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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 examine whether this contributed to financial stability in the respective host countries in the global financial crisis. Our results suggest that the stabilizing impact of foreign banks was limited to the cross-border component of financial globalization and to two regions: Eastern Europe and Sub-Saharan Africa. Only in the latter region was this translated into more stable credit growth. Thus hopes that a stronger presence of foreign banks might help host countries in isolating domestic credit from international shocks did not materialize in the current crisis.

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) and developing countries (DCs) in the global financial crisis by mitigating the sudden stop of capital flows and the contraction of credit growth after the *Lehman* collapse. It is motivated by the fact that after the EME crises of the 1990s the entry of foreign banks was seen as a key measure to strengthen the resilience of EME and DC banking sectors against external shocks. Authorities in many EMEs and DCs followed this policy recommendation. As a result, the average share of banking sector assets held by foreign banks in EMEs and DCs rose from 21 percent in 1995 to 38 percent in 2005.

In this environment of globalised banking, cross-border capital flows from mature economies to EMEs and DCs recovered from the crises-lows of the late 1990s. Aggregate outstanding claims of BIS-reporting banks vis-à-vis EMEs and DCs almost tripled between 2000 and the third quarter of 2008. Moreover – as in previous episodes of strong capital inflows – growth of real private sector credit was advancing rapidly. The trend of increasing financial integration and deepening ended abruptly after the bankruptcy of *Lehman Brothers* in September 2008. Cross-border bank flows stopped or even reversed and real credit growth slowed substantially in most countries. However, the degree of the downturn varied across countries and regions. While some countries experienced a classical sudden stop of capital flows and a strong credit contraction, the decline was more subdued in other countries.

We analyze the role of foreign banks in stabilizing cross-border bank flows and credit growth in EMEs and DCs after the *Lehman* collapse, controlling for the size of the pre-crisis boom and other determinants of financial instability. Based on a sample of 97 EMEs and DCs and estimating a cross-sectional OLS model we find that their stabilizing impact was limited to the cross-border component of financial globalization. EME and DC banking sectors with a higher share of foreign ownership in total banking assets experienced a smaller decline in capital flows. One percentage point more of foreign bank asset share leads to a decrease of more than two percent in the magnitude of fall of cross-border bank flows. However, foreign banks did not significantly dampen the decline in credit growth in their respective host countries. These results are robust to variations of the instability and boom measures.

A closer analysis shows that the stabilizing impact of foreign banks was a regional rather than a global phenomenon. Foreign banks mitigated the fall in cross-border bank flows to Eastern Europe and Central Asia and Sub-Saharan Africa. Moreover, only in Sub-Saharan Africa did foreign banks contribute to a more stable growth of credit in the crisis period. We interpret our results as indicating that foreign banks are no panacea for guaranteeing financial stability in EMEs and DCs

in an environment of increasing financial globalization. In particular, hopes that a stronger presence of foreign banks might help host countries in isolating domestic credit from international shocks did not materialize in the current crisis.

The paper is organized as follows: after a short review of the literature and the empirical evidence on foreign banks and financial stability issues in EMEs and DCs (section 2), we illustrate developments in cross-border bank flows and real domestic credit growth during the financial crisis (section 3). Section 4 describes our data and the model specification. Sections 5 and 6 present the results and robustness checks and section 7 concludes.

2. FOREIGN BANKS AND FINANCIAL STABILITY: LITERATURE REVIEW AND EMPIRICAL EVIDENCE

Boom-bust cycles in capital flows and domestic credit characterized financial liberalization in emerging markets and developing countries in the 1990s, (Tornell and Westermann 2002, Mendoza and Terrones 2008). From a financial stability perspective, the evidence suggests two possible policy responses. The first response is to pursue a cautious approach toward capital account liberalization (Rodrik and Subramanian 2009, Ostry et al. 2010). Capital controls and regulatory measures limit capital inflows, in particular highly reversible flows, like cross-border bank lending (Becker et al. 2007). Thus, domestic credit growth and the associated financial stability risks remain contained. The second response is to strengthen domestic banking sectors in EMEs and DCs, as buoyant capital flows bring about unsustainable credit booms in an environment characterized by poor governance of domestic banks and a weak supervisory and regulatory framework (Krugman 1998, Llewellyn 2002, Hernández and Landerretche 2002). Thus, EMEs and DCs should not retreat on financial opening but improve the domestic financial systems. Inviting foreign banks to enter domestic banking sectors is a major element of a strategy to achieve this goal (Mishkin 2001).

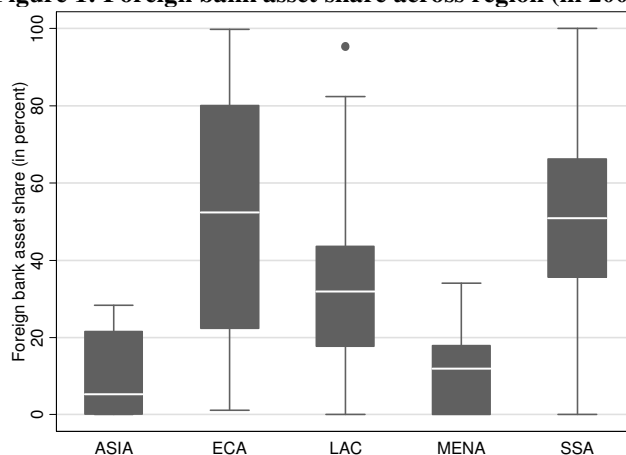
Foreign institutions are expected to strengthen financial stability in EMEs and DCs by improving the solvency and liquidity of host country banking systems. Banking sector solvency improves because foreign banks are better capitalized than their domestic peers. Moreover, they provide ‘reputational capital’ (Hellman and Murdock 1998) due to their long presence in the financial markets of mature economies. Finally, foreign banks 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 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).

The empirical evidence on foreign banks and financial stability in EMEs and DCs 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, there are substantial regional differences. De Haas and van Lelyveld (2006, 2010) find that foreign banks in Eastern Europe had less of a need to rein their credit supply during a financial crisis. By contrast, the stabilizing impact has been more subdued and diverse in Latin America and Asia (Arena et al. 2007). Moreover, the stabilizing impact on credit growth depends on the relative strength and soundness of the respective parent banks (De Haas and van Lelyveld 2006, 2010; Aydın 2008). The latter result echoes an argument of Dages et al. (2000) that the stability enhancing effect of foreign banks might be more about the relative strengths of institutions rather than ownership per se.

After the financial crises of the 1990s many EMEs and DCs followed the recommendation to enhance financial stability by strengthening domestic financial sectors rather than by backtracking on financial integration. This included the opening up to foreign institutions, in particular in Latin America (LAC) and Eastern Europe and Central Asia (ECA) (Committee on the Global Financial System (CGFS) 2004, Cull and Martinez Peria 2007). Both regions were the main drivers accounting for the rise in the average share of assets held by foreign banks in total banking sector assets of EMEs and DCs (Appendix 1). By contrast, the strong presence of foreign banks in Sub-Saharan Africa (SSA) does not reflect an overall policy approach toward financial liberalization, but the legacy of the colonial past (Daumont et al. 2004) and – compared to other regions – a substantially higher share of foreign banks from other EMEs and DCs (Van Horen 2007). Indeed, SSA countries – 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 (MENA). In the latter regions, the generally sceptical attitude toward financial liberalization influenced policies on the entry of foreign banks, as many countries did not open up their banking systems to foreign institutions. As a result, there is no country with a high penetration of foreign banks in these regions (Figure 1).

Figure 1: Foreign bank asset share across region (in 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

The years before 2008 were characterized by a substantial decline in the number and severity of EME and DC banking crises compared to the 1990s (Reinhart and Rogoff 2009). Against this background, the global financial crisis provides the first significant test for the arguments in favour of a stabilizing role of foreign banks in EMEs and DCs after the substantial increase in foreign ownership. First results suggest that the positive effects on host banking sector solvency may have been overestimated. Focusing on Eastern Europe, Mihaljek (2008) argues that risk management systems designed for mature economies might have failed in the emerging market context. Parent banks have relied on overly optimistic reports from local managers in host countries about the extent of the credit risk they have taken on board when providing loans to businesses and households. With regard to liquidity, the collapse of *Lehman* Brothers radically changed the environment for any possible liquidity support by parent banks to their EME and DC 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 (Winkler 2009). Cetorelli and Goldberg (2010) provide evidence suggesting that the transmission of the liquidity shock after *Lehman* to emerging markets was severe for EMEs 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 EMEs and DCs relying on cross-border 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, EMEs and DCs with the highest reliance on cross-border 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*. However, based on a larger sample of countries, also including mature economies, Aisen and Franken (2010) do not find evidence for the proposition that foreign banks contributed positively to a stable flow of credit in EMEs and DCs in the post-crisis period.

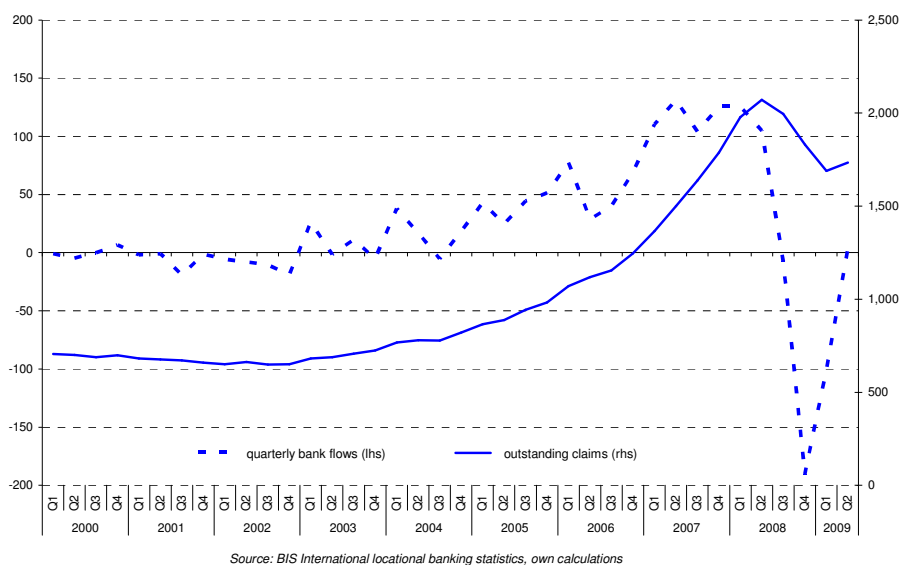
We contribute to this literature by directly testing the validity of the policy proposition that a higher share of foreign ownership of EME and DC banking sector assets stabilizes cross-border capital flows and domestic credit in times of financial distress. As the *Lehman* event marks a clear-cut beginning of the crisis, we measure instability by the magnitude of the post-*Lehman* declines in cross-border bank flows and credit growth rates against the levels and growth rates seen before the crisis. This is because it is not the post-crisis level of flows or lending per se which constitutes a sudden stop or credit contraction forcing the real economy to adjust, but the change in flows and credit growth. A decline in cross-border bank flows from pre-crisis heights to a much lower but still positive level can be a severe financial shock for a country. Moreover, given the substantial regional differences in foreign ownership among EMEs and DCs we conduct a regional analysis in order to find out whether the contribution of foreign banks to financial stability has been different across regions.

3. CROSS-BORDER BANK FLOWS AND REAL CREDIT GROWTH IN THE CRISIS – AN ILLUSTRATION

Cross-border bank flows from mature economies to EMEs and DCs rose from a level around zero in 2000 to over USD 130 bn in the second quarter of 2007 (Figure 2).¹ After the collapse of *Lehman* EMEs and DCs faced a classical sudden stop in capital flows which is defined as large and unexpected falls in capital inflows (e.g. Calvo et al. 2004). The fourth quarter of 2008 even saw an outflow of funds in the amount of USD 190 billion. As a result the outstanding volume of claims by BIS reporting banks to EMEs and DCs declined from over USD 2.000 billion in the middle of 2008 to less than USD 1.700 billion at the end of the first quarter of 2009.

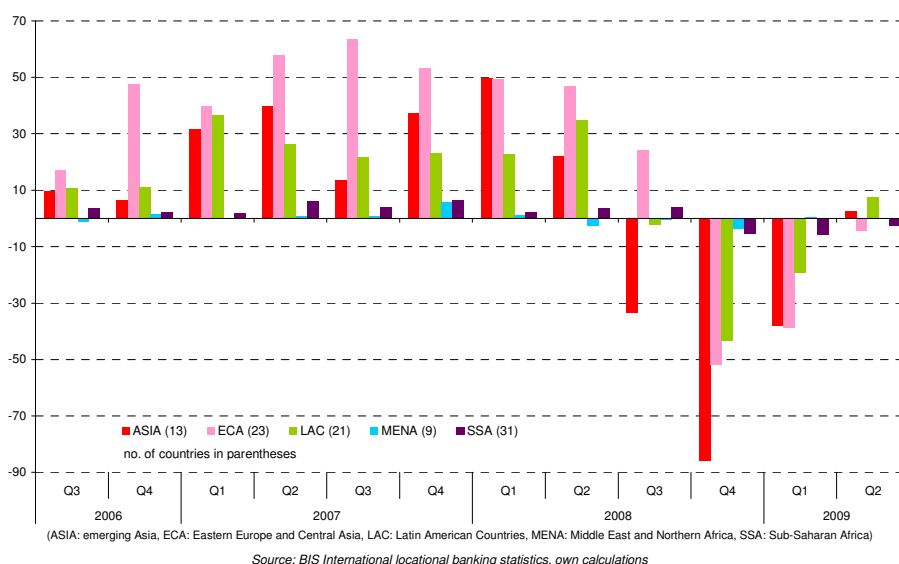
¹ All illustrations are based on the countries we include in the empirical analysis (see section 4 and Appendix 2).

Figure 2: Bank flows and total outstanding claims of BIS-reporting banks on EMEs and DCs (USD bn)



Closer analysis reveals that there were substantial regional differences in the boom and bust periods (Figure 3). In the period preceding the *Lehman* collapse capital inflows were most pronounced in Eastern Europe and Central Asia, followed by Asia and Latin America. The reversal was most immediate in Asia and Latin America, as both regions recorded outflows in the third quarter of 2008. By contrast, capital inflows to Eastern Europe and Sub-Saharan Africa merely slowed down, but were still positive. The fourth quarter of 2008 and the first quarter of 2009 saw outflows in all regions – except in MENA in the first quarter of 2009.

Figure 3: Aggregated cross-border bank flows per region (USD bn)

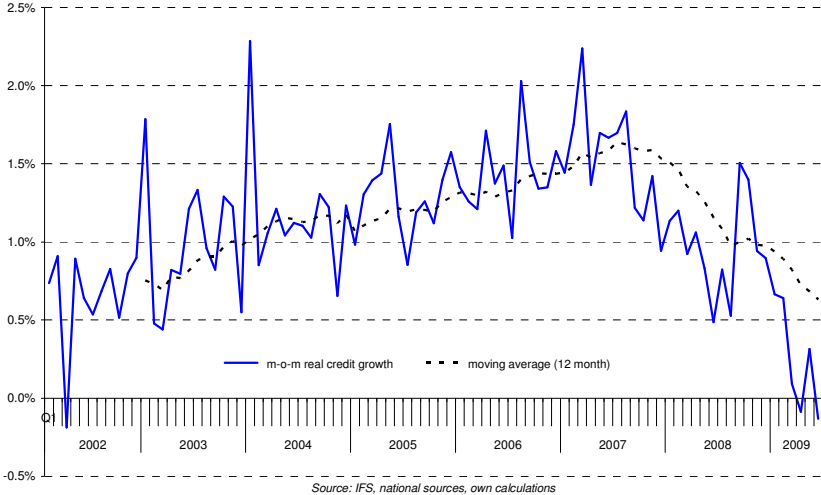


A country-by-country analysis reveals that two-thirds out of 97 EMEs and DCs experienced capital inflows before 2008Q3 and capital outflows in the post-*Lehman* quarters. Moreover 49 of our sample countries experienced quarterly inflows higher than two standard deviations from the pre-

crisis mean (2000 – 2008Q2) during the four quarters before the *Lehman* collapse and 37 less than two standard deviations below the mean in the three post-shock quarters.

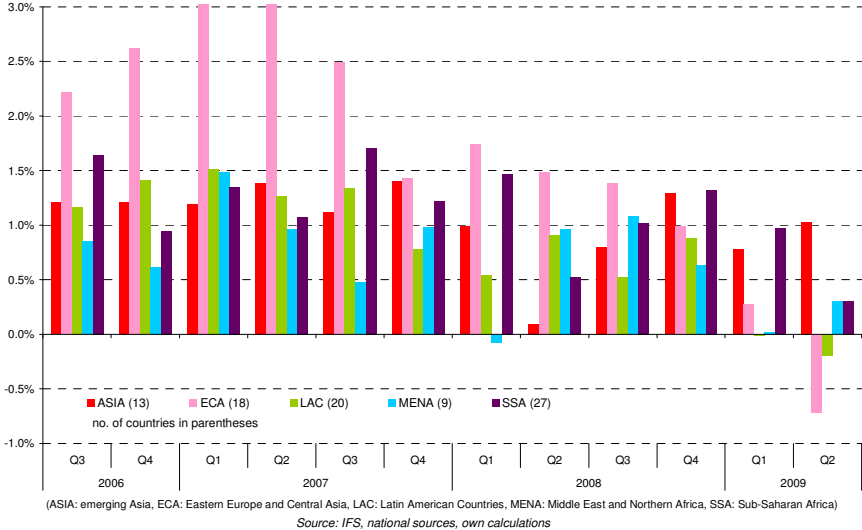
Growth of real private sector credit in EMEs and DC had been on a rising trend since 2000 (Figure 4). From mid-2007 on credit growth started to decline.

Figure 4: Average mom real credit growth in EMEs and DCs



However, there were again substantial cross-regional differences (Figure 5). In Eastern Europe credit growth slowed at the end of 2007/early 2008 but remained on elevated levels, while average credit growth in LAC turned negative in 2009Q1 and remained relatively stable in Asia. By contrast, credit growth slowed down markedly and turned negative in Eastern Europe and Latin America after the *Lehman* shock, while credit growth proved largely resilient in Asia and Sub-Saharan Africa.

Figure 5: Mom growth of real private sector credit – regional averages (in percent)



4. DATA AND MODEL SPECIFICATION

We analyze whether foreign bank presence had a stabilizing impact on cross-border bank flows and real credit growth in the recent crisis. Cross-border bank flows are from the BIS International Locational Banking statistics and are the exchange-rate-adjusted changes from the quarterly reports of outstanding claims of all BIS reporting banks vis-à-vis non-residents and vis-à-vis residents in foreign currency. 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 obtain data on domestic private sector credit from the IMF's International Financial Statistics (IFS line 22d). We deflate it using the CPI series (IFS line 64). As data availability is limited we supplement the IFS CPI data with data from national sources for China, Ukraine, Hungary and Bosnia and Herzegovina². We seasonally adjust these series and calculate month-on-month growth rates for real private sector credit growth. We use growth rates for real credit as there is no data for exchange rate adjusted changes in the outstanding stock of domestic credit as is the case for cross-border bank flows provided by the BIS. We have collected data for 97 EMEs and DCs. Due to the limited availability of data for some indicators the number of observations in our estimations is often smaller.

We construct variables to measure the magnitude of instability in bank flows and credit growth during the crisis. These variables we call *FALL* as they depict the sudden drop from the (in most cases) higher pre-*Lehman* level to the post-*Lehman* level.

- $FALL_{flows}$ 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 to 2009Q1) in US dollar. We disregard the crisis quarter itself, as the respective data reflects developments before and after the shock. As $FALL_{flows}$ has a negative value in 17 countries we follow Papaioannou (2009) and Herrmann and Mihaljek (2010) by taking the logarithm of the absolute value and assign it a negative sign.
- $FALL_{credit}$ is the difference between the average monthly growth rate of real private sector credit in country i in the year preceding the *Lehman* bankruptcy, i.e. September 2007 - August 2008, and the average monthly growth rate of real private sector credit in the six months following the *Lehman* shock, i.e. October 2008 - March 2009. For symmetry we again drop the crisis quarter. Further we multiply the measure with one hundred to increase the coefficient estimates.

A higher *FALL* value indicates greater financial instability in the respective country.

² National Bureau of Statistics of China, State Statistics Committee of Ukraine, Hungarian Central Statistical Office and Agency for Statistics of Bosnia and Herzegovina.

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. We expect foreign bank presence to have a mitigating impact on our *FALL* variables (i.e. negative coefficients).

The boom-bust literature suggests that the pre-crisis boom is a major determinant of the fall. 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 real credit growth prior to the shock as additional explanatory variables:

- $SURGE_{flows}$ is the log of the aggregated quarterly cross-border bank flows over the three years prior to the *Lehman* bankruptcy (i.e. 2005Q3-2008Q2).
- $SURGE_{credit}$ is the average month-on-month real credit growth rate in the three years prior to the crisis (July 2005-June 2008). To increase the coefficient estimates we again multiply by 100.

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 OLS model applying heteroscedasticity robust standard errors and using Stata:

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

Note that *FALL* and *SURGE* are both, either the fall and surge in bank flows or the fall and surge in real credit growth 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:

- **Institutional quality** (Kaufmann et al. 2009). 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.
- **De jure financial openness** (Chinn and Ito 2008). 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** (IMF DOTS). 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.

- **Current account to GDP in 2007** (IMF WEO). 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.
- **Percentage change in money market rate** (IFS line 60b) Growth in real private sector credit is influenced by domestic monetary policy reflected in interest rates prevailing on money markets (Aisen and Franken 2010). Thus, the percentage change in the money market rate between Sept. 2008 and March 2009 serves as a proxy for the ability and willingness of central banks to foster credit expansion after *Lehman*. We expect that a larger decline in the money market rate dampens the magnitude of *FALL_{credit}* (positive coefficient expected). We refrain from using the change in money market rate as an independent variable in the estimation of *FALL_{flows}* as - with open capital accounts - it is a variable influenced by changes in cross-border flows and the exchange rate regime.

External and internal vulnerabilities:

- **External debt to GNI** (WDI). 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** (WDI). 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** (Lane and Shambaugh 2010). 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** (Beck and Demirgüç-Kunt 2009). 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.

5. RESULTS

5.1 Basic Model

We find the expected mitigating impact of foreign bank presence on *FALL* as all coefficient estimates of *FBAS* show the expected negative sign (Table 1). However, only for *FALL_{flows}*, the fall in cross-border bank flows, is the impact of foreign banks significant (columns 1-3). Each additional percentage point in foreign bank asset share leads to a decrease in *FALL_{flows}* of roughly two percent. Turning to *FALL_{credit}*, the fall in real credit growth, we find a mitigating but not significant impact of foreign bank presence (columns 4-6).

Table 1: The basic model

	Dependent variable: respective <i>FALL</i> measure			Dependent variable: respective <i>FALL</i> measure		
	Flows 1/			Credit 2/		
	(1)	(2)	(3)	(4)	(5)	(6)
FBAS	-0.0255** (0.0119)	-0.0299*** (0.0096)	-0.0198** (0.0078)	-0.0019 (0.0050)	-0.0054 (0.0044)	-0.0055 (0.0045)
SURGE 3/ 4/		0.4070*** (0.0548)	0.1678*** (0.0555)		0.6872*** (0.1371)	0.7052 (0.4565)
SURGE^2			0.0610*** (0.0085)			-0.0050 (0.1206)
constant	5.6461*** (0.5808)	3.7180*** (0.5313)	1.2198** (0.5536)	0.5753** (0.2520)	-0.2296 (0.2720)	-0.2392 (0.3594)
R-sqr	0.046	0.399	0.612	0.002	0.252	0.252
N	97	97	97	78	78	78

Stars indicate statistical significance at * 10 percent, **5 percent and *** 1 percent level.

Standard errors in parentheses below. Robust standard errors applied.

1/ *FALL* for flows is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1.

2/ *FALL* for credit is the difference between the average m-o-m real credit growth in the pre-crisis period July 2007-June 2008 and the post-shock period October 2008-March 2009, seasonally adjusted rates.

3/ *SURGE* for flows is the (log of the) aggregated capital inflows in the three years preceding the *Lehman* bankruptcy (2005Q3-2008Q2).

4/ *SURGE* for credit is the average m-o-m real credit growth rate in the three years prior to the crisis (i.e. July 2005-June 2008), seasonally adjusted rates.

Further we find strong evidence for the expected boom-bust relationship for bank flows and credit growth. *SURGE_{flows}* has a significant positive non-linear impact on *FALL_{flows}* (column 3). The more it varies upward or downward from the turning point (i.e. 1.4) the more aggravating is its marginal impact on *FALL_{flows}*. A closer look at the countries experiencing lower aggregate inflows or even outflows suggests that this might be due to other destabilizing factors like institutional underdevelopment and political risk. Those factors might have become more important in an environment of increasing global financial stress and risk aversion. Overall, the higher the absolute *SURGE* in flows prior to the crisis (no matter if inflows or outflows) the more destabilizing was its impact after the financial shock.

The pre-crisis credit boom is an important determinant of the magnitude of the credit contraction. We find a positive and significant linear relationship (column 5). The higher the pre-shock credit boom, the higher the *FALL* after the *Lehman* collapse.

The basic models containing foreign bank presence and the booms prior to the *Lehman* shock as explanatory variables explain about 60 percent of the variation in *FALL_{flows}* and 25 percent of the variation in *FALL_{credit}*.

Capital inflows and credit growth are closely linked. General economic developments or situations in a country might simultaneously affect the shock in bank inflows and in real credit growth. Therefore it might be that the equation errors correlate. To control for this we further test the relationship with a seemingly unrelated regression system proposed by Zellner in 1962 (Table 2).

Table 2: Seemingly unrelated regression estimation (SUR)

Equation	Obs	Parms	RMSE	R-sqr	Chi2	P
<i>FALLflows</i>	78	3	2.309576	0.5909	114.83	0.0000
<i>FALLcredit</i>	78	2	1.144419	0.2524	26.73	0.0000

	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
<i>FALLflows</i>					
FBAS	-.01626	.0087343	-1.86	0.063	-.0333789 .0008589
SURGE	.1371797	.067449	2.03	0.042	.0049822 .2693773
SURGE^2	.0646446	.0093888	6.89	0.000	.046243 .0830463
constant	1.040308	.6360204	1.64	0.102	-.2062691 2.286885
<i>FALLcredit</i>					
FBAS	-.0054514	.0043591	-1.25	0.211	-.0139951 .0030923
SURGE	.6895482	.1338541	5.15	0.000	.427199 .9518973
constant	-.2323562	.2663358	-0.87	0.383	-.7543648 .2896524

The SUR-estimation results confirm our previous ones. While a higher foreign bank presence stabilizes bank inflows during the crisis this is not translated into more stable real credit growth. Further the pre-crisis surges remain important determinants in both equations.

Instability in bank flows and credit growth might be influenced by many variables. To test whether the results are sensitive to the inclusion of other variables in the regression we add the variables referred to in section 4. Due to data availability (Appendix 4) and correlation among independent variables (Appendix 5) we first determine financial openness and economic activity growth as main further determinants on the *FALLs*. Then we add one by one each of the other before mentioned variables to control for their effects.

We find that financial openness and the change in institutional quality significantly affect the instability in bank flows (Appendix 6). As expected higher financial openness and a recent deterioration in institutional quality aggravate the *FALL*. We explain the significant effect of recent changes in institutional quality with the increasing risk awareness after the *Lehman* collapse. The coefficient estimate of the reserves to debt ratio is significant as well (column 7), indicating that better reserve adequacy stabilized bank flows. However, a closer look at the data reveals that this

result is driven by some outlier values. Botswana, China, Nigeria and Algeria have reserve to debt ratios higher than 400 (while the median of all countries is 53, the mean 123). If we exclude them from the sample the coefficient estimate loses significance.

For $FALL_{credit}$ only foreign liability dollarization has a significant and positive effect, indicating that a higher liability dollarization aggravates the instability of credit growth (Appendix 7). Moreover, only when adding FLD to the basic model does the coefficient estimate of FBAS become significant, indicating a mitigating impact of foreign bank presence (column 9). This suggests that foreign banks stabilize credit growth in countries which are less subject to the ‘original sin’ problem and face a currency mismatch. In all other estimations the coefficient estimate of $FBAS$ remains negative and insignificant.

5.2 Regional differentiation

The illustration of bank flows and credit growth before and during the financial crisis revealed substantial regional differences (Section 3). The same applies to the presence of foreign banks in the respective EME and DC regions which is heterogeneous regarding dispersion and penetration of foreign bank presence per region (Figure 1). These regional differences might affect the mitigating impact of foreign banks on the stability of bank flows and credit growth. We test for regional differences by interacting region-dummies with our variable for foreign bank presence. The results indicate that the effect of foreign bank presence on $FALL$ in bank flows and real credit growth differs considerably among regions.

Regarding the $FALL$ in bank flows we find only in ECA and SSA a negative and significant marginal effect of foreign bank presence (Table 3). Within the other regions foreign bank presence even had a slightly destabilizing albeit not significant impact.

In Sub-Saharan Africa the stabilizing impact of foreign banks on bank flows was translated into more stable credit growth during the financial crisis. However in Eastern Europe and Central Asia, banking sectors do not seem to transmit their relatively stable external funding position to a smooth pattern of domestic real credit growth. With exception of SSA, foreign banks do not have a significant impact on stability in credit growth.

Table 3: Differences across regions
Dependent variable: respective FALL measure

	Flows 1/	Credit 2/
SURGE 3/ 4/	0.1327 (0.1072)	0.8223*** (0.1849)
SURGE^2	0.0613*** (0.0114)	
ASIA	0.8206 (1.4784)	-3.1299*** (0.8638)
ECA	0.4927 (1.0166)	-3.9392** (1.7789)
LAC	0.6662 (0.7636)	-2.7359*** (0.9063)
MENA	-0.1713 (1.2129)	-3.1594*** (0.9362)
SSA	1.9421*** (0.6077)	-0.6023 (0.9099)
FBAS*ASIA	0.0349 (0.0436)	0.0215 (0.0253)
FBAS*ECA	-0.0312** (0.0146)	-0.0010 (0.0126)
FBAS*LAC	0.0111 (0.0117)	-0.0049 (0.0056)
FBAS*MENA	0.0447 (0.0524)	0.0323 (0.0268)
FBAS*SSA	-0.0361*** (0.0127)	-0.0391*** (0.0133)
FIN.OPENNESS	0.3439* (0.1988)	0.1374 (0.1003)
ExpP GDP GROWTH	-0.2069 (0.1260)	-0.2368** (0.1158)
INST.QUALITY change	-5.5661* (2.8561)	
FLD		0.0324*** (0.0105)
R-sqr	0.885	0.582
N	91	63

Stars indicate statistical significance at * 10 percent, **5 percent and *** 1 percent level.

Standard errors in parentheses below. Robust standard errors applied.

1/ *FALL* for flows is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1.

2/ *FALL* for credit is the difference between the average m-o-m real credit growth in the pre-crisis period July 2007-June 2008 and the post-shock period October 2008-March 2009.

3/ *SURGE* for flows is the (log of the) aggregated capital inflows in the three years preceding the *Lehman* bankruptcy (2005Q3-2008Q2).

4/ *SURGE* for credit is the average m-o-m real credit growth rate in the three years prior to the crisis (i.e. July 2005-June 2008).

The stabilizing impact of foreign banks is highest in those regions with the highest average foreign bank presence. Moreover, the impact of foreign banks on domestic credit growth might only emerge when foreign banks are dominating players in host country banking systems. This might suggest that the influence of foreign banks is due to a certain level of foreign bank presence rather than to other, region-specific factors of influence. We test this proposition by grouping our sample countries according to their foreign bank asset share. Countries with up to 33 percent foreign bank asset share belong to group T1, those in T2 have more than 33 and up to 66 percent foreign bank asset share, while countries with more than 66 percent foreign bank asset share belong to T3. Each

group dummy we interact with *FBAS*. The results show insignificant coefficient estimates for each interaction term (Table 4) for both *FALL* measures.

Table 4: Grouping of countries by foreign bank presence
Dependent variable: respective *FALL* measure

	Flows 1/	Credit 2/
SURGE 3/ 4/	0.1232 (0.1081)	0.6411** (0.2776)
SURGE^2	0.0639*** (0.0117)	
T1 /5	0.9982 (0.6311)	-1.6570** (0.7934)
T2	0.5071 (0.9270)	-2.1161** (0.8844)
T3	0.3030 (0.8058)	-2.4837*** (0.7693)
FBAS*T1	-0.0122 (0.0300)	-0.0311 (0.0476)
FBAS*T2	0.0092 (0.0230)	-0.0050 (0.0135)
FBAS*T3	-0.0192 (0.0164)	-0.0101 (0.0069)
FIN.OPENNESS	0.3333* (0.1722)	0.1069 (0.1052)
ExpP GDP GROWTH	-0.0036 (0.0928)	-0.0901 (0.0695)
INST.QUALITY change	-7.1828** (2.9042)	
FLD		0.0267** (0.0103)
R-sqr	0.870	0.453
N	91	63

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

1/ *FALL* for flows is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1.

2/ *FALL* for credit is the difference between the average m-o-m real credit growth in the pre-crisis period July 2007-June 2008 and the post-shock period October 2008-March 2009.

3/ *SURGE* for flows is the (log of the) aggregated capital inflows in the three years preceding the *Lehman* bankruptcy (2005Q3-2008Q2).

4/ *SURGE* for credit is the average m-o-m real credit growth rate in the three years prior to the crisis (i.e. July 2005-June 2008).

5/ Countries are grouped according to their foreign bank asset share: T1<=33%, 33%<T2<=66%, 66%<T3<=100%.

As the number of countries per group is diverse we further test for a conditional impact of foreign bank presence with only two groups and, moreover, with a squared *FBAS* variable instead of grouping. Coefficient estimates of the interaction and of the squared term do not show significance as well.

Overall our results indicate that the mitigating impact of foreign bank presence is a regional rather than a global phenomenon. Our conjecture is that it is either the regional characteristics of ECA and SSA or of countries with substantial financial engagements in both regions which stabilized bank funding during the crisis period. ECA includes all countries of Eastern Europe that have either become New Member States of the European Union or are deemed to become Member States in the future. Thus, activities of foreign banks as well as cross-border capital flows have at least partly been driven by the European integration process (Berglöf and Bolton 2002). Parent

banks from the EU-15 have established subsidiaries in the respective host countries as they regard them as an extension of their home markets (Winkler 2009). This peculiarity of European integration in the ongoing process of financial globalization was already noted before the global financial crisis as it was accompanied by a strong divergence of current account patterns in the region compared to other emerging markets (Abiad, Leigh and Mody 2007, Herrmann and Winkler 2009). Our results suggest that it has also had an impact on the stability of cross-border bank flows in the crisis period as parent banks seem to have provided liquidity support to their subsidiaries in an effort to safeguard their long-term investments in an enlarged home market. Their supporting role was facilitated by the backing of mature economy central banks, governments as well as international financial institutions (EBRD 2009).

Sub-Saharan Africa possesses the characteristic that foreign bank presence has a long history which is not linked to the process of financial globalization. Indeed, on average, Sub-Saharan Africa is the region with the closest capital account according to the Chinn-Ito Index (Appendix 4). Thus, foreign banks significantly stabilized cross-border capital flows in a region where capital flows are restricted the most. Hence, for the global financial crisis it is difficult to base an argument that foreign banks enhance stability in financially open EMEs and DCs by referring to the case of Sub-Saharan Africa.

6. 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 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 is insignificant for both bank flows and for credit growth (Appendix 8, columns 1 and 2). However, a closer look at the data reveals that this variation in the *FALL_{flows}* 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. 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 on a declining trend or even turned into inflows. Further we extend the pre-crisis period to two years, i.e. 2006Q3-2008Q2 (columns 5 and 6). The results confirm our general findings. Foreign bank presence has a stabilizing impact which is significant only regarding cross-border flows.

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 (Appendix 9). 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 (columns 1-3) but not regarding credit growth (columns 4-6).

Finally, we change the calculation method of *SURGE*. Instead of using absolute values of cross-border flows and credit growth, we use an alternative *SURGE* variable that is based on deviations of pre-shock developments from the mean:

- $SURGEalt_{flows}$ 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. Again we take the logs of these values.
- $SURGEalt_{credit}$ is the difference between the average monthly real credit growth rate in the three years prior to the *Lehman* bankruptcy and the average m-o-m real credit growth rate between 2002 and mid 2008.

In addition to the deviation of the three year pre-shock average from the pre-shock period mean (columns 7 and 9), 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 8 and 10). Again these tests are in line with our previous results.

7. CONCLUSION

After the financial and currency crises of the 1990s many EMEs and DCs, 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 EMEs and DCs after the collapse of *Lehman Brothers* by looking at their impact on mitigating the fall in cross-border bank flows and domestic credit growth 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. Moreover, the mitigating impact of foreign banks is of quantitative relevance. One percentage point more of foreign bank asset share leads to a decrease of more than two percent in the magnitude of fall of cross-border bank flows. A regional analysis suggests that this result mainly reflects the impact of foreign banks in 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. Moreover, parent banks received strong support from home country central banks and governments as well as international financial institutions in the post-crisis period. This may explain why in Eastern Europe cross-border flows have been less prone to a sudden stop in cross-border capital flows than in other regions. Sub-Saharan Africa is special as many countries of the region are characterized by a long-standing presence of foreign banks operating in an environment of a rather closed capital account. Thus, foreign banks contributed to financial stability in host countries which have only marginally integrated into the global financial system. Accordingly, the evidence from Sub-Saharan Africa neither supports nor rejects the argument that a high degree of foreign ownership serves as a key instrument allowing EMEs and DCs to open up financially without running severe stability risks.

Overall we do not find evidence indicating that foreign banks contributed to a smoother pattern of domestic post-crisis credit growth. The regional analysis reveals that only in Sub-Saharan Africa countries with a higher share of total banking sector did assets held by foreign banks experience a smaller credit contraction in the post-*Lehman* period.

We interpret our results as indicating that foreign banks are no panacea for guaranteeing financial stability in EMEs and DCs in an environment of increasing financial globalization. While a strong foreign bank presence has mitigated the sudden stop of cross-border lending to Eastern Europe

and Central Asia, it has not contributed to a less severe domestic credit contraction. Moreover, the positive impact on financial stability with regard to cross-border bank flows seems to have more to do with the peculiar European environment than with foreign bank ownership as such. Thus, the evidence suggests that EMEs and DCs aiming to avoid traditional boom-bust cycles in domestic credit growth may be better off preventing the boom in the first place and/or conducting macroeconomic and regulatory policies, including regulatory policies with regard to the capital account, that put them in a position to act decisively when they are hit by an external shock (IMF 2009, Ostry et al. 2010, Goldstein and Xie 2010). However, these conclusions may reflect the peculiar characteristic of the crisis as a global one, triggered in mature economies with severe negative effects on the strength of the parent banks of EME and DC subsidiaries. The next crisis may have a different origin and history that may weigh less on the potential advantages of foreign banks with regard to solvency and liquidity for host country banking sectors. Thus, hopes that a stronger presence of foreign banks might help EMEs and DCs in isolating domestic credit from international shocks may materialize in a more typical emerging market crisis setting.

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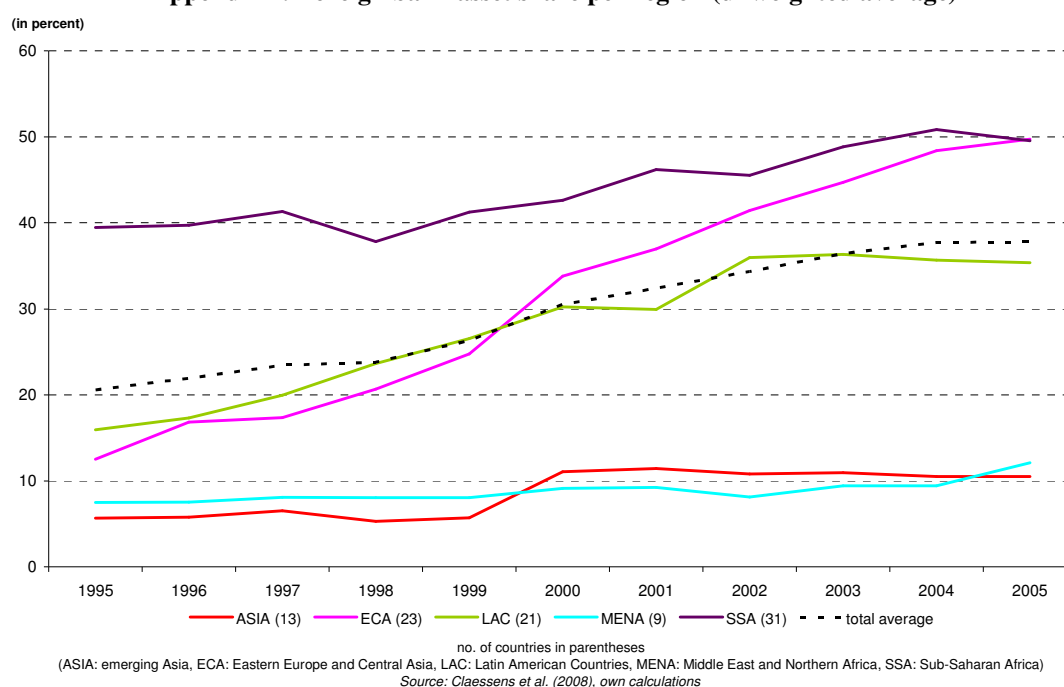
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APPENDIX

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



Appendix 2: List of sample countries by region

We subdivide our countries into regional groups according to the World Bank country classification 2009. We exclude high income countries. As Croatia, Estonia and Slovenia 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.

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

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. Ötör-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	Obs	Mean	Std. Dev.	Min	Max
FALL flows	ASIA	13	5.974	4.300	-5.857	10.791
	ECA	23	5.555	4.108	-4.794	10.485
	LAC	21	6.263	2.040	1.609	10.225
	MENA	9	4.680	2.630	-1.833	6.698
	SSA	31	2.422	3.190	-3.624	8.601
	all	97	4.682	3.662	-5.857	10.791
FALL credit	ASIA	10	0.251	1.273	-2.113	2.449
	ECA	16	1.184	1.506	-2.648	3.197
	LAC	20	0.458	0.830	-1.435	1.450
	MENA	7	0.211	0.902	-0.824	1.823
	SSA	25	0.275	1.582	-2.403	5.043
	all	78	0.500	1.332	-2.648	5.043
FBAS	ASIA	13	10.52	11.13	0	28.30
	ECA	23	49.73	33.35	1.21	99.76
	LAC	21	35.37	27.15	0	95.35
	MENA	9	12.11	11.50	0	34.04
	SSA	31	49.53	29.20	0	100
	all	97	37.81	30.72	0	100
SURGE flows	ASIA	13	5.472	6.183	-7.702	11.763
	ECA	23	7.810	3.866	-6.105	11.806
	LAC	21	5.200	5.822	-8.091	11.525
	MENA	9	3.834	6.834	-8.483	9.263
	SSA	31	3.389	4.607	-6.897	9.314
	all	97	5.150	5.354	-8.483	11.806
SURGE credit	ASIA	12	1.098	0.872	0.067	2.842
	ECA	17	2.400	0.737	1.062	3.643
	LAC	20	1.076	0.629	-0.169	2.664
	MENA	8	0.714	0.430	-0.067	1.221
	SSA	27	1.172	1.036	-0.047	4.065
	all	84	1.344	0.975	-0.169	4.065
FIN.OPENNESS	ASIA	13	-0.313	1.005	-1.129	1.27
	ECA	22	0.712	1.541	-1.129	2.54
	LAC	20	1.583	1.140	-0.764	2.54
	MENA	9	0.492	1.722	-1.129	2.54
	SSA	30	-0.548	1.362	-1.808	2.54
	all	94	0.332	1.564	-1.808	2.54
INST.QUALITY change	all	97	0.018	0.068	-0.332	0.159
INST.QUALITY	all	97	-0.371	0.592	-1.687	1.153
ExpP GDP GROWTH	all	94	-1.625	2.448	-7.698	4.197
CHANGE MMR	all	52	-0.041	0.632	-0.785	3.164
CA/GDP	all	96	-3.269	10.762	-25.185	40.655
DEBT/GNI	all	90	41.313	31.417	3.522	166.815
ERR	all	95	5.116	2.209	1	8
RESERVES/DEBT	all	86	122.588	341.332	1.471	2435.307
FLD	all	76	63.040	16.260	20.236	95.863
CDR	all	92	0.935	0.424	0.257	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>INST.QUALITY</i>	<i>INST.QUALITY change</i>	<i>ExpP GDP GROWTH</i>	<i>CHANGE MMR</i>	<i>CA/GDP</i>	<i>DEBT/GNI</i>	<i>ERR</i>	<i>RESERVES/DEBT</i>	<i>FLD</i>	<i>CDR</i>
<i>FALLflows</i>	1															
<i>FALLcredit</i>	0.0807 (0.4827)	1														
<i>FBAS</i>	-0.2139 (0.0354)	-0.0431 (0.7079)	1													
<i>SURGEflows</i>	0.5794 (0.0000)	0.0880 (0.4436)	0.0627 (0.5420)	1												
<i>SURGEcredit</i>	0.1242 (0.2604)	0.4873 (0.0000)	0.1613 (0.1427)	0.2551 (0.0192)	1											
<i>FIN.OPENNESS</i>	0.2407 (0.0195)	0.1466 (0.2032)	0.2013 (0.0517)	0.2404 (0.0196)	0.0211 (0.8499)	1										
<i>INST.QUALITY</i>	0.3089 (0.0021)	-0.0400 (0.7283)	0.3136 (0.0018)	0.3916 (0.0001)	-0.0260 (0.8141)	0.4258 (0.0000)	1									
<i>INST.QUALITY change</i>	0.0234 (0.8198)	0.0313 (0.7856)	0.2066 (0.0423)	0.1576 (0.1232)	0.1946 (0.0760)	0.0886 (0.3956)	0.2300 (0.0234)	1								
<i>ExpP GDP GROWTH</i>	-0.2967 (0.0037)	-0.1748 (0.1310)	-0.1844 (0.0753)	-0.2998 (0.0033)	-0.1874 (0.0939)	-0.2079 (0.0480)	-0.4178 (0.0000)	-0.3369 (0.0009)	1							
<i>CHANGE MMR</i>	0.0370 (0.7946)	0.0888 (0.5711)	0.0782 (0.5817)	-0.0824 (0.5615)	0.4065 (0.0046)	-0.1486 (0.2930)	-0.2292 (0.1022)	-0.0319 (0.8223)	-0.0742 (0.6088)	1						
<i>CA/GDP</i>	0.0402 (0.6974)	0.0162 (0.8884)	-0.3537 (0.0004)	-0.2028 (0.0476)	-0.1246 (0.2588)	-0.1991 (0.0544)	-0.2319 (0.0230)	0.0708 (0.4929)	0.1770 (0.0896)	0.1003 (0.4793)	1					
<i>DEBT/GNI</i>	0.0343 (0.7482)	-0.1268 (0.2817)	0.1039 (0.3298)	0.1412 (0.1842)	0.1251 (0.2689)	0.1112 (0.3023)	0.0310 (0.7715)	-0.0584 (0.5844)	-0.1358 (0.2070)	-0.0463 (0.7545)	-0.4936 (0.0000)	1				
<i>ERR</i>	0.1039 (0.3164)	-0.0257 (0.8241)	-0.0386 (0.7101)	0.2065 (0.0447)	0.0876 (0.4310)	0.0867 (0.4086)	0.1560 (0.1312)	0.0664 (0.5223)	-0.0947 (0.3694)	-0.0820 (0.5634)	-0.0010 (0.9926)	-0.0555 (0.6055)	1			
<i>RESERVES/DEBT</i>	-0.2536 (0.0184)	0.0500 (0.6764)	0.0072 (0.9479)	-0.3117 (0.0035)	-0.0586 (0.6100)	0.0145 (0.8956)	0.0946 (0.3862)	0.0016 (0.9885)	-0.0350 (0.7518)	0.0215 (0.8859)	0.4412 (0.0000)	-0.2698 (0.0125)	0.0119 (0.9137)	1		
<i>FLD</i>	-0.3165 (0.0053)	0.1481 (0.2428)	0.1282 (0.2697)	-0.2773 (0.0153)	-0.1853 (0.1274)	-0.1203 (0.3004)	-0.3328 (0.0033)	-0.1297 (0.2641)	0.2379 (0.0399)	0.1996 (0.1785)	-0.1944 (0.0924)	0.0385 (0.7466)	-0.1777 (0.1247)	-0.0779 (0.5213)	1	
<i>CDR</i>	0.2475 (0.0174)	0.0652 (0.5706)	0.1000 (0.3427)	0.3079 (0.0028)	0.2870 (0.0081)	0.1900 (0.0729)	0.3920 (0.0001)	0.1203 (0.2532)	-0.4615 (0.0000)	0.0383 (0.7918)	-0.2577 (0.0131)	0.1690 (0.1199)	-0.1367 (0.1962)	-0.2042 (0.0625)	-0.2567 (0.0273)	1

p-values in parentheses below.

Appendix 6: FALL in bank flows - controlling for macroeconomic, structural and financial factors of influence

Dependent variable: FALL in cross-border bank flows during the recent financial crisis 1/

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
FBAS	-0.0240*** (0.0084)	-0.0220*** (0.0079)	-0.0239** (0.0096)	-0.0229** (0.0091)	-0.0247*** (0.0093)	-0.0257*** (0.0085)	-0.0262** (0.0101)	-0.0252*** (0.0094)	-0.0229** (0.0091)
SURGE 2/	0.1306 (0.1031)	0.1328 (0.1039)	0.1307 (0.1071)	0.1364 (0.1036)	0.1241 (0.1066)	0.1408 (0.1035)	0.0825 (0.1450)	0.1338 (0.1144)	0.1307 (0.1141)
SURGE^2	0.0608*** (0.0114)	0.0621*** (0.0114)	0.0609*** (0.0106)	0.0598*** (0.0120)	0.0619*** (0.0119)	0.0610*** (0.0110)	0.0667*** (0.0148)	0.0651*** (0.0106)	0.0624*** (0.0115)
FIN.OPENNESS	0.4103** (0.1663)	0.4156** (0.1635)	0.4112** (0.1790)	0.4173** (0.1698)	0.4139** (0.1741)	0.4496*** (0.1696)	0.4034** (0.1781)	0.5191** (0.2044)	0.4335** (0.1717)
ExpP GDP GROWTH	0.0124 (0.0923)	-0.0357 (0.0931)	0.0121 (0.0945)	0.0061 (0.0975)	0.0295 (0.1057)	0.0269 (0.0910)	0.0051 (0.1067)	0.0332 (0.1221)	0.0015 (0.1209)
<i>Structural and macroeconomic variables</i>									
INST.QUALITY change		-6.7917** (2.8790)							
INST.QUALITY			-0.0084 (0.5841)						
CA/GDP				0.0098 (0.0210)					
<i>External and internal vulnerabilities</i>									
DEBT/GNI					0.0039 (0.0067)				
ERR						-0.1206 (0.1230)			
RESERVES/DEBT							-0.0027** (0.0011)		
FLD								0.0120 (0.0232)	
CDR									-0.2409 (0.5769)
constant	1.4413*** (0.5334)	1.3010** (0.5456)	1.4329* (0.8510)	1.4496*** (0.5404)	1.3097** (0.6310)	2.0930*** (0.6188)	1.6626** (0.6831)	0.4296 (2.0068)	1.4775** (0.6732)
R-sqr	0.625	0.639	0.625	0.626	0.611	0.635	0.633	0.616	0.618
N	91	91	91	91	86	90	82	75	87

Stars indicate statistical significance at * 10 percent, **5 percent and *** 1 percent level.

Standard errors in parentheses below. Robust standard errors applied.

1/ FALL is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and post-shock inflows in 2008Q4-2009Q1.

2/ SURGE is the (log of the) aggregated capital inflows in the three years preceding the Lehman bankruptcy (2005Q3-2008Q2).

Appendix 7: FALL in credit growth – controlling for macroeconomic, structural and financial factors of influence

Dependent variable: FALL in real credit growth during the recent financial crisis 1/

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FBAS	-0.0081 (0.0055)	-0.0080 (0.0055)	-0.0072 (0.0054)	-0.0099 (0.0088)	-0.0068 (0.0054)	-0.0071 (0.0060)	-0.0075 (0.0056)	-0.0076 (0.0058)	-0.0110* (0.0055)	-0.0087 (0.0054)
SURGEcredit	0.7280*** (0.1742)	0.7479*** (0.1723)	0.7188*** (0.1721)	0.9221*** (0.2242)	0.7328*** (0.1715)	0.6889*** (0.1769)	0.7248*** (0.1753)	0.6922*** (0.1682)	0.7119*** (0.2271)	0.7941*** (0.1501)
FIN.OPENNESS	0.1401 (0.0904)	0.1399 (0.0898)	0.1642* (0.0898)	-0.0351 (0.1430)	0.1500 (0.0927)	0.1353 (0.0920)	0.1166 (0.0920)	0.1412 (0.0954)	0.1285 (0.0970)	0.1573* (0.0903)
ExpP GDP GROWTH	-0.0378 (0.0543)	-0.0471 (0.0553)	-0.0612 (0.0552)	-0.0678 (0.0839)	-0.0464 (0.0555)	-0.0849 (0.0686)	-0.0547 (0.0537)	-0.0340 (0.0660)	-0.0975 (0.0705)	-0.0764 (0.0600)
<i>Structural and macroeconomic variables</i>										
INST.QUALITY change		-1.8070 (3.3366)								
INST.QUALITY			-0.2793 (0.2109)							
CHANGE MMR				-0.2910 (0.2798)						
CA/GDP					0.0126 (0.0139)					
<i>External and internal vulnerabilities</i>										
DEBT/GNI						-0.0086 (0.0059)				
ERR							-0.0388 (0.0545)			
RESERVES/DEBT								0.0017 (0.0036)		
FLD									0.0267*** (0.0095)	
CDR										-0.5692 (0.4130)
constant	-0.2962 (0.2349)	-0.3093 (0.2464)	-0.4539* (0.2573)	-0.3444 (0.4134)	-0.3200 (0.2448)	0.0211 (0.3452)	-0.1498 (0.3872)	-0.3924 (0.3719)	-1.8797*** (0.6351)	0.1075 (0.4029)
R-sqr	0.293	0.298	0.302	0.379	0.301	0.322	0.301	0.289	0.343	0.317
N	75	75	75	42	75	72	74	70	63	75

Stars indicate statistical significance at * 10 percent, **5 percent and *** 1 percent level.

Standard errors in parentheses below. Robust standard errors applied.

1/ FALL is the difference between the average m-o-m real credit growth in the pre-crisis period July 2007-June 2008 and the post-shock period October 2008-March 2009, seasonally adjusted rates.

2/ SURGE is the average m-o-m real credit growth rate in the three years prior to the crisis (i.e. July 2005-June 2008), seasonally adjusted rates.

Appendix 8: Robustness checks – FALL measures

Dependent variable: respective FALL measure covering different periods

	FALL from 2006Q3-2007Q2 to 2008Q4-2009Q1		FALL from 2007Q3-2008Q2 to 2008Q4-2009Q2		FALL from 2006Q3-2008Q2 to 2008Q4-2009Q1	
	(1) Flows	(2) Credit	(3) Flows	(4) Credit	(5) Flows	(6) Credit
FBAS	-0.0130 (0.0101)	-0.0075 (0.0050)	-0.0171** (0.0079)	-0.0035 (0.0047)	-0.0150* (0.0086)	-0.0065 (0.0046)
SURGE 1/ 2/	0.0712 (0.0914)	0.7454*** (0.1825)	0.2021** (0.0959)	0.9103*** (0.1683)	0.1602* (0.0914)	0.7163*** (0.1377)
SURGE^2	0.0691*** (0.0100)		0.0564*** (0.0099)		0.0582*** (0.0096)	
constant	0.6342 (0.6593)	0.0571 (0.2938)	1.0832** (0.4627)	-0.3647 (0.2248)	1.2399** (0.5279)	-0.0863 (0.2365)
R-sqr	0.464	0.276	0.591	0.416	0.587	0.330
N	97	78	97	71	97	78

Stars indicate statistical significance at * 10 percent, **5 percent and *** 1 percent level.

Standard errors in parentheses below. Robust standard errors applied.

1/ SURGE for flows is the (log of the) aggregated capital inflows in the three years preceding the Lehman bankruptcy (2005Q3-2008Q2).

2/ SURGE for credit is the average m-o-m real credit growth rate in the three years prior to the crisis (i.e. July 2005-June 2008), seasonally adjusted rates.

Appendix 9: Robustness checks – SURGE measures

Dependent variable: respective FALL measure

	Variation of SURGE period						Variation of SURGE calculation method			
	Flows 1/			Credit 2/			Flows 1/		Credit 2/	
	(1) (2 years)	(2) (4 years)	(3) (5 years)	(4) (2 years)	(5) (4 years)	(6) (5 years)	(7) SURGE – pre-shock mean	(8) SURGE-period mean	(9) SURGE – pre-shock mean	(10) SURGE-period mean
FBAS	-0.0222*** (0.0069)	-0.0189** (0.0083)	-0.0179** (0.0084)	-0.0051 (0.0049)	-0.0068 (0.0053)	-0.0067 (0.0052)	-0.0195* (0.0116)	-0.0237* (0.0120)	-0.0047 (0.0048)	-0.0045 (0.0045)
SURGE	0.2572** (0.1062)	0.1285 (0.0826)	0.0865 (0.0689)	0.7447*** (0.1426)	0.6322*** (0.1737)	0.5973*** (0.1765)				
SURGE^2	0.0563*** (0.0115)	0.0615*** (0.0091)	0.0655*** (0.0084)							
SURGEalt							-0.0369 (0.0576)	-0.0002 (0.0580)	1.0694*** (0.3206)	1.4644*** (0.3035)
SURGEalt^2							0.0000*** (0.0000)	0.0000** (0.0000)		
constant	1.2703*** (0.4295)	1.2672*** (0.4727)	1.2437** (0.5229)	-0.3390 (0.2157)	-0.0197 (0.2300)	0.0415 (0.2285)	5.0533*** (0.5823)	5.3570*** (0.5844)	0.4896* (0.2476)	0.3553 (0.2348)
R-sqr	0.651	0.567	0.575	0.331	0.221	0.202	0.154	0.114	0.140	0.250
N	95	96	96	78	75	75	96	96	75	75

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

1/ FALL for flows is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1.

2/ FALL for credit is the difference between the average m-o-m real credit growth in the pre-crisis period July 2007-June 2008 and the post-shock period October 2008-March 2009, seasonally adjusted rates.

Appendix 10: List of variables

Name	Description	Source
<i>FALL</i> _{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
<i>SURGE</i> _{flows}	aggregated cross-border bank flows over the three years prior to the <i>Lehman</i> bankruptcy (i.e. 2005Q3-2008Q2) (logs)	
<i>FALL</i> _{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
<i>SURGE</i> _{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)
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
CHANGE MMR	percentage change in the money market rate between Sept. 2008 and March 2009	IFS (line 60b)
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)
NPL	bank nonperforming loans to total loans in 2007	Global Financial Stability Report 2009, IMF