

# Cross-border bank flows and foreign banks in the global financial crisis - is Eastern Europe different?

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## ***Abstract***

We examine whether the presence of foreign banks mitigated the sudden stop of cross-border bank flows to emerging markets in the global financial crisis. We find that foreign banks had no stabilizing effect. However, Central and Eastern Europe is different. Cross-border bank flows to Eastern European countries with a higher foreign bank asset share was significantly more stable during the crisis than flows to other emerging markets. This holds in particular for cross-border bank-to-bank flows. We argue that this is due to intra-bank flows as the European integration process has blurred the boundaries between home and host countries and led to additional efforts by parent banks to stabilize cross-border bank flows to the region in the global financial crisis.

Keywords: foreign banks, cross-border bank flows, financial crisis, Eastern Europe

JEL classification: E44, F36, G21

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## 1. Introduction<sup>1</sup>

‘Europe is different’ - The phrase has become a popular heading for characterizing developments in emerging Europe compared to its emerging market peers (e.g. IMF 2010a). Originally, the term was chosen to highlight the fact that in the European Union (EU) net capital has been flowing ‘downhill’ as predicted by the standard textbook model (Obstfeld and Rogoff 1996). By contrast, the convergence process in most other countries has been a prime example of the *Lucas Paradox* (Lucas 1990), with net capital flowing ‘uphill’. Abiad et al. (2007) find that a high degree of financial integration between mature and converging countries within Europe has been a key factor driving this result, with financial integration in Europe itself being a function of the broader political and economic integration process which has been taking place for more than fifty years.

Since the mid- to late 1990s European financial integration has been characterized by a new form of financial integration, namely the widespread presence of EU-15 banks in Central and Southeastern Europe (CESEE), i.e. the New Member States in Central and Southeastern Europe and the Baltics as well as the countries of South-eastern Europe with an EU accession perspective. This peculiar form of financial integration is found to be a significant factor in explaining the divergent pattern of net capital flows in Europe compared to net capital flows in the convergence club consisting of the United States and the countries in emerging Asia (Herrmann and Winkler 2009). In a similar vein, Friedrich et al. (2010) identify parent banking as an important factor for positive growth effects of financial integration which emerge in CESEE countries but not in other emerging markets.

Based on a sample of 56 emerging market economies (EMEs) and estimating a cross-sectional OLS model we test whether a strong presence of foreign banks significantly mitigated the sudden stop of cross-border bank flows from mature economies to EMEs in the global financial crisis. Controlling for the size of the pre-crisis boom in cross-border flows and several other potential determinants we find that the presence of foreign banks had no significant stabilizing effect. However, our results suggest that Eastern European countries have been different conditional on the share of assets held by foreign banks in the respective host countries. Beyond the threshold of an asset share of about 37 percent, the impact of foreign banks in CESEE has been significantly different compared to other emerging markets, mitigating the sudden stop in cross-border bank flows. Moreover, while not completely conclusive, our results suggest that the conditional impact of a high share of assets held by foreign banks on the stability of cross-border bank flows can only be observed for CESEE and not for other EMEs. Finally, the stabilizing effect of a higher share of assets held by foreign banks in the CESEE region can be traced to cross-border bank-to-bank flows.

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Our results lend further support to the view that the process of European integration has been a special one. Most importantly, the common market has blurred the boundary between home and host countries. This has reinforced cross-border bank flows, including flows between parent banks and their subsidiaries. As the environment for financial integration is different for other EMEs, a similar effect has been absent, suggesting that parent banks of the respective subsidiaries were less keen to hold on to their pre-crisis positions against the background of substantial financial distress in global financial markets.

The paper is organized as follows: after a review of the literature and the empirical evidence on foreign banks and financial stability in EMEs (section 2), we describe our data and model specification (section 3). Sections 4 and 5 present the results and robustness checks and section 6 concludes.

## **2. Literature review and empirical evidence**

Boom-bust cycles in capital flows characterized financial liberalization in emerging markets and developing countries in the 1990s and triggered substantial fluctuations in domestic credit and economic activity (Tornell and Westermann 2002, Mendoza and Terrones 2008). Against this background, two policy responses to stabilize capital flows have been discussed. The first response has been a cautious approach toward capital account liberalization (Rodrik and Subramanian 2009, Ostry et al. 2010). The second response relied on measures to strengthen domestic banking sectors in EMEs, as sudden stops and capital flow reversals are a feature of banking sectors characterized by poor governance and a weak supervisory and regulatory framework (Krugman 1998, Llewellyn 2002, Hernández and Landerretche 2002).

Foreign institutions are expected to strengthen financial stability in EMEs by improving the solvency and liquidity of host country banking systems. Banking sector solvency improves because foreign banks are better capitalized than their domestic peers. Foreign banks are also said to have superior credit technologies, better management expertise and governance structures and are less open to government and political interference than domestic banks (Detragiache et al. 2008). Banking sector liquidity is enhanced because depositors' trust in the stability of foreign institutions makes bank runs less likely. In addition, foreign banks may mitigate the risk of a credit crunch following a domestic shock as they are more diversified than local banks with primarily local operations. Also sudden stops and capital flow reversals are less likely as parent banks will provide the needed international liquidity in crises periods to safeguard their investments in the respective host countries (Moreno and Villar 2005). Finally, foreign bank entry may strengthen banking supervision in EMEs because foreign banks are supervised by their home country supervisors

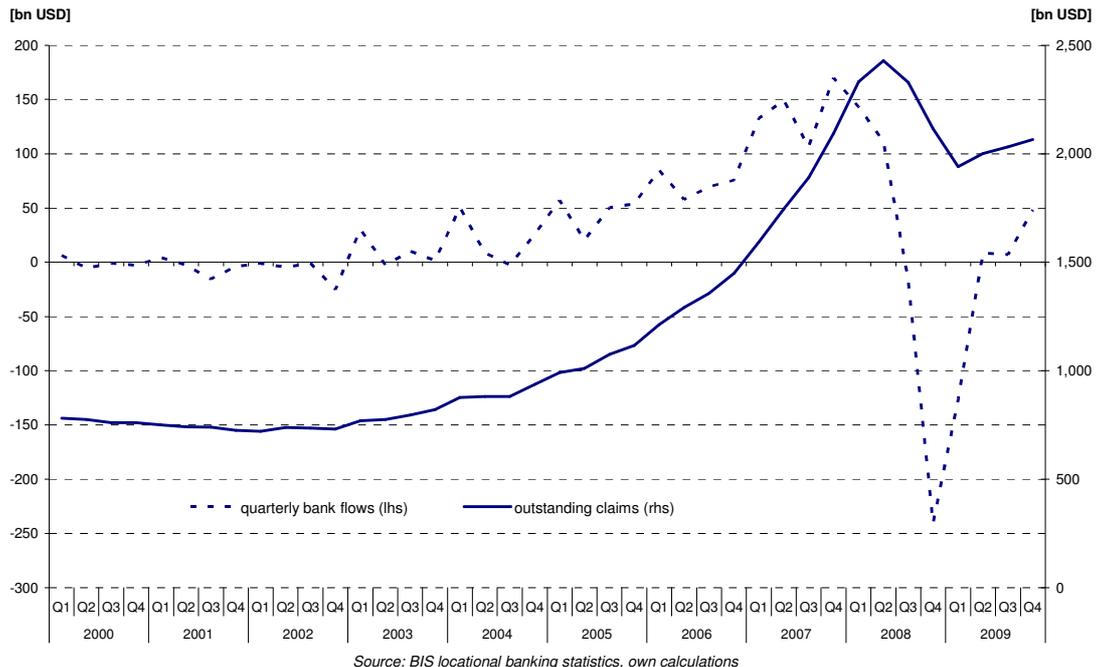
which in general are seen as more demanding and strict compared to supervisors in most EMEs (Peek and Rosengren 2000). Thus, inviting foreign banks to enter domestic banking sectors has been identified as a major element of a strategy to strengthen EME banking sector and thereby mitigate boom-bust cycles without restricting capital flows and financial integration (Sachs and Woo 1999, Mishkin 2001, 2006).

Most empirical studies provide evidence that foreign banks have stabilized credit growth in EMEs when facing local shocks to financial stability (De Haas and Van Lelyveld 2006, 2010, Arena et al. 2007, Aydin 2008, Dages et al. 2000). However, the stability enhancing effect relies on the strength of the respective parent banks. In a crisis originating in the parent banks' home countries this strength cannot be taken for granted. Instead, foreign banks may transmit financial distress in their home countries to countries where they operate. The decline of lending by Japanese banks operating in the US in the aftermath of the Japanese financial crisis provides an early example (Peek and Rosengren 1997). For Latin America Galindo et al. (2010) confirm that credit supply by foreign-owned banks in general shows a larger response to external shocks than credit supply by domestic banks.

Cross-border bank flows are negatively affected by financial stress in mature economies due to rising risk aversion and tighter lending conditions (World Bank 2008). A strong presence of foreign banks in the domestic banking sector might provide an additional transmission channel, as parent banks confronted with a crisis in the home market may reduce their cross-border claims in order to bolster domestic liquidity (Geršl 2007, Cetorelli and Goldberg 2008). However, the evidence provided by Garcíá Herrero and Martínez Pería (2006) suggests that the volatility of foreign claims on EMEs is negatively associated with an increasing share of foreign claims in the form of local claims extended by parent banks' subsidiaries in the respective host countries.

After the collapse of *Lehman Brothers*, cross-border bank flows to EMEs dropped substantially (Figure 1) and quite differently among regions and countries. Have EMEs with a larger presence of foreign presence exhibited a stronger or a smaller reversal of cross-border bank flows than countries where foreign-owned banks account for only a small share of total banking sector assets?

**Figure 1: Aggregated cross-border bank flows to EMEs**



On the one hand, we would expect an aggravating effect, as the loss of access to global financial markets made parent banks unable or unwilling to support their subsidiaries. On the other hand, the sudden stop of cross-border bank flows might have been less pronounced for countries with a strong presence of foreign banks for three reasons:

- a) Firstly, flows between parent banks and subsidiaries (intra-bank lending) are less prone to problems of asymmetric information compared to lending on international capital markets (García Herrero and Martínez Pería 2006, De Haas and Van Lelyveld 2010).
- b) Secondly, parent banks attach a high value to their investments in terms of capital and reputation, i.e. parent banks will only withdraw funds from subsidiaries if this does not jeopardize the viability of their subsidiaries.
- c) Thirdly, parent banks have access to lender of last resort facilities (Broda and Levy Yeyati 2002) as well as support mechanisms of home country governments and international financial institutions.

These arguments are of particular relevance in the CESEE region. Since the mid-1990s subsidiaries and branches of parent banks with headquarters in the EU-15 entered the region because they perceive the host countries as an extension of the single domestic European market (Wiedner 2005, Wimmer 2005, Profumo 2006). This also explains the strong focus on retail activities as many of the respective parent banks are established retail banks in their home markets. Thus, EU-15 banks entered CESEE host countries with the goal of exploiting their comparative advantages, namely their 'reputational capital' (Hellman and Murdock, 1998) in expanding the deposit business, and

their superior credit technology, governance structure and capitalization in expanding loans to businesses and households.<sup>2</sup> Finally, stability of cross-border bank flows to CESEE countries might have been boosted by the overall process of European financial integration, including the convergence of regulatory and supervisory standards to those in the EU-15.

Several studies look at the link between foreign bank presence and financial stability in EMEs during the global financial crisis. Cetorelli and Goldberg (2010) find that the transmission of the liquidity shock after *Lehman* was severe for those EMEs with a strong presence of foreign banks that were subsidiaries of parent banks with a US Dollar liquidity shortage in September 2008. However, their results also suggest that locally owned banks in EMEs relying on cross-border flows from the same mature economies reacted in a similar way as foreign banks' subsidiaries. Hence, foreign ownership as such did not aggravate the credit contraction in host countries. Kamil and Rai (2010) also find that local lending by foreign banks with a strong funding base in the respective host countries is more resilient to global shocks than lending by domestic owned banks and may even compensate for a decline in the cross-border component of foreign claims. EBRD (2009) shows that a higher foreign bank presence contained outflows of cross-border bank flows after the *Lehman* collapse. This holds for a narrow sample involving 25 transition countries and for a broad sample of 64 emerging markets. Vogel and Winkler (2010) present similar results based on a larger sample of 97 countries. However, they also find that the stabilizing impact of foreign bank presence seems to be driven by two regions, Eastern Europe and Central Asia and Sub-Saharan Africa.

De Haas and van Horen (2011) conduct an analysis for cross-border syndicated bank lending to banks and non-financial firms in the post-crisis period. For EMEs they find that bank-to-bank lending, which - by definition excludes parent bank lending to subsidiaries - took the hardest hit. Lending to non-banks was less affected if the lending banks had a subsidiary in the recipient country. This suggests that a stronger presence of foreign banks might reduce problems of asymmetric information and thereby the risk of sudden stop phenomena.

Finally, Lahnsteiner (2011) provides evidence for a stabilizing impact of the lending relationship between parent bank and subsidiaries in selected CESEE countries during the global financial crisis by reviewing annual reports and financial stability reviews published by the central banks of the respective host countries. Several statements, in some cases supported by data, indicate that parent banks did not withdraw funds from their subsidiaries in the immediate post-*Lehman* period. This is confirmed by the pattern of a proxy for parent bank lending to their subsidiaries, derived from BIS data. The share of this proxy in total foreign claims rose during the crisis period suggesting that

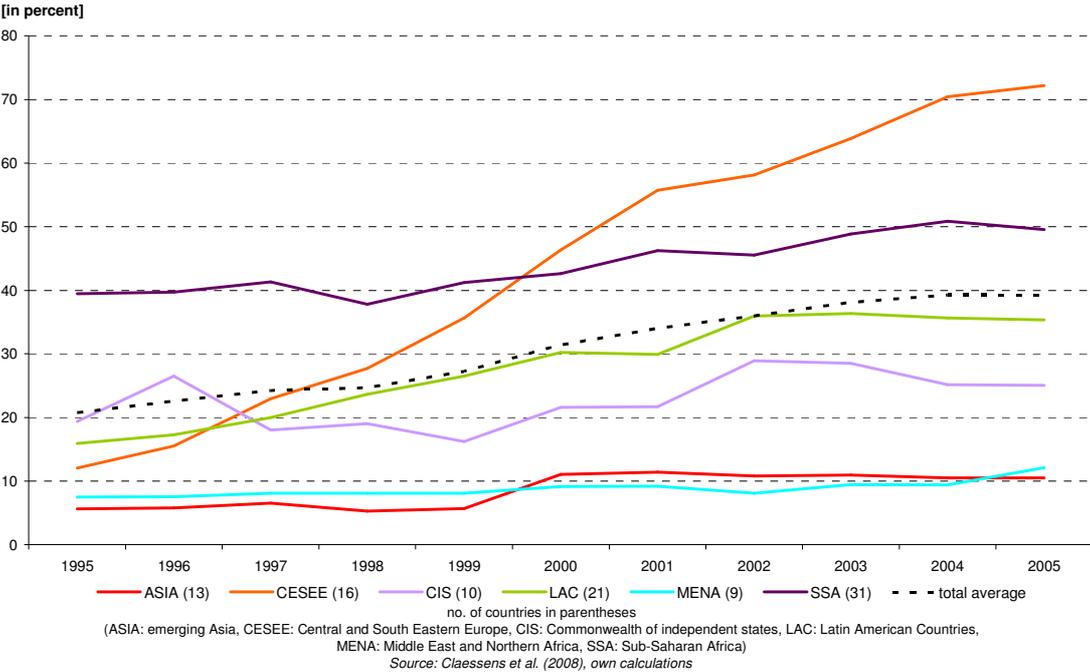
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<sup>2</sup> Thus, foreign bank activities in CESEE are difficult to explain with traditional arguments of foreign bank entry like the 'follow the client' motive (Wezel 2004) or 'cherry-picking' of the best domestic borrowers (Griogrian and Manole 2002).

parent bank lending was a major component in stabilizing cross-border bank flows to CESEE countries after the *Lehman* shock.

CESEE stands out as the emerging market region where, in an environment of rapid capital account liberalization, foreign bank presence has expanded most since the early 1990s, rising from 12.9 percent of total banking sector assets in 1995 to 72.2 percent of total assets in 2005 (Figure 2).<sup>3</sup> Moreover, banks from mature economies, here: the EU-15, account for more than 90 percent of foreign entry into the region. Sub-Saharan Africa is the region ranked second, with foreign banks accounting for almost 50 percent of total banking sector assets. However, foreign entry in recent years has mainly taken the form of south-south FDI (World Bank 2008) while most foreign banks from mature economies have a long-standing presence closely tied to the colonial past (Daumont et al. 2004). Thus, in contrast to the CESEE region, the entry of mature economy banks into African banking sectors does not reflect policies aimed at strengthening domestic financial sectors in an increasingly integrated global financial system. This is different in Latin America where foreign banks have considerably expanded their presence over the last twenty years. However, compared to the CESEE, there is much more heterogeneity in Latin America. While the banking sectors of some countries, such as Mexico and Peru, are dominated by foreign banks, foreign banks play a comparatively minor role in other countries (Brazil, Colombia). Finally, foreign bank activity in the Commonwealth of Independent States, the Middle East and Northern Africa as well as emerging Asia has been basically stable at low levels.

**Figure 2: Average foreign bank asset share per region**



<sup>3</sup> Data on foreign bank presence comes from Claessens et al. (2008) where foreign banks are defined as banks with direct foreign ownership of more than 50 percent of capital.

### 3. Data and Model Specification

We analyze whether foreign bank presence had a stabilizing impact on cross-border bank flows. Our sample includes 56 EMEs<sup>4</sup> of which 16 are CESEE countries (for a list of countries see Appendix 1). Data on cross-border bank flows are from the BIS Locational banking statistics in which banks report their external positions. This happens quarterly and on a gross and unconsolidated basis, i.e. including claims and liabilities of reporting banks vis-à-vis their own affiliates. Claims include all principal balance sheet items, mainly standard cross-border loans, holdings of securities and participations. The BIS further estimates the exchange rate adjusted changes between the quarterly reported stocks. Currently banking institutions in 42 countries are reporting to the BIS Locational statistics. As these countries include all major economies and the largest centers of financial activity, the coverage of international banking activity is virtually complete (Wooldridge 2002).

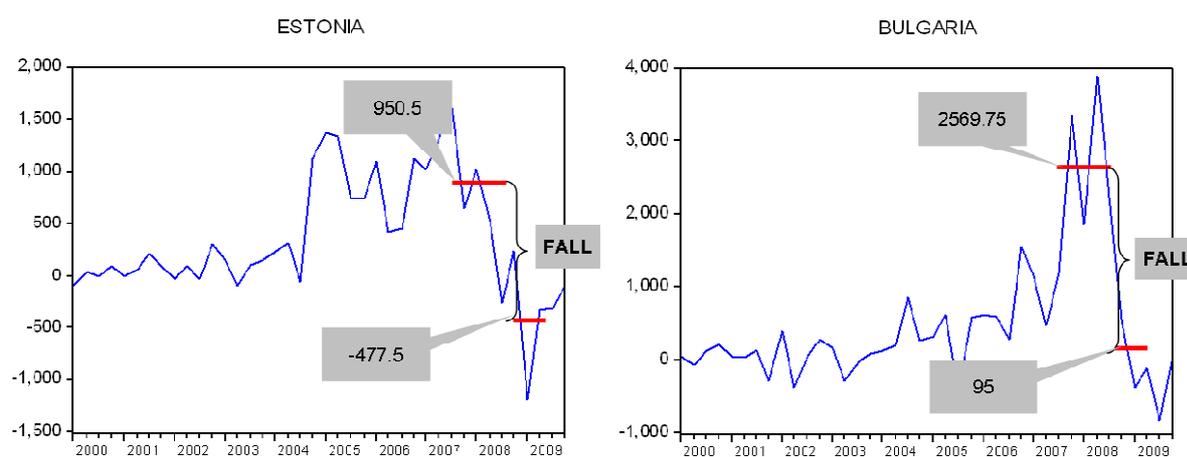
We measure the instability of cross-border bank flows during the financial crisis with a variable called *FALL*. *FALL* is the difference between the average pre-shock capital inflows (2007Q3-2008Q2) and the average post-shock in- or outflows (2008Q4-2009Q1).<sup>5</sup> It depicts the change from the (in most cases) higher pre-*Lehman* level of bank flows to the post-*Lehman* level, disregarding the crisis quarter itself. Figure 3 illustrates the idea, taking Estonia and Bulgaria as examples. Estonia experienced on average quarterly inflows of USD 950.5 million in the four quarters preceding the shock and average quarterly outflows of USD 477.5 million in the two quarters after the *Lehman* collapse. We take the difference, i.e. USD 1.42 billion, as our measure of the magnitude of the external shock Estonia had to deal with. For Bulgaria, the external shock amounts to USD 2.47 billion (i.e. USD 2.57 billion minus USD 0.09 billion). Accordingly, the shock has been larger for Bulgaria, even though Bulgaria, unlike Estonia, on average did not record capital outflows in the two quarters after *Lehman*. Thus, our measure is different from the one employed in EBRD (2009), where the flows in the post-Lehman quarter (2008Q4) are expressed as a share of the outstanding stock in 2008Q3. Most importantly, the EBRD variable – if applied to the two post-crisis quarters – would show a negative sign for Estonia, but a positive one for Bulgaria.

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<sup>4</sup> We use the same sample as in IMF (2010b).

<sup>5</sup> We settle for a relatively short post-crisis period to account for the ‘suddenness’ of the stop. Moreover, a short post-crisis period reduces the risk that any stabilizing effect we might find is largely due to policy initiatives like the *Vienna Initiative* (Andersen 2009), which explicitly aimed at stabilizing cross-border exposures of foreign banks to CESEE countries, and the *Joint IFI Action Plan In Support of Banking Systems and Lending to the Real Economy in Central and Eastern Europe* (EIB 2009).

**Figure 3: Construction of the *FALL* measure [in mio USD]**



Source: BIS Locational Banking Statistics, own calculations

In the econometric analysis *FALL* is expressed in logs, i.e. it is the log of the difference between the average cross-border bank flows to country *i* in the four quarters preceding the *Lehman* collapse (2007Q3 - 2008Q2) and the average cross-border bank flows in the two post-shock quarters (2008Q4 - 2009Q1) in US dollar. A higher *FALL* value indicates a greater financial shock in the respective country. If *FALL* has a negative value we take the logarithm of the absolute value and assign it a negative sign.

The explanatory variable of our main interest is the asset share of foreign banks in total banking sector assets in the respective host countries. We use 2005 data provided by Claessens et al. (2008) for consistency reasons, even though we are aware that these shares may not accurately reflect the respective shares on the eve of the global financial crisis. However, a comparison with more recent data reported in EBRD (2009), Galindo et al. (2010) and Rajan and Gopalan (2009) for CESEE and the CIS as well as selected LAC and ASIA countries reveals that the share of foreign banks in total banking sectors has changed substantially in only a few countries.

The literature review of section 2 suggests that in the case of a crisis triggered in mature economies a stronger presence of foreign banks (*FBAS*) might have an aggravating or mitigating impact on our *FALL* variable. Thus, the sign of the coefficient of *FBAS* is an empirical question. However, given the peculiar features of financial integration in Europe we expect that a higher share of assets held by foreign banks in CESEE stabilized cross-border bank flows in this region. Accordingly, we expect a negative coefficient estimate for the interaction of *FBAS* with a CESEE dummy.

The boom-bust literature suggests that the pre-crisis boom is a major determinant of the sudden stop (Sula 2006). Thus, we construct a measure for the *SURGE* in cross-border bank flows prior to the shock as an additional explanatory variable. *SURGE* is the log of the aggregated quarterly cross-border bank flows over the three years prior to the *Lehman* bankruptcy (i.e. 2005Q3-2008Q2). We

expect the *SURGE* to aggravate the *FALL*, i.e. positive coefficient estimates. We will test the robustness of our results by changing the calculation of both variables in terms of periods covered and by modifying the calculation method for *SURGE*.

We estimate the following cross-sectional OLS model applying heteroscedasticity robust standard errors and using Stata:

$$FALL_i = \alpha * FBAS_i + \beta * SURGE_i + \gamma_k * X_{ik} + \varepsilon_i$$

*FALL* is the previously described measure for instability and *SURGE* the measure that catches the amount of lending prior to the crisis in country *i*. *FBAS* is the foreign bank asset share in total banking assets in country *i*. *X* is a matrix of the following structural and macroeconomic variables as well as external and internal vulnerability indicators<sup>6</sup>:

*Structural and macroeconomic variables:*

- **Institutional quality:** Better creditor protection and information sharing among institutions provide comfort to foreign and domestic investors (Papaioannou 2009). Thus, we expect a higher level of institutional quality to mitigate the magnitude of our *FALL* measure. Following Kose et al. (2009) we use the simple 2008 average of the six individual World Governance Indicators and in addition the change from 2007 to 2008 as proxies for institutional quality.
- **De jure financial openness:** An open capital account facilitates capital inflows. Thus, countries with a higher value of the index provided by Chinn and Ito (2008) should be more vulnerable to external shocks. Accordingly, we expect a positive coefficient.
- **De facto financial openness:** The more a country is financially integrated with the rest of the world, the more likely it will be affected by global financial turmoil. De facto financial openness is measured as the ratio of the sum of total foreign assets and total foreign liabilities to GDP in 2007 and is taken from the updated and extended version of the dataset constructed by Lane and Milesi-Ferretti (2007). We again expect a positive coefficient.
- **GDP growth in 2009:** We expect a negative coefficient as stronger growth in the post-shock period should encourage capital inflows.
- **Export partners' GDP growth in 2009:** This variable is the real GDP growth of a country's 30 main export partners in 2009 weighted by their share in total exports of a given EME in 2008. Following Aisen and Franken (2010) we construct this variable to account for economic activity after the crisis avoiding possible endogeneity problems, as GDP growth in a given country might reflect the fall in cross-border bank flows after *Lehman*.<sup>7</sup> We expect a negative coefficient as higher GDP growth in the main trading partners indicates higher demand for that country's exports and hence stronger domestic economic activity. This should positively influence capital inflows.

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<sup>6</sup> For a list of all variables used in our analysis and their sources see Appendix 5.

<sup>7</sup> Takáts (2010) provides evidence that supply factors are the dominant determinants of the drop in cross-border lending in 2008Q4, suggesting that 2009 growth is also a result of *FALL* and not only a factor determining the size of *FALL*.

- **Current account to GDP in 2007:** The current account balance provides information about countries' positions as net providers or recipients of external finance. Countries with a positive (less negative balance) are less prone to capital flow reversals, as they do not depend on external finance in net terms. Thus, a higher current account surplus should be associated with a smaller *FALL*, i.e. we expect a negative coefficient.

*External and internal vulnerabilities:*

- **External debt to GNI.** Net debtor countries face a higher risk of sudden stops and thus a decline in capital, as the indebtedness of a country depicts vulnerability regarding the risk of default (positive coefficient expected).
- **Exchange rate regime.** A floating exchange rate provides a certain buffer against external shocks. Thus, we expect the sign of the coefficient to be negative as - making use of the IMF exchange rate classification with a scale from one to eight - a higher value indicates a more flexible exchange rate (Appendix 2).
- **International reserves to total external debt in 2007:** A higher ratio indicates that the country is in a better position to deal with liquidity shocks and comfort foreign investors. Thus, a higher ratio should stabilize capital inflows (negative coefficient expected).
- **Foreign liability dollarization:** A higher share of external liabilities denominated in foreign currency ("original sin") in total external liabilities indicates a higher exposure to exchange rate risk, making countries more vulnerable to sudden stops (positive coefficient expected).
- **Credit deposit ratio in 2007:** Banking sectors with a higher credit to deposit ratio rely on other funding sources, including foreign funding, to finance credit expansion. Given this dependency on foreign funds, in a crisis situation foreign investors are inclined to withdraw from these countries as early as possible, forcing banks to adjust private sector credit respectively, suggesting a positive coefficient. However, as already mentioned in section 2, the opposite reasoning might apply with regard to cross-border bank flows for countries with a strong foreign bank presence (Cetorelli and Goldberg 2008, 2010). Parent banks might initially withdraw funds from countries with a low credit deposit ratio because headquarters want to make use of the excess liquidity held by their subsidiaries abroad. This argument suggests a negative coefficient.

## 4. Results

### 4.1 Foreign banks

We start with a basic model including only foreign bank presence and the size of the pre-crisis boom in cross-border flows as explanatory variables. For the whole sample of 56 EMEs we do not find the expected stabilizing impact of foreign bank presence on cross-border bank flows during the global financial crisis (columns 1 and 2 in Table 1). However, in the CESEE region foreign bank presence had a significantly different impact on the stability of cross-border bank flows compared to other EMEs in our sample. The interaction of *FBAS* with a CESEE dummy has a significant and negative coefficient (columns 3 and 4).

**Table 1: The basic model with foreign banks**

<b>Dependent variable: <i>FALL</i> measure</b>				
	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>
FBAS	0.0011 (0.0152)	0.0025 (0.0133)	0.0318 (0.0220)	0.0353 (0.0217)
FBAS*CESEE			-0.0657** (0.0285)	-0.0519** (0.0248)
SURGE	0.3663** (0.1403)	0.1209 (0.2122)	0.3800** (0.1438)	0.1436 (0.2058)
SURGE^2		0.0531*** (0.0186)		0.0544*** (0.0178)
CESEE			2.7840** (1.2189)	1.2619 (0.8827)
constant	3.8040*** (1.4227)	1.4637 (1.1951)	3.0628* (1.5981)	0.6264 (1.4423)
R-sqr	0.256	0.415	0.314	0.472
adj.R-sqr	0.228	0.381	0.260	0.420
N	56	56	56	56

Stars indicate statistical significance at \* 10 percent, \*\*5 percent and \*\*\* 1 percent level. Standard errors in parentheses below. Estimation method is OLS. Robust standard errors applied.  
*FALL* is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country. *SURGE* is the (log of the) aggregated capital inflows in the three years preceding the *Lehman* bankruptcy (2005Q3-2008Q2).

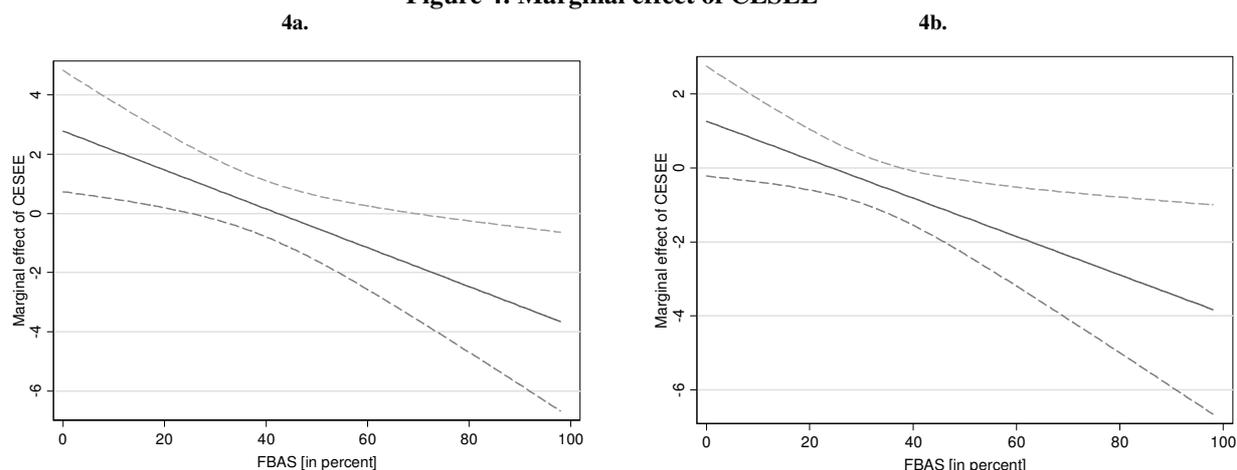
We also find strong evidence for the expected boom-bust relationship. The pre-crisis boom in cross-border bank lending has a significant aggravating impact on the magnitude of *FALL*. The coefficient of the squared surge variable ( $SURGE^2$ ) is highly significant and *SURGE* becomes insignificant when we add the squared term (columns 2 and 4)<sup>8</sup>. This indicates that the higher the absolute pre-crisis *SURGE* in flows (no matter if inflows or outflows) the more destabilizing was its impact after the financial shock.<sup>9</sup>

CESEE countries are on average significantly different from the other EME's with regard to the impact of foreign banks on the stability of cross-border bank flows during the crisis. However, the marginal effect of the CESEE dummy on *FALL* might not be constant for all possible values of *FBAS*. In particular, the effect may only be significant for a certain range of *FBAS* values. Following Brambor et al. (2006) we calculate the marginal impact of the CESEE dummy for the whole range of potential values of *FBAS* (i.e. from zero to one hundred). Figure 4 shows for which foreign bank asset share the CESEE dummy has a statistically significant impact on the stability of cross-border bank flows. The effect is significant whenever the upper and lower bounds of the confidence interval are both above (or below) the zero line.

<sup>8</sup> However, a closer look at the data reveals that this is due to only very few observations. Therefore we will keep both models for our analysis.

<sup>9</sup> For those countries experiencing aggregate outflows in the three years prior to the *Lehman* collapse destabilizing factors like institutional underdevelopment and political risk might have become more important in an environment of increasing financial stress and risk aversion.

**Figure 4: Marginal effect of CESEE**



The solid line depicts the marginal effect of CESEE on our dependent variable *FALL*. *FALL* is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country. The dashed lines are the upper and lower bounds of the 90 % confidence interval. In the underlying regression in 4a. we control for *SURGE* and in 4b. we control for *SURGE* and *SURGE*<sup>2</sup>.

Controlling for a linear relationship between *SURGE* and *FALL* we observe, that being a CESEE country significantly aggravates the instability of cross-border bank flows for low values of *FBAS* (below 25 percent) while it significantly mitigates the instability in cross-border bank flows when in a country the asset share held by foreign banks is larger than 69 percent (Figure 4a). For CESEE countries with *FBAS* values between 25 and 69 there is no significant difference in the impact of foreign bank presence on cross-border bank flows compared to other EMEs.

Adding the squared *SURGE*<sup>2</sup> variable to the model shifts the line depicting the marginal effect downwards (Figure 4b). In this case the marginal effect of CESEE significantly mitigates the *FALL* for the range of countries with a foreign bank asset share higher than 37 percent. 14 of the 16 CESEE countries have a higher value of *FBAS* than 37 percent. This suggests that for CESEE countries it paid off to have a high level of foreign bank presence compared to countries from other regions.

Our basic model might suffer from omitted variable bias, as we only account for two determinants of *FALL*. To test whether the results are sensitive to the inclusion of other factors we add the variables referred to in section 3 one by one to the basic models. The results confirm our main findings: foreign banks do not mitigate the sudden stop in cross-border bank flows to other EMEs (Table 2), while the CESEE interaction variable remains significant in all estimations (Table 3).<sup>10</sup>

<sup>10</sup> We also test an expanded basic model including as additional explanatory variables de jure financial openness and GDP growth. The results are very similar to the ones reported in Table 3. In particular *FBAS* is always insignificant while *FBAS*\*CESEE is always significant with a negative sign with one exception: when controlling for foreign liability dollarization (FLD). Results are available from the authors on request.

**Table 2: Controlling for potential determinants – all EMEs**

<b>Dependent variable: FALL measure</b>												
	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>	<b>(6)</b>	<b>(7)</b>	<b>(8)</b>	<b>(9)</b>	<b>(10)</b>	<b>(11)</b>	<b>(12)</b>
FBAS	0.0090 (0.0139)	0.0104 (0.0188)	0.0051 (0.0131)	0.0009 (0.0195)	0.0041 (0.0156)	0.0074 (0.0152)	0.0062 (0.0172)	-0.0109 (0.0156)	0.0036 (0.0141)	-0.0009 (0.0122)	-0.0122 (0.0139)	0.0029 (0.0141)
SURGE	0.1322 (0.2098)	0.1498 (0.2067)	0.1418 (0.2264)	0.1146 (0.2088)	0.1275 (0.2127)	0.1302 (0.2138)	0.1160 (0.2090)	0.1592 (0.2180)	0.0946 (0.2009)	0.1243 (0.2045)	0.1554 (0.2087)	0.1248 (0.2166)
SURGE^2	0.0549*** (0.0186)	0.0579*** (0.0183)	0.0511** (0.0204)	0.0543*** (0.0186)	0.0535*** (0.0188)	0.0549*** (0.0190)	0.0552*** (0.0176)	0.0454** (0.0178)	0.0622*** (0.0194)	0.0582*** (0.0188)	0.0472*** (0.0171)	0.0532*** (0.0186)
<i>Structural and macroeconomic variables</i>												
INST.QUALITY <i>change</i>	-12.8484* (6.4591)											
INST.QUALITY		-1.2204 (1.0382)										
CA/GDP			0.0268 (0.0326)									
FIN.OPENNESS <i>de jure</i>				0.0968 (0.4337)								
FIN.OPENNESS <i>de facto</i>					-0.3405 (0.5533)							
ExpP GDP GROWTH						0.1636* (0.0937)						
GDP GROWTH							0.0468 (0.0547)					
<i>External and internal vulnerabilities</i>												
DEBT/GNI								0.0066 (0.0115)				
FLD									0.0396 (0.0242)			
ERR										-0.2673 (0.1768)		
RESERVES/DEBT											-0.0045 (0.0051)	
CDR												-0.2416 (0.6129)
constant	1.2779 (1.2404)	0.4953 (1.8071)	1.4714 (1.2016)	1.3953 (1.1647)	1.8592* (1.0111)	1.4514 (1.2084)	1.2886 (1.2698)	2.1816** (0.9527)	-1.3618 (2.6243)	2.6106*** (0.8035)	2.7168*** (0.8067)	1.6698 (1.3477)
R-sqr	0.449	0.444	0.418	0.416	0.421	0.423	0.419	0.516	0.429	0.447	0.520	0.416
adj.R-sqr	0.406	0.401	0.372	0.369	0.375	0.378	0.373	0.471	0.377	0.403	0.475	0.370
N	56	56	56	55	56	56	56	48	49	56	48	56

Stars indicate statistical significance at \* 10 percent, \*\*5 percent and \*\*\* 1 percent level. Standard errors in parentheses below. Estimation method is OLS. Robust standard errors applied.

FALL is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country. SURGE is the (log of the) aggregated capital inflows in the three years preceding the *Lehman* bankruptcy (2005Q3-2008Q2).

**Table 3: Controlling for potential determinants – is Eastern Europe different?**

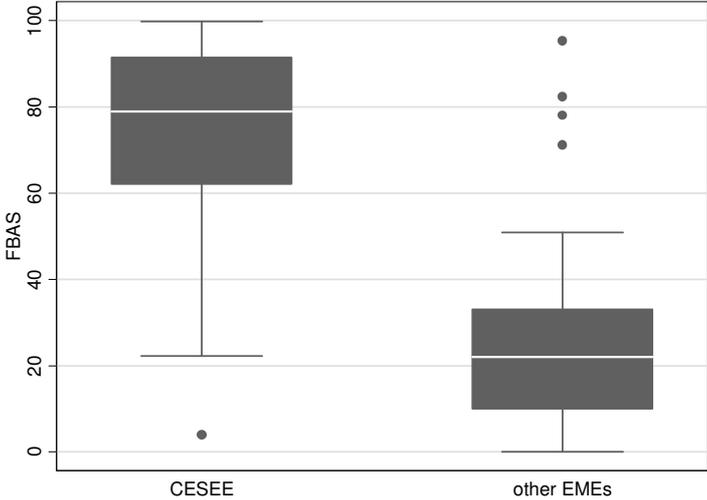
<b>Dependent variable: FALL measure</b>												
	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>	<b>(6)</b>	<b>(7)</b>	<b>(8)</b>	<b>(9)</b>	<b>(10)</b>	<b>(11)</b>	<b>(12)</b>
FBAS	0.0356 (0.0216)	0.0379 (0.0239)	0.0352 (0.0216)	0.0351 (0.0281)	0.0355 (0.0221)	0.0354 (0.0218)	0.0368 (0.0235)	0.0182 (0.0138)	0.0357 (0.0220)	0.0358* (0.0205)	0.0175 (0.0134)	0.0353 (0.0219)
FBAS*CESEE	-0.0484** (0.0232)	-0.0514* (0.0261)	-0.0519** (0.0248)	-0.0513* (0.0272)	-0.0508** (0.0248)	-0.0527** (0.0253)	-0.0532** (0.0257)	-0.0583** (0.0282)	-0.0387* (0.0225)	-0.0649** (0.0290)	-0.0594* (0.0309)	-0.0520** (0.0257)
SURGE	0.1484 (0.2065)	0.1632 (0.2024)	0.1420 (0.2191)	0.1427 (0.2040)	0.1471 (0.2073)	0.1426 (0.2064)	0.1400 (0.2039)	0.1773 (0.2125)	0.1182 (0.1948)	0.1504 (0.1982)	0.1805 (0.2055)	0.1434 (0.2095)
SURGE^2	0.0550*** (0.0180)	0.0573*** (0.0177)	0.0546** (0.0205)	0.0546*** (0.0179)	0.0545*** (0.0179)	0.0542*** (0.0181)	0.0552*** (0.0171)	0.0467** (0.0175)	0.0655*** (0.0186)	0.0603*** (0.0170)	0.0466*** (0.0166)	0.0544*** (0.0179)
CESEE	1.4218 (0.9721)	1.6024 (1.2247)	1.2400 (0.8276)	1.1788 (1.1009)	1.2401 (0.8916)	1.1994 (0.9147)	1.4513 (1.0611)	1.3098 (1.3206)	0.0305 (0.8991)	1.9564 (1.1718)	1.6132 (1.6385)	1.2616 (0.8875)
<i>Structural and macroeconomic variables</i>												
INST.QUALITY change	-9.5497* (5.5275)											
INST.QUALITY		-0.9585 (1.0447)										
CA/GDP			-0.0023 (0.0418)									
FIN.OPENNESS <i>de jure</i>				0.0061 (0.4217)								
FIN.OPENNESS <i>de facto</i>					-0.2122 (0.5089)							
ExpP GDP GROWTH						-0.0348 (0.1069)						
GDP GROWTH							0.0274 (0.0593)					
<i>External and internal vulnerabilities</i>												
DEBT/GNI								0.0132 (0.0121)				
FLD									0.0379 (0.0250)			
ERR										-0.3358* (0.1924)		
RESERVES/DEBT											-0.0029 (0.0046)	
CDR												0.0166 (0.5961)
constant	0.6227 (1.4361)	-0.0156 (1.9137)	0.6198 (1.5191)	0.6139 (1.4096)	0.8939 (1.3066)	0.5923 (1.4529)	0.5530 (1.4919)	1.2035 (1.1894)	-2.1696 (2.7474)	1.9756** (0.8777)	1.9461* (0.9691)	0.6110 (1.6763)
R-sqr	0.490	0.489	0.472	0.473	0.475	0.473	0.474	0.602	0.487	0.521	0.598	0.472
adj.R-sqr	0.427	0.427	0.408	0.407	0.410	0.408	0.409	0.544	0.414	0.462	0.540	0.408
N	56	56	56	55	56	56	56	48	49	56	48	56

Stars indicate statistical significance at \* 10 percent, \*\*5 percent and \*\*\* 1 percent level. Standard errors in parentheses below. Estimation method is OLS. Robust standard errors applied.

FALL is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country. SURGE is the (log of the) aggregated capital inflows in the three years preceding the Lehman bankruptcy (2005Q3-2008Q2).

CESEE is the region with the by far highest share of foreign banks in total banking sector assets of EME host countries. Among CESEE countries, Turkey is below the 5<sup>th</sup> percentile, while among the other EMEs four countries represent outliers: Mexico, Peru, Paraguay and El Salvador have foreign bank asset shares lying outside the 95<sup>th</sup> percentile (Figure 5).

**Figure 5: Foreign bank asset share (in percent, 2005)**



The line in the box indicates the median, the bottom and the top of the box are the 25th and the 75th percentiles and the ends of the whiskers mark the 5th and 95th percentiles. Dots represent outliers.

Source: Claessens et al. 2008, own calculations

This raises the question whether CESEE is different due to its regional characteristics or whether the high share of foreign banks as such drives the CESEE result. To answer this question we run a piecewise regression. We split our sample countries into two groups according to their foreign bank asset share. Those countries with a foreign bank asset share below the sample median (i.e. 28.4 percent) are the reference group, while countries with a foreign bank presence above the median form a separate group. Two CESEE countries (Slovenia and Turkey) belong to the group with the below median foreign bank asset share and 15 countries from the ‘other EMEs’ group join the remaining CESEE countries in the group with the above median *FBAS*. Thus, in the above median group there are about as many CESEE countries (14) as non-CESEE countries (15).

We test whether the impact of foreign bank presence on the stability of cross-border bank flows differs significantly between the two groups. Results show that the impact of foreign banks is not significantly different for countries with a foreign bank asset share above the median of our sample (Table 4).

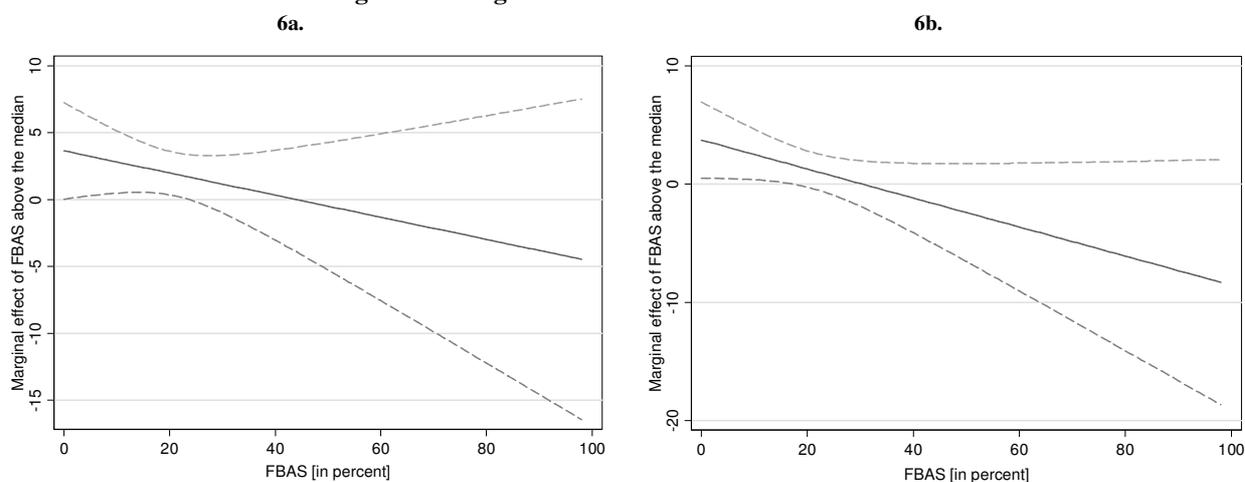
**Table 4: Grouping of countries by foreign bank presence**

Dependent variable: <i>FALL</i> measure		
	(1)	(2)
FBAS	0.0576 (0.0838)	0.0919 (0.0776)
FBAS*above median dummy	-0.0927 (0.0871)	-0.1229 (0.0796)
SURGE	0.3790*** (0.1349)	0.1137 (0.2111)
SURGE^2		0.0555*** (0.0187)
above median dummy	3.6636 (2.2094)	3.7457* (1.9147)
constant	2.7046 (1.9744)	-0.0138 (1.9855)
R-sqr	0.307	0.476
adj.R-sqr	0.253	0.423
N	56	56

Stars indicate statistical significance at \* 10 percent, \*\*5 percent and \*\*\* 1 percent level. Standard errors in parentheses below. Estimation method is OLS. Robust standard errors applied.  
*FALL* is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country. *SURGE* is the (log of the) aggregated capital inflows in the three years preceding the *Lehman* bankruptcy (2005Q3-2008Q2).

The analysis of the marginal effect of the ‘above median dummy’ on the stability of cross-border bank flows conditional on the level of foreign bank presence reveals that for the range of values that are included in the group of countries with a foreign bank presence above the median (i.e. above 28.4 percent) the zero line lies within the confidence interval (Figure 6). Only for a range of *FBAS* values which are not applicable to the above median group (i.e. lower than 28.4 percent) does the 90 percent confidence interval not include the zero line. For the countries with a foreign bank presence above the median the impact of *FBAS* is never significantly different from those countries with below median foreign bank presence. This suggests that it is not the high average foreign bank presence *per se* causing the difference in the impact of foreign bank presence of the CESEE countries.

**Figure 6: Marginal effect of above median *FBAS***



The solid line depicts the marginal effect of CESEE on our dependent variable *FALL*. *FALL* is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country. The dashed lines are the upper and lower bounds of the 90% confidence interval. In the underlying regression in 6a. we control for *SURGE* and in 6b. we control for *SURGE* and *SURGE*<sup>2</sup>.

We get slightly different results when we divide our sample countries into two groups below and above the *FBAS* mean (i.e. 39.1 percent). Estimating the respective piecewise regression we do not find a significant difference for the above mean group compared to the countries with a foreign bank asset share below the mean when controlling for *SURGE*. However, results are significantly different when we include *SURGE*<sup>2</sup>. Thus we cannot rule out completely that the conditional impact of a higher share of foreign banks for CESEE countries reflects the impact of a strong presence of foreign banks *per se* rather than regional specifics. At the same time it has to be noted that CESEE countries dominate the ‘above mean’ group, representing 14 out of the 22 countries.

#### 4.2 Disaggregation of cross-border bank flows

The Locational banking statistics provide information on BIS reporting banks’ total international positions and on international positions vis-à-vis non-banks. Thus, we can test whether the impact of foreign banks on the stability of cross-border bank flows has been significantly different for flows to EME banking sectors compared to flows to EME non-bank sectors. As the data on bank-to-bank flows includes flows between parent banks and their subsidiaries (intra-bank flows) we expect that foreign bank presence is most conducive to financial stability for bank-to-bank flows. This is based on two assumptions.<sup>11</sup> Firstly, intra-bank flows are likely to account for the bulk of cross-border bank-to-bank flows to EMEs where foreign banks are major players in the respective host countries. Secondly, parent banks are likely to protect the value of their pre-crisis investments in the form of equity and reputation and refrain from sudden withdrawals. These arguments do not hold for flows to non-affiliates, i.e. when bank-to-bank flows are conducted between BIS reporting banks and EMEs with a low share of assets held by foreign banks. For the same reason we also expect that the stabilizing impact of foreign banks will be less pronounced for flows to the non-bank sector. We test this proposition with separate regressions for each kind of flows. Results are presented in Table 5.

For the EME sample as a whole we do not find evidence supporting our hypothesis.<sup>12</sup> Countries with a higher share of assets held by foreign banks do not exhibit more stable cross-border bank flows to EME banks in the post-crisis period than countries with a lower share. This suggests that two opposing forces - weakened parent banks and strong interest in protecting the value of previous investments in the respective host countries - might have offset each other. Again we find that CESEE countries are different with regard to the impact of foreign banks compared to their emerging market peers. This holds in particular for bank-to-bank flows. By contrast, for flows to

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<sup>11</sup> The BIS data we use does not have the level of disaggregation that would allow for a direct test of the relative stability of flows between parent banks and their subsidiaries (intra-bank flows) compared to other cross-border flows.

<sup>12</sup> This result also holds when the regression is run without the CESEE interaction variable.

the non-bank sector we get ambiguous results, as in two out of three specifications the interaction variable is not significant.<sup>13</sup>

**Table 5: Disaggregation of cross-border bank flows and FBAS**

Dependent variable: respective <i>FALL</i> measure						
	Bank to bank flows			bank to non-bank flows		
	(1)	(2)	(3)	(1)	(2)	(3)
FBAS	0.0229 (0.0232)	0.0295 (0.0235)	0.0352 (0.0234)	0.0172 (0.0391)	0.0477* (0.0266)	0.0213 (0.0228)
FBAS*CESEE	-0.0825** (0.0346)	-0.0801** (0.0338)	-0.0757** (0.0334)	-0.0578 (0.0489)	-0.0729** (0.0347)	-0.0213 (0.0273)
CESEE	5.0930*** (1.6233)	3.2641** (1.5240)	2.4363* (1.4343)	4.4525** (2.1454)	3.0072* (1.7443)	0.2878 (1.2071)
SURGE		0.4808*** (0.1530)	0.2931 (0.2202)		0.6011** (0.2655)	0.1207 (0.2143)
SURGE^2			0.0460** (0.0194)			0.0860*** (0.0224)
Constant	4.8183*** (1.1427)	1.8055 (1.5735)	-0.1121 (1.3684)	3.9818*** (1.3076)	-0.7609 (2.5729)	-2.1405 (1.7328)
R-sqr	0.050	0.311	0.376	0.035	0.256	0.408
N	56	56	56	55	55	55

Stars indicate statistical significance at \* 10 percent, \*\*5 percent and \*\*\* 1 percent level. Standard errors in parentheses below. Estimation method is OLS. Robust standard errors applied.  
*FALL* is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country. *SURGE* is the (log of the) aggregated capital inflows in the three years preceding the *Lehman* bankruptcy (2005Q3-2008Q2).

**Table 6: Seemingly unrelated regression estimation**

Dependent variable: respective <i>FALL</i> measure				
	bank to bank flows		Bank to non-bank flows	
	(1)	(2)	(1)	(2)
FBAS	0.0300 (0.0244)	0.0355 (0.0233)	0.0486* (0.0271)	0.0223 (0.0252)
FBAS*CESEE	-0.0805* (0.0418)	-0.0757* (0.0399)	-0.0733 (0.0449)	-0.0223 (0.0423)
SURGE	0.4870*** (0.1042)	0.2983** (0.1275)	0.6182*** (0.1476)	0.1399 (0.1837)
SURGE^2		0.0465** (0.0194)		0.0848** (0.0228)
CESEE	3.2114 (2.7724)	2.3970 (2.6647)	2.9661 (2.9602)	0.2941 (2.7365)
constant	1.7961* (1.0677)	-0.1678 (1.3091)	-0.8959 (1.4749)	-2.2222 (1.3712)
R-sqr	0.3121	0.3750	0.2556	0.4082
N	55	55	55	55

Stars indicate statistical significance at \* 10 percent, \*\*5 percent and \*\*\* 1 percent level. Standard errors in parentheses below. Seemingly unrelated regression estimation method is applied. Robust standard errors applied.  
*FALL* is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country. *SURGE* is the (log of the) aggregated capital inflows in the three years preceding the *Lehman* bankruptcy (2005Q3-2008Q2).

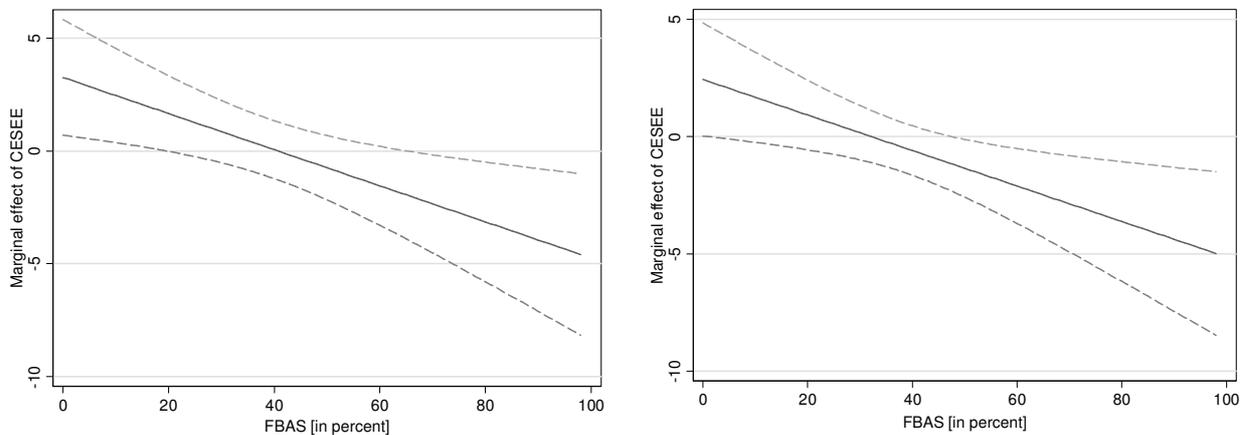
International bank flows to the banking sector and to the non-banking sector are closely linked. General economic developments and other country characteristics might simultaneously affect inflows to the banking and the non-banking sector. Therefore the equation errors might correlate. To control for this we further test the relationships with a seemingly unrelated regression system proposed by Zellner (1962).

<sup>13</sup> The significantly different impact of foreign banks in CESEE countries on bank-to-bank flows holds when we include other potential determinants of instability in cross-border bank flows during the crisis. Results are inconclusive regarding the impact on bank-to-non-bank flows. Estimation results are available on request.

The SUR-estimation results show that for cross-border bank flows to the banking sector the impact of foreign bank presence is significantly different for CESEE countries while this does not hold for cross-border bank flows to the non-bank sector.

The analysis of the marginal impact of the CESEE dummy on the *FALL* of bank-to-bank flows yields similar results as the analysis focused on the *FALL* of total cross-border bank flows. In particular, we find that the marginal effect of CESEE significantly mitigates the *FALL* for the range of countries with a foreign bank asset share higher than about 47 percent when controlling for *SURGE*<sup>2</sup>. This suggests that for most CESEE countries it paid off to have a high level of foreign bank presence compared to countries from other regions due to its stabilizing effect on cross-border bank-to-bank flows.

**Figure 7: Marginal effect of CESEE on the stability of bank-to-bank flows**  
8a. 8b.



The solid line depicts the marginal effect of CESEE on our dependent variable *FALL*. *FALL* is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country. The dashed lines are the upper and lower bounds of the 90% confidence interval. In the underlying regression in 8a. we control for *SURGE* and in 8b. we control for *SURGE* and *SURGE*<sup>2</sup>.

Overall the evidence suggests that a larger presence of foreign banks stabilized cross-border bank-to-bank flows in the common European financial market, while a similar effect cannot be found for cross-border bank flows to the non-bank sector. This is an interesting result because it represents the opposite ranking to what De Haas and Van Horen (2011) find for cross-border syndicated lending to EMEs. Syndicated lending to non-banks was more stable in the crisis than lending to banks. Moreover, while the presence of foreign banks did have a stabilizing impact on cross-border lending to non-banks, this was not the case for lending to banks. Since cross-border syndicated bank flows do not include – by definition – intra-bank lending between parent banks and their subsidiaries, the contradictory results provide indirect evidence for the proposition that in the CESEE region intra-bank lending was a major factor in stabilizing cross-border bank-to-bank flows.

## 5. Robustness checks

To check for the robustness of our results we conduct some sensitivity tests. We vary those two of our variables that are not predetermined, i.e. *FALL* and *SURGE*. The tests reveal that the specification of *FALL* is of more relevance for the robustness of our results than the specification of the *SURGE* variable. Generally our findings are robust as the coefficients remain significant for the different specifications.

The global financial crisis started with the turmoil in mature economy money markets in August 2007. Some EMEs, like Kazakhstan and Russia were already affected by this event. Thus, we change the definition of the pre-crisis period to 2006Q3-2007Q2, while sticking to 2008Q4-2009Q1 as the post-crisis period after the *Lehman* default. We find that the stabilizing impact of foreign bank presence is insignificant, for the EME sample as a whole and CESEE, whether we control for a squared surge or not (Table 7, columns 1 and 2). As a second variation of our main *FALL* variable we extend the period after the *Lehman* shock to nine months (columns 3 and 4), including 2009Q2 when average regional outflows were already declining or had even turned into inflows. Further we extend the pre-crisis period to two years, i.e. 2006Q3-2008Q2 (columns 5 and 6). For both specifications, the results confirm our previous findings that foreign banks did not stabilize cross-border bank flows in general, but CESEE is different.

**Table 7: Robustness checks – *FALL* measures**

Dependent variable: respective <i>FALL</i> measure covering different time windows						
	<i>FALL</i> from 2006Q3-2007Q2 to 2008Q4-2009Q1		<i>FALL</i> from 2007Q3-2008Q2 to 2008Q4-2009Q2		<i>FALL</i> from 2006Q3-2008Q2 to 2008Q4-2009Q1	
	(1)	(2)	(3)	(4)	(5)	(6)
FBAS	0.0033 (0.0131)	0.0083 (0.0094)	0.0322 (0.0221)	0.0356 (0.0218)	0.0099 (0.0121)	0.0136 (0.0110)
FBAS*CESEE	-0.0417 (0.0250)	-0.0223 (0.0177)	-0.0660** (0.0289)	-0.0524** (0.0254)	-0.0521** (0.0251)	-0.0377* (0.0208)
SURGE	0.2034** (0.0833)	-0.1315** (0.0641)	0.3844*** (0.1402)	0.1505 (0.2015)	0.3373*** (0.1186)	0.0894 (0.1621)
SURGE^2		0.0770*** (0.0110)		0.0538*** (0.0176)		0.0570*** (0.0136)
CESEE	2.2833* (1.1955)	0.1270 (0.6789)	2.9553** (1.2195)	1.4494 (0.9194)	2.1296** (1.0450)	0.5334 (0.7695)
constant	5.1287*** (0.9715)	1.6772 (1.0060)	2.7916* (1.5827)	0.3811 (1.4608)	4.2807*** (1.1797)	1.7257* (0.8844)
R-sqr	0.118	0.476	0.319	0.472	0.346	0.593
adj.R-sqr	0.048	0.423	0.266	0.419	0.295	0.552
N	56	56	56	56	56	56

Stars indicate statistical significance at \* 10 percent, \*\*5 percent and \*\*\* 1 percent level. Standard errors in parentheses below. Estimation method is OLS. Robust standard errors applied.  
*SURGE* is the (log of the) aggregated capital inflows in the three years preceding the *Lehman* bankruptcy (2005Q3-2008Q2).

We change the *SURGE* variable by altering the time periods covered and by changing the method of calculation of *SURGE*. We define *SURGE* periods for three additional time windows prior to the *Lehman* collapse. The estimations confirm our previous results (Table 8). The impact of the

*SURGE* remains aggravating and highly significant in all estimations. As before, the stabilizing effect of the presence of foreign banks is significantly different for the CESEE region.

**Table 8: Robustness checks – *SURGE* measures: variation of *SURGE* period**

Dependent variable: <i>FALL</i> measure						
	variation of <i>SURGE</i> period					
	[2 years]		[4 years]		[5 years]	
FBAS	-0.0024 (0.0115)	0.0268 (0.0176)	0.0018 (0.0133)	0.0311 (0.0198)	0.0003 (0.0129)	0.0303 (0.0193)
FBAS*CESEE		-0.0447** (0.0202)		-0.0453** (0.0210)		-0.0449** (0.0205)
<i>SURGE</i>	0.3792 (0.3110)	0.3833 (0.2991)	-0.1049* (0.0555)	-0.0703 (0.0436)	-0.0830* (0.0452)	-0.0557 (0.0379)
<i>SURGE</i> <sup>2</sup>	0.0426* (0.0224)	0.0449** (0.0218)	0.0719*** (0.0120)	0.0723*** (0.0114)	0.0703*** (0.0117)	0.0716*** (0.0114)
CESEE		0.9857 (0.6391)		1.0272 (0.8342)		0.8913 (0.7576)
constant	0.5974 (1.5971)	-0.1057 (1.6916)	1.7341 (1.1534)	0.9172 (1.4099)	1.7227 (1.2354)	0.9043 (1.4720)
R-sqr	0.534	0.580	0.431	0.477	0.467	0.516
adj.R-sqr	0.507	0.539	0.399	0.425	0.436	0.467
N	56	56	56	56	56	56

Stars indicate statistical significance at \* 10 percent, \*\*5 percent and \*\*\* 1 percent level. Standard errors in parentheses below. Estimation method is OLS. Robust standard errors applied.  
*FALL* is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country.

**Table 9: Robustness checks – *SURGE* measures: variation of *SURGE* calculation method**

Dependent variable: <i>FALL</i> measure				
	<i>SURGE</i> – pre-shock mean		<i>SURGE</i> – period mean	
	(1)	(2)	(3)	(4)
FBAS	0.0133 (0.0171)	0.0431* (0.0255)	0.0102 (0.0176)	0.0254 (0.0227)
FBAS*CESEE		-0.0788** (0.0326)		-0.0695** (0.0311)
<i>SURGE</i> <sub>alt</sub>	-0.0251 (0.0571)	-0.0469 (0.0746)	0.0110 (0.0613)	0.0413 (0.0807)
<i>SURGE</i> <sub>alt</sub> <sup>2</sup>	0.0000*** (0.0000)	0.0000*** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)
CESEE		4.0614*** (1.4334)		5.0574*** (1.7414)
constant	5.5291*** (0.9454)	4.7599*** (1.1373)	5.8771*** (0.9624)	5.2721*** (1.1040)
R-sqr	0.155	0.225	0.097	0.161
adj.R-sqr	0.106	0.147	0.045	0.077
N	56	56	56	56

Stars indicate statistical significance at \* 10 percent, \*\*5 percent and \*\*\* 1 percent level. Standard errors in parentheses below. Estimation method is OLS. Robust standard errors applied.  
*FALL* is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country.

Finally, we change the calculation method of *SURGE*. Instead of using absolute values of cross-border bank flows, we use an alternative *SURGE* variable that is based on deviations of pre-shock developments from the mean. *SURGE*<sub>alt</sub> is the difference between the average quarterly cross-border bank flows in the three years prior to the *Lehman* bankruptcy (i.e. 2005Q3-2008Q2) and the average quarterly flows in the whole period from 2002Q1 to 2008Q2 per country. Again we take the logs of these values. In addition to the deviation of the three year pre-shock average from the pre-shock period mean (Table 9, columns 1 and 2), we also run an estimation with the deviation of

the three year pre-shock average from the whole period mean covering 2002 to mid-2009 (columns 3 and 4). Again these tests are in line with our previous results.

## 6. Conclusions

After the financial and currency crises of the 1990s many EMEs, in particular in Central and Southeastern Europe and in Latin America, opened up their banking sectors for foreign-owned banks. This paper analyzes the role of foreign banks in EMEs after the collapse of *Lehman Brothers* by looking at their impact on mitigating the instability in cross-border bank flows in the immediate post-*Lehman* period compared to pre-crisis levels.

We find robust evidence indicating that foreign banks did not stabilize cross-border bank flows to EMEs during the global financial crisis. However, our analysis also suggests that Central and Southeastern Europe is different. In this region foreign banks have a significantly different impact on the stability of cross-border bank flows mitigating the sudden stop. Moreover, while not completely conclusive, our results suggest that the conditional impact of a higher share of foreign banks for CESEE countries is a regional phenomenon. Finally, we find that this difference can be traced to cross-border bank-to-bank flows.

For the EME sample as a whole we interpret our results as that two opposing forces - weakened parent banks and a strong interest in protecting the value of previous investments in the respective host countries - have offset each other. Thus, from a financial stability perspective our results neither provide support for the proponents of foreign bank entry - stressing the benefits of foreign banks for financial stability - nor for the critics - stressing the risk of large contagion effects. Given the character of the crisis as a global one triggered in mature economies, this result is not surprising, as the main advantage of foreign banks in mitigating sudden stop phenomena - the alleged strength of the parent banks - has been absent.

For CESEE, however, the evidence indicates that the impact of foreign bank presence is different, in particular for bank-to-bank flows. We interpret this result as reflecting the peculiarities of foreign banking and cross-border bank flows in the form of European financial integration. According to this interpretation, the common market has reinforced the special lending relationship between parent banks and their subsidiaries.<sup>14</sup> Parent banks perceive their subsidiaries in CESEE as operating in an extension of their home markets. This concept is absent for any other relationship between parent banks and subsidiaries in EMEs. While our dataset does not allow for a direct test

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<sup>14</sup> Following Cetorelli and Goldberg (2010) our results could also indicate that the EU-15 banks active in the region were less affected by the crisis than other banks engaged in cross-border lending. This stabilized cross-border bank lending significantly more in CESEE where EU-15 banks were most active.

of the relative stability of intra-bank flows in CESEE compared to other regions, our results lend support to the view that cross-border flows from parent banks to their subsidiaries have been an important element in stabilizing cross-border bank flows in the CESEE region during the global financial crisis.

## References

- Abiad, A., Leigh, D. and A. Mody (2007) 'International Finance and Income Convergence: Europe is Different', IMF Working Paper No. 64.
- Aisen, A. and M. Franken (2010) 'Bank Credit During the 2008 Financial Crisis: A Cross-Country Comparison', IMF Working Paper WP/10/47.
- Andersen, C. (2009) 'Agreement with Banks Limits Crisis in Emerging Europe', IMF Survey online, 28 October, <http://www.imf.org/external/pubs/ft/survey/so/2009/INT102809A.htm>.
- Arena, M., Reinhart, C. and F. Vázquez (2007) 'The Lending Channel in Emerging Economies: Are Foreign Banks Different?', IMF Working Paper No. 07/48.
- Aydin, B. (2008) 'Banking Structure and Credit Growth in Central and Eastern European Countries', IMF Working Paper 08/215.
- Beck T. and A. Demirgüç-Kunt (2009) 'Financial Institutions and Markets across Countries and over Time: Data and Analysis', World Bank Policy Research Working Paper No. 4943.
- Brambor, T., Clark, W.R. and M. Golder (2006) 'Understanding Interaction Models: Improving Empirical Analysis', *Political Analysis*, Vol. 14, pp. 63-82.
- Broda, C. and E. Levy Yeyati (2002) 'Dollarization and the Lender of Last Resort', mimeo, <http://www.uoit.ca/sas/International%20Finance/Dollandlenderlast.pdf>.
- Bubula, A. and I. Ötker-Robe (2002) 'The Evolution of Exchange Rate Regimes Since 1990: Evidence from De Facto Policies', IMF Working Paper 02/155.
- Cetorelli, N. and L.S. Goldberg (2010) 'Global banks and international shock transmission: Evidence from the crisis', NBER Working Paper no. 15974.
- Cetorelli, N. and L.S. Goldberg (2008) 'Banking Globalization, Monetary Transmission, and the Lending Channel', NBER Working Papers 14101, Cambridge MA.
- Chinn, M. and H. Ito (2008) 'A New Measure of Financial Openness', *Journal of Comparative Policy Analysis: Research and Practice*, Vol. 10(3), pp. 309-322.
- Claessens, S., Van Horen, N., Gurcanlar, T. and J. Mercado (2008) 'Foreign Bank Presence in Developing Countries 1995-2006: Data and Trends', available at SSRN: <http://ssrn.com/abstract=1107295>.
- Dages, B.G., Goldberg, L. and D. Kinney (2000) 'Foreign and domestic bank participation in emerging markets: lessons from Mexico and Argentina', NBER Working Paper No. 7714.
- Daumont, R., Le Gall, F. and F. Leroux (2004) 'Banking in Sub-Saharan Africa: What Went Wrong?', IMF Working Paper No. 04/55.
- De Haas, R. and I. Van Lelyveld (2006) 'Foreign banks and credit stability in Central and Eastern Europe. A panel data analysis', *Journal of Banking & Finance*, Vol. 30, pp. 1927 – 1952.
- De Haas, R. and I. Van Lelyveld (2010) 'Internal Capital Markets and Lending by Multinational Bank Subsidiaries', *Journal of Financial Intermediation*, Vol. 19(1), pp. 1-25.
- De Haas, R. and N. Van Horen (2011) 'Running for the exit: international banks and crisis transmission', EBRD Working paper 124.
- Detragiache, E., Tressel, T. and P. Gupta (2008) 'Foreign Banks in Poor Countries: Theory and Evidence', *Journal of Finance*, Vol. 63(5), pp. 2123-2160.
- EBRD (2009) 'Transition Report 2009 - Transition in crisis?', European Bank for Reconstruction and Development, London.

- EIB (2009) 'EBRD, EIB and World Bank Group join forces to support Central and Eastern Europe', Press release, 27 February, <http://www.eib.org/about/press/2009/2009-029-ebrd-eib-and-world-bank-group-join-forces-to-support-central-and-eastern-europe.htm>.
- Friedrich, C., I. Schnabel and J. Zettelmeyer (2010) 'Financial Integration and Growth – Is Emerging Europe Different?', EBRD Working Paper No. 123.
- Galindo, A.J., A. Izquierdo, and L. Rojas-Suárez (2010) 'Financial Integration and Foreign Banks in Latin America – How Do they Impact the Transmission of External Financial Shocks?', IDB Working Paper No. 116.
- García Herrero, A.G. and M.S Martínez Pería (2006) 'The mix of international banks' foreign claims: Determinants and implications', *Journal of Banking and Finance*, Vol. 31, pp. 1613-1631.
- Geršl, A. (2007) 'Foreign Banks, Foreign Lending and Cross-Border Contagion: Evidence from the BIS Data', *Czech Journal of Economic and Finance*, Vol. 57 (1-2), pp. 27-40.
- Grigorian, D. A. and V. Manole (2002) 'Determinants of Commercial Bank Performance in Transition: An Application of Data Envelopment Analysis', IMF Working Paper 02/146.
- Hellmann, T. and K. Murdock (1998) 'Financial Sector Development Policy: The Importance of Reputational Capital and Governance', in: Sabot, R. and I. Skékely (eds.) 'Development Strategy and Management of the Market Economy', Vol. 2, Oxford University Press.
- Hernández. L. and Ó. Landerretche (2002) 'Capital Inflows, Credit Booms, and Macroeconomic Vulnerability: The Cross-Country Experience', in : Hernández. L.; Schmidt-Hebbel, K. and N. Loayza (eds.) 'Banking, Financial Integration, and International Crises', Central Bank of Chile - Central Banking, Analysis, and Economic Policies Book Series, edition 1, Vol. 3, chapter 7, pp. 199-234.
- Herrmann, S. and A. Winkler (2009) 'Financial Markets and the Current Account - Emerging Europe versus emerging Asia', *Review of World Economics*, Vol. 145 (3), pp. 531-550.
- IMF (2010a) 'Europe – Fostering Sustainability, Regional Economic Outlook', May, Washington DC.
- IMF (2010b) 'How Did Emerging Markets Cope in the Crisis?', IMF Policy Paper.
- Kamil, H. and K. Rai (2010) 'The global credit crunch and foreign banks' lending to Emerging Markets: Why did Latin America fare better?'; IMF Working Paper WP/10/102.
- Kaufmann, D., Kraay, A. and M. Mastruzzi (2009) 'Governance Matters VIII: Aggregate and Individual Governance Indicators, 1996-2008', World Bank Policy Research Working Paper No. 4978.
- Kose, M., Prasad, E. and A Taylor (2009) 'Thresholds in the Process of International Financial Integration', World Bank Policy Research Working Paper 5149.
- Krugman, P. (1998) 'What Happened to Asia?', mimeo, available at: <http://web.mit.edu/krugman/www/DISINTER.html>.
- Lahnsteiner, M. (2011) 'The refinancing structure of banks in selected CESEE countries', European Economy Occasional Papers No 75, European Commission.
- Lane, P. and G. M. Milesi-Ferretti (2007) 'The external wealth of nations mark II: Revised and extended estimates of foreign assets and liabilities, 1970–2004'; *Journal of International Economics*, Vol. 73, pp. 223-250.
- Lane, P. and J. Shambaugh (2010) 'Financial Exchange Rates and International Currency Exposures', *American Economic Review*, Vol. 100(1), pp. 518-540.

- Llewellyn, D.T. (2002) 'An analysis of the causes of recent banking crises', *European Journal of Finance*, Vol. 8(2), pp. 152-175.
- Lucas, R. (1990) 'Why doesn't Capital Flow from Rich to Poor Countries?', *American Economic Review*, Vol. 80, pp. 93-96.
- Mendoza E. and M. Terrones (2008) 'An Anatomy of Credit Booms: Evidence From Macro Aggregates and Micro Data', IMF Working Paper WP/08/226.
- Mishkin, F.S. (2001) 'Financial Policies and the Prevention of Financial Crises in Emerging Market Economies', World Bank Policy Research Working Paper No. 2683.
- Mishkin, F.S. (2006) 'Financial Stability and Globalization: Getting It right, Paper presented at the Bank of Spain Conference, Central Banks in the 21st Century, June 8-9, 2006, Madrid, [http://www.bde.es/webbde/Agenda/Eventos/06/Jun/Fic/Mishkin\\_BdE.pdf](http://www.bde.es/webbde/Agenda/Eventos/06/Jun/Fic/Mishkin_BdE.pdf)
- Moreno, R. and A. Villar (2005) 'The increased role of foreign bank entry in emerging markets', BIS Papers chapters, in: Bank for International Settlements (ed.), Globalisation and monetary policy in emerging markets, Vol. 23, pp 9-16.
- Obstfeld, M. and Rogoff, K. (1996) 'The Intertemporal Approach to the Current Account', NBER Working Papers, No. 4893.
- Ostry, J. D., Ghosh, A.R., Habermeier, K.F., Chamon, M., Qureshi, M.S. and D.B.S. Reinhardt (2010) 'Capital Inflows: The Role of Controls', IMF Staff Position Note No. 2010/04.
- Papaioannou, E. (2009) 'What drives international financial flows? 'Politics, institutions and other determinants'', *Journal of Development Economics*, Vol. 88, pp. 269-281.
- Peek, J. and E.S. Rosengren (1997) 'The International Transmission of Financial Shocks: The Case of Japan', *American Economic Review*, Vol. 87(4), pp. 495-505.
- Peek, J. and E.S. Rosengren (2000) 'Implications of the Globalization of the Banking Sector: The Latin American Experience', *New England Economic Review*, Federal Reserve Bank of Boston, September, pp. 45-62.
- Profumo, A. (2006) 'UniCredit's strategy in Central and Eastern Europe' in: Liebscher, K., J. Christl, P. Mooslechner and D. Ritzberger-Grünwald (eds.), *Financial Development, Integration and Stability. Evidence from Central, Eastern and South-Eastern Europe*. Edward Elgar. pp 519-530.
- Rajan, R.S. and S. Gopalan (2009) 'Sales to Foreign Banks in Emerging Asia', CESifo DICE Report 3/2009.
- Rodrik, D. and A. Subramanian (2009) 'Why Did Financial Globalization Disappoint?', IMF Staff Papers, Vol. 56(1), pp. 112- 138.
- Sachs, J.D. and W.T. Woo (1999) 'The Asian Financial Crisis: What Happened, and what is to be done', William Davidson Institute Working Papers Series 253.
- Sula, O. (2006) 'Surges and Sudden Stops of Capital Flows to Emerging Markets', MPRA Paper No. 383.
- Takáts, E. (2010) 'Was it credit supply? Cross-border bank lending to emerging market economies during the financial crisis', BIS Quarterly Review, June 2010.
- Tornell, A. and F. Westermann (2002) 'Boom-Bust cycles in middle income countries: facts and explanation', NBER Working Paper no. 9219.
- Vogel, U. and A. Winkler (2010) 'Foreign banks and financial stability in emerging markets: Evidence from the global financial crisis', Frankfurt School of Finance & Management Working Papers No. 149.

- Wezel, T. (2004) 'Foreign Bank Entry into Emerging Economies: An Empirical Assessment of the Determinants and Risks Predicated on German FDI Data', Deutsche Bundesbank, Discussion Paper 01/2004.
- Wiedner, H. (2005) 'Banking in South-East Europe: the case of the Raiffeisen Group', in: Liebscher, K., J. Christl, P. Mooslechner and D. Ritzberger-Grünwald (eds.), *European Economic Integration and South-East Europe. Challenges and Prospects*. Edward Elgar. pp. 382–385.
- Wimmer, M. (2005) 'Banking in South-East Europe: the case of Erste Bank', in: Liebscher, K., J. Christl, P. Mooslechner and D. Ritzberger-Grünwald (eds.), *European Economic Integration and South-East Europe. Challenges and Prospects*, Edward Elgar. pp. 386–390.
- World Bank (2008) 'Global Development Finance - The role of international banking', World Bank.
- Wooldridge, P. (2002) 'Uses of the BIS Statistics: An introduction', *BIS Quarterly Review*, March 2002.
- Zellner, A. (1962) 'An efficient method of estimating seemingly unrelated regression equations and tests for aggregation bias', *Journal of the American Statistical Association*, Vo. 57, pp. 348–368.

## Appendix

### Appendix 1: List of sample countries

	CESEE	other EMEs
1	Albania	Argentina
2	Bosnia and Herzegovina	Belarus
3	Bulgaria	Bolivia
4	Croatia	Brazil
5	Czech Republic	Chile
6	Estonia	China
7	Hungary	Colombia
8	Latvia	Costa Rica
9	Lithuania	Dominican Republic
10	Macedonia, FYR	Ecuador
11	Poland	Egypt
12	Romania	El Salvador
13	Serbia	Georgia
14	Slovakia	Guatemala
15	Slovenia	India
16	Turkey	Indonesia
17		Israel
18		Jamaica
19		Jordan
20		Kazakhstan
21		Lebanon
22		Malaysia
23		Mexico
24		Mongolia
25		Morocco
26		Pakistan
27		Panama
28		Paraguay
29		Peru
30		Philippines
31		Russia
32		South Africa
33		South Korea
34		Sri Lanka
35		Thailand
36		Tunisia
37		Ukraine
38		Uruguay
39		Venezuela
40		Vietnam

### Appendix 2: IMF exchange rate classification scheme

1	Exchange arrangement with no separate legal tender
2	Currency board arrangement
3	Conventional pegged arrangement
3.5	Conventional peg to a composite
4	Pegged exchange rate within horizontal bands
5	Crawling peg
6	Crawling band
7	Managed floating with no predetermined path for the exchange rate
8	Independently floating

The information is based on the de facto methodology introduced in 1997 and was retroactively updated by A. Bubula and Í. Ótker-Robe, "The Evolution of Exchange Rate Regimes Since 1990: Evidence from De Facto Policies," WP/02/155. These data are published annually in the Annual Report on Exchange Arrangements and Exchange Restrictions; updates are published semi-annually at <http://www.imf.org/external/np/mfd/er/index.asp>. The official definitions of the categories are available at <http://www.imf.org/external/np/mfd/er/index.asp>. Data are accurate as of January 2008, but future retroactive reclassifications may be made.

### Appendix 3: Descriptive statistics

Variable	Sample	Obs	Mean	Std. Dev.	Min	Max
FALL	CESEE	16	6.973	3.195	-3.248	9.753
	other EMEs	40	6.436	3.509	-6.722	10.791
	all	56	6.589	3.403	-6.722	10.791
SURGE	CESEE	16	9.407	1.591	5.663	11.276
	other EMEs	40	6.716	5.288	-8.091	11.806
	all	56	7.485	4.693	-8.091	11.806
FBAS	CESEE	16	72.216	26.975	3.945	99.760
	other EMEs	40	25.837	23.400	0	95.346
	all	56	39.089	32.151	0	99.760
NBAS	CESEE	16	64.359	26.766	3.863	98.602
	other EMEs	40	19.602	19.384	0	88.150
	all	56	32.390	29.633	0	98.602
FIN.OPENNESS de jure	CESEE	15	1.378	1.311	-1.129	2.541
	other EMEs	40	0.699	1.441	-1.129	2.541
	all	55	0.884	1.427	-1.129	2.541
FIN.OPENNESS de facto	CESEE	16	1.861	0.807	0.811	3.871
	other EMEs	40	1.460	0.766	0.549	4.514
	all	56	1.575	0.792	0.549	4.514
INST.QUALITY	all	56	-0.056	0.573	-1.145	1.153
INST.QUALITY change	all	56	0.023	0.052	-0.084	0.157
CA/GDP	all	56	-4.038	8.428	-25.185	15.405
ExpP GDP GROWTH	all	56	-2.408	2.249	-7.698	4.197
GDP GROWTH	all	56	-2.017	5.485	-18.500	8.504
DEBT/GNI	all	48	44.163	25.775	10.968	141.444
ERR	all	56	5.384	2.401	1	8
RESERVES/DEBT	all	48	69.498	63.034	14.643	413.870
FLD	all	49	55.077	14.350	24.576	81.032
CDR	all	56	1.084	0.455	0.308	2.390

Appendix 4: Pairwise correlations

	FALL	SURGE	FBAS	NBAS	INST.QUALITY change	INST.QUALITY	CA/GDP	FIN.OPENNESS de jure	FIN.OPENNESS de facto	ExpP GDP GROWTH	GDP GROWTH	DEBT/GNI	FLD	ERR	RESERVES/DEBT	CDR
FALL	1															
SURGE	0.5063 (-0.0001)	1														
FBAS	0.0648 (0.6354)	0.1073 (0.4311)	1													
NBAS	0.1065 (0.4348)	0.2158 (0.1102)	0.9338 (0.0000)	1												
INST.QUALITYchange	-0.0567 (0.6783)	0.1694 (0.2121)	0.3236 (0.015)	0.3403 (0.0103)	1											
INST.QUALITY	0.1242 (0.3618)	0.3821 (0.0037)	0.3949 (0.0026)	0.3897 (0.003)	0.0956 (0.4835)	1										
CA/GDP	-0.0071 (0.9588)	-0.2805 (0.0363)	-0.3986 (0.0023)	-0.3242 (0.0148)	-0.2844 (0.0336)	-0.2817 (0.0355)	1									
FIN.OPENNESS de jure	-0.0160 (0.9076)	0.0669 (0.6273)	0.3774 (0.0045)	0.2493 (0.0664)	0.0884 (0.5208)	0.4054 (0.0021)	-0.3075 (0.0224)	1								
FIN.OPENNESS de facto	0.0255 (0.8521)	0.1652 (0.2236)	0.2045 (0.1306)	0.2295 (0.0889)	-0.0260 (0.8492)	0.4339 (0.0008)	-0.2716 (0.0428)	0.3328 (0.013)	1							
ExpP GDP GROWTH	-0.1148 (0.3996)	-0.2726 (0.0421)	-0.4530 (0.0005)	-0.4213 (0.0012)	-0.4810 (0.0002)	-0.3334 (0.012)	0.5243 (0.0000)	-0.1735 (0.2053)	-0.1025 (0.4522)	1						
GDP GROWTH	-0.1008 (0.4597)	-0.1359 (0.3181)	-0.4630 (0.0003)	-0.3990 (0.0023)	0.0187 (0.8914)	-0.4192 (0.0013)	0.4226 (0.0012)	-0.2630 (0.0524)	-0.1683 (0.2151)	0.6036 (0.0000)	1					
DEBT/GNI	0.0277 (0.8515)	0.0955 (0.5186)	0.3022 (0.0369)	0.2134 (0.1452)	-0.0326 (0.8258)	0.2654 (0.0683)	-0.5458 (0.0001)	0.3018 (0.0393)	0.6276 (0.0000)	-0.3613 (0.0116)	-0.4190 (0.003)	1				
FLD	-0.0044 (-0.976)	-0.1068 (0.4651)	0.0272 (0.8528)	-0.1129 (0.4399)	-0.0323 (0.8256)	-0.2465 (0.0877)	-0.1073 (0.4632)	0.0987 (0.50)	-0.2360 (0.1026)	-0.0918 (0.5303)	-0.0829 (0.5712)	0.2452 (0.1223)	1			
ERR	0.0014 (0.9916)	0.1793 (0.186)	-0.1548 (0.2546)	-0.0339 (0.8044)	0.0856 (0.5303)	0.2169 (0.1084)	0.2040 (0.1315)	-0.1786 (0.192)	-0.2135 (0.1141)	0.0523 (0.7019)	0.1041 (0.4453)	-0.2847 (0.0499)	-0.2221 (0.1251)	1		
RESERVES/DEBT	0.0720 (0.6268)	0.0295 (0.842)	-0.2675 (0.066)	-0.1973 (0.1789)	-0.0343 (0.8169)	-0.1746 (0.2352)	0.4527 (0.0012)	-0.3086 (0.0348)	-0.0306 (0.8364)	0.1935 (0.1876)	0.3670 (0.0103)	-0.3684 (0.0108)	-0.4241 (0.0057)	-0.0012 (0.9935)	1	
CDR	0.0840 (0.5382)	0.2028 (0.1338)	0.1524 (0.2621)	0.1019 (0.4551)	-0.0503 (0.713)	0.3231 (0.0152)	-0.3979 (0.0024)	0.1120 (0.4154)	0.1108 (0.4162)	-0.4438 (0.0006)	-0.5351 (0.0000)	0.3443 (0.0166)	-0.0413 (0.7783)	-0.1342 (0.3241)	-0.1911 (0.1932)	1

p-values in parentheses below.

### Appendix 5: List of variables

Name	Description	Source
FALL	difference between the average cross-border bank flows in 2007Q3 - 2008Q2 and the average bank flows in 2008Q4 - 2009Q1 (logs)	BIS International locational banking statistics, Table 6A
SURGE	aggregated cross-border bank flows over the three years prior to the <i>Lehman</i> bankruptcy (i.e. 2005Q3-2008Q2) (logs)	
FBAS	percentage of assets of foreign banks among total banks in 2005	Claessens et al. (2008)
NBAS	percentage of assets of northern banks among total banks in 2005	
FIN.OPENNESS de jure	Chinn-Ito-Index value for de-jure financial openness in 2007	Chinn and Ito (2008)
FIN.OPENNESS de facto	foreign assets and liabilities to GDP in 2007	Lane and Milesi-Feretti (2007)
INST.QUALITY	average of the six individual WGI governance indicators in 2008	Kaufmann et al. (2009)
INST.QUALITY change	change of INST. QUALITY from 2007 to 2008	
ExpP GDP GROWTH	real GDP growth of the 30 main export partners weighted by their participation in the total exports to them in 2009	IMF DOTS, WEO
GDP GROWTH	real GDP growth in 2009	IMF WEO
CA/GDP	current account balance in percent of GDP in 2007	IMF WEO
DEBT/GNI	total external debt stocks to gross national income in 2007	WDI, World Bank
ERR	classification of exchange rate regime as of end of 2007	Bubula and Ötler-Robe (2002)
RESERVES/DEBT	total reserves (% of total external debt) in 2007	WDI, World Bank
FLD	share of total foreign liabilities denominated in foreign currency in 2004	Lane and Shambaugh (2010)
CDR	private credit by deposit money banks as a share of demand, time and saving deposits in deposit money banks in 2007	Beck and Demirgüç-Kunt (2009)