Choosing the currency to borrow in: An experiment among bank customers

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1 Introduction

In this project, I intend to empirically understand the choice of households in emerging market economies to borrow in local or foreign currency when applying for bank credit via an experiment with a group of bank customers applying for large short-to-medium-term (3 to 5 years) personal loans. In particular, I will attempt to derive the elasticities of (1) the chosen fraction of total financing in foreign currency α for households given household characteristics (risk aversion, income in foreign currency, other financials) following their responses to the experiment, if they were to borrow in a mix of currencies, and (2) the level of borrowing in foreign currency if it were the only currency available for borrowing. For the purposes of this project, the foreign currency in question is the U.S. dollar. I intend to conduct the experiment on a select group of customers of a large commercial bank in 2 emerging or transition economy countries simultaneously.[1] Such setting will allow to condition on exchange rate risk, which is presumed to be the primary source of heterogeneity in currency choices in the cross-section of economies.

Exploiting the fact that the interest rate on dollar loans is substantially lower than that on domestic loans in most emerging economies, in the first experiment, all participants will receive a 25 bps reduction in interest rate on local currency loans, which is defined in part by the government rates and in part by the lenders. The treatment group will receive a 50 bps reduction in interest rate on local currency loans and the interest payment forgiveness for the first year of the loan. Holding the total loan size unchanged, borrowers should shift at least some of their total borrowing[2] to local currency loans, and the borrowers who received larger interest rate reductions and interest payment forgiveness should be shifting a larger fraction of their borrowing away from dollar loans. I compare the before-treatment and post-treatment estimates of the dollar debt fraction in the household portfolio chosen by the borrowers to the predicted dollarization derived from the mean-variance portfolio model by Ize and Yeyati (2003).

In the second experiment, all borrowers who intend to borrow only in foreign currency receive an interest rate reduction of 25 bps. The treatment group will receive an interest rate reduction of 50 bps and fixed exchange rate conversion terms for the first year of the loan. The improved borrowing terms relative to the standard loan contracts should provide incentives for the participants to request a larger loan size, and for the treatment group members to request the largest levels of loans. I compare the before-treatment and post-treatment estimates of the levels of dollar debt from the second experiment and the dollar deposit levels to the estimates of the net dollar position stemming from the model by Montamat (2020) [20], which incorporates household labor income, risk aversion, and interest rate differentials.

My paper attempts to address the currency selection problem faced by borrowers in emerging economies, who have to decide between borrowing in their national currency and borrowing in a reserve currency such as the U.S. dollar, given (a) current and expected foreign exchange rates, (b) interest rates on loans denominated in domestic and foreign currency, and (c) domestic and foreign currency inflation rates. I primarily intend to focus on the effects of the interest rate differential reduction and absence of short-term expected exchange rate volatility. I also intend to explore heterogeneity in treatment effects based on various personal and financial characteristics of the borrowers.

1.1 Motivation

Emerging literature emphasizes dollar borrowing and macroeconomic shocks that affect borrowing decisions of households. Households outside of the U.S. can obtain short-term and long-term financing in foreign currency through local commercial banks and lending institutions. Compared to local currency-denominated loans, foreign currency-denominated loans offer lower interest rates [24] [25] [18] [17]. For certain types of consumer debt like mortgages, another major advantage is having a fixed interest rate for at least the first year of the mortgage [25].

[1] As of now, I have not reached out to any banks or lending institutions, but I intend to seek advice on connecting with institutions in countries of interest from faculty members at Olin Business School.

[2] This includes existing loans and the experiment loan.

The foreign currency of choice in my experimental setting is the U.S. dollar. I make this choice due to the prevailing opinion in existing literature that the dollar is the dominant currency in lending worldwide, including household debt. U.S. GDP makes up for 24.4% of the world GDP (World Bank, 2019 data), and dollar-denominated loans make up for 80% of cross-border loans to emerging market economies [6]. In Estonia and Latvia, 2 small Baltic economies that are a part of the European Union, dollar debt made up for 70-80% of all private debt as of 2010 [5]. The global preference for the dollar is unlikely to change in the near future, even if the U.S. Federal Reserve policies aren't particularly strong [23]. Compared to other major currencies, the dollar has been supported by well-established infrastructure [19], which in fact allowed other currencies, such as the euro, to be broadly used due to the incumbency effect [21] [22].

1.1.1 Currency mismatch

The key friction in foreign currency borrowing arises from the exchange rate risk. While in some emerging economies pegged exchange rates minimize the exchange rate risk [5], this is not the case for most borrowers around the world. The currency mismatch arises when borrowers earn their income in a domestic currency and have to repay their debt in another currency (and vice versa), making them vulnerable to exchange rate shocks. Given information about contemporaneous and predicted exchange rates, domestic and foreign inflation, and borrowing rates, borrowers essentially face a problem of having to match their future domestic currency-denominated income to interest payments and debt principal in a foreign currency to minimize their financing and foreign exchange conversion costs. If there is an exchange rate shock (i.e. the domestic currency gets severely devalued) after they borrow, without (sufficient) hedging, borrowers are faced with higher interest and principal repayments than expected. In the second proposed experiment, this friction is artificially eliminated for the treatment group in the short run via a contract term that fixes an exchange rate for interest payment conversions in the first year.

1.1.2 Currency revaluations

As briefly discussed earlier, foreign currency-denominated debt makes borrowers vulnerable to periodic currency revaluations and in more extreme cases, currency crises in their respective home countries. Recent literature discusses the effects of such exchange rate shocks on consumer credit and other household finance metrics. In Hungary, the 2008 forint devaluation crisis was associated with rise in default rates even for households with soft (local) currency debt only, decline in housing prices, and decline in durable and non-durable consumption [24]. At the start of the 2014 Russian ruble crisis, many borrowers experienced a "payment shock" with their ruble-denominated incomes being insufficient to repay foreign currency loans (the majority of which were in U.S. dollars) [25] [18]. The first proposed experiment seeks to incentivize all of the borrowers to shift their lending preferences towards local currency loans by reducing the interest rate and bringing it closer to the dollar loan interest rate. Moreover, the interest payment forgiveness for the first year that the treatment group will receive is supposed to alleviate expected payment shocks that come with foreign currency loans. If borrowers end up taking out a larger fraction of their loans in local currency, they reduce the expected disutility from payment shocks, which arises with the portion of their debt denominated in dollars.

1.2 Contribution to existing literature

While the bulk of recent literature mostly focuses on the macroeconomic foundations of the optimal currency choice in depositing and borrowing, I attempt to understand the microeconomic and behavioral foundations of the actual/imputed currency choice by households. While there are papers that study effects of certain macroeconomic shocks on the corporations' decisions to borrow in foreign currency, such as Keller (2019) [16], there are no similar papers that study household decisions. Gyongyozi and Verner (2021) use macroeconomic shocks and change in foreign currency debt burden of households as a channel for change in political preferences, but do not explore the question of foreign currency debt choice in the first place. Rather, the foreign currency borrowing is used as an instrument [10]. Verner and Gyongyozi (2020) exploit variation in exposure to foreign currency debt by Hungarian households and revaluation of debt burdens to find effects on various macroeconomic indicators. [24]

2 Theoretical framework

2.1 Optimal dollar borrowing

Several papers have attempted to derive the optimal dollar position and level of dollar borrowing. Montamat (2020) defines optimal real wealth and net position in dollars in her model, which establishes optimal real wealth in dollars as a function of 3 terms: an uncovered interest parity term, a price hedging term, and an income hedging term. The model setup involves savers and borrowers: borrowers are more risk-averse (typically households), while borrowers have higher tolerance for risk (typically corporations and entrepreneurs). The U.S. dollar offers households and entrepreneurs a hedge against exchange rate pass-through into prices and income risk. While dollar savings can partially hedge against exchange rate risk, households are more negatively exposed to exchange rate risk than the firms. [20] In Ize and Yeyati (2003),

dollarization is defined as a dollar share of the optimized mean-variance asset portfolio and flows into the dollar share of the borrowers' optimal portfolio. Other variables are included in the term that involves the coefficient of risk aversion, the lending rate differential, and the variance of the interest rate differential. Dollar loans can optimize credit portfolios. [13] Higher deposit dollarization leads to higher borrowing in dollars, while higher risk aversion is correlated with lower dollar borrowing. Basso et al. (2011) similarly find that higher mean-variance portfolio dollarization leads to higher deposit and loan dollarization. [2] In my paper, I use measures from Montamat (2020) and Ize and Yeyati (2003) to compare borrower-level estimates to actual experiment results.

2.2 Measures of risk aversion with incentives

As a part of my experiments, I conduct a risk aversion assessment of the bank customers. I specifically utilize methodology by Holt and Laury (2002), which allows for measuring risk aversion with incentives ans also estimation of a utility functional form. Unlike earlier papers on the subject, such as Binswanger (1980) [4], the lottery involves large cash prizes that are actually to be paid to the select experiment participants. [12]

In this paper, the lottery will be conducted in 4 rounds. In the first round, there are 10 paired lottery choices. One of the choices is selected at random ex-post and played to determine the earnings for the option selected. In the second round, there are same 10 decisions as in the first round, but with hypothetical payoffs 20 times the original levels. In the third round, there is a high-payoff task, but payoffs are paid in cash. In the fourth round, the lottery returns to baseline payoffs from the first round. In order to participate in the high-payoff decision, the subjects are required to give up what they earned in the first low-payoff task.

Such an experiment design has several advantages over other measures of risk aversion. Measurements of risk aversion with low laboratory incentives can be rather unrealistic and can't properly replicate "real-world" risks [15]. Higher stakes and potential prizes allow to compare behavior under real and hypothetical incentives. Moreover, this approach can help specify and estimate and hybrid utility function that permits increasing payoffs and decreasing absolute risk aversion needed to avoid "absurd" predictions for high-payoff treatments [12].

3 Experiment

3.1 Proposed setting/environment

I intend to conduct my experiment with 2 samples of bank customers who have interest in applying for large personal loans with terms ranging from 3 to 5 years. To obtain such samples, I intend to collaborate with large commercial banks in 2 countries with relatively high levels of deposit dollarization (i.e. above 50% of all bank deposits being denominated in dollars) and/or high levels of loan dollarization (above 50% of total loans denominated in dollars). A few candidate countries that fulfill one or two of these criteria are Peru and Paraguay [20], Uruguay [11], and select countries in the European Union – Bulgaria, Croatia, Hungary, Latvia, Lithuania, Romania, and Serbia [11]. I intend to enter an agreement with a commercial bank or a lending institution in two countries of interest to conduct my study.[3]

Another important factor to consider is the population access to banking services. According to the 2019 World Bank data for population aged 15 and above, only 3 countries on my list – Croatia, Latvia, and Lithuania – have more than 80% of population covered by banking and credit services. 3 countries – Bulgaria, Hungary, and Serbia – have a coverage rate of over 70%.

The two-country setting in the experiment is important for exploiting cross-sectional heterogeneity in exchange rate risk. While the two selected countries may have similar levels of dollarization, the exchange rate volatility environment may be different.

3.2 Alternative setting/environment

In the instance that the first research setting is not available, I intend to utilize Amazon Mechanical Turk (MTurk) as a platform to conduct my experiment on. As of today, only 4 countries on the list – Bulgaria, Croatia, Hungary, and Lithuania – have worker access to this platform. The survey is uploaded onto the platform for a select group of respondents to complete. The respondents are pre-screened for credit history before they are allowed to participate in various studies.

[3] As of today, a list of target institutions includes Banco Santander, BNP Paribas, Citadele Bank (Latvia, Lithuania), Citibank, Raiffeisen Bank, Unicredit Bank (Hungary, Romania). Potential scholarships to consider include the Lamlafussy Research Fellowship and Wim Duisenberg Research Fellowship (European Central Bank).

3.3 Experiment design

The first experiment that aims to explore the borrowing currency mix shift involves a choice between equivalent local currency and dollar loans. In the survey designed as a fast-track credit application, the bank customers who intend to obtain a large personal loan and don't indicate a strict preference for either a dollar loan or a local currency loan will need to decide between the two equivalent loans, where the interest rates are set according to the real UIP parity.

A group of $\approx 1,000$ random customers who have been pre-screened by the bank will receive an invitation to use the fast-track credit application to apply for a loan. In the application, the customers will be asked to fill out personal data and financial information. The personal data survey includes questions about age, marital status, occupation, education level, and zip code. Then the subjects will be asked to indicate whether they have a preference for dollar loans only, local currency loans only, equally for either type of the loan, or neither. If the customer selects the "either" option, she then has to indicate the requested (equivalent) loan size in both currencies, as well as loan term (same loan term for both currencies). The current exchange rate will be provided. The initial credit offer is then generated with accordance to the real UIP parity. If the customer chooses to proceed with either the dollar loan or the local currency loan, she becomes a part of the first experiment.

The customer will then complete a risk aversion assessment (following the methodology by Holt and Laury 2002), a questionnaire that contains questions about knowledge of primary economic and financial indicators (inflation, interest rates, and exchange rates), and a questionnaire that seeks responses to various economic scenarios. Reception of the new credit offer is conditional on completion of at least the first round of the risk aversion assessment, and completion of both the economic knowledge and the economic scenario questionnaires. Then a new credit offer is generated that involves an interest rate reduction on the local currency loan for all of the customers, and a larger interest rate reduction as well as interest payment forgiveness for the first year for the treatment group. The loan term does not change. The customer will need to make a choice between the dollar loan and the local currency loan of an equivalent size, as indicated in the original loan offer. After the final selection, her application is formally processed and the loan is approved.

The second experiment evolves around dollar-denominated short-to-medium-term personal loan products. After filling out the personal data and the financial information sections of the fast-track credit application, the subjects who indicate strict preference for dollar loans will be asked to indicate the requested loan size in USD. The initial credit offer is then generated. If the customer chooses to proceed with the loan, she becomes a part of the second experiment.

The customer will then complete a risk aversion assessment (following the methodology by Holt and Laury 2002), a questionnaire that contains questions about knowledge of primary economic and financial indicators (inflation, interest rates, and exchange rates), and a questionnaire that seeks responses to various economic scenarios. Reception of the new credit offer is conditional on completion of at least the first round of the risk aversion assessment, and completion of both the economic knowledge and the economic scenario questionnaires. Then a new credit offer is generated that involves an interest rate reduction on the dollar loans for all customers and a larger interest rate reduction as well as fixed exchange rate for interest payments for the first year for the treatment group. The customer will then be asked if she would like to increase the borrowing limit, which will be immediately approved in the system if she chose to do so. Then her application is formally processed and the loan is approved.

3.3.1 Sample

For each of the experiments, $\approx 1,000$ random customers with each of the two banks will receive a link to the fast-track credit application. Once these customers accept the offer and sign the loan contract, they will be included in the final sample.

3.3.2 Randomization

I intend to randomize the loan applications using simple computerized block randomization in Qualtrics, similar to the Bryan, Karlan, and Osman (2022) randomization of business loan applications. That guarantees the 50-50 assignment to treatment and control groups. If there is an odd number of loan applicants, the additional applicant can be assigned with the independent 50% probability to treatment or control. [8]

3.4 Experimental treatment

3.4.1 Treatment assignments and summary

Below is the summary of treatment and control loan terms for both experiments.

Assignment	Interest rate reduction	Other conditions
Control	25 bps	
Treatment	50 bps	Interest payment forgiveness for 1 year

Table 1: Currency composition experiment: treatment and control assignment summary

Assignment	Interest rate reduction	Other conditions
Control	25 bps	
Treatment	50 bps	Fixed exchange rate for interest payments for 1 year

Table 2: Dollar loan levels experiment: treatment and control assignment summary

3.4.2 Survey design

I use Qualtrics to design a fast-track credit application with immediate loan approval upon receiving applicant data. The baseline demographic and financial characteristics of the borrowers are inferred from the first part of the fast-track application, before the loan is approved. The characteristics reported by the loan applicants include occupation, salary and other income, total assets and liabilities, age, gender, education level, and marital status. Financial information is then going to be verified via bank documents and employer references after the new APR offer acceptance. Income, assets, and liabilities are broken down by currency of denomination. Borrowers then will be asked whether they would be interested in a 3-5 year personal loan. If they respond "Yes, in USD" or "Yes, either currency", they become a part of the experiment. If they choose the local currency-only option in that question, they will be directed to the confirmation page of the application after completing the lottery questions, the financial knowledge questions, and the economic scenario assessment questions.

Those participants interested in borrowing are asked to indicate the desired loan term: 3, 4, or 5 years. For participants' convenience, monthly equivalents of these terms are mentioned as well (36, 48, 60 months). Participants are also asked about how much they would like to borrow if they were to borrow either in USD or in local currency. After the responses are recorded, 2 credit offers are generated. Offer A is a local currency-denominated credit offer and Offer B is a USD-denominated credit offer. The APRs are set according to the real uncovered interest rate parity. The borrowers can accept either offer or neither one of them. If the participant selects "neither," she will be asked an optional question about her reasons not to borrow with a text box for response.

The second part of the initial survey involves a lottery with 4 rounds of 10 paired choices, following Holt and Laury (2002). The earnings from the third and fourth rounds are deposited as cash into the participant's e-wallets. In order to participate in the second and further rounds of the lottery, participants need to give their hypothetical earnings from the first lottery. For every lottery, one choice out of ten is selected randomly and the participant is informed of which choice was selected to be played out. The prompt shows the decision situation and the choice that they made for that specific decision situation. After that, the participant proceeds to a random number generator. If the number generated is less or equal to the probability threshold %, the participant wins the first payout option. If it's greater than the probability threshold %, then the participant wins the second payout option. Participants will also be given an option to skip the lottery part altogether.

The third and the fourth parts of the initial survey are focused on understanding participants' knowledge of major economic indicators and their reactions to different economic and financial scenarios. The economic knowledge survey consists of questions on current indicators and expectations for future indicators 3 months from the date of the survey, such as exchange rates, inflation rates, and interest rates. Participants can also check the "Don't know" box if they don't have an answer to a certain question. The economic and financial scenario questionnaire consists of hypothetical 12-month-ahead scenario descriptions with simple up and down graphs, which lead to questions about the preferred currency of borrowing given the scenarios. The answer options are "USD", "Local currency", "Either currency", or "Neither currency". Participants will also be given an option to skip the questionnaires.

New credit offers are generated upon completion of all 3 assessments. In the first experiment, participants will be asked to once again choose between a local currency and a USD credit offer, but with the local currency credit offer having a reduced APR for all borrowers and interest payment forgiveness for the treatment group. The final choice will be the actual loan contract that the participant subscribes to. In the second experiment, the borrower receives a new credit offer and will have an option to enter a new desired loan size, if they choose to do so. They can also keep the previous loan size, but with a new offer APR.

The second survey, which is implemented 1 year after the applicant accepts the experimental offer, includes all of the above, except for the loan offers. All of the surveys can be filled out by applicants using personal computers and mobile devices using a link for the loan application.

4 Empirical analysis

Following Ize and Yeyati (2003), I estimate the optimal dollar share of the loan portfolio for each of the borrowers as

$$\lambda_L = \lambda^* + \frac{\delta_L^I}{c_L V},$$

where $\delta_L^I = E(r_L^H - r_L^F)$ is the lending rate differential, $\lambda^* = \frac{S_{\pi\pi}+S_{\pi s}}{S_{\pi\pi}+S_{ss}+2S_{\pi s}}$ is the mean-variance portfolio dollarization defined by the volatilities of inflation and the rate of real depreciation, $c_L > 0$ is the coefficient of risk aversion and V is the variance of the interest rate differential.

Following Montamat (2020), I estimate the optimal net position in dollars for an agent who has exogenous labor income y_t as

$$\theta_t^{\$} = \frac{r^{\$}+\mu^{\epsilon}-r^{LC}}{\gamma(\sigma^{\epsilon})^2} + \frac{\nu_t^P}{\gamma} P_t \beta_{\frac{dP}{P},\frac{d\epsilon}{\epsilon}} + \frac{\nu_t^y}{\gamma} y_t \beta_{\frac{dy}{y},\frac{d\epsilon}{\epsilon}},$$

where γ is the coefficient of risk aversion, ν_t^s is aversion to risk to a state variable s, and $\beta_{\frac{ds}{s},\frac{d\epsilon}{\epsilon}}$ is the regression coefficient of innovations in the growth of the state variable on innovations in the depreciation of local currency.

I then calculate the borrower-level estimates of changes in these two variables between the initial loan contract and the acceptance of the special offer with the data from the baseline and the follow-up survey. These estimates will be compared to the first-stage, intent-to-treat and treatment effect estimates. I also intend to explore stratified treatment effects by level of education, household income levels and currency composition, risk aversion, and household balance sheet composition following methodology by Jann, Brand, and Xie (2010) [14]. I will use propensity score estimates from probit and logit regressions and variance weighted least squares to estimate the trends of treatment effects across propensity score strata.

In the first experiment, the left-hand-side variable in the first-stage regression is the change in the local currency debt APR and the interest payment forgiveness dummy variable. The OLS regression will be estimating the take-up of the loan offer. I then compute the ITT estimates of the currency mix shift regressed on the treatment indicator. I then estimate the treatment effect of the change in borrowing conditions on the change in chosen currency composition of the debt product using a 2SLS specification. The randomized experimental assignment is used as an instrument for the change in borrowing conditions.

In the second experiment, the left-hand-side variable in the first-stage regression is the change in the foreign currency debt APR and the fixed exchange rate dummy variable. The OLS regression will be estimating the take-up of the loan offer. I then compute the ITT estimates of the levels of foreign currency borrowing regressed on the treatment indicator. I then estimate the treatment effect of the change in borrowing conditions on the change in chosen dollar loan size using a 2SLS specification. The randomized experimental assignment is used as an instrument for the change in borrowing conditions.

4.1 Elasticities

I estimate 2 measures of elasticities following the 2 experiments: (1) the elasticity of increase in local currency debt as a percentage of the total household debt portfolio following the local currency interest rate decrease and the interest payment forgiveness and (2) the elasticity of increase in the dollar loan size following the dollar interest rate decrease and the introduction of fixed exchange rate for the first year into the loan contract. In the first case, the basic model specification is as follows:

$$\Delta LCDebtFraction_i = \alpha + \beta_1 \Delta r_i^{LC} + \beta_2 P_i + \beta_3 X_i + \epsilon_i, \tag{1}$$

where Δr_i^{LC} is the interest rate reduction on the local currency loan, P_i is the dummy variable indicating interest payment forgiveness on the local currency part of the loan, and X_i is the vector of personal and financial characteristics of borrower i.
The price (local currency interest rate) elasticity of demand for local currency debt relative to dollar debt is then formally defined as

$$\mu_i = \frac{\Delta LCDebtFraction_i}{\beta_{1,i}}, \tag{2}$$

where β_1 is the coefficient of interest from equation 1 and $\Delta LCDebtFraction_i$ is the change in the local

currency debt fraction in the total household debt portfolio.
In the second case, the model specification is

$$\Delta Y_i^{\$} = \alpha + \beta_1 \Delta r_i^{\$} + \beta_2 FX_i + \beta_3 X_i + \epsilon_i, \tag{3}$$

where $\Delta r_i^{\$}$ is the interest rate reduction on the dollar loan, FX_i is the dummy variable indicating fixed exchange rate term in the loan contract, and X_i is the vector of personal and financial characteristics of borrower i.
The price (dollar interest rate) elasticity of demand for dollar debt is then defined as

$$\mu_i = \frac{\Delta Y_i^{\$}}{\beta_{1,i}}, \tag{4}$$

where $\beta_{1,i}$ is the coefficient of interest from equation 3 and $\Delta Y_i^{\$}$ is the change in the amount of requested dollar debt.
I then calculate the country-wide measures of borrowing outcomes for each of the two countries as

$$\Delta LCDebtFraction_{j=1,2} = \frac{1}{n} \sum \Delta LCDebtFraction_{i,j=1,2}, \tag{5}$$

$$\Delta Y_{j=1,2}^{\$} = \frac{1}{n} \sum \Delta Y_{i,j=1,2}^{\$} \tag{6}$$

as the averages across all borrowers in a given country j.
The country-specific elasticities of demand are defined as

$$\mu_{j=1,2} = \frac{\Delta LCDebtFraction_{j=1,2}}{\beta_{1,j=1,2}}; \tag{7}$$

$$\mu_{j=1,2} = \frac{\Delta Y_{j=1,2}^{\$}}{\beta_{1,j=1,2}}. \tag{8}$$

5 Predictions

Based on the potential outcomes of the two experiments, I establish 2 sets of predictions. The predictions for the debt currency composition experiment are as follows:

1. Households with lower levels of dollar-denominated assets (higher levels of local currency-denominated assets) have higher price (local currency interest rate) elasticities of demand for local currency debt.

2. Households with higher degrees of risk aversion have higher price (local currency interest rate) elasticities of demand for local currency debt.

3. Households with almost no dollar income have higher price (local currency interest rate) elasticities of demand for local currency debt.

Another set of predictions is for the dollar debt level experiment:

1. Households with higher levels of dollar-denominated assets have higher price (dollar interest rate) elasticities of demand for dollar debt.

2. Households with lower degrees of risk aversion borrow more in dollars and have higher price (dollar interest rate) elasticities of demand for dollar debt.

3. Households with higher dollar incomes have higher price (dollar interest rate) elasticities of demand for dollar debt.

6 Mechanisms

6.1 Risk hedging by heterogeneous households

Foreign currency debt can serve as a hedging device by households for price-level/consumption and income motives. Aiba, Odajima, and Khou (2018) find that Cambodian households with a lot of foreign currency income tend to borrow more in foreign currency in order to resolve currency mismatch issues. However, currency of debt choices are also correlated with the level of education. Highly educated households tend to make currency choices consistent with risk hedging and resolution of currency mismatch, while less educated households tend to borrow in the currency in which most purchases are made [1]. Beckmann and Stix (2015) find that among borrowers in Central and Eastern Europe, better knowledge about exchange rate risks decreases demand for foreign currency-denominated loans [3]. Fidrmuc, Hake, and Stix (2013) find that the probability of foreign currency borrowing in Central and Eastern Europe is higher for those households who declare preferences for foreign currency savings over local currency. Such

preferences indicate lack of "monetary credibility" of the domestic currency – borrowers try to insulate themselves from inflationary risks of the domestic currency by saving in a foreign currency. As a result, foreign currency borrowing increases to match the deposits. On the other hand, higher trust in local currency decreases the probability of planning for a foreign currency loan. [9] To sum up, education level, risk aversion and asset currency composition all seem to define heterogeneity in debt currency choices. Moreover, negative expectations around exchange rate volatility and domestic inflation expectations make households shift towards foreign currency loans.

6.2 Reaction to interest rate differentials

Another mechanism that will be explored in this project is the reaction to the change in interest rate differentials. Brown, Ongena, and Yesin (2014) find that information asymmetries cause local currency earners (small firms) to borrow in foreign currency due to lower interest rates compared to local currency loans. Since the banks have imperfect information about the firms' revenues (currency denomination and level), this allows the firms to borrow in foreign currency without incurring the full cost of the credit risk. [7] This may also be the case for households, so it's important to investigate heterogeneous treatment effects based on household income levels and currency composition.

7 Research progress

As of now, I have conducted the literature review and identified the research methodologies to use in this paper. My next step would be to contact potential partner credit institutions and banks in countries of interest and secure financing for the project from Olin Business School or external sources.

References

[1] Aiba, D., Odajima, K. and Khou, V. *Foreign currency borrowing and risk-hedging behavior: Evidence from Cambodian households.* Journal of Asian Economics, 2018, 58, pp.19-35.

[2] Basso, H.S., Calvo-Gonzalez, O. and Jurgilas, M. *Financial dollarization: The role of foreign-owned banks and interest rates.* Journal of Banking Finance, 2011, 35(4), pp.794-806.

[3] Beckmann, E. and Stix, H. *Foreign currency borrowing and knowledge about exchange rate risk.* Journal of Economic Behavior Organization, 2015, 112, pp.1-16.

[4] Binswanger, H.P. *Attitudes toward risk: Experimental measurement in rural India.* American journal of agricultural economics, 1980, 62(3), pp.395-407.

[5] Bordo, M.D., C.M. Meissner, and D. Stuckler. *Foreign currency debt, financial crises and economic growth: A long-run view.* Journal of International Money and Finance, 2010, 29(4), pp.642-665.

[6] Brauning, F., and V. Ivashina. *U.S. Monetary Policy and Emerging Market Credit Cycles.* NBER Working Paper 25185, 2018.

[7] Brown, M., Ongena, S. and Yeşin, P., *Information asymmetry and foreign currency borrowing by small firms.* Comparative Economic Studies, 2014, 56(1), pp.110-131.

[8] Bryan, G., D. Karlan and A. Osman. *Big Loans to Small Businesses: Predicting Winners and Losers in an Entrepreneurial Lending Experiment.* Working paper, 2022.

[9] Fidrmuc, J., M. Hake, and H. Stix. *Households' foreign currency borrowing in Central and Eastern Europe.* Journal of Banking and Finance, 2013, 37: pp. 1880-1897.

[10] Gyongyosi, G. and Verner, E. *Financial crisis, creditor-debtor conflict, and populism.* Journal of Finance, 2021, Forthcoming.

[11] Hake, M., Lopez-Vicente, F. and Molina, L. *Do the drivers of loan dollarization differ between CESEE and Latin America? A Meta-analysis.* Focus on European Economic Integration, 2014, (1), pp.8-35.

[12] Holt, C.A. and Laury, S.K. *Risk aversion and incentive effects.* American Economic Review, 2002, 92(5), pp.1644-1655.

[13] Ize, A. and E. L. Yeyati. *Financial dollarization.* Journal of International Economics, 2003, 59: pp. 323-347.

[14] Jann, B., J. E. Brand, and Y. Xie. *Heterogeneous Treatment Effect Analysis.* Presentation at the German Stata Users Group Meeting, 2010.

[15] Kahneman, D. and A. Tversky. *Prospect Theory: An Analysis of Decision Under Risk.* Econometrica, 1979, 47, pp. 263–291.

[16] Keller, L. *Capital controls and risk misallocation: evidence from a natural experiment.* Jacobs Levy Equity Management Center for Quantitative Financial Research Paper, 2019.

[17] Keloharju, M. and M. Niskanen. *Why Do Firms Raise Foreign Currency Denominated Debt? Evidence from Finland.* European Financial Management, 2001, 7: pp. 481-496.

[18] Klepikova, E. and N. Rogozhina. *Residential Mortgage Lending, Risk Management, and Affordable Housing Market Development in Russia.* From *Housing Finance: New and Old Models in Central Europe, Russia, and Kazakhstan.* Local Government and Public Service Reform Initiative, Open Society Institute-Budapest, 2015, 237-254.

[19] McKinnon, R. *The euro versus the dollar: resolving a historical puzzle.* Journal of Policy Modeling, 2002, 24: 355-359.

[20] Montamat, G. *Stubborn dollarization: Love for the Dollar and Fear of the Peso.* Job market paper, 2020.

[21] Otero-Iglesias, M., and F. Steinberg. *Reframing the euro vs. dollar debate through the perceptions of financial elites in key dollar-holding countries.* Review of International Political Economy, 2013, 20(1): 180-214.

[22] Posen, A.S. *Why the Euro Will Not Rival the Dollar.* International Finance, 2008, 11 (1): 75-100.

[23] Prasad, E. *The dollar reigns supreme – by default.* Nikkei Asian Review, 2014.

[24] Verner, E., and G. Gyöngyözi. *Household Debt Revaluation and the Real Economy: Evidence from a Foreign Currency Debt Crisis.* American Economic Review, 2020, 110(9), pp.2667-2702.

[25] Vlasov, A.V. and L.A. Mishina. *Refinancing of mortgage loans in Russia: methodology and conceptual approaches. (in Russian)* Entrepreneur's Guide, 2014, vol. XXV.