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Foreign currency borrowing by small firms in the transition economies [☆]

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ABSTRACT

We examine the firm- and country-level determinants of foreign currency borrowing by small firms, using information on the most recent loan extended to 3101 firms in 25 transition countries between 2002 and 2005. Our results suggest that foreign currency borrowing is much stronger related to firm-level foreign currency revenues than it is to country-level interest rate differentials. Supporting the conclusion that carry-trade behavior is not the key driver of foreign currency borrowing in our sample we find no evidence that firm-level indicators of distress costs or financial transparency affect loan currency denomination. Overall, our findings suggest that retail clients which do take foreign currency loans are better equipped to bear the corresponding currency risks than is commonly thought. Policy makers should therefore take a closer look at the characteristics of borrowers before implementing regulations which are aimed at curbing foreign currency loans.

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1. Introduction

Foreign currency borrowing is widely alleged to be one of the major causes of the severe financial crisis that hit many Asian countries in the 1990's. Recently, foreign currency borrowing has also expanded rapidly in Central and Eastern Europe (CEE) as well as in the Commonwealth of Independent States (CIS). Between 20% and 85% of all private-sector loans in Eastern European countries are now denominated in a foreign currency (European Central Bank, 2010; Moody's Investors Service, 2010).

[☆] Any views expressed are those of the authors and do not necessarily reflect those of the Swiss National Bank.

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Policy makers fear that foreign currency borrowing in Eastern Europe could similarly lead to widespread credit default and the destabilization of the entire banking sector. This would also have strong repercussions on the Western European banks which dominate the banking sector in many transition countries.

Particularly worrying for policy makers in Eastern Europe is that many retail clients, i.e., households and small firms, have taken out foreign currency loans. Indeed, recent data (European Central Bank, 2010) suggests that in countries such as Latvia, Estonia, Lithuania, Hungary, and Bulgaria households hold a similar or larger share of their loans in foreign currency than corporations. These retail loans in foreign currency are widely held to be “small men’s carry trades”, i.e., loans in which households and entrepreneurs seek lower interest rates and take unhedged exchange rate risk upon themselves (Sorsa et al., 2007).

As a response, authorities throughout Eastern Europe have started to take measures to discourage foreign currency borrowing in the retail sector (Rosenberg and Tirpak, 2008). Banks are now forced to fully disclose the exchange rate risks involved in foreign currency borrowing and have had to tighten eligibility criteria for such loans in Hungary, Poland and Latvia, for example. In Romania, Croatia and Kazakhstan supervisory authorities have imposed stronger provisioning requirements on foreign currency compared to local currency loans. Ukraine even completely banned foreign currency lending to households in late 2008. The call for policies to curb foreign currency lending in Eastern Europe has intensified in recent months, with the European Central Bank stating that national efforts have had little impact and calling for coordinated efforts, including among regulators from the home countries of banks which own subsidiaries in Eastern Europe (European Central Bank, 2010).

Given the widespread fears concerning the impact of foreign currency lending on financial stability in Europe, and the strong policy response that it has initiated, it is striking that to date there is no micro-evidence documenting which firms and households are exposed to foreign currency loans, and what this exposure may imply in terms of credit risk. The gap between policy measures and supporting evidence has recently been emphasized in an EBRD paper that concludes: “Policy responses to the liability dollarization problem will be successful only if they are shaped by the correct diagnosis” (Zettelmeyer et al., 2010). Our study is a first step towards filling this gap.

We investigate the currency denomination of 3101 bank loans granted to small firms in 25 transition countries in the period 2002–2005. This cross-country, firm-level dataset allows us to disentangle the relative importance of firm characteristics versus macroeconomic conditions in fostering foreign currency loans across the region. Important from a policy perspective, we can therefore assess to what extent retail borrowing (by small firms) really poses a threat to financial stability in the transition economies.

We find that in our sample of retail clients, foreign currency borrowing is much stronger related to firm-characteristics than it is to macroeconomic conditions. On average 25% of the loans in our sample are denominated in foreign currency. We find that being an exporter or having foreign owners raises the probability of a firm taking a foreign currency loan by 9 and 24 percentage points respectively. By comparison, a one standard deviation increase in the interest differential between the domestic currency and the euro raises the probability of having a foreign currency loan by less than 5 percentage points. Supporting our finding that currency speculation is not the key driver of foreign currency borrowing in our sample we find hardly any evidence that firm-level distress costs or financial transparency affect the decision to borrow in foreign versus local currency.

Our findings suggest that policy makers in Europe might want to take a closer look at the characteristics of retail foreign currency borrowers before implementing regulations which inhibit or ban this activity. In line with evidence on small business lending in Bulgaria (Brown et al., 2010) and mortgage borrowing in Austria (Beer et al., 2010), we find that those small firms which do take foreign currency loans are better equipped to bear the corresponding currency risks than commonly thought.

The rest of the paper is organized as follows. Section 2 reviews the existing theoretical and empirical literature and clarifies our contribution. Section 3 describes the loan data we use, while Sections 4 and 5 report our firm-level and country-level analysis, respectively. Section 6 concludes with policy implications.

2. Literature

2.1. Theoretical studies

A number of recent papers model the choice of the loan currency denomination by firms borrowing from financial institutions or investors (see Allayannis et al. (2003) for an overview). Managing the risk from economic exposure clearly matters in this choice: if the firm's cash flows are in foreign currency, borrowing in the same foreign currency will provide a straightforward natural hedge (Goswami and Shrikhande, 2001).¹ In addition when the uncovered interest rate parity does not hold, firms may opt for the currency which offers the lowest cost of debt, as static capital structure trade-off theory suggests (Graham and Harvey, 2001).² These two elements, i.e., the management of currency risk and the cost of debt, can be traded off as in Cowan (2006). His model predicts that firms with more foreign income and firms in countries with a higher interest differential and lower exchange rate risk will have more foreign debt. His model further shows that firms that have higher costs of distress, i.e., higher costs of emergency funds in the case of default, are more likely to match the denomination of debt to their income streams.

The framework in Cowan (2006) is also relevant for the behavior of small firms studied in this paper. Small firms that have earnings in foreign currencies can be expected to borrow in these foreign currencies. Small, highly leveraged firms and firms with intangible personal value, on the other hand, may have less foreign currency debt because they face higher costs of distress. Brown et al. (2009) include information asymmetries between the bank and the borrower which are pervasive in small business lending. They show that if banks cannot identify either the currency or the level of revenues of the firm, more local currency earners will borrow in foreign currency than under perfect information.

The above models assume that banks (or investors) are risk neutral price takers, so that the currency denomination of debt is determined by the firms' choice. However, in countries, where forward markets for foreign exchange are not complete, banks may behave averse towards exchange rate exposure on their balance sheet. Banks are also typically limited by prudential regulation in the foreign currency exposure they can take. Luca and Petrova (2008) and Basso et al. (2007) examine models of credit dollarization in which risk-averse banks and firms choose an optimal portfolio of foreign currency and local currency loans. In line with other portfolio-choice models of foreign currency debt (Ize and Levy-Yeyati, 2003) they predict that banks will offer more foreign currency loans when the volatility of domestic inflation is high and the volatility of the real exchange rate is low. They also predict that banks' supply of foreign currency loans will depend on their access to foreign currency debt through financial markets and parent-banks abroad, as well as on their access to foreign currency customer deposits.

2.2. Empirical studies

Several studies analyze the currency denomination of debt of large corporations within a single country. Kedia and Mozumdar (2003) for example study large US corporations. These firms, according to their results, match loan to sales currencies. But they find no evidence that tax arbitrage, market liquidity, or legal regime affects the currency choice of these corporations. Keloharju and Niskanen (2001) study 44 large Finnish corporations and document not only currency matching, but also evidence of carry trade (i.e., borrowing in the low-interest rate currency). Large Chilean and Mexican corporations, for example, also engage in currency-matching (Benavente et al., 2003; Cowan et al., 2006; Gelos, 2003). Clark and Judge (2008) critically review these and other studies.

Fewer studies have had access to the firm-level panel (country, time) data that is essential to investigate the link between loan currency denomination and firm characteristics, controlling for macro

¹ Mian (1996), Bodnar et al. (1998), Brown (2001) and Allayannis and Ofek (2001), among others, analyze the hedging of foreign currency exposure, using forward contracts and derivatives for example.

² Our empirical analysis focuses on small firms in emerging economies. Consequently, we do not discuss the literature on: (1) international taxation issues such as tax loss carry forwards and limitations on foreign tax credits; (2) the possibilities for international income shifting; (3) the differential costs across countries of derivatives to create synthetic local debt; and (4) clientele effects in issuing public bonds. These issues are clearly important when analyzing the debt structure of large corporations.

and institutional variables. A study by Allayannis et al. (2003) is an exception. Following Rajan and Zingales (1995) and Booth et al. (2001), they investigate the capital structure of 327 of the largest East-Asian corporations, including foreign, local, and synthetic local (hedged) debt. They find that the ability to manage currency risk with risk management tools and the interest rate differentials, as well as the asset type, explain the use of foreign currency debt. A paper by Cowan (2006) investigating around 500 corporations in half a dozen Latin American countries arrives at similar findings (see also for example Esho et al., 2007). Finally, recent work by Kamil (2008) – using a new database with annual accounting information for over 2200 non-financial companies in seven Latin American countries – investigates the effect of various exchange rate regimes on firms' incentives to hedge currency risk (see also Kamil and Sutton, 2008).

Complementing the above studies, we investigate the currency denomination of individual bank loans granted to *small firms*, rather than the currency denomination of the outstanding corporate debt of large corporations. Our dataset comprises survey data on 3101 bank loans granted to small firms in 25 transition countries over the period 2002–2005. This dataset allows us to disentangle the relative importance of firm characteristics versus macroeconomic conditions in fostering foreign currency loans across the region. Important, from a policy perspective, we can therefore assess to what extent retail borrowing (by small firms) really poses a threat to financial stability in the transition economies.

Our analysis complements a wave of recent studies which use aggregate cross-country data to examine foreign currency lending in Emerging Europe. Basso et al. (2007), for example, examine aggregate data across 24 countries for the period 2000–2006 and find that access to international funding, exchange rate volatility and domestic inflation affect loan dollarization. Interest rate differentials seem less important. Rosenberg and Tirpak (2008) confirm that international funding is a key determinant of loan dollarization, while Luca and Petrova (2008) suggest that domestic deposits in foreign currency are also an important driver. Our firm-level data allows us to expand upon these findings by comparing the relative importance of firm characteristics versus macroeconomic conditions in fostering foreign currency loans across the region.

We also complement a recent paper by Brown et al. (2010) which examines the demand and supply determinants of foreign currency borrowing in Bulgaria. They examine the requested and granted loan currency of small business loans granted by one retail bank. Their findings suggest that foreign currency borrowing is at least partly supply-side driven, with their bank striving to match the currency structure of their assets and liabilities, and reluctant to lend long-term in local currency. In contrast to Brown et al. (2010) we cannot disentangle supply-side from demand side drivers of foreign currency loans as we observe only the actual currency denomination of the loan received. Our cross-country, firm-level data does, however, allow us to examine how important firm-characteristics are in determining loan currency denomination for the full sample of transition economies, rather than just for one bank from one country.

3. Loan data

Firm-level loan information was obtained from the *Business Environment and Enterprise Performance Survey* (BEEPS). The European Bank for Reconstruction and Development (EBRD) and the World Bank jointly conducted this survey in 1999, 2002, 2005, and 2008.³ Our analysis is based on the 2005 wave of the survey, as it contains the most comprehensive information on the borrowing behavior of the firms.

The characteristics of the firms in the BEEPS are comparable to those in the US Survey of Small Business Finance (SSBF) that was analyzed in Petersen and Rajan (1994, 2002), Berger and Udell (1995), and Berger et al. (2005) for example. In the 2003 SSBF the debt over assets ratio of the reporting firms equals 50% (it equals 38% in our sample), while 77% of the firms are sole proprietorships, partnerships or S-corporations (versus 72% family firms and 61% small firms here).

³ With BEEPS Brown et al. (forthcoming), Ongena and Popov (forthcoming), and Popov and Udell (2010) analyze credit availability, Gorodnichenko and Schnitzer (2010) analyze financial constraints and firm innovation, while Ranciere et al. (forthcoming) focus on the impact of currency mismatch on firm performance.

BEEPS 2005 provides data on 9098 firms in 26 transition countries and covers a representative sample of firms for each of these countries.⁴ 3867 firms report that they have received a loan in the past. We drop those observations for which the most recent loan was received prior to 2002 (263 observations) or for which the date is not known (467 observations). We drop a further 32 observations for which the firm did not indicate whether its most recent loan was in local or foreign currency. Finally, we drop the four observations from Azerbaijan. Our analysis is therefore based on a sample of 3101 firms in 25 countries which report detailed information on their most recent loan.

Most important for our analysis, the survey includes an indicator of the currency denomination of the loan. Each firm states whether its most recent loan was denominated in local or foreign currency. The answer to this question is our dependent variable *ForexLoan*, which takes the value one if the most recent loan was denominated in a foreign currency and zero if the most recent loan was in local currency. The definitions and sources of all variables used are presented in Table 1.

The survey further lists the date the loan was received and information on collateralization, maturity, and interest rate. We use the information on the date of loan disbursement to create a synthetic panel of loan observation per year:quarter in each country. As discussed in more detail in Section 4 we include the information on loan maturity and collateralization as controls in our empirical exercise. The variable *Maturity* measures the maturity of the loan in months at origination. The variable *Collateralized* equals one if the loan is collateralized, and zero otherwise. We assume banks determine maturity and collateral prior to currency. However, dropping both loan variables does not alter our findings.

Table 2 presents information on our sample of firms and their most recent loan by country. The table lists the number of firms in BEEPS 2005, the share of these firms which report having credit, as well as the share of firms with credit that are covered in our sample. We also report the total number of firms in the sample. The number of firms in BEEPS varies from 200 in Tajikistan to 975 in Poland, and our sample covers between 18% (Macedonia) and 56% (Slovenia) of the total number of firms surveyed in BEEPS 2005.

The share of foreign currency loans in our sample varies significantly across countries, from less than 10% in the Czech Republic, the Slovak Republic, Bosnia, and Uzbekistan to more than 50% in Albania and Georgia. The share of collateralized loans ranges from 60% in Slovenia to 96% in Albania, while the average maturity of the loans ranges from 19 months in Ukraine to 51 months in Estonia.

Not surprising given the weak institutional environment in many transition countries, loans are more likely to be collateralized and have shorter maturities than, for example, in the US. Firms surveyed by the 2003 SSBF receive loans that are collateralized in 51% of the cases (87% in our sample) and with a maturity of 44 months (29 months here). Of course the foreign currency denomination of loans is a phenomenon which is virtually non-existent among small businesses in the US.

4. Firm-level determinants of foreign currency borrowing

We start our empirical analysis by studying the firm-level determinants of loan currency. In our empirical model, the dependent variable $\Pr(\text{ForexLoan})_{i,j,t}$ is the probability that a firm of type i in country j has a foreign currency denominated loan when receiving a loan at time t :

$$\Pr(\text{ForexLoan})_{i,j,t} = \alpha_{j,t} + \beta_1 \cdot F_{i,j} + \beta_2 \cdot L_{i,j,t} + \varepsilon_{i,j,t}, \quad (1)$$

where $F_{i,j}$ is the vector of characteristics of firm i in country j , $L_{i,j,t}$ are the characteristics of the loan taken by i in j at t , and $\varepsilon_{i,j,t}$ is the error term. The variable $\alpha_{j,t}$ represents the fixed effects that will be included in the various models, for example, sector, country, and/or country * (year * quarter) fixed effects.

4.1. Explanatory variables

Theory suggests that a firm's decision to take a foreign currency loan should be related to the currency denomination of its revenues, the expected distress costs if it were to default on the bank loan,

⁴ The survey covers all countries in which the EBRD is operational, with the exception of Turkmenistan. See <http://www.ebrd.com/country/sector/econo/surveys/beeps.htm> for detailed information on BEEPS 2005.

Table 1

Variable definitions.

Variable name	Definition	Source
<i>Dependent variable</i>		
Forex loan	1 = last loan of firm was in a foreign currency, 0 = last loan of firm was in local currency.	BEEPS
<i>Loan characteristics</i>		
Collateral	1 = loan is collateralized, 0 = loan is not collateralized.	BEEPS
Maturity	Maturity of the loan in months at origination.	BEEPS
<i>Firm characteristics</i>		
Exporter	1 = firm has export revenues, 0 = otherwise.	BEEPS
Sales to multis	1 = firm has domestic sales to multinational companies, 0 = otherwise.	BEEPS
Foreign firm	1 = at least 50% of ownership in foreign hands, 0 = otherwise.	BEEPS
Family firm	1 = firm is owned by sole proprietor or family, 0 = otherwise.	BEEPS
Debt	Share of short-term investment financed by debt.	BEEPS
Audited firm	1 = firm has an external auditor, 0 = otherwise.	BEEPS
Income via bank	Share of firm revenues that are received through bank transfers.	BEEPS
Int. accounting	1 = firm applies international accounting standards (IAS or USGAAP), 0 = otherwise.	BEEPS
Small firm	1 = less than 50 employees, 0 = otherwise.	BEEPS
Age	Age of firm at time of loan disbursement, in log years.	BEEPS
<i>Macroeconomic conditions</i>		
Interest differential	Domestic Tbill (line 60c)/money market rate minus Eurepo rate, in the past quarter.	IFS
Depreciation	Depreciation of local currency versus the Euro, nominal, in%, during the past quarter.	IFS
Deprec. volatility	Variance of monthly changes in the real exchange rate versus the Euro, in%, during the past 4 quarters.	IFS
Peg	1 = country has crawling peg, fixed peg or currency board exchange rate regime, 0 = otherwise	AREAER
EU	1 = country is or has completed negotiations to become EU member, 0 = otherwise.	CIAF
Inflation	Consumer price inflation, in the past quarter.	IFS
Inflation volatility	Variance of monthly changes in the consumer price index, in%, during the past 4 quarters.	IFS
<i>Institutional environment and banking sector</i>		
Enterprise reform	EBRD index of Enterprise reform, by year. Scale: 1–4.33.	TR
Foreign banks	Assets share of foreign controlled banks in domestic banking system by year, in%.	TR
Cross-border loans	Volume of cross-border loans by BIS reporting banks by quarter, in% GDP	BIS, IFS
Forex deposits	Share of deposits in the banking sector denominated in foreign currency by quarter, in%.	BCJ

Data Sources: AREAER: Annual report on Exchange Arrangements and Exchange Restrictions of the International Monetary Fund; BCJ: Basso et al. (2007); BEEPS: Business Environment and Enterprise Performance Survey in 2005 by the European Bank for Reconstruction and Development and the World Bank; BIS: Locational banking statistics by the Bank for International Settlements. CIAF: CIA Factbook; IFS: International Finance Statistics of the International Monetary Fund; TR: Transition report by the European Bank for Reconstruction and Development.

and the financial transparency of its activities. Our empirical model therefore includes a vector of firm-level indicators that captures the corresponding firm-level characteristics.⁵ All firm-level explanatory variables are taken from the BEEPS 2005 itself. Much like the US Survey of Small Business Finance it is not

⁵ These characteristics are taken to be those prevailing at the time of the interview (in 2005) or for the 12 months prior to the interview. For most firms, this implies that our firm-level explanatory variables are elicited *after* their most recent choice of loan currency. However, theory also suggests that it is the expected firm characteristics (in particular, income and its verifiability, and distress costs) at the time of loan repayment – and not necessarily at the time of the loan disbursement – which drive the currency choice. For a subset of 395 firms we have access to the firm-level characteristics from the 2002 BEEPS survey. We replicate our full-sample firm-level analysis using these 2002 values instead of the 2005 values. We find no significant correlations between the 2002 firm characteristics and their choice of loan currency.

Table 2

Loan-level explanatory variables.

Country	Firms in BEEPS	Firms in sample	Firms with credit/ firms in BEEPS	Firms in sample/firms with credit	Forex loan	Collateral	Maturity
Albania	204	81	0.46	0.86	0.73	0.96	37
Armenia	351	140	0.46	0.86	0.29	0.74	22
Belarus	325	79	0.42	0.57	0.27	0.89	20
Bosnia	200	94	0.61	0.78	0.02	0.97	35
Bulgaria	300	102	0.41	0.84	0.29	0.88	38
Croatia	236	130	0.65	0.84	0.27	0.80	49
Czech Rep.	343	84	0.32	0.76	0.07	0.82	33
Estonia	219	69	0.47	0.68	0.28	0.90	51
Georgia	200	53	0.39	0.68	0.66	0.92	25
Hungary	610	262	0.55	0.78	0.24	0.92	30
Kazakhstan	585	232	0.44	0.90	0.26	0.96	28
Kyrgyzstan	202	70	0.44	0.79	0.36	0.96	23
Latvia	205	84	0.51	0.81	0.23	0.92	40
Lithuania	205	69	0.48	0.70	0.25	0.84	32
Macedonia	200	35	0.29	0.60	0.46	0.94	20
Moldova	350	134	0.50	0.76	0.25	0.93	19
Poland	975	306	0.37	0.85	0.14	0.79	29
Romania	600	254	0.48	0.89	0.39	0.93	25
Russia	601	177	0.34	0.87	0.12	0.90	23
Serbia	300	114	0.45	0.85	0.19	0.90	21
Slovak Rep.	220	64	0.49	0.60	0.06	0.83	40
Slovenia	223	125	0.64	0.87	0.25	0.60	41
Tajikistan	200	38	0.22	0.88	0.26	0.84	21
Ukraine	594	218	0.42	0.87	0.23	0.83	19
Uzbekistan	300	87	0.34	0.85	0.06	0.77	21
Total	8748	3101	0.44	0.81	0.25	0.86	29

Firms in BEEPS is the total number of firms surveyed per country. *Firms with credit* is the number of surveyed firms per country which report having a bank loan. *Firms in sample* is the number of firm-level observations per country in our sample. See Table 1 for the definition and source of all other variables.

possible to obtain financial statement data for our sample of firms from standard sources. First, less than 10% of the firms surveyed report that they have issued private or public equity. Second, the BEEPS database does not include firm identifiers which would allow us to match those (few) publicly traded firms with data from other databases.⁶

We use three indicators of a firm's revenue currency denomination: *Exporter*, *Sales to multinationals*, and *Foreign firm*. The dummy variable *Exporter* equals one if the firm exports and zero if the firm obtains revenues only from domestic sales. In countries where domestic sales are conducted exclusively in domestic currency, we believe that this dummy variable is a good indicator of whether a firm has foreign currency income or not. However, many of the countries in our sample display a strong degree of "dollarization", i.e., many domestic transactions are also conducted in foreign currency. Therefore, we include the variable *Sales to multinationals* which equals one if the firm makes domestic sales to multinational or foreign-owned companies.⁷ Such sales are more likely to be made in foreign currency. Finally, in addition to current sales, assets in foreign currency could be an additional potential source of foreign currency cash flows. The BEEPS survey does not provide us with detailed information on the asset structure of the firms. We therefore use foreign firm ownership as an indicator of whether firms

⁶ Giannetti and Ongena (2009b) find that the information on bank relationships from BEEPS (especially on being unbanked) is broadly consistent with evidence provided by Kompass a database that has full records on bank-firm relationships for over 2 million firms in Europe.

⁷ The use of foreign currency loans by exporting firms, and those which sell to multinational companies could potentially be supported by guarantees from their foreign clients. However, available data on the collateralization of loans in BEEPS suggests that this is not the case. Only 8.6% of the firms have pledged such "other" types of collateral and this proportion does not differ significantly between firms taking domestic or foreign currency loans (9.1% versus 7.0%).

have assets that yield foreign currency cash flow. The variable *Foreign firm* equals one if more than 50% of the firm's ownership is in foreign hands, and zero otherwise.

We include two indicators of distress costs that occur when firms default on their most recent bank loan: *Family firm* and *Debt*. Expected distress costs are higher for entrepreneurs deriving more private intangible value from their firm. Expecting that this private value is higher for sole proprietorships or family owned businesses, we include the variable *Family firm*. This dummy variable equals one if the firm is a sole proprietorship or a family owned business, and zero otherwise. Highly leveraged firms also have higher distress costs, as they face higher costs of accessing additional external finance. Our second indicator of distress costs, *Debt*, therefore relies on a measure of firm leverage available from BEEPS 2005, namely the share of working capital financed by debt in the 12 months prior to the interview.⁸

We include two firm-level indicators of financial transparency in our analysis: *Audited firm* and *Income via bank*. Our first indicator is based on firms' financial reporting standards and it equals one for all firms with an external auditor and equals zero otherwise. Our conjecture is that firms with audited accounts are in a position to provide more credible information about their revenues to banks. Our second indicator, *Income via bank*, measures the share of the firm's sales that are settled through a bank account. We expect that the higher this share, the better banks are informed about the revenues of the firms (à la Mester et al., 2007; Norden and Weber, 2010).

In addition to our indicators of firm revenue, distress costs and financial transparency, we include three firm variables and sector fixed effects to control for other differences in firm characteristics.⁹ The variable *International accounting* equals one for all firms that apply international accounting standards (IAS or US GAAP), and equals zero otherwise. Firms with stronger relations to foreign markets or investors are more likely to apply international accounting standards. At the same time, adhering to international accounting standards may make firms more transparent if these standards are stricter than local standards or more widely understood. The variable *Small firm* equals one for firms with less than 50 employees and equals zero otherwise. Distress costs related to loan default may be larger for small firms, at least in proportion to loan size (Froot et al., 1993). On the other hand, small firms may also be more opaque. We include firm *Age*, measured at the time of disbursement of the most recent loan in log years. The information about the firm's activities may become more accurate and credible as the firm grows older and can provide a longer public track record. On the other hand, because of the transition in the countries we consider, age may also proxy for export income, ownership and financial transparency.

Finally, as discussed in Section 2, the probability of a firm receiving a foreign currency loan may depend on other loan characteristics such loan maturity and collateralization. We therefore include our loan-level variables *Maturity* and *Collateral* as controls in our empirical exercise.

4.2. Univariate results

Table 3 provides univariate results for our firm-level explanatory variables. Panel A displays the means of each variable for firms in our sample with local/foreign currency loans as well as the means for all 8478 firms covered by the survey for the countries in our sample (i.e., including those firms without loans). We compare the means of each variable for firms with local currency loans to the means for firms with foreign currency loans in our sample. Panel B of Table 3 displays a full set of pairwise correlations for our firm-level variables.

The table suggests that firms with foreign currency loans differ systematically from those with local currency loans. Firms with foreign currency loans are more likely to have export income, sales to multinationals, and foreign owners. There seems to be little difference in levels of family ownership

⁸ The BEEPS 2005 survey lacks an indicator of total firm leverage. Available indicators are the share of working capital or the share of recent investment financed by debt. We choose the former variable as it is available for a larger sample of firms. For those firms which reported both measures working capital debt and investment debt are highly correlated (pairwise correlation = 0.642).

⁹ We classify each firm into one of the following seven sectors based on where it obtains the largest percentage of its revenues: Mining; Construction; Manufacturing; Transport and communication; Wholesale, retail and repairs; Real estate; and Hotels and restaurants.

Table 3

Firm-level explanatory variables.

	Firms in BEEPS		Firms in sample		Firms with local currency loan			Firms with foreign currency loan			Difference tests		
Observations	8478		3101		2332			769					
Panel A: Sample means by loan currency													
Exporter	0.25		0.34		0.31			0.43			t(3, 095) = 6.25***		
Sales to multis	0.14		0.18		0.17			0.24			t(3, 014) = 4.45***		
Foreign firm	0.10		0.11		0.08			0.20			t(3, 099) = 8.99***		
Family firm	0.73		0.72		0.73			0.70			t(3, 006) = 1.16		
Debt	0.23		0.38		0.38			0.40			t(3, 048) = 1.24		
Audited firm	0.46		0.53		0.51			0.59			t(3, 065) = 4.20***		
Income via bank	0.50		0.57		0.58			0.55			t(3, 093) = 1.96*		
Int. accounting	0.16		0.22		0.19			0.31			t(3, 099) = 7.22***		
Small firm	0.71		0.61		0.62			0.57			t(3, 099) = 2.53**		
Age	2.28		2.31		2.34			2.22			t(3, 097) = 3.20***		
Collateral	0.85		0.87		0.86			0.88			t(3, 099) = 0.76		
Maturity	31.12		28.96		26.57			36.07			t(3, 019) = 8.02***		
	Forex loan	Exporter	Sales to multis	Foreign firm	Family firm	Debt	Audited firm	Income via bank	Int. accounting	Small firm	Age	Collateral	Maturity
Panel B: Pairwise correlations													
Forex loan	1												
Exporter	0.11**	1											
Sales to multis	0.08**	0.21**	1										
Foreign firm	0.16**	0.21**	0.17**	1									
Family firm	−0.02	−0.15**	−0.06**	−0.26**	1								
Debt	0.02	0.08**	0.09**	0.04**	−0.04**	1							
Audited firm	0.08**	0.19**	0.16**	0.18**	−0.25**	0.04**	1						
Income via bank	−0.04	0.29**	0.12**	0.11**	−0.16**	0.06**	0.17**	1					
Int. accounting	0.13**	0.18**	0.11**	0.16**	−0.13**	0.06**	0.20**	0.06**	1				
Small firm	−0.05**	−0.29**	−0.07**	−0.18**	0.36**	−0.04**	−0.31**	−0.18**	−0.23**	1			
Age	−0.06**	0.20**	0.03	−0.04**	−0.29**	0.00	0.20**	0.15**	0.15**	−0.36**	1		
Collateral	0.01	−0.01	−0.04**	−0.02	0.02	0.04**	−0.01	0.00	−0.04**	−0.04**	−0.03	1	
Maturity	0.14**	0.00	0.02	−0.01	−0.01	−0.05**	0.03	−0.02	0.05**	0.04	−0.01	0.06**	1

Panel A reports the means of firm and loan characteristics for firms in our sample as well as for all firms covered by the survey (i.e., including those firms who report having no loan, for which the most recent loan was received prior to 2002, or firms which did not indicate the currency of their most recent loan). The reported difference tests between firms with local currency loans and foreign currency loans are standard t -tests. See Table 1 for the definition and source of each variable.

Panel B reports pairwise correlations for our full sample of 3101 firms. See Table 1 for the definition and source of each variable.

* Significance at the 10% level.

** Significance at the 5% level.

*** Significance at the 1% level.

and external debt between local currency and foreign currency borrowers. There is also an ambiguous relation between financial transparency and loan currency denomination. On the one hand, firms with foreign currency loans are more likely to be audited. On the other hand, these firms have a lower share of their income flowing through bank accounts, suggesting less financial transparency. Finally, firms taking foreign currency loans are more likely to adhere to international accounting standards, and are smaller and younger. Collateral requirements for firms with local or foreign currency loan do not seem different whereas foreign currency loans have a significantly longer maturity.

Panel A also suggests that there are differences between the characteristics of the firms in our sample and those firms in the survey who do not report having a local currency or foreign currency loan. Compared to the full sample of surveyed firms those which have a loan are more likely to export or sell to multinationals. Not surprisingly, firms with loans have higher average leverage ratios. Interestingly firms with loans seem to be more financially transparent, being more likely to have audited financial statements, to adhere to international accounting standards and having a larger share of their income flowing through bank accounts. Firms with loans are also larger than the mean of all surveyed firms. Due to the lack of strong instruments we do not attempt to control for sample selection effects in our empirical analysis. Recent studies which do estimate sample selection models using the same data set (Brown et al., *forthcoming*; Ongena and Popov, *forthcoming*) find that these do not substantially alter the estimates of the relation between firm characteristics and credit availability.

4.3. Multivariate results

Table 4 provides full sample estimates when *ForexLoan* is regressed on firm and loan characteristics. In each column we display the marginal effects at the sample means based on probit estimations. The T-statistics reported in parentheses are based on standard errors clustered at the country level. Column (1) reports estimates without accounting for country-fixed effects, where Column (2) includes country-fixed effects, and Column (3) includes country * year * quarter effects.

The estimates displayed in Columns (1)–(3) confirm that foreign currency borrowing is systematically related to our indicators of foreign currency revenue. *Exporters* and *Foreign firms* obtain more foreign currency loans. Both coefficients are also economically relevant. At the means of the other variables, the probability of having a foreign currency loan increases by 9 percentage points for exporters and by 25 percentage points for foreign firms (remember that only 25% of all loans in the sample are in foreign currency).

Full sample estimates for our indicators of firm distress costs (*Family firm*, *Debt*) are insignificant. Further, our indicators of financial transparency (*Audited firm*, *Income via bank*) do not display the expected significant negative coefficient, suggesting that opaqueness does not encourage foreign currency borrowing. Moreover, we find a significant positive correlation between international accounting standards and foreign currency borrowing. However, this latter result may be explained by the fact that firms that adhere to international standards are more likely to have foreign currency income. In line with the conjecture that financial transparency may reduce foreign currency borrowing is the finding that older firms, i.e., firms with a longer public track record, are less likely to take foreign loans. A one standard deviation increase in firm age (0.9 log years) from the mean (2.3 log - years) decreases the probability of taking a foreign currency loan by roughly 5 percentage points.

Finally, we find that loans with a longer maturity are more likely to be in a foreign currency, confirming the conjecture that banks may be particularly reluctant to lend long-term in local currency. Only 17% of the one-month loans are denominated in a foreign currency, while 26% of the three-year loans are. The coefficient on *Collateralized*, on the other hand, is not significant.

We run several robustness tests to check the validity of our findings (to conserve space we do not tabulate the estimates). We first replicate our baseline model dropping Albania and Georgia where the share of foreign currency loans is particularly high, or Belarus, Czech Republic, Georgia, Macedonia, Russia, Slovakia, Tajikistan and Uzbekistan where the sample coverage is less than 30%. We then replicate our baseline estimates dropping the potentially endogenous loan variables *Collateral* and *Maturity*, and the firm variables *Debt*, *Audited firm*, *Income via bank* and *International accounting* respectively. We also add to our baseline model a variable capturing the intensity of import competition to control for indirect hedging (see Hodder, 1982). In all of these robustness checks the

Table 4

Firm-level determinants of foreign currency borrowing.

	Dependent variable (Model)	(1) <i>ForexLoan</i> (Probit)	(2) <i>ForexLoan</i> (Probit)	(3) <i>ForexLoan</i> (Probit)
Exporter	(+)	0.073*** [0.022]	0.080*** [0.019]	0.088*** [0.024]
Sales to multis	(+)	0.055* [0.029]	0.056* [0.030]	0.042 [0.033]
Foreign firm	(+)	0.172*** [0.044]	0.195*** [0.040]	0.243*** [0.040]
Family firm	(–)	0.033 [0.027]	0.028 [0.023]	0.040 [0.028]
Debt	(–)	0.013 [0.024]	0.026 [0.020]	0.046* [0.026]
Audited firm	(–)	0.034 [0.037]	0.013 [0.022]	0.018 [0.027]
Income via bank	(–)	–0.087** [0.038]	–0.017 [0.029]	–0.039 [0.034]
Int. accounting		0.085** [0.034]	0.056* [0.029]	0.082** [0.039]
Small firm		–0.016 [0.025]	–0.030 [0.027]	–0.035 [0.033]
Age		–0.045*** [0.011]	–0.036*** [0.011]	–0.042*** [0.015]
Collateral		0.033 [0.039]	–0.005 [0.040]	–0.006 [0.043]
Maturity		0.002*** [0.000]	0.002*** [0.000]	0.003*** [0.001]
Sector effects		Yes	Yes	Yes
Country effects		No	Yes	No
Country * year * quarter effects		No	No	Yes
Observations		2776	2776	2381

The dependent variable in this table is *ForexLoan* which equals one if the firm's last loan is denominated in foreign currency and zero if this loan is in local currency. All explanatory variables are defined in Table 1. Each regression includes six sector dummies. The table displays the marginal effects calculated at the sample means. *t*-Statistics are reported in parentheses. Standard errors are adjusted for cluster effects at the country level.

* Significance at the 10% level.

** Significance at the 5% level.

*** Significance at the 1% level.

estimated coefficients for our firm-level variables change neither in significance nor in economic magnitude.

In a further robustness check we test whether our results are sensitive to the fact that we observe the currency denomination of only the most recent firm loan and not the currency composition of total firm debt. Unfortunately, the 2005 wave of BEEPS did not gather information about the currency composition of total firm debt. However, for a sub-sample of 435 firms we can match our 2005 data to information from the 2002 wave of BEEPS where the foreign currency share of total debt was elicited. Controlling for this foreign currency share of debt in 2002, we confirm our baseline findings that the foreign currency denomination of firms' most recent loans is positively related to foreign currency revenue and loan maturity while it is negatively related to firm age. However, due to the small number of observations, only the effect of foreign ownership and loan maturity are precisely estimated.

In a final set of robustness checks we conduct sub-sample analyses for firms which have no foreign currency earnings (firms with no exports, no sales to multinationals, and no foreign owners), for firms

that are located in a country with a pegged exchange rate, and for firms that are located in a country where alternative hedging instruments are available from forward foreign currency markets. We find some evidence that firms without foreign currency revenue are more likely to have foreign currency loans, when they are financial opaque (not-audited). By contrast we find no evidence that a fixed exchange rate encourages foreign currency borrowing among these firms. We also find no evidence that forward currency markets influence the incidence of foreign currency loans among firms with foreign currency revenue.

5. Country-level determinants of foreign currency borrowing

In a second empirical step, we examine to what extent macroeconomic conditions and the institutional environment explain cross-country variation in the choice of loan currency in our sample, as well as within country variation over time. To do so we augment our empirical model with a vector of time-varying country-level variables ($C_{j,t}$):

$$\Pr(\text{ForexLoan})_{i,j,t} = \alpha_j + \beta_1 \cdot F_i + \beta_2 \cdot L_{i,j,t} + \beta_3 \cdot C_{j,t} + \varepsilon_{i,j,t}. \quad (2)$$

5.1. Explanatory variables

As discussed in Section 2 macroeconomic conditions should affect both the demand for foreign currency loans from firms as well as the willingness of banks to supply such loans. In particular, we expect that foreign currency loans will be more prevalent in countries with high interest differentials between the local and foreign currency, low exchange rate volatility and high volatility of domestic inflation. Our indicators of these macroeconomic conditions are taken predominantly from the IMF *International Financial Statistics* (IFS).

The variable *Interest differential* is calculated as the difference between nominal benchmark interest rates in the domestic and foreign financial sectors for the past quarter, namely the domestic Treasury bill rate and the Euro rate.¹⁰ We use the euro as the reference currency, as recent evidence shows that most foreign currency loans in the transition economies are denominated in euros (Luca and Petrova, 2008). Firms and banks should, however, not care just about nominal interest differentials, but rather about departures from the uncovered interest parity, which takes into account expected exchange rate movements. We proxy for expected depreciation using the realized nominal depreciation of the local currency versus the euro (*Depreciation*) during the past quarter.

We employ three measures of exchange rate volatility. Our first indicator (*Depreciation volatility*) measures the actual variance of month on month changes per currency in the real exchange rate vis-à-vis the euro for the past 12 months prior to each quarter. In addition, we include two measures of the exchange rate regime, which may affect agents' expectations. We distinguish countries with a fixed exchange rate (*Peg*), i.e., those with a currency board, fixed peg or crawling peg, from those with a floating exchange rate regime. Further, affiliation with the European Union may shape expectations about future currency arrangements, as new member states are automatically on track to join the Euro-zone. We therefore distinguish those countries that have completed negotiations to join the European Union (*EU*) from those that have not.

Our measure of *Inflation volatility* is the variance of month on month changes in the consumer price index for the past 12 months prior to each quarter. We also account for the level of domestic *Inflation*, which is the percentage change in the domestic consumer price index in the past quarter.

Changes in the institutional setting or in the banking sector may also affect the incidence of foreign currency borrowing. In particular, informational asymmetries in the banking sector are arguably influenced by the extent to which domestic corporate law promotes good corporate governance. As a measure of sector-wide information asymmetries we therefore include the EBRD *Enterprise reform* index, which measures on a yearly basis the degree to which corporate governance meets international

¹⁰ Where a Treasury bill rate was not available, we use the central bank reference rate or money market rates which are also available from the IFS.

standards. With regard to information asymmetries, foreign-owned banks may have less knowledge about the activities of local firms (Detragiache et al., 2008; Giannetti and Ongena, 2009a,b). The variable *Foreign banks* therefore measures the asset share of foreign controlled banks on a yearly basis per country. These two measures of information asymmetries are measured on annual basis and taken from the *Transition report*, published by the EBRD.

Foreign-owned banks also have better access to cross-border funding which is seen as a potential driver of foreign currency loans in Emerging Europe (Basso et al., 2007). To control for cross-border funding of banks (and direct cross-border funding of firms) we employ the variable *Cross-border loans*. This variable is taken from the Bank for International Settlements (BIS) locational banking statistics and measures the volume of cross-border lending to a country by BIS reporting banks per quarter (scaled by GDP).¹¹ As emphasized by Luca and Petrova (2008) and Brown et al. (2010), customer deposits are also an important source of foreign currency funding for banks in the regions. To account for retail funding in foreign currency we include the variable (*Forex deposits*) from Basso et al. (2007) which measures the share of banking deposits that are held in foreign currency.

Table 5 displays summary statistics for our indicators of the macroeconomic and institutional environment as well as changes in the banking sector. Panel A reveals positive values of the nominal interest rate differential in almost all countries. More importantly, the panel confirms that the uncovered interest parity did not hold (*ex post*) for the majority of countries in our sample during the observation period. While the majority of currencies did depreciate against the euro, the magnitude of this depreciation was substantially lower than that of the nominal interest rate differential. This implies a widespread interest rate advantage of taking foreign currency (euro) loans rather than local currency loans in our sample. This interest rate advantage does, however, vary substantially across countries.

Panel B of Table 5 displays the pairwise correlations of our country-level explanatory variables. This panel confirms that our macroeconomic indicators are strongly correlated with changes in the institutional environment and the banking sector.

5.2. Multivariate results

In Table 6 we report full sample estimates of our country-level analysis. In Columns (1) and (2) we report the coefficients of probit estimations using our macroeconomic variables. We introduce country-fixed effects in Column (2). Column (3) reports the coefficients of a probit estimation that includes time-varying macroeconomic and institutional variables as well as country-fixed effects.¹² In all specifications we include the full set of firm-level explanatory variables. For brevity however, we do not tabulate the corresponding estimates. All inferences are based on standard errors that are adjusted for clustering at the country level.

As expected, we find that the estimated coefficient for the nominal interest rate differential is positive in all columns. However, when we control for time-invariant country-level characteristics (in Column (2)) and additionally for changes in the institutional and banking environment (in Column (3)) the coefficient loses statistical significance. Moreover, the economic relevance of interest differentials for foreign currency borrowing is weak, in comparison to the impact of firm revenue or firm ownership. The coefficient in Column (1), for example, suggests that (at the sample mean) a 1% increase in the interest rate differential to the euro increases the share of foreign currency loans by 0.7%. This implies that raising the interest differential by one standard deviation (8.9 percentage points) from its mean (7.6%) would increase foreign currency borrowing by a mere 4.4 percentage points. To put this result into perspective, remember that being an exporter or foreign-owned raises the probability of having a foreign currency loan by 9 and 24 percentage points, respectively.

¹¹ The BIS locational banking statistics report both the volume of cross-border interbank funding and the volume of direct cross-border funding to non-financial firms. For our observation period and sample of countries these two indicators are, however highly correlated (.90, $p < .05$). We therefore employ the aggregate measure of cross-border funding in our analysis. In non-tabulated robustness checks we replace the variable *Cross-border loans* with two separate indicators of interbank and direct cross-border funding. Our empirical results are unaffected.

¹² In Columns (2) and (3), we drop the variable *Peg* as there is no time variation in this variable during our observation period.

Table 5

Country-level explanatory variables.

Country	Firms in sample	Interest diff.	Depreciation	Depr. vol.	Peg	EU	Inflation	Infl. vol.	Enterprise reform	Foreign banks	Cross-border loans	Forex deposits
<i>Panel A: Sample means by country</i>												
Albania	81	5.53	−0.11	6.84	0	0	1.11	2.03	2.0	66.41	5.4	31.2
Armenia	140	8.01	1.33	8.44	0	0	1.51	5.05	2.3	53.44	1.3	73.6
Belarus	79	30.69	5.52	8.74	1	0	6.09	1.19	1.0	16.17	3.4	57.1
Bosnia	94	n/a	0.00	n/a	1	0	n/a	n/a	1.9	80.79	11.0	51.2
Bulgaria	102	0.68	0.01	1.18	1	0.14	1.29	1.2	2.6	79.07	17.8	50.1
Croatia	130	0.76	−0.03	3.43	0	0	0.59	0.23	2.8	90.86	53.1	66.4
Czech Rep.	84	0.30	−0.80	5.45	0	0.71	0.37	0.23	3.3	85.49	17.3	10.8
Estonia	69	0.52	0.04	0.32	1	0.71	0.71	0.22	3.4	97.91	85.2	28.6
Georgia	53	30.97	1.84	8.38	0	0	1.88	1.43	2.0	40.9	5.5	95.6
Hungary	262	6.83	−0.20	3.36	1	0.71	1.29	0.32	3.4	77.94	39.0	16.4
Kazakhstan	232	2.46	1.87	8.27	0	0	1.72	0.16	2.0	28.67	9.1	52.4
Kyrgyzstan	70	5.04	1.65	12.82	0	0	1.01	1.05	2.0	62.49	5.2	0.6
Latvia	84	0.59	1.62	3.34	1	0.71	1.07	0.24	2.9	49.53	28.7	40.1
Lithuania	69	−0.06	−0.39	2.33	1	0.71	0.13	0.21	3.0	93.81	25.3	37.1
Macedonia	35	5.62	0.07	1.35	1	0	0.29	0.53	2.3	46.84	7.7	52.6
Moldova	134	7.80	2.65	10.37	0	0	2.85	1.05	1.8	32.94	4.9	50.7
Poland	306	4.73	0.54	8.62	0	0.71	0.54	0.13	3.4	71.63	17.1	17.1
Romania	254	19.46	2.18	5.07	1	0.14	3.46	0.32	2.0	55.94	14.5	44.9
Russia	177	4.26	2.25	8.35	0	0	3.32	0.39	2.3	7.79	11.9	38.5
Serbia	114	14.32	2.41	2.51	0	0	2.93	1.76	2.0	38.89	n/a	62.1
Slovak Rep.	64	3.56	−0.72	3.77	0	0.71	1.46	1.07	3.4	93.07	23.7	15.3
Slovenia	125	3.88	0.67	1.15	1	0.71	1.2	0.16	3.0	19.2	27.3	32.8
Tajikistan	38	14.74	4.42	n/a	0	0	n/a	n/a	1.7	4.59	6.0	55.6
Ukraine	218	4.45	2.61	7.34	1	0	1.87	0.84	2.0	13.47	4.5	32.9
Uzbekistan	87	n/a	n/a	n/a	0	0	n/a	n/a	1.7	3.97	n/a	n/a
		Interest diff.	Depre- ciation	Depr. vol.	Peg	EU	Inflation	Infl. vol.	Enterprise reform	Foreign banks	Cross- border loans	Forex deposits
<i>Panel B: Pairwise correlations</i>												
Interest diff.	1											
Depreciation	0.67**	1										
Depr. vol.	0.33	0.52**	1									
Peg	−0.04	−0.07	−0.57**	1								
EU	−0.43**	−0.52**	−0.48**	0.30	1							
Inflation	0.72**	0.87**	0.36	0.05	−0.45**	1						
Infl. vol.	0.25	0.16	0.29	−0.32	−0.43**	0.15	1					
Enterprise reform	−0.64**	−0.77**	−0.54**	0.12	0.86**	−0.72**	−0.35	1				
Foreign banks	−0.44**	−0.81**	−0.40	0.14	0.51**	−0.62**	−0.10	0.67**	1			
Cross-border loans	−0.40	−0.44*	−0.64*	0.28	0.57*	−0.36	−0.41	0.66*	0.55**	1		
Forex deposits	0.55**	0.38	−0.01	−0.08	−0.58**	0.32	0.41	−0.50**	−0.33	−0.21	1	

Firms in sample is the number of firm-level observations per country in our sample. See Table 1 for the definition and source of all other variables.

Panel B reports pairwise correlations for each of our country-level explanatory variables. See Table 1 for the definition and source of each variable.

** Significance at the 5% level.

Our results provide some support to the conjecture that a stable exchange rate and uncertain domestic monetary policy foster foreign currency borrowing. The estimations suggest that past *Depreciation* and *Depreciation volatility* vis-à-vis the euro does not affect firms' choices of loan currency. We also find no evidence that countries on track to join the European Union display higher levels of foreign currency borrowing. As expected, though, the coefficients of *Peg* (in Column (1)) and domestic *Inflation volatility* (in all specifications) are significant and positive. The economic magnitude of the

Table 6

Country-level determinants of foreign currency borrowing.

	Dependent variable (Model)	(1) <i>Forex loan</i> (Probit)	(2) <i>Forex loan</i> (Probit)	(3) <i>Forex loan</i> (Probit)
Interest differential	(+)	0.007*** [0.002]	0.004* [0.002]	0.003 [0.002]
Depreciation	(–)	–0.002 [0.002]	0.000 [0.001]	–0.001 [0.001]
Deprec. volatility	(–)	0.003 [0.003]	0.002 [0.002]	0.003 [0.002]
Peg	(+)	0.070** [0.034]		
EU	(+)	–0.085*** [0.029]	0.023 [0.042]	0.038 [0.049]
Inflation	(+)	–0.016* [0.008]	–0.010 [0.007]	–0.010 [0.007]
Infl. volatility	(+)	0.020* [0.012]	0.037** [0.015]	0.036** [0.017]
Enterprise reform	(+)			–0.175 [0.128]
Foreign banks	(–)			0.001 [0.001]
Cross-border loans	(+)			0.001 [0.003]
Forex deposits	(+)			0.003 [0.004]
<i>Firm-level variables</i>		Yes	Yes	Yes
Sector effects		Yes	Yes	Yes
Country effects		No	Yes	Yes
Clustered errors		Yes	Yes	Yes
Observations		2581	2581	2440

The table reports results from probit estimates for our full sample for the dependent variable *Forex loan*. Each regression includes the firm-specific explanatory variables *Exporter*, *Sales to multis*, *Foreign firm*, *Family firm*, *Debt*, *Audited firm*, *Income via bank*, *Int. accounting*, *Small firm*, *Age*, *Collateral* and *Maturity* as well as six sector dummies. Columns (2) and (3) include country-fixed effects. In these columns we drop the variable *Peg* due to lack of time variation. All explanatory variables are defined in Table 1. The table displays the marginal effects calculated at sample means. The table omits observations for Bosnia, Tajikistan and Uzbekistan (and in Column (3) also Serbia) due to lack of data. *t*-Statistics reported in parentheses and are adjusted for clustering at the country level.

* Significance at the 10% level.

** Significance at the 5% level.

*** Significance at the 1% level.

effect of domestic monetary uncertainty is again moderate compared to the effect of firm revenue or ownership. The coefficients reported in Columns (1)–(3) suggest that raising *Inflation volatility* by one standard deviation (1.1) from its mean (0.9) would increase foreign currency borrowing by less than 4 percentage points.¹³

¹³ The coefficient on *Peg* in Column (1) suggests that a fixed (nominal) exchange rate increases foreign currency borrowing by small firms by 7% points. However, we cannot rule out that this estimate is biased due to omitted country characteristics.

The estimates in Column (3) suggest that changes in the institutional and banking environment had little impact on foreign currency borrowing during our observation period. We find an insignificant coefficient of *Enterprise reform* on foreign currency borrowing, suggesting that increasing transparency in bank-borrower relationships did not impact foreign currency borrowing. The coefficients for the presence of *Foreign banks*, *Cross-border loans* and *Forex deposits* are insignificant as well. Thus our results do not support the conjecture that foreign bank ownership and cross-border wholesale funding of banks is a key driver of foreign currency borrowing in the transition economies. This finding is in line with recent evidence by Brown et al. (2010).

We conduct several tests to check the robustness of our country-level results (but again do not include the tabulated estimates to conserve space). First, we replicate our analysis in Table 6 using the US dollar instead of the euro as the reference currency. Second, we do a sample split analysis by isolating the firms which do not have foreign currency revenue (firms which do not export, have no sales to multinationals and no foreign owners) from those that do. Lastly, we perform regional and country-by-country regressions. In these regressions we find a significant positive impact of the interest differential (at the 5% level) in only two countries: Hungary and Serbia. All robustness tests yield results consistent with our key finding that macroeconomic conditions, i.e., interest rate differentials or exchange rate volatility do not contribute significantly to explaining foreign currency borrowing in our sample.

6. Conclusion

Motivated by policy concerns about the credit risks resulting from foreign currency loans to retail clients in Central and Eastern Europe and in the Commonwealth of Independent States we investigate how firm-level and country-level variables determine the currency denomination of bank loans to small firms. We rely on a 2005 survey detailing 3101 recent bank loans in 25 transition countries over the period 2002–2005 to pursue this analysis.

Our results suggest that foreign currency borrowing by small firms is much stronger related to firm-characteristics, i.e., foreign currency revenue, than it is to macroeconomic conditions, i.e., interest rate differentials. Hence, our results question the widely held view that “carry-trade behavior” is the key driver of the recently observed increase in foreign currency borrowing by small firms in the transition economies. Supporting this conclusion we find hardly any evidence that firm-level indicators of distress costs or financial transparency affect the decision to borrow in foreign versus local currency.

Our findings suggest that policy makers in Europe should take a closer look at the characteristics of retail foreign currency borrowers before implementing regulations which are aimed to curb foreign currency lending. Since 2005 (and thus after our observation period) authorities in several transition countries have forced banks to tighten eligibility criteria for foreign currency loans and have also imposed stronger provisioning requirements on these loans. In line with recent evidence on small business lending in Bulgaria (Brown et al., 2010) and mortgage borrowing in Austria (Beer et al., 2010), our results suggest that retail clients which do take foreign currency loans are better equipped to bear the corresponding currency risks than is commonly thought.

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