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**Can Emerging Market Bank Regulators
Establish Credible Discipline ?
The Case of Argentina, 1992-1999**

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Abstract

In the early 1990s, after decades of high inflation and financial repression, Argentina embarked on a course of macroeconomic and bank regulatory reform. Bank regulatory policy promoted privatization, financial liberalization, and free entry, limited safety net support, and established a novel mix of regulatory and market discipline to ensure stable growth of the banking system during the liberalization process. Argentina suffered some fallout from the Mexican tequila crisis of 1995, but its response to that crisis (allowing weak banks to close) and the redoubling of regulatory efforts to promote market discipline after the crisis made Argentina's banking system quite resilient during the Asian, Russian, and Brazilian crises. Argentina's bank regulatory system now is widely regarded as one of the two or three most successful among emerging market economies. This paper traces the evolution of the regulatory policy changes of the 1990s and shows that the reliance on market discipline has played an important role in prudential regulation by encouraging proper risk management by banks. There is substantial heterogeneity among banks in the interest rates they pay for debt and the rate of growth of their deposits, and that heterogeneity is traceable to fundamental attributes of banks that affect the riskiness of deposits (i.e. asset risk and leverage). Moreover, market perceptions of default risk are mean-reverting, indicating that market discipline encourages banks to respond to increases in default risk by limiting asset risk or lowering leverage.

I. Introduction

In common with many other emerging market countries, Argentina's banking sector was liberalized in the 1990s. That liberalization followed decades of severe "financial repression." The return to deposits placed in banks previously was substantially negative; if \$100 worth of deposits had been placed in an Argentine bank in 1944, it would today be worth roughly 3 cents in real terms today (and 1 cent in 1990).¹ As recently as 1990, bank deposits were frozen as part of an emergency fiscal adjustment. As elsewhere, liberalization involved lifting controls on interest rates, deregulation of the banking sector, allowing the entry of foreign capital, privatization and adopting international regulatory standards.

Nevertheless, the experience of the Argentine banking sector over the past decade has been unique in several respects. Many observers view Argentina's reforms as among the most radical attempts to overhaul a banking system. Traditionally in Argentina, credit was allocated either to the public sector or through public intervention to specific sectors or projects in the private sector. Moreover, the banking sector suffered from ineffective regulation and supervision and repeated, forced government rescues contributed significantly to Argentina's past fiscal and inflationary problems. In contrast, many have argued that today there is a credible, restrictive safety net and high regulatory and supervisory standards. For example, as shown in Table 1, one World Bank study rated Argentina's regulatory regime on par with Hong Kong, second only to Singapore, and higher than the longer-lived and much-admired regime in Chile². In particular, the Argentine system is praised for its attempt to introduce elements of private market discipline as a central component of its regulatory regime.

Table 1. World Bank Comparison of Bank Regulatory Quality in Developing Economies

Country	Total Score	Capital Position	Loan Classification	Foreign Ownership (management)	Liquidity	Operating Environment	Transparency
Singapore	16	1	6	2	5	1	1
Argentina	21	1	4	3	4	7	2
Hong Kong	21	3	9	1	2	2	4
Chile	25	5	1	4	8	5	2
Brazil	30	7	3	4	3	8	5
Peru	35	5	2	6	1	11	10
Malaysia	41	5	9	8	8	3	8
Colombia	44	3	4	11	6	10	10
Korea	45	7	9	10	11	3	5
Philippines	47	4	6	7	7	11	12
Thailand	52	7	12	12	8	6	7
Indonesia	52	7	8	9	12	8	8

Source: World Bank (1998), p. 54. Numbers indicate rankings, where low numbers mean high ranking.

The total score is a simple average of the six categories.

Private market discipline is enhanced by the following policies: (a) A strictly limited safety net (comprised of a privately funded, limited deposit insurance scheme and restrictions on the Central Bank's potential lender of last resort powers) exposes bank depositors to the possibility of loss. (b) High and credible minimum risk-based capital requirements further ensure that stockholders (rather than taxpayers)

¹ Central Bank estimates.

² We note, however, that Chile has since revised and strengthened its capital requirements on banks.

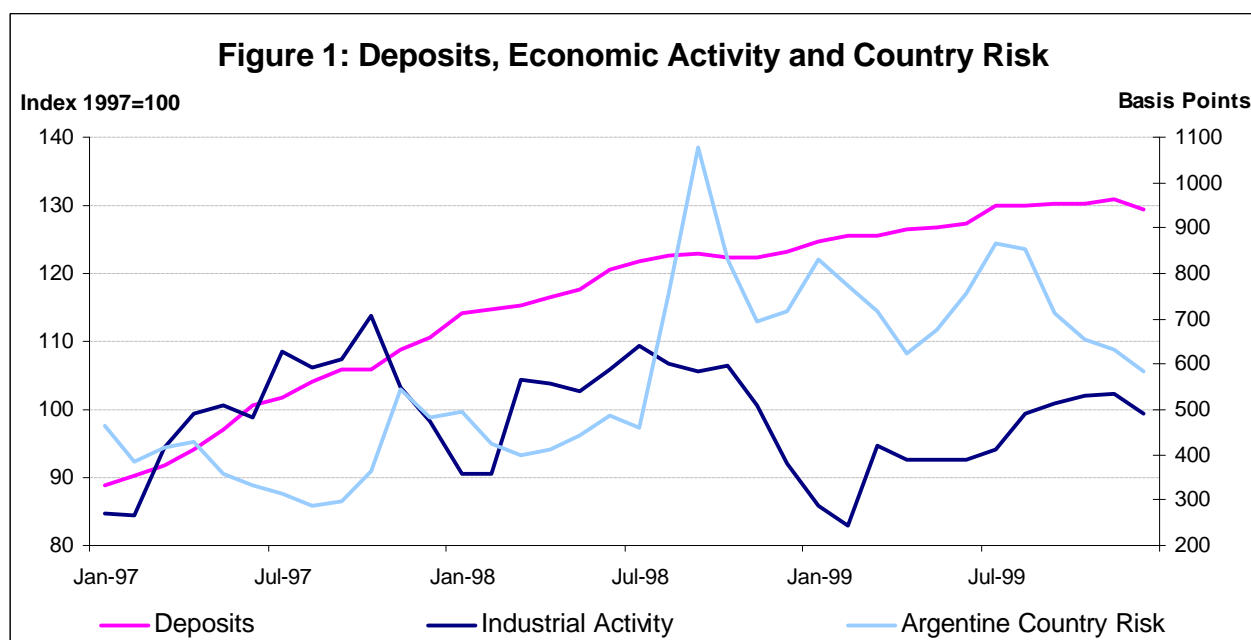
bear the risk of bank default. (c) National government programs encourage the privatization of provincial government-owned banks. (d) A credit rating scheme has been introduced whereby each bank must solicit a credit rating from an internationally active rating agency. (e) A subordinated debt requirement mandates that banks must issue a subordinated liability for some 2% of deposits each year. (f) Banks must satisfy a “liquidity requirement” in addition to the capital requirement. This not only reduces portfolio risk, ensures systemic liquidity, and further reduces the potential for taxpayer loss from failed banks, but (because of the structure of the requirement) rewards banks with lower regulatory cost when the market perceives that their risk of failure is low. (g) The Central Bank publishes basic information about bank loans to individuals and firms that borrow from banks (which enhances transparency of credit risk). (h) The quality of accounting data is enhanced by mandatory private audits conducted according to Central Bank guidelines, and auditors must post a forfeitable bond. (i) Argentina permits free entry and competition among foreign and domestic banks, which not only encourages the efficient management of banks, but also enhances the ability of bank depositors to punish weak banks by moving their funds to stronger institutions.

The Argentine system’s high marks from the World Bank also reflect the fact that the regulatory reforms put in place in the early and mid-1990s have been tested by external shocks. The reactions of the banking authorities to those shocks have been encouraging to advocates of market discipline. Rather than retreating from the reform process in the face of the “tequila” crisis of 1994-1995, the Argentine authorities redoubled their efforts to ensure that market discipline prevailed in the banking system. Indeed, many of the features of the current regulatory system listed above were enacted or strengthened after the tequila crisis, as part of a new plan for bank oversight developed at the central bank, which is known as the B.A.S.I.C. system of bank regulation.

We define the key elements of that system, and explain its evolution, in Section II below. These included the new liquidity requirement system (replacing a more traditional reserve requirement approach), capital requirements that reflect banks' trading risks and banking book interest rate risks, an expansion of the publicly available database on the condition of bank borrowers, as well as the minimum mandatory subordinated debt and credit rating requirement. The authorities have also negotiated a contingent liquidity facility with international banks in order to be able to inject emergency liquidity on the basis of Argentine collateral in the case of a sharp, systemic, liquidity shock (this facility currently stands at some \$6.45bn excluding a \$1bn World Bank/IDB enhancement). Also over this period there was significant entry of foreign capital to the banking system such that, at the time of this writing, some 60% of private sector deposits are now in banks under foreign control, accounting for some 40% of the whole system. There remains only one large (top 8) private retail bank that does not have a foreign controlling interest.

The only policy reaction to the 1995 crisis that could be construed as a weakening of the commitment to market discipline was the reestablishment of deposit insurance. But the significance of this change for market discipline should not be exaggerated. In November 1992, Argentina abolished its deposit insurance system. When the tequila crisis of 1994-1995 hit, Argentina reestablished limited insurance for small deposits, but it did not retreat on its commitment to market reform by bailing out insolvent banks. Banks suffered large outflows of deposits during 1995 (see BCRA 1995 and D’Amato, Grubisic and Powell 1997 for an analysis). While some critics have pointed to government-assisted acquisitions of banks as a partial bailout of some institutions, it is important to emphasize that, as we describe in detail below, several banks were allowed to fail in the wake of the tequila crisis and that there have been subsequent failures too (see Anastasi, Burdiso, Grubisic and Lencioni 1998). In some of these cases, depositors and other creditors suffered significant losses.

During the recent crises in Asia, Russia, and Brazil, Argentina suffered significant macroeconomic fallout, and thus bank deposit growth and credit growth have slowed and interest rates have risen, as shown in Figure 1 (which plots deposit growth, the sovereign yield, and an index of economic activity). In contrast to some other emerging countries, however, the weakness of the banking sector has not itself been a source of macroeconomic problems, foreign exchange attack, or capital flight. Indeed, it is widely perceived that the banking sector as a whole has weathered these storms extremely well, even though some individual banks have been weakened. That record has added to confidence in the credibility of regulation.



In large part, the apparent success of Argentina’s banks reflects unique circumstances of history and the current political environment. In particular, Argentina’s experience prior to the 1990s with inflation, financial repression, large bank rescues and low quality in terms of banking services created widespread popular support for the continuation of the currency board as an inflation-fighting tool, a restricted safety net for banks and tight fiscal discipline. These factors reduced the temptation to bail out financial institutions during the recent crises and also implied that the authorities could allow a significant increase of foreign capital in the sector without fear of any political or popular backlash. Indeed, one puzzle is that although the sector was opened significantly in 1992, and the rest of the economy received large injections of foreign capital between 1992 and 1996, it was only in the years 1997 and 1998 that the banking system saw a very significant increase in foreign capital. One hypothesis is that these international banks waited until the system was tested by its first major external shock before making such significant investment decisions.

Despite this record of apparent success, the reforms and transformation of the banking system have not gone without criticism. Some have suggested that the enactment of limited deposit insurance was unnecessary and counterproductive, that more institutions should have been allowed to fail, and that some assisted mergers, particularly during the tequila period, simply delayed a problem rather than solving it (see World Bank (1998)). Other critics have suggested that Argentina's banking regulations are too tight (in particular capital, liquidity and provisioning) and have diminished banking sector returns and placed the sector at a disadvantage with respect to foreign banks. Other criticisms refer to particular

regulations. Some suggest, for example, that a regulatory authority should not establish requirements for the private rating of banks. Others suggest that the effectiveness of the obligation to issue subordinated debt, and therefore, market discipline, has been reduced because the penalties for non-compliance have been lowered – a consequence of the perceived difficulties of issuing debt in the wake of the international financial crises of 1997 and 1998. Finally, it has been suggested that the entry by foreign banks may have a drawback; some perceive foreign banks as having more restricted lending practices than national banks, and blame those lending policies for exacerbating the current recession.

In this paper we review the record of bank regulation and evaluate that record from the perspective of evidence on the existence of market discipline. We consider evidence on the question of whether and to what extent banks have been disciplined by the market. Section II provides an overview of the evolution of the regulatory environment from 1992 to the present, and an evaluation of its consequences for the structure and performance of banks and their exposure to market discipline. Section III brings econometric evidence to bear on the question of the extent to which market discipline penalizes risk and constrains bank behavior. Thus, in addition to evaluating the record of regulatory enforcement in the narrow legal sense, we also examine the economic evidence that market discipline exists, and that it has in fact achieved its desired goal of limiting bank risk taking.

Specifically, Section II summarizes the experience with privatization, foreign entry, consolidation, bank failure and depositor loss experience. Section III focuses on differences in bank deposit interest rate risk premia, and differences in deposit growth, with an emphasis on the degree of diversity within the system with respect to these measures of market discipline. It then develops a framework for identifying links between fundamentals that affect bank default risk and market reactions to that risk (as seen through higher interest rates on deposits and lower deposit growth). Finally, we consider evidence on the effectiveness of market discipline in constraining bank risk taking. Section IV concludes.

II. The Development of the Regulatory Framework, 1992-1999

The origins of banking reform

The economic turbulence of the late 1980s and the hyperinflations of 1989 and 1990 virtually destroyed the Argentine financial system. M3/GDP, which had stood at almost 50% in the 1940s, declined over the following decades and then fell very sharply, reaching a mere 5% as of 1990. The fiscal reforms of 1989 and 1990 sowed the seeds of the end of inflationary financing in Argentina. However, as part of those reforms, the 1989 Bonex plan (which included replacing bank deposits with Bonex bonds trading at deep discounts) had a significant adverse impact on the financial system. A path to reform based on the seizure of private property housed in the banking system does not encourage rapid faith in the safety of bank deposits.

Nevertheless, since 1990 confidence gradually has returned and deposits have grown strongly. M3 has risen and is now some 30% of GDP. Although this is still a low level for a country of Argentina's GDP per capita and level of development, this financial system growth has been rapid and reflects the transformation of a private banking system, which has resumed its role of allocating credit to the private sector.

Macroeconomic stability returned with the imposition of the April 1991 currency board (enshrined in the Convertibility Law), and a very significant opening and further liberalization of the economy, including the banking system. The legal and regulatory environment in the financial system was further defined with a new (September 1992) Central Bank charter. This established Central Bank independence (as in its 1936 creation), and recreated the banking Superintendency as a semi-autonomous unit within the Central Bank. The Central Bank has 10 full-time directors proposed by the executive and approved by the Senate) including the President, Vice-President, Superintendent and Vice-Superintendent of banking supervision. The Central Bank was given a significant degree of autonomy with respect to banking regulation and supervision (e.g. capital and other requirements can be changed by a simple decision of the Board) but its role in monetary policy and lender of last resort activities is severely restricted by the 1991 Convertibility Law and 1992 charter..

Table 2 lists the main regulatory changes over the period 1992-1999. The period 1992-1994 was one of strong economic growth and fast development of the financial system, albeit from a very small base. In this context the Central Bank worked to impose international capital, accounting and provisioning standards and to improve banking supervision. The financial system had lost virtually all deposits and hence banks were very highly capitalized implying that high capital standards were not too difficult to impose at that time. A minimum of 9.5% of assets at risk was the standard required as of the end of 1992, rising to 11.5% from January 1st 1995 (0.5% rises were effected each 6 months). On top of these requirements, Argentina also introduced a capital requirement for credit risk, which uses the interest rate charged on each loan as a signal of credit risk, and requires that capital rise accordingly. Actual minimum capital requirements by the end of 1994 were then some 14% of assets at risk – well-above minimum capital requirements set by the Basel standards, or those required in other developing economies. Provisioning requirements were tightened significantly at the end of 1994 and through 1995.

Other improvements in banking supervision were underway well before the tequila crisis. In 1992, the Central Bank created a database of the main debtors of the financial system (for loans of more than \$200,000). Argentina also maintained a system of high reserve requirements which explicitly were viewed at the time as a liquidity tool (that is, both as a means of limiting asset risk, and as a way of protecting the banking system from the risk of depositor flight). These non-remunerated reserve requirements were also thought of as a tax on banks. The required reserve ratios were set at high levels on

sight deposits and at low levels on time deposits. That difference did not reflect underlying liquidity risk differences between time and demand deposits so much as the inelasticity of demand for sight deposits (i.e. the desire to avoid financial disintermediation in reaction to the taxation of banks). As we discuss below, time deposits actually displayed a greater withdrawal propensity during the crisis than demand deposits.

Table 2. Main Regulatory Advances in Argentina 1991-1999

April 1991 Currency Board Adopted (backing of monetary base and ex rate 10,000:1, subsequently 1:1).

September 1992 New Charter of the Central Bank.

December 1992 Deposit Insurance Abolished.

1992-1994 Basel Capital Requirements Adopted, Raised to 11.5% at December 1994.

1994-1995 Provisioning Requirements Tightened.

April 1995 Limited, Fully Funded, Deposit Insurance, \$20,000 (subsequently \$30,000).

August 1995 Liquidity Requirement System (Rasied to 20% of Deposits through 1997).

September 1996 Market Risk Capital Requirements.

1997-1998 BASIC Introduced (B for Bonds, C for Credit Rating etc).

March 1999 Capital Requirements for Interest Rate Risk

The nineteen eighties had left Argentina with a very large number of small financial institutions, many of which disappeared in the 1990s. In the pre-reform period, these institutions had become government financing vehicles rather than a proper means of channeling credit to the productive sectors of the economy. With macroeconomic stability, low inflation and liberalization many such institutions – which lacked the skills to survive in the new environment – faced the daunting challenge of transforming themselves into bona fide competitive providers of credit. Many survived into the 1990s as they attempted to change their focus. According to one view of that transition period, the strong economic growth and sharp rises in Argentine asset prices in the period 1992-1994 (at least until the change in direction of US interest rate policy in February 1994), coupled with high levels of bank capital, gave a breathing space to many institutions as they attempted to adapt to the new circumstances. An alternative interpretation of this period of economic boom is that it allowed many institutions to survive despite underlying weaknesses that only became apparent in subsequent periods of stress.

Table 3 gives statistics on the number and type of financial institutions in Argentina over the 1990's and the total size of the system. Table 3 shows that there has been substantial restructuring in the Argentine financial system. From 1980 to 1992 over 250 institutions closed. While 210 of these were non-bank financial institutions, 48 were banks. Between 1992 and 1994 there was actually relatively little

restructuring activity and while a set of further non-banks closed their doors, new banks opened as the system re-orientated its focus. Also in this period the privatization process commenced with 3 entities privatized. There was then a second quite ferocious wave of restructuring activity through 1995 – the so-called tequila period – and to a lesser extent this process has continued through 1999. From the end of 1994 to September 1999 over 90 institutions closed, including 54 banks and 14 non-banks. There were also a significant number of privatizations (18). As these privatizations were banks transferred to the private sector, the number of total bank closures (including both private and public banks) was 72 (54+18).

Table 3. Structure of the Financial System

	1980	1992	1994	Sep-99
<i>Number of Institutions</i>	469	212	205	119
Private	179	131	135	81
Wholesale	n.a.	32	34	31
Retail	n.a.	99	101	50
Foreign owned	27	31	31	48
Public	35	36	33	15
Non-bank	255	45	37	23
<i>Total Deposits (¹)</i>	55,020	26,002	42,278	74,693

(¹) In millions of pesos of 1993.

The “Tequila” Crisis

Despite the advances in regulation and supervision in 1992-1994, the events of late 1994 (particularly after the December 20th Mexican devaluation) and early 1995 exposed weaknesses in many institutions. The tequila period was a very significant event for the financial system and as such it is worth explaining the main events and regulatory response in some detail. After December 20th, a dramatic fall in Argentine asset prices significantly affected the solvency ratios of several wholesale banks with relatively large government bond portfolios or other financial market exposures. At the same time, because these institutions had only a small amount of sight deposits, they had little in the way of liquidity reserves at the central bank. Several such institutions experienced a significant loss of deposits and hence a sharp liquidity crunch. Cooperative and some provincial banks also fared particularly badly reflecting their low-quality loan portfolios. Nevertheless, while the financial system lost deposits in January and February, this period could not be described as a systemic panic; larger retail banks and large public banks gained deposits, and deposits denominated in dollars overall also rose (see BCRA 1995 and D'Amato, Grubisic and Powell 1997 for more details). This phase of the shock was largely a flight to quality.

The Central Bank responded to these events in a number of ways. Within the Central Bank there was an interesting debate as to whether the problem being faced was a run on the currency, which might require a tightening of monetary conditions (i.e. a raising of reserve requirements), or alternatively a liquidity problem, which would require the opposite policy. In the wake of the monetary contraction and a deteriorating macroeconomic environment, it was soon realized that the greater problem was a potential banking sector liquidity crisis, rather than a run on the peso. Hence reserve requirements were lowered.

The distribution of liquidity within the system was as significant a problem as its aggregate amount. Large retail banks had large reserves in the Central Bank and gained deposits while wholesale banks had low reserves in the Central Bank and were losing deposits. A private liquidity sharing system was negotiated for the banking system. However, the amount of liquidity actually circulated via that mechanism was very restricted. Thus the authorities also set up an obligatory system through an extra (2%) reserve requirement on certain banks, which was then distributed through the publicly owned Banco Nación. Finally the Central Bank extended repos and rediscounts to other affected institutions according to the rules laid down in the Central Bank's 1992 charter.

The end of February 1995 was a critical moment. The Central Bank was finding that the rules on how it could provide rediscounts were very restrictive (being limited to 30 days and to never exceed the regulatory capital of the borrowing bank) and on February 27th Congress approved a set of changes. These modifications included being able to extend rediscounts for longer periods and, under exceptional circumstances, for an amount exceeding the regulatory capital of the bank. Some interpreted these changes as a weakening of Convertibility itself.

By February Argentina's fiscal position had deteriorated markedly and there was no agreement yet in place with the IMF. Argentina had missed an IMF fiscal target at the end of 1994 and the authorities had not agreed to a new program. Finally, the May 14th Presidential election was looming and it had been agreed that this election would be fought subject to new electoral rules (a ballottage system) which created new uncertainty. Opinion polls at the time put Carlos Menem in the lead but without enough votes to win comfortably in the first round, prompting speculation of potential second-round coalitions. The opposition parties at the time were not perceived as being strong supporters of the currency board system, nor the very deep liberalization measures that had been pursued.

In this uncertain economic and political climate rumors abounded. These centered on the state of the banking system and individual banks and the state of the fiscal accounts. A persistent rumor was that

the Government was considering, as a way out of the crisis, “freezing” bank deposits as had been done in 1989. The deposit runs that had affected mostly individual banks spread throughout the system and in the first two weeks of March virtually all banks lost deposits. Indeed, in this two week period roughly half of the total \$8bn that left the system, fled the country.

This more systemic run was halted in the middle of March with the signing of a new agreement with the IMF and an international support package with money from the IMF, the World Bank and the Inter-American Development Bank. A private bond was also launched (known as the Patriotic Bond with internal and external tranches – an early explicit example of “bailing in”). Part of these funds financed two fiduciary funds for the banking system; one to assist provinces in the privatization of provincial banks and one to assist in the restructuring of the private banking system. Deposits fell slightly from the day after this agreement was signed until May 14th (the Presidential election date). On Carlos Menem's victory in that election, and with much uncertainty thus resolved, deposits started to grow again, and the financial system recovered very quickly.

Despite the fact that the systemic run of March 1995 affected all the banks, depositors fled some banks more than others. Schumacher (1997), Dabos and Sosa (1999), and Anastasi, Burdiso, Grubisic, and Lencioni (1998) all conclude that banks that failed or were forced to merge over this period were much weaker institutions. Each of these papers adopts a logit/probit methodology to explain bank “failures” as a function of banks’ ex ante observable characteristics. Although each study is slightly different in the samples of banks used and the precise specification of the model, the main results are consistent across all the studies. Each study reports that in over 90% of the cases the model correctly predicts failure or survival. Thus, although both Type 1 and Type 2 errors are found, they are very small in number.

Anastasi et al. (1998) provides more extensive analysis of market discipline of banks using a larger sample of banks, a longer time series and a more complete set of models than the other papers. In that paper logit estimates are presented and as well as results for a survival analysis, where the predicted variable is the number of months a bank is expected to survive (after December 1994). This is estimated using data as of the end of 1994 and predictions are updated on a quarterly basis. A rather small subset of bank fundamentals are found to be significant explanatory variables, and these variables correctly predict over 90% of banks' survival experience even when the set of predictors is constrained to the predicting variables as of December 1994. Little is added to predictive power when explanatory variables are updated quarterly³.

D'Amato, Grubisic and Powell (1997) develop a slightly different approach. Here the authors examine whether the amount of deposits lost during the crisis, on a bank by bank basis, could be explained by bank fundamentals, macroeconomic factors or “contagion”. Contagion is defined here as serially correlated losses across banks that could not be explained either by macroeconomic influences or by changes in individual bank characteristics. This interpretation of significant panel time effects (indicating significant residual correlation) as potential “contagion” may overstate true contagion, since it could also be accounted for by time-varying coefficients or omitted variables. Nevertheless, what is striking in this study is that even this potentially overstated measure of contagion was not the most important influence on deposit loss. When explicit “contagion” terms were added (e.g. the loss of deposits of other banks in the previous time period) it was found that additional time effects in the panel analysis became insignificant, indicating the importance of serial correlation of risk for the banking sector as a whole. However, fundamental macroeconomic factors remained significant in generating aggregate

³ As a caveat it is worth noting that if this model is re-estimated over different sample periods, although similar prediction success can be obtained, other bank fundamentals are preferred. This indicates some potential instability in model specification or an alternative explanation might be a very flat likelihood function with respect to the different model specifications. The Superintendency is now employing the results of this analysis in its off-site work.

risk, and the majority of the explained variation in deposits was accounted for by bank fundamentals, indicating the importance of bank soundness in depositors' decisions.

Table 4 summarizes the effect of the tequila period on the financial system. It should be noted that between December and May, the system lost \$8bn or 18% of deposits and the Central Bank lost some \$5bn or 30% of international reserves. Over this single year some 51 institutions were closed (12 liquidated and 39 merged) and 2 institutions were suspended and subsequently merged in 1996. The total deposits in liquidated institutions in 1995 amounted to \$958m and of this depositors received roughly 50% of their investments, losing an estimated \$477m. In addition other creditors (mainly bond holders), lost an estimated \$249m. This is a record of market discipline (i.e. actual depositor loss) that few countries have matched in recent decades. (Interestingly, Estonia in the early 1990s – a country also constrained by its commitment to a currency board – is the other example of significant depositor loss of which we are aware.)

Table 4. The "Tequila" Crisis

Number of institutions (Dec 94)	205
Institutions liquidated	12
Number of mergers	39
New institutions	4
Number of institutions (Dec 95)	158
Institutions suspended and then merged	2
Total deposits in liquidated institutions (1)	958
Estimated total loss of deposits (1)	477
Estimated total loss of other liabilities (1)	249

(1) In millions of pesos.

Challenges and Reforms after the Tequila Crisis

Argentina had abolished deposit insurance in the early 1990s, and managed to weather the tequila storm without it. Nevertheless, there was a perception among some that the complete absence of deposit insurance was too extreme and that its absence may have contributed to the flight from the banking system. A limited deposit insurance scheme was introduced in May 1995 covering deposits of up to \$20,000 and funded through premia on banks calculated using a risk-based pricing formula. This insurance scheme was implemented through a government-sponsored enterprise – SEDESA S.A. – which is separate from the Central Bank. The scheme has since been extended to cover deposits up to \$30,000.

Originally, SEDESA was originally seen as a body that would simply pay out to depositors in the case of a bank liquidation. However, over time SEDESA's role and powers have been extended. SEDESA is now formally charged with a minimum cost resolution objective. Additionally, the charter of the Central Bank has been altered to allow the Central Bank to separate the assets and liabilities of a failing bank. In effect this allows the Central Bank to create a "good" bank that can then be sold and a "residual bank" that can be wound-up, thus avoiding the liquidation of the whole bank. The residual bank rests in a type of "trust" backed by bonds. Consistent with the minimum cost resolution guidelines, SEDESA's funds, and also funds of the Central Bank, have been used to finance this process through purchases of the bonds issued by the residual bank trust.

To some observers this process has appeared to be an efficient way of dealing with problem institutions involving very little public money; to others, it has reduced market discipline and potentially placed the Central Bank at risk of losing some of its investment, which seems to be at odds with the intent of the Convertibility Law (see, for example, World Bank 1998). That criticism reflects the view that

some mergers are unsustainable combinations of weak institutions. The World Bank (1998) recommended requiring that acquiring banks have A or better credit ratings, in light of that risk. In the event, however, little adverse consequences have resulted from Central Bank involvement because merged banks have tended to improve over time. For example, banks rated BB have shown a greater probability of being upgraded rather than downgraded. That positive tendency is also reflected in the transition probability matrix of CAMEL ratings (see BCRA 1999). It is also worth noting that – despite the possible advantages from following the World Bank’s recommendation to require a minimum quality standard for acquirers – the Central Bank currently lacks the legal tools to implement such a policy without leaving itself open to legal dispute.

Immediately after the tequila shock, beginning in August 1995, there was a very significant reform of the reserve requirement system. During the crisis it was found that sight deposits were more stable than time deposits and that banks with more time deposits had lost a greater fraction of their deposits and (because of the relatively low reserve requirement on time deposits) had less liquidity available to them in the Central Bank. It was decided to replace reserve requirements with a "liquidity requirement" acknowledging explicitly that these reserves were intended for “systemic liquidity protection”. These new liquidity requirements were specified on virtually all liabilities (reserve requirements had been placed only on deposits) at rates which declined depending on the residual maturity of each liability and were required irrespective of the type of liability (sight deposit, time deposit, bond, etc). Finally the liquidity requirements introduced were remunerated at rates approximately equal to short-term dollar interest rates, thus alleviating a substantial tax that had been placed on the financial system.

In recent years, the liquidity requirement has been further amended to permit the holding of balances in qualifying foreign banks to count toward as much as 80% of the requirement, and to permit the use of standbys from foreign banks as a substitute for deposits held abroad. These rules reflect the intent of the liquidity requirement – a means to insulate the banking system against the flight of deposits – and the recognition that for that purpose hard currency balances held abroad may be as good or better than deposits held at the Central Bank. Furthermore, the flexibility afforded by the use of standbys provides a market reward to low-risk banks, since those banks are able to obtain standbys at low cost from foreign banks.

Another lesson from the tequila crisis had been the importance of market risk as wholesale banks had maintained little regulatory capital against relatively large government bond positions. In 1996, Argentina became one of the first countries to implement an adapted version of the Basel market risk capital requirement Amendment to the 1988 Accord. The approach employed was to use the 'standardized' approach, (with simplified rules for offsetting positions reflecting the more limited Argentine bond market), but with higher risk weights calculated via a “value at risk” formula. The Central Bank publishes the volatilities used to calculate these risk weights on a monthly basis. Capital requirements were further augmented in March 1999 with a requirement to cover interest rate risk on the banking book.

The tequila experience underlined certain structural problems with respect to banking oversight, which encouraged new thinking about the benefits of involving markets in the regulatory process. First, although in large part standard statistics monitored by the Superintendency do a fairly good job in predicting bank failure, some failures came as a surprise to the authorities. Among the reasons why banks failed but were not identified in advance as problem institutions is that there is a limit to what reported balance sheet and other statistics tell about a bank. Unsound practices and fraud are an important cause of bank failure, and one that is not likely to show itself in reported financial ratios. For example, off-balance sheet contracts (types of derivative operations) and even undeclared off-shore banks were uncovered in the analysis of some institutions that failed during the tequila crisis. That observation (along with the

evidence that market deposit interest rates had been useful in forecasting bank failures during the crisis) led policy makers to consider the potential advantages of relying on market assessments as part of the regulatory process. In an emerging country context, in particular, where supervisory technology and resources are relatively constrained, in some cases the “market” knows more about the existence of derivatives and offshore transactions than the Superintendency.

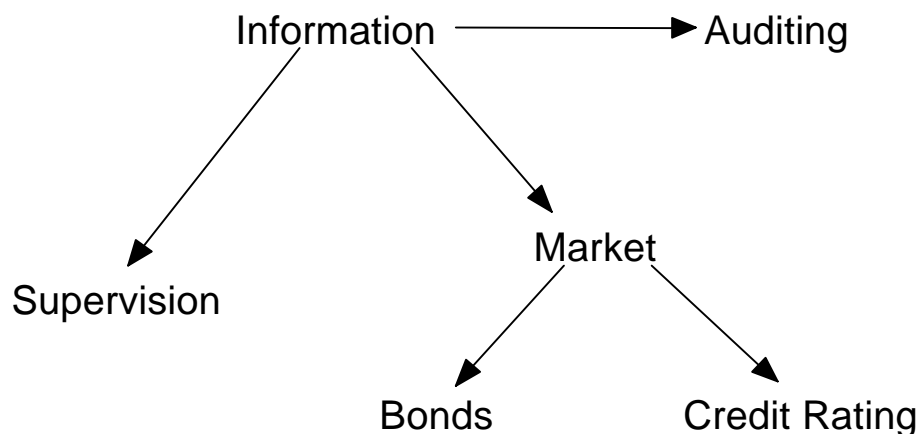
Furthermore, there can also be differences between the powers and incentives of regulators and those of markets to discipline banks. An important issue in some emerging market countries is the legal powers and the legal protection offered to supervisors who attempt to discipline banks. In Argentina, for example, legal protection of supervisors is weak (a point made in World Bank 1998), and the legal tradition does not give much scope for early Supervisory intervention if an institution is still formally complying with regulations. There is a possibility, therefore, that Supervisors cannot close an institution or force remedial action even if they know that an institution is facing serious problems. In that case, the market – if it has the correct information – may be more willing and able to discipline weak institutions than their supervisors⁴.

The B.A.S.I.C. Approach to Bank Regulation

These kinds of considerations led the regulatory authorities in Argentina to develop what has become known in that country as B.A.S.I.C. banking oversight (see Powell 1997 and World Bank 1998 for further details). B.A.S.I.C. is an acronym that stands for Bonds, Auditing, Supervision, Information and Credit Rating. The main idea behind B.A.S.I.C. is that both market and regulatory discipline are imperfect and that there are complementarities between the two. As we have argued, the Superintendency and the “market” may have different information sets, incentives, and legal powers, and hence the quality of monitoring can be improved if both are employed actively to monitor banks. Despite the appeal of the B.A.S.I.C. acronym, the more logical order to discuss the operation of the system is: Information, Auditing, Supervision, Bonds and Credit Rating. Table 5 gives a schematic representation of the main policies under each heading.

⁴ See Powell (1997) on this point.

Table 5. BASIC



- Information: Disclosure rules on banks, Credit Bureau of the Central Bank.
- Auditing: Auditors supervised by Central Bank, subject to Financial Bonds and Disqualification.
- Supervision: Capital, liquidity and other regulations plus CAMELS system of bank assesment.
- Bonds: Obligation to issue 2% of deposits as subordinated liability each year.
- Credit-Rating: Each bank must obtain a credit-rating from an internationally active authorized rating agency (4 agencies authorized).

Good information is a prerequisite to either market or regulatory discipline. The Superintendency in Argentina publishes summarized bank balance sheets, principal regulatory ratios, performance ratios and details of the non-performing loans and provisions on a bank-by-bank basis. Moreover, the Superintendancy's credit bureau has been extended to cover virtually every loan in the financial system (all those above \$50). The database includes the name of the borrower and a unique identification number (each person and each company in Argentina has a unique identification number issued by the National Registry and used for many purposes), the name of the bank extending the credit, the amount of the credit, the quality category of the loan (the Central Bank has defined a standard categorization system from 1 = normal to 5 = loss) and the details of any guarantees extended. This information is available free of charge on the Central Bank's website debtor by debtor.⁵ In other words, anyone can input the surname of a borrower or a company name and view instantly the total amount of debt that that individual or company has with the financial system and whether that debt is performing or not.

Measures are taken to ensure that the entire database cannot be downloaded. For example, if hundreds of searches are detected from the same source, then further access is denied, essentially in an attempt to protect the identity of banks' good creditors from other banks (to ensure that banks can internalize the benefits of their own screening and monitoring investments). However, no measures are taken to protect the identity of individual borrowers. Moreover, the database, except credits of less than

⁵ For the interested reader the Central Bank's website is www.bcra.gov.ar

\$200,000 in categories 1 and 2 (i.e. performing), is sold at very low cost to all interested parties. The main objectives of this policy are not only to promote transparency with respect to the borrowers of the Argentine financial system, but also to enhance the 'willingness to pay' debts, given what is perceived as a weak legal system.⁶The database maintained by the Superintendency has recently been expanded to include many more variables (e.g., basic financial ratios of borrowers and other information that would be relevant to determining the quality of the loan), and these data are also available for limited private use, although comprehensive current data are only available for unlimited private use for non-performing borrowers.

The usefulness of information depends not only on its quantity and availability, but also on its quality. The auditing process is a vital component to ensure the validity of the information published. In Argentina in previous decades auditing firms have been subject to harsh criticism. The Central Bank in response has set up a list of qualified bank auditors who must post a financial bond. In the event of a dispute, this bond may be forfeited and the auditor may be struck from the authorized list. Additionally, the Central Bank lays down strict guidelines on minimum auditing requirements and supervises the auditing process.

“Supervision” in B.A.S.I.C. actually refers to both supervision and regulation (and these activities are separated within the internal structure of the Central Bank). The Superintendency has now adopted a version of the U.S. CAMELS system of bank rating. The banks’ CAMELS ratings are then used in several regulations. In particular the CAMELS score affects capital requirements such that banks with poor CAMELS ratings face a higher requirement⁷.

“Bonds” refers to the requirement that banks in Argentina must issue a subordinated liability for some 2% of their deposits each year⁸. The idea behind this kind of regulation (as proposed by Calomiris 1997, 1999) is threefold. First, if banks are forced to attract institutional investors and to go to market to issue debt, that process reveals information about the bank to those debt-holders and to supervisors. Supervisors may be able to use that information to discipline the bank. Second, sophisticated investors that hold a subordinated liability then have incentives to monitor the bank, and are likely to be a constituency for conservatism within the bank because (like the deposit insurer) their claims are senior to equity. In contrast, equity holders in an insured bank that faces large losses may have incentive to increase risk to take advantage of the put option inherent in deposit insurance. Thus when equity capital is severely depleted it is not a constituency for conservatism.⁹ Third, if debts are traded publicly, then the secondary market prices reveal further information about the default risk of the bank over time. In the case of Argentina, where corporate debt markets are extremely thin, it was thought that the first two objectives would be more important.

⁶ The database also has great potential to analyze, for example, whether provisioning and capital requirements are adequate. Falkenheim and Powell (1999) use the database and a simple portfolio model of credit risk in this vein and conclude that in general provisioning and capital requirements are more than adequate in Argentina given loss probabilities (estimated on data for 1998 and 1999).

⁷ Argentine capital requirements can be expressed as: $CR=11.5*w*X*K+MR+IR$ where CR is the Capital Requirement as a % of assets at risk, w is the average bank Basle risk weight for counterparty risk, X is the average interest rate factor (as described in the text, the interest rate on each loan is used as an indicator of counterparty risk), K is the CAMELS factor, MR is the market risk capital requirement and IR is the interest rate risk (banking book) capital requirement.

⁸ In this paper we refer to the “subordinated debt requirement”. In fact, there are several ways to comply including issuing a bond or by holding a deposit/obtaining a loan from certain investors. These investors must be from outside Argentina (and subject to a minimum credit rating) or be local and have already satisfied the requirement. In the case of the bond issue, the bond is not necessarily subordinated to other bonds outstanding although it is always subordinate to deposits. Meeting the stronger requirement allows subordinated debt to be considered as Tier 2 capital.

⁹ Bond holders can be depended upon to discipline banks so as to limit their risk taking so long as either (1) equity remains in the bank, or alternatively, so long as (2) an upper limit is placed on the yield on any subordinated debt that counts toward the regulatory requirement (which it is not the case in Argentina, and which Calomiris 1997 argues is a weakness of the current law). For more details, see Shadow Financial Regulatory Committee (2000).

The subordinated debt regulation has not performed as well as its advocates had hoped. The regulation was adopted in late 1996, to become effective January 1998. However, over this period the Asian crisis struck global capital markets, and Argentina was also affected (specifically, after the speculative attack on Hong Kong in October 1997). Subsequently, Argentina's securities markets suffered further minor shocks as different countries in Asia were affected, then suffered considerably in August 1998 as the result of the Russian debt moratorium, and then was again shaken by the January 1999 Brazil devaluation. To summarize, from roughly October 1997 to mid-1999, the international financial crisis made debt or equity issues (foreign or local) from any issuer (sovereign or corporate) difficult. The Central Bank reacted to this by putting back the compliance date for subordinated debt on several occasions, by extending somewhat the range of liabilities that banks could issue in satisfaction of the requirement, and by revising the penalties banks faced for non-compliance.

Currently the regulation remains in force, and banks have a wide range of liabilities that qualify as subordinated debt. Banks that fail to comply face higher capital and liquidity requirements. Banks with foreign parents may comply through their parent.

To investigate how the subordinated debt regulation has been working in practice, we analyze the characteristics of banks according to how they have reacted to this regulation. In particular, in Table 6 we divide banks into two groups according to whether they have complied with the regulation and how they have complied. In a first group we place banks either that do not have to comply (an exception is made for foreign owned banks subject to a minimum credit rating) or that have complied by issuing a bond or obtaining a 2 year deposit from a foreign bank. We call this the "high-compliance" group. In a second group we place banks that either have complied "weakly" by obtaining a 2 year deposit from a local institution (a category that includes some banks that subsequently failed), or banks that have not complied at all. We designate these "low-compliance" banks.

The identities of the banks in each of these categories are not a matter of public information. Some critics have argued that the failure to disclose that information weakens the power of subordinated debt to provide signals to the marketplace (i.e. if banks choosing not to comply are weaker, then revealing that information could facilitate market discipline of those banks). The decision not to reveal information about banks' compliance reflected concerns on the part of supervisors about creating false impressions about the relative health of banks during the turbulent period of 1998-1999. In particular, banks that had issued required subordinated debt early (e.g. before the Asian crisis) did not face the same market challenges as those that had waited to issue debt, and regulators did not think that relative compliance always reflected relative strength. Nevertheless, that lack of confidence in the market's ability to draw proper inferences is somewhat at odds with the motivations for the law in the first place.

Table 6 compares various characteristics of these two groups to see if the banks that comply at a high level are the strongest banks (since one would expect that banks with lower default risk would have lower costs of meeting the rigors of market discipline). We report variables that capture elements of asset risk and liquidity, as well as market perceptions of the default risk on debt, and the capital ratio.

Default risk on debt is captured alternatively by the average interest cost on debt for the bank (which reflects a market risk premium) and by the growth rate of deposits. When banks' deposits are perceived as riskier, they have a harder time attracting deposits (for theory and empirical evidence on depositors' aversion to risky deposits, see Gorton and Pennacchi 1990, Calomiris and Kahn 1991, Calomiris and Mason 1997, and Calomiris and Wilson 1998).

Table 6. Subordinated Debt

			1993.2-1994	1995	1996-1999
Deposit Interest Rate (US dollars deposits)	High Compliance	Average	6.16%	8.47%	6.96%
		St. Dev.	2.28%	5.33%	3.45%
	Low Compliance	Average	6.99%	9.98%	7.93%
		St. Dev.	3.18%	7.16%	2.76%
Loan Interest Rate (US dollars loans)	High Compliance	Average	15.40%	16.69%	15.12%
		St. Dev.	5.63%	6.21%	9.29%
	Low Compliance	Average	19.02%	20.70%	17.41%
		St. Dev.	10.94%	11.80%	9.70%
Change in Deposits	High Compliance	Average	2.43%	0.44%	5.30%
		St. Dev.	36.8%	31.8%	30.8%
	Low Compliance	Average	3.58%	-1.42%	4.49%
		St. Dev.	14.6%	61.2%	27.47%
Capital Ratio (capital integration)	High Compliance	Average	15.97%	17.85%	15.70%
		St. Dev.	10.85%	13.98%	12.14%
	Low Compliance	Average	20.20%	17.37%	18.31%
		St. Dev.	14.55%	24.75%	16.38%
Non-Performing Loans	High Compliance	Average	13.29%	16.24%	14.16%
		St. Dev.	16.04%	16.50%	12.91%
	Low Compliance	Average	23.10%	30.00%	25.44%
		St. Dev.	19.25%	22.37%	17.35%
Loans/Liquid Assets	High Compliance	Average	6.37	6.92	4.16
		St. Dev.	7.52	6.36	4.06
	Low Compliance	Average	7.14	9.25	5.39
		St. Dev.	7.93	10.14	8.42
Number of Observations	High Compliance		177	237	922
	Low Compliance		76	97	412

(*) Low Compliance means either the bank did not comply or the bank complied through a local subordinated insurance

Asset risk and liquidity differences are captured by (1) the ratio of loans-to-assets (which, ceteris paribus, indicates higher risk and lower liquidity), (2) the average interest rate on loans (which we view as an indicator of the riskiness of loans), and (3) the ratio of non-performing loans to total loans (another indicator of the riskiness of loans). This way of defining elements of asset risk isolates three perspectives on asset risk: the proportion of risky assets (loans), the ex ante riskiness of loans, and the riskiness of loans based on actual performance.

Bank default risk reflects a combination of asset risk and leverage. The inverse of leverage (the capital ratio) is measured here using book values (the only available measure, since virtually none of the banks has publicly traded stock). For the various measures of asset risk, default risk, and leverage, Table

6 reports data *retrospectively* for various dates – that is, compliance is measured in 1998 and 1999, and data are reported for previous periods for the groups defined by their recent compliance.

The simple comparisons presented in Table 6 indicate that banks that achieved the highest degree of compliance with the rule are relatively strong, as indicated by deposit growth and deposit interest rate differences (the exception is the lack of a difference in deposit growth rates in the pre-tequila period, which predates the subordinated debt regulation by several years). Those differences are also reflected in differences in asset risk, as measured by loan interest rates, non-performing loans, and loan-to-asset ratios. Capital ratios are higher for the banks that comply least with the law, which reflects a combination of their asset weakness (i.e. that risk-based capital standards being enforced) as well as the penalty of a higher capital requirement imposed on banks that fail to comply with the rule.

Despite the fact that not all banks have complied fully with the subordinated debt rule, and that there is substantial room for improving the requirement (i.e. disclosing compliance, and limiting more what qualifies as subordinated debt), we think the rule can be regarded as a partial success for three reasons: First, compliance patterns with the rule demonstrate the usefulness of market discipline. The fact that weak banks find it difficult to issue subordinated debt, but that strong banks find it easy, is encouraging to advocates of the rule who see it as a way to reward banks for gaining the confidence of the marketplace.

Second, banks that fail to comply outright are penalized in ways that reduce the gains that banks might otherwise obtain from failing to comply, and that protect against the dangerous moral-hazard problem of risk taking (so-called “asset substitution”) in distress states. By being forced to increase capital and liquidity, non-complying banks are not encouraged to increase asset risk easily in the face of weakening in their loan quality, which protects the deposit insurer and the taxpayer from the risks of extreme loss attendant to the pursuit of “resurrection” strategies.

Third, the law makes it clear to all parties that supervisors are aware of the failure to comply with subordinated debt, and this has the benefit of enhancing discipline over supervisors. When a weak bank with a long record of failing to comply with the subordinated debt rule fails, supervisors cannot claim to have been unaware of the bank’s weakness, since the market was providing a clear signal of its lack of confidence in the bank. While market yields on debt issues are one form of signal, the failure to issue subordinated debt is arguably an even stronger one, since it indicates that banks would have a very difficult time attracting uninsured long-term debt. The presence of the subordinated debt rule thus eliminates *ex post* “plausible deniability” for supervisors – they cannot claim to have been ignorant about bank weakness if that weakness is known in the marketplace.

Finally, the C in B.A.S.I.C. refers to the Credit Rating requirement. The idea of this requirement is also to improve information regarding financial institutions. While the subordinated debt requirement looks to institutional investors to provide discipline and information, the idea of a credit rating is to ensure that public information is available to less-sophisticated investors. As in the case of the subordinated debt rule, however, this regulatory requirement has not proved to be problem-free.

The Central Bank first required banks to obtain credit ratings and permitted the ratings to be produced by any of a set of authorized agencies, which included local and internationally active agencies (8 in all). However, the perception was that this regime was expensive and that the ratings were of varying quality. In other words, there was a perception that some agencies were giving higher ratings than others. Arguably this reflected the fact that local capital markets are still not highly developed; Argentina currently may lack a set of institutional investors capable of providing incentives for rating agencies to be conservative.

The Central Bank initially responded to the problem of questionable ratings quality by issuing standardized guidelines for rating agencies to follow. This did not appear to solve the problem. Finally, the Central Bank asked banks to have only one rating (reducing the cost of the regime) but also restricted the authorized agencies to only internationally active ones. Currently there are four authorized rating agencies.¹⁰ We show in Table 7 an estimated transition probability matrix of ratings over the history of this regulation. The table illustrates the distribution of current and past ratings, and the probability of obtaining a particular current rating given a particular previous rating. Table 7 shows that most banks enjoy fairly high private ratings. The vast majority of banks rated (89 out of 103) currently enjoy investment grade ratings (BBB or higher), and 45 banks are rated AA or AAA. There have been significant changes in ratings for individual banks in both directions during 1998, three of which placed banks that had been rated BB, BBB, and A into the F category. The evidence of such dramatic, negative changes in ratings suggests that the ratings are a meaningful signal of quality.

¹⁰ These agencies are, in alphabetical order, Duff and Phelps, Fitch-IBCA, Standard and Poor's and Thompson Bankwatch.

**Table 7. Credit Rating Regulation
Transition Matrix**

	Evaluations	AAA	AA	A	BBB	BB	Evaluations in December 98					Total	
							B	CCC, CC, C, D	F	Not Available	Orderly Retirement		Revoked, Suspended
	AAA	23	1								1		25
	AA	2	14										16
Evaluations	A		2	28	2				1	2		1	36
in	BBB			1	13	2			1	1	1	3	22
December 97	BB					5			1	2			8
and	B						3			1			4
March 98	CCC, CC, C, D												0
	F		1									1	2
	Not Available	2							1	4	8		15
	Total	27	18	29	15	7	3	0	4	10	10	5	128

(* In the cases that the entity presented two evaluations, the worse one was considered

Banking System Structure and Performance

There have also been extremely important structural changes in the Argentine financial system since the tequila crisis, which have been facilitated by the policies of permitting free entry and encouraging the privatization of public banks. First, the consolidation process begun in the early 1990s, and accelerated by the tequila crisis, has continued, as shown in Tables 3 and 4. As mentioned above, some of these mergers were assisted through the use of the Fiduciary Fund set up during 1995 with funds from multilateral institutions and some through the use of funds from SEDESA (the deposit insurance agency). Moreover, there was also a strong tendency towards privatization in the banking sector, visible in Table 8. Some 17 of the 24 provincial banks that have been privatized were assisted through a Fiduciary Fund set with the assistance of the multilaterals (see Appendix Table A1).¹¹ Privatizations have occurred via a mixture of types of sales, and have largely been to existing domestic banks or domestic investment groups. Two very large public banks remain in Argentina – Banco Nación, owned by the Federal Government, and Banco de la Provincia de Buenos Aires (the largest Argentine province in terms of GDP) – and efforts to privatize them have met significant political resistance. As of July 1999, these two banks represent some 27% of banking system deposits. Although former President Carlos Menem expressed his desire to privatize Banco Nación in his second term, this was not approved by Congress. The ex-Governor of the Province of Buenos Aires (Mr. Duhalde) and his successor (Mr. Ruckhauf) have not come out in favor of privatizing this important provincial bank at the time of this writing.

Table 8. Bank Privatization in Argentina

	Number of	Assets (¹)		Deposits (¹)	
	Institutions	before	after	before	after
1992 - 1994	3	1,128	321	562	498
1995 - 1996	11	3,093	1,993	1,706	1,316
1997 - 1999	4	1,442	1,078	1,004	793
Total	18	5,663	3,392	3,273	2,606

(¹) Assets and deposits after and before privatization, in millions of pesos .

The other very significant structural change in the banking system has been the entry of foreign capital. During 1996 through 1998, several significant transactions took place which resulted in the purchase of domestic banks by Spain's Banco Santander and Banco Bilbao Vizcaya, the UK's HSBC and Canada's Bank of Nova Scotia (Scotia International) to name a few. Table 9 provides figures on specific transactions. Furthermore, Banco Itau from Brazil entered as a start-up, and subsequently also purchased a local bank. These entrants added to several existing foreign banks, including Citibank and Bank of Boston, ABM Amro and Lloyds. Deposits in

¹¹ There have also been a number of privatizations of municipal banks which we do not report here.

banks with a foreign controlling share now account for some 60% of private sector deposits and some 40% of total deposits. Foreign banks have heightened competition, and this is most visible in their strong advertising campaigns and, in some products, their willingness to wage price wars.¹² Foreign competition has also allowed the introduction of new technology, probably more rapidly than otherwise, and has assisted in creating a much more stable deposit base.

¹² There has also been a tendency among some banks to offer bank accounts combined with lotteries, free computers and other domestic appliances and even airline tickets. These marketing campaigns may of course reflect an immature market rather than reflecting real competition. Still, we note that relative to international standards, banking services in Argentina tend to be expensive, bank administration costs tend to be high, non-performing loans tend to be high and bank profitability is low.

Table 9. Entry of Foreign Capital

	Local bank	Purchasing Institution	Origin	Share purchased
1-Sep-96	Tornquist	O'Higgins - Central Hispano	Chile - Spain	100%
1-Dec-96	Francés del Río de la Plata	Banco Bilbao Vizcaya (BBV)	Spain	30%
1-Apr-97	Liniers Sudamericano	BT LA Holdings LLC.	U.S.A.	51%
1-Jul-97	Trasandino	Abinsa	Chile	51%
1-Jul-97	Crédito de Cuyo	Abinsa	Chile	67%
1-Jul-97	Banco Río de la Plata	Banco Santander de España	Spain	50%
1-Aug-97	Banco Roberts	Hong Kong Shangai Banking Corp.	U.K.	100%
1-Aug-97	Banco de Crédito Argentino	Banco Francés del Río de la Plata (BBV)	Spain	28%
1-Nov-97	Los Tilos	Caja de Ahorros Prov. San Fernando	Spain	40%
1-Dec-97	Finvercon	Norwest - Finvercon	U.S.A.	100%
1-Dec-97	Quilmes	Scotia International	Canada	70%
1-Jan-98	B.I. Creditanstalt	Bank Austria	Austria	49%
1-Jul-98	Compañía Financiera Argentina	AIG Consumer Finance Group	U.S.A.	91%
1-Nov-98	Del Buen Ayre	Banco Itaú	Brazil	100%
1-Jan-99	Bisel	Caisse Nationale De Credit Agricole	France	36%
1-May-99	Entre Ríos	Bisel (Caisse Nationale de Credit Agricole)	France	82%

To a large extent, this entry of foreign capital in the banking sector is simply a reflection of what has happened in the Argentine economy more generally. In fact the puzzle is really why this did not happen earlier given that the sector was liberalized in 1992. As noted before, one hypothesis is that foreign investors were waiting to see that the new policy regime was “fully tested” before making significant investments. It is worth noting that investors in the financial system were unusually late in entering compared to investors in telephones, electricity, gas, water, railways, mining and petrochemicals. That difference in timing suggests that potential bank investors had specific policy concerns that did not affect other sectors. In particular, they may have wished to see proof that the government respected the independence of the Central Bank as a regulator and a monetary agency, and that the government would not appropriate resources from the banking sector during a period of stress – e.g. by freezing deposits as had been done in 1990. According to that interpretation, after the tequila “test”, these investors were more willing to come in.

Despite the dynamism in Argentine banking, bank profitability remains very low by international standards, which is partly a result of regulations that create incentives for banks to limit their risk, and partly reflects the high operating costs of banks in Argentina. Table 10 gives a breakdown of the profitability of the Argentine banking system in the last three years for public banks, private banks and the top 10 private banks. Even in the top 10 private banks, it can be seen that costs remain high (almost 6% of assets), and although service income is relatively high, loan-loss charges are also high (at around 2% of assets this year) reducing profits to less than 1% of assets. Other private banks are less profitable (0.5% of assets) with higher operating costs (6.4% of assets) and public banks show lower interest margin (3.5% of assets as opposed to 4.5% for top 10 private banks). Public bank profitability also remains low at 0.4% of assets.

Table 10. Breakdown of Banks Profitability*Annualized, in percentage of net assets*

	Public Banks			Private Banks			Top Ten Private		
	1997	1998	1999 (¹)	1997	1998	1999 (¹)	1997	1998	1999 (¹)
Interest margin	3.9	3.9	3.5	3.9	4.7	4.6	4.0	4.5	4.5
Service income margin	2.8	2.8	2.5	3.6	3.3	3.1	3.4	3.1	2.9
Gains on securities	0.4	0.6	0.6	1.3	0.8	1.0	1.4	0.6	0.9
Operating costs	-5.5	-5.5	-4.9	-6.8	-6.6	-6.4	-6.3	-6.0	-5.8
Loan-loss charges	-2.8	-1.2	-1.3	-1.9	-1.8	-2.1	-1.8	-1.5	-2.1
Tax charges	-0.3	-0.3	-0.3	-0.5	-0.4	-0.4	-0.5	-0.4	-0.4
Income tax	-0.1	-0.1	-0.1	-0.4	-0.4	-0.4	-0.4	-0.3	-0.5
Other	2.6	0.3	0.4	1.5	1.0	1.2	1.7	1.0	1.2
Total profits	1.1	0.6	0.4	0.8	0.5	0.5	1.5	0.9	0.8

(¹) Up to September 1999.

The combination of low earnings and high recent acquisition prices is interesting. Projecting current levels of profits into the future would appear not to justify the prices paid for recent acquisitions. Thus, in order to explain these prices, one would have to assume a high forecasted growth rate for the financial system. If those growth forecasts do not materialize it is possible that some foreign entrants may reassess their decisions to enter the Argentine market in the years to come (we note in passing the decision of Deutsche Bank to sell its Argentine retail business to Bank of Boston as an example of foreign exit). On the other hand, if high growth rates resume, the foreign acquisitions of the 1990s could prove quite successful.

What are the prospects for further improvement in the structure and performance of the Argentine banking industry, and what are the risks posed to the system from delaying those improvements? The World Bank (1998) report suggests that the problems of the remaining weak private institutions and the remaining public institutions are quite distinct, and that neither is a systemic threat or a cause for urgent concern. The World Bank (1988) suggests that the weaker private institutions – because of their small relative size – pose no threat to the stability of the financial system more generally. The remaining public banks, it was argued, also present no threat to the system (because of their separateness from the private sector) but might well present significant fiscal cost if they were to be privatized today (presumably the authors had in mind a significant clean-up of the public banks' balance sheets).

In the eyes of investors the reforms in the financial system in the late 1990s appear to have produced a very clear positive result. From 1996 to 1998, the financial system grew very strongly with deposits growing at a roughly 30% annualized rate. In the second half of 1998, however, and through 1999, Argentina fell into a recession (due to the combination of external factors (high international lending spreads for emerging economies, sharp falls in commodity prices, a high value of the dollar, and a recession in Brazil) and internal factors (political uncertainty leading up to the October 1999 Presidential election). That recession has taken its toll on the banking system. While deposits have kept growing (at just over 10% for the year), credit to the private sector has grown very little over the last 18 months and interest rates have generally risen, depending on the sub-period analyzed. Non-performing loans have also risen quite significantly, and thus profitability has suffered.

Although the past year has been a very difficult time in some sectors of the real economy, the banking sector has been very stable. Indeed, the fact that credit supply has tightened in the face of a recession and high loan losses is precisely what one would expect from a banking system subject to market discipline. In that sense, tight credit supply is a sign of the financial system's strength (Calomiris and Wilson 1998).¹³ There has been no capital flight from the banking system whatsoever and no capital flight from the country (reserves in fact have risen). Thus, the financial system, which had always been an Achilles' heel for Argentina, recently has contributed to the long-run credibility of fiscal, monetary, and regulatory policy, and thus despite the tightness of credit, has contributed to macroeconomic stability.

¹³ Some observers argue that market discipline is undesirable because it reduces the supply of credit during downturns and thus exacerbates recessions. We see that effect as unavoidable, and attempts to mitigate market discipline with regulatory "forbearance" as counter-productive. When regulators forbear – in order to permit banks to undertake greater risk than the market would permit – some (especially insolvent) banks will abuse forbearance by undertaking enormous risk as part of a resurrection strategy. These bets (e.g. in foreign exchange markets) often have large negative expected returns and produce enormous losses to taxpayers. Indeed, the credit contraction attendant to a banking collapse, and the fiscal costs of financing those bailouts – both of which are apparent in Mexico recently – can produce a much worse cyclical drag on the economy than market discipline on banks. For further discussion of these macroeconomic costs, see Caprio and Klingebiel (1996).

Table 11. Comparison of Two Crises

	Tequila	Oct-97 to Feb-99
Deposits growth	-18%	19%
Reserves growth	-30%	14%
Max. rise in interest rates (1)	12.1	7.9

(1) Percentage points increase.

As Table 11 shows, the reaction by Argentine bank depositors to the recent period of emerging market upheaval (as measured by deposit growth) is strikingly different from the tequila period, despite the fact that the recent upheaval (in Brazil) has had larger fundamental consequences for the Argentine economy than did the collapse of the Mexican peso in 1994-1995. Not only have deposit growth and international reserves growth remained strong, interest rises have not risen by nearly as much as they did during the tequila period.

III. Is Market Discipline Real? Microeconomic Evidence

In this section we take a more formal look at the evidence that market discipline operates on Argentine banks. We define market discipline as reactions of private debt holders to bank actions such that the bank is penalized for increasing the default risk on its debt, either by a higher risk premium on debt, or by the withdrawal of debt.

There is now a large empirical literature summarizing evidence on the existence of market discipline in banking in a variety of contexts. In the U.S., that literature focuses on the usefulness of certificate of deposit yields for predicting bank problems (Baer and Brewer 1986, Berger, Davies, and Flannery 1998, Flannery, 1998, Jagtiani, Kaufman, and Lemieux 1999, Morgan and Stiroh 1999), while in developing countries, the empirical focus is on the predictability of deposit interest rates and the contraction of deposits (Peria and Schmukler 1999). Calomiris and Mason (1997) and Calomiris and Wilson (1998) show that during the interwar period in the United States, weak banks (measured either by their probability of failure or by their implied risk of default on debt from an asset-pricing model) were forced to pay higher interest and suffered larger deposit outflows than other banks.

As we discussed above, several studies of the recent Argentine experience have linked ex ante bank risk with ex ante interest charges and deposit outflows, and ex post bank failure (Schumacher 1997, Dabos and Sosa 1999, Anastasi, Burdisso, Grubisic, and Lencioni 1998, and D'Amato, Grubisic and Powell 1997). Banks with high deposit interest rates and high observable asset risk were more likely to fail during the tequila crisis and afterward, and lost a greater proportion of deposits than other banks. Thus there is already substantial evidence of the operation of market discipline within the Argentine banking system.

Our approach to measuring market discipline focuses on links between observable characteristics of banks (related to asset risk and leverage), on the one hand, and market reactions

to those characteristics as captured in market pricing of deposit risk and contractions in the volume of deposits. A banking system in which market discipline is an important constraining force on bank risk taking should display three characteristics. First, market measures of, and reactions to, deposit default risk should vary across banks. A banking system in which depositors do not distinguish among banks is one in which market discipline is unlikely to exist. Second, differences in deposit interest rates and deposit growth across banks should reflect differences in bank asset risk and leverage which, according to economic theory, should be the sources of deposit default risk.

Third, depositor discipline should constrain default risk on deposits. Recent models of banking that emphasize either the liquidity services of bank deposits (as in Gorton and Pennacchi 1990) or “delegated monitoring” of bank borrowers (as in Calomiris and Kahn 1991) emphasize that depositors do not simply price default risk, but also act to limit it. That is, bank depositors are not only risk-averse, but also “risk-intolerant” (Calomiris and Wilson 1998). As the level of default risk on deposits increases, deposits become less liquid, and the agency problems inherent in delegated monitoring become magnified. Both of these problems lead to a type of quantity rationing where depositors withdraw their deposits from risky banks, which acts as a source of discipline over bank risk taking. These arguments imply that increases in default risk caused by adverse shocks to bank asset risk and capital should be mean-reverting. Banks that suffer those shocks face a strong incentive to reduce asset risk or increase capital to avoid disciplinary withdrawals of funds by depositors.

Our discussion of microeconomic evidence has three parts. First, we begin by summarizing the evidence on the extent of cross-sectional heterogeneity in the banking system, with special attention to the heterogeneity in deposit interest rates and flows (our measures of market discipline) during different sub-periods. Second, we test a model that relates these two market discipline measures to bank leverage and asset risk measures. That is, according to finance theory (e.g. the Black-Scholes model) default risk should be an increasing function both of asset risk and leverage. In light of that theory, we test to see whether our panel data set displays observable links that confirm the presence of market discipline in bank debt markets. Third, if depositors are “risk-intolerant,” then increases in deposit interest rates in response to increased risk should be reversed over time, as banks are forced to reduce asset risk and leverage to meet depositors’ preferences for low risk. As a first step to testing that theory, we provide some simple tests of mean reversion in deposit interest rates.

Market Discipline and Bank Heterogeneity

Tables 12-15 provide summary statistics for our measures of asset risk, default risk, leverage, and deposit growth. These are provided for separate sub-periods, and for different sets of financial institutions. Interest rates on loans and deposits are measured in these tables as premia over the rates of a benchmark, low-interest rate group of foreign retail banks, to facilitate a comparison of spreads across sub-periods. Our measure of deposit interest rates converts interest rates on peso-denominated deposits into dollar equivalent yields using the interest rate parity condition for riskless assets (proxied by Citibank's interest rate spread) to construct dollar-equivalent yields for peso-denominated deposits.

The main usefulness of these tables is to (1) indicate the extent of heterogeneity in the reactions of markets to banks (deposit growth and deposit interest rates), (2) describe the average changes over time in measures of asset risk, leverage, deposit growth, and deposit risk premia, and (3) explore links over time between average bank asset risk and leverage, on the one hand, and average deposit growth and default risk premia on debt, on the other hand. A perusal of these tables clearly indicates the pronounced heterogeneity in deposit interest rates and deposit growth, the variation in average performance over time (reflecting the tumult of the 1990s), and the correspondence among measures of asset risk, leverage, deposit interest rates, and deposit growth. We return to those connections among asset risk, leverage, and market discipline in our regression analysis below.

These tables also provide some evidence on how links among asset risk, leverage, and market discipline differ across types of institutions. For example, to the extent that public banks are protected from the risk of insolvency by their sponsoring governments, depositors in those public banks may not penalize asset risk and leverage as much. If that were true, then public bank weakness would not be as evident in deposit interest rate premia or in lower deposit growth. The tables lend some support for that view. Note, for example, that during the tequila crisis (Table 13), non-performing loan ratios for public banks were very high, but deposit interest rates remained very low.

Table 12. Pre-Tequila Banking System Heterogeneity 1994.2-1994.4

Variables	All Institutions			Private Domestic Retail			Private Domestic Wholesale			Foreign Retail			Foreign Wholesale		
	Avg.	Med.	Std.	Avg.	Med.	Std.	Avg.	Med.	Std.	Avg.	Med.	Std.	Avg.	Med.	Std.
Id - avg.Idf*	2.21	2.39	2.77	2.42	2.52	1.73	1.51	1.57	2.02	-	-	-	3.02	1.4	4.89
Il - avg. Ilf*	5.15	4.38	7.21	4.54	4.6	3.65	2.3	1.21	5.32	-	-	-	0.51	-0.5	6.57
Npl/loans	14.22	9.96	13.74	11.43	9.89	6.71	5.68	4.61	7.95	8.08	8.24	4	11.36	5.92	14.05
Loans/Assets	69.37	72.74	28.69	70.78	72.78	11.08	43.15	42.56	21.19	70.41	72.51	10.29	46.34	49.58	26.47
Capital/Assets	16.98	13.47	12.09	14.06	12.39	6.45	16.65	10.73	21.98	13.43	12.28	4.18	24.97	24.31	13.99
Dep.Growth 1994.2-1994.4	3.69	3.34	17.24	4.18	3.39	9.58	5.29	3.41	20.04	2.46	5.68	16.14	4.15	1.67	40.88
Number Obs.	497			124			44			36			36		

Variables	Provincial Public			National Public			Finance Companies			Cooperative		
	Avg.	Med.	Std.	Avg.	Med.	Std.	Avg.	Med.	Std.	Avg.	Med.	Std.
Id - avg.Idf	0.57	0.41	2.76	0.08	-0.16	0.51	3.22	3.74	2.84	3.5	3.3	2.27
Il - avg. Ilf	4.82	3	10.41	8.28	6.39	8.42	10.28	9.92	9.36	6.54	6.78	3.77
Npl/loans	34.06	29.21	21.27	17.93	13.94	9.58	10.96	9.34	6.99	12.35	10.49	6.49
Loans/Assets	90.33	78.12	54.62	76.33	79.04	12.49	71.63	78.26	20.88	74.31	74.96	7.66
Capital/Assets	13.46	12.37	11.69	11.1	10.35	1.64	23.45	19.73	13.57	17.08	15.09	7.93
Dep.Growth 1994.2-1994.4	2.08	0.96	10.36	-0.11	0.53	5.46	3.3	3.06	23.25	4.53	4.37	7.1
Number Obs.	75			9			70			103		

* Id is deposit interest rate. Idf is deposit interest rate for foreign retail banks. Il is loan interest rate. Ilf is loan interest rate for foreign retail banks. Interest rates are expressed in dollar-equivalent units.

Table 13 - Tequila Crisis Banking System Heterogeneity - 1995.1-1995.4 period

Variables	All Institutions			Private Domestic Retail			Private Domestic Wholesale			Foreign Retail			Foreign Wholesale		
	Avg.	Med.	Std.	Avg.	Med.	Std.	Avg.	Med.	Std.	Avg.	Med.	Std.	Avg.	Med.	Std.
Id - avg.Idf*	2.8	2	6.38	3.91	3.01	6.26	2.88	2.4	5.04	-	-	-	2.78	-0.35	12.29
Il - avg. Ilf*	3.9	2.6	7.69	3.77	3.14	4.27	4.23	2.5	7.03	-	-	-	1.7	-0.54	9.34
Npl/loans	20.61	16.18	17.75	18.95	16.58	13.58	11.21	7.04	11.33	9.41	8.84	4.57	9.05	2.86	1.34
Loans/Assets	69.21	73	30.95	71.7	74.84	15.24	47.48	46.88	24.98	71.15	71.8	8.33	43.84	40.78	27.04
Capital/Assets	18.54	14.78	17.12	16.03	13.47	9.61	24.95	19.42	18.54	13.71	12.31	4.8	27.59	22.86	18
Number Obs.	536			152			61			47			58		
Dep.Growth 1994.4-1995.4	-2.25	0.34	26.65	-1.46	1.07	21.11	-3.8	-2.2	38.71	2.24	4.48	15.66	5.25	4.97	44.39
Number Obs.	593			160			70			56			65		

Variables	Provincial Public			National Public			Finance Companies			Cooperative		
	Avg.	Med.	Std.	Avg.	Med.	Std.	Avg.	Med.	Std.	Avg.	Med.	Std.
Id - avg.Idf	0.02	-0.32	3.85	-0.08	-0.05	2.57	5.88	4.78	6.76	4.02	3.64	3
Il - avg. Ilf	3.48	0.5	13.7	3.65	2.52	6.39	6.43	6.31	6.3	5.07	5.46	3.89
Npl/loans	43.63	40.37	22.62	23.37	17.96	9.16	22.01	18.17	12.05	19.27	17.87	8.93
Loans/Assets	89.86	83.48	54.5	73.18	74.71	9.75	69.16	75.57	24.83	76.75	77.51	8.42
Capital/Assets	9.66	10.49	24.51	17.89	9.67	23.27	25.5	22.8	18.69	20.14	18.65	9.6
Number Obs.	84			18			53			63		
Dep.Growth 1994.4-1995.4	-4.1	-2.58	13.07	0.1	1.99	8.15	-12.96	-7.4	30.4	-1.52	0.07	18.7
Number Obs.	108			17			61			56		

* Id is deposit interest rate. Idf is deposit interest rate for foreign retail banks. Il is loan interest rate. Ilf is loan interest rate for foreign retail banks. Interest rates are expressed in dollar-equivalent units.

Table 14 - Immediate Post-Tequila Banking System Heterogeneity 1996.1-1997.2

Variables	All Institutions			Private Domestic Retail			Private Domestic Wholesale			Foreign Retail			Foreign Wholesale		
	Avg.	Med.	Std.	Avg.	Med.	Std.	Avg.	Med.	Std.	Avg.	Med.	Std.	Avg.	Med.	Std.
Id - avg.Idf*	1.82	1.65	5.13	1.92	1.98	4.04	2.76	2.58	2.84	-	-	-	0.79	0.86	6.73
Il - avg. Ilf*	4.67	3.29	7.09	4.87	3.51	7.25	4.73	3.41	6.78	-	-	-	2.52	0.49	7.76
Npl/loans	20.54	16.57	17.43	22.15	18.53	16.25	16.33	11.38	16.62	10.24	9.71	6.45	11.51	5.28	14.74
Loans/Assets	60.10	62.55	20.73	59.74	60.82	18.04	55.61	59.23	18.25	58.22	62.77	16.66	44.10	41.73	26.27
Capital/Assets	17.11	12.89	15.41	12.54	11.43	11.64	18.35	15.06	13.57	12.42	11.47	4.56	28.26	18.96	20.71
Number Obs.	649			181			52			115			72		
Dep.Growth 1995.4-1997.2	7.05	5.94	22.62	6.75	6.40	16.44	11.95	8.51	24.47	7.51	6.02	9.97	9.73	6.06	36.45
Number Obs.	854			286			89			77			100		

Variables	Provincial Public			National Public			Finance Companies			Cooperative		
	Avg.	Med.	Std.	Avg.	Med.	Std.	Avg.	Med.	Std.	Avg.	Med.	Std.
Id - avg.Idf	0.28	0.84	5.17	0.03	0.04	0.54	4.04	4.60	7.92	2.66	2.74	1.56
Il - avg. Ilf	3.21	1.39	8.36	5.95	7.41	3.93	8.60	8.06	7.53	6.34	6.39	3.01
Npl/loans	45.13	44.55	22.58	20.10	20.11	2.31	19.80	15.73	11.25	22.48	21.50	8.86
Loans/Assets	69.79	62.83	27.06	63.11	62.69	6.35	68.22	69.00	18.25	62.21	63.18	6.99
Capital/Assets	11.87	8.77	20.25	9.22	7.97	2.78	26.47	20.73	16.43	17.91	14.63	9.15
Number Obs.	72			16			103			38		
Dep.Growth 1995.4-1997.2	2.48	4.06	28.69	4.68	3.44	10.34	5.74	6.02	23.33	8.57	7.51	8.86
Number Obs.	114			23			116			49		

* Id is deposit interest rate. Idf is deposit interest rate for foreign retail banks. Il is loan interest rate. Ilf is loan interest rate for foreign retail banks. Interest rates are expressed in dollar-equivalent units.

Table 15 - Post-Asian Crisis Banking System Heterogeneity 1997.3-1999.1

Variables	All Institutions			Private Domestic Retail			Private Domestic Wholesale			Foreign Retail			Foreign Wholesale		
	Avg.	Med.	Std.	Avg.	Med.	Std.	Avg.	Med.	Std.	Avg.	Med.	Std.	Avg.	Med.	Std.
Id - avg.Idf*	1.47	0.97	3.48	1.14	1.08	2.01	2.18	1.98	2.00	-	-	-	1.55	-0.05	6.41
Il - avg. Ilf*	4.09	2.26	7.02	4.77	3.44	6.44	2.70	1.90	5.99	-	-	-	1.33	0.01	5.36
Npl/loans	17.5	13.85	15.48	9.00	14.31	10.20	19.39	9.57	10.26	9.69	8.68	6.76	7.99	3.54	12.24
Loans/Assets	55.53	58.11	21.17	54.25	57.44	14.80	61.33	60.54	14.73	51.89	54.85	15.42	36.47	29.32	26.77
Capital/Assets	16.86	12.10	13.84	12.98	11.23	7.16	18.27	17.64	7.14	11.14	10.16	4.67	25.27	12.74	24.27
Number Obs.	811			227			61			161			94		
Dep.Growth 1997.3-1999.1	2.46	1.82	17.73	1.78	1.10	12.45	0.16	-0.71	19.36	4.68	4.15	12.35	4.75	3.90	30.16
Number Obs.	772			201			59			159			90		

Variables	Provincial Public			National Public			Finance Companies			Cooperative		
	Avg.	Med.	Std.	Avg.	Med.	Std.	Avg.	Med.	Std.	Avg.	Med.	Std.
Id - avg.Idf	0.77	0.72	2.65	-0.94	-0.39	1.22	3.65	3.35	4.63	1.71	1.81	1.61
Il - avg. Ilf	2.29	1.45	6.56	5.68	0.55	9.64	8.2	7.64	9.19	3.39	3.67	3.45
Npl/loans	41.97	43.38	21.42	21.45	21.18	2.88	20.47	16.96	12.83	23.64	23.04	8.11
Loans/Assets	55.24	55.34	17.89	58.87	59.29	10.55	71.15	67.05	17.79	59.11	61.12	5.35
Capital/Assets	10.34	9.49	11.38	8.00	7.98	1.51	26.62	23.92	14.40	18.15	14.35	8.4
Number Obs.	68			21			140			39		
Dep.Growth 1997.3-1999.1	0.69	1.12	10.50	3.74	3.64	4.48	1.42	0.70	22.44	1.02	2.45	7.75
Number Obs.	68			21			146			28		

* Id is deposit interest rate. Idf is deposit interest rate for foreign retail banks. Il is loan interest rate. Ilf is loan interest rate for foreign retail banks. Interest rates are expressed in dollar-equivalent units.

Fundamental Determinants of Market Assessments of Bank Liability Risk

Next, we turn to a regression analysis of market discipline as a reaction to deposit risk, as measured either by the interest rate on deposits or by the outflow of deposits. The basic model regresses either of these two dependent variables on our three measures of asset risk (loans/other assets, non-performing loans/loans, and the loan interest rate), a measure of the liquidity of non-loan assets (cash/government bonds), and the (book) capital ratio. We used lagged capital ratios to avoid correlation by construction between deposit growth and the capital ratio. Other independent variables are taken as exogenous within the quarter in which deposit growth or deposit interest rates are set.

We report a variety of regression specifications, including OLS, fixed firm and time effects, and random effects. We ran the regressions for different time periods and for different samples (sometimes including all banks, sometimes confining the sample to private commercial banks). Our results were generally robust to alternative specifications, although results were stronger when we restricted our sample to private commercial banks. The restrictions imposed by random effects (the orthogonality of regressors with firm and time effects) passed Hausman's test in some cases, and in those cases, random-effects estimation is more efficient. In Tables 16 and 17 we report a subset of our results for the deposit growth and deposit interest rate regressions. Specifically, we report OLS, fixed effects, and random effects specifications for the "restricted sample" of private commercial banks, for the entire period.

Table 16

Panel Regression Analysis of Bank Deposit Growth Rates
Sample Restricted to Private Commercial Banks
Quarterly Observations, 1993:3-1999:1
(Standard Errors in Parentheses)

<u>Variables</u>	OLS	Fixed Firm/Time Effects	Random Effects
	(1)	(2)	(3)
Constant	0.018 (0.019)	0.018 (0.031)	0.042 (0.027)
Lagged Capital Ratio	0.296 (0.064)	0.326 (0.087)	0.277 (0.074)
Loan Interest Rate	-0.418 (0.106)	-0.190 (0.153)	-0.254 (0.121)
Loans/Other Assets	-0.0047 (0.0006)	-0.0028 (0.0008)	-0.0032 (0.0007)
Cash/Government Bonds	0.0000 (0.0002)	0.0000 (0.0002)	-0.0000 (0.0002)
Non-Performing Loans/ Loans	-0.059 (0.051)	0.025 (0.079)	-0.060 (0.060)
Adjusted R-Squared	0.082	0.325	
P-Value for Hausman Test			0.309*
Number of Observations	1,138	1,138	1,138

* The restrictions of the random-effects model are not rejected, implying that the random-effects estimator is preferred.

Table 17

**Panel Regression Analysis of Bank Deposit Interest Rates
Sample Restricted to Private Commercial Banks
Quarterly Observations, 1993:3-1999:1**
(Standard Errors in Parentheses)

	OLS	Fixed	Random
		Firm/Time	Effects
		Effects	
	(1)	(2)	(3)
<u>Variables</u>			
Constant	0.036 (0.002)	0.060 (0.003)	0.058 (0.004)
Lagged Capital Ratio	0.035 (0.008)	0.009 (0.009)	0.019 (0.008)
Loan Interest Rate	0.142 (0.013)	0.086 (0.015)	0.101 (0.014)
Loans/Other Assets	0.00085 (0.00007)	0.00034 (0.00008)	0.00046 (0.00007)
Cash/Government Bonds	-0.00002 (0.00003)	0.00000 (0.00002)	-0.00000 (0.00002)
Non-Performing Loans/ Loans	0.038 (0.006)	-0.0205 (0.0079)	-0.007 (0.007)
Adjusted R-Squared	0.269	0.638	
P-Value for Hausman Test			0.000*
Number of Observations	1,138	1,138	1,138

* The restrictions of the random-effects model are rejected, implying that the fixed-effects estimator is preferred.

Both deposit growth and deposit interest rates reflect fundamental cross-sectional differences in our measures of asset risk. Higher asset risk and leverage are associated with depositor discipline in the form of greater deposit withdrawals, and high asset risk also is reflected in higher interest rates on deposits.

Not all the measures of asset risk have the predicted impacts on interest rates and deposit growth in the regressions. The loan interest rate and loan ratio enter significantly and with the right sign in all regressions, while non-performing loans and the ratio of cash to government bonds are either insignificant, or (in the case of the non-performing loans) switch signs across specifications.

Interestingly, the effect of the capital ratio is of the expected sign for deposit growth (positive), but contrary to our expectation, is also positive (sometimes insignificantly) for the deposit interest rate. One way to explain the differences in the capital ratio effect between Tables 16 and 17 is to recall that capital ratios are an endogenous variable chosen by the bank. Even though the capital ratio is lagged (to mitigate the endogeneity problem) it is possible that banks anticipate interest rate changes in their deposits one quarter ahead and alter capital ratios to compensate for anticipated increases in default risk.

Does Market Discipline Encourage Prudent Risk Management?

The regressions reported in Tables 16 and 17 do not describe the dynamic responses of banks' to market discipline. For example, the regressions do not examine whether increases in default risk on debt produce reductions in loan-to-asset ratios, or loan risk, or increases in the ratio of cash to bonds. To accomplish this result, one would have to specify a dynamic system of equations (possibly, a panel VAR model), which requires strong assumptions about the relative endogeneity, and the adjustment frequencies, of our various measures of asset risk, deposit risk, deposit growth, and capital accumulation. We have already argued that this is treacherous ground; for example, our initial assumption about the exogeneity of capital ratios to interest rate changes is suspect (especially given our findings of a positive partial correlation between deposit interest rates and capital ratios in Table 17).

While we think a panel VAR approach to this problem may be promising in future research, here we pursue a simpler approach. We examine whether there is a tendency for individual banks' deposit interest rates to revert to their mean, and whether the speed of mean reversion has changed over time. If depositor discipline forces banks to react to increases in their debt default risk, then high levels of default risk should prompt reductions in interest rates in the future. We test that proposition using a simple model of the time series properties of individual banks' interest rates, and we report our results in Table 18.

Table 18

Fixed-Effects Regressions*
Deposit Interest Rate Mean Reversion
Dependent Variable: Change in Deposit Interest Rate
All Financial Institutions
Quarterly Observations, 1993:3-1999:1
(Standard Errors in Parentheses)

	(1)	(2)	(3)	(4)
	1993:3-1994:4	1995:1-1996:2	1996:3-1997:4	1997:4-1999:1
$r_{i,t-1}$	-1.04 (0.04)	-1.06 (0.04)	-1.04 (0.03)	-1.29 (0.04)
Adjusted R-Squared	0.475	0.450	0.545	0.577
Number of Observations	989	791	762	688

* All regressions include fixed firm and time effects, which are not reported here.
 $r_{i,t-1}$ is defined as the lagged deposit interest rate for each bank.

The “fixed-effects” approach to examining mean reversion holds firm and time effects constant and constrains all banks to react similarly to a change in their deposit interest rate. Alternatively, we also estimated the relationship using a “random-coefficients” approach, which takes advantage of the opportunity to see whether banks differ in the extent to which their deposit interest rates revert to the mean. As the results for these two models were quite similar, we only report the “fixed effects” results in Table 18.

As we discussed at length above, regulatory and supervisory monitoring and discipline has improved markedly in Argentina over the period 1992-1999. In Table 18, we investigate whether the speed of mean reversion has increased over time. Specifically, we report results for several sub-periods (1993 Q3 to 1994 Q4, 1995 Q1 to 1996 Q2, 1996 Q3 to 1997 Q4, and 1997 Q4 to 1999 Q1).

The regression we run for each sub-period is:

$$\Delta r_{it} = c + \alpha r_{it-1} + b_i + f_t + \varepsilon_{it} .$$

Δr is the change in the liability interest rate, b and f are fixed firm and time effects, and ε is an error term. The i and t subscripts refer to individual banks and time. α , which we expect to be negative, measures the speed at which the interest rate “mean reverts.” If interest rates revert by 100% in just one quarter then we expect the α coefficient to be -1 whereas if there is no reversion at all, then we expect the α coefficient to be zero. We then compare the distribution of the α coefficients (across banks) for the sub-periods.¹⁴

We find that mean reversion is rapid. Within-firm mean reversion occurs within one quarter (α is -1 or smaller) in all sub-periods. The most recent period, which has witnessed the implementation of the B.A.S.I.C. plan, shows a significantly higher rate of mean reversion (a coefficient value of -1.29), which is consistent with the view that banks face stronger incentives to resolve problems of high default risk in the more recent period. It is difficult to interpret a coefficient size less than -1 (which seems to imply greater than mean reversion of interest rates). In specifications without fixed time effects, coefficient sizes tended to be smaller (typically in the range of -0.6 to -0.8). Thus we suspect that correlation between average time effects and individual banks’ sensitivities to aggregate shocks may explain the apparent over-adjustment of rates.

To summarize our empirical results, we find significant cross-sectional differences in market reactions to bank default risk (as measured by deposit interest rates and deposit growth), and our regressions indicate links between those measures and fundamental characteristics of banks related to asset risk and leverage. Furthermore, deposit interest rates mean revert very quickly (holding fixed effects and time effects constant), and the rate of mean reversion has increased during the period in which the B.A.S.I.C. framework was implemented. Overall, these results suggest that market discipline is present in measuring bank risk, punishing it, and successfully encouraging banks to pursue risk-management policies that reduce risk after they suffer risk-increasing shocks.

¹⁴ We also ran regressions excluding fixed firm effects, which constrains all firms to target the same long-run average level of interest rates. Fixed effects have a great deal of explanatory power (raising the adjusted R-squared substantially in all sub-periods), and so we only report fixed-effects results in Table 18. In specifications without fixed effects, coefficients on the lagged interest rate were smaller, but the same pattern of increasing coefficient size over time appeared, and was even large in magnitude than the differences reported in Table 18.

IV. Conclusion

In this chapter, we reviewed the Argentine experience in the 1990s with bank regulatory reform, which has been one of the most determined efforts, among emerging market countries, to inject credible market discipline into the relationship between banks and depositors, and into the regulatory and supervisory process. We have argued that Argentina successfully implemented a system of bank regulation that achieved credible market discipline over banks. Markets, as well as regulators, punish or reward banks depending on the perceived risk of bank failure, and market perceptions of risk (as indicated in deposit interest rates and deposit flows) are correlated both with ex ante measures of fundamental asset risk and with ex post incidence of bank failure. Market discipline encourages rapid, risk-reducing adjustments by banks to shocks that raise their risk of failure.

Despite these favorable findings, clearly there is room for improvement in Argentina's bank regulation regime. First, the privatization of public banks remains unfinished, most notably in the cases of the two largest public banks, which account for more than a quarter of banking system deposits. Second, the least-cost resolution mandate that has been given SEDESA thus far has not proved very costly, but it could become a slippery slope – a means to pay for implicit bank bailouts, and thus undermine the hard-won gains of market confidence and market discipline. Limits to the subsidization of acquisitions that prevent least-cost resolution from becoming an implicit bailout mechanism are, therefore, a potentially important area for reform. Finally, the subordinated debt law also could be improved. Disclosing banks' compliance with the law seems a desirable first step. Placing greater limits on what qualifies as compliance (in particular, excluding domestic interbank deposits from the definition of qualifying subordinated debt and ensuring that subordinated debt is held at arms length) and limiting the yield of qualifying subordinated debt are two additional steps the government should consider.

Does the Argentine regulatory system provide a model that other countries should adopt? We think the capital requirements, liquidity requirements, and B.A.S.I.C. system offer an excellent set of blueprints for any country to consider if is serious about fostering market discipline in banking. At the same time, experience in developing and developed economies alike has shown that a regulatory system is only as effective as the political will that underlies its enforcement. In many countries – notably Chile in 1982, the United States in 1984, and Venezuela in 1991 – de facto deposit insurance was provided despite its de jure absence.

During the tequila crisis of 1995 in Argentina (as during the liberalization of Estonia's banks in 1991) the government chose to force insolvent banks to close and permitted depositors in insolvent banks to lose a significant proportion of their deposits. The political commitment to low inflation and to reform of the banking system in Argentina in the wake of the inflation and banking disasters of the earlier era set constraints on government policy toward banks in the 1990s, limiting the possibility of large bailout expenditures or other interventions into the banking system. The ability to apply the Argentine approach successfully to other countries likely depends on the existence of a similar political will backing real reform and limiting bailouts. Thus the challenges for reformers in emerging market countries include not only the technical problem of how to design an effective regulatory system, but the more difficult problem of how to create the political conditions that make such a system credible.

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Appendix

Bank	Date in wich law was enacted	Date of Loan agreement	Date of bid	Date of first disbursement	Date of transference	Percentage of capital privatized	Total Loan in millions
Corrientes *	11/91	-	NA	-	5/93	60%	NA
La Rioja *	NA	-	NA	-	7/94	70%	NA
Chaco **	5/93	8/95	7/94	11/95	11/94	60%	78
Entre Ríos **	8/93	8/95	8/94	10/95	1/95	60%	78
Formosa	2/95	4/95	3/95	7/95	12/95	60%	80
Misiones	11/94	4/95	11/94	7/95	1/96	92.5% ***	78
Río Negro	3/95	4/95	8/95	7/95	3/96	85%	80
Salta	7/94	4/95	8/95	7/95	3/96	70%	50
Tucumán	3/95	6/95	7/95	7/95	7/96	75%	80
San Luis	12/89	4/95	4/96	10/95	8/96	100%	50
Santiago del Estero	1/95	4/95	3/96	7/95	9/96	95%	50
San Juan	7/95	4/95	11/95	8/95	11/96	75%	80
Previsión Social de Mendoza	3/95	4/95	11/95	5/95	11/96	90%	100
Mendoza	3/95	4/95	11/95	5/95	11/96	90%	160
Jujuy	6/95	6/95	8/97	12/95	1/98	80%	50
Santa Fe	7/96	12/96	9/97	5/97	6/98	100%	160
Santa Cruz	10/95	3/98	3/98	4/98	10/98	56%	80
Municipal de Tucumán	12/93	12/96	2/97	6/97	7/98	100%	25
Catamarca	NA	9/98	-	4/98	-	70%	50
Caja Nacional de Ahorro y Seguro *	NA	-	NA	-	5/96	100%	NA

Source: Subsecretaría de Programación Regional – Trust Fund for Provincial Development

Note: The Banco Municipal de Paraná was assisted by the TFPD by an amount of 20 million dollars for closure.

* Privatizations not supported by the TFPD.

** The Banco del Chaco and the Banco de Entre Ríos were privatized previous TFPD creation.

*** Corresponds to the privatization of 100% of the bank's capital, since the rest was in private hands.