Foreign Banks and Macroeconomic Fluctuations: Evidence from Financially Integrated Emerging Markets

Zeynep Önder and Süheyla Özyıldırım
Bilkent University, Ankara, Turkey

Abstract

In this paper, we investigate whether foreign banks affect the volatility of GDP and its components, mainly consumption and investment for the period between 1998 and 2011. Examining 24 emerging market countries, we find that the effect of increasing presence of foreign banks vary depending on the level of financial intermediary development in these countries. On the one hand, they play a significant role in smoothing the volatility at low levels of development. On the other hand, they contribute to macroeconomic volatility at high levels of development. We also observe that there is a widespread variation of the effect of foreign banks on the macroeconomic fluctuation across regions. Our findings indicate that during the global crisis, foreign banks had a dampening effect on the volatility of GDP and its components in Latin America, generally magnified volatility in Asia and did not significantly affect it in Emerging Europe.

JEL Classification: F62, G21, O57

Keywords: Macroeconomic Volatility, Foreign Banks, 2008/2009 Global Financial Crisis, Emerging Markets

1 Introduction

The financial systems and economies of many emerging markets have benefited from the entry of foreign banks into their banking systems over the past two decades. These banks have been stable providers of external financing even during episodes of local financial turmoil (Goldberg et al., 2000; Schnabl, 2012; De Haas and Van Lelyveld, 2014). The global financial crisis, however, led to a reassessment of the benefits of these banks due to their significant role in transmitting the crisis to emerging economies (see e.g., Ceterolli and Goldberg, 2011). In this paper, we contribute to this literature by examining the association between the share of foreign banks in the banking sector and the volatility of real GDP and its components, mainly consumption and investment, for a sample of 24 emerging economies during normal periods and the global financial crisis.[1] We argue that because foreign banks are different from local banks in terms of their exposure to external and domestic liquidity shocks, they may have different real effects on local economies, especially during crisis periods.

Macroeconomic volatility can be considered one of the major obstacles to economic and social development (Ramey and Ramey, 1995; Bruno and Easterly, 1998; Agénor, 2004). There is a broad consensus in the theoretical and empirical literature that high macroeconomic volatility tends to depress investment, bias it toward short-term returns, reduce consumption levels and factor productivity, increase poverty and worsen income distribu-

[1]The countries included in our analysis are Argentina, Brazil, Bulgaria, Chile, China, Estonia, Hungary, India, Indonesia, Latvia, Lithuania, Malaysia Mexico, Pakistan, Peru, the Philippines, Poland, Romania, the Russian Federation, South Africa, Thailand, Turkey, Ukraine, and Venezuela. The IMF classifies them as "more financially integrated" emerging market economies.

tion (see e.g., Agénor, 2004; Breen and García-Peñalosa, 2005; Loayza et al., 2007, Aghion et al., 2010). Its harmful effects are more pronounced in emerging market economies. These countries, in general, have experienced more macroeconomic volatility, and do not always have effective means to reduce their vulnerabilities (Hnatkovska and Loayza, 2005; Aizenman and Pinto, 2005; Loayza et al., 2007).

The 2008/2009 global crisis was unprecedented in its global scale and severity, and affected advanced and emerging market economies. Kose and Prasad (2010) underline that the damage in financial stability caused by the crisis has been particularly serious for some emerging economies especially those that are highly dependent on foreign bank financing. Foreign banks can affect countries' economies by changing their lending patterns before and after crisis. For example, Cull and Martínez Pería (2013) report that loan growth by foreign banks was higher than by domestic banks in 2008 in Latin America and fell more than that of domestic private banks in Eastern Europe in 2009. Similarly, De Haas and van Lelyveld (2014) demonstrate that the reduction in the credit growth rate of multinational bank subsidies was almost three times faster than in domestic banks during the 2008/2009 global crisis, controlling for other bank characteristics. Moreover, Claessens and Marchetti (2013) find that foreign banks mostly rebalanced their portfolios away from host countries and repatriated funds to help absorb shocks at home during the 2008/2009 crisis. Although these recent findings suggest that by hindering credit access to businesses, households and banks, foreign banks have played an important role on choking further investment and growth, the existing theoretical and empirical literature offers little guidance on the impact of these banks on domestic economic activity, especially on consumption and investment activities.

The impact of foreign banks on macroeconomic volatility might vary depending on their nature and their involvement in the host country. There is considerable heterogeneity in foreign bank lending and bank behavior across countries, even within broad country groupings. For example, cross-border flow from parent banks is common in Eastern European countries, but it is lower than ten percent in Latin America and Asia (local affiliates distribute the majority of foreign bank lending in Latin America) (Kamil and Rai, 2010). Moreover, Spanish and US banks are dominant foreign banks in Latin America, whereas they have a low presence in Eastern Europe, where Austrian, Belgian, Swedish and Italian banks are more active. In both regions, German and French banks are also very active. Among European banks, UK banks have a particularly significant presence in Asia. In this paper, we also aim to explore how the association between foreign bank presence and macroeconomic volatility differs across regions, that is, Latin America, Emerging Europe, and Asia, and how the global financial crisis influenced this association in the different regions.

To our knowledge, only two papers have examined the association between the presence of foreign banks and macroeconomic volatility. Measuring volatility with the deviation of actual employment growth rate from the expected rate, Morgan et al. (2004) provide evidence that out-of-state banks had a stabilizing effect on economic activity among US states. Such banks can be considered "foreign" because most states forbade entry to out-of-state banks during the author's sample period, 1976 to 1994. In another paper, examining a sample of 102 countries, Morgan and Strahan (2004) find zero association between foreign banks and real GDP volatility but a positive association between foreign banks and real investment volatility. Their sample period, 1990 to 1997, coincides with the early years of foreign bank entry into

host countries. The average share of bank assets controlled by foreign banks in the majority of their sample countries was small. For example, during their sample period, the highest average market share of foreign banks was among Latin American countries, at 18.7%. Moreover, their sample period does not cover a large-scale financial crisis, which may compel foreign banks to reconsider their commitment to sustaining sufficient levels of external financing in the host countries.

In this paper, we contribute to the literature in three ways. First, we examine whether the share of foreign banks in the banking sector affects macroeconomic volatility in emerging economies between 1998 and 2011, a period when foreign banks were highly involved in financially integrated emerging markets. On average, foreign banks held almost 40% of the banking sector's total assets in these countries. Second, we analyze how this relationship changed during the global crisis. Third, we investigate the variation among different global regions in terms of the association between foreign banks and macroeconomic volatility.

Measuring macroeconomic volatility as the unexpected change in growth rates of GDP and its components between 1998 and 2011, we find that foreign banks play a role in amplifying output and consumption growth volatilities in the emerging countries with high levels of financial intermediary development during the sample period and the 2008/2009 global crisis period. We observe dampening effect of these banks on investment growth volatility during normal times, and in 2009, at low levels of financial development.

The macroeconomic effectiveness of foreign banks is found to be quite heterogeneous across regions. We observe that foreign banks reduce GDP and investment volatility at a low level of financial intermediary development in Emerging European countries, and at a high level of financial devel-

opment in Latin American countries. Moreover, they dampen volatility of investments in Latin America regardless of the country's financial development level. During the crisis, although foreign banks did not affect volatility significantly in Emerging European countries, they reduced macroeconomic volatility in Latin America but increased it in Asia at low levels of financial development.

To check the robustness of our results, we perform several further estimations, such as using different measures of macroeconomic volatility, changing the estimation methods to eliminate any endogeneity problem, and examining different samples of countries with high levels of foreign bank involvement. The findings seem to be consistent with our main results.

The paper is organized as follows: Section 2 presents the empirical model and the data. Section 3 reports the results and the outcomes of several robustness checks. Section 4 concludes the paper.

2 Empirical Methodology

In this paper, we define output, consumption, and investment growth volatility as the absolute deviation of the actual growth rates from the growth rates predicted using the standard growth regression model, as in Morgan and Strahan (2004). We, first estimate the growth rates of three macroeconomic variables: real GDP, real consumption, and real investment, with factors affecting growth rates with country and year fixed effects, and then use the absolute value of the residuals as our measure of macroeconomic volatility.

In general, studies that examine macroeconomic volatility use the standard deviation of the growth rate as a measure of volatility. However, constructing time series volatilities by rolling windows with fixed sizes and com-

puting standard deviations for every window generates serial correlation in the resulting time series. Moreover, in the rolling-window approach, outliers have a level effect and it is not easy to identify shocks. Therefore, since we try to estimate how the relationship between foreign banks and macroeconomic volatility changed during the global crisis, we do not employ this approach.[2] Furthermore, using residuals to measure volatility allows a less-restrictive formalization of the process, underlying the change in the trend of economic series (see also Morgan et al., 2004; Wolf, 2005; Aghion et al., 2009).

2.1 The Standard Growth Model

The growth rates of real GDP, real consumption and real investment expenditures are estimated using the following fixed-effects model, as in Bekaert et al. (2005):

$$GROWTH_{it} = \eta_i + \mu_t + \Theta\, X_{it} + \varepsilon_{it} \quad (1)$$

where η_i, μ_t and X_{it} represent country and year fixed effects and a vector of variables affecting growth rates of country i at time t, respectively. These variables include trade openness of a country measured with the GDP share of total exports and imports, international capital flows to a country measured by private capital-to-GDP ratio, external debt as a percentage of GDP, rate of population growth, years of secondary education as a proxy for human capital, government expenditure-to-GDP ratio, unemployment rate, life expectancy, inflation rate, and a local crisis dummy variable. In the model,

[2]As a robustness check, we also measure macroeconomic volatility with the standard deviation of growth rates over a three-year rolling window and observe that although foreign bank shares are not significantly related to the volatility of GDP and investment growth rates, they increase consumption volatility for whole sample and magnify at high levels of financial intermediary development.

we also include the lagged values of growth rates in real GDP, real consumption, real investment expenditures.[3] The estimated coefficients of the standard growth model are presented in Table A.1 in the Appendix.

2.2 Empirical Model for Macroeconomic Volatility

Our volatility measure, v_{it}, is the absolute value of the residuals of the model specified in equation (1). It is the dependent variable with which we examine the relationship between foreign bank presence and macroeconomic volatility. The following regression equation is estimated to explain macroeconomic volatility (Model I):

$$v_{it} = \alpha + \beta_1 Foreign_{it} + \beta_2 FD_{it} + \beta_3 FD_{it}^2 + \Psi CONTROL_{it} + \epsilon_{it}. \qquad (2)$$

where *Foreign* is defined as the share of foreign bank assets in total assets of the banking system[4] and *FD* is a financial intermediary development indicator, measured by the aggregate private credit provided by banks and other financial institutions as a share of GDP, as in Levine et al. (2000). We add a quadratic *FD* term to the model to investigate the presence of a non-linear relationship between financial development[5] and macroeconomic volatility, as in Easterly et al. (2001) and in Bugamelli and Paternó (2011). $CONTROL_{it}$ represents two control variables, the asset concentration of the largest five banks in the banking sector (*Bank Concentration*) and change in the real effective exchange rate (*REER*), which might unexpectedly affect the growth

[3]Modeling growth is difficult in time series analysis. Several variables affect growth, and some econometric problems, such as endogeneity, arise. We follow the solution suggested by Sims (1980) and use lagged values of a dependent variable as an explanatory variable.

[4]A bank is classified as foreign-owned if foreign shareholders hold at least 50% of the bank's equity.

[5]We use financial intermediary development and financial development interchangeably as in Beck et al. (2006).

rate of output, consumption, or investment. Because of heteroscedasticity, the standard errors are adjusted for it and for lack of normality.[6]

We do not have an a priori expectation about the sign of the coefficient of foreign banks (*Foreign*) in explaining macroeconomic variability. Foreign banks can affect macroeconomic volatility through maintaining or threatening financial stability.[7] Recent international experience shows that financial and banking distress have been inseparably linked to currency and macroeconomic crises. Hence, if foreign banks help strengthen financial stability, increasing foreign bank shares in the domestic banking system may reduce the deviation of output and its components from their expected growth rates. On the other hand, foreign banks may exacerbate economic volatility by creating financial instability, especially during financial crises. Previous empirical studies, however, do not provide any clear-cut evidence on the role of foreign banks in maintaining or risking financial stability. The findings, especially from developing and transition countries, suggest that foreign banks improve financial stability by their ability to access supportive parent banks that provide liquidity and capital if and when needed (Clarke et al., 2006; Vogel and Winkler, 2012). They can, however, be a source of instability by constraining funding caused by liquidity conditions in the global inter-bank market (Kamil and Rai, 2010; Cetorelli and Goldberg, 2011; Tong and Wei, 2011). Thus,

[6]The results of the endogenity tests indicate that foreign bank shares are not endogenous. Nevertheless, we also estimate the models with an instrumental variable approach using legal origin and lagged ratio of foreign bank assets to total assets in the banking sector as instrumental variables. However, our major results do not change as discussed in Section 3.4. Robustness Check.

[7]We use Rosengren's (2011) definition of financial stability, which ties financial institutions to the real economy: "Financial stability reflects the ability of the financial system to consistently supply the credit intermediation and payment services that are needed in the real economy if it is to continue on its growth path."

the association between foreign bank presence and macroeconomic volatility seems to be an empirical issue.

Economic theory suggests a number of channels through which financial development can affect volatility. For example, deeper financial systems can dampen volatility by alleviating firms' cash constraints (particularly in economies with tight international financial constraints (Aghion et al.,1999; Caballero and Krishnamurty, 2001)), or by lessening the sensitivity of household and firm spending to downturns in income and cash flow (Dynan et al., 2006). However, financial development can increase the risk-taking appetite of entrepreneurs and banks and facilitate over-leverage. Both of these factors may drive up volatility, as shown by Shliefer and Vishny (2010) and Wagner (2010). Most previous empirical studies have found a negative effect of financial development on volatility at the aggregate level (see, e.g., Easterly et al., (2001); Denizer et al., (2002); Aghion et al., (2010); Bekeart et al., 2006; Beck et al., 2006), however, there is also evidence that the effect of financial development is not a significant factor in explaining consumption volatility (Bekeart et al., 2006) or investment volatility (Aghion et al., 2010).

In our estimations, we control for bank concentration because this situation could create a monopoly power that would reduce banking system efficiency and credit availability, as well as increase loan prices and the risk that these institutions would become too big to fail. These effects may hamper investment and economic growth (see, e.g., Jayaratne and Strahan, 1996; Cetorelli and Gambera, 2001) and even generate macroeconomic fluctuations (see e.g., Morgan and Strahan, 2004; Buch and Neugebauer, 2011; Bremus and Buch, 2014).

We also include change in real exchange rate to explain fluctuations in economic growth. As shown by Badia and Segura-Ubiergo (2014), most

emerging market economies have experienced substantial real exchange rate appreciation in recent years, generating concerns about macroeconomic difficulties including the loss of competitiveness and macroeconomic volatility. However, Magud and Sosa (2010) show that unintended consequences of foreign exchange abundance are tried to be managed by the policymakers of these countries and its effect on macroeconomic volatility seems to be mostly inconclusive.

The relationship between foreign banks and macroeconomic volatility may depend on the level of a country's financial intermediary development. To examine this issue, we add an interaction variable between foreign bank presence and financial development to Model I and estimate the following model (Model II):

$$v_{it} = \alpha + \beta_1 Foreign_{it} + \beta_2 FD_{it} + \beta_3 FD_{it}^2 + \beta_4 (Foreign_{it} \text{ x } FD_{it}) + \Psi X_{it} + \epsilon_{it} \quad (3)$$

It can be argued that in financially developed markets, firms have easy access to funding, thereby diminishing their dependence on foreign lenders. However, previous empirical evidence show that especially in emerging economies, some firms may be less likely to obtain credit after foreign entry since foreign bank competition adversely affects the ability of domestic banks to finance informationally opaque firms (see Gormley, 2010; 2014). Hence, the invasion of these banks may result in greater macroeconomic volatility even in financially developed emerging economies. On the other hand, in countries with lower levels of financial intermediary development, foreign entry may alleviate financial constraints (see, e.g., Clarke et al., 2006) and help smooth economic activities, especially consumption and investment.

The effect of foreign banks and the interaction effect between foreign banks and financial development on macroeconomic volatility may be different during normal and global crisis periods. We examine how these rela-

tionships changed during the 2008/2009 crisis, by creating dummy variables, Y_{2008} and Y_{2009}. These variables take a value of 1 in that year and 0 in other years. Thus, Model III includes both these variables, the interaction between foreign bank share (*Foreign*) and the crisis year dummy variables, and a three-way interaction among crisis years, foreign banks, and financial development (Model III):

$$\begin{aligned} v_{it} \;=\; & \alpha + \beta_1 Foreign_{it} + \beta_2 FD_{it} + \beta_3 FD_{it}^2 + \beta_4 (Foreign_{it} \text{ x } FD_{it}) \\ & + \gamma_1 Y_{2008} + \gamma_2 Y_{2009} + \gamma_3 (Foreign_{it} \text{ x } Y_{2008}) + \gamma_4 (Foreign_{it} \text{ x } Y_{2009}) \\ & + \gamma_5 (Foreign_{it} \text{ x } FD_{it} \text{ x } Y_{2008}) + \gamma_6 (Foreign_{it} \text{ x } FD_{it} \text{ x } Y_{2009}) + \Psi X_{it} + \epsilon_{it} \end{aligned} \tag{4}$$

The characteristics and credit behavior of foreign banks are different in different parts of the world, as shown by Kamil and Rai (2010). We examine how the association between the presence of foreign banks and macroeconomic volatility changes among different regions, namely Latin America, Emerging Europe and Asia, and estimate three major models by including the three region dummy variables and the two-way and three-way interaction variables with foreign bank and financial development, and region dummy variables for Latin America, Emerging Europe and Asia.[8]

2.3 Data

We analyze the relationship between macroeconomic volatility and foreign bank presence between 1998 and 2011 for a sample of 24 countries: six Latin American, ten Emerging European, seven Asian, and one African. We collected the share of foreign banks in the total banking industry from various

[8]Since we have only one country from Africa, we do not include this region in our analysis of regional differences; we estimate our models with region dummy variables by excluding South Africa from the sample.

sources, such as the publications of each country's central bank and the reports of national banking associations.[9] The major source for other variables was the World Development Indicators (WDI) database. Real effective exchange rate data (*REER*) were obtained from the Bank for International Settlements' (BIS) database.

Figures 1 to 3 show how the share of foreign banks in each country's banking sector changed over the sample period. Foreign bank participation has increased in almost all countries over the last decade, but a sharp expansion of foreign bank presence has been observed mainly in seven Eastern European countries: the share of assets controlled by foreign banks in these countries increased from less than 10% in 1994 to over 70% in 2011. On average, foreign banks hold more than half of the banking sector assets (54.85%) in Emerging European countries, even though Russia and Turkey (which had less than 20% foreign ownership in 2011) are also included in this region. The average share of foreign banks in Asia is almost one-fifth that in Emerging European countries. Latin American countries are less homogeneous in terms of the share of foreign banks in their banking industry. In South Africa, foreign banks increased their share from less than 10% at the beginning of the 2000s to around 30% in 2004, and have stabilized at that level.[10]

The descriptive statistics of the variables in the estimations are summarized in Table 1. We measure the growth rate in consumption and the growth

[9]In a recent paper, Claessens and Van Horen (2014) provide the number of banks that were fully controlled by foreigners in 137 countries between 1995 and 2009, based on Bankscope data. However, the data on foreign bank presence in terms of market share are for a limited time period, (2004-2009) and there are several missing data for most of our sample countries, e.g. Chile, China, the Philippines, Russia, and Turkey.

[10]Since South Africa is the only country in Africa classified as a financially integrated developing country by the IMF, to save space in Figure 1, we graph it with Latin American countries.

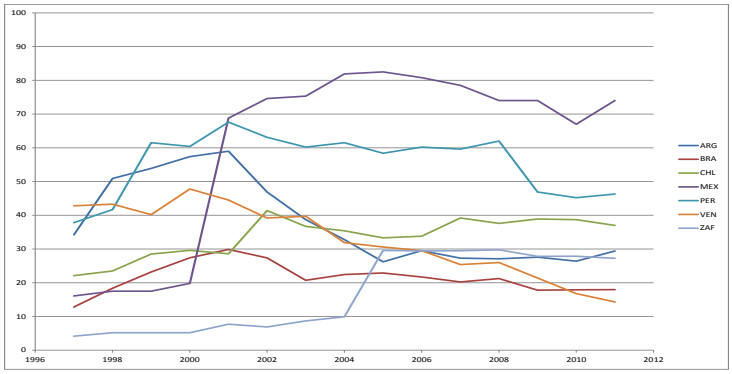

Fig. 1: Foreign Bank Assets to Total Assets in Latin America and Africa

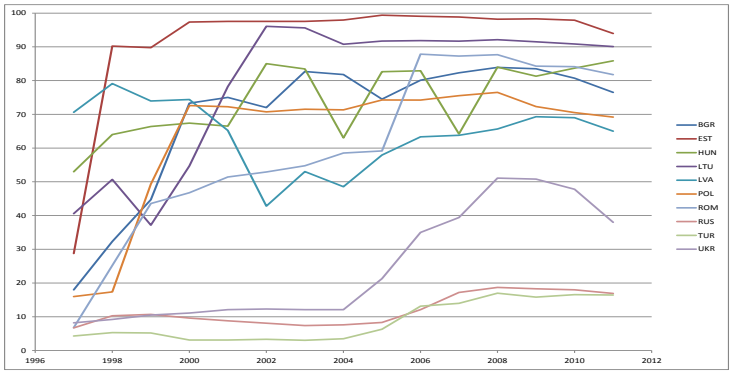

Fig. 2: Foreign Bank Assets to Total Assets in Emerging Europe

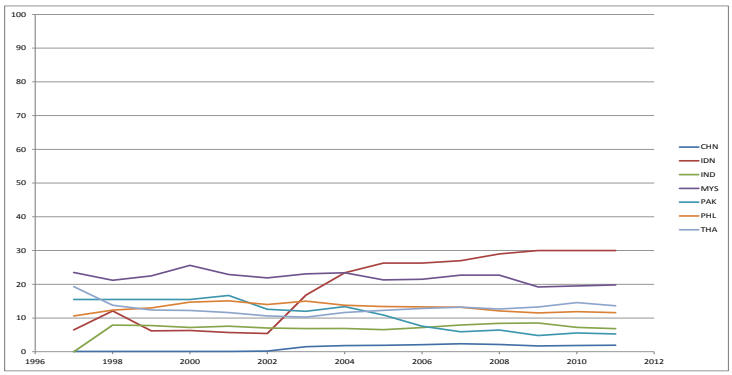

Fig. 3: Foreign Bank Assets to Total Assets in Asia

Table 1. Descriptive Statistics of Variables, 1998-2011.

	Latin America	Emerging Europe	Asia	South Africa	All Countries
Growth Rate in GDP	3.66	3.90	5.14	3.25	4.17
	(4.58)	(5.25)	(3.99)	(1.86)	(4.67)
Growth Rate in Consumption	4.31	4.60	4.85	3.77	4.56
	(5.24)	(6.98)	(3.86)	(2.36)	(5.62)
Growth Rate in Investment	7.51	8.07	4.70	5.50	6.84
	(20.50)	(20.75)	(13.86)	(6.61)	(18.50)
Foreign Banks	40.24	54.85	11.40	16.94	37.16
	(18.96)	(32.08)	(8.17)	(11.53)	(29.77)
Private Credits to GDP	29.95	31.22	68.27	136.37	45.80
	(20.79)	(19.98)	(44.72)	(12.33)	(38.44)
Bank Concentration	67.26	61.25	60.94	87.03	63.74
	(12.92)	(16.86)	(11.05)	(4.18)	(15.03)
Trade Openness	45.80	98.23	85.49	56.78	79.68
	(15.82)	(36.13)	(55.90)	(7.14)	(44.43)
Capital Flows to GDP	3.53	5.53	2.26	1.66	3.91
	(2.18)	(7.17)	(1.66)	(1.61)	(5.05)
Unemployment Rate	8.82	10.20	5.78	24.59	9.17
	(3.58)	(3.70)	(2.92)	(1.61)	(5.02)
Growth in Population	1.29	-0.32	1.47	1.57	0.68
	(0.32)	(0.73)	(0.59)	(0.56)	(1.04)
Years in Secondary School	5.82	7.11	6.14	5.00	6.42
	(0.70)	(0.86)	(0.99)	(0.00)	(1.05)
External Debt to GDP	38.44	61.93	39.00	22.57	47.49
	(20.62)	(28.68)	(24.65)	(3.83)	(27.82)
Government to GDP	13.05	17.62	11.01	19.43	14.62
	(3.45)	(4.20)	(2.24)	(1.20)	(4.58)
Expected Life (years)	73.98	71.35	69.04	54.29	70.62
	(2.43)	(2.54)	(3.94)	(2.54)	(4.88)
Inflation Rate	8.14	12.42	5.35	5.89	9.02
	(8.03)	(23.45)	(5.50)	(2.32)	(16.21)
Real Effective Exchange Rate	109.11	89.84	92.67	95.36	95.71
	(40.04)	(13.21)	(9.22)	(13.91)	(23.75)
Local Crisis	4.44	2.67	7.62	0.00	4.44
	(20.72)	(16.16)	(26.66)	(0.00)	(20.64)

Notes: Standard deviations are reported below the mean values in parentheses. All figures are in percentages except schooling and expected life. They are in years. *Sources:* World Development Indicators (WDI) and Bank for International Settlements (BIS) databases. Foreign bank shares are obtained from the banking associations and central bank web sites of each country.

rate in investment with the growth rate in real household final consumption expenditure and the growth rate in real gross capital formation, respectively. The average growth rates are high even though some countries experienced local crises during the sample period, and the global 2008/2009 crisis hit almost all countries in our sample. Although Asian countries had the highest average annual growth rates in real GDP and real consumption during the sample period, Emerging European countries had the highest average annual growth rate in real investments.

The local crisis dummy variable is created using the dataset provided by Laeven and Valencia (2012), and includes all systemic banking, currency, and sovereign debt crises between 1998 and 2011. Some of the sample countries experienced severe financial instability over the sample period. For example, currency and financial crises hit Russia in 1998, Brazil in 1999, and Turkey and Argentina in 2001.

Overall, trade openness, measured by the sum of imports and exports divided by GDP, was high (79.68%) among the sample countries. Yet, higher trade openness is mainly observed in Emerging Europe and Asia. It is also worth mentioning that South Africa has the most developed financial system, measured by the ratio of domestic private credits to GDP. There are significant differences among the countries in each region in terms of their financial intermediary development. For example, Chile had the highest average ratio among Latin American countries (72.1%) during our sample period, whereas it was only 14% in Venezuela. Emerging European countries were more homogeneous, moving between 17.2% in Romania to 53.2% in Estonia. In Asia, Pakistan had the lowest financial development level, (25.2%) whereas Malaysia had the highest (124.9%). Although Asian countries show variation in terms of the domestic private credit-to-GDP ratio, they are more homo-

geneous than other regions in terms of the average share of foreign banks assets in their banking sector.

3 Empirical Findings

3.1 The relationship between Foreign Banks and Macroeconomic Volatility

In Table 2, we present the empirical results of the second-step estimations that examine the relationship between foreign banks and macroeconomic volatility. The dependent variable in the estimations is the macroeconomic volatility measured by the absolute value of the deviations from the predicted growth rates of real GDP, real consumption and real investment.

When we consider our model with no interaction between foreign bank *(Foreign)* and financial intermediary development *(FD)* (Model I), we find that foreign banks did not have any significant effect on the volatility of real GDP and real investment in our sample period, but they did play a significant role in increasing the volatility of real consumption. When we include the interaction between foreign bank shares and the financial development indicator (Model II), the foreign bank coefficients become negative and significant and the coefficients of the interaction between foreign bank shares and financial development are found to be positive and significant in explaining all measures of macroeconomic volatility, (see Columns (2), (4) and (6) of Table 2).

The estimated coefficients suggest that the relationship between foreign banks and the growth rate volatility of different economic activities depends on the level of financial intermediary development. For example, at low levels

Table 2. Results of Macroeconomic Volatility Estimations (Model I and Model II)

	GDP		Private Consumption		Investment	
	Model I	Model II	Model I	Model II	Model I	Model II
	(1)	(2)	(3)	(4)	(5)	(6)
Foreign	0.503	-5.344 **	1.117 *	-9.240 ***	-0.075	-25.144 **
	(0.420)	(2.346)	(0.648)	(2.713)	(1.885)	(10.062)
Foreign x *FD*		1.703 **		3.016 ***		7.301 **
		(0.692)		(0.803)		(3.039)
FD	-0.890	-2.106	-0.820	-2.973 **	2.536	-2.676
	(1.236)	(1.577)	(1.704)	(1.432)	(5.377	(7.068)
FD x *FD*	0.128	0.227	0.139	0.315	-0.404	0.024
	(0.165)	(0.199)	(0.232)	(0.192)	(0.710)	(0.875)
Bank Concentration	-0.009	-0.008	-0.016	-0.013	-0.026	-0.019
	(0.008)	(0.008)	(0.011)	(0.011)	(0.036)	(0.035)
REER	-0.026 ***	-0.026 ***	-0.029 ***	-0.028 ***	-0.050	-0.049
	(0.008)	(0.008)	(0.010)	(0.010)	(0.035)	(0.034)
Intercept	3.833	6.737 **	4.367	9.512 ***	7.383	19.836
	(2.359)	(3.087)	(3.118)	(2.714)	(10.827)	(14.514)
Adjusted R^2	0.035	0.060	0.035	0.080	0.010	0.033
F-statistics	2.860 **	3.110 ***	2.300 **	4.100 ***	1.010	2.010 *
p-value	0.015	0.006	0.045	0.000	0.411	0.064
N	307	307	307	307	307	307

Notes: The dependent variable is the macroeconomic volatility measured by the absolute value of the deviations from the predicted growth rates of real GDP, real consumptions and real investments. The numbers in parentheses are standard errors. $*$, $**$ and $***$ denote statistical significance at the 10%, 5% and 1% levels, respectively.

of financial development, an increase in foreign bank shares reduces GDP volatility, but at high levels of financial development, an increase in foreign bank shares increases GDP volatility. The financial development indicator is entered in logarithmic form in our regression models. Therefore, using the estimated coefficients of *Foreign* and *(Foreign* x *FD)* in the GDP model reported in Column 2 of Table 2, we find that if the level of bank credit to private sector is 23.1% of the GDP (threshold value), the coefficient of foreign bank penetration on GDP volatility is zero. If the ratio of bank credit to private sector over GDP is less (greater) than 23.1%, the estimated coefficients suggest that there is a negative (positive) association between foreign bank penetration and GDP volatility. Similarly, using estimated coefficients in the fourth and the sixth column, the threshold values of financial intermediary development for the consumption and investment volatility models are found to be 21.4% and 31.3%, respectively. As it can be seen in Table 1, the annual average level of bank credit-to-GDP ratio was 45.80% in our sample countries between 1998 and 2011. Thus, our findings suggest that an increase in foreign bank shares is expected to increase output, consumption and investment volatilities on average. Nevertheless, these results should be interpreted cautiously, given that this analysis does not indicate whether the foreign bank coefficient at the average level is statistically significant or not.[11]

[11]To test whether the impact of foreign banks on macroeconomic volatility is significant, we estimate the predicted coefficients of foreign bank participation at three different levels of financial development: 25th, 50th, 75th percentiles of the financial development indicator for the sample period. The predicted coefficients are presented in Table 4, with the estimated foreign bank coefficients from Model III, which analyzes this relationship during the global crisis period.

3.2 The Relationship between Foreign Banks and Macroeconomic Volatility during the 2008/2009 Crisis Period

The relationship between foreign banks and volatility is found to be similar for the whole period, including the crisis years, 2008 and 2009 (see Table 3). The coefficients of foreign banks are negative and significant in explaining consumption and investment volatility. The findings suggest that the dampening effect of foreign banks on macroeconomic volatility continued in 2009 but no significant change in this effect was observed for 2008. The coefficients of the interaction between financial development and foreign banks are found to be positive and significant for the consumption and investment models and they increase significantly in explaining the GDP and investment volatility models for 2009. Because of two-way and three-way interaction variables with foreign banks, it is not easy to observe the association between foreign banks shares and macroeconomic volatility in this model.

The change in the signs of the foreign bank coefficient and the coefficient of interaction between foreign banks and financial development indicator suggests that the relationship between foreign bank share and macroeconomic volatility is negative at low levels of financial development but positive after a certain threshold level of financial development. In particular, for the whole sample, the threshold values for the financial development indicator are calculated as 25.04%, 22.16%, and 29.28% of GDP, for output, consumption and investment volatility, respectively. Considering the average level of financial development (45.80%), these values reveal again that an increase in foreign bank shares, on average, caused output, consumption, and investment growth rates to become more volatile among our sample countries between

Table 3. Results of Macroeconomic Volatility Estimations (Model III)

	GDP	Private Consumption	Investment
Foreign	-2.506	-6.521 ***	-21.365 *
	(2.087)	(2.494)	(11.539)
Foreign x *FD*	0.778	2.105 ***	6.327 *
	(0.602)	(0.737)	(3.599)
Foreign x *Y2008*	1.380	2.043	-3.128
	(7.973)	(9.128)	(20.773)
Foreign x *Y2009*	-18.998***	-1.854	-41.712 **
	(6.138)	(14.953)	(19.990)
Foreign x *FD* x *Y2008*	0.204	0.010	0.972
	(2.017)	(2.349)	(5.890)
Foreign x *FD* x *Y2009*	4.939 ***	0.676	8.863 *
	(1.597)	(3.752)	(5.279)
FD	-1.732	-2.993 **	-2.857
	(1.521)	(1.374)	(7.282)
FD x *FD*	0.188	0.332 *	0.052
	(0.193)	(0.184)	(0.901)
Y2008	-0.954**	-0.911	-0.643
	(0.475)	(0.656)	(2.515)
Y2009	2.232 **	3.309 **	8.237 **
	(0.995)	(1.574)	(3.394)
Bank Concentration	-0.009	-0.012	-0.025
	(0.007)	(0.010)	(0.035)
REER	-0.029***	-0.032 ***	-0.058
	(0.007)	(0.010)	(0.036)
Intercept	5.963 **	9.205 ***	19.994
	(3.007)	(2.645)	(14.938)
Adjusted R^2	0.170	0.216	0.065
F-statistics	3.55 ***	3.19 ***	2.46 ***
p-value	0.000	0.000	0.005
N	307	307	307

Notes: The dependent variable is the macroeconomic volatility measured by the absolute value of the deviations from the predicted growth rates of real GDP, real consumptions and real investments. The numbers in parentheses are standard errors. $*$, $**$ and $***$ denote statistical significance at the 10%, 5% and 1% levels, respectively.

1998 and 2011.

We also calculate the threshold values for financial development in the crisis years, although the coefficients of interaction variables between foreign banks, financial development, and the year 2008 are found to be statistically insignificant. The corresponding threshold values are 3.15%, 8.31%, and 28.67% in 2008 and 42.99%, 20.33%, and 63.61% in 2009 for output, consumption and investment respectively. The average level of financial development indicator in our sample was 49.31% in 2008 and 52.93% in 2009, these findings suggest that foreign banks amplified macroeconomic volatility in 2008 but helped smoothing investment volatility in 2009.

When the interaction variables are included in the model, one can plausibly argue that it is not straightforward to identify the statistical significance of the foreign bank coefficients. Therefore, we estimate the significance of the foreign bank share coefficients on macroeconomic volatility at different levels of financial intermediary development, mainly at 25th, 50th, 75th percentiles of this measure over the period analyzed in this study. The predicted coefficients of foreign banks are reported in Table 4.

At the 25th percentile of financial intermediary development, we find that foreign banks have a dampening effect on macroeconomic volatility, whereas they increase macroeconomic volatility at the 75th percentile. However, only three coefficients are found to be significant (Model II): foreign banks significantly reduce investment volatility at a low level of financial development and increase GDP and consumption volatilities at a high level of development. Although the signs of the predicted coefficients are similar in Model III, foreign banks are found to significantly amplify only consumption volatility at high level of financial development.

The predicted coefficients of foreign banks during the crisis period are

Table 4. The Predicted Coefficients of Foreign Banks at Different Levels of Financial Intermediary Development.

	Percentile of Financial Intermediary Development					
	25th	50th	75th	25th	50th	75th
	Model II			Model III		
Growth volatility of GDP						
GDP	-0.239	0.383	1.605 **	-0.173	0.111	0.669
	(0.468)	(0.403)	(0.652)	(0.433)	(0.354)	(0.533)
GDP in 2008				1.851	2.222	2.913 *
				(2.085)	(1.529)	(1.517)
GDP in 2009				-2.892	2.673	4.652 *
				(2.030)	(2.268)	(2.479)
Private Consumption	-0.198	0.903	3.068 ***	-0.211	0.557	2.068 ***
	(0.664)	(0.625)	(0.890)	(0.556)	(0.506)	(0.758)
Private Consumption in 2008				1.862	2.638	4.152 **
				(2.483)	(1.963)	(2.075)
Private Consumption in 2009				0.162	1.653	3.359
				(4.042)	(3.738)	(4.278)
Investment	-3.258 *	-0.593	4.649	-2.400	-0.090	4.452
	(1.911)	(1.762)	(3.034)	(2.008)	(2.053)	(3.827)
Investment in 2008				-2.457	0.269	5.440
				(5.224)	(4.639)	(5.944)
Investment in 2009				-14.901**	-3.116	3.974
				(7.443)	(8.186)	(8.504)

Notes: We use the 25, 50 and 75 percentiles of financial intermediary development values for all sample for the overall estimation. We take the corresponding values for each year separately in estimating the coefficient of foreign banks for crisis years. Standard errors are in parentheses.

mostly consistent with the overall findings. An increase in the presence of foreign banks is found to significantly magnify the volatility of GDP and consumption growth rates for 2008, and volatility of GDP for 2009, at the 75th percentile of financial development and significantly reduce the volatility of investments at a low level of development in 2009. In general, the impact of foreign banks on macroeconomic volatility at high level of financial intermediary development was higher during the crisis years 2008 and 2009 than in the whole sample period.

With respect to control variables that are reported in Table 2 and 3, we find that appreciation of real exchange rate, i.e., the goods become cheaper in the international markets, has significant dampening impact on GDP and consumption growth volatility. In general, bank concentration as measured by the share of the assets of five largest banks does not have any significant impact on macroeconomic volatility.

3.3 Regional Variation

Table 5 presents the results of Models II and III with the region interaction variables.[12] In these estimations, we exclude South Africa from the sample and investigate three regions, Latin America, Asia, and Emerging Europe. When the results for the whole sample are examined (Model II), the coefficients of foreign banks and the interaction between foreign banks and financial development are found to be similar to the overall results in

[12]We estimate Model I by including the interaction between foreign bank shares and region dummy variables. It is found that an increase in foreign bank shares significantly reduces investment volatility only in Latin America. The coefficients of foreign banks for other regions and other measures of macroeconomic volatility are not found to be significant.

Table 5. Results of Macroeconomic Volatility Estimations with region Variables

	Growth Rate Volatility in					
	GDP		Private Consumption		Investment	
	Model II	Model III	Model II	Model III	Model II	Model III
Foreign x *Latin America*	6.477	8.823 **	1.790	1.697	28.584	35.033
	(4.389)	(4.268)	(5.574)	(5.167)	(19.803)	(21.440)
Foreign x *Asia*	0.900	-13.657	21.145	14.795	22.593	-17.451
	(16.649)	(11.410)	(25.052)	(19.215)	(63.313)	(56.946)
Foreign x *Emerging Europe*	-5.649 **	-2.925	-7.915 **	-6.163 **	-25.136 **	-23.477 *
	(2.569)	(2.313)	(3.235)	(2.898)	(10.840)	(12.773)
Foreign x *FD* x *Latin America*	-2.606 *	-3.323 **	-1.169	-1.001	-13.146 *	-14.973 *
	(1.585)	(1.551)	(1.932)	(1.833)	(7.284)	(7.811)
Foreign x *FD* x *Asia*	-0.370	2.685	-5.554	-4.218	-5.875	2.835
	(3.718)	(2.817)	(5.610)	(4.492)	(14.980)	(13.854)
Foreign x *FD* x *Emerging Europe*	1.527 **	0.574	2.509 **	1.852 **	6.756 **	6.348
	(0.768)	(0.681)	(0.987)	(0.900)	(3.300)	(3.992)
Foreign x *Latin America* x *Y2008*		-0.259		8.051		-49.071 *
		(5.923)		(5.177)		(27.887)
Foreign x *Asia* x *Y2008*		32.693 **		-26.047		253.670 **
		(15.861)		(28.742)		(115.193)
Foreign x *Emerging Europe* x *Y2008*		6.354		10.066		-8.188
		(16.325)		(18.581)		(42.443)
Foreign x *Latin America* x *Y2009*		-24.028 ***		-14.713		-46.796
		(8.422)		(14.601)		(41.104)
Foreign x *Asia* x *Y2009*		169.955 ***		145.181 ***		274.057 ***
		(27.251)		(39.412)		(104.996)
Foreign x *Emerging Europe* x *Y2009*		-20.271 *		25.927		-23.540
		(10.391)		(25.364)		(35.644)
Foreign x *FD* x *Latin America* x *Y2008*		0.310		-2.741 *		17.413 **
		(1.528)		(1.607)		(8.403)
Foreign x *FD* x *Asia* x *Y2008*		-5.912		7.402		-59.975 **
		(3.883)		(7.258)		(26.145)
Foreign x *FD* x *Emerging Europe* x *Y2008*		-0.946		-2.122		2.486
		(4.130)		(4.737)		(10.929)

Table 5. (continued)

Foreign x *FD* x *Latin America* x *Y2009*		6.078 ***		2.651		9.488
		(2.314)		(4.464)		(11.994)
Foreign x *FD* x *Asia* x *Y2009*		-40.585***		-35.520***		-63.098**
		(6.760)		(10.151)		(25.482)
Foreign x *FD* x *Emerging Europe* x *Y2009*		5.413 **		-6.266		4.697
		(2.630)		(6.324)		(8.459)
Y2008		-1.302**		-0.734		-2.302
		(0.571)		(0.798)		(3.116)
Y2009		1.897 **		3.652 *		6.279
		(0.923)		(1.903)		(4.605)
FD	-1.778	-1.033	-4.368**	-4.851 ***	-3.228	-2.984
	(1.901)	(1.851)	(1.832)	(1.633)	(8.302)	(9.014)
FD^2	0.273	0.171	0.637 **	0.696 ***	0.476	0.421
	(0.266)	(0.251)	(0.300)	(0.252)	(1.158)	(1.247)
Bank Concentration	0.000	0.003	-0.006	0.001	0.008	0.007
	(0.009)	(0.009)	(0.012)	(0.011)	(0.041)	(0.042)
REER	-0.030***	-0.032***	-0.034***	-0.035 ***	-0.063 *	-0.062 *
	(0.007)	(0.007)	(0.010)	(0.009)	(0.034)	(0.035)
Latin America	0.066	0.037	0.213	0.114	3.111	3.106
	(0.787)	(0.803)	(0.772)	(0.804)	(3.872)	(4.002)
Asia	-0.887	-0.861	-0.540	-0.512	-2.496	-2.171
	(0.779)	(0.524)	(1.232)	(0.977)	(2.969)	(2.702)
Intercept	5.306	3.898	10.514***	10.861 ***	16.312	15.929
	(3.453)	(3.396)	(3.056)	(2.832)	(15.635)	(16.799)
Adjusted R^2	0.1067	0.2874	0.1134	0.3089	0.0726	0.1227
F-statistics	2.48 ***	6.57 ***	2.64 ***	5.26 ***	1.95 **	4.70 ***
p-value	0.004	0.000	0.002	0.000	0.029	0.000
N	295	295	295	295	295	295

Notes: The numbers in parentheses are standard errors. $*$, $**$ and $***$ denote statistical significance at the 10%, 5% and 1% levels, respectively. The coefficients of country and year fixed effects are not reported to save space.

Emerging European countries, that is, a negative and mostly significant coefficient of *Foreign,* and a positive coefficient on the interaction term of foreign bank penetration and financial development. The signs of these variables are opposite in Latin America, that is, the coefficients of *Foreign* are positive and the coefficients of interaction term with financial development are negative in all models. None of the coefficients of foreign bank share-related variables for the whole sample is found to be significant in Asia. These results suggest that foreign banks have different effects on macroeconomic volatility in different regions. Yet, there is still a point at which financial development switches from holding volatility back to propelling forward it in real growth rates. In particular, foreign banks are found to increase (decrease) macroeconomic volatility at low levels of financial development in Latin America (Emerging Europe) but reduce (increase) it at high levels.

The control variable coefficients are similar to the estimations without regional variables. Real exchange rate is found to reduce macroeconomic volatility significantly, whereas bank concentration is not found to affect volatility significantly. Although financial development is not found to be significant in explaining output and investment volatility, it has a significant smoothing impact on consumption volatility. However, we find a non-linear association between consumption volatility and financial development, that is, too much finance might lead to consumption volatility amplification.

In 2009, GDP and consumption volatilities were significantly higher than in other years. Although the volatility in 2008 was lower than other years, it is found to be significant only in explaining output volatility. However, we do not observe any significant difference in macroeconomic volatility among regions in the crisis years.

As mentioned above, it is not straightforward to infer the impact of for-

eign banks during the global crisis years in each region by examining the coefficients of foreign-bank-related variables (Model III). We found that the coefficients of foreign banks significantly increased for 2009 in Asia and the coefficients of interaction between foreign bank shares and financial intermediary development indicator declines for 2009 in this region. Except for this observation, we did not find a consistent relationship in the estimated coefficients. Therefore, we estimate the coefficients of foreign banks at the 25th, 50th, and 75th percentiles of financial development in each region and in each year.

Table 6 presents the coefficients of foreign banks at different levels of financial development in each region for the whole sample period and specifically for each year during the global crisis period. Although it is found that foreign banks reduce the volatility of GDP growth rate in all regions regardless of the level of financial development, the coefficients are found to be significant at the 75th percentile in Latin America, and at the 25th and 50th percentiles of financial development in Emerging Europe and Asia. No significant impact of foreign banks shares on consumption volatility is observed for the whole sample period. The coefficients of foreign banks in the investment volatility models indicate that although foreign banks did not appear to affect investment volatility in Asia during the sample period, they reduced investment volatility significantly at the 25th percentile of financial development in Emerging Europe. Moreover, foreign banks appeared to reduce the volatility of real investments in Latin America significantly during the whole sample period at all three levels of financial development.

The significant volatility-reducing role of foreign banks in Latin American countries can be explained by the nature of foreign bank behavior in this region. As highlighted by Moguillansky et al. (2004), foreign banks in Latin

Table 6. Predicted Coefficients of Foreign Banks a Different Levels of Financial Intermediary Development by Regions

	GDP Growth Volatility						Consumption Growth Volatility					
	Model II			Model III			Model II			Model III		
	25th	50th	75th	25th	50th	75th	25th	50th	75th	25th	50th	75th
Latin America	-0.762	-1.508	-2.790 *	-0.408	-1.359	-2.993 *	-1.456	-1.790	-2.365	-1.083	-1.370	-1.862
	(0.993)	(1.143)	(1.679)	(1.050)	(1.203)	(1.720)	(1.180)	(1.268)	(1.845)	(1.175)	(1.311)	(1.893)
Asia	-0.318	-0.491	-0.844	-4.811 *	-3.553 **	-0.987	2.848	0.245	-5.063	0.898	-1.079	-5.110
	(4.940)	(3.580)	(2.828)	(2.552)	(1.707)	(2.523)	(7.196)	(5.036)	(3.783)	(4.931)	(3.291)	(3.286)
Emerging	-1.387 *	-0.654	0.003	-1.324 *	-1.048 *	-0.801	-0.913	0.292	1.372	-0.994	-0.105	0.692
Europe	(0.748)	(0.668)	(0.760)	(0.712)	(0.633)	(0.698)	(0.897)	(0.819)	(0.966)	(0.798)	(0.758)	(0.914)
2008												
Latin America				0.165	-0.722	-2.147				-0.394	-1.247	-3.590
				(2.595)	(2.514)	(2.245)				(2.117)	(2.162)	(2.474)
Asia				8.326 **	7.505 ***	3.998				-0.661	-0.034	3.539
				(3.724)	(2.850)	(3.776)				(7.074)	(5.160)	(7.506)
Emerging Europe				1.850	1.849	1.823				1.934	2.204	2.388
				(2.792)	(1.841)	(1.365)				(3.246)	(2.303)	(1.954)
2009												
Latin America				-7.145 **	-7.479 **	-4.553				-8.255 *	-8.272 *	-6.776
				(3.088)	(3.073)	(2.818)				(4.700)	(4.568)	(5.067)
Asia				29.675***	14.411***	-19.851***				27.518***	11.080	-25.183 **
				(5.714)	(4.398)	(6.628)				(8.982)	(8.150)	(11.806)
Emerging Europe				-2.659	-0.381	0.815				3.012	1.583	1.281
				(2.208)	(1.953)	(1.987)				(4.366)	(3.116)	(2.979)

Notes: We use the 25, 50 and 75 percentiles of financial intermediary development values in each region. We take the corresponding values in 2008 and 2009 in each region separately in estimating the coefficient of foreign banks for crisis years and different regions. Standard errors are in parentheses.

Table 6. (continued)

	Investment Growth Volatility					
	Model II			Model III		
	25th	50th	75th	25th	50th	75th
Latin America	-7.932 *	-11.695 **	-18.160 **	-6.556	-10.842 *	-18.206 **
	(4.312)	(5.160)	(7.793)	(4.736)	(5.558)	(8.293)
Asia	3.237	0.483	-5.132	-8.113	-6.784	-4.075
	(16.542)	(11.749)	(12.923)	(13.053)	(8.471)	(11.487)
Emerging Europe	-6.284 *	-3.040	-0.133	-5.762 *	-2.714	0.018
	(3.241)	(3.031)	(3.504)	(3.421)	(3.267)	(3.999)
2008						
Latin America				-8.858	-9.546	-5.154
				(9.785)	(9.811)	(10.283)
Asia				47.163	27.389	-31.513
				(34.140)	(26.522)	(22.044)
Emerging Europe				-5.592	-1.818	1.632
				(7.927)	(5.810)	(4.978)
2009						
Latin America				-26.358 **	-29.681 **	-29.925 **
				(13.358)	(13.565)	(13.912)
Asia				55.331 *	30.972	-23.575
				(28.356)	(23.992)	(31.111)
Emerging Europe				-12.870	-8.084	-4.529
				(10.103)	(8.763)	(8.411)

Notes: We use the 25, 50 and 75 percentiles of financial intermediary development values in each region. We take the corresponding values in 2008 and 2009 in each region separately in estimating the coefficient of foreign banks for crisis years and different regions. Standard errors are in parentheses.

Latin America have more conservative risk evaluation systems than their local counterparts. Since their entry, foreign banks have not had a very significant effect on the cost of capital of domestic banks in Latin America, and hence they have not created much competitiveness pressure for local banks. Moreover, these banks are less vulnerable to the region's domestic cycles as their effective exposure is very small in relation to their global diversification. For most of the region's economies, half or more of all foreign banks financing is denominated in local currency. Considering these factors, it is conceivable that foreign banks in Latin America helped smoothing macroeconomic volatility especially investment volatility over the whole sample period.

During the global crisis years, the impact of foreign banks on macroeconomic volatility in 2009 was different than in 2008. In general, we do not observe a significant impact of foreign banks on output, consumption, or investment volatility in 2008. The only exception is Asia, where at the 25th and 50th percentiles of financial intermediary development, the foreign bank shares significantly increased output volatility. In Asia, most lending during 2008/2009 was conducted by domestic banks, which in turn funded their operations by borrowing from foreign banks. As Chen and Wu (2014) show, in 2008, average credit growth rate slowed down in Asia more than 40%, which also decreased credit provisions by domestic banks. Even though a more severe credit crunch occurred in Emerging Europe in 2008, our findings suggest that the macroeconomic impact of the decline in credit supply in Asia contributed to a significant output volatility in 2008 among countries in that region with low or medium level of financial intermediary development.

Our findings showed different effects of foreign banks in 2009. Similar to overall findings, foreign banks in Latin America helped significantly reduce investment volatility in 2009, regardless of financial development level and

reduce output and consumption volatilities at the 25th and 50th percentile development levels. Unlike Latin America, foreign banks in Asia increased macroeconomic volatility at the 25th percentile but reduced volatility at the 75th percentile of financial intermediary development. Interestingly, foreign banks in Emerging Europe did not significantly propel macroeconomic volatility even in 2009. As emphasized earlier, Emerging Europe is different than the other regions. This region includes countries with the highest foreign bank shares and the countries, such as Latvia, which experienced the largest decline in GDP in 2009. However, in terms of financial depth, some Asian countries are far more developed than those in Emerging Europe and Latin America. For example, the largest leaps in financial development in Asia took place in China, Malaysia and Thailand and their private sector credits were around 120% of GDP between 1998 and 2011. Among these financially well-developed economies (in the 75th percentile), China and Malaysia represent two extreme cases in terms of total foreign bank claims as a percent of GDP, that is, they were the highest in Malaysia and the lowest in China. Despite relatively large foreign bank claims in Malaysia, deleveraging pressures associated with troubles in European banks did not create large vulnerability in that country. In fact, several factors worked against pressures for banks to deleverage from Malaysia, for example, their experience with past crises, large local-currency bank content (around 60%),[13] mandatory local incorporation of all commercial banks and relatively fewer claims of Eurozone banks in Malaysia relative to other regions. Despite the smaller presence of foreign banks, the nature of banking activities in China has some similarities with Malaysia especially in terms of credit and deposit denominations. Didier

[13]There has been a dramatic increase in the local currency share of foreign claims in Malaysia over the last two decades (see IMF country report, 2014).

and Schmukler (2014) document that foreign currency loans in total loans and foreign currency deposits in total deposits were around five percent in China between 2000 and 2009. Considering these factors, it is conceivable that foreign banks in financially developed Asian countries helped insulate these countries from output and consumption volatility especially in 2009.

The foreign bank coefficient in the investment volatility models indicate that foreign banks reduced the volatility of real investments in Latin America significantly during the whole sample period, including 2009, regardless of their financial intermediary development level. These findings can be explained by the results of Cull and Martinez Peria (2013) who report that the credit growth rate of foreign banks in this region in 2008 was significantly more than that of domestic banks although no significant change was observed in 2009. Even though the coefficients are negative for 2008 at all levels of financial development, they are not found to be significant. They are also found to have no significant effect on investment volatility in Asia even during the crisis period except for 2009 at the 25th percentile of financial development. Although no significant effect of foreign banks is observed in Emerging European countries during the global crisis period, these countries seemed to reduce investment volatility at a low level of financial development during the sample period.

In summary, our findings indicate that between 1998 and 2011, foreign banks significantly reduce the volatility of GDP in Latin America at high levels of financial development, in Asia at low and moderate levels of development, and in Emerging Europe at a low level of development, controlling for banking concentration, financial development, crisis years, and foreign exchange volatility. Although foreign banks did not appear to significantly affect consumption volatility in any region, they seemed to reduce investment

volatility in Latin America regardless of the country's development level and reduce it in Emerging Europe at low levels of financial development. During the crisis years, foreign banks seemed to reduce the volatility of GDP and its components at high levels of financial development in Latin America in 2009 and in Asia in 2008 and 2009, but seemed to increase GDP volatility in Asian countries at low and moderate levels of financial development in 2009. Of all countries, the global crisis most affected Emerging European countries, but foreign banks were not found to contribute significantly to macroeconomic volatility in this region during the crisis.

3.4 Robustness Checks

We employ three robustness checks to identify whether our results are consistent.[14] First, we use the squared value of residuals rather than absolute value of residuals from the standard growth model as our dependent variable in the second step (Table A.2, Panel A). The findings are similar to main results. An amplifying impact of foreign bank shares on macroeconomic volatility is observed at high levels of financial intermediary development, whereas a significant and dampening effect is observed at a low level of financial development only in the model explaining investment volatility. Foreign banks are found to have increased consumption volatility in 2008 and GDP volatility in 2008 and 2009 at 75th percentile of financial development.

Second, in order to account for possible endogeneity bias, we follow the instrumental variable (IV) approach and use a measure of institutional dis-

[14]In the Appendix, we report the predicted coefficients of the foreign bank variable using different models at the 25th, 50th, and 75th percentiles of financial intermediary development for each robustness tests. Tables A.2. and A.3. present the estimated coefficients of foreign banks for the whole sample and for the three regions, respectively.

tance based on legal origin, as in Detragiache et al. (2008), and the lagged ratio of foreign bank assets to total assets.[15] At the 25th, 50th, and 75th percentiles, we find that foreign banks amplified macroeconomic volatility regardless of the measure used (Table A2, Panel B). In 2009, they reduced the volatilities of GDP and investment significantly at low levels of financial development, and in 2008, increased the volatilities of GDP and consumption at high levels of development.

Third, we define volatility by the standard deviation of the growth rate rather than by the absolute value of residuals from the standard growth model, and estimate our models using OLS and IV estimations.[16] In these estimations, the number of observations decreased to 120, and we cannot analyze the association between foreign bank presence and macroeconomic volatility during the 2008/2009 crisis due to the computation of standard deviations with three-year rolling windows. As it is seen in Panel C of Table A.2., an increase in foreign bank shares is found to increase the standard deviation of the growth rate of consumption. Consistent with the main findings, foreign banks are found to increase consumption volatility at the 75th percentile development level. Moreover, it is found that although foreign banks increase the standard deviation of growth rates in GDP, consumption

[15]There are four legal origins in the countries analyzed in this study namely English, French, German and socialist countries.

[16]The models used in these estimations are different from the models we use in the other estimations. The dependent variable is the standard deviation of GDP, consumption, or investment growth rates over three years. Since only one model is estimated for each measure of macroeconomic volatility, the variables included in the original first-step estimation are included in the standard deviation model. We control for trade openness, foreign investments, unemployment rate, population growth, government expenditures, inflation, variability in inflation, bank concentration, volatility in real exchange rate, financial intermediary development, and lagged growth rate.

and investments, only coefficients explaining the volatilities of consumption and investment at high levels of development are significant.

The results of the robustness checks for regional models are, in general, consistent with the main findings. The predicted coefficients of foreign bank shares with their p-values are reported in Table A.3. in the appendix. For Latin American countries, we observed that foreign banks seem not to significantly affect GDP and consumption volatility but to reduce GDP and investment volatility for the whole period, including the crisis period in 2009. However, foreign banks in Asia reduced GDP volatility at low and moderate levels of financial development. During the crisis in 2009, they were found to increase of GDP and consumption volatilities at the 25th and 50th percentiles of financial development but decrease it at the 75th percentile. In general, our robustness estimates indicate that foreign banks did not significantly affect macroeconomic volatility in Emerging European countries during the sample period.

4 Conclusion

In this paper, we examine the association between macroeconomic volatility and foreign bank presence using a sample of 24 emerging-market countries over the period 1998 to 2011. We focus on the global crisis period of 2008/2009 to assess whether banks with a higher degree of foreign ownership helped these economies reduce output, consumption and investment growth volatilities. Our empirical findings show that foreign banks, in general, did not have a significant effect. Yet, they did play a role in amplifying output and consumption growth volatilities in countries with the higher levels of financial intermediary development and in mitigating investment volatility in

countries with the lower levels of financial development.

We also document that foreign banks increased output growth volatility in 2008 and 2009, and consumption volatility in 2008 at high levels of financial intermediary development, but helped reducing investment volatility at low levels of financial development in 2009. In normal times, foreign banks are expected to buffer idiosyncratic shocks or country-specific shocks more easily, but since they may have less space for diversification in the case of a large-scale shock or highly correlated shocks, we argue that they may lose their ability to absorb extreme shocks. Our findings seem to partly support this argument for crisis years, but for normal times, the smoothing effect of these banks on macroeconomic fluctuations seems to be mostly valid for emerging economies at low levels of financial development.

We also show that the significance of the effect of foreign banks on macroeconomic volatility is not homogeneous across regions and changes with financial development levels for the sample period. When the financial crisis erupted, economic activity in Emerging Europe was hit harder than any other emerging markets. However, although this region had a deeper credit crunch and broader financial swings than other regions, our findings show that foreign banks in this region did not become a significant source of macroeconomic volatility during the global crisis. On the other hand, in 2009, in Latin America these banks appeared to help significantly smooth macroeconomic volatility whereas in Asia, they increased output, consumption and investment volatility at low levels and decreased at high levels of financial development.

Several policy lessons can be learned from our analysis. First of all, a growing share of foreign banks may be a mixed blessing. As shown by Bruno and Hauswald (2013), by reducing lending inefficiencies foreign banks con-

tribute to the overall financial development of local economies. However, it seems that foreign bank penetration in financially developed economies contributes positively to macroeconomic volatility in emerging economies. There is evidence that a large foreign bank presence leads to low domestic bank profitability and high provisioning for bad loans by domestic banks in emerging countries (see, e.g., Claessens et al., 2001). Thus, increasing financial risk from competition with foreign banks must be monitored more closely in emerging economies. It is well documented that foreign banks allow easy access to abundant foreign-currency financing in emerging markets. Our analysis shows that in the regions where foreign banks funded themselves through domestic deposits and provided loans denominated in local currency, foreign banks were found to help mitigate macroeconomic volatility, as observed in Latin America. Thus, the second lesson drawn from our study can be to place some limits on foreign currency exposure or foreign-currency-denominated lending in emerging economies with high foreign bank penetration.

References

Agénor, Pierre-Richard, 2004. Macroeconomic Adjustment and the Poor: Analytical Issues and Cross-Country Evidence. Journal of Economic Survey 18, 351-408.

Aghion, P., Banerjee, A., Piketty, T., 1999. Dualism and Macroeconomic, The Quarterly Journal of Economics 114, 1359-1397.

Aghion, P., Bacchetta, P., Rancie, R., Rogoff, K., 2009. Exchange Rate Volatility and Productivity Growth: The role of Financial Development. Journal of Monetary Economics 56, 494?513.

Aghion, Philippe, Angeletos, George-Marios, Banerjee, Abhijit, Manova, Kalina, 2010. Volatility and Growth: Credit Constraints and Composition Investment. Journal of Monetary Economics 57, 246-265.

Aizenman, Joshua and Pinto, Brian, 2005. Managing Economic Volatility and Crises: A Practitioner's Guide. Cambridge University Press.

Badia, M.M., Segura-Ubiergo, A., 2014. Real Exchange Rate Appreciation in Emerging Markets: Can Fiscal Policy Help? IMF Working Papers 14/1.

Beck, T., Lundberg, M., Majnoni, G., 2006. Financial Intermediary Development and Growth Volatility: Do Intermediaries Dampen or Magnify Shocks. Journal of International Money and Finance 25, 1146-1167.

Bekaert, G., Harvey, C.R., Lundblad, C., 2005. Does financial liberalization spur growth? Journal of Financial Economics 77 (1), 3-55.

Bekaert, G., Harvey, C.R., Lundblad, C., 2006. Growth volatility and financial liberalization. Journal of International Money and Finance, Elsevier 25, 370-403.

Breen, R., García-Peñalosa, C., 2005. Income Inequality and Macroeconomic Volatility: An Empirical Investigation. Review of Development Economics 9,380-398.

Bremus, F., Buch, C.M., 2014. Banking Market Structure and Macroeconomic Stability: Are Low Income Countries Special? Mimeo.

Bruno Micheal, Easterly, William, 1998. Inflation crises and long-run growth. Journal of Monetary Economics 41, 3-26.

Buch, C.M., Neugebauer, K., 2011. Bank-Specific Shocks and the Real Economy. Journal of Banking and Finance 35, 2179-2187.

Bugamelli, M., Paternó, F., 2011. Output Growth Volatility and Remittances. Economica 78, 480-500.

Caballero, R.J., Krishnamurthy, A., 2001. International and Domestic Collateral Constraints in a Model of Emerging Market Crises. Journal of Monetary Economics 48, 513-548.

Cetorelli, N., Gambera, M. 2001. Banking Market Structure, Financial Dependence and Growth: International Evidence from Industry Data. The Journal of Finance 56, 617-648.

Cetorelli, N., Goldberg, L.S., 2011. Global Banks and International Shock Transmission: Evidence from the Crisis. IMF Economic Review 59, 41-76.

Chen, G., Wu, Y., 2014. Bank Ownership and Credit Growth in Emerging Markets During and After the 2008-09 Financial Crisis - A Cross-Regional Comparison. IMF Working Paper, WP/14/171.

Claessens, S., Demirguc-Kunt, A., Huizinga, H., 2001. How Does Foreign Entry Affect Domestic Banking Markets? Journal of Banking and Financ 25, 891-911.

Claessens, S., Van Horen, N., 2014. Foreign Banks: Trends and Impact. Journal of Money, Credit and Banking 46(s1), 295-326.

Claessens, S., Juan A. Marchetti, J.A., 2013. Global Banking Regroups. Finance & Development 50(4), 14-17.

Clarke, G.R.G., Cull, R., Martinez Peria, M.S., 2006. Foreign Bank Participation and Access to Credit Across Firms in Developing Countries. Journal of Comparative Economics 34, 774-795.

Cull, R., Cull and Martínez Pería, M.S., 2013. Bank ownership and lending patterns during the 2008-2009 financial crisis: Evidence from Latin America and Eastern Europe. Journal of Banking and Finance 37(12), 4861-4878.

De Haas, Ralph, van Lelyveld, Iman, 2014. Multinational banks and the global financial crisis: Weathering the perfect storm? Journal of Money, Credit, and Banking 46(s1), 333-364.

Denizer, C.A., Iyigun, M.F., Owen, A.L., 2002. Finance and Macroeconomic Volatility The B.E. Journal of Macroeconomics 2, 1-32.

Detragiache, E., Tressel, T., Guptthe, P., 2008. Foreign Banks in Poor Countries: Theory and Evidence. Journal of Finance 67, 2123-2160.

Didier, T., Schmukler, S.L., 2014. Financial development in Asia : Beyond Aggregate Indicators. World Bank Policy Research Working Paper Series 6761.

Dynan, K.E., Elmendorf, D.W., Sichel, D.E., 2006. Can Financial Innovation Help to Explain the Reduced Volatility of Economic Activity? Journal of Monetary Economics 53, 123-150.

Easterly, W., Islam, R. and Stiglitz, J.E. (2001) Shaken and Stirred: Explaining Growth Volatility. In: The World Bank's 12th Annual Bank Conference on Developement Economics, The International Bank for Reconstruction and Development, World Bank, pp 191-211.

Goldberg, Linda S., Dages, B. Gerard, Kinney, Daniel, 2000. Foreign and domestic bank participation in emerging markets: Lessons from Mexico and Argentina. NBER Working Papers 7714.

Gormley, T.A., 2010. The Impact of Foreign Bank Entry in Emerging Markets: Evidence from India. Journal of Financial Intermediation 19, 26-51.

Gormley, T.A., 2014. Costly Information, Entry, and Credit Access, Journal of Economic Theory, Forthcoming.

Hnatkovska, Viktoria V., Loayza, Norman, 2005. Volatility and growth. In: Aizenman, J., Pinto B. (Eds.), Managing Economic Volatility and Crises: A Practitioner's Guide. Cambridge University Press, Cambridge.

Jayaratne, J., Strahan, P., 1996. The Finance-Growth Nexus: Evidence from Bank Branch Deregulation. Quarterly Journal of Economics 101, 639-670.

IMF Country Report. 2014. Technical Note on Banking System Spillovers on Malaysia, No. 14/95.

Kamil, H., Rai, K., 2010. The Global Credit Crunch and Foreign Banks' Lending to Emerging Markets: Why Did Latin America Fare Better? IMF Working Paper, WP/10/102.

Kose, M.A., Prasad, E. S., 2010. Come of Age EmergingMarkets. Finance & Development, 47(4), 6-10.

Laeven, Luc, Valencia, Fabián, 2012. Systemic Banking Crises Database: An Update. IMF Working Paper, WP/12/163.

Levine R., Loayza N., Beck, T., 2000. Financial Intermediation and Growth: Causality and Causes. Journal of Monetary Economics 46, 31-77.

Loayza, Norman, Rancière, Romain, Servén, Luis, Ventura, Jaume, 2007. Macroeconomic Volatility and Welfare in Developing Countries: An Introduction. The World Bank Economic Review 21, 343-357.

Magud, N., Sosa, S., 2010. When and Why Worry About Real Exchange Rate Appreciation? The Missing Link between Dutch Disease and Growth. IMF Working Paper 10/271.

Moguillansky, G., Studart, R., Vergara, S., 2004. Foreign banks in Latin America: A paradoxical result. CEPAL Review 82, 19-34.

Morgan, Donald P., Rime, Bertrand, Strahan, Philip E., 2004. Bank integration and state business cycles. Quarterly Journal of Economics 119 (4), 1555-1584.

Morgan, Donald P. and Strahan, Philip E., 2004. Foreign bank entry and business volatility: Evidence from U.S. states and other countries. In Banking Market Structure and Monetary Policy, A. Ahumada and J.R. Fuentes (eds). Central Bank of Chile, Santiago, Chile.

Ramey, G., Ramey, V.A, 1995. Cross-Country Evidence on the Link between Volatility and Growth. American Economic Review 85, 1138-1151.

Rosengren, E.S., 2011. "Defining Financial Stability, and Some Policy Implications of Applying the Definition." Keynote Remarks at the Stanford Finance Forum Graduate School of Business, Stanford University, June 3.

Schnabl, P., 2012. The International Transmission of Bank Liquidity Shocks: Evidence from an Emerging Market. Journal of Finance 67, 897-932.

Shleifer, Andrei and Robert W Vishny. 2010. Unstable Banking. Journal of Financial Economics 97(3), 306-318.

Sims, Christopher A., 1980. Macroeconomics and reality. Econometrica 48, 1-48.

Tong, H., Wei, S.J., 2011. The Composition Matters: Capital Inflows and Liquidity Crunch During a Global Economic Crisis. Review of Financial Studies 24, 2023-2052.

Vogel, U., Winkler, A., 2012. Do Foreign Banks Stabilize Cross-Border Bank Flows and Domestic Lending in Emerging Markets? Evidence from the Global Financial Crisis. Comparative Economic Studies 54, 507-530.

Wagner, W., 2010, Diversification at Financial Institutions and Systemic Crises. Journal of Financial Intermediation 19, 373-386.

Wolf, H., 2005. "Volatility: Definitions and consequences." In J. Aizenmann and B. Pinto, eds., Managing Economic Volatility and Crises. Cambridge, United Kingdom: Cambridge University Press.

Table A.1. First Stage Growth Panel Regressions

	Dependent Variable: Growth in Real		
	GDP	Private Consumption	Investment
Intercept	40.464	112.015	316.857
	(64.697)	(85.569)	(320.313)
Trade Openness	6.656 ***	6.501 ***	28.185 ***
	(1.370)	(1.782)	(6.796)
Capital Flows to GDP	0.028	0.039	0.038
	(0.047)	(0.062)	(0.234)
Unemployment Rate	-0.279 ***	-0.504 ***	-0.420
	(0.100)	(0.133)	(0.480)
Growth in Population	0.017	0.003	1.218
	(0.836)	(1.105)	(4.141)
Years in Secondary School	4.445	-1.401	-7.838
	(5.304)	(7.019)	(26.300)
External Debt to GDP	-3.172 ***	-3.785 ***	-10.070 ***
	(0.695)	(0.906)	(3.374)
Government to GDP	-0.517	-3.625 *	5.836
	(1.435)	(1.895)	(7.132)
Log(Expected Life)	-13.181	-23.714	-86.586
	(14.659)	(19.362)	(72.599)
Log(1+Inflation)	-4.393 ***	-8.439 ***	-14.231 **
	(1.317)	(1.698)	(6.579)
Local Crisis Dummy	-5.131 ***	-4.863 ***	-23.702 ***
	(0.912)	(1.204)	(4.519)
$Log(Growth)^{\dagger}_{-1}$	0.098 *	0.135 **	-0.052
	(0.054)	(0.053)	(0.056)
Year and Country Fixed Effects	Yes	Yes	Yes
Adjusted R^2	0.555	0.462	0.304
F-statistic	10.180***	7.310 ***	4.210 ***
N	355	355	355

Notes: For the consumption and investment growth models, lagged levels of real consumption and investment are used respectively. The numbers in parentheses are standard errors. $*$, $**$ and $***$ denote statistical significance at the 10%, 5% and 1% levels, respectively. The coefficients of country and year fixed effects are not reported to save space.

Table A.2. Robustness Checks - Predicted Coefficients of Foreign Banks at Different Levels of Financial Intermediary Development

The 25th, 50th and 75th columns indicate the predicted coefficient of the *Foreign* variable at the 25th, 50th, and 75th percentile of the private-credit-to-GDP ratio. The percentile values are calculated for the period 1998-2011 for the rows Model I, Model II, and Model III for 1998-2011, and the corresponding year values are used for the rows 2008 and 2009. Panel A presents the predicted coefficients of the foreign bank variable in the models estimated using the squared residuals of the model in Equation (1) as dependent variables. In Panel B, the predicted coefficients are obtained from IV estimations, where legal origin and the lagged value of foreign bank shares in the banking sector are used as IVs. The predicted foreign bank coefficients reported in Panel C are obtained from the model by using the standard deviation of the growth rate of the macroeconomic variables over a three-year period as the dependent variable. In this model, we control for trade openness, foreign investments, unemployment rate, population growth, government expenditures, inflation, variability in inflation, bank concentration, volatility in real exchange rate, financial intermediary development, and lagged growth rate. The p-values are reported in parentheses. The coefficients and p-values reported under Model I are the predicted coefficients and their p-values for the whole sample regardless of the financial development level of a country. They are reported under 25th percentile column to save space.

	GDP			Private Consumption			Investment		
	Percentile of Financial Intermediary Development								
	25th	50th	75th	25th	50th	75th	25th	50th	75th
Panel A - Squared Residuals									
Model I									
1998-2011	3.423			12.755			2.590		
	(0.302)			(0.119)			(0.970)		
Model II									
1998-2011	-2.653)	2.435	12.441	-0.051	10.673	31.762	-141.080	-20.769	215.833
	(0.428)	(0.434)	(0.029)	(0.995)	(0.176)	(0.009)	(0.067)	(0.741)	(0.072)
Model III									
1998-2011	-2.798	-1.025	2.460	-1.048	4.730	16.094	-116.639	-2.982	220.537
	(0.334)	(0.643)	(0.440)	(0.831)	(0.282)	(0.020)	(0.153)	(0.969)	(0.148)
2008	17.198	18.551	21.404	22.251	28.367	40.242	-160.280	-37.707	199.279
	(0.288)	(0.108)	(0.032)	(0.353)	(0.115)	(0.026)	(0.222)	(0.735)	(0.217)
2009	-15.813	31.089	46.711	22.401	36.199	49.719	-421.854	-95.126	185.693
	(0.410)	(0.196)	(0.085)	(0.746)	(0.555)	(0.481)	(0.157)	(0.773)	(0.586)

	GDP			Private Consumption			Investment		
	Percentile of Financial Intermediary Development								
	25th	50th	75th	25th	50th	75th	25th	50th	75th
Panel B - IV Estimation									
Model I									
1998-2011	0.613			1.310			0.901		
	(0.155)			(0.05)			(0.645)		
Model II									
1998-201	-0.301	0.396	1.767	-0.245	0.941	3.273	-2.813	0.020	5.592
	(0.526)	(0.324)	(0.006)	(0.728)	(0.141)	(0.000)	(0.165)	(0.991)	(0.067)
Model III									
1998-2011	-0.204	0.149	0.844	-0.287	0.577	2.275	-1.867	0.595	5.437
	(0.641)	(0.673)	(0.116)	(0.626)	(0.264)	(0.003)	(0.376)	(0.770)	(0.155)
2008	1.909	2.394	3.289	1.861	2.770	4.536	-1.475	1.288	6.585
	(0.359)	(0.124)	(0.024)	(0.449)	(0.159)	(0.023)	(0.777)	(0.787)	(0.281)
2009	-3.334	2.260	4.364	-0.484	1.187	3.102	-15.690	-4.354	2.875
	(0.093)	(0.333)	(0.087)	(0.902)	(0.755)	(0.472)	(0.029)	(0.609)	(0.745)
Panel C - Standard Deviation as Volatility Measure									
OLS Estimations:									
Model I	1.550			3.582			11.849		
	(0.275)			(0.038)			(0.118)		
Model II	0.439	1.189	2.665	1.113	2.717	5.870	5.174	9.245	17.253
	(0.763)	(0.386)	(0.147)	(0.444)	(0.070)	(0.010)	(0.555)	(0.239)	(0.032)
IV Estimations:									
Model I	3.821			7.634			8.739		
	(0.248)			(0.083)			(0.635)		
Model II	0.798	2.340	5.373	3.206	4.892	8.207	-17.700	-10.805	2.756
	(0.781)	(0.419)	(0.114)	(0.339)	(0.146)	(0.041)	(0.312)	(0.498)	(0.851)

Table A.3. Robustness Checks - Predicted Coefficients of Foreign Banks at Different Levels of Financial Intermediary Development by Regions.

The 25th, 50th, and 75th columns indicate the estimated coefficient of the *Foreign* variable at the 25th, 50th, and 75th percentile of the private-credit-to-GDP ratio. The percentile values are estimated for each region separately. Panel A presents the predicted coefficients of the foreign bank variable in the models estimated, using the squared residuals of the model in Equation (1) as dependent variables. In Panel B, the predicted coefficients are obtained from IV estimations, where legal origin and the lagged value of foreign bank shares in the banking sector are used as IVs. The predicted foreign bank coefficients reported in Panel C are obtained from the model by using the standard deviation of the growth rate of the macroeconomic variables over a three-year period as the dependent variable. In this model, we control for trade openness, foreign investments, unemployment rate, population growth, government expenditures, inflation, variability in inflation, bank concentration, volatility in real exchange rate, financial intermediary development, and lagged growth rate. p-values are reported in parentheses. The coefficients and p-values reported under Model I are the predicted coefficients and their p-values for the whole sample regardless of the financial development level of a country. They are reported under 25th percentile column to save space.

	GDP			Private Consumption			Investment		
	Percentile of Financial Intermediary Development								
	25th	50th	75th	25th	50th	75th	25th	50th	75th
Panel A - Squared Residuals									
Model I									
Latin America	-10.275			-14.140			-314.176		
	(0.214)			(0.145)			(0.088)		
Asia	0.176			-37.865			-99.497		
	(0.993)			(0.347)			(0.742)		
Emerging Europe	1.273			11.122			-35.500		
	(0.806)			(0.189)			(0.798)		
Model II									
Latin America	-11.290	-18.700	-31.431	-15.841	-18.241	-22.364	-340.160	-506.129	-791.260
	(0.197)	(0.111)	(0.088)	(0.147)	(0.104)	(0.205)	(0.077)	(0.063)	(0.076)
Asia	17.744	8.855	-9.270	1.254	-17.494	-55.718	290.190	94.338	-304.971
	(0.651)	(0.752)	(0.630)	(0.989)	(0.777)	(0.097)	(0.593)	(0.798)	(0.471)
Emerging Europe	-7.954	-1.825	3.667	-3.852	9.622	21.696	-253.887	-105.670	27.153
	(0.126)	(0.707)	(0.538)	(0.694)	(0.282)	(0.050)	(0.070)	(0.376)	(0.836)

Table A.3. (continued)

	GDP			Private Consumption			Investment		
	Percentile of Financial Intermediary Development								
	25th	50th	75th	25th	50th	75th	25th	50th	75th
Panel A - Squared Residuals									
Model III									
Latin America									
1998-2011	-8.576	-17.603	-33.112	-10.197	-11.956	-14.978	-291.669	-479.214	-801.412
	(0.351)	(0.161)	(0.097)	(0.367)	(0.363)	(0.454)	(0.151)	(0.098)	(0.099)
2008	-7.634	-14.112	-21.293	-7.410	-11.357	-21.527	-483.348	-548.929	-472.631
	(0.649)	(0.431)	(0.223)	(0.647)	(0.516)	(0.346)	(0.186)	(0.176)	(0.275)
2009	-60.234	-65.437	-52.697	-114.327	-114.895	-109.118	-987.730	-1120.857	-1041.073
	(0.021)	(0.016)	(0.033)	(0.094)	(0.084)	(0.122)	(0.062)	(0.051)	(0.069)
Asia									
1998-2011	-15.129	-13.256	-9.437	-15.037	-25.562	-47.022	-41.743	-136.428	-329.476
	(0.385)	(0.221)	(0.531)	(0.809)	(0.517)	(0.047)	(0.925)	(0.589)	(0.360)
2008	51.782	43.271	16.772	-23.792	-15.590	17.628	1411.330	880.129	-587.356
	(0.069)	(0.060)	(0.459)	(0.707)	(0.716)	(0.682)	(0.214)	(0.313)	(0.370)
2009	253.291	133.552	-133.688	235.219	51.075	-357.360	1926.138	1116.270	-670.832
	(0.000)	(0.001)	(0.024)	(0.070)	(0.687)	(0.073)	(0.101)	(0.284)	(0.541)
Emerging Europe									
1998-2011	-7.690	-6.034	-4.551	-4.710	3.522	10.899	-250.564	-92.871	48.445
	(0.091)	(0.156)	(0.352)	(0.488)	(0.637)	(0.271)	(0.093)	(0.472)	(0.751)
2008	22.191	18.831	15.350	28.008	29.183	29.575	-240.661	-93.192	38.004
	(0.285)	(0.172)	(0.136)	(0.364)	(0.167)	(0.090)	(0.259)	(0.560)	(0.794)
2009	-11.341	8.557	18.683	63.077	37.772	29.260	-313.241	-210.502	-95.221
	(0.613)	(0.667)	(0.375)	(0.417)	(0.472)	(0.553)	(0.471)	(0.567)	(0.784)

Table A.3. (continued)

	GDP			Private Consumption			Investment		
	Percentile of Financial Intermediary Development								
	25th	50th	75th	25th	50th	75th	25th	50th	75th
Panel B - IV Estimation									
Model I									
Latin America	-0.449			-1.114			-5.569		
	(0.625)			(0.337)			(0.168)		
Asia	-0.388			-0.463			1.853		
	(0.891)			(0.897)			(0.858)		
Emerging Europe	-0.190			0.618			-0.094		
	(0.780)			(0.464)			(0.977)		
Model II									
Latin America	-0.911	-1.578	-2.725	-1.087	-1.477	-2.146	-6.831	-10.485	-16.763
	(0.379)	(0.171)	(0.112)	(0.394)	(0.268)	(0.259)	(0.133)	(0.046)	(0.037)
Asia	-1.379	-0.857	0.207	7.128	3.311	-4.473	9.197	5.554	-1.873
	(0.803)	(0.827)	(0.944)	(0.347)	(0.527)	(0.237)	(0.630)	(0.675)	(0.886)
Emerging Europe	-1.581	-0.702	0.085	-0.996	0.209	1.290	-6.047	-2.507	0.665
	(0.037)	(0.293)	(0.910)	(0.319)	(0.811)	(0.191)	(0.081)	(0.419)	(0.849)
Model III									
Latin America									
1998-2011	-0.494	-1.319	-2.735	-0.858	-1.141	-1.628	-5.072	-9.334	-16.657
	(0.655)	(0.275)	(0.113)	(0.518)	(0.427)	(0.418)	(0.328)	(0.102)	(0.049)
2008	0.040	-0.628	-1.532	-0.424	-1.221	-3.384	-7.178	-7.740	-2.970
	(0.987)	(0.797)	(0.490)	(0.841)	(0.574)	(0.174)	(0.448)	(0.417)	(0.765)
2009	-7.658	-7.861	-4.685	-8.038	-8.050	-6.528	-26.600	-30.065	-31.501
	(0.002)	(0.002)	(0.085)	(0.039)	(0.035)	(0.216)	(0.013)	(0.008)	(0.030)
Asia									
1998-2011	-6.442	-4.131	0.581	3.680	1.122	-4.093	-1.192	-1.097	-0.903
	(0.028)	(0.029)	(0.824)	(0.527)	(0.771)	(0.213)	(0.940)	(0.915)	(0.937)
2008	6.350	6.689	5.645	0.444	0.606	3.332	56.355	35.029	-27.318
	(0.137)	(0.045)	(0.145)	(0.953)	(0.914)	(0.677)	(0.136)	(0.234)	(0.205)
2009	27.068	12.478	-20.481	29.250	11.846	-26.457	55.225	27.415	-34.587
	(0.000)	(0.014)	(0.004)	(0.009)	(0.182)	(0.023)	(0.089)	(0.316)	(0.350)
Emerging Europe									
1998-2011	-1.522	-1.040	-0.609	-1.177	-0.204	0.669	-5.488	-2.159	0.824
	(0.031)	(0.099)	(0.380)	(0.175)	(0.798)	(0.475)	(0.134)	(0.510)	(0.831)
2008	1.883	2.079	2.229	1.734	2.123	2.416	-4.724	-0.797	2.779
	(0.514)	(0.285)	(0.107)	(0.612)	(0.385)	(0.219)	(0.555)	(0.893)	(0.582)
2009	-3.263	-0.768	0.618	2.376	1.040	0.818	-14.994	-9.913	-6.100
	(0.129)	(0.692)	(0.757)	(0.593)	(0.740)	(0.783)	(0.137)	(0.268)	(0.482)

Table A.3. (continued)

	GDP			Private Consumption			Investment		
	Percentile of Financial Intermediary Development								
	25th	50th	75th	25th	50th	75th	25th	50th	75th
Panel C - Standard Deviation as Volatility Measure									
Model I									
Latin America	4.077			-0.906			11.934		
	(0.080)			(0.791)			(0.383)		
Asia	-3.093			-0.661			-9.333		
	(0.552)			(0.918)			(0.631)		
Emerging Europe	-0.675			2.046			3.490		
	(0.637)			(0.286)			(0.653)		
Model II									
Latin America	3.012	1.235	-1.819	-2.451	-3.334	-4.851	7.981	0.509	-12.327
	(0.240)	(0.655)	(0.611)	(0.468)	(0.373)	(0.321)	(0.560)	(0.969)	(0.440)
Asia	-4.311	-3.161	-2.131	-2.804	-0.740	1.110	-10.606	-6.528	-2.874
	(0.011)	(0.023)	(0.133)	(0.161)	(0.668)	(0.564)	(0.285)	(0.427)	(0.709)
Emerging Europe	-6.503	-3.165	3.638	-5.144	-1.271	6.625	-14.654	-9.327	1.533
	(0.172)	(0.492)	(0.678)	(0.458)	(0.824)	(0.504)	(0.427)	(0.584)	(0.969)