Foreign banks and foreign currency lending in emerging Europe

Brown, Martin and de Haas, Ralph

University of St. Gallen, EBRD

January 2012

Foreign banks and foreign currency lending in Emerging Europe

Martin Brown and Ralph De Haas

University of St. Gallen; European Bank for Reconstruction and Development, London

Summary

Based on survey data from 193 banks in 20 countries we provide the first bank-level analysis of the relationship between bank ownership, bank-funding and foreign currency (FX) lending across Emerging Europe. Our results contradict the widespread view that foreign banks have been driving FX lending to retail clients as a result of easier access to foreign wholesale funding. Our cross-sectional analysis shows that foreign banks do lend more in FX to corporate clients but not to households. Moreover, we find no evidence that wholesale funding had a strong causal effect on FX lending for either foreign or domestic banks. Panel estimations show that the foreign acquisition of a domestic bank does lead to faster growth in FX lending to households. However, this is driven by faster growth in household lending in general not by a shift towards FX lending.

1. INTRODUCTION

Unhedged foreign currency (FX) borrowing is seen as a major threat to financial stability in Emerging Europe. More than 80 percent of all private sector loans in Belarus, Latvia and Serbia are currently denominated in (or linked to) a foreign currency and the share of FX loans also exceeds that of domestic currency loans in various other countries including Bulgaria, Hungary, and Romania (EBRD, 2010). FX borrowing throughout the region is dominated by retail loans – household mortgages, consumer credit, and small business loans – to clients which typically have their income and assets in local currency. It is therefore not surprising that national authorities have taken measures to discourage such loans. Supervisors in Hungary, Latvia and Poland have pushed banks to disclose the exchange rate risks of FX loans to clients and to tighten the eligibility criteria for such loans. In countries like Croatia, Kazakhstan and Romania stronger provisioning requirements were imposed on FX compared to local currency loans. Ukraine even completely banned FX lending to households in late 2008.

The call for policies to curb FX lending in Eastern Europe has intensified lately. In June 2010 the ECB stated that national efforts to rein in FX lending have had little impact and called for better coordination, including among home-country regulators of banks with subsidiaries in Eastern Europe.[1] In this line of thinking FX lending is largely supply-driven, with FX funding of banks, often from their parent banks, at the heart of the problem. Surprisingly, the widespread view that FX lending in Eastern Europe is driven by foreign bank subsidiaries with access to ample FX funding has not yet been substantiated by empirical analysis. Comparisons of cross-country data document higher shares of FX lending in countries where banks have larger cross-border liabilities (Bakker and Gulde, 2010; Basso et al., 2010). However, whether such liabilities are causing or being caused by FX loans is hard to establish from aggregate data. Recent loan-level evidence for Bulgaria suggests that FX lending seems to be at least partly driven by customer deposits in FX, while wholesale funding in FX is a result rather than a cause of FX lending (Brown et al., 2010). It is unclear, however, whether this applies to a broad set of banks across the transition region.

The impact of foreign bank ownership on euroisation and financial stability is a pertinent policy question. After the fall of the Berlin wall governments and development institutions actively supported the process of banking integration between Western and Eastern Europe. This support was based on the presumed positive impact of foreign bank entry on the efficiency and stability of local banking systems. The empirical evidence that emerged over the next two decades suggests that foreign banks indeed contributed to more efficient (Fries and Taci, 2005) and stable (De Haas and Van Lelyveld, 2006) banking sectors. However, the recent financial crisis has hit Emerging Europe hard and questions have been raised about foreign banks' role in creating the economic imbalances, including large unhedged FX exposures, which made the region vulnerable. Regulation may help to counterbalance distortions – such as banks and borrowers that disregard the negative externalities of FX loans in terms of increasing the risk of a systemic crisis (see Rancière et al., 2010). Our paper contributes to this debate by using bank-level data to analyse to what extent FX lending in Eastern Europe is related to the presence of foreign banks and their funding.

Our main data source is the EBRD Banking Environment and Performance Survey (BEPS) conducted in 2005 and covering 95 foreign-owned and 98 domestic-owned banks in 20 transition countries. The BEPS elicits detailed information on the loan and deposit structure of each bank in 2001 and 2004, its risk management, as well as its assessment of local creditor rights and banking

---

[1] http://www.ecb.int/pub/pdf/other/financialstabilityreview201006en.pdf.

regulation. We match the BEPS data with financial statement data provided by Bureau van Dijk's BankScope database and with country-level indicators of the interest rate differential on foreign versus local currency funds, exchange rate volatility, inflation history, and the position of the country on the path towards EU accession.

While we do not cover the immediate run-up to and aftermath of the recent financial crisis, the observation period covered by our data is particularly interesting to study FX lending dynamics. During this period foreign currency lending to corporate clients was already widespread in Eastern Europe. For the banks in our sample the mean share of the corporate loan portfolio denominated in FX was 41 percent in 2001 and 44 percent in 2004. During this three-year period we do, however, observe a significant increase in FX lending by banks in some countries (such as Belarus and Estonia) while in other countries (Kazakhstan, Russia) banks reduced FX lending. Furthermore, FX lending to households increased substantially across Eastern Europe during our observation period. Considering the banks in our sample, we find that the share of FX loans in their household loan portfolio increased from 28 percent in 2001 to 38 percent in 2004. Our data allow us to investigate to what extent these developments in FX lending to corporate and household clients are related to changes in the ownership and funding structure of banks.

Our results contradict the view that foreign banks have been driving FX lending to unsuspecting retail clients throughout Eastern Europe as a result of easier access to cross-border funding. First, our cross-sectional results suggest that while foreign banks do lend more in FX to corporate clients, they do not do so to households. Second, while the foreign acquisition of a bank does lead to faster growth in FX lending to retail clients, this is driven by faster growth in household lending per se and not by a redirecting of credit from domestic to foreign currency. Third, we find no evidence that wholesale funding had a strong causal effect on FX lending for any type of bank over the 2001-04 period. The correlation between wholesale funding and FX lending at the bank level is weak. If anything, wholesale funding seems to be a result rather than a determinant of FX lending.

All in all, our findings tell us that foreign banks did not indiscriminately 'push' FX loans through their subsidiary network in the transition region, but followed a more subtle approach where FX lending is targeted to (corporate) clients that can carry the associated risks and to countries in which FX lending to households is attractive from a macroeconomic perspective. These results provide important insights to policy makers into the drivers of FX lending. In particular, they suggest that credible macroeconomic policies which encourage depositors to save in local currency may be more important than regulatory proposals to limit the wholesale funding of banks.

The rest of the paper is organized as follows. Section 2 relates our study to the existing theoretical and empirical literature on FX lending. Section 3 describes our data and Section 4 presents our results. Section 5 sets out our policy conclusions.

2. LITERATURE AND HYPOTHESES

In this section we review existing theoretical and empirical studies on the currency denomination of bank loans, establish the hypotheses for our empirical analysis, and clarify our contribution to the literature.

2.1. Bank funding

The share of foreign currency assets held by a bank is typically related to the currency structure of its liabilities because banks are limited by prudential regulation in the FX exposure they can take. In a country with underdeveloped derivative markets for foreign currency exchange, banks' supply of

FX loans therefore depends on their own access to foreign currency funding from depositors, financial markets and/or parent banks.

Recent evidence for Eastern Europe provides mixed results on the role of bank funding as a driver of FX lending. Basso *et al.* (2010) examine aggregate credit dollarisation for 24 transition countries for the period 2000–06. They find that countries in which banks have a higher share of foreign funding display a higher share of FX loans. De Haas and Naaborg (2006) and De Haas and Van Lelyveld (2006, 2010) show that parent bank funding, typically denominated in FX, influences the credit growth of foreign subsidiaries. To the extent that subsidiaries do not swap these funds into local currency, access to parent bank funding may have a positive impact on FX lending.

Luca and Petrova (2008) by contrast find no robust relation between aggregate lending in FX across transition countries and aggregate foreign liabilities of banks. They do, however, find a strong relation between aggregate levels of deposit dollarisation and FX lending. Similarly, Brown *et al.* (2010) provide loan-level evidence that FX lending is driven by customer funding of banks in FX, rather than wholesale funding in FX.

2.2. Banks' sensitivity to monetary conditions

Banks' willingness to supply FX loans, and borrowers' demand for such loans, also depends on monetary conditions. On the demand side, firms and households are more likely to request FX loans when interest differentials are high and real exchange rate volatility is low. Luca and Petrova (2008) examine a model of credit dollarisation in which risk-averse banks and firms choose an optimal portfolio of foreign and local currency loans. In line with other portfolio-choice models of foreign currency debt (Ize and Levy-Yeyati, 2003) they predict that banks offer more foreign currency loans when the volatility of domestic inflation is high and the volatility of the real exchange rate is low. Thus, in countries where the monetary authority has not established a credible reputation for pursuing price stability banks may prefer to make FX loans. As memories of bouts of (hyper)inflation are persistent, high inflation may lead to the entrenched use of FX even when economies stabilise (Kokenyne *et al.*, 2010).

Cross-country comparisons of aggregate credit indeed document a strong role for monetary conditions in explaining the use of foreign currency in emerging economies. Most recently, Luca and Petrova (2008) analyse the aggregate share of FX loans for 21 transition countries of Eastern Europe and the former Soviet Union between 1990 and 2003. They find that the aggregate share of FX loans is positively related to interest rate differentials and domestic monetary volatility and negatively related to the volatility of the exchange rate. Work by Arteta (2002) on a broad sample of low-income countries, as well as Barajas and Morales (2003) and Kamil (2009) on Latin America, confirms the hypothesis that higher exchange rate volatility reduces credit dollarisation.

Firm-level studies find more mixed results concerning the impact of monetary conditions on the currency composition of firm debt. Keloharju and Niskanen (2001) and Allayanis *et al.* (2003) find that the use of FX debt by corporate firms is strongly related to interest rate differentials. Brown *et al.* (2011) by contrast find only a weak impact of interest rate differentials and no impact of exchange rate volatility on the use of FX loans among small firms in transition economies.

2.3. Bank ownership and client structure

A bank's propensity to lend in FX also reflects the demand it encounters for FX loans from its clients. This means that to the extent that foreign and domestic banks serve different types of clients they may also face a different demand for FX denominated loans. Goswami and Shrikande (2001) show theoretically how firms may use foreign currency debt as a hedging instrument for the

exchange rate exposure of their revenues.[2] Cowan (2006) and Brown *et al*. (2009b) consider firms' choices of loan currency in models where the cost of foreign currency debt is lower than the cost of local currency debt. Cowan (2006) shows that firms are more likely to choose foreign currency debt the higher the interest rate differential, the larger their share of income in foreign currency and the lower their distress costs in case of default. The incentive to take foreign currency loans is weaker when the volatility of the exchange rate is higher, as this increases the default risk on unhedged loans. Brown *et al*. (2009b) show that not only firms with foreign currency income, but also firms with high income in local currency (compared to their debt service burden) are more likely to choose foreign currency loans, as their probability to default due to exchange rate movements is lower. They also examine the impact of bank-firm information asymmetries on loan currency choice, showing that when lenders are imperfectly informed about the currency or level of firm revenue, local currency borrowers may be more likely to choose foreign currency loans.[3] While focused on commercial loans, the models of Cowan (2006) and Brown *et al*. (2009b) are also relevant for FX lending to households. They predict that households with assets denominated in foreign currency, such as real estate in many countries, as well as households with FX income or high income to debt service levels are more likely to borrow in foreign currency.

A broad set of studies confirm that the use of FX debt is related to borrower characteristics, in particular borrower income structure. Large firms have been shown to match loan currencies to those of their sales in the US (Kedia and Mozumdar, 2003), Europe (Keloharju and Niskanen, 2001), Latin America (Martinez and Werner (2002), Gelos (2003), and Benavente *et al*. (2003)) and East Asia (Allayannis *et al*., 2003).

More recent evidence suggests that the use of a foreign rather than a local currency loan by retail clients is also strongly related to borrower characteristics. Brown *et al*. (2011) examine the currency denomination of the most recent loan received by 3,105 small firms in 24 transition countries. They find strong evidence that the choice of an FX loan is related to FX cash flow. In contrast, they find only weak evidence that FX borrowing is affected by firm-level distress costs or financial opaqueness. Brown *et al*. (2010) examine requested and granted loan currencies using credit-file data for over 100,000 loans to small firms in Bulgaria. They show that firms with revenue in foreign currency, lower leverage and lower distress costs are more likely to ask for an FX loan, and are more likely to receive such a loan. Beer *et al*. (2010) examine survey data covering over 2,500 Austrian households and find that those households with higher wealth, higher income and better education are more likely to have foreign currency (CHF) rather than local currency (EUR) mortgages. Fidrmuc *et al.* (2011) show that the intention of households to take FX loans in Eastern Europe is related to household age, education and savings in FX. Finally, Degryse *et al.* (2011) provide evidence that suggests that FX lending in Poland is related to bank ownership. Examining a dataset on Polish banks for the period 1996-2006 they find that in particular greenfield foreign banks provide more FX loans than domestic banks.

This paper contributes to the empirical literature on foreign currency lending and borrowing by providing bank-level evidence on how FX lending is impacted by banks' funding structure, sensitivity to the macroeconomic environment, and ownership structure. We use our dataset to test three main hypotheses: (i) Access to FX denominated wholesale and deposit funding has a positive impact on FX lending; (ii) Banks are more likely to lend in FX in countries with instable

---

[2] The model assumes uncovered interest rate parity, i.e. differences in nominal interest rates are cancelled out by changes in the exchange rate so that the cost of foreign and local currency borrowing is identical. In such a model interest rate differentials do not motivate foreign currency borrowing. However, evidence suggests that this parity does not hold for many currencies (Froot and Thaler (1990) and Isard (2006)).

[3] Banks may not be able to verify the income sources of small firms which do not keep detailed and audited financial records (Berger and Udell, 1998). This information asymmetry may be particularly pressing in countries with weak corporate governance (Brown *et al*., 2009) and a strong presence of foreign banks which have less knowledge about local firms (Detragiache *et al*., 2008).

macroeconomic conditions, and (iii) Foreign ownership has an independent positive impact on banks' proportion and quantity of FX lending, e.g. because foreign banks are more likely to attract clients with a demand for currency hedging.

By testing these hypotheses with bank-level data for a broad set of transition economies, we provide micro-evidence on FX lending to both firms and households and complement cross-country studies of aggregate FX lending such as Luca and Petrova (2008) and Basso *et al.* (2007), firm-level and household-level studies such as Brown *et al.* (2011) and Fidrmuc *et al.* (2011), as well as bank-level studies for individual countries such as Brown *et al.* (2010) and Degryse *et al.* (2011).

3. DATA

3.1. The Banking Environment and Performance Survey (BEPS)

Our main data source is the EBRD Banking Environment and Performance Survey (BEPS) conducted in 2005 across 20 transition countries. The BEPS elicits detailed information on the loan and deposit structure, including the currency denomination, of a large number of banks in 2001 and 2004. Information was also collected on banks' risk management and their assessment of creditor rights and banking regulation. BEPS further provides detailed information on bank ownership, which allows us to differentiate between three ownership categories: banks with majority domestic ownership, newly created foreign banks (greenfields), and privatized banks with majority foreign ownership (takeovers).

From the 1,976 banks operating in the transition region in 2005 the EBRD approached the 419 banks which were covered by Bureau van Dijk's BankScope database. These banks represent more than three quarters of all banking assets in the transition region. Of these banks 220 agreed to participate in the BEPS. There are only small differences between banks that agreed to participate in BEPS and those that declined. De Haas *et al.* (2010) provide a detailed description of the BEPS and how it provides a representative picture of the underlying banking population in Emerging Europe in terms of bank size and bank ownership. Both in BankScope and in BEPS 7 percent of the banks are state-owned and while in BankScope 47 percent of all banks are foreign owned, in BEPS 55 percent are foreign owned. Finally, while in BankScope 45 percent of all banks are private domestic banks, 38 percent of all banks in BEPS belong to this category. There is only a weak relationship between bank size and inclusion in BEPS.

The dataset we use in this paper excludes 27 banks for which information on the currency composition of loans was not available. We thus have a sample of 193 banks from 20 countries, of which 98 are domestic banks (private or state-owned), 44 greenfield foreign banks, and 51 are foreign banks that are the result of a take-over of a former domestic bank. Table 1 shows the geographical distribution of these banks over the transition region. The sample is evenly distributed over the three main sub-regions: Central Europe and the Baltic countries (62 banks), South Eastern Europe (72 banks), and the Commonwealth of Independent States (CIS) (59 banks). In terms of ownership, our sample also reflects that the banking sector in the CIS has seen less foreign direct investment compared to the other parts of the transition region.

[INSERT TABLE 1 HERE]

From the BEPS we yield four indicators of bank-level foreign currency lending as our dependent variables: *FX share corporates* is the share of a bank's outstanding loan portfolio to firms which is FX denominated. Likewise, *FX share households* is the share of the outstanding loan portfolio to households denominated in FX. We measure both of these variables in 2004 and 2001 and use the

2004 values in our cross-sectional analysis and the 2004-01 differences in our panel analysis. In our panel analysis we further employ two variables – *FX growth corporates* and *FX growth households* – that measure the growth of the *volume* of FX loans over 2001-04.

[INSERT FIGURE 1 HERE]

Figure 1 depicts the 2001 and 2004 values for *FX share corporates* and FX *share households* for each of the 193 banks in our dataset. It shows a strong correlation between the 2001 and 2004 proportion of corporate lending in FX. By contrast, during this period many banks experienced stronger changes in the currency denomination of their household loan portfolio. On average, the share of FX loans to households in our sample increased from 28 percent in 2001 to 38 percent in 2004. However, as Figure 1 shows, these averages mask substantial heterogeneity in the development of household lending across banks.

While dynamics in FX lending continued after our sample period ended, we think that the period 2001-04 – that is, the first half of the 2001-07 credit boom in many parts of Emerging Europe – is well-suited to study the determinants of FX lending as it set the scene for later developments. Table A1 in the Appendix displays country-level data on FX lending. It shows that in many countries the FX lending dynamics that took place during 2001-04 continued during the later years. For instance, our data pick up both the trend towards more FX lending in Bulgaria, Estonia, Latvia, and Serbia and the trend towards less FX lending in Albania, Kazakhstan, and Russia. Indeed, the overall cross-country correlation between FX lending in 2004 and 2007 is very high at 0.79 and between 2007 and 2010 even 0.94.

3.2. Explanatory variables

Table 2 provides a description and the source of all variables we use in our empirical analysis. We construct bank ownership dummies that indicate whether a bank is a *Foreign greenfield* bank, a *Foreign takeover* bank, or a *Domestic* bank in 2004. Information to construct these dummies is taken from BEPS and where needed supplemented with information from banks' websites. We also create a variable *Foreign held* which is 1 for all banks that were foreign-owned throughout 2000-04 and 0 for all banks that were domestically owned throughout this period. Finally, we construct a dummy *Foreign acquired* that identifies banks acquired in 2000, 2001, or 2002.

[INSERT TABLE 2 HERE]

We use BEPS to create two indicators of the funding structure of a bank. *FX deposits* is taken from BEPS and directly captures the share of customer deposits which are FX denominated. *Wholesale funding* is taken from BankScope and captures non-customer liabilities as a share of total liabilities. We employ this variable as an indicator of wholesale funding *in foreign currency*. We think this is a reasonable assumption as much of the transition region remains characterised by very underdeveloped local currency bond and money markets (EBRD, 2010). As a result, banks find it difficult if not impossible to supplement their (mainly short-term) domestic deposit base with longer-term local-currency liabilities. Wholesale funding therefore tends to be FX denominated, as (the more reputable) banks attract FX debt in the international capital markets or, in the case of foreign bank subsidiaries, from their parent banks. De Haas and Naaborg (2006) show how centralised Treasuries operated by multinational banks such as SEB, Erste Bank, ING Bank, and ABN Amro Bank form the main source of non-deposit funding for the subsidiaries of these banks in Emerging Europe.

Both our measures of bank funding may be endogenous to FX lending. In our cross-sectional analysis we therefore add a specification in which we instrument both. Our instrument for *Wholesale funding* is the variable *Internal ratings* which indicates whether the bank used an internal ratings based approach in 2004. Banks that use such an approach tend to be relatively sophisticated and in a better position to attract wholesale funding. Our instrument for *FX deposits* is the variable *Corporate deposits* which measures the share of customer deposits from firms. FX deposits may be directly related to a bank's focus on corporate clients as (exporting) firms tend to have more access to FX and deposit this at their bank. Section 4.1 provides details on our instrumentation strategy.

At the bank-level we control for bank size with the variable *Assets* which measures total bank assets in log USD. This indicator is taken from BankScope and is a measure of both client structure and bank-funding structure. On the one hand, larger banks are more likely to serve large firms, which may have a higher demand for FX debt. On the other hand, larger banks may have better access to cross-border wholesale funding.

In our empirical analysis we alternatively employ country fixed effects and country-level explanatory variables to account for cross-country variation in macroeconomic conditions. Our country-level explanatory variables are taken from the EBRD Transition Report and the IMF International Financial Statistics. *Interest differential* is the difference between reference interest rates on the domestic currency and the euro. *Exrate volatility* captures the variation of month-on-month changes in the nominal exchange rate of the domestic currency to the euro. *Interest advantage* combines the preceding two variables into one summary measure of the relative advantage of borrowing in a foreign currency. It divides *Interest differential* by the *Exrate volatility* (plus 1) and can be seen as a reward-to-variability or Sharpe ratio that measures the benefit of borrowing in euro, rather than in the local currency, per unit of exchange rate risk.

Besides the above measures of contemporary monetary conditions we attempt to control for past and future macroeconomic stability which may affect FX lending. *Inflation history* measures the mean annual inflation rate over the preceding period 1994-2003. Lastly, we create a variable *EU accession* which indicates for each country and year in the 2001-04 period whether a country had completed EU accession negotiations. This yearly score is then averaged over the sample period.

3.3. Descriptive statistics

Table 3 provides descriptive statistics for all our variables. Panel A reports summary statistics for the full sample as well as means by bank-ownership and region. Panel B shows summary statistics for our country-level variables. Table A2 in the Appendix provides a matrix of pair-wise correlations. Table 3 shows that in 2004, 44 percent of all corporate lending and 38 percent of all household lending by the banks in our sample was denominated in FX. Differences in the share of FX lending are substantial across banks, with some banks displaying no FX loans while other banks have their entire loan portfolio in FX. Between 2001 and 2004 there was an average increase of 3 and 10 percentage points, respectively, in the proportion of corporate and household loans denominated in FX.

The table confirms that foreign banks lend more in FX. However, there is a marked difference between lending to firms and to households. For corporate clients we see that in 2004 both greenfield and takeover foreign banks display a higher share of FX lending than domestic banks. Interestingly, the share of FX loans to firms by takeover banks converges to that of greenfield banks between 2001 and 2004, while FX lending by domestic banks to firms did not increase. For household loans we find that the share of FX lending increased strongly for all ownership types. In contrast to corporate lending, we also find that in 2004 the share of household loans in FX is similar

for foreign takeover banks and domestic banks with both bank types displaying a lower level of FX loans than foreign greenfield banks.[4]

[INSERT TABLE 3 HERE]

Looking at banks' funding structure, we find that on average 32 percent of total liabilities is *Wholesale funding*, while 42 percent of bank deposits are denominated in FX. Greenfield foreign banks rely much more on wholesale funding (44 percent) compared to foreign takeover banks (29 percent) or domestic banks (28 percent). By contrast, the foreign currency share of deposits is similar for all bank types, indicating that the "euroisation" of deposits is mostly driven by the macroeconomic environment. Interestingly, during 2001-04 the share of FX deposits in total deposits declined by about four percentage points.

[INSERT FIGURE 2 HERE]

To what extent is FX lending by the banks in our sample related to their funding structure? The scatter plots in Figure 2 provide some first insights into this issue. The figure shows no apparent bivariate relationship between the proportion of wholesale funding and FX lending. By contrast, banks with a large share of FX denominated customer deposits lend more in FX. In line with this, Table A2 in the Appendix shows that whereas the pair-wise correlation between wholesale funding and corporate and household FX lending is only 0.16 (p=0.04) and 0.13 (p=0.09), respectively, the correlations between the proportion of FX deposits and both types of FX lending are 0.44 (p=0.00) and 0.43 (p=0.00). This is in line with findings by Brown *et al.* (2010) and Fidrmuc *et al.* (2011) on the importance of FX deposits for FX lending.

4. MULTIVARIATE RESULTS

The cross-sectional and panel analyses in this section examine to what extent there is a *causal relationship* between foreign ownership, bank funding and FX lending.

4.1. Cross-sectional variation in FX lending

Table 4 provides a cross-sectional analysis of banks' share of FX lending to corporate clients (left-hand panel) and households (right-hand panel) in 2004. In line with the hypotheses developed in Section 2, we analyse the impact of bank ownership, bank-funding and the macroeconomic environment. The first column in each panel displays an OLS specification in which the share of FX lending is explained by bank ownership, bank funding and bank size.

In columns (2,7) we account for the endogeneity of a bank's funding structure by instrumenting our variables *Wholesale funding* and *FX deposits* with *Internal rating* and *Corporate deposits*, respectively. Our analysis suggests that the chosen instruments are valid, strong, and span our endogenous regressors. When we run second-stage regressions where we add these instruments as additional regressors they do not have an independent impact on FX lending, suggesting that the instruments are valid. Our instruments are highly correlated with the endogenous regressors in the first-stage regressions and thus relatively strong. Finally, the reported Kleibergen-Paap statistics

---

[4] Degryse *et al*. (2011) also find that in particular greenfield foreign banks provide more FX loans than domestic banks.

show that our regression specification is not underidentified. Table A3 in the Appendix reports the first-stage results of our instrumental variable analysis.

In columns (3-4) and (8-9) we add to this IV specification country-level indicators of the macroeconomic environment. Finally, in columns (5) and (10) we interact these macroeconomic indicators with foreign bank ownership to examine whether foreign banks react differently to contemporaneous monetary conditions and long-term macroeconomic stability.[5] As these two specifications also contain country fixed effects, we do not include the macroeconomic indicators as stand-alone variables but only when interacted with the bank-ownership variables.

[INSERT TABLE 4 HERE]

Table 4 displays four key findings. First, foreign ownership is associated with a higher share of FX loans to firms but not to households. Columns (2-4) show that greenfield (takeover) foreign banks lend 17 (12) percentage points more in FX than domestic banks. In sharp contrast, bank ownership does not impact FX lending to households. Why do foreign banks lend more in FX to firms but not to households? One reason may be that households are a relatively homogenous borrower group whereas firms are more diverse. Foreign banks may serve a different set of corporate clients with a higher demand for FX loans, for instance because they are larger and better diversified or because they have FX revenues that need to be hedged. Indeed, the BEPS data indicate that foreign banks lend significantly more to subsidiaries of international firms than domestic banks (see also De Haas *et al.* 2010).

Our second finding is that *Wholesale funding* of banks seems to be a result rather than a determinant of FX lending. The coefficients in columns (1) and (6) suggest that there is a relation between wholesale funding and FX lending. However, once we account for the endogeneity of wholesale funding (by instrumenting it with *Internal rating)* its coefficient is no longer significant at any conventional level.

Our third finding is that there does seem to be a causal impact of foreign denominated customer deposits on FX lending. The coefficients reported in columns (1) and (6), respectively, suggest that a 10 percentage point increase in *FX deposits* by customers increases the share of FX loans to firms by 5 percent and to households by 7 percent. Not surprisingly, the impact on *FX share corporates* loses statistical and economic significance once we account for the potential endogeneity of deposits. This indicates that *FX deposits* is partially endogenous, as FX lending to (international) firms and access to FX deposits by these firms is determined simultaneously.

Interestingly, and in line with this interpretation, the same instrumentation strategy does not reduce the significance of *FX deposits* in the right-hand panel. In the case of lending to households, access to FX deposits is exogenous and has a causal impact on FX lending to retail clients. Note, however, that the coefficient becomes insignificant once we include country fixed effects in column (10). Our result is thus mainly driven by between-country variation in FX deposits rather than between-bank variation in access to FX deposits within countries. The impact of FX denominated customer deposits on the share of FX lending to households confirms recent findings by Brown *et al.* (2010) and Luca and Petrova (2008).

Our fourth finding is that long-term macroeconomic conditions rather than contemporaneous monetary conditions affect FX lending. In particular, we find that banks in countries with a history

---

[5] Since some banks provide no FX loans at all, we also ran models were we first estimate a probit regression and then a conditional OLS. This yields similar results to the unconditional OLS results reported in Table 4. The same holds when we estimate Tobit regressions. Note that the proportion of FX lending is naturally bound between 0 and 100 and not truly censored, which makes OLS a more appropriate estimation technique than Tobit regressions.

of high inflation (over the period 1994-2003) show a higher proportion of FX lending. This may suggest that in countries with "inflation traumas" banks are more reluctant to lend in local currency. An alternative explanation is that FX lending is related to a history of real appreciation of the local currency. Our data show that in Emerging Europe high levels of past inflation are associated with real appreciation of the local currency. Indeed, when we replace the variable *Past inflation* in Table 4 with the variable *Trend appreciation*, which measures the mean real appreciation of the local currency over the period 1994-2003, we find that FX lending is indeed higher in countries that have experienced trend appreciation in the past.

For FX lending to firms we also find that progress with EU accession, and the associated macroeconomic and institutional stabilization, had a *positive* effect on the proportion of FX lending. Progress towards EU accession may somewhat paradoxically have increased the incentives for denominating debt in FX as the 'certainty' of a euro exit, and the expectation of nominal exchange rate stability during the convergence trajectory, made FX lending more attractive even when interest-rate differences came down at the same time. Indeed, in line with recent evidence by Brown *et al*. (2009), we find that neither interest-rate differentials nor nominal exchange-rate volatility is significantly related to FX lending. The main macroeconomic determinants seem to be past inflation and real appreciation as well as the expected stabilisation of EU accession.

In columns (5) and (10) we examine whether FX lending by foreign banks is more sensitive to the macroeconomic environment. Foreign banks may be more reluctant to lend in domestic currency if they mistrust macroeconomic policy more than domestic banks. We therefore interact our macroeconomic indicators with the dummy variable *Foreign*, which is 1 for greenfield and takeover foreign banks (while also including country fixed effects).[6] Our results suggest that foreign banks are not significantly more sensitive to the host-country macroeconomic environment than domestic banks.

Throughout much of Central and South-eastern Europe the euro has been the main currency used for FX lending and we have therefore calculated our variables *Interest rate differential*, *Exrate volatility*, and *Interest advantage* relative to euro interest and exchange rates. However, in a number of countries many FX loans are denominated in either the Swiss franc (Hungary and Poland)[7] or the US dollar (Belarus, Kazakhstan, Moldova, Russia, and Ukraine). As a robustness test we therefore ran the regressions in Table 4 while replacing the exchange rate of the local currency vis-à-vis the euro with the exchange rate vis-à-vis the Swiss franc or the US dollar for the countries mentioned above. Our results remain virtually unchanged in terms of economic and statistical significance, reflecting the co-movement of these foreign currencies relative to the currencies of Emerging Europe during 2001-04.

Summing up, our cross-sectional results contradict widespread views concerning foreign bank ownership, bank funding and FX lending. First, we find that foreign banks lend more in FX to corporate clients but not to retail clients. Second, we find only a very weak relationship between wholesale funding and FX lending, with the former being a result, rather than a determinant of the latter. These results are remarkable as they run counter to the view that foreign banks, using cheap funding from abroad, have been 'pushing' FX loans into the hands of unsuspecting retail borrowers.

We further find that long-term macroeconomic stability (past inflation/trend appreciation and EU accession) rather than contemporaneous monetary conditions are associated with persistently high shares of FX lending by both domestic and foreign banks. Indirectly, the macroeconomic

---

[6] We do not distinguish between greenfield and takeover foreign banks here because unreported regression results show no significant differences in the interaction effects between these two types of foreign banks.

[7] Brown *et al*. (2009c) show that Poland and Hungary are the only two transition economies with a significant share of foreign currency loans denominated in Swiss Francs.

environment may play an important a role as well. We find that between countries –but not so much within countries– a higher proportion of FX deposits is linked to higher proportions of FX lending, in particular to households. As shown by De Nicolo, Honohan and Ize (2005) the macroeconomic environment is a key driver of deposit dollarisation.

4.2. Foreign ownership and changes in banks' FX lending over time

It is difficult to establish a *causal* relationship between bank ownership or funding and FX lending from our cross-sectional results alone. First, the observed impact of customer funding may be driven by omitted bank characteristics, e.g. customers with income in FX, which affect both FX deposits and FX lending. Second, the observed impact of (long-term) macroeconomic instability may be driven by unobserved country characteristics, e.g. institutional weaknesses which may be correlated with both weak macroeconomic policies and the absence of (exporting) firms which demand FX loans. Third, the observed relation between foreign bank ownership and FX lending to corporate clients may be due to reverse causality. Foreign banks may be more likely to enter countries where there are more clients with a demand for financial services in foreign currency, i.e. countries with more export-oriented firms or a real estate market that is denominated in euro. Foreign institutions may also be more likely to take over domestic banks that already have a clientele that use financial services in foreign currency.[8] In this section, we try to mitigate concerns about omitted variables and reverse causality by looking at *changes* in banks' FX lending between 2001 and 2004, controlling for time-invariant bank characteristics and changes in the macroeconomic environment.

In Table 5 we control for omitted bank-level variables by running first-difference regressions using a sub-sample of banks that did not change their ownership during 2000-04. We examine changes in the share and the volume of FX lending between 2001 and 2004. The dependent variables in the left-hand side panel are the percentage-point change in FX share corporate/ households between 2001 and 2004.[9] The dependent variables in the right-hand side panel are *FX growth corporates / households*, i.e. the percentage-point change in the *volume* of FX lending to these clients. Likewise all independent variables – with the obvious exception of the *Foreign held* dummy – are expressed in changes as well. We control for changes in country specific monetary conditions with country fixed effects. The results presented in Table 5 suggest that foreign bank ownership did not impact the *change* in either the share or the volume of FX lending to firms or households.

[INSERT TABLE 5 HERE]

4.3. Foreign acquisition and changes in banks' FX lending over time

In Table 6 we control for reverse causality in the observed relationship between foreign bank ownership and FX lending by analysing whether the currency composition of bank lending changes when a domestic bank is taken over by a foreign strategic investor. As in Table 5, the dependent variables are the percentage-point change in FX *share* corporates / households (left-hand side) and FX *growth* corporate / households (right-hand side). To measure the impact of foreign acquisition

---

[8] For foreign banks like ABN Amro, Bank Austria, and Raiffeisen, serving foreign firms – in particular home-country clients – has been an important part of their expansion strategy into Emerging Europe (De Haas and Naaborg, 2006).
[9] A number of banks change their proportion of FX lending very considerably between 2001 and 2004. We undertook a robustness test where we exclude extreme values in the dependent variables by trimming at the 5th and 95th percentile. This does not change our results.

we limit our sample to those banks which were domestically owned before 2000 and compare banks that remained domestically owned over 2000-04 to those that were taken over by a foreign bank in 2000, 2001, or 2002. The latter are captured by the dummy *Foreign acquired*.[10]

[INSERT TABLE 6 HERE]

The results presented in Panel A of Table 6 suggest that there is no effect of foreign acquisition on FX lending to corporates. The coefficients for *Foreign Acquired* in columns (1-2) and (5-6) suggest that neither the share of bank lending in FX nor the growth of the FX loan volume to corporate clients differs between acquired and non-acquired banks.

The foreign acquisition of a domestic bank does, by contrast, impact FX lending to households. The results in columns (7-8) suggest that after a take-over, acquired banks expand the volume of FX lending to households by almost 10 percentage points more than banks that remain in domestic hands. Interestingly though, the stronger increase in FX loan volume to households does not appear to be driven by an increase in the share of household loans extended in FX. The results displayed in columns (3-4) suggest that foreign acquisition has no impact on FX share households. These results suggest that the main effect of foreign acquisition is to accelerate the growth of household lending by banks. This leads to a faster growth of FX loans to households, even though the share of FX loans in the household loan portfolio does not increase.

A concern with our analysis in Panel A of Table 6 is selection bias. Foreign institutions choose to takeover particular domestic banks. If our regressions omit indicators which are relevant for the takeover decision, and these indicators are positively correlated with initial FX lending, then we may underestimate the impact of foreign acquisition on the subsequent change in FX lending. In Table 6B we therefore report a propensity scoring exercise in which we attempt to mitigate potential selection bias by comparing banks that were taken over by a foreign bank with *similar* banks that were not taken over (Rosenbaum and Rubin, 1983).[11]

In a first step we run a probit regression on the sub-sample of domestic banks in 2000 in which the dependent variable is *Foreign acquired*. This probit regression yields a propensity score (the conditional probability of a bank being acquired given pre-acquisition characteristics) for each bank. As explanatory variables in the first-step regression we include bank size and country fixed effects. We expect that acquiring banks are mainly interested in large banks, as they search for a minimum presence and scale in a country. The first-stage probit regression results (available upon request from the authors) show that bank size is indeed an important determinant of the acquisition probability. In addition, various country fixed effects are significant, indicating that foreign strategic investors targeted particular countries more than others, for instance because of a higher credit-growth potential and a better institutional environment.

In a second step we match each 'treated' (acquired) bank to similar banks that were not acquired by a strategic investor. We either match an acquired bank to the closest propensity score (nearest neighbour match with a common-support requirement) or use Gaussian kernel matching.[12] The results in Table 6B confirm our finding of Table 6A that over the 2001-04 period acquired banks expanded their FX loan volume (but not their FX loan share) to households significantly faster than

---

[10] Our definition of *Foreign acquired* implies that after a takeover in 2000, 2001, or 2002 there are four, three, and two years, respectively, during which the integration into a multinational group may have influenced the FX lending of these banks. This should be enough time to pick up an effect of foreign ownership as the parent bank may in principle start providing its new subsidiary with intrabank funding as soon as the takeover is finalised.

[11] See Havrylchyk and Jurzyk (2010) for a similar application to investigate the impact of foreign bank ownership on the performance and market power of acquired banks.

[12] In the latter case the counterfactual outcome is calculated as a kernel-weighted average of the outcomes of all non-acquired banks. Weights are inversely proportional to the distance between the propensity scores of acquired and non-acquired banks.

banks that remained in domestic hands. Again, we find no relation between foreign acquisition and changes in FX lending to corporate clients.

4.4. Convergence of FX lending within countries and multinational banks

In this section we examine the role of foreign banks in spreading FX lending within countries (to domestic banks). We also examine their role in spreading FX lending across countries through their multinational networks. Panel A of Table 7 displays the results for within-country and Panel B for within-network dispersion of FX lending.

Panel A reports regressions on our sample of banks for which information on FX lending is available for 2001 and 2004. We relate the change in *FX share corporate / households* over the 2001-04 period to the dummy variable *Low FX 2001 in country* which is 1 if in 2001 a bank had a lower proportion of FX lending compared to the country average. As in Tables 5 and 6 we control for cross-country variation in changes in macroeconomic conditions through country fixed-effects.

The results provide evidence for convergence of FX lending within countries. Banks with below-average levels of FX lending in 2001 increased the share of FX loans the fastest between 2001 and 2004. A bank that had below-average FX lending in 2001 subsequently increased its proportion of FX lending to firms and households by 14 and 18 per cent more, respectively, compared to banks in the same country that had above average shares of FX loans in 2001.

Király *et al.* (2009) point out that in the case of Hungary the combination of foreign-bank ownership and intense inter-bank competition was a key determinant of FX lending. Did foreign banks start the euroisation process while intense competition merely forced domestic banks to follow their foreign competitors? We find no evidence that the catching up effect identified above is driven in particular by domestic or foreign banks. In columns (2,3) and (5,6) we examine whether foreign banks spread FX lending to domestic banks during our observation period. We interact the variable *Low FX 2001 in country* with a *Foreign held* dummy, which is one for banks that were already foreign owned in 2000, or a *Foreign acquired* dummy, which is one for banks that became foreign owned in 2000, 2001, or 2002. These results are in line with banking competition increasing FX lending as a two-way rather than as a unidirectional process.

[INSERT TABLE 7 HERE]

In Panel B of Table 7 we examine whether foreign banks spread FX lending across countries through their multinational networks. For this exercise we analyse a sub-sample of banks which belong to a multinational banking group – such as UniCredit Group, Raiffeisen International, or Société Générale – for which we have at least three subsidiaries from the group in our sample. We relate changes in *FX share corporates / households* between 2001 and 2004 to a dummy variable *Low FX 2001 within network* which is 1 for subsidiaries with a proportion of FX lending below the 2001 average for the group they belong to. As in Panel A we find positive coefficients for the variable *Low FX 2001* although the estimates are not precisely estimated. We cannot conclude that during our observation period multinational banking groups used their internal capital markets to spread FX lending throughout their network.

5. CONCLUSIONS AND POLICY IMPLICATIONS

We use a unique dataset – containing detailed information on the loan and deposit structure of nearly 200 banks in 20 transition economies – to examine how FX lending is related to bank ownership, bank funding, and the macroeconomic environment. We focus on the extent to which

foreign-owned banks and wholesale funding have contributed to the widespread use of FX lending in Emerging Europe.

Overall our results contradict the view that foreign-owned banks have been driving FX lending to unsuspecting retail clients throughout Eastern Europe as a result of easier access to cross-border wholesale funding. First, our cross-sectional results suggest that while foreign banks do lend more in FX to corporate clients, they do not do so to retail clients. Second, while foreign acquisition of a bank does lead to faster growth in FX lending to households, this is driven by faster growth in household lending per se, and not be a redirecting of household credit from domestic to foreign currency. Third, we find no evidence that wholesale funding had a strong causal effect on FX lending for any type of bank over the 2001-04 period. The correlation between wholesale funding and FX lending at the bank level is weak, and if anything wholesale funding seems to be a result rather than a determinant of FX lending.

Our results also contradict the view that foreign bank presence spread the FX lending to domestic banks in Emerging Europe. We do find evidence for a within-country convergence process of FX lending. However, we show that *both* foreign and domestic banks with low levels of FX lending in 2001 –compared to the country average– let their FX lending increase faster over the subsequent three years. Finally, at the country level, our results suggest that banks' FX lending is driven by long-term macroeconomic stability rather than contemporaneous monetary conditions. In particular, a history of high inflation and prospective EU accession are associated with high levels of euroisation. Again, this holds for both domestic and foreign banks.

All in all, our findings tell us that foreign banks did not indiscriminately 'push' FX loans through their subsidiary network in the transition region, but followed a more cautionary approach where FX lending is targeted to (corporate) clients that can carry the associated risks and to countries in which FX lending to households is attractive from a macroeconomic and institutional perspective. Our results provide important insights to policy makers into the drivers of FX lending in Eastern Europe. They show that FX customer deposits rather than wholesale funding have been a key driver of FX lending in the region. This suggests that credible macroeconomic policies which encourage customers to save in local currency may in many countries be more important than regulatory proposals to limit the wholesale funding of (foreign) banks.

Indeed, countries like the Czech Republic and Poland demonstrate how adherence to credible macroeconomic policies can result in relatively low levels of FX lending even when a majority of the banking system is foreign owned. Similarly, various Latin American countries have successfully de-dollarised by moving to macroeconomic regimes that were more conducive to local currency funding, including flexible exchange rate regimes and inflation targeting (see Zettelmeyer *et al.*, 2010). Having said that, our results also indicate that macroeconomic stabilisation within the framework of a credible political commitment to eventual euro adoption, may actually stimulate firms and households to disregard any residual currency risk and expand their FX borrowing.

In countries with weak monetary and fiscal institutions a strong regulatory response to reduce FX lending may even be counterproductive as lending in domestic currency is not a realistic alternative in the short term. In those cases, reducing FX lending through regulation may just lead to less credit. The current policies in Ukraine and Belarus, where new FX denominated mortgages (Ukraine) or all FX retail loans (Belarus) have been banned, may come at the cost of an even sharper decline in bank lending.

This is not to say that regulation can or should not play a role in reducing FX lending. In a second-best world where monetary credibility is not instantly attainable, regulation may be an optimal instrument, at least for some time. Regulation may well be advisable if banks and their customers create (unhedged) FX debt whilst disregarding that growing currency mismatches may increase the probability of a systemic crisis. Such behaviour may become apparent when banks

count on an explicit or implicit government commitment to maintain nominal exchange rate stability (see Rancière *et al.*, 2010) such as in the run up to euro membership. In such cases, regulators may for instance require banks to hold unremunerated reserve requirements on their FX funding or may introduce higher capital and/or provisioning requirements for FX loans. Poland has been successful in weighing against the tide of FX lending by introducing Recommendation S in 2006, which required banks to apply stricter credit underwriting standards and to disclose FX risks when providing FX mortgages. Measures like these may partially restore a level playing field between FX and local currency loans and force banks and their borrowers to take the externalities of their lending decisions into account.

Finally, we should underline that our empirical analysis has focused quite narrowly on the impact of bank funding and ownership on the currency composition of credit across Emerging Europe. Even though we do not find that foreign banks have had a strong influence on the *share* of FX lending, we do find that they have been instrumental in pushing the *amount* of household lending (both in local and foreign currencies). Given the underdeveloped nature of mortgage and consumer credit markets across Emerging Europe this development should in principle be viewed positively, as it has allowed households to better smooth consumption over time. Yet, previous crises in emerging markets as well as developed countries have shown that episodes of rapid financial deepening may turn into self-fulfilling and unsustainable credit booms. Indeed, many countries in Emerging Europe – including the Baltic States, Ukraine, and Kazakhstan – are still recovering from burst credit and real estate bubbles. To the extent that foreign banks played a particular role in financing these bubbles – again: regardless of the currency of denomination of this financing – they may still have contributed to financial instability. We leave this issue, as well as the role that access to finance has played in shaping households' ability to cope with the crisis, for future research.

REFERENCES

Allayannis, G., G. Brown, and L. Klapper (2003). 'Capital Structure and Financial Risk: Evidence from Foreign Debt Use in East Asia', *Journal of Finance*, 58, 2667-2709.

Arteta, C.O. (2005). 'Exchange Rate Regimes and Financial Dollarisation: Does Flexibility Reduce Bank Currency Mismatches?', *Berkeley Electronic Journals in Macroeconomics, Topics in Macroeconomics*, 5(1), Article 10.

Bakker, B.B., and A. Gulde (2010). 'The Credit Boom in the EU New Member States: Bad Luck or Bad Policies?', IMF Working Paper No. 130, International Monetary Fund, Washington D.C.

Barajas, A., and R.A. Morales (2003). 'Dollarisation of Liabilities: Beyond the Usual Suspects', IMF Working Paper No. 11, International Monetary Fund, Washington D.C.

Basso, H., O. Calvo-Gonzalez, and M. Jurgilas (2010). 'Financial Dollarisation: The Role of Foreign-Owned Banks and Interest Rates', *Journal of Banking and Finance* 35, 794-806.

Beer, C., S. Ongena, and M. Peter (2010). 'Borrowing in Foreign Currency: Austrian Households as Carry Traders', *Journal of Banking & Finance*, 34, 2198-2211.

Benavente, J., C. Johnson, and F. Morande (2003). 'Debt Composition and Balance Sheet Effects of Exchange Rate Depreciations: A Firm-Level Analysis for Chile', *Emerging Markets Review*, 4, 397-416.

Berger, A., and G. Udell (1998). 'The Economics of Small Business Finance: The Roles of Private Equity and Debt Markets in the Financial Growth Cycle', *Journal of Banking & Finance*, 22, 613-673.

Brown M., T. Jappelli, and M. Pagano (2009). 'Information Sharing and Credit: Firm-Level Evidence from Transition Countries'. *Journal of Financial Intermediation* 18, 151-172.

Brown, M., K. Kirschenmann, and S. Ongena (2010). 'Foreign Currency Loans: Demand or Supply Driven?', CEPR Discussion Paper No. 7952, London.

Brown, M., S. Ongena, and P. Yesin (2009b). 'Foreign Currency Borrowing by Small Firms', *Swiss National Bank Working Paper 2009-2*.

Brown, M., S. Ongena, and P. Yesin (2011). 'Foreign Currency Borrowing by Small Firms in the Transition Economies', *Journal of Financial Intermediation* 20, 285-302.

Brown, M., M. Peter, and S. Wehrmüller (2009c). 'Swiss Franc Lending in Europe', *Aussenwirtschaft*, 64(2), 167-181.

Cowan, K. (2006). 'Firm Level Determinants of Dollar Debt?', Central Bank of Chile, Working Paper.

Degryse, H., O. Havrylchyk, E. Jurzyk, and S. Kozak (2011). 'Foreign Bank Entry, Credit Allocation, and Lending Rates in Emerging Markets: Empirical Evidence from Poland", *Journal of Banking and Finance*, forthcoming.

De Haas, R., D. Ferreira, and A. Taci (2010). 'What Determines the Composition of Banks' Loan Portfolios? Evidence from Transition Countries', *Journal of Banking and Finance*, 34, 388-398.

De Haas, R. and I. Naaborg (2006). 'Foreign Banks in Transition Countries: To Whom do They Lend and How are They Financed?', *Financial Markets, Institutions & Instruments*, 15, 159-199.

De Haas, R. and I. Van Lelyveld (2006), Foreign banks and credit stability in Central and Eastern Europe. A panel data analysis, *Journal of Banking and Finance*, 30, 1927-1952.

De Haas, R. and I. Van Lelyveld (2010), Internal Capital Markets and lending by multinational bank subsidiaries, *Journal of Financial Intermediation*, 19, 1-25.

De Nicolo, G., P. Honohan, and A. Ize (2005). 'Dollarisation of Bank Deposits: Causes and Consequences', *Journal of Banking & Finance*, 29, 1697-1727.

Detragiache, E., T. Tressel, and P. Gupta (2008). 'Foreign Banks in Poor Countries: Theory and Evidence', *Journal of Finance*, 63, 2123-2160.

European Bank for Reconstruction and Development (2010). 'Transition Report 2010. Recovery and Reform', London.

Fidrmuc, J., M. Hake, and H. Stix (2011), 'Households' Foreign Currency Borrowing in Central and Eastern Europe', mimeo.

Fries, S. and A. Taci (2005), Cost efficiency of banks in transition: Evidence from 289 banks in 15 post-communist countries, *Journal of Banking and Finance*, 29, 55-81.

Froot, K. and R. Thaler (1990). 'Anomalies: Foreign Exchange', *Journal of Economic Perspectives*, 4, 179-192.

Gelos, G. (2003). 'FX Debt in Emerging Markets: Firm-Level Evidence from Mexico', *Economics Letters*, 78, 323–327.

Goswami, G., and M.M. Shrikhande (2001). 'Economic Exposure and Debt Financing Choice', *Journal of Multinational Financial Management*, 11, 39-58.

Graham, J. and C. Harvey (2001). 'The Theory and Practice of Corporate Finance: Evidence from the Field', *Journal of Financial Economics*, 60, 187-243.

Havrylchyk, O. and E. Jurzyk (2010). 'Inherited or Earned? Performance of Foreign Banks in Central and Eastern Europe', IMF Working Paper No. 04, International Monetary Fund, Washington D.C.

Isard, P. (2006). 'Uncovered Interest Parity', IMF Working Paper No. 96, International Monetary Fund, Washington D.C.

Ize, A., and E. Levy-Yeyati (2003). 'Financial Dollarisation', *Journal of International Economics*, 59, 323-347.

Kamil, H. (2009), How Do Exchange Rate Regimes Affect Firms' Incentives to Hedge Currency Risk in Emerging Markets?, mimeo.

Kedia, S., and A. Mozumdar (2003). 'FX-Denominated Debt: An Empirical Examination', *Journal of Business*, 76, 521-546.

Keloharju, M., and M. Niskanen (2001). 'Why Do Firms Raise FX Denominated Debt?', *European Financial Management*, 7, 481-496.

Király, J., J. Antal, M. Nagy, and V. Szabó (2009), 'Retail Credit Expansion and External Finance in Hungary: Lessons from the Recent Past (1998-2007)', BIS Papers No. 4, Bank for International Settlements, Basel.

Kokenyne, A., J. Ley, and R. Veyrune (2010), 'Dedollarization', IMF Working Paper No. 188, International Monetary Fund, Washington D.C.

Luca, A., and I. Petrova (2008). 'What drives Credit Dollarisation in Transition Economies?', *Journal of Banking & Finance*, 32, 858-869.

Martinez, L., and A. Werner (2002). 'The Exchange Rate Regime and the Currency Composition of Corporate Debt: The Mexican Experience', *Journal of Development Economics*, 69, 315-334.

Peek, J. and E. Rosengren (1998). 'Bank Consolidation and Small Business Lending: It's Not Just Size that Matters', *Journal of Banking & Finance*, 22, 799-819.

Rancière, R., A. Tornell, and A. Vamvakidis (2010). 'Currency Mismatch and Systemic Risk in Emerging Europe', *Economic Policy*, 64, October, 597-658.

Rosenbaum, P. and D. Rubin (1983). 'The Central Role of the Propensity Score in Observational Studies for Causal Effects', *Biometrika*, 70(1), 41-55.

Zettelmeyer, J., P. Nagy, and S. Jeffrey (2010). 'Addressing Private Sector Currency Mismatches in Emerging Europe', EBRD Working Paper No. 115, European Bank for Reconstruction and Development, London.

Figure 1. FX lending in 2001 and 2004

This figure plots the 2001 values against the 2004 values for the variables *FX share corporates* and *FX share households*. Table 2 provides definitions and sources of all variables.
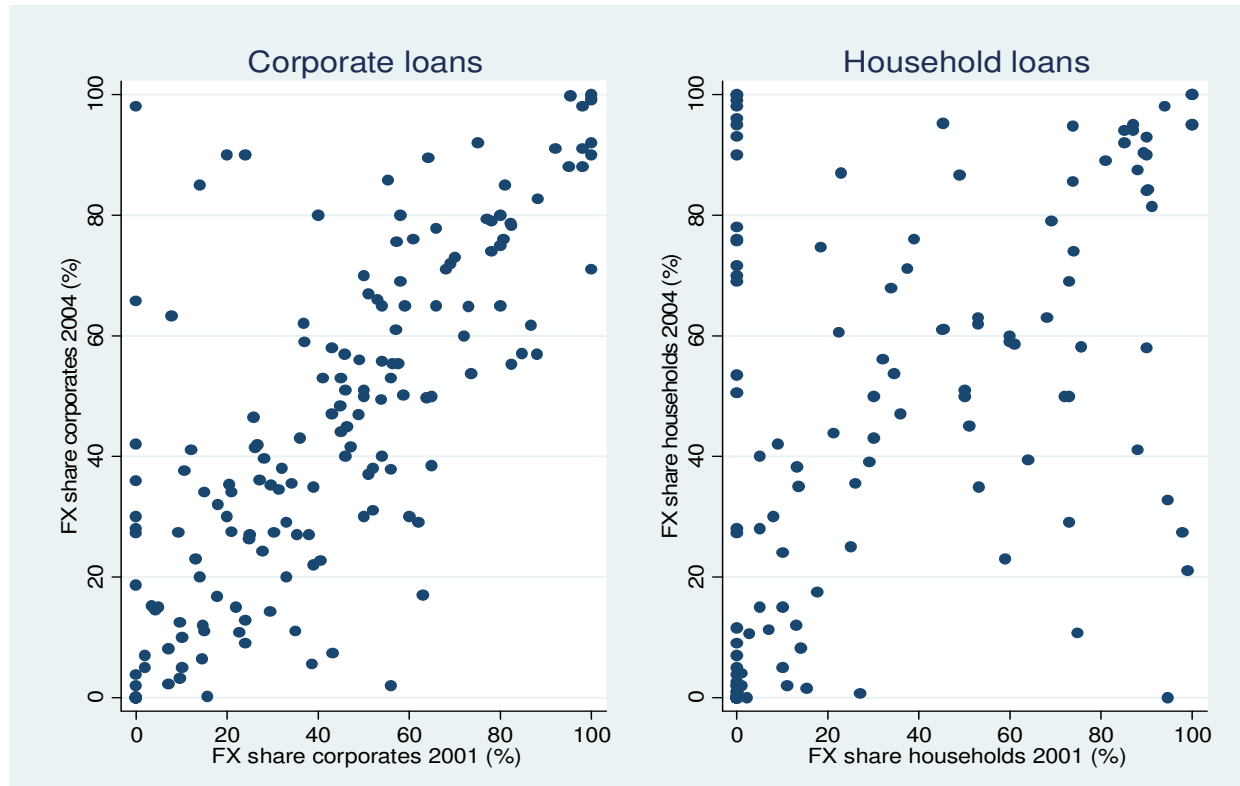
Figure 2. FX lending and bank funding in 2004

This figure plots *FX share corporates* and *FX share households* against *Wholesale funding* and *FX deposits.* All data refer to 2004. For comparability with Figure 1 we include only banks with observations for *FX share corporates* and *FX share households* in 2004 and 2001. Table 2 provides definitions and sources of all variables.
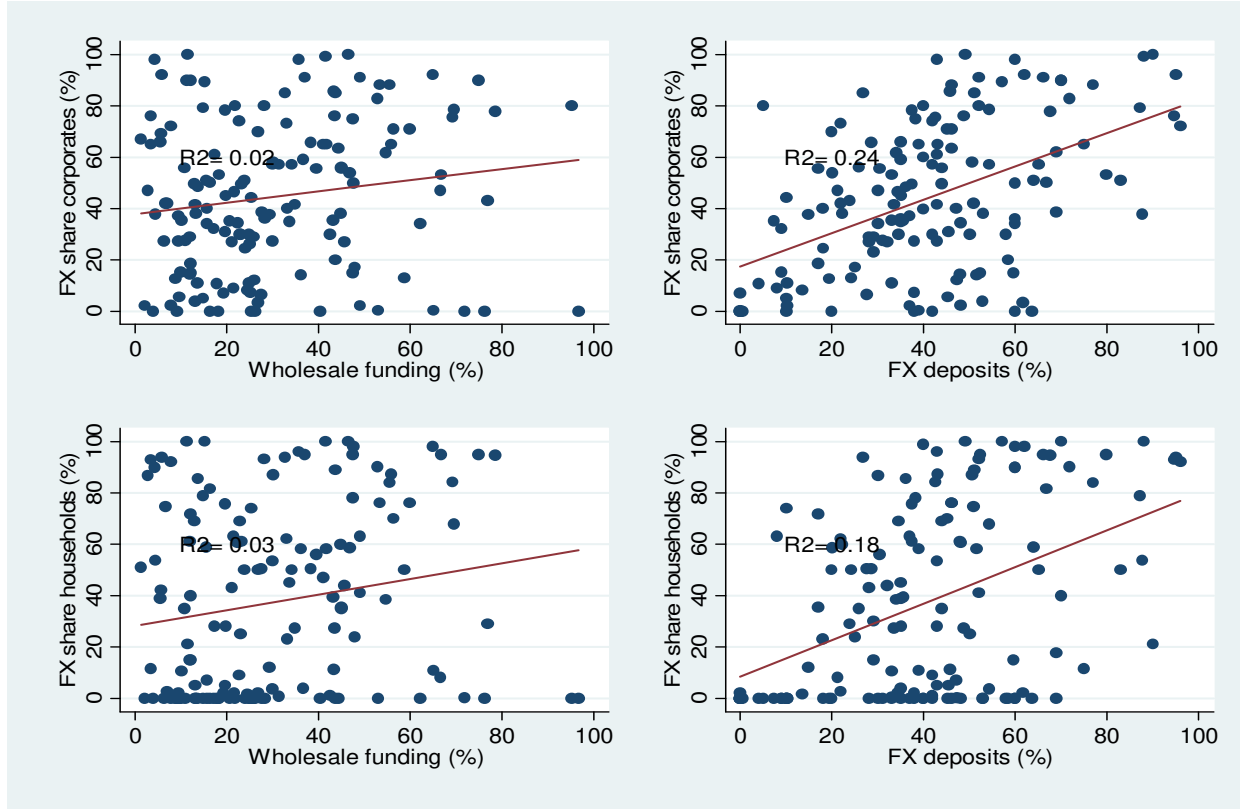
Table 1. Bank ownership by country

The table reports the number of banks in our sample by country and ownership type. Foreign greenfield banks are foreign banks established from scratch, whereas Foreign takeover banks are foreign banks that are the result of a takeover of a domestic bank by a foreign strategic investor. Foreign acquired banks are takeover banks that were acquired in 2000, 2001, or 2002. Table 2 provides definitions and sources of all variables.

	Total	Foreign greenfield	Foreign takeover	Domestic	Foreign acquired
Central Europe & Baltics (CEB)	*62*	*15*	*26*	*21*	*15*
Czech Republic	7	0	4	3	3
Estonia	5	0	4	1	1
Hungary	3	3	0	0	0
Latvia	16	1	6	9	2
Lithuania	5	0	3	2	2
Poland	13	7	4	2	3
Slovak Republic	6	3	3	0	2
Slovenia	7	1	2	4	2
South Eastern Europe (SEE)	*72*	*22*	*22*	*28*	*13*
Albania	4	3	1		1
Bosnia	11	3	4	4	2
Bulgaria	11	3	6	2	5
Croatia	11	4	1	6	1
Macedonia	6	0	2	4	2
Romania	11	5	5	1	2
Serbia	18	4	3	11	0
Commonwealth of Independent States (CIS)	59	7	3	49	0
Belarus	9	1	2	6	0
Kazakhstan	7	0	0	7	0
Moldova	8	0	1	7	0
Russia	27	3	0	24	0
Ukraine	8	3	0	5	0
Total	**193**	**44**	**51**	**98**	**28**

Table 2. Variable descriptions

This table presents definitions and sources of all variables used in our empirical analysis. BEPS is the EBRD Banking Environment and Performance Survey conducted in 2005. BankScope is Bureau van Dijk's BankScope database of bank balance sheet and income statement data. EBRD-TR is the EBRD Transition Report 2004. IMF-IFS are the International Financial Statistics provided by the International Monetary Fund.

Variable name	Periodicity	Description	Source
		Bank-level data (# banks = 193)	
FX share corporates	2001, 2004	Share of FX loans in all loans to corporations (%)	BEPS
FX share households	2001, 2004	Share of FX loans in all loans to households (%)	BEPS
FX growth corporates	2004	Growth of the volume of FX loans to corporations 2004 minus 2001 (%)	BEPS
FX growth households	2004	Growth of the volume of FX loans to households 2004 minus 2001 (%)	BEPS
Foreign greenfield	2004	1= bank is a newly established 'greenfield' foreign bank, 0= otherwise	BEPS, websites
Foreign takeover	2004	1= bank is a foreign bank resulting from a take-over, 0= otherwise	BEPS, websites
Domestic	2004	1= bank is domestically owned, 0=otherwise	BEPS, websites
Foreign held	2000-2004	1= if bank was foreign owned from 2000-2004, 0= bank was domestically owned from 2000-2004.	BEPS, websites
Foreign acquired	2000-2004	1= domestic bank was acquired by a foreign investor in 2000, 2001 or 2002, 0= domestic bank was not acquired in the period 2000-2004.	BEPS, websites
Assets	2001, 2004	Total assets (in log US dollars)	BankScope
Wholesale funding	2001, 2004	Non-customer liabilities as a share of total bank liabilities (%)	BankScope
FX deposits	2001, 2004	Share of FX denominated customer deposits in all customer deposits (%)	BEPS
Corporate deposits	2004	Share of customer deposits from corporates (%)	BEPS
Internal ratings	2004	Bank uses internal ratings approach for credit risk assessment (yes=1, no=0)	BEPS
		Country-level data (# countries = 20)	
Interest differential	2001-2004	Domestic Tbill or money market rate minus Eurepo rate (% p.a.)	IMF-IFS
Exrate volatility	2001-2004	Coefficient of variation of monthly changes in nominal exchange rate to the euro (%)	IMF-IFS
Interest advantage	2001-2004	*Interest differential* / (1 +*Exrate volatility*)	IMF-IFS
Inflation history	1994-2003	Mean annual cpi inflation rate over the period 1994-2003	EBRD-TR
EU accession	2001-2004	EU accession negotiations completed (yes=1, no=0)	EBRD-TR

Table 3. Descriptive statistics

This table provides summary statistics for the 2004 values and 2004-2001 differences of our bank-level and country-level variables. Region definitions CEB, SEE and CIS are in accordance with those listed in Table 1. Table 2 provides variable definitions and sources.

Panel A. Bank-level variables

Variable name	Obs	Mean	Std. Dev.	Min	Max	Greenfield	Takeover	Domestic	CEB	SEE	CIS
		Full sample summary statistics				Means by bank-ownership			Means by region		
Cross-sectional analysis: 2004											
FX share corporates	179	44.0	28.9	0	100	51.3	50.4	37.6	44.6	45.2	42.0
FX share households	174	38.0	36.1	0	100	45.7	36.1	35.5	32.0	36.1	46.1
Assets	187	20.0	1.6	16	24.1	20.1	20.7	19.7	20.9	19.5	19.8
Wholesale funding	187	31.9	22.2	1	99	44.0	28.6	27.8	34.4	27.8	34.0
FX deposits	176	41.7	23.6	0	99	43.0	37.2	43.4	34.9	49.3	39.8
Corporate deposits	177	45.1	24.7	0	100	49.5	39.0	46.1	43.4	43.2	49.4
Internal ratings	178	0.80	0.40	0	1	0.80	0.84	0.78	0.74	0.79	0.89
Panel analysis: 2004 minus 2001											
FX share corporates	166	2.5	20.4	-54	98	0.7	10.0	-0.1	5.3	4.2	-2.1
FX share households	158	9.8	32.4	-95	100	11.5	9.6	9.2	3.2	10.9	15.3
FX growth corporates	127	6.7	26.1	-1	270	12.6	8.2	3.1	3.6	14.0	3.2
FX growth households	77	4.7	5.9	-1	33	4.1	6.1	4.2	4.0	5.4	5.0
Assets	155	1.0	0.5	-0.7	2.9	1.1	1.0	1.0	1.0	1.0	1.1
Wholesale funding	155	3.0	15.3	-42	50	4.5	5.4	0.9	4.1	4.0	0.6
FX deposits	167	-4.1	16.0	-52	62	-3.4	-2.1	-5.5	-2.4	-4.2	-5.9

Panel B. Country-level variables

Variable name	Obs	Mean	Std. Dev.	Min	Max	CEB	SEE	CIS
		Full sample summary statistics				Means by region		
Country-level variables: 2001-2004 averages								
Interest differential	20	6.9	9.2	0.4	37.4	2.9	7.8	12.0
Exrate volatility	20	2.8	2.1	0.0	8.0	2.1	1.8	5.2
Interest advantage	20	1.7	1.5	0.1	4.8	0.9	2.5	1.6
Inflation history	20	60	93	2	371	11	42	165
EU accession	20	0.2	0.3	0	0.5	0.5	0	0

Table 4. FX lending in 2004

In this table the dependent variables are *FX share corporates* and *FX share households* in 2004. Models (1,6) report OLS estimates in which standard errors are adjusted for clustering by country. Models (2-5, 7-10) report IV estimates with robust standard errors in which *Wholesale funding* and *FX deposits* are instrumented with the variables *Internal ratings* and *Corporate deposits*. Models (5,10) include country fixed effects. Standard errors are reported in brackets. ***, **, * denote significance at the 0.01, 0.05 and 0.10-level. Tabel 2 provides the definitions and sources of all variables. Table A3 in the Annex provides diagnostic tests related to the instrumentation strategy.

Dependent variable	FX share corporates					FX share households				
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Foreign greenfield	0.982	16.010	17.18*	17.71*	16.680	0.909	-2.370	6.139	2.801	-15.980
	[8.907]	[9.839]	[10.35]	[10.24]	[16.27]	[9.954]	[10.99]	[10.55]	[10.50]	[20.87]
Foreign takeover	7.423	12.53**	12.73**	12.02**	15.550	1.224	3.559	11.000	5.832	-8.570
	[7.562]	[6.248]	[6.282]	[5.749]	[13.40]	[7.749]	[9.062]	[8.412]	[8.136]	[15.30]
Assets	1.236	1.196	0.055	0.057	1.288	2.107	3.346	1.760	2.366	1.931
	[2.221]	[1.712]	[1.704]	[1.690]	[2.289]	[2.546]	[2.113]	[1.950]	[1.857]	[2.852]
Wholesale funding	0.382**	-0.415	-0.365	-0.363	0.100	0.378**	0.390	0.207	0.334	0.442
	[0.143]	[0.485]	[0.467]	[0.464]	[0.504]	[0.161]	[0.558]	[0.483]	[0.494]	[0.672]
FX deposits	0.456***	0.735*	0.512	0.489	0.183	0.735***	1.329***	1.096***	1.071***	0.895
	[0.119]	[0.435]	[0.390]	[0.401]	[0.605]	[0.0713]	[0.471]	[0.362]	[0.370]	[0.636]
Interest differential			0.365					-0.422		
			[0.408]					[0.461]		
Exrate volatility			1.177					7.069***		
			[1.837]					[2.302]		
Interest advantage				1.219					-0.961	
				[1.619]					[1.896]	
Inflation history			0.0602*	0.0989***				0.045	0.119***	
			[0.0337]	[0.0280]				[0.0423]	[0.0313]	
EU accession			20.21*	22.18*				7.121	7.103	
			[11.86]	[12.14]				[14.18]	[15.17]	
Foreign*Interest advantage					-5.367					5.549
					[5.106]					[4.821]
Foreign*Inflation history					0.103					-0.057
					[0.0643]					[0.0668]
Foreign*EU accession					-12.740					30.280
					[33.21]					[35.60]
Method	OLS	IV	IV	IV	IV	OLS	IV	IV	IV	IV
Country fixed effects	no	no	no	no	yes	no	no	no	no	yes
R^2	0.53	0.06	0.20	0.18	0.50	0.24	0.11	0.33	0.27	0.53
# Banks	155	155	155	155	155	151	151	151	151	151
# countries	20	20	20	20	20	20	20	20	20	20

Table 5. Foreign ownership and changes in FX lending (2001-2004)

In this panel we examine the sample of banks that were either domestically owned or foreign owned during the entire period 2000-2004 and which report data on FX lending for 2001 and 2004. The dependent variables are the percentage point changes (2004 minus 2001) in either the share of FX lending (columns 1-4) or in the amount of FX lending (columns 5-8). All models report OLS estimates with country fixed effects. Standard errors are reported in brackets and are adjusted for clustering at the country level. ***, **, * denote significance at the 0.01, 0.05 and 0.10-level. Table 2 provides definitions and sources of all variables.

Dependent variable	FX share (2004 minus 2001)				FX growth			
	Corporates		Households		Corporates		Households	
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Foreign held	5.065	9.8	2.596	0.325	14.82	12.88	1.128	1.087
	[5.389]	[6.017]	[5.834]	[6.779]	[14.96]	[12.80]	[1.455]	[1.538]
Bank-level changes 2004-01:								
Assets		0.503		3.744				
		[2.822]		[11.53]				
Wholesale funding		0.0081		0.238		0.208		-0.0167
		[0.111]		[0.272]		[0.192]		[0.0257]
FX deposits		-0.0494		0.383		0.063		0.0409
		[0.152]		[0.253]		[0.108]		[0.0355]
Method	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Country fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
R^2	0.23	0.37	0.39	0.45	0.22	0.27	0.37	0.44
# Banks	135	106	126	99	102	96	62	58
# countries	20	20	20	20	20	20	14	14

Table 6. Foreign acquisition and changes in FX lending (2001-2004)

Panel A. OLS regressions

In this panel we compare the change in FX lending (2004 minus 2001) by domestic banks which were acquired in 2000, 2001 or 2002 to the change in FX lending by domestic banks that were not acquired. The dependent variables are percentage point changes in the share of FX lending (columns 1-4) or the growth (2004 minus 2001) of FX volume in % (columns 5-8). All models report OLS estimates with country fixed effects. Standard errors are reported in brackets and are adjusted for clustering at the country level. ***, **, * denote significance at the 0.01, 0.05 and 0.10-level. Table 2 provides definitions and sources of all variables.

Dependent variable	FX share *(2004 minus 2001)*				FX growth			
	Corporates		*Households*		*Corporates*		*Households*	
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Foreign acquired	-4.859	-5.388	2.229	-0.577	1.046	1.926	8.724**	9.831**
	[4.759]	[7.663]	[5.005]	[8.352]	[2.001]	[2.305]	[3.789]	[3.804]
Bank-level changes 2004-01:								
Assets		-2.155		-3.571				
		[3.479]		[7.537]				
Wholesale funding		0.151		0.195		-0.00955		-0.0565
		[0.175]		[0.271]		[0.0651]		[0.0609]
FX deposits		-0.0253		0.13		-0.0533**		0.0702*
		[0.239]		[0.134]		[0.0237]		[0.0339]
Method	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Country fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
R^2	0.21	0.32	0.42	0.52	0.19	0.28	0.44	0.75
# Banks	117	89	115	87	90	82	60	54
# countries	18	18	18	18	18	18	14	14

Panel B. Controlling for endogenous acquisition - Propensity score matching

In this panel we compare the change in FX lending (2004 minus 2001) by domestic banks which were acquired in 2000, 2001 or 2002 to the change in FX lending by domestic banks that were not acquired. The propensity to be acquired is estimated as a function of the banks *Asset volume* (log USD, in 2000) and a set of country dummies. The table reports treatment effects based on unmatched comparisons as well as nearest neigbour matching (with a common support requirement) and kernel matching. ***, ** denote significance at the 0.01 and 0.05-level.

FX share (2004 minus 2001)		Acquired	Not Acquired	Difference	S.E.	T-stat
Corporates	Unmatched	2.82	4.91	-2.09	5.29	-0.39
	Nearest neighbour matching	2.28	8.37	-6.09	9.78	-0.62
	Kernel matching	5.84	5.83	0.01	6.99	0.00
Households	Unmatched	2.52	1.83	0.69	6.23	0.11
	Nearest neighbour matching	3.02	5.71	-2.69	8.41	-0.32
	Kernel matching	0.64	8.70	-8.06	9.46	-0.85
FX growth		Acquired	Not Acquired	Difference	S.E.	T-stat
Corporates	Unmatched	4.96	3.71	1.25	1.51	0.83
	Nearest neighbour matching	4.09	2.76	1.33	1.68	0.79
	Kernel matching	5.63	3.69	1.95	2.16	0.9
Households	Unmatched	9.64	3.29	6.35	2.14	2.96***
	Nearest neighbour matching	9.64	3.38	6.26	3.23	1.94**
	Kernel matching	9.64	3.39	6.25	3.22	1.94**

Table 7. Convergence of FX lending

In Panel A *Low FX 2001 in country* is a dummy variable which is 1 if the bank had a lower fraction of FX loans to corporates (households) in 2001 than the country mean. In Panel B we analyze data for banks that are subsidiaries of a multinational bank. *Low FX 2001 in network* is a dummy variable which is 1 if the bank had a lower fraction of FX loans to corporates (households) in 2001 compared to the mean of all subsidiaries of the network it belongs to. All models report OLS estimates. Standard errors are reported in brackets and are adjusted for clustering by country. ***, **, * denote significance at the 0.01, 0.05 and 0.10-level. Table 2 provides the definitions and sources of all variables.

	Panel A. Within country convergence						Panel B. Within network convergence	
Dependent variable: *FX share* (2004 minus 2001)	*Corporates*			*Households*			*Corporates*	*Households*
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Low FX 2001 in country	14.17***	9.202*	14.68**	17.96**	12.080	19.37**		
	[3.633]	[5.239]	[6.416]	[6.989]	[9.585]	[7.717]		
Foreign held		7.086			-10.170			
		[4.449]			[11.59]			
Foreign held*Low FX 2001		7.679			21.240			
		[6.922]			[18.09]			
Foreign acquired			-8.720			12.030		
			[6.943]			[13.02]		
Foreign acquired*Low FX 2001			6.375			-17.670		
			[8.737]			[15.21]		
Low FX 2001 in network							26.29*	25.790
							[12.43]	[15.00]
Bank-level changes 2004-01:								
Assets	-0.121	-0.486	-0.398	4.115	1.467	-1.828	1.412	10.990
	[1.990]	[2.762]	[2.626]	[8.395]	[9.780]	[6.748]	[12.39]	[6.908]
Wholesale funding	0.125	0.017	0.126	0.212	0.370	0.167	0.630	0.427
	[0.101]	[0.0787]	[0.126]	[0.205]	[0.234]	[0.239]	[0.450]	[0.644]
FX deposits	-0.104	-0.102	-0.076	0.343	0.448	0.080	-0.167	0.719***
	[0.133]	[0.148]	[0.216]	[0.202]	[0.265]	[0.147]	[0.207]	[0.154]
Method	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Country fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
R^2	0.39	0.47	0.43	0.51	0.54	0.59	0.70	0.85
# Banks	130	106	89	123	99	87	39	37
# countries	20	20	18	20	20	18	17	17

Table A1. Aggregate FX lending in Emerging Europe: 2001-10

This table provides aggregated country-level data on FX lending for the years 2001, 2004, 2007 and 2010. Data source: BEPS, IMF Article IV reports and CEIC. Data for a number of Balkan countries are not comparable across BEPS and IMF statistics due to a different treatment of FX-linked loans and therefore not shown. The Slovak Republic joined the eurozone in 2009. n.a.: not available.

Year	2001	2004		2007	2010
Source	BEPS	BEPS	IMF	IMF	IMF
	(1)	(2a)	(2b)	(3)	(4)
Albania	0.83	0.80	0.70	0.71	0.68
Belarus	0.52	0.71	0.58	0.64	0.80
Bosnia and Herzegovina	n.a.	n.a.	n.a.	0.74	0.72
Bulgaria	0.25	0.37	0.48	0.50	0.61
Croatia	n.a.	n.a.	n.a.	0.60	0.73
Estonia	0.37	0.56	0.73	0.78	0.90
FYR Macedonia	n.a.	n.a.	n.a.	0.55	0.58
Hungary	0.20	0.22	0.32	0.53	0.63
Kazakhstan	0.62	0.51	0.52	0.43	0.42
Latvia	0.62	0.66	0.60	0.86	0.92
Lithuania	0.51	0.47	0.58	0.55	0.75
Moldova	0.28	0.24	0.40	0.44	0.42
Poland	0.30	0.27	0.24	0.25	0.33
Romania	0.55	0.69	0.60	0.54	0.63
Russia	0.38	0.33	0.26	0.23	0.22
Serbia	0.35	0.48	n.a.	0.78	0.80
Slovak Republic	0.07	0.09	0.14	0.16	n.a.
Ukraine	0.55	0.59	n.a.	0.50	0.47

Table A2. Pairwise correlations

This table provides pairwise correlations for the 2004 values and 2004-01 differences of our bank-level and country-level variables. Table 2 provides variable definitions and sources.

Panel A. Bank-level variables: 2004

		[1]	[2]	[3]	[4]	[5]	[6]	[7]
[1]	FX share corporates	1.00						
[2]	FX share households	0.60	1.00					
[3]	Assets	0.03	0.01	1.00				
[4]	Wholesale funding	0.16	0.13	0.05	1.00			
[5]	FX deposits	0.44	0.43	-0.14	-0.11	1.00		
[6]	Internal ratings	-0.08	-0.02	0.05	0.24	-0.10	1.00	
[7]	Corporate deposits	0.10	0.25	-0.17	0.06	0.29	-0.09	1.00

Panel B. Bank-level variables: 2004-2001 differences

		[1]	[2]	[3]	[4]	[5]	[6]	[7]
[1]	FX share corporates	1.00						
[2]	FX share households	0.27	1.00					
[3]	FX growth corporates	0.22	0.30	1.00				
[4]	FX growth households	0.00	0.58	0.29	1.00			
[5]	Assets	-0.02	0.11	0.32	0.50	1.00		
[6]	Wholesale funding	0.07	0.06	0.14	-0.07	0.20	1.00	
[7]	FX deposits	0.09	0.26	0.03	0.10	-0.03	-0.04	1.00

Panel C. Country-level variables: 2001-04 averages

		[1]	[2]	[3]	[4]	[5]
[1]	Interest rate differential	1.00				
[2]	Exrate volatility	0.70	1.00			
[3]	Interest advantage	0.74	0.20	1.00		
[4]	Inflation history	0.63	0.63	0.22	1.00	
[5]	EU accession	-0.36	-0.27	-0.40	-0.44	1.00

Table A3. Diagnostics of IV estimates in models 2 and 7 in Table 4

This table provides diagnostic tests related to the instrumentation strategy in Table 4. Columns (1) and (2) illustrate the absence of a statistically significant direct impact of the instruments *Corporate deposits* and *Internal ratings* on the share of FX lending. Columns (3) to (6) show the strong correlation between these two instruments and the endogenous variables *Wholesale funding* and *FX deposits*, respectively, in the first-stage regressions.

	Validity of Instruments			Strength of Instruments		
2nd stage dependent variable	FX share corporates	FX share households	FX share corporates		FX share households	
1st stage dependent variable			Wholesale funding	FX deposits	Wholesale funding	FX deposits
	(1)	(2)	(3)	(4)	(5)	(6)
Foreign greenfield	5.955	0.227	14.31***	2.750	15.50***	3.659
	[8.915]	[10.23]	[4.359]	[4.942]	[4.456]	[4.922]
Foreign takeover	12.93*	1.605	-1.028	-2.405	0.765	-3.095
	[6.784]	[7.529]	[3.566]	[4.320]	[3.604]	[4.239]
Assets	0.763	2.383	0.288	-1.531	0.149	-1.519
	[1.678]	[2.526]	[0.933]	[1.141]	[0.896]	[1.115]
Wholesale funding	0.316**	0.372**				
	[0.135]	[0.173]				
FX deposits	0.590***	0.694***				
	[0.0843]	[0.0843]				
Corporate deposits	0.0034	0.15	0.039	0.220**	0.050	0.235**
	[0.117]	[0.115]	[0.0744]	[0.0945]	[0.0783]	[0.0968]
Internal ratings	-8.567*	-1.925	11.26***	-2.350	10.82***	-3.326
	[4.885]	[4.964]	[3.346]	[4.826]	[3.354]	[4.798]
Method	OLS	OLS	2SLS	2SLS	2SLS	2SLS
Country fixed effects	no	no	no	no	no	no
R²	0.29	0.25	0.15	0.09	0.16	0.11
# Banks	155	151	155	155	151	151
F test of *Internal ratings* =0 and *Corporate deposits* =0 (p-value)	0.20	0.43	0.01	0.07	0.01	0.05
Kleibergen-Paap rk test (p-value)			0.04		0.01	