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Foreign Currency Borrowing: The Case of Hungary

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Foreign Currency Borrowing: The Case of Hungary

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November 2009

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We use household survey data from Hungary to analyse the determinants of foreign currency (FX) borrowing. We do not find evidence that Hungarian FX borrowers are better educated, wealthier or more risk-loving than their peers. In fact, FX borrowing is a common phenomenon driven mostly by macroeconomic factors: high interest rate spreads, a relatively stable exchange rate and the competition of foreign owned banks. Although FX borrowing is widespread, our analysis suggests that loan losses directly attributed to it may be limited, given currency fluctuations up to autumn 2009.

JEL codes: D14, F34, G21
Keywords: foreign currency borrowing, households, survey data, liability dollarization

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1. Introduction

Foreign currency (hence FX) borrowing is often seen as a catalyst of financial crises in emerging markets, at least since the paper of Eichengreen and Hausmann (1999). Empirical support for this view comes from a number of studies (see Levy Yeyati, 2006, for a summary). Hungary has come under intense scrutiny in the current financial crisis due to the high share of FX borrowing among firms and households, even though its fundamentals may have not signalled a high risk of financial crisis (Bordo et al., 2009).[1] Nevertheless, investors' fears sent the currency tumbling in October 2008 and the government sought the help of international institutions. The currency recovered temporarily before starting to slide again early 2009 (this time together with regional currencies). By March 2009 the forint reached record heights and concerns over FX borrowing arose again. The currency has stabilised since spring 2009 as the currency stabilised, but the accumulated debt stocks and vulnerabilities remain.

Given this background, any analysis of FX borrowing in Hungary might be of interest to a wide audience. However, our paper goes beyond typical macro level studies and provides first-hand information on Hungarian household borrowers through a custom survey carried out in November 2008. The design and timing of the survey allow us to test hypotheses on FX borrowers' characteristics, financial literacy and risk attitudes. We can also infer – albeit tentatively – the potential loan losses stemming from a sharp devaluation. Besides its obvious policy relevance, our paper also contributes to the research of financial dollarization by providing empirical evidence on borrowers' actual behaviour.

Our main finding is that Hungarian households borrowing in FX are not better educated, wealthier or more risk-loving than their peers. Hence, FX borrowing is not a result of heterogeneity among borrowers. These results are in sharp contrast to those of Beer et al. (2008) among Austrian FX borrowers. Actually, FX borrowing is a quite universal phenomenon in Hungary driven by persistently large interest rate spreads and the massive underestimation of currency risk. We argue that macroeconomic policies (especially loose fiscal policy) created a fertile environment for FX loans. This may explain why Hungary stands out of its regional peers (especially the Czech Republic and Poland) with respect to FX borrowing.

Section 2 reviews the literature on FX borrowing with a focus on empirical evidence from Central and Eastern Europe. Section 3 analyses FX borrowing in Hungary from a macro perspective. The survey data are presented and discussed in Section 4, while Section 5 presents a simple stress test of household FX borrowers. Section 6 concludes.

2. Literature review and motivation

FX borrowing characterises mainly developing economies. The share of FX denominated bank deposits and domestic bank loans averaged at 35% in all developing economies at the beginning of the millennium, while practically all foreign loans were denominated in FX (Levy Yeyati, 2006). Since dollar has a significant share in FX borrowing the literature identifies this phenomenon as financial dollarization. In the following we focus on the issue of FX borrowing within financial dollarization (also labelled liability dollarization).

[1] See e.g. "Crisis Comes to Hungary in Loans of Francs and Euros", New York Times, October 18, 2008.

Numerous theories have been proposed to account for liability dollarization. The 'original sin' theory of Eichengreen and Hausmann (1999) argues that less developed countries cannot borrow abroad (or even domestically on longer maturities) in their national currency. Indeed, less developed countries generally have higher shares of FX denominated debt and lower shares of long term domestic currency denominated debt.

While early theories defined financial dollarization as a currency substitution phenomenon, more recent contributions focus on three topics: portfolio allocation, market failures and institutions (Levy Yeyati, 2006 provides an overview). In the portfolio allocation model of Ize and Levy Yeyati (2003) agents minimize the variance of their portfolio returns. Both the returns of local and FX assets are uncertain because inflation and exchange rate volatility influence them respectively. Risk-minimising agents optimally engage in FX borrowing and/or asset purchases. A key message of the model is that lower exchange rate volatility coupled with higher price volatility is conductive for dollarization. The portfolio view has found support in numerous empirical studies (e.g. De Nicoló et al, 2003; Levy Yeyati, 2006). Basso et al. (2007) extend the approach by allowing monopolistically competing banks to borrow from abroad. This feature introduces persistent deviations from interest parity. They test the model on Central and Eastern European countries: the rapid growth of FX borrowing is explained mostly by the competition of foreign-owned banks for market shares and interest rate differentials. Rosenberg and Tirpák (2008) similarly find a significant role of foreign funding, interest rate spreads and volatility of exchange rate in new EU members; the latter result is also confirmed by Luca and Petrova (2008).

The market failure view is related to the presence of domestic market imperfections and externalities, making FX denominated loans relatively cheaper. Broda and Levy Yeyati (2006) show that if borrowers' default is positively correlated with real exchange rate depreciations and lenders are imperfectly informed about the currency composition of borrowers, then FX funding will be cheaper (because FX lenders fare batter in case of a default). Jeanne (2003) finds that non-linear liquidation costs can also play a role. If interest differentials reflect the small risk of a large devaluation, then FX borrowers may face a lower risk of default than local currency borrowers with a sufficiently large interest rate spread. In his model borrowers with lower liquidation costs are more likely to be lured by high spreads. Brown et al. (2008) test this proposition on data from 9655 small and medium-sized enterprises in 26 transition economies. They show that higher interest rate differentials and lower distress costs indeed encourage FX borrowing. On the other hand, firm opacity does not matter in their dataset, contrary to the argument of Broda and Levy Yeyati.

Finally, the institutional view stresses that the quality of local institutions may induce financial dollarization. Burnside et al. (2003) point out that implicit debtor guarantees favour FX borrowers, while De Nicoló et al. (2003) find that weak institutions also detract from the credibility of government commitments not to bail out borrowers. Monetary policy can also contribute to dollarization. Barajas and Morales (2003) find a significant effect for central banks' currency interventions in Latin America. Rosenberg and Tirpák (2008) highlight the role of EU entry and expected euro adoption as catalysts of FX borrowing.

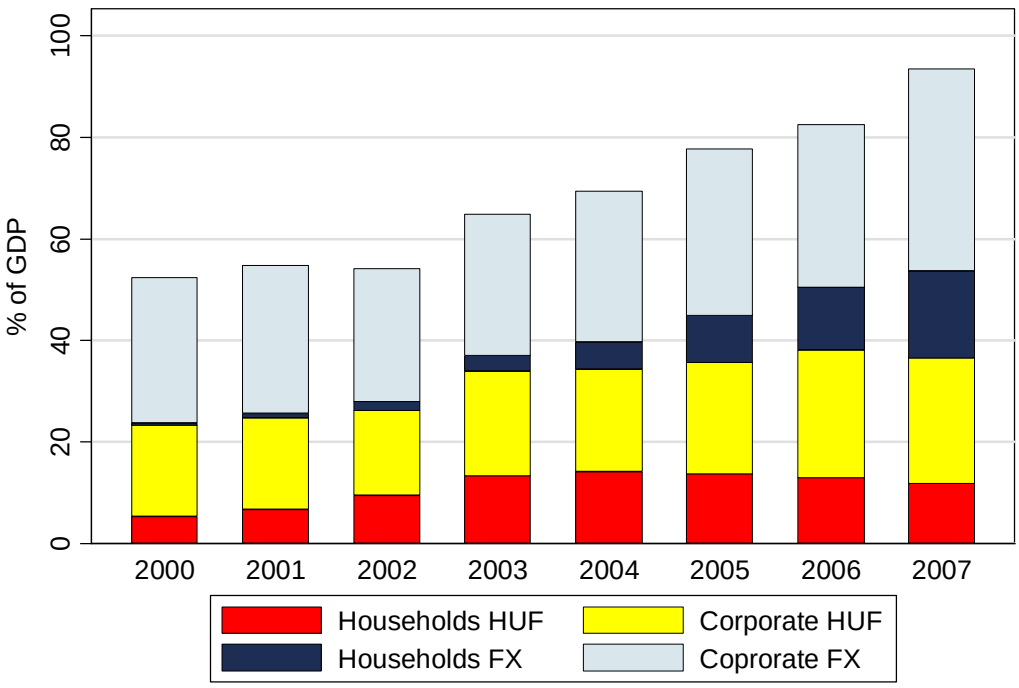
The reviewed papers typically perform macro level analyses. Their usual theoretical foundations, models of portfolio choice are based on the assumption of rational, optimising borrowers. However, micro evidence on the appropriateness of these assumptions is scarce. Our paper contributes to the literature by analysing the actual behaviour of Hungarian household borrowers.

We are aware of one similar paper, which serves as a benchmark for our analysis. Beer et al. (2008) analyse the characteristics of FX (Swiss franc) borrowers in Austria. They find that risk-loving, wealthy and married households are more likely to choose franc loans, and that they are mostly motivated by lower interest rates. The socio-economic characteristics of FX borrowers lead them to the tentative conclusion that Swiss franc borrowing may not be a serious threat to financial stability in other Central and Eastern European countries (such as Hungary) either.

3. Macroeconomic developments in Hungary

Hungary experienced significant financial deepening in recent years (Chart 1). The stock of non-financial private sector loans rose from 52.4% of GDP in 2000 to 93.5% by the end of 2007. Households accounted for almost 60% of this increase. FX borrowing rose from 29% to 57% of GDP, raising its share in the loan stock from 56% to 61%. Since 2003 growth in the loan stock was almost entirely due to FX borrowing.

Chart 1. Private sector loan stock by denomination (end of period)

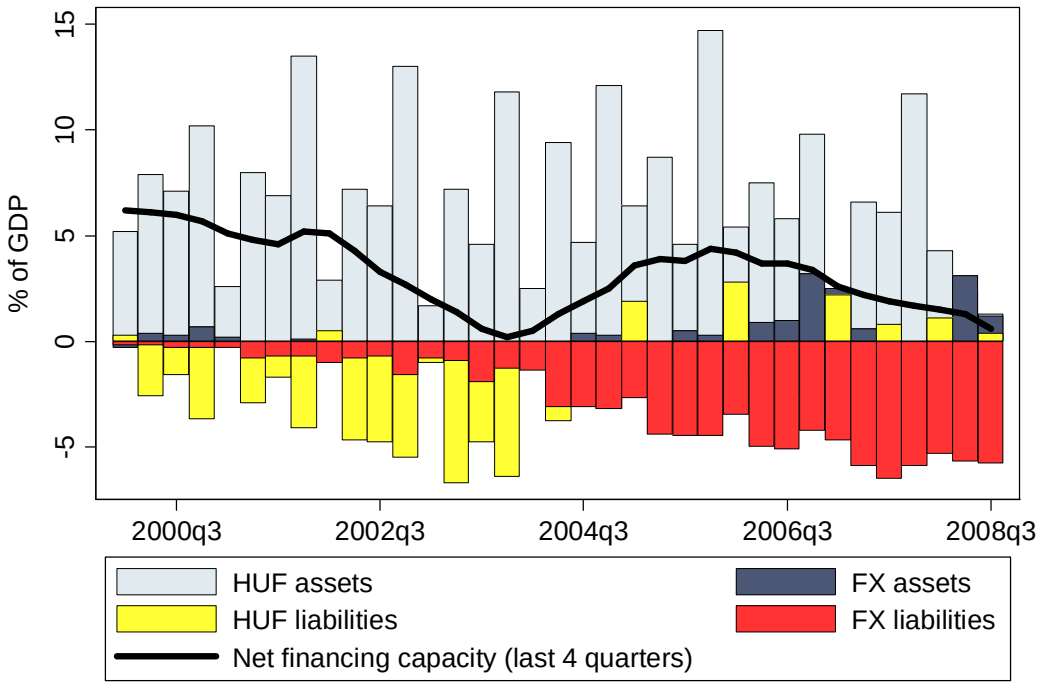


Source: MNB (central bank), own calculations

Household borrowing has become a particular source of concern, especially during the current global financial crisis. Thanks to the availability of cheap external financing and competition among banks the liquidity constraints of the household sector eased significantly. In addition, years of stable economic growth, falling inflation and the prospects of further improvements in living standards following EU accession encouraged households to raise current consumption. A government programme for housing loans (with subsidised HUF interest rates) also contributed to higher borrowing between 2000 and 2003. This led to the erosion of households' net financing capacity vis-à-vis other sectors and boosted the current account deficit (Chart 2). Recognising the costs of housing loan subsidies the government tightened its

conditions in 2003. However, banks soon filled the void with cheap FX loans (Bethlendi et al, 2005). From 2004 on, the household sector borrowed almost entirely in FX (mainly Swiss francs). Although net financing capacity recovered temporarily, it deteriorated again since 2006: as the government implemented fiscal austerity measures (from September 2006), households may have aimed to maintain their consumption level by increasing borrowing. Meanwhile, household assets were accumulated almost exclusively in HUF during the entire period, leading to the build-up of a huge net open FX position.

Chart 2. Net financing capacity of Hungarian households



Source: MNB (central bank), own calculations

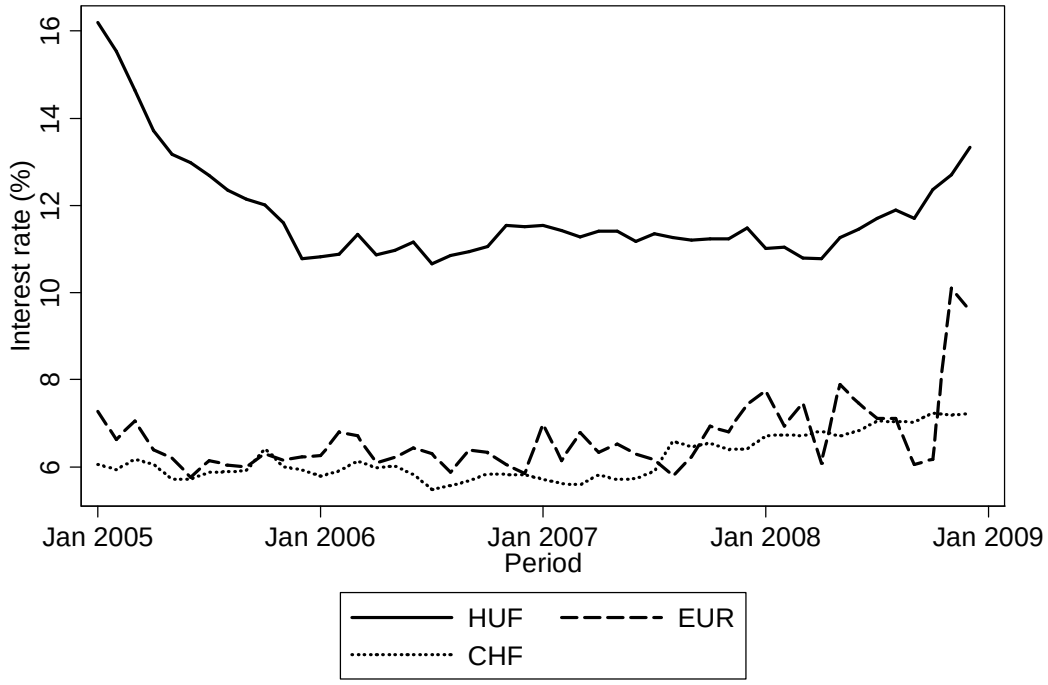
The attractiveness of FX borrowing may be attributed to two macroeconomic factors. First, interest rates on FX loans were considerably lower, even though disinflation lowered domestic interest rates. This gap was basically the consequence of a global liquidity glut on the one hand, and the significant Hungarian risk premium due to loose fiscal policy on the other hand (Chart 3).[2] Second, the exchange rate was fairly stable against the euro (with some swings around the 250 value) and was gradually strengthening against the Swiss franc. This strengthening was due to the Swiss franc being a vehicle currency of carry trade and the forint being a main target for carry trade investors.[3] In addition, economic theory predicts that long-term real convergence results in real appreciation (Balassa-Samuelson effect). Finally, Central and Eastern European currencies tended to overshoot in their depreciation following transition. The return to equilibrium levels coincided with the onset of financial deepening, creating a favourable environment for FX borrowing. Although there were volatile periods (in 2004 and 2006), exchange rate movements did not seem persistent enough to affect the

[2] The sharp hike in EUR lending rates at the end of 2008 (visible on Chart 3) can be attributed to the fact that since the global financial crisis broke out, new FX lending took place almost exclusively in EUR (which had had a small initial share), at much higher costs.

[3] Carry traders borrow in low-yield currencies to invest in high-yield currencies. Capital inflows then strengthen high-yield currencies vis-a-vis the currency of borrowing.

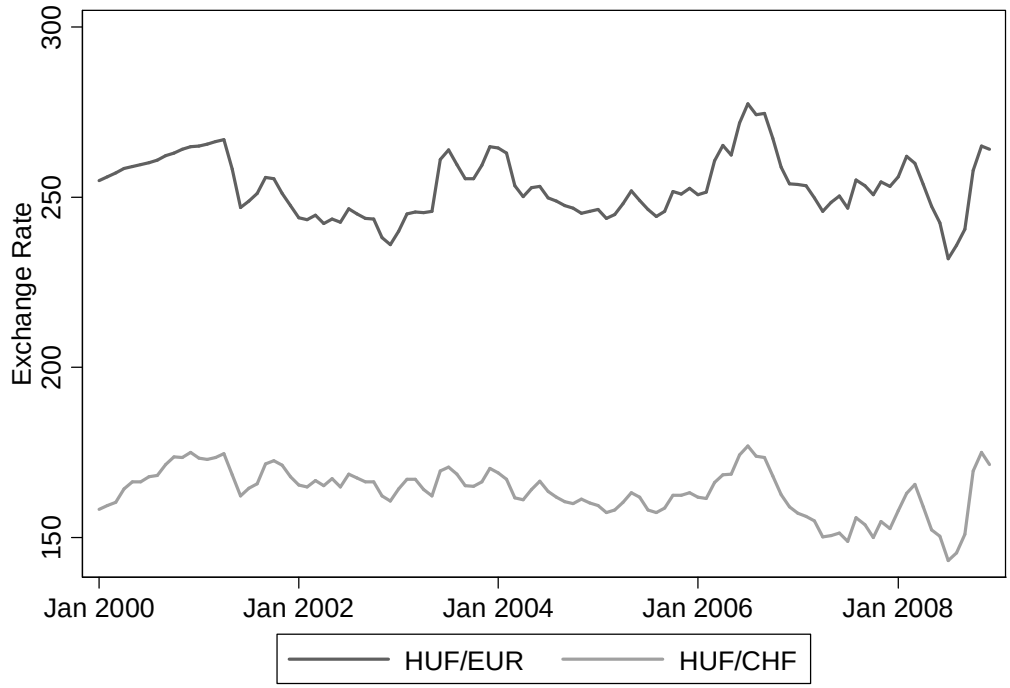
monthly instalments of borrowers. All these factors may have led to the underestimation of currency risk. Monetary policy played an unintentional part: since 2001 the exchange rate regime promised to limit swings against the euro within a ±15% band (as in the ERM-II system). The motivation for this arrangement was the prospect of early euro adoption. In addition, a strong (and stable) currency helps disinflation in a small and open economy such as Hungary.

Chart 3. Average lending rates for households by denomination (on outstanding stock)



Source: MNB (central bank), own calculations

Chart 4. Exchange rate developments



Source: MNB (central bank)

The macroeconomic environment suggests that Hungarian households were rational to opt for FX loans in the sense that they chose the denomination with the lowest expected cost. However, it is not clear how their expectations about these costs were formed. Were households aware of the risks of potential currency movements? Did they take these risks fully into account when choosing the denomination of their loans? These are the questions we seek to answer in the following.

4. Micro-level analysis: borrower characteristics

We use data from a custom survey dataset to assess the characteristics of FX borrowers. The survey was carried out in November 2008 by the market research firm GfK Hungária as part of its monthly omnibus survey among households.[4] The survey is representative of the Hungarian population and covers 1001 households. It includes basic socio-economic characteristics, information on financial literacy, attitudes to risk, and use of financial services. Financial literacy is based on the self-assessment of respondents on a five-level scale. We aggregate the answers to three questions on risk-taking into a common factor where a higher value indicates higher risk aversion.[5] FX borrowers answered additional questions on their financial status, their assessment of currency risk and their willingness to hedge such risks.

[4] More details about the survey are available at http://www.gfk.studyshop.hu/english/study.php?id=185

[5] We use factor analysis to extract the (first) common factor of the answers to the following statements (answers are on a scale of 1 to 5):

- "I think of only the safest investment types to save my money."
- "It is very important to buy insurance products to protect our values and our loved ones."
- "I try to keep my savings in long-term savings."

A higher value of the common factor reflects greater risk aversion.

Table 1 presents descriptive statistics for the main socio-economic characteristics by two groups: borrowers and non-borrowers. 20% of the sample have at least one loan. Borrowers have higher than average income and are more likely to be employed. This is to be expected if banks screen borrowers by their creditworthiness. Borrowers are more likely to own property or a car, since these are typically financed by credit. Although borrowers are not more educated than non-borrowers, their financial literacy is better. This suggests that past experience with financial services improves the knowledge of consumers. Borrowers are also less averse to risk, probably due to their higher confidence in financial services.

Table 1. Descriptive statistics: borrowers v non-borrowers

	Credit=0			Credit=1			Equality of means test
	Obs. no.	**Mean**	**Std. dev.**	**Obs. no.**	**Mean**	**Std. dev.**	**t-statistic**
Gender	799	0.51	0.50	202	0.50	0.50	0.21
Age	799	40.78	14.67	202	40.99	10.89	-0.22
Family size	799	2.85	1.42	202	3.11	1.31	-2.51 *
Years of schooling	799	11.31	2.34	202	11.48	2.15	-1.01
Income per family member	799	73 566	38 397	202	65 629	34 450	2.86 ***
Has property	799	0.89	0.31	202	0.93	0.25	-2.00 **
Has car	799	0.53	0.50	202	0.65	0.48	-3.07 ***
Is employed	799	0.55	0.50	202	0.68	0.47	-3.52 ***
Financial literacy	799	2.73	1.18	202	3.06	1.02	-3.94 ***
Risk aversion	799	-0.03	0.69	202	0.10	0.66	-2.43 **

*Note: two-sided t-test significant at * 10%, ** 5%, *** 1%.*

In the following we restrict our analysis to borrowers. Table 2 overviews the denomination of loans by their type based on 145 individuals reporting only one type of loan. FX loans account for almost 60% of all loans. They are dominant at longer maturities (mortgage-backed and car loans) as the effect of interest differentials is magnified with a longer repayment period (see also Bethlendi et al, 2005). Macro data suggest that HUF home loans are of the government-subsidised type, typically taken before 2004. Similarly, student loans are available only through a government-subsidised scheme with HUF denomination. Apart from these types, HUF loans are predominant for relatively short-term loan types (for goods purchase or personal loans).

Table 2. Loan types by denomination

	HUF	**EUR**	**CHF**	**Other**	***FX share (%)***
Home loan	19	0	32	1	*63.5*
Loan for goods purchase	12	0	6	0	*33.3*
Personal loan	18	3	13	0	*47.1*
Mortgage-backed personal loan	0	0	6	0	*100.0*
Car loan or lease	6	0	22	0	*78.6*
Student loan	7	0	0	0	*0.0*
Total	*62*	*3*	*79*	*1*	*57.2*

Our dataset allows us to test some hypotheses on the socio-economic background and motivations of FX borrowers. Answers to these questions could shed light on the potential

risks related to households' FX borrowing. Based on the findings of Beer et al. (2008) for Austrian households we can hypothesise that:

H1. FX borrowers are more educated and financially literate than HUF borrowers.
H2. FX borrowers have higher income and wealth than HUF borrowers.
H3. FX borrowers are less risk averse than HUF borrowers.

Table 3 provides descriptive statistics for HUF and FX borrowers. Two individuals reporting both HUF and FX loans were classified as FX borrowers so that the two sub-populations do not overlap. As an introductory step, we test the equality of selected variables across the two sub-populations through t-statistics (assuming unequal variances).

Table 3. Descriptive statistics: HUF v FX borrowers

	Only HUF credit			Only FX credit			Equality of means test
	Obs. no.	**Mean**	**Std. dev.**	**Obs. no.**	**Mean**	**Std. dev.**	**t-statistic**
Gender	135	0.49	0.50	67	0.52	0.50	-0.45
Age	135	41.79	10.36	67	39.37	11.81	1.42 $^{+}$
Family size	135	3.16	1.33	67	3.01	1.26	0.77
Years of schooling	135	11.57	2.02	67	11.30	2.38	0.80
Income per family member	135	67 747	35 247	67	61 361	32 623	1.28
Has property	135	0.96	0.21	67	0.88	0.33	1.72 *
Has car	135	0.72	0.45	67	0.51	0.50	2.90 ***
Is employed	135	0.70	0.46	67	0.66	0.48	0.56
Financial literacy	135	3.10	0.98	67	2.97	1.10	0.84
Risk aversion	135	0.15	0.64	67	0.00	0.69	1.54 $^{+}$
Thinks HUF rates are too high	135	4.21	0.97	67	4.27	0.88	-0.40
Thinks HUF cannot depreciate enough to make FX loans unattractive	135	3.29	1.23	67	2.87	1.13	2.43 **

Note: two-sided t-test significant at * 10%, ** 5%, *** 1%, $^{+}$ one-sided t-test significant at 10%

First of all, we find that FX borrowers are neither better educated nor more financially literate than HUF borrowers: H1 is not supported by univariate tests. Second, FX borrowers do not have higher income levels. They have less wealth: they are less likely to own property or a car: H2 does not hold either. Finally, FX borrowers are not less averse to risk than HUF borrowers. If anything, our data indicate that they are even slightly less risk taking. This leads us to reject H3 as well. One final interesting result emerges: FX borrowers were more likely to believe that depreciation can make FX loans costlier than HUF loans. As they have already been affected by currency fluctuations, their awareness of currency risk could have increased.[6]

We also check whether government interventions drive the results above by excluding home and student loans from the analysis, but none of the hypotheses is supported in the restricted sample either (the result table is available upon request).

We next carry out a regression analysis to identify the marginal effects of various personal characteristics on loan denomination choices. Individuals can choose not to borrow (which we

[6] For example, 70% of FX borrowers reported that their monthly instalments have increased significantly from October to November 2008.

consider as the base case in our regression), or to borrow either in HUF or in FX. As these choices cannot be meaningfully ranked, multinomial logit estimation is chosen. Due to the non-linear nature of this estimation method, we do not report the estimated parameters, but rather the marginal effects of individual variables, evaluated at the means of all explanatory variables.

Table 4 summarizes the results. Although FX borrowers are better education in the entire sample, this result is not robust if we exclude government-subsidised loan types. The financial literacy of HUF borrowers appears to be somewhat higher than the literacy of FX borrowers. This leads us to reject H1. FX borrowers are more likely to own a car than other individuals, but this merely reflects that most car loans have been granted in foreign currency. Thus, wealth is endogenous in our setup and this finding cannot be considered as evidence in favour of H2. Differences in (self-reported) income are small. In all, H2 is not supported either. Finally, FX borrowers are significantly more averse to risk than HUF borrowers: H3 is rejected.

Table 4. Marginal effects of individual characteristics on loan choices

	Full sample			Sample excluding home and student loans		
	None	**HUF credit**	**FX credit**	**None**	**HUF credit**	**FX credit**
Gender^{+}	0.024	-0.023	0.000	0.032	-0.036*	0.004
Age	-0.001	0.001	0.000	-0.002**	0.001*	0.001
Education	-0.032**	0.009	0.023**	-0.006	-0.006	0.012
Income per family member (thousand HUF)	0.001***	-0.001*	-0.001*	0.000*	0.000	0.000
Has property^{+}	0.036	-0.077*	0.041	0.062	-0.076*	0.014
Has car^{+}	-0.042	-0.026	0.068***	-0.014	-0.024	0.038**
Financial literacy	-0.056***	0.031***	0.025***	-0.051***	0.031***	0.020***
Risk aversion	-0.040*	0.011	0.029*	-0.041**	0.010	0.032**
Probability of outcome	0.776	0.115	0.109	0.844	0.093	0.063
Log likelihood	-692.55			-517.32		
Chi^2	72.23			66.62		
Pseudo R^2	0.050			0.061		
Number of obs.	1001			922		

Note: the table reports imputed partial derivative estimates from the multinomial logit models of individual characteristics on the type of a loan. The reported partial derivatives measure the change in probability of observing a loan choice given a small change in a regressor (in the case of dummy variables, denoted with $^{+}$, a change from 0 to 1), holding all other variables constant. The marginal effects are evaluated at the sample mean of the explanatory variables; their significance is denoted by * at 10%, ** at 5%, *** at 1%.

Findings of this regression exercise corroborate the results of the univariate tests presented above. H1 is neither supported nor rejected: FX borrowers are more educated but slightly less familiar with finances than HUF borrowers. H2 is partially supported: HUF borrowers are less likely to own property while FX borrowers are more likely to own a car – the latter is explained by the fact that most car loans in recent years have been offered in FX. Finally, H3 is rejected: FX borrowers are more averse to risk than their peers.

These findings lead us to the conclusion that the surge in FX borrowing cannot be attributed to the risk preferences of certain households, contrary to Beer et al. (2008). We rather argue that poor financial literacy and backward-looking expectations about currency movements could have played a role on the micro level. Our results are also in line with the finding from macro-

level studies that persistently large interest rate differentials are the key driver of FX borrowing.

5. Currency risk and mitigation tools

Low awareness of FX risk among Hungarian borrowers has already been mentioned by Bethlendi et al. (2005). Bodnár (2006) found that managers of small and medium-sized enterprises borrowing in FX usually underestimate the sensitivity of their firms' financial situation to currency fluctuations. We attempted a similar analysis by asking borrowers at what exchange rate do they expect difficulties with their monthly instalments. However, we received no answers to this question, arguably highlighting the difficulties households face understanding the concept of currency risk. Nevertheless, we can infer the extent of risk awareness from other, indirect questions (Table 5).

Three quarters of FX borrowers never considered HUF borrowing as a viable option, echoing earlier results on interest rate differentials between denominations. Financial institutions mostly fulfilled their legal obligation to provide information on currency risk, although a quarter of respondents did not remember having received such advice. Despite the legal requirement to advise borrowers on exchange rate risk, the sharp currency swings in 2008 (Chart 4) still took most borrowers by surprise.

Table 5. Currency risk awareness of FX borrowers

	Obs. no.	No (%)	Yes (%)	Cannot remember (%)	Mean (Std. dev.)
Considered HUF loan instead of FX	125	76.8	23.2		
Was informed of FX risk	125	10.4	74.4	15.2	
Expected FX volatility at the 2008 level	125	87.2	12.8		
Has FX income / saving	125	98.4	1.6		
Would consider switching to HUF loan	125	89.6	10.4		
Would consider insuring against FX risk	125	56	44		
How much would you be willing to pay for such insurance? (% of instalment)	54				5.3 (3.6)

Turning to risk mitigation techniques, borrowers typically have no natural hedge (e.g. income in foreign currency). Switching to a HUF loan is dismissed by nine in ten FX borrowers, most likely due to interest rate differentials again. However, over 40% would consider buying insurance against currency risk. Respondents were willing to accept 5% higher instalments on average for such insurance. Some banks already offer multi-currency loans or partial exchange rate guarantees which may be considered a similar arrangement.

We proceed by evaluating the sensitivity of households' financial position to fluctuations in their monthly instalments (which are potentially linked to currency movements). As Table 6 shows, 29% of FX borrowers have already been delinquent with their monthly instalments; 34% reported that HUF depreciation in autumn 2008 strained household finances. However, financial difficulties need not result in delinquencies: just half of those affected by the depreciation reported missing a monthly payment. This figure may even be an upper bound as the original question referred to ever missing a monthly payment.

Table 6. Repayment difficulties due to HUF depreciation among FX borrowers

		Difficulties due to HUF depreciation		
		No	**Yes**	**Total**
Was delinquent	**No**	58	19	77
	Yes	14	18	32
	Total	72	37	109

We assess the sensitivity of banks' household FX debt portfolio to currency movements through a simple simulation exercise. Respondents all reported their net monthly income per family member, their family size and the ratio of instalments to the households' monthly income. Based on these self-reported figures we calculate the disposable income of households as net income less instalments. We are interested in the evolution of disposable income as monthly instalments increase. More precisely, we would like to calculate the share of households with potential repayment problems as monthly instalments rise. Therefore we calculate the disposable income of every borrower household assuming increases in monthly instalment payments from 0 to 50% (its distribution is plotted on Chart 5).[7] The distribution of disposable income is estimated with kernel density regression.[8] We record the shares of households with negative disposable income and with income below the subsistence income level for each instalment increase. Table 7 summarises these figures.

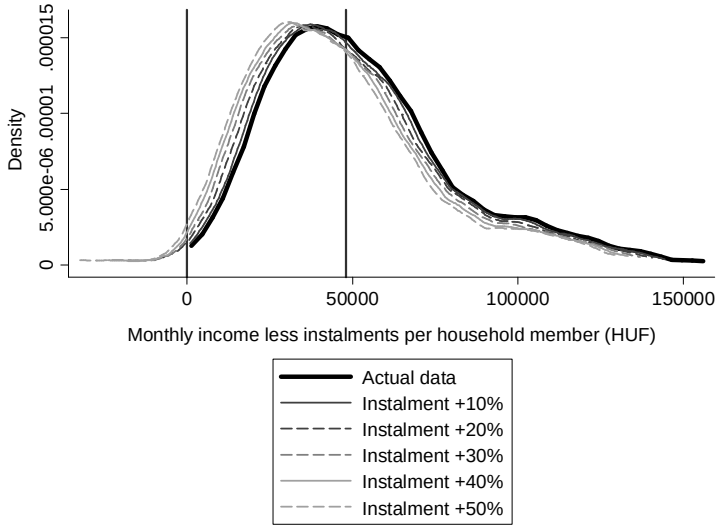
A small share of households (0.4%) has negative disposable income after paying their current reported instalments – this should in principle trigger default. A substantial share (almost 63%) has disposable income below the subsistence level (defined by the Central Statistical Office, based on average nutrition requirements). This should reflect widespread repayment difficulties. However, we believe it is more likely to suggest that either incomes are underreported in the survey, or/and monthly loan payments are overreported. Nevertheless, if these biases do not vary with the income level or debt servicing of households, then the change in the share of affected households need not be affected by the bias.

We can thus argue that a 50% rise in instalments may raise the share of problematic FX loans by around 14 percentage points. Meanwhile the share of households with negative income rises only marginally, to just 3% even with a 50% increase in instalments. These figures are comparable to the more detailed stress test of Holló and Papp (2007), who found that if the currency depreciates by 30%, the share of 'debt-at-risk' would *ceteris paribus* rise by 0.5-8 percentage points while the share of defaulting households would increase by 0.25-3 percentage points. Their wide intervals reflect methodological uncertainties; our estimates are closer to their more pessimistic figures. Holló and Papp also estimate the potential impact of unemployment shocks: they find that a 5% fall in employment (a very likely scenario for Hungary in 2009-10) could raise the share of defaults by as much as 6 percentage points. Our analysis suggests that although the recent currency and interest rate shocks may cause non-negligible losses in banks' household credit portfolio, real economic shocks (higher unemployment) could prove even more harmful.

[7] Anecdotal evidence suggests that instalments increased by around 50% between summer 2008 and spring 2009 for many households. Our simulation is equivalent to a depreciation from HUF/EUR 270 (around November 2008) to around HUF/EUR 330 with fixed risk premia (in interest rates). The historical low was HUF/EUR 316 on March 6, 2009, but the risk premium increased as well. Our analysis cannot separate the effects of risk premia and currency movements.

[8] See Fox (1990) for an introduction to the estimation method.

Chart 5. The distribution of disposable income among FX borrowers with rising monthly instalments



Note: the reported distributions (probability density functions) were estimated with kernel density estimation.

Table 7. Share of financially strained households among FX borrowers with rising monthly instalments

Increase in monthly instalment	Share below subsistence disposable income (%)	Share with negative disposable income (%)
0%	62.9	0.4
10%	66.0	0.9
20%	68.8	1.4
30%	71.6	1.7
40%	74.4	2.2
50%	77.2	2.9

6. Conclusions

Existing theories of liability dollarization and empirical studies on Central and Eastern Europe identify important macroeconomic factors driving FX borrowing, including the presence of foreign banks and the availability of external funding; the resulting persistent interest rate differentials; low exchange rate volatility, EU accession and the prospect of euro introduction. However, micro evidence on the behavioural aspects of FX borrowing is scarce. We aimed to fill this knowledge gap with an analysis of survey data from Hungarian household borrowers.

We found that – contrary to previous findings among Austrian households – Hungarian FX borrowers are not more financially literate, wealthy or risk-loving than their peers. Instead of borrower heterogeneity different forces may be at work: persistent interest rate differentials between local currency and FX loans and the underestimation of currency risk due to backward-looking expectations. Most of these can be traced back to macro factors: the presence of foreign owned banks, a high risk premium due to loose fiscal policy and relative exchange rate stability due to monetary policy. Although expectations of euro adoption may have played a role, they fail to explain why most FX borrowing happened in Swiss francs.

Our findings are relevant both for theory and policymakers. On the theoretical front, our findings suggest that while macroeconomic factors are indeed relevant for borrowing decisions, borrowers themselves are imperfectly informed and this can lead to excessive risk-taking. On the policy side we stress that the unhealthy mix of fiscal and monetary policy was probably the most important driver of FX borrowing. Only fiscal discipline policy can reduce risk premia which allows monetary policy to narrow interest rate spreads and encourage borrowing in home currency. Fiscal discipline is also a prerequisite for euro adoption, which should eliminate currency risk for some FX borrowers.

We find that household borrowers were unprepared for exchange rate volatility and the dangers of depreciation. Recent experiences might lead borrowers to more prudent behaviour in the future. On the other hand, a mass bailout of FX borrowers could raise moral hazard and encourage even more FX borrowing in the future. Our results tentatively indicate that such a bailout may not be necessary: loan losses caused directly by currency depreciation may be limited. In addition, a large share of borrowers is willing to consider market-based hedging techniques. Finally, as real economic shocks may play a larger role for loan losses, policies boosting employment are valuable for financial stability too.

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