

## **PART III**

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# **The Effects of Market Structure**



## Concentration and Competition

**A**DVANCES in information technology, globalization, and deregulation have caused drastic changes in the structure of the banking industry. Innovations and increased competition have reduced margins in traditional banking activities and led to mergers between banks and other financial institutions.

Although this trend toward consolidation affects banks in both developed and developing countries, there are differences in the way the process has taken place in these two groups of countries. In developing countries, most of the consolidation process has taken place with cross-border mergers and acquisitions (usually with banks headquartered in developed countries acquiring banks based in developing countries), whereas in developed countries most of the consolidation process has been through mergers and acquisitions of domestic banks. Empirical evidence suggests that the main driver of consolidation in developed countries is the need to reduce excess capacity, but for developing countries, consolidation is often an outcome of crisis resolution mechanisms, regulatory reforms, and privatization processes. Therefore, consolidation in developed countries is mainly driven by the market, and in developing countries authorities play an important role in the process.

Latin America is not an exception to this trend. In the 1990s, the region was characterized by a process of bank consolidation and entry of foreign banks (see Chapter 10) that was mostly triggered by financial crises and regulatory tightening that tended to affect smaller (and more specialized) institutions. In the case of Argentina, for instance, the Tequila crisis of 1994–95 was followed by the closing of 35 banks and the merger of another 37 banks. A similar process took place in Brazil (the country lost 76 banks between 1996 and 2002) and Colombia after the Russian crisis of 1998. In the case of Mexico, the Tequila crisis led to massive entry of foreign banks (see Box 10.2 in Chapter 10).

Table 9.1 shows the sharp decrease in the number of commercial banks in the region.<sup>1</sup> Interestingly, although the decrease in the number of banks led to an important increase in bank concentration in Nicaragua,

El Salvador, Chile, Guatemala, and Colombia (Figure 9.1), Latin America as a whole did not experience an increase in bank concentration as large as that observed in developed countries.<sup>2</sup> As a consequence, the level of bank concentration experienced by the region is still lower than the level of concentration in developed countries, and it is lower than the level obtained by almost all the other developing regions (East Asia is the only developing region that reached a lower level of bank concentration than Latin America; Figure 9.2).

### CONCENTRATION AND COMPETITION

Although concentration remains low in Latin America, the increase in concentration in some Latin American countries and the entry of large foreign banks in the region have raised concerns about possible effects on bank competition, borrowing costs, bank efficiency, and financial stability.

A concern is that large international banks could exploit their market power by paying lower deposit rates, charging higher interest rates on their loans, and downgrading their services.

Another concern is that the consolidation process may affect sectors and regions differently. For example, the reduction in the number of banks may have a negative effect in regions that already have a small number of banks. Furthermore, the consolidation process (through which banks provide more services) could increase the market power of banks because customers who use banks that supply multiple products may have higher switching costs and hence they could be less sensitive to changes in prices.

<sup>1</sup> Levy-Yeyati and Micco (2003) describe the complete process that occurred in Latin America.

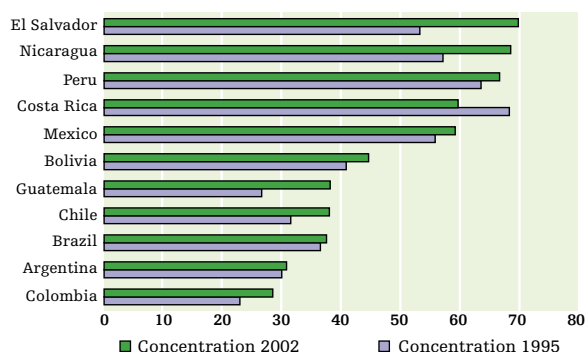
<sup>2</sup> Between 1995 and 2002, the average concentration ratio in developed countries increased from 50 to 54 percent. These figures were calculated using BANKSCOPE data that cover only 28 developed countries and hence do not exactly match the data reported in Figure 9.2, which were computed using 33 developed countries.

**TABLE 9.1** | DECLINE IN THE NUMBER OF BANKS IN LATIN AMERICA, 1996–2002

Country	Number of banks		Change	
	1996	2002	Number	Percent
Argentina	117	80	-37	-32
Brazil	253	177	-76	-30
Chile	31	25	-6	-18
Colombia	39	27	-12	-31
Costa Rica	30	21	-9	-29
Mexico <sup>a</sup>	40	32	-9	-21
Peru	22	15	-7	-32
El Salvador	18	13	-5	-28

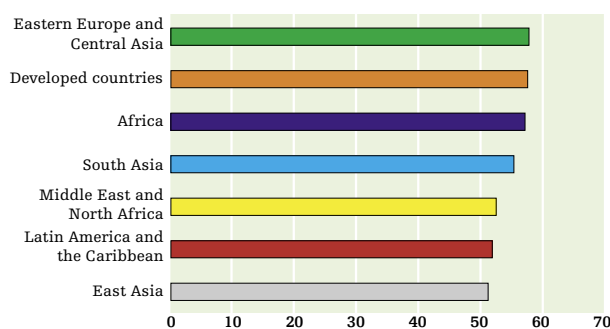
<sup>a</sup> In 1994 there were 19 banks.

Source: Bank superintendencies.

**FIGURE 9.1** Bank Concentration in Latin America, 1995 and 2002 (Percent)

Note: Concentration is measured as the share of assets of the three largest banks.

Source: Bank superintendencies.

**FIGURE 9.2** Bank Concentration by Region, 2002 (Percent)

Source: BANKSCOPE.

There is some evidence that lower deposit rates and higher lending rates characterize highly concentrated markets. However, these studies may be flawed because they are based on the structure-conduct-performance paradigm, which implicitly assumes that causality goes from market structure to market performance.<sup>3</sup> Several factors have led recent empirical work to rely more on nonstructural models: new developments in industrial organization, the refinement of formal models of imperfectly competitive markets, and the realization of the need to endogenize market structure (that is, to take into account that market performance may affect market structure).<sup>4</sup> This class of models often assesses market structure, and therefore the level of competition, by measuring how banks react to changes in costs, finding that the largest reactions are experienced by more competitive markets (Bikker and Haaf 2002). Applying this methodology to 50 countries, Claessens and Laeven (2003b) find no evidence that banking system concentration leads to less competition. Their main finding is that competition is stronger in countries with easier entry and fewer restrictions on bank activity.

<sup>3</sup> Most studies focus on developed countries. For the United States, see Hannan (1991) and Simons and Stavins (1998). For the United Kingdom, see Egli and Rime (1999). Molyneux, Lloyd-Williams, and Thornton (1994) provide a survey of the literature that applies the structure-conduct-performance paradigm to the banking industry.

<sup>4</sup> The literature proposes the following three main nonstructural models: Iwata (1974), Bresnahan (1982), and Panzar and Rosse (1987). Of these, Iwata's model has not yet been applied to the banking industry, due to the lack of micro data needed for empirical estimation. Variations on Bresnahan's conjectural variation approach applied to developing countries include Barajas and Steiner (2000) on Colombia.

**TABLE 9.2** | BANK CONCENTRATION AND PERFORMANCE AROUND THE WORLD

Variable	Dependent variable	
	Interest margin	Return on assets
Concentration	-0.01 (1.088)	0.52 (0.508)
GDP per capita (ln)	-0.79 (0.115)***	-0.28 (0.053)***
Constant	9.77 (1.247)***	3.32 (0.582)***
Observations	94	94
R <sup>2</sup>	0.35	0.26

\*\*\* Significant at 1 percent.  
*Note:* Interest margin and concentration are the time average for 1995–2002. Standard errors are in parentheses.  
*Source:* IDB calculations.

The statistical analysis reported in Table 9.2 corroborates these results. The table shows that, controlling for the level of development (measured by gross domestic product (GDP) per capita), there is no statistically significant correlation between bank concentration and either the interest margin or bank profitability.<sup>5</sup> Levy-Yeyati and Micco (2003) and Gelos and Roldós (2002) study the Latin American case in detail and find no evidence of a negative relationship between competition and concentration or of a fall in the number of banks leading to less competition.

The fact that concentration is not associated with less competition is in line with the contestable market view, suggesting that if there were no barriers to entry, the presence of potential competitors would discipline the incumbent and lead to a situation in which a competitive outcome would be reached although there was only one supplier in the market (Tirole 1988). In fact, although regulations, asymmetric information, and economies of scale may limit entry in the banking industry, in many countries the increase in concentration was the outcome of foreign entry that became possible after the removal of barriers to entry. Furthermore, analytical arguments support the hypothesis that bank consolidation may lead to a more competitive or efficient system (Kroszner and Strahan 1999; Yanelle 1997). In fact, competition and concentration may go in the same direction. Elimination of branching restrictions and widespread use of automated teller machines may reduce geographical barriers and enhance, rather than hinder, banking competition. However, they may also lead to a reduction in margins that, in turn, may induce a consolidation process. In this case, the causality would

go from more competition to more consolidation rather than from more consolidation to less competition.<sup>6</sup>

Given that there is no clear link between bank concentration and competition, it may not be surprising that concentration does not seem to affect credit availability. In fact, there is a weak negative correlation (the correlation coefficient is  $-0.06$ ; Figure 9.3) between concentration and financial development (measured as credit to the private sector relative to GDP). However, this correlation is not statistically significant and becomes positive (still not statistically significant) once the analysis controls for the size of the economy (measured as the log of total GDP).

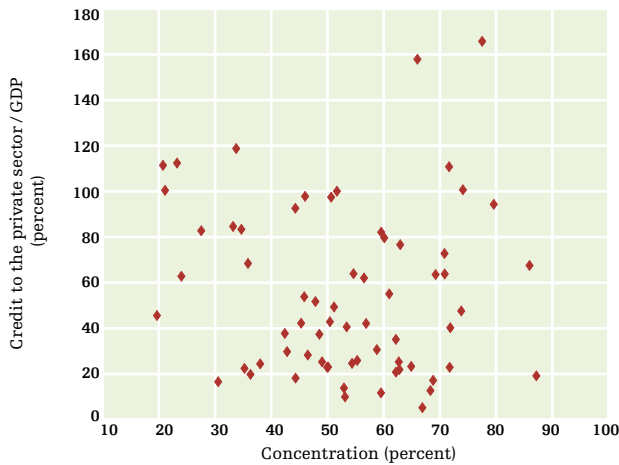
## CONCENTRATION AND EFFICIENCY

As in the case of concentration and competition, there is no clear relationship between concentration and bank efficiency. On the one hand, mergers can reduce competitive pressure and allow bank managers to supply less effort.<sup>7</sup> On the other hand, mergers may increase

<sup>5</sup> The interest margin is defined as net interest income divided by the sum of loans and deposits; bank profitability is measured as the return on assets. The analysis uses annual observations for 1995–2002.

<sup>6</sup> In fact, a wide range of studies analyze experience in the United States and Europe and conclude that mergers seem to have had a favorable effect on increasing bank competition. For the U.S. case, see Kroszner and Strahan (1999) and Berger and Humphrey (1997).

<sup>7</sup> Hicks (1935) calls this effect “quiet life.” Berger and Hannan (1998) test it and find it important.

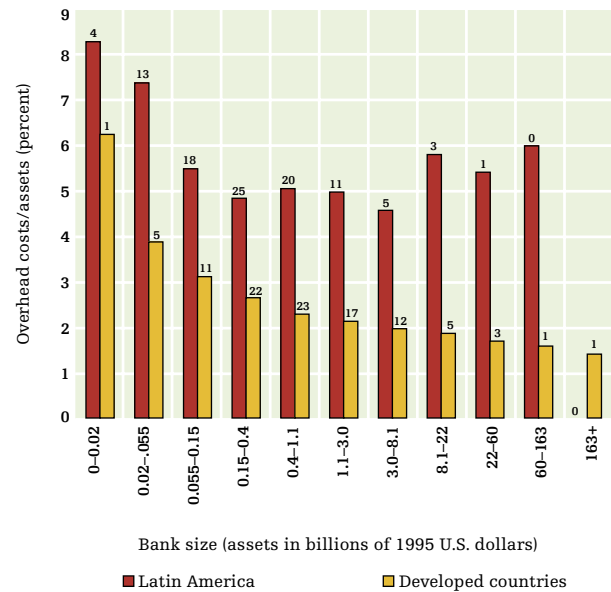
**FIGURE 9.3** Concentration versus Financial Development, 1995-2002

Note: The data are for 66 countries.  
Source: BANKSCOPE and World Bank data.

efficiency. For example, a merger between firms serving overlapping or identical markets may increase efficiency by eliminating duplication of activities. Mergers can also increase efficiency if banks are too small and hence unable to fully exploit economies of scale. Finally, mergers can increase efficiency if the merged banks are very different in terms of technology and efficiency ex ante.

Empirical studies focusing on developed countries find no evidence in support of the idea that consolidation improves efficiency (Shaffer 1993; Rhoades 1998; Peristiani 1997). Furthermore, they find that cost scale economies are exhausted at a relatively small size (around US\$10 billion in assets) and, hence, that cost reduction cannot be used as a justification for the existence of large banking conglomerates (Berger, Demsetz, and Strahan 1999; Sheldon 2001).<sup>8</sup> The evidence for developing countries is more limited.<sup>9</sup> Therefore, it is useful to test for the presence of economies of scale in the Latin American banking industry.

A simple way to test for the presence of economies of scale is to observe the correlation between overhead costs (expressed as a fraction of total assets) and bank size.<sup>10</sup> Compared with banks operating in developed countries, Latin American banks have higher overhead costs, independent of bank size (Figure 9.4). The data seem to indicate that there are substantial scale economies for small banks that have less than \$150 million in assets. In Latin America, such banks have overhead costs that are 2 percentage points higher than the overhead costs of larger banks. However, banks that have between \$150 million and \$8 billion in assets have simi-

**FIGURE 9.4** Overhead Costs and Bank Size, Latin America and Developed Countries, 2001

Note: The value above the bars indicates the percentage of banks in each size bracket.  
Source: BANKSCOPE.

lar overhead costs (equivalent to about 4.8 percent of total assets), indicating that economies of scale are not at work for these banks. Banks with similar asset size located in developed countries have much lower overhead costs (between 2 and 3 percent of assets), which continue to decrease with the size of assets, indicating that economies of scale may be at work. Not only do economies of scale not seem to be at work for large Latin American banks, but it seems that for very large banks (with more than \$8 billion in assets), overhead costs are positively correlated with bank size. This is not the case for developed countries, where the negative relationship between size and overhead costs never reverses, although it becomes flatter for larger banks.<sup>11</sup>

These results indicate that the optimal size of banks operating in developing countries may be small-

<sup>8</sup> Exceptions include Hughes and Mester (1998).

<sup>9</sup> Berger and Humphrey (1997) is the only relevant study.

<sup>10</sup> See Mathieson, Schinasi, and others (2001). The data discussed here are for 2001 and are measured in 2001 U.S. dollars.

<sup>11</sup> The statistical analysis reported in Appendix 9.1 confirms the findings described in Figure 9.4, which shows overhead costs by size. The analysis regresses overhead costs (over assets) on size (log assets), controlling for the relative size of demand deposits over total deposits (a proxy for the type of banks), the relative importance of noninterest income, state ownership, and a country-year fixed effect.

er than that of banks operating in developed countries. Possible explanations for this finding may have to do with the lack of efficient infrastructure (telecommunication and other support), smaller market size, and lack of a well-developed institutional and contracting environment.

### CONCENTRATION, COMPETITION, AND BANK STABILITY

It is more complex to evaluate the effects of competition and concentration in the financial sector than in the rest of the economy because they affect not only efficiency, but also the stability of the system in a way that does not have a counterpart in the nonfinancial sector. From a theoretical point of view, greater competition in the banking sector may lead to a drop in bank charter value, which, in turn, may reduce the incentives for prudent risk-taking and negatively affect stability. According to this view, the excess profits associated with the presence of market power reduce the agency problem of limited liability banks (namely, their propensity to gamble). There is in fact some evidence that stiffer competition may lead to excessive risk-taking.<sup>12</sup> In addition, higher profits provide a buffer against adverse shocks and hence reduce the probability of bank failures (Hellman, Murdoch, and Stiglitz 2000).

There are also possible benefits from greater concentration because large banks are likely to be more diversified and hence better able to face shocks compared with smaller and less diversified banks. Along the same lines, some authors argue that it is easier to monitor a few large banks (see Beck, Demirgüç-Kunt, and Levine 2003a). Therefore, the probability of mismanagement and excessive risk-taking might be lower in concentrated systems.

However, some arguments suggest that a more concentrated system may lead to excessive risk-taking because of moral hazard problems. That is, large banks may increase their risk exposure because they anticipate the unwillingness of the regulator to let the bank fail in the event of insolvency problems (this is known as the too big to fail problem; see Hughes and Mester 1998). Furthermore, it is possible that as banks grow in size, they may become complex institutions, making them more difficult to monitor than a large number of small banks. In this case, greater concentration would imply a more opaque and fragile banking system.<sup>13</sup>

Few large banks and high stability characterize the banking industry in the United Kingdom, and low concentration and relative instability characterize the

system in the United States. Thus, comparing these two countries suggests that there might be a trade-off between concentration and stability (Allen and Gale 2000).<sup>14</sup> However, cross-country analyses seem to suggest that there is a positive relationship between competition and stability. In particular, a study that focuses on 79 developed and developing countries in the 1980s and 1990s finds that greater levels of concentration are correlated with lower levels of bank fragility (Beck, Demirgüç-Kunt, and Levine 2003a). The same study indicates that lower barriers to bank entry and fewer restrictions on bank activities also reduce bank fragility, suggesting that competition (not concentration) increases efficiency and reduces bank fragility.

Although these results suggest that concentration is not a proxy for market power, its effect on stability should come from better diversification or better monitoring. The study finds weak evidence to accept the hypothesis that concentrated banking systems are better diversified. Levy-Yeyati and Micco (2003) study Latin American bank performance. Controlling for the degree of competition, they corroborate this result and find that concentration appears to exert no impact on the level of risk taken by banks.

### CONCENTRATION, COMPETITION, AND CYCLICALITY OF CREDIT

Another key consideration regards the relationship between market structure and credit volatility. It is interesting to ask the following two questions: Do concentration and competition affect how credit responds to macroeconomic conditions? And do concentration and competition make credit more or less procyclical? As is often the case, theory does not provide an unambiguous answer. On the one hand, theoretical models that

<sup>12</sup> See Cerasi and Daltung (2000) and Keeley (1990). Cordella and Levy-Yeyati (2002) argue that proper regulation and correct disclosure of information by bank creditors would enhance market discipline and could reduce the perverse link between competition and risk.

<sup>13</sup> Another possible source of instability is that banks charging higher interest rates may induce firms to take excessive risk and hence reduce bank stability (Boyd and De Nicoló 2003). Whether this argument suggests a negative or positive link between consolidation and stability depends on the relationship between consolidation and market power, which is not clear.

<sup>14</sup> Keeley (1990) argues that deregulation of the U.S. banking industry in the 1970s and 1980s led to an increase in competition and was partly to blame for the collapse of the savings and loans in the 1980s. In his view, competition pushed banks to increase asset risk and reduce capital, increasing the vulnerability of banks.

focus on the collusive behavior of banks suggest a positive correlation between concentration and credit procyclicality.<sup>15</sup> On the other hand, some models suggest that fierce competition in the banking industry would not allow banks to smooth credit by using future profits to compensate for current losses.<sup>16</sup> Furthermore, modern portfolio theory implies that diversification reduces volatility. In this context, large banks taking advantage of the law of large numbers are likely to be better diversified and hence better able to face shocks than smaller and less diversified banks. Therefore, large banks would have more stable credit levels (Demsetz and Strahan 1997).

Because the theoretical relationship between concentration and credit procyclicality is ambiguous, it is important to check what the data reflect. Appendix 9.1 presents a statistical exercise aimed at studying how bank concentration affects the way in which credit reacts to macroeconomic shocks. The main results can be summarized as follows: conditional on the level of financial development and income per capita, changes in GDP growth are related to lower fluctuations in aggregate credit in countries with higher levels of concentration in the banking industry. For the median developing country in the sample (with a concentration level of 60 percent), a 1 percent change in GDP is associated with a 1.6 percent change in credit. This percentage goes from 1.9 percent for a country with a concentration level of 50 percent (25th percentile) to 1.1 percent for a country with a concentration of 75 percent (75th percentile).<sup>17</sup> These results suggest that more concentrated banking sectors are associated with lower credit volatility. (Note that greater concentration is not necessarily associated with less competition.)

### CONCENTRATION, COMPETITION, AND ACCESS

Another interesting issue concerns the relationship between the market structure of the banking sector and economic growth. Conventional wisdom suggests that any departure from perfect competition in the credit market introduces inefficiencies that would increase interest margins and reduce firms' access to credit (Pagano and Jappelli 1993). However, it is possible that banks with greater market power may have an incentive to establish lending relationships with their clients and hence facilitate their access to credit. In this case, competition may be detrimental to the formation of mutually beneficial relationships between firms and banks (Petersen and Rajan 1995).

In particular, if the cash flow of new or distressed firms is low but potential future cash flow is high, a bank with market power might be willing to lend at a low interest rate today under the expectation that in the future it will be able to extract part of the surplus of the firm. This would not be possible for a bank that operates in a competitive market and needs to break even on a period-by-period basis (because it would be driven out of business if it charged more than the competitive rate in any period). This implies that in a competitive market, young firms with high uncertainty in their flow of funds would have to pay high interest rates, and this could reduce entry or innovation and hence reduce growth.

Furthermore, the process of lending may generate proprietary information that may be affected by the structure of the banking system. Hoff and Stiglitz (1997) show that if information flows worsen with the number of competitors, reputation effects and borrowers' incentives to repay become weaker in more competitive markets. In this case, entry by new banks implies a more severe moral hazard problem and increases enforcement and monitoring costs, inducing higher interest rates. Similarly, Márquez (2002) shows that borrower-specific information becomes more dispersed in more competitive banking industries, which results in a less efficient borrower screening process.

The empirical evidence on whether bank concentration facilitates access to credit for small firms is not clear-cut. Using U.S. data, Petersen and Rajan (1995) show that small, information-opaque firms receive

<sup>15</sup> Rotemberg and Saloner's (1986) implicit collusion model implies that banks decrease mark-ups during good times. In their model, the threat of future punishment provides the discipline that facilitates collusion; therefore, the temptation for a bank to unilaterally break the cartel is higher when demand is high (during an expansion). To moderate this temptation, a maximizing cartel reduces its profitability at such time by cutting prices. For a more recent discussion of countercyclical mark-ups, see Rotemberg and Woodford (1999).

<sup>16</sup> Petersen and Rajan (1995) point out that banks with greater market power may have an incentive to establish a lending relationship with their clients and hence facilitate their access to credit. It is possible that such a lending relationship would allow banks to smooth their lending rate over the cycle, reducing credit volatility.

<sup>17</sup> The results are robust to substituting an external shock for GDP growth. Estimations include all countries for which data are available. The results are similar if only developing countries are included in the sample. If the sample is restricted to Latin American countries, the results remain qualitatively similar, but the coefficient for the concentration variable is no longer statistically significant.

more credit in a more concentrated market than in a more competitive one (concentration is used as a proxy for lack of competition). As the firm grows older, cash flow is less uncertain, which implies that firm borrowing differences disappear. Using data for Italy, Bonaccorsi di Patti and Dell'Ariceia (2000) find a nonlinear relationship between firm growth and bank concentration. They find that the relationship is positive when concentration is low and negative when concentration is high. They also find that the level of concentration at which the inflection point occurs is increasing with the level of opaqueness of the industry. Bonaccorsi di Patti and Gobbi (2001) show that concentration has a positive effect for small and medium-size firms, but a detrimental effect for large firms.

Using evidence from industry-level data for 41 developing and developed countries, Cetorelli and Gambera (2001) show that bank concentration promotes the growth of those industries that are more dependent on external finance by facilitating access to credit for younger firms. However, they also find that bank concentration has a negative general effect on growth, which affects all sectors and firms indiscriminately.

Although these studies seem to provide evidence supporting the idea that bank concentration may promote small firms' access to credit, Beck, Demirgüç-Kunt, and Maksimovic (2003) find exactly the opposite. They use a worldwide survey (covering 74 countries)

on financing obstacles for firms of various sizes to show that bank concentration increases financing obstacles and decreases the probability of receiving bank finance, and this negative effect is especially strong for small and medium firms.

## CONCLUSIONS

Although the 1990s witnessed a large fall in the number of banks operating in Latin America, the increase in bank concentration was limited, and bank concentration in the region is still relatively low. Contrary to what it is often thought, this low level of concentration has not led to greater competition, which would result in lower margins and overhead costs. Lack of concentration may be one of the possible causes of the poor performance of the banking sector in Latin America. In fact, some evidence suggests that bank concentration may reduce the fragility of the banking system and reduce credit procyclicality.

The effect of concentration on credit availability is not clear. However, there is evidence that a more concentrated banking system may improve access to credit for small firms. If this were the case, the low concentration of the Latin American banking system might also help to explain why, at least in part, small firms in the region find access to credit very difficult.

## APPENDIX 9.1. BANK SIZE AND CONCENTRATION

Appendix Table 9.1 uses bank-level balance sheet data to compare overhead costs for banks of various asset sizes. In order to control for variation in product mix across banks, the regression includes a variable that measures the share of demand deposits over total deposits, which should account for differences between wholesale and retail banks. Because state-owned banks tend to be larger and have higher overhead costs than private banks, the regressions include a dummy variable controlling for public ownership. All regressions include country-year fixed effects (therefore the identification is from within-country-year differences).

Appendix Table 9.2 uses aggregate balance sheet data to compare credit cyclicalities for countries with various levels of bank concentration. In particular, the

table shows the elasticity of aggregate credit to changes in GDP and external shocks. The analysis controls for lagged aggregate credit growth using instrumental variables and includes GDP growth and GDP growth interacted with both banking concentration (the assets share of the three largest banks) and financial development (credit over GDP). The sum of these three coefficients is the elasticity of credit to GDP. A negative coefficient in the interaction of GDP growth and concentration indicates that greater concentration reduces the elasticity of credit to GDP.

To calculate the elasticity of credit to external shocks, the analysis interacts the external shock variable with bank concentration. The results suggest that greater concentration reduces the elasticity of credit to both GDP and external shocks. Therefore, after controlling for financial development, concentration is related to lower credit volatility.

**APPENDIX TABLE 9.1** | OVERHEAD COSTS BY BANK SIZE

Variable	Developed countries	Latin America	Other developing countries
<i>Bank size (billions of 1995 U.S. dollars)</i>			
0.02 to 0.055	-2.177 (0.292) <sup>***</sup>	-0.955 (0.352) <sup>***</sup>	-2.064 (0.256) <sup>***</sup>
0.055 to 0.15	-0.614 (0.094) <sup>**</sup>	-0.759 (0.190) <sup>***</sup>	-0.841 (0.139) <sup>***</sup>
0.15 to 0.4	-0.350 (0.056) <sup>***</sup>	-0.730 (0.132) <sup>***</sup>	-0.513 (0.086) <sup>***</sup>
0.4 to 1.1	-0.265 (0.026) <sup>**</sup>	-0.383 (0.128) <sup>***</sup>	-0.191 (0.071) <sup>***</sup>
1.1 to 3.0	-0.141 (0.023) <sup>***</sup>	-0.034 (0.159)	-0.040 (0.065)
3.0 to 8.1	-0.198 (0.023) <sup>**</sup>	-0.101 (0.191)	-0.097 (0.064)
8.1 to 22	-0.148 (0.026) <sup>***</sup>	0.183 (0.272)	-0.184 (0.075) <sup>**</sup>
22 to 60	-0.222 (0.039) <sup>**</sup>	0.443 (0.382)	-0.405 (0.088) <sup>***</sup>
60 to 163	-0.189 (0.041) <sup>***</sup>	0.263 (0.874)	0.173 (0.206)
163 or more	-0.076 (0.050)	0.000 (0.000)	0.601 (0.284) <sup>**</sup>
Demand deposits/total deposits	0.895 (0.092) <sup>***</sup>	2.145 (0.387) <sup>***</sup>	0.404 (0.213) <sup>*</sup>
Noninterest rate income/total assets	42.190 (8.375) <sup>**</sup>	9.817 (2.369) <sup>***</sup>	17.875 (5.601) <sup>***</sup>
Public bank (dummy)	-0.097 (0.060)	1.289 (0.172) <sup>***</sup>	0.477 (0.077) <sup>***</sup>
Observations	19,497	3,321	4,660
R <sup>2</sup>	0.56	0.42	0.65
Countries	41	23	77

\* Significant at 10 percent.

\*\* Significant at 5 percent. \*\*\* Significant at 1 percent.

*Note:* The dependent variable is overhead costs over assets (in percentage points). Robust standard errors are in parentheses.  
*Source:* IDB calculations based on data from BANKSCOPE.

**APPENDIX TABLE 9.2 | CREDIT CYCLICALITY BY BANK CONCENTRATION**

Variable	1	2	3	4	5	6	7	8
Credit (growth, lagged)	0.412 (0.049)***	0.406 (0.048)***	0.383 (0.056)***	0.499 (0.136)***	0.453 (0.054)***	0.457 (0.055)***	0.399 (0.061)***	0.516 (0.143)***
GDP (change, log)	2.816 (0.585)***	2.976 (0.600)***	3.382 (0.882)***	3.170 (1.564)**				
GDP (change, log)* concentration (percent)	-2.111 (0.888)**	-1.812 (0.904)**	-3.028 (1.317)**	-0.490 (2.384)				
GDP (change, log)* low-income countries (dummy)		-1.110 (0.413)***						
GDP (change, log)* developed countries (dummy)		-0.129 (0.428)						
GDP (change, log)* financial development (percent)	-0.681 (0.454)	-0.943 (0.568)*	-1.011 (0.808)	-4.509 (2.574)*				
External shock (percent)					11.090 (3.812)***	11.341 (4.095)***	14.434 (6.823)**	14.864 (16.289)
External shock* concentration					-11.948 (4.979)**	-13.455 (5.429)**	-13.923 (8.755)	-2.380 (20.199)
External shock* low-income countries (dummy)						3.150 (3.445)		
External shock* developed countries (dummy)					1.121 (2.266)			
External shock* financial development (percent)					-1.353 (2.079)	-1.442 (2.900)	-6.171 (5.062)	-22.168 (25.656)
Concentration (percent)	0.108 (0.104)	0.087 (0.104)	0.117 (0.146)	-0.207 (0.220)	0.120 (0.118)	0.134 (0.119)	0.094 (0.167)	-0.132 (0.268)
Observations	895	895	566	203	869	869	547	203
Sample	All	All	Developing countries	Latin America	All	All	Developing countries	Latin America

\* Significant at 10 percent.

\*\* Significant at 5 percent.

\*\*\* Significant at 1 percent.

Note: The dependent variable is overhead costs over assets (in percentage points). Banking concentration is the assets share of the three largest banks; financial development is credit over GDP. Robust standard errors are in parentheses.

Source: IDB calculations based on data from BANKSCOPE.

