IMF Working Paper

Banking Spreads in Latin America

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Abstract

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Intermediation spreads in Latin America are high by international standards. This paper examines the determinants of bank interest margins in that region using bank- and country-level data from 85 countries, including 14 Latin American economies. The results suggest that Latin America has higher interest rates, less efficient banks, and larger reserve requirements than other regions and that these factors have a significant impact on spreads. However, Latin American countries do not differ markedly from their peers in other aspects that are found important in determining the cost of financial intermediation, such as inflation and bank profit taxation.

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I. INTRODUCTION

Financial intermediation in Latin America is low by international standards. Financial systems in Latin America are still largely bank-based, but after a short period of strong credit growth sparked by financial liberalization in the early 1990s, bank lending has not yet recovered from the collapse following the banking crises of the mid-1990s (Singh et al., 2005). As a result, bank lending as a percentage of GDP is low compared to industrialized countries and other emerging markets (Figure 1).

This lack of financial intermediation is seen as an important obstacle to growth: there is a considerable body of evidence indicating that financial intermediation is not only correlated with growth but a causal factor in explaining economic performance (see, for example, Levine, 2004).

Figure 1. Bank Credit to the Private Sector, 2003
(In percent of GDP)
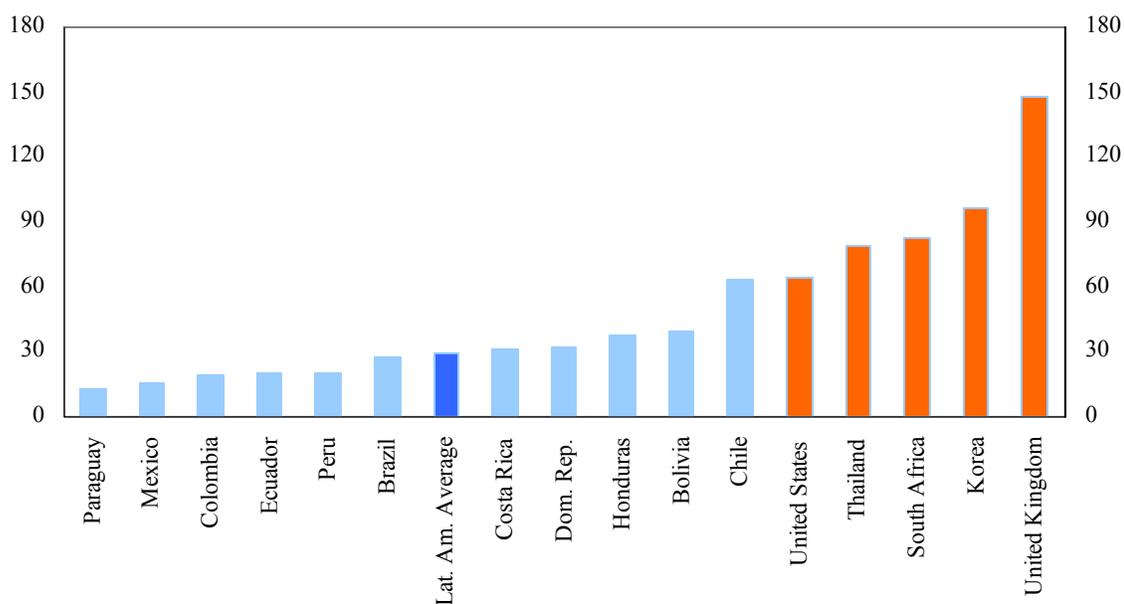
Source: IFS.

The low levels of lending in Latin America appear related to the prevalence of high intermediation costs in the region. Intermediation spreads in Latin America are high compared to those in other banking markets. This is true when measuring spreads either as ex-ante bank spreads (the difference between weighted averages of lending rates and bank funding costs, Figure 2) or ex-post net interest margins (defined as the bank's total interest income minus total interest expense, divided by the sum of interest bearing assets, Figure 3).

Figure 2. Ex-Ante Banking Spreads Worldwide
(In percentage points, 138 countries, 2003)
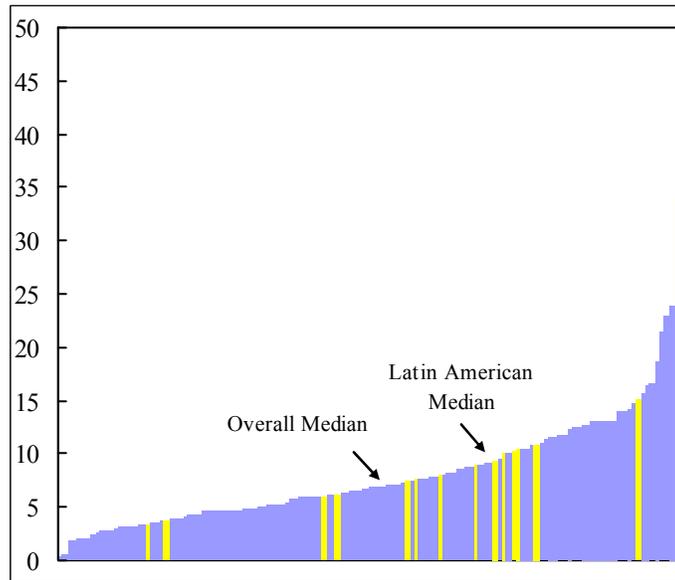
Note: Simple average of difference between deposit and lending rates. Source: IFS. Latin American countries are marked in light color.

Figure 3. Net Interest Margins
(Average, 1999–2002)
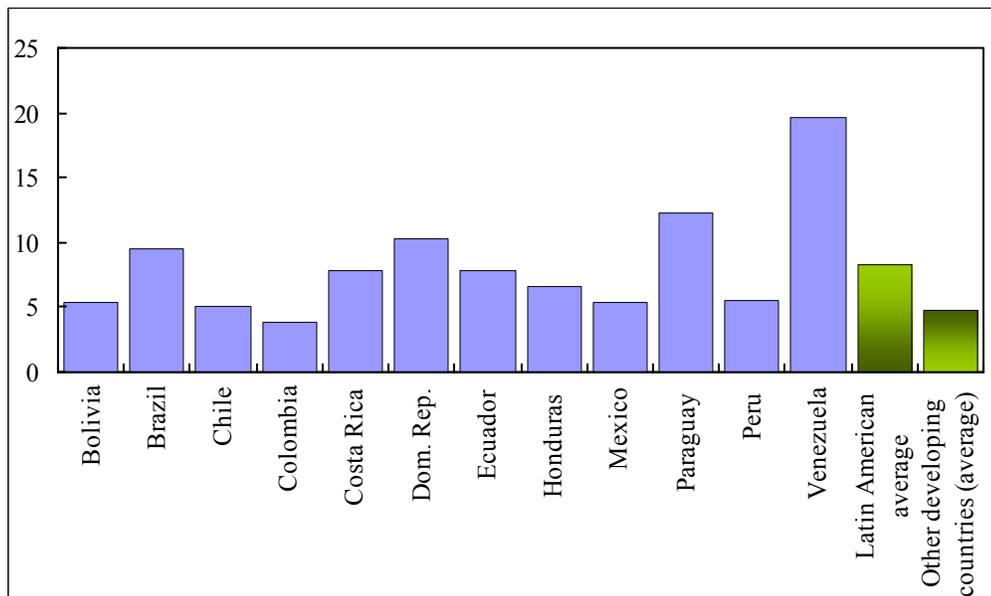
Note: Total interest income minus total interest expense, divided by the sum of interest bearing assets. Source: Bankscope

The high levels of spreads are not a recent phenomenon, and unlikely to be a result of the ongoing process of bank consolidation. As in other regions, in the 1990s Latin America saw a trend toward bank consolidation and concentration. To a large extent, consolidation was driven by financial crises and subsequent regulatory tightening (IDB, 2004). While this resulted in a marked reduction of the number of banks in most countries, it does not seem to have yielded a decline in competition intensity, partly because it was accompanied by a lowering of barriers of entry to foreign banks (see Gelos and Roldós, 2004, and IDB, 2004). In fact, banking spreads have fallen somewhat over the last decade although the pace of the reduction has been slow (Figure 4).[2]

Figure 4. Ex-Ante Banking Spreads in Latin America
(In percentage points)
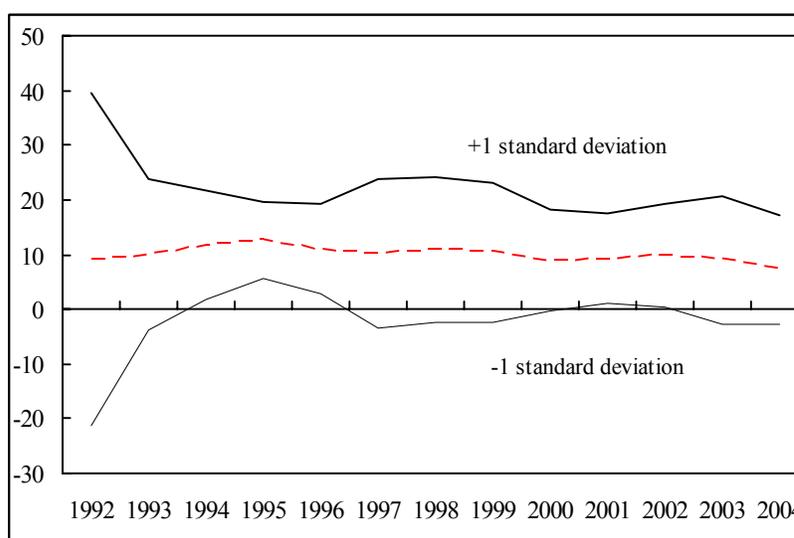
Note: Simple average of difference between lending and deposit rates for 12 Latin American economies. Source: IFS.

This paper takes a closer look at the determinants of bank interest margins in Latin America using bank- and country-level data from 85 countries, including 14 Latin American economies. We assess the role of bank- and country-specific factors in determining banking spreads using micro data from over 2,200 banks. Taking an international perspective allows us to delineate the key dimensions in which Latin America differs from other regions. The paper differs from existing studies in further dimensions apart from the Latin American specific focus in a cross-country approach. Among other aspects, we make use of new or expanded data sets (including comprehensive information on reserve requirements and foreign ownership) and investigate the relationship between competition and bank spreads by using behavioral measures of bank competition suggested by the new industrial organization literature.

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[2] See also Singh et al. (2005).

The results suggest that Latin America has higher interest rate levels, less efficient banks, and larger reserve requirements than other regions and that these factors have a significant impact on spreads. However, Latin American countries do not differ markedly from their peers in other aspects that are found important in determining the cost of financial intermediation, such as inflation, bank profit taxation, average bank size, or average equity as a percentage of total bank assets.

II. THE DETERMINANTS OF SPREADS: LITERATURE REVIEW

The extensive literature on bank behavior suggests that, at the country level, the following factors are likely to influence the cost of credit:

- **Creditor rights and the quality of the legal framework.** Higher recovery rates and shorter times to repossess collateral in countries with better legal environments are expected to reduce bank spreads. Some studies have found a significant impact of judicial efficiency on ex-ante spreads and net interest margins (see Laeven and Majnoni, 2003, and Demirguç-Kunt, Laeven, and Levine, 2004, henceforth DLL).

- **The degree of banking competition.** More intense competition intensity should yield lower spreads. Empirically, however, a strong correlation between direct measures of competition or concentration and spreads is hard to find.[3] Nevertheless, administrative expenses have been found to be positively associated with net interest margins, and the presence of inefficiencies in a country's banking system in turn is likely to reflect a lack of competitive pressure.

- **The macroeconomic environment.** There is no generally accepted model relating macroeconomic performance to spreads between borrowing and lending rates. However, macroeconomic volatility may raise the risk of default and therefore bank spreads. In the dealership model of banks developed by Ho and Saunders (1981), interest margins rise with the variance of interest rates as a result of the intermediation risk faced by banks. This is supported empirically by Saunders and Schumacher (2000), among others. Moreover, if inflation shocks are not passed through to both borrowing and lending rates equally rapidly, bank spreads may be correlated with inflation rates, and indeed various studies find a positive correlation between spreads and inflation (see Honohan, 2003). Similarly, theory predicts that the riskiness of borrowers is likely to rise with the level of interest rates, possibly in a nonlinear way. Banks will typically want to be compensated for higher risk, which yields a positive relationship between the level of interest rates and spreads. Lastly, an increase in economic activity may raise the net worth of borrowers and lower spreads (see Bernanke and Gertler, 1989).

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[3] DLL do not find a robust correlation between measures of concentration and net interest margins. However, Martínez Peria and Mody (2004), focusing on a small number of countries, report a positive relationship between bank concentration and spreads. For a discussion of competition in Brazilian banking, see Belaisch (2003) and Nakane (2003).

- **Taxation, including reserve requirements.** Taxation of financial intermediation can take different forms, such as financial transaction taxes, bank profit and revenue taxes, or reserve requirements that are remunerated at below-market rates. Taxation drives a wedge between borrowing and lending rates. Effective tax rates usually rise with inflation and the level of short-term interest rates, and depending on the behavioral response of banks and depositors, the same form of taxation will have a larger effect on bank spreads at higher inflation levels. See Honohan (2003).

- **Availability of information about borrowers.** Higher availability of information about potential borrowers will reduce default risk and lower spreads. For example, the existence of credit information registries and good accounting standards are widely seen as important for improving risk assessment and reducing ex-ante spreads (and, through risk premia, also ex-post margins). See Chu and Schechtman (2003).

- **Banking regulations and mandated lending.** Regulatory barriers to entry will reduce competition and increase intermediation margins. Regulations may also take the form of mandated lending programs which requires lending to particular sectoral groups, often at low or subsidized rates. The costs associated with these mandated lending programs tend to be borne by other borrowers.

Bank-specific factors, however, also affect the level of interest margins. Banks have different strategies which may affect their product mix and the pricing of loans (see Dell'Ariccia and Márquez, 2002). For example, some banks may rely more on fee income than others. Similarly, in an imperfectly competitive environment, larger banks may be able to exploit economies of scale and lower interest margins, institutions with larger market share may be able to charge more, and banks with larger overhead costs may pass these costs on to borrowers. Well-capitalized banks may face lower funding costs, implying larger net interest margins (see DLL).

Foreign banks in developing countries are generally thought to be more efficient than domestic ones. The evidence on the impact of bank ownership on the level of spreads charged, is, however, mixed. Martínez Peria and Mody (2004) find that foreign banks in Latin America, in particular new entrants (as opposed to banks acquired by foreigners) were able to charge lower spreads than domestic ones. On the other hand, Claessens et al (2001) report that foreign banks tend to have higher net interest margins. Detragiache et al. (2005) find that in poor countries, a larger foreign bank presence is associated with shallower credit markets.

Previous studies on Latin American banking spreads have emphasized the importance of taxes, operating costs, imperfect competition, and macroeconomic volatility in determining the cost of financial intermediation. Using data from seven Latin American economies, Brock and Rojas Suárez (2000a) find that administrative and other operating costs as well as reserve requirements contribute to the prevalence of high spreads in Latin America.[4] Moreover, macroeconomic volatility also appears to be a factor behind the high spread levels. According to the authors' findings, and contrary to results reported in the literature for

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[4] See also Brock and Rojas Suárez (2000b).

industrial countries, in Latin America, higher shares of non-performing loans tend to be associated with lower spreads.[5] Examining the effect of foreign participation and market concentration on spreads in five Latin American countries, Martínez Peria and Mody (2000) do not find a significant effect of the share of nonperforming loans on spreads. The authors also report that spreads are positively related to concentration measures and administrative costs. In a study comprising five Central American economies, Dick (1999) also documents that high operating costs are the most important component of the spread.

Similar results have been found in studies focusing on individual Latin American countries. Barajas, Steiner, and Salazar (1999) examine the behavior of spreads in Colombia, reporting that imperfect competition and operating costs, the fraction of nonperforming loans, and financial taxation all contributed to high spreads. Catão (1988) studies intermediation spreads in Argentina, singling out high administrative costs, loan-loss provisions, and imperfect competition as key determinants. Brock and Franken (2003) assess the factors driving interest spreads in Chile. Among their findings is that macroeconomic volatility, bank size, and concentration measures are significant spread determinants across different specifications. A substantial number of studies have focused on Brazil. For example, the Brazilian central bank regularly publishes a decomposition of ex-ante spreads, and has traditionally emphasized taxation, administrative costs, and loan-loss provisions as the main determinants.[6] Koyama and Nakane (2002) conclude that risk perceptions accounted for the largest fraction of total ex-ante spreads, with administrative costs and indirect taxes (excluding reserve requirements) coming second and third, respectively.[7]

III. DESCRIPTIVE EVIDENCE

In this section, we use data from a variety of sources to assess how Latin America scores in international comparisons of the dimensions highlighted above. Data on bank-specific variables, including net interest margins, are taken from the Bankscope database. (Details on the construction of bank-specific variables can be found in the appendix). We include data for the period 1999–2002. We use data on banks from all developing countries and emerging markets included in Bankscope's database. Not all variables are available for all banks, and in most estimations we work with samples of 30–60 countries and data on 1,000–1,300 banks. To measure economy wide characteristics, we resort to a variety of sources, as discussed below.

The focus on ex-post net interest margins as opposed to ex-ante spreads between deposit and loan rates allows for a broader examination of the costs of financial intermediation. Net

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[5] The authors argue that this could be the result of inadequate provisioning or reflect the fact that banks with a high proportion of bad loans may lower spreads to attract deposits and grow out of their troubles.

[6] See Banco Central do Brasil (1999, 2000, 2001, 2002, and 2003).

[7] See also Afanasieff, Lhacer, and Nakane (2002). Cardoso (2003) examines the effects of reserve requirements on banking spreads through their impact on bank inflationary revenue (resulting from noninterest bearing demand deposits), finding that spreads decline with inflationary income. The central bank spread reports contain a number of other studies of spread determinants that cannot all be surveyed here.

interest margins—the bank's total interest income minus total interest expense, divided by the sum of interest bearing assets—are easy to calculate from bank balance-sheet information and available for most banks. They allow for an analysis of the determinants of intermediation margins in a general equilibrium setting, taking into account all operations of a bank. For example, banks may compensate high taxation of a particular form of intermediation (such as demand deposits) by charging lower rates on other liabilities.[8] Spreads measured as the difference between deposit and loan rates do not capture this effect.

Another aspect is that, when measured in a large sample, net interest margins in principle control for expected default probability. This is true since they are based on actual interest received, i.e. including performing and nonperforming loans. However, they still incorporate default risk premia if banks are risk averse since in that case banks will want to get compensated for assuming risk through higher interest margins. Of course, in any given period, default realizations may differ from expected levels, particularly in the case of large macroeconomic shocks. A drawback of ex-post interest margins is that they do not measure the marginal cost of intermediation.[9] We will complement our analysis with an alternative spread measure.

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[8] See Beck (2002).
[9] Neither ex-post nor ex-ante spreads take into account the importance of fees.

Table 1. Factors Influencing the Level of Spreads:
Mean Values by Country for Latin American Countries Included in the Sample

Country	Interest Margin	Overhead as % of total assets	Personnel expenses as % of total assets	Reserve requirement (2002/03) (percent of demand deposits)	Legal Protection	Annual Inflation	Avail. of Inform.	Country risk score (ICRG)	Average Bank Profit Tax Rate	Annual GDP Growth	Std. Dev of real exchange rate	Deposit Rate
Bolivia	7.6	4.8	2.3	12.00	3.4	2.2	3	67.3	47.2	1.7	2.9	10.9
Brazil	8.9	6.0	2.4	60.00	5.4	6.7	5	62.3	14.5	2.1	9.9	20.2
Chile	5.5	3.1	1.7	9.00	6.5	3.3	5.8	74.6	5.8	2.1	6.0	6.9
Colombia	4.0	8.8	2.4	13.00	3.5	8.2	4	59.9	33.0	0.8	10.9	12.7
Costa Rica	7.8	6.7	3.3	5.00	6.9	10.4	4.4	75.4	7.1	2.6	2.5	12.3
Dominican Republic	9.6	5.9	2.9	17.00	4.6	7.1		71.8	9.8	5.4	4.1	16.5
Ecuador	6.8	7.7	2.9	4.00	3.3	51.7	2.9	56.6	11.5	1.6	18.4	7.6
Guatemala	9.5	6.2	1.3	14.60	3.2	6.7		69.3	12.9	2.9	7.5	8.5
Honduras	8.1	5.5	2.8	12.00	3.6	9.8		63.7	13.2	2.8	6.9	15.4
Mexico*	6.6	5.3	2.3	20.00	4.3	8.9	4	70.7	30.6	2.6	9.9	7.2
Nicaragua	7.3	5.1	0.0	19.25	4.0	8.0		53.7	15.1	4.6	7.5	10.1
Paraguay	12.1	9.1	3.3	15.00	3.7	7.9		64.6	1.1	0.6	5.1	18.1
Peru	11.9	7.6	4.1	9.00	3.9	2.3	4	68.4	26.3	2.2	4.6	10.6
Venezuela	19.8	10.0	4.3	15.00	5.4	18.9	3.2	64.1	7.2	-2.0	22.5	20.4
Latin American Median	**8.0**	**6.1**	**2.6**	**13.80**	**4.0**	**8.0**	**4.0**	**66.0**	**13.0**	**2.2**	**7.2**	**11.6**
Other EM Median	**5.0**	**3.6**	**1.7**	**6.00**	**5.4**	**3.3**	**4.4**	**67.6**	**18.8**	**3.3**	**4.7**	**6.4**

Source: Authors' calculations based on data from BankScope, IMF, ICRG, *Economic Freedom Index of the World Annual Reports*, *Global Competitiveness Reports*, World Bank, and Kodres, Pritsker, and Souto (2005). Data are averages for 1999–2002 except for data on reserve requirements, which are partly for 2002 and partly for 2003. *At the time, Mexico did not have a traditional reserve requirement on demand deposits but an obligatory liquidity reserve.

A. Creditor Rights and the Legal Framework

Latin America's ranking in indices measuring the strength of creditor rights and the quality of the legal framework is below the average among developing countries/emerging markets. This is in line with the perception that the legal environment in many Latin American countries is regarded as detrimental to lending. In some countries, there has been a pro-debtor bias in legislation and jurisdiction; often, the judicial process is very slow, creating uncertainty about loan recovery[10]. For purposes of international comparison, we use both the index on "Legal System and Property Rights" from the *Economic Freedom Index of the World Annual Reports* as well as an index on property protection constructed by the Heritage Foundation. Figure 1 shows a clear negative correlation between country averages of net interest margins and the "Legal System and Property Rights" (*legprop*) index. The average score for the Latin American countries in our sample is below the average but average interest margins are clearly above a simple regression line describing the relation between the two variables.

Figure 5. Legal Protection and Interest Margins
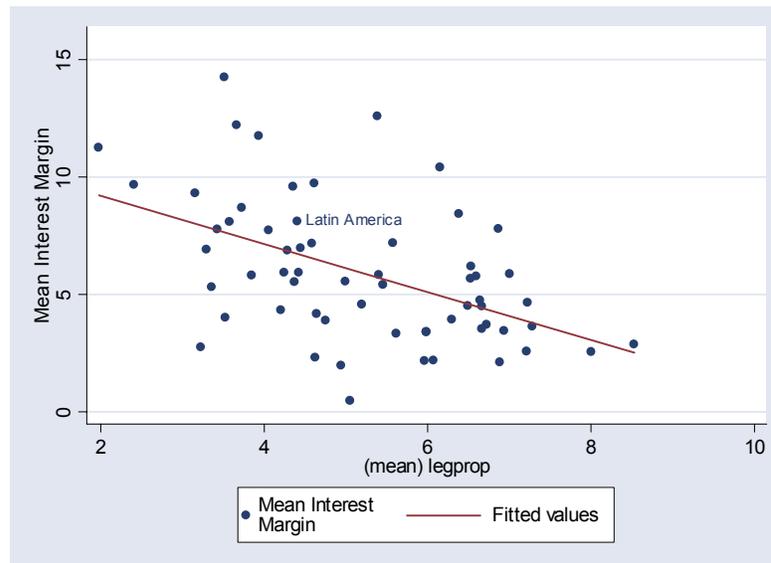
Source: Author's calculations based on data from Economic Freedom Index and Bankscope

B. Macroeconomic Volatility

Macroeconomic risk in Latin America is, on average, similar to that in other emerging markets. Across countries, there is a positive correlation between macroeconomic volatility or country risk and interest margins. Again, average intermediation margins in Latin America are higher than predicted by simple linear regressions of margins on volatility and risk measures (Figure 6 shows the relationship with the ICRG score, where a higher score indicates lower risk).

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[10] See, for example, Pinheiro and Cabral (2001).

Figure 6. Country Risk and Net Interest Margins
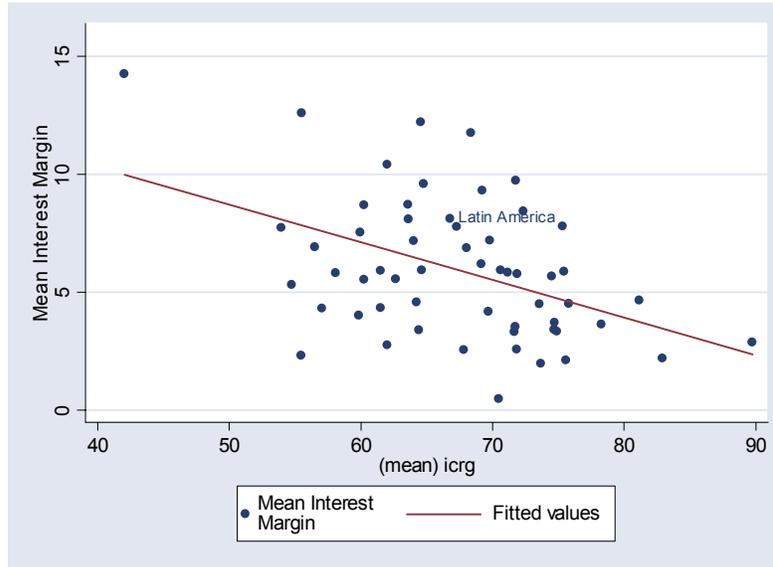
Source: ICRG and author's calculations. Higher ICRG values correspond to lower risk.

C. Competition in the Banking Sector

The relationship between economy wide competition measures and interest margins is weak, possibly reflecting the difficulties associated with computing internationally comparable indices of competition intensity. The theoretical relationship between concentration and competition is ambiguous, and we therefore construct a behavioral measure of the intensity of competitive pressures as proposed by Panzar and Rosse (1987). Panzar and Rosse show that the sum of the elasticities of a firm's revenue with respect to the firm's input prices (the so-called H statistic) can be used to identify the nature of the market structure in which the firm operates. In long-run competitive equilibrium, the H statistic should be equal to one, since any increase in input prices should lead to a one-to-one increase in total revenues. If the market structure is characterized by monopolistic competition, the H statistic will lie between zero and one. If the elasticity of demand is constant, there is a monotone relationship between the mark-up over marginal costs and the H index.[11] The average H statistic for the

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[11] To derive the H statistic, we estimate the following revenue equation using fixed bank effects for the period 1999–2003:

$$\ln \frac{IR}{cap} = c + a \cdot \ln w_L + b \cdot \ln w_F + c \cdot \ln w_K + d \cdot oth$$

where

IR	=	interest revenue divided by total assets
C	=	constant
w_L	=	unit price of labor
w_F	=	unit price of funds

(continued…)

Latin American countries in our sample is roughly equal to the average of the total sample (0.67). However, there is no correlation between the *H* statistic and interest margins across countries, possibly reflecting the fragility of *H* statistic calculations and limited comparability across countries.

On the other hand, the correlation between bank-level measures of administrative costs—another indicator of competitive pressures—and interest margins is strong, with Latin America's banks burdened by high costs. The correlation between average administrative and personnel expenses and interest margins is very high. Latin America's banks' overhead and personnel costs are large by international standards, suggesting the presence of substantial inefficiencies.[12] Such inefficiencies, in turn, point to the absence of strong competitive pressures.

Figure 7. Average Bank Overhead and Net Interest Margins
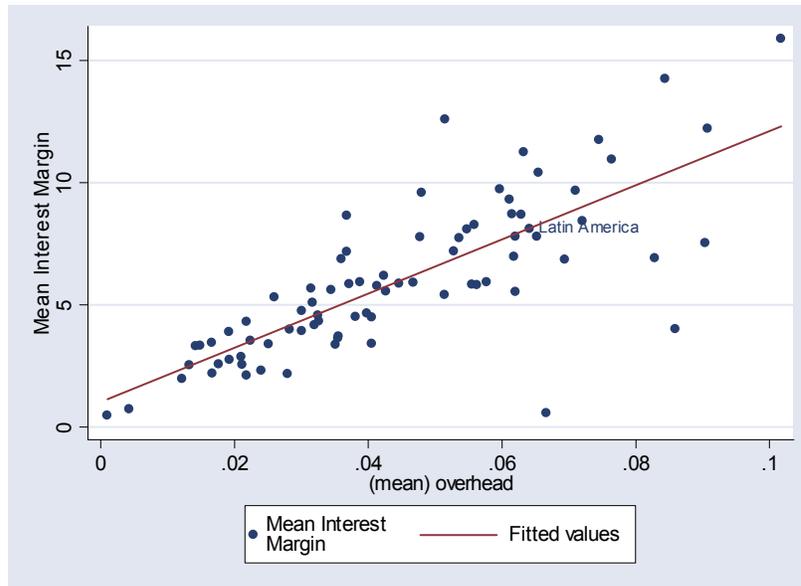
Source: Author's calculations based on data from Bankscope.

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w_K =   unit price of capital

cap   =   capacity indicators, such as total fixed assets

oth   =   other factors potentially affecting interest revenues, such as the business mix of the bank and the size of nonperforming loans.

H is defined as the sum of the coefficients a-d. For applications of this methodology to Latin American banking systems, see Belaisch (2003), Gelos and Roldós (2004), and Claessens and Laeven (2004). For details on the definition of variables, see the appendix.

[12] See Demigurc-Kunt and Huizinga (1999) for an early study.

D. Reserve Requirements

To examine the link between reserve requirements and interest margins, we complement data collected in the World Bank's database on banking regulations with information obtained from IMF country desks.[13] The impact on net interest margins depends on the level of interest rates, the level of existing reserve requirements, and in particular on the extent to which the bank adjusts lending and deposit rates in response to the changes in reserve requirements.

Across countries, reserve requirements on demand deposits are strongly correlated with intermediation spreads. Reserve requirements are relatively high in Latin America, and as pointed out in some of the individual country studies discussed earlier, are likely to be one factor behind high intermediation spreads.

Figure 8. Reserve Requirements on Demand Deposits and Net Interest Margins
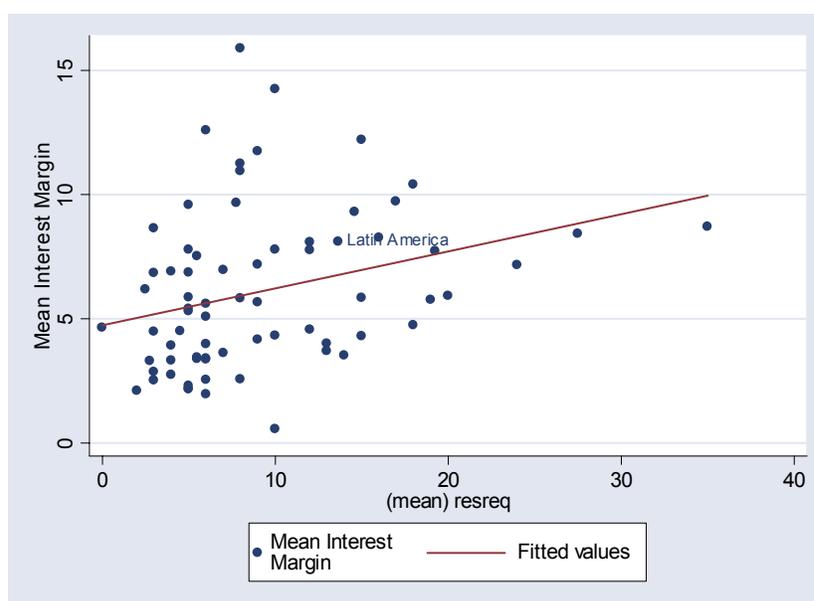
Source: Author's calculations based on data from Bankscope and World Bank.
Note: Reserve requirements on demand deposits, data for 2002/2003.

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[13] Data are mostly for 2003 and partly for 2002. We use data on unremunerated reserve requirements on demand deposits wherever available. Regulations on minimum reserve requirements are typically complex. Summarizing these regulations in the form of one number naturally produces inaccuracies. While these inaccuracies introduce some noise into the data, they are unlikely to be a source of a systematic bias which would pose a problem for cross-country comparisons.

E.   The Level of Interest Rates

Net interest margins are positively correlated with the level of interest rates, as measured by the rates paid on deposits. The relatively high interest rates prevailing in most Latin American economies therefore appear to be a likely candidate in a list of factors explaining high spreads in the region.

Figure 9. Deposit Rates and Net Interest Margins
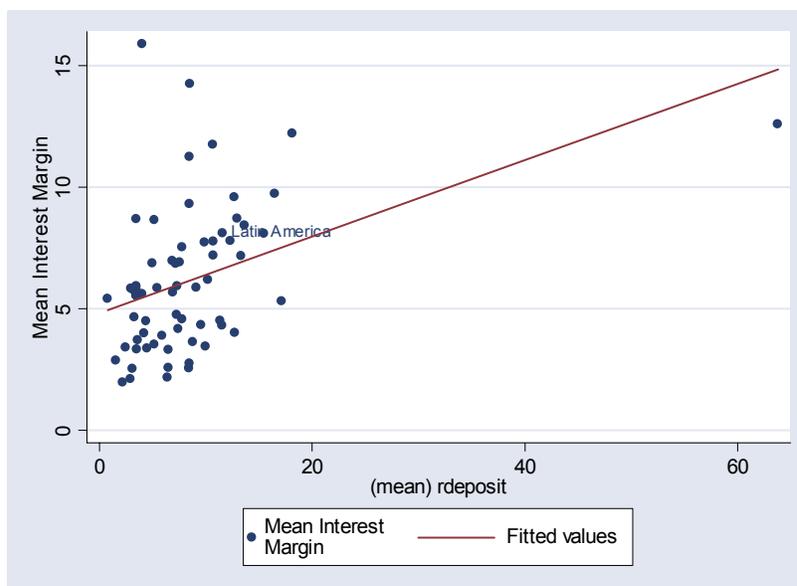
Source: Author's calculations based on data from Bankscope and IFS.

F.   Taxation of the Financial Sector

Bank profit and revenue taxation in Latin America is relatively low by international standards (Table 2). The relationship of spreads with these taxes (as measured by taxes paid by banks divided by gross profits) is slightly negative (not shown). However, financial transaction taxes in various Latin American countries (Argentina, Bolivia, Brazil, Colombia, Peru, and Venezuela) are likely to contribute to high spreads but international comparisons are hampered by the lack of comparable data. In a perfectly competitive environment, financial transaction taxes would be passed on fully to borrowers; in a less-than-competitive environment, some costs will be borne by depositors. In any case, the tax will drive a wedge between what borrowers pay and lenders receive, increasing the spread.[14]

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[14] Kirilenko and Perry (2004) and Coelho, Ebrill, and Summers (2001). Albuquerque (2001) develops a general-equilibrium model in which the financial transaction tax also raises the equilibrium interest rate.

Similarly, mandated lending programs widen bank spreads but their effect is hard to quantify. Moreover, there exist no comparable data across countries that would allow for an international comparison.

G. Availability of Information about Borrowers

The availability of information about companies is more limited in Latin America than in most emerging markets. To measure the degree of corporate transparency, we use an index compiled by the Global Competitiveness Report (2002).[15] The index is (mildly) negatively correlated with net interest margins, as expected.

Figure 10. Availability of Information about Companies and Net Interest Margins
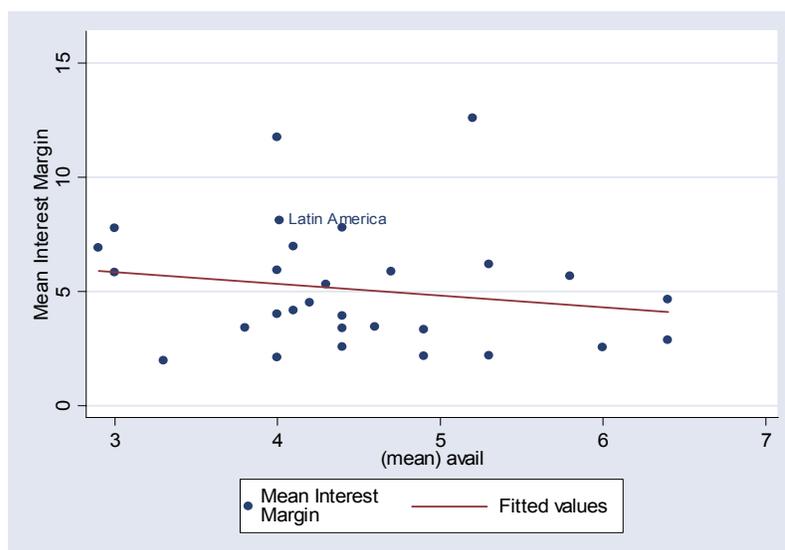
Source: Author's calculations based on data from Bankscope and *Global Competitiveness Report*.

IV. ECONOMETRIC ESTIMATIONS

Based on the preceding descriptive discussion, in this section we explore the relative importance of different factors in determining interest rates using econometric methods. We carry out estimations of the following form:[16]

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[15] See Gelos and Wei (forthcoming) for more details on this measure of transparency.

[16] The specification is motivated by the work of Ho and Saunders (1981) and Wong (1997). For related approaches, see Demirgüç-Kunt and Huizinga (1998) and Claessens and Laeven (2004).

$$Net\ Interest\ Margin_{i,j} =$$

$$a+b{\cdot}Bank_j+c{\cdot}Comp_i+d{\cdot}ResReq+e{\cdot}Deposit\ Rate+f{\cdot}Taxes+g{\cdot}Legal_i+h{\cdot}Info_i+i{\cdot}Macro_i+\varepsilon_{i,j},\ (2)$$

where i and j denote country and bank indices, respectively,

> **Net interest margin** is defined as interest income minus interest expense divided by interest-bearing assets,
>
> **Bank** stands for bank-specific variables (bank size, bank equity, overhead costs, and foreign ownership),
>
> **Comp** denotes country variables measuring the degree of competition in the banking system, such as the five-bank-concentration ratio or the *H*-Statistic,
>
> **ResReq** stands for the cost of reserve requirements, measured as the rate of required reserves on demand deposits; wherever the information was available, data for unremunerated reserves were used;
>
> **Deposit Rate** is the average rate paid on deposits;
>
> **Taxes** stands for taxes paid by the bank,
>
> **Legal** denotes the two variables measuring the quality of the legal environment and the enforceability of contracts and creditor rights, *legprop* and *prop*.
>
> **Info** stands for indices measuring the availability of information about potential borrowers,
>
> and **Macro** comprises variables measuring the macroeconomic environment; specifically, we use GDP growth, inflation, inflation volatility, and country risk ratings.

The regression results highlight the role of bank-level factors in determining banking spreads. We first run simple cross-sectional regressions using data for the most recent year in the sample for which data coverage is satisfactory, 2002.[17] The initial focus on a single cross section is partly motivated by the fact that we do not have time-varying information about all variables at the country level, such as reserve requirements. The results for bank-level variables show that higher net interest margins are associated with smaller bank size and larger overheads (Table 3).[18] These factors alone explain about 33 percent of the variation in

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[17] A drawback of the focus on 2002 is that some Latin American countries in the sample experienced banking crises in that year. To avoid this problem, we excluded two countries experiencing severe banking crises in 2002, Argentina and Uruguay. The key results in this paper remain if the years 2000 or 2001 are chosen instead.

[18] It is not fully clear why, after controlling for overhead costs, larger banks seem to be able to charge lower spreads. Possibly this reflects a greater scope for risk diversification within larger banks.

bank spreads. The ratio of equity to total assets is not significantly associated with interest margins, nor is the dummy for foreign ownership.[19] The ratio of nonperforming loans and similar measures did not enter the estimations systematically. Since economy-wide statistics are repeated in the sample for all banks from the same country, standard errors are corrected for clustering by country.[20]

At the country level, the level of interest rates and reserve requirements are strongly positively associated with higher spreads, while the correlation with GDP growth is negative. According to the results of regressions, a fall in the deposit rate of one percentage point would be associated with a drop in net interest margins by 0.1–0.2 percentage points; and a reduction in reserve requirements on demand deposits by 10 percentage points would reduce net interest margins by an average of 0.4–0.7 percentage points. A possible objection to including the deposit rate as a measure of the level of interest rates is that it is endogenous, since it is jointly chosen with lending rates by banks. When instrumenting deposit rates with their lagged levels, the coefficient becomes insignificant, while the estimated effect of reserve requirements becomes larger and more significant (not shown). Alternatively, when including a measure of the prevailing money market rate instead, the results remain broadly similar (with a somewhat higher estimated coefficient on reserve requirements); due to more limited data availability, however, the sample is substantially smaller. Regarding the effect of economic activity, a one-percent increase in GDP growth is associated with a 0.2–0.5 percentage point lower net interest margin.

Higher concentration in the banking market is associated with higher interest margins but the *H* statistic does not enter the estimations significantly. Since bank overhead costs are likely to be partly a reflection of the degree of competition, we first regress overheads on our concentration and competition measures (the five-bank concentration ratio and the *H* statistic, respectively) and include the residuals in our main estimations. The five-bank concentration ratio enters significantly and with the expected positive sign but the *H* statistic does not. Taxation, indices measuring the availability of information, and the strength of the legal framework, while entering with the expected sign, are not significant after controlling for other factors. One possible reason for this is that measurement problems impede a more precise estimation of the effects.

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[19] This dummy was kindly supplied by Laura Kodres. See Kodres, Pritsler, and Souto (2005). Data on ownership is only available for a subset of banks. The resulting reduction in the sample may be a reason for the absence of a statistically significant effect of foreign ownership in the cross-sectional estimation.

[20] An alternative approach is to include country random effects; the key results reported here are unaltered when following this route instead.

Table 2. Determinants of Net Interest Margins: Cross-Country Regressions, 2002

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ln(Size)	-0.604	-0.732	-0.285	-0.512	-0.511	-0.514	-0.513	-0.442	-0.432	-0.475
	(4.43)***	(4.66)***	(1.86)*	(3.55)***	(2.59)**	(3.02)***	(3.18)***	(2.40)**	(2.73)**	(4.15)***
Equt/Tot.Assets	5.583	5.164	7.496	4.895	4.789	4.905	4.871	4.735	5.299	1.806
	(3.06)***	(2.64)***	(3.53)***	(2.67)**	(2.29)**	(2.41)**	(2.59)**	(2.65)**	(2.40)**	(0.96)
Overhead	68.814	60.128	89.261	66.299	69.768	64.358	65.423	64.871		
	(4.41)***	(3.72)***	(4.67)***	(4.21)***	(4.07)***	(3.43)***	(4.12)***	(3.94)***		
Mkt. Share	2.072	4.510	3.792							
	(1.59)	(1.70)	(1.19)							
Profit tax rate	1.515	1.505	1.765	1.741	2.014	2.112	1.826	1.543	2.067	0.774
	(1.38)	(1.23)	(1.76)*	(1.66)	(1.69)*	(1.75)*	(1.75)*	(1.26)	(1.92)*	(0.79)
Res. Req.	0.063	0.065	0.047	0.053	0.049	0.050	0.054	0.040	0.040	0.044
	(3.66)***	(2.99)***	(4.15)***	(3.65)***	(2.51)**	(3.05)***	(3.38)***	(2.39)**	(2.59)**	(2.52)**
Deposit rate	0.152		0.059	0.130	0.201	0.147	0.135	0.203	0.123	0.080
	(2.37)**		(1.37)	(3.63)***	(2.53)**	(2.41)**	(2.99)***	(3.32)***	(3.14)***	(1.67)
Money mkt interest rate		0.185								
		(2.37)**								
Inflation				0.019	-0.052	-0.008	0.006	0.049	-0.009	0.052
				(0.47)	(0.60)	(0.10)	(0.10)	(1.00)	(0.16)	(0.71)
GDP growth				-0.296	-0.324	-0.357	-0.310	-0.175	-0.370	-0.532
				(1.82)*	(2.08)**	(2.44)**	(1.94)*	(1.17)	(3.11)***	(2.20)**
Pred. Overhead									83.585	52.993
									(4.24)***	(2.83)***
H										-0.863
										(0.89)
5-Bank-Conc.									0.037	
									(2.01)*	
PROP								0.087		
								(0.22)		
Legprop							0.051			
							(0.19)			
Avail. Of Inf.						-0.351				
						(1.01)				
ICRG score					0.041					
					(0.63)					
Sd(Inflation)				-0.000						
				(1.49)						
Foreign			-0.413							
			(0.88)							
Observations	953	711	335	926	817	716	915	859	691	629
# of countries	58	35	43	41	27	47	41	33	28	33
R-squared	0.48	0.46	0.58	0.49	0.50	0.48	0.49	0.49	0.56	0.44

Robust t statistics in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

A. Alternative Specifications and Robustness

Panel regressions for the period 1999–2002 broadly confirm the results but also provide some support for the importance of the legal environment, bank profit taxation, and foreign ownership. In panel regressions with country random effects (columns 1–5 in Table 4), the results regarding bank size and bank overhead are similar to those shown in Table 3. While the size of the coefficients remains broadly unchanged, not surprisingly, the statistical significance of the reserve requirements variable diminishes somewhat since it does not vary over time. In contrast to the results in Table 2, the property protection index PROP now enters the estimations marginally significantly in one specification. The results also indicate that bank taxes (measured as ex-post paid taxes on bank profits) matter, with a ten percentage point increase in profit taxes raising net interest margins by around 0.15 percentage points. The foreign ownership dummy enters significantly with a negative sign, supporting the findings by Martínez Peria and Mody (2004) that—ceteris paribus—foreign banks are able to charge lower spreads. At the aggregate level, however, the fraction of foreign-owned banks in a country's banking system is not correlated with spreads (not shown).[21]

The results are largely robust to the exclusion of outliers. Within our sample, Malawi and Venezuelan banks stand out as reporting large interest margins, and Brazil as having large reserve requirements. To ascertain whether our results are driven by these outliers, we ran the cross-country regressions (1)–(9) in Table 3 excluding banks from those countries. The results are shown in Table AI in the Appendix. Compared to Table 3, the size of coefficients for some variables—such as those on equity/total assets, overhead, and deposit rates—falls. Moreover, GDP growth and the profit tax rate do no longer enter statistically significantly in most cases.

Similar results were also obtained when using an alternative definition of spreads. We ran the cross-country regressions using the following spread definition:

Spreads2 = [(total interest income/total loans)-(total interest expense/total deposits)]*100.

The results (shown in Table AII) in the Appendix, are qualitatively similar, although the magnitude of some of the estimated effects differs. The only major difference is that bank size looses its statistical significance in the estimation. As expected, the estimated effect of reserve requirements on spreads defined this way is substantially larger: a 10 percentage point increase in reserve requirements is associated with an increase in spreads between 2 and 7 percentage points.

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[21] Possibly, foreign banks operate in particular market niches characterized by higher competition or lower risk.

B. What Explains the Difference Between the Level of Spreads in Latin America and Other Developing Countries?

A decomposition of the difference between Latin America' spreads and the average among other developing countries highlights overhead costs, high interest rates, lower growth, and reserve requirements as key factors. Decomposing the difference between average net interest margins for Latin American and those for the other countries in the sample (based on results in column 4 of Table 4) indicates that the difference in overhead costs explains about 1.7 percentage points of the total difference of 3.3 percentage points (Figure 11). Differences in reserve requirements contribute another 0.5 percentage points. Higher interest rates explain about 0.4 percentage points, less developed property rights contribute about 0.2 percentage points, and lower GDP growth about 0.15 of the total difference. The other factors discussed earlier fail to account for a significant fraction of the difference in observed spreads.

Figure 11. Net Interest Margins: Contribution of Different Factors in Explaining Difference Between Latin America's Average and the Average for Developing Countries
(Percentage points)
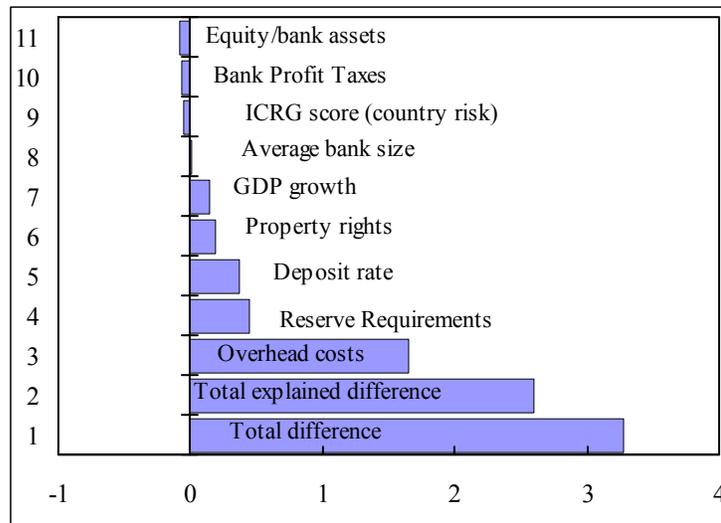
Source: Based on results reported in Table 4, Column (4).

Table 3. Determinants of Net Interest Margins: Panel Regressions for 1999–2002

	(1) RE	(2) RE	(3) RE	(4) RE	(5)RE	(6) FE
	n4018	n4018	n4018	n4018	n4018	n4018
Ln(Size)	-0.412	-0.364	-0.491	-0.378	-0.413	-0.137
	(7.27)***	(5.36)***	(5.49)***	(5.91)***	(5.95)***	(1.12)
Equity/Assets	3.479	3.248	4.864	3.854	3.347	4.929
	(6.64)***	(5.54)***	(4.84)***	(6.74)***	(5.28)***	(3.43)***
Overhead	62.663	60.656	61.847	68.634		53.760
	(30.28)***	(25.25)***	(17.65)***	(30.05)***		(3.31)***
Res. Req	0.053	0.064	0.066	0.062	0.045	0.000
	(2.25)**	(2.50)**	(2.02)**	(2.28)**	(1.87)*	(.)
Deposit Rate	0.105		-0.047	0.090	0.042	0.132
	(5.94)***		(1.22)	(2.35)**	(1.33)	(2.14)**
GDP growth	-0.095	-0.138	-0.176	-0.097	-0.139	-0.074
	(3.16)***	(3.92)***	(3.42)***	(2.61)***	(3.12)***	(2.03)**
Mon. mkt rate		0.080				
		(4.47)***				
Profti tax rate			1.272	1.525	1.486	1.176
			(2.45)**	(3.74)***	(3.63)***	(1.69)*
Country risk				0.067		0.017
				(1.73)*		(0.23)
Mkt. share						-2.347
						(1.25)
Liq. Assets/Total						-3.519
						(2.39)**
PROP			-0.404	-0.544	-0.327	
			(1.05)	(1.48)	(0.95)	
Ppover					78.879	
					(31.07)***	
fivebankconc					0.026	
					(1.61)	
foreign			-1.198			
			(4.54)***			
Observations	3810	2861	1133	3083	2639	2563
# of countries	59	36	37	38	29	43

Note: The dependent variable is net interest margins in all cases. Absolute value of z statistics in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. RE denotes country random effects, FE country random effects. In the FE case, errors adjusted for clustering at the country level.

V. CONCLUSIONS

The results of this study suggest that, *in comparison to other developing countries*, spreads in Latin American banking markets are likely to be higher because of:

- Less efficient banks, which in turn is likely to be a reflection of weaker competition,
- relatively higher levels of interest rates, and
- higher reserve requirements

Furthermore, a less supportive legal environment in the region contributes to larger intermediation costs. On average, Latin American countries do not differ markedly from other emerging markets regarding bank profit taxation, the availability of information about borrowers, and key bank characteristics such as average bank size.

Therefore, promoting bank competition and efficiency, providing a macroeconomic environment which is conducive to lower equilibrium interest rates, and reducing reserve requirements are likely to be important measures for reducing spreads in Latin America.

One potentially important issue that we have not been able to investigate here due to limited data availability is the role of financial transaction taxes in influencing spread levels. This could be a profitable area for future research.

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Table AI. Determinants of Net Interest Margins: Cross-Country Regressions, 2002
(excluding Brazil, Malawi, and Venezuela)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ln(Size)	-0.525	-0.476	-0.221	-0.531	-0.484	-0.581	-0.518	-0.461	-0.389
	(4.42)***	(3.82)***	(-1.77)**	(4.37)***	(2.99)***	(3.25)***	(3.86)***	(3.30)***	(3.55)***
Equ./Tot. Assets	4.248	4.685	6.605	3.780	3.974	3.272	3.907	3.374	4.220
	(1.94)*	(1.81)*	(3.46)**	(1.72)*	(1.48)	(1.15)	(1.70)*	(1.39)	(1.32)
Overhead	53.058	40.114	85.155	53.104	56.177	47.880	51.389	51.520	
	(3.71)***	(4.27)***	(14.28)***	(3.64)***	(3.34)***	(2.69)**	(3.53)***	(3.35)***	
Mkt. share	1.392	2.089	2.342						
	(1.14)	(1.33)	(0.73)						
Profit tax rate	1.130	1.262	1.473	1.086	1.188	2.025	1.096	0.751	1.456
	(1.40)	(1.70)*	(1.77)	(1.34)	(1.31)	(2.25)**	(1.42)	(0.89)	(1.90)*
Res. Req.	0.075	0.058	0.040	0.090	0.101	0.055	0.090	0.089	0.082
	(1.75)*	(1.19)	(1.01)	(2.14)**	(2.44)**	(0.63)	(2.25)**	(2.10)**	(1.74)*
Deposit rate	0.096		0.024	0.077	0.133	0.028	0.086	0.119	0.066
	(6.18)***		(1.20)	(2.83)***	(1.89)*	(0.54)	(2.32)**	(2.11)**	(1.91)*
Money mkt rate		0.075							
		(3.55)***							
Inflation				0.031	-0.033	0.047	0.009	0.044	0.017
				(0.89)	(0.40)	(0.59)	(0.18)	(0.91)	(0.33)
GDP growth				0.098	0.073	0.241	0.063	0.126	0.021
				(0.83)	(0.61)	(0.85)	(0.52)	(0.91)	(0.18)
Pred. Overhead									68.463
									(2.74)**
5-Bank-Concentration Ratio									0.030
									(1.79)*
PROP								0.169	
								(0.47)	
Legprop							-0.022		
							(0.10)		
Avail. Of Inf.						0.317			
						(0.66)			
ICRG score					0.030				
					(0.55)				
St. dev (infl.)				-0.001					
				(3.01)***					
Foreign			-0.790**						
			(1.98)						
Observations	808	586	293	781	672	571	770	714	546
R-squared	0.36	0.38	0.53	0.36	0.37	0.30	0.35	0.34	0.41

Robust t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table AII. Determinants of Spreads: Cross-Country Regressions, 2002
(alternative spread definition)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ln(Size)	-0.524	0.178	-0.318	-0.010	-0.035	0.962	0.058	0.473	0.682
	(0.65)	(0.16)	(0.41)	(0.01)	(0.04)	(1.13)	(0.07)	(0.61)	(0.74)
Equty/Tot. Assets	29.361	34.279	6.844	30.023	28.720	37.830	31.015	33.009	33.392
	(2.29)**	(2.58)**	(0.68)	(2.60)**	(2.34)**	(3.20)***	(2.71)***	(2.82)***	(2.00)*
Overhead	71.534	79.362	28.447	68.243	63.275	78.594	70.706	58.501	
	(2.70)***	(2.91)***	(0.94)	(2.69)***	(2.57)**	(3.06)***	(2.76)***	(2.39)**	
Mkt Share	6.452	-0.576	-14.887						
	(1.10)	(0.08)	(1.46)						
Profit tax rate	-0.460	-8.137	-6.115	0.511	-2.494	-0.311	-0.397	1.054	2.584
	(0.21)	(1.17)	(1.73)*	(0.22)	(0.97)	(0.13)	(0.19)	(0.41)	(0.98)
Res. Req.	0.342	0.328	0.690	0.315	0.218	0.337	0.281	0.275	0.332
	(4.83)***	(4.74)***	(9.31)***	(4.38)***	(2.67)**	(5.11)***	(3.98)***	(3.98)***	(3.64)***
Deposit rate	0.850		0.588	0.634	1.172	0.619	0.850	0.909	0.363
	(3.25)***		(5.91)***	(2.29)**	(3.11)***	(3.25)***	(3.25)***	(3.12)***	(1.24)
Money mkt Interest rate		0.893							
		(5.53)***							
Inflation				0.168	-0.580	0.162	-0.105	0.524	0.430
				(0.50)	(1.25)	(0.80)	(0.36)	(1.86)*	(1.30)
GDP growth				-1.196	-1.296	-1.426	-1.197	-0.577	-1.501
				(2.69)***	(3.74)***	(5.05)***	(2.79)***	(1.20)	(4.75)***
Pred. Overh.									102.694
									(4.11)***
5-bank-conc.									-0.013
									(0.25)
PROP								1.202	
								(0.97)	
Legprop							-0.197		
							(0.25)		
Avail						-1.210			
						(1.37)			
ICRG					-0.217				
					(0.89)				
St. dev (Infl)				-0.000					
				(0.04)					
Foreign			1.679						
			(0.99)						
Observations	806	592	292	780	681	584	770	723	576
R-squared	0.26	0.33	0.38	0.28	0.31	0.32	0.29	0.29	0.31

Dependent variable is defined as Spreads2 = ((Interest income/Total Loans)-(Interest Expenses/Total Deposits))*100. Robust t statistics are given in parentheses

* denotes significant at the 10 percent level; ** significant at the five percent level; *** significant at the one percent level.