

**How Foreign Participation and Market Concentration Impact Bank Spreads:  
Evidence from Latin America**

Maria Soledad Martinez Peria and Ashoka Mody\*

**Abstract:**

Increasing foreign bank participation and high, and often rising, concentration levels characterize the recent evolution of banking market structures in many developing countries. We analyze the impact of these factors on bank spreads using bank level data for Argentina, Chile, Colombia, Mexico, and Peru during the late 1990s. Our results suggest that foreign banks were able to charge lower spreads relative to domestic banks. This was more so for *de novo* foreign banks than for existing ones acquired by foreigners. The overall level of foreign bank participation did not apparently have a direct impact on spreads, but seemed to influence them through its effect on administrative costs. Bank concentration was positively and directly related to both higher spreads and higher administrative costs.

---

\* The authors are World Bank and IMF staff members, respectively. We would like to thank Asli Demirgüç-Kunt and Sergio Schmukler for comments and suggestions. We are greatly indebted to Juan Miguel Crivelli and Adrian de la Garza for excellent research assistance. The opinions expressed in this paper are entirely those of the authors and do not reflect the views of the IMF, the World Bank, or their executive directors. Corresponding author: Maria Soledad Martinez Peria, 1818 H Street N.W., The World Bank, Washington, D.C. 20433. Phone: (202)458-7341. Fax: (202)522-1155. E-mail: [mmartinezperia@worldbank.org](mailto:mmartinezperia@worldbank.org).

In recent years, many developing countries have witnessed significant changes in the market structure of their banking sectors. In particular, a far-reaching transformation experienced by an increasing number of developing countries has been the ongoing and, often, extensive entry of foreign banks. Between 1994 and 1999, the share of assets held by foreign banks (i.e., those banks that are at least 50 percent foreign) increased from 7.8 percent to 52.3 percent among countries in Eastern Europe (IMF 2000). For countries in Latin America, the corresponding figures reflect an increase in foreign bank participation from 13.1 percent to 44.8 percent over this period. The rise in foreign bank participation has often occurred in the context of already high and in some countries rising levels of bank concentration. Among a sample of 33 developing countries, the level of bank assets held by the three largest banks averaged 64 percent during 1995-99.<sup>1</sup>

The increase in foreign bank presence and the high levels of bank concentration in developing countries have been the result of a number of factors, some of them interrelated. The increase in foreign bank participation has been largely a facet of the larger process of financial liberalization and international integration experienced by developing countries in recent years. In many cases, however, foreign entry arose from the exigencies of crises, encouraged by local banking authorities to reduce the costs of recapitalizing the domestic financial system. The high levels of concentration are also the consequence, in part, of bank closures, mergers, and acquisitions following crises. Furthermore, foreign bank entry, in some cases, contributed to bank concentration. First, in many countries foreign banks entered the system mainly by acquiring existing domestic banks. Second, it is possible that in some countries the observed domestic bank consolidation and concentration occurred in response to foreign competition.

---

<sup>1</sup> Figures obtained from Demirgüç-Kunt, Laeven, and Levine (2002).

Foreign bank entry and bank concentration could influence many aspects of banking sectors in developing countries.<sup>2</sup> A particular question of interest for policymakers and academics alike might be the impact of these factors on bank spreads -the difference between the rate charged to borrowers and the rate paid by depositors. Spreads are commonly interpreted as a measure of the cost of financial intermediation.<sup>3</sup> High spreads can hinder the growth of savings and investment and imply that the cost of using the financial system may become prohibitive for certain borrowers. Furthermore, the impact of high spreads is likely to be more severe for developing countries where, given that capital markets are generally small and underdeveloped, a larger percentage of firms and individuals tend to depend on banks to meet their financial needs.

A number of recent papers investigate the impact of foreign entry on bank spreads and other variables (see for example Claessens, Demirgüç-Kunt, and Huizinga (2000), Barajas, Steiner, and Salazar (2000), and Denizer (2000)).<sup>4</sup> Yet, only some of these studies have also taken into account the parallel trend towards more consolidation in the sector. On the other hand, none has examined how different types of foreign bank entry affect spreads.

---

<sup>2</sup> For a review of the potential consequences of foreign bank participation see Levine (1996). For a discussion of the impact of bank concentration on profitability see Berger (1995). For a test on whether bank consolidation and concentration has worsened competition in developing countries see Gelos and Roldós (2002).

<sup>3</sup> See Saunders and Schumacher (2000) and Brock and Rojas-Suarez (2000).

<sup>4</sup> Using bank level data for 80 countries in the 1988-1995 period, Claessens, Demirgüç-Kunt, and Huizinga (2000) find that foreign bank entry significantly reduces domestic bank profitability and overall expenses, but fail to find any significant impact on net interest margins. Barajas, Steiner, and Salazar (2000) study the impact of financial liberalization measures undertaken by Colombia in the early 1990s, of which an opening to foreign investment (i.e., foreign bank entry) was a significant component. Controlling for the impact of the relaxation of restrictions on domestic bank entry, the authors find that foreign entry lowered spreads only among foreign, but not domestic banks. At the same time, the Herfindahl index appears to have no impact on net interest margins charged by banks in Colombia. Denizer (2000) investigates the impact of foreign bank penetration in Turkey over the period 1980-97. This study fails to find an association between foreign entry and bank net interest margins, but finds that concentration has a positive impact on spreads.

At the same time, many papers have focused on the impact of concentration on the degree of competition in the banking sector and, hence, on overall bank profitability.<sup>5</sup> However, typically, these studies have not examined the direct impact on bank spreads. A recent study by Demirgüç-Kunt, Laeven, and Levine (2002) is an exception. This paper analyzes the effect of concentration and bank regulation on spreads, but in this study little attention is paid to the simultaneous impact that foreign bank participation could have on this variable.

Our paper investigates the impact of foreign bank participation and concentration on bank spreads in a sample of developing, particularly Latin American, countries during the late 1990s. Using bank level data for Argentina, Chile, Colombia, Mexico, and Peru over the late 1990s, we study a number of hypotheses, some of which have been ignored in previous studies. First, we investigate whether, foreign banks are able to operate with lower spreads, directly benefiting borrowers. We refer to this effect as the “own-effect” of foreign bank presence.

Second, we examine whether the type of foreign bank entry influences how big the “own effect” might be. In other words, among the foreign banks we distinguish between spreads charged by those that entered or increased their presence in the system by acquiring domestic banks vis-à-vis those that established de novo operations. A recent theoretical study by Dell’Ariccia and Marquez (2002) suggests that even if all banks are equally cost efficient, there might still be differences in the spreads they charge based on their specialization in different market segments. An alternative explanation for variations in spreads across foreign banks might be related to differences in the pricing strategies pursued by banks to gain market share, even if they lend to the same segments. Though we are not be able to formally test whether variations in market segments or in pricing strategies account for differences in spreads across banks, to our

---

<sup>5</sup> See Gelos and Roldós (2002) and Berger (1995).

knowledge, our study is the first to examine whether all forms of foreign entry have the same impact on spreads.

Third, we analyze whether there is a “spillover effect” as a result of foreign bank participation. That is, once we control for the origin (domestic or foreign) of individual banks, we test whether the overall level of foreign bank participation in the banking system leads to lower spreads across the board, and in particular among domestic banks. This could happen if foreign banks compete directly with domestic banks forcing them to lower their spreads.<sup>6</sup> Alternatively, it is possible that faced with foreign bank competition, domestic banks redirect their lending to segments that are more opaque and where they have an informational advantage and greater market power, allowing them to charge higher spreads (Dell’Ariccia and Marquez, 2002). As a consequence, it is possible that the spillover effect of foreign bank participation is neutral.

Finally, we study the impact of bank concentration on bank spreads by including several measures of system-wide bank concentration in our estimations. At the same time, we control for banks’ market share and for cases of bank consolidation.

We believe this paper contributes to the existing literature not only by testing some hypotheses that have been overlooked before, but also by focusing on a region that has been at the forefront of the recent changes in bank market structure in developing countries and that has been traditionally characterized by having high spreads. In other words, we feel that Latin America makes for an interesting case study for a number of reasons. First, despite having embarked in a process of financial market liberalization during the late 1980s and early 1990s,

---

<sup>6</sup> Domestic banks may lower spreads either because they are driven to become more efficient following bank entry (and they might be able to become more efficient by imitating some of the practices introduced by foreign banks) or because they are forced to give up some of the margins they were able to charge before. In other words, lower spreads could be the result of lower costs or lower revenues.

which included the elimination of interest rates and direct credit controls, spreads in the region remained high by the mid-1990s.<sup>7</sup> Second, perhaps after Eastern Europe, Latin America has been the region to witness the sharpest increase in foreign bank participation (IMF 2000). Third, concentration rose or remains high (depending on the country) in part because many foreign banks increased their participation by acquiring domestic banks. Also, in many of these countries, there has been a trend towards consolidation by domestic banks.

Our empirical analysis yields a number of interesting results. Regarding the effect of foreign bank participation, we find that foreign banks are able to charge lower spreads than domestic banks. Moreover, those foreign banks that acquired domestic institutions have higher spreads than those that established de novo operations, suggesting either some market segmentation or differences in pricing strategies to gain market share. However, we do not find evidence of a direct spillover effect on spreads. In other words, the degree of system wide foreign bank participation (as measured by the share of total loans) does not have any direct impact on spreads. The degree of concentration in the banking system has a positive and economically significant impact on spreads, especially on domestic banks. Nevertheless, spreads in the region appear to be primarily driven by the behavior of administrative costs. In turn, foreign banks seem to exhibit lower administrative costs and foreign bank participation seems to have a spillover effect on administrative costs, i.e., greater participation of foreign banks lowers costs all around.

The remainder of the paper is organized as follows. Section II describes the structure of the banking sector and the behavior of bank spreads in Argentina, Chile, Colombia, Mexico, and

---

<sup>7</sup> Brock and Rojas-Suarez (2000) study spreads in Latin America during 1990-1996 and conclude that they have not gone down significantly (perhaps with the exception of Mexico) and in many cases are still three times higher than those observed for industrial countries (though less so for Chile). In general, the study finds that high operating or administrative costs are particularly significant in explaining the behavior of bank spreads in the region.

Peru over the late 1990s. Section III discusses the empirical methodology and data used to study the determinants of administrative costs and bank spreads in Latin America. Section IV presents the empirical results and section V concludes.

## **II Foreign Bank Participation, Concentration, and Spreads in Latin America**

As in many developing economies, countries in Latin America experienced a significant increase in foreign bank participation during the late 1990s (see Table 2). In Argentina, foreign bank participation increased from 18.9 percent in 1995 to 49.4 percent of outstanding loans in 2000. In Chile, Mexico, and Peru the share of bank loans held by foreign banks rose from below 15 percent in 1995 to exceed 40 percent in 2000. Colombia is the only country in our sample where foreign banks consistently accounted for one-fourth of the loans during the period under consideration.

Accompanying the dramatic increase in foreign bank participation, the total number of banks in the region dropped in four of the five countries and concentration levels increased or remained high. In Argentina and Peru, the number of bank declined by more than 30 percent between 1995 and 2000. The total number of banks in Argentina fell from about 141 in 1995 to 90 in 2000. While Peru had 29 banks in 1995, this number dropped to 20 by 2000. For Colombia and Chile, the number of banks fell by 18 and 11 percent, respectively, during this period. The one exception is Mexico, where the number of banks increased from 39 to 40 between 1997 and 2000.

In all five countries, the share of loans held by the top three (five) banks exceeded 30 (40) percent for most of this period and the Herfindahl index was above 650. Concentration levels rose significantly for Argentina and Chile between 1995 and 2000. In Argentina, the share of

loans held by the top five largest banks increased from 40.9 percent in 1995 to 49.4 percent in 2000. Similarly, this share increased from 51.9 percent to 61.5 percent for the case of Chile between 1995 and 2000.

The drop in the number of banks and the high or rising concentration levels can be ascribed to several reasons. First, there were many bank closures during this period. Such closures typically followed periods of financial distress in the countries, like the Tequila crisis in Argentina in 1995, when 32 banks were closed, and the 1998-99 period of financial turmoil in Colombia, when 4 institutions were liquidated.

Second, much of the increase in foreign bank participation resulted from purchases of domestic banks. Thus, foreign entry did not typically add to the number of banks. In Argentina, sixteen foreign banks acquired domestic financial institutions during the period 1995-2000. The Spanish banks Banco Bilbao Viscaya and Santander, the British bank HSBC, and the Canadian Scotia Bank were among the most significant entrants in Argentina. During the same period, foreign banks acquired five domestic banks in Chile, two in Colombia, and three in Mexico. As in Argentina, Santander, BBVA, and Scotia were significant players in these countries. Though there were also some truly de novo entries, i.e., cases of foreign banks that started their own operations without any affiliation with domestic banks, these were not the norm.<sup>8</sup> Six foreign banks set up de novo operations in Argentina, while two banks settled in Peru over this period. This explains why the total number of foreign banks in these countries did not increase at the same pace as the increase in foreign bank participation in the system.

At the same time, many domestic banks also consolidated with other domestic banks due to financial distress or as a strategy to compete with the foreign banks, bringing down the total

---

<sup>8</sup> Following the lifting of restrictions on foreign entry, fifteen banks initiated operations in Mexico during 1995 and 1996. These entrants were small relative to the existing domestic banks, and the main increase in foreign bank participation occurred through the acquisition of domestic banks during 1999-2001.

number of institutions. Thirty-seven such transactions took place in Argentina, four in Chile, three in Colombia, and three in Peru during the late 1990s.

While a detailed econometric analysis will be undertaken below to analyze the impact of concentration and foreign bank participation on bank spreads, it is interesting to note some trends in these variables for the countries in our sample (see Figures 1.a through 1.e). In Argentina, spreads declined consistently between 1995-1997 from 14 to 8 percent. During this period, foreign bank presence rose from 17 percent of total loans to 28 percent, while concentration (measured by the share of total loans held by the largest five banks) remained fairly stable at around 40 percent. After 1997, both concentration and foreign bank participation rose steadily to 50 percent in 2000, but spreads remained fairly constant at around 10 percent. In Peru, foreign bank entry was associated with a continuous decline in spreads up until about 1999; since then spreads have been relatively stable as increased foreign participation has also been accompanied by greater concentration. In Chile and Mexico, the big increase in foreign participation appears to have had little effect on spreads; both countries have had high concentration levels. Note, however, that Chile and Mexico already had relatively low levels of spreads. Interestingly, spreads in Colombia declined steadily from 19 to around 12 percent though foreign entry was modest and concentration levels did not change significantly. This might point to the fact that we also need to consider other determinants of spreads.

Foreign and domestic bank spreads appear to move very much in tandem across countries in the region (see Figures 2.a. through 2.e). This behavior could signal the influence of macroeconomic factors and/or similar cost structures that affect all banks in the system, as well as the possibility that in general or at least in certain markets foreign and domestic banks compete with each other for customers. Chile is the only case where foreign banks appear to

consistently have higher spreads than domestic banks. In all other countries, the reverse is true most of the time. We turn to a more formal examination of the determinants of spreads and administrative costs to sort out what is driving the trends described.

### III Empirical Methodology and Data

We study the impact of market structure changes on bank spreads, while controlling for a host of bank characteristics and macroeconomic variables, by estimating regressions of the following form:

$$\begin{aligned}
 Spread_{i,j,t} = & \alpha_0 + \alpha_1 Liquidity_{i,j,t} + \alpha_2 Administrative\ Cost_{i,j,t} + \alpha_3 NPLs_{i,j,t} + \\
 & \alpha_4 Equity_{i,j,t} + \alpha_5 Bank\ Market\ Share_{i,j,t} + \alpha_6 Bank\ Origin_{i,j,t} \\
 & \alpha_7 Foreign\_M\ \&A_{i,j,t} + \alpha_8 Foreign\_M\ \&A \times Age_{i,j,t} + \\
 & \alpha_9 Other\_M\ \&A_{i,j,t} + \alpha_{10} Other\_M\ \&A \times Age_{i,j,t} \\
 & \alpha_{11} Foreign\_De\ novo_{i,j,t} + \alpha_{12} Foreign\_De\ novo \times Age_{i,j,t} + \\
 & \alpha_{13} Foreign\ Bank\ Participation_{j,t} + \alpha_{14} Bank\ Concentration_{j,t} + \\
 & \alpha_{15} * Real\ Output\ Growth_{j,t} + \alpha_{16} * Inflation_{j,t} + \alpha_{17} * Short-Term\ Real\ Interest\ Rate_{j,t} + \\
 & \alpha_{18} * Argentina_{i,j,t} + \alpha_{19} * Chile_{i,j,t} + \alpha_{20} * Colombia_{i,j,t} + \alpha_{21} * Peru_{i,j,t} + \varepsilon_{i,j,t} \quad (1)
 \end{aligned}$$

where  $i$  is the bank id,  $j$  identifies the country, and  $t$  refers to the time period considered.

Equation (1) is motivated by the dealership model of bank spreads developed by Ho and Saunders (1981) and the firm-theoretical framework developed by Zarruck (1989), Zarruck and Madura (1992), and Wong (1997).<sup>9</sup> Both models predict that operating costs, regulatory costs, credit risks, and the market structure of the banking sector can affect spreads.<sup>10</sup>

<sup>9</sup> According to the dealership approach (extended by Allen (1988), Mc Shane and Sharpe (1985), and Angbazo (1997)), banks are risk-averse dealers trying to balance loan and deposit markets, where loan requests and deposit flows are not necessarily synchronized. In this set up, bank margins are interpreted as fees charged by banks for the provision of liquidity under transactions uncertainty. The firm theoretical models of banks assume these operate in a static framework where the demand and supply for loans and deposits clears both markets.

<sup>10</sup> A common limitation of the empirical applications of these frameworks is that market structure differences across countries have been modeled by including country dummies (see Saunders and Schumacher (2000), that is they have been implicitly assumed to be constant over time.

In equation (1), the variable *Spread* is the difference between the implicit average interest charged on loans and the implicit average interest paid on deposits. In other words, the spread is calculated by taking the total interest received by banks on loans over one quarter divided by the average loans over that period and subtracting from it the total interest paid on deposits over the quarter divided by average deposits. *Liquidity* is measured as the ratio of liquid to total assets. Liquid assets refer to cash and deposit balances in other banks (including reserve requirements at the central bank). High liquidity ratios, either self-imposed for prudential reasons or as a result of regulation (e.g., reserve or liquidity requirements), inflict a cost on banks since it implies that banks have to give up holding higher yielding assets. To the extent that banks are able to transfer this opportunity cost to borrowers, spreads will rise with liquidity ratios.

*Administrative Costs* refers to the ratio of administrative expenses (including payroll and overhead) to average assets. If banks incur high administrative costs in the process of providing their services as intermediaries, they are likely to increase the spread they charge their customers. *NPLs* is the ratio of non-performing loans to total loans. This variable is intended to capture credit risk. Faced with higher credit risk, banks are likely to charge higher rates on their loans, as equity holders demand risk-adjusted returns. *Equity* refers to the share of bank equity to total assets. Holding large equity ratios either on a voluntary basis or as a result of regulation can be costly for banks. We would expect bank spreads to rise with this variable. *Market Share* is the ratio of each banks' loans to the total system loans. To the extent that market shares gets translated into market power, banks with higher shares of the market may be able to charge higher rates on loans. On the other hand, larger banks may be able to reap economies of scale and may pass on some of these benefits to their customers in the form of lower spreads.

*Bank Origin* is a dummy that takes the value of 1 if a bank is foreign at each point in time. By introducing this variable, we can test whether the average spread for foreign banks is significantly different from the average spread for domestic institutions. That is, this variable allows us to test for the “own effect” of foreign bank presence. *Foreign M&A* is a dummy variable that identifies those transactions where foreign banks increased their size or began operations within our sample by acquiring domestic banks. *Foreign de novo*, on the other hand, is a zero/one variable that captures those foreign banks that set up de novo operations in a given country. The purpose of including the latter two variables is to determine how the spreads for these banks compare with those that have been foreign since the start of the sample and how different modes of foreign bank entry and/or strategies to increase participation in local markets affect bank spreads.

We also control for other types of mergers and acquisitions, namely those involving domestic banks or foreign banks, by including the variable *Other\_M&As*, which takes the value of 1 for those domestic or foreign banks that acquired an institution of the same type. Both M&A variables (i.e., *Foreign* and *Other*) plus the dummy identifying foreign de novo entry are interacted with *Age*, the time since entry (measured in years), to allow for the possibility that there is an adjustment period until banks can attain their desired level of spreads after they enter a new market or purchase/merge with a bank.

*Foreign bank participation* is the share of loans in the hand of foreign banks. This variable captures the dynamic impact of changes in the relative importance of foreign banks on the overall level of spreads. In other words, this variable is included to test whether there is a “spillover effect” arising from the presence of foreign banks in the system. *Banking sector concentration* measures the extent to which loans are concentrated on the hands of few banks

within a system. We include three different measures of concentration, namely, the Herfindahl index – defined as the sum of squared loan market shares - plus the share of loans held by the top 3 and top 5 largest banks, respectively. We expect concentration measures to have a positive impact on bank spreads, once we control for differences in cost ratios across banks. Furthermore, contrary to the literature on bank concentration and profitability, where a positive association between these variables can signal different things, we interpret a positive sign on bank concentration as an indication of greater market power and less competition in the banking sector.<sup>11</sup>

Given that the level of bank spreads can be affected by the macroeconomic environment in which banks operate, we control for the *Inflation* rate, the *Real Output Growth*, and a measure of the money market *Short-term Real Interest Rate*. Following Smith (2001), we include the inflation rate for two reasons. First, given that bank spreads are the difference between two nominal rates, if inflation shocks are not passed through to both rates equally fast, then spreads should reflect this. Second, Cottarelli and Kourelis (1994) have found that inflation can affect the flexibility of loan rates and therefore of bank spreads. The real growth of output variable could help pick up business cycle effects as those discussed by Bernanke and Gertler (1989) and Kiyotaki and Moore (1997). These studies suggest that changes in output can affect lending rates, and consequently spreads, because borrowers' creditworthiness is countercyclical. As

---

<sup>11</sup> An extensive literature exists studying the impact of concentration on bank profitability (see Berger 1995 for a review). While the literature unanimously predicts a positive association between concentration and profitability, different theories exist explaining what is behind this result. The structure-conduct-performance theory argues that bank concentration signals market power and that a positive association between profits and concentration is unambiguously bad for the economy. A related theory is the relative market power hypothesis, which claims that only firms with large market share and differentiated products can obtain market power and are able to earn profits above normal. On the other hand the efficiency-structure hypothesis (see Demsetz 1973, 1974, Peltzman 1977) contends that larger concentration levels and market shares could reflect greater efficiency by the largest banks, which in turn are able to lower costs and obtain higher profits. While a problem of observational equivalence exists in interpreting the relationship between bank concentration and profits, this issue should not arise in analyzing bank spreads. Relatively more efficient banks should be able to charge lower spreads, as a result of having lower costs. Consequently a positive association between bank spreads and concentration should signal greater market power and less competition in the banking sector.

output growth slows down, creditworthiness deteriorates and, other things equal, this is likely to be reflected in higher bank loan rates and, consequently, spreads. Finally, we include a measure of the short-term money market real interest rate to control for the marginal cost of funds faced by banks.

We obtained bank-level balance sheet and income statement data from the Superintendency of Banks in each of the countries in our sample. For Argentina, Chile, and Peru the data covers the period 1995-2000. For Colombia, we obtained data for 1997-2000. For Mexico, where a change in accounting standards does not allow us to use data before 1997, the sample studied is 1998-2001. The data frequency is quarterly in all cases. The corresponding bank authorities also provided detailed accounts on the foreign banks operating in each country at each point in time along with information on their mode of entry (e.g., via acquisitions or by de novo entry). They also supplied us with the list of mergers and acquisitions among domestic banks and between existing foreign banks.

Data on inflation, output growth, and the real short-term interest rate come from the IMF International Financial Statistics database. Table 2 contains a detailed description of the variables used in this paper together with means and standard deviations for each of them.

#### **IV Empirical Results**

Table 3 presents the empirical results from the estimation of equation (1) to analyze the determinants of bank spreads across all private banks in Argentina, Chile, Colombia, Mexico, and Peru over the late 1990s.<sup>12</sup> A number of clarifications need to be made regarding these estimations. First, all specifications presented in this table include contemporaneous bank

---

<sup>12</sup> As mentioned above, for Argentina, Chile, and Peru the estimations cover the period 1995-2000. For Colombia and Mexico data availability dictates that we focus on shorter periods, namely, 1997-2000 and 1998-2001, respectively.

characteristics (like liquid assets, administrative costs, and equity over total assets, non-performing loans over total loans, and market share). However, to verify the robustness of our results to possible endogeneity between spreads and bank characteristics similar estimations are included in the appendix using one-quarter lag of these variables as regressors (see Tables A.1 through A.4). Second, we report estimations combining all countries because we consider the sample period to be relative short to conduct separate estimations, and because we think that it is interesting and useful to exploit cross-country variations.<sup>13</sup> However, to account for unexplained differences across countries, country dummies are included, but not shown. Third, the t-statistics reported were calculated allowing standard errors to be correlated for observations corresponding to the same bank within a country (i.e., using clustered standard errors as described by Rogers, 1993). Fourth, because the spreads charged by public banks may be subject to constraints due to direct subsidies and other political considerations, we do not include these banks in our sample. Finally, since implicit bank spreads calculated from quarterly income and balance sheet data can be quite volatile, we exclude those observations in the top and bottom 5 percentile of the distribution of the change in bank spreads. The purpose of doing so is to avoid the possibility that outliers drive our results. However, eliminating these observations does not change the results described below.

The first column in Table 3 includes only bank-level variables. Specifications (3.2) to (3.4) incorporate system-wide measures such as the degree of foreign bank participation and concentration, along with variables that control for the macroeconomic environment (i.e., inflation, real growth of production, and the real market interest rate). We report results with

---

<sup>13</sup> One concern regarding our results might be that they are driven by the findings for Argentina, since this country has the largest number of observations, given that it has a lot more banks than other countries. However, we ran the same regressions as those reported here without Argentina and our main findings do not change. Results excluding Argentina are available upon request.

three measures of bank concentration, namely, the Herfindahl index and the share of loans held by the top 3 banks, and top 5 banks, respectively. Because bank origin might be correlated with the degree of foreign bank participation (i.e., the larger the number of foreign banks, the more likely it is that foreign bank participation will be high) and bank market share might be positively associated with the level of system wide concentration, we reestimate the equations after excluding these bank level variables to verify the robustness of our findings (see columns 3.5 to 3.7).

Among the individual bank characteristics, bank liquidity and administrative costs, have a significant impact on bank spreads across all specifications included in Table 3. Banks that either decide or are required by regulation to hold a high proportion of their assets in the form of liquid assets seem to charge higher spreads. This can be interpreted as their response to the fact that in holding higher liquidity ratios they forego a return on such assets. However, the impact of this variable on bank spreads seems to be quantitatively small. From the average estimated coefficient on bank liquidity we can infer that a one standard deviation in this variable leads to a 0.14 standard deviation change in bank spreads. On the other hand, administrative costs seem to have a larger impact on bank spreads. In this case, a one standard deviation change on administrative costs results in an almost 0.6 standard deviation change in spreads. Notice, however, that the macro country characteristics, inflation, growth, and domestic interest rates, do not have a direct influence on spreads. They apparently influence spreads indirectly through their effects on administrative costs, as we discuss below.

Controlling for other bank characteristics, foreign banks in general seem to be able to operate with lower spreads than their domestic counterparts. This explains the negative sign on the *Bank Origin* dummy. On average foreign banks show spreads that are 0.5 percent lower per

quarter, than those charged by domestic banks. However, there are important differences among foreign banks, depending on how they entered the system. Foreign banks that grew in size by acquiring local banks at some point within the sample seem to charge higher spreads than the average foreign bank. Spreads for these foreign banks are 0.25 percent higher per quarter than for the average foreign bank, but they are still lower by an equal amount vis-à-vis those charged by domestic banks. On the other hand, foreign banks that set up de novo operations seem to be able to function with lower spreads vis-à-vis all other foreign and domestic banks. In particular, these banks exhibit spreads that are on average 2 percent per quarter lower than those for the average foreign bank, and around 2.5 percent per quarter lower than those for domestic banks.

At least two factors could explain why different foreign banks (i.e., those that started operations or increased them by acquiring domestic banks vis-à-vis those that are de novo entrants) might exhibit different spreads. First, differences in pricing strategies could be driving the results. For example, it is possible that de novo banks, interested in gaining market share, might be more willing to offer lower rates, relative to those foreign banks that in part gained market share by acquiring existing domestic institutions. Second, variations in spreads between domestic and foreign banks and by type of foreign bank might be driven by differences in the market segments banks focus on, which in turn are likely to be the result of informational advantages that one type of bank might have over the other.<sup>14</sup> In particular, it is more probable that de novo banks have the least knowledge about local markets and so they are more likely to focus on segments that are more transparent (i.e., where it is easier to access information about borrowers). At the same time, transparent market segments are likely to be more competitive, so banks entering these segments, in this case de novo banks, will have to charge lower spreads

---

<sup>14</sup> Dell’Ariccia and Marquez (2002) suggest that differences in the information available to different banks will impact whom they would lend to and what spreads they are able to charge.

relative to those prevalent in other segments. On the other hand, foreign banks involved in mergers or acquisitions with domestic banks could have higher spreads, because, as a result of the information they can gain from the domestic banks, they might be able to serve the somewhat less transparent firms, in less contestable markets, where they might have some market power and the ability to charge higher spreads. Finally, as a result of foreign competition, domestic banks might be forced to increase their lending to the least transparent borrowers on who they are likely to have better information than foreign banks, and to whom they are able to charge higher spreads.

Beyond the fact that foreign banks appear to be able to offer lower spreads, their participation in the system does not seem to have a “spillover effect” on the overall level of spreads. This result could imply either (1) that there is truly no spillover effect, meaning that the lower spreads charged by foreign banks do not create any pressure on other banks to lower their spreads (perhaps because there is full market segmentation across banks) or (2) that the spillover effect happens indirectly through the impact of foreign competition on administrative costs. If the latter is true – if foreign bank competition forces domestic banks to lower costs in order to be able to offer lower spreads - then once we control for administrative costs (as we do in the estimations discussed so far) we would not observe any direct impact of foreign bank participation on spreads. We explore the impact of foreign bank participation on administrative costs below.

Bank concentration has a direct impact on bank spreads, after we control for individual bank characteristics and the macroeconomic environment. Regardless of the measure of concentration included, we find that spreads rise as a response to increases in bank concentration.

Depending on the measure of concentration we use, the impact of a one standard deviation increase in concentration results in a 0.13 to 0.25 standard deviation change in bank spreads.<sup>15</sup>

Table 4 presents estimations for the determinants of spreads among domestic banks only. Consequently, variables associated with bank origin are not included in these estimations. For this subset of banks, we verify the main results discussed above. Namely, we continue to find that liquidity and administrative costs have a positive impact on bank spreads, although the impact of the latter dominates that of the former. Within the sample of domestic banks, we also find that those with higher market shares are able to charge lower spreads. This may point to the presence of economies of scale among large domestic banks. Finally, as before, a rise in bank concentration leads to higher spreads, while changes in foreign bank participation do not seem to directly affect the overall level of spreads. The impact of system-wide concentration in raising spreads appears to be higher for domestic banks than for foreign banks.

One possible concern with the estimations discussed above for all private banks and for domestic banks only is that they may be subject to simultaneity bias. This may occur to the extent that spreads and bank level variables like the share of liquid assets, non-performing loans, equity or administrative costs are simultaneously determined. To mitigate this concern, we re-run all estimations including one-quarter lag of these regressors. Since the results discussed above do not change when we include lagged bank-level variables in the specifications, we report these estimations in the appendix (see Tables A.1 and A.2).

In our final set of estimations, we explore whether foreign bank participation has an indirect impact on bank spreads by lowering overall administrative costs. Tables 5 and 6 present estimations for the ratio of administrative costs to total assets for all private banks and for

---

<sup>15</sup> In particular, a one standard deviation change in the share of loans held by the top 3 banks (top 5 banks) results in a 0.25 (0.13) standard deviation change in bank spreads. At the same time, a one standard deviation change in the Herfindahl index leads to a 0.20 standard deviation rise in bank spreads.

domestic banks only, respectively. In both cases, we allow administrative costs to vary with banks' market share, banks' origin and type of foreign entry, along with the market structure and macro variables included in the estimations for bank spreads.<sup>16</sup>

In the administrative cost estimations, the macro variables are now seen to be significant, unlike in the spreads equations. Inflation is negatively signed, suggesting that certain input prices may be sticky; higher interest rates, which are a proxy for the marginal cost of capital, raise administrative costs.

We find that bank origin has a negative impact on administrative costs. In other words, foreign banks appear to be able to operate with lower costs. Moreover, the overall level of foreign bank presence seems to exert a downward pressure on the administrative costs of individual banks, regardless of their origin. These results seem to support the argument that foreign banks are on average more efficient and that, even if some market segmentation exists, foreign bank presence exerts competitive pressure on other banks, forcing them to lower their costs. Bank concentration, on the other hand, is associated with higher costs. This result is consistent with the notion that in more concentrated systems there appears to be less pressure for banks to lower their administrative costs in order to offer more competitive spreads.

## **V Conclusions**

We briefly summarize our main findings and their implications both for further research and for policymakers. First, foreign entry lowers interest margins and potentially fosters the process of financial intermediation. However, the impact of foreign entry depends on the form it takes. Our results suggest that new establishments (i.e., *de novo* banks) operate with lower

---

<sup>16</sup> We also conducted estimations with lagged values of the market share, which we do not show since the results were the same as those described here. However, these estimations are available upon request.

spreads. The welfare gains from such form entry, however, may not benefit all borrowers. These will depend on whether the lower spreads are the result of a more aggressive pricing strategy across the board or come from the fact that de novo banks choose to lend only to the most transparent segments where there is more competition or at least greater market contestability. Further research would, thus, greatly enhance our understanding by linking bank-level data with the types of customers served by each type of bank.

Second, we found concentration to be a statistically and economically important determinant of spreads. This is so especially for domestic banks. The implication is that some part of the benefits from foreign entry may have been offset where concentration levels also increased. As noted in the introduction, the consolidation that did occur in the banking sectors of the countries concerned was not necessarily related to foreign entry, although the fact that much of the entry was in the form of takeovers, rather than new establishments, may have not helped to create more competition. For policymakers, this creates a challenge since more competition is desirable for lowering spreads, but could generate vulnerability where the “franchise” value of domestic banks is seriously eroded.

Finally, long-term benefits of foreign entry are likely to come from lower cost structures in the banking system. Here the conclusions are more optimistic. Foreign banks have lower administrative costs and, importantly, foreign bank presence fosters cost reduction throughout the banking system. It appears, as if a combination of demonstration effects and potential competition, with each group of banks threatening to encroach on the others’ customer base, generates the pressures for cost reduction that ultimately benefit bank clients.

## References

- Allen, L., (1988). "The Determinants of Bank Interest Margins: A Note." *Journal of Financial and Quantitative Analysis* 23, 231-235.
- Angbazo, L., (1997). "Commercial Bank Net Interest Margins, Default Risk, Interest-Rate Risk, and Off-Balance Sheet Banking." *Journal of Banking and Finance* 21, 55-87.
- Barajas, A., R. Steiner, and N. Salazar, (2000). "The Impact of Liberalization and Foreign Investment in Colombia's Financial Sector." *Journal of Development Economics* 63, 157-96.
- Berger, A., (1995). "The Profit-Structure Relationship in Banking – Tests of Market-Power and Efficient Structure Hypotheses." *Journal of Money, Credit, and Banking* 2 (1995).
- Bernanke, B. and M. Gertler, (1989). "Agency Costs, Net Worth, and Business Fluctuations." *American Economic Review* 79, 14-31.
- Brock, P., and L. Rojas Suarez, (2000). "Understanding the Behavior of Bank Spreads in Latin America." *Journal of Development Economics* 63, 113-34.
- Claessens, S., A. Demirgüç-Kunt, and H. Huizinga, (2000). "The Role of Foreign Banks in Domestic Banking Systems." In Stijn Claessens and Marion Jansen, eds., *The Internationalization of Financial Services: Issues and Lessons for Developing Countries*. Boston: Kluwer Academic.
- Cottarelli, C. and A. Kourelis, (1994). "Financial Structure, Bank Lending Rates, and the Transmission Mechanism of Monetary Policy". *International Monetary Fund Staff Papers* 41, 587-623.
- Demirgüç-Kunt, A., L. Laeven, and R. Levine, (2002). "The Impact of Bank Regulations and Concentration on Bank Efficiency." Mimeo. The World Bank.
- Demsetz, H., (1973). "Industry Structure, Market Rivalry, and Public Policy." *Journal of Law and Economics* 16, 1-9.
- \_\_\_\_\_, (1974). "Two Systems of Belief about Monopoly." In *Industrial Concentration: The New Learning* edited by Harvedy Goldschmid. Boston: Little, Brown.
- Denizer, C., (2000). "Foreign Entry in Turkey's Banking Sector, 1980–1997." In Stijn Claessens and Marion Jansen, eds., *The Internationalization of Financial Services: Issues and Lessons for Developing Countries*. Boston: Kluwer Academic.
- Gelos, G. and J. Roldós, (2002). "Consolidation and Market Structure in Emerging Market Systems," IMF Working Paper No. 02/186.

Ho, T. and A. Saunders, (1981). "The Determinants of Bank Interest Margins: Theory and Empirical Evidence." *Journal of Financial and Quantitative Analysis* 4.

IMF (International Monetary Fund) (2000). *International Capital Markets: Developments, Prospects, and Key Policy Issues*. Washington, D.C.

Kiyotaki, N. and J. Moore, (1997). "Credit Chains." *Journal of Political Economy* 105, 211-248.

Mc Shane, R.W. and I.G. Sharpe, (1985). "A Time Series-Cross Section Analysis of the Determinants of Australian Trading Bank Loan-Deposit Interest Margins: 1962-1981." *Journal of Banking and Finance* 9, 115-136.

Peltzman, S., (1977). "The Gains and Losses from Industrial Concentration." *Journal of Law and Economics* 20, 229-63.

Rogers, W.H, (1993). Regression Standard Errors in Clustered Samples. *Stata Technical Bulletin Reprints* 3, 88-94.

Saunders, A., and L. Schumacher, (2000). "The Determinants of Bank Interest Rate Margins: An International Study." *Journal of International Money and Finance* 19, 813-32.

Smith R. Todd, (2001). "Bank Spreads and Business Cycles." Mimeo. International Monetary Fund.

Zarruck, Emilio R., (1989). "Bank Margin with Uncertain Deposit Level and Risk Aversion." *Journal of Banking and Finance* 14, 803-820.

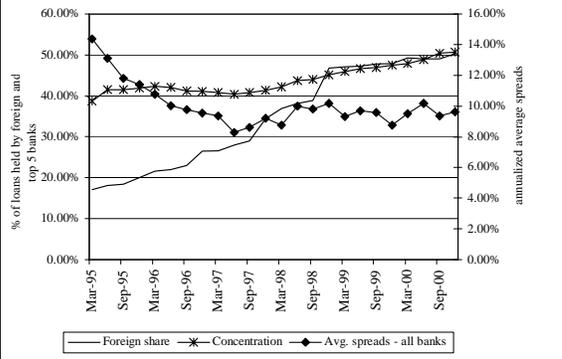
\_\_\_\_\_ and Jeffrey Madura (1992). "Optimal Bank Interest Margin under Capital Regulation and Deposit Insurance." *Journal of Financial Quantitative Analysis* 27, 143-149.

Wong, Kit Pong, (1997). "On the Determinants of Bank Interest Margins under Credit and Interest Rate Risks." *Journal of Banking and Finance* 21, 251-71.

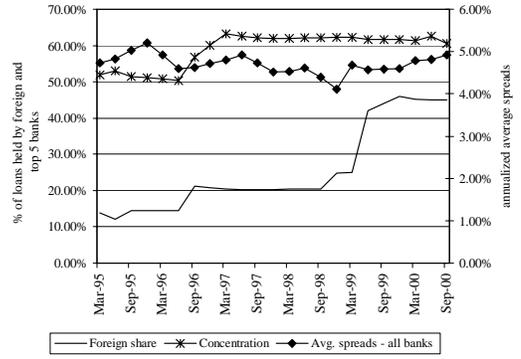
**Table 1: Bank market structure in Latin America 1995-2000**

| Country   | Variables                    | 1995   | 1996   | 1997   | 1998    | 1999    | 2000    |
|-----------|------------------------------|--------|--------|--------|---------|---------|---------|
| Argentina | Total number of banks        | 141    | 122    | 115    | 106     | 96      | 90      |
|           | Number of foreign banks      | 32     | 32     | 35     | 38      | 38      | 40      |
|           | Foreign bank share (percent) | 18.9   | 24.2   | 30.4   | 40.9    | 47.4    | 49.4    |
|           | Top 3 banks share (percent)  | 30.0   | 29.9   | 29.5   | 30.8    | 32.1    | 33.9    |
|           | Top 5 banks share (percent)  | 40.9   | 41.7   | 40.9   | 43.8    | 46.7    | 49.4    |
|           | Herfindahl index             | 483.3  | 489.6  | 482.6  | 545.3   | 605.5   | 656.7   |
| Chile     | Total number of banks        | 31     | 31     | 29     | 29      | 29      | 28      |
|           | Number of foreign banks      | 17     | 17     | 17     | 17      | 18      | 18      |
|           | Foreign bank share (percent) | 13.7   | 16.7   | 20.3   | 21.5    | 37.7    | 45.0    |
|           | Top 3 banks share (percent)  | 36.6   | 35.7   | 42.5   | 42.1    | 41.5    | 41.1    |
|           | Top 5 banks share (percent)  | 51.9   | 52.6   | 62.5   | 62.1    | 61.9    | 61.5    |
|           | Herfindahl index             | 788.8  | 796.3  | 982.8  | 973.1   | 961.2   | 949.8   |
| Colombia  | Total number of banks        |        |        | 33     | 33      | 28      | 27      |
|           | Number of foreign banks      |        |        | 13     | 14      | 12      | 10      |
|           | Foreign bank share (percent) |        |        | 27.6   | 27.6    | 26.0    | 24.9    |
|           | Top 3 banks share (percent)  |        |        | 29.5   | 31.5    | 32.3    | 29.9    |
|           | Top 5 banks share (percent)  |        |        | 44.1   | 47.4    | 50.2    | 47.3    |
|           | Herfindahl index             |        |        | 584.7  | 644.4   | 714.4   | 691.6   |
| Mexico    | Total number of banks        |        |        |        | 39      | 39      | 40      |
|           | Number of foreign banks      |        |        |        | 18      | 18      | 20      |
|           | Foreign share (percent)      |        |        |        | 13.2    | 14.0    | 25.8    |
|           | Top 3 banks share (percent)  |        |        |        | 50.0    | 49.2    | 47.5    |
|           | Top 5 banks share (percent)  |        |        |        | 63.8    | 62.7    | 60.8    |
|           | Herfindahl index             |        |        |        | 1,108.0 | 1,055.5 | 1,078.2 |
| Peru      | Total number of banks        | 29     | 27     | 27     | 27      | 24      | 20      |
|           | Number of foreign banks      | 15     | 14     | 14     | 14      | 13      | 11      |
|           | Foreign bank share (percent) | 14.1   | 16.4   | 19.1   | 21.9    | 31.1    | 39.2    |
|           | Top 3 banks share (percent)  | 60.6   | 61.2   | 58.2   | 54.2    | 53.3    | 55.7    |
|           | Top 5 banks share (percent)  | 74.4   | 74.8   | 70.7   | 67.0    | 68.2    | 72.5    |
|           | Herfindahl index             | 1468.9 | 1517.3 | 1356.5 | 1203.9  | 1226.8  | 1316.4  |

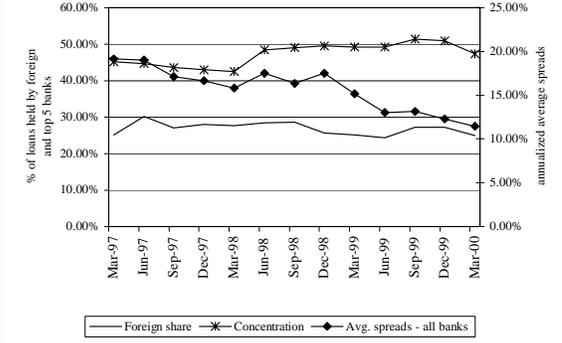
**Figure 1.a: Bank Spreads, Concentration, and Foreign Share in Argentina**



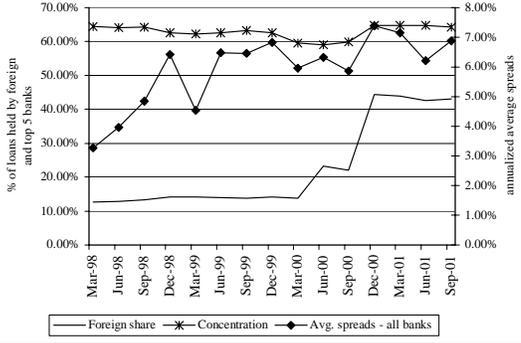
**Figure 1.b: Bank Spreads, Concentration, and Foreign Share in Chile**



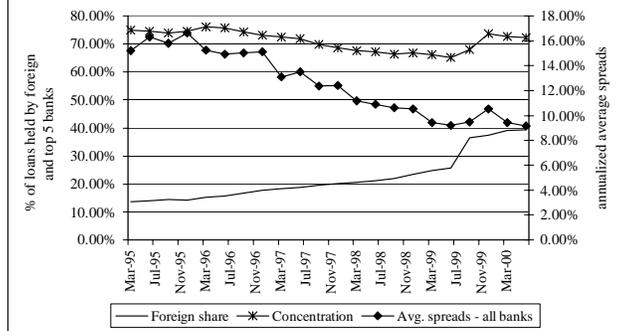
**Figure 1.c: Bank Spreads, Concentration, and Foreign Share in Colombia**



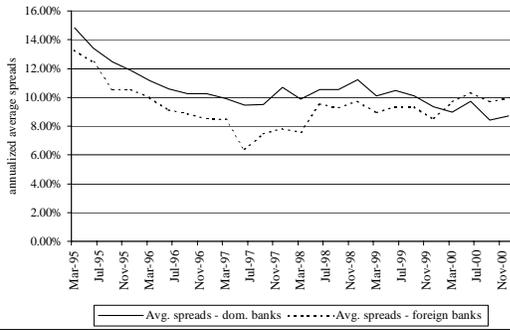
**Figure 1.d: Bank Spreads, Concentration, and Foreign Share in Mexico**



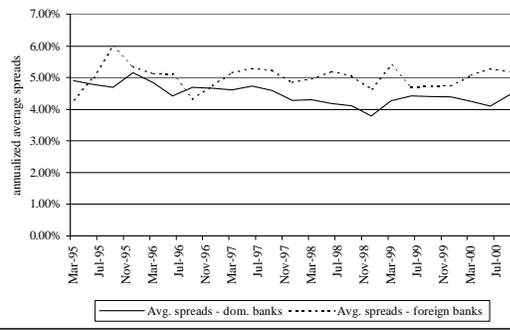
**Figure 1.e: Bank Spreads, Concentration, and Foreign Share in Peru**



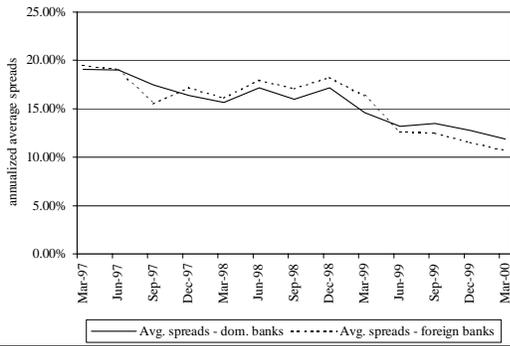
**Figure 2.a: Foreign and Domestic Bank Spreads in Argentina**



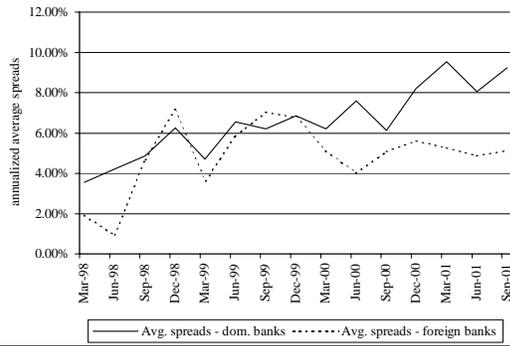
**Figure 2.b: Foreign and Domestic Bank Spreads in Chile**



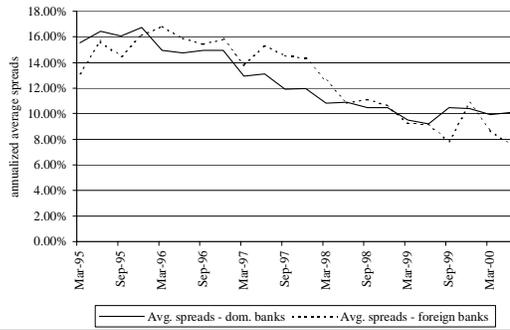
**Figure 2.c: Foreign and Domestic Bank Spreads in Colombia**



**Figure 2.d: Foreign and Domestic Bank Spreads in Mexico**



**Figure 2.e: Foreign and Domestic Bank Spreads in Peru**



**Table 2: Definition of variables used and data descriptive statistics**

| <b>Variable</b>                          | <b>Definitions</b>  | <b>Source of original data</b>         | <b>Mean</b> | <b>Standard deviation</b> |
|--|---|--|-------------|---------------------------|
| Spread                                   | Interest income received on loans (over total loans) minus interest expenses paid on deposits (over total deposits)           | Bank superintendencies                 | 0.025       | 0.016                     |
| Liquid assets (over total assets)        | Cash and deposits with other banks (including the central bank)   | Bank superintendencies                 | 0.108       | 0.077                     |
| Non-performing loans (over total loans)  | Loans considered to be non-performing by the banking authorities (in most cases 90 days overdue)                              | Bank superintendencies                 | 0.109       | 0.151                     |
| Administrative costs (over total assets) | Includes payroll and other operating expenses   | Bank superintendencies                 | 0.016       | 0.0128                    |
| Bank origin                              | Dummy equal to 1 when bank is at least 50% foreign owned  | Bank superintendencies                 | 0.412       | 0.492                     |
| Bank market share                        | Share of loans held by each bank to total loans   | Bank superintendencies                 | 0.024       | 0.043                     |
| Equity (over total assets)               | Bank capital plus reserves  | Bank superintendencies                 | 0.145       | 0.116                     |
| Foreign M&A                              | Dummy equal to 1 for cases when a foreign banks acquired a domestic bank  | Bank superintendencies                 | 0.062       | 0.289                     |
| Foreign M&A×Age                          | Interaction of Foreign M&A with time (in fraction of years) since acquisition of a domestic bank by a foreign bank            | Bank superintendencies                 | 0.048       | 0.263                     |
| Foreign de novo                          | Dummy equal to 1 for foreign banks that entered the country by setting up de novo operations                                  | Bank superintendencies                 | 0.002       | 0.044                     |
| Foreign de novo×Age                      | Interaction of Foreign De novo with time (in fraction of years) since entry   | Bank superintendencies                 | 0.002       | 0.044                     |
| Other M&A                                | Dummy equal to 1 for domestic banks that acquired other domestic banks, or for foreign banks that acquired other foreign bank | Bank superintendencies                 | 0.113       | 0.439                     |
| Other M&A×Age                            | Interaction of Other M&A with time (in fraction of years since entry)   | Bank superintendencies                 | 0.091       | 0.432                     |
| Foreign bank participation               | Share of loans held by foreign banks (those that are at least 50% foreign owned)  | Bank superintendencies                 | 0.273       | 0.119                     |
| Top 3 bank share                         | Share of loans held by the top 3 banks in the system  | Bank superintendencies                 | 0.385       | 0.105                     |
| Top 5 bank share                         | Share of loans held by the top 5 banks in the system  | Bank superintendencies                 | 0.526       | 0.114                     |
| Herfindahl index                         | Sum of squared bank market shares   | Bank superintendencies                 | 794.405     | 325.403                   |
| Inflation                                | Rate of growth of the consumer price index  | IMF International Financial Statistics | 0.011       | 0.015                     |
| Real output growth                       | Rate of growth of industrial/manufacturing production   | IMF International Financial Statistics | -0.011      | 0.054                     |
| Real interest rate                       | Money market rate – inflation   | IMF International Financial Statistics | 13.189      | 8.222                     |

**Table 3: Spread estimations for all private banks – with contemporaneous bank characteristics**

|                            |           |           |           |           |           |           |           |
|----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                            | (3.1)     | (3.2)     | (3.3)     | (3.4)     | (3.5)     | (3.6)     | (3.7)     |
| Liquid assets              | 0.0300    | 0.0280    | 0.0288    | 0.0276    | 0.0289    | 0.0297    | 0.0285    |
|                            | (4.05)*** | (3.75)*** | (3.86)*** | (3.68)*** | (3.80)*** | (3.90)*** | (3.72)*** |
| Non-performing loans       | -0.0007   | -0.0010   | -0.0011   | -0.0009   | 0.0020    | 0.0018    | 0.0020    |
|                            | (0.17)    | (0.25)    | (0.29)    | (0.24)    | (0.48)    | (0.44)    | (0.49)    |
| Administrative costs       | 0.6534    | 0.6526    | 0.6561    | 0.6523    | 0.6735    | 0.6768    | 0.6734    |
|                            | (8.06)*** | (7.88)*** | (7.94)*** | (7.87)*** | (8.86)*** | (8.92)*** | (8.85)*** |
| Bank origin                | -0.0052   | -0.0052   | -0.0052   | -0.0052   |           |           |           |
|                            | (4.01)*** | (3.92)*** | (3.93)*** | (3.93)*** |           |           |           |
| Bank market share          | -0.0136   | -0.0140   | -0.0139   | -0.0143   |           |           |           |
|                            | (1.32)    | (1.38)    | (1.37)    | (1.41)    |           |           |           |
| Equity                     | 0.0088    | 0.0095    | 0.0096    | 0.0096    | 0.0051    | 0.0052    | 0.0051    |
|                            | (1.47)    | (1.59)    | (1.61)    | (1.60)    | (0.86)    | (0.87)    | (0.87)    |
| Foreign M&A                | 0.0028    | 0.0024    | 0.0024    | 0.0024    |           |           |           |
|                            | (2.81)*** | (2.54)**  | (2.55)**  | (2.61)*** |           |           |           |
| Foreign M&A×Age            | 0.0004    | 0.0002    | 0.0002    | 0.0002    |           |           |           |
|                            | (0.45)    | (0.22)    | (0.24)    | (0.17)    |           |           |           |
| Foreign de novo            | -0.0215   | -0.0217   | -0.0218   | -0.0217   |           |           |           |
|                            | (2.08)**  | (2.08)**  | (2.08)**  | (2.07)**  |           |           |           |
| Foreign de novo×Age        | 0.0083    | 0.0075    | 0.0076    | 0.0075    |           |           |           |
|                            | (1.19)    | (1.06)    | (1.08)    | (1.06)    |           |           |           |
| Other M&A                  | 0.0001    | 0.0002    | 0.0002    | 0.0002    |           |           |           |
|                            | (0.12)    | (0.25)    | (0.19)    | (0.26)    |           |           |           |
| Other M&A×Age              | 0.0004    | 0.00002   | 0.00005   | 0.00001   |           |           |           |
|                            | (0.80)    | (0.03)    | (0.08)    | (0.00)    |           |           |           |
| Foreign bank participation |           | 0.0023    | 0.0016    | 0.0007    | 0.0015    | 0.0008    | -0.0001   |
|                            |           | (0.71)    | (0.46)    | (0.22)    | (0.47)    | (0.23)    | (0.02)    |
| Top 3 bank share           |           | 0.0381    |           |           | 0.0382    |           |           |
|                            |           | (3.03)*** |           |           | (3.02)*** |           |           |
| Top 5 bank share           |           |           | 0.0177    |           |           | 0.0178    |           |
|                            |           |           | (1.83)*   |           |           | (1.87)*   |           |
| Herfindahl index           |           |           |           | 0.00001   |           |           | 0.00001   |
|                            |           |           |           | (2.82)*** |           |           | (2.76)*** |
| Inflation                  |           | -0.0024   | 0.0049    | -0.0047   | -0.0032   | 0.0042    | -0.0054   |
|                            |           | (0.07)    | (0.14)    | (0.13)    | (0.09)    | (0.12)    | (0.15)    |
| Real growth of production  |           | 0.0023    | 0.0020    | 0.0028    | 0.0016    | 0.0013    | 0.0022    |
|                            |           | (0.78)    | (0.67)    | (0.96)    | (0.53)    | (0.43)    | (0.71)    |
| Real market interest rate  |           | 0.00001   | -0.00004  | 0.00003   | 0.00002   | 0.000003  | 0.00004   |
|                            |           | (0.23)    | (0.06)    | (0.48)    | (0.34)    | (0.04)    | (0.57)    |
| Constant                   | 0.0001    | -0.0193   | -0.0114   | -0.0127   | -0.0221   | -0.0143   | -0.0154   |
|                            | (0.02)    | (2.96)*** | (1.86)*   | (2.56)**  | (3.32)*** | (2.29)**  | (3.01)*** |
| Observations               | 2780      | 2618      | 2618      | 2618      | 2618      | 2618      | 2618      |
| R-squared                  | 0.51      | 0.52      | 0.52      | 0.52      | 0.50      | 0.50      | 0.50      |

Robust t-statistics (calculated allowing for clustered standard errors by bank) in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 4: Spread estimations for domestic private banks - with contemporaneous bank characteristics**

|                            | (4.1)     | (4.2)     | (4.3)     | (4.4)     | (4.5)     | (4.6)     | (4.7)     |
|----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Liquid assets              | 0.0540    | 0.0526    | 0.0539    | 0.0520    | 0.0499    | 0.0512    | 0.0494    |
|                            | (4.94)*** | (4.77)*** | (4.85)*** | (4.72)*** | (4.59)*** | (4.68)*** | (4.55)*** |
| Non-performing loans       | 0.0002    | 0.0003    | 0.0002    | 0.0004    | 0.0003    | 0.0001    | 0.0004    |
|                            | (0.05)    | (0.08)    | (0.04)    | (0.11)    | (0.07)    | (0.03)    | (0.09)    |
| Administrative costs       | 0.5690    | 0.5693    | 0.5727    | 0.5677    | 0.5863    | 0.5898    | 0.5850    |
|                            | (7.91)*** | (7.73)*** | (7.79)*** | (7.71)*** | (8.09)*** | (8.14)*** | (8.07)*** |
| Bank market share          | -0.0250   | -0.0235   | -0.0237   | -0.0237   |           |           |           |
|                            | (2.15)**  | (2.00)**  | (2.01)**  | (2.02)**  |           |           |           |
| Equity                     | 0.0214    | 0.0191    | 0.0193    | 0.0191    | 0.0194    | 0.0196    | 0.0194    |
|                            | (1.50)    | (1.35)    | (1.37)    | (1.35)    | (1.38)    | (1.40)    | (1.38)    |
| Other M&A                  | 0.0004    | 0.0006    | 0.0006    | 0.0006    |           |           |           |
|                            | (0.55)    | (0.82)    | (0.79)    | (0.84)    |           |           |           |
| Other M&A×Age              | 0.0004    | -0.0003   | -0.0003   | -0.0003   |           |           |           |
|                            | (0.72)    | (0.37)    | (0.38)    | (0.40)    |           |           |           |
| Foreign bank participation |           | 0.0053    | 0.0028    | 0.0030    | 0.0055    | 0.0032    | 0.0034    |
|                            |           | (1.12)    | (0.56)    | (0.64)    | (1.20)    | (0.66)    | (0.72)    |
| Top 3 bank share           |           | 0.0501    |           |           | 0.0488    |           |           |
|                            |           | (3.26)*** |           |           | (3.17)*** |           |           |
| Top 5 bank share           |           |           | 0.0325    |           |           | 0.0311    |           |
|                            |           |           | (2.76)*** |           |           | (2.68)*** |           |
| Herfindahl index           |           |           |           | 0.0000    |           |           | 0.0000    |
|                            |           |           |           | (3.17)*** |           |           | (3.05)*** |
| Inflation                  |           | -0.0234   | -0.0169   | -0.0274   | -0.0224   | -0.0158   | -0.0262   |
|                            |           | (0.57)    | (0.41)    | (0.67)    | (0.55)    | (0.38)    | (0.64)    |
| Real growth of production  |           | 0.0040    | 0.0036    | 0.0046    | 0.0040    | 0.0036    | 0.0046    |
|                            |           | (0.98)    | (0.87)    | (1.14)    | (0.99)    | (0.87)    | (1.14)    |
| Real market interest rate  |           | 0.0001    | 0.0001    | 0.0001    | 0.0001    | 0.0000    | 0.0001    |
|                            |           | (1.20)    | (0.96)    | (1.52)    | (1.05)    | (0.80)    | (1.35)    |
| Constant                   | -0.0025   | -0.0287   | -0.0240   | -0.0202   | -0.0290   | -0.0241   | -0.0206   |
|                            | (0.69)    | (3.47)*** | (3.01)*** | (3.15)*** | (3.49)*** | (3.04)*** | (3.21)*** |
| Observations               | 1630      | 1539      | 1539      | 1539      | 1539      | 1539      | 1539      |
| R-squared                  | 0.52      | 0.53      | 0.53      | 0.53      | 0.53      | 0.53      | 0.53      |

Robust t-statistics (calculated allowing for clustered standard errors by bank) in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 5: Administrative cost estimations for all private banks - with contemporaneous bank characteristics**

|                            | (5.1)     | (5.2)     | (5.3)     | (5.4)     | (5.5)     | (5.6)     | (5.7)     |
|----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Bank origin                | -0.0032   | -0.0029   | -0.0029   | -0.0029   |           |           |           |
|                            | (2.85)*** | (2.57)**  | (2.57)**  | (2.57)**  |           |           |           |
| Bank market share          | -0.0578   | -0.0546   | -0.0548   | -0.0549   |           |           |           |
|                            | (4.80)*** | (4.57)*** | (4.58)*** | (4.58)*** |           |           |           |
| Foreign M&A                | 0.0013    | 0.0017    | 0.0017    | 0.0018    |           |           |           |
|                            | (1.12)    | (1.52)    | (1.50)    | (1.56)    |           |           |           |
| Foreign M&A×Age            | -0.00001  | 0.0004    | 0.0004    | 0.0003    |           |           |           |
|                            | (0.00)    | (0.16)    | (0.14)    | (0.13)    |           |           |           |
| Foreign de novo            | 0.0172    | 0.0116    | 0.0115    | 0.0115    |           |           |           |
|                            | (1.53)    | (0.70)    | (0.70)    | (0.70)    |           |           |           |
| Foreign de novo×Age        | -0.0018   | 0.0035    | 0.0035    | 0.0035    |           |           |           |
|                            | (0.42)    | (0.39)    | (0.39)    | (0.39)    |           |           |           |
| Other M&A                  | 0.0015    | 0.0015    | 0.0015    | 0.0015    |           |           |           |
|                            | (2.65)*** | (2.83)*** | (2.79)*** | (2.87)*** |           |           |           |
| Other M&A×Age              | -0.0014   | -0.0010   | -0.0010   | -0.0010   |           |           |           |
|                            | (4.27)*** | (2.24)**  | (2.24)**  | (2.28)**  |           |           |           |
| Foreign bank participation |           | -0.0165   | -0.0183   | -0.0185   | -0.0167   | -0.0186   | -0.0187   |
|                            |           | (4.97)*** | (5.51)*** | (5.67)*** | (5.00)*** | (5.55)*** | (5.68)*** |
| Top 3 bank share           |           | 0.0448    |           |           | 0.0455    |           |           |
|                            |           | (5.75)*** |           |           | (5.57)*** |           |           |
| Top 5 bank share           |           |           | 0.0278    |           |           | 0.0285    |           |
|                            |           |           | (4.79)*** |           |           | (4.77)*** |           |
| Herfindahl index           |           |           |           | 0.00001   |           |           | 0.00001   |
|                            |           |           |           | (5.72)*** |           |           | (5.42)*** |
| Inflation                  |           | -0.0260   | -0.0185   | -0.0285   | -0.0235   | -0.0158   | -0.0257   |
|                            |           | (1.57)    | (1.12)    | (1.69)*   | (1.43)    | (0.97)    | (1.54)    |
| Real growth of production  |           | -0.0106   | -0.0109   | -0.0098   | -0.0106   | -0.0109   | -0.0098   |
|                            |           | (3.99)*** | (4.05)*** | (3.77)*** | (3.89)*** | (3.96)*** | (3.67)*** |
| Real market interest rate  |           | 0.0001    | 0.0001    | 0.0001    | 0.0001    | 0.0001    | 0.0001    |
|                            |           | (3.16)*** | (2.85)*** | (3.59)*** | (3.06)*** | (2.74)*** | (3.45)*** |
| Constant                   | 0.0205    | 0.0001    | 0.0052    | 0.0067    | -0.0036   | 0.0014    | 0.0034    |
|                            | (7.89)*** | (0.01)    | (1.21)    | (1.52)    | (0.75)    | (0.34)    | (0.77)    |
| Observations               | 3271      | 2982      | 2982      | 2982      | 2982      | 2982      | 2982      |
| R-squared                  | 0.34      | 0.36      | 0.36      | 0.37      | 0.33      | 0.33      | 0.33      |

Robust t-statistics (calculated allowing for clustered standard errors by bank) in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

**Table 6: Administrative cost estimations for domestic private banks - with contemporaneous bank characteristics**

|                            | (6.1)     | (6.2)     | (6.3)     | (6.4)     | (6.5)     | (6.6)     | (6.7)     |
|----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Bank market share          | -0.0327   | -0.0321   | -0.0322   | -0.0323   |           |           |           |
|                            | (3.15)*** | (3.12)*** | (3.13)*** | (3.14)*** |           |           |           |
| Other M&A                  | 0.0012    | 0.0011    | 0.0010    | 0.0011    |           |           |           |
|                            | (2.19)**  | (2.06)**  | (2.03)**  | (2.12)**  |           |           |           |
| Other M&A×Age              | -0.0015   | -0.0007   | -0.0007   | -0.0007   |           |           |           |
|                            | (4.14)*** | (1.41)    | (1.40)    | (1.48)    |           |           |           |
| Foreign bank participation |           | -0.0209   | -0.0226   | -0.0233   | -0.0210   | -0.0225   | -0.0233   |
|                            |           | (4.45)*** | (4.80)*** | (5.01)*** | (4.56)*** | (4.85)*** | (5.07)*** |
| Top 3 bank share           |           | 0.0411    |           |           | 0.0390    |           |           |
|                            |           | (4.10)*** |           |           | (3.74)*** |           |           |
| Top 5 bank share           |           |           | 0.0249    |           |           | 0.0228    |           |
|                            |           |           | (3.18)*** |           |           | (2.91)*** |           |
| Herfindahl index           |           |           |           | 0.00001   |           |           | 0.00001   |
|                            |           |           |           | (4.56)*** |           |           | (4.13)*** |
| Inflation                  |           | -0.0698   | -0.0623   | -0.0748   | -0.0710   | -0.0637   | -0.0756   |
|                            |           | (3.47)*** | (3.18)*** | (3.59)*** | (3.51)*** | (3.22)*** | (3.62)*** |
| Real growth of production  |           | -0.0173   | -0.0178   | -0.0164   | -0.0175   | -0.0179   | -0.0166   |
|                            |           | (4.46)*** | (4.48)*** | (4.29)*** | (4.49)*** | (4.51)*** | (4.34)*** |
| Real market interest rate  |           | 0.0002    | 0.0002    | 0.0002    | 0.0002    | 0.0001    | 0.0002    |
|                            |           | (3.55)*** | (3.37)*** | (3.97)*** | (3.39)*** | (3.19)*** | (3.78)*** |
| Constant                   | 0.0143    | -0.0034   | 0.0017    | 0.0011    | -0.0036   | 0.0016    | 0.0007    |
|                            | (9.80)*** | (0.59)    | (0.31)    | (0.25)    | (0.62)    | (0.29)    | (0.15)    |
| Observations               | 1904      | 1752      | 1752      | 1752      | 1752      | 1752      | 1752      |
| R-squared                  | 0.36      | 0.40      | 0.40      | 0.40      | 0.39      | 0.39      | 0.39      |

Robust t-statistics (calculated allowing for clustered standard errors by bank) in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

**Table A.1: Spread estimations for all private banks – with lagged bank characteristics**

|                             | (A.1.1)   | (A.1.2)   | (A.1.3)   | (A.1.4)   | (A.1.5)   | (A.1.6)   | (A.1.7)   |
|-----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Lag of liquid assets        | 0.0252    | 0.0235    | 0.0246    | 0.0233    | 0.0251    | 0.0262    | 0.0249    |
|                             | (3.08)*** | (2.84)*** | (2.97)*** | (2.82)*** | (3.01)*** | (3.14)*** | (2.99)*** |
| Lag of non-performing loans | 0.0005    | 0.0011    | 0.0009    | 0.0010    | 0.0040    | 0.0038    | 0.0040    |
|                             | (0.13)    | (0.25)    | (0.21)    | (0.24)    | (0.88)    | (0.84)    | (0.87)    |
| Lag of administrative costs | 0.6087    | 0.6008    | 0.6048    | 0.6030    | 0.6235    | 0.6273    | 0.6258    |
|                             | (7.27)*** | (6.71)*** | (6.77)*** | (6.74)*** | (7.50)*** | (7.56)*** | (7.54)*** |
| Bank origin                 | -0.0054   | -0.0053   | -0.0053   | -0.0053   |           |           |           |
|                             | (4.16)*** | (4.10)*** | (4.10)*** | (4.10)*** |           |           |           |
| Lag of market share         | -0.0155   | -0.0161   | -0.0160   | -0.0162   |           |           |           |
|                             | (1.55)    | (1.62)    | (1.61)    | (1.64)    |           |           |           |
| Lag of equity               | 0.0095    | 0.0100    | 0.0101    | 0.0102    | 0.0061    | 0.0062    | 0.0062    |
|                             | (1.52)    | (1.62)    | (1.65)    | (1.65)*   | (1.02)    | (1.04)    | (1.05)    |
| Foreign M&A                 | 0.0026    | 0.0021    | 0.0021    | 0.0022    |           |           |           |
|                             | (2.48)**  | (2.24)**  | (2.24)**  | (2.33)**  |           |           |           |
| Foreign M&A×Age             | 0.0007    | -0.000004 | -0.000002 | -0.00004  |           |           |           |
|                             | (0.74)    | (0.00)    | (0.00)    | (0.04)    |           |           |           |
| Foreign de novo             | -0.0205   | -0.0226   | -0.0224   | -0.0226   |           |           |           |
|                             | (4.86)*** | (4.38)*** | (4.33)*** | (4.35)*** |           |           |           |
| Foreign de novo×Age         | 0.0077    | 0.0081    | 0.0080    | 0.0081    |           |           |           |
|                             | (3.32)*** | (2.65)*** | (2.61)*** | (2.64)*** |           |           |           |
| Other M&A                   | -0.0004   | -0.0003   | -0.0003   | -0.0003   |           |           |           |
|                             | (0.48)    | (0.30)    | (0.35)    | (0.31)    |           |           |           |
| Other M&A×Age               | 0.0008    | 0.0003    | 0.0003    | 0.0003    |           |           |           |
|                             | (1.66)*   | (0.48)    | (0.51)    | (0.47)    |           |           |           |
| Foreign bank participation  |           | 0.0049    | 0.0035    | 0.0032    | 0.0040    | 0.0026    | 0.0023    |
|                             |           | (1.39)    | (0.88)    | (0.85)    | (1.15)    | (0.67)    | (0.62)    |
| Top 3 bank share            |           | 0.0478    |           |           | 0.0480    |           |           |
|                             |           | (3.47)*** |           |           | (3.48)*** |           |           |
| Top 5 bank share            |           |           | 0.0263    |           |           | 0.0262    |           |
|                             |           |           | (2.38)**  |           |           | (2.40)**  |           |
| Herfindahl index            |           |           |           | 0.00001   |           |           | 0.00001   |
|                             |           |           |           | (2.90)*** |           |           | (2.86)*** |
| Inflation                   |           | 0.0007    | 0.0089    | -0.0016   | -0.0001   | 0.0082    | -0.0023   |
|                             |           | (0.02)    | (0.25)    | (0.05)    | (0.00)    | (0.23)    | (0.06)    |
| Real growth of production   |           | 0.0023    | 0.0016    | 0.0026    | 0.0019    | 0.0011    | 0.0022    |
|                             |           | (0.64)    | (0.43)    | (0.74)    | (0.51)    | (0.31)    | (0.60)    |
| Real market interest rate   |           | -0.00002  | -0.00004  | -0.000001 | -0.00002  | -0.00003  | 0.00001   |
|                             |           | (0.34)    | (0.58)    | (0.02)    | (0.23)    | (0.46)    | (0.08)    |
| Constant                    | 0.0025    | -0.0214   | -0.0141   | -0.0123   | -0.0245   | -0.0171   | -0.0153   |
|                             | (0.84)    | (3.15)*** | (2.06)**  | (2.28)**  | (3.54)*** | (2.48)**  | (2.77)*** |
| Observations                | 2586      | 2394      | 2394      | 2394      | 2394      | 2394      | 2394      |
| R-squared                   | 0.49      | 0.51      | 0.51      | 0.51      | 0.48      | 0.48      | 0.48      |

Robust t-statistics (calculated allowing for clustered standard errors by bank) in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table A.2: Spread estimations for domestic private banks – with lagged bank characteristics**

|                             | (A.2.1)   | (A.2.2)   | (A.2.3)   | (A.2.4)   | (A.2.5)   | (A.2.6)   | (A.2.7)   |
|-----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Lag of liquid assets        | 0.0456    | 0.0434    | 0.0449    | 0.0431    | 0.0406    | 0.0421    | 0.0403    |
|                             | (3.85)*** | (3.71)*** | (3.81)*** | (3.69)*** | (3.52)*** | (3.61)*** | (3.50)*** |
| Lag of non-performing loans | 0.0013    | 0.0022    | 0.0020    | 0.0022    | 0.0022    | 0.0019    | 0.0021    |
|                             | (0.32)    | (0.53)    | (0.48)    | (0.52)    | (0.52)    | (0.47)    | (0.51)    |
| Lag of administrative costs | 0.5288    | 0.5157    | 0.5192    | 0.5177    | 0.5345    | 0.5383    | 0.5366    |
|                             | (6.43)*** | (6.05)*** | (6.09)*** | (6.08)*** | (6.40)*** | (6.45)*** | (6.44)*** |
| Lag of market share         | -0.0265   | -0.0247   | -0.0250   | -0.0249   |           |           |           |
|                             | (2.30)**  | (2.13)**  | (2.15)**  | (2.16)**  |           |           |           |
| Lag of equity               | 0.0169    | 0.0142    | 0.0145    | 0.0144    | 0.0151    | 0.0154    | 0.0153    |
|                             | (1.12)    | (0.97)    | (1.00)    | (0.99)    | (1.04)    | (1.06)    | (1.05)    |
| Other M&A                   | -0.0003   | 0.00004   | 0.00003   | 0.00004   |           |           |           |
|                             | (0.35)    | (0.05)    | (0.03)    | (0.05)    |           |           |           |
| Other M&A×Age               | 0.0009    | 0.000009  | -0.000009 | -0.000005 |           |           |           |
|                             | (1.54)    | (0.01)    | (0.01)    | (0.01)    |           |           |           |
| Foreign bank participation  |           | 0.0082    | 0.0049    | 0.0055    | 0.0086    | 0.0056    | 0.0061    |
|                             |           | (1.69)*   | (0.95)    | (1.12)    | (1.81)*   | (1.09)    | (1.24)    |
| Top 3 bank share            |           | 0.0616    |           |           | 0.0603    |           |           |
|                             |           | (3.88)*** |           |           | (3.77)*** |           |           |
| Top 5 bank share            |           |           | 0.0421    |           |           | 0.0405    |           |
|                             |           |           | (3.36)*** |           |           | (3.26)*** |           |
| Herfindahl index            |           |           |           | 0.00002   |           |           | 0.00002   |
|                             |           |           |           | (3.67)*** |           |           | (3.55)*** |
| Inflation                   |           | -0.0098   | -0.0017   | -0.0144   | -0.0084   | -0.0003   | -0.0128   |
|                             |           | (0.26)    | (0.05)    | (0.38)    | (0.22)    | (0.01)    | (0.33)    |
| Real growth of production   |           | 0.0045    | 0.0036    | 0.0049    | 0.0045    | 0.0036    | 0.0049    |
|                             |           | (0.96)    | (0.77)    | (1.05)    | (0.96)    | (0.77)    | (1.05)    |
| Real market interest rate   |           | -0.00001  | -0.00002  | 0.00003   | -0.00001  | -0.00003  | 0.00002   |
|                             |           | (0.11)    | (0.34)    | (0.44)    | (0.22)    | (0.45)    | (0.33)    |
| Constant                    | 0.0006    | -0.0304   | -0.0260   | -0.0195   | -0.0310   | -0.0262   | -0.0202   |
|                             | (0.16)    | (3.63)*** | (3.11)*** | (2.94)*** | (3.66)*** | (3.15)*** | (3.03)*** |
| Observations                | 1509      | 1405      | 1405      | 1405      | 1405      | 1405      | 1405      |
| R-squared                   | 0.48      | 0.49      | 0.49      | 0.49      | 0.49      | 0.49      | 0.49      |

Robust t-statistics (calculated allowing for clustered standard errors by bank ) in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table A.3: Administrative cost estimations for all private banks – with lagged bank characteristics**

|                            | (A.3.1)   | (A.3.2)   | (A.3.3)   | (A.3.4)   | (A.3.5)   | (A.3.6)   | (A.3.7)   |
|----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Bank origin                | -0.0028   | -0.0025   | -0.0025   | -0.0025   |           |           |           |
|                            | (2.50)**  | (2.23)**  | (2.23)**  | (2.24)**  |           |           |           |
| Lag bank market share      | -0.0545   | -0.0512   | -0.0513   | -0.0515   |           |           |           |
|                            | (4.76)*** | (4.55)*** | (4.56)*** | (4.56)*** |           |           |           |
| Foreign M&A                | 0.0011    | 0.0014    | 0.0014    | 0.0015    |           |           |           |
|                            | (0.98)    | (1.31)    | (1.30)    | (1.35)    |           |           |           |
| Foreign M&A×Age            | 0.0002    | 0.0004    | 0.0003    | 0.0004    |           |           |           |
|                            | (0.10)    | (0.16)    | (0.14)    | (0.14)    |           |           |           |
| Foreign de novo            | 0.0157    | 0.0083    | 0.0084    | 0.0084    |           |           |           |
|                            | (1.41)    | (0.45)    | (0.45)    | (0.45)    |           |           |           |
| Foreign de novo×Age        | -0.0014   | 0.0036    | 0.0035    | 0.0035    |           |           |           |
|                            | (0.34)    | (0.37)    | (0.36)    | (0.36)    |           |           |           |
| Other M&A                  | 0.0017    | 0.0017    | 0.0016    | 0.0017    |           |           |           |
|                            | (3.07)*** | (3.15)*** | (3.13)*** | (3.15)*** |           |           |           |
| Other M&A×Age              | -0.0012   | -0.0009   | -0.0009   | -0.0009   |           |           |           |
|                            | (3.71)*** | (2.02)**  | (2.05)**  | (2.03)**  |           |           |           |
| Foreign bank participation |           | -0.0140   | -0.0163   | -0.0156   | -0.0167   | -0.0186   | -0.0187   |
|                            |           | (4.22)*** | (4.81)*** | (4.73)*** | (5.00)*** | (5.55)*** | (5.68)*** |
| Top 3 bank share           |           | 0.0461    |           |           | 0.0455    |           |           |
|                            |           | (4.73)*** |           |           | (5.57)*** |           |           |
| Top 5 bank share           |           |           | 0.0313    |           |           | 0.0285    |           |
|                            |           |           | (4.43)*** |           |           | (4.77)*** |           |
| Herfindahl index           |           |           |           | 0.00001   |           |           | 0.00001   |
|                            |           |           |           | (3.99)*** |           |           | (5.42)*** |
| Inflation                  |           | -0.0253   | -0.0187   | -0.0256   | -0.0235   | -0.0158   | -0.0257   |
|                            |           | (1.53)    | (1.12)    | (1.54)    | (1.43)    | (0.97)    | (1.54)    |
| Real growth of production  |           | -0.0099   | -0.0106   | -0.0095   | -0.0106   | -0.0109   | -0.0098   |
|                            |           | (3.73)*** | (3.93)*** | (3.62)*** | (3.89)*** | (3.96)*** | (3.67)*** |
| Real market interest rate  |           | -0.00003  | -0.00004  | -0.000004 | 0.0001    | 0.0001    | 0.0001    |
|                            |           | (0.91)    | (1.38)    | (0.13)    | (3.06)*** | (2.74)*** | (3.45)*** |
| Constant                   | 0.0202    | 0.0014    | 0.0051    | 0.0103    | -0.0036   | 0.0014    | 0.0034    |
|                            | (7.83)*** | (0.26)    | (1.05)    | (2.10)**  | (0.75)    | (0.34)    | (0.77)    |
| Observations               | 3030      | 2772      | 2772      | 2772      | 2982      | 2982      | 2982      |
| R-squared                  | 0.33      | 0.35      | 0.35      | 0.35      | 0.33      | 0.33      | 0.33      |

Robust t-statistics (calculated allowing for clustered standard errors by bank) in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table A.4.: Administrative cost estimations for domestic banks only – with lagged bank characteristics**

|                            | (A.4.1)              | (A.4.2)              | (A.4.3)              | (A.4.4)              | (A.4.5)              | (A.4.6)              | (A.4.7)              |
|----------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Lag of bank market share   | -0.0310<br>(3.13)*** | -0.0298<br>(3.06)*** | -0.0300<br>(3.08)*** | -0.0301<br>(3.08)*** |                      |                      |                      |
| Other M&A                  | 0.0014<br>(2.61)***  | 0.0012<br>(2.38)**   | 0.0012<br>(2.37)**   | 0.0012<br>(2.40)**   |                      |                      |                      |
| Other M&A×Age              | -0.0012<br>(3.43)*** | -0.0007<br>(1.33)    | -0.0007<br>(1.34)    | -0.0007<br>(1.35)    |                      |                      |                      |
| Foreign bank participation |                      | -0.0178<br>(3.78)*** | -0.0201<br>(4.29)*** | -0.0199<br>(4.30)*** | -0.0210<br>(4.56)*** | -0.0225<br>(4.85)*** | -0.0233<br>(5.07)*** |
| Top 3 bank share           |                      | 0.0468<br>(4.50)***  |                      |                      | 0.0390<br>(3.74)***  |                      |                      |
| Top 5 bank share           |                      |                      | 0.0312<br>(3.97)***  |                      |                      | 0.0228<br>(2.91)***  |                      |
| Herfindahl index           |                      |                      |                      | 0.00001<br>(4.35)*** |                      |                      | 0.00001<br>(4.13)*** |
| Inflation                  |                      | -0.0721<br>(3.73)*** | -0.0647<br>(3.42)*** | -0.0745<br>(3.79)*** | -0.0710<br>(3.51)*** | -0.0637<br>(3.22)*** | -0.0756<br>(3.62)*** |
| Real growth of production  |                      | -0.0166<br>(4.15)*** | -0.0172<br>(4.24)*** | -0.0160<br>(4.04)*** | -0.0175<br>(4.49)*** | -0.0179<br>(4.51)*** | -0.0166<br>(4.34)*** |
| Real market interest rate  |                      | -0.0000<br>(0.69)    | -0.0000<br>(1.17)    | 0.0000<br>(0.40)     | 0.0002<br>(3.39)***  | 0.0001<br>(3.19)***  | 0.0002<br>(3.78)***  |
| Constant                   | 0.0142<br>(9.87)***  | -0.0030<br>(0.54)    | 0.0010<br>(0.18)     | 0.0046<br>(1.08)     | -0.0036<br>(0.62)    | 0.0016<br>(0.29)     | 0.0007<br>(0.15)     |
| Observations               | 1752                 | 1618                 | 1618                 | 1618                 | 1752                 | 1752                 | 1752                 |
| R-squared                  | 0.36                 | 0.39                 | 0.39                 | 0.39                 | 0.39                 | 0.39                 | 0.39                 |

Robust t-statistics (calculated allowing for clustered standard errors by bank) in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%