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Foreign Banks and Financial Stability in Emerging Markets: Evidence from the Global Financial Crisis

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Foreign banks and financial stability in emerging markets: evidence from the global financial crisis

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Abstract

Foreign banks have increased their market share in many emerging markets since the mid-1990s. We analyze the financial stability implications of foreign banks for their host countries in the global financial crisis. Our results suggest that a higher share of assets held by foreign banks was associated with more stable cross-border bank flows during the crisis period. This result is largely driven by two regions: Eastern Europe and Sub-Saharan Africa. By contrast, foreign banks had no stabilizing impact on domestic bank lending. Thus, the evidence indicates that the financial stability benefits of a stronger foreign bank presence did not spill over from cross-border to domestic credit flows.

Keywords: foreign banks; cross-border lending; bank credit; financial crisis

JEL classification: E44, F36, G21

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1. Introduction

This paper examines whether foreign banks contributed to financial stability in emerging market economies (EMEs)¹ in the global financial crisis by mitigating the sudden stop of cross-border bank flows and the contraction of domestic lending after the *Lehman* collapse. It is motivated by the observation that after the emerging market crises of the 1990s many EMEs opened up their banking sectors to foreign banks, also with the objective to reduce the probability of sudden stops of capital inflows and the corresponding contraction in domestic lending (Mishkin 2001). As a result, the average share of EME banking sector assets held by foreign banks rose from 21 percent in 1995 to 38 percent in 2005 (Claessens et al. 2008).

In this environment of globalised banking, cross-border bank flows from mature economies to emerging markets recovered from the crises-lows of the late 1990s. However, after the collapse of *Lehman* emerging markets faced a classical sudden stop which is defined as a large and unexpected falls in capital inflows. Following patterns observed in the past (Mendoza and Terrones 2008) the boom and bust in bank flows was associated with a corresponding expansion and contraction of domestic lending.

We analyze whether a stronger presence of foreign banks in EME banking sectors had an impact on the stability of cross-border bank flows and domestic lending in EMEs after the *Lehman* collapse, controlling for the size of the pre-crisis boom and other determinants of financial instability. Based on a sample of 84 emerging market countries we find that foreign banks had a stabilizing impact on the cross-border component of financial globalization. Emerging markets' banking sectors with a higher share of assets held by foreign banks experienced a smaller decline in bank flows. However, foreign banks did not significantly contribute to dampen the

¹ See Annex 2 for a list of the countries included in our analysis. For the sake of convenience we refer to the whole group of countries as 'emerging markets'. We group them according to their geographical region into Eastern and Southeastern Asia (ASIA), Eastern Europe and Central Asia (ECA), Middle East and Northern Africa (MENA), Latin America and the Caribbean (LAC) and Sub-Saharan Africa (SSA).

decline in domestic lending in their respective host countries. These results are robust to variations of the instability and boom measures. Closer analysis reveals that the stabilizing impact of foreign banks was a regional rather than a global phenomenon. Foreign banks mitigated the sudden stop of cross-border bank flows in Eastern Europe and Central Asia and Sub-Saharan Africa, but not in other regions.

Our results indicate that foreign banks are no panacea for guaranteeing financial stability in emerging markets in an environment of increasing financial globalization. This might reflect the global character of the crisis triggered in mature and not in emerging market economies. With many parent banks being severely hit by substantial losses and facing a severe liquidity shortage most arguments pointing to a stability advantage of a strong foreign bank presence in EMEs had become invalid. At the same time, we find little evidence that a higher degree of financial integration via foreign bank entry was associated with a stronger transmission of the crisis into the host countries with regard to bank flows and domestic lending. That being said a higher degree of financial stability does not necessarily imply a higher stability of output. Countries in Eastern Europe and Central Asia suffered the most in terms of output and employment, even though ECA is a region that benefitted from a stabilizing impact of foreign banks on cross-border flows.

The paper is organized as follows: after a short review of the theory and the empirical evidence on the stability impact of financial integration via foreign bank entry (section 2), we describe our data and the model specification (section 3). Sections 4 and 5 present the results and robustness checks and section 6 concludes.

2. Foreign banks and financial stability in emerging markets

Our paper is related to two strands in the literature: a) the literature on financial stability effects of bank integration, with a particular focus on foreign banks in emerging markets and b) the emerging literature on foreign banks and financial stability in the global financial crisis.

Boom-bust cycles in capital flows and domestic credit, associated with strong fluctuations in economic activity, characterized financial liberalization in emerging markets and developing countries in the 1990s (Mendoza and Terrones 2008). Two possible policy responses to smooth these cycles providing for a more stable flow of credit and output have been discussed. The first response is to pursue a cautious approach toward capital account liberalization (Rodrik and Subramanian 2009). Capital controls and regulatory measures limit capital inflows, in particular highly reversible flows, like cross-border bank lending. Thus, the speed of domestic credit growth and the associated financial stability risks remain contained. The second response is to strengthen domestic banking sectors in emerging markets. It reflects the view that buoyant capital flows only lead to unsustainable credit booms in an environment characterized by poor governance of domestic banks and a weak supervisory and regulatory framework (Krugman 1998). Thus, EMEs are called upon to put their financial systems on a sounder institutional footing. Inviting foreign banks to enter domestic banking sectors is a major element of a strategy to achieve this goal (Sachs and Woo 1999, Mishkin 2001, 2006).

Foreign institutions are expected to strengthen financial stability in emerging markets 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. They also provide 'reputational capital' (Hellman and Murdock 1998) due to their long presence in the financial markets of mature economies. 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. Banking sector liquidity is enhanced because depositors' trust in the stability of foreign institutions makes local bank runs less likely. Moreover foreign banks mitigate the risk of sudden stops and capital flow reversals as parent banks will provide the needed international liquidity in crisis 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).

The empirical evidence on foreign banks and financial stability in emerging markets is mixed. Demirgüç-Kunt et al. (1998) find that foreign bank presence is negatively associated with the incidence of banking sector fragility. Moreover, the results of most studies indicate that foreign banks smooth domestic credit in periods of financial distress. However, the evidence also suggests that the stabilizing impact on credit growth depends on the relative strength and soundness of the respective parent banks (De Haas and Van Lelyveld 2010). Thus, foreign banks may also transmit financial distress in their home countries to the respective host countries (Peek and Rosengren 1997, Galindo et al. 2010).

The evidence on the financial stability effects of multinational banks, i.e. banks with a parent bank and many subsidiaries operating in foreign countries, can be compared with the stability effects of banking integration in a domestic economy characterized by a regionally fragmented banking system. The prototype of such a fragmented system had been the United States where entry by non-state banks into 'host states' was only liberalized starting in the late 1970s (Morgan, Rime, and Strahan 2004). Williamson (1989) compares financial and output stability in the fragmented banking system of the United States and the integrated Canadian banking system during the Great Depression. He finds that the integrated Canadian banking market performed better in terms of financial stability than the fragmented banking market in the United

States, where bank failures were a widespread phenomenon. In terms of output, however, the Great Depression was as severe in Canada as in the United States.

Given the *Great Moderation* before 2007, the global financial crisis provides the first significant test of the financial stability effect of foreign banks in EMEs after the substantial increase in foreign ownership observed over the last fifteen years. Focusing on Eastern Europe, Mihaljek (2008) argues that the positive effects on host banking sector solvency may have been overestimated as risk management systems designed for mature economies seem to have failed in the emerging market context. With regard to liquidity, the collapse of *Lehman Brothers* radically changed the environment for any possible liquidity support by parent banks to their EME subsidiaries and branches. Facing the collapse of national and global interbank markets parent banks themselves scrambled for liquidity and had to rely on support from the respective lenders of last resort. Cetorelli and Goldberg (2010) provide evidence suggesting that the transmission of the liquidity shock after *Lehman* was severe for those emerging markets with a strong presence of foreign banks that were subsidiaries of parent banks with a US Dollar liquidity shortage in September 2008. However, they also find that domestic banks in emerging markets relying on cross-border bank flows from the same mature economies reacted in a similar way, suggesting that foreign ownership as such did not aggravate the credit contraction in host countries. Finally, emerging markets with the highest reliance on cross-border bank flows did not seem to suffer the greatest declines in domestic lending, rejecting the hypothesis of a joint boom-bust cycle of cross-border flows and domestic lending in the recent turmoil. This is in line with evidence provided by EBRD (2009) and Aisen and Franken (2010). Parent banks supplied their subsidiaries in Eastern Europe with international liquidity (EBRD 2009), thereby mitigating the sudden stop in capital flows after *Lehman*. De Haas et al. (2010) also find that in the immediate aftermath of the *Lehman* collapse cross-border syndicated bank lending to non-banks was less affected if the lending banks had a subsidiary in the recipient country. This suggests that local presence reduces information asymmetries and facilitates lending in times of

crisis. By contrast, bank-to-bank lending was hit the hardest because – by definition – syndicated bank-to-bank lending does not include credit relationships between parent banks and their subsidiaries.

By contrast there is no paper finding evidence for the proposition that foreign banks contributed positively to a stable flow of credit in emerging markets in the post-crisis period. This holds for analyses pursued at the macro level and a large sample of countries, also including mature economies (Aisen and Franken 2010) as well as studies exploring bank-level data and focusing on a narrower sample of countries (de Haas et al. 2011).

We contribute to this literature in two ways. First, we test *jointly* whether EME banking sectors with a higher share of assets held by foreign banks showed a higher degree of stability with regard to cross-border bank flows and domestic lending in times of severe financial distress, i.e. the two quarters following the *Lehman* collapse. Second, given the substantial regional differences in foreign ownership among emerging markets we conduct a regional analysis in order to find out whether the contribution of foreign banks to post-crisis financial stability was different across regions.

3. Data and model specification

We take data on cross-border bank flows from the BIS International Locational Banking statistics. We use the Locational Banking statistics because its primary purpose is the measurement of international capital flows from banks in BIS reporting countries - currently banking institutions in 42 countries - to non-banks and banks, including affiliates in the form of subsidiaries or branches,² in emerging markets (Bank of England 2002). Cross-border bank flows are calculated as exchange-rate-adjusted changes from the quarterly reports of outstanding claims of all BIS reporting banks vis-à-vis non-residents in any currency. As the reporting countries include all major economies and the largest centers of financial activity the coverage of international banking activity is virtually complete (Wooldridge 2002). However, the dataset only provides information on aggregate flows to the respective host countries. It does not contain information about bilateral flows from individual source to individual host countries. Thus, unlike Cettorelli and Goldberg (2010) we cannot control for characteristics in source countries that might have had an effect on the stability of cross-border bank flows, i.e. possible differences in the degree source countries and their respective banks were affected by the financial crisis. The dataset also does not allow us to differentiate between flows to foreign and domestic banks in the respective host countries.

Our data on domestic bank lending is based on the IMF's International Financial Statistics (IFS line 22d). The IFS provides data on the stocks of outstanding credit in local currency and quarterly frequency. For a few countries, i.e. Ghana, Russia and Kyrgyz Republic, we

² By contrast, the Consolidated Banking statistics collect data on a group worldwide-consolidated basis. Thus claims and liabilities of parent banks and their affiliates are netted out. Foreign claims are split in international claims (cross-border claims and local claims of foreign affiliates in foreign currency) and local claims of foreign affiliates in local currency.

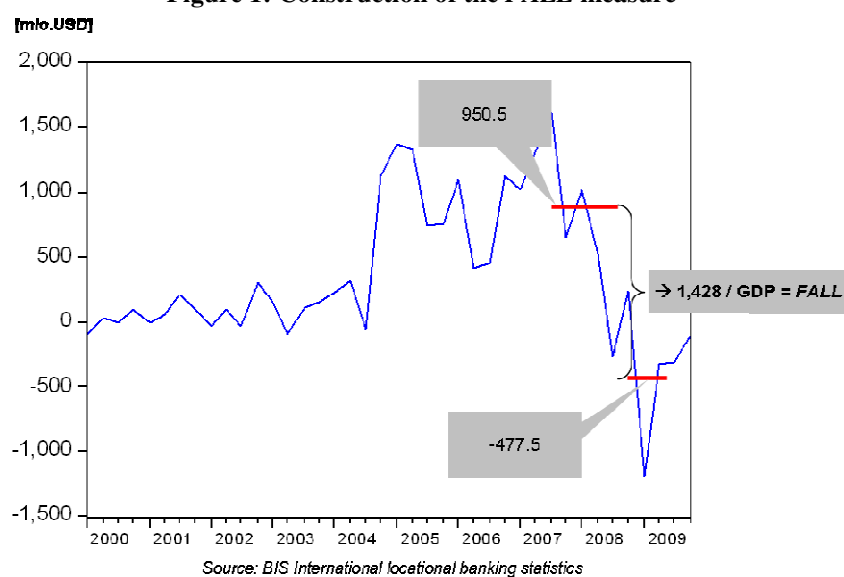
supplement the IFS data with data provided by local central banks. We calculate quarterly bank flows by taking the first differences of the stocks of private sector credit outstanding.³

Like BIS data IFS compiles macro data which does not allow us to distinguish between foreign and domestic banks as originators of domestic lending in the host countries. Thus, we cannot exclude that a sharp credit contraction by foreign banks is (partly) compensated by a rise in lending by domestic banks, leading to a stable flow of aggregate domestic lending. This shortcoming can be overcome by using bank-level data (see de Haas et al. 2011). However, bank-level data is only available on an annual frequency. Since the *Lehman* collapse, which marked the beginning of the financial crisis for emerging markets, occurred in September 2008, annual data does not catch the sudden stop phenomenon. 2008 data does not only reflect the post-*Lehman* contraction, but also the pre-crisis boom until the mid of the year. 2009 data measures the carryover from the crisis as well as first signs of recovery.

We measure the instability in bank flows and domestic lending during the financial crisis by calculating the difference between the average pre-shock flows (2007Q3-2008Q2) and the average post-shock flows (2008Q4-2009Q1). [Figure 1](#) illustrates the idea with cross-border bank flows as an example. The given country 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 1.428 billion, and scale it by the respective country's GDP in 2007 in billion USD.

³ As these flows are in local currency and not exchange-rate adjusted, the lending data suffers from a bias which can be large in countries with a high degree of lending in foreign currency and significant fluctuations in the exchange rate. Thus, we control for the – in some cases substantial – fluctuations in the exchange rate that followed the *Lehman* event.

Figure 1: Construction of the *FALL* measure

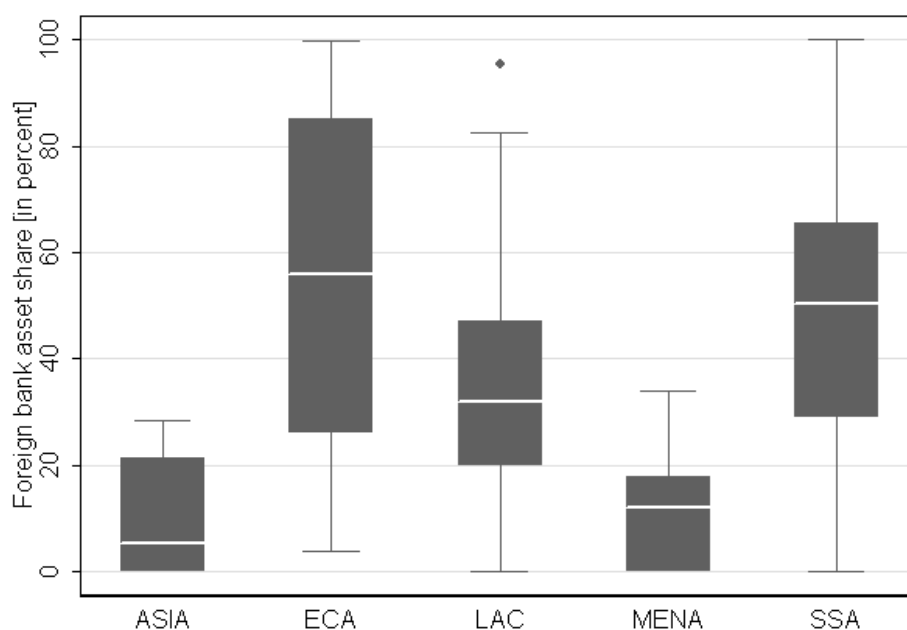


We follow the same procedure for domestic lending. Thus, we take the difference between average quarterly pre-crisis and post-crisis lending and scale this difference by 2007 GDP. We call these variables *FALL* as they depict the sudden drop from the (in most cases) higher pre-*Lehman* level of bank flows resp. domestic lending to the post-*Lehman* level, disregarding the crisis quarter itself. For both cases a higher *FALL* value indicates a greater financial shock in the respective country.

The explanatory variable of our main interest is the asset share of foreign banks in total banking sector assets in the respective host countries (*FBAS*). We use the dataset by Claessens et al. (2008), where foreign banks are defined as banks with direct foreign ownership of more than 50 percent of capital. The dataset shows that after the financial crises of the 1990s many emerging markets opened up their banking sectors to the entry of foreign institutions, with countries in Latin America and Eastern Europe and Central Asia being the main drivers accounting for the rise in the average share of assets held by foreign banks in total banking sector assets of emerging markets (see Appendix 1; Cull and Martinez Peria 2007). In Sub-Saharan Africa a sizeable presence of foreign banks has a long-standing history. However, this mainly reflects the legacy of the colonial past rather than early efforts to foster and stabilize domestic banking

sector development in an increasingly open environment.⁴ Indeed, countries in Sub-Saharan Africa – on average – take a rather restrictive stance on financial integration. The same applies to Emerging Asia and most countries in the Middle East and Northern Africa. In the latter regions, a cautious approach towards financial liberalization in general also influenced policies on the entry of foreign banks. As a result, there is no country with a foreign bank penetration ratio above 40% in these regions (Figure 2).

Figure 2: Foreign bank asset share within regions (in 2005)



Source: Claessens et al. (2008), own calculations

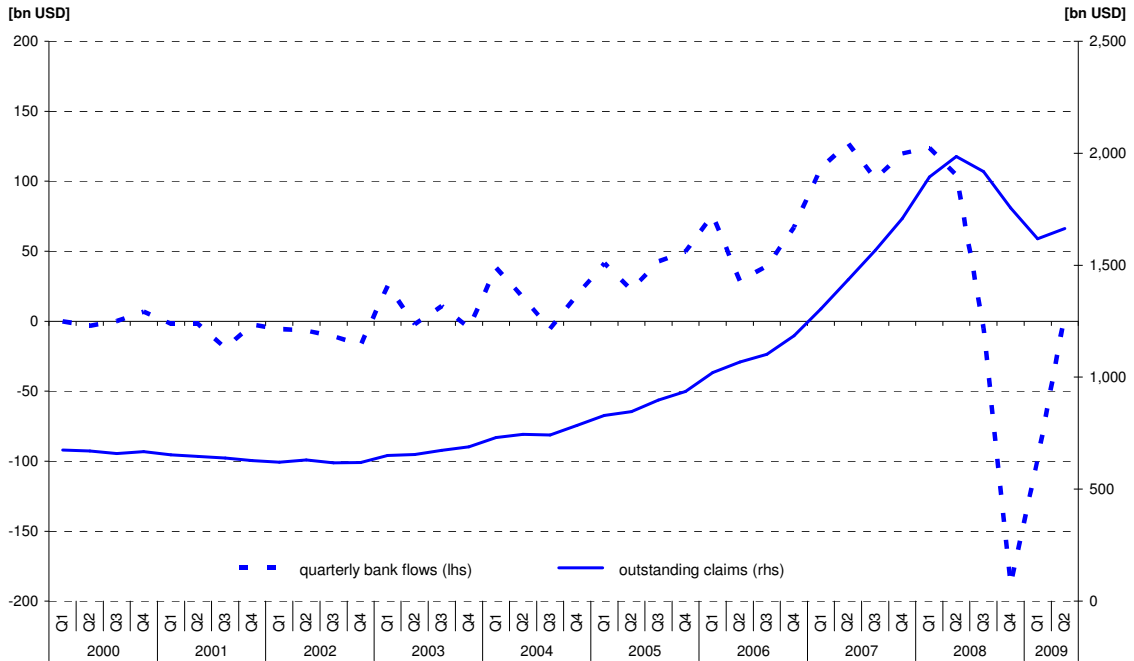
Given the arguments listed in section 2, we expect foreign bank presence to have a mitigating impact on our *FALL* variables (i.e. negative coefficients).

As already noted in the introduction bank flows and domestic lending in the pre- and post-crisis periods followed the familiar boom-bust pattern observed in the past (Figures 3 and 4).⁵

⁴ The recent rise in the asset share held by foreign banks in SSA largely reflects increasing South-South integration, i.e. the entry of foreign banks from other EMEs, while in most other countries and regions of our sample a rise in the share of assets held by foreign banks has been driven by entry from mature economy banks (Van Horen 2007).

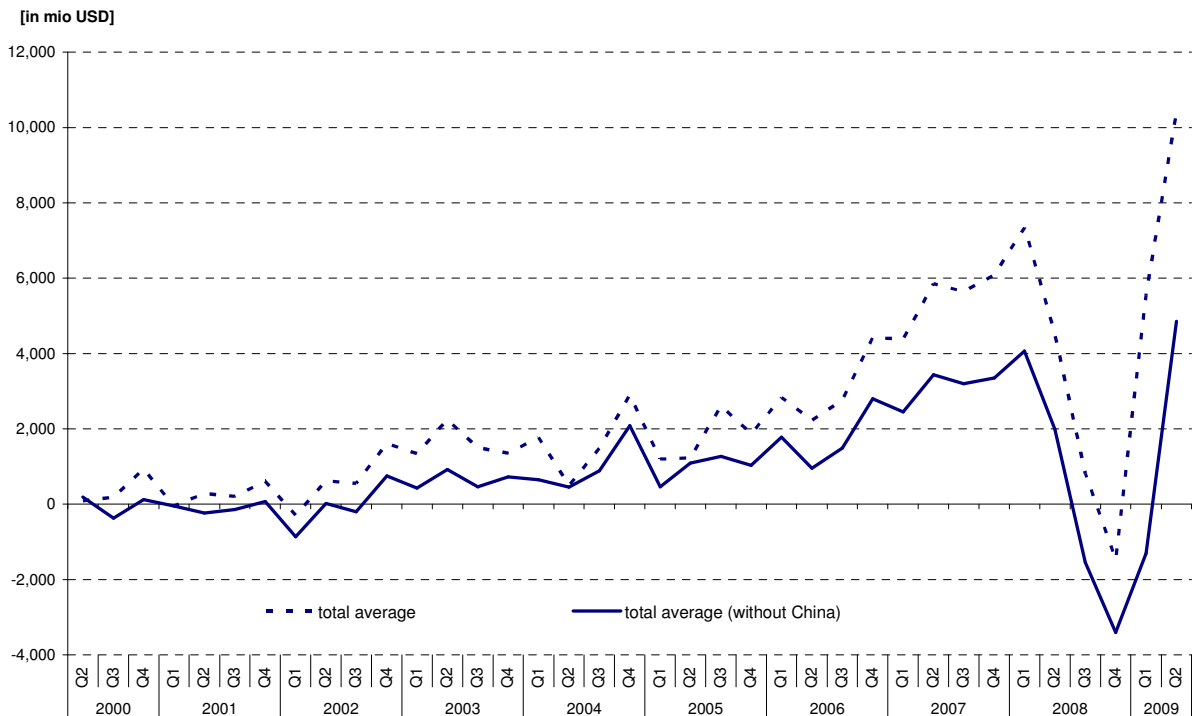
⁵ Figures are based on the sample of countries listed in Annex 2.

Figure 3: Bank flows and total outstanding claims of BIS-reporting banks on emerging markets



Source: BIS International locational banking statistics, own calculations

Figure 4: Nominal quarterly changes in domestic lending in emerging markets



Source: IMF IFS, national sources, own calculation

The literature suggests that the pre-crisis boom is a major determinant of the bust. For example Sula (2006) shows that surges in capital inflows significantly increases the probability of sudden stops. Thus, we construct measures for the *SURGE* in cross-border bank flows and domestic

lending prior to the shock and use them as additional explanatory variables. The *SURGE* in flows is the aggregated quarterly cross-border bank flows over the three years prior to the *Lehman* bankruptcy (i.e. 2005Q3-2008Q2) to GDP in 2007 in billion USD. The *SURGE* in domestic lending is the aggregated quarterly changes in domestic lending in the three years prior to the crisis (2005Q3-2008Q2) to GDP in 2007 in local currency. We expect the *SURGE*s to aggravate the *FALL*s, i.e. positive coefficient estimates. For testing the robustness of our results we will vary the *FALL* and *SURGE* measures.

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

$$FALL_i = \alpha * FBAS_i + \beta * SURGE_i + \gamma_k * X_{ik} + \varepsilon_i \quad (1)$$

Note that *FALL* and *SURGE* are both, either the fall and surge in bank flows or the fall and surge in domestic lending 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:

Structural and macroeconomic variables:

- **De jure financial openness.** An open capital account facilitates capital inflows and credit growth spurred by foreign borrowing. Thus, countries with a higher index value should be more vulnerable to external shocks. Accordingly, we expect a positive coefficient.
- **Export partners' GDP growth in 2009.** Real GDP growth of the 30 main export partners in 2009 weighted by their share in total exports of a given EME/DC in 2008. Following Aisen and Franken (2010) we construct this variable to account for economic activity after the crisis avoiding endogeneity problems. 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 bank flows and credit growth.

- **Institutional quality.** Better creditor protection and information sharing among institutions like public credit registries 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* measures. Following Kose et al. (2009) we use the simple 2008 average of the six individual World Governance Indicators as well the change from 2007 to 2008 as proxies for institutional quality.
- **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.
- **Commodity price dependence.** Commodity price dependence might explain a significant part of countries' vulnerabilities to a sudden stop in the current crisis, as the immediate post-Lehman period was characterized by a significant decline in raw material and oil prices (positive sign expected). We measure commodity price dependence by calculating the share of exports of primary commodities (SITC0-SITC4) in total exports in 2007 for each EME.

External and internal vulnerabilities:

- **External debt to GNI.** Net debtor countries face a higher risk of sudden stops and thus a decline in capital flows and domestic credit 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 3).

- **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, comforting both foreign investors as well as domestic financial institutions. Thus, a higher ratio should stabilize capital inflows as well as credit growth (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 and the corresponding decline in credit growth (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, the opposite reasoning might apply with regard to capital flows for countries with a strong foreign bank presence (Cetorelli and Goldberg 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.

Further we use a set of **dummy variables** to account for effects of the different groups of countries regarding region, income and other characteristics.

4. Results

4.1. Benchmark model

We examine the impact of foreign banks on the stability of cross-border bank flows and domestic lending simultaneously, as both are closely linked. General economic developments or country characteristics might simultaneously affect the shock in bank flows and in domestic

lending. Therefore equation errors might correlate. To control for this we test the relationship with a seemingly unrelated regression system (Zellner 1962).⁶

Our benchmark estimations include the share of assets held by foreign banks, *FBAS*, the respective *SURGE* variables to control for the pre-crisis boom as well as financial openness and GDP growth. For additional controls we adopt a parsimonious approach, adding them one by one to the benchmark estimation to reduce correlation among independent variables ([Appendix 5](#)) and to keep the sample size as high as possible.

We find the expected mitigating impact of foreign bank presence on *FALL* for bank flows (upper panels in [Table 1](#) and [Table 2](#)), but not on *FALL* for domestic lending (lower panels). Thus, the stabilization effect of a stronger foreign bank presence on bank inflows is not translated into more stable domestic lending. While we cannot rule out that our estimations suffer from an omitted variable bias the coefficient of our main interest *FBAS* is strikingly stable in size and significance in the various estimates for bank flows and domestic lending respectively.

Table 1: Controlling for structural and macroeconomic variables

	(1)	(2)	(3)	(4)	(5)
<i>Flows</i>					
FBAS	-0.1281*** (0.0417)	-0.1253*** (0.0418)	-0.1468*** (0.0423)	-0.1154*** (0.0441)	-0.1380*** (0.0433)
SURGE	0.1381*** (0.0052)	0.1385*** (0.0052)	0.1352*** (0.0054)	0.1389*** (0.0052)	0.1383*** (0.0053)
FIN.OPENNESS	0.4962 (0.8445)	0.4950 (0.8420)	0.1677 (0.8472)	0.5665 (0.8443)	0.5158 (0.8843)
ExpP GDP GROWTH	0.0933 (0.5431)	-0.0048 (0.5609)	0.3612 (0.5519)	0.0722 (0.5410)	0.2414 (0.5946)
INST.QUALITY change		-12.7194 (18.9650)			
INST.QUALITY			5.0369* (2.7793)		
CA/GDP				0.1054 (0.1230)	
COMMODITY PRICE DEP.					-3.8501 (4.6167)
constant	9.1822*** (2.0115)	9.0628*** (2.0134)	12.5487*** (2.7201)	8.9268*** (2.0236)	12.1587*** (3.5383)
<i>Credit</i>					
FBAS	0.0012 (0.0694)	0.0071 (0.0696)	0.0402 (0.0709)	0.0257 (0.0741)	0.0245 (0.0720)
SURGE	0.1046*** (0.0100)	0.1053*** (0.0100)	0.1104*** (0.0104)	0.1067*** (0.0101)	0.1072*** (0.0102)
FIN.OPENNESS	3.2006**	3.2362**	4.0301***	3.3975**	3.1938**

⁶ Simple separate OLS regressions show similar results and are available from the authors on request.

	(1.3462)	(1.3423)	(1.3851)	(1.3569)	(1.3924)
ExpP GDP GROWTH	1.9140**	1.7242*	1.4664	1.8962**	1.6708*
	(0.9093)	(0.9399)	(0.9168)	(0.9055)	(0.9757)
INST.QUALITY change		-24.0147			
		(31.1127)			
INST.QUALITY			-8.8127*		
			(4.5218)		
CA/GDP				0.1857	
				(0.2034)	
COMMODITY PRICE DEP.					10.4297
					(7.5435)
constant	-7.9147**	-8.2367**	-14.7811***	-8.7302**	-15.8254**
	(3.8855)	(3.8908)	(5.2327)	(3.9533)	(6.3171)
R-sqr flows	0.911	0.912	0.914	0.912	0.913
R-sqr credit	0.570	0.573	0.589	0.574	0.585
N	84	84	84	84	81

The dependent variable is the respective *FALL* measure for flows and for credit. *FALL* for flows is the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 (in mio USD) as a share of GDP (in 2007 in bn USD). *FALL* for credit is the difference between the average nominal quarterly changes of claims on private sector before (2007Q3-2008Q2) and after the *Lehman* collapse (2008Q4-2009Q1) to GDP in 2007. *SURGE* is the aggregated bank flows resp. nominal changes in credit to the private sector in the three years preceding the *Lehman* bankruptcy (i.e. 2005Q3-2008Q2) as a share of GDP.

Stars indicate statistical significance at * 10 percent, **5 percent and *** 1 percent level. Standard errors in parentheses below. Seemingly unrelated regression estimation method according to Zellner (1962) applied.

Moreover, we find strong evidence for the expected boom-bust relationship as *SURGE* is positive and highly significant in all specifications. The higher the pre-crisis boom in bank flows and domestic lending, the higher the *FALL* after the *Lehman* collapse.

Among the control variables institutional quality significantly affects the stability of bank flows and domestic lending (Table 1, column 3), however in different directions. While countries with higher institutional quality experienced a smaller *FALL* in domestic lending, a higher degree of institutional quality aggravated the *FALL* in cross-border bank flows. This conflicting result might reflect that institutional quality is an important driver of bank flows in non-crisis times (Papaioannou 2009).⁷ Regarding internal and external vulnerabilities we find that a higher degree of foreign liability dollarization – as expected – significantly aggravates the instability of domestic lending (Table 2, column 4). Overall our benchmark estimations explain about 90 percent of the variation of *FALL* in bank flows and 56 percent of the variation in *FALL* in domestic lending.⁸

⁷ Moreover, the correlation coefficient between institutional quality and the *SURGE* in cross-border bank flows is higher than between institutional quality and the *SURGE* in domestic lending (Appendix 5).

⁸ As already indicated, the domestic lending variable suffers from the shortcoming that the flows are not exchange-rate-adjusted. Thus, countries exhibiting a high share of domestic credit in foreign currency show a smaller decline in lending if they experienced a significant depreciation after the *Lehman* collapse. To control for this, we also run a regression that takes into account fluctuations of the respective currencies vis-à-vis the US dollar, measured as the

Table 2: Controlling for external and internal vulnerabilities

	(1)	(2)	(3)	(4)	(5)
<i>flows</i>					
FBAS	-0.1090*** (0.0422)	-0.1338*** (0.0417)	-0.1239*** (0.0453)	-0.1199*** (0.0440)	-0.1255*** (0.0421)
SURGE	0.1399*** (0.0051)	0.1393*** (0.0052)	0.1383*** (0.0053)	0.1255*** (0.0151)	0.1379*** (0.0051)
FIN.OPENNESS	0.4183 (0.8236)	0.6789 (0.8562)	0.4842 (0.8832)	0.5358 (0.9154)	0.5922 (0.8589)
ExpP GDP GROWTH	-0.1125 (0.5445)	0.3059 (0.5515)	-0.0404 (0.5925)	0.2267 (0.7101)	-0.2747 (0.6027)
DEBT/GNI	-0.0415 (0.0417)				
ERR		0.6520 (0.5645)			
RESERVES/DEBT			0.0006 (0.0055)		
FLD				-0.1054 (0.0820)	
CDR					-4.1740 (3.2234)
constant	10.1512*** (2.4329)	6.3392* (3.5711)	9.2289*** (2.3489)	16.5273*** (5.4890)	12.4238*** (3.3150)
<i>credit</i>					
FBAS	0.0254 (0.0733)	0.0008 (0.0707)	-0.0113 (0.0763)	-0.0371 (0.0761)	0.0039 (0.0702)
SURGE	0.1066*** (0.0103)	0.1042*** (0.0101)	0.1051*** (0.0107)	0.1040*** (0.0107)	0.1093*** (0.0104)
FIN.OPENNESS	3.3587** (1.3654)	3.1586** (1.3854)	3.1545** (1.4281)	3.7884** (1.5566)	3.4624** (1.3808)
ExpP GDP GROWTH	1.9164** (0.9486)	1.8487** (0.9333)	2.4652** (0.9919)	1.1861 (1.0819)	1.5339 (0.9858)
DEBT/GNI	-0.0505 (0.0693)				
ERR		-0.3694 (0.9305)			
RESERVES/DEBT			0.0014 (0.0091)		
FLD				0.2776** (0.1416)	
CDR					-7.0773 (5.5412)
constant	-7.2324 (4.6827)	-6.0090 (6.3744)	-7.0621 (4.6166)	-24.7063** (9.7872)	-3.1012 (5.5556)
R-sqr flows	0.918	0.914	0.912	0.635	0.913
R-sqr credit	0.570	0.571	0.561	0.590	0.575
N	81	83	78	70	82

The dependent variable is the respective *FALL* measure for flows and for credit. *FALL* for flows is the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 (in mio USD) as a share of GDP (in 2007 in bn USD). *FALL* for credit is the difference between the average nominal quarterly changes of claims on private sector before (2007Q3-2008Q2) and after the *Lehman* collapse (2008Q4-2009Q1) to GDP in 2007. *SURGE* is the aggregated bank flows resp. nominal changes in credit to the private sector in the three years preceding the *Lehman* bankruptcy (i.e. 2005Q3-2008Q2) as a share of GDP.

Stars indicate statistical significance at * 10 percent, **5 percent and *** 1 percent level. Standard errors in parentheses below. Seemingly unrelated regression estimation method according to Zellner (1962) applied.

difference between the average quarterly exchange rate in the year before the *Lehman* collapse (i.e. 2007Q3-2008Q2) minus the average quarterly exchange rate in the two quarters after the *Lehman* collapse (i.e. 2008Q4-2009Q1) divided by the average quarterly exchange rate in the year before the *Lehman* collapse. As expected, the coefficient estimate is insignificant for bank flows, as those flows are already exchange-rate-adjusted, but highly significant for domestic lending. However, the impact of foreign banks on the *FALL* variables remains unchanged for both variables. Separate OLS and joint SUR estimations lead to the same results which are available from the authors on request.

4.2. Regional differentiation

There is significant heterogeneity among emerging market regions regarding the presence of foreign banks. These regional differences might affect the mitigating impact of foreign banks on the stability of bank flows and domestic lending. Thus, we test for a stabilizing effect of *FBAS* within each EME region by interacting region-dummies with our variable for foreign bank presence and excluding the constant and *FBAS* separately in our model.

The results indicate that the mitigating effect of foreign bank presence on *FALL* in bank flows we found in our benchmark estimations for the whole sample can largely be traced to the ECA and SSA regions (Table 3). Here we find a negative and significant marginal effect of *FBAS* indicating that a higher foreign bank presence mitigated the sudden stop of bank flows. Within the other regions foreign bank presence does not have a significant and robust impact on the stability of cross-border bank flows.⁹

Table 3: Differences across regions

	OLS		SUR	
	(1a) Flows	(1b) Credit	(2a) Flows	(2b) Credit
FBAS*ASIA	0.1151 (0.3030)	1.3502* (0.7196)	0.1087 (0.2773)	1.3572*** (0.5126)
FBAS*ECA	-0.2674*** (0.0827)	0.0331 (0.1513)	-0.2674*** (0.0676)	0.0316 (0.1251)
FBAS*LAC	0.0851* (0.0477)	-0.0661 (0.0678)	0.0859 (0.0809)	-0.0651 (0.1495)
FBAS*MENA	0.3206 (0.2175)	-0.0123 (0.2816)	0.3232 (0.2874)	-0.0212 (0.5324)
FBAS*SSA	-0.1352* (0.0693)	-0.1046 (0.1324)	-0.1406** (0.0697)	-0.0953 (0.1319)
SURGE	0.1373*** (0.0115)	0.1043*** (0.0222)	0.1353*** (0.0046)	0.1068*** (0.0100)
FIN.OPENNESS	1.0602 (0.8929)	2.0179 (1.4836)	1.1951 (0.9045)	2.0111 (1.5609)
ExpP GDP GROWTH	-1.4702** (0.7236)	1.2819 (1.1312)	-1.5578** (0.6414)	1.3367 (1.1414)
ASIA	11.8264** (5.7871)	-28.8997* (16.3198)	11.9435*** (4.1313)	-29.5991*** (8.1261)
ECA	4.7193 (4.7805)	-11.6746 (14.4032)	4.5895 (4.6683)	-12.1396 (8.8131)
LAC	0.2343 (3.1152)	-3.7416 (4.9350)	0.0753 (3.9968)	-4.0754 (7.4774)
MENA	-3.4503 (2.8106)	-4.1638 (4.3951)	-3.5605 (4.7225)	-4.4352 (8.7851)
SSA	11.0164** (4.8823)	-2.3609 (9.6581)	11.5526*** (4.0512)	-3.2138 (7.8900)

⁹ We find evidence for an aggravating impact of foreign banks on the sudden stop in cross-border bank flows within Latin America as the coefficient estimate is positive and significant in the OLS regression. However, the result is not robust to a change in the estimation method.

R-sqr	0.951	0.683	0.951	0.683
N	84	84	84	84

The dependent variable is the respective *FALL* measure for flows and for credit. *FALL* for flows is the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 (in mio USD) as a share of GDP (in 2007 in bn USD). *FALL* for credit is the difference between the average nominal quarterly changes of claims on private sector before (2007Q3-2008Q2) and after the *Lehman* collapse (2008Q4-2009Q1) to GDP in 2007. *SURGE* is the aggregated bank flows resp. nominal changes in credit to the private sector in the three years preceding the *Lehman* bankruptcy (i.e. 2005Q3-2008Q2) as a share of GDP. Stars indicate statistical significance at * 10 percent, **5 percent and *** 1 percent level. Standard errors in parentheses below. Robust standard errors applied.

The regional analysis also confirms the result of our benchmark estimations that there is no stabilizing effect of foreign banks on the stability of domestic lending. This also holds for ECA and SSA. This suggests that a strong presence of foreign banks, even if it contributes to the stability of cross-border bank flows, does not necessarily imply a more stable credit provision in the host country in times of financial distress. Within Asian countries foreign bank even seem to have aggravated instability regarding credit provision. However, a closer look reveals that this result is driven by China, a country experiencing stable credit growth after the *Lehman* collapse without any foreign bank presence.

The stabilizing impact of foreign banks on cross-border flows is most pronounced in ECA and SAA, i.e. the regions with the highest shares of assets held by foreign banks (Figure 3). Given that we use macro-level data, the impact of foreign banks on domestic credit growth might only emerge when foreign banks are dominating players in host country banking systems. To test this proposition we run a piecewise regression. We group our sample countries according to their foreign bank asset share and test whether the impact of foreign banks in countries with a foreign bank asset share higher than 50 percent differs significantly from the impact in countries with a foreign bank asset share of less than 50 percent. The results show insignificant coefficient estimates for the interaction term indicating that a high foreign bank presence does not have a stabilizing impact *per se* (Table 4, column 1). This also holds when we divide the sample countries into three groups with 33 and 66 percent being the cutoff values. For none of the three groups the impact of foreign bank presence differs significantly. Further we test the relationship with a squared *FBAS* variable instead of grouping. However, the coefficient is again found to be

insignificant. This suggests that the mitigating impact of foreign banks on the sudden stop of bank flows to ECA and SSA is a regional phenomenon and not driven by the comparatively high share of assets held by foreign banks in the countries of the regions as such.

This leads to the question which characteristics of ECA and SSA might be responsible for the different impact of foreign banks on the stability of bank flows compared to other EME regions.

We test two hypotheses. For ECA, the hypothesis is that foreign banks – mainly parent banks from the EU-15 – consider ECA as a single market and hence remained strongly committed to their subsidiaries during the crisis (Schoenmaker 2011). This holds in particular for those countries in ECA which have already joined the EU or have an EU accession perspective (Berglöf and Bolton 2002). Thus, we create a dummy variable for those countries called ‘*EU perspective*’ which equals one for countries that are EU members or EU candidate countries¹⁰ and zero otherwise. We interact this dummy with our variable on foreign bank presence *FBAS*.

Table 4: Testing for foreign bank asset share and regional characteristics

	(1)	(2)	(3)	(4)
FBAS*above 50 % FBAS dummy	-0.1856 (0.1837)			
above 50 % FBAS dummy	6.9133 (11.0913)			
FBAS*EU perspective dummy		-0.2236** (0.0954)		-0.2814** (0.1183)
EU perspective dummy		7.0654 (5.8639)		11.0370* (5.7468)
FBAS*INDEPENDENCE			-0.0147 (0.0887)	-0.1243 (0.1080)
INDEPENDENCE			8.2606* (4.2711)	10.7228** (4.3340)
FBAS	-0.0170 (0.0969)	-0.0706 (0.0456)	-0.1406** (0.0658)	-0.0294 (0.0907)
SURGE	0.1379*** (0.0113)	0.1400*** (0.0114)	0.1374*** (0.0096)	0.1376*** (0.0102)
FIN.OPENNESS	0.4067 (0.7341)	0.5160 (0.7086)	1.3828* (0.7985)	1.2440 (0.7659)
ExpP GDP GROWTH	-0.0092 (0.5262)	-0.4427 (0.4755)	-0.3746 (0.5260)	-0.7530 (0.4978)
constant	7.2362*** (2.5452)	7.1273*** (1.9613)	5.4792*** (1.9247)	2.6311 (1.9549)
R-sqr	0.913	0.917	0.919	0.924
N	84	84	84	84

The dependent variable is the *FALL* in flows. This is the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 (in mio USD) as a share of GDP (in 2007 in bn USD). *SURGE* for flows are the aggregated capital flows in the three years preceding the *Lehman* bankruptcy (2005Q3-2008Q2) in mio USD as a share of GDP (in 2007 in bn USD).

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.

¹⁰ These countries are Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Estonia, Latvia, Lithuania, Macedonia, Poland, Romania and Turkey.

We find (Table 4, column 2) that the coefficient estimate of the interaction variable is negative and significant. This suggests that in EU (candidate) countries the impact of foreign bank presence is significantly more mitigating than for other EMEs in our sample. Parent banks seem to have provided liquidity support to their subsidiaries in an effort to safeguard their long-term investments in an enlarged European home market.¹¹

In SSA foreign banks, in particular foreign banks with parent banks in mature economies, have a longstanding presence that is largely linked to colonial ties (Daumont et al. 2004). In contrast to other EME countries, i.e. in Latin America, these ties ended for most SSA countries only after World War II. Thus, we create a dummy variable called *INDEPENDENCE* that equals one if a country became independent from a colonial power after World War II and zero otherwise. *INDEPENDENCE* takes the value one for 34 out of the 84 sample countries, of which twenty are located in the SSA region. Again we interact this dummy with our variable on foreign bank presence. We expect that the effect of foreign banks is more mitigating for countries which gained independence only after WW II compared to other emerging markets i.e. we expect a negative coefficient estimate for the interaction. The coefficient estimate of the interaction *FBAS*INDEPENDENCE* is negative but insignificant (Table 4, column 3).

Controlling *EU perspective* and *INDEPENDENCE* simultaneously (Table 4, column 4), however, we find a significant effect with the expected sign for both interaction variables. Moreover, this effect is robust to the inclusion of the full set of control variables for separate and joint estimations.¹² Thus, overall there is strong evidence of a mitigating impact of foreign banks related to the EU accession while we get mixed results on a stabilizing effect of foreign banks operating in countries that became independent only in the post-WW II period.

¹¹ As we settle for a relatively short post-crisis period to account for the ‘suddenness’ of the stop, there is little risk that the stabilizing effect we find is largely due to policy responses to the crisis 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).

¹² Estimation results are available from the authors upon request.

5. Robustness checks

To check for the robustness of our results we vary those two of our variables that are not predetermined, i.e. *FALL* and *SURGE*. Generally our findings are robust as for cross-border bank flows the *FBAS* coefficients remain significant for most specifications, while we never find a significant impact of foreign banks on domestic lending. Moreover, the checks reveal that the specification of *FALL* is of higher relevance for the robustness of our results than the specification of the *SURGE* variable.

Table 5: Robustness checks – variation of *FALL*

	(1) <i>FALL</i> from 2006Q3- 2007Q2 to 2008Q4- 2009Q1	(2) <i>FALL</i> from 2006Q3- 2008Q2 to 2008Q4- 2009Q1	(3) <i>FALL</i> from 2007Q3- 2008Q2 to 2008Q4- 2009Q2
<i>Flows</i>			
FBAS	-0.0660 (0.0526)	-0.0918** (0.0394)	-0.0919** (0.0417)
SURGE	0.1172*** (0.0063)	0.1283*** (0.0047)	0.1201*** (0.0052)
FIN.OPENNESS	-0.7719 (1.0627)	-0.1811 (0.8049)	0.6817 (0.8555)
ExpP GDP GROWTH	-0.4285 (0.6833)	-0.1359 (0.5182)	-0.3637 (0.5509)
constant	7.1332*** (2.5356)	7.7190*** (1.9499)	5.8495*** (2.0674)
<i>Credit</i>			
FBAS	-0.0116 (0.0660)	0.0274 (0.0559)	0.0409 (0.0635)
SURGE	0.0253*** (0.0092)	0.1489*** (0.0077)	0.0939*** (0.0092)
FIN.OPENNESS	4.4439*** (1.2808)	3.8644*** (1.0990)	3.4864*** (1.2462)
ExpP GDP GROWTH	-0.4899 (0.8624)	0.0181 (0.7418)	1.2591 (0.8447)
constant	-2.3031 (3.6647)	-2.8550 (3.1431)	-6.3328* (3.6020)
R-sqr flows	0.824	0.911	0.892
R-sqr credit	0.214	0.826	0.578
N	84	81	81

The dependent variable is different *FALL* measure for flows and for credit and covers different time windows. The usual *SURGE* measures for flows and for credit are applied. Stars indicate statistical significance at * 10 percent, **5 percent and *** 1 percent level. Standard errors in parentheses below. Seemingly unrelated regression estimation method according to Zellner (1962) applied.

The global financial crisis started with the turmoil in mature economy money markets in August 2007. Some emerging markets, like Kazakhstan and Russia were already affected by this event. Thus, we define the pre-crisis period as 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 becomes insignificant for both bank flows and for credit growth ([Table 5](#), column 1).¹³ As a second variation of our main *FALL* variable we extend the pre-crisis period to two years, i.e. 2006Q3-2008Q2 (column 2). Further we extend the period after the *Lehman* shock to nine months (column 3). The results confirm our general findings. Foreign bank presence has a stabilizing impact on cross-border bank flows but not on domestic lending.

We change the *SURGE* variable by altering the time periods covered. We define *SURGE* periods for three additional time windows prior to the *Lehman* collapse. The estimations confirm our previous results ([Table 6](#)). The impact of the *SURGE* remains aggravating and highly significant in all estimations. As before, the stabilizing effect of foreign bank presence is significant regarding bank flows (upper panel) but not regarding credit growth (lower panel).

Table 6: Robustness checks – variation of *SURGE*

	(1) [2 years]	(2) [4 years]	(3) [5 years]
<i>Flows</i>			
FBAS	-0.1203*** (0.0368)	-0.1297*** (0.0427)	-0.1300*** (0.0416)
SURGE	0.1711*** (0.0055)	0.1206*** (0.0046)	0.1167*** (0.0043)
FIN.OPENNESS	0.2330 (0.7452)	0.4983 (0.8651)	0.4651 (0.8428)
ExpP GDP GROWTH	0.0549 (0.4774)	-0.0072 (0.5604)	0.1134 (0.5469)
constant	9.0952*** (1.7718)	9.7368*** (2.0902)	9.9914*** (2.0351)
<i>credit</i>			
FBAS	0.0102 (0.0709)	0.0009 (0.0686)	-0.0009 (0.0675)
SURGE	0.1363*** (0.0133)	0.0863*** (0.0080)	0.0739*** (0.0067)
FIN.OPENNESS	3.4336** (1.3741)	3.3764** (1.3301)	3.4958*** (1.3103)
ExpP GDP GROWTH	1.8193** (0.9242)	1.7085* (0.8966)	1.5231* (0.8775)
constant	-8.7984** (4.0054)	-7.3914* (3.8579)	-6.6025* (3.7541)
R-sqr flows	0.931	0.908	0.913
R-sqr credit	0.553	0.587	0.600
N	84	83	83

The dependent variable is the usual *FALL* measure for flows and for credit. The *SURGE* varies and is the aggregated bank flows resp. nominal changes in credit to the private sector in the above given time periods preceding the Lehman bankruptcy as a share of GDP. Stars indicate statistical significance at * 10 percent, ** 5 percent and *** 1 percent level. Standard errors in parentheses below. Seemingly unrelated regression estimation method according to Zellner (1962) applied.

¹³ A closer look at the data reveals that this variation in the *FALL* variable particularly affects countries in the MENA region. Following substantial turmoil in local stock exchanges in 2006, capital inflows were on a much lower level in 2007 than in 2008. As a result the newly defined *FALL* variable is smaller than the original variable for those countries. When we exclude the MENA countries from the estimation the *FBAS* coefficient turns to be significant again with the same strength as in our main estimation.

6. Conclusion

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

We find robust evidence indicating that countries with a high share of banking sector assets held by foreign banks experienced a more stable pattern of cross-border bank flows during the recent crisis than countries with a low share of banking sector assets held by foreign institutions. By contrast, we do not find evidence indicating that foreign banks contributed to a smoother pattern of domestic post-crisis credit growth.

A regional analysis suggests that the mitigating impact of foreign banks in cross-border bank flows is a regional phenomenon driven by Eastern Europe and Central Asia as well as Sub-Saharan Africa. This may be due to special features of both regions. In Eastern Europe and Central Asia, in particular in countries that have already joined the European Union or are deemed to become Member States in the future, foreign banks have been entering host country banking markets because of the European integration process. Thus, parent banks perceive host markets as an extension of their home market and consider the presence of their subsidiaries as a long-term investment. We find evidence supporting this interpretation. Sub-Saharan Africa is special as many countries of the region are characterized by a long-standing presence of foreign banks mainly reflecting colonial ties. The importance of these ties might be affected by the length of time that has elapsed since countries gained independence. Testing for this effect we get inconclusive results.

Overall our results indicate that foreign banks provided some additional financial stability in the crisis. Moreover, there is no evidence that a stronger presence of foreign banks was associated with a higher degree of instability of cross-border flows and domestic credit in the respective host countries compared to countries where the role of foreign banks is less pronounced. This is remarkable because the crisis has been a global one, triggered in mature economies with severe negative effects on the strength of the parent banks of subsidiaries in emerging markets. The next crisis may have a different origin weighing less on the potential advantages of foreign banks with regard to solvency and liquidity for host country banking sectors. Thus, the financial stability benefits of a stronger presence of foreign banks in terms of a smoother pattern of cross-border flows and domestic credit might materialize in a more typical emerging market crisis setting.

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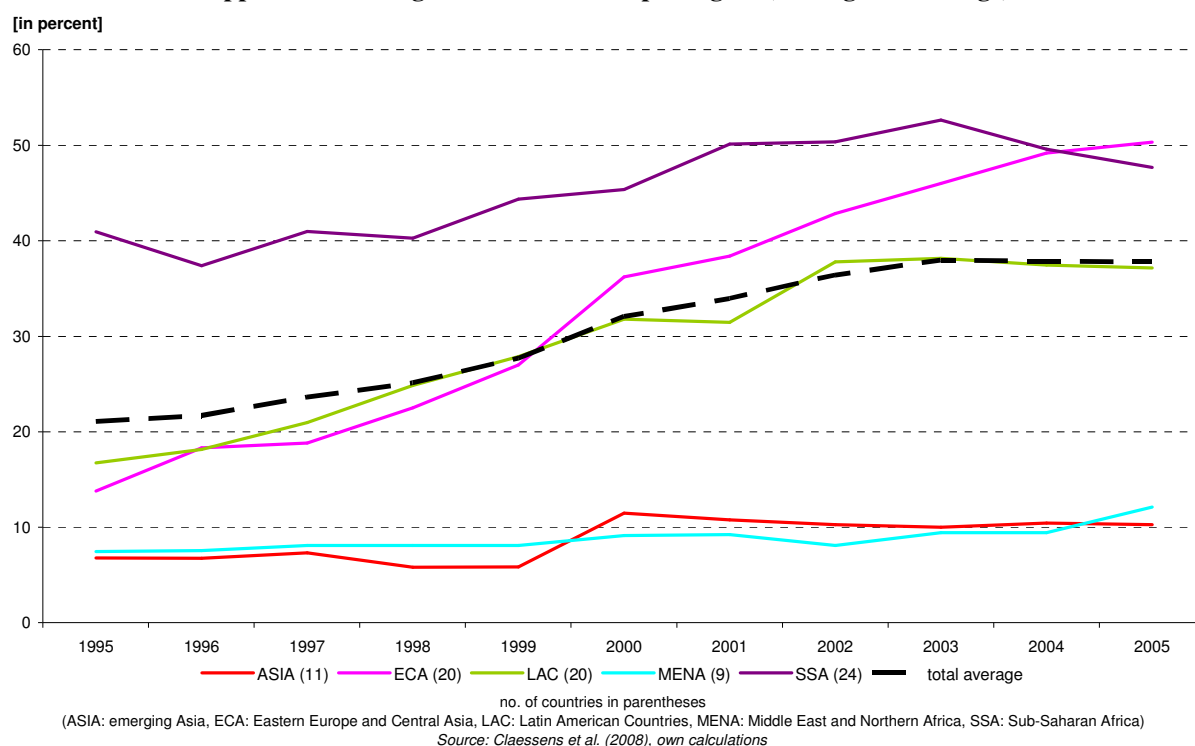
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Appendix

Appendix 1: Foreign bank asset share per region (unweighted average)



Appendix 2: List of sample countries by region

	ASIA	ECA	LAC	MENA	SSA
1	Bangladesh	Albania	Argentina	Algeria	Angola
2	Cambodia	Armenia	Bolivia	Egypt	Benin
3	China	Azerbaijan	Brazil	Iran	Burkina Faso
4	India	Belarus	Chile	Jordan	Burundi
5	Indonesia	Bosnia & Herzegovina	Colombia	Lebanon	Cameroon
6	Malaysia	Bulgaria	Costa Rica	Libya	Côte d'Ivoire
7	Mongolia	Croatia	Dominican Rep.	Morocco	Ghana
8	Nepal	Estonia	Ecuador	Tunisia	Kenya
9	Sri Lanka	Georgia	El Salvador	Yemen	Madagascar
10	Thailand	Kazakhstan	Guatemala		Malawi
11	Vietnam	Kyrgyz Republic	Haiti		Mali
12		Latvia	Honduras		Mauritania
13		Lithuania	Jamaica		Mauritius
14		Macedonia, FYR	Mexico		Mozambique
15		Moldova	Nicaragua		Niger
16		Poland	Panama		Nigeria
17		Romania	Paraguay		Senegal
18		Russia	Peru		Seychelles
19		Turkey	Uruguay		South Africa
20		Ukraine	Venezuela		Sudan
21					Tanzania
22					Togo
23					Uganda
24					Zambia
25					

We subdivide our countries into regional groups according to the World Bank country classification 2009. We exclude high income countries. As Croatia and Estonia have been classified as high-income countries only recently, we still treat them as Eastern European and Central Asian countries and upper middle income countries.

Appendix 3: 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 I. Ötker-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 4: Descriptive statistics

Variable	Region	N	Mean	Std. Dev.	Min	Max
FALL flows	ASIA	11	19.473	18.025	-1.416	56.007
	ECA	20	23.681	26.733	-31.718	79.759
	LAC	20	23.829	42.373	0.863	198.482
	MENA	9	5.726	6.192	-0.047	20.593
	SSA	24	19.579	52.114	-2.060	234.535
	all	84	20.070	37.403	-31.718	234.535
FALL credit	ASIA	11	11.447	27.836	-57.629	52.278
	ECA	20	19.213	23.968	-23.106	52.318
	LAC	20	11.705	9.400	-1.736	30.477
	MENA	9	13.527	17.109	-5.601	51.461
	SSA	24	8.8920	42.451	-42.823	196.945
	all	84	12.850	28.064	-57.629	196.945
FBAS	ASIA	11	10.252	11.166	0	28.299
	ECA	20	52.790	33.211	3.945	99.760
	LAC	20	37.140	26.586	0	95.346
	MENA	9	12.110	11.504	0	34.044
	SSA	24	47.537	28.969	0	100
	all	84	37.634	30.469	0	100
SURGE flows	ASIA	11	41.315	40.929	-8.964	125.8437
	ECA	20	187.758	168.272	1.839	583.727
	LAC	20	118.717	341.556	-14.433	1559.766
	MENA	9	26.967	34.372	-17.520	80.831
	SSA	24	112.334	327.895	-48.402	1424.153
	all	84	113.3651	257.166	-48.402	1559.766
SURGE credit	ASIA	11	268.619	163.795	127.252	673.461
	ECA	20	320.278	153.456	77.512	637.889
	LAC	20	161.521	90.836	54.486	324.255
	MENA	9	170.432	139.890	17.125	442.152
	SSA	24	166.787	314.077	20.375	1582.465
	all	84	215.804	210.620	17.125	1582.465
FIN.OPENNESS	ASIA	11	-0.280	1.060	-1.129	1.271
	ECA	20	0.713	1.506	-1.129	2.541
	LAC	20	1.583	1.140	-0.764	2.541
	MENA	9	0.492	1.722	-1.129	2.541
	SSA	24	-0.527	1.340	-1.808	2.541
	all	84	0.412	1.551	-1.808	2.541
ExpP GDP GROWTH	ASIA	11	-0.744	2.301	-3.152	4.197
	ECA	20	-4.456	1.739	-7.698	-530
	LAC	20	-1.672	.8128	-3.479	-454
	MENA	9	-0.728	2.116	-3.083	2.192
	SSA	24	-.088	2.005	-3.865	3.014
	all	84	-1.660	2.415	-7.698	4.197
INST.QUALITY change	all	84	0.015	0.069	-0.332	.157
INST.QUALITY	all	84	-0.347	0.545	-1.661	1.153
CA/GDP	all	84	-3.585	11.051	-25.185	40.655
COMMODITY PRICE DEP.	all	81	0.548	0.291	0.043	0.999
DEBT/GNI	all	81	41.751	30.501	4.341	166.815
ERR	all	83	5.169	2.205	1	8
RESERVES/DEBT	all	78	97.490	240.745	3.117	2075.063
FLD	all	70	62.334	16.464	20.236	95.863
CDR	all	82	0.950	0.429	0.2571	2.390

Appendix 5: Pairwise correlations

	<i>FALLflows</i>	<i>FALLcredit</i>	<i>FBAS</i>	<i>SURGEflows</i>	<i>SURGEcredit</i>	<i>FIN.OPENNESS</i>	<i>ExpP GDP GROWTH</i>	<i>INST.QUALITY change</i>	<i>INST.QUALITY</i>	<i>CA/GDP</i>	<i>COMMODITY PRICE DEP.</i>	<i>DEBT/GNI</i>	<i>ERR</i>	<i>RESERVES/DEBT</i>	<i>FLD</i>
<i>FALLflows</i>	1														
<i>FALLcredit</i>	0.036 (0.748)	1													
<i>FBAS</i>	0.030 (0.789)	-0.051 (0.647)	1												
<i>SURGEflows</i>	0.949* (0.000)	0.033 (0.766)	0.138 (0.212)	1											
<i>SURGEcredit</i>	0.257* (0.018)	0.726* (0.000)	-0.072 (0.517)	0.232* (0.033)	1										
<i>FIN.OPENNESS</i>	0.2952* (0.006)	0.136 (0.217)	0.229* (0.036)	0.316* (0.004)	-0.011 (0.918)	1									
<i>ExpP GDP GROWTH</i>	-0.283* (0.009)	-0.100 (0.363)	-0.220* (0.045)	-0.324* (0.003)	-0.293* (0.007)	-0.196* (0.074)	1								
<i>INST.QUALITY change</i>	0.177 (0.107)	0.026 (0.814)	0.173 (0.116)	0.226* (0.039)	0.143 (0.196)	0.112 (0.310)	-0.332* (0.002)	1							
<i>INST.QUALITY</i>	0.4696* (0.000)	0.146 (0.184)	0.340* (0.002)	0.478* (0.000)	0.329* (0.002)	0.366* (0.001)	-0.407* (0.000)	0.184* (0.094)	1						
<i>CA/GDP</i>	-0.193* (0.079)	-0.082 (0.456)	-0.388* (0.000)	-0.268* (0.014)	-0.165 (0.134)	-0.234* (0.032)	0.192* (0.080)	0.050 (0.654)	-0.333* (0.002)	1					
<i>COMMODITY PRICE DEP.</i>	-0.061 (0.590)	0.014 (0.900)	-0.106 (0.346)	-0.049 (0.667)	-0.153 (0.173)	-0.112 (0.320)	0.363* (0.001)	-0.294* (0.008)	-0.407* (0.000)	0.189* (0.092)	1				
<i>DEBT/GNI</i>	0.230* (0.039)	-0.006 (0.956)	0.128 (0.257)	0.284* (0.010)	0.078 (0.490)	0.095 (0.398)	-0.214* (0.055)	-0.044 (0.696)	0.121 (0.281)	-0.516* (0.000)	-0.019 (0.866)	1			
<i>ERR</i>	-0.120 (0.279)	-0.093 (0.401)	-0.019 (0.866)	-0.165 (0.135)	-0.062 (0.580)	-0.005 (0.963)	-0.099 (0.372)	0.093 (0.402)	0.136 (0.221)	0.012 (0.915)	-0.247* (0.027)	-0.171 (0.129)	1		
<i>RESERVES/DEBT</i>	-0.078 (0.498)	-0.071 (0.537)	-0.173 (0.131)	-0.101 (0.380)	-0.068 (0.556)	-0.155 (0.175)	-0.027 (0.817)	-0.041 (0.724)	-0.135 (0.238)	0.451* (0.000)	0.178 (0.125)	-0.259* (0.023)	0.046 (0.689)	1	
<i>FLD</i>	-0.268* (0.025)	0.069 (0.572)	0.161 (0.182)	-0.174 (0.151)	-0.109 (0.370)	-0.082 (0.497)	0.216* (0.073)	-0.139 (0.252)	-0.335* (0.005)	-0.193 (0.109)	0.233* (0.054)	0.051 (0.678)	-0.168 (0.166)	-0.010 (0.938)	1
<i>CDR</i>	0.137 (0.221)	0.162 (0.147)	0.106 (0.344)	0.193* (0.083)	0.355* (0.001)	0.181 (0.104)	-0.443* (0.000)	0.068 (0.544)	0.360* (0.001)	-0.266* (0.016)	-0.155 (0.174)	0.203* (0.073)	-0.157 (0.160)	-0.191* (0.096)	-0.267 (0.027)

p-values in parentheses below. Correlation coefficients significant at the 10 percent level or better are marked by a star.

Appendix 6: List of variables

Name	Description	Source
FALL flows	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 flows	aggregated cross-border bank flows over the three years prior to the <i>Lehman</i> bankruptcy (i.e. 2005Q3-2008Q2) (logs)	
FALL credit	difference between average monthly real credit growth in Sep. 2007 - Aug. 2008 and the average real credit growth in Oct. 2008 - Mar. 2009, seasonally adjusted rates	IFS: credit to private sector (line 22d), CPI (line 64) and national sources; seasonal adjusted with Census X-12
SURGE credit	average month-on-month real credit growth in the three years prior to the crisis (July 2005-June2008), seasonally adjusted rates	
FBAS	percentage of assets of foreign banks among total banks in 2005	Claessens et al. (2008)
FIN.OPENNESS	Chinn-Ito-Index value for de-jure financial openness in 2007	Chinn and Ito (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
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	
COM.PRICE.DEP	share of SITC categories 0,1,2,3 and 4 in total export value	UN comtrade data
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 Ötker-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)
FALL exchange rate	average exchange rate in 2007Q3-2008Q2 minus the average exchange rate 2008Q4-2009Q1 divided again by the average exchange rate in 2007Q3-2008Q2	IFS: exchange rate quarterly period average (line rf)
EU perspective	equals 1 if a country is EU member or a potential candidate and 0 otherwise	-
INDEPENDENCE	equals 1 if a country became independent from a colonial power after World War II and 0 otherwise	ICOW colonial history data at http://www.ICOW.org