

The Role of Banks in the Transmission of Shocks: Micro Evidence from Argentina 1996-1999

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This Draft: May 25, 2000
Very Preliminary and Incomplete. Please do not quote.
Comments Welcome¹.

Abstract

We study the reaction of commercial banks to external macroeconomic shocks using panel data from over 120 banks in Argentina for the period 1996-1999. We show that all banks reduce lending when systemic risk increases and that this reaction is driven by credit supply decisions by banks, beyond and above the impact of reduced credit demand or increased regulatory pressure. However, the underlying reasons differ with bank size: while small banks respond primarily to a credit crunch due to a decline in their deposit base, large banks, which benefit from this shift in deposits, tend to substitute away from risky assets such as lending to small firms towards safe assets such as cash and implicitly guaranteed public sector debt. Thus, countercyclical policies to mitigate the credit crunch may be ill advised if not targeted to those institutions whose lending decisions are currently constrained by lack of capital.

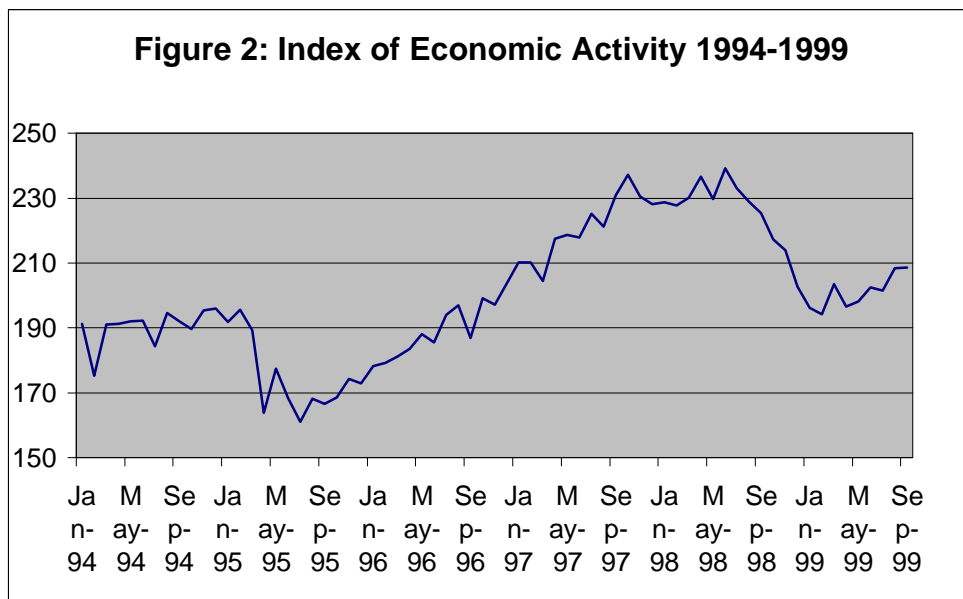
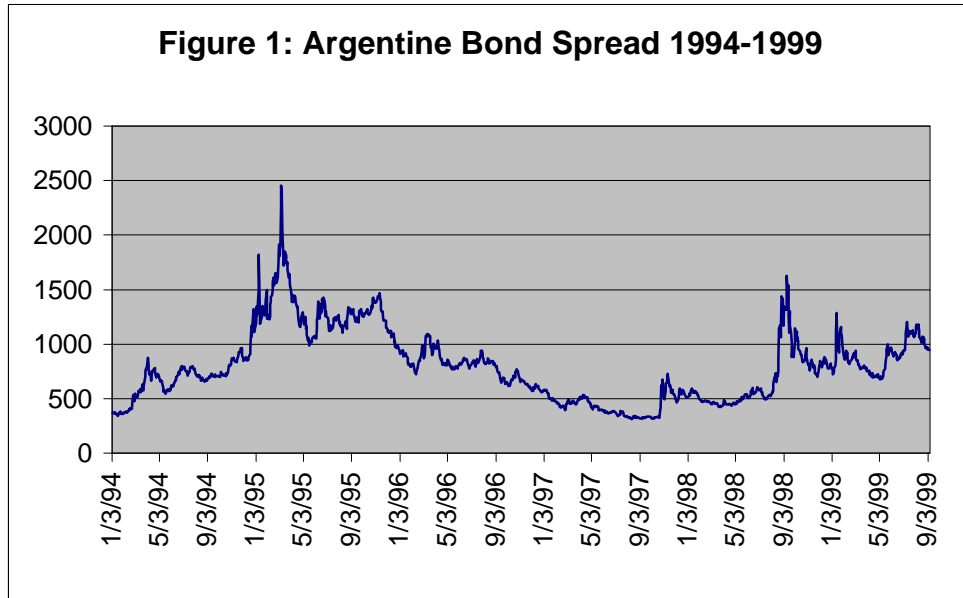
JEL: E44, E51, G21

Keywords:.

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1. Introduction

As a small, open economy with substantial links with international capital markets, Argentina suffered several adverse external shocks during the 1990s, each of them with strong impact on real activity. This is clearly illustrated in Figures 1 and 2 where we show the spread between dollar-denominated Argentine bonds and US Treasury bills and a monthly index of economic activity.



The existence of a significant effect from external shocks on economic activity suggested by the figures has been noted by most observers and is corroborated by standard causality tests.² However, there is no consensus view as to how these shocks were transmitted and what role, if any, was played by the banking sector in the process.

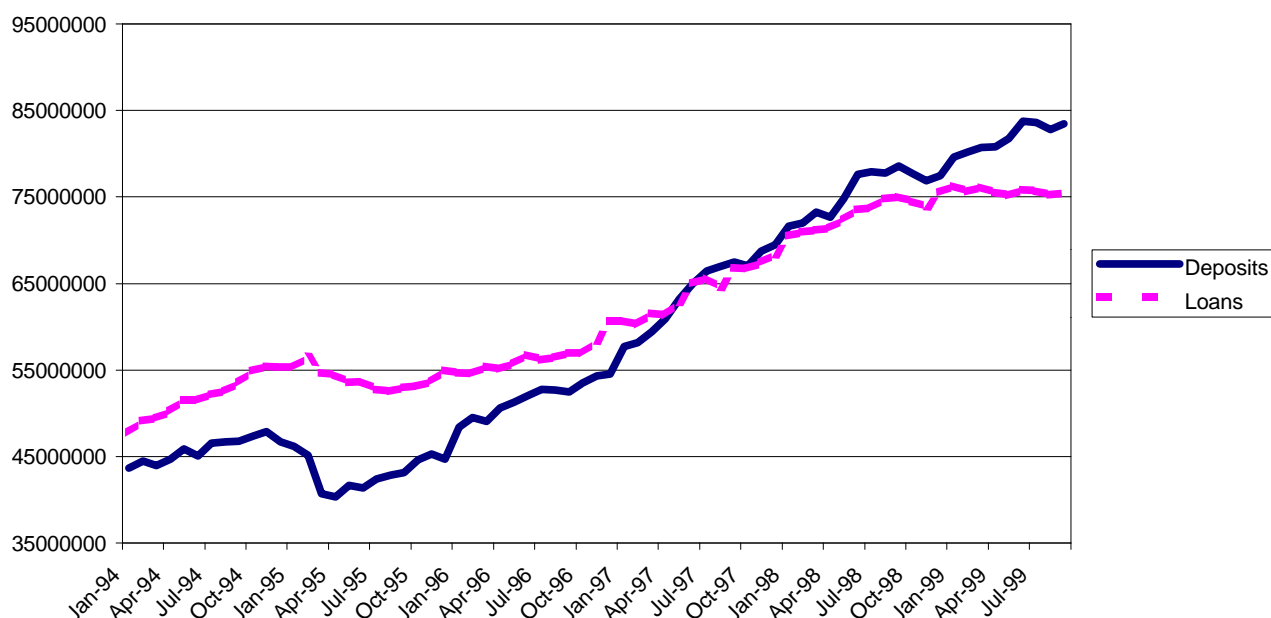
Determining the role that banks played in the transmission of external shocks in Argentina is the aim of this paper. Argentina presents a particularly interesting case study for various reasons. It is a small, open economy highly dependent on international capital flows. It was significantly affected by the period of market turbulence that started with the Asian crisis of 1997, and endured a long aftermath that is still ongoing at the time of writing. Furthermore, the currency board in place during the period of study (1996-1999) eliminates the ability of the Central Bank to conduct monetary policy, thus allowing us to isolate external shocks such as the Asian crisis and the Brazilian devaluation. In addition, the Argentine Central Bank provides detailed monthly information on banks' balance sheets.

More important, however, is the fact that the behavior displayed by the banking sector during the recent period of distress clearly differed from the banking crisis that the country experienced during the Tequila crisis of 1994-1995. Following the Mexican devaluation a bank run occurred in Argentina, with bank deposits falling by almost 20%. In the recent period, with the only exception of very short periods, deposits never ceased to grow, largely due to the generalized confidence in the resilience of the system after the consolidation process and the strengthening of the regulatory and prudential framework. Despite this, credit to the private sector remained stagnant for the most part, as Figure 3 shows.

What role do banks play in the transmission of monetary shocks to the real sector? The question is relevant to both developed countries studying the impact of monetary policy, and to developing countries trying to understand their vulnerability to external shocks and the possible policy responses. It is also a question that has received increasing attention in the academic literature in recent years. Although most economists would now agree that monetary and financial shocks can affect the real economy in the short run, there is less consensus regarding the channels through which this occurs.

² We present some of these tests later in the paper.

Figure 3: Deposits and Loans 1994-1999



The textbook argument states that, in the context of a fixed exchange rate regime, any attempt of monetary authorities to manipulate short-term interest rates in a countercyclical way results in capital flows that leaves the interest rate stable and close to international levels (plus country risk). However, several economists have pointed out the potentially important role that the banking system can play in the transmission of monetary shocks to the real economy. These arguments fall broadly into two categories, known as the balance sheet channel and the bank-lending channel of monetary transmission.

Balance sheet channel proponents argue that tight monetary policy weakens the financial position of firms by increasing interest expenses and reducing the value of collateral through lower asset prices. In a context of imperfect capital markets in which collateral is an important determinant of lending, banks should lend less to firms during a monetary contraction, leading to a reduction in real activity.

Bernanke and Blinder (1988) introduced banks into an IS-LM framework and showed how the bank-lending channel operates via the reduction of reserves that occurs during a monetary tightening. Lower reserves lead to lower deposits, and if banks are unable to substitute these lower deposits by other means due to imperfections in the capital markets, then banks are forced to reduce lending.

Bernanke and Gertler (1995) survey the evidence regarding the balance sheet channel and the bank-lending channel in the US. They find support for the balance sheet channel, but less evidence of a bank-lending channel. Kashyap and Stein (1997) present microevidence from bank balance sheets that support the existence of a bank lending channel in the US.

The work on the transmission of shocks via the banking sector in developing countries has been much more scant. Edwards and Vegh (1997) present a model in

which they show how banks can amplify the effect of shocks such as an increase in the international interest rate on a small, open economy by increasing the spread between loans and deposits. We are unaware of empirical papers addressing this issue.

An external shock, such as an increase in international interest rates, should lead to a capital outflow and a consequent loss of reserves under a currency board. If this outflow is not sterilized, then bank deposits fall, and banks are forced to cut lending unless they are able to procure funds in the capital markets or if they have excess liquid assets. This is basically the bank-lending channel at work. In addition, the capital outflow leads to a balance sheet channel because of a reduction in asset values. This worsens the balance sheet position of firms and individuals, thus making access to credit harder.

In addition to the traditional transmission mechanisms cited in the literature, there are other factors that may explain the link between macro shocks and real activity, particularly in the case of emerging markets. First, government and large firms with access to international capital markets may find it more costly (or outright impossible) to roll over their debt in a context of international financial distress. This may force them to resort to domestic markets, crowding out smaller borrowers. Secondly, the ongoing process of consolidation and internationalization of the domestic banking sectors in many emerging economies, by changing the nature of the players, may change the way they respond to fluctuations in the macroeconomic context. More precisely, large foreign banks may be both more reluctant to lend to risky small business, and less willing to roll over debt to risky borrowers if overall financial conditions worsen. Finally, the tightening of prudential regulation that followed episodes of financial distress in many emerging economies may have caused a permanent shift in the composition of loan portfolios towards safer clients, specifically large firms and the public sector.

In this paper we explore all these contending hypothesis by looking at micro data from banks' balance sheets. The map of the paper is the following. Section 2 presents an overview of the evolution of the Argentine banking system. Section 3 describes the data and our empirical strategy. Section 4 presents the main results, and Section 5 concludes.

2. The Argentine banking system, 1994-1999

a) Regulation

Argentina introduced a currency board in March 1991, following two hyperinflationary bouts. The financial system was severely crippled after years of high inflation, and by the hyperinflationary shocks. There were a large number of small, inefficient and undercapitalized banks, and the size of the system was small.

The introduction of a currency board was combined with the disappearance of lender of last resort responsibilities for the Central Bank. The combination of a weak banking system together with the inexistence of a lender of last resort led the regulatory authorities (the Central Bank) to make efforts to strengthen the system. In particular, measures were aimed at ensuring that banks operate with high liquidity and capital-asset ratios, enforcing strict supervision and loan loss provisions to reduce risk, and reducing informational asymmetries and structural costs in credit markets.

These efforts, combined with strong economic growth, allowed the system to develop and strengthen. Reserve requirements reached 17.5% of deposits by 1994, and risk weighted capital-asset ratios above the Basle standard of 8%.

However, the Mexican crisis at the end of 1994 was a strong blow for the Argentine banking system. Between December 1994 and March 1995, the system lost almost 20% of its deposits. Several banks were closed, and some feared a generalized banking collapse. The crisis highlighted the remaining problems in the banking system. Despite 3 years of strong economic growth, problem loans were still above 10% of loans, and these bad loans were concentrated disproportionately in provincial banks and small private banks. The crisis, which led to deposit withdrawals and reductions in asset values, hit these banks particularly hard.

By April 1995, the authorities had managed to stabilize the situation by pushing through a packet of reforms including lowering reserve requirements temporarily to increase available liquidity; increasing Central Bank credit (the limits on LLR were softened); the creation of two fiduciary trusts to foster privatization of provincial banks and to help capitalize and restructure private banks; setting up a temporary safety net coordinated by Banco Nacion – the largest bank in the system, owned by the state -; and instating a privately managed deposit insurance funded with compulsory contributions from banks

These measures led to a recovery of deposits in the second half of 1995, and by January 1996, they were above pre-crisis levels. However, the Central Bank did not remain inactive. In an effort to prevent future crises, it embarked on a “second generation” of reforms, aimed at increasing liquidity and capitalization even more, reducing information asymmetries and overhauling the payments system.

In the third quarter of 1995, reserve requirements were replaced by remunerated liquidity requirements, which were set at 20% by February 1998 (compared with 10% in Chile, 6% in Germany). Furthermore, the Central Bank signed a contingent repo facility with a consortium of international banks, by which it has the option to swap Argentine government securities for up to \$7.3bn, at an implicit cost of aprox. LIBOR plus 2%. In addition, the Central Bank increased capital-asset ratios by changing the weighting scheme, and created a credit risk bureau in 1996 to centralize and make credit history information available. Finally, information publication requirements were increased, and elements of market discipline were introduced by forcing banks to sell subordinated debt to sophisticated investors.

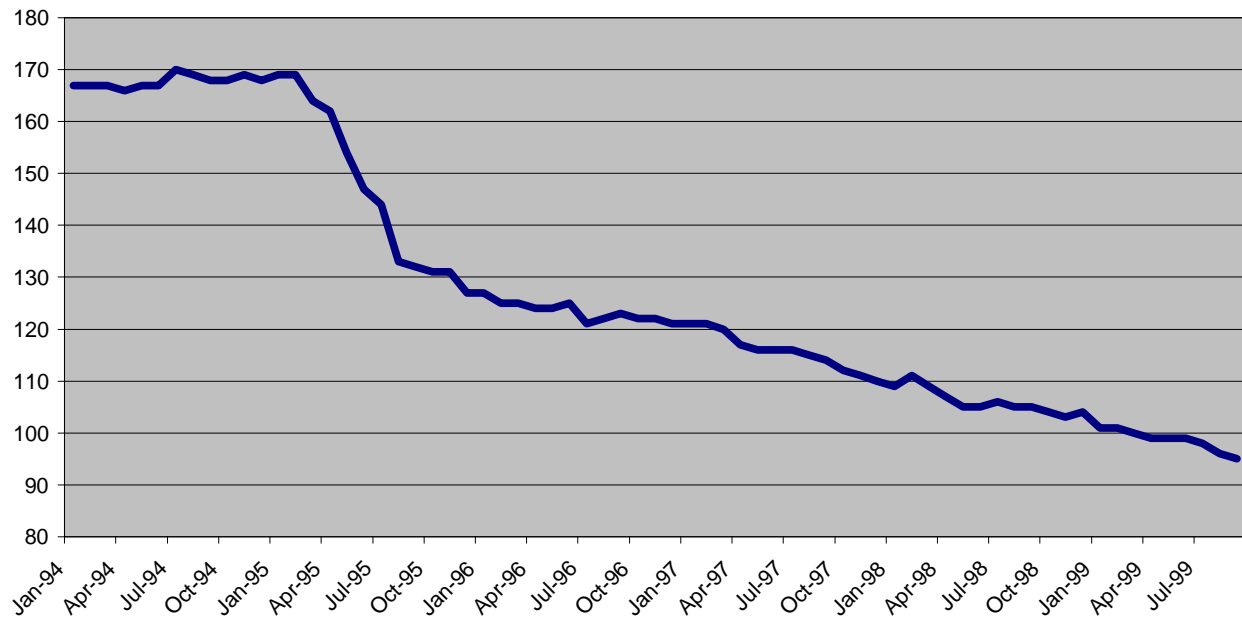
b) Variables

The international context was highly volatile in 1994-1999, as shown in the introduction, but growth was also strong, and followed vast privatization, deregulation, and opening of the economy after 1990.

In this context, the banking sector was no exception. Deposits grew from less than \$50bn in July 1994 to almost \$80bn in January 1999, and loans grew from just over \$50bn to around \$75bn. However, in 1998 loans began to lag behind deposits, leading many commentators to blame banks for being too conservative, and for “sitting on their

In July 1994 there were approximately 170 banks. This number fell to around 130 in July 1995, and to less than 100 in January 1999. (see Fig. 4).

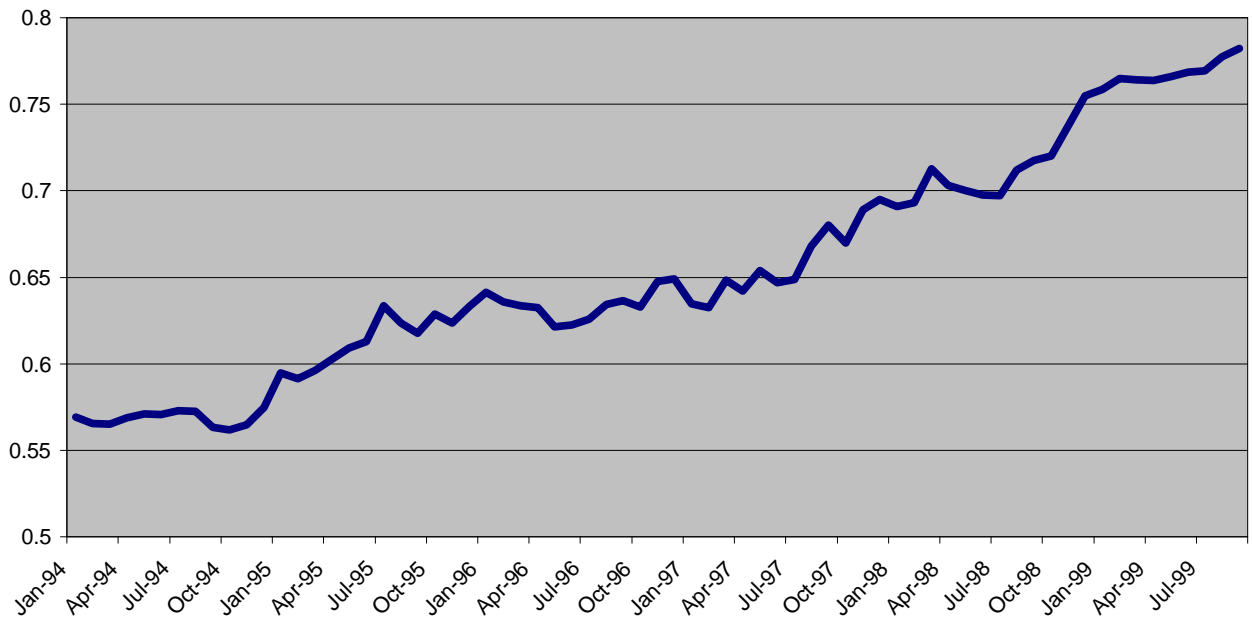
Figure 4: Number of Banks 1994-1999



This reduction in number was a consequence of the 1995 crisis, which hurt small private banks (especially cooperatives) and provincial banks particularly hard. Also, throughout the period, many foreign banks entered the market by buying one or more local banks, and several mergers took place. Thus, the system went from a large number of mostly small, domestic banks to a much smaller number of banks, with many of them foreign owned.

Furthermore, the system became more concentrated. The share of assets in the 20 largest banks increased from around 57% in January 1994 to almost 80% in September 1999. (see Fig. 5)

Figure 5: Proportion of assets in top 20 banks, 1994-1999



Thus, the Argentine banking system between 1994 and 1999 grew and became more concentrated. As shown above, regulation also became tighter after the Mexican crisis, leaving the system better prepared to face the turbulence in international capital markets of 1997-1999.

Despite the improved fundamentals of the banking system, loans stagnated after mid-1998. Furthermore, the composition of bank assets changed, with safer loans displacing riskier loans. For example, dollar denominated loans increased vis-à-vis peso denominated loans, loans to the private sector lost ground against guaranteed loans to the public sector and within private sector loans, collateralized loans and loans to large firms substituted uncollateralized loans and loans to small firms.

Figure 6: Peso and Dollar Loans 1994-1999

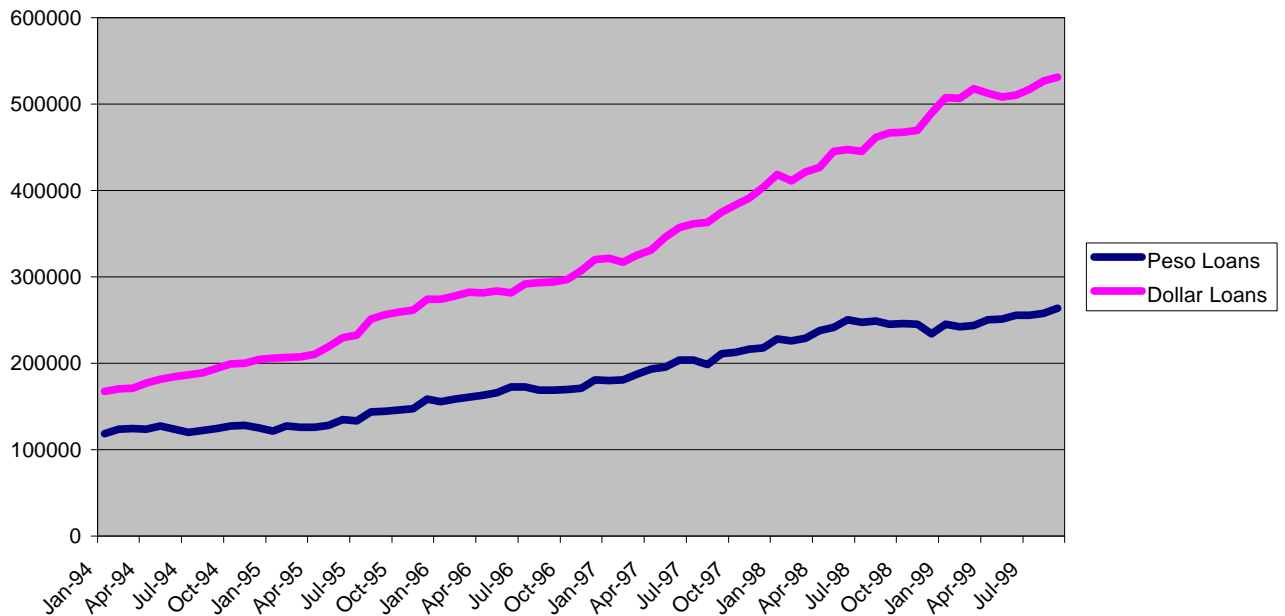


Figure 6 shows how the trend for substitution from peso to dollar denominated loans became stronger after mid-1998, with peso loans stagnating while dollar loans continued to grow.

In Figures 7 and 8 we show the evolution of private and public sector loans. Loans to the private sector stagnated after mid-1998, whereas loans to the public sector continued to grow. Given that loans to the public sector are usually collateralized with future tax receipts, they are considered safer than most private sector loans. This once again shows the change in bank asset composition towards safer assets.

Figure 7: Private Sector Loans 1997-1999

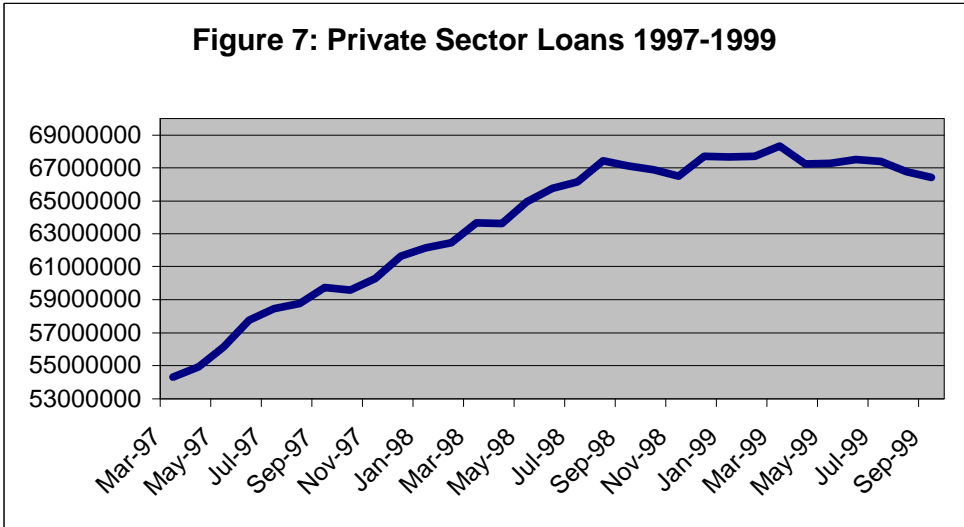
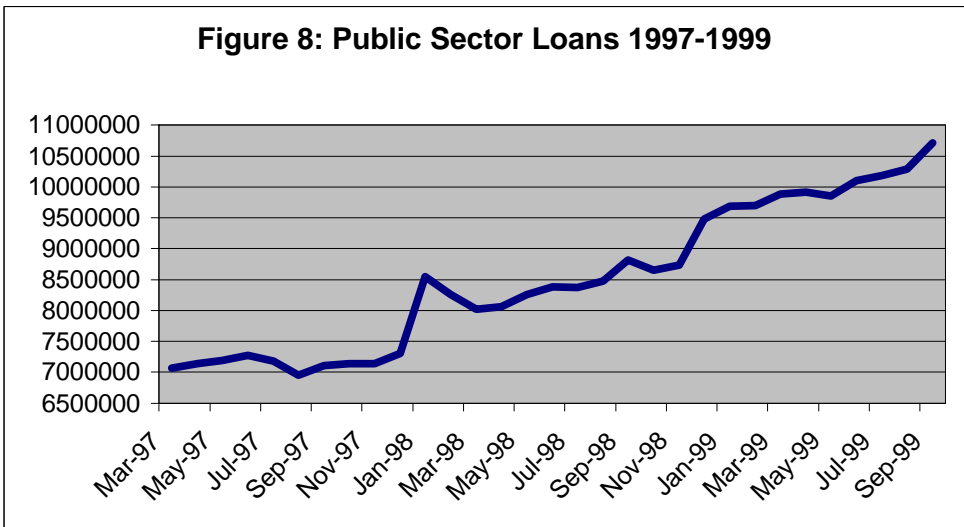
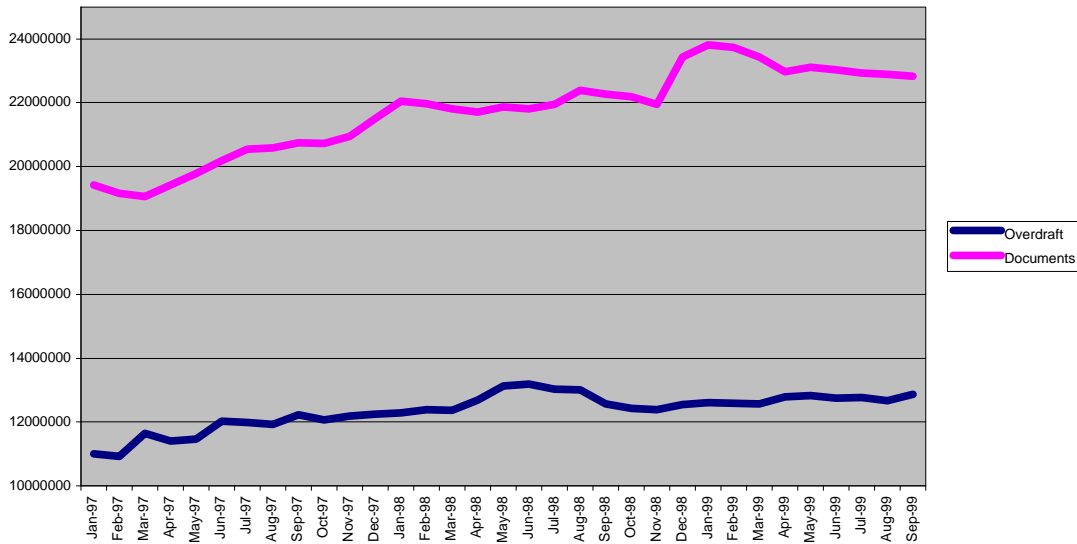


Figure 8: Public Sector Loans 1997-1999



In Figure 9 we present data for the evolution of overdraft loans, which in Argentina are usually uncollateralized and used by small firms that are unable to obtain a loan, and for documents, which are loans given usually to larger, safer firms. Although the trend is less clear, after mid-1998 we observe a substitution from the riskier to the safer type of loan.

Figure 9: Overdraft and Documents 1997-1999



Thus, a first glance at the aggregate data suggests that, during the period following the 1997 Asian crisis, loans to the private sector stagnated even though deposits continued to rise, and the composition of bank portfolios changed towards safer assets. However, this description masks an important difference at the micro level, which is immediately clear once we distinguish between large and small banks.

Figures 10 and 11 show the evolution of deposits and loans for the 20 largest banks (both private and state-owned) and the rest of the banks in our sample, where size is measured as the deposit share.³ As the figures show, while the aggregate picture is dominated by the behavior of large banks, smaller banks did suffer from a decline in deposits. Indeed, the apparent correlation between the deposit base of these banks and the evolution of country risk suggests that this decline can be largely attributed to a flight to quality (associated by depositors with size).

Three preliminary conclusions can be extracted from this exploratory inspection. First, the stability of deposit growth notwithstanding, small banks seems to have suffered from a standard credit crunch as a result of the escalation in macroeconomic risk. Secondly, any analysis of the behavior of banks during the period has to discriminate

³ Banks closed or merged during the period of analysis were excluded from the sample. See description of the data below.

between these two groups of banks. Finally, there seems to be a close link between economic activity and the activity of small banks that deserves closer attention.⁴

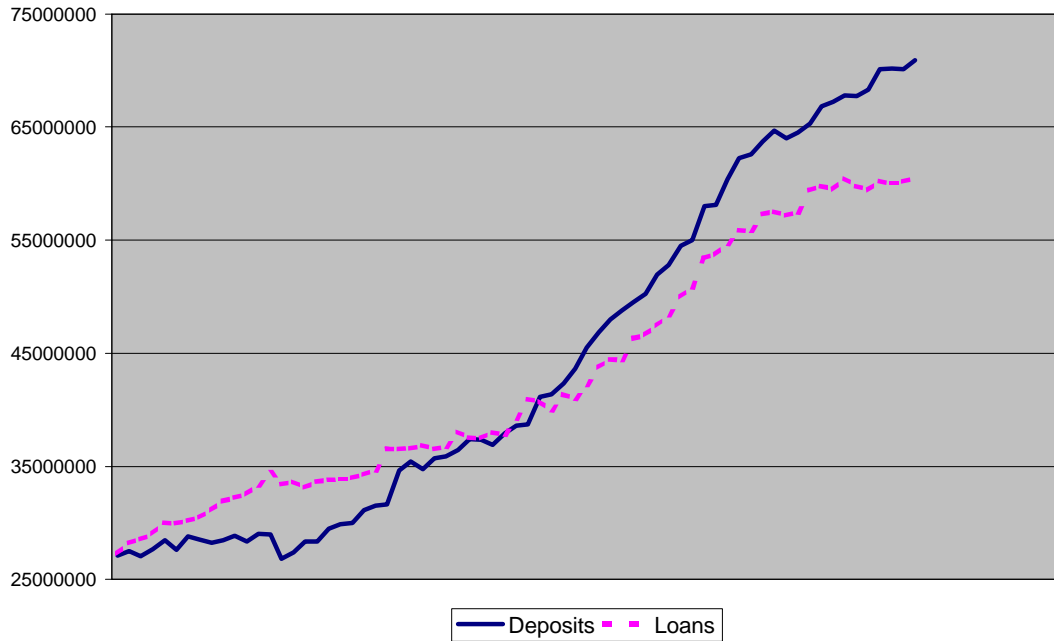
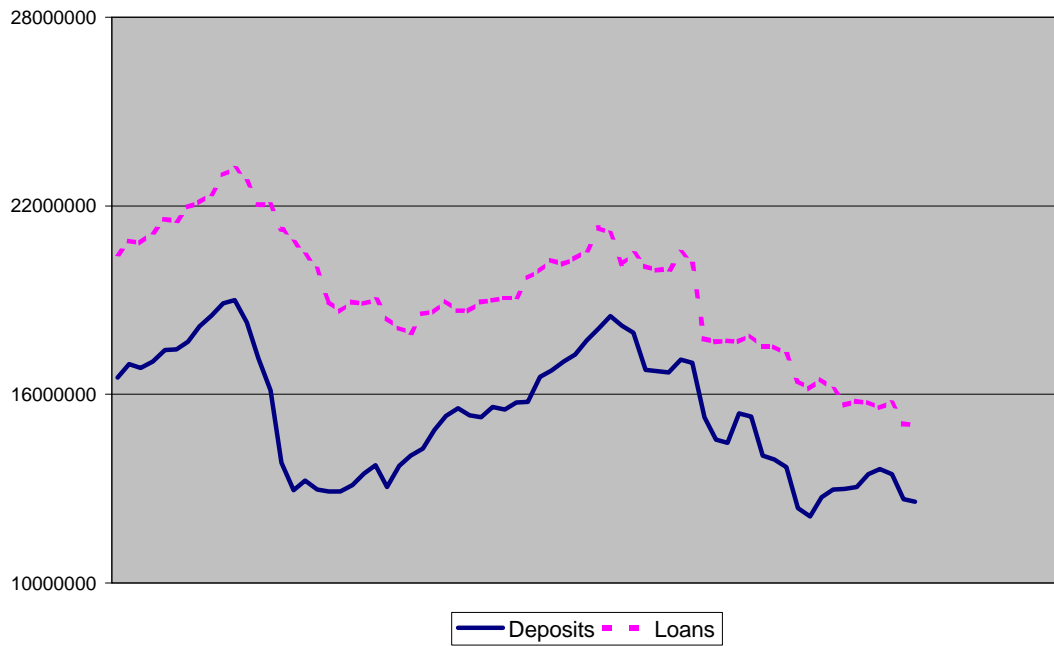


Figure 11. Deposits and Loans, smaller banks 1994-1999



⁴ While this link may be an indication of the impact of the credit crunch on the real economy, it may also reflect the strong cyclicality in the demand for credit of small businesses that constitute the primary clients of smaller banks. We come back to this point later on.

3. Data and Specification

Our data come from the Central Bank of Argentina. They cover the balance sheets of all banks and finance companies in Argentina for the period January 1996 to September 1999. The data are monthly, and have a high level of detail. (we have higher detail since 1997, after the Central Bank increased publication requirements).

The raw data includes 195 banks and around 40 finance companies. We focus only on banks, which we divided into private national, private foreign, cooperative and state banks. As shown in Figure 5, several banks “died” following the 1995 crisis. Although we conducted our test also for all banks, the following discussion focuses on results based on the subsample of banks that were alive throughout the period under study.⁵ We divided banks into 2 categories: large ones (top 20 in terms of deposit base) and small ones (the remaining surviving banks in the sample).

As mentioned in the introduction, two types of hypotheses can be advanced to explain the evolution of the banking sector credit described in the previous section. The first one points at a direction of causality that goes from the banking sector to economic activity. Within this group we can mention:

- 1) **Bank lending channel:** banks have less access to funds, and thus have to limit lending.
- 2) **Balance sheet channel:** firms and individuals’ balance sheets are worsened due to lower asset values, making them less creditworthy and thus less able to borrow, forcing banks to lend more to safer, collateralized loans.
- 3) **Crowding out:** the public sector and large firms that usually resort to international capital markets may find access more costly or severely limited, thus having to search for funds in the domestic market and crowding out smaller firms. In addition, this may combine with the fact that procyclical public sector deficits in many emerging economies create an additional demand for funds both in the foreign and domestic market, crowding out the private sector as a whole.
- 4) **Concentration:** larger, foreign banks tend to behave more conservatively and to favor larger, safer clients. Therefore, the process of consolidation and internationalization of the banking sector in Argentina may have shifted the composition of bank lending portfolios towards larger firms and the public sector.
- 5) **Tougher regulation:** increasingly stricter regulations imposed by the Central Bank of Argentina following the Tequila crisis may have induced banks to reduce the riskiness of their portfolios, as well as increased their sensitivity to sudden changes in overall risk.

The second group emphasizes reverse causality, that is, that recessions cause a fall in the demand for credit. More precisely, according to the *demand hypothesis*, the recession usually associated with adverse macroeconomic shocks, and the concomitant

⁵ Given that we intend to compare the behavior of large and small banks (where the hazard rate was substantially higher), including all banks would have introduced undesired fluctuations in the evolution of the second group.

deterioration of the financial situation of firms and consumers may have led them to reduce their demand for credit, leading to the reported decline in loans. Furthermore, smaller firms that rely on overdraft facilities for credit, are typically hit harder than larger firms, thus explaining the different behavior of these two types of financing.

4. Results

a) Tests of the bank-lending channel

We explore these contending hypotheses with the only prior that there is a difference in behavior according to the size of the bank. For this purpose, we use the following variables.

Our proxy for external shocks (RISK) is the yield spread of floating rate Argentine bonds over a U.S. Treasury bond of comparable duration, as measured by the EMBI-AR compiled by J.P. Morgan.

To test for the existence of a lending channel, we followed Kashyap and Stein (1997), and measured bank strength (its holdings of liquid assets at the time of an adverse shock) as the share of cash and securities (mostly public bonds) in its asset portfolio. This variable (STRENGTH) allows us to test the bank-lending channel: if an adverse shock triggers a decline in bank deposits, higher strength would allow the bank to attenuate the impact of this decline on its lending portfolio.

For all banks and for each size category, we run a fixed-effects panel data regression of the form:

$$L = b_1 RISK + b_2 STRENGTH + b_3 RISK * STRENGTH + aX$$

where L is a vector of the loan portfolio, normalized by the assets of the bank and X is a matrix formed by vectors of the control variables which we describe below.

The test of the lending channel relies on the sign of the coefficient on the interactive term, b_3 . If the bank-lending channel operates, it implies that a buffer of liquid assets is important for banks when trying to absorb a shock to deposits without reducing loans. Therefore, b_3 should be positive, meaning that the negative impact of RISK on loans is attenuated by a high buffer of liquidity.

Several controls are added to this test, accounting for the alternative (demand) hypothesis and others discussed above. We control for regulatory pressure by including the capital-asset ratio (CAPASSET). If tight regulation is a significant factor behind the bank's lending decisions, we expect to see a negative correlation between the ratio and its loan portfolio. Similarly, we measure a deterioration in the quality of the loan portfolio by the ratio of non-performing loans to total loans (PROBLEM LOANS), which according to the balance sheet hypothesis must be negatively correlated to the bank lending. The importance of size is tested through the self-explanatory variable LOG(ASSETS). To test the demand hypothesis we include an index of the economic cycle (CYCLE), measured as the cyclical component of a monthly coincident index of

economic activity.⁶ Finally, we include a TIME TREND to control for aspects not covered by the previous variables.⁷ To control for endogeneity, all explanatory variables - with the exception of the size variable LOG(ASSETS) - are computed as the average over the previous three months.

Table 1 reports the main results from the test of the bank lending channel. For the whole sample, the coefficient on the interaction term has the right coefficient, but, contrary to the hypothesis of the bank lending channel, both the effect of risk and the buffer stock of liquid assets on bank loans are significantly positive or, in the case of risk when controls are added, negative but very close to zero.⁸ This implies that the bank-lending channel does not find support for the whole sample of banks.

For small banks, however, we find a significantly negative relationship between risk and lending, partially attenuated by the access to a liquid stock of assets. This implies that the bank-lending channel is an accurate description of the behavior of small banks.

Curiously enough, the same relationship has the opposite sign for large banks, consistent with the hypothesis advanced in section 2 that large banks benefit from adverse shocks that trigger a flight to quality and a shift of deposits from small banks.

The coefficient of the controls for regulation and asset quality, on the other hand, are highly significant and of the expected sign in all cases. However, a look at the magnitude of these effects indicates that while asset quality is particularly important for large banks, capital requirements seem to be a larger concern for small ones. This reflects the greater conservatism of the former, and the more limited access to new capital of the latter.

While we find some weak support for the demand hypothesis in the aggregate, cyclical movements seem to have played a role only through larger banks, with no apparent impact on smaller institutions. The same is true of size effects, which provides some, albeit weak, support to the hypothesis that the consolidation and growth of the leading institutions was accompanied by a change in asset composition that tended to favor public securities.

In sum, while we find evidence of a bank-lending channel for small banks, large banks do not seem to have suffered a credit crunch but rather to have benefited from external shocks. It remains to be tested to what extent the reluctance to lend to the private sector during the recent period was the result of the deterioration of investment opportunities (balance sheet channel).

⁶ We applied a HP filter to the Coincident Index computed on a monthly basis by the Center for Financial Research of the Universidad Torcuato Di Tella.

⁷ We discuss the interpretation of this variable below.

⁸ The sign of these links, computed as the first derivative of the dependent variable on RISK (STRENGTH), valued at the average STRENGTH (RISK), is positive. This is confirmed by conducting the same regression excluding the interactive regressor.

Table 1: Test of Bank Lending Channel (January 1996 - September 1999)

DEPENDENT VARIABLE: LOANS						
SAMPLE:	ALL BANKS	ALL BANKS	LARGE	SMALL	LARGE	SMALL
RISK*STRENGTH	0.1919** <i>0.0080</i>	0.0257*** <i>0.0079</i>	-0,0319** <i>0.0155</i>	0,0197** <i>0.0094</i>	-0,0228 <i>0.0151</i>	0,0276*** <i>0.0092</i>
RISK	-0.0028* <i>0.0017</i>	-0.0042** <i>0.0016</i>	0,0103*** <i>0.0030</i>	-0,0042** <i>0.0019</i>	0,0095*** <i>0.0029</i>	-0,0058*** <i>0.0019</i>
STRENGTH	-0.4376*** <i>0.0685</i>	0.5825*** <i>0.0687</i>	0,4972*** <i>0.1355</i>	-0,5634*** <i>0.0788</i>	0,3663*** <i>0.1352</i>	-0,7174*** <i>0.0794</i>
CYCLE	0.0001 <i>0.0002</i>	0.0004** <i>0.0017</i>	0,0003 <i>0.0002</i>	8.56E-6 <i>0.0002</i>	0,0005** <i>0.0002</i>	-0.0003 <i>0.0002</i>
TIME TREND	-0.0012*** <i>0.0001</i>	-0.0010*** <i>0.0001</i>	-0,0021*** <i>0.0001</i>	-0,0008*** <i>0.0001</i>	-0,0012*** <i>0.0002</i>	-0,0007*** <i>0.0002</i>
CAPASSET		1.1200*** <i>0.0765</i>			4.4925*** <i>0.4238</i>	1,0286*** <i>0.0880</i>
CAPASSETSQ		-1.0527*** <i>0.1122</i>			-18.8672*** <i>1.8450</i>	-0.9504*** <i>0.1269</i>
PROBLEM LOANS		-0.0970*** <i>0.0194</i>			-0,2002*** <i>0.0658</i>	-0,0904** <i>0.0216</i>
LOG(ASSETS)		-0.0047 <i>0.0061</i>			-0,0419*** <i>0.0115</i>	0.0040 <i>0.0072</i>
N	3453	3134	900	2553	863	2271

Includes banks alive throughout the period. Large banks are the top 20 banks by deposits.

*, **, and *** represent 90, 95 and 99% significance

Standard errors in italics.

All independent variables except LOG(ASSETS) are the averages of the three previous periods

b) Tests of the balance sheet channel

We argued above that one possible explanation for the growing gap between the supply of deposits and loans may be an increasing conservatism of the banks due to either tighter prudential regulation or greater risk aversion on the part of large international institutions. In the first case, one should expect a substitution towards safer assets across the board: from advances to documents, and from both of them to loans to the public sector and public bonds. In the second, this trend should be more pronounced the larger the institution.

We proceed to test this hypothesis by looking at the components of the asset side of banks' balance sheets, both for all banks and disaggregating according to size. We also run test excluding state-owned banks, to account for the fact that these banks are naturally more willing to lend to the public sector.⁹

Table 2 summarizes the results of the test on the portfolio composition of large banks (with and without state-owned ones).

[To be written.]

⁹ The distinction is particularly important in the segment of large banks, many of which are state-owned.

Table 2: Test of Balance Sheet Channel – Large Banks**DEPENDENT VARIABLE:**

	LOANS	CASH+SEC.	PUBLIC	ADVANCES	DOCUM.
CYCLE	0.0006* <i>0.0002</i>	-0.0001 <i>0.0001</i>	-0.0006*** <i>0.0001</i>	0.0006 <i>0.0005</i>	-0.0004 <i>0.0003</i>
RISK	0.0048*** <i>0.0011</i>	-0.0030*** <i>0.0007</i>	0.0004 <i>0.0011</i>	0.0002 <i>0.0015</i>	-0.0005 <i>0.0008</i>
TIME TREND	-0.0010*** <i>0.0002</i>	0.0005** <i>0.0002</i>	-0.0007 <i>0.0003</i>	-0.0022*** <i>0.0004</i>	-0.0001 <i>0.0002</i>
CAPASSET	4.7983*** <i>0.4204</i>	0.3025 <i>0.2642</i>	1.4868*** <i>0.3794</i>	0.9517 <i>0.4976</i>	0.9102** <i>0.2702</i>
CAPASSETSQ	-19.1822*** <i>1.8496</i>	0.5689 <i>1.1622</i>	-12.7338*** <i>1.8689</i>	0.5176 <i>2.1715</i>	-4.6245*** <i>1.1794</i>
PROBLEM LOANS	-0.1831* <i>0.0655</i>	0.0423 <i>0.0412</i>	-0.3301*** <i>0.0484</i>	-0.2629** <i>0.0829</i>	0.0841 <i>0.0450</i>
LOG(ASSETS)	-0.0510*** <i>0.0112</i>	-0.0234** <i>0.0070</i>	-0.0004 <i>0.0089</i>	0.0326 <i>0.0129</i>	-0.0386*** <i>0.0070</i>
N	863	863	585	703	703

Includes banks alive throughout the period. Large banks are the top 20 banks by deposits.

*, **, and *** represent 90, 95 and 99% significance

Standard errors in italics.

All independent variables except LOG(ASSETS) are the averages of the three previous periods

Table 3: Test of Balance Sheet Channel – Large Private Banks

DEPENDENT VARIABLE:					
	LOANS	CASH+SEC.	PUBLIC	ADVANCES	DOCUM.
CYCLE	0.0012*** <i>0.0003</i>	-0.0001 <i>0.0001</i>	-0.0001 <i>0.0001</i>	0.0002 <i>0.0006</i>	0.0001 <i>0.0003</i>
RISK	0.0069*** <i>0.0014</i>	-0.0019 <i>0.0008</i>	-0.0001 <i>0.0010</i>	-0.0017 <i>0.0018</i>	0.0006 <i>0.0009</i>
TIME TREND	-0.0008 <i>0.0004</i>	0.0005* <i>0.0002</i>	-0.0001 <i>0.0003</i>	-0.0030*** <i>0.0006</i>	0.0004 <i>0.0003</i>
CAPASSET	7.3013*** <i>0.5429</i>	0.6195 <i>0.2981</i>	1.9135*** <i>0.4141</i>	1.4501 <i>0.6669</i>	0.9739** <i>0.3221</i>
CAPASSETSQ	-28.8233*** <i>2.3200</i>	-1.0184 <i>1.2737</i>	-15.3566*** <i>2.0075</i>	-0.8405 <i>2.7680</i>	-3.0610 <i>1.3369</i>
PROBLEM LOANS	-0.0504 <i>0.1018</i>	0.0323 <i>0.0559</i>	-0.0338 <i>0.0655</i>	-0.2954 <i>0.1194</i>	0.2074*** <i>0.0577</i>
LOG(ASSETS)	-0.0151 <i>0.0195</i>	-0.0482*** <i>0.0107</i>	0.0204 <i>0.0110</i>	0.0995*** <i>0.0247</i>	-0.0388** <i>0.0119</i>
N	643	643	430	523	523

Includes banks alive throughout the period. Large banks are the top 20 banks by deposits.

*, **, and *** represent 90, 95 and 99% significance

Standard errors in italics.

All independent variables except LOG(ASSETS) are the averages of the three previous periods

5. Conclusions

In this paper we found evidence that the banking sector played a key role in the transmission of shocks to the real economy in Argentina during 1996-1999. In particular, we found evidence for a bank-lending channel operating for small banks. That is, the adverse shocks reduced the deposits of these banks, and their inability to obtain financing in financial markets forced them to reduce lending.

Furthermore, we found that, controlling for the reduction in loan demand, large banks reduced their lending to the private sector, and in general substituted towards safer assets, such as loans to the public sector, collateralized loans to large firms and dollar-denominated loans.

These results provide support to the hypothesis that banks play an important role in the transmission of macroeconomic shocks to the real economy. This is important for policymakers in developing countries trying to attenuate the impact of these shocks. For example, Edwards and Vegh (1997) advocate lowering reserve requirements during a crisis so as to provide banks with more liquidity and reduce their need to liquidate assets below market value, thus leading to solvency problems.

Our results indicate that measures of this sort should be targeted towards those institutions whose lending decisions are more affected by the shocks, namely small banks. Furthermore, the government should make an effort to avoid increasing its demand for credit during bad times, so as not to crowd out private sector borrowing when it is most needed.

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