6)
not lit. & exp. LC depreciation	-0.029	-0.073	-0.151	0.010	0.053	-0.006
	(0.074)	(0.099)	(0.150)	(0.089)	(0.074)	(0.201)
lit. & exp. no LC depreciation (a)	-0.059	-0.069	-0.215*	-0.006	-0.060	-0.054
	(0.055)	(0.061)	(0.125)	(0.043)	(0.066)	(0.147)
lit. & exp. LC depreciation (b)	-0.162***	-0.194***	-0.310***	-0.125**	-0.162***	-0.332***
	(0.047)	(0.075)	(0.111)	(0.058)	(0.049)	(0.128)
IR literate	-0.030					
	(0.044)					
FC deposit preference	0.099**	0.155***	0.049	0.132***	0.084**	0.420***
	(0.041)	(0.044)	(0.094)	(0.039)	(0.040)	(0.121)
exp. volatile XR	0.029	0.004	0.017	0.029	0.017	0.134
	(0.037)	(0.047)	(0.045)	(0.053)	(0.036)	(0.118)
network effect weak	-0.121**	-0.152**	-0.154**	-0.099	-0.112**	-0.353**
	(0.049)	(0.078)	(0.078)	(0.073)	(0.053)	(0.143)
no savings	0.055	0.012	0.037	0.071	0.084*	0.063
	(0.044)	(0.056)	(0.069)	(0.074)	(0.047)	(0.190)
income in euro	0.266	0.307	2.379***	-0.048	0.252	0.494
	(0.167)	(0.223)	(0.136)	(0.111)	(0.166)	(0.451)
country & time fixed effects	yes	yes	yes	yes	yes	yes
Log-L	-3231.6	-1997.7	-1304.1	-1891.3	-3032.9	-4104.4
N(selection equation)	13648	8575	5866	7815	12829	13681
N(outcome equation)	768	479	322	447	724	769
P(FC attractive=1)	0.44	0.43	0.40	0.48	0.44	3.23
Rho	0.00	0.71	0.01	-0.19	0.15	0.29
$H_0 : a = b$	5.00	3.23	2.03	3.03	5.61	5.03
p-Value	0.03	0.07	0.15	0.08	0.02	0.02

Notes: In columns (1) to (5), the dependent variable is a dummy variable that takes the value one if a respondent considers FC loans attractive. P(FC attractive=1) denotes the sample probability. In column (6) the dependent variable takes values from 1 (FC very unattractive) to 6 (FC very attractive). Rho denotes the correlation between the selection and the outcome equation. Coefficients report the marginal effects from a probit model (cols. (1) to (5)) and from an OLS model (col. (6)). The reported coefficients are based on a Heckman sample selection (probit) model, where the selection is respondents' loan demand (see Table A.3). Standard errors in parentheses are adjusted for clustering at the country and time level; ***, **, and * denote significance at the 1%, 5% and 10% level. Results for socio-demographic characteristics, indicators of wealth and risk aversion not shown.

Appendix

Table A.1: Description of key variables

Label	Description
bank account	Dummy variable which takes the value one if the respondent has a deposit or a transaction account, else zero.
education (high / medium / low)	Dummy variables; degree of education (university level, medium level and basic education). Omitted category: education low.
exp. econ sit better	Derived from question *"Over the next five years, the economic situation of my country will improve."* Respondents could agree on a scale from 1 (strongly agree) to 6 (strongly disagree). Dummy variable, answers from 1 to 3 are defined as one.
exp. LC depreciation	Dummy variable derived from the question "How do you think will the exchange rate of the local currency develop over the next five years?" coded as one if respondent answers "The local currency will lose value against the euro." else zero.
exp. volatile XR	Dummy variable derived from question *"How predictable do you think the exchange rate of the local currency vis-à-vis the euro over the next 12 months is? The exchange rate development is..."* Answers "unpredictable" and "very unpredictable" defined as one, "very predictable" and "predictable" defined as zero, "don't know" and "no answer" are excluded.
FC deposit	Dummy variable that takes the value one if the respondent has a savings deposit denominated in foreign currency.
FC deposit preference	Dummy variable derived from the question *"Suppose you had about 2 times an average monthly salary to deposit in a savings account. Would you choose to deposit this amount in local currency, euro, US dollar, Swiss franc, or other foreign currency?"* Answer category "local currency" is coded as zero, all foreign currencies are coded as one.
FC loan	Dummy variable that takes the value one if respondent has a foreign currency loan, otherwise zero.
FCL attractive	Dummy variable derived form question *"Taking everything into account, Loans in euro are more attractive than [LOCAL CURRENCY] loans."* Respondents could agree on a scale from 1 (strongly agree) to 6 (strongly disagree). Answers from 1 to 3 are coded as 1, else zero. Respondents answering "Don't know" and "No answer" are excluded.
income high / medium /no answer	Dummy variables which take value one for each net household income terciles (high, medium, low). Sample values are used to construct terciles. For those respondents who did not give an answer an additional dummy variable is defined (refused income). Omitted category: income low.
income in euro	Dummy variable; one if the respondent regularly receives income in euro.

Label	Description
Inf literate	Dummy variable derived from the question: "*Suppose that the interest rate on your savings account was 4% per year and inflation was 5% per year. Disregarding any bank fees – after 1 year, would you be able to buy more than, exactly the same, or less than today with the money in this account?*" Answers "less" coded as 1, answers "more", "exactly the same" and "don't know" coded as zero. "No answer" observations are excluded.
IR literate	Dummy variable derived from question: "*Suppose you had 100 [local currency] in a savings account and the interest rate was 2% per year. Disregarding any bank fees, how much do you think you would have in the account after 5 years if you left the money to grow?*" Answer "more than 102" coded as 1, answers "exactly 102", "less than 102" and "don't know" coded as zero. "No answer" observations are excluded.
LC loan	Dummy variable that takes the value one if the respondent has a local currency loan, else zero.
memories of inflation	Dummy variable indicating agreement with the statement that "*I remember periods of high inflation during which the value of the local currency dropped sharply.*" Respondents could agree on a scale from 1 (strongly agree) to 6 (strongly disagree). Answers from 1 to 3 are coded as 1, else zero. Respondents answering "Don't know" and "No answer" are excluded.
network effect weak	Dummy variable derived from question "In my country, it is very common to make certain payments in euro." Respondents could agree on a scale from 1 (strongly agree) to 6 (strongly disagree). Answers "strongly disagree" and "disagree" are defined as one, answers "somewhat disagree" to "strongly agree" are defined as zero. "Don't know" and "no answer" are excluded.
no savings	Dummy variable that takes the value one if respondent does not have any of the following form of savings: cash, savings deposits, life insurance, mutual funds, stocks, pension funds, bonds or current account.
own car(s)	Dummy variable that takes the value one if respondent owns a car or cars.
own house	Dummy variable that takes the value one if respondent owns a house or apartment.
plan FC loan	Dummy variable derived from the question "*Do you plan to take out a loan within the next year and if so in what currency?*" Answer "Yes, in local currency" are coded as zero, answers "Yes, in euro", "Yes, in Swiss franc" and "Yes, in other foreign currency" are coded as one. Answers "No", "Don't know" and "No answer" are coded as missing.
plan loan	Dummy variable derived from the question "*Do you plan to take out a loan within the next year and if so in what currency?*" Answer "No" is coded as zero, answers "Yes, in local currency", "Yes, in euro", "Yes, in Swiss franc" and "Yes, in other foreign currency" are coded as one. Answers "Don't know" and "No answer" are coded as missing.

Label	Description
retired / student unemployed / self-employed	Dummy variable coded as one if respondent belongs to selected occupational category.
risk aversion	Derived from answers to the statement that "in financial matters, I prefer safe investments over risky investments." Categorical variable ranging from 1 ("strongly disagree") to 6 ("strongly agree").
XR literate	Dummy variable derived from question: "*Suppose that 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 installments?*" Answer "increases" coded as 1, answers "stays exactly the same" , "decreases" and "don't know" coded as zero. "No answer" observations are excluded.

Table A.2. Descriptive Statistics

	Min/Max	HU	PL	BG	RO	BiH	HR	FYROM	RS	Total
FC loans attractive	0/1	0.29	0.52	0.51	0.49	0.38	0.37	0.57	0.53	0.48
		(0.46)	(0.50)	(0.50)	(0.50)	(0.49)	(0.48)	(0.50)	(0.50)	(0.50)
plan FC loan	0/1	0.09	0.06	0.13	0.21	0.04	0.35	0.26	0.31	0.19
		(0.29)	(0.24)	(0.33)	(0.41)	(0.20)	(0.48)	(0.44)	(0.46)	(0.39)
XR literate	0/1	0.72	0.50	0.67	0.67	0.50	0.90	0.61	0.79	0.66
		(0.45)	(0.50)	(0.47)	(0.47)	(0.50)	(0.31)	(0.49)	(0.41)	(0.48)
age	1.9/9.4	4.12	4.34	3.82	4.18	4.32	3.97	4.34	4.10	4.17
		(1.22)	(1.45)	(1.30)	(1.51)	(1.36)	(1.31)	(1.36)	(1.26)	(1.36)
age squared	4/88	18.40	20.91	16.27	19.76	20.49	17.50	20.63	18.41	19.27
		(10.34)	(13.50)	(10.64)	(14.03)	(12.72)	(11.79)	(11.96)	(11.29)	(12.20)
education medium	0/1	0.51	0.47	0.68	0.52	0.64	0.70	0.49	0.59	0.57
		(0.50)	(0.50)	(0.47)	(0.50)	(0.48)	(0.46)	(0.50)	(0.49)	(0.50)
education high	0/1	0.20	0.26	0.25	0.37	0.13	0.16	0.28	0.28	0.25
		(0.40)	(0.44)	(0.44)	(0.49)	(0.34)	(0.37)	(0.45)	(0.45)	(0.43)
exp LC depreciation	0/1	0.56	0.28	0.25	0.52	0.18	0.58	0.33	0.63	0.40
		(0.50)	(0.45)	(0.43)	(0.50)	(0.38)	(0.50)	(0.47)	(0.48)	(0.49)
exp volatile XR	0/1	0.49	0.51	0.55	0.49	0.32	0.53	0.36	0.54	0.46
		(0.50)	(0.50)	(0.50)	(0.50)	(0.47)	(0.50)	(0.48)	(0.50)	(0.50)
FC deposit preference	0/1	0.49	0.19	0.55	0.33	0.50	0.62	0.62	0.81	0.53
		(0.50)	(0.39)	(0.50)	(0.47)	(0.50)	(0.49)	(0.49)	(0.40)	(0.50)
female	0/1	0.45	0.51	0.51	0.44	0.43	0.59	0.49	0.50	0.49
		(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.49)	(0.50)	(0.50)	(0.50)
2 person household	0/1	0.34	0.34	0.21	0.33	0.19	0.23	0.13	0.14	0.22
		(0.48)	(0.48)	(0.41)	(0.47)	(0.39)	(0.43)	(0.34)	(0.35)	(0.42)
3+ person household	0/1	0.45	0.57	0.74	0.53	0.76	0.70	0.83	0.81	0.71
		(0.50)	(0.50)	(0.44)	(0.50)	(0.43)	(0.46)	(0.38)	(0.39)	(0.46)
head of household	0/1	0.72	0.61	0.57	0.61	0.63	0.44	0.48	0.49	0.55
		(0.45)	(0.49)	(0.50)	(0.49)	(0.48)	(0.50)	(0.50)	(0.50)	(0.50)
income high	0/1	0.32	0.28	0.29	0.43	0.37	0.33	0.46	0.33	0.36
		(0.47)	(0.45)	(0.46)	(0.50)	(0.49)	(0.47)	(0.50)	(0.47)	(0.48)
income medium	0/1	0.22	0.21	0.32	0.20	0.28	0.34	0.18	0.24	0.24
		(0.42)	(0.41)	(0.47)	(0.41)	(0.45)	(0.48)	(0.39)	(0.43)	(0.43)
income no answer	0/1	0.26	0.16	0.25	0.22	0.23	0.20	0.06	0.23	0.18
		(0.44)	(0.37)	(0.43)	(0.42)	(0.43)	(0.40)	(0.25)	(0.42)	(0.39)
income in euro	0/1	0.00	0.00	0.01	0.02	0.01	0.00	0.04	0.05	0.02
		(0.00)	(0.00)	(0.12)	(0.14)	(0.10)	(0.00)	(0.18)	(0.22)	(0.14)
network effect weak	0/1	0.58	0.32	0.30	0.31	0.54	0.25	0.21	0.05	0.29
		(0.50)	(0.47)	(0.46)	(0.47)	(0.50)	(0.43)	(0.41)	(0.22)	(0.46)
no savings	0/1	0.56	0.24	0.58	0.53	0.55	0.35	0.06	0.36	0.35
		(0.50)	(0.43)	(0.50)	(0.50)	(0.50)	(0.48)	(0.25)	(0.48)	(0.48)
own car(s)	0/1	0.56	0.73	0.70	0.55	0.72	0.88	0.67	0.76	0.71
		(0.50)	(0.45)	(0.46)	(0.50)	(0.45)	(0.33)	(0.47)	(0.43)	(0.45)
own house	0/1	0.72	0.65	0.85	0.78	0.91	0.90	0.92	0.85	0.84
		(0.45)	(0.48)	(0.36)	(0.42)	(0.28)	(0.30)	(0.27)	(0.36)	(0.36)
risk aversion	0/1	0.82	0.78	0.88	0.90	0.73	0.85	0.93	0.94	0.86
		(0.39)	(0.42)	(0.33)	(0.31)	(0.44)	(0.36)	(0.26)	(0.24)	(0.35)
self-employed	0/1	0.04	0.10	0.03	0.06	0.03	0.15	0.08	0.06	0.07
		(0.20)	(0.30)	(0.16)	(0.24)	(0.18)	(0.36)	(0.27)	(0.24)	(0.26)

Notes: The table shows the sample means and standard deviations of respective variables. Total refers to the entire sample of observations without adjusting for country size. The sample comprises respondents who plan a loan (as used in estimations in Tables 2 and 3).

Table A.2. Descriptive Statistics Ctd.

	Min/Max	HU	PL	BG	RO	BiH	HR	FYROM	RS	Total
bank account	0/1	0.77	0.77	0.35	0.18	0.69	0.94	0.79	0.73	0.65
		(0.42)	(0.42)	(0.48)	(0.38)	(0.46)	(0.24)	(0.41)	(0.45)	(0.48)
exp econ sit better	0/1	0.31	0.33	0.25	0.27	0.22	0.26	0.50	0.25	0.30
		(0.46)	(0.47)	(0.43)	(0.45)	(0.42)	(0.44)	(0.50)	(0.43)	(0.46)
FC deposit	0/1	0.04	0.02	0.05	0.03	0.03	0.09	0.11	0.08	0.06
		(0.19)	(0.15)	(0.21)	(0.17)	(0.18)	(0.29)	(0.32)	(0.27)	(0.23)
FC loan	0/1	0.16	0.06	0.09	0.08	0.08	0.22	0.07	0.15	0.11
		(0.37)	(0.24)	(0.28)	(0.27)	(0.26)	(0.41)	(0.26)	(0.36)	(0.32)
LC loan	0/1	0.13	0.16	0.19	0.11	0.17	0.07	0.16	0.06	0.13
		(0.34)	(0.37)	(0.39)	(0.31)	(0.38)	(0.26)	(0.37)	(0.24)	(0.34)
memory of inflation	0/1	0.68	0.61	0.81	0.69	0.39	0.46	0.69	0.74	0.63
		(0.47)	(0.49)	(0.40)	(0.46)	(0.49)	(0.50)	(0.46)	(0.44)	(0.48)
retired	0/1	0.27	0.21	0.23	0.35	0.24	0.17	0.23	0.16	0.23
		(0.45)	(0.41)	(0.42)	(0.48)	(0.42)	(0.37)	(0.42)	(0.37)	(0.42)
student	0/1	0.03	0.04	0.04	0.03	0.08	0.05	0.04	0.05	0.04
		(0.16)	(0.21)	(0.21)	(0.17)	(0.28)	(0.21)	(0.19)	(0.21)	(0.21)
unemployed	0/1	0.12	0.09	0.13	0.18	0.33	0.22	0.37	0.26	0.21
		(0.33)	(0.29)	(0.34)	(0.38)	(0.47)	(0.42)	(0.48)	(0.44)	(0.41)

Notes: The table shows the sample means and standard deviations of respective variables. Total refers to the entire sample of observations without adjusting for country size. The sample comprises all respondents (as used in estimations in Table 1 and Table A.3).

Table A.3. Loan Demand - Selection Equation

dependent variable	(1)	(2)	(3)	(4)
	FC loan attractive			
bank account	0.015***	0.015***	0.011**	0.011**
	(0.006)	(0.006)	(0.005)	(0.005)
exp. econ situation	0.008*	0.008*	0.007	0.007*
	(0.005)	(0.004)	(0.004)	(0.004)
unemployed	-0.014**	-0.014**	-0.013***	-0.012***
	(0.006)	(0.006)	(0.005)	(0.005)
student	-0.043***	-0.043***	-0.035***	-0.035***
	(0.009)	(0.009)	(0.008)	(0.008)
retired	-0.006	-0.006	-0.009	-0.009
	(0.009)	(0.009)	(0.010)	(0.010)
XR literate	0.006		0.004	
	(0.004)		(0.004)	
exp. LC depreciation	-0.002		-0.002	
	(0.004)		(0.004)	
not lit. & exp. LC depreciation		-0.004		-0.003
		(0.007)		(0.006)
lit. & exp. no LC depreciation		0.005		0.003
		(0.006)		(0.005)
lit. & exp. LC depreciation		0.004		0.002
		(0.006)		(0.005)
income in euro	-0.014	-0.014	-0.019*	-0.019*
	(0.010)	(0.010)	(0.010)	(0.010)
country & time fixed effects	yes	yes	yes	yes
Log-L	-3239.7	-3239.1	-2035.6	-2035.1
N(selection equation)	13681	13681	10060	10060
N(outcome equation)	769	769	477	477
P(plan loan=1)	0.44	0.44	0.44	0.44
Rho	-0.01	-0.01	0.19	0.18

Notes: The dependent variable is a dummy variable that takes the value one if a respondent plans to take out a loan. P(plan loan=1) denotes the sample probability. Rho denotes the correlation between the selection and the outcome equation. Coefficients report the marginal probability effects at the mean. The reported coefficients are based on a Heckman sample selection probit model. Standard errors in parentheses are adjusted for clustering at the country and time level; ***, **, and * denote significance at the 1%, 5% and 10% level. Results for socio-demographic characteristics, indicators of wealth and risk aversion not shown.

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