INTERNATIONAL MONETARY FUND

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FINANCING FUTURE GROWTH: THE EVOLVING ROLE OF THE BANKING SYSTEMS IN CESEE: TECHNICAL NOTES

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FIGURES

I. THE ROLE OF FOREIGN BANKS IN THE CESEE BANKING SYSTEM

The Role of Foreign Banks in the CESEE Banking System as of 2012

1. Banks of advanced countries, mainly from Western Europe, play a very important role in the banking systems of CESEE, both in terms of ownership and funding.[1] According to BIS data (see Box 1 of main paper for a description of the various international banking statistics used in this text):

- Assets owned by BIS-reporting banks ("foreign claims" in the BIS consolidated banking statistics) exceed 50 percent of GDP in most CESEE countries, with the exception of Macedonia, Turkey, and the European CIS countries. (Figure 1, top panel).

- Cross-border funding by BIS-reporting banks ("external positions" in the BIS locational banking statistics) exceeds 20 percent of GDP in most countries, and are particularly high in Croatia, Slovenia, Estonia, and Latvia (Figure 1, middle panel).

2. Foreign ownership and foreign funding do not necessarily go hand-in-hand, and there are countries with high foreign ownership but limited foreign funding (Figure 1, bottom panel). In the Czech Republic, for example, consolidated claims of BIS reporting banks amount to 100 percent of GDP, but most of these claims are financed by local deposits, and gross foreign funding amounts to only 19 percent of GDP. In addition, the Czech subsidiaries have considerable claims on the parents, reducing their net external positions even further.

3. EBRD data show that that the asset share of foreign banks in the region exceeds 60 percent in 15 out of 22 countries.[2] (Figure 2). The asset share of foreign banks is relatively low only Belarus, Russia, and Slovenia. In many countries it exceeds 90 percent.

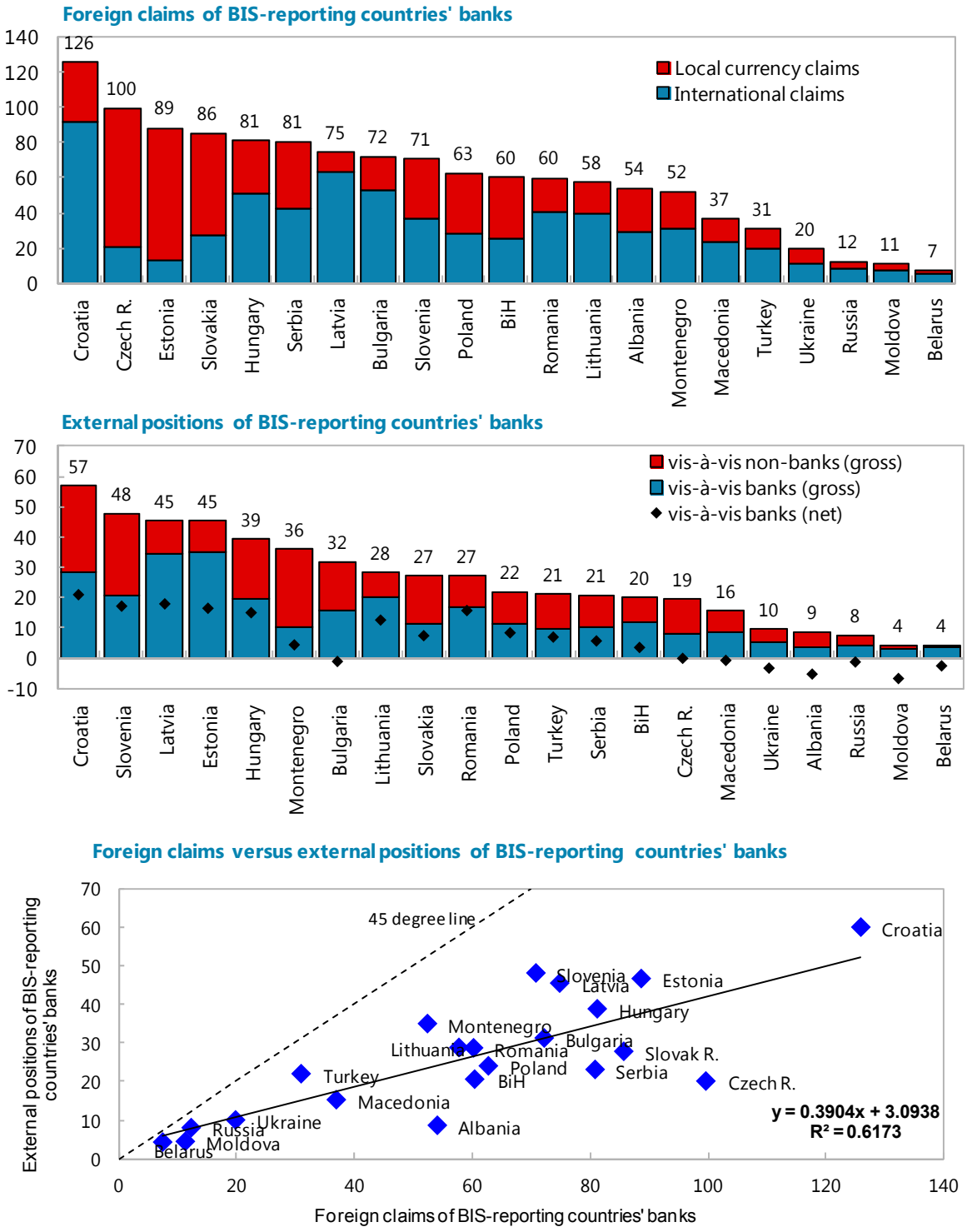
4. Key foreign institutions in the region are Austrian, Italian, and, to a lesser extent, French and Swedish banks. Consolidated foreign claims of Austrian banks (resp. Italian banks) exceed 10 percent of host country GDP in 10 (resp. 8 percent) countries (Figure 3). The largest banks in terms of assets in the region are Unicredit (Italy), Erste (Austria), Societé Générale (France), KBC (Belgium), BBVA (Spain), and Raiffeisen (Austria) (Figure 4).

[1] Western European banks operate in CESEE primarily through their local subsidiaries, as well as cross-border lending to non-financial enterprises. Branches of Western European banks play only a minor role in CESEE and are therefore not discussed in this paper. The pros and cons of subsidiaries versus branches are analyzed in Fietcher et al. (2011).

[2] BankScope data show that most of the foreign banks are from advanced economies, although in SEE and European CIS countries (especially Bulgaria, Bosnia, Montenegro, and Ukraine) foreign banks from other CESEE emerging markets also play a role.

Figure 1. CESEE: Foreign Claims and External Positions of BIS-Reporting Countries' Banks, 2012:Q3

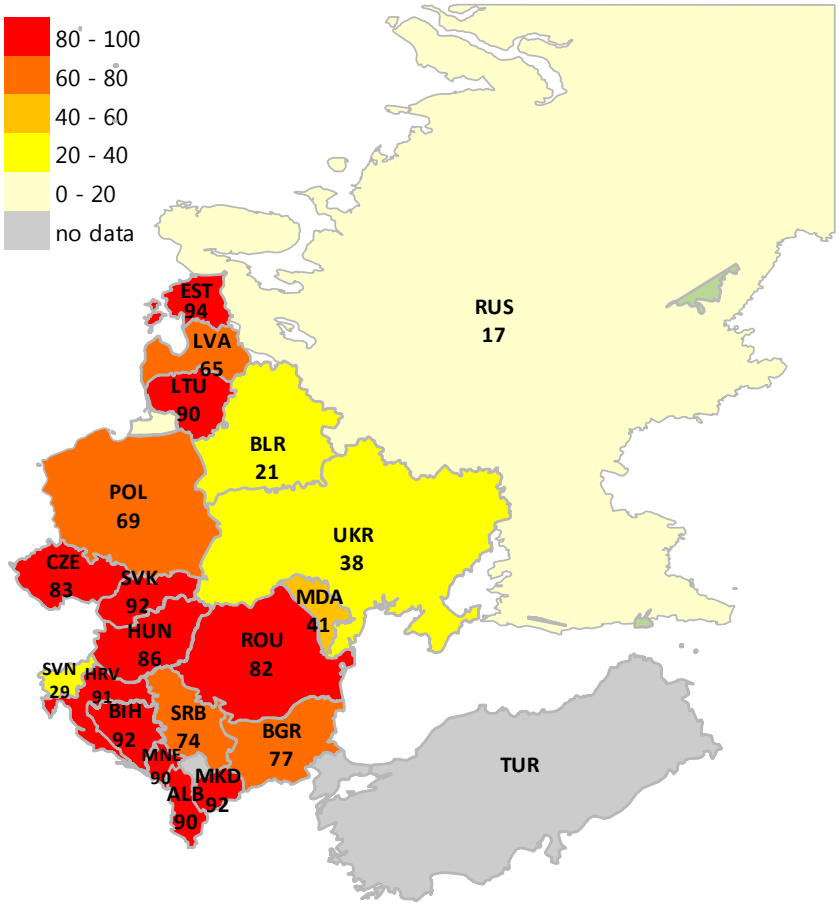
(Percent of host country GDP)



Sources: BIS, International Banking Statistics (Tables 6 and 9); IMF, World Economic Outlook database; and IMF staff calculations.

5. While foreign banking groups are important for CESEE, CESEE is less important for most foreign banking groups. As of end-2011, for most banking groups, the share of assets owned through affiliates in CESEE was less than 20 percent of consolidated assets (Figure 4). Most of the exceptions were Austrian banks: for Erste Group, Hypo Alpe-Adria-Group, Raiffeisen RZB, and Volksbank[3] the share is between 20 and 40 percent of consolidated assets.

Figure 2. CESEE: Asset Share of Foreign Banks, 2011
(Percent)



Sources: EBRD Banking Survey; and various country sources compiled by IMF staff.

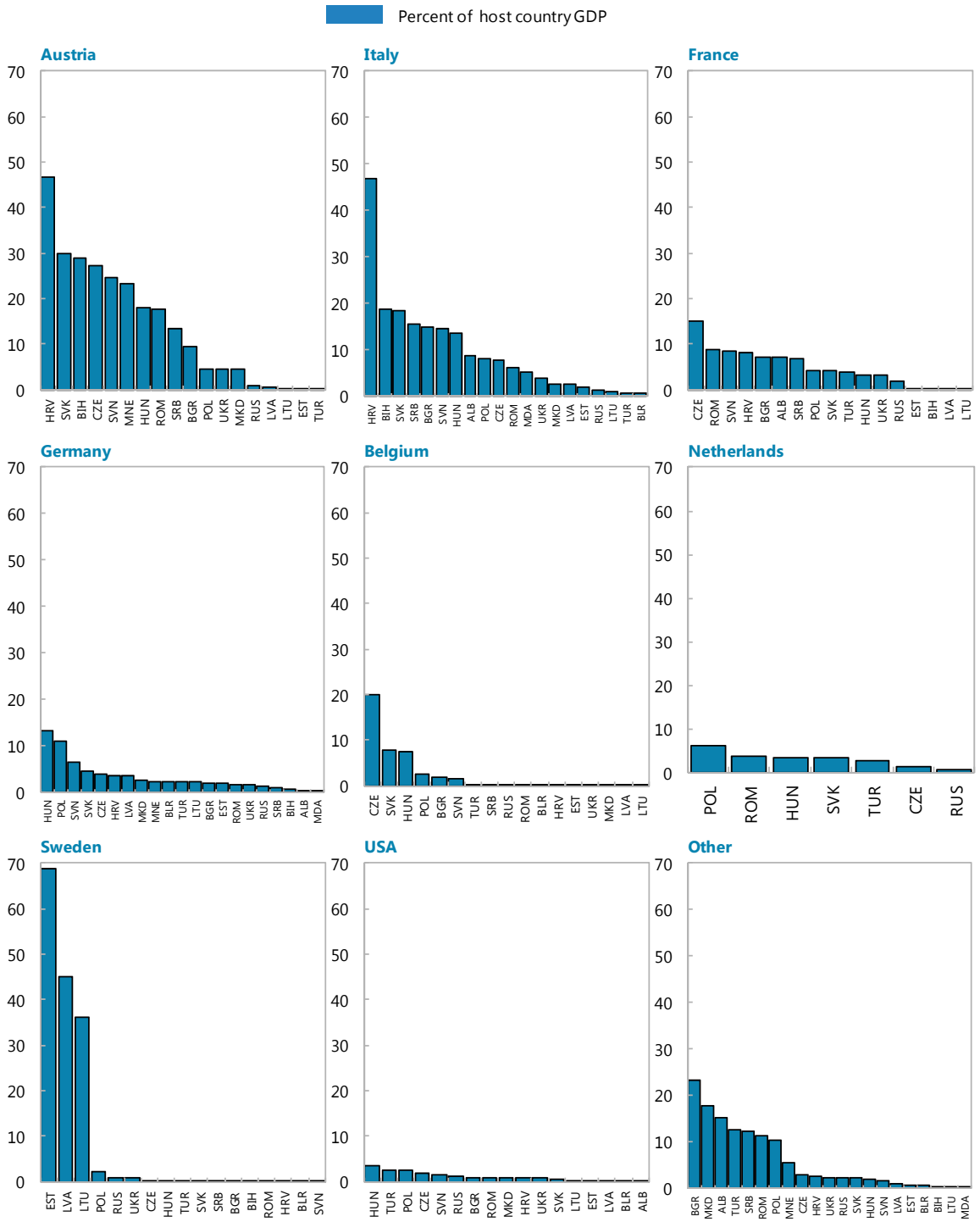
A Brief History of Banking in CESEE: How the Region Came to Have So Many Foreign-Owned Banks

6. Developing a modern, market-oriented banking sector was a particular challenge for the transition economies of CESEE. They all inherited a monobank system, where banking activities were entirely subservient to central planning (Bonin and others, 2008). Credit evaluation and risk planning were irrelevant. Banking supervision did not exist (Bonin and Wachtel, 2003). The first reform step created a two-tier system with a central bank in charge of monetary and exchange rate policies and financial sector oversight and other parts of the monobank system transformed into state-owned commercial banks (SOCBs). The establishment of private domestic banks was allowed, often under lenient requirements to encourage entry and thereby foster competition in the banking sector (Altmann, 2006). Banking legislation following the western model was put in place.

7. The early phase of transition was marred by frequent banking crisis and difficulties to secure macroeconomic stability. There was little experience with modern banking practices, the SOCBs had

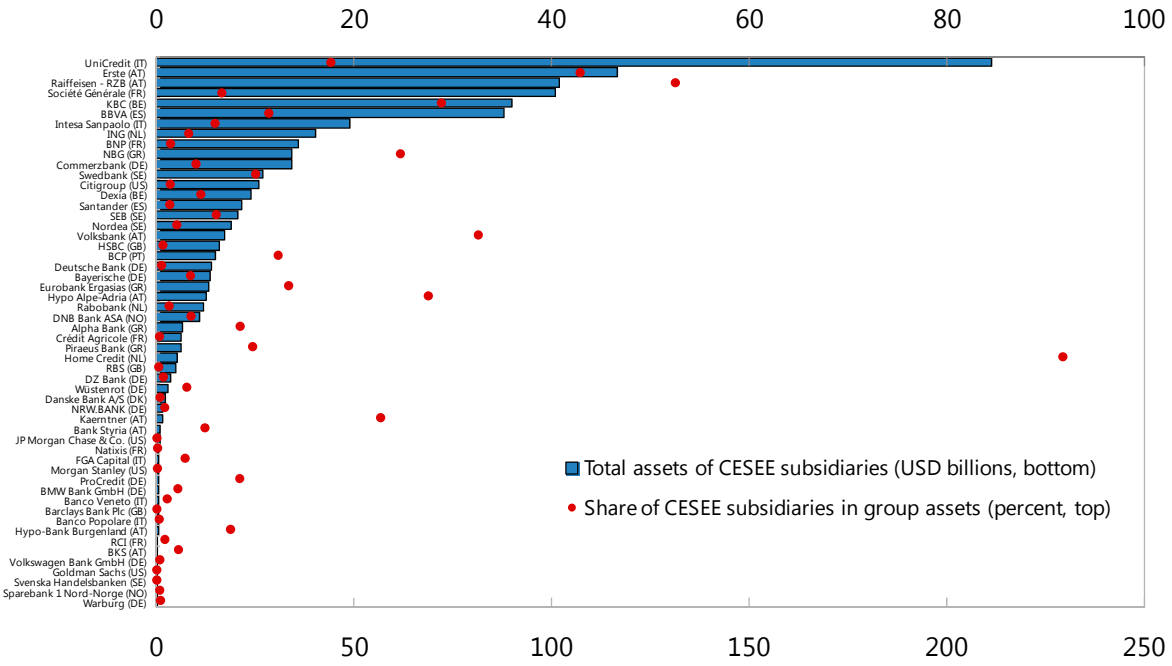
[3] In 2012, Volksbank sold most of its CESEE subsidiaries to Sberbank of Russia.

Figure 3. CESEE: Foreign Claims of BIS-Reporting Countries' Banks on CESEE Countries, 2012:Q2



Sources: BIS, International Banking Statistics (Table 9); and IMF staff calculations.
Note: Claim data is on an immediate borrower basis (where the actual borrower resides).

Figure 4. Foreign Banks Active in CESEE: CESEE Subsidiaries' Assets and Shares in Total Group Assets, 2011



Sources: Bankscope; and IMF staff calculations.
Notes: A bank is defined as foreign-owned when it has a foreign global-ultimate-owner that controls 25 percent or more of its total shares. A few small subsidiaries did not have 2011 data at the time of download.

inherited a poorly performing portfolio of loans to state-owned enterprises (SOEs), and SOCBs continued to lend to insolvent SOEs. SOEs in effect faced "soft budget constraints" which complicated their restructuring and establishing macroeconomic stability (Kornai, 1980; and Berglof and Roland, 1998).The wave of lightly-capitalized and poorly-supervised new private domestic banks often engaged in large-scale connected lending or outright fraud. Repeated rounds of bank recapitalization became necessary and created moral hazard for banks to yet again extend loans that had little prospect of being repaid.

8. Bank privatization, mostly to strategic foreign investors, finally led to the rapid creation of a market-oriented independent banking industry at the turn of the century. Early privatization attempts had only moderate success, because there was limited interest by reputable foreign banks in light of poor macroeconomic conditions, a strong sentiment amongst some governments that the banking sector had to remain "national," and unsuitable privatization strategies. At least in the relatively small economies with aspirations to join the EU, a consensus emerged over time that privatization itself was not sufficient to improve bank performance but that involvement of a strategic investor was critical. As domestic strategic investors were in short supply, in practice this meant foreign control of a large share of CESEE banking systems. The timing of foreign bank entry differed across CESEE with Hungary registering a substantial foreign bank ownership already in the early 1990s while macroeconomic instability or political resistance delayed the process into the late 1990s in many other CESEE countries. However, by the early 2000s, foreign banks dominated CESEE banking systems with few exceptions (Table 1).

Table 1. Asset Share of Foreign Owned Banks (percent)

Country	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Baltics															
Estonia	28.8	90.2	89.8	97.4	97.6	97.5	97.5	98.0	99.4	99.1	98.8	98.2	98.3	97.9	94.0
Latvia	71.2	72.6	74.0	74.4	65.2	42.8	53.0	48.6	57.9	63.3	63.8	65.7	69.3	69.0	65.0
Lithuania	40.5	38.8	37.1	54.7	78.2	96.1	95.6	90.8	91.7	91.8	91.7	92.1	91.5	90.8	90.1
CEE															
Czech R.	23.3	26.4	38.4	65.4	89.1	85.8	86.3	84.9	84.4	84.7	84.8	84.7	84.0	83.5	83.4
Hungary	61.9	61.7	61.5	67.4	66.5	85.0	83.5	63.0	82.6	82.9	64.2	84.0	81.3	83.7	85.8
Poland	16.1	32.7	49.3	72.6	72.2	70.7	71.5	71.3	74.3	74.2	75.5	76.5	72.3	70.5	69.2
Slovakia	19.3	23.7	24.1	42.7	78.3	84.1	96.3	96.7	97.3	97.0	99.0	99.2	91.6	91.8	91.5
SEE															
Albania	10.1	14.4	18.9	35.2	40.8	45.9	47.1	93.3	92.3	90.5	94.2	93.6	92.4	90.6	90.3
BiH	4.2	1.9	3.8	21.6	65.3	76.7	79.7	80.9	90.9	94.0	93.8	95.0	94.5	94.5	92.1
Bulgaria	15.5	32.5	42.8	75.3	72.7	75.2	82.7	81.6	74.5	80.1	82.3	83.9	84.0	80.7	76.5
Croatia	3.0	6.6	40.3	84.1	89.3	90.2	91.0	91.3	91.3	90.8	90.4	90.6	90.9	90.3	90.6
Macedonia	11.8	11.4	11.5	53.4	51.1	44.0	47.0	47.3	51.3	53.2	85.9	93.1	93.3	92.9	92.4
Montenegro								31.0	87.7	91.9	78.7	84.6	87.1	88.4	89.7
Romania	6.8	25.2	43.6	46.7	51.4	52.9	54.8	58.5	59.2	87.9	87.3	87.7	84.3	84.1	81.8
Serbia	0.6	0.5	0.4	0.5	13.2	27.0	38.4	37.7	66.0	78.7	75.5	75.3	74.3	73.5	74.5
Slovenia	5.4	4.9	4.9	15.3	15.2	16.9	18.9	20.1	22.6	29.3	28.8	31.1	29.5	28.7	29.3
CIS															
Belarus	1.4	2.3	2.8	4.0	7.5	8.1	20.4	20.0	16.2	14.7	19.7	20.6	26.3	27.8	33.6
Moldova	14.5	24.5	34.4	39.8	34.9	36.7	35.2	33.6	19.6	22.9	24.8	31.6	41.0	41.5	40.9
Russia	7.4	9.0	10.6	9.5	8.8	8.1	7.4	7.6	8.3	12.1	17.2	18.7	18.3	18.0	16.9
Ukraine	8.2	9.2	10.5	11.1	12.1	12.3	12.1	12.1	21.3	35.0	39.4	51.1	50.8	47.8	38.0
Average (simple)	18.4	25.7	31.5	45.8	53.1	55.6	58.9	58.4	64.4	68.7	69.8	72.9	72.8	72.3	71.3

Sources: EBRD Banking Survey; and various country sources compiled by IMF staff.

9. From the early 2000s the incidence of banking crises in CESEE declined sharply (Table 2). This not only reflected successful macroeconomic stabilization throughout CESEE and tighter entry conditions and supervision of banks, the operational restructuring of banks by their strategic investors was another critical element. "Introducing foreign-owned banks … broke the symbiotic link between government and state enterprises and newly privatized enterprises. Foreign bank ownership helped harden budget constraints and attain macroeconomic stability" (Mitra and others, 2010, page 11). The period of repeated systemic CESEE banking crisis during the 1990s gave way to over a decade virtually free of such disruptions. The few systemic crises that did occur—in Turkey in 2001 and in Latvia and Ukraine in 2008/09—involved domestic banks only.

Why is Foreign Funding So High: The "Centralized" Funding Model of Banking Groups Operating in CESEE

10. The high level of cross-border funding, which sets CESEE apart from other regions, is in large part the result of the "centralized" banking model that banking groups active in the region follow. Under this model, funding and liquidity management decisions are centralized, and parent banks shift funds to where they are most needed, and intra-group pricing of liquidity may not fully reflect

market conditions.[4] This contrasts with the "decentralized" model—characterized by a high degree of funding independence for subsidiaries—which is more common in Latin America.

11. In Latin American emerging markets, where foreign bank presence is important as well, cross-border funding from advanced countries' banks is generally much lower than in CESEE (Figure 5, top panel). External positions are highest in Chile, but at around 20 percent of GDP, they would fall into the lowest quartile of the distribution in CESEE. Spanish banks in Latin America are the largest group of banks and typically use the "decentralized" model.[5]

12. Cross-border funding is also lower in Asia (Figure 5, bottom panel). In general, foreign ownership is much lower in Asia than in CESEE and Latin America.

Table 2. Systemic Banking Crises in CESEE Countries

Country	80s	90s	00s
Albania		1994	
Belarus		1995	
BiH		1992-96	
Bulgaria		1996-97	
Croatia		1998-99	
Czech Republic		(1996-2000)	
Estonia		1992-94	
Hungary		1991-95	(2008-…)
Latvia		1995-96	2008-…
Lithuania		1995-96	
Macedonia		1993-95	
Poland		1992-94	
Romania		1990-92	
Russia		1998	(2008-…)
Slovakia		1998-2002	
Slovenia		1992	(2008-…)
Turkey	1982-84		2000-01
Ukraine		1998-99	2008-…

Sources: Laeven and Valencia (2012)
Note: Borderline cases are indicated in brackets.

13. As discussed in BIS (2010), the macroeconomic determinants relevant for banks' model of funding and liquidity management have not been studied in depth, but are likely to include openness to international trade, the presence of multinational firms, financial regulation, the depth of financial markets, external imbalances, currency regimes, and capital controls. Microeconomic determinants include trade-offs between coherence, lower funding costs, economies of scale, lower overhead costs on the one hand, and diversification of funding sources, the value of a local presence, transparency and market discipline, and contagion prevention on the other hand.

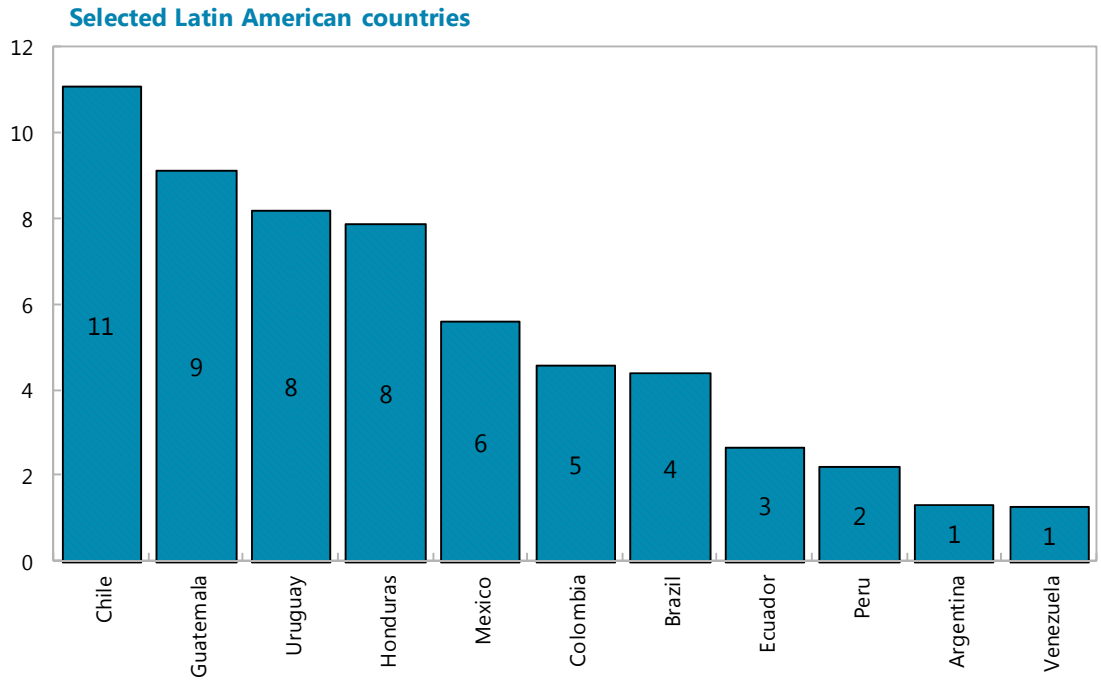
14. The model followed by Spanish banks in Latin America is also explained by the framework imposed by the Spanish regulator in the early 2000s after the Argentina crisis (see Box 2 in BIS, 2010). The framework included a principle of financial autonomy, which is interpreted to include funding and liquidity. Each subsidiary should implement its own funding and liquidity management autonomously with appropriate mechanisms to meet ordinary needs and with contingency plans for extraordinary circumstances. Intragroup operations should be limited to exceptional situations, and the prices applied in those cases must be market prices.

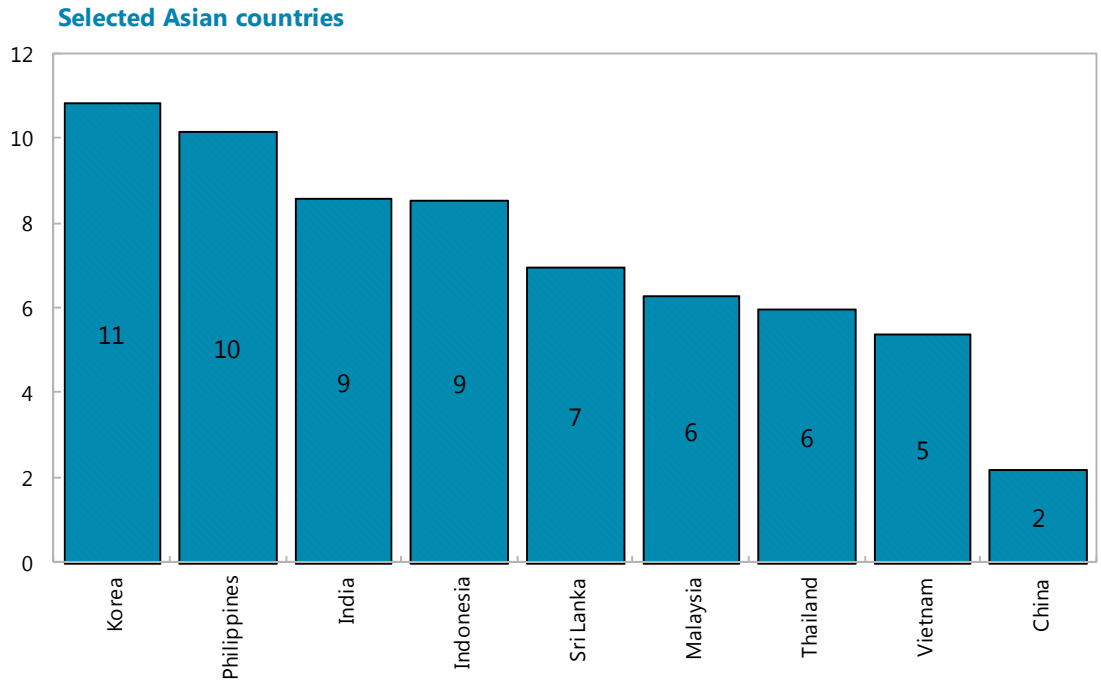
[4] Pre-crisis shortcomings in EU banks' internal transfer pricing policies is discussed in ECB (2009).

[5] See IMF (2011) for a discussion of how large Austrian, Belgian, and Dutch banks follow the "international" banking model while large Spanish banks follow the "multinational banking model, and BIS (2010) for a contrast between the Swedish banks in the Baltic region and the Spanish banks in Latin America.

Figure 5. External Positions Vis-à-vis Banks of BIS-Reporting Countries' Banks, 2012:Q3

(Percent of banking system's total assets)





Sources: BIS, International Banking Statistics (Table 6); IMF, *International Financial Statistics*; and IMF staff calculations.

II. BENEFITS AND PITFALLS OF FOREIGN BANK OWNERSHIP AND FOREIGN FUNDING: A LITERATURE REVIEW

15. It is useful to distinguish the two separate dimensions of foreign funding and foreign ownership when discussing the pros and cons of a banking model that is open to foreign banks. These two dimensions are analyzed in two literatures which have a large intersection but do not perfectly overlap. Indeed, foreign funding can be provided to both foreign-owned and domestically-owned banks, while foreign-owned banks may or may not rely on foreign sources of funding.

16. The literature emphasizes risk-sharing and diversification gains as the main benefit of openness to foreign banks, whether through cross-border lending (to banks and non-banks) or through foreign bank ownership. However, in a world of multiple currencies, foreign funding also brings the benefits and challenges of the greater availability of foreign currency loans. Furthermore, just as cross-border banking insulates the domestic economy from domestic shocks, it also exposes it to foreign shocks and to fluctuations in the liquidity position of global banks.

17. At a more structural level, it is widely accepted that the presence of foreign banks (from advanced economies) brings financial know-how, technology, and international networks into a country, thus improving the efficiency and quality of financial intermediation in general and of credit provision in particular. The effect of foreign bank ownership on the availability of credit to the private sector in financially underdeveloped markets is less clear.

Both foreign ownership and foreign funding bring diversification gains

18. Allen et al. (2011) explain how the activity of foreign banks bring diversification effects in the domestic economy and to banks. The presence of foreign banks allows domestic borrowers to have multiple lending relationships with domestic and foreign banks. When domestically-owned banks are lending-constrained, borrowers can substitute with finance from foreign-owned banks. While borrowers will by the same token be exposed to shocks to foreign banks, standard portfolio theory suggests that lending would still be smoother than under financial autarky. Similarly, there are financial stability gains for banks as risks of setbacks in individual markets of their operation are diversified. However, the risk diversification argument carries only so far: while it suggests welfare gains from some foreign bank presence, it cannot justify foreign bank dominance from host countries that also have strong trade linkages with CESEE.

Foreign funding brings foreign currency lending, a source both of opportunities and of challenges

19. EBCI (2011) discusses the advantages and disadvantages of foreign currency (FX) lending. FX borrowing could be cheaper than local currency borrowing, if funding is cheaper abroad than locally, and the availability of cheaper credit is likely to have a positive impact on growth. FX lending to the export sector is unproblematic, as its access to foreign currency income serves as a natural hedge. However, FX lending generates challenges as well: (i) mispriced FX risk may contribute to credit and asset price bubbles; (ii) FX lending exposes unhedged borrowers to FX risk; (iii) excessive dollarization of the economy may impair the conduct of monetary policy; (iv) large volumes of FX lending require commensurately high foreign reserves to prevent exchange rate crises; and (v) supervision needs strengthening as FX mismatches on the local banks' balance sheets need to be assessed, monitored, and mitigated.

While foreign ownership brings greater financial stability during local crises…

20. Turning to the more specific case of foreign bank ownership, cross-country studies discussed in the recent survey by Cull and Martinez Peria (2010) suggest that greater foreign bank ownership is associated with lower probability of systemic banking crises in the host country and that official barriers to foreign bank entry are associated with measures of banking system fragility. Regional studies are generally supportive of the positive role played by foreign-owned banks during domestic or regional emerging market crises too:

- Case studies on Latin American banking crises in the 1990's indicate that foreign banks had more robust loan growth, a more aggressive response to asset deterioration, and a greater ability to absorb losses than domestic banks during this period.
- In case studies of the Asian financial crisis, foreign banks were not a major stabilizing force, but this is likely because they did not constitute a large share of the banking sectors in these countries.
- As to the CESEE region, De Haas and van Lelyveld (2006) find that during local crisis periods domestically-owned banks and banks acquired by foreign owners contracted their credit base, whereas greenfield foreign banks did not. De Haas and van Lelyveld (2010) find that multinational bank subsidiaries with financially strong parent banks were able to expand their lending faster during 1991-2004. As a result of parental support, foreign bank subsidiaries also did not need to rein in their credit supply during local financial crises, while domestic banks had to.

…foreign funding may undermine it

21. Hahm, Shin, and Shin (2012) formulate a model of credit supply where a large stock of "non-core" liabilities serves as an indicator of the erosion of risk premiums and hence of vulnerability to a

financial crisis. Looking at a panel study of emerging and developing economies during 2000-10, they find empirical evidence that various measures of non-core liabilities, in particular gross foreign liabilities, serve as a good indicator of the vulnerability to a crisis, whether a collapse in the value of the currency or a credit crisis where lending rates rise sharply.

Foreign funding can also generate synchronized boom-bust cycles…

22. The recent literature on cross border banking also emphasizes the risks of generating boom-bust cycles. Recent work by Bruno and Shin (2012) suggests that banking sector capital flows and credit growth in recipient economies are explained in part by the fluctuations in global liquidity that follow the leverage cycle of global banks.

…and help transmit international shocks

23. Schnabl (2012) shows how the 1998 Russian crisis spilled over to Peru as banks, including multinational bank subsidiaries, saw their foreign funding decline and had to reduce local lending. Cetorelli and Goldberg (2011) find that credit growth was lower in emerging market countries that were more exposed to the 2008-09 global liquidity shock because of their reliance on liabilities held by non-residents, and that this effect worked through the three channels of direct cross-border lending by BIS-reporting banks, lending of BIS-reporting banks' affiliates, and lending by domestic banks.[6]

Foreign ownership can help transmit international shocks too…

24. Turning to the more specific case of foreign bank ownership, several studies have shown how an external shock suffered by the parent bank can lead to reduced lending by the host country affiliate:

- Peek and Rosengren (1997 and 2000) demonstrate how the drop in Japanese stock prices in the early 1990's led Japanese bank branches in the US to reduce lending so as to shrink risk-weighted assets and preserve capital at the group level. They also find that the behavior of Japanese bank subsidiaries depended on their own capital adequacy ratio but not on that of their parents.

- Using surveys of firms in 16 CESEE countries in 2005 and 2008, Popov and Udell (2012) provide some evidence that firms' access to credit was affected by changes in the financial condition of their bank (if domestically-owned) or their bank's parent (if foreign-owned). They find that, in the spring of 2008, firms were more credit constrained if their bank or bank's parent experienced

[6] Such cross-border spillovers of course also happen across advanced economies, as documented in Aiyar (2011) in the case of the UK during 2008-09.

a decline in equity or Tier 1 capital, or a decline in gains/losses on financial assets between 2005 and 2008.

… but less so if the affiliates are locally funded…

25. The strength of this contagion appears to be reduced in subsidiaries with low reliance on external funding:

- Analyzing a panel of 13 Latin American countries between 1999 and 2008, Kamil and Rai (2010) find that the transmission of global financial shocks through the foreign bank lending channel is significantly more muted in countries where foreign banks conduct a higher share of their lending in domestic currency, i.e., where they rely less on cross-border funding.[7]

- Looking at a panel of banks in 14 CESEE countries during 2005-09, Ongena, Peydro and van Horen (2012) find that, while foreign banks reduced lending growth more than domestically-owned banks in 2009,[8] they did not do so compared to those domestically-owned banks that relied on funding from international capital markets. Furthermore, the size of the decline in loan growth was lower for those subsidiaries that had a greater share of funding through local deposits.

- Claessens and van Horen (2012) analyze a worldwide sample of banks during 2005-09 and find that (controlling for several bank characteristics) foreign banks reduced credit more compared to domestic banks in 2009, except when they dominated the host banking systems or when they had a high share of deposit funding.

…and the parent has limited dependence on wholesale funding

26. Furthermore, the size of the spillover seems to depend on the funding profile of the parent:

- De Haas and van Lelyveld (2011) find that, controlling for a variety of bank and host country characteristics, multinational bank subsidiaries around the world slowed down credit growth faster than stand-alone domestically-owned banks during 2008-2009, and that this slowdown was greater for subsidiaries of banking groups based in countries that suffered a greater GDP decline and that relied more on wholesale funding.

27. In the same spirit, IMF (2011) suggests that if external wholesale funding markets misprice the risks of parent banks, or if parent banks benefit from implicit sovereign support, the funding cost advantages enjoyed by emerging market subsidiaries of advanced economies banks can lead to excessive credit growth, and may increase the transmission of macro-financial risks between home and host economies.

[7] Because of strict net open position limitations set in prudential regulation, cross-border funding in foreign currency typically finances foreign currency claims.

[8] This result is also obtained by Cull and Martinez Peria (2012).

Foreign ownership brings greater competition and efficiency…

28. Cull and Martinez Peria (2010) list a series of cross-country empirical studies showing that the presence of foreign-owned banks is generally associated with greater efficiency and competition in a host country's banking sector. In particular, foreign bank presence has been linked to lower net interest margins, profitability, cost ratios, and non-interest income for domestic banks in developing and emerging market countries. However, the relationship between bank competition and financial stability may be positive or negative and is likely to depend on the quality of the regulatory, supervisory, and broad institutional frameworks (see Beck, De Jonghe and Schepens, 2012 and the references therein). It is also widely believed that the entry of reputable foreign banks improves corporate governance (see Hasan and Xie, 2012, for the case of China) but comprehensive datasets on governance indicators are currently lacking to provide analytical support for such claims.

…but has an ambiguous effect on access to credit…

29. Several cross-country studies suggest that foreign bank presence is associated with less provision of credit. However, Cull and Martinez Peria (2010) find that this relationship is not causal but is driven by the non-random entry of foreign banks into banking markets that were in crisis. While foreign banks tend to have difficulties in lending to borrowers that lack the hard information to prove their creditworthiness, this does not necessarily lead to less overall lending to small and medium-sized businesses as domestic players may develop their presence in that market segment over time as a result.

… and may complicate the bank resolution process

30. As discussed in IMF (2010), as a result of the interconnectedness of an international financial group's legal entities, weaknesses in one entity can adversely affect the entire group. In group structures where liquidity is centralized, any sudden and material downgrading of the central entity's credit ratings or the opening of insolvency proceedings against it would lead to the immediate illiquidity of the other entities in the group. The triggering of cross default or cross guarantee arrangements for funding purposes as a result of rating downgrades or otherwise may also lead to financial distress in other parts of the group. However, the resolution of such institutions is subject to different national frameworks and, accordingly, national authorities must proactively coordinate their actions to avoid the significant costs of an uncoordinated approach.

31. While having a foreign owner might complicate the actual resolution of a bank, it might also reduce the likelihood of the need for sovereign support in case of crisis. Literature on this topic is scarce though. Detragiache and Gupta (2004) show that foreign-owned banks did not abandon the Malaysian market after the 1997–08 crisis and received less government support than domestically-owned banks. Cárdenas, Graf and O'Dogherty (2004) explain that parent groups often provide "comfort letters" to assure creditors (or host country authorities) that they would assist the subsidiary in case of distress, but that such support should not be taken for granted as shown by the example of several advanced country banks that did not recapitalized their Argentine subsidiaries during the crisis in the early 2000's.

III. INTEREST RATE SPREADS, FOREIGN CURRENCY LENDING AND MACROPRUDENTIAL POLICY IN SELECTED INFLATION-TARGETING CESEE COUNTRIES

32. This note focuses on five inflation-targeting countries in Central, Eastern and South-Eastern Europe (CESEE): the Czech Republic, Hungary, Poland, Romania, and Serbia. The first three countries joined the European Union in 2004, the fourth in 2007, and the fifth became an EU accession candidate in 2012. The five countries have strong linkages to the euro area, have banking sectors dominated by large euro area banking groups and the euro is their domestic currencies' natural cross.

33. The dispersion in the five countries' monetary policy rates has narrowed over time but remains large. The Czech Republic was the earliest inflation-targeting adopter and has managed to maintain low inflation targets, low inflation outturns and low policy rates over the past several years, suggesting a high degree of policy credibility (Table 3). At the other end of the spectrum, Serbia has struggled to meet increasingly more ambitious inflation targets, with inflation overshooting the target by more than 5 percentage points in 2011 and policy rates remaining close to double-digits.

34. Higher policy rates are associated with a higher share of foreign currency (FX) loans across this group of countries (Figure 6). FX lending has been a long-standing feature in a large part of CESEE and increased further during the 2003–08 credit boom. While there are multiple demand and supply factors that explain the currency composition of credit and each of them is likely to have played a role in favoring the growth of FX loans in the region over time, it is striking to see that among the group of five inflation-targeters, the level of the monetary policy rate is very strongly

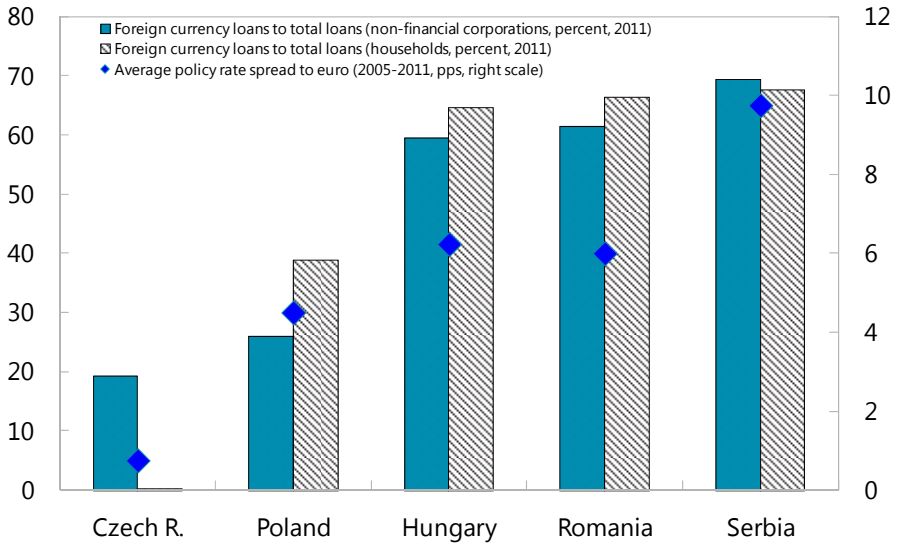
Table 3. Selected CESEE Countries: Inflation Target, Inflation Outturn and Policy Rates, 2006-11 (Percent)

	Date of inflation targeting adoption	2011			2006		
		Target	Average inflation rate	End-year policy rate	Target	Average inflation rate	End-year policy rate
Czech Republic	1998	2±1	1.9	0.75	3±1	2.5	2.50
Poland	1999	2.5±1	4.2	4.50	2.5±1	1.1	4.00
Hungary	2001	3±1	4.0	7.00	3.5±1	3.9	8.00
Romania	2005	3±1	5.8	6.00	5±1	6.6	8.75
Serbia	2006	4.5±1.5	11.2	9.75	7-9	11.8	14.00

Sources: National central banks' websites; IMF, International Financial Statistics; and IMF staff calculations.

associated with the share of foreign currency loans.[9] Except for the Czech Republic, interest rates on domestic currency loans are generally higher than on FX loans, due to lower monetary policy credibility and/or higher inflation volatility in the domestic economy. The lower interest rate charged on FX loans may be too salient a feature for the typical unhedged borrower to appropriately factor the risks of FX appreciation into his or her decision. Indeed in many countries in the CESEE region, especially those with fixed or appreciating exchange rates, FX loans were perceived to be cheaper. This was especially the case for mortgages: mortgages in euros and Swiss francs (and even in some cases in Japanese yen) carried a much lower interest rate—and longer maturity—than those denominated in local currency.

Figure 6. Selected CESEE Countries: Foreign Currency Loans and Policy Interest Rate Spreads, 2005-11



Source: IMF, BSA database; Haver Analytics; and IMF staff calculations.

35. To prevent the emergence of FX loans on a large scale, policy intervention may be needed. There are three main reasons for this. First, large aggregate unhedged FX exposures create negative externalities because they are a significant source of systemic risk in the banking system during crisis times (as greater installments increase the probability of default), generate greater macroeconomic volatility and limit macroeconomic policy options (e.g., because policy makers internalize the adverse balance sheet effects of devaluations or large depreciations on unhedged FX borrowers). Indeed the Czech National Bank was able to reduce its policy rate by 150 bps between end-June and end-December 2008 while the Serbian National Bank increased its policy rate by 200 bps during the same period of time. Second, such exposures are subject to moral hazard related to implicit bailout guarantees. Third, a FX loan may expose the borrower (whether hedged or unhedged) to greater liquidity risk than a domestic currency loan if the bank supplying the loan is funded through international wholesale markets rather than more stable sources of funding (e.g., domestic deposits). All of these considerations may therefore justify policy action—on macroeconomic management and financial stability grounds—to limit the extent of FX borrowing in the economy. In addition,

[9] Besides interest rates, other demand-side determinants include expectations of euro adoption, underestimation of foreign currency risk, and natural hedges. Major supply side determinants include deposit euroization and foreign funding of the banking system. Some determinants, such as institutional quality and exchange rate volatility operate both through the demand and the supply side. See, among others, Rosenberg and Tirpak (2008); Pann, Seliger, and Übeleis (2010); Zettelmeyer, Nagy, and Jeffrey (2010); and Steiner (2011).

policy intervention may also be required for customer protection motives if some borrowers misunderstand and/or are not properly alerted of exchange rate risks.

36. Across the five countries, policy-makers addressed the risks associated with FX loans differently and at different stages of the recent boom-bust cycle (Table 4). The Czech policy-makers did not have to intervene, as FX loans in their country were mostly to hedged corporations and remained stable throughout the past decade. Romania and Serbia, which have a large share of euroized liabilities, increasingly differentiated the rate of reserve requirements by currency during the boom period starting in 2004/05.[10] They also differentiated loan classification and provisioning rules by currency (in 2005 in Romania and in 2008 in Serbia). Higher risk-weights on FX loans above a certain threshold amount were introduced in Serbia in 2006 and higher risk-weights on FX mortgages were introduced in Poland in 2008. Poland (in 2006) strongly recommended that banks use stricter debt-service-to-income (DTI) and loan-to-value requirements (LTV) on new FX mortgage holders (through the so-called "Recommendation S"). Romania imposed a maximum ratio of FX loans to unhedged borrowers to own funds between 2005:Q3 and its entry in the European Union in 2007:Q1, and tightened DTI limits for households for a short period in 2008-09. As the macroeconomic and financial costs of FX loans to unhedged borrowers became apparent during the post-Lehman bust, Hungary introduced LTV and DTI regulation differentiated by currency before banning FX mortgages altogether in 2010.[11] More recently, Poland further increased risk-weights on FX household loans while Romania introduced differentiated LTV limits by currency. Across the CESEE region, there is now greater consciousness among policy-makers of the need to develop local currency capital markets so that banks can decrease their reliance on FX funding for long maturities,[12] while, at the European Union level, the European Systemic Risk Board has published a set of recommendations on lending in FX (ESRB, 2011).

Table 4. Selected CESEE Countries: Use of Macroprudential Instruments Addressing Foreign Currency Loans (2002:Q1-2012:Q1)

	Czech Rep.	Hungary	Poland	Romania	Serbia
Differentiation of reserve requirement rate by currency				+	+
Differentiation of provisioning requirement by currency				+	+
Higher risk-weights for FC loans			+		+
Lower Loan-to-value ratio for FC loans		+	+		
Lower debt-service-to-income ratio for FC loans		+	+	+	
Maximum ratio of FC loans to capital				+	
Quantitative restrictions on the share of FC mortgages		+			

Sources: Vandenbussche-Vogel-Detragiache (2012) database; and national central banks' websites.

[10] A significant part of FX loans in Hungary and Poland were funded through FX swaps, making differentiated reserve requirements by currency in those two countries a less effective tool.

[11] To reduce the large *stock* of foreign currency mortgages, the Hungarian government later introduced a mortgage early repayment scheme, which allowed households to repay their FX debt at a preferential exchange rate. This measure had a significant effect on the share of FX loans during 2011:Q4-2012:Q1

[12] See European Bank Coordination ("Vienna") Initiative (2011).

37. A panel regression analysis confirms that greater interest rate spreads lead to larger increases in the share of FX loans within countries (Table 5). Explanatory variables in the regression include the spread between the domestic policy rate and the policy rate of that currency's natural cross, the volatility between the domestic currency and that cross currency, and the past appreciation of the domestic currency relative to the cross currency. The natural cross currency is taken to be the euro in all cases but two (in which it is taken to be the Swiss franc). While higher spreads and greater recent appreciation are expected to stimulate demand for FX loans, exchange rate volatility is expected to reduce their attractiveness. Regression results, both for FX loans to non-financial corporations and to households, are consistent with these priors but only the interest spread is consistently significant. Possible concerns about the endogeneity of the interest rate spread to the level of foreign currency loans can be dismissed because the dependent variable is the change in the share of FX loans—not the level—and explanatory variables are lagged one period. [13]

Table 5. Selected CESEE Countries: Determinants of the Share of Foreign Currency Loans, 2002:Q1-2012:Q2

	Non-financial corporations	Households
Explanatory variables:		
Macro variables		
Spread to EUR (or CHF) 1/	+ (**)	+ (**)
2-year volatility of EUR (or CHF) 1/	-	- (**)
2-year appreciation relative to EUR (or CHF) 1/	+	+
Macroprudential policy variables		
Maximum ratio of FX loans to own funds	- (**)	- (***)
Difference of reserve requirement rate by currency	+	-
Differentiation of provisioning requirement by currency	-	-
Higher risk-weights for FX loans	-	+
Lower LTV for FX loans		+ (*)
Lower DTI for FX loans		- (*)
Other restrictions on mortgages		- (*)
Bank funding variables		
Change in logistic transformation of share of FX deposits	+	+
Itraxx index	+	-

Sources: Haver Analytics; IMF, International Financial Statistics; Vandenbussche-Vogel-Detragiache (2012) database; national central banks' websites; and IMF staff calculations.
Note: The dependent variable is the quarter-on-quarter change in the logistic transformation of the share of foreign currency loans (adjusted for exchange rate movements). The unbalanced panel covers the Czech Republic, Hungary, Poland, Romania, and Serbia during 2002:Q1-2012:Q2 and contains 160 observations. The estimation method is fixed effects with robust standard errors. All explanatory variables are lagged one period. One (resp. two, three) stars indicates significance at the 10 (resp. 5, 1) percent confidence level. A "+" or "-" indicates the sign of the estimated coefficient. The strength of each type of macroprudential measure is measured using the same method as Vandenbussche-Vogel-Detragiache (2012). A dummy for Hungary in 2012:Q1 is included to account for the drop in the share of household foreign currency loans by about 6 percentage points to control for the introduction of the government's early mortgage repayment schemes.
1/ The euro is used as the cross currency in all cases but two. Because most FX loans to households in Poland and Hungary are in Swiss franc, the Swiss franc is used in those two cases.

[13] One could argue that higher euroization would lead to lower monetary policy effectiveness and credibility because of (i) lower pass-through; and (ii) central bank paying more attention to the risk of exchange rate swings following monetary policy decisions. The latter would lead to a tightening bias of monetary policy and increased sensitivity of policy rates to the changes of the risk premium.

38. At the same time, several macroprudential measures have been effective in counteracting that effect. The various types of macroprudential measures discussed above are also included in the regression. Because policy-makers are likely to take measures against unhedged FX loans when they anticipate that unhedged FX borrowing would otherwise be strong, endogeneity likely biases the estimates for the effect of these measures. In spite of endogeneity, we do find that the strongest measures—a maximum ratio of FX loans to own funds as in Romania, quantitative restrictions on the share of FX mortgages in Hungary (0 percent of the flow)—and stricter DTI requirements for FX loans had an impact.[14] The availability of funding in FX, captured by the change in the share of FX deposits and by the itraxx index (which is correlated with funding pressures of large Western European banks), does not enter significantly into the regression results.

39. In conclusion, policy rate differentials have been one of the key drivers of changes in FX lending in the group of five CESEE inflation-targeters and at least some macroprudential measures can contain vulnerabilities from FX lending by reducing the extent of the build-up. The case study confirms that strong monetary and macroprudential policies can have mutually reinforcing effects. If a country has a credible monetary policy regime, policy rates can stay relatively low, reducing the incentive for unhedged FX borrowing. Conversely, strong macroprudential policies can help enrich the set of feasible monetary policy options and sustain monetary policy transmission in small open economies. In the case of countries with a high degree of foreign ownership of the banking system, as in the CESEE region, circumvention of domestic macroprudential measures can be a relatively greater concern, and close home-host supervisory cooperation is therefore a requirement to enhance the effectiveness of both macroprudential and monetary policies.

[14] It is likely that more conservative LTV limits for FX loans helped keep default rates relatively low, even if—at least according to the analysis at hand—they may not have done much to slow FX lending.

IV. CREDIT GROWTH AND FOREIGN BANK OWNERSHIP AND FUNDING: A BANK-LEVEL ANALYSIS

The econometric analysis in this note tries to shed light on three key questions: (i) What have been the main drivers of the decline in credit growth since the crisis of 2008/09? (ii) Did foreign-owned banks behave differently—in particular was their credit provision more cyclical than that of domestic banks? and (iii) What role did banks' funding structure play in credit provision and its cyclicality? The findings will inform the debate on the pros and cons of foreign bank presence in CESEE and the search for a suitable banking paradigm for the future.

The analysis uses individual bank information available in the BankScope database. It is primarily based on panel regressions that link each bank's credit growth to macroeconomic conditions in the *host* country, the bank's own fundamentals, and parent bank's fundamentals in the case of foreign banks.

Modeling Credit Growth

40. Credit growth of individual banks is modeled using panel regression analysis which takes the following general specification:

$$crg_{it} = c_i + \alpha \cdot MA_t + \beta \cdot B_{it} + \gamma \cdot CR_{it} + \theta \cdot OWN_{it} + \mu \cdot CROWN_{it} + \varepsilon_{it}.$$

The model explains the growth of gross loans to nonbanks by bank *i* in period *t*, based on:

i) macroeconomic variables, *MA*;[15]
ii) banks' financial fundamentals at the beginning of period *t*, *B*;[16]
iii) crisis controls, *CR*;
iv) controls for foreign ownership, *OWN*;[17]
v) variables controlling the joint effect of crisis and foreign ownership, *CROWN*; and
vi) bank individual effects, c.

[15] From the perspective of an individual bank, contemporaneous GDP growth is an exogenous variable, and does not depend on the its own credit growth.

[16] For flow variables, such as equity returns, values of period *t-1* are used in the regressions. *MA* and *B* are sometimes referred to as the core regressors hereafter.

[17] In this study, a bank is defined as foreign-owned when it has a foreign global-ultimate-owner that controls 25 percent or more of its total shares. The ownership status could change over time.

Determinants of Credit Growth

41. Following the literature on bank credit, a set of *standard* variables are included to control for the macroeconomic conditions and banks' financial fundamentals:

- Real GDP growth (*ggdp*). This measures the overall strength of the economy and is expected to have a positive impact on credit growth.
- Loan loss reserves to gross loans ratio (*rtgl*). High loan loss reserve ratios often indicate poor bank asset quality, and therefore are expected to have negative effects on credit growth.
- Liquid assets to deposits and short-term funding ratio (*lqdty*). The higher this ratio, the less a bank needs to be concerned about its short-term liquidity and therefore may expand its lending more rapidly.
- Equity to net loans ratio (*slvcy*). This ratio measures the capital adequacy of a bank and is expected to have a positive impact on credit growth.
- Net loans to customer deposits ratio (*nltd*). High leverage ratio indicates that a bank is financially stretched. Therefore, banks with high leverage ratios at the beginning of a period are likely to exhibit lower credit growth.
- Return on average equity (*prft*). This measures the profitability of a bank and is expected to have a positive impact on credit growth.
- Bank size relative to GDP (*size*). When a bank grows larger relative to the economy, its room for market expansion becomes smaller. Therefore, this variable is expected to have a negative impact on a bank's credit growth.

42. Exchange rate movement is also included in the regressions. The purpose is, partly, to capture and control valuation effects—while gross loans, as well as many other bank balance sheet variables, are denoted in US dollars in the dataset, banks in the CESEE countries typically lend in both local and foreign currencies. In addition, some CESEE countries experienced large exchange rate fluctuations during the sample period. In this sense, exchange rate movements also serve as an indicator of macroeconomic stability.

43. Inflation, however, is not included as a regressor, although it is often discussed in the literature as a possible factor affecting credit growth. While inflation indeed appeared significant in some trial regressions, the robustness checks suggested that such results were mainly driven by a few hyper-inflation country episodes. Still, the study tests the robustness of its results by replacing either credit growth with inflation-adjusted real credit growth, or real GDP growth with nominal GDP growth. Qualitative results remained largely unchanged.

44. The crisis effect for the period 2008–11 is captured in two different ways. Some specifications include a crisis dummy or a set of crisis-year dummies. Although those dummies can

capture the overall difference between the crisis and pre-crisis periods, they fall short of explaining why such abrupt changes have happened. An alternative way is to interact the core regressors with the crisis dummy, essentially treating the crisis effect as banks changing how they respond to the macroeconomic environment and their own financial fundamentals.

45. The estimations capture the foreign ownership effect in three different ways:

- Some regressions include foreign ownership related dummies, to gauge the average difference between domestic and foreign banks. Those dummies include the foreign ownership dummy itself and its interactions with either the crisis or crisis-year dummies.

- To further explore the variations among foreign banks and examine how parent bank fundamentals may affect their subsidiaries' credit growth, some specifications replace the ownership related dummies by parent bank characteristics. As discussed below, this is possible because the dataset used by this study tracks the ownership information of individual banks over time and uses such information to match foreign subsidiaries with their parent banks. Those variables of parent bank fundamentals are similar to the foreign ownership dummy in that they take the value of zero for all domestic banks. Yet, unlike the foreign ownership dummy that has a constant value for all foreign bank observations, those variables see variations among the foreign banks. As a result, while their aggregate contribution to credit growth still captures the average foreign ownership effect, they can also help to explain some differences among the foreign banks themselves. In addition to testing parent bank fundamentals similar to those of the subsidiaries, the study also tries two additional variables, parent bank funding costs, as measured by the parent bank home country CDS spreads (*guocds*) and cost-to-income ratios (*guoctir*).[18]

- Finally, some regressions interact the core regressors with the foreign ownership dummy, to capture the indirect channels through which parent banks may affect the subsidiaries' credit growth, such as via their influence on how the subsidiaries would respond to their own financial fundamentals.

Data and Sample Coverage

46. The dataset for the regression is constructed from individual bank information available in the BankScope database.

- Two special features of the dataset allow this analysis to provide deeper insight regarding the role of foreign ownership.

[18] In the baseline specifications, the funding costs of parent banks are proxied by the home country CDS spreads. We tried alternative estimations, where parent banks' own CDS spreads were used whenever available. The qualitative results remained largely the same.

- It tracks the ownership of individual banks over time. This is different from most other studies based on the BankScope database, where a bank's ownership is often defined only based on its most recent status. Such accurate account of ownership is important to gauging the ownership effect on credit growth, especially in CESEE, a region that has seen many bank ownership changes.

- Based on the historical ownership information of each individual bank, the dataset carefully matches foreign subsidiaries with their parent banks, whose information is also available in BankScope. The additional information on parent banks enables the study to not only look at the difference between domestic and foreign banks, but also explore the variations among foreign banks and examine the impact of parent banks' financial conditions on subsidiaries' credit growth.

47. The sample covers all countries in the CESEE region, except Russia, and includes data from 2001 to 2011. Russia is excluded for the following reason. Compared with most other CESEE countries, foreign banks account for only a small share of Russia's banking sector. As a result, foreign banks in Russia are likely to behave differently from those in other CESEE countries. In addition, in the raw dataset, more than half of the observations are for Russian banks. If included in the regressions, they would likely drive the results and paint a distorted picture of the CESEE region. The country and time distributions of the sample are provided in Tables 6 and 7, respectively, and the summary statistics are reported in Table 8.

Estimation Results

48. The baseline results are reported in Table 9. From column (1) to column (5), more flexibilities are progressively added to the model. In column (1), the crisis and foreign ownership effects are

Table 6. Country Distribution of the Sample

Country	No. of obs. for domestic banks	No. of obs. for foreign banks	Total no. of obs.	Country	No. of obs. for domestic banks	No. of obs. for foreign banks	Total no. of obs.
Albania	13	41	54	Macedonia, FYR	47	45	92
Belarus	45	42	87	Moldova	59	21	80
Bosnia & Herzegovina	60	84	144	Montenegro, Rep. of	20	27	47
Bulgaria	81	83	164	Poland	34	97	131
Croatia	175	101	276	Romania	47	110	157
Czech Republic	17	94	111	Serbia, Republic of	88	84	172
Estonia	18	30	48	Slovak Republic	14	102	116
Hungary	18	46	64	Slovenia	63	38	101
Kosovo, Republic of	1	17	18	Turkey	70	68	138
Latvia	89	53	142	Ukraine	181	108	289
Lithuania	43	44	87				
Total	1183	1335	2518				

Sources: BankScope and IMF staff calculations.

Table 7. Time Distribution of the Sample

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
No. of obs. for domestic banks	90	88	95	112	116	117	118	113	122	113	99	1183
No. of obs. for foreign banks	48	55	65	76	104	125	151	171	174	191	175	1335
Total	138	143	160	188	220	242	269	284	296	304	274	2518

Sources: BankScope and IMF staff calculations.

captured by the crisis dummy, the foreign ownership dummy, and their interaction term. Column (2) replaces the crisis dummy, including in the interaction term, with crisis-year dummies, to show richer dynamics during the crisis period. In column (3), rather than including the crisis or crisis-year dummies themselves, the model interacts the core regressors with the crisis dummy. This provides a better understanding of the reasons for the abrupt changes during the crisis period. Column (4) replaces the foreign ownership related dummies with parent bank characteristics. The aim is to explore the variations among foreign bank subsidiaries and study how parent bank fundamentals may affect their credit growth. The last column further interact the core regressors, and their interactions with the crisis dummy, with the foreign ownership dummy. The purpose is to check whether foreign bank subsidiaries, in making their lending decisions, respond to their financial

Table 8. Summary Statistics of Data 1/

Variable	No. of observation	Mean	Standard deviation	Min	Max
Growth of gross loans (%)	2518	31.2	45.1	-79.2	402.7
Real GDP growth (%)	2518	3.6	4.9	-18.1	14.3
Exchange rate change (%)	2518	-0.1	12.6	-20.0	100.0
Bank size (% of host country GDP, 1st lag)	2518	4.3	9.6	0.0	172.8
Reserves to gross loan ratio (%, 1st lag)	2518	5.7	5.1	0.0	44.0
Liquidity to dep. & st funding ratio (%, 1st lag)	2518	39.5	24.5	3.6	246.8
Equity to net loans ratio (%, 1st lag)	2518	29.1	25.5	-3.8	294.2
Net loans to customer deposits ratio (%, 1st lag)	2518	114.1	103.8	13.2	1898.6
Return on average equity (%, 1st lag)	2518	8.6	18.9	-151.5	560.0
Parent equity to total assets ratio (%)	902	6.5	3.0	0.9	24.2
Parent net loan to dep & st funding ratio (%)	902	135.9	52.9	31.7	379.2
Parent cost to income ratio (%)	902	64.4	16.0	12.7	192.8
Parent bank home country CDS spreads	902	90.1	134.5	1.8	812.4

1/ Summary statistics of parent bank variables are only reported for foreign bank observations included in the regressions with those variables.

Sources: BankScope and IMF staff calculations.

fundamentals differently from domestic banks, and how such difference might have evolved during the crisis period.[19]

49. Macroeconomic conditions appear to be a key factor driving credit growth, especially during the pre-crisis period. The regression results in columns (3)–(5) of Table 9 show that, during the boom period of 2001–07, a one percentage point rise in real GDP growth had led to some 1½ to 2 percentage points increase in banks' annual credit growth. But such positive impact has dropped significantly since 2008, by around 1½ percentage points.

50. Consistent with the literature, the study finds that banks' own financial fundamentals also have significant influence on their lending decisions. Banks tend to expand their lending more rapidly when:

- Their asset quality is better (negative coefficients on *rtgl*);
- They are less subject to liquidities constraints (positive coefficients on *lqdty*);
- They have higher capital reserves (positive coefficients on *slvcy*);
- They are less financially stretched (negative coefficients on *nltd*); and
- They are more profitable (positive coefficients on *prft*).

Credit growth slowdown since 2008

51. The significant credit slowdown since 2008 was mainly due to three factors: weakened macroeconomic conditions, deteriorations in banks' own fundamentals, and banks' lending decisions becoming more sensitive to their own fundamentals.

52. Banks' more conservative lending behavior from 2009 onward is evidenced by the estimation results shown in columns (3)–(4) of Table 9. The coefficients on the crisis interaction terms, including real GDP growth, *rtgl*, *nltd* and *prft*, all suggest that banks were extending less credits given the same fundamentals. Another indication of the change is the importance shift between the short-term liquidity (*lqdty*) concern and the long-term solvency consideration (*slvcy*). Better liquidity and capital adequacy both had positive effects on credit growth during the pre-crisis period. Nonetheless, while the positive effect of better liquidity have declined significantly since

[19] The study has carried out extensive tests to check the robustness of the results. For instance, to make sure the results were not driven by outliers, all the models were re-estimated by excluding: a) residual outliers; b) hyper-inflation episodes; c) country episodes with large exchange rate movements; d) observations with ownership change; e) subsidiaries of non-bank foreign owners, and f) one sample country at a time. Another example is that, to make sure the results were not driven by the inclusion of certain regressors, such as the exchange rate movements, each model was re-estimated while excluding those regressors. In all the tests, the qualitative results remained largely the same as those reported here.

Table 9. Credit Growth - Baseline Regression Results

Dependent variable: gross loan growth (%) 1/	(1)	(2)	(3) 2/
Real GDP growth	0.481**	1.327***	2.115***
	(0.212)	(0.280)	(0.407)
x Crisis dummy			-1.593***
			(0.488)
Exchange rate depreciation 3/	-0.688***	-0.856***	-0.941***
	(0.080)	(0.084)	(0.117)
x Crisis dummy			0.276*
			(0.151)
Bank size (% of host country GDP, 1st lag)	-0.845***	-0.820***	-1.293***
	(0.234)	(0.232)	(0.330)
x Crisis dummy			0.368**
			(0.186)
Reserves to gross loan ratio (%, 1st lag)	-1.680***	-1.554***	-0.975***
	(0.231)	(0.237)	(0.251)
x Crisis dummy			-1.576***
			(0.401)
Liquid assets to dep. & st funding ratio (%, 1st lag)	0.262***	0.261***	0.417***
	(0.060)	(0.062)	(0.068)
x Crisis dummy			-0.372***
			(0.094)
Equity to net loans ratio (%, 1st lag)	0.359***	0.370***	0.231***
	(0.061)	(0.060)	(0.064)
x Crisis dummy			0.662***
			(0.110)
Net loans to customer deposits ratio (%, 1st lag)	-0.040***	-0.039***	
	(0.014)	(0.013)	
x Crisis dummy			-0.090***
			(0.015)
Return on average equity (%, 1st lag)	0.137***	0.147***	0.089*
	(0.048)	(0.049)	(0.050)
x Crisis dummy			
Foreign dummy	22.176***	22.593***	21.414***
	(4.151)	(4.125)	(4.183)
Foreign dummy x crisis dummy	-3.311		
	(3.545)		
Foreign dummy x 2008 dummy		5.217	-4.445
		(5.156)	(4.388)
Foreign dummy x 2009 dummy		-6.644	0.772
		(5.190)	(4.515)
Foreign dummy x 2010 dummy		-4.258	-0.311
		(5.211)	(4.295)
Foreign dummy x 2011 dummy		-11.044**	-13.155***
		(5.538)	(4.422)
Crisis dummy	-27.450***		
	(3.001)		
2008 dummy		-33.667***	
		(4.070)	
2009 dummy		-5.482	
		(5.670)	
2010 dummy		-17.805***	
		(4.316)	
2011 dummy		-25.954***	
		(4.571)	
Observations	2,518	2,518	2,518
R-squared	0.330	0.344	0.352
Number of banks	455	455	455

Dependent variable: gross loan growth (%) 1/	(4) 2/	(5) 2/
Real GDP growth	1.603***	1.885***
	(0.435)	(0.413)
x Crisis dummy	-1.393***	-1.358***
	(0.490)	(0.474)
Exchange rate movement 3/	-0.722***	-1.053***
	(0.088)	(0.128)
x Crisis dummy		0.575***
		(0.165)
Bank size (% of host country GDP, 1st lag)	-1.213***	-1.442***
	(0.376)	(0.373)
Reserves to gross loan ratio (%, 1st lag)	-0.867***	-0.744***
	(0.281)	(0.277)
x Crisis dummy	-1.712***	
	(0.436)	
x Foreign dummy x crisis dummy		-2.637***
		(0.582)
Liquid assets to dep. & st funding ratio (%, 1st lag)	0.362***	0.311***
	(0.074)	(0.068)
x Crisis dummy	-0.297***	-0.155**
	(0.095)	(0.071)
Equity to net loans ratio (%, 1st lag)	0.373***	0.441***
	(0.075)	(0.071)
x Crisis dummy	0.590***	
	(0.113)	
x Foreign dummy x crisis dummy		0.731***
		(0.136)
Net loans to customer deposits ratio (%, 1st lag)		
x Crisis dummy	-0.079***	-0.078***
	(0.015)	(0.015)
Return on average equity (%, 1st lag)	0.349***	0.371***
	(0.111)	(0.101)
x Crisis dummy	-0.351***	
	(0.128)	
x Foreign dummy		-0.446***
		(0.146)
Parent bank home country CDS spreads	-0.051***	-0.055***
	(0.012)	(0.013)
Parent cost to income ratio (%)	-0.216**	-0.220**
	(0.087)	(0.088)
Parent net loans to deposits ratio (%)	0.174***	0.187***
	(0.046)	(0.047)
Parent equity to total assets ratio (%)	2.498***	2.279***
	(0.616)	(0.620)
Observations	2,085	2,085
R-squared	0.370	0.375
Number of banks	423	423

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

1/ Nominal credit growth measured in US dollars.

2/ The general-to-specific-modeling method is applied.

3/ The exchange rates are against the US dollar.

Sources: BankScope and IMF staff estimations.

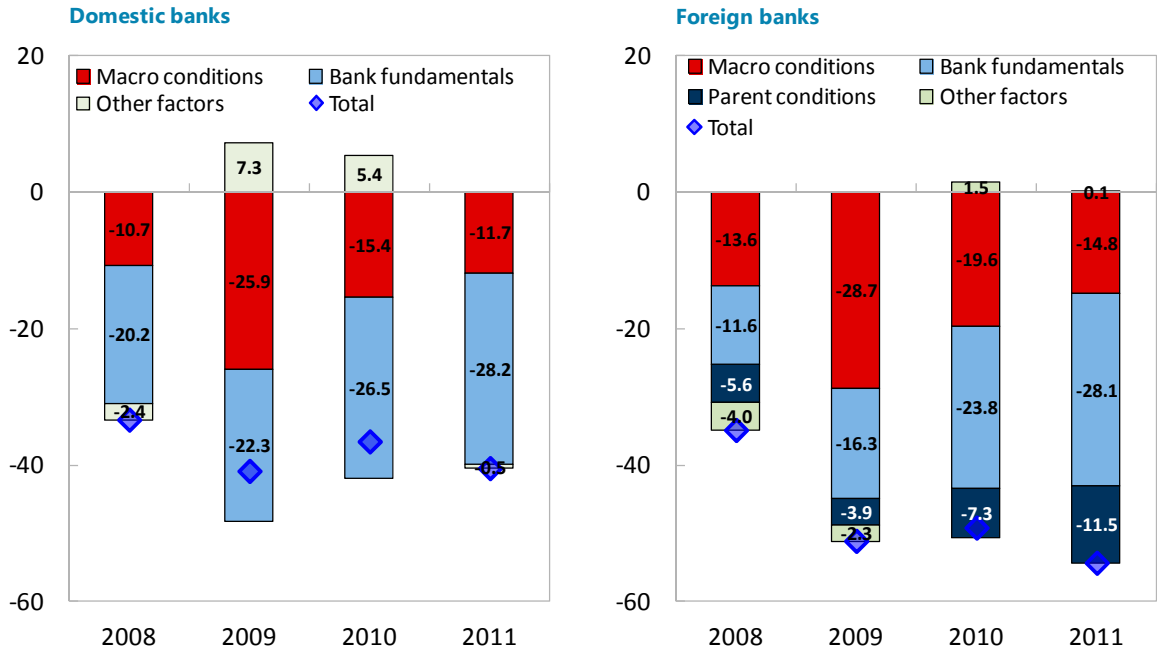
2008 (negative coefficients on *lqdty-crisis*), solvency has become a much more important factor in banks' lending decisions (positive coefficient on *slvcy-crisis*).

53. Figure 7 displays the decomposition of the credit slowdown relative to 2001–07, based on the regression reported in column (5) of Table 9.[20] It shows that the worsening of macroeconomic conditions played a particularly large role in 2009, accounting for more than 60 percent of the overall credit slump. In 2010 and 2011, however, it was banks' own weakened fundamentals and their more conservative way of responding to these fundamentals that had put most drag on credit growth.

Why did credit growth of foreign banks slow down more?

54. Credit growth of foreign banks has declined more than that of domestic banks since 2008, as shown in Figure 8. During the pre-crisis period, the annual credit growth of foreign banks was, on average, 6 percentage points higher than that of domestic banks. However, this difference has largely disappeared since 2008. Indeed, in 2011 the annual credit growth of foreign banks was almost 6 percentage points lower than that of domestic banks.

Figure 7. Decomposition of Credit Growth Slowdown in 2008-11
(Relative to 2001-07 average, percentage points)

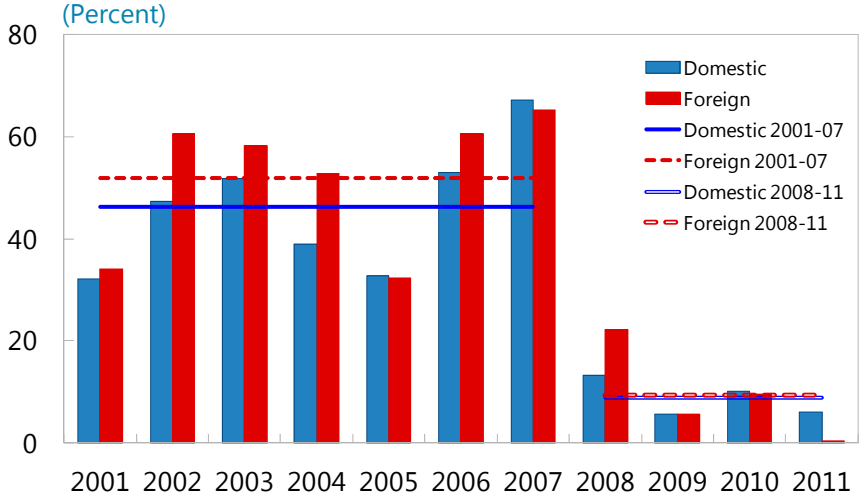


Note: The results of the underlying regression are reported in column (5) of Table 9.

[20] Compared with column (4), the regression in column (5) added additional flexibility to the model by allowing foreign banks to respond to fundamentals differently from domestic banks, during both the pre-crisis and crisis periods.

55. The more pronounced credit growth slowdown seen among foreign banks can be largely explained by the tightening of their parent banks' funding conditions. Figure 9 decomposes the difference in credit growth slowdown between foreign and domestic banks since 2008. It shows that the tightening in parent banks' funding conditions has been the largest contributor throughout the crisis period, while other factors, including changes in other parent bank fundamentals, as well as the macroeconomic conditions and banks' own financial fundamentals, accounted for only a small share.

Figure 8. CESEE: Average Annual Credit Growth by Banks, 2001-11[1]
(Percent)

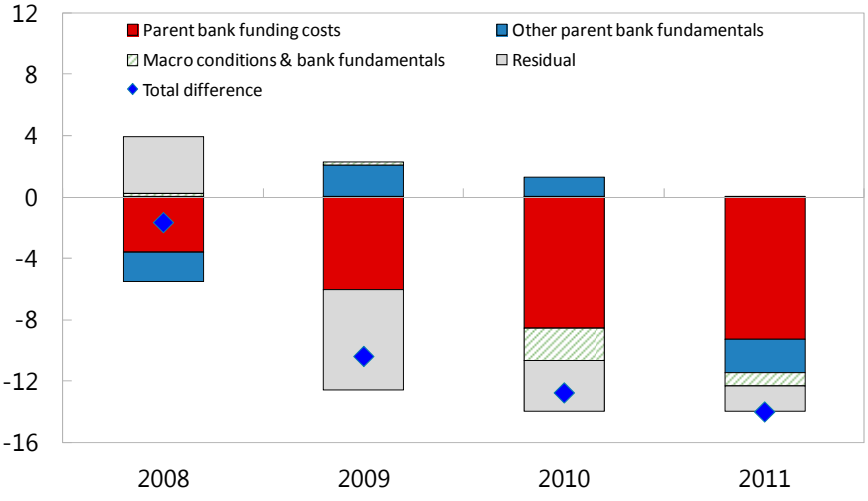


Sources: BankScope; and IMF staff calculations.
[1]Unweighted average, excluding Russia. Credit is measured in US dollars.

Foreign ownership effect on credit growth and credit cyclicality

56. Foreign ownership *per se*, after controlling all other factors, seems associated with higher credit growth, although such positive effect appeared to have declined since 2008. Table 10 reports the estimates of the foreign ownership effect. The results in columns (1)–(3) suggest that foreign ownership has boosted the subsidiaries' annual credit growth by 10 to 12½ percentage points during the pre-crisis period.[21] Since 2008, the differential has dropped to some 7–9½ percentage points. This small

Figure 9. Why Foreign Banks Credit Growth Slowed Down More than Domestic Banks during 2008-11
(Percentage points)



Sources: BankScope; and IMF staff estimates.

[21] This is larger than the *unconditional* (without controlling other factors) difference between the credit growth by foreign and domestic banks, suggesting that foreign banks might have achieved faster credit expansion with weaker fundamentals than domestic banks.

Table 10. Foreign Ownership Effect on Subsidiaries' Credit Growth 1/

(Percentage points)	Estimate 1	Estimate 2	Estimate 3	Estimate 4 2/	Estimate 5 2/
2001-7 average	9.9	9.9	12.4	18.6	22.3
2008-11 average	7.4	7.1	9.7	12.5	13.3
2001-11 average	9.0	8.9	11.4	16.4	19.0

1/ The estimates are based on the regression results reported in Table 9. For Columns (1)-(3), they are calculated from the coefficients on the foreign ownership related dummies, adjusted for the difference in the average individual bank effects between foreign and domestic banks. For Columns (4) and (5), they are the aggregate contribution to credit growth by variables of parent bank characteristics, also adjusted for the difference in the average individual bank effects between foreign and domestic banks.

2/ Why does the foreign ownership effect appear larger when based on regressions (4) and (5)? The identification of the foreign ownership effect critically depends on those banks in the sample that have ownership changes. Regressions (4) and (5) dropped many foreign bank observations due to missing parent bank information. Those missing observations include unproportionally more ownership change cases that happened during the crisis period, which saw less credit growth hike after the ownership changes, relative to the cases that happened during the pre-crisis period. As a result (of missing those ownership change cases with smaller credit hike), the foreign ownership appear larger in these regressions.

Sources: BankScope and IMF staff estimations.

decline in the differential of some 2¾ percentage points, relative to the magnitude of the overall credit slump, suggests that foreign ownership has contributed only very moderately to the procyclicality of credit growth.[22]

57. The estimation results in column (5) of Table 9 show that foreign banks respond to some fundamentals differently from domestic banks. First, while domestic banks grow faster when they are more profitable, this is not true for foreign banks, perhaps because they do not depend as much on retained earnings to build capital and grow. Second, foreign banks have behaved differently since the onset of the crisis, as they became much more sensitive to the quality of their loan portfolio and solvency started to carry more weights in their credit decisions.

58. Among foreign bank subsidiaries, the ownership effect on credit growth seems to depend on several key parent bank characteristics, including funding costs, capital adequacy, funding leverage ratio, and cost-efficiency. The regression results in columns (4) and (5) of Table 9 indicate that foreign bank subsidiaries tend to expand their credit faster when their parents have:

- Lower funding costs (negative coefficients on *guocds*);
- More adequate capital reserves (positive coefficients on *guoslvcy*);

[22] The estimates based on the regressions in columns (4) and (5) of Table 9 indicate even larger positive foreign ownership effects. But this is mainly because they dropped some foreign bank observations due to missing parent bank information. Those missing observations included disproportionally more ownership change cases that happened during the crisis period, which often saw much smaller credit growth hikes after the ownership changes relative to those cases that happened during the boom period. Since ownership change cases are the key to the identification of the foreign ownership effect, missing those cases with smaller credit boosts led to a larger estimated foreign ownership effect.

- Better access to funding (positive coefficients on *guonltd*); and
- Higher operational efficiency (negative coefficients on *guoctir*).

Funding structure and the cyclicality of credit

59. In contrast to foreign ownership, banks' funding structure had a large bearing on cyclicality. This can be seen from the regression results in columns (3)–(5) of Table 9, where the net loans to customer deposits ratio only received significant negative coefficients for the crisis period. These results suggest that while funding leverage ratio did not seem to carry much weight in banks' lending decisions before the crisis, it has become a major concern since 2008. The decomposition exercises show that, for both foreign and domestic banks, this factor alone can account for over 20 percent of the total credit growth slowdown since 2008.[23]

60. The results are indicative of foreign funding being a major contributor to procyclicality in lending. Within the sample of foreign banks, the net loans to customer deposit ratio also gains significance only after 2008 and hence explains a large part of the credit growth slowdown. While the BankScope database does not provide information on parent bank funding, it is fair to assume that high net loan to customer deposit ratios in foreign banks are closely associated with high reliance on parent bank funding, implying that large recourse to foreign funding likely adds to the procyclicality of credit.

[23] The regressions in Table 9 take the net loans to customer deposits ratio at the beginning of the period as the regressor, whose results reflect how current funding leverage ratio would affect a bank's future credit expansion. When this regressor is replaced by the end-period funding leverage ratio, the regressions (not reported) show that it has a strong positive relation with credit growth, suggesting that when banks leverage up (for instance, when they get better access to foreign funding), they tend to expand their credit more rapidly.

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