



IMF Working Paper

Banks During the Argentine Crisis: Were They All Hurt Equally? Did They All Behave Equally?

*Adolfo Barajas, Emiliano Basco,
V. Hugo Juan-Ramón, and
Carlos Quarracino*

IMF Working Paper

IMF Institute

Banks During the Argentine Crisis: Were They All Hurt Equally? Did They All Behave Equally?

Prepared by Adolfo Barajas, Emiliano Basco, V. Hugo Juan-Ramón, and Carlos Quarracino¹

Authorized for distribution by Enzo Croce

February 2006

Abstract

This Working Paper should not be reported as representing the views of the IMF.

The views expressed in this Working Paper are those of the author(s) and do not necessarily represent those of the IMF or IMF policy. Working Papers describe research in progress by the author(s) and are published to elicit comments and to further debate.

The simple answer to both questions in the title of this paper is: No. We concentrate on the three main risk elements that contributed to the banking system's difficulties during the crisis: increasing dollarization of the balance sheet, expanding exposure to the government, and, eventually, the run on deposits. We find that there was substantial cross-bank variation in these elements—that is, not all banks were hurt equally by macroeconomic shocks. Furthermore, using panel data estimation for the 1998–2001 period, we find that depositors were able to distinguish high- from low-risk banks, and that individual banks' exposure to currency and government default risk depended on bank fundamentals and other characteristics. Thus, not all banks behaved equally in the run-up to the crisis. Finally, our results have implications for the existence of market discipline in periods of stress and for banking regulation, which may have led banks to underestimate some of the risks they incurred.

JEL Classification Numbers: F30, F41, G14, G21.

Keywords: Argentina, banking, crisis, market discipline

Author(s) E-Mail Address: abarajas@imf.org; ebasco@bcra.gov.ar; vjuanramon@imf.org; cquarr@mecon.gov.ar

¹ Mr. Basco and Mr. Quarracino are at the Central Bank and Ministry of Finance of Argentina, respectively. The paper's views do not necessarily represent those of these institutions or (as noted in the box on this page) of the IMF. We thank Eduardo Levy-Yeyati, Miguel Messmacher, Hemant Shah, Rodolfo Luzio, Ernesto Ramírez, and IMF Institute seminar participants for their helpful comments, and to Takayuki Tsuruga and Wolfgang Harten for outstanding research assistance.

Contents	Page
I. Introduction	3
II. Overview of the Argentine Banks in the Run-Up to the Crisis.....	5
III. Descriptive Look at Argentine Banks in the 1995–2001 Period	8
A. Foreign Currency Exposures—Increasing Dollarization.....	8
B. Banking System Financing of the Government	9
C. The Deposit Run.....	10
D. Cross-Bank Variability	10
IV. Econometric Analysis.....	11
A. Foreign Currency Operations.....	13
B. Government Financing.....	15
C. Deposit Growth	16
D. Robustness Checks.....	18
V. Conclusions.....	20
Figures	
1. Foreign Currency Liabilities as a Percentage of Total Liabilities.....	38
2. Foreign Currency Assets as a Percentage of Total Assets.....	38
3. Foreign Currency Position as a Percentage of Assets of the Total Banking System	39
4. Bank Financing to the Government as a Percentage of Assets of the Total Banking System	39
5. Percentage of Bank Financing to the Government Denominated in Foreign Currency	40
Tables	
1. Foreign Currency Positions of Argentine Banks	26
2. Bank Financing of the Government in Argentina	27
3. Intermediation Activity in Argentina	28
4. Deposit Growth in Argentina	28
5. Cross-Bank Variability in Risk Elements in 2001	29
6. Foreign Currency Operations by Argentine Banks	30
7. Government Financing by Argentine Banks	31
8. Deposit Growth in Argentina: Explanatory Role of Bank Fundamentals	32
9. Deposit Growth in Argentina	33
10. Deposit Growth in Argentina: Restricting the Sample	34
11. Deposit Growth in Argentina: Interactions with Macroeconomic Variables.....	35
12. The Argentine Deposit Run	36
13. Government Financing by Argentine Banks.....	37
References.....	24

I. INTRODUCTION

The literature on the Argentine crisis of 2001 has stressed the macroeconomic disequilibria that arose in the 1990s, continued unchecked for several years, and ultimately led to the abandonment of the currency board and declaration of default by the government in early 2002. Studies have pointed out the fiscal factors, showing that large increases in government spending throughout the 1990s were partly to blame, as deficits persisted and even widened during years of vigorous economic growth,² thus leading to a rapid buildup of public debt, from 29 to 41 percent of GDP in the five years ending in 1998 (see Perry and Servén, 2002; Mussa, 2002; Independent Evaluation Office, 2004).

Exchange rate issues have also been addressed extensively, with studies highlighting the difficulties of establishing a sustainable hard peg to the dollar in an economy with a relatively small tradable sector and even smaller trade relations with the United States.³ Furthermore, the argument has been made that, with somewhat limited domestic price flexibility, the currency board arrangement made the economy particularly vulnerable to serious output contractions in the event of real exchange rate overvaluations. In particular, Argentina would tend to be vulnerable to sudden stops in international capital inflows, requiring much greater adjustments in domestic demand to bring about the current account adjustments necessary to restore external equilibrium (Calvo, Izquierdo, and Talvi, 2003). Finally, fiscal and exchange rate vulnerabilities were compounded when, because of a history of instability and macroeconomic mismanagement, the government had denominated most of its debt in foreign currency. A dollarized debt coupled with an overvalued currency⁴ implied that the true size of the debt was much greater than it appeared, as was the risk of default.

The banking sector was seen to play a part in the crisis as well. Several studies have shown how the macroeconomic imbalances impacted the banking system in the years prior to the

² During 1991–97, Argentina was one of the fastest-growing economies in Latin America, with an average growth rate of 6.7 percent.

³ Argentina is less open than most Latin American countries; during 1990–95 total trade represented 16 percent of GDP, compared to 37 percent in Mexico and 46 percent in Chile. Moreover, as pointed out by the Independent Evaluation Office of the IMF (2004), the differences in Argentina's degree of openness in relation to other hard peg economies are even more pronounced; for a sample of eight hard peg economies throughout the world, total trade averaged 96 percent of GDP.

⁴ Analysts as well as the government agreed that the exchange rate was overvalued, although there was no consensus on the degree of overvaluation. As the study by the Independent Evaluation Office (2004) reports, by spring of 2000 overvaluation was estimated at 7 percent by Goldman Sachs, 13 percent by JP Morgan, and 17 percent by Deutsche Bank. Ex post, Perry and Servén (2002) estimated the Argentine peso to be overvalued by 55 percent by 2001.

crisis, increasing its vulnerability to devaluation and its exposure to government default risk.⁵ Eventually, the banking system also suffered a deposit run, which led the government to impose measures that severely curtailed the convertibility of bank deposits. To make matters worse, in early 2002 the government introduced asymmetric “pesoization” of dollar-denominated items on banks’ balance sheets, which converted their liabilities at a higher exchange rate than that for assets. The end result was a banking crisis that has extended into subsequent years and left financial intermediation greatly hampered. As it is widely recognized that recovery in banking is crucial for Argentina’s overall recovery, a better understanding of the factors that led to this situation is key, particularly to help prevent this type of situation from arising in the future.

Our study focuses on three main risk elements underlying the Argentine banking crisis: the buildup of foreign currency assets and liabilities, the accumulation of government debt, and the run on deposits. We will show that, while all three exhibited large increases during the run-up to the crisis and played a key role in the banking system’s difficulties, these increases did not affect all banks equally, and substantial cross-bank variability can be observed. Therefore, we set out to determine to what extent bank-specific characteristics can explain why some banks increased their exposures or suffered deposit withdrawals to a larger extent than others. Specifically, we test the extent to which both fundamental and nonfundamental bank characteristics add explanatory power above and beyond that of the systemic or macroeconomic variables.

Our results will have implications for the analysis of banking sector health in emerging markets, and for regulation as well. Given that traditional bank fundamentals or indicators tended to give an overly optimistic portrait of the Argentine banking system up to 2000, it would be tempting to discard these as irrelevant or misleading once the economy was hit with a large systemic shock. However, it still may be the case that these indicators could contain relevant information at the micro level, helping to predict which types of banks would be more likely to increase their exposure to systemic risk or suffer from sizable deposit withdrawals. Moreover, certain bank fundamentals may be viewed not only as predictors of a bank’s ability to withstand exogenous shocks, but also as indicative of the quality of management and the extent of risk-taking. For example, bank capitalization serves not only as a buffer against future shocks to profitability, but should also provide incentives for prudent behavior towards risk.⁶ Thus, if banks were well-regulated and -supervised prior to the crisis, it should be the case that the relatively well-capitalized and -managed banks would also be the ones less likely to increase their foreign currency operations and holdings of government bonds, precisely at a time when currency and country risks were increasing.

⁵ In particular, De la Torre, Levy-Yeyati, and Schmukler (2003), Levy-Yeyati, Martínez Pería, and Schmukler (2004), and della Paolera and Taylor (2003).

⁶ There is an extensive literature linking bank capital to a more prudent behavior toward risk in general.

In our analysis of the deposit run, we will draw on the approach used in two recent studies of market discipline in Argentina and will test for the relevance of other bank characteristics and different lags in bank fundamentals in explaining deposit growth. For the other two risk elements, our study is the first to examine them in a systematic way, testing for their micro and macro determinants. The rest of the paper is organized as follows: Section II provides some background, briefly describing the major changes that the Argentine banking system undertook in the years leading up to the crisis; Section III looks more closely at the stylized facts surrounding the three risk elements; Section IV shows the econometric results; and finally Section IV concludes.

II. OVERVIEW OF THE ARGENTINE BANKS IN THE RUN-UP TO THE CRISIS

As described above, the Argentine banking system was affected by the main macroeconomic imbalances: increasing fiscal gaps and public debt and the related fragility of the exchange rate regime. Regarding the latter, as fears of unsustainability of the currency board grew, depositors reacted by transferring a progressively larger portion of their funds into foreign-currency-denominated accounts, thus contributing to a growing dollarization of the banking system. Banks, on their part, were faced with a dilemma: whether to allow the mounting dollarization on the liability side to occur, thus increasing the vulnerability of their balance sheets to a devaluation, or whether to offset this position by increasing loans (to domestic borrowers) in foreign currency. The second alternative, while arresting the direct currency mismatch, implied an increase in credit risk to the extent that borrowers were not perfectly hedged against currency depreciations.⁷ Eventually, the move toward dollar-denominated deposits evolved into a full-fledged run affecting all types of deposits, which culminated in a three-day period in November 2001, during which 6 percent of the banking system's deposits were withdrawn. This led the authorities to impose extreme measures, such as the well-known "corralito," greatly restricting the convertibility of deposits.

Banks were also adversely affected by the deteriorating fiscal situation. As the government's financing needs rose and its ability to tap the international capital markets declined, it had to rely increasingly on domestic sources of finance, with banks playing a particularly key role. This rise in bank financing of the public sector in turn resulted in greater exposure of the banking system to the risk of government default.

The result was that by the end of 2001, the banking sector was in crisis as well. The deposit outflow had led to the suspension of convertibility of a large portion of bank deposits, and the government default in December 2001 left banks with a significant loss in the value of their assets. In addition, in February 2002, the government introduced an asymmetric pesoization of bank balance sheets, converting dollar-denominated deposits at an exchange rate of 1.4 and dollar-denominated loans at par, while the market exchange rate hovered

⁷ See de la Torre, Levy-Yeyati, and Schmukler (2003) and Levy-Yeyati, Martínez Pería, and Schmukler (2004).

around 1.8, all with negative effects on banks' net worth.⁸ This was compounded by an asymmetric indexation scheme whereby banks were allowed to adjust the nominal value of pesoized deposits and loans. The scheme called for using the consumer price index (CPI) to adjust deposits and a salary index to adjust loans. To the extent that the CPI grew faster than the salary index, a further deterioration of banks' net worth ensued.

Although the government subsequently introduced measures to compensate banks for asymmetric pesoization and provided liquidity support equaling 2 percent of GDP,⁹ and some deposits subsequently returned to the system, bank profitability and intermediation activities have remained weak since. Based on the International Financial Statistics figures for the Banking Survey (comprising all banking institutions), deposits began to register positive growth in annual terms in September 2002. By end-2002, deposits were growing at an annual rate of 19 percent, and by 26 percent at end-2003. Credit to the private sector, on the other hand, has been much slower to recover, only achieving positive year-on-year growth by July of 2004. As for profitability, private banks returned to positive profits in the last quarter of 2003, while public banks continued to show negative profits (International Monetary Fund, 2004).

This situation contrasts starkly with perceptions of the health of the Argentine financial sector even just a few years before the crisis. Studies such as that of Calomiris and Powell (2000) had lauded the extensive regulatory reform undertaken during the 1990s, starting with the liberalization of the banking sector early in the decade. The reforms included the establishment of a new Central Bank Charter and the abolishment of deposit insurance, adoption of the Basel Capital requirements and their subsequent tightening during 1992–95, introduction of a liquidity requirement system, and, finally, the adoption of the BASIC oversight approach,¹⁰ whereby regulatory and market discipline would function in tandem. Furthermore, when looking at traditional financial performance indicators, even as late as 2000 the Argentine banking system appeared to be sound, well-capitalized, liquid, and with a relatively high level of provisions.¹¹ In fact, as Perry and Servén (2002) show, in 1998 the

⁸ However, it is worth noting that the conversion of loans at par may have had a positive—and therefore partially offsetting—effect on net worth by reducing the rate of default by imperfectly hedged bank borrowers.

⁹ Caprio and Klingelbiel (2003).

¹⁰ Acronym standing for Bonds, Auditing, Supervision, Information, and Credit Rating. The BASIC approach was introduced following the Tequila Crisis of 1994–95, and relied heavily on providing timely and relevant information on individual banks to both private markets and regulators. In turn, regulators and markets would then use this information to punish banks for excess risk-taking; regulators, by imposing higher capital requirements, and markets, by pricing down banks' subordinated debt.

¹¹ For example, the capital-to-asset ratio was 10.5 percent and capital to risk-weighted assets was 21.2 percent. Provisioning had been well above 100 percent of nonperforming loans during 1997–99, but an increase in nonperforming loans owing to the recession brought the
(continued...)

World Bank Financial Sector Review ranked Argentina's banking system second (to Singapore) among emerging market economies in terms of its CAMELOT ratings of bank soundness and the quality of its regulation and operating environment.

Moreover, by most accounts, the Argentine banking system had demonstrated its resiliency throughout the 1990s, withstanding the Tequila Crisis following the Mexican devaluation of December 1994, and then the subsequent strains caused by the Asian, Russian, and Brazilian crises. In the Tequila Crisis in particular, the authorities were able to partially offset a substantial deposit run (18 percent of total deposits were withdrawn between December 1994 and May 1995) by reducing reserve requirements and easing liquidity constraints of the banks. Although 51 institutions failed—they were either closed down or merged—studies have shown that these tended to be the *ex ante* weaker institutions (Dabós and Sosa, 1999). Depositors certainly were concerned with the risk of a possible currency crisis, but market discipline was shown to be operating even during the Tequila Crisis, as depositors tended to withdraw more funds from the banks that exhibited weaker fundamentals (and therefore greater risk of default) (Calomiris and Powell, 2000; Schumacher, 2000; and Martínez Pería and Schmukler, 2001).

On the other hand, some analysts criticized aspects of the reform process.¹² First, they stressed the lack of stability in the rules of the game. For example, deposit insurance, abolished early on, was reinstated in 1995 and its coverage limit subsequently raised. Liquidity requirements were changed over time, particularly in response to the Tequila Crisis, as discussed above. Second, although the obligation of banks to issue subordinated debt was thought to be a key aspect of the BASIC approach, the penalty for noncompliance was relatively low. Third, tight regulations on risk-taking may have combined with the traditionally high operating costs to lower bank profitability throughout the decade. Fourth, the regulatory reforms may have still left significant room for government discretion in the banking system. In particular, regulatory incentives as well as a degree of moral suasion by the government may have been responsible for an excessive buildup of government debt on banks' balance sheets. Finally, one study¹³ characterized the banking system more as a willing accomplice than a victim of the fiscal imbalances. For all the regulatory changes enacted during the 1990s, it argues, the system is still one of rampant cronyism, more than willing to contribute to the government's soft budget constraint.

provisioning ratio to 77.1 percent in 2000 (Perry and Servén, 2002, based on data from the Central Bank of Argentina).

¹² See, for example, World Bank (1998).

¹³ della Paolera and Taylor (2003).

III. DESCRIPTIVE LOOK AT ARGENTINE BANKS IN THE 1995–2001 PERIOD

Here we concentrate on the three risk elements underlying the banking side of the recent crisis in Argentina: the expansion of foreign currency operations of the banking system, the accumulation of government debt, and, finally, the run on deposits. All three are closely connected to the macroeconomic shocks; to the extent that the crisis resulted in a large currency devaluation and a default by the government, banks' balance sheets would be severely affected and depositors had good reason to fear that funds deposited in the banking system would be in danger. However, the extent to which individual banks were affected by the macroeconomic shocks would depend crucially on the degree to which their balance sheets were exposed to these risks. We will investigate whether there was any pattern across banks to the accumulation of these exposures.

A. Foreign Currency Exposures—Increasing Dollarization

A first step is to quantify the Argentine banks' foreign currency operations, on both the asset and the liability sides. We note that two different types of risk are increased with each type of exposure. On the one hand, an increase in foreign currency liabilities—to a large extent caused by depositors' preferences as devaluation fears mounted—would lead to a direct currency mismatch on bank balance sheets. On the other hand, an accumulation of foreign currency assets, through increased dollar lending, would lead to an increased default risk to the extent that borrowers were not perfectly hedged against currency risk. Figure 1 shows that throughout the second half of the 1990s, over 60 percent of bank liabilities were denominated in foreign currency and that this portion displayed an upward trend particularly from mid-1998 onward; for the banking system as a whole, the share of foreign currency liabilities increased from 61 percent in June 1998 to 73 percent by the end of 2001. A similar behavior can be observed on the asset side in Figure 2, where foreign currency assets increased their share from 64 to 75 percent during the same period. As Table 1 shows, much of the movements in currency denomination of assets and liabilities is related to increases in the shares of foreign currency deposits and loans.

We combined data on both foreign currency asset and liabilities to produce a net foreign currency position (assets minus liabilities) measured as a percentage of total assets. As Table 1 and Figure 3 illustrate, there is a slight downward trend in the total position during the 1995–2001 period, going from a 8.4 percent of assets in 1995 to 7.6 percent by the end of the study period. However, when only loans and deposits are considered, the downward trend is more pronounced; the banking system as a whole went from a positive net position of almost 12 percent of assets to a net negative position of about 3 percent of assets. Thus, when deposits became progressively more dollarized, banks responded by increasing their foreign-currency-denominated assets, although only partially offsetting the impact on their balance sheets. Furthermore, in addition to foreign currency lending, banks increased other assets denominated in foreign currency. Overall, Argentine banks maintained a positive net foreign currency position, but the increase in foreign currency loans would presumably leave them more exposed to default risk arising from imperfectly hedged borrowers.

B. Banking System Financing of the Government

Next, we turn to our second element in the banking crisis, namely the accumulation of bank claims on the government. Other studies have highlighted the increase in government reliance on voluntary domestic financing, particularly as foreign financing dried up in 2001.¹⁴ Here we focus on the impact of this borrowing from the banking system's perspective. Figure 4 shows how the share of government bonds in total assets increased rapidly during 1995 and the first nine months of 1996, and stabilized thereafter, with a small downward trend starting in 1998. However, when we included other forms of lending to the government, the ratio to assets continued to increase after 1996. By late 2001, government bonds accounted for about 10 percent of assets, versus 3 percent at the beginning of 1995, and total government financing had grown from just under 10 percent to over 23 percent. In Table 2, we present both the Central Bank and IFS data, showing that banks' claims on the public sector increased rapidly both as a percentage of total assets and of GDP, increasing threefold between 1995 and 2001. It is interesting to note that, although public banks had a higher proportion of assets dedicated to financing the government throughout this period, the relative increases were larger for private banks; their corresponding ratio of total government financing increased roughly by a factor of four, while it doubled for public banks.

Furthermore, Argentine banks used government financing increasingly as a means for dollarization of the asset side of their balance sheets. In Figure 5 we show that the proportion of government financing denominated in foreign currency grew by about 30 percentage points between 1995 and 2001. In Table 2 we also show that during the same period the share of loans to the government within total foreign currency lending almost tripled, from about 11 percent to 29 percent. Although the initial levels of this share for public banks were higher on average, private domestic banks in particular banks exhibited sharp increases, from a negligible amount to about a third of their foreign currency loan portfolio devoted to financing the nonfinancial public sector.

One logical consequence of the increased financing of the government was a decline in commercial intermediation activities, as measured by bank financing to the private sector.¹⁵ As Table 3 shows, both the loan-asset and the loan-deposit ratios declined across all three groups of banks, from close to 70 percent in the mid-1990s to under 50 percent by the end

¹⁴ For example, in Figure 11 in de la Torre, et al. (2003), voluntary domestic financing of the central government is shown to increase steadily between 1994 and 2001, with banks and pension funds being the major contributors.

¹⁵ Barajas and Steiner (2002) analyze recent credit slowdowns in eight Latin American countries, including Argentina. Using a breakdown of major changes in banks' balance sheets, the authors rank the relative importance of different factors, such as deposit growth or alternative uses of funds raised. It is interesting to note that, up until 2000, government financing did not appear to be a major factor causing the slowdown in Argentina. However, if the analysis were to be repeated including 2001, this factor would most likely enter the picture significantly.

of 2001. The same pattern is observed in IFS data for Deposit Money Banks, where both ratios fell considerably. The credit-to-GDP ratio, after increasing throughout the 1990s and peaking at 24 percent in 1999, fell to 20 percent at end-2001, roughly the same value as in 1994.¹⁶

C. The Deposit Run

Finally, we look at the run on deposits. Table 4 shows how aggregate deposits¹⁷ for Deposit Money Banks grew at an average annual rate of 21 percent between 1992 and 2000, then fell by close to 18 percent in 2001. Furthermore, the disaggregated bank data show that the run appeared to be most severe on the domestic private banks, whose deposits fell by 36 percent, while foreign banks suffered a drop of 17 percent and public banks lost close to a quarter of their deposits during 2001.

Thus, it is clear that in the years leading up to the crisis, Argentine banks increased their exposure to currency risk, to credit risk to the extent that a large proportion of their increased foreign currency lending was to unhedged borrowers, and to the risk of a significant capital loss arising from an eventual government default. Furthermore, and partly as a result of these exposures, they also suffered a run on their deposits, particularly during 2001.

D. Cross-Bank Variability

However, the aggregate figures on the different risk factors might conceal considerable variability across banks. This appears to be the case, as we show in Table 5. At end-2001 the degree of exposure to currency risk and to government default, and the size of the deposit withdrawals, all varied noticeably across banks. First, regarding currency risk, although many banks exhibited noticeably high dollarization levels, there was still a sizable number of banks (about 44 percent of them) with less than 60 percent of their loans or deposits denominated in foreign currency, and even some banks with levels below 20 percent. Furthermore, the distribution of dollarization was not the same for deposits and loans; for example, there appeared to be considerably more banks with extremely high (above 80 percent) dollarization of loans than of deposits. Therefore, as one would expect, the net foreign currency positions varied considerably across banks as well. Most banks exhibited a negative foreign currency position at the end of 2001; that is, foreign currency deposits were generally greater than foreign currency loans. On the other hand, roughly one-quarter of banks had a positive position at end-2001. Within foreign currency loans in particular, there was also considerable cross-bank variation in the extent to which they were directed to the private sector, although a good number of the banks were clustered around the 40–60 percent range. Second, government debt financing also exhibited variability across banks. While

¹⁶ Because of the severe recession which began in 1999, the credit-GDP ratio understates the magnitude of the credit decline up to 2001.

¹⁷ This includes demand, time, savings, and foreign-currency-denominated deposits held by the private sector.

most banks held less than 10 percent of their assets in government bonds, there were many that had over 10 or even 20 percent of their assets in these securities. Finally, the deposit run, although it affected a very large segment of the banking system, was far from being equal across all banks. In fact, a quarter of all banks actually enjoyed positive deposit growth during 2001, and some banks even had their deposits grow by over 10 percent.

To summarize the descriptive results of this section, we observed an increase in risk exposure in the banking system over time as well as considerable cross-bank variability in all three risk elements, both of which point to the need to use a panel data approach to separate the possible bank-specific from the macroeconomic variables that may have led to the precarious situation in which Argentine banks found themselves by the end of 2001. We describe the estimation procedure and results in the next section.

IV. ECONOMETRIC ANALYSIS

Our approach was to test for the effect of bank specific and macroeconomic factors on banks' risk exposure, using a panel containing about 90 banks and monthly observations for the four-year period between January 1998 and December 2001. Therefore, it comprises virtually the entire Argentine banking system for the key period during which all three risk elements increased considerably. Furthermore, as discussed in the introduction, in 1998 many analysts considered the Argentine banking system to be solid and well-managed and also among the best regulated and supervised among emerging economies. Their analysis, based on CAMEL-type bank fundamentals, did not at the aggregate level reveal the kinds of vulnerabilities that would later plague the Argentine banking system. However, it is possible that there is still relevant information contained in these fundamentals, namely their variability across banks, that may help explain the extent to which the increase in different risk exposures also varied across banks. We also were interested in testing whether other bank characteristics, for instance ownership, were significant in explaining the risk exposure. Finally, we controlled for the macroeconomic risk factors affecting all banks simultaneously. Our regression equation may be summarized as follows:

$$E_{it} = \alpha_0 + \alpha_1 FUND_{it-l} + \alpha_2 BANK_i + \alpha_3 MACRO_t + \varepsilon_{it}$$

The risk elements (E) are related to vectors of bank fundamentals ($FUND$), other bank-specific characteristics ($BANK$), and macroeconomic factors ($MACRO$). Note that the $BANK$ variables are generally not expected to change much over time, therefore they act much in the same way as an intercept shift in OLS regressions. As an alternative, we also ran fixed effects estimations, in which all bank-specific but time-invariant factors are summarized in the fixed effects themselves. The $FUND$ variables were lagged by l periods depending on the regression. Lagging the bank fundamentals had two main advantages. First, it allowed us to capture the time required for either bank managers or depositors to react to previous information on the state of the banks. Second, it also helped to ameliorate endogeneity problems arising from the possible effect of the risk exposures on the bank fundamentals themselves.

The dependent variables expressing foreign exchange exposure, lending to the government, and loss of deposits were: (i) the percentage of foreign currency deposits (*FDD*); (ii) the percentage of foreign currency loans to the private sector (*FPL*),¹⁸ (iii) the net foreign exchange position (foreign currency loans minus deposits) as a percentage of total assets (*FP*); (iv) government financing by banks as a percentage of total assets (*NGOV*); and (v) the 12-month deposit growth rate (*AGDEP*).

Our three basic groups of explanatory variables are defined as follows. First, the components of bank fundamentals (*FUND*) were: (i) capitalization, as measured by the capital-asset ratio (*CAPR*); (ii) liquidity, measured by the ratio of liquid assets total assets (*LIQ*), (iii) credit risk, measured by the nonperforming loan ratio (*NPL*); (iv) profitability (*PROFIT*), as measured by the ratio of before-tax profits to assets; and (v) the bank-specific real implicit interest rate paid on deposits (*DEPR*).¹⁹ Second, the components of *BANK* were bank size, measured by each bank's market share of assets in each period (*SIZE*); and dummy variables for bank ownership, *PRIVATE* and *FOREIGN*. Finally, the *MACRO* components were: (i) currency risk (*CURISK*), as measured by the spread between dollar and peso-denominated interbank rates;²⁰ (ii) the monthly central government balance as a percentage of GDP (*FISCAL*), to capture the growing financing requirement of the public sector; and (iii) the stock market index (*MERVALNB*), to reflect market expectations on the state of the economy.²¹ In addition, we also included some of the exposure variables to test whether the three types of exposures were correlated with each other. After removing outliers among the

¹⁸ In order to avoid double counting, we excluded from *FPL* foreign currency loans to the government, since these are already included in our measure of financing to the government, *NGOV*.

¹⁹ Measured as total interest paid divided by the stock of deposits, then deflated by the change in the CPI.

²⁰ In earlier drafts we used a country risk indicator, *CRISK*, measured as the EMBI spread for Argentina. Following comments received, and in order to isolate the currency risk component, not directly captured by the other two macroeconomic controls, we opted to use *CURISK* instead. The results were similar in all regressions except in those for government financing, where *CURISK* had a more intuitively reasonable effect than *CRISK*. We now report only the regressions with *CURISK*.

²¹ Similarly, we also used the headline *MERVAL* Argentine stock market index in earlier drafts of the paper. However, in order to rule out the possibility that overall banking sector performance—through the stock price—was driving the relationship between *MERVAL* and individual bank behavior, we constructed our own nonbanking stock market index, *MERVALNB*, by excluding banking institutions. We found that the degree of correlation between the two indices, while high throughout the sample period, declined appreciably from the third quarter of 1999 onward. Furthermore, both *MERVAL* and *MERVALNB* performed well in our regressions, with consistently significant coefficients in virtually of the equations. We now report only the regressions using the nonbanking index.

fundamental and exposure variables,²² we ran Ordinary List Squared (OLS) and Fixed Effects (FE) regressions for the Argentine banking system in the 1998–2001 period. We report the results in Tables 6–9.

A. Foreign Currency Operations

Our results for the foreign currency operations of banks—deposits and the net position—are shown in Table 6, where the each column corresponds to *FDD*, *FPL*, and *FP*, respectively. In general, lagged bank fundamentals appear to be jointly significant, as shown by high by the corresponding F-test for all three dependent variables, and macro variables are also highly significant in explaining time variation in foreign currency operations. We ran an OLS version of the equation in which we included the time-invariant bank ownership variables as well as size. The latter, since it exhibits some time variation as well, was also included in the fixed effects estimations.

Looking at depositor behavior (*FDD*) in the first column, it appears that banks with higher capital and liquidity ratios tended to have a lower portion of foreign currency deposits, thus depositors may have perceived that banks were safer and therefore were slower to move into foreign currency deposits. However, depositors concentrated less of their funds in foreign currency when the bank had a higher exposure to credit risk, as shown by a higher nonperforming loan ratio, although this effect is not very strong.²³ Government financing and real interest rates were also positively related to the percentage of foreign currency deposits, although not with high significance. As for the macroeconomic variables, when economywide conditions deteriorated, either through an increase in country risk or through reductions in the fiscal balance or the stock market index, the share of foreign currency deposits became larger. This reflects the initial reaction of depositors to the increased systemic risk, which would later be followed by a withdrawal of deposits—both in domestic and foreign currency—from the system. As for non-fundamental bank characteristics, the OLS results in the lower panel²⁴ shows that, for given fundamentals, all private banks (domestic and foreign) had a larger percentage of foreign currency deposits, which could reflect a perception by depositors that public banks were safer, possibly because of an implicit guarantee. This perception did not appear to extend to large banks, which also tended to have greater foreign currency deposits.

²² In all regressions, we eliminate observations containing unrealistically high liquidity, loan-asset, government financing, nonperforming loan, or dollarization ratios, as well as those containing negative capitalization ratios.

²³ In fact, when we estimated this equation using an alternative measure for nonperforming loans, the “broad nonperforming loan ratio,” this effect disappeared.

²⁴ In Table 6—as well as in Tables 7 and 9—we only report the OLS coefficients for the three non-fundamental bank characteristics, although all fundamental and macro variables were also included. The OLS results on these variables did not differ substantially from those obtained in the FE estimations shown in the upper panel.

In the descriptive section we saw that banks made efforts to offset their increasingly dollarized deposits by lending in foreign currency, often to an unhedged private sector. The second column of Table 6 (*FPL*) shows that it was generally the lower-risk banks, those more highly capitalized, more profitable, and with lower credit risk, that tended to lend more actively in foreign currency. Interestingly on the macro side, country risk increased banks' foreign currency lending, but fiscal imbalances and stock market declines tended to reduce it. Thus, it appears that the first macro variable signaled an increasing currency risk that banks attempted to offset by lending in foreign currency, while the latter variable would affect the private sector's repayment capacity, thus causing banks to cut back on foreign currency.

The results in the third column of Table 6 allow us to determine the effect of bank-specific and macro variables in explaining changes in banks' net currency positions. We see again that relatively profitable, well-capitalized banks with a low credit risk tended to increase their foreign currency position by more, while liquid banks or those holding more government bonds tended to lower their net position. Regarding the macroeconomic variables, the progressively increasing country risk tended to induce banks to increase their foreign currency position, while the deteriorating fiscal situation and slumping stock market tended to have the opposite effect. The increase in country risk led depositors to increase their preference for foreign currency deposits, but banks reacted by expanding foreign currency loans even more. On the other hand, since the stock market decline and fiscal deterioration tended to increase the public's preference for foreign currency deposits and simultaneously reduce banks' willingness to lend in foreign currency,²⁵ these effects reinforced each other to reduce banks' net foreign currency position toward the end of the sample period.

Looking at the OLS coefficients in the lower panel of the table allows us to examine whether the net position differed significantly across groups of banks. We find that large banks tended to increase their net position more, given the same fundamentals. Domestic private banks did so less than public banks, owing to a lower willingness to lend in foreign currency. Finally, foreign banks were the ones who most offset foreign currency deposits by expanding their foreign currency loans.

To summarize, both macroeconomic and bank-specific variables measuring different types of risk had a measurable impact on bank foreign currency operations. Depositors increased their preference for foreign currency denomination as macroeconomic risk—country risk, rising fiscal deficits, falling stock market—increased. Furthermore, this preference was more pronounced for riskier banks, as measured by capital and liquidity ratios. As these types of deposits grew, banks in turn responded by increasing their foreign currency loans in an attempt to offset a growing exposure of their balance sheets to devaluation risk. However, not all banks did this to the same degree. Highly capitalized banks, as well as those with higher profitability, lower credit risk, and higher liquidity increased their net position even more. Furthermore, there appeared to be a tradeoff between exposure to currency risk, represented

²⁵ Similarly, as imperfectly hedged borrowers perceived an increase in the risk of a devaluation, their *demand* for foreign currency loans may have declined as well.

by a lower net position, and exposure to government default, as the coefficient on lagged government financing was negative and significant. Finally, it must also be noted that reduction in currency risk through lending came at the cost of an increase in exposure to credit risk, as many of the private sector borrowers were themselves vulnerable to a devaluation.

B. Government Financing

In Table 7 we present our estimation findings for the proportion of government financing in total assets (*NGOV*),²⁶ similarly to Table 6, with fixed effects results in the upper portion and OLS results for groupwise (size and ownership) tests in the lower portion. The results show that the extent to which certain banks engaged in government financing is related to their past fundamentals; the F-test again shows these variables to be jointly significant across all specifications. Banks with higher capitalization and liquidity and lower nonperforming loan ratios tended to have a higher percentage of financing to the government. Thus, somewhat paradoxically, banks associated with lower risk were more likely to increase their exposure to a government default.

The degree of involvement in foreign currency operations on either the loan or deposit side also mattered. First, banks with highly dollarized deposits tended to finance the government to a larger degree. Also, the portion of such financing denominated in foreign currency rose was large and increasing, from 68 percent at the beginning of 1998 to 95 percent in late 2001 (Figure 5). Thus, government financing would serve to help banks to balance their foreign currency position. Second, just as in the foreign currency regressions, foreign currency lending to the private sector was negatively related to government bond holdings, reflecting a tradeoff between these two avenues for countering the dollarization of liabilities. Finally, banks that had preferred to maintain a greater currency mismatch on their balance sheets—but lower exposure to credit risk arising from lending in foreign currency to the private sector—would also engage in greater government financing. Banks could reduce their currency mismatch without having to expand credit to unhedged private borrowers. Of course, as the public debt expanded and its sustainability became more suspect, banks incurred an ever greater exposure to the risk of government default, exacerbated by an increasing dollarization of this financing.

Macroeconomic conditions affected the exposure of all banks to the government. As we expected, the fiscal deterioration tended to increase banks' financing of the government significantly. Second, as conditions in the stock market worsened, and presumably the creditworthiness of private companies was also weakened, banks increased their government financing. This is consistent with our previous result that banks reduced their foreign currency lending to the private sector in response to a fall in the stock market index. Finally, upward movements in currency risk—the spread between peso- and dollar-denominated

²⁶ The dependent variable *NGOV* is defined as the broad measure of financing to the government, as in Table 5. It includes both government bonds and loans to the government.

interest rates—also led to an increase in government financing which, as we found, was increasingly denominated in foreign currency.

Looking at the OLS results in the lower panel, we find that, given the same fundamentals, large banks engaged more in lending to the government. Interestingly, foreign banks tended to lend more to government—given the same fundamentals—than public banks. Finally, domestic private banks were the least likely to expand credit to the government.

To summarize, government financing operations, while spurred to a significant degree by the fiscal deterioration and worsening conditions in the domestic private sector, tended to be favored by traditionally lower-risk or prudent banks. Also, for similar levels of fundamentals, public and foreign banks were significantly more active in accumulating claims on the government. Finally, this practice tended to be correlated with a greater foreign currency mismatch; these banks preferred not to pass on the exchange risk to private sector borrowers. Some of the results are puzzling at first glance; it was the banks with strongest fundamentals—those that one might associate with a more prudent stance toward risk-taking—that tended to be more active in lending to the government.

One possible explanation for this behavior is the progovernment bias in prudential regulation. Particularly in times of mounting macroeconomic distress, lending to the government provided banks with a low-cost alternative for complying with capital adequacy requirements and gaining access to liquidity assistance. For example, the Basel I risk-based capital regulations adopted by Argentina in the mid-1990s assigned much lower requirements for loans to the government in comparison to loans to the private sector. Norms designed to promote asset diversification, limiting the maximum exposure to a single debtor, did not apply to a broad class of government financing instruments. Finally, capital requirements related to market risk exempted those government bonds which appeared in the “investment accounts” of commercial banks’ balance sheets.

C. Deposit Growth

Two recent studies have examined the issue of market discipline in the context of the Argentine crisis. De la Torre, et al. (2003) contrasted depositor behavior in the 1997–99 precrisis, or tranquil, period with that in the 2000–01 crisis period. They found that the precrisis period was characterized by a measurable degree of market discipline, as certain individual bank fundamentals proved to be significant predictors of subsequent deposit growth. However, market discipline appeared to break down considerably in the crisis period, where systemic risk, rather than bank-specific factors, tended to explain deposit growth. In other words, the bank run appeared to be indiscriminate, affecting risky and safe banks equally. Levy-Yeyati, Martínez Pería, and Schmukler (2004) revisited this issue for both Argentina and Uruguay, and refined the analysis. They argued that the very concept of market discipline should be reformulated in the context of emerging economies facing large systemic shocks. While the statistical link between depositor behavior and traditional bank fundamentals disappears during a period of large systemic shocks, this may be due to the fact that the systemic variables tend to swamp the effect of fundamentals, and the informational content of traditional fundamentals decreases tremendously. Furthermore, their study showed

how, once the deposit growth regressions included measures of banks' exposure to systemic risk along with the systemic variables, depositor behavior in the crisis period turned out to be quite consistent with market discipline.

Our objective in this section is to draw on the framework developed above and examine several additional hypotheses. We examine whether other bank-specific (nonfundamental) characteristics were relevant to depositors, and whether the lags on fundamental variables matter; since it is possible that, as the macro situation became more uncertain and volatile, depositors' assessment of financial information released by banks would change. Finally, we focus our analysis on the deposit run period itself, to see if support for the above hypotheses is strengthened or weakened during this subperiod.

Regarding the relevance of lag length, we compared the results obtained with lags in the fundamental variables of three, six, nine, and twelve months.²⁷ Several results become apparent, as shown in Table 8. We see that bank fundamentals are generally jointly significant, with the exception of the estimation with a six-month lag. Second, at least one bank fundamental is significant at every lag. Third, we can see that with a three-month lag a greater number of bank fundamentals are significant, although the capital ratio has a counterintuitive negative sign, suggesting that depositors prefer less capitalized banks. Fourth, once the lag reached nine months, we find that depositors ceased to care about the signals on credit risk (*NPL*), profitability, or liquidity, whereas they began to prefer banks with a history of higher capitalization. Thus, during this pre-crisis period, shorter-term signals on bank credit quality, liquidity, and profitability tended to drive depositors' preferences, while short-term signals on capitalization proved to be less informative, and depositors tended to rely on past history instead.

Another interesting result was that financing to the government was negatively related to the growth rate of deposits. On the one hand, this could simply reflect the macro pressures that caused all banks to increase their financing to the government and aggregate deposits to decelerate. However, since we also controlled for the fiscal balance—which was negatively related to deposit growth—the effect of *NGOV* must reflect depositors' preference for banks with lower exposures to the public sector. Thus, while results of our previous estimations implied that banks used government financing when conditions in the corporate sector worsened, the deposit growth estimations implied that depositors appeared to be conscious of the risks inherent in accumulating government debt.

In Table 9 we present the full results for the deposit growth regressions using a three-month lag for the bank fundamental variables. As in previous sections, the fixed effects estimations are shown in the upper panel, and OLS estimations for groupwise comparisons in the lower one. In the first column we excluded all foreign currency variables, and in each of the following three columns we included one foreign currency variable at a time. As mentioned above, depositors valued traditional fundamentals: liquidity, profitability, and loan quality. In

²⁷ For this comparison we use a simple specification which includes the three macroeconomic controls (*CRISK*, *FISCAL*, and *MERVAL*) and the real deposit interest rate.

addition, depositors tended to prefer banks with a lower exposure to the government. As for foreign currency operations, there was no inherent preference for banks having greater foreign currency operations on the deposit or lending side, but depositors preferred banks that had lower net positions. Thus, depositors also appeared to recognize the additional risk incurred by expanding foreign currency loans to offset the currency mismatch. The OLS results indicate that depositors preferred larger banks, perhaps reflecting their perception of these institutions as being “too big to fail.” On the other hand, they also preferred domestic banks in general over foreign banks, and private over public banks. Finally, our macroeconomic variables proved to be significant in explaining deposit growth. Bank deposits in general decelerated as country risk grew, the fiscal balance deteriorated, or the stock market index fell.

D. Robustness Checks

As in the deposit growth estimations, we estimated the equations for government finance and foreign currency operations using longer (three- and six-month) lags of the fundamental variables. We found that most of the results continued to hold, with two main exceptions. First, the significance of the capital and nonperforming loan ratios declined somewhat as the lag length was increased; in some cases they became non-significant at a 10 percent level. Second, the tradeoff between government financing and foreign currency lending to the private sector became less apparent; in fact, foreign currency lending became positively and significantly related to the level of government financing lagged six months.

In the deposit growth equations, certain issues arose regarding bank size and deposit composition. As we showed earlier, dollarization on the deposit and lending side, as well as the net foreign currency position, exhibited a fair amount of variability across banks. However, it could be argued that such variability was simply a reflection of a type of market segmentation, whereby a considerable number of small transaction-oriented or retail banks had, by definition, very little involvement in foreign exchange operations, while a group of larger and more sophisticated banks tended to concentrate the bulk of the system’s foreign currency operations. Thus, a negative coefficient of a dollarization variable in the deposit growth equation could be showing that only larger banks relying on time deposits would suffer withdrawals during the crisis. More generally, it could also have been the case that the results were being driven to a large extent by the presence of these retail banks in the sample.

We addressed these issues in various ways: (i) by reestimating the equations over a sample that excluded the 20 percent smallest banks; (ii) by reestimating over a sample that excluded the 20 percent of banks with the lowest ratio of time deposits to total deposits, (iii) by including interaction terms between bank size and the macro variables; and (iv) by including interaction terms between the time deposit ratio and the macro variables. We found that restricting the sample by size (i), or by the time deposit ratio (ii), made very little difference in the results, as seen in Table 10; dollarization of deposits or private sector loans continued to be nonsignificant, while the foreign exchange position was still negatively related to deposit growth. However, when using interaction terms in exercises (iii) and (iv), we found evidence that depositors’ sensitivity to changes in the macroeconomic environment—as measured by the fiscal balance and the stock market index—was indeed greater for larger

banks and for banks with higher shares of time deposits. On the other hand, these banks exhibited less sensitivity of deposits to currency risk (Table 11).²⁸

So far, all the above regressions encompassed both an initial period of overall deposit growth and a subsequent deposit run period. However, depositor behavior may have changed between periods, becoming more or less sensitive to bank-specific characteristics. Therefore, we were also interested in focusing on the deposit run period, to determine whether individual banks' deposit loss during the crisis was related to ex ante bank variables. We defined the deposit run period as beginning in September 2000—the peak of total deposits in real terms—and ending in November 2001.²⁹ We ran cross-section regressions of each bank's real deposit growth rate during this period as a function of bank-specific characteristics and fundamentals evaluated at their average value during July–September 2000.

The cross-section results, as shown in Table 12, support the market discipline hypothesis, as the amount of deposits withdrawn from a given bank was related to some of the fundamentals. Banks with lower capitalization and higher nonperforming loan rates, and those with greater financing to the government tended to suffer greater deposit withdrawals. In particular, the effect of capitalization is now positive, more consistent with market discipline than the puzzling negative effect obtained in the panel data estimations using smaller lag lengths. The effect of the foreign exchange position is also contrary to the panel data results; here depositors appeared to prefer banks with a net lending position in foreign currency. Finally, turning to the nonfundamental bank variables, we also included in these regressions the share of time deposits. Presumably, in a period of distress depositors would more readily withdraw time deposits than transaction-driven sight deposits, and so we were interested in testing whether a banks' reliance on time deposits would make it more susceptible to a run. Our results show that neither the share of time deposits nor the other nonfundamental variables, relating to size and ownership, were relevant in explaining the deposit loss.

²⁸ As Table 9 shows, we found the effect of currency risk (*CURISK*) on deposit growth to be negative. Thus, a positive coefficient on the interaction terms *SIZE*CURISK* and *TIMEDEP*CURISK* implies that larger and more time deposit-oriented banks were less likely to suffer deposit withdrawals from an increase in currency risk. Perhaps depositors perceived that these banks were managing their currency risk more effectively; at the same time, depositors may have felt that there was little these banks could do in the face of other deteriorating macroeconomic conditions.

²⁹ We preferred this ending date over December 2001 because the latter contained the effect of a regulation in November 2001 requiring private pension funds to increase their holdings of government bonds. As this caused an additional and somewhat indiscriminate deposit run in December, the significance of bank-specific variables was higher when using November 2001 as the ending date.

We also ran regressions in which the dependent variable was the real *monthly* percentage change in deposits, rather than the annualized change.³⁰ In general, bank fundamentals continued to be significant, and the macro controls exhibited the correct sign, but the significance of explanatory variables was much lower overall, and the fit was quite poor. The volatility of month-to-month changes in deposits was therefore smoothed considerably by annualizing, by eliminating an important seasonal component.

On the issue of government financing by banks, we were interested in testing whether specific policy actions had had a measurable impact. In particular, several actions were taken in 2001 to encourage banks to increase their financing of the government, precisely when international markets for Argentine sovereign debt had dried up. While many of these policies took place at the end of our sample period—thus making it impossible to test their significance—we were able to focus on one which was implemented in April 2001, permitting banks to comply with reserve requirements by acquiring “Patriot Bonds” issued by the government. Thus, we reran the government finance regressions including a dummy variable for April 2001 (*D0401*), as shown in Table 13. While the dummy variable itself proved to be highly significant, the significance of the other macroeconomic variables declined noticeably. This is not surprising, given that this policy coincided with a general worsening of macroeconomic conditions, which makes it difficult to disentangle the individual effects of each factor.

V. CONCLUSIONS

Although most of the literature on the 2001 Argentine crisis has focused on the macroeconomic imbalances that appeared and worsened in the years leading up to the crisis, the banking sector also merits careful examination. Banks were certainly affected by the macro situation in several ways. As fiscal performance faltered and public debt mounted, the banking system faced increasing pressure to provide financing to the public sector, incurring greater default risk in the process. As the sustainability of the currency board came under question and depositors shifted their preferences toward foreign-currency-denominated deposits, banks were exposed to an initial currency risk on the liability side of their balance sheets, to which they responded by—at least partially—dollarizing their asset side as well. Furthermore, the downturn in economic activity, which began in the late 1990s, weakened banks’ balance sheets by increasing their ratio of nonperforming loans. Finally, by end-2001 the banks were subjected to a sizable deposit outflow, which ultimately led the authorities to impose tight convertibility restrictions.

Banking activity stalled in the aftermath of the crisis, with negative consequences for Argentina’s recovery. As discussed in the introduction, it took almost a full year for deposits to begin to recover, over two years for private sector credit to register positive annual growth in real terms, and almost two years for private banks to post positive quarterly profits. To the extent that bank credit contributes to economic activity, this situation has severely

³⁰ These results are available upon request.

constrained the strength of Argentina's post-crisis recovery, and therefore smooth functioning of bank intermediation should be a key issue toward the future.

Our study was motivated in part by the observation that, to a certain degree, many of the banking system's weaknesses were not apparent beforehand. The assessment of the Argentine banking system in the late 1990s was positive overall, as indicated by the lofty position it obtained in a 1998 World Bank ranking of emerging market banks and regulatory structures. Since this analysis was based on traditional bank fundamental indicators, it would be tempting to discard this type of information and deem it unsuitable for analyzing bank vulnerability. Indeed, traditional bank performance indicators did not detect the growing currency risk nor the risk of government default, both of which were key components of the banks' fragility in the Argentine case. However, we were interested in examining whether bank fundamentals still contained relevant cross-section information that might explain differences in vulnerability across banks. We were also interested in exploring whether certain nonfundamental characteristic of banks might help to explain these differences.

We concentrated on the behavior of the three risk elements on banks' balance sheets from 1995 to 2001: the foreign currency exposure, the financing to the government, and the deposit run. In the descriptive section, we showed the magnitude of each change and illustrated how they varied by type of banking institution. Deposits and loans became increasingly dollarized, and banks increased their financing to the government, both through acquisition of bonds and through direct loans. This financing in turn led to a progressive crowding out of credit to the private sector. We also showed the magnitude of the fall in deposits during 2001. In addition, we showed that there was considerable cross-bank variability in each of the risk elements; not all banks increased the foreign currency and government default exposures, nor were they all subject to the same deposit withdrawal. In fact, a good number of banks actually experienced an increase in deposits in 2001. Thus, a panel data approach, which could capture bank-specific characteristics as well as time-varying macroeconomic indicators, might allow us to understand how the banking sector vulnerabilities evolved over time and across different institutions.

Our econometric analysis revealed that bank fundamental variables were relevant in explaining the three risk elements, although not all fundamentals operated in the same direction or with the same level of significance. Across all regressions, bank fundamentals were overwhelmingly jointly significant. In general, we found that "safer" banks—those with the strongest fundamentals—tended to have higher net foreign exchange positions as a result of depositors showing less preference for dollarization when the fundamentals were strong and of these banks being more likely to expand dollarized loans. Safer banks also tended to engage more actively in financing to the government; in particular, those with higher capitalization rates and lower nonperforming loans. Depositors tended to prefer banks with higher liquidity and profitability, and lower nonperforming loan ratios. Somewhat paradoxically, however, at short lags they tended to prefer banks with lower capitalization. However, comparing across different lags for the fundamental variables, we found that with a lag of three quarters or more depositors did prefer more capitalized banks. Moreover, when we focused our attention on the deposit run period per se, we found supporting evidence that

banks with higher initial capitalization rates suffered smaller deposit losses, thus depositors preferred highly capitalized banks.

We also found that the risk elements themselves were significant in many regressions. There appeared to be a tradeoff between loan dollarization and government financing; banks that had been more active in government financing in the past tended to have lower foreign currency loans and hence, a lower net position in foreign currency. Likewise, banks that had maintained a higher net position in the immediate past³¹ would be less active in government financing. As for depositors, the coefficients in the deposit growth equations suggest that they recognized the inherent risk in accumulating government debt and in increasing the foreign currency position. Thus, depositors appeared to weigh the potential risk of expanding foreign currency loans to an unhedged private sector more heavily than the direct currency risk arising from increasing dollarized liabilities.

Nonfundamental characteristics also helped to explain cross-bank differences in performance. All else equal, depositors tended to prefer larger banks, and preferred domestic (particularly private) over foreign banks. Foreign banks tended to concentrate more lending in foreign currency and thus, had a higher net position. Interestingly, given similar fundamentals, foreign banks engaged more in government financing than their domestic counterparts. Finally, larger banks also were more active in government financing.

As the summary table below shows, macroeconomic shocks affected banks in several ways. The progressive dollarization and eventual outflow of deposits were significantly related to an increase in currency risk, a deterioration in fiscal performance, and a weakening in the domestic stock market. Banks in turn reacted to the stock market decline and the fiscal deterioration by increasing financing to the government and cutting back on foreign currency lending to the private sector, thus lowering their net position. On the other hand, banks responded to the increase in currency risk by increasing foreign currency lending to the private sector and increasing government financing, both of which tended to increase their foreign currency net position.

Summary of the Effect of Macroeconomic Variables			
	Increases in country risk	Deterioration of the fiscal balance	Fall in the stock market index
	$\uparrow CURISK$	$\downarrow FISCAL$	$\downarrow Merval$
Deposit dollarization	(+)	(+)	(+)
Overall deposit growth	(-)	(-)	(-)
Private loan dollarization	(+)	(-)	(-)
Financing to the government	(+)	(+)	(+)

³¹ Note that when we used longer lag lengths, this tradeoff became weaker.

As in the two previous studies on depositor behavior surveyed in this paper, we can address the issue of market discipline in a situation of large adverse macroeconomic shocks. Based on our analysis of deposit growth, it does appear that appropriate signals were being sent to banks regarding their riskiness. Overall, depositors tended to punish banks with weaker fundamentals,³² as well as those with a higher foreign currency positions as a result of greater indirect currency risk arising from lending to unhedged domestic borrowers. Depositors also appeared to recognize the inherent risk in accumulating claims on the government and did not show a particular preference for foreign banks.

However, it is unclear whether these signals were effective in curbing risky behavior by banks. We found that it was safer banks that tended to incur more of the indirect currency risk as well as the government default risk. We argued that regulatory and other incentives may have skewed bank behavior in this direction. Indeed, the Basel I risk-weighted capital requirements gave a low risk weight to government financing, thus providing a low-cost avenue for banks to comply with the regulation during a period in which raising additional capital would have been extremely costly.³³ We also found that a specific measure, the April 2001 policy allowing banks to use “Patriot Bonds” to comply with reserve requirements had a measurable positive effect on government financing, although such effect was difficult to disentangle from other macroeconomic changes occurring at the same time. In addition, the regulatory biases may have been reinforced by other incentives such as moral suasion and the increasing return offered by government bonds as its financing needs expanded.

Regarding the treatment of foreign currency operations, at first glance the regulations were unbiased in the sense that there was no differentiation between operations in one or another currency. However, the greater indirect credit risk inherent in foreign currency lending—to the extent that borrowers were subject to currency risk—would justify imposing higher capital requirements on these operations. Furthermore, capital adequacy requirements did apply differential risk weights to loans according to their interest rate. Since foreign currency loans tended to have lower interest rates, this provided an additional incentive for banks to lend in foreign currency, particularly as the country spread and domestic peso interest rates increased.

³² Although we do recognize the counterintuitive negative coefficient on capitalization in the panel data regressions at relatively short lags.

³³ De la Torre, Levy-Yeyati, and Schmukler (2003) also make this point, and argue that, although the authorities introduced a positive risk weight on government loans in 2000, this may have come too late.

REFERENCES

- Barajas, Adolfo, and Roberto Steiner, 2002, “Why Don’t They Lend? Credit Stagnation in Latin America,” *IMF Staff Papers*, Volume 49 (Washington: International Monetary Fund), pp. 156–184.
- Basu, Ritu, Pablo Druck, David Marston, and Raul Susmel, 2004, “Bank Consolidation and Performance: The Argentine Experience,” IMF Working Paper 04/149 (Washington: International Monetary Fund).
- Calomiris, Charles W., and Andrew Powell, 2000, “Can Emerging Market Bank Regulators Establish Credible Discipline? The Case of Argentina, 1992–99” (unpublished: New York: Columbia Business School).
- Calvo, Guillermo A., Alejandro Izquierdo, and Ernesto Talvi, 2002, “Sudden Stops, the Real Exchange Rate and Fiscal Sustainability: Lessons from Argentina,” IADB Working Paper No. 469 (Washington: The Inter-American Development Bank).
- Caprio, Gerard, and Daniela Klingelbiel, 2003, “Episodes of Systemic and Borderline Financial Crises” (unpublished; Washington: World Bank).
- Dabós, Marcelo, and Walter Sosa, 1999, “Predicción y explicación del momento de caída de bancos en Argentina, usando modelos de duración (unpublished; Argentina: Universidad de San Andrés).
- de la Torre, Augusto, Eduardo Levy-Yeyati, and Sergio L. Schmukler, 2003, “Living and Dying with Hard Pegs: The Rise and Fall of Argentina’s Currency Board” (unpublished; Washington: World Bank).
- della Paolera, Gerardo, and Alan M. Taylor, 2003, “Gaucho Banking Redux,” NBER Working Paper 9457 (Cambridge, Massachusetts: National Bureau of Economic Research).
- Independent Evaluation Office, 2004, *The IMF and Argentina, 1991–2001* (Washington: International Monetary Fund).
- International Monetary Fund, 2004, “Argentina: Second Review Under the Stand-By Arrangement and Requests for Modification and Waiver of Performance Criteria,” IMF Country Report 04/195 (Washington: International Monetary Fund).
- Levy-Yeyati, Eduardo, María Soledad Martínez Pería; and Sergio L. Schmukler, 2004, “Market Discipline under Systemic Risk: Evidence from Bank Runs in Emerging Market Economies” (unpublished; Washington: World Bank).

- Martínez Pería, María Soledad, and Sergio Schmukler, 2001, "Do Depositors Punish Banks for Bad Behavior? Market Discipline, Deposit Insurance, and Banking Crises," *Journal of Finance*, 56(3), pp. 1029–1051.
- Mussa, Michael, 2002, *Argentina and the Fund: From Triumph to Tragedy* (Washington: Institute for International Economics).
- Perry, Guillermo, and Luis Servén, 2002, "The Anatomy of a Multiple Crisis: Why Was Argentina Special and What Can We Learn From It" (unpublished; Washington: World Bank).
- Schumacher, Liliana, 2000, "Banks Runs and Currency Run in a System without a Safety Net: Argentina and the 'Tequila' Shock," *Journal of Monetary Economics*, 46 (1).
- World Bank, 1998, "Argentine Financial Sector Review," Report No. 17864-AR (Washington: World Bank).

Table 1. Foreign Currency Positions of Argentine Banks

	January-95	September-01	January-95	September-01
Liabilities				
	Foreign currency liabilities/ Total liabilities		Foreign currency deposits/ Total deposits	
Banking system	59.9	70.4	54.2	67.7
Foreign	71.0	72.8	66.3	72.3
Domestic private	65.0	73.6	60.0	66.4
Public	50.4	64.0	41.7	61.4
Assets				
	Foreign currency assets/ Total assets		Foreign currency loans/ Total loan	
Banking system	58.9	69.3	62.8	72.3
Foreign	67.8	69.6	74.2	73.4
Domestic private	62.1	66.1	68.1	63.1
Public	52.4	70.8	52.4	77.1
Net foreign currency position as a percentage of total assets				
	Foreign currency assets/ Liabilities		Foreign currency loans/ Deposits	
Banking system	8.4	7.6	11.6	-2.8
Foreign	6.0	4.2	12.6	-5.3
Domestic private	6.4	6.8	10.5	-1.3
Public	11.3	14.3	12.2	0.6

Source: Central Bank of Argentina.

Table 2. Bank Financing of the Government in Argentina

Central Bank Monthly Data	Jan-95	Sep-01
Government bonds/total assets		
Banking system	3.3	10.0
Foreign	4.4	11.0
Domestic private	3.2	8.0
Public	2.9	9.6
Government bonds plus lending/total assets		
Banking system	9.7	21.0
Foreign	4.5	16.7
Domestic private	5.0	20.2
Public	16.1	29.5
Foreign currency loans to the government/ total foreign currency loans		
Banking system	10.7	29.3
Foreign	0.1	17.0
Domestic private	2.1	33.6
Public	28.5	46.1
IFS Annual Data - Deposit Money Banks	Dec-94	Dec-01
Claims on central government		
as a percentage of total assets ¹	15.7	29.8
as a percentage of GDP	4.5	11.1
Claims on nonfinancial public sector ²		
as a percentage of total assets ¹	8.3	20.2
as a percentage of GDP	2.4	7.5

¹ Defined as the sum of reserves, foreign assets, and claims on the central government, state and local government, official entities, and the private sector.

² Defined as claims on the central government, state and local governments, and official calculations.

Table 3. Intermediation Activity in Argentina

Central Bank Monthly Data	Jan-95	Dec-01
Loans/total assets		
Banking system	65.7	49.0
Foreign	68.8	45.8
Domestic private	68.8	54.3
Public	61.6	51.4
Loans/total deposits		
Banking system	119.9	86.7
Foreign	118.7	85.1
Domestic private	113.3	101.4
Public	127.8	80.9
IFS Annual Data - Deposit Money Banks	Dec-94	Dec-01
Claims on the private sector		
as a percentage of total assets ¹	69.7	54.4
as a percentage of total deposits ²	121.6	84.6
as a percentage of GDP	20.0	20.2

¹ Defined as the sum of reserves, foreign assets, and claims on the central government, state and local government, official entities, and the private sector.

² Includes demand, time, savings, and foreign currency deposits.

Source: Central Bank of Argentina, *International Financial Statistics*, authors'

Table 4. Deposit Growth in Argentina

Central Bank Monthly Data		
	Average growth	
Annualized growth of deposits ¹	1995-2000	2001
Banking system	11.3	-23.1
Foreign	30.5	-17.1
Domestic private	-3.4	-36.3
Public	8.6	-24.7
	Average growth	
IFS Annual Data - Deposit Money Banks	1992-2000	2001
Total deposits ²	21.1	-17.8

¹ Average annual growth rate between January 1995 and January 2000; and growth rate between December 2000 and December 2001.

² Includes demand, time, savings and foreign currency deposits.

Source: Central Bank of Argentina, *International Financial Statistics*, authors'

Table 5. Cross-Bank Variability in Risk Elements in 2001

	Ranges				
	0 to 20%	20 to 40%	40 to 60%	60 to 80%	80 to 100%
1. Dollarization					
a. Foreign Currency Deposits/Total Deposits					
Number of banks	6	10	20	24	22
Domestic private	4	5	11	6	6
Foreign private	1	2	7	13	14
Public	1	3	2	5	2
b. Foreign Currency Loans/Total Loans					
Number of banks	7	11	20	24	24
Domestic private	4	5	11	6	8
Foreign private	2	3	7	13	14
Public	1	3	2	5	2
c. Foreign Exchange Position/Total Assets					
	<-10%	-10 to 10%	10 to 30%	30 to 50%	>50%
Number of banks	24	42	10	1	2
Domestic private	16	14	3	0	0
Foreign private	5	19	7	1	2
Public	3	9	0	0	0
d. Foreign Currency Loans to the Private Sector/					
Total Assets					
Number of banks	8	20	28	16	14
Domestic private	5	9	13	4	3
Foreign private	1	4	14	10	10
Public	2	7	1	2	1
2. Claims on the government					
Government Bonds/Total Assets					
	0 to 10%	10 to 20%	20 to 30%	30 to 40%	>40%
Number of banks	57	22	3	1	3
Domestic private	19	13	2	0	0
Foreign private	27	8	1	0	3
Public	11	1	0	1	0
3. Run on Deposits					
	<-20%	-20 to -10%	-10 to 0%	0 to 10%	>10%
Deposit Growth December 2000 to December 2001	22	17	21	14	7
Domestic private	7	9	10	6	1
Foreign private	11	5	8	6	6
Public	4	3	3	2	0

Source: Authors' calculations based on bank balance sheets provided by the Central Bank of Argentina.

Note: Foreign exchange position is defined as foreign currency loans minus foreign currency deposits.

Table 6. Foreign Currency Operations by Argentine Banks

Fixed Effects Estimation			
Dependent variables: Foreign currency deposits as a percentage of total deposits (<i>FDD</i>), foreign currency loans to the private sector as a percentage of assets (<i>FPL</i>), and the foreign exchange position, scaled by assets (<i>FP</i>).			
	<i>FDD</i>	<i>FPL</i>	<i>FP</i>
Explanatory variables:			
Individual Bank Fundamentals			
CAPR (-1), Capital ratio	-0.083 (2.17) **	0.094 (4.69) ***	0.208 (6.40) ***
LIQ (-1), Liquid asset ratio	-0.288 (5.67) ***	-0.021 (0.61)	-0.154 (3.57) ***
PROFIT (-1), Before-tax profits to assets	0.402 (1.88) *	0.697 (4.73) ***	0.641 (3.53) ***
NPLL(-1), Nonperforming loan ratio	-0.031 (2.27) **	-0.020 (2.09) **	-0.026 (2.20) **
NGOVB(-1), Government financing ratio	0.035 (1.17)	-0.040 (2.01) **	-0.160 (6.39) ***
DEPR, Implicit real interest rate	-0.091 (0.23)	0.531 (1.96) **	-0.108 (0.32)
Other bank characteristics			
SIZE, Market share of assets	-0.604 (1.09)	-3.925 (10.36) ***	-0.512 (1.09)
Macroeconomic Variables			
CURISK, Currency risk premium	1.63E-05 (2.95) ***	2.42E-05 (6.39) ***	2.47E-05 (5.28) ***
FISCAL, Fiscal balance to GDP	-2,416.9 (9.52) ***	2,001.7 (11.59) ***	3,715.1 (17.27) ***
MERVALNB, Stock market index ¹	-3.46E-04 (4.98) ***	2.81E-05 (0.59)	2.07E-04 (3.51) ***
Number of observations	3,066	3,219	3,072
R^2 (within)	0.091	0.103	0.149
F-test for joint significance of fundamental variables, P-values in parentheses	8.88 (0.00)	7.91 (0.00)	15.37 (0.00)
F-test for individual effects, P-values in parentheses	214.15 (0.00)	136.54 (0.00)	92.61 (0.00)
OLS Estimation, Effect of bank-specific non-fundamental variables			
SIZE	1.645 (9.10) ***	1.171 (11.19) ***	0.500 (4.67) ***
FOREIGN	0.074 (8.45) ***	0.080 (16.22) ***	0.093 (18.11) ***
PRIVATE	0.099 (7.35) ***	-0.052 (7.25) ***	-0.072 (9.19) ***
R^2	0.164	0.374	0.369

Unless indicated otherwise, t-statistics shown in parentheses, significance at a 10 percent (*), 5 percent (**), and 1 percent (***) level indicated.

¹ Recalculated index, excludes banks.

Table 7. Government Financing by Argentine Banks

Fixed Effects Estimation				
Dependent variable: Government financing as a percentage of total assets (NGOVB)				
Explanatory variables:				
Individual Bank Fundamentals				
CAPR (-1), Capital ratio	0.236 (13.25) ***	0.055 (2.29) **	0.243 (13.39) ***	0.056 (2.34) **
LIQ (-1), Liquid asset ratio	0.021 (0.64)	0.053 (1.64)	0.018 (0.55)	0.208 (0.65)
PROFIT (-1), Before-tax profits to assets	0.227 (1.61)	0.060 (0.43)	0.245 (1.74) *	0.097 (0.70)
NPLL(-1), Nonperforming loan ratio	-0.032 (3.61) ***	-0.020 (2.26) **	-0.033 (3.79) ***	-0.022 (2.57) ***
FDD (-1), Foreign currency deposit ratio		0.026 (2.17) **		
FPL (-1), Private foreign currency loan ratio			-0.057 (3.44) ***	
FP (-1), Foreign currency position				-0.096 (6.91) ***
DEPR, Implicit real interest rate	0.185 (0.73)	0.215 (0.87)	0.177 (0.71)	0.182 (0.74)
Other bank characteristics				
SIZE, Market share of assets	-0.767 (2.17) **	-0.487 (1.40)	-0.923 (2.60) ***	-0.544 (1.59)
Macroeconomic Variables				
CURISK, Currency risk premium	8.85E-06 (2.52) **	8.47E-06 (2.43) **	1.08E-05 (3.05) ***	1.15E-05 (3.33) ***
FISCAL, Fiscal balance to GDP	-790.7 (4.91) ***	-806.9 (4.96) ***	-644.7 (3.91) ***	-480.7 (2.88) ***
MERVALNB, Stock market index ¹	-1.32E-04 (2.97) ***	-1.51E-04 (3.42) ***	-1.20E-04 (2.70) ***	-1.35E-04 (3.12) ***
Number of observations	3,220	3,065	3,208	3,068
R ² (within)	0.104	0.056	0.106	0.068
F-test for joint significance of fundamental variables, P-values in parentheses	36.83 (0.00)	3.01 (0.01)	31.74 (0.00)	9.66 (0.00)
F-test for individual effects, P-values in parentheses	82.15 (0.00)	85.87 (0.00)	73.50 (0.00)	83.40 (0.00)
OLS Estimation, Effect of bank-specific non-fundamental variables				
SIZE	0.196 (2.37) ***	0.112 (1.35)	0.461 (5.84) ***	0.280 (3.56) ***
FOREIGN	0.026 (6.64) ***	0.024 (6.17) ***	0.044 (11.78) ***	0.044 (11.27) ***
PRIVATE	0.004 (0.71)	0.001 (0.24)	-0.010 (1.86) *	-0.009 (1.51)
R ²	0.114	0.114	0.204	0.167

Unless indicated otherwise, t-statistics shown in parentheses, significance at a 10 percent (*), 5 percent (**), and 1 percent (***) level indicated.

¹ Recalculated index, excludes banks.

Table 8. Deposit Growth in Argentina: Explanatory Role of Bank Fundamentals

Fixed Effects Estimation				
Dependent variable: 12-month real growth rate of deposits (<i>AGDEP</i>)				
Explanatory variables:				
	Lags (<i>l</i>)			
	3 months	6 months	9 months	12 months
Individual Bank Fundamentals				
CAPR (<i>-l</i>), Capital ratio	-0.425 (3.33) ***	0.010 (0.08)	0.434 (3.52) ***	1.105 (8.91) ***
LIQ (<i>-l</i>), Liquid asset ratio	0.484 (3.60) ***	0.320 (2.10) ***	0.017 (0.12)	-0.154 (1.10)
PROFIT (<i>-l</i>), Before-tax profits to assets	1.278 (1.87) *	0.028 (0.05)	-0.605 (0.99)	0.488 (0.71)
NPLL(<i>-l</i>), Nonperforming loan ratio	-0.147 (3.89) ***	-0.042 (1.22)	0.021 (0.63)	0.049 (1.45)
NGOVB(<i>-l</i>), Government financing ratio	-0.197 (2.33) **	-0.030 (0.35)	-0.233 (2.96) ***	-0.296 (3.60) ***
Number of observations	1,959	1,948	2,003	2,008
F-test for joint significance of fundamental variables, P-values in parentheses	9.71 (0.00)	1.26 (27.31)	3.89 (0.00)	15.71 (0.00)
F-test for individual effects, P-values in parentheses	10.80 (0.00)	11.96 (0.00)	13.11 (0.00)	12.96 (0.00)
R^2 (within)	0.202	0.189	0.192	0.209

Unless indicated otherwise, t-statistics shown in parentheses, significance at a 10 percent (*), 5 percent (**), and 1 percent (***) level indicated.

All regressions also include three macroeconomic controls (*CURISK*, *FISCAL*, and *MERVALNB*) and the real deposit rate, all at their contemporaneous levels.

Table 9. Deposit Growth in Argentina

Fixed Effects Estimation				
Dependent variable: 12-month real growth rate of deposits (<i>AGDEP</i>)				
Explanatory variables:				
Individual Bank Fundamentals				
CAPR (-3), Capital ratio	-0.252 (3.33) ***	-0.432 (3.38) ***	-0.383 (2.95) ***	-0.361 (2.81) ***
LIQ (-3), Liquid asset ratio	0.484 (3.60) ***	0.484 (3.60) ***	0.491 (3.69) ***	0.410 (3.02) ***
PROFIT (-3), Before-tax profits to assets	1.278 (1.87) *	1.236 (1.80) *	1.314 (1.93) *	1.406 (2.06) **
NPLL(-3), Nonperforming loan ratio	-0.147 (3.89) ***	-0.146 (3.84) ***	-0.150 (3.98) ***	-0.150 (3.96) ***
NGOVB(-3), Government financing	0.197 (2.33) **	-0.184 (2.17) **	-0.206 (2.43) ***	-0.255 (2.97) ***
DEPR, Implicit real interest rate	-0.018 (0.02)	-0.056 (0.06)	-0.464 (0.67)	-0.004 (0.00)
FDD (-3), Foreign currency deposit ratio		-0.086 (1.26)		
FPL (-3), Private foreign currency loan ratio			-0.141 (1.60)	
FP (-3), Foreign currency position				-0.236 (3.50) ***
Other bank characteristics				
SIZE, Market share of assets	11.477 (6.24) ***	11.597 (6.30) ***	11.140 (6.03) ***	11.441 (6.24) ***
Macroeconomic Variables				
CURISK, Currency risk premium	-3.92E-05 (2.87) ***	-3.88E-05 (2.84) ***	-3.75E-05 (2.75) ***	-3.67E-05 (2.70) ***
FISCAL, Fiscal balance to GDP	6,140.58 (8.67) ***	5,978.46 (8.32) ***	6,426.07 (8.77) ***	6,855.01 (9.32) ***
MERVALNB, Stock market index ¹	1.80E-03 (8.25) ***	1.78E-03 (8.15) ***	1.80E-03 (8.29) ***	1.83E-03 (8.43) ***
Number of observations	1,959	1,957	1,963	1,957
R^2 (within)	0.202	0.203	0.204	0.208
F-test for joint significance of fundamental variables, P-values in parentheses	9.71 (0.00)	8.55 (0.00)	10.40 (0.00)	10.12 (0.00)
F-test for individual effects, P-values in parentheses	10.80 (0.00)	10.77 (0.00)	10.79 (0.00)	11.04 (0.00)
OLS Estimation, Effect of bank-specific non-fundamental variables				
SIZE	1.362 (7.45) ***	1.264 (6.79) ***	1.215 (6.36) ***	1.352 (7.33) ***
FOREIGN	-0.033 (3.44) ***	-0.036 (3.72) ***	-0.040 (4.05) ***	-0.033 (3.30) ***
PRIVATE	0.056 (4.01) ***	0.051 (3.65) ***	0.056 (4.03) ***	0.056 (3.96) ***
R^2	0.189	0.191	0.193	0.189

Unless indicated otherwise, t-statistics shown in parentheses, significance at a 10 percent (*), 5 percent (**), and 1 percent (***) level indicated.

¹ Recalculated index, excludes banks.

Table 10. Deposit Growth in Argentina: Restricting the Sample

Fixed Effects Estimation¹			
Dependent variable: 12-month real growth rate of deposits (<i>AGDEP</i>)			
Samples:	<i>FDD</i> (-3), Foreign currency deposit ratio	<i>FPL</i> (-3), Private foreign currency loan ratio	<i>FP</i> (-3), Foreign currency position
<u>Full sample</u>			
Coefficient	-0.086 (1.26)	-0.141 (1.60)	-0.236 (3.50) ***
Number of observations	1,957	1,963	1,957
R^2 (within)	0.203	0.204	0.208
F-test for joint significance of fundamental variables, P-values in parentheses	8.55 (0.00)	10.40 (0.00)	10.12 (0.00)
<u>Sample excluding 20% smallest banks</u>			
Coefficient	0.044 (0.57)	0.005 (0.05)	-0.203 (2.89) ***
Number of observations	1,706	1,710	1,706
R^2 (within)	0.215	0.211	0.218
F-test for joint significance of fundamental variables, P-values in parentheses	7.91 (0.00)	8.42 (0.00)	9.09 (0.00)
<u>Sample excluding 20% of banks with lowest level of <i>TIMEDEP</i>.</u>			
Coefficient	-0.058 (0.81)	-0.114 (1.27)	-0.306 (4.16) ***
Number of observations	1,598	1,605	1,598
R^2 (within)	0.251	0.248	0.259
F-test for joint significance of fundamental variables, P-values in parentheses	6.90 (0.00)	8.32 (0.00)	9.35 (0.00)

¹ Same specification as in Table 9. Here we only report the coefficients on foreign exchange variables. Unless indicated otherwise, t-statistics shown in parentheses, significance at a 10 percent (*), 5 percent (**), and 1 percent (***) level indicated.

Table 11. Deposit Growth in Argentina: Interactions with Macroeconomic Variables

Fixed Effects Estimation¹

Dependent variable: 12-month real growth rate of deposits (*AGDEP*)

Explanatory variables:

Interaction between Size and Macroeconomic Variables

SIZE · CURISK	9.99E-04 (1.69) *	9.97E-04 (1.69) *	9.98E-04 (1.69) *	1.00E-03 (1.70) *
SIZE · FISCAL	73,527.29 (2.66) ***	72,660.42 (2.62) ***	80,512.150 (2.90) ***	69,958.580 (2.53) **
SIZE · MervalNB ²	0.027 (3.28) ***	0.027 (3.27) ***	0.027 (3.26) ***	0.027 (3.29) ***
Number of observations	1,958	1,956	1,963	1,956
R^2 (within)	0.194	0.195	0.196	0.199

Interaction between TIMEDEP³ and Macroeconomic Variables

TIMEDEP · CURISK	2.39E-04 (3.12) ***	2.40E-04 (3.14) ***	2.41E-04 (3.16) ***	2.32E-04 (3.04) ***
TIMEDEP · FISCAL	15,904.35 (4.12) ***	15,754.73 (4.07) ***	16,408.830 (4.25) ***	16,530.46 (4.29) ***
TIMEDEP · MervalNB ²	3.96E-03 (5.41) ***	3.93E-03 (0.01)	4.01E-03 (5.49) ***	3.99E-03 (5.47) ***
Number of observations	1,956	1,956	1,961	1,956
R^2 (within)	0.201	0.201	0.202	0.206

Unless indicated otherwise, t-statistics shown in parentheses, significance at a 10 percent (*), 5 percent (**), and 1 percent (***) level indicated.

¹ Same bank-specific fundamental variables as in the respective columns of Table 9. Here we only report the coefficients on interaction terms.

² Recalculated index, excludes banks.

³ TIMEDEP is defined as the ratio of time deposits to total deposits.

Table 12. The Argentine Deposit Run

OLS Estimation				
Dependent variable: Real growth rate of deposits from banking sector peak (September 2000) to end of period (November 2001).				
Explanatory variables:				
Individual Bank Fundamentals, Average values for July - September 2000.				
CAPR, Capital ratio	1.068 (3.81) ***	1.172 (4.12) ***	0.875 (2.30) **	0.634 (1.84) *
LIQ , Liquid asset ratio	1.470 (1.27)	1.655 (1.44)	0.845 (0.69)	2.062 (1.77) *
PROFIT , Before-tax profits to assets	11.918 (0.71)	13.701 (0.83)	15.938 (0.90)	7.503 (0.46)
NPLL, Nonperforming loan ratio	-0.396 (1.82) *	-0.411 (1.91) *	-0.365 (1.60)	-0.340 (1.59)
NGOVB, Government financing ratio	-0.966 (2.15) **	-0.791 (1.73) *	-0.776 (1.47)	-0.629 (1.35)
DEPR, Implicit real interest rate	-70.848 (2.46) **	-55.503 (1.85) *		-49.535 (1.66)
FDD , Foreign currency deposit ratio		-0.386 (1.60)		
FPL , Private foreign currency loan ratio			0.340 (0.64)	
FP , Foreign currency position				0.783 (2.07) **
Bank-specific non-fundamental variables				
TIMEDEP, Share of time deposits ¹	0.276 (0.90)	0.425 (1.34)	-0.114 (0.38)	0.353 (1.17)
SIZE, Market share of assets	1.073 (0.57)	1.551 (0.83)	0.784 (0.37)	0.394 (0.21)
FOREIGN	0.012 (0.11)	0.052 (0.47)	0.089 (0.79)	-0.029 (0.27)
PRIVATE	-0.150 (0.99)	-0.150 (1.01)	-0.166 (1.03)	-0.085 (0.56)
Number of observations	73	73	71	73
R^2	0.291	0.320	0.227	0.338

Unless indicated otherwise, t-statistics shown in parentheses, significance at a 10 percent (*), 5percent (**), and 1 percent (***) level indicated.

¹ TIMEDEP is defined as the ratio of time deposits to total deposits.

Table 13. Government Financing by Argentine Banks
(Including a dummy variable for April 2001)

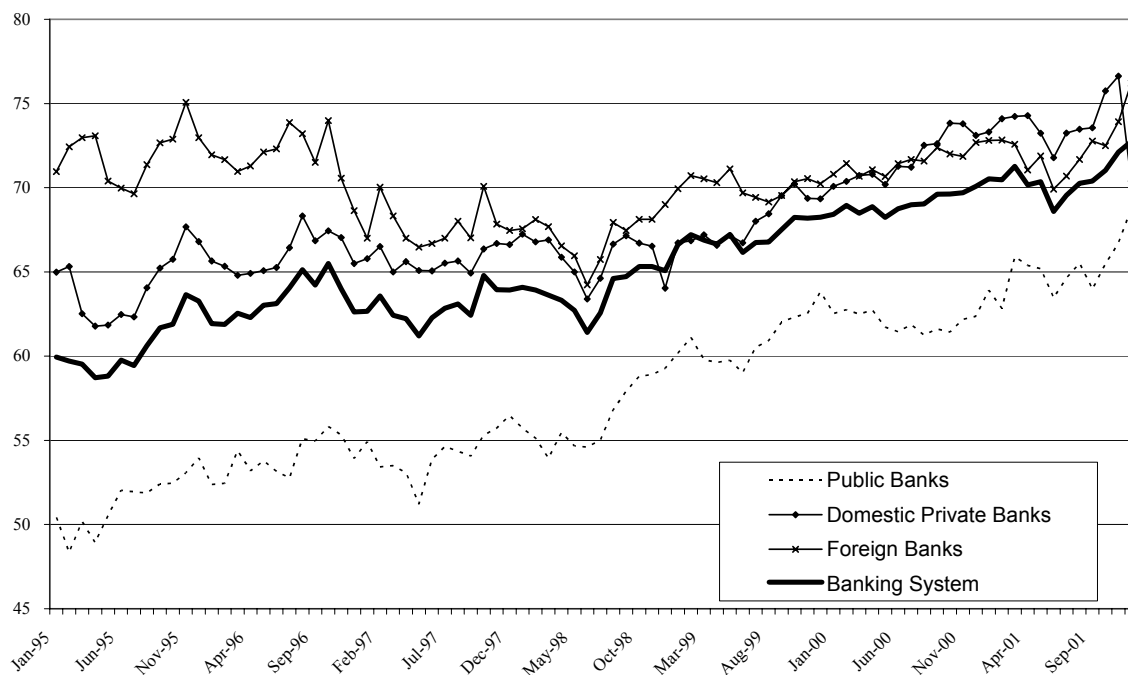
Fixed Effects Estimation				
Dependent variable: Government financing as a percentage of total assets (NGOVB)				
Explanatory variables:				
Individual Bank Fundamentals				
CAPR (-1), Capital ratio	0.229 (12.93) ***	0.049 (2.06) **	0.024 (13.18) ***	0.051 (2.17) **
LIQ (-1), Liquid asset ratio	-0.009 (0.27)	0.021 (0.66)	-0.016 (0.48)	-0.017 (0.52)
PROFIT (-1), Before-tax profits to assets	0.194 (1.38)	0.025 (0.18)	0.212 (1.52)	0.062 (0.45)
NPLL(-1), Nonperforming loan ratio	-0.030 (3.37) ***	-0.017 (2.01) **	-0.033 (3.79) ***	-0.020 (2.31) **
FDD (-1), Foreign currency deposit ratio		0.022 (1.85) *		
FPL (-1), Private foreign currency loan ratio			-0.069 (4.05) ***	
FP (-1), Foreign currency position				-0.105 (7.61) ***
DEPR, Implicit real interest rate	0.127 (0.51)	0.167 (0.68)	0.118 (0.47)	0.118 (0.48)
Other bank characteristics				
SIZE, Market share of assets	-0.792 (2.26) **	-0.489 (1.41)	-0.976 (2.78) ***	-0.551 (1.62)
Macroeconomic Variables				
CURISK, Currency risk premium	3.36E-06 (0.94)	2.87E-06 (0.80)	4.79E-06 (1.33)	5.28E-06 (1.50)
FISCAL, Fiscal balance to GDP	-272.7 (1.53)	-296.2 (1.65) *	-41.2 (0.23)	149.1 (0.81)
MERVALNB, Stock market index ¹	-2.46E-05 (0.52)	-4.60E-05 (0.99)	1.71E-06 (0.04)	-1.33E-05 (0.29)
D0401, Dummy variable: April 2001 ²	0.270 (6.61) ***	0.027 (6.55) ***	0.030 (7.43) ***	0.031 (7.62) ***
Number of observations	3,220	3,065	3,208	3,068
R ² (within)	0.117	0.069	0.122	0.086
F-test for joint significance of fundamental variables, P-values in parentheses	34.51 (0.00)	1.99 (0.06)	30.78 (0.00)	10.61 (0.00)
F-test for individual effects, P-values in parentheses	82.50 (0.00)	86.45 (0.00)	73.92 (0.00)	84.17 (0.00)
OLS Estimation, Effect of bank-specific non-fundamental variables				
SIZE	0.203 (2.47) ***	0.120 (1.46)	0.469 (5.98) ***	0.290 (3.72) ***
FOREIGN	0.025 (6.56) ***	0.024 (6.06) ***	0.044 (11.74) ***	0.043 (11.23) ***
PRIVATE	0.004 (0.77)	0.002 (0.30)	-0.010 (1.82) *	-0.009 (1.50)
R ²	0.123	0.122	0.214	0.177

Unless indicated otherwise, t-statistics shown in parentheses, significance at a 10 percent (*), 5 percent (**), and 1percent (***) level indicated.

¹ Recalculated index, excludes banks.

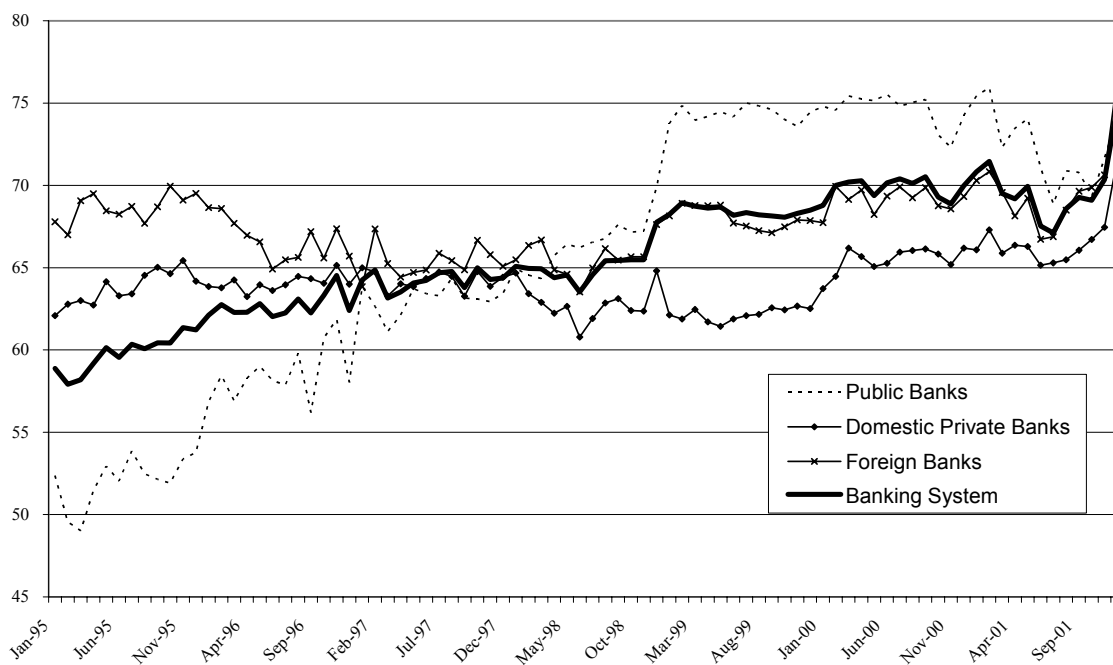
² Captures measure enacted in April 2001 permitting banks to use government bonds to comply with reserve requirements.

Figure 1. Foreign Currency Liabilities as a Percentage of Total Liabilities



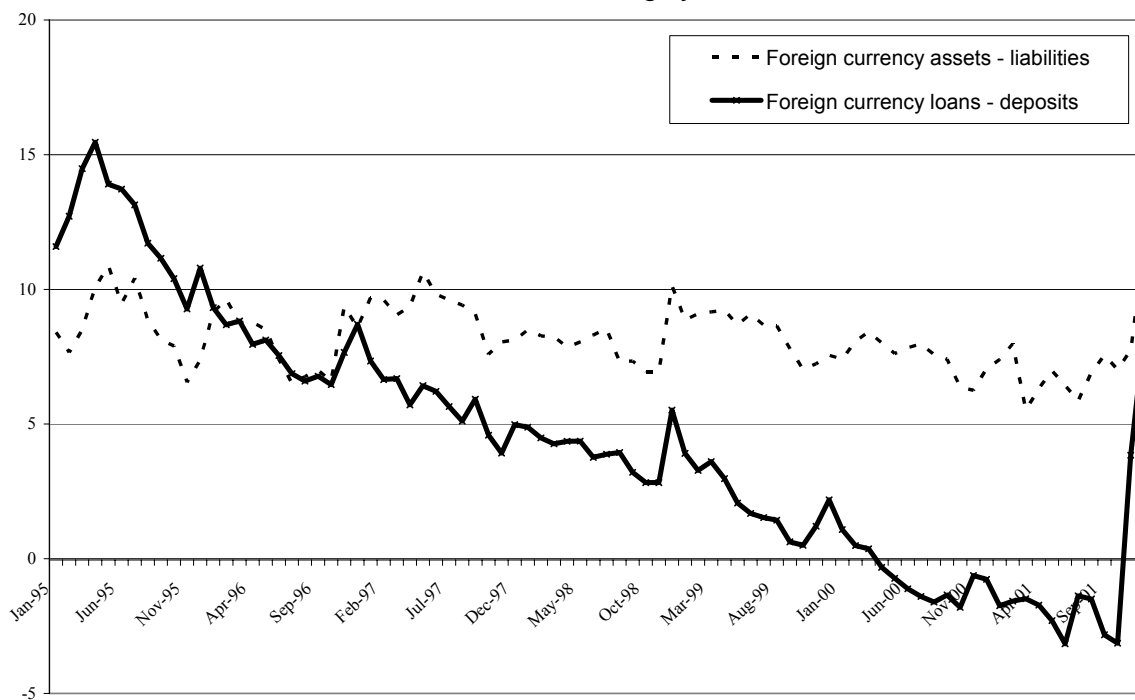
Source: Central Bank of Argentina.

Figure 2. Foreign Currency Assets as a Percentage of Total Assets



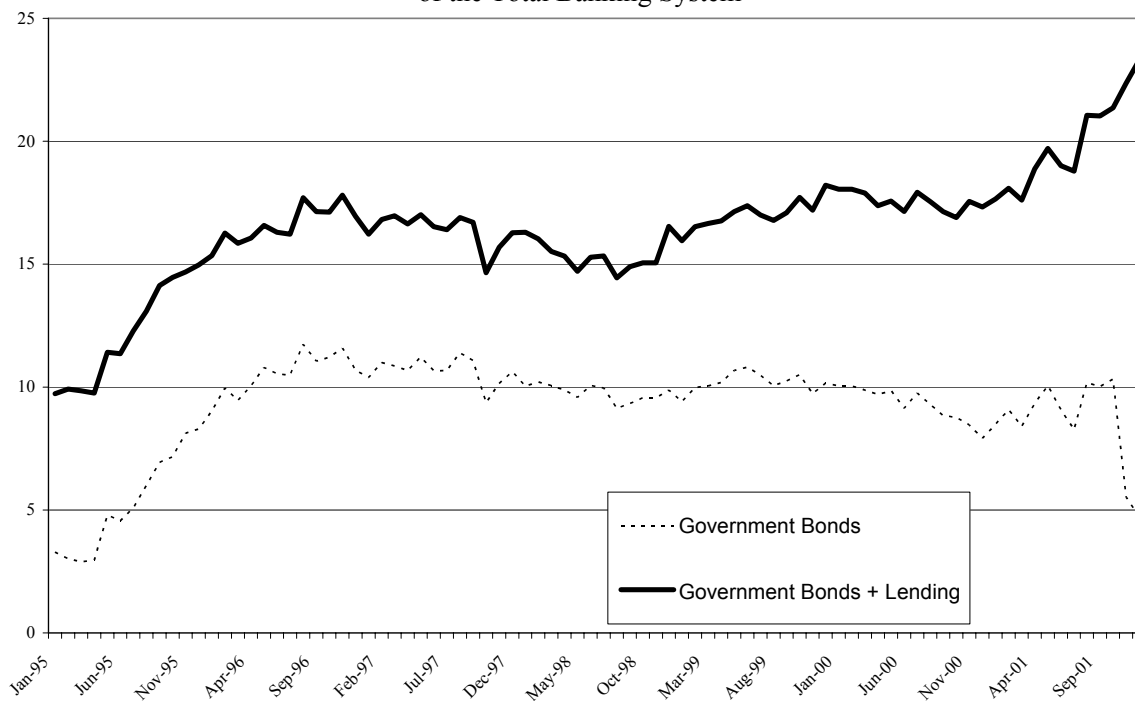
Source: Central Bank of Argentina.

Figure 3. Foreign Currency Position as a Percentage of Assets of the Total Banking System



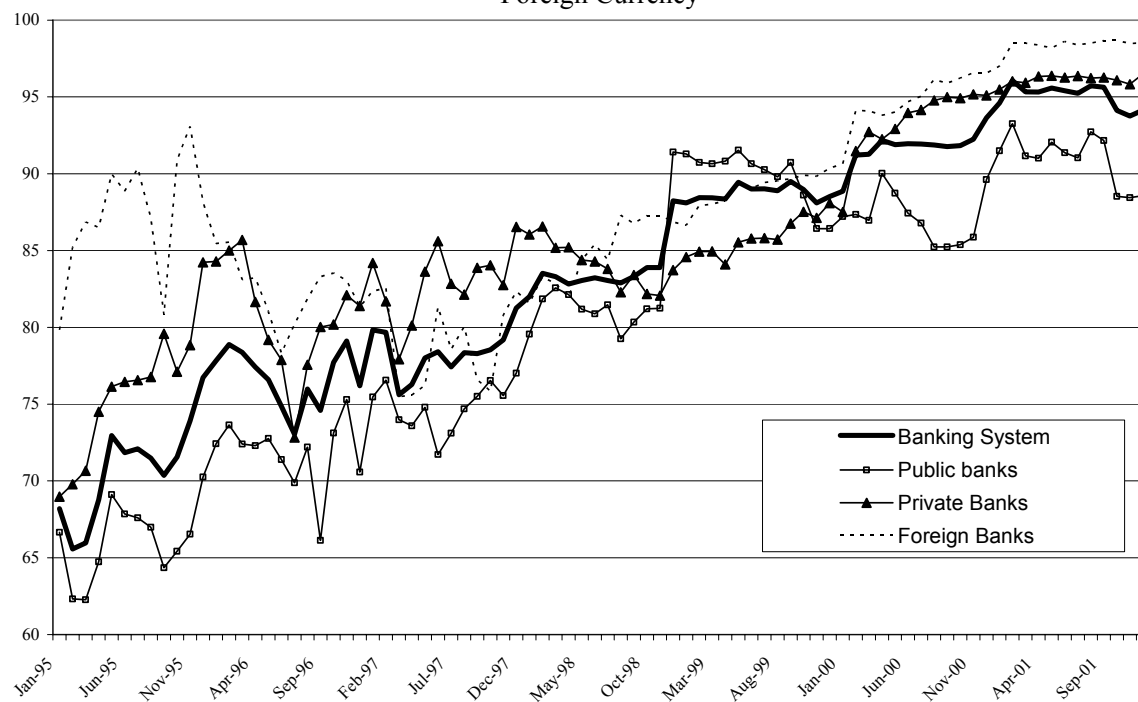
Source: Central Bank of Argentina.

Figure 4. Bank Financing to the Government as a Percentage of Assets of the Total Banking System



Source: Central Bank of Argentina.

Figure 5. Percentage of Bank Financing to the Government Denominated in Foreign Currency



Source: Central Bank of Argentina.