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Credit to Private Sector, Interest Spread and Volatility in Credit-Flows: Do Bank Ownership and Deposits Matter?

Hamid Rashid

Abstract

With bank-level data from 81 developing countries, the paper shows that increased foreign bank presence is associated with increased reliance on non-deposit based funding, which leads to higher interest rate spreads, less credit to the private sector, and higher volatility in bank loans. Foreign bank entry significantly reduces domestic banks' share of deposits while foreign banks typically allocate less of their assets and deposits to lending. As domestic banks lose their deposit base, they rely on non-deposit based funding, but its higher costs and uncertainty force domestic banks to reduce their lending activities.

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Credit to Private Sector, Interest Spread and Volatility in Credit-Flows: Do Bank Ownership and Deposits Matter?

Hamid Rashid

1. Introduction

Proponents of financial market liberalization have argued that increased presence of foreign banks in developing countries would reduce the cost of financial intermediation, increase the availability of credit and foster financial development. Competition from foreign banks—it was claimed—would increase financial sector efficiency, reduce bank concentration, increase access to credit and reduce the cost of financial intermediation and enhance host countries' access to international capital. A large body of empirical literature, however, finds evidence that increased foreign bank participation is associated with weak financial development, higher interest rate spreads and lower levels of credit to the private sector. These studies largely rely on different variations of cherry-picking models to explain why foreign bank presence does not necessarily increase availability of credit or promote financial development.

This paper presents an alternative explanation as to why foreign bank presence does not lead to financial development, taking into account the adverse effects of foreign bank on the market share of deposits of domestic banks—an issue that has largely been overlooked in the literature. Our paper shows that while foreign banks manage to take a significant share of deposits from domestic banks, they typically allocate a smaller fraction of those deposits to lending activities. As domestic banks lose their deposit base, they are forced to rely on non-deposit-based funding to retain their existing level of lending. But higher costs and uncertainty associated with non-deposit-based funding sources force domestic banks to reduce their lending activities.

With bank level data from 81 developing and emerging countries, the paper shows that increased foreign bank presence is associated with increased reliance on non-deposit-based funding, which contributes to higher interest spreads, and lower levels of credit to the private sector. Moreover, the paper shows that non-deposit-based funding increases the volatility of bank loans.

The presence of foreign banks, and their growing market shares, has often been the most visible feature of financial market liberalization in many developing countries. Since the 1990s, the market share of foreign banks—measured as the share of total banking sector assets of a country—has grown significantly, especially in Eastern Europe, Latin America and Sub Saharan Africa. Advocates of financial market liberalization argue that foreign banks force their domestic counterparts to reduce operational inefficiencies, improve screening and lending standards and make the host country banking sector, on the whole, more competitive. It is further suggested that foreign banks strengthen supervisory, regulatory and legal frameworks by demanding better systems of regulation and supervision. In addition, they help reduce corruption and favoritism in lending decisions, as they typically do not engage in directed or relation-based lending. It is further argued that with better economies of scale, access to capital abroad and improved risk diversification strategies, foreign banks can make the host country banking sector more stable and resilient to shocks.

A body of literature, on the other hand, argues that foreign banks face considerable informational and locational disadvantages, which limit their ability to extend loans to creditworthy borrowers, especially small- and medium-sized enterprises (SMEs). Efficiency and technological advantages that foreign banks typically enjoy do not sufficiently offset the informational disadvantages they face as outsiders. Foreign banks, many argue, are also more likely to engage in pro-cyclical, short-term and consumer lending activities, which can intensify "boom-bust" lending cycles in the host country. Others suggest that foreign banks increase financial instability and volatility in the host country, by providing avenues for capital flight during an economic downturn, or reducing lending when confronted with economic shocks in their home country. Still others have shown that increased competition from foreign banks makes domestic banks less profitable, shrinking their equity base and lending capacity. There are also claims that increased foreign bank penetration may reduce the franchise value of domestic banks, compelling them to gamble on risky projects. Foreign banks, with their global operations and complex accounting and reporting systems, may also increase the regulatory burden of the host country regulators.

In this paper, we examine whether the so-called "cherry-picking" effect of foreign bank presence adequately explains the higher interest rate spreads and lower level of credit to the private sector. These models assume that foreign banks primarily compete with domestic banks in the lending market. In these setups, foreign lenders capture the low-risk borrowers, who usually meet their accounting standards and procedures, leaving domestic banks with a larger pool of risky borrowers with a higher probability of default. This, in turn, increases the monitoring costs of the domestic banks, requiring them to raise lending rates. Higher borrowing costs then force many creditworthy entrepreneurs to opt out of borrowing, explaining lower level of credit in the economy.

Cherry-picking models provide a plausible, albeit partial, explanation as to why increased foreign bank presence is associated with reduced credit to the private sector. But they require a number of unrealistic assumptions, including that banks have unlimited access to funds and that the supply of loanable funds is fully elastic. In reality, the deposit base of a country is finite and changes rather slowly over time. Also, foreign banks typically do not lend in the host country with funds imported from abroad. With efficient cost structures, brand names and reputational advantages and better service quality, foreign banks can manage to take a sizeable portion of deposits away from domestic banks.

Cherry-picking models assume that the banking sector of the host country is fully competitive. But in most developing countries, the banking sector experiences monopolistic competition, with banks offering differentiated products and services to their clients. Domestic banks, in particular, maintain long-standing relationship with their borrowers and offer specialized financial products that meet specific requirements of their borrowers. It is unrealistic to assume that foreign banks can offer competitive rates to a large set of domestic borrowers that can sufficiently offset the relational advantages that they enjoy with their long-term domestic bank partners. It requires us to assume that borrowers can switch their lending from domestic to foreign banks rather costlessly. Given the informational disadvantages they face in lending, foreign banks, we believe, find it more attractive to compete in the deposit market, where informational disadvantages pose no problem in attracting deposits.

These cherry-picking models also assume that banks can *ex ante* ascertain the cost of monitoring (or screening) risky borrowers and accordingly offer a menu of interest rate contracts that internalize the higher monitoring costs. But monitoring cost can vary not only among borrowers but also with respect to the same borrower during the duration of a loan contract. If a borrower faces an adverse shock and finds it difficult to

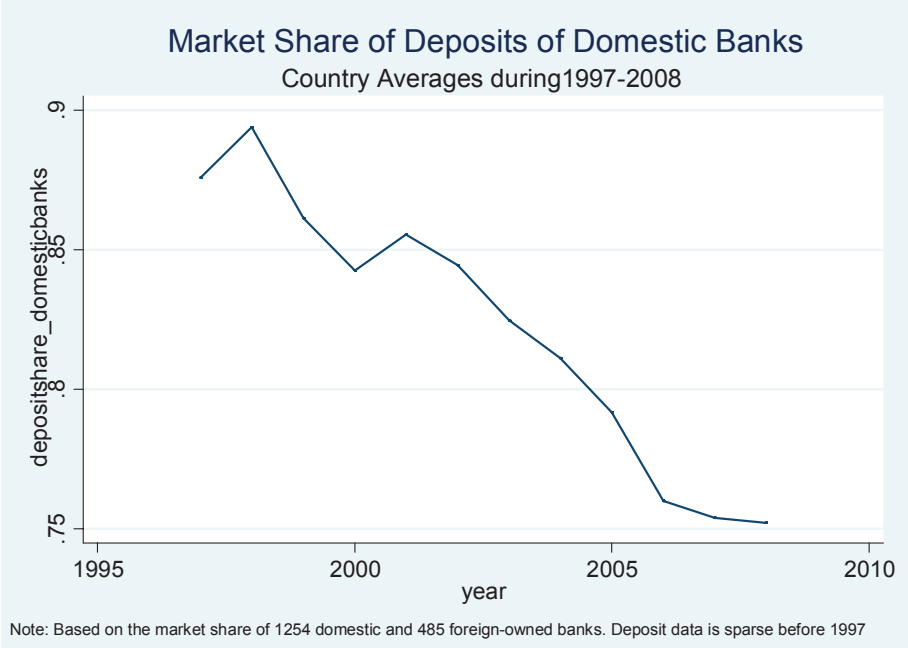
pay an installment, banks may require increased monitoring to reduce the probability of a default. Hence, banks cannot fully internalize the monitoring cost in the menu of loan contracts they offer to borrowers with different probability of defaults.

In this paper, we first show that foreign banks are fundamentally different from domestic banks in the sense that they are less inclined to engage in lending activities in the host country. Their portfolio structure is significantly different from that of their domestic counterparts as they allocate more of their resources in non-lending activities. We find that the average loan-to-asset ratio of foreign banks is lower than that of domestic banks and the difference is statistically highly significant in our sample of 81 countries (Table B and Table I). The portfolio composition of foreign banks partly explains the decline in credit to the private sector, as foreign banks typically divert deposits to non-lending, high-return activities such as investments in securities and trading activities.

Second, we offer evidence that the growth rate of foreign banks' market share of deposits is significantly higher than that for domestic banks. This confirms that foreign banks gain their market share at the expense of their domestic counterparts (Graph I and Table II). This also challenges the myth that foreign banks use their own capital—funds that they bring from outside the country—to finance their lending and non-lending activities. We also find evidence that the deposit share of foreign banks is, on average, significantly higher than that of domestic banks (Table B). These findings confirm that domestic banks face stiff competition from foreign banks in the deposit market.

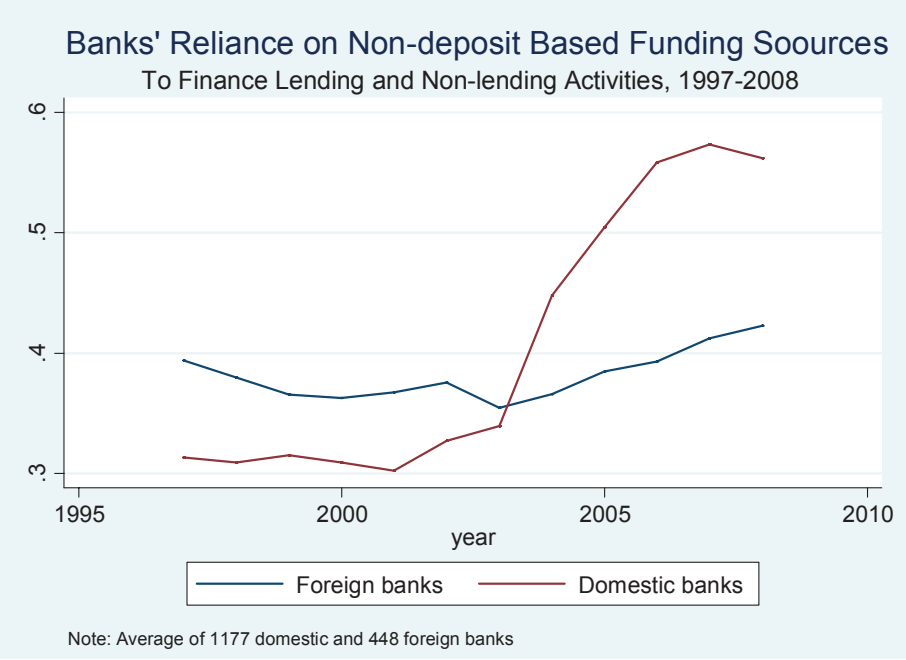
Third, the paper presents evidence that, as foreign banks increase their share of deposits, domestic banks are forced to increase their reliance on non-deposit-based funding to finance their lending (and non-lending) activities (Graph II). Non-deposit-based funding typically involves inter-bank borrowing, including borrowing from foreign banks. We find evidence that the deposit share of foreign banks is positively and significantly correlated to the country average reliance on non-deposit-based funding (Table IV).

Graph I: Deposit shares of domestic banks



Note: Based on the market share of 1254 domestic and 485 foreign-owned banks. Deposit data is sparse before 1997

Graph II: Increased Reliance on Non-deposit Based Funding



Domestic banks—as they lose their deposit base to foreign banks and are required to raise funds through inter-bank borrowing—face higher borrowing costs, which in turn, increase their lending rates. As lending rates go up, banks, on average, attract a riskier pool of projects that require higher returns on investment. Higher interest rates also force many creditworthy borrowers to opt out of borrowing, explaining the fall in domestic credit to the private sector. We find evidence that the share of non-deposit-based funding is positively and significantly correlated to interest spreads (Table V). We also find evidence that the share of deposits held in foreign banks is negatively correlated to the volume of credit to the private sector (Table VI).

Finally, the paper presents evidence that loans from foreign banks are more volatile than loans from domestic banks, an issue that has so far been ignored in the literature on foreign banks. Bank-level data show that the loan to total asset ratio of foreign banks is more volatile than it is for domestic banks (Table B and Table III). The difference is statistically significant. The regression analysis confirms that foreign ownership of banks is a significant predictor of higher volatility in loans to total asset ratio. We also find evidence that non-deposit-based funding is strongly and positively correlated to bank-level volatility in the loans to total asset ratio. Our macro-level data show that average volatility in the loans to total asset ratio is positively correlated to the country average of non-deposit-based funding (Table VII). We conclude that increased reliance on non-deposit-based funding, such as inter-bank borrowing, makes lending less predictable. It also forces banks to provide more short-term loans. Both these factors explain why the loans to total asset ratio is more volatile when banks increase their reliance on non-deposit-based funding.

The rest of the paper is organized as follows: Section II presents a review of relevant literature. Section III explains the limitations of cherry-picking models and presents an alternative explanation as to why increased foreign bank presence does not lead to financial development. Section IV describes the data source and provides a few summary statistics. Section V reports the regression results and analyzes key findings. The final section makes a few concluding remarks.

2. Literature Review

Proponents of financial market liberalization maintain that financial openness—easing of entry barriers in the banking sector and removal of restrictions on international capital flows—enhances financial development, which in turn, promotes economic growth and welfare.[1] A large body of empirical literature demonstrates the positive correlation between the development of a country's financial sector and its economic growth.[2] Levine (1996) argues that foreign banks promote financial development in the host country directly, by providing high quality banking services, and indirectly—by forcing domestic banks to improve quality and reduce costs; by encouraging the upgrading of accounting, auditing and rating institutions; and by intensifying pressures on governments to improve the legal, supervisory and regulatory practices.[3] We review four strands of literature on foreign banks that focus on: (a) efficiency gains; (b) effects on deposits; (c) effects on lending and availability of credit; and (d) volatility and instability in supply of credit.

Efficiency gains

Although we do not address the efficiency-gains effects of foreign bank entry in this paper, it is a pertinent topic to fully understand how foreign bank presence affects the terms and availability of credit. Claessen*, et al.* (1998),[4] using bank level data from 80 countries, show that foreign bank entry enables domestic banks to cut costs as they acquire superior banking techniques from their foreign competitors. They also show that foreign bank entry significantly reduces domestic banks' profitability, non-interest income and overall expenses. Their data also show that foreign banks are less profitable than domestic banks in developed countries, as they are unlikely to enjoy a technological edge over their domestic counterparts. These findings allow Claessen*, et al.* (1998) to conclude that in developing countries, foreign banks enjoy strong technological and efficiency advantage, which can be large enough to overcome any informational disadvantage they may encounter as outsiders.

Bayraktar and Wang (2004), contradicting the findings of Claessens*, et al.* (1998), find no statistically significant correlation between foreign banks' share in the host country and the performance of domestic banks. They find that domestic banks' performance is, in fact, driven by the equity/asset ratio, the overhead cost ratio, and several macroeconomic factors. Levy-Yeyati and Micco (2003),[5] using bank level data from eight Latin American countries, show that foreign bank penetration actually weakened banking sector competition in these countries.

Effects on deposits

The literature on how foreign bank entry affects the deposit share of domestic banks is rather scant. One line of literature assumes that foreign banks bring new lending resources and do not depend on domestic deposits to support their lending activities in the host country. A second strand of literature, albeit less explicit,

1 Please see Rajan, R. G., and L. Zingales (2003). "The Great Reversals: The Politics of Financial Development in the 20th Century". *Journal of Financial Economics*, vol. 69.

2 Please see Demirguc-Kunt and Maksimovic, 1998; King and Levine, 1993; Jayaratne and Strahan, 1996; Rajan and Zingales, 1998.

3 Also, see Glaessner and Oks (1994), who argue that financial integration, and larger foreign bank presence, can improve financial system infrastructure, including accounting, transparency, and financial regulation, and encourage the increased presence of supporting agents such as ratings agencies, auditors, and credit bureaus.

4 See also: Demirgüç-Kunt and H. Huizinga. 1998. "Determinants of Commercial Bank Interest Margins and Profitability: Some International Evidence". The World Bank Economic Review 13, pp. 379-408.

5 Please also see Cárdenas,, *et al.* (2003)

assumes domestic deposits to be highly elastic. As foreign banks offer better financial services and attractive deposit rates, they encourage more savings and mobilize new deposits. Domestic banks are not worse off, it is argued, as foreign banks largely pick up new and additional deposits that they mobilize in the host country.

Crystal*, et al.* (2002), for example, claim that foreign banks generally rely less on deposit-based funding than private domestic banks. According to their research, the most likely explanation is that foreign banks largely rely on alternative funding sources in their home countries. Another strand of literature, however, shows that domestic depositors can punish poorly performing and risky domestic banks by transferring their deposits to more reliable and efficient foreign banks. Martinez-Peria, *et al*. (1998), for example, show that depositors shifted their deposits to more reliable foreign banks in Argentina, Chile and Mexico. Other studies claim that on-shore presence of foreign banks can facilitate the flight to quality and safety. Clarke*, et al.* (2000) show that foreign bank deposits in Argentina increased during the financial turmoil of the mid-1990s, while Kraft (2002) finds that foreign bank subsidiaries acted as havens for depositors during the 1998 Croatian banking crisis.

Looking at the balance-sheet data of 1334 banks in 101 countries, Demirgüç-Kunt and Huizinga (2009) find strong evidence that banks increasingly rely on non-deposit-based or wholesale funding and non-interest income. They show that reliance on non-deposit-based funding can increase bank fragility and instability as the supply and terms of wholesale funding can be highly sensitive to the perceived riskiness of a bank. They also find that reliance on non-deposit funding can lower the return on assets and bank profitability. The paper, however, does not explain why banks are forced to rely on non-deposit-based funding or how the reliance on such funding can increase volatility in the supply of loans. In our analysis, we will show that foreign bank entry, and their market share of deposits, is a key determinant for increased reliance on non-deposit-based funding.

Effects on lending

The empirical literature on foreign bank entry and how it affects the aggregate level of credit largely focuses on whether foreign banks lend to SMEs. Many argue that foreign banks rely on hard information—and less on relationship-based lending—in extending credit to domestic borrowers. The presence of information asymmetry generally explains why foreign banks are less able to lend to small firms, which in turn, attempts to explain the negative association between foreign bank presence and credit to the private sector.

Using a survey of 4000 entrepreneurs in 38 developing and emerging countries, Clarke*, et al.* (2001), however, show that firms are less credit-constrained in countries with more foreign bank participation. Escude*, et al.* (2001) find no bias against SMEs in foreign banks' loan portfolios. In Eastern Europe, Giannetti and Ongena (2005) find that foreign bank presence benefits all firms, though the effects are more pronounced for large firms and firms that are less likely to be involved in connected lending. Beck*, et al.* (2010), using bank-level data from 80 countries, find no evidence that foreign banks lend less to SMEs than other banks. They conclude that foreign banks simply use different lending techniques and organizational structures.

On the other hand, Berger, *et al*. (2001) present evidence that small businesses in Argentina are less likely than larger ones to receive credit from large banks or foreign banks. Looking at bank balance sheet data for Argentina, Chile, Columbia and Peru, Clarke, *et al*. (2005) also find that foreign banks generally lent a smaller fraction of their funds to small- and medium-sized enterprises than similar domestic banks in

the late 1990s. They, however, suggest that the difference is primarily due to the behavior of small foreign banks. They also find that in Chile and Colombia, large foreign banks actually lent more to SMEs than comparable domestic banks.

Naaborg, *et al.* (2003) find that while foreign-owned banks became major players in the financial system of Central and Eastern-European countries, the speed of financial development has been rather slow in these transition countries. Their data show that while banking sector assets in these countries have grown significantly since 1990s, credit to the private sector has remained relatively low. Likewise, Haber and Musacchio (2005) show that lending to the private sector actually declined as the presence of foreign banks grew in Mexico. The fall in private lending was more pronounced in foreign banks. In further research, Mian (2006), using a dataset of 80,000 loans in Pakistan, shows that, compared to their domestic counterparts, foreign banks lend less to informationally opaque firms that typically rely on relational lending.

Detragiache, *et al.* (2006) demonstrate the negative effect of foreign bank presence on aggregate private credit. Their "cream-skimming" model, using data from 60 low-income countries, show that countries with more foreign bank penetration have a shallower banking sector, and lower level of credit to the private sector. Gromley (2007), using firm-level data on credit across different regions of India, finds evidence both of 'cream-skimming' by foreign banks and of a systematic drop in loans from domestic banks, which leads to an overall reduction in access to credit for many domestic firms, particularly smaller firms and those with fewer tangible assets.

Volatility and instability in the supply of credit

The literature presents divergent views on whether increased foreign bank presence enhances financial stability in the host country. Most of the discussions center on how aggregate-level volatility in capital flows affects financial stability. Goldberg, *et al.* (2000) show that while foreign and private domestic banks in Argentina and Mexico engaged in similar lending activities in the 1990s, foreign banks showed stronger and less volatile loan growth. Their findings suggest that financial soundness of banks—and not ownership *per se*—determines the growth, volatility and cyclicality of bank credit. According to Goldberg, *et al.* (2000), ownership diversity enhances credit stability in times of crisis and when the host country financial system is under-developed. They also find no evidence of foreign banks causing instability in the domestic credit market.

Demirgüç-Kunt, *et al.* (1998) claim that increased participation of foreign banks tends to lower the probability of a banking crisis, as foreign banks import better accounting standards and demand more effective prudential regulations. Other studies argue that large foreign banks with established local presence (e.g. branches or subsidiaries) are less likely to reduce their exposure during financial crises due to the high fixed costs involved with establishing a branch network and gaining market share. Peek, *et al.* (2000), for example, find that offshore lending was more volatile than onshore lending for Brazil, Argentina and Mexico.

Economic theories, on the other hand, predict that capital and financial market liberalization increases volatility in capital flows. Stiglitz (2000) shows how capital market liberalization—often the precursor of large foreign bank presence in developing and emerging countries—reduces financial stability and adversely affects growth. Agenor (2003) argues that pro-cyclical capital flows from foreign sources increase financial and macroeconomic instability. He shows that financial openness, which is associated with large foreign bank presence, increases volatility in capital movement. It is argued that foreign financial institutions,

constrained by information asymmetry, are less able to assess the consequences of an adverse economic shock in the host country and may demonstrate herding behavior, resulting in *en masse* capital flight during a crisis. Dell'Ariccia and Marquez (2006) show that capital market liberalization can reduce the cost of financing for banks, which can, in turn, increase the likelihood of both a credit boom and a banking crisis. They argue that competition from foreign bank entry can compel incumbent domestic banks to reduce screening of loan applications to retain their market share, which may deteriorate the quality of their loan portfolio and increase the likelihood of a banking crisis. A number of empirical studies[6] show that foreign-owned financial institutions actually decrease the stability of aggregate domestic bank credit by providing additional avenues for capital flight during a crisis, either in the host or home country.

Looking at banking and balance-of-payment crises in five developed and fifteen developing countries from 1970 through the 1990s, Kaminsky and Reinhart (1996) show that financial liberalization usually predates banking crises. They find that financial market liberalization often leads to a boom in consumption, which is usually financed by an explosion in bank credit, with banks borrowing abroad. The foreign borrowings also lead to real exchange rate appreciation, which squeezes bank profit and gives rise to bankruptcies and capital outflows.

3. Beyond cherry-picking: An alternative explanation[7]

Cherry-picking in lending

The cherry-picking models, explaining the lending behavior of foreign banks, assume information asymmetries between the lender and the borrowers. Prospective borrowers typically know more about their ability to repay loans than lenders do, while lenders screen borrowers to select high-quality entrepreneurs and reduce the risk of default among the low quality ones. Detragiache*, et al.* (2006) present a model that assumes that foreign banks are better than domestic banks in monitoring "hard" information, such as accounting information or collateral values, but not in monitoring "soft" information, such as the borrower's entrepreneurial ability or trustworthiness. They show that foreign bank entry induces "cream-skimming", when the hard-information borrowers are no longer pooled with the soft-information borrowers, who are perceived to carry higher risks. The cost of monitoring the soft-information borrowers increases banks' operating costs. Consequently, the soft-information borrowers face higher borrowing costs, which discourage them from borrowing. Accordingly, the model predicts that countries with a larger foreign bank presence, and relatively larger number of soft information borrower, are likely to see a lower level of credit available to its private sector.

Gromley (2008) presents a similar model showing that banks are likely to over-invest in bad projects and under-invest in good projects in countries where information asymmetries and screening costs are sufficiently high. His model shows that entry of foreign banks may induce a separating equilibrium, where foreign banks only finance the large projects of 'cream' firms and domestic banks finance those of 'average' firms. In this setup, bad firms do not receive bank finance.

Sengupta (2005) develops a model that argues domestic and foreign banks face observationally identical borrowers—either high- or low-risk—but that domestic banks have better information about the

6 See McKinnon,, *et al.* (1997)

7 The author presents a theoretical model in a forthcoming paper.

unobservable risks, which they acquire over time in the process of lending. The model shows that by offering cheaper loans, foreign banks with greater cost advantages can cherry-pick low-risk borrowers away from domestic banks. However, it predicts that foreign banks, even with moderate cost advantages, can pool all borrowers, but only in countries that have a higher fraction of low-risk borrowers.

These models typically assume a perfectly competitive banking sector that satisfies market clearing conditions in lending. Detragiache*, et al.,* for example, claim, "Banks are perfectly competitive. They have access to a perfectly elastic supply of funds, and their cost of funds is normalized to one …. Banks can raise unlimited funds". Gromley (2008) assumes that foreign banks' relative cost advantage is derived from their more efficient deposit collection system and access to international capital, while Sengupta (2005) contends that foreign banks are more efficient in converting deposits to loans. Gromley (2008) further assumes that domestic lenders have access to an unlimited supply of domestic funds, while foreign lenders' have access to an unlimited supply of international funds.

Sengupta's model predicts that foreign banks will pool low and high-risk borrowers together, and that no cherry picking will occur if and only if the foreign bank has a sufficiently large cost advantage, and the proportion of high-risk borrowers in the host country is relatively small. Gromley's model, on the other hand, requires us to assume that the number of "bad" firms is sufficiently high relative to "average" firms to demonstrate that foreign bank entry reduces access to credit for all firms. Detragiache, likewise, requires us to assume that firms maintaining hard information are less risky than firms that only have soft information. This ignores the possibility that large firms—skilled in providing hard information—can also possess a higher capacity to deceive their lenders into funding negative NPV projects.

Detragiache*, et al.* further assume that banks can *ex ante* ascertain the monitoring costs of borrowers and accordingly adjust their interest rates. Monitoring costs are unlikely to remain constant during the term of a loan contract and may well depend on the continued performance of a borrower. A borrower facing an exogenous shock may require more monitoring, which, in turn, can increase monitoring costs and shrink profit margin of the bank. Gromley makes a similar simplifying assumption that screening costs of firms, regardless of borrower type or loan size, are fixed. But in reality, screening costs are likely to vary by firm-size, sector and duration of a loan contract. While Gromley subsequently relaxes the assumption, he requires screening costs to fall with an increase in the size of a loan. Screening costs are likely to be non-linear and may even increase with firm-size or loan size.

An Alternative Explanation

These cherry-picking models do not address the question whether foreign banks are fundamentally different from domestic banks. Do foreign banks, on average, maintain a different portfolio structure from domestic banks, allocating a smaller portion of their deposits to lending? These studies typically do not take into account the effects of foreign bank entry on the deposit shares of domestic banks. Does increased foreign bank presence lead to increased reliance on non-deposit-based funding for domestic banks? Does increased reliance on non-deposit-based funding explain the increase in interest spreads? Also, cherry-picking models largely ignore the adverse effect of foreign bank presence on the volatility of credit and financial sector stability.

It is unrealistic to assume a perfectly competitive banking market. Credit markets rarely clear, even when banks can offer a menu of loan contracts that fully reflect the risk of borrowers or when borrowers can fully meet collateral requirements of the banks. In reality, banks are heterogeneous agents, offering

specialized and differentiated financial products to their clients and engage in monopolistic competition in both deposit and lending market. Banking relations matter because people typically borrow from banks where they maintain accounts and keep deposits. Foreign banks—offering reputation, efficient service, prestige or international banking network—are likely to find it easier to compete in the deposit market. At the same time, domestic clients are also likely to find it easier to shift their deposits to foreign banks. Information asymmetry or lack of relationship poses little problem to shifting of deposits to foreign banks.

Furthermore, while foreign banks are likely to be more efficient in mobilizing deposits, it is highly improbable that either set of banks has access to unlimited funds, even in a globalized financial market. Elasticity of savings and deposits is usually very low in developing countries. Total deposits available in a country do not increase rapidly. The marginal cost of raising deposits typically increases as competition in the deposit market intensifies. Moreover, under conditions of monopolistic competition, as is the case in the developing world, there can be excessive incentives for foreign banks to enter and compete for deposits by raising deposit rates to reap the "business-stealing" effect (Stiglitz and Hellman, 1998).

Our empirical analysis relies on two very simple assumptions: that the supply of deposits is finite and inelastic, and that banks set lending rates that reflect the cost of their funds. In our empirical model, we make no assumption about the distribution of the borrower types and still manage to explain, without any restrictive assumption, why increased foreign bank presence is associated with higher interest spread, lower levels of credit to the private sector and higher volatility in the loans to total asset ratio. Regardless of whether a country has a large number of risky borrowers or whether they are better at monitoring hard information, we show that large foreign bank presence will contribute to decreasing credit supply to the private sector if they manage to reduce the share of deposits held in domestic banks.

In our analysis, we first show that foreign banks are typically less inclined to lending in the host country, with the competitive disadvantages they face relative to domestic banks partially explaining this aversion. The "liability of foreignness" (Hymer, 1976)[8] dominates their lending decisions, regardless whether they operate in the host market as a branch, subsidiary or through acquisition of domestic banks.[9] The cost advantage that foreign banks enjoy is not necessarily sufficient to overcome the informational and locational disadvantages they face vis-à-vis domestic banks. This is also consistent with the conclusion of Stein (2002), who suggests that distance constraints (both cultural and geographic) between top management and loan officers force foreign banks to curtail discretion in lending decisions, resulting in less lending to informationally opaque smaller businesses. Our paper presents unambiguous evidence that foreign banks lend less than domestic banks in the same macroeconomic and regulatory environment. This contradicts the claims of Demirgüç-Kunt, *et al.* (1999) that the technological and efficiency advantage of foreign banks is large enough to overcome any informational disadvantage they may encounter in lending in developing countries.

Contrary to popularly held belief, we find strong evidence that foreign banks largely rely on the deposits they collect in the host country to fund both their lending and non-lending activities. We find that domestic banks lose a significant share of their deposit base to foreign banks, which the latter largely deploy

8 Also see, Miller and Parkhe (2002).

9 Carow, *et al.* (2004) show that that large bank mergers negatively affect the availability of credit for capital-constrained small firms. Karceski, *et al.* (2005) find that Bank mergers lead to higher relationship exit rates among borrowers of target banks. Degryse, *et al.* (2003) find that cost of borrowing increases with increase in the distance between the lender and borrower. Sapienza (2002) finds that as banks become larger through merger and acquisition, they reduce the supply of loans to small borrowers.

in non-lending activities such as securities, bonds and foreign exchanges. Information asymmetry and unfamiliarity with the local market pose no problem to foreign banks in attracting a sizeable portion of deposits away from domestic banks. Foreign banks' superior service quality, and expertise in investment advisory services, coupled with a perception that they provide safe havens and greater access to an international network can encourage domestic depositors to switch their deposits to foreign banks, a relatively costless effort on the part of domestic borrowers. Our data also show that, on average, foreign banks have larger market share of deposits than domestic banks. These findings largely undermine the claims of Crystal*, et al.* (2000) that foreign banks generally rely less on deposit-based funding than domestic banks.

While banks take into account possible monitoring costs, they set lending rates primarily on the basis of their cost of deposit rates and the cost of inter-bank borrowing. The reduced deposit-base forces domestic banks to borrow from other banks, particularly from foreign banks, to meet their lending targets and commitments. This increases the cost of funds for domestic banks, which leads to increased lending rates. Higher lending rates then force a fraction of creditworthy borrowers to opt out of borrowing. They also attract more risky borrowers, including those who are unlikely to repay their loans, triggering the problem of adverse selection. This explains why increased foreign bank presence can lead to higher interest spreads in many developing and emerging countries.

Furthermore, superior knowledge of investment and risk diversification strategies—including the capacity for developing and selling complex financial products—allows foreign banks to invest a larger portion of their deposits in non-lending activities, which usually yields higher returns. The diversion of deposits to high-return non-lending activities offers further explanation as to why increased foreign bank presence is associated with lower levels of credit to the private sector. In addition, since foreign banks are less familiar with the domestic credit market and usually less inclined to lend to firms that do not meet their accounting and information requirements, they not only allocate a smaller portion of their deposits to loans, but are also likely to extend loans of shorter maturity. This partly explains why loans from foreign banks are, on average, more volatile. The shrinking deposit base compels domestic banks to finance their lending activities through borrowing from foreign banks, which can be unpredictable and mostly short-term. As domestic banks increasingly rely on non-deposit-based funding, bank credit becomes more short-term and volatile.

4. Data and Summary Statistics

Our dataset includes bank-level data from 81 developing and emerging countries, obtained from the Bankscope database, covering the period 1995-2009. Bankscope covers more than 95 percent of all licensed commercial banks operating in these countries. All banks available in Bankscope from our list of developing and emerging countries are included in our data set. To avoid potential problems with many small countries (i.e. island economies or financial centers) that have very large foreign bank presence (relative to the size of their GDP) that can skew the results, we only include developing and emerging countries that had a population of at least 5 million in 2008 and had data for at least 3 (three) commercial banks in the Bankscope database. As such, the small island states of the Caribbean and the Pacific are not included in our data set. Financial centers—Hong Kong, Singapore, Panama, Bahrain or Lebanon—are also excluded. We also exclude countries that experienced prolonged wars or conflicts (e.g. Afghanistan, Liberia, Iraq) or faced international economic embargos (e.g. Iran, North Korea, Cuba) to ensure that the variations in loans, deposits and other financial variables are not influenced by these non-economic factors. Please see Annex I for the list of countries included in our analysis.

The Bankscope database contains an ownership code that classifies banks as state-owned, private domestic, and foreign-owned, but the code is not available for all banks included in the database. We also looked at the "Global Ultimate Owner" information in Bankscope to determine whether a bank is foreign-owned. When Bankscope had no ownership code for a bank or did not list the name and address of a global ultimate owner, we checked an individual Bank's annual report/shareholder information or other publicly available data to ascertain ownership of the bank. A bank is classified as foreign if at least 50 percent of its capital is in foreign hands and the variable *foreign* is coded 1. For domestically owned banks, the variable *foreign* is coded 0. We construct the variables *loans_totalassets* (the ratio of loans to total assets), *equity_totalassets* (the ratio of equity to total assets), *nondeposit_ratio* (the share of loans and other earning activities funded by non-deposits), *depositshare_growth* (growth rate of the market share of deposits of an individual bank) and *volatility_loansassetratio* from the bank-level data available in Bankscope. We construct our two other key explanatory variables—*depositshare_foreignbanks* and *countrymean_nondepositratio*, adding up the share of deposits held in all foreign banks and calculating the average share of non-deposit based-funding of all banks in each country, respectively. For detailed explanations on all variables used in our analysis, please see Annex II.

Our macroeconomic variables—*log_gdppc, l_cpi, trade_gdp, markcap_gdp, govdebt_gdp , log_pop*—are drawn from the World Banks' World Development Indicators (WDI) database. We create the variable *creditcover*—the percentage of adult population covered by both public and private credit registries, using relevant data available in WDI. The variable *dep_insurance* is taken from the Levine-Caprio database on Bank Supervision and Regulation. We also use the World Banks' Financial Structure database for data on financial development. This includes—*dbagdp* (banking sector assets as percentage of GDP), *bcbd* (bank credit over bank deposits), *concentration* (market share of the three largest banks) and *stutrnover* (stock-turnover relative to stock market capitalization in the country).

The financial market reform and regulation variables—*intratecontrols* (the level and intensity of interest rate controls), *entrybarriers* (the level of barriers to entry to the banking sector), *creditcontrols* (the level of directed credit and credit ceilings), and *bankingsuperv* (quality of banking supervision)—are taken from the database developed by Abiad*, et al.* (2008), which measure the status of financial market reforms in 91 countries over 1973-2005 period. We extend the coverage of this dataset to 2008, incorporating updates from relevant Central Bank websites. Our choice of control variables follows the standard practice in the literature on foreign banks. As Gelos (2006) finds it in his survey of relevant literature, factors such as macroeconomic environment, the degree of banking competition, availability of information about borrowers and banking regulations influence the cost and terms of credit available in a country.

The correlation matrix of our key dependent and explanatory variables is reported in Table A. Deposit share of foreign banks is significantly and positively correlated to domestic banks' reliance on non-deposit based funding, while it is negatively correlated to foreign banks' reliance on non-deposit based funding at 1% significance level.

Furthermore, we find that the correlation between the share of deposits held in foreign banks and domestic credit to the private sector is negative and while its correlation with interest spread is positive, both significant at 1% level. The correlation between the share of deposits held in foreign banks and the volatility in loans to total asset ratio is positive but insignificant. The correlations between the country average reliance on non-deposit based funding and volatility in loans to total asset ratio and also with interest spread are positive and significant at 1% level. It is negatively correlated to domestic credit to the private sector, also at 1% level. Finally, interest spread is negatively correlated to domestic credit to the private sector.

Table A: Correlation matrix of key dependent and explanatory variables

	depositshares_ foreignbanks	nondeposit shares_ domestic	nondeposit shares_ foreign	countrymean_ nondeposit ratio	domcredit pvt_gdp	int_spread	countrymean_ loanasset volatility
depositshares_foreignbanks	1.000						
	1035						
nondepositshares_domestic	0.1965*	1.0000					
	0.0000						
	900	1001					
nondepositshares_foreign	-0.1687*	0.4782*	1.0000				
	0.0000	0.0000					
	856	790	932				
countrymean_nondepositratio	-0.0124	0.8813*	0.8201*	1.000			
	0.6966	0.0000	0.0000				
	984	1001	932	1143			
domcreditpvt_gdp	-0.2185*	0.0561	0.1500*	0.0753	1.000		
	0.0000	0.0923	0.0000	0.0157			
	943	902	852	1030	1440		
int_spread	0.1478*	-0.0020	0.1511*	0.0835	-0.3552*	1.0000	
	0.0001	0.9576	0.0001	0.0206	0.0000		
	709	686	629	769	1033	1050	
countrymean_loanassetvolatility	0.0244	0.1226*	0.0939*	0.1701*	-0.3306*	0.2892*	1.000
	0.4339	0.0001	0.0041	0.0000	0.0000	0.0000	
	1034	990	932	1132	1151	856	1275

* denotes significance at 1% level, p-value reported in line 2 and the number observations in line 3.

In Table B, we present summary statistics on key differences between foreign and domestic banks. In our sample, foreign banks' loans to total assets ratio is less than the loans to total asset ratio of domestic banks and the difference is statistically significant at 1% level. Relative to their total assets, foreign banks, on average, lend less compared to their domestic counterparts. We also find evidence that average volatility in the loans to total asset ratio of foreign banks is significantly higher than the volatility ratio of domestic banks. The difference is significant at 1% level. The summary statistics also shows that average market share of deposits of foreign banks is 9%, compared to the average of 5% for domestic banks. The difference in mean is statistically significant. This shows that foreign banks, on average, manage to gain a sizeable market share of deposits in the host country. Our regression results will further show that foreign bank's market share of deposits grow at a faster pace than that of domestic banks. Finally, we find that on average, domestic banks rely more on non-deposit-based funds to extend loans to their customers.

5. Empirical Evidence

Our empirical analysis presents a comprehensive, yet intuitively straightforward, explanation as to why increased foreign bank presence reduces the availability of credit to the private sector or increase the cost of financial intermediation. In assessing the effects of foreign bank entry on financial development of the host country, we answer the following questions:

Table B: Key differences between foreign and domestic banks

	Mean for Domestic banks	Mean for Foreign banks	Difference in mean	t-statistics	p -value
loans_totalasset	0.5136 [0.1885] *13325*	0.4802 [0.2039] *5315*	Significant	10.31	0.0000
Loansasset_volatility	0.2318 [0.1954] *11600*	0.2737 [0.2363] *4985*	Significant	-15.12	0.0000
depositshare_individualbank	0.0551 [0.1272] *13250*	0.0912 [0.1631] *5244*	Significant	-14.41	0.0000
nondepositratio_individualbank	0.4783 [0.3458] *11889*	0.3885 [0.2813] *4582*	Significant	17.19	0.0000

Standard deviation is reported in parentheses; the number of observations is reported in italics.

- Do foreign banks lend less?
- Do foreign banks compete for deposits in the host country?
- Are loans from foreign banks more volatile?
- Can the share of deposits held in foreign banks explain the increased reliance on non-deposit based funding in the host country?
- Can the increased reliance on non-deposit based funding explain higher Interest rate spreads?
- Can the share of deposits held in foreign banks explain the decline in credit to private sector?
- Can the increased reliance on non-deposit based funding explain the increased volatility in loans to total asset ratio in the host country?

Do foreign banks lend less?

We investigate whether foreign banks typically allocate a smaller portion of their total assets to lending activities. This will allow us to test the hypothesis that foreign banks encounter significant informational and locational disadvantages that compel them to allocate a larger fraction of their resources to non-lending and non-interest earning assets. There are three plausible arguments as to why foreign banks devote a smaller portion of their assets to lending. First, since foreign banks have superior knowledge of various financial and capital market products such as stocks, bonds and derivatives, they enjoy a comparative advantage in earning healthy profits from non-lending activities. Second, since they lack sufficient information about the range of borrowers in the host country, they find it less attractive to engage in lending activities. Third, foreign banks prefer non-lending activities, such as securities trading over lending because it allows them to quickly reduce their exposure and "cut and run" when necessary. It is usually harder for a bank to call back loans and reduce exposure during an economic downturn or crisis.

Table I reports the regression estimates for banks' loans to total asset ratio (*loans_totalasset*) and ownership, controlling for macroeconomic and regulatory environments. The dependent variable is the share of loans as percentage of a bank's total assets. We include equity total asset (*equity_totalassets)* ratio to control for a bank's level of equity investment.

The regression model includes a set of macroeconomic variables (column 1) to control for the level of economic activities in the country, which directly or indirectly influence a bank's level of lending relative to its total assets. The key macroeconomic controls are *log_gdppc* and *l_cpi*—the natural logs of GDP per capita and inflation—to broadly account for the level of economic development and economic uncertainty. We expect *log_gdppc* to be positively correlated to a bank's level of loans relative to its total assets, while the log of inflation is expected to be negatively correlated to lending in a dynamic set up. Other macroeconomic variables are: *govdebt_gdp*—the level of public sector debt relative to GDP; *trade_gdp*—the share of import plus export relative to GDP, which can be a broad measure of private sector economic activities and *markcap_gdp*—the level of stock market capitalization relative to GDP, which is often an alternative source of finance. The model also includes *creditcover*—the percentage of adult population covered by public and private registries.

The OLS estimate in column 1 shows a negative correlation, significant at 1% level, between *foreign* and *loans_totalasset*. Column 2 reports OLS estimates with three additional variables—*intratecontrols, concentration and entrybarriers,* which measure the level of financial regulations in the economy, which can affect banks' lending activities. Again, *foreign* is negatively correlated with *loans_totalassets* and the correlation is significant at 1% level. Both models have high adjusted R-squared, confirming the explanatory power of the model.

We, however, know that OLS estimates are biased and inefficient in the presence of heteroskedasticity and serial correlation, which is often the case with large panel data. To account for heteroskedasticity, we replicate the basic model (as in column 1) in generalized least squares (GLS) method, with random effects (column 3). The Breusch-Pagan test Lagrange Multiplier test confirms the presence of random effects in our panel data. It is reasonable to assume that some omitted variables—e.g. management style that affect banks' lending decisions are time invariant but vary widely between two banks. The GLS estimate also confirms the negative correlation between foreign ownership of banks and loans to total asset ratio. Additionally, we find that loans to total asset ratio as positively correlated to *creditcover*. In column 4, we report the GLS, random effect estimates of the full model. Again, foreign ownership is significantly and negatively correlated to *loans_totalassets.* We also find that *intratecontrols* to be negatively correlated to loans to total asset ratio, significant at 1% level. This suggests that when interest rates are liberalized, banks are more likely to devote a relatively smaller fraction of their assets devoted to lending. We also find that lower level of entry barrier is associated with lower levels of loans to total asset ratio, again significant at 1% level.

In panel data, the unobserved panel-level effects are usually correlated with lagged dependent variables, making standard estimators inconsistent. We estimate our model using the System Generalized Methods of Moment (GMM) estimation technique, developed by Arellano-Bover/Blundell-Bond,[10] which addresses the problem of simultaneity in dynamic panel data. The system GMM estimator uses the level equation to obtain a system of two equations: one differenced and one in levels. By adding the second equation, the Arellano-Bover method obtains additional instruments. Thus the variables in levels in the second equation are instrumented with their own first differences, which help to increase the efficiency of the estimators. Columns 5 through 7 report the system GMM estimates of our model, with first, second and third lags of the dependent variable (*loans_totalasset*) included in the model. A bank's loans to total asset ratio is expected to be sticky, with its lagged values at time t-1, t-2, and t-3 predicting the value at time t. We perform the Sargan test to check for the validity of the instruments included in the model. The Sargan test has a null hypothesis that "the instruments as a group are exogenous".

10 Please see: Arellano, M., and O. Bover (1995) and Arellano, M. and S. Bond. (1991).

The Sargan test for system GMM estimates of the full model with one lagged dependent variable (Column 5) is negative i.e. that the instruments are not valid. The coefficient of *foreign* is, however, negative but not significant. The Sargan test for estimations with 2nd (Column 6) and 3rd lag (Column 7) of the dependent variable confirms the validity of the instruments included in the model. The regression results reported in Column 6 re-confirms the negative correlation between foreign ownership of banks and the loans to total asset ratio. We find, as expected, *log_gdppc* and *trade_gdp* are positively correlated to loans to total asset ratio. This suggests, controlling for macroeconomic and financial market variables, banks are likely to have higher loans to total asset ratios in richer countries. Also, countries with higher trade to GDP ratio are likely to see higher loans to total asset ratio in their banks. Furthermore, we find that interest rate controls are negatively and significantly correlated to loans to total asset ratio of banks. All other explanatory variables carry the expected signs, though they are not statistically significant.

The regression results reported in Table I confirm that foreign banks, on average, deploy a lower portion of their assets into lending, even when we control for the level of equity investment, level of economic activities and financial market regulations. The results also confirm that regulation matters –interest rates liberalization can make lending activities less attractive for banks. Interest rate controls can keep the cost of deposits low, which can reduce the cost of lending and help banks lend more. This has important implication for central bankers and policy-makers in developing countries.

Do foreign banks compete for deposits in the host country?

Table II reports the regression results for the dependent variable *depositshare_growth*—the growth rate of the market share of deposits of an individual bank with respect to bank ownership. The market share of deposits is calculated as an individual banks' share of total deposits in each country. Column 1 reports the regression result of the basic model, controlling for *equity_totalasset, log_gdppc, l_cpi and dep_insurance* and *gdp_grow (*the annual growth rate of GDP). *dep_insurance* is a dummy variable, which takes the value of 1 when the country has an explicit deposit insurance scheme. The model is estimated with Arellano-Bover/Blundell-Bond estimation method. We find that *foreign* is positively correlated to *depositshare_growth,* significant at 1% level, suggesting that, on average, the growth rate of foreign banks' market share of deposits is likely to be 44% higher than the growth rates of the market share of deposits of domestic banks, when controlled for the levels of economic development, inflation, GDP growth rate and deposit insurance.

Deposit insurance is negatively correlated to the growth rate of a banks' market share of deposits. One plausible explanation is that banks in countries with deposit insurance schemes are likely to experience more stable market share of deposits. It suggests that depositors are less likely to switch deposits from one back to another if the country has an explicit deposit insurance scheme. The Sargan test confirms the validity of the instruments included in the model.

Column 2 estimates the model with an additional control variable: *concentration.* The new estimates retain the significance of the coefficients of both *foreign* and *dep_insurance*. The coefficient of concentration is significant and negative, suggesting that a highly concentrated banking sector is likely to experience less change in the market share of deposits of an individual bank. The estimates in columns 3, 4 and 5 add additional controls: *bcbd*—the ratio of bank credit to bank deposits; *intratecontrols*—the level of interest rate controls; and *entrybarriers.* While, the coefficients of *foreign, dep_insurance* and *concentration* remain significant and carry the expected signs, none of the additional controls assume any statistical significance. The growth rates of the market share of deposits of foreign owned banks is 54%, 57% and 64% higher than

the growth rates of the domestic banks in these three regressions. The coefficient of *foreign* is positive and significant at 1% level in all five regressions.

These regression results confirm that foreign banks manage to increase their market share of deposits at a significantly faster rate. The higher growth rates of deposit shares of foreign banks also confirm that domestic banks lose their market share of deposits. This also suggests that foreign banks aggressively compete in the deposit market. It is important for policy-makers to note that existence of deposit insurance can reduce the intensity of competition for deposits and reduce the volatility in the market share of deposits. Also, an optimal level of concentration—i.e. a fewer number of banks—can make the deposit share of banks more stable and predictable. Furthermore, it is important to note that a banks' equity investment or its level of lending (relative to deposit) does not influence the market share of deposits of a bank.

Are loans from foreign banks more volatile?

The literature has thus far ignored whether foreign bank entry increases the volatility in the supply of loans, which we believe should be an important factor for financial development. Bank credits should be predictable and stable to ensure that they facilitate productive investment and growth. When bank credit becomes volatile—because more short-term loans are given or because loans are recalled prematurely—private sector cannot use bank loans for investments to enhance their productive capacities. To take into account the effects of foreign bank entry on the terms and availability of credit, we explore whether loans from foreign banks, on average, are more volatile than loans from domestic banks. To normalize variations in bank size, we estimate the volatility in the loans to total asset ratio, instead of estimating the volatility in the nominal level of loans. The level of volatility in loans to total assets is calculated by taking the mean and standard deviation of each bank's loans to total asset ratio over the period 1995-2008. The variable *volatility_loansassetratio* is the coefficient of variation of the variable *loans_totalasset*—the standard deviation of *loans_totalasset* divided by the mean *loans_totalasset* of each bank.

In Table III, we present bank level evidence that *volatility_loansassetratio* of foreign banks is significantly higher than that of domestic banks. Given that the time dimension of the dependent variable *volatility_loansassetratio* is one (i.e. a single value calculated for the period 1995-2008), we are unable to estimate the models in system GMM, which requires the dependent variable to vary over time. The initial model is estimated in OLS (column 1), which shows that, on average, the volatility in the loans to total asset ratio of foreign banks is 6% higher than their counterpart domestic banks. The coefficients of all control variables—*equity_totalassets, log_gdppc, l_cpi, govdebt_gdp, trade_gdp* and *markcap_gdp* are statistically significant. The coefficients of *markcap_gdp* and *tade_gdp* are negative, suggesting that higher level of market capitalization and higher level of trading activities are likely to be associated with lower level of volatility in loans to total asset ratio. It is, however, interesting to note that, holding all else constant, the coefficient of *govdebt_gdp* is positive, suggesting a positive correlation between *volatility_loansassetratio and govdebt_gdp*. One plausible explanation could be that when the public debt is high, the credit to private sector experiences faster turnover to account for limited availability of credit.

Column 2 reports the OLS regression results with additional controls—*stutrnover* and *nondeposits_ratio*. The coefficients of both these variables are positive and statistically significant. While controlling for the level of *nondeposits_ratio*, the coefficient of *foreign* is still positive and significant at 1% level. The final model (column 3) includes two additional variables—*intratecontrols* and *concentration*, both of which are significant at 1% level. The model shows that as interest rates are liberalized, the loans to total asset ratio

of banks are likely to experience higher volatility. Given that OLS estimates yield biased coefficients, we estimate the final model with instrumental variables in two-stage least squares (2SLS) and in single equation GMM. We consider that *l_cpi, govdebt_gdp trade_gdp, market_gdp, stutrnover* and *nondeposits_ratio* as endogenous variables and they are instrumented with *log_pop* (natural log of population), *british* (=1 if the country is a former British colony), *french* (=1 if the country is a former French colony), *spanish* (=1 if the country is a former Spanish colony), *Portuguese* (=1 if the country is a former Portuguese colony), *cis* (=1 if the country belonged to the Soviet block or was part of the Soviet Union) and *others* (=1 if the country does not belong to any of the aforementioned group).

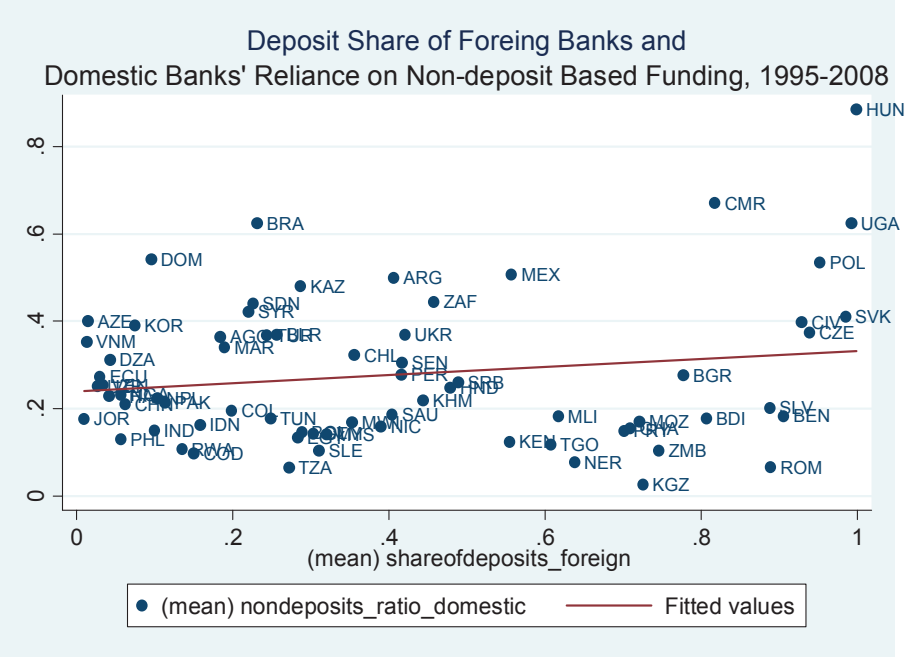
The 2SLS and GMM instrumental variable estimates are reported in columns 4 and 5. In both estimates, coefficient of *foreign* is positive and significant at 1% level. All control variables, except for *l_cpi* and *log_gdppc*, are significant. In particular, the coefficient of *intratecontrols* is positive and significant at 1% level, confirming the positive correlation between interest rate liberalization and volatility in loans to total asset ratio. It is equally important to note that even when we control for bank ownership, *volatility_loansassetratio* is positively and significantly correlated to *nondeposit_ratio.* This finding has important policy implications, especially if the policy-makers intend to make loans more predictable and less volatile.

Can the share of deposits held in foreign banks explain the increased reliance on non-deposit based funding in the host country?

In Table IV, we report the regression estimates for the dependent variable *countrymean_nondepositratio*, and the key explanatory variable *depositshare_foreignbanks,* while controlling for macroeconomic conditions and financial regulation. We create the variable *countrymean_nondepositratio* with bank-level data obtained from the Bankscope database. For each bank in our dataset, we first calculate the share of non-deposit funding with following calculations: (loans + other-earning assets—deposits)/(loans + other-earning assets). This gives us the fraction of a bank's loans and non-lending activities is financed with funding other than deposits. The variable *countrymean_nondepositratio* is then calculated as the average non-deposit funding ratio of all banks in the country. We also calculate the share of deposits of all foreign banks in the country *depositshare_foreignbanks*, by adding the deposits of individual foreign banks and dividing the sum by the total deposits held in all banks (foreign and domestic) in the country (Graph III).

Column 1 estimates the basic model in system GMM (Arellano-Bover/Blundell-Bond estimation method), controlling for financial development, measured in terms of *dbagdp*—domestic banking sector asset as percentage of GDP, economic development (*log_gdppc*) inflation (*l_cpi*) and concentration in the banking sector. The coefficient of *depositshare_foreignbanks* is positive and significant at 5% level, suggesting that a higher fraction of total deposits held in foreign banks is likely to result in increased reliance on non-deposit based funding for all banks in the country. The results also show that, holding all other factors constant, countries with higher level of economic development are likely to see an increase in non-deposit based funding. Interestingly, we see a negative but significant association between inflation and non-deposit based funding, which suggests the possibility that high inflation expectations (as it is captured in the dynamic setup of system GMM, which includes the lagged values of inflation as instruments) is likely to encourage banks to reduce their reliance on non-deposit based funding. As deposits rates are not inflation indexed, banks can reduce their cost of borrowing by relying more on deposit based funding when inflation is high. We also find a negative and statistically significant correlation between *countrymean_nondepositratio* and *concentration,* suggesting that a concentrated banking sector (with few banks controlling the market share) is likely to rely less on non-deposit based funding to finance lending and non-lending activities.

Graph III: Foreign Banks' Deposit shares and Increased Reliance on Non-deposit Based FundingFunding



In columns 2 through 5, we add additional variables—*intratecontrols, creditcontrols, entrybarriers* and *bankingsuperv*—to control for variations in financial regulations among countries. None of these variables assume significance in the regression estimates. In the full model (column 5), the coefficient of *depositshare_foreignbanks* is significant at 1% level. The coefficient suggests that if the *depositshare_foreignbanks* in a country increases by 1%, the country-average reliance on non-deposit based funding (*countrymean_nondepositratio)* will increase by .11%. The coefficients of *log_gdppc* and *l_cpi* are significant and carry the expected signs in the full model (Column 5). In addition, we find that a reduction in credit controls (e.g. directed credit or credit targets) is negatively correlated to reliance on non-deposit based funding of loans and other earning assets. We run the Sargan test for all system GMM estimates to confirm that these models are not over-identified. For robustness check, we also estimate the full model in Feasible Generalized Least Squares (FGLS) method (column 6), correcting for heteroskedasticity and serial correlation in the data. In FGLS estimate, the coefficient of *depositshare_foreignbanks* is positive and significant at 1% level. Finally, we report the OLS estimates of the full model in column 7. We know that OLS estimates of panel data, with large cross-sectional variations, yield biased estimates. In the OLS estimate, the coefficient of *dbagdp* is significant and negative, suggesting the possibility that few large variations in *dbagdp* is influencing the regression estimates. The coefficient of *depositshare_foreignbanks* is still positive and significant.

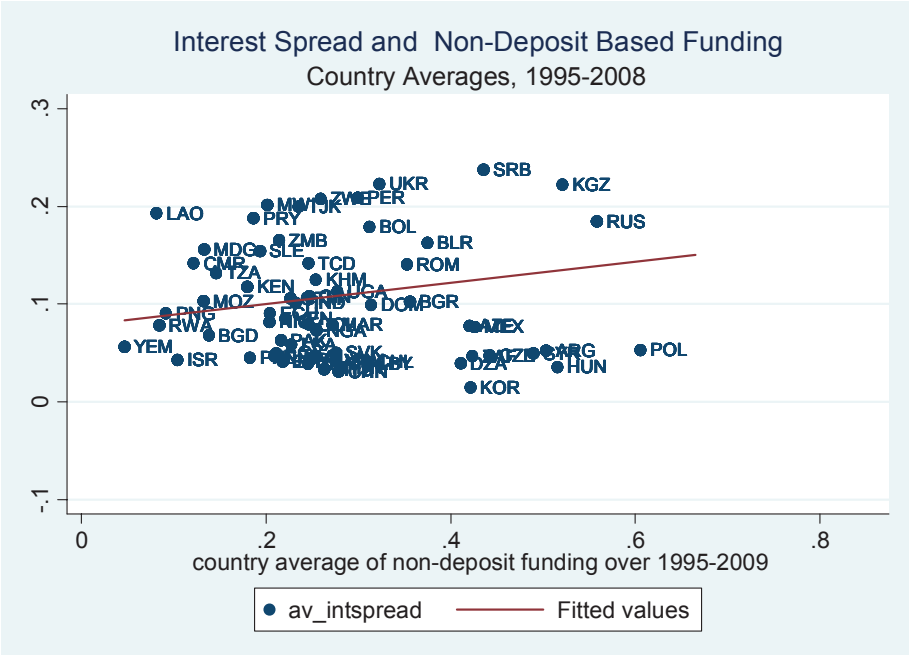
The regression results in Table IV confirm our hypothesis that an increase in share of deposits held in foreign banks, holding all else constant, increases the reliance on non-deposit based funding for all banks. This correlation is robust under different model specifications. As foreign banks take a sizeable portion of deposits away from domestic banks, the latter is forced to secure funding form non-deposit based sources, including borrowing from foreign banks. The reliance on non-deposit based funding can increase the cost of funds for all banks, resulting in higher interest spreads and lower levels of aggregate credit to the private sector.

Can the increased reliance on non-deposit based funding explain higher Interest rate spreads?

We regress *countrymean_nondepositsrtio* on average interest rate spread (*int_spread*) in the country to find out whether an increase in reliance on deposit-based funding can explain the increase in interest spreads, as observed in many developing countries (Graph IV). Table V summarizes the regression results. Column 1 reports the system GMM estimates of the basic model, controlling for the size of the banking sector (*dbagdp*), the level of economic development (*log_gdppc*), inflation (*l_cpi*) and the level of economic activities (*trade_gdp, markcap_gdp* and *govdebt_gdp*). The coefficient of *countrymean_nondepositsrtio* is positive and significant at 1% level. Inflation, rather surprisingly, is negatively correlated to *int_spread,* suggesting the possibility that the lagged values of inflation influence the correlation, forcing banks to reduce spreads when inflation expectations are high. While the coefficients of *dbagdp* and *log_gdppc* are insignificant, the result shows a negative and significant correlation between spread and *trade_gdp* ratio. One plausible explanation could be that countries more integrated with the global economy through imports and exports are likely to be more open to capital flows and are likely to have less domestic control over bank spreads. A relatively closed economy, holding all else constant, is likely to be able to more able to maintain higher interest spreads.

In column 2 through 4, we report the results of system GMM estimates with additional control variables—*intratecontrols, concentration* and *depositshare_foreignbanks.* The coefficient of *countrymean_nondepositsrtio* remains positive and statistically significant in all three regression estimates. In addition to *trade_gdp* and *l_cpi*, the coefficient of *concentration* also assumes significance when included in the models. The positive coefficient of *concentration* suggests that 1% increase in banking sector concentration is likely to result in .06% increase in interest spread. This is consistent with what we should expect to see when the banking sector of a country is highly concentrated. The coefficient of *depositshare_foreignbanks* is positive though insignificant, suggesting that the effects of foreign bank entry on interest rate spread is largely transmitted through its positive effect on *countrymean_nondepositsrtio.* The regression results of Table V show that increased foreign bank presence, inducing increased reliance on non-deposit based funding sources in the host country, can lead to higher interest rate spreads, as observed in many developing and emerging economies.

Graph IV: Non-deposit based funding and interest spreads

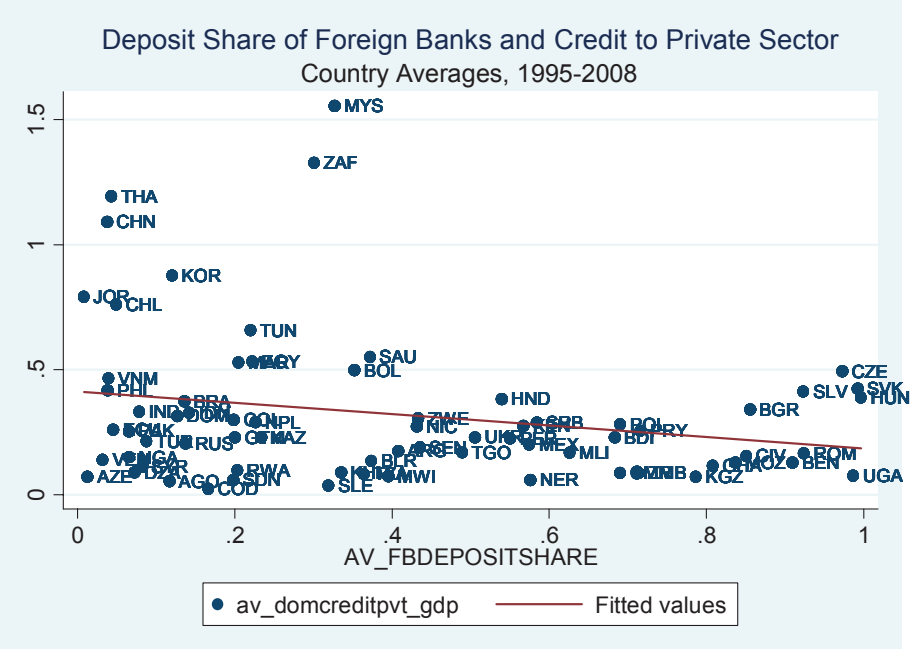


Can the share of deposits held in foreign banks explain the decline in credit to private sector?

Table VI reports the regression results for the dependent variable *domcreditpvt_gdp*—total credit to the private sector as the percentage of GDP. This is one of the most critical indicators of financial development since it broadly measures the private sectors' access to credit. A number of recent empirical papers—looking at both bank-level and macro level data—have shown that increased foreign bank presence is associated with lower levels of credit to private sector. We present an alternative explanation, showing that *depositshare_foreignbanks*—the total share of deposits held in foreign banks can explain the fall in credit to the private sector (Graph V). Our initial model (column 1) is estimated in system GMM, controlling for *dbagdp, log_gdppc, trade_gdp, markcap_gdp* and *govdebt_gdp*. We find that the coefficient of *depositshare_foreignbanks* is negative and statistically significant at 1% level. The Sargan test, however, cannot confirm that the estimated model is not over-identified. The revised model (column 2) adds *creditcover* as an additional control and the Sargan test confirms the validity of all instruments included in the model. Again, we find that the coefficient of *depositshare_foreignbanks* is negative and statistically significant at 1% level. The coefficient value suggests that 1% increase in *depositshare_foreignbanks* will reduce *domcreditpvt_gdp* by .21%. As expected, *loggdp_pc* and *trade_gdp* are positively and significantly correlated to *domcreditpvt_gdp,* while the correlation with *l_cpi* is negative and significant.

Columns 3 through 5 report regression results with additional control variables—*creditcontrols, intratecontrols* and *concentration*. In all these specifications, the coefficient of *depositshare_foreignbanks* is negative and statistically significant. Estimates of the full model (column 5) suggest that 1% increase in *depositshare_foreignbanks* can lead to .45% decline in credit to the private sector. The Sargan test confirms that the model is not over-identified. The coefficients of *log_gppc* and *l_cpi* retain their significance and signs. Moreover, we find that *concentration*, holding all else constant, is positively correlated to credit to the private sector. This suggests that a concentrated banking sector, with fewer banks dominating the market share, can increase the supply of credit to the private sector.

Graph V: Deposit share of foreign banks and credit to private sector

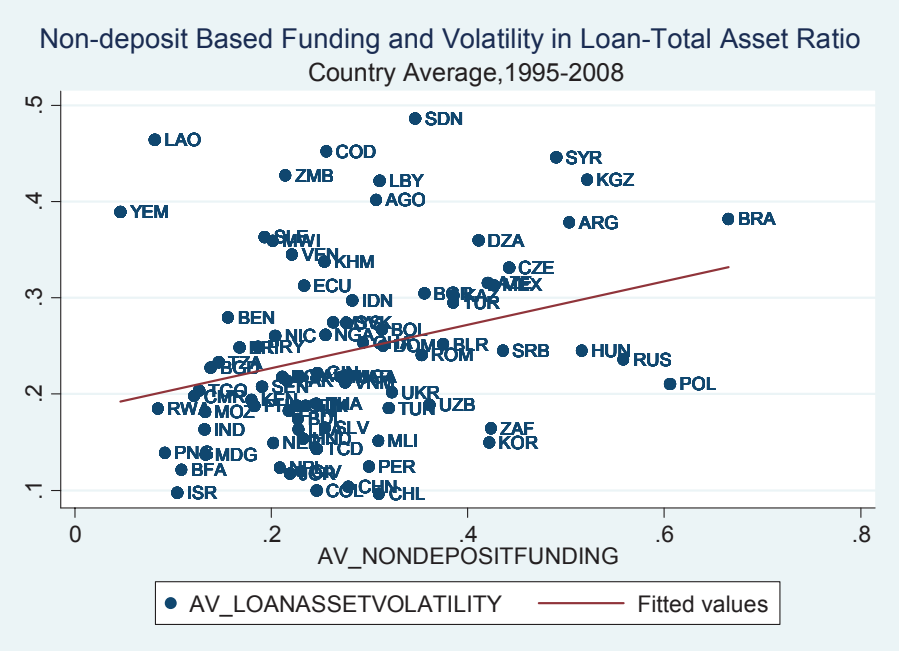


Can the increased reliance on non-deposit-based funding explain the increased volatility in loans to total asset ratio in the host country?

In Table VII, we report the regression results for the dependent variable *countrymean_loansassetvolatility*—the country average of the volatility in loans to total asset ratio (Graph VI). Our key explanatory variable is *countrymean_nondepositsrtio*—the country average of banks' reliance on non-deposit-based funding. Given the cross-sectional nature of the data (by construction, *countrymean_loansassetvolatility* does not have a time dimension), we estimate the model first in OLS and also in Feasible GLS, that takes into account the presence of heteroskedasticity and serial correlation in the error terms. The basic model (column 1) includes *log_gdppc, l_cpi, dbagdp, markcap_gdp, trade_gdp and govdebt_gdp*. The coefficient of *countrymean_nondepositsrtio* is positive and significant at 1% level, suggesting that a 1% increase in *countrymean_nondepositsrtio* can lead to .12% increase *countrymean_loansassetvolatility*. The coefficients *of l_cpi, log_gdppc* and *trade_gdp* are positive and significant, while it is negative and significant for *markcap_gdp*, consistent with what we observed in the regression estimates for bank-level volatility in loans to total asset ratio. The model is re-estimated (Column 2) with additional control variables—*intratecontrols* and *concentration*. The coefficient of *countrymean_nondepositsrtio* remains positive and significant at 1% level. We also see that *concentration* assumes significance, suggesting that an increase in concentration can lead to higher average volatility in loans to total asset ratio.

In column 3, we report the estimates of the model with *stutrnover*, which is, as we should expect, positively and significantly correlated to *countrymean_loansassetvolatility*, while *markcap_gdp* remains negatively and significantly correlated to average loans to total asset volatility. Our key explanatory variable, *countrymean_nondepositsrtio* remains positive and significant at 1% level. The result also shows that interest rate liberalization is—as we should expect—positively and significantly correlated to volatility in loans to total assets. The full OLS model (column 4) is estimated with an additional control variable, *depositshare_foreignbanks* to see whether it can explain the variations in *countrymean_loansassetvolatility*, when controlling for *countrymean_nondepositsrtio* and other variables. Though the coefficient of *depositshare_foreignbanks* is positive, it is insignificant, while the *countrymean_nondepositsrtio* remains significant at 1% level.

Graph VI: Non-deposit based funding and volatility in loans



Recognizing that our OLS estimates are likely to be biased, we estimate the final model in Feasible Generalized Least Squares[11] to correct for potential heteroskedasticity and serial correlation in the data. Again, the estimate yields positive and significant coefficients for *countrymean_nondepositsrtio* and also in case of *intratecontrols*. We run the model in Two Stage Least Squares (2SLS, Column 6) and GMM (Column 7) Instrumental Variable Estimation methods. We assume that our controls—*l_cpi, dbagdp, markcap_gdp, trade_gdp, govdebt_gdp and stutrnover*—are endogenous variables and they are instrumented with *log_pop* (natural log of population), *british* (=1 if the country is a former British colony), *french* (=1 if the country is a former French colony), *spanish* (=1 if the country is a former Spanish colony), *Portuguese* (=1 if the country is a former Portuguese colony), *cis* (=1 if the country belonged to the Soviet block or was part of the Soviet Union) and *others* (=1 if the country does not belong to any of the aforementioned group). Both 2SLS and GMM estimates confirm the positive correlation between *countrymean_nondepositsrtio and countrymean_loansassetvolatility,* showing that a 1% increase in *countrymean_nondepositsrtio,* holding everything else constant, can increase *countrymean_loansassetvolatility* by .40% (.39% in the GMM estimate). The results also confirm the positive association between interest rate liberalization and volatility in loans to total asset ratio.

The regression results of Table VII confirm our hypothesis that an increase in reliance on non-deposit-based funding can make the average loans to total assets ratio in the country more volatile. For central bankers, this finding has important implications especially if they intend to make the availability of bank credit more predictable and stable. Central banks may also need to take into account that liberalization of interest rates can make bank credit not only more costly but also more unpredictable and volatile.

6. Conclusion

Bank ownership is an important factor in explaining not only who banks lend to, but also how much they lend and under what terms and conditions. Cherry-picking modes only focus on foreign banks' lending preferences for a particular type of borrower—the so-called "creams" who maintain better accounting standards or are more likely to succeed in implementing positive NPV projects. These models, implicitly or explicitly, suggest that improved legal protection for foreign lenders, greater availability of information on domestic borrowers, objective credit-ratings or transparent accounting systems will sufficiently correct the cherry-picking problems and enable foreign banks to lend to the "non-creams". The onus is therefore on the host country legal, informational and regulatory environment to ensure that foreign banks do not cherry-pick their clients.

Our analysis shows that foreign banks are fundamentally different from domestic banks. For a number of reasons, as argued in the paper, they are less inclined to lending and their loans are likely to be more volatile than those offered by domestic banks. Our empirical analysis shows that bank ownership does matter. It also shows that deposits matter. We also find compelling evidence that financial regulations matter. Foreign banks may contribute to the financial development of the host country so long as their presence does not erode the deposit share of domestic banks. Many developing countries have welcomed foreign banks and exploit the benefits of their specialized skills and services without allowing their domestic banks losing market share of deposits.

11 We were able to run FGLS estimates in Stata 11 when the matrix size remained below 800. Stata 11 was unable to perform FGLS on bank-level data when the matrix size was larger than 800.

To ensure that increased foreign bank presence does not adversely affect the supply of credit to the private sector or make credit more volatile, central bankers in developing countries must carefully manage the competition between foreign and domestic banks for market share in deposits. If domestic banks lose their deposits to foreign banks, they will also lose their capacity to lend. Foreign banks may be discouraged from competing in the retail deposit market, as had been the practice in the United States or China. Alternatively, central banks may control interest rates in inter-bank borrowing to ensure that domestic banks, which have lost their deposit-base to foreign banks, can borrow on favorable terms. Restricting *de novo* entries of foreign banks and maintaining an optimal level of concentration in the banking sector can also ensure that banks do not excessively compete for deposits. Deposit insurance schemes for domestic banks, but not for foreign banks that collect large deposits, can also limit foreign banks' aggressive entry in the deposit market. We argue that a set of financial regulations—including selective controls on interest rates, credit ceilings, entry restrictions and deposit insurance—can ensure that foreign bank presence leads to a win-win outcome for the host country.

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Annex I

Developing and Emerging Countries Included in the Analysis

Algeria	Hungary	Poland
Angola	India	Romania
Argentina	Indonesia	Russia
Azerbaijan	Israel	Rwanda
Bangladesh	Ivory Coast	Saudi Arabia
Belarus	Jordan	Senegal
Benin	Kazakhstan	Serbia
Bolivia	Kenya	Sierra Leone
Brazil	Korea	Slovakia
Bulgaria	Kyrgyz Republic	South Africa
Burkina Faso	Laos	Sri Lanka
Burundi	Libya	Sudan
Cambodia	Madagascar	Syria
Cameroon	Malawi	Tajikistan
Chile	Malaysia	Tanzania
China	Mali	Thailand
Colombia	Mexico	Togo
Congo Democratic Republic	Morocco	Tunisia
Czech Republic	Mozambique	Turkey
Dominican Republic	Nepal	Uganda
Ecuador	Nicaragua	Ukraine
Egypt	Niger	Uzbekistan
El Salvador	Nigeria	Venezuela
Ethiopia	Pakistan	Vietnam
Ghana	Paraguay	Yemen
Guatemala	Peru	Zambia
Honduras	Philippines	Zimbabwe

Annex II

Definition of Variables and Sources

Bankscope database, 2010[1]

foreign: A bank is considered foreign-owned and *foreign*=1 if 50% of its capital is in the hands of non-resident. The variable foreign is coded based on the relevant data available in Bankscope, including the data that provides the name and address of the global ultimate owner of a bank. When the relevant ownership information is not available in Bankscope, we verified ownership of the bank, checking the relevant central bank website, the bank's own website and the most recent annual report. The value of foreign does not change over the 1995-2009 period.

loans_totalassets: The nominal US dollar value of loans of bank i at time t divided by the nominal US dollar value of the total assets of bank i at time t.

equity_totalassets: The nominal US dollar value of total equity of bank i at time t divided by the nominal US dollar value of the total assets of bank i at time t.

nondeposit_ratio: The nominal US dollar value of total loan plus other earning assets minus total deposits (loans + other-earning assets – deposits) of bank i at time t divided by the nominal US dollar value of loans plus other-earning assets (loans + other-earning assets) of bank i at time t.

depositshare_growth: The market share of deposits is calculated as an individual banks' share of total deposits in each country. The variable *depositshare_growth* is calculated as ***depositshare*** of bank i at time t minus depositshare of bank i at time t-1 divided by ***depositshare*** of bank i at time t-1.

volatility_loansassetratio: It is the coefficient of variation of the variable ***loans_totalasset*** of bank i at time t. The coefficient of variation is calculated, dividing the standard deviation of ***loans_totalasset*** of bank i over 1995-2008 by the mean *loans_totalasset* of bank i over 1995-2008.

depositshare_foreignbanks: The total deposits held in all foreign banks in country j at time t *divided by* the sum of all deposits held in all banks (foreign and domestic) in country j at time t.

countrymean_nondepositratio: It is the country average of ***nondeposit_ratio*** for all banks in country j.

countrymean_loansassetvolatility: The variable is the country average of ***volatility_loansassetratio*** for all banks in country j.

World Development Indicators, the World Bank, 2010

l_cpi: Natural log of inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.

1 Bankscope is a comprehensive, global database of banks' financial statements, ratings and intelligence, developed and maintained by Bureau van Djik

log_gdppc: Natural log of GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current U.S. dollars.

int_spread: Interest rate spread is the interest rate charged by banks on loans to prime customers minus the interest rate paid by commercial or similar banks for demand, time, or savings deposits.

markcap_gdp: Market capitalization (also known as market value) is the share price times the number of shares outstanding. Listed domestic companies are the domestically incorporated companies listed on the country's stock exchanges at the end of the year. Listed companies do not include investment companies, mutual funds, or other collective investment vehicles. (Source: Standard & Poor's, Emerging Stock Markets Factbook and supplemental S&P data, and World Bank and OECD GDP estimates)

stutrnover: Turnover ratio is the total value of shares traded during the period divided by the average market capitalization for the period. Average market capitalization is calculated as the average of the end-of-period values for the current period and the previous period. (Source: Standard & Poor's, Emerging Stock Markets Factbook and supplemental S&P data. Catalog Sources World Development Indicators)

gdp_grow: Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2000 U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.

creditcover: Sum of private and public credit registry coverage as percentage of adult population. Private credit bureau coverage reports the number of individuals or firms listed by a private credit bureau with current information on repayment history, unpaid debts, or credit outstanding. The number is expressed as a percentage of the adult population. Public credit registry coverage reports the number of individuals and firms listed in a public credit registry with current information on repayment history, unpaid debts, or credit outstanding. The number is expressed as a percentage of the adult population. (Source: World Bank, Doing Business project (http://www.doingbusiness.org/).

log_pop: Natural log of total population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship – except for refugees not permanently settled in the country of asylum, who are generally considered part of the population of their country of origin. The values shown are midyear estimates. (Source: United Nations Population Division. 2009)

domcreditpvt_gdp: Domestic credit to private sector refers to financial resources provided to the private sector, such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries these claims include credit to public enterprises. (Source: International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates).

govdebt_gdp: Debt is the entire stock of direct government fixed-term contractual obligations to others outstanding on a particular date. It includes domestic and foreign liabilities such as currency and money deposits, securities other than shares, and loans. It is the gross amount of government liabilities reduced by the amount of equity and financial derivatives held by the government. Because debt is a stock rather than a flow, it is measured as of a given date, usually the last day of the fiscal year. (Source: International Monetary Fund, Government Finance Statistics Yearbook and data files, and World Bank and OECD GDP estimates).

trade_gdp: Sum of export and imports, expressed as percentage of GDP. Imports of goods and services represent the value of all goods and other market services received from the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. Exports of goods and services represent the value of all goods and other market services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments. (Source: World Bank national accounts data and OECD National Accounts data files).

Financial Development and Structure Database, 2009[2]

dbagdp: Deposit money bank assets / GDP. Claims on domestic real nonfinancial sector by deposit money banks as a share of GDP, calculated using the following deflation method: {(0.5)*[Ft/P_et + Ft-1/P_et-1]}/[GDPt/P_at] where F is deposit money bank claims, P_e is end-of period CPI, and P_a is average annual CPI. Raw data are from the electronic version of the IMF's International Financial Statistics, October 2008. Deposit money bank assets (IFS lines 22, a-d); GDP in local currency (IFS line 99B.ZF or, if not available, line 99B.CZF); end-of period CPI (IFS line 64M.ZF or, if not available, 64Q.ZF); and annual CPI (IFS line 64.ZF)

Concentration: Assets of three largest banks as a share of assets of all commercial banks. (Source: Fitch's BankScope database)

bcbd: Bank credit /Bank deposits. Private credit by deposit money banks as a share of demand, time and saving deposits in deposit money banks. Raw data are from the electronic version of the IMF's International Financial Statistics, October 2008. Private credit by deposit money banks (IFS line 22d); bank deposits (IFS lines 24 and 25).

Financial Reform Database, 2008[3]

creditcontrols: The variable takes a value between 0 and 4 based on the following (higher value means less control):

1. *Are reserve requirements restrictive?*
   - Coded as 0 if reserve requirement is more than 20 percent.

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2 Thorsten Beck, Asli Demirgüç-Kunt and Ross Levine, (2000), "A New Database on Financial Development and Structure", World Bank Economic Review 14, 597-605, revised January 2010

3 Abiad, Abdul, Enrica Detragiache, and Thierry Tressel: A New Database of Financial Reforms, IMF Working Paper, WP/08/266, December 2008

- Coded as 1 if reserve requirements are reduced to 10–20 percent or complicated regulations to set reserve requirements are simplified as a step toward reducing reserve requirements
- Coded as 2 if reserve requirements are less than 10 percent.

2. *Are there minimum amounts of credit that must be channeled to certain sectors?*
   - Coded as 0 if credit allocations are determined by the central bank or mandatory credit allocations to certain sectors exist.
   - Coded as 1 if mandatory credit allocations to certain sectors are eliminated or do not exist.

3. *Are there any credits supplied to certain sectors at subsidized rates?*
   - Coded as 0 when banks have to supply credits at subsidized rates to certain sectors.
   - Coded as 1 when the mandatory requirement of credit allocation at subsidized rates is eliminated or banks do not have to supply credits at subsidized rates.

These three questions' scores are summed and coded as follows:

Fully Liberalized = [4], Largely Liberalized = [3], Partially Repressed = [1,2], Fully Repressed= [0]

intratecontrols: The variable takes a value between 0 and 4 based on the following ((higher value means less control on interest rates):

Deposit rates and lending rates are separately considered, in coding this measure, in order to look at the type of regulations for each set of rates. They are coded as being government set or subject to a binding ceiling (code=0), fluctuating within a band (code=1) or freely floating (code=2). The coding is based on the following description:

- FL=4 [2, 2] Fully Liberalized if both deposit interest rates and lending interest rates are determined at market rates.
- LL = 3 [2, 1] Largely Liberalized when either deposit rates or lending rates are freed but the other rates are subject to band or only a part of interest rates are determined at market rates.
- PR= 2/1 [2, 0] [1, 1][1, 0] Partially Repressed when either deposit rates or lending rates are freed but the other interest rates are set by government or subject to ceiling/floor; or both deposit rates and lending rates are subject to band or partially liberalized; or either deposit rates or lending rates are subject to band or partially liberalized.
- FR= 0 [0, 0] Fully Repressed when both deposit rates and lending rates are set by the government or subject to ceiling/floor.

entrybarriers: The variable takes a value between 0 and 5 based on the following (higher value means less barrier):

1. *To what extent does the government allow foreign banks to enter into a domestic market?*

   This question is coded to examine whether a country allows the entry of foreign banks into a domestic market; whether branching restrictions of foreign banks are eased; to what degree the equity ownership of domestic banks by nonresidents is allowed.

- Coded as 0 when no entry of foreign banks is allowed; or tight restrictions on the opening of new foreign banks are in place.
- Coded as 1 when foreign bank entry is allowed, but nonresidents must hold less than 50 percent equity share.
- Coded as 2 when the majority of share of equity ownership of domestic banks by nonresidents is allowed; or equal treatment is ensured for both foreign banks and domestic banks; or an unlimited number of branching is allowed for foreign banks.

Three questions look at policies to enhance the competition in the domestic banking market.

2. *Does the government allow the entry of new domestic banks?*
   - Coded as 0 when the entry of new domestic banks is not allowed or strictly regulated.
   - Coded as 1 when the entry of new domestic banks or other financial institutions is allowed into the domestic market.

3. *Are there restrictions on branching?*
   - Coded as 0 when branching restrictions are in place.
   - Coded as 1 when there are no branching restrictions or if restrictions are eased.

4. *Does the government allow banks to engage in a wide rage of activities?*
   - Coded as 0 when the range of activities that banks can take consists of only banking activities.
   - Coded as 1 when banks are allowed to become universal banks.

The dimension of entry barriers is coded by adding the scores of these three questions.

Fully Liberalized= 4 or 5, Largely Liberalized= 3, Partially Repressed= 1 or 2, Fully Repressed = 0

bankingsuperv: The variable takes a value between 0 and 6 based on the following (higher value means more/better regulation):

1. *Has a country adopted a capital adequacy ratio based on the Basle standard?*
   - Coded as 0 if the Basle risk-weighted capital adequacy ratio is not implemented. Date of implementation is important, in terms of passing legislation to enforce the Basle requirement of 8 percent CAR.
   - Coded as 1 when Basle CAR is in force. (Note: If the large majority of banks meet the prudential requirement of an 8 percent risk-weighted capital adequacy ratio, but this is not a mandatory ratio as in Basle, the measure is still classified as 1). Prior to 1993, when the Basle regulations were not in place internationally, this measure takes the value of 0.

2. *Is the banking supervisory agency independent from executives' influence?*
   - Coded as 0 when the banking supervisory agency does not have an adequate legal framework to promptly intervene in banks' activities; and/or when there is the lack of legal framework for the independence of the supervisory agency such as the appointment and removal of the head of the banking supervisory agency; or the ultimate jurisdiction of the banking supervision is under the MOF; or when a frequent turnover of the head of the supervisory agency is experienced.

- Coded as 1 when the objective supervisory agency is clearly defined and an adequate legal framework to resolve banking problems is provided (the revocation and the suspension of authorization of banks, liquidation of banks, and the removal of banks' executives etc.) but potential problems remain concerning the independence of the banking supervisory agency.
- Coded as 2 when a legal framework for the objectives and the resolution of troubled banks is set up and if the banking supervisory agency is legally independent from the executive branch and actually not interfered with by the executive branch.

3. *Does a banking supervisory agency conduct effective supervisions through on-site and off-site examinations?*
   - Coded as 0 when a country has no legal framework and practices of on-site and off-site examinations is not provided or when no on-site and off-site examinations are conducted.
   - Coded as 1 when the legal framework of on-site and off-site examinations is set up and the banking supervision agency have conducted examinations but in an ineffective or insufficient manner.
   - Coded as 2 when the banking supervisory agency conducts effective and sophisticated examinations.

4. *Does a country's banking supervisory agency cover all financial institutions without exception?*
   - Coded as 1 when all banks are under supervision by supervisory agencies without exception.
   - Coded as 0 if some kinds of financial institutions are not exclusively supervised by the banking supervisory or are excluded from banking supervisory agency oversights.

Enhancement of banking supervision over the banking sector is coded by summing up these four dimensions, which are assigned a degree of reform as follows.

Highly Regulated = [6], Largely Regulated = [4-5], Less Regulated = [2-3], Not Regulated = [0-1]

Bank Regulation and Supervision Database, updated June 2008[4]

dep_insurance: The World Bank survey of Central Banks asks the question whether the country has an explicit deposit insurance protection system. The variable takes the value of 1 if the answer is yes, 0 otherwise.

4 The regulation and supervision of banks around the world—a new database, by James R. Barth, Gerard Caprio, Jr. and Ross Levine. World Bank Policy Research Working Paper Number 2588, April 2001.

Annex III

Table I: Loans to Total Asset Ratio: Do Foreign Banks Lend Less?

VARIABLES	(1) OLS	(2) OLS	(3) GLS	(4) GLS	(5) DPD	(6) DPD	(7) DPD
L.loans_totalasset					0.49***	-0.46*	-0.31
					(0.054)	(0.271)	(0.212)
L2. loans_totalasset						-0.85***	-0.87***
						(0.245)	(0.309)
L3. loans_totalasset							0.19
							(0.374)
foreign	-0.04***	-0.03***	-0.03*	-0.03*	-0.09	-0.67***	-0.47*
	(0.009)	(0.009)	(0.015)	(0.015)	(0.162)	(0.252)	(0.241)
equity_totalasset	-0.12***	-0.12***	0.02	0.02	0.27***	0.08	0.03
	(0.019)	(0.020)	(0.018)	(0.018)	(0.033)	(0.061)	(0.057)
l_cpi	0.59***	0.54***	0.56***	0.50***	-0.05	-0.01	-0.33
	(0.133)	(0.135)	(0.098)	(0.102)	(0.163)	(0.187)	(0.204)
log_gdppc	0.05***	0.05***	0.01	0.00	0.00	0.07***	0.09***
	(0.003)	(0.005)	(0.006)	(0.007)	(0.015)	(0.021)	(0.030)
govdebt_gdp	0.16***	0.12***	0.00	0.02	0.03	-0.02	-0.01
	(0.015)	(0.024)	(0.019)	(0.022)	(0.031)	(0.033)	(0.034)
trade_gdp	0.07***	0.08***	0.10***	0.10***	0.08	0.28***	0.22**
	(0.014)	(0.016)	(0.019)	(0.022)	(0.073)	(0.097)	(0.091)
markcap_gdp	-0.01	-0.02	0.02**	0.02**	-0.01	0.03	0.01
	(0.012)	(0.013)	(0.010)	(0.010)	(0.015)	(0.017)	(0.015)
creditcover	-0.11***	-0.14***	0.05*	0.10***	0.16*	0.13	0.17*
	(0.021)	(0.027)	(0.025)	(0.036)	(0.083)	(0.087)	(0.090)
intratecontrols		0.02		-0.12***	0.01	-0.44**	-0.51**
		(0.014)		(0.024)	(0.119)	(0.176)	(0.253)
concentration		0.05		-0.04	-0.09*	0.03	-0.06
		(0.036)		(0.036)	(0.052)	(0.057)	(0.061)
entrybarriers		-0.01		0.06***	-0.06	-0.01	0.10
		(0.010)		(0.018)	(0.060)	(0.076)	(0.129)
Observations	4,908	4,857	4,908	4,857	4,274	3,341	2,489
Number of banks			1,373	1,359	1,328	1,218	992
Adj. R-squared	0.88	0.88	.	.	.	.	.
Breuesh-Pagan Test for Random Effects (GLS)			Yes	Yes			
Sargan test for valid instruments (DPD)					No	Yes	Yes

Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.10.

Table II: Growth in Market Share of Deposits—Do foreign banks compete for deposits in the host country?

VARIABLES	(1) Model	(2) Model	(3) Model	(4) Model	(5) Model
L.depositshare_growth	-0.0240	-0.0386**	-0.0424**	-0.0494***	-0.0479***
	(0.016)	(0.016)	(0.016)	(0.017)	(0.017)
foreign	0.4430***	0.5258***	0.5424***	0.5736***	0.6468***
	(0.154)	(0.160)	(0.170)	(0.162)	(0.200)
equity_totalasset	-0.0000	-0.0000	0.0000	-0.0000	-0.0000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
log_gdppc	0.0084	0.0197	0.0159	0.0139	0.0215
	(0.015)	(0.016)	(0.020)	(0.021)	(0.026)
l_cpi	0.0983	0.0576	0.0296	0.0168	0.0043
	(0.170)	(0.172)	(0.175)	(0.194)	(0.198)
gdp_grow	0.5687*	0.4230	0.3695	0.3867	0.3694
	(0.315)	(0.316)	(0.321)	(0.357)	(0.359)
dep_insurance	-0.3139**	-0.3318**	-0.3080**	-0.3320**	-0.2918*
	(0.144)	(0.145)	(0.155)	(0.165)	(0.161)
concentration		-0.2546***	-0.2647***	-0.2703***	-0.2548***
		(0.077)	(0.078)	(0.082)	(0.083)
bcbd			0.0129	0.0253	0.0138
			(0.064)	(0.068)	(0.069)
intratecontrols				0.0040	0.0083
				(0.026)	(0.026)
entrybarriers					-0.0493
					(0.065)
Observations	6,240	6,181	6,155	5,810	5,754
Number of banks	1,807	1,793	1,786	1,698	1,690
Sargan Test for Valid Instruments	Valid.	Valid	Valid	Valid	Valid

Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.10.

Table III: Volatility in Loans to Total Asset ratio—Are loans from foreign banks more volatile?

VARIABLES	(1) OLS	(2) OLS	(3) OLS	(4) IV-2SLS	(5) IV-GMM
foreign	0.06***	0.06***	0.05***	0.03***	0.03***
	(0.006)	(0.007)	(0.007)	(0.008)	(0.010)
equity_totalasset	0.35***	0.33***	0.32***	0.20***	0.20***
	(0.016)	(0.018)	(0.018)	(0.030)	(0.038)
log_gdppc	0.02***	0.02***	-0.00	-0.01	-0.01
	(0.001)	(0.002)	(0.003)	(0.006)	(0.006)
l_cpi	0.21***	0.07	0.16***	0.05	0.05
	(0.040)	(0.046)	(0.049)	(0.121)	(0.132)
govdebt_gdp	0.03***	0.05***	0.05***	0.10***	0.09***
	(0.009)	(0.011)	(0.014)	(0.035)	(0.034)
trade_gdp	-0.02**	-0.02*	-0.04***	-0.10***	-0.09***
	(0.009)	(0.010)	(0.010)	(0.019)	(0.021)
markcap_gdp	-0.04***	-0.05***	-0.01	-0.14***	-0.14***
	(0.008)	(0.008)	(0.009)	(0.047)	(0.047)
stutrnover		0.01**	0.03***	0.09***	0.09***
		(0.006)	(0.006)	(0.018)	(0.019)
nondeposits_ratio		0.08***	0.09***	0.37***	0.37***
		(0.011)	(0.011)	(0.051)	(0.054)
intratecontrols			0.03***	0.03***	0.03***
			(0.006)	(0.010)	(0.010)
concentration			0.20***	0.13***	0.13***
			(0.019)	(0.032)	(0.033)
Observations	6,777	6,240	6,185	6,185	6,185
R-squared	0.6259	0.6285	0.6331		
Adj. R-squared	0.6256	0.6280	0.6325	.	.

Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.10.

Table IV: Can the share of deposits held in foreign banks explain the increased reliance on non-deposit based funding in the host country?

VARIABLES	(1) DPD	(2) DPD	(3) DPD	(4) DPD	(5) DPD	(6) FGLS	(7) OLS
L.countrymean_nondepositratio	0.69***	0.71***	0.72***	0.72***	0.70***		
	(0.054)	(0.055)	(0.056)	(0.056)	(0.058)		
depositshare_foreignbanks	0.07*	0.10**	0.10**	0.10**	0.11***	0.06***	0.03*
	(0.039)	(0.044)	(0.044)	(0.044)	(0.046)	(0.022)	(0.018)
dbagdp	-0.01	-0.02	-0.02	-0.01	-0.01	-0.00	-0.08***
	(0.044)	(0.037)	(0.037)	(0.038)	(0.038)	(0.024)	(0.022)
l_cpi	-0.02**	-0.01**	-0.02**	-0.01**	-0.01*	-0.01**	0.01
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.004)	(0.012)
log_gdppc	0.02***	0.02***	0.03***	0.03***	0.03***	0.06***	0.07***
	(0.006)	(0.006)	(0.007)	(0.008)	(0.008)	(0.007)	(0.004)
concentration	-0.05	-0.09**	-0.07*	-0.07	-0.07	-0.03	-0.11***
	(0.041)	(0.043)	(0.043)	(0.043)	(0.043)	(0.029)	(0.026)
intratecontrols		0.00	0.01	0.02	0.02	0.00	0.00
		(0.012)	(0.012)	(0.013)	(0.013)	(0.007)	(0.008)
creditcontrols			-0.03**	-0.03**	-0.03**	-0.01	-0.04***
			(0.014)	(0.014)	(0.014)	(0.006)	(0.007)
entrybarriers				-0.02	-0.02	-0.01*	-0.01*
				(0.016)	(0.016)	(0.007)	(0.008)
bankingsuperv					-0.01	-0.00	0.01
					(0.010)	(0.006)	(0.008)
Observations	725	576	576	573	573	609	610
R-squared							0.85
Number of country_id	70	51	51	51	51	50	
Adj. R-squared	.	.	.	.	.	.	0.85
Sargan test for valid instruments	Yes	Yes	Yes	Yes	Yes		

Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.10.

Table V: Can the increased reliance on non-deposit based funding explain higher interest rate spreads?

VARIABLES	(1) DPD	(2) DPD	(3) DPD	(4) DPD	(5) FGLS	(6) OLS
L.int_spread	0.59***	0.57***	0.60***	0.61***		
	(0.068)	(0.069)	(0.073)	(0.076)		
countrymean_nondepositsrtio	0.06***	0.06**	0.05**	0.05*	0.05**	0.13***
	(0.024)	(0.025)	(0.025)	(0.027)	(0.022)	(0.043)
l_cpi	-0.14***	-0.10***	-0.09**	-0.09**	-0.01	-0.08
	(0.037)	(0.038)	(0.037)	(0.037)	(0.039)	(0.071)
log_gdppc	0.01	0.01	0.00	0.00	0.00	0.01
	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)	(0.008)
dbagdp	0.01	0.00	-0.00	-0.01	0.01	0.04
	(0.025)	(0.025)	(0.025)	(0.026)	(0.029)	(0.034)
markcap_gdp	0.01	0.01	0.02	0.02	-0.00	-0.00
	(0.013)	(0.012)	(0.012)	(0.012)	(0.008)	(0.018)
trade_gdp	-0.08***	-0.08***	-0.08***	-0.08***	-0.07***	-0.12***
	(0.016)	(0.017)	(0.017)	(0.017)	(0.017)	(0.020)
govdebt_gdp	-0.02	-0.01	-0.02	-0.02	0.00	-0.02
	(0.019)	(0.018)	(0.018)	(0.018)	(0.018)	(0.023)
intratecontrols		-0.00	-0.00	-0.00	0.01	0.02
		(0.009)	(0.009)	(0.009)	(0.006)	(0.014)
concentration			0.06**	0.06**	0.04	0.15***
			(0.027)	(0.027)	(0.030)	(0.041)
depositshare_foreignbanks				0.01	-0.00	-0.03
				(0.015)	(0.013)	(0.021)
Observations	118	109	109	108	113	117
R-squared						0.4581
Number of country_id	26	23	23	22	28	
Adj. R-squared	.	.	.	.	.	0.4070
Sargan test for valid instruments	Yes	Yes	Yes	Yes		

Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.10.

Table VI: Can the share of deposits held in foreign banks explain the decline in credit to private sector?

VARIABLES	(1) DPD	(2) DPD	(3) DPD	(4) DPD	(5) DPD	(6) FGLS	(7) OLS
L.domcreditpvt_gdp	0.87***	0.65***	0.51***	0.47***	0.44***		
	(0.045)	(0.150)	(0.170)	(0.178)	(0.171)		
depositshare_foreignbanks	-0.14***	-0.21***	-0.24***	-0.35**	-0.45***	-0.07***	-0.04
	(0.033)	(0.064)	(0.069)	(0.161)	(0.162)	(0.025)	(0.036)
log_gdppc	0.04***	0.08***	0.09***	0.11***	0.11***	0.01	0.00
	(0.012)	(0.020)	(0.026)	(0.036)	(0.034)	(0.008)	(0.010)
l_cpi	-0.03	-0.91***	-0.96***	-0.88***	-0.77**	-0.55***	-0.71**
	(0.065)	(0.286)	(0.305)	(0.324)	(0.317)	(0.147)	(0.282)
dbagdp	0.02	0.01	0.07	0.06	0.03	0.74***	0.94***
	(0.069)	(0.119)	(0.129)	(0.131)	(0.127)	(0.057)	(0.081)
markcap_gdp	0.03*	-0.01	0.01	0.02	0.03	-0.01	-0.03
	(0.016)	(0.024)	(0.024)	(0.026)	(0.025)	(0.015)	(0.023)
trade_gdp	-0.02	0.12**	0.11	0.12*	0.09	0.06*	-0.01
	(0.034)	(0.055)	(0.068)	(0.070)	(0.068)	(0.034)	(0.057)
govdebt_gdp	0.11***	0.03	0.04	0.06	0.00	-0.08**	-0.10**
	(0.040)	(0.055)	(0.057)	(0.060)	(0.064)	(0.035)	(0.043)
creditcover		0.05	0.16**	0.11	0.03	-0.01	-0.07
		(0.068)	(0.081)	(0.104)	(0.108)	(0.023)	(0.049)
creditcontrols			0.08	0.07	0.07	0.07***	0.09***
			(0.055)	(0.057)	(0.055)	(0.009)	(0.015)
intratecontrols				0.09	0.17	-0.01	0.03
				(0.120)	(0.121)	(0.023)	(0.017)
concentration					0.18**	0.09**	0.09
					(0.089)	(0.040)	(0.064)
Observations	173	75	71	71	71	70	71
R-squared							0.9373
Adj. R-squared	.	.	.	.	.	.	0.9256
Sargan test for valid instruments	No	Yes	Yes	Yes	Yes		

Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.10.

Table VII: Can the increased reliance on non-deposit based funding explain the increased volatility in loans to total asset ratio in the host country?

VARIABLES	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FGLS	(6) IV-2SLS	(7) IV-GMM
countrymean_nondepositsrtio	0.12***	0.16***	0.15***	0.15***	0.02**	0.40***	0.39***
	(0.037)	(0.032)	(0.033)	(0.034)	(0.011)	(0.132)	(0.136)
l_cpi	0.42***	0.22***	0.22***	0.23***	0.03*	-1.50*	-1.59
	(0.067)	(0.061)	(0.061)	(0.063)	(0.016)	(0.776)	(1.112)
log_gdppc	0.01*	0.00	0.00	-0.00	0.01***	-0.04	-0.02
	(0.006)	(0.006)	(0.006)	(0.006)	(0.003)	(0.027)	(0.035)
dbagdp	0.01	0.06**	0.05**	0.06**	-0.03***	-0.10	-0.19
	(0.030)	(0.025)	(0.026)	(0.027)	(0.012)	(0.150)	(0.193)
markcap_gdp	-0.04**	-0.04***	-0.04***	-0.04**	-0.00	0.06	0.15
	(0.017)	(0.014)	(0.014)	(0.014)	(0.003)	(0.120)	(0.137)
trade_gdp	0.03*	0.01	0.01	0.01	0.00	-0.03	-0.02
	(0.016)	(0.015)	(0.015)	(0.015)	(0.007)	(0.062)	(0.059)
govdebt_gdp	-0.02	-0.12***	-0.12***	-0.12***	-0.02**	-0.19	-0.05
	(0.017)	(0.017)	(0.017)	(0.018)	(0.010)	(0.123)	(0.113)
intratecontrols		0.01	0.01	0.01	0.01**	0.04*	0.02*
		(0.007)	(0.007)	(0.007)	(0.003)	(0.025)	(0.004)
concentration		0.09***	0.11***	0.11***	0.01	0.19*	0.12
		(0.027)	(0.028)	(0.031)	(0.012)	(0.115)	(0.101)
stutrnover			0.02**	0.02*	-0.00	0.06	0.04
			(0.008)	(0.008)	(0.002)	(0.049)	(0.041)
depositshare_foreignbanks				0.01			
				(0.015)			
Observations	187	176	172	169	167	172	172
R-squared	0.4007	0.5518	0.5633	0.5548			
Adj. R-squared	0.3772	0.5275	0.5361	0.5236	.	.	.
Number of country_id					44		

Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.10.