

Private Oversight of the Banking Sector: The Role of Market Discipline

DEPOSITORS play a crucial role in guaranteeing the soundness of the banking system. When banks assume excessive risks, depositors may respond by going to other banks or other financial systems, or by demanding higher interest rates on their deposits. Since deposits are the major source of funds for banks, depositors' actions may lead the banks to align their risk-taking incentives with those of depositors. This is known as **market discipline**, a key complement for the discipline imposed by supervisors.

Chapter 6 outlines the justifications for banking regulation. These explanations center on the protection of small depositors and the moral hazard created by the presence of a safety net to protect the payments system and the financial system as a whole. Unfortunately, banking regulation and supervision can fail and hence may not always provide the necessary discipline for banks.

Assuming that supervisors have appropriate powers and regulations are appropriately written, supervisors may still lack the required information to effectively monitor those regulations. There is an unavoidable informational asymmetry between the bank and its supervisor. Banks may not always truthfully reveal the required information and, as witnessed recently in major corporate scandals in the United States and Europe, auditors do not always ensure that even fully audited information is completely reliable. Moreover, although the supervisor may have periodic information on the basic facts and activities of banks, the supervisor may lack finer information, for example, on intraday market transactions.

Supervisors may not act appropriately on the information that they possess because they may be subject to particular incentives and conflicts of interest. Bank failures have, perhaps unfairly, often been linked to supervisory failures. In some countries in Latin America and the Caribbean, bank failures may even place supervisors in a vulnerable legal position because they

frequently lack the legal protection that is normally awarded in developed countries and is advised in the Basel Core Principles for Effective Banking Supervision. Hence, supervisors may attempt to avoid declaring a bank insolvent or may seek means to ensure that bank weaknesses are not fully revealed. This is generally known as **forbearance**.

These types of regulatory and supervisory failures indicate the usefulness of harnessing the market to discipline banks as a complementary form of supervision. Market discipline has typically been considered the reaction of bank creditors (depositors and other liability holders) to increases in bank risk. This chapter extends this definition to include the reaction of bank creditors to risk and the subsequent reaction of banks to the actions of creditors. Discipline is then seen as effective if banks take prompt remedial actions to curb any actual or potential negative actions on the part of their creditors.

At first sight, market and supervisory discipline may be considered substitutes, but in fact, in the terminology of modern microeconomics, they are strategic complements. This means that appropriate regulations can enhance the disciplining power of markets and markets may enhance the disciplining power of supervisors. Together they may imply greater discipline and more prudent risk-taking on behalf of banks, compared with the simple sum of the two components.

First and foremost, the market and the supervisor may have different information. Although the market and the supervisor have the same basic information published by the bank, the market may not have confidential information reported only to the supervisor. The supervisor may lack the fine transactional information that comes from repeated market interactions.

Second, information disclosure is not independent of the regulations in force. Some countries have strong rules on what banks must disclose to the market in terms of their underlying financial ratios, how they match up to their peers, and how they match up to the

regulations in force. The quality of this information is critical, and hence the role of auditors is crucial. The regulations that govern the auditing profession are then also highly significant for market discipline.¹ In some countries, bank regulators have gone further than simply strict disclosure and auditing rules, requiring banks to have a credit rating, ensuring that the rating is published, and even making highly transparent the interest rate a bank must pay on its noninsured liabilities.

The market may enhance supervisory discipline. For example, if it detects a weakness, the market will act, making that weakness generally known. Armed with this information, the supervisor may be forced to act, even if otherwise there are incentives to “wait and see.” Hence, just as certain regulations can enhance market discipline, the market can enhance supervisory discipline.

However, market discipline may be limited, or there may be a trade-off between the degree of market discipline and the risk of systemic financial instability if the safety net is too narrow. This chapter discusses the empirical evidence of market discipline, with special reference to Latin America and the Caribbean. It presents new results for a set of countries in the region and discusses key policy measures for enhancing market discipline.

COSTS AND BENEFITS OF MARKET DISCIPLINE

Market discipline is defined as the reaction of bank creditors to risk and the subsequent reaction of banks to the actions of their creditors. For bank creditors to react to bank risk, it is clear that those creditors cannot be fully and credibly insured. Market discipline operates principally on noninsured liabilities.² This implies that to enhance market discipline, standard policy recommendations are to ensure that banks have noninsured liabilities.

Typically, bonds do not attract insurance, and the required returns on more subordinated bonds are more sensitive to bank risk. One response has been the proposal that all banks should issue subordinated liabilities. A more standard proposal is to limit the coverage of deposit insurance. Chapter 7 reviews various schemes that countries have adopted. Deposit insurance schemes usually have an upper quantitative limit, implying that larger, and possibly more sophisticated, depositors lack full insurance. In some countries, there is co-insurance in that only a percentage of the upper limit is insured. That is, the insurance even for small depositors covers

only, say, 90 percent of their investment, and hence all depositors stand to lose some (small) amount in the case of bank failure. In addition, deposit insurance could be restricted to a maximum interest rate. For depositors that require a higher level of return, presumably because of high perceived risk, then those deposits will not be insured. This restriction would prevent banks from paying very high interest rates on insured deposits, especially if the banks are close to failure and risks are considered very high.

At the same time, deposit insurance has an important objective, namely to prevent bank runs spreading from one or more weak banks to other banks and, more generally, to promote financial stability. There is an important trade-off between promoting financial stability by providing deposit insurance and ensuring that there is market discipline to complement standard supervisory oversight. On the one hand, market discipline may assist in providing appropriate incentives for bankers to contain risks and to react conservatively when risks are perceived. On the other hand, insufficient deposit insurance (excessive market discipline) may result in runs spreading across a banking system and converting a problem in one bank (or a few banks) into a larger, systemic problem. This trade-off was visible in the banking crisis that hit Argentina in 1995 in the wake of the Tequila shock; see Box 8.1.

The optimum amount of market discipline may depend on the types of shocks that would be likely to affect the banking system. If shocks tend to be macroeconomic in nature, affecting the perceived risk of the whole banking system, then bankers would be unable to take action to solve them. In this case, depositors in weaker banks may require greater increases in interest rates, or those banks may face greater withdrawals in deposits, and it may be advisable to limit market discipline. If shocks tend to be macroeconomic in nature and if banks themselves can do little to rectify the situation, then market discipline may well be counterproductive.

However, if shocks serve to expose the weaknesses of banks that urgently require remedial action, market discipline should be enhanced. Argentina in the lead-up

¹ One of the factors that contributed to the Enron fiasco was that the information the company presented to the market did not appear to be a fair reflection of the financial strength of the company.

² In Latin America, there is also some evidence of withdrawals of insured depositors or those investors demanding higher interest rates as a response to risk, presumably as a result of insurance systems lacking full credibility or depositors factoring in the costs and delays of recouping their investments in the case of bank failure.

BOX 8.1 | FINANCIAL INSTABILITY AND MARKET DISCIPLINE

The Mexican devaluation in December 1994 heralded a financial crisis known as the **Tequila crisis**. The first phase of the crisis hit a set of weak banks including wholesale and cooperative institutions; larger banks and foreign banks gained deposits, and dollar deposits increased. However, bank runs spread across the system, and rumors of the weaknesses of particular banks abounded. In the first two weeks of March 1995, all banks lost deposits in a systemic run, which was halted only by a new agreement with the International Monetary Fund (IMF) in mid-March 1995.

In **Argentina**, after the banking crises of the 1980s, deposit insurance was explicitly removed, and the currency board was established. The general perception was that the lender of last resort power of the central bank was limited. On the one hand, the restricted safety net assisted in ensuring that banks maintained good incentives. Weaker banks were allowed to fail or were merged, and arguably there was little “gambling for resurrection,” and the resolution of the crisis was relatively fast. On the other hand, in part to calm depositors’ nerves and promote financial stability (and in part perhaps to smooth political problems arising from bank failures), in April 2001 Argentina introduced a new, albeit limited, deposit insurance scheme.

In the financial crisis of 2000–02, Argentina

experienced four separate bank runs in November 2000, March 2001, July 2001, and November 2001. Substantial evidence indicates that as the crisis deepened, these runs became more systemic. In the earlier runs, weaker banks were punished, and there is evidence that foreign and public banks had guarantees that were perceived as stronger and therefore lost fewer deposits. In the later runs, banks lost deposits virtually as one. In the case of the earlier runs, excepting foreign and public banks, market discipline served a role in ensuring that weaker banks maintained conservative incentives. However, the later runs were largely related to the perception that depositors would have to share in the economywide costs of a macroeconomic crisis, including public sector default and exchange rate devaluation. It was clear that bankers could not solve this problem, and the role of market discipline became less relevant.

It might be argued that a systemic bank run serves to discipline governments. The systemic run in 1995 forced the Argentine government to renegotiate an agreement with the IMF—that Argentina had let lapse in December 1994—and the run of July 2001 prompted the government to pass a zero-budget law. However, the run of November 2001 resulted in a different response: bank and capital controls, the fall of the government, default, and devaluation.

to the 2002 crisis provides an interesting illustration. In general, countries are exposed, perhaps with different probabilities, to all types of shocks, and hence the extent of market discipline versus the breadth of the safety net is a difficult but critical judgment for each country to make.

An argument might be made that even if a country tended to face systemic shocks, market discipline would be useful to discipline the country or the government rather than the banks. Box 8.1 argues that the systemic run in March 1995 forced the authorities in Argentina to sign a new agreement with the International Monetary Fund, and it might be argued that the runs in 2001 forced the country to adopt tougher budgetary policies. However, Argentina eventually defaulted in 2002, arguably pointing out the failure of market discipline, in this context, rather than its success.

DO DEPOSITORS ACT ON BANK RISK?

Proponents of market discipline point to analyses of the reactions of depositors to bank fundamentals as evidence that depositors can indeed distinguish between safer and riskier institutions and that pure bank runs and contagion may not be as widespread as previously thought.³ Analyses of historical and contemporary U.S. data explore the relations between bank fundamentals and the interest rates that banks must pay and the likelihood of deposit withdrawals (Baer and Brewer 1986; Hannan

³ A pure bank run is defined here as a self-fulfilling run on an otherwise solvent bank (Diamond and Dybvig 1983). Contagion might then be thought of as depositors’ running against otherwise healthy banks as a result of runs against other, perhaps weaker, institutions.

and Hanweck 1988; Ellis and Flannery 1992; Cook and Spellman 1994; Goldberg and Hudgins 1996; Calomiris and Wilson 1998). **Bank fundamentals** include measures of bank risk, such as nonperforming loans, liquidity indicators, or past returns on equity. For most developed countries, researchers have indeed found a positive link between interest rates and deposit withdrawals and risk, and hence infer that depositors may exert pressure on banks to avoid excessive risk-taking.

Country-specific studies in Latin America focus on Argentina (Schumacher 1996; D'Amato, Grubisic, and Powell 1997; Calomiris and Powell 2001; McCandless, Gabrielli, and Rouillet 2003; Levy-Yeyati, Martínez Pería, and Schmuckler 2004) and Colombia (Barajas and Steiner 2000). On Argentina, Schumacher (1996) finds evidence that bank fundamentals are significant in explaining deposit withdrawals in the **Tequila crisis**. D'Amato, Grubisic, and Powell (1997), also on the Tequila crisis, show that while bank fundamentals are significant, so too are both macroeconomic variables and explicit "contagion" terms. Given the combination of macroeconomic systemic factors, contagion, and bank fundamentals, the authors argue in favor of **market discipline** combined with a (limited) deposit insurance system. Calomiris and Powell (2001) present a wider review of market discipline for the case of **Argentina**. They show how depositors responded to bank risk and present a critical review of Argentina's regulations intended to enhance market discipline. McCandless, Gabrielli, and Rouillet (2003) analyze bank runs in late 2000 and early 2001 and find that although bank fundamentals are significant in explaining deposit withdrawals, the later runs through 2001 were more systemic in nature. Levy-Yeyati, Martínez Pería, and Schmuckler (2004) find a similar result and conclude that systemic factors can overshadow bank fundamentals, limiting the potential for market discipline in environments where systemic risk is likely to predominate.

On Colombia, Barajas and Steiner (2000) show how deposit growth and bank fundamentals are related, and how depositors' choices effectively discipline banks. Following deposit losses, banks tend to improve their fundamentals. The authors conclude that market discipline exists in Colombia—perhaps complemented by "regulatory discipline"—and that moral hazard stemming from deposit insurance is limited, perhaps as a consequence of design features of the insurance scheme.

There are few cross-country studies on market discipline. Notable exceptions are BID/CAN (2001) on countries of the Andean Community; Martínez Pería and Schmuckler (2001), who employ data from Argen-

tina, Chile, and Mexico; and Arena (2003), who uses a set of Latin American and Asian emerging economies. These three papers consider market discipline as the reaction of depositors to bank risk in the form of either demanding higher interest rates for higher risk or withdrawing deposits if bank risk rises. Bank risk is measured through a set of bank fundamentals that are reviewed in Appendix 8.1. BID/CAN and Arena find mixed evidence for the existence of market discipline; Martínez Pería and Schmuckler find strong evidence in favor in the three countries considered.

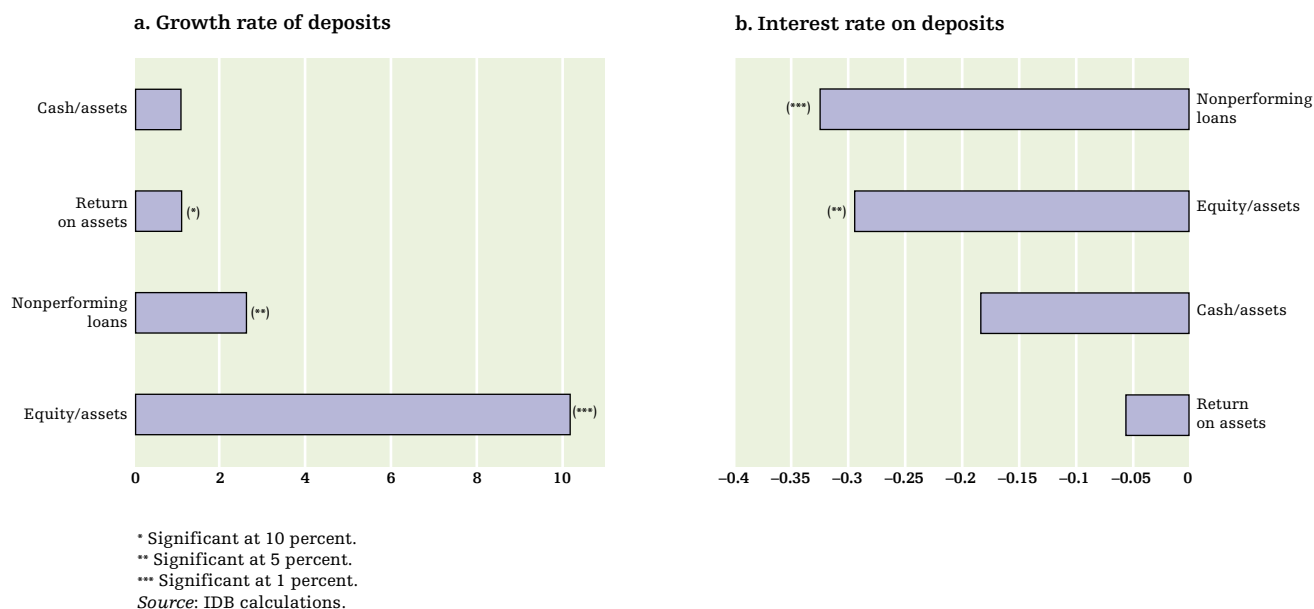
Using a wider dataset covering 13 Latin American and Caribbean countries, Galindo, Loboguerrero, and Powell (2004) find evidence consistent with previous studies, in that depositors discipline banks by withdrawing deposits and requiring higher interest rates.⁴ Bank fundamentals reflecting idiosyncratic bank risk are indeed negatively associated with deposit growth and positively associated with interest rates on deposits. Appendix 8.2 reports regression results showing how deposit growth rates and the interest paid on deposits are related to bank fundamentals that reflect bank risk. The measures of bank fundamentals include the most commonly used variables in the empirical literature on market discipline. The analysis indicates that variables that signal higher risk profiles in banks are associated negatively and significantly with the growth rate of deposits and positively with the interest rate paid on these deposits. These results support the idea that depositors discipline banks by withdrawing deposits and by demanding higher interest rates on the deposits held by riskier banks.

The results are quantitatively important. Figure 8.1 illustrates the effect on the real growth rate of deposits (panel a) and on the deposit interest rate (panel b) of moving from the lower 25 percent of the sample distribution, for each bank risk variable, to the upper 75 percent (the upper part of the distribution always implies lower risk). For example, moving from the lower 25 percent to the upper 75 percent of the sample distribution for equity/assets results in deposits growing 10 percent faster and deposit interest rates declining by 30 basis points.

Literature on the impact of institutional frameworks that might affect market discipline is surprisingly scarce. Perhaps curiously at first sight, the presence of

⁴ The data are from a bank-level panel (of banks over time) for 13 Latin American and Caribbean countries from the early 1990s to 2002. The panel includes 840 banks in Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, and Peru.

FIGURE 8.1 Effects of Changes in Measures of Bank Risk
(Percent)



deposit insurance does not appear to diminish the extent of market discipline (Martínez Pería and Schmukler 2001; Budnevich and Franken 2003). This may be due to the fact that even where such insurance exists, it may be costly for depositors to be involved in a bank failure due to long delays in payments or because the system is perceived as less than fully credible or unlikely to cover all of the investments of the depositors.

A question that arises naturally from the evidence is whether this finding is common to all types of banks, or whether ownership or market structure alters the conclusions. In particular, state ownership, foreign ownership, and bank size might affect the results depending on the guarantees, explicit or implicit, perceived by depositors. Government-owned banks, for example, may be perceived as being safer than private banks because an implicit or explicit government guarantee covers the government-owned banks but is not always perceived as present in the private sector. This guarantee tends to reduce the incentives to monitor and discipline government-owned banks. There may also be a perception that foreign banks tend to be protected by a strong parent. And large banks may be perceived as “too big to fail.” That is, depositors may believe that the social cost of allowing a large bank to fail would be so high that authorities would avoid letting the bank fail.

Indeed, the regression results in Appendix 8.2 reveal that the importance of fundamentals is significantly diminished in explaining deposit or interest rate movements for public sector banks. Private banks drive

the results shown in Figure 8.1. To summarize the findings in the literature, there is strong support that bank depositors across several countries in Latin America and the Caribbean respond to indicators of bank risk, although this discipline is weakened during truly systemic episodes.

DO DEPOSITORS DISCIPLINE BANKS?

The majority of the empirical literature on **market discipline** to date has centered on how depositors react to changes in bank risk proxied by a set of bank fundamentals. However, the actions of bank owners and managers—and hence bank fundamentals—are clearly not exogenous to the actions of depositors. The central motivation of market discipline is that bank owners and managers act conservatively to limit bank risk. If risk increases and depositors demand higher interest rates or withdraw, then discipline has been effective if banks react to it by reducing bank risk.

This suggests that analyzing whether bank depositors react to bank risk tells at most only half the story, and does not lead to the conclusion that discipline is effective.⁵ Arguably, the more important question has

⁵ And yet the empirical evidence places much less emphasis on how banks respond to changes in the behavior of depositors. This is partly because of the empirical difficulties associated with attempting to disentangle the dynamics of depositor and bank behavior.

to do with whether and how banks respond to the actions of depositors. This issue is more difficult to tackle empirically, although Calomiris and Powell (2001) and Barajas and Steiner (2000) argue that banks reacted conservatively to depositors' actions in Argentina and Colombia. Galindo, Loboguerrero, and Powell (2004) explore this for a larger sample of countries. The empirical issue is whether there is in fact an interactive system among the following factors: (i) the quantity of bank deposits, (ii) the interest rate that depositors charge or that banks offer, and (iii) bank risk.⁶

Galindo, Loboguerrero, and Powell's results show that depositors tend to withdraw deposits or require higher interest rates on their deposits when bank fundamentals weaken. In their study, a weakening is a reduction in the capital-to-assets ratio. When deposits fall or interest rates rise, banks react by increasing their capital-to-assets ratio. In essence, this is the true test of whether there is discipline because depositors withdraw deposits or demand higher interest rates when bank risk increases, and bankers increase capital or reduce assets as a response to the actions of depositors.

Figure 8.2 reproduces some of the results in Galindo, Loboguerrero, and Powell. Specifically, the figure illustrates the estimated dynamics of their empirical model. The figure shows the standard result that when bank risk rises (capital-to-assets ratios fall), bank deposit growth falls and deposit interest rates rise. However, this result occurs in the context of a system in which the actions of bank depositors also feed back to bank fundamentals because bankers can alter capital-to-assets ratios. More important, bankers react conservatively to risk. In other words, the impulse responses indicate that if deposit growth is more negative or interest rates rise, then banks tend to increase capital or decrease assets.

Thus, there is strong evidence in favor of market discipline in Latin America. The results indicate that depositors react to the standard indicators of bank risk by demanding higher interest rates or withdrawing deposits (deposit growth becomes more negative). This result supports previous analyses on single countries and the sparse multicountry studies on fewer countries. However, the findings must be tempered by the lack of depositor discipline on public sector banks and foreign banks and by the reduced depositor discipline on large banks. Furthermore, extending these traditional studies to consider not only the actions of depositors in relation to changes in bank risk, but also the reactions of bankers to the actions of depositors, there is strong evidence that depositors discipline private banks, which react conservatively to depositors' actions.

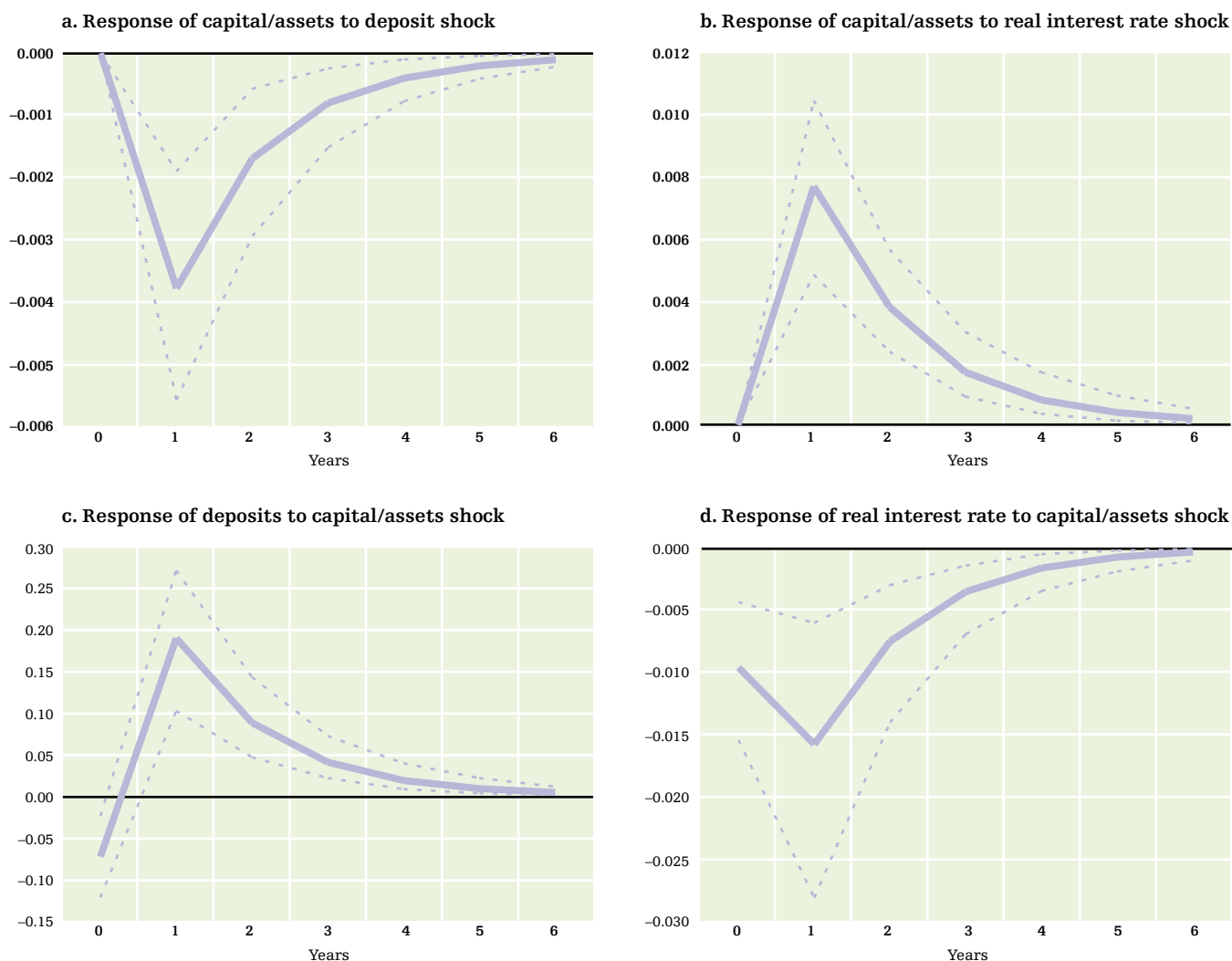
EXPLOITING MARKET DISCIPLINE IN LATIN AMERICA—POLICY IMPLICATIONS

Market discipline and traditional banking supervision are complementary. On the one hand, market discipline may enhance supervisory discipline; on the other hand, regulation and supervision can enhance market discipline. This section focuses on the latter link, namely, the specific policies that may be and have been used to enhance market discipline in the region.

First, market discipline relies on useful and timely information. Disclosure is critical to ensure that market discipline operates effectively. In developed countries, disclosure rules on banks typically refer to information released by the bank on a quarterly or even semi-annual basis. Latin America has in general adopted stricter rules. Typically, banks report to supervisors, who compile reports on a regular basis, usually monthly. Data requirements include balance sheet and profit and loss results and information on the asset portfolio intended to describe credit risk and other risks. Some regulators take the individual bank data and calculate ratios and compare the information across banks by constructing peer tables for ratios summarizing risk and efficiency.

Important questions are whether the bank or the regulator publishes the bank's regulatory ratios at the level of individual banks and whether an individual bank complies with particular regulations. Although the 1988 Basel Accord does not call for banks to disclose their regulatory capital requirement or actual regulatory capital ratios (Basel I-defined capital divided by assets at risk), some countries have indeed asked banks to publish their Basel I-calculated capital requirements and their actual capital ratios. Some countries have also asked banks to publish required liquidity levels, actual ratios, required provisioning levels, and actual provisions. Moreover, as reviewed in Chapter 16, Basel II Pillar 3 explicitly calls for banks to disclose a number of features regarding the credit risk of assets. Basel II calculates capital requirements and actual regulatory capital. It is clear that the trend is toward greater disclosure regarding banks' risks, regulatory requirements, and actual regulatory ratios in order to provide wider information for the market.

⁶ The methodology adopted is that of a vector autoregression (VAR) with three equations corresponding to the change in bank deposits, the deposit interest rate, and the bank capital-to-assets ratio, which represents bank risk. The model controls for bank-specific and country-time-specific factors. The panel VAR methodology in this context was proposed by Charles Calomiris.

FIGURE 8.2 Response of **Bank Fundamentals** to Changes in Deposits and Interest Rates

Note: The figure shows impulse response functions for private domestic banks. In the case of public banks, the impulse responses are not significantly different from zero. The panel VAR is estimated using a routine in Stata originally written by Inessa Love. The annual sample is from 1994 to 2003. Bank fixed effects are included as well as country-year-specific effects. The panel VAR is estimated with one lag, and impulse response functions are computed via Monte Carlo simulations.

Source: Galindo, Loboguerrero, and Powell (2004).

A second policy guideline is to produce accurate information. In this regard, the task of bank **auditors** is particularly important. As recent corporate scandals in the United States and Europe have illustrated, non-financial companies can form highly complex financial structures, which make the financial risks of the company less than fully transparent. The potential of financial engineering to make true risks opaque is, if anything, multiplied in a financial institution such as a bank. In recent corporate scandals, auditors either did not understand or did not wish to reveal the true nature of the risks of their clients. It is therefore of critical im-

portance to consider carefully the incentives of auditors to truly understand and report the financial risks of banks. Some countries in the region, in part due to their poor experience with auditors, have gone so far as to construct lists of authorized bank auditors and hence threaten to remove an auditor from that list in case of negligence. Another possibility is to ask auditors for a financial bond to be forfeited in case of proven negligence.

A third strategy that some countries have adopted to enhance monitoring by the market is to make banks seek a credit rating and to make that credit rating pub-

lic. This policy would ensure that an outside body that is not the supervisor, but is skilled in risk analysis, gives an objective opinion regarding the risks of the bank. However, rating agencies are of variable quality. If a rating were made compulsory, what would stop a bank from soliciting a rating from an agency that places more emphasis on the fee than on the objectivity of the rating? The regulator may have to limit the number of authorized ratings agencies to a few internationally recognized agencies that would suffer too much in terms of reputation to devalue their ratings. Or the regulator may have to explain exactly what a rating agency should do in assessing bank risk to try to regulate rating quality. Some rating agencies have argued that attempting to dictate what they should do goes directly against the idea of attempting to harness an informed and objective opinion, and that ratings should not be subject to (or even used for) regulatory purposes. It seems that although the idea of a credit rating is appealing, its application is less clear-cut.

The final policy reviewed here is that of forcing banks to issue a small but significant quantity of **subordinated debt**. This proposal has attracted considerable academic and policy interest, especially in the United States, but has been applied in only one country to date—**Argentina**. The Chicago Federal Reserve Bank and the Federal Reserve Bank of Atlanta first proposed this approach in response to the U.S. **savings and loan** crisis of the 1980s (Keehn 1989; Wall 1989). For a recent review of the proposal, see Evanoff and Wall (2000); for a discussion and application to emerging economies, see Calomiris (1998). Calomiris and Powell (2001) review the Argentine experience.

The underlying idea is to ensure that each bank has some explicitly uninsured liabilities held by sophisticated investors at arm's length, which would constitute the first loss in case of bank failure. Given the lower seniority of this debt if the bank were to fail and assets were liquidated, it is likely that these liability holders would lose their investments and hence such instruments would be sensitive to bank risk. The proposal is normally that banks must issue a small amount of such debt with a minimum maturity (say, 24 months) each year, and that the debt may qualify as (tier 2) capital for the purposes of Basel-style capital requirement regulations.⁷

It is critical that bank insiders do not hold the debt because although they might hold it at nonmarket prices, they would be able to sell it on the basis of private negative information. Calomiris (1998) proposes that emerging country subordinated bank debt be held by a group of only 50 or so pre-authorized internation-

al investors. However, at the same time it is normally considered useful that the debt is reasonably standardized in terms of the instruments used and that it is traded so that secondary prices would reveal relative risks across institutions and movements in prices would reflect changing market perceptions of bank risk. Moreover, Calomiris (1998) advocates that supervisory action should be triggered by the required yields of these instruments. In particular, if banks cannot roll over the instruments at a spread of, say, 5 percent over treasury instruments with comparable maturity, then banks would have to scale back their risk-weighted assets to comply with the subordinated debt requirement.

Foreign banks have become extremely important in many emerging economies, including those in Latin America. Typically, these banks have entered by purchasing significant local institutions that previously were quoted on local stock markets and had bonds outstanding in their own name in local and/or foreign markets. In many cases, the local subsidiaries of large international banks are delisted, and, depending on the institutions' funding policy, the subsidiary may not issue bonds in its own name. Market information on the risks of these institutions has disappeared and been replaced (from the point of view of depositors) by a non-transparent guarantee by a large international bank. The Argentine crisis, for example, has shown that in most cases international banks have stood by their local subsidiaries and branches, but three international banks did withdraw.⁸ The lack of transparent market signals on the riskiness of large banks in the region has provoked renewed interest in subordinated debt and related proposals. If the subsidiaries of international banks were asked to issue subordinated liabilities in local markets, it would reveal market perceptions of the strength of the local institution and of the parental guarantee, and it might assist depositors in making investment decisions.

⁷ Argentina asked banks to have a minimum of 2 percent of their deposits in instruments with a minimum maturity of two years.

⁸ Tschoegl (2003) discusses the cases of Scotia Bank, Credit Agricole, and Intesa. In the first case, two local banks managed the exit and took over the bank's operations. In the second case, the national public Banco Nación took over the three local subsidiaries of Credit Agricole. Intesa sold its operations to a regional bank, but retains a 20 percent share in the newly created entity.

APPENDIX 8.1. WHAT ARE BANK FUNDAMENTALS?

Indicators of bank risk frequently come from the CAMELS rating system. CAMELS stands for Capital adequacy, Asset quality, Management, Earnings, and Liquidity, with the “S” sometimes added for Sensitivity to capture how risk changes with critical variables, including interest rates.

Capital adequacy is normally proxied by the bank capital-to-assets ratio or bank capital plus provisions over assets. These indicators measure how well a financial institution can absorb losses. A second indicator would be capital over assets at risk, a weighted average of assets with weights purportedly reflecting loan risk. The definition of assets at risk stems from the Basel Capital Accord (see Chapter 6); however, definitions vary across countries, and there is controversy as to how well asset risk is measured.

Asset quality is frequently measured by the amount of nonperforming loans over total assets or total loans. In some countries with bank ratings, finer measures of asset quality may be available. Measures of loan concentration, loan interest rates, and the percentages of

different loan types have also been included to measure asset risk.

Earnings are normally included as the bank’s return on assets—profits before taxes divided by assets. Observers frequently comment that bank risk may decline as earnings rise for lower earnings levels; but at high levels of profitability, increases in this variable might actually be positively correlated with risk. The empirical literature agrees on using this indicator to measure the efficiency of banks. The overhead ratio—noninterest expenditures over total assets—reflects variations across banks in employment as well as in wage levels; less efficient banks are expected to have higher expenditures.⁹

Loans over total assets, liquid assets (cash and reserves, government bonds, and other marketable securities) over total assets, and liquid assets relative to liabilities are the most common measures of liquidity risk. In general, banks with a large volume of liquid assets (fewer loans) are perceived to be safer (Demirgüç-Kunt and Huizinga 2004).

Sensitivity to interest rates is in theory measured by asset-liability maturity mismatches. Unfortunately, this critical measure of bank risk is rarely available for the researcher.

⁹ Martínez Pería and Schmukler (2001) consider the case in which banks that offer better services to customers might have higher overhead ratios.

APPENDIX 8.2. EMPIRICAL EVIDENCE OF MARKET DISCIPLINE IN LATIN AMERICA

Most of the empirical literature on **market discipline** in Latin America focuses on country-specific cases in which bank fundamentals are used to explain movements in the growth rate of deposits during episodes of banking crises. The analysis here uses a panel data approach on 13 Latin American countries (Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, and Peru) during 1994–2003. Each regression includes a country-year effect and a bank effect. With the country-year effect, the analysis can account for most shocks faced by each economy in each year. To avoid problems of endogeneity, the analysis uses the lag of bank fundamentals to estimate changes in deposit growth rates and deposit interest rates. The table below shows that depositors discipline banks by reducing their

deposits and by demanding higher interest rates on the deposits held by riskier banks.

To analyze the role that different market structures play in determining market discipline, the regressions are estimated including interactions with dummies that indicate the ownership structure (state owned, foreign, etc.) of the bank. Dummies for public banks, foreign banks, and large domestic private banks are considered. The table shows that for banks owned by governments, a deterioration in bank fundamentals has significantly lower effects on deposits and interest rates than for private banks. This result is obtained by noting that the sum of the coefficient on the fundamentals variable and the coefficient on its interaction with the state-owned bank dummy is no longer negative and is statistically close to zero. The bank fundamentals variable used in the table is the ratio of nonperforming loans to total loans. The results are similar for other measures.

Independent variable	Dependent variable	
	Growth rate of deposits	Interest rate on deposits
<i>All banks</i>		
Nonperforming loans/loans (lag)	-0.359 (2.49)**	0.045 (3.25)***
Equity/assets (lag)	1.415 (6.92)***	-0.041 (2.09)**
Cash/assets (lag)	0.116 (0.55)	-0.02 (0.99)
Return/assets (lag)	0.622 (1.93)*	-0.032 (1.05)
Observations	1,456	1,456
R ²	0.25	0.74
Year-country effects	Yes	Yes
Bank effects	Yes	Yes
<i>Public, foreign, and large banks</i>		
Nonperforming loans/loans (lag)	-0.332 (1.93)*	0.06 (3.41)***
Public banks * nonperforming loans	0.681 (2.18)**	-0.071 (2.11)**
Foreign banks * nonperforming loans	-0.146 (0.45)	-0.002 (0.05)
Large banks * nonperforming loans	-0.154 (0.45)	0.029 (0.81)
Observations	1,661	1,553
R ²	0.19	0.73
Year-country effects	Yes	Yes
Bank effects	Yes	Yes

* Significant at 10 percent.

** Significant at 5 percent.

*** Significant at 1 percent.

Note: t-statistics are in parentheses.

Source: IDB calculations.