

Bonin, John P.; Louie, Dana

**Working Paper**

## Did foreign banks "cut and run" or stay committed to Emerging Europe during the crises?

BOFIT Discussion Papers, No. 31/2015

**Provided in Cooperation with:**

Bank of Finland, Helsinki

*Suggested Citation:* Bonin, John P.; Louie, Dana (2015) : Did foreign banks "cut and run" or stay committed to Emerging Europe during the crises?, BOFIT Discussion Papers, No. 31/2015, ISBN 978-952-323-071-2, Bank of Finland, Institute for Economics in Transition (BOFIT), Helsinki, <https://nbn-resolving.de/urn:nbn:fi:bof-201511231445>

This Version is available at:

<https://hdl.handle.net/10419/212841>

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John P. Bonin and Dana Louie

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Bank of Finland, BOFIT  
Institute for Economies in Transition

BOFIT Discussion Papers  
Editor-in-Chief Laura Solanko

BOFIT Discussion Papers 31/2015  
4.11.2015

John P. Bonin and Dana Louie: Did foreign banks “cut and run” or  
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ISBN 978-952-323-071-2  
ISSN 1456-5889 (online)

This paper can be downloaded without charge from <http://www.bof.fi/bofit>.

Suomen Pankki  
Helsinki 2015

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## Did foreign banks “cut and run” or stay committed to Emerging Europe during the crises?

### Abstract

Our objective is to examine empirically the behavior of foreign banks regarding real loan growth during a financial crisis for a set of countries in which these banks dominate the banking sectors due primarily to having taken over large existing former state-owned banks. The eight countries are among the most developed in Emerging Europe, their banking sectors having been modernized by the beginning of the time period. We consider a data period that includes an initial credit boom (2004 – 2007) followed by the global financial crisis (2008 & 2009) and the onset of the Eurozone crisis (2010). Our main innovations with respect to the existing literature on banking during the financial crisis are to include explicit consideration of exchange rate dynamics and to separate foreign banks into two categories, namely, subsidiaries of the Big 6 European MNBs and all other foreign-controlled banks. Our results show that bank lending was impacted adversely by the crisis but that the two types of foreign banks behaved differently. The Big 6 banks remained committed to the region in that their lending behavior was not different from that of domestic banks corroborating the notion that these countries are a “second home market” for these banks. Contrariwise, the other foreign banks were primarily responsible for fueling the credit boom prior to the crisis but then “cut and ran” by decreasing their lending appreciably during the crisis. Our results also indicate different bank behavior in countries with flexible exchange rate regimes from those in the Eurozone. Hence, we conclude that both innovations matter in empirical work on bank behavior during a crisis in the region and may, by extension, be relevant to other small countries in which banking sectors are dominated by foreign financial institutions.

JEL Codes: P34, G01, G15

Keywords: foreign bank lending, financial crisis, multinational banks, Emerging Europe

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We are indebted to Bob Cull and Sole Martinez for sharing their data with us. We have benefitted from helpful comments and suggestions by participants in an Economics Department summer workshop at Wesleyan University (August 2015) and at the 5th Annual CInSt Banking Workshop at the National Research University Higher School of Economics in Moscow, Russia (October 2015). We thank Marko Kosak for his thoughtful suggestions and close read of a preliminary draft. We express our appreciation for the financial support provided by Wesleyan University to the Quantitative Analysis Center Summer Program during which this work was initiated in 2013.

## I Not all foreign banks are the same

The European countries that either emerged from the shadow of the Warsaw Pact after the fall of the Berlin Wall or were created from provinces seceding from the Yugoslav Federation looked westward to the European Union (EU) with aspirations to become members as quickly as possible. A crucial aspect of this integration would be the development of modern financial systems from banking sectors that had been subservient to the government planning bureaucracy in many of the countries. Over approximately a decade, most of the state-owned banks in the region, which is commonly referred to as Central, Eastern, and Southeastern Europe (CESE) by the IMF, were privatized eventually to mainly majority foreign financial institutions. In addition, foreign banks set up greenfield operations in these countries and new domestic banks were born as entry requirements were relaxed to engender competition at the beginning of the economic transformation. Foreign banks brought expertise and technology to a backward sector in need of rapid modernization. At the beginning of the new millennium, foreign banks dominated the banking sectors of most CESE countries having asset shares as a group of over 40% in all but one of the eleven countries that would become part of the EU in the subsequent decade. Indeed, foreign banks had assets shares of over 65% in seven of these countries by 2000.<sup>1</sup>

Foreign dominance of the banking sectors is not the only special characteristic of these eleven countries. Due partly to mergers and acquisitions among parent banks, the landscape became dominated by seven multinational European banks. Swedbank is the dominant foreign bank in all three Baltic countries that are now members of the EU. Six banks, namely Raiffeisen and Erste (Austria), Intesa Sanpaolo and UniCredit (Italy), Societe Generale (France) and KBC (Belgium), are active in the other eight new EU member countries. Bonin (2010) and Epstein (2014) argue that these six banks treat the region as a second home market having staked reputational capital on the success of their subsidiaries in the host countries. This commitment to the region was tested recently during both the global financial crisis (GFC) and the Eurozone crises (EZC). The reaction of these banks to both crises provides important evidence for the general discussion of the net benefit of foreign takeover of banking sectors in small countries.<sup>2</sup>

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<sup>1</sup> Bonin, Hasan, and Wachtel (2015) provides an overview of this development with the relevant data on p.968.

<sup>2</sup> The dominance of Swedbank in the Baltic countries makes these three countries, Estonia, Latvia and Lithuania, different enough for us to exclude them from consideration in this paper. In our opinion, these countries should be treated as a separate group (see Bonin (2010) for further discussion of this point).

The empirical literature treats all foreign banks in the region alike by incorporating them into a dummy variable for banks with controlling foreign ownership. In this paper, we recognize the special character of the six multinational European banks (Big 6) operating in some or all eight new EU member countries (EU 8), namely, Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Slovakia, and Slovenia. Our focus is on the time period immediately preceding the GFC through the onset of the EZC in 2010. We consider three sub-periods: first a credit boom that continues from 2004 to 2007 in all countries, followed by the GFC in 2008 and 2009, and finally the initial effects of the EZC in 2010. The credit boom was essentially fueled by all banks’ desire to take advantage of the nascent and profitable retail credit markets in these countries, including home mortgage business. Much of the funding for this lending came from wholesale markets or through the internal capital markets of the large banks. The GFC provided a stress test for this business model. In addition, the EU 8 were buffeted by a second shock when the Greek crisis exploded in 2010 leading to the EZC. Empirical work attempting to discern the role played by foreign banks in the region during the crisis period basically concluded that foreign banks reduced lending during crisis years more than their domestic counterparts. However, by failing to distinguish between the Big 6, which as a group were the dominant foreign presence in most countries, and other foreign banks, in particular Greek banks that were active in the southern countries, the literature conflates two different business models.

For the most part, the empirical literature uses bank-level data from Bank Scope denominated usually in U.S. dollars.<sup>3</sup> Normally this would not be problematic but this time period has a distinct characteristic regarding exchange rate regimes and dynamics. Throughout the period, Slovenia is a member of the Eurozone and Bulgaria has a currency board using a fixed peg to the euro. In addition, Slovakia joins the Eurozone in 2009. Complicating the problem of different exchange rate regimes is the dynamics of the exchange rates in the remaining five (plus) countries operating under flexible exchange rate regimes. For most of the pre-crisis period through 2008, the currencies of these countries were appreciating with respect to the euro whereas, in 2009, all countries depreciated their currency in some cases dramatically. Ignoring the ubiquitous currency depreciation in 2009 and, of lesser importance, the euro/dollar cross rate movements may omit an important aspect of bank lending

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<sup>3</sup> Data in euros are also available from BankScope but the publication uses U.S. dollars primarily for comparability across banking sectors throughout the world.

in the data. Hence, we convert all bank lending data to domestic currency values and use the real (inflation-adjusted) growth of lending in domestic currency as our variable of interest.

These two innovations allow us to obtain results different from those in the existing literature. Most importantly, we provide evidence that the Big 6 banks maintained their commitment to their second home market during both crises. Moreover, we find that other foreign banks did grow lending significantly more than their domestic counterparts during the boom period but then also did “cut and run” by reducing lending considerably during the crises. Thus, these foreign banks exacerbated the business cycle in their host countries. Our results also indicate that the banking sectors in these countries behave as would be expected in developed market economies in that bank lending is strongly procyclical. In addition, we find that the growth of bank lending increases as the domestic currency depreciates.<sup>4</sup> With respect to the impact of the crises, we find that higher bank capitalization tends to buoy up lending and that wholesale funding has a negative impact on lending in the initial year of the EZC. Finally, we find preliminary evidence that the two crises are different with regard to bank lending in that bank size has a positive impact on lending in the first year of the GFC but a negative effect at the onset of the EZC.

The remainder of the paper is organized as follows. The next section provides an overview of the relevant empirical literature. Section three discusses the data set, presents descriptive statistics and provides information about real loan and bank ownership growth by country. The fourth section presents the model specification and the basic regression results. Section five concludes with a summary of the salient results. Two appendices contain supplementary empirical work including, including several robustness checks, along with a figure depicting the dynamics of bank lending over the period.

## II The literature

Our review of the literature is selective and based on three criteria. First, we wish to identify the key bank explanatory variables to include in our empirical specification. Basically, these turn out to be bank size (assets), capitalization of the bank (equity/assets), a funding measure taken as the loan to customer-deposit ratio ( $L/D$ ), and a measure of bank profitability given by the return on average assets (ROAA). Second, we wish to motivate our inclusion of the

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<sup>4</sup> In countries in which a considerable portion of bank lending is denominated in foreign exchange, this result is due partially to re-evaluation of the loans in domestic currency.

exchange rate dynamics by noting the role played by lending denominated in foreign exchange (FX) in many countries. Third, we want to justify our separation of foreign banks subsidiaries into the Big 6 and other foreign banks by identifying considerable differences in their business models. To do so, we make a somewhat artificial division of the literature focusing on three categories: papers dealing mainly with the pre-crisis period, those considering issues relevant to the crisis using data from some crisis years as a segue and, finally, work specifically analyzing the impact of the crisis on bank lending in the region. The coverage of these papers ranges from work on a single country (Hungary) to multi-country analyses using data from up to 137 countries but always including countries from the region.

In the first pre-crisis category, Arvai, Driessen and Otker-Robe (2009) use data on cross-border positions from the Bank of International Settlements (BIS) from 1998 to 2007 to study regional contagion triggered by a common lender. Their work confirms our claim that the Baltic countries constitute a separate group in that any contagion in these countries would depend solely on Swedbank. In addition, the authors find that the Big 6 subsidiaries in the region have a greater share in bank earnings than in banking assets. This result highlights the economic importance of the second home market for these parent banks and provides support for our conjecture about their long-term commitment. Maechler & Ong (2009) study the currency composition and term structure of lending to households in thirteen CESE countries. Using an indirect analysis of the data, they show that contagion risk depends on the reliance of the banks in the host country on short-term (non-parent) inter-bank liquidity. They conclude that banking systems in the Baltic and Southeastern European (SEE) sub-regions will be most susceptible to contagion in a crisis. In contrast, banks in the Central East European (CEE) sub-region rely more on local funding from customer deposits and, thus, they argue are less prone to contagion. Their work confirms our Baltic separation and indicates the importance of including a variable to capture the funding structure of individual banks in empirical work.

De Haas and van Lelyveld (2010) use data on the intra-group ownership structure of 45 large multinational banks (MNBs) from 1992 to 2004 to study internal capital markets. In their data set, 83% of the parent banks and 73% of the subsidiaries are in Europe with some of the latter in CESE. They find that greenfields are closely integrated with their parents and pursue a portfolio strategy in which they allocate funds across subsidiaries based on relative risk/return tradeoffs. By contrast, takeovers by foreign banks of domestic banks are more independent of their parent and focus on host-country needs. These authors also

find that MNB subsidiaries with strong parents extend credit faster and that foreign banks of all types maintain lending during host-country crises. Since the largest of the foreign banks in CESE were involved in the privatization of formerly large state-owned banks and thus belong to the takeover category, this paper suggests the importance of differentiating the Big 6 from other foreign banks. Brown and De Haas (2012) use data from a European Bank for Reconstruction and Development (EBRD) survey (BEPs) of 193 banks in 2005 for twenty countries including those in the CESE region. They find that foreign banks made more loans denominated in foreign exchange than domestic banks but to corporate clients mainly. They also provide evidence that the foreign acquisition of a domestic bank led to faster growth of household lending. Hence, their results indicate the importance of considering exchange rate movements in analyzing the credit boom and suggest the increasing importance of foreign banks in retail banking.

Moving to the literature that includes data from the crisis period, Popov & Udell (2012) use data from two EBRD (BEEPs) surveys of small and medium enterprises (SMEs) in CESE taken in 2005 and 2008. Studying the other side of the lending market, they find that SMEs are more credit-constrained in regions having banks with less equity and that this result is exacerbated in regions having foreign-bank subsidiaries that are undercapitalized. Hence, their work on the demand side of lending indicates the importance of including a bank-level capitalization measure in our empirical work. Beck, Degryse, De Haas and van Horen (2014) combine data from several EBRD surveys, namely the two BEEPs surveys mentioned above and two BEPs (bank) surveys (2005) & (2008/09) to examine the impact of relationship lending over the business cycle in twenty-one countries including CESE. They conclude that relationship lending alleviates credit constraints for SMEs during the cyclical downturn but not during the boom period. They also find substantial variation among both domestic and foreign-owned banks in their use of relationship lending indicating that the traditional dichotomy suggesting that domestic banks engage in relationship banking while foreign banks use transaction banking may not hold in the region. Their work corroborates the point that the Baltic countries should be treated as a separate group and that takeover banks pursue a different business strategy. Ongena and Schindele (2014) use data for Hungary only from 2005 to 2011 to attempt to identify transmission channels during the crisis. Their main result indicates that less-capitalized banks take on more risk by increasing FX lending when interest rates are lower in the home country. This paper motivates our inclusion of country fixed effects in the empirical specification.

Turning to the empirical literature that examines directly the impact of the GFC on bank lending, Claessens and van Horen (2014) study banks in 137 countries from 1995 to 2009 to examine the impact of the global financial crisis on bank lending. They conclude that foreign banks decrease lending more on average than do domestic banks during the GFC but not if they have market dominance in the host country, suggesting again the different behavior of takeover banks. In addition, subsidiary balance sheet differences (capital, liquidity) are shown to be important determinants of this decrease in lending. De Haas and Van Lelyveld (2014) study the lending behavior of 48 multinational banks (MNBs) from 1992 to 2009 and conclude that parent banks were not a significant source of strength for their local subsidiaries in 2008/09. When they control for bank characteristics, the authors find that MNB subsidiaries decreased credit growth three times faster than domestic banks in the GFC. Their overarching conclusion is that MNBs mitigate domestic financial shocks but transmit foreign shocks and, in the process, exacerbate shocks to the real economy in the host country during the GFC. The authors also find some evidence that weak parents may use internal capital market to repatriate funds. Treating the Big 6 takeover banks separately, including bank capitalization as an explanatory variable interacted with crisis year dummies, and taking account of exchange rate dynamics are the lessons from this group of papers.

Focusing on the CESE countries, Vujic (2015) examines internal capital markets from BIS data for nineteen countries during a short period from 2009 to 2011. The author finds that foreign banks with higher sovereign risk exposure to distressed countries curtailed intragroup funding to subsidiaries in CESE indicating a possible transmission channel for the Eurozone crisis. De Haas, Korniyenko, Pivovarsky and Tsankova (2014) study banking in sixteen CESE countries to examine the impact of a financial agreement coordinated by the EBRD and referred to as the Vienna Initiative (VI). The VI was designed to solve a perceived coordination problem in the region suggesting that foreign banks would be tempted to act individually and “cut and run” but that such behavior could be avoided by coordinated group action. International financial institutions (IMF and EBRD) and the European Commission (EC) were the organizers. Interestingly, the impetus for the VI came initially from the Big 6 banks in that they urged coordinated intervention in a letter to the EC sent in November 2008. Ultimately, five countries and seventeen banking groups signed on; of the EU 8, only Hungary and Romania signed commitment letters (May 2009). Whether the VI was a successful instrument in solving a coordination problem or used as a vehicle allowing the Big 6 to act strategically is debatable.

Using data from 1999 to 2011, De Haas *et al.* (2014) argue the former. These authors show evidence that foreign subsidiaries in general curtailed credit more aggressively than domestic banks in 2008/09. However, they find that banks participating in the VI were relatively stable lenders in both VI-participating and non-VI countries during the crisis period. Hence, they conclude that the VI succeeded in protecting the participating countries without generating any negative externalities on non-participating countries. Epstein (2013) takes a contrarian view of the VI based on her extensive interview work probing the business strategies of banks in the region. She argues that the business model of the Big 6 focuses on deep financial integration in the region and leads to a strong commitment to these clients. Hence, she finds only a very modest retrenchment occurs in the “second home market” for the Big 6 during the crisis due to their business model and independent of the VI. These papers underscore the importance of treating the Big 6 separately and including country fixed effects.

In a paper directly related to our work, Cull & Martinez Peria (2013) compare bank lending in these same eight countries (EU 8) with bank lending in Latin American countries from 2004 to 2009.<sup>5</sup> Some Latin American countries also have extremely high concentration of foreign ownership of their banking sectors. In addition to a foreign-bank dummy, these authors include a dummy variable for government-owned banks in their empirical specifications due to relatively more prevalence of such banks in Latin America. We choose to exclude all government-owned banks (e.g., ExIm banks) from the data set because the commercial banking sector in the EU 8 is almost entirely private (foreign or domestic) throughout this period.<sup>6</sup> Regarding the EU 8, these authors conclude that foreign banks did fuel a corporate credit boom. However, when using total loan growth denominated either in U.S. dollars or in local currency, they find no significant direct ownership differences but considerable reductions in total lending in both crisis years (2008 and 2009). The authors do find some evidence that foreign banks reduced lending more than their domestic counterparts during the crisis period, especially in 2009, based on interaction terms. Moreover, they find no appreciable difference in the coefficients between regressions in which bank-level variables are denominated in U.S. dollars or domestic currency. Finally, these authors find some evidence that larger banks (which would include the Big 6) tended to stabilize lending in 2009. Our work differs in that we add an additional year (2010) to the data, include demand-

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<sup>5</sup> We are extremely indebted to these authors for sharing their data on the EU 8, including the additional year of 2010, with us.

<sup>6</sup> We discuss this issue more thoroughly in the next section when we describe the data cleaning.

side country variables (e.g., real growth of GDP), consider explicitly exchange rate dynamics, and separate out the Big 6 banks from other foreign banks as an ownership category. Otherwise, our empirical specification follows theirs as closely as possible so that we can highlight the impact that these differences have on the empirical results.

### III Data and empirical specifications

Our data set includes macroeconomic country data and bank-level data. The country data are from Eurostats and the bank data are from BankScope. From 2004 to 2010, the total number of bank observations is initially 1,791 and the total number of banks is 256. Once we eliminate observations in which any of our chosen variables is missing, we retain 1,061 observations remaining. Following Cull and Martinez Peria, we trim the data set for extreme outliers in the dependent variable and in some of the explanatory variables. By eliminating the top 2.4% and the bottom 0.05% of the distribution of the dependent variable (26 observations), we retain 1,035 observations. Trimming extreme values of three explanatory variables, namely, the loans-to-deposit ratio, the equity ratio, and the return on average assets, we eliminate an additional 39 observations for a remaining total of 996. At this point, we clean the data by removing observations for all public banks, including Export-Import banks and Development banks, of which there are 74 observations in the data. Finally, we eliminate an additional 54 observations for institutions that are not full-service commercial banks, namely building societies and car financing companies. Such trimming and cleaning leaves us with a data set containing 868 bank-level observations from 194 commercial (non-public) banks.

Table A1 of Appendix I contains the variables with their definitions and descriptive statistics. As is evident from the minima and maxima, we do retain some relatively extreme values for the dependent variable as well as for the trimmed explanatory variables. The average annual real growth of lending for banks during the data period is almost 16%. As the table reports, the average ratio of loans to deposits for banks exceeds one indicating that, overall, banks in the region use some wholesale funding to support their lending activities. The country statistics indicate that, on average, exchange rates appreciate during the period, inflation is slightly over 4% per annum and real GDP growth is almost 3% per year in the region. To attempt to control for institutional aspects that may vary across countries, e.g.,

regulatory differences, we include country fixed effects in all empirical specifications.<sup>7</sup> With respect to bank ownership, 24% of our observations by count are Big 6 banks, 40% are other foreign banks and 36% are domestic banks. In our empirical specifications, domestic banks will be the omitted ownership category.<sup>8</sup>

Table A2 contains information about market shares by bank ownership category. As is evident, variation across countries is considerable and market shares by ownership category change considerably in some countries over the data period. In Romania, the Big 6 lose 13.3% market share with domestic banks increasing market share by 10% and the remaining increase of 3.3% taken by other foreign banks. Overall, the Big 6 increase market share in Slovakia (6.3%), Bulgaria (6.2% and mainly at the expense of domestic banks), Poland (3.8%) and Hungary (2.7%) from 2005 to 2010. Domestic banks also increase market share in Slovakia by 3.5% so that the market share of other foreign banks decreases by 9.7% in that country. Other foreign banks increase their market share considerably in Slovenia (7%) at the expense of the Big 6 (decrease by 4.6%) and domestic banks (decrease by 2.4%). However, the market share of other foreign banks falls in both Hungary (4.1%) and Poland (2.9%). Taken together with the precipitous decline in Slovakia and the increases in Slovenia and Romania, these changes indicate a movement out of the northern tier countries and into the southern tier countries by foreign banks that are not part of the Big 6 group.

Figure 1 in Appendix II depicts inflation-adjusted loan growth in the domestic currency by country from 2005 to 2010. Bank lending grows robustly up to 2007 in all eight countries with some sharp country spikes (e.g., Romania and Croatia in 2006 and Bulgaria in 2007). In 2008 (GFC), lending decelerates considerably and even becomes negative in some countries (sharply in the Czech Republic). In all countries, bank lending spikes upward in 2009, particularly those having flexible exchange rate regimes, (strongly in Poland and the Czech Republic) but converges to virtually no (or mildly negative) growth in 2010 at the onset of the EZC.<sup>9</sup>

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<sup>7</sup> Since seven of the eight countries are either in the EU or join the EU during the data period, we expect most institutions to conform to EU requirements. Croatia joins the EU after 2010 but it is in the process of accession during the data period so that its institutions should be broadly comparable to the others. Nonetheless, country differences may persist, e.g., in implementation, so we include country fixed effects in all empirical specifications.

<sup>8</sup> Unlike in the earlier period, the controlling ownership of banks does not change appreciably across time in the region after 2004. The privatization programs are virtually completed. In a few cases, we have coded non-privatized banks as domestic, e. g., PKO BP in Poland, because their governing boards are controlled by domestic (non-governmental) entities. Full coding information for all banks in the sample is available from the authors.

<sup>9</sup> The pattern across countries is quite similar when we plot loan growth in US dollars. This figure is available from the authors upon request.

Table A3 in Appendix I presents the simple correlation coefficients for all variables. Using only these measures, loan growth is positively related to a bank’s capitalization (equity ratio) and the country’s depreciation of its currency but negatively related to a bank’s size (assets) and its profitability (ROAA). Regarding differences across ownership categories, the Big 6 tend to be larger, less-capitalized and more profitable than domestic banks (omitted category). The non-Big 6 foreign banks tend to be more capitalized, more reliant on wholesale funding and less profitable than domestic banks. Regarding the macroeconomic variables, GDP growth is positively related to inflation but negatively related to depreciation whereas the pass-through of inflation to depreciation is positive. The coefficients for bank characteristics suggest that bigger banks are less capitalized and more profitable whereas banks using more wholesale funding tend to be more capitalized and less profitable. Such simple correlations help inform our prior expectations for the signs of the explanatory variables in the regression specifications.

All regressions have real loan growth in the domestic currency as the dependent variable and use pooled ordinary least squares with country fixed effects and clustered robust standard errors. Regarding the country-specific explanatory variables, we expect bank lending growth to be positively related to real GDP growth and inflation but we are agnostic about the direct impact of currency depreciation. With respect to the individual bank characteristics, we expect loan growth to be positively related to size (logged assets), capitalization (equity to assets) but we are agnostic about the direct impact of funding (loan/deposits) and profitability (ROAA).

## IV Empirical results

The following two tables (1 and 2) present the results of building the benchmark regression, i.e., Model 5. The benchmark specification contains interaction terms between the bank ownership and characteristic variables and the three crisis year dummies (2008, 2009, and 2010). The most parsimonious specification, Model 1, contains no interaction terms. In this model, loan growth is related positively to GDP growth and currency depreciation along with bank profitability but negatively related to inflation and bank size (see column 1 of Tables 1 and 2).

Table 1 Regression coefficients

	(Model 1)	(Model 2)	(Model 3)	(Model 4)	(Model 5)
Other foreign	2.164	0.983	7.117**	6.649**	6.824**
Big 6	3.103	0.131	1.642	-0.179	1.27
GDP growth (%)	2.179***	3.974***	4.104***	5.006***	5.504***
Inflation (%)	-2.136***	0.535	0.812	1.372*	3.694***
Depreciation (%)	1.409***	0.613**	0.680***	0.492*	2.613***
Crisis2008		-23.19***	-24.30***	-49.85***	-68.06***
Crisis2009		30.49***	39.99***	64.92***	57.87***
Crisis2010		-6.937*	2.447	34.50*	35.84*
Foreign * crisis2008			-1.496	-2.768	-5.937
Foreign * crisis2009			-18.04***	-16.97***	-14.51**
Foreign * crisis2010			-18.61***	-16.32***	-17.47***
Big 6 * crisis2008			3.875	3.956	2.672
Big 6 * crisis2009			-7.487	-2.77	-7.333
Big 6 * crisis2010			-7.336*	-0.929	-3.753
Depreciation * 2008					-2.646***
Depreciation * 2009					-3.714***
Depreciation * 2010					0.74
With bank characteristic – crisis year interactions	No	No	No	Yes	Yes
Observations	868	868	868	868	868
Adjusted R-squared	0.196	0.325	0.338	0.346	0.385

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Table 2 Bank characteristics and interaction coefficients

	(Model 1)	(Model 4)	(Model 5)
Assets (log)	−3.471***	−0.477	−0.783
Equity ratio (%) (lagged)	−0.302	−0.369	−0.389*
Loans/Deposits (lagged)	−0.0805	3.191	2.68
ROAA (%) (lagged)	2.062**	0.322	−0.00106
Assets * 2008		1.397*	1.793*
Assets * 2009		−1.276	0.00688
Assets * 2010		−2.113**	−1.956*
Equity ratio * 2008		0.944***	1.163***
Equity ratio * 2009		0.639	0.508
Equity ratio * 2010		1.025**	1.215***
Loans/Deposits * 2008		−2.658	−1.887
Loans/Deposits * 2009		−1.461	0.198
Loans/Deposits * 2010		−5.150*	−4.634*
ROAA * 2008		−2.880	−4.118*
ROAA * 2009		0.221	1.480
ROAA * 2010		−0.466	0.183
Observations	868	868	868
Adjusted R-squared	0.196	0.346	0.385

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

The strong pro-cyclicality of bank lending and the positive impact of currency depreciation on bank lending throughout the data period are robust to all specifications. Model 2 introduces dummy variables for the crisis years; the coefficients replicate the patterns in Figure 1 in Appendix II indicating that loan growth is negatively impacted in 2008 and 2010 but positive supported in 2009. Notably, in these two models, there is no statistically discernible difference between foreign banks of any kind and domestic banks regarding loan growth. Model 3 introduces interaction terms between the crisis years and ownership categories; evidence of different behavior by non-Big 6 foreign banks emerges. First, the coefficient on the dummy for these other foreign banks indicates that they grew lending more than their domestic counterparts throughout the period before taking account of the crises years. Second, the interaction terms indicate that these other foreign banks did cut and run as they decreased lending considerably in 2009 and 2010 when the interaction term is included with the dummy. By contrast, the Big 6 maintained their commitment to the region for the most

part with some suggestion that the EZC in 2010 may have led to less lending. The first result is robust to further different specifications suggesting that these other foreign banks played a major role in the credit boom but withdrew to a considerable extent from the region during the crisis periods.

Model 4 introduces interaction terms between bank characteristics and the crisis-year dummies. Notably, not one of the individual bank characteristics reported in Table 2 is statistically significant unlike in Model 1. However, the interaction terms suggest that bank size had a somewhat positive impact in 2008 but a negative impact in 2010 whereas bank capitalization had a positive impact on lending in both of these years. In addition, wholesale funding (a higher loan-to-deposit ratio) impacted bank lending negatively in 2010. Notably, once these interaction terms are taken into account, the Big 6 interaction in 2010 is no longer statistically significant. These results corroborate the commitment of the Big 6 to the region in both crises and provide some suggestive evidence that the two crises had a differential impact on loan growth.

Model 5, the benchmark, incorporates a set of additional interaction terms between currency depreciation and the crisis-year dummies. From Table 1, the coefficients of these interactions are negative and strongly statistically significant for 2008 (appreciation) and 2009 (depreciation). Noting that the coefficient for depreciation is positive, strongly statistically significant, and of comparable magnitude to the interaction coefficient for 2008, we conclude that appreciation had a neutral impact on loan growth at the beginning of the GFC. In addition, the overall positive impact of depreciation of the currency on bank lending was attenuated in 2009 as the interaction term indicates. The other interaction terms in Table 2 are virtually the same as in Model 4 except that profitability becomes negatively related to bank lending in 2008. Notably, the individual coefficients for the bank characteristics in Table 2 are not robust to this change in specification as capitalization becomes mildly significant and negative. We conclude that not including interaction terms for the impact of currency depreciation during the crisis years generates omitted variable bias regarding the coefficients related to bank characteristics.<sup>10</sup>

To summarize our general results, non-Big 6 (other) foreign banks lend more than all other banks during the entire period but “cut and run” during the crises while the Big 6 maintain their commitment to their “second home market” in both crises. Bank loan growth

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<sup>10</sup> We ran all specifications with loan growth denominated in US dollars as the dependent variable and obtained basically consistent results with those reported. These results are available upon request from the authors.

is strongly pro-cyclical in the region, indicating that the banking sectors in these countries operate as expected. However, we find that bank lending is impacted negatively by the currency appreciation throughout most of the period. The crisis years are idiosyncratic in that loan growth is considerably below average in 2008 but considerably above average in 2009. We find weaker evidence that loan growth is above average in 2010 after taking account of other correlates and interactions, especially the withdrawal of lending from non-Big 6 foreign banks. Bank capitalization tends to buoy up lending during the crises but bank size has a different impact on lending growth in 2008 (positive) than in 2010 (negative). Wholesale funding has a negative impact on lending but only in 2010. Hence, we find suggestive evidence that the two crises may impact bank lending in the region differently and should, thus, be considered separately.

To check for robustness, we include the lagged dependent variable in a specification equivalent to Model 5 and report the results in Table A4 of Appendix I. The coefficient on the lagged variable is not significant and, with few exceptions, the results for the benchmark specification are robust. The significance of the coefficients for inflation, for the last two crisis years and for the interactions between these and depreciation is lowered reflecting perhaps the considerably fewer observations and the time dynamic now included. To check further for robustness, we consider Model 5 with depreciation eliminated in the Table A4. Compared to the benchmark, the impact of the last two crisis years is strengthened considerably while the significance of the inflation variable is reduced reflecting the connection between inflation and currency changes. Importantly, the cut and run strategy exhibited by non-Big 6 banks in the crisis periods is robust to all specifications as is the pro-cyclicality of loan growth for all banks.

As a final robustness check, we divide the sample in two depending on the exchange rate regime of the country. Table A5 reports the results for the countries having flexible exchange rate regimes throughout the entire time period, namely, Croatia, Czech Republic, Hungary, Poland and Romania along with the years for Slovakia prior to its joining the Eurozone. Table A6 reports the results for the countries with a fixed exchange rate regime, namely, Bulgaria with a currency board having a euro peg fixed throughout the period and Slovenia being a member of the Eurozone for the entire period along with the two years in which Slovakia was also a member of the Eurozone. The differences for Eurozone countries compared to the countries having a flexible exchange rate are that bank lending is now

strongly positively related to inflation. The pro-cyclicality of bank lending is weaker statistically in these countries, perhaps due to the smaller number of observations. The only significant impact of either crisis in these countries is the overall reduction in bank lending in 2008, although even this result becomes statistically insignificant when bank characteristic and crisis-year dummies interactions are included. In addition, we find no statistically significant evidence that bank ownership has an impact on lending even during the crisis periods in the Eurozone countries. Hence, we conclude that we have no solid evidence to indicate that any foreign banks cut and ran during both crisis periods in the Eurozone countries.

## V Conclusion

By the middle of the last decade, the banking sectors in the EU 8 countries of Emerging Europe exhibited the general characteristics of those in mature developed market economies. Bank lending is strongly pro-cyclical and also sensitive to exchange rate policy responding positively to depreciation of the domestic currency. Perhaps such normalcy could have been anticipated because foreign banks play a dominant role in all but one of these countries' banking sectors. The external shocks from the global financial crisis (GFC) in 2008 and the onset of the Eurozone crisis (EZC) in 2010 provide a stress test for the commitment of foreign banks to host countries throughout the region. The literature examining this commitment tends to find that the conventional warning of the transmission of external shocks to host countries by MNBs was warranted in that foreign banks overall reduced lending considerably more than domestic banks in CESE countries in response to the GFC. Our paper takes a careful look at the type of foreign bank by dividing foreign ownership into two categories, namely Big 6 and other foreign. Thus, we examine empirically the commitment of the six largest foreign participants, all European MNBs, in the banking sectors of the eight most developed countries in CESE.

Both during the GFC and at onset of EZC, we find that the Big 6 European MNBs stayed committed to their "second home market" in Emerging Europe. Contrariwise, other foreign banks operating in the region actively sought market share during the retail credit boom but cut and ran during the crises. Hence, we conclude that the business model of a foreign owner is an important consideration in evaluating the net benefits of foreign participation in a country's banking sector. This separation also supports a finding in the literature that foreign takeover of a domestic bank engenders different behavior during a crisis from

that of the foreign greenfield subsidiaries of MNBs. We also find a surprisingly different impact of the GFC in the region for 2008 and 2009. Bank lending is below-average in the former year as expected during which domestic currencies were appreciating but above-average lending in the latter year during which domestic currencies were depreciating, presumably to mitigate the impact of the GFC on exports and the real economy. This result confirms the importance of including a variable for exchange rate dynamics in the empirical analysis of the crisis period in the region. Furthermore, when we separate the countries into those with a flexible exchange rate regime and those in the Eurozone (explicitly or implicitly due to a currency board peg), we find that evidence that the patterns are different and, importantly that foreign banks of both types appear to remain committed to the Eurozone countries. Finally, we find some preliminary evidence that the impact of EZC may be different from the impact of GFC on bank lending in Emerging Europe but this requires further research to corroborate or reject.

As more of the countries in Emerging Europe become part of the Eurozone, as by commitment in the accession agreements, whether or not the common currency introduces stability to bank lending during a crisis period can be tested. Our results suggest that having the flexibility to adjust the domestic currency in a crisis affords some protection against a cut and run foreign bank strategy but only with respect to the large committed takeover MNBs. We also observe the impact of volatility in the exchange rates during two years of the GFC; specifically an appreciation in 2008 followed by a devaluation of the currency (sharp in some countries) in 2009 to support the real economy. The former appears to have had a neutral effect on bank lending and the impact of the latter was mitigated to some extent. If our inability to find any significant impact of the crises on foreign bank lending in the Eurozone countries reflects a strategy by the other foreign banks to shift lending from countries with flexible exchange rates to those using the euro based on a risk/return calculation, the argument for further inclusion of countries in Emerging Europe in the Eurozone is supported. However, future research is needed to determine whether this result continues to hold after 2010.

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## Appendix I Tables

Table A1 Variables: Descriptive statistics and definitions

Variable	Definition	Mean	Stand. Dev.	Min.	Max.
Real loan growth	% Annual change in real gross loans (in domestic currency)	15.88	28.15	−53.16	153.90
GDP growth	% Annual change in real GDP (in domestic currency)	2.84	4.43	−7.80	10.50
Assets	Log of assets (in domestic currency) (lagged)	15.76	2.36	10.70	22.70
Equity ratio	Ratio of equity to assets (%) (lagged)	11.08	5.91	2.69	48.12
Loan/Deposits	Ratio of loans to customer deposits (lagged)	1.23	0.93	0.22	9.71
ROAA	Return on average assets (%) (lagged)	1.08	1.22	−4.51	6.31
Inflation	% Annual change in consumer prices (in domestic currency)	4.16	2.43	0.86	12.35
Depreciation	% Annual change in exchange rate (domestic currency to the euro)	−0.36	6.92	−11.13	23.22
Big 6	Dummy equal to 1 if bank is owned by a Big Six bank	0.24	0.43	0	1
Other foreign	Dummy equal to 1 if bank is foreign-owned by a non-Big Six bank	0.40	0.49	0	1

Table A2 Market shares of banking assets by ownership category by country

	Bulgaria		Croatia		Czech Republic		Hungary	
	2005	2010	2005	2010	2005	2010	2005	2010
Big 6	28.08	34.23	72.76	73.71	90.72	89.46	49.38	52.07
Other foreign	31.68	30.26	14.59	12.77	7.74	8.99	23.97	19.84
Domestic	40.24	35.51	12.66	13.52	1.53	1.55	26.64	28.09
	Poland		Romania		Slovakia		Slovenia	
	2005	2010	2005	2010	2005	2010	2005	2010
Big 6	20.27	24.03	67.44	54.18	77.63	83.91	25.69	21.10
Other foreign	51.68	48.81	25.99	29.28	17.93	8.18	0.00	7.01
Domestic	28.04	27.17	6.57	16.54	4.44	7.91	74.31	71.89

Table A3 Correlation coefficients

	Loan growth	Other foreign	Big 6	GDP growth	Assets	Equity ratio	Loans/ Deposits	ROAA	Inflation
Other foreign	0.0492								
Big 6	-0.0472	-0.437***							
GDP growth	0.00196	0.0311	0.00505						
Assets	-0.0566*	-0.0378	0.323***	-0.152***					
Equity ratio	0.243***	0.117***	-0.177***	-0.00765	-0.311***				
Loans/Deposits	-0.00946	0.0752**	-0.0344	-0.00987	-0.00199	0.0951***			
ROAA	-0.165***	-0.0771***	0.128***	0.115***	0.153***	0.0534*	-0.287***		
Inflation	0.0413	0.0982***	-0.0132	0.248***	-0.0680**	0.0649**	0.0215	0.103***	
Depreciation	0.140***	0.0470*	-0.0356	-0.317***	0.0311	-0.0183	0.00523	-0.00675	0.112***

Table A4 Robustness checks

	(Model 5)	With lagged dependent variable	Full sample (no depreciation)
Real loan growth in domestic currency (lagged)		−0.00189	
Other foreign	6.824**	11.15***	6.287*
Big 6	1.27	2.755	−0.706
GDP growth (%)	5.504***	4.533***	5.959***
Inflation (%)	3.694***	0.849	1.367*
Depreciation (%)	2.613***	1.043**	
Crisis2008	−68.06***	−43.07***	−45.82***
Crisis2009	57.87***	44.78*	78.92***
Crisis2010	35.84*	17.58	49.75***
Foreign* crisis2008	−5.937	−6.522	−2.525
Foreign* crisis2009	−14.51**	−18.92***	−14.70***
Foreign* crisis2010	−17.47***	−19.72***	−16.47***
Big 6 * crisis2008	2.672	2.215	4.687
Big 6 * crisis2009	−7.333	−9.048	−2.235
Big 6 * crisis2010	−3.753	−4.195	0.698
Depreciation * 2008	−2.646***	−1.175**	
Depreciation * 2009	−3.714***	−1.053*	
Depreciation * 2010	0.74	0.301	
With bank characteristic – crisis year interactions	Yes	Yes	Yes
Observations	868	868	868
Adjusted R-squared	0.385	0.473	0.342

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Table A5 Flexible exchange rate countries

	(Model 1)	(Model 2)	(Model 3)	(Model 4)	(Model 5)
Other foreign	1.975	0.773	8.003**	7.694*	7.578*
Big 6	3.781	0.271	2.767	1.949	2.943
GDP growth (%)	2.583***	4.049***	4.227***	5.081***	5.595***
Inflation (%)	-4.113***	-1.197	-0.896	-0.611	1.789
Depreciation (%)	1.448***	0.694**	0.754**	0.656**	2.609***
Crisis2008		-20.70***	-20.49***	-71.30***	-97.77***
Crisis2009		27.10**	40.07***	30.54	36.53
Crisis2010		-8.838*	3.281	33.92	29.75
Foreign* crisis2008			-4.163	-6.088	-7.767
Foreign* crisis2009			-21.16**	-21.73**	-18.36**
Foreign* crisis2010			-21.71***	-20.33***	-22.36***
Big 6 * crisis2008			3.993	0.309	-1.103
Big 6 * crisis2009			-13.18*	-12.29	-13.89
Big 6 * crisis2010			-9.349*	-1.818	-4.544
Depreciation * 2008					-2.776***
Depreciation * 2009					-3.383***
Depreciation * 2010					0.429
With bank characteristic - crisis year interactions	No	No	No	Yes	Yes
Observations	647	647	647	647	647
Adjusted R-squared	0.237	0.338	0.353	0.363	0.399

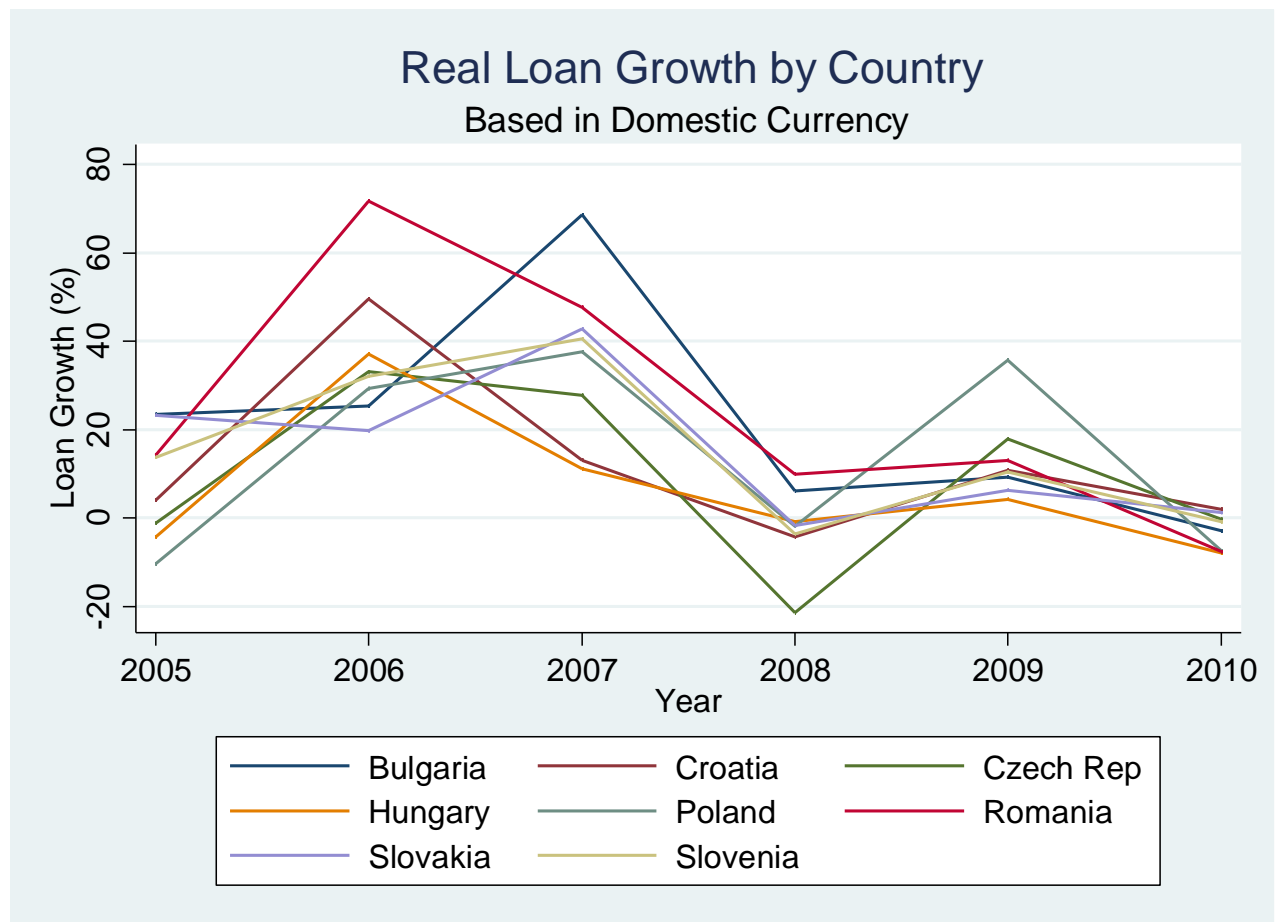
\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Table A6 Fixed exchange rate countries

	(Model 2)	(Model 3)	(Model 4)
Other foreign	3.435	4.615	5.597
Big 6	1.775	2.077	1.152
GDP growth (%)	2.064	2.181	3.394*
Inflation (%)	6.138***	5.944***	7.096***
Crisis2008	-45.02***	-45.75***	-29.36
Crisis2009	29.32	31.92*	60.79
Crisis2010	3.572	4.980	64.12
Foreign* crisis2008		3.635	-6.654
Foreign* crisis2009		-6.350	-8.557
Foreign* crisis2010		-3.015	3.786
Big 6 * crisis2008		2.662	4.664
Big 6 * crisis2009		-1.270	-2.219
Big 6 * crisis2010		-3.451	2.383
With bank characteristic – crisis year interactions	No	No	Yes
Observations	221	221	221
Adjusted R-squared	0.339	0.323	0.360

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

## Appendix II Figure



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