Why Have Banks Stopped Lending In Mexico Since the Peso Crisis in 1995

by

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Abstract

Lending from commercial banks to the non-financial private sector shrank from 10% to 0.3% of GDP in 1994 and 2000 respectively. There has been a general reduction in the depth of traditional financial markets since 1994. The purpose of this paper is to answer why banks have reduced lending so dramatically since the peso crisis? The paper will argue, that the two conventional explanations: (i) low capitalization/lack of access to capital and (ii) poor legislation to repossess collateral or “barzon” like debtor club behavior are inconsistent with the stylized facts. Rather the problem is one of perverse incentives created by the banking bailout scheme. In particular, IPAB bailout bonds have reduced/eliminated the incentive for banks to lend to the non-financial private sector. Because banks cannot perfectly discriminate among depositors or creditors, banks have no incentives to increase deposits or lines of credit because the losses incurred due to the overall rise in the interest rate on the cost of funds outweigh the gains from increased lending. Equivalently, higher lending lowers the lending rate which also lowers the return on existing income from IPAB bonds. Capital injections are not profitable because they lower average returns to capital. The policy implication is that if Mexico wants banks to lend again, it will have to buy back the bonds and perhaps even replace them with foreign debt.

JEL: E44, E22,G2, O16, O54

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I. Introduction

The Peso crisis in 1995 dealt a huge blow to economic activity and to the structural reform effort began in the mid to late 1980s. In particular, Gonzalez and Marrufo (2001) argued that since the peso crisis in 1995, the dynamism and depth of the financial sector broadly defined began a dramatic decline. Financial sector depth decreased from a high of 100% of GDP in 1994 to close to 70% of GDP in 1999. The most drastic fall was in commercial banking. The assets of commercial banks fell from 39% in 1995 to 25% in 1999, not much higher than the pre-stabilization levels in the mid 1980s. Perhaps more importantly, bank lending to the non-financial private sector decreased from 10% of GDP in 1994 to 0.3% of GDP in 2000 while the economy experienced one of the fastest expansion periods with an average annual GDP growth of 5.4% from 1996 to 2000. The same authors argue the results present a puzzle because despite the fact that Mexico’s financial sector experienced a pronounced contraction in relation to GDP since 1995, gross domestic investment recovered and surpassed the pre-crisis level to reach 24% of GDP.\footnote{In a series of 10 working papers produced by the CREDPR at Stanford various authors address where these investment funds are coming from, whether they are sustainable, their terms, and if the intermediation mechanisms appear efficient. Working Papers XX-XX.}

A key question then is: Why have private commercial banks stopped lending in Mexico? There are two common wisdom explanations to this accepted fact although there is surprisingly little formal work: The first is that banks are undercapitalized. At the outset of the crisis, the outcome was almost inevitable. The fall in economic activity left commercial banks holding a large share of non performing loans leaving them undercapitalized. The presumption was that as banks returned to profitability and increased their capital, bank lending would return. The second explanation is that poor legislation for repossessing collateral is preventing banks from lending. Or equivalently, that there is a pervasive “culture” of no repayment since the crisis that goes unpunished by the authorities. Section 3 in this paper argues neither of these reasons is consistent with the stylized facts. Undercapitalization should have lead to a sharp reduction in lending immediately following the crisis and a gradual increase in lending since then. However, the data suggest a continuous fall in lending since 1995 despite the fact...
economic activity recovered sharply. Similarly, legislation to exercise the collateral has been in place for a long time and there was a clear structural break in 1995.

The main purpose of this paper is to argue that the reason for the lack of bank lending is one of perverse incentives created by the banking bailout package rather than low capitalization and/or poor lending enforcement legislation. Section 4 argues bailout bonds have reduced and in most cases eliminated bank’s incentives to lend. It is not that banks lack capital or access to it but that banks do not find it profit maximizing to lend. In order to increase lending, banks have to lower the lending rates and either increase their deposits, their lines of credit, or their capital. The proposition is that the inframarginal losses outweigh the incentives to lend. That is, in order to increase deposits or lines of credit banks raise the interest rates on deposit or on lines of credit, for all existing bank liabilities. The presence of bailout bonds increases the inframarginal losses decreasing the incentives to lend and even cause banks to reduce lending.

Why should banks lend if instead they can hold a bond that pays a competitive rate with zero default risk which does not incur screening, provisioning, or capitalization costs? There is no reason and that is why bank lending has virtually disappeared. Banks in Mexico have been reduced to institutions that accept deposits, hold either IPAB bonds or other government securities, and make a huge profit with almost zero risk. The irony is that these profits are being financed by the bailout bonds, which are being financed by taxpayers, which the bailout was supposed to protect.

The question is important for many reasons. First, the importance of a well functioning financial sector for growth and development cannot be overstated. A growing body of literature finds that the development of the financial sector has a positive effect on growth. The mechanism is well known, a well functioning financial sector improves the quantity and quality of firm investment, which in turn translates into economic growth. If Mexico is to attain and maintain high rates of growth like those experienced by Chile and the East Asian Tigers, the financial sector will have to be a larger and more efficient intermediary of funds than it is today; i.e. East Asian countries

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3 From the consumer’s perspective, the financial sect allows economic agents to smooth out consumption in time and to protect them from exogenous shocks.
invest around 30% of GDP while in Mexico the comparable number is around 20% of GDP. Moreover, Gonzalez and Marrufo (2001) among others argue that financial markets are complements rather than substitutes to each other (Levine XX). Contrary to what some of the literature has argued, the financial system in Mexico does not appear to be bank vs. market based. Rather, banks are complements to bonds, which are in turn complements to stocks. The reasoning should come as no surprise because in order for banks to issue bonds they usually have to have access to bank credit previously. Similarly, in order to issue stocks, firms usually acquire reputation in the bond market first (Mishkin 2001).

Second, understanding the reasons Mexican banks are not lending is the first step in defining the right policies to remedy the situation. This paper is not about pointing mistakes in the banking bailout but about understanding why banks have stopped lending so that in the future the situation can be remedied. Enough time has passed since the crisis to take an objective look at its effects on the financial sector. The economy has recovered and it is clear that the financial sector, and the banking sector in particular have lagged behind placing drag on economic activity. This helps us understand why there is a sense that Mexico never emerged from the crisis. Growth returned without renewed access to credit so economic agents feel the 1995 crisis never really ended.

Third, the lack of lending has caused (mostly large tradable) firms to leverage themselves with financing abroad which has put pressure on the peso to appreciate and set in motion a vicious cycle of capital inflow-sterilization. Fourth, the experience is important beyond Mexico. Many bank bailouts in the 1990s have been resolved through loan purchases in exchange for bonds. The reason for this appears to be that authorities can clean a large non performing portfolio with minimum impact on inflation. However, few have studied the perverse incentives of loan purchase bailouts with bonds.

The rest of the paper is divided into four more sections. Section 2 reviews banking sector performance since 1995 and describes the main elements of the bailout. Section 3 presents the reasons existing arguments to explain the lack of lending do not agree with the data. Section 4 presents a new explanation. Section 5 concludes.

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4 This idea is developed in a different paper. Gonzalez (2002).
II. Banking Sector Performance Since 1995 and the Bailout: Stylized Facts

A brief exposition of the evolution of the main variables of financial sector performance, and in particular banking sector performance since 1995 is necessary to provide a context and frame the issue.\(^5\)

Figure 2.1 presents the evolution of the depth of the financial sector in Mexico from 1985 to the present as a percentage of GDP. It presents the contribution of the main financial markets: the stock of assets of commercial and development banks, the stocks of public and private bonds outstanding, and the stock market capitalization. The Mexican financial system grew from 40% in 1985 to 100% in 1994 before shrinking to about 70% of GDP in 1999.\(^6\) The increased depth of the financial sector was accompanied by a reduction in the participation of public development banks whose participation fell from close to 38% in 1986 to less than 10% of GDP in 1999. Domestic public bond capitalization remained roughly constant during the period while the corporate bond market increased from a very small base. Both stock market capitalization and commercial bank assets move together. They increased from 1985 to 1994 and they shrank continuously until 1999. This finding corroborates findings by Levine (2000) who argues that bank and equity markets appear to be complements rather than substitutes in emerging economies.\(^7\)

\(^5\) This section draws on extensively from Gonzalez and Marrufo (2001) where a more extended evaluation of the financial system can be found. More complete historical reviews of the process of financial liberalization can be found in Aspe (1993), and Ortiz (1994).

\(^6\) Some authors have argued that the increase in credit in Mexico was not optimal and that the bubble was bound to burst. Many of the papers which address the 1995 peso crisis take this view. See Edwards and Naim (1997) for a good compilation of papers about the Mexican crisis. Telling the difference between financial market development and a lending boom is not trivial. Loayza (2002) is developing a methodology to address this issue. Determining whether the growth in the financial markets was sustainable or not prior to 1994 is beyond the scope of this paper.

\(^7\) In fact Gonzalez and Marrufo (2001) argue that bank lending is a complement to other financial markets as well. They also show that as of 1997, financial sector depth Chile was 200% of GDP, Mexico is behind most European nations, Chile and Korea but is has a larger financial sector than Argentina and Brazil. Similarly, the stock market alone in the U.S. in 1999 was close to 200% of GDP (Mishkin 2000).
Figure 2.1: Financial Sector Assets

Figure 3.1
Financial Sector Assets

Figure 2.2 translates the year-end stocks into yearly flows and adds foreign savings (the current account), to determine the annual contributions of each of these sources of funds to gross domestic investment in Mexico. As in many developed countries, gross domestic investment exceeds the sum of traditional external sources of investment during most years. The gap is usually thought to represent the contribution of retained earnings and trade credit.

Figure 2.2: Investment flows by source.

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8 Figure 3.3 does not include the stock market because we lack data on new issues. Given the small number of firms listed on the Mexican Stock Exchange, new issues do not represent a large amount.
9 Mayer (1990) finds that retentions and trade credit account for more than 50 percent of the sources of finance in United States, Japan, France, United Kingdom and Germany. In Japan, trade credit alone accounts for 18 percent of the sources of lending.
Typically, this difference between investment and the “traditional sources of finance” evolves slowly over time stable but Figures 2.1 and Figure 2.2 indicate there was a structural break in 1995. Since the Peso crisis in 1995, the depth of Mexico’s financial markets shrank. Figure 2.1 shows that most of this fall is driven by the fall in the assets of the commercial banks from 39% in 1995 to 25% in 1999. Figure 2.2 shows this translated into a continuous reduction in commercial bank lending continuously close to 10% of GDP in 1994 to 0.3% of GDP in the year 1999. Thus, Mexico presents an interesting puzzle in the second half of the 1990s because despite the fact that Mexico’s financial sector, and in particular the banking sector, experienced a pronounced contraction in relation to GDP since 1995, gross domestic investment recovered relatively quickly and surpassed the pre-crisis level to reach close to 24%. Although traditional sources of external funds dried up, private enterprises in Mexico continued to find investment funds from other sources. It is not entirely clear what these sources are, whether they are sustainable, or whether the mechanisms these sources are using to sort out the most productive investments are functioning adequately.\footnote{See footnote 1 for a series of papers that attempt to address this issue.}

\textbf{2.b Banking Sector Performance}
Figure 2.3 shows domestic credit outstanding to the non-financial private sector for Argentina, Brazil, Chile, and Mexico from 1980 to the present as a percentage of GDP. Credit to the non-financial private sector credit is a better indication of bank contribution to private investment because in Mexico, as in other countries in Latin America, bank credit to the public sector can be substantial.\(^\text{11}\) The role of the commercial banking sector increased in the early 1990s following financial reform and privatization and then experienced a severe contraction after the crisis in 1995. Bank’s assets reached 39% of GDP in 1994, and by 1999, the same figure had dropped to 25% of GDP, a proportion lower than the world average of 52.6% and lower than the Latin American average of 27.9%.\(^\text{12}\)

Credit growth after financial reform in Mexico resembles the Chilean experience in the early 1980s.\(^\text{13}\) Bank credit to the private sector in Chile increased as a consequence of the liberalization reform initiated in 1975 and the Chilean credit boom also ended in a banking crisis followed by a massive reduction in credit in the subsequent years\(^\text{14}\). However, lending in Chile has recovered steadily since the late 1980s to reach close to 55% of GDP where as Mexico’s credit crunch continued to worsen seven years after the crisis. The continuous deterioration and reduction of bank lending is a key feature of the Mexican banking crisis that will be addressed later in the paper.

Figure 2.4 compares outstanding banking credit to the non-financial private sector as a percentage of the GDP for a selected group of countries. Before the banking crisis in 1995 Mexico was just behind Chile, while in 1999 Mexico is compared to less developed countries like Ecuador and Colombia. As a result, the relative size of Mexico’s banking sector is smaller than Brazil’s and slightly larger than Argentina’s.

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\(^{11}\) For example, in Mexico in 1986, 72% of commercial bank credit flowed to the public sector (Gelos (1997) as cited in Copelman (2000). Public finances in Mexico have been solid since 1995 but the following sections will show Mexican banks have increased their share of government securities as a part of the restructuring program.

\(^{12}\) Source: Demirguc-Kunt, and Levine (1999).

\(^{13}\) Gil Diaz (2001) expresses some concerns on whether this credit boom was sustainable. He mentions other factors, besides liberalization responsible for the observed credit boom. These factors are: poor mechanisms of creditor screening due to low levels human capital in the commercial and non-transparent capitalization in some commercial banks.

\(^{14}\) See Norman Loayza (2000) for an analysis of the history of financial system in Chile.
Sources: Beck et al. (1999) and Bank of Mexico, Economic and Financial Indicators, various issues

**Figure 2.4:** Bank credit to non-financial private sector.

**Figure 3.5**
Bank Credit to Non-financial Private Sector

Sources: For Mexico: Bank of Mexico, Economic and Financial Indicators, various issues
For Other countries, 1990-97 Average from Kunt and Levine (1999)
The reduction in lending was across the board to firms and households. However, the reduction hit non-tradable firms harder. Krueger and Tornell (1999) document based on data from Banco de Mexico, that the 142 firms listed in the Mexican stock market had on average 53% of their liabilities denominated in dollars, and that the ones with the highest leverage in dollars had a higher export to sales ratio.

A good indicator of banking efficiency is the interest rate spread. Interest rates spreads measure the cost of channeling deposits to firms for investment. It is difficult to construct a good series of deposit and lending rates because there are many deposit and lending rates, they vary across countries, change over time, and the composition of deposits and loans also change. Demirgüç-Kunt and Levine (1999) proposed the use of the net interest margin to compare banking sector efficiency across countries. The net interest margin is equal to total interest revenues minus total interest expenditures divided by the value of assets. Higher values of net interest margin indicate a higher spread on deposit and lending rates and therefore lower efficiency.

Figure 2.5 shows the net interest margin for Argentina, Brazil, Chile and Mexico from 1990 to the present. The net interest margin in Mexico did not decrease after bank privatization in 1992. Some have argued that this is due to a riskier pool of creditors but also due to a high industry concentration in the sector. Only, Argentina and Brazil show substantial reductions in the net interest margin in the 1990s and Gallego and Loayza (2000) show a decrease in the spread in the 1980s for Chile.

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15 After privatization, the three largest banks held about 60% of the total assets in the banking sector. A comprehensive study on interest rates spreads during liberalization can be found in Montes Negret and Landa (2000). Using two different measures of interest spread, they find that privatization did not reduce the spread significantly.
2.c: The Banking Bailout Package

The Peso crash in 1995 was severe but short lived. Economic activity in 1995 fell 6.2% in real terms, and official open unemployment doubled to 7.6%. But by 1996 the economy was in a full recovery driven by exports and investment in the exportable sector. Mexico experienced one of the most vigorous expansion periods in recent history. The crisis struck a large shock to the banking system. The devaluation hurt bank’s balance sheet directly through their foreign exchange exposure, and indirectly because firms who borrowed in dollars but sold their goods in pesos were not able to pay. In addition the combination of the fall in economic activity and the rise in real interest rates left many firms unable to meet their obligations. As a result Mexican banks were left undercapitalized.16

The government took several measures to reduce the current account deficit, prevent inflation from rising, and avoiding a meltdown of the banking system. The

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16 There are many papers that analyze the Peso Crisis and its effects on the banking financial system. Edwards and Naim (199X) have a good compilation of papers. Krueger and Tornell (1999) provide a more recent version.
measures included fiscal and monetary tightening as well as a support package from the U.S. treasury, the IMF and the World Bank amounting to US$52 billion. The measures to resolve the banking crisis can be grouped into three categories: (i) A liquidity assistance program that provided short-term foreign currency loans at penalty rates so that banks could honor their external lines of credit and their foreign exchange exposure. (ii) Debtor support programs of various sorts. Some reduced interest payments to debtors able and willing to repay their debts in their original conditions while the government paid the costs of interest reductions. Others included a loan indexation mechanism that allowed loans to be restructured in a constant value unit of account (UDIs) and at a constant real interest rate based of forward looking inflation expectations. There were also some debtor programs targeted for mortgages, the agricultural sector, and small and medium size business.

(iii) The final and costliest measure included two forms of open bank assistance: The first program, called PROCAPTE\(^\text{17}\) was designed to increase bank assets to face rising past due loans in order to aid banks in reaching a capital asset ratio higher than 8%. Banks who agreed to participate in this program were allowed to issue five year convertible bonds which would be purchased by the government and the proceeds would have to be converted to equity capital. There was a strong incentive to raise the capital quickly because the bonds were charged a premium over the interbank rate. If the bank failed to meet the 8% capital/asset ratio by a pre-established date, the bank would be taken over by the authorities. Unfortunately, the program did not work because “the market considered participation as a sign of weakness or as a prelude to [government] intervention.”\(^\text{18}\) As section 4 will show, in hindsight, these measures would not have created the perverse incentives against lending that the loan purchase program described below created.

The second open bank assistance program and the one that actually was implemented fully was a loan purchase where banks swapped non-performing loans in exchange for non-tradable, 10 year bonds with interest rates linked to Mexican Treasuries.

\(^{17}\) Programa de Capitalización Temporal (Temporary Capitalization Program)  
\(^{18}\) Mackey (1999).
The purpose of the program was to give banks a “clean slate” so they could return to profitability and lending. One condition to enter this program was the following: for every two pesos of non-performing loans that the government acquired, the shareholders should invest one peso of fresh capital in the bank. The idea was that this program would increase bank capitalization at the same time and as the economy recovered banks would get rid of non-performing loans, and return to profitability and lending.

**Insert Table 2.1. Summary of the terms and amounts of bonds for each bank.**

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19 Fondo Bancario de Protección al Ahorro. A deposit insurance agency created in 1990, modeled after the FDIC, but without an explicit limit on deposit coverage and without the institutional strength to resolve banks. The institution was replaced in (1998) by IPAB. The functions of IPAB have been strengthened but
The terms of the bonds were negotiated individually with each bank that participated in the program. Table 2.1 presents the stock of bonds outstanding the second quarter of 2001 and Figure 2.6 graphically shows the distribution. The idea was to tailor make the bailout package for each bank in order to lower the cost. Ex post the distribution assumptions of bad loans is hard to explain. Bancrecer, a small bank, swapped bad loans for bonds worth 10 billion dollars.

In general, the interest rates of the bonds are fixed to a specific market interest rate: CETES, Mexican Treasuries, or the TIIE, the inter-bank interest rate (the equivalent of the Federal Funds rate). In retrospect, it appears the returns are high with a few points above or below the reference rate indicating the authorities were not able to reduce the cost much.

The loan purchase program were not done once and for all because the share of non-performing loans kept increasing and banks failed to recapitalize. Table 2.1 shows there were various swaps between 1995 until 2000. Some of the later issues are “refinancing.” It is not clear if this implies a strict renegotiation of maturities and rates or if these transactions included reductions or increases in the loan. Moreover, it is not clear why there is such a high concentration of renewals at the end of the Zedillo administration. The temporary bailout program became an open-ended bailout mechanism. The moral hazard induced by this process was tremendous. Not surprisingly, past due loans continued to increase even as bad loans were taken of the balance sheets. The ratio of past due loans to total loans increased from 8.7% in 1994, to 16.4% in 1995, 21.4% in 1996, and 29.8% in 1997.20 All of this despite the fact the economy recovered at a fast pace –it grew at 5.4% during the 1996-2000 period while inflation fell from above 50 percent in 1995 to single-digit levels in 2000. La Porta et al (2001) present a convincing case that the main reason non-performing loans continued to increase was that related lending increased once it became obvious that there was going to be a bailout.

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20 The increase between 1996 and 1997 is mostly because the Banking Supervision agency (CNBV) changed its methodology. Under the new standards, which follow the Basel guidelines more closely, the value of a past due loan is reported as the total unpaid balance, capital and interest, rather than only the amount that was delinquent. Section III presents the evolution of past due loans since 1997 under the new methodology.
Three questions arise: (i) Why did the government not implement a comprehensive once and for all cleansing of bad loans. (ii) Should government take over management of the banks (the legal figure in Mexico is intervention). And (iii) Why were there no bank liquidations? Partial answer to these questions provided in the literature are that authorities did not want to recognize all the bad loans because they did not want the problem to appear bigger than it was already perceived to be. Moreover, it would have increased the government’s obligations substantially at a time when it was having a hard time rolling over short term paper. At the same time, the initially the intention was too keep private management despite the fact most banks were insolvent and most loan purchases took place this way because it did not want to send a signal that Mexico was back in 1982.21

Over time, authorities intervened a large number of banks both before and after the loan purchase had taken place. There were five cases in which the swap took place without change in ownership and 10 other cases the loan purchase was done after the bank administration had been taken over by the government.22 Table 2.2 below shows a summary of the merger and consolidation process that took place in the Mexican banking system since 1994. On one hand, the number of non intervened banks decreased from 34

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22 Source: La Porta et al (2000) for a complete list of intervened and non intervened banks.
to 15 in 1994 and 2002 respectively and the share of the market share of the largest banks increased undoubtedly hindering competition. On the other, foreign participation increased from no-majority ownership of any bank to majority ownership in four of the largest banks which is intended to increase stability of the system.  

Table 2.2. Summary of bank mergers since the peso crisis.

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Banamex, Bancomer, and Serfin account for over 70% of the assets. Citibank was a foreign owned bank prior to 1994 but its participation in retail banking was limited.
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<td>17 Capital</td>
<td>18 Capital</td>
<td>16 Capital</td>
</tr>
<tr>
<td>29 Inverlat</td>
<td>20 Inverlat - Scotia (55%)</td>
<td>20 Inverlat - Scotia (55%)</td>
<td>20 Inverlat - Scotia (55%)</td>
<td>15 Inverlat - Scotia (99%)</td>
</tr>
</tbody>
</table>

**Banks in resolution (sale or liquidation)**

<table>
<thead>
<tr>
<th>30 Capital</th>
<th>21 Capital</th>
<th>18 Capital</th>
<th>17 Capital</th>
<th>16 Capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>31 Sureste</td>
<td>22 Sureste</td>
<td>19 Sureste</td>
<td>18 Sureste</td>
<td>17 Sureste</td>
</tr>
<tr>
<td>32 Pronorte</td>
<td>23 Pronorte</td>
<td>20 Pronorte</td>
<td>19 Pronorte</td>
<td>18 Pronorte</td>
</tr>
<tr>
<td>33 Anáhuac</td>
<td>24 Anáhuac</td>
<td>21 Anáhuac</td>
<td>20 Anáhuac</td>
<td>19 Anáhuac</td>
</tr>
<tr>
<td>34 Industrial</td>
<td>25 Industrial</td>
<td>22 Industrial</td>
<td>21 Industrial</td>
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</tr>
<tr>
<td></td>
<td>26 Cremi</td>
<td>23 Cremi</td>
<td>22 Cremi</td>
<td>21 Cremi</td>
</tr>
<tr>
<td></td>
<td>27 Obreño</td>
<td>27 Obreño</td>
<td>27 Obreño</td>
<td>27 Obreño</td>
</tr>
<tr>
<td></td>
<td>28 Oriente</td>
<td>25 Oriente</td>
<td>24 Oriente</td>
<td>23 Oriente</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>25 Quadrum (99%)</td>
<td>24 Quadrum</td>
</tr>
</tbody>
</table>

1) In 1993 Bancrecer acquires Banoro
2) Atlántico buys Interestatal
3) In June 1997 GF-Banorte acquires Bancrecer and in December they acquire Banpaís.
4) Obreño branches are incorporated in April 1997
5) There is buy agreement from Bital. It is valid until December 2001 but payment has not occurred.
6) Banorte paid for Bancrecer in December 2001 but the fusion occurred until Q1 2002.
7) Signature of agreement to buy Confía in May 1998.
8) In August 2000 Bancomer bought 100% of the shares for Promex.
9) In may 1995 the formal purchase of Probursa took place and the branches from Oriente and Cremi were acquired in August 19996.
10) Santander acquired the control of GF-Invermexico in April 1997.
11) In February 1996 an option to convert subordinated obligations equal to 55% of the stock of Inverlat is issued and Scotia bank made the operation in November 2000
12) In November 2000 BBVA acquires 33% and by December 2001 it holds 48% of the stock.
13) In May 2000 GF-Santander acquires Serfin.
15) In August 2001 the order to intervene Quadrum is issued.
Source: Serrano (2002) at CNBV.

There were no bank liquidations or closed bank resolutions at all during the crisis. The attitude was that “authorities had to act promptly to provide liquidity and maintain the integrity of the banking system: otherwise, deterioration of the system’s financial situation (or some of its segments could have spread quickly to the business sector.” (Gavito et al 1998). The Makcsey Report (1999) noted that the Mexico followed a policy “that no banks would fail and that bank operations would ‘regularized’ rather than
liquidated.” Mexican authorities wanted to avoid a systemic bank problem at all costs. They succeeded in avoiding a systemic crisis but the costs were enormous, the approach encouraged to moral hazard and outright illegal behavior from bank owners, and more importantly, the next section will argue the bailout has perverse incentives which prevent banks from returning to lending.

Estimating the cost of resolving the Mexican banking crisis is time dependent and non-trivial. Krueger and Tornell (1999) show the present value of the costs at the end of a given year divided by the GDP of that year from Banco de Mexico. The costs are 5.5% in 1995, 8.4% in 1996, and 16.2% in 1998. Caprio and Klingebiel (1999) estimate the costs at around 21% of GDP. Today the IPAB's bond liabilities reach close to US$55 billion and the value of the assets is uncertain. Thus, as long as authorities resist the temptation to continue to carry out loan purchases, this will be the upper bound.

For our purposes, the crucial result from the banking bailout is that, the bank’s asset portfolio shifted substantially into IPAB bonds. During a takeover, the acquiring bank would also acquire the bailout bonds that the target bank had in its portfolio leading to an important concentration of bailout bonds. The remarkable fact is that after the mergers there are only six banks that hold pagaes IPAB: BBVA-Bancomer, Banamex-Citibank, Santander-Serfin, Bital, Banorte, Scotiabank-Inverlat. At the same time these are the biggest banks accounting for 93% of the total assets of the banking system.

Figure 2.7 shows the large share of IPAB bonds in these banks. Since IPAB bonds were swapped for loans, for accounting purposes keep them as part of their good standing loans. Figure 2.7 shows, that in fact a huge share good standing loans are in fact IPAB bonds. In the case of Banorte it almost doubles the amount of loans in good standing. The three largest banks, Banamex, Bancomer and Serfin which control about 60% of assets in the banking system also held 48% (CNBV web page) indicating that the fact they were larger banks did not make them more immune to crisis.

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24 See La Porta et al (2001) for convincing documentation of increased related lending once it became obvious that there was going to be a bailout.
25 The Fox administration is working on improving the closed bank resolution framework to diminish the moral hazard in banking behavior. See Gonzalez (2001) for a proposal on how to improve the resolution framework in Mexico.
If one were to add other non loan assets, the inevitable conclusion is that banks in Mexico are not lending at all. They are holding IPAB bonds and buying other instruments.
III. Demystifying to Existing Explanations for the Lack of Lending.

3.1 Lack of Capital

The most common explanation for the lack of bank lending in Mexico is that banks are undercapitalized. The argument has two variants. The first, arose in the immediate aftermath of the crisis, is commonly known and was described in Section 2: Banks were sold at a price that was many times its book value leaving them vulnerable. The devaluation deteriorated the bank’s balance sheet directly because of net exchange rate exposure and indirectly because firms with net foreign exchange exposure were unable to meet their obligations. The fall in economic activity and the rise in interest rates increased the default rates. All of the above eroded the capital base of Mexican banks sharply. In fact as late as 1999 the Mackey Report cited that “price maximization” objective in privatization as “an underlying cause of the banking crisis.”

Economic activity picked up in Mexico early in 1996, the loan purchase program took a sizable share of non-performing loans out of bank’s balance sheets, but lending continued to fall. This gave rise to the second variant of the argument: that authorities had imposed “first world banking regulation, on third world banks;” i.e. that banks were undercapitalized under the new legislation. As late as 1998, Thorne (1998) at J.P Morgan suggested that banks were still undercapitalized under correct accounting procedures. The argument arose because as early as 1996, authorities began to introduce a series of changes to overcome regulatory and supervisory shortcomings that had been highlighted by the crisis:26 a new definition for the capital adequacy ratio, new methods to classify loans and to create loan-loss reserves, stricter requirements in risk management, the introduction of an explicit deposit insurance scheme, a new bankruptcy law, and foreign control of banks was permitted for the first time in decades. The new rules follow the spirit of Basle. Capital adequacy incorporates market risks, institutions have to have a risk-management division that reports to the CNBV daily, basic capital has to account for at least 50 percent of net capital, deferred taxes can only account for 20 percent of basic capital, and it is no longer possible to increase capital by issuing subordinated debt.

26 Gavito et al (1998) and Gil-Diaz (1998) among others suggested to shortcomings in banking regulation and supervision were important causes of the crisis.
The problem is that this story, with its two variants, is inconsistent with stylized facts for various reasons. First, the pattern of bank lending would follow some kind of U-curve. The crisis would lower bank capitalization sharply causing a severe credit crunch but it would be followed by a gradual increase in lending and capitalization that would go hand in hand with the remarkably quick economic recovery. The problem is that and Figures 2.1 and 2.2 in section 2 show bank lending fell steadily since 1995. Thus the credit crunch has worsened despite vigorous economic recovery.

Second, Figure 3.1 shows that bank capitalization has improved significantly and that the Mexican banking system has been adequately capitalized since at least 1999 under the new standards. Most banks are above the 10% capital to risk-weighted assets mandated by the supervisory institution (CNBV). As of June 2001 the capitalization index of the banking system as a whole was 14.59%. McQuerry (1999) argues that “Mexican banks have been well capitalized (if not overcapitalized) all along.” In other words, the asset structure today, banks have adequate capital. In equilibrium, capital is endogenous and banks will keep the minimum capital necessary to either meet their obligations comfortably or meet the regulatory requirements. It is not surprising that there is not overcapitalization. What is surprising is to find an adequate capital structure but no lending.

27 Source: CNBV.
Third, large foreign banks with plenty of capital and access to it have been buying distressed Mexican banks since 1997 when authorities lifted restrictions on foreign control of banks precisely to incentivize capitalization. Currently, foreign institutions control more than three quarters of the banking system (in terms of assets). Of the six largest banks, foreign banks control four. Undoubtedly, these banks do not suffer from a lack of or lack of access to capital. Most of these banks could easily increase the capital base of their newly acquired Mexican subsidiaries and increase lending. However, foreign banks have not found it optimal to increase lending either.

<table>
<thead>
<tr>
<th>Bank</th>
<th>Date of Government Intervention</th>
<th>Date of sale to private bank</th>
<th>Name of private buyer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cremi</td>
<td>July 1994</td>
<td>July 1997 (branches)</td>
<td>BBV</td>
</tr>
<tr>
<td>Union</td>
<td>July 1994</td>
<td>July 1997 (branches)</td>
<td>Promex</td>
</tr>
<tr>
<td>Oriente</td>
<td>December 1994</td>
<td>July 1997 (branches)</td>
<td>BBV</td>
</tr>
<tr>
<td>Banpais</td>
<td>March 1995</td>
<td>December 1997</td>
<td>Banorte</td>
</tr>
<tr>
<td>Probursa</td>
<td>June 1995</td>
<td>June 1995</td>
<td>BBV</td>
</tr>
<tr>
<td>Inverlat</td>
<td>June 1995</td>
<td>July 1996</td>
<td>Nova Scotia</td>
</tr>
<tr>
<td>Centro</td>
<td>June 1995</td>
<td>September 1997</td>
<td>Banorte</td>
</tr>
<tr>
<td>Mexicano</td>
<td>December 1996</td>
<td>December 1996</td>
<td>Santander</td>
</tr>
<tr>
<td>Banoro</td>
<td>January 1997</td>
<td>January 1997</td>
<td>Bancrecer</td>
</tr>
<tr>
<td>Confia</td>
<td>May 1997</td>
<td>October 1998</td>
<td>Citibank</td>
</tr>
<tr>
<td>Atlantico</td>
<td>December 1997</td>
<td>December 1997</td>
<td>Bital</td>
</tr>
<tr>
<td>Promex</td>
<td>December 1997</td>
<td>December 1997</td>
<td>Bancomer</td>
</tr>
<tr>
<td>Bancrecer</td>
<td>December 1997</td>
<td>??</td>
<td>Banorte</td>
</tr>
<tr>
<td>Serfin</td>
<td>June 1999</td>
<td>May 2000</td>
<td>Santander</td>
</tr>
</tbody>
</table>

**Banks that were not taken over by the authorities**

<table>
<thead>
<tr>
<th>Bank</th>
<th>Date</th>
<th>Name of buyer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banamex</td>
<td>July 2001</td>
<td>Citibank</td>
</tr>
<tr>
<td>Bital</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bancomer</td>
<td>??</td>
<td>BBV</td>
</tr>
<tr>
<td>Banorte</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: La Porta et al (2000) and other publicly available information.

Fourth, if banks have adequate capital is it possible that there are not any good investment opportunities to invest in Mexico? Gross domestic investment as a share of GDP has reached an all time historical high. Thus the problem is not that there is no capital or that there are no good investment opportunities but that banks are not finding it in their best interest to lend.

In short, the issue is not that banks do not have enough capital to lend but that they do not find it profitable to lend. It is time to move away from banks programs that
attempt to increase bank capitalization but induce serious moral hazard issues in bank behavior and ask why it is that banks do not find it profitable to use or increase their capital to lend.

3.2 Poor Repossession Laws or a no Repayment Culture

As the economy recovered and banks unloaded a significant share of bad loans with the bailout package and increased their capitalization, a new explanation for the lack of bank lending emerged: legislation that prevents the swift repossession of collateral when a debtor cannot or will not fulfill his obligations. The argument is in full force today. A respected economic analyst argues today that “the principal obstacle for that (the increase in bank credit) is not that their (bank’s) resources are tied paying hidden debts… After the bad experience with innumerable of loans that could not be collected on... banks today are exercising extreme caution and selectivity.”

Most bankers today argue that the reason they are not lending is that they cannot repossess the collateral in case of no payment because the laws are inoperable to the point that it was the central issue in the National Banking Convention held April 19 and 20, 2002 and authorities have made reforming the legislation for exercising creditor rights the highest priority.

The financial times reported that, Hector Rangel Domene, a senior executive at BBVA Bancomer, and the president of the National association of banks complained that banks could only extend more credit if the country was freed from the "weak rule of law". The financial times also reported that “Mexico's president Vicente Fox responded by chastising financiers for not increasing lending to the private sector: ‘In the last few years, the financial sector has not contributed with its full potential to the financing of economic growth. To have reversed the trend in credit is not sufficient. You can do more, much more.’”

While there is no question that lending and property rights laws in Mexico are woefully inadequate, they have been so for a very long time and banks still lent to the private sector. The question is why did these inadequacies become increasingly

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28 Mauricio Gonzalez, Director General de GEA, published in Newspaper Reforma, April 11, 2002 and translated by the author.
29 See the Financial Times April 29. Also see Newspaper Reforma on April 18 for a wide selection of articles covering the National Banking Convention.
important since the crisis in 1995 as evidenced by such a large structural break shown in Figure 2.1 in the previous section?

A possible explanation is given by Krueger and Tornell (1999) who argue that the lack of “transparent and effective bankruptcy procedures in Mexico… make it impossible to take possession of a debtor’s assets in case it fails to service its debt.” They argue that this problem was aggravated by the 1995 crisis because banks lost “good customers” because good credit subjects like big tradable firms avoid high real domestic interest rates and obtain financing abroad. Thus the “deterioration in the pool of borrowers and the associated reduction in the expected rate of return have resulted in an unwillingness of banks to attract more deposits” and increase lending. The argument is originally due to Stiglitz and Weist (1981) in which they argue that when interest rates are very high the adverse selection problem is so severe that banks are better off not lending.

However, their argument has lost some of its validity because in April 2000, Congress approved a new bankruptcy Law (Ley de Concursos Mercantiles) that creates the conditions to have faster and more efficient bankruptcy procedures. Two years have passed and bank lending has not returned. Thus either the law is still inappropriate or this was not the most important problem to begin with.

An alternative view of the same problem is that “el barzon” culture of no repayment has made important head way in Mexico. Again Krueger and Tornell (1999) argued that the inoperable bankruptcy procedures created the “incentives for some debtors with the capacity to service their debts not to do so, since nonpayment would be hardly punished.” While there is no doubt that debtor clubs have been looked upon more favorably by society and even by the judicial system since the crisis, the story is not consistent with the facts. One would expect, strong “debtor clubs” right after the crisis when the capacity to pay is low and the consensus is that not paying a loan goes unpunished. However, as time goes by and firms require financing, there would be an incentive for firms to try to disassociate themselves from these debtor clubs and try to signal to the bank they are good credit subjects and have a good credit history. Thus we would see a gradual return to credit not a continuous deterioration of access to credit. Moreover, 0.3% of GDP of banking credit implies that almost no one is receiving credit

today and it is impossible that everyone has adopted the “barzon attitude” of no repayment when firms know that access to credit is a “repeated game.” The latter is especially true of large tradable corporations who are accessing foreign funds under greater scrutiny to prove they are good credit subjects.

3.3 A heavy load of past due loans and lack of liquidity

The argument was originally proposed by Krueger and Tornell (1999). They proposed mechanisms through which banks had lower incentives to lend during this paradoxical increase in past due loans despite the strong recovery in economic activity: (i) Poor bankruptcy procedures which as a result of the crisis deteriorated the pool of borrowers leaving only the bad borrowers. (ii) The 30% ratio of non-performing loans in 1997 was an underestimation because it did not take into account “evergreen accounts” whose interest must be capitalized every period thereby reducing the capacity of banks to make fresh loans. (iii) Severe moral hazard from debtors who could but would not pay and from bank owners who with “negative effective capital” because of evergreen accounts had incentives to undertake risky or white elephant projects which have a negative expected value.

The first mechanisms was discussed above. The existence of evergreen accounts is a new issue. However, Figure 3. shows that since they wrote their paper (1999) and since 1997 which is the last year they have data for, past-due loans fell steadily while credit continued to contract.
A final issue to address is whether solvent banks are too illiquid to lend. Before the crisis, banks were required to classify loans only according to credit history of debtors. Now, banks have to use classification models that take into account not only credit history but also ability to generate cash flow, country risk, industry risk, quality of collateral among other factors in order to estimate expected losses. Reserves have to be taken accordingly. Figure 2 shows loan-loss reserves have increased substantially and have been above 100% since September 1999 despite the fact reserve requirements have become more strict. Thus Mexican banks have adequate reserves and liquidity.

Source: CNBV
Figure 2. Loan-loss Reserves

Source: CNBV
IV. Proposed Explanation:

Banking Bailout Bonds have “Crowded Out” Lending to the Private Sector

Section 2 showed an important component of the measures taken to resolve the banking crisis was a loan purchase program of non-performing loans in exchange for 10-year non-tradable government bonds. These bonds represent a significant share of the bank’s portfolio. The purpose was to give banks a “clean slate” by assuming a significant portion of the bad portfolio so that banks could return to profitability and lending. However, this did not happen. This section will argue that the effect of the bailout has been the reverse. The bonds crowd out private lending by eliminating the incentives to lend. The crowding out effect caused by the bailout is not in the traditional yearly flow rate due to a fiscal deficit but a once and for all stock swap that eliminates the incentives to lend. That is it is not that the public sector takes away resources from the financial system every year because it is running a budget deficit but that the stock of bonds received in the bailout program provide perverse incentives inducing banks not to lend.

The intuition is that banks would rather hold IPAB bonds that pay a competitive interest rate with close to zero default risk and no capital requirements rather than a loan where there is a positive probability of no repayment. Moreover, since the bond interest rates are tied with the Inter-bank or Cetes rates, banks have obtained competitive returns on their assets. IPAB bonds reduce the incentives for banks to place new credits in the system because they have a safe source of income at virtually not cost since they do not have to incur in credit screening, risk measurement, monitoring, provisioning etc.

At first sight, this would be enough to argue that banks are not lending because of the large shares of highly profitable IPAB bonds in their portfolios. The problem with this assertion is that one could think of the profits coming from the IPAB bonds as a “sunk” source of profits and banks should still have an incentive to increase their profits by lending. Therefore, at the margin, banks would still have an incentive to lend as long as the risk adjusted interest on loans (assets) is greater than the interest cost of funds (liabilities). Although the spread has decreased in the last year as interest rates have fallen, section 2 argued that the deposit-lending interest rate spread in Mexico is still large and almost twice the comparable number for Chile or Brazil.
The question then remains, why, are banks not lending on the margin in Mexico? We argue that on closer inspection, the banking bailout also has lowered, and even eliminated, the incentives to lend even when there is a relatively large interest rate differential between banking assets and liabilities. The following simple profit maximization exercises show that banks do indeed lose their incentives to lend when a significant share of their asset portfolio is made up of government bonds.

First look at a bank without bailout bonds. For simplicity, assume a bank’s assets can be either loans to the private sector or government bonds and its liabilities are deposits, lines of credit, or capital. By definition the balance sheet of the bank is:

\[ L + B = D + C + K \]  

(4.1)

where \( L \) are loans, \( B \) are government bonds, \( D \) are deposits, \( C \) are lines of credit, and \( K \) is capital.

For simplicity assume for now that the interest rates on both of the assets, bonds and loans, are the same and equal to \( i_l \). Similarly, assume the interest rates on deposits and credit lines are the same and equal to \( i_d \). There is an issue of risk in the calculation of interest rates. Surely an interest rate of 10% on a government bond is not the same as a nominal interest rate of 10% on a loan which has a positive probability of default. For simplicity, all of the interest rates presented here are “certainty equivalent.” There is nothing lost in the argument except that the actual nominal loan interest rates would be higher making access to credit even more difficult and thereby strengthening the arguments presented here.

Assume that a bank faces a downward sloping demand for its loans, and an upward sloping cost of funds. Both of these assumptions are plausible. Ceteris paribus, if a bank decides to increase lending, it will have to lower its price, i.e. the interest rate, on the loan. Similarly, if it tries to increase its liabilities, it will either have to increase the interest it pays to its depositors or if it attempts to increase its lines of credit, its interest rates will increase because a higher leverage ratio raises the cost of funds. An upward sloping liabilities schedule is crucial for our arguments but fortunately is likely to represent reality. On one hand, some have argued that national savings rates are not very responsive to deposit rates of return implying a flat deposit schedule. By the same token, this implies that once banks have captured all the deposits in the system the schedule
becomes vertical. If banks wanted to increase liabilities after the given savings rate, they would have to increase their leverage through credit lines or steal deposits from another bank. Both of these actions would be reflected in upward sloping schedules because (i) as the debt to asset ratio increases, the cost of funds increases making the schedule upward sloping; and (ii) to steal deposits from a competing bank, banks would have to offer more favorable terms. Given that in Mexico gross domestic savings is lower than gross domestic investment evidenced by a current account deficit of around 4% of GDP, one can argue that on the margin, banks face an upward sloping deposit schedule.

The bank’s maximization problem can be thought of as a firm facing a downward sloping demand and an upward sloping marginal cost curve. The bank will choose an amount of assets (or liabilities) such that it maximizes its profits.

\[
\max_{L+B} [ L + B ](i_t - i_d) \quad (4.2)
\]

The problem is depicted graphically in Figure 3.1 below. The bank will choose the amount of loans such that it maximizes the size of the shaded rectangle. It should come as no surprise that this is the same maximization problem as a conventional monopolist who chooses to equal marginal cost and marginal revenue. Since the banking sector in Mexico is so concentrated, the three largest banks hold over 55% of the assets, the representation below is probably not too far from the truth. However, all we need for the proposition to hold is for the demand curve to be downward sloping.

31 In fact, in the U.S. the FDIC puts a limit on deposit rates in order to prevent banks from stealing deposits as a way to increase their liquidity when the bank is in trouble. (See Benson and Kaufman, 1997 for a more complete description of the resolution process in the U.S.)

32 Banks, like any other firms, have an optimal price cost margin given by the inverse of the elasticity of demand. When there is more than one firm in the market, the relevant elasticity is the perceived elasticity of the demand which is given by market structure and form of competition. In the case of a monopolist, the perceived and the market elasticity of demand are the same making the calculation easier.
If the bank wants to increase its assets (loans) it has to increase its liabilities by increasing deposits, credit lines, or capital. Two things happen: The interest rate on assets, \(i_{ass}\) decreases and the interest rate on the liabilities, \(i_{liab}\) increases. Thus there is always some trade off between volume of lending and interest rate spreads. Graphically, banks are always comparing the size of the two rectangles in the figures below to find an optimal price cost margin. The profits at \(L_1\) and \(L_2\) in Figure 4.2 are given by

\[
\Pi_{L_1} = (L_1)(i_{t1} - i_{d1}) \quad (4.3)
\]

\[
\Pi_{L_2} = (L_2)(i_{t2} - i_{d2}) \quad (4.4)
\]

\[
\Pi_{L_1} - \Pi_{L_2} = L_{t1}(i_{t1} - i_{d1}) - (L_2)(i_{t2} - i_{d2}) \quad (4.5)
\]

The bank will increase lending to \(L_2\) if profits are greater than at \(L_1\). Note the figure shows banks cannot discriminate between borrowers and depositors at all. In reality, banks probably can discriminate among borrowers and lenders but as long as they cannot do so perfectly the main thrust of the argument holds. The reason is that less than perfect discrimination implies increased lending translates into a fall in the average lending and increased deposits translate into a rise in the average cost of funds.
Figure 4.2: The profit trade offs from changing the volume of lending.

Now let's turn to what happens when a bank gets a large stock of bailout bonds to replace a significant share of its assets at a flexible rate that is tied to some equilibrium interest rate. As noted in the previous section most of the bonds are tied to the CETES rate or the inter bank money market rate (the TIEE). Therefore, the equilibrium lending rate $i_l$, and the IPAB interest rate $i_{IPAB}$ move together.\textsuperscript{33}

The effect of the loan purchase in exchange for bonds is that the demand for loans curve is shifted to the right by the amount of the IPAB loans but the deposit supply curve stays in the same place because with zero loans, the banks still “rides” up the deposit curve; i.e. the bank still needs deposits to hold the bonds. For simplicity, assume that the IPAB rate and the lending rates are the same, that the bank is making some loans, and that the bank is in the upward sloping deposit segment of the schedule for the reasons argued before.

Figure 4.3 shows a bank that has participated in a loan purchase that still holds some loans $L_1$. To increase lending, a bank would have to increase its deposits, its leverage, or its capital. The paper tackles each of these in turn.

\textsuperscript{33} The Appendix develops the cases where the IPAB interest rate is fixed. The case is a somewhat weaker because the bank does not loose the inframarginal income on the asset side since the interest rate does not fall. The appendix also presents the extreme case where a bank has zero incentives to lend and receives higher profits by holding only bonds as assets.
The effect of increasing lending from $L_1$ to $L_2$ through either an increase in deposits or credit lines is graphically the same and shown in figure 4.3. Lending and IPAB rates fall from $i_{i1}$ to $i_{i2}$. To increase its liabilities, banks have to raise the average deposit or cost of funds rates from $i_{d1}$ to $i_{d2}$.

The effect on profits is the same as given in Figure 4.2 but there are additional terms because of the presence of profits coming from IPAB bonds that are part of the asset portfolio. The respective profits at $L_1$ and $L_2$ and the difference between them are given by

\[
\Pi_{L1} = B_{IPAB}(i_{i1} - i_{d1}) + (L_1 - B_{IPAB})(i_{i1} - i_{d1}) \quad (4.6)
\]

\[
\Pi_{L2} = B_{IPAB}(i_{i1} - i_{d1}) - B_{IPAB}(i_{i2} - i_{d1}) - B_{IPAB}(i_{i1} - i_{i2}) + (L_2 - B_{IPAB})(i_{i2} - i_{d2}) \quad (4.7)
\]

\[
\Pi_{L1} - \Pi_{L2} = B_{IPAB}(i_{i2} - i_{d1}) + B_{IPAB}(i_{i1} - i_{i2}) + (L_1 - B_{IPAB})(i_{i1} - i_{d1}) - (L_2 - B_{IPAB})(i_{i2} - i_{d2})
\]

The presence of bailout bonds adds the first term in the profit expression for $L_1$ and the first three terms in the profit expression for $L_2$. Note that if $B_{IPAB} = 0$ then the three expressions are reduced to equations 4.3-4.5. The profit difference equation is noteworthy. The last two terms are exactly as in a bank without bailout bonds indicating that basic mechanism is still at work and that equations 4.6-4.8 are more general. As expected, IPAB profits computed at $L_1$ drop out of the marginal incentives to lend validating our initial conjecture that IPAB profits are sunk on some level. Most importantly, the firm incurs additional losses in profits as the bank attempts to increase lending. The two initial terms in equation 4.8 are the inframarginal losses on IPAB profits that result from the fall in the lending rate and the rise in the deposit rate. These two terms make it more difficult for profits at $L_2$ to be higher and thus the bank has lower incentives to increase its lending. Graphically the brick filled rectangles in Figure 4.3 denote the additional IPAB losses which do not exist if IPAB bonds were not part of the bank’s portfolio.

The intuition for lower incentives to lend is that in addition to the usual maximization tradeoff described earlier without a bailout bond; a marginal unit of lending causes additional losses measured by the increase in the cost of funds and the fall in lending rates times the amount of IPAB bonds the bank holds. That is, increased lending
causes banks lower their return on IPAB bonds because the bonds are tied to the equilibrium interest rate. In addition, in order to increase deposits banks raise the average cost of funds. The larger the share of IPAB bonds, the larger the disincentive to lend. The size of these rectangles are substantial since section 2 showed that for many banks, IPAB bonds are a large share of the total asset portfolio. The slope of the cost of funds curve and the slope of the lending demand curves also affect the incentives. Steeper curves translate into stronger disincentives to increase lending. Surprisingly, the level interest rate on the IPAB bonds do not affect the marginal incentives because they are tied to the equilibrium lending interest rate. They affect the amount of profits a bank makes but it does not affect the marginal incentives to increase lending. Appendix I, shows that this is the case even if the rate were fixed.

![Figure 4.3: Maximization exercise with IPAB bonds.](image)

In order to offset the IPAB inframarginal losses caused by the increased cost of funds and lower average return in lending, banks require a large difference between the lending and the deposit rates i.e. banks require a large return on a loan to offset the inframarginal losses on the deposit and on the fall in the interest rate on IPAB bonds. This may explain why lending and deposit the spreads have remained stubbornly high. The problem is compounded because with high lending rates, the adverse selection
problem from borrowers is so high that banks lose more from defaults that from increased lending. The reduced pool of borrowers argument made by Krueger and Tornell (1999) based on Stiglitz and Weiss (1981). The result of this huge spread is that only risky projects are willing to borrow at these high rates. Therefore, the ones that do borrow at these high real interest rates do in fact default. But this is not an issue of a culture of no repayment but of adverse selection in the borrowers because the rates are so high. Analysts and bankers are confusing the inevitable result of high lending rates with a culture of no repayment.

Note that the exercise could be applied to a bank that starts at $L_2$ and finds that profits at $L_1$ are higher and therefore finds it optimal to reduce lending. This would explain why lending has decreased in Mexico. In relative terms, section 2 showed bank lending decreased as a share of GDP but in fact the overall lending portfolio decreased in nominal terms from 1.1 trillion pesos in March 1999 to 950 billion pesos in December 2001. It is remarkable that even 6 years after the crisis lending is still falling. In the extreme, the inframarginal losses on the IPAB profits could be so large that banks find it optimal not to lend at all eliminating their function as financial intermediaries. That is, banks are reduced to institutions which capture deposits by citizens, invest them in zero default risk bonds and make a huge profit in the process (with only a 10% capital to back the operation up with). The irony is that the financial costs of the bailout have become the profits of the banks which in a perverse way are coming from the taxpayers, the supposedly main beneficiaries of the banking bailout.

*Increasing Capital to Increase Lending*

One could argue that instead of trying to capture more deposits or increasing their leverage and raising the average cost of funds, banks could use their capital to profitably increase lending. In this case, banks do not raise the deposit interest rate to increase lending eliminating one of the sources of inframarginal losses caused by IPAB bonds. To increase lending a bank increases its capital liabilities but there are no changes on the

---

34 The CNBV states that the fall in the lending portfolio is due to loans that are not renewed which is in fact the standard way banks reduce credit. Evolucion de la Banca Múltiple, December 2001. From the CNBV Web page.
deposit or the credit line interest rates because these did not move. The issue is important because the Mexican banking sector was opened to foreign banks that in principle should not have problems injecting capital to their newly acquired Mexican banks. But 5 five years after the first foreign bank purchased a Mexican bank, foreign banks have not found it profitable to increase lending in Mexico either.

There are two ways for a bank to use its capital to increase lending: (i) Receive capital from shareholders. (ii) Use the “working capital” the bank owns and lower the capital/asset ratio.

Shareholders should be willing to provide new capital to the bank if it is in their best interest to do so. A bank can increase the peso amount of profits from an injection of capital as long as there is a positive differential between lending and cost of funds interest rates. However, shareholders are maximizing their return on all of their capital not just the marginal ones they injected to increase lending. Higher lending will lower the average lending rate thereby lowering the average profit rate for existing capital. Shareholders will be willing to provide new capital as long as the marginal return to a an extra unit of capital is higher than the average return on existing capital. The conjecture is that today the losses on the profits from holding IPAB bonds is so great that shareholders make a higher average return on their capital by not lending and only holding government bonds. The statement can be made categorically because new lending is close to zero. Note that by increasing lending, peso profits are greater but the return to each unit of capital is lower. Thus existing shareholders do not find it in their interest to increase lending.

Shareholders will be willing to provide new capital if the certainty equivalent return from lending was equal to or greater than the return on IPAB bonds and existing loans because that way the average return on capital is higher. The problem is that such high lending rates put us back in the severe adverse selection problem that makes lending unprofitable. In short, banks appear to be beyond the profit maximization volume of assets given the returns on IPAB bonds.

A simple simulation clarifies the proposition. Imagine a bank with $100 pesos in assets, a Basal consistent capital asset ratio of 10%, an asset interest rate equal to \( i_{\text{CETES}} = i_{\text{IPAB}} \approx 20\% \), and a deposit rate of 10%. The situation is similar to Mexico in
2000. The peso profits (with almost default zero risk) is $10 and a return on equity of 100%! To engage in any lending, the risk adjusted lending rate has to be at least 20% otherwise the average equity return falls. But that would imply an actual lending rate of 30% or higher. Not surprisingly that is close to the lending Mexico had in 2000. Since inflation was below 10% that implies real rates of over 20% which are prohibitively high.

The following exercise shows the fall in interest rates will go a long way to increase the incentives for bank lending in Mexico despite the presence of IPAB bonds but the problem of large spreads will remain. Imagine the same bank but this time the interest rates are close to what they are in Mexico today. The asset rates are \( i_{CETES} = i_{IPAB} \approx 8\% \), and a deposit rate of 3%. This implies a peso profit with close to zero default risk of $5 and a return on equity of 50%. For banks to lend, the certainty equivalent return on their loans would have to be greater than 8%. Not surprisingly the actual lending rates today now are “only” about 15% vs. an inflation of 4%. Therefore, rate compression will improve lending conditions in Mexico but it will not solve the problem.

Using the “excess working” capital from the bank does not run into the shareholders incentive problem because the number of shares stays constant and greater profits are distributed among existing shareholders. Banks in Mexico are overcapitalized given existing regulation so one would think bankers would be willing to increase lending at the expense of this “working capital.” However, recall that Banks will have the mandated capita-asset ratio or the ratio they need to meet their everyday obligations, whichever is greater. The 8% mandatory capital-asset ratio may be too low for the level of solvency and liquidity banks in Mexico need today. Therefore, banks keep a higher capital-asset ratio than mandated by regulation. The result should not be surprising since most banks in the U.S. today are well above the regulatory mandated capital asset ratio.
V. Empirical Evidence

Section 2 showed that some of the idiosyncrasies of the bailout plan were that banks received different amounts of bailout bonds and some banks did not receive any bonds at all. This short empirical section attempts to prove the basic hypothesis of this work: *ceteris paribus*, banks with bailout bonds tend to lend less because they have a lower incentive to lend.

The econometric process requires two steps. First, one needs to determine that the fall in bank credit is because of a supply constraint and not a fall in credit demand. This is accomplished through a switching regression framework from the credit crunch literature. And second, once it has been determined that there is a credit crunch, one needs to establish that the presence of bailout bonds has a perverse incentive on the supply of bank credit. This is accomplished using panel data analysis of bank credit supply behavior taking advantage of the fact that banks hold different amounts of bailout bonds and that there is a control group of banks that do not hold bailout bonds at all.

**Is the fall in bank credit a supply or demand problem?**

A disequilibrium model from the credit crunch literature.

A priori, it is difficult to determine if a fluctuation in credit can be attributed to either a shift in the demand or supply curves. In equilibrium, the interest rate adjusts such that the supply equals the demand for credit and conventional instrumental variable analysis could estimate the supply and demand functions. However, in a disequilibrium condition, the interest rate does not adjust and the amount of lending observed is the minimum of supply and demand.

The key identification question resides in attributing the observed changes in lending to underlying movements of the credit supply or credit demand functions. The identification problem has been resolved in the credit crunch literature through a switching regression framework which imposes an a priori exclusion restriction that affects the supply but not demand of credit, i.e. total deposits or capital.\(^{35}\) The

The disequilibrium model used in this case assumes that a priori there is no way to know whether the observed amount of credit is supply or demand constrained (or both).

The disequilibrium model is given by:

\[ D_t = X_{1t} B_1 + u_{1t} \]  
\[ S_t = X_{2t} B_2 + u_{2t} \]  
\[ Q_t = \min(D_t, S_t) \]

where at time \( t \), \( D_t \) and \( S_t \) are the quantities of loans demanded and supplied, \( Q_t \) is the actual quantity of loans extended in the market, \( X_{1t} \) and \( X_{2t} \) are the vectors of explanatory variables, \( u_{1t} \) and \( u_{2t} \) are disturbance terms.

In the absence of the market clearing condition, the primary problem is that \( D_t \) and \( S_t \) are not observable variables. To handle this problem, equation (3) assumes that the quantity exchanged in the market will be either on the demand or supply equation, whichever is less (see figure 5.1). In other words, when demand exceeds supply, the observed quantity lies on the supply schedule, and the market is in a credit crunch. The condition reverses when supply exceeds demand. The rationale for the assumption is that, in markets with voluntary exchange, the short side of the market must prevail.\(^{36}\)

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\(^{36}\) Sealey, 1979, 691.
If the model presented in equation (1) through (3) were specified as an equilibrium model, the market clearing condition $D_t = S_t = Q_t$ would be invoked and equation (3) would be eliminated, equations (1) and (2) could be estimated as a simultaneous equation model using an appropriate instrumental variable technique. However, in the presence of credit rationing, price changes cannot be relied on to equate demand and supply and thus the market clearing condition cannot be employed.

The supply and demand function specifications are standard from the literature. Appendix two indicates what the literature has used.

The procedure requires the specification of a supply and demand equation. The supply and demand function specifications are standard from the literature. Appendix two indicates what the literature has used.

The credit supply equation is given by (all the variables are in logarithm):

$$CredS_t = depo_{t-1} + cfunds_{t} + prof_{t} + f_{t} + \pi_{t-1} + u_{t}$$

where $CredS_t$ is real credit to the private sector at time $t$, $depo_{t-1}$ is real total deposits at $t-1$, $cfunds_{t}$ is the cost of funds measured as the ratio between the stock prices of financial groups and the general stock price index at time $t$, $prof_{t}$ is the profitability of financial intermediaries as a whole measure as the ratio between des net income by interest and the
assets, \( f_t \) is the forecast index of economic activity at time \( t \), \( \pi_{t-1} \) is inflation at time \( t-1 \) and \( u_t \) is an error term.\(^{37}\) In the table 5.1 are shown the expected sign for these variables.

### Table 5.1 Expected sign for the supply and demand specification in the disequilibrium model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Expected sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \text{depo}_{t-1} )</td>
<td>Positive</td>
</tr>
<tr>
<td>( \text{cfunds}_t )</td>
<td>Positive</td>
</tr>
<tr>
<td>( \text{prof}_t )</td>
<td>Positive</td>
</tr>
<tr>
<td>( f_t )</td>
<td>Positive</td>
</tr>
<tr>
<td>( \pi_{t-1} )</td>
<td>Negative</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dependent variable: logarithm of the real credit demand to the private sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>( n_t )</td>
</tr>
<tr>
<td>( f_t )</td>
</tr>
<tr>
<td>( \pi_{t-1} )</td>
</tr>
</tbody>
</table>

The intuition for each one of these variables is straightforward. Credit supply will increase with the amount of deposits. The intuition comes directly from the balance sheet. Higher deposits increase one for one the availability of resources for lending or buying securities. The cost of funds proxy is also expected to increase credit supply because as the relative stock prices rises, the cost of raising funds for a bank is diminished. Higher profitability increases credit supply because earnings can be used to lend. Prospects of increased economic activity will also increase lending since banks expect firms to have a higher capacity to repay the loans. Higher inflation is in theory neutral but it could decrease credit supply to the degree it is perceived as increased uncertainty.

The demand equation is given by (all the variables are in logarithms):

\[
\text{CredD}_t = n_t + f_t + \pi_{t-1} + u_{2t},
\]

where \( \text{CredD}_t \) is real credit to the private sector at time \( t \), \( n_t \) is the real lending rate at time \( t \), \( f_t \) is the forecast index of economic activity published by INEGI, \( \pi_{t-1} \) is the inflation rate lagged one term and \( u_{2t} \) is an error term. The intuition for the coefficients

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\(^{37}\) The data of banking credit to the private sector, total deposits, income by interests, expense in interest come from the National Commission of Banking and Securities (CNVB), the banking regulatory entity. The price index of the Mexican stock market and the price index for the bank were obtained from Infosel. The data for inflation and the forecast index were obtained from INEGI.
are similar, a higher lending rate will diminish credit demand because the credit is more expensive, increased economic activity in the future will increase firms demand for credit today to meet increased demand tomorrow inflation is also expected to be neutral but uncertainty could also decrease credit demand. Table 5.1 shows the expected sign for these variables.

Table 5.2 presents the estimation results using monthly data for the period the period 1998:01-2002:6. The estimation method was maximum likelihood and the program used was TSP.

| Table 5.2 Credit demand and supply estimations (Maximum likelihood disequilibrium estimation) |
|-----------------------------------------------|-----------------|-----------------|
| Dependent variable: Logarithm of the real credit to the non financial private sector |
| Variable          | Coefficient | t-statistic |
| Supply             |              |              |
| Constant           | 19.412**    | 8.75         |
| Total deposits, $d_{o,-1}$ | -0.383** | -2.03         |
| Costs of funds, $cfunds$    | -0.035      | -0.86        |
| Profitability, $prof$       | -0.011      | -0.60        |
| Forecast index, $f_{o}$     | -0.534**    | -3.50        |
| Inflation, $\pi_{o,-1}$    | 0.077**     | 3.11         |
| Sigma               | 0.244**     | 5.79         |
| $R^2$ OLS           |              | 0.9096       |

| Demand             |              |              |
| Constant           | 22.425**    | 8.72         |
| Lending rate, $r_l$ | -0.156**    | -2.64        |
| Forecast index, $f_l$ | 2.161**   | 3.90         |
| Inflation, $\pi_l$ | 0.241**     | 2.94         |
| Sigma               | 0.008       | 1.43         |
| $R^2$ OLS           |              | 0.8959       |

Two asterisks means that the coefficient is significant at 95% of confidence.

The estimation of the demand equation presents conventional signs. As expected, the real lending rate is negatively related to credit demand and significant. The elasticity in Mexico is -0.156 which is small in magnitude compared to the results from other studies (see appendix three). The forecast index has a positive sign and is significant. The inflation coefficient is positive and significant.
The results of the estimation of the supply equation shows credit supply in Mexico during this period is atypical. The result should not be surprising given the motivation of the work. At an aggregate level and given the macroeconomic performance in Mexico’s bank credit should have increased but it did not. The coefficients highlight some of the anomalies of credit supply behavior in Mexico. The coefficient on deposits is negative and significant instead of positive. The result indicates that credit supply decreased despite an increase in deposits. This result is the opposite of what the literature has found even during the Asian Crisis. The forecast index of economic activity has a negative and significant sign instead of a positive one. The inflation rate is positively and significantly related to credit supply indicating that banks increased their lending with higher inflation. The result is somewhat counterintuitive given the belief that inflation erodes creditors to the benefit of debtors. The cost of funds, and profitability coefficients also have signs opposite of what is expected but they are not significant.

The graphs below present some of the bilateral relationships between variables. The most striking one is the deposits versus credit. In general, bank credit since 1998 decreased continuously while deposits increased from 1998 to mid 1999 before they fell continuously for a year, and then recovered vigorously six months after the election. The behavior of deposits is to a certain extent rational. Deposits increased with a vigorous economy but the political transition jitters overwhelmed investor confidence and deposits fell in the second half of 2000 despite the fact the Mexican economy grew 7% that year.

**Graph 5.1 Real credit, total deposits and forecast index**

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38 All studies reviewed indicate that increased deposits are associated with higher credit supply. Sealy 1979 for the U.S., Pazarbasioglu 1997 for Finland; even Ghosh and Ghosh 1999 for Indonesia, Thailand, and Korea during the Asia crisis.
Real credit to the non financial private credit, total deposits and forecast index

Graph 5.2 Real credit and inflation

Real credit to the non financial private sector and inflation
Once the maximum likelihood estimators for the demand and supply equations were obtained, one calculates the probability that any given observation at time $t$ is supply constrained through the following formula:

$$\Theta_t = \Pr \left( C_t^d > C_t^s \right) = \Phi \left( \frac{C_t^d - C_t^s}{\sigma_d + \sigma_s} \right)$$

Where:

$C_t^d$ is the fitted value of the demand for credit at the period $t$; $C_t^s$ is the fitted value of the supply for credit at the period $t$; $\sigma_d$ and $\sigma_s$ are the estimated standard errors of supply and demand functions. If the probability that $C_t^d > C_t^s$ is greater than 0.05 we are set against a problem of credit crunch. At the 95% of confidence, México experimented a credit crunch in all the months between February of 1998 and June of 2002, except the transition months of September of 2000 and March of 2001 (see graph 5.3). Therefore, we can conclude that any movements in the observed amount of credit were due to fluctuations in the supply curve.

**Graph 5.4 Probability of credit crunch**
The result points directly into the direction that the fall in bank credit in Mexico is not due to a fall in credit demand or in the quality this work mentions some authors have argued. The fall in credit is due to an atypical behavior of the credit supply function.

**Panel Data Analysis of Individual Bank Behavior**

The previous section established that during this time period, Mexico experienced a credit crunch and that therefore any observed movements in bank credit were due to supply fluctuations. Taking advantage of the panel nature of the data set, this section will estimate the credit supply function for each bank and show that that IPAB bonds reduce the incentives to lend. The results from the previous section allows us to talk about the credit supply variable as actual lending because we have now established that the observed lending is credit constrained and on the supply curve.

The credit supply specification for the panel analysis is similar to the one used in the previous section but with more controls (all the variables are in logarithms).

\[ \text{Cred}_i = \alpha + \text{depo}_{i-1} + \text{prof}_{i-1} + \text{ass}_i + \text{cap}_{i-1} + \Pi_{i-1} + \text{act}_{i+1} + \text{IPAB}_{i-1} + \varepsilon_i \]

Where \( \text{Cred}_i \) is the real credit to the private sector by bank \( i \) at time \( t \), \( \text{depo}_{i-1} \) are real deposits of bank \( i \) at time \( t-1 \), \( \text{prof}_{i-1} \) is profitability of lending activities measured as the difference between income by interests income interest expenditure, \( \text{ass}_i \) are bank assets, \( \text{cap}_{i-1} \) is the real capital of the bank, \( \Pi_{i-1} \) and \( \text{act}_{i+1} \) are variables that reflect the general state of the economy, \( \Pi_{i-1} \) is the inflation rate and \( \text{act}_{i+1} \) is the global index of economic activity, and finally \( \text{IPAB}_{i-1} \) is the ratio of income by interests from IPAB bonds to total income from credit portfolio interests.\(^{39}\)

The expected signs of the coefficients are given by table 5.3 below

\(^{39}\) The data of banking credit to the private sector, total deposits, income by interest, expense in interests, assets and capital for each bank were obtained from the CNBV, Mexican regulatory agency of banks, the data of inflation and the global index of economic activity were obtained from INEGI.
Credit supply will increase with the amount of deposits; higher deposits increase the availability of resources for lending. Higher profitability in lending activities increases credit supply. Credit supply will increase with the amount of capital whenever the bank has gotten the minimum level of capital in order to comply with the regulation. The expectations of increased economic activity will increase credit supply. The inflation should be neutral but it could decrease credit supply for the uncertainty that it represents. Assets were used like control variable. The existence of the bonds of the IPAB and their associated flow of incomes generate adverse incentives to the supply of credit.

Given the heterogeneity of bank size, a fixed effects estimation process allowed a different intercept for each bank given the heterogeneity of bank sizes. Table 5.5 below presents the estimation results.

Table 5.3 Expected sign for the panel data specification

<table>
<thead>
<tr>
<th>Variable</th>
<th>Expected sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total deposits, $depo_{it-1}$</td>
<td>Positive</td>
</tr>
<tr>
<td>Profitability, $prof_{it-1}$</td>
<td>Positive</td>
</tr>
<tr>
<td>Assets, $ass_{it}$</td>
<td>Positive</td>
</tr>
<tr>
<td>Capital, $cap_{it-1}$</td>
<td>Positive</td>
</tr>
<tr>
<td>Inflation, $Π_{it-1}$</td>
<td>Negative</td>
</tr>
<tr>
<td>Global index of economic activity, $act_{it+1}$</td>
<td>Positive</td>
</tr>
<tr>
<td>Income from IPAB bonds, $IPAB_{it-1}$</td>
<td>Negative</td>
</tr>
</tbody>
</table>

In a colloquial way is considered that the difference between a fixed effects model and a random effects models is the following one:

According to Johnston 1997, page. 391

1. The random effects model is used when $α_1$ is not correlated with $X_{it}$;
2. The fixed effects model is used when $α_1$ is correlated with $X_{it}$.

According to Greene 1999, chapter 14:

1. The fixed effects model is used when we can be sure that the difference between the crossed section units can be interpreted like a parametric displacement of the regression function. This model would be able to be interpreted as exclusively applicable to the crossed section units of the study and not to additional units out of the sample;
2. The effects model is used when the specific constant terms of the crossed section units can be interpreted as randomly distributed among the crossed section units. It would be appropriate if we believe that the crossed section units of the sample extraction of a large population.

The use in this work of a fixed effects model, was based on a more formal criteria than the previously show: the Hausman test provided a statistical equal to 32.551 (with a probability equal to 0.000) it indicate that in this case the best is to use a fixed effects model.
### Table 5.4 Results from the panel data model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total deposits, ( depo_{t-1} )</td>
<td>0.180**</td>
<td>3.014</td>
</tr>
<tr>
<td>Profitability, ( prof_{t-1} )</td>
<td>0.161**</td>
<td>3.427</td>
</tr>
<tr>
<td>Assets, ( ass_{t} )</td>
<td>0.377**</td>
<td>3.715</td>
</tr>
<tr>
<td>Capital, ( cap_{t-1} )</td>
<td>0.743**</td>
<td>2.954</td>
</tr>
<tr>
<td>Inflation, ( infl_{t-1} )</td>
<td>0.255**</td>
<td>2.881</td>
</tr>
<tr>
<td>General index of economic activity, ( act_{t+1} )</td>
<td>-3.021**</td>
<td>-4.150</td>
</tr>
<tr>
<td>Income from IPAB’s pagaré ( IPAB_{t-1} )</td>
<td>-0.124**</td>
<td>-2.989</td>
</tr>
<tr>
<td>( R^2 )</td>
<td></td>
<td>0.954</td>
</tr>
</tbody>
</table>

All the coefficients have the expected signs the general index of economic activity. It is interesting that some of the coefficients which in the aggregate presented atypical results, in the panel analysis with the introduction of bank specific variables corrected their sign. Specifically, deposits.

The most relevant result of this estimation is the fact the income derived from the IPAB bonds significantly reduce the incentive to lend. The coefficient implies that a 1% increase in ratio of interest income from IPAB bonds in relation to loan interest decreases bank credit by 0.124%. This is quite a robust result given the fact the credit supply equation appears to be properly specified since it explains a significant amount of the variance in the observations, the R squared is equal to .954, and because the amount of IPAB bonds held by banks in the sample varies widely between banks from a high of almost 90% of good standing loans to zero.

In short, these idiosyncratic bonds reduce the incentive to lend despite the fact there are other variables which would indicate that banks should increase their lending.
V. Conclusions, Policy Lessons, and Recommendations

Bank lending in Mexico has fallen steadily and drastically since the Peso Crisis in 1995. If Mexico is to attain and maintain higher rates of growth, it will have to increase the quantity and quality of its investment and it cannot do it with a banking sector that is not lending. Banks are complements to other financial markets and are in fact the base of other financial markets not only in Mexico but in other countries. Socially, the lack of access to credit for the majority of the population translated into a feeling that the crisis has not really ended despite the fact Mexico experienced a remarkable economic recovery.

The paper argued that the three conventional explanations of the lack of bank lending do not fit the stylized facts. (i) Lack of capitalization is not a coherent story because one would have expected a U-shaped pattern in lending not a steady decrease; because banks have been well capitalized since at least 1999; and because foreign banks which in principle have no capitalization problems have been buying Mexican banks since 1997. (ii) Poor legislation to repossess collateral or a culture of no repayment is not a coherent story either. The reason is that although the laws are woefully inadequate they have been so for a long time and there was a structural break in 1995 and because debtor clubs would be expected to loose their strength in time as firms wanted to regain their access to credit. (iii) A heavy load of past due loans and lack of liquidity is not coherent either because the bank bailout package has reduced the amount of past due loans dramatically and the reserve position of banks have increased substantially as well.

Section 3 argued theoretically that the lack of lending is due to perverse incentives created by the swap of non performing loans in exchange for bonds implemented as part of the banking bailout. The bonds have caused a “stock crowding out” of lending. The crowding out is not in the classical fiscal deficit flow sense since the swap only takes place at one, or a few, times in the Mexican case. Banks have no incentive to lend when they can profit from holding simply holding IPAB bonds which have close to zero default risk, and require no costs hold. The argument holds even on new marginal lending because the inframarginal profit losses from increasing deposit and lowering lending rates outweigh the gains from new lending. Section 3 also argued that incentives to inject or use capital to increase lending also suffered perverse
incentives from the stock of IPAB bonds. To offset the large inframarginal losses from increased lending banks have to charge very high lending rates. These in turn, make adverse selection among debtors so severe that banks are better off not lending at all. But this is not an issue of a culture of no repayment but of adverse selection in the borrowers because the rates are so high. Analysts and bankers are confusing the inevitable result of high lending rates with a culture of no repayment.

Section 4, showed empirically using a disequilibrium credit model from the credit crunch literature and a panel data analysis that IPAB bonds significantly reduce the incentives for banks to lend. The econometric procedure was carried in two steps: First it established that in the relevant time period Mexico was suffering from a credit crunch. That is, that the lack of bank credit was due to a supply constraint and that therefore the observed amount of bank lending was on the credit supply curve. Second, using data from each bank and considering the amount of IPAB bonds varied between banks and that there were some banks that had no IPAB bonds at all, the estimation showed that as banks held more IPAB bonds in their portfolio, their lending was reduced.

In effect, the banking bailout eliminated the intermediation function of banks and reduced them to institutions that take deposits from the public, sit on the IPAB bonds and make a profit without taking any risks. In a sense bonds replaced bad loans and banks were supposed to return to profitable lending. The problem to increase lending on the margin is not the high interest rate but the large share of IPAB bonds on the bank’s portfolio. The high interest rate on IPAB bonds translate into a large bank profit but they make no difference on the margin because the bonds are not tradable.

The irony of the banking bailout is that the interest on IPAB bonds have showed up as higher bank profits and higher fiscal deficits, which will eventually have to be paid by taxpayers, the supposedly ultimate beneficiaries of the bailout. The higher financial deficits in government due to IPAB bonds show up in Banks and exporters profits at the expense of Mexican tax payers. McKinnon. It is time to move away from banks programs to increase bank capitalization which induce serious moral hazard issues in bank behavior and ask why it is that banks do not find it profitable to use or increase their capital to lend.
There are many lessons from the banking bailout in Mexico. Krueger and Tornell (1999) provide a good set of them. What this paper wants to add is that the standard practice of swapping non-performing loans for non-tradable bonds has perverse incentives on banks that have not been documented. The practice eliminates the incentives for banks to lend and intermediate funds and reduces them to institutions that capture deposits and hold government bonds. In hindsight, the measures proposed by the initial bank bailout program described in section 2 (PROCAPTE) would not have created the perverse incentives against lending that the loan purchase program described below created. Bailout packages should look more like this: banks issuing bonds at penalty rates while they regain their capital, not loan purchases in exchange for bonds.

The policy options are not simple. The main objective is to rid the bank of IPAB bonds. The process is non trivial because the public sector has to pay for the bonds and this would cause inflation or require a sizable increase in tax revenues.

Renegotiate the terms of IPAB bonds Banks are content to hold IPAB bonds because they are getting a competitive or higher return on these assets. Authorities need to lower the returns so in order for banks to have an incentive to try to have these paid off. Recall that most banks are still responsible for collecting on some of the overdue loans that they swapped. Authorities should also accelerate the sell of overdue loans at whatever price. Having those loans in IPAB longer is only deteriorating their value. It is a politically thorny issue but any ground that is made is an advantage.

Make IPAB bonds tradable and incorporate them into the National debt management calculations. There are a few advantages. First, once these bonds become tradable, their price will adjust to similar public bonds in circulation. Banks will be able to adjust their portfolio to better manage their assets. It may be that banks prefer to sell these assets and replaced them with loans which may have a higher return. Under current conditions they cannot replace IPAB bonds with loans. They can only increase loans on top of IPAB bonds. Secondly, incorporating this stock of bonds into “conventional” public debt will lead to a recalculation of the optimization of the debt profile in Mexico. Most likely, the calculation will show that there is too much domestic debt and too little
foreign debt given the total public debt. As a result, authorities could replace some domestic debt with foreign debt and lower total public interest costs. And finally, since these bonds have long maturities, making these bonds tradable will lengthen the yield curve, which is something Mexican authorities have been trying to do for a while. Interest rates on the bonds are variable but their circulation would put them in a position to fix the interest rates from some periods of time.

Allow entry into the banking system. For some reason, Mexican authorities have resisted giving new bank licenses since 1995. Foreign banks have bought domestic banks with their stock of IPAB bonds. It should not be a surprise that foreign banks are also not finding it profitable to increase lending. Authorities need to allow entry to new banks, foreign and domestic, that do not have an existing stock of IPAB bonds. This way, the new institutions will do what banks are supposed to do: take on deposits and make loans. Given new licenses to banks will ameliorate the problem but the issue is that the incumbents with the IPAB bonds have an incredible advantage on their bottom line.

Dziobek and Pazarbasioglu (1997) at the IMF define the goal of banking restructuring efforts as: “to restore the financial viability of the banking system (restore solvency and sustainable profitability; and to restore the system’s intermediation capacity and an appropriate level of banking services relative to aggregate economic activity.” Obviously the authorities succeeded in the first but failed in the second.
APPENDIX 1: TWO PARTICULAR CASES:

(i) A bank finds it optimal not to lend and 
(ii) IPAB Rates are fixed and not linked to lending

(i) A bank that finds it optimal not to lend at all

It is interesting to analyze the case where the profits from a IPAB bonds are so large that a bank chooses not to lend at all and be content with taking deposits from the public, holding IPAB bonds, or other government securities, and make a large profit with virtually zero default risk.

With zero lending, the bank’s profits are shown graphically in Figure A.1 and given by:

\[
\Pi_{L_0} = B_{IPAB}(i_{IPAB} - i_{d_0}) = B_{IPAB}[(i_{IPAB} - i_{L_1}) + (i_{L_1} - i_{d_1}) + (i_{d_1} - i_{d_0})] 
\]  

(A.1)

The effect of increasing lending to \(L_1\) through either an increase in deposits or credit lines is analytically the same. The cost of funds rates increases from \(i_{d_1}\) to \(i_{d_2}\), and profits are given by:

\[
\Pi_{L_1} = B_{IPAB}(i_{L_1} - i_{d_1}) + (L_1 - B_{IPAB})(i_{L_1} - i_{d_1}) 
\]  

(A.2)

The difference in profits is given by

\[
\Pi_{L_1} - \Pi_{L_0} = (L_{L_1} - B_{IPAB})(i_{L_1} - i_{d_1}) - B_{IPAB}(i_{IPAB} - i_{L_1}) - B_{IPAB}(i_{d_1} - i_{d_0}) 
\]  

(A.3)

The bank will be willing to increase lending only if the gain in profits (the first term) is greater than the sum of the last two terms. The larger the share of IPAB bonds the larger the two last terms will be and therefore the greater the probability that a bank finds it optimal to not lend at all. Without bailout bonds, the last two terms disappear and banks find it optimal to lend as long as the lending rate is greater than the deposit rate.

Given the large shares of IPAB bonds, it is not surprising that this situation could arise or that banks are lowering their outstanding credit to maximize profits. The bailout can turn some banks into institutions which capture deposits by citizens, invest them in zero risk bonds and make a huge profit in the process (with only a 10% capital to back the operation up with).
(ii) **Perverse Incentives are Less Severe if IPAB rates are fixed**

Although none of the IPAB bonds today have fixed rates, it is worth analyzing the case because the incentives are less perverse and because some could argue that banks cannot affect the interbank rate or the CETES rates which serve as references for IPAB bonds.\(^{41}\) The banking sector in Mexico is very concentrated but the demand for money which is intimately linked to the supply of 28-day CETES is determined by other players in the market as well, notably foreign investors.

The problem is shown in Figure A.2 and the profits at the initial level of lending \(L_1\) are given by

\[
\Pi_{L_1} = B_{IPAB} (i_{IPAB} - i_{d1}) + (L_1 - B_{IPAB})(i_{i1} - i_{d1}) \tag{A.4}
\]

Similarly, the profits at the increased level of lending are given by

\[
\Pi_{L_2} = B_{IPAB} (i_{IPAB} - i_{d1}) - B_{IPAB} (i_{d2} - i_{d1}) + (L_2 - B_{IPAB})(i_{i2} - i_{d2}) \tag{A.4}
\]

The profit difference is given by

\[
\Pi_{L_1} - \Pi_{L_2} = B_{IPAB} (i_{IPAB} - i_{d1}) - B_{IPAB} (i_{d2} - i_{d1}) + (L_1 - B_{IPAB})(i_{i1} - i_{d1}) - (L_2 - B_{IPAB})(i_{i2} - i_{d2})
\]

There are two comparisons to note. First, without IPAB bonds, the bank compares the

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\(^{41}\) Actually, the rate of IPAB bonds does not have to be fixed nominally. All that needs to happen is for banks to think they have little influence or leverage in moving it. The assumption is plausible because in most cases the bonds were negotiated fixed to a reference interest rate, like CETES or TIE, which domestic banks indeed do not have a much influence over.

---
conventional maximization expression given in equation A.4. Second, the difference between the expression in equation A.5 and equation 4.8 where the IPAB rate is flexible is that in this case there are no inframarginal losses on the lending side. That is there is no rectangle lost at the top in Figure A.2. Thus, the perverse incentives from the bailout exist but only come from the rise in the deposit rates.

As usual the larger the share of IPAB bonds, the larger the disincentive to lend. Only a very tall rectangle that arises from increased lending from $L_1$ to $L_2$ can offset the loss. The result of this huge spread is that only very risky projects are willing to borrow at these high rates. Therefore, the ones that do borrow at these high real interest rates do in fact default. But this is not an issue of a culture of no repayment but of adverse selection in the borrowers because the rates are so high.
APPENDIX 2: SUMMARY OF VARIABLES INCLUDED IN DIFFERENT STUDIES FROM THE LITERATURE

Diverse specifications

<table>
<thead>
<tr>
<th>Objective</th>
<th>Pazarbasioglu</th>
<th>Ghosh y Ghosh</th>
<th>Sealey</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supply</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Available resources for loans</td>
<td>Lagged deposits. Capital is mentioned but is not observed in the specification.</td>
<td>Lending capacity (total bank liabilities plus net worth- minus required reserve and liquidity requirements minus cash in vault minus capital).</td>
<td>Total deposits.</td>
</tr>
<tr>
<td>2. To show the collateral that banks receive.</td>
<td>Market capitalization of corporative equity.</td>
<td>Industrial production.</td>
<td></td>
</tr>
<tr>
<td>3. To measure the ease with which banks can get new capital to fund loans in the following period.</td>
<td>Banking sector share price relative to the market average.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. To measure the profitability.</td>
<td>The rate on short term bank loans.</td>
<td>Real interest rate relative to the cost of funds.</td>
<td>Differential between the interest rate on loans and the interest rate on alternative assets.</td>
</tr>
<tr>
<td>5. To measure the credit risk.</td>
<td>The difference between the lending rate and the money market rate.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. To measure the uncertainty.</td>
<td>Expected inflation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. To measure the expectations of the economy.</td>
<td>Expected GDP.</td>
<td>Index of industrial production.</td>
<td></td>
</tr>
<tr>
<td>8. To measure the specific risk of the banking sector.</td>
<td>Variance of bank share prices relative to the market average.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Cost of lending.</td>
<td></td>
<td></td>
<td>The cost per dollar of deposit.</td>
</tr>
</tbody>
</table>

**Demand**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To measure the requests of credit by firms.</td>
<td>a. The volume of expected fixed investment.</td>
<td>a. Industrial production.</td>
</tr>
<tr>
<td></td>
<td>b. Expected production.</td>
<td>b. The output gap.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. The price of the stock market as a proxy for the future expected output.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Differential between the lending rate and the interest</td>
</tr>
<tr>
<td>3. Variables which favor the demand for credit.</td>
<td>Expected rate of inflation.</td>
<td></td>
</tr>
<tr>
<td>4. Variables that reflect the general state of the economy.</td>
<td>Inflation.</td>
<td></td>
</tr>
<tr>
<td>5. Variables that reflect alternative financing.</td>
<td>Price index of the stock market.</td>
<td></td>
</tr>
</tbody>
</table>

Own elaboration based on: Sealey 1979, Pazarbasioglu 1997 and Ghosh and Ghosh 1999.
### APPENDIX 2: SUMMARY OF COEFFICIENTS OBTAINED IN DIFFERENT STUDIES FROM THE LITERATURE

#### Comparison of coefficients

<table>
<thead>
<tr>
<th>Objective</th>
<th>Pazarbasioğlu</th>
<th>Ghosh y Ghosh</th>
<th>Sealey</th>
<th>González</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supply</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Available resources for loans</td>
<td>Positivo y significativo</td>
<td>Ind. Cor. Tai.</td>
<td>.1967 (9.2783)</td>
<td>-3.83594 (-2.02889)</td>
</tr>
<tr>
<td>2. Collateral</td>
<td>.04 (3.27)</td>
<td>Ind. Cor. Tai.</td>
<td>.1967 (9.2783)</td>
<td>-3.83594 (-2.02889)</td>
</tr>
<tr>
<td>3. The ease with which banks can get new capital.</td>
<td>4.77 (5.71)</td>
<td>Ind. Cor. Tai.</td>
<td>4.30 (5.30188)</td>
<td>-0.11416 (-.605354)</td>
</tr>
<tr>
<td>4. Profitability.</td>
<td>2.76 (4.69)</td>
<td>Ind. Cor. Tai.</td>
<td>4.30 (5.30188)</td>
<td>-0.11416 (-.605354)</td>
</tr>
<tr>
<td>5. To measure the credit risk.</td>
<td>2.92 (15.83)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. To measure the uncertainty.</td>
<td>.21 (.50)</td>
<td></td>
<td>(.077434)</td>
<td>(3.10185)</td>
</tr>
<tr>
<td>7. To measure the expectations of the economy.</td>
<td>.71 (.33)</td>
<td></td>
<td>.4419 (.0527)</td>
<td>-534160 (-3.50149)</td>
</tr>
<tr>
<td>8. To measure the expectations of the economy.</td>
<td>.05 (.88)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Cost of the loan activities.</td>
<td>1.9744 (1.2758)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Demand</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. To measure the requests of credit by the firms.</td>
<td>.01 (2.88)</td>
<td>Ind. Cor. Tai.</td>
<td>1.1705 (11.9074)</td>
<td>-2.16145 (-3.90238)</td>
</tr>
<tr>
<td>2. To measure the cost for the firms to ask lent.</td>
<td>-3.49 (-2.29)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. To capture variables those favor the demand of credit.</td>
<td>-4.72 (-.40)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Variables that reflect the general state of the economy.</td>
<td>-1.384 (-3.22)</td>
<td>Ind. Cor. Tai.</td>
<td>-22.8051 (-8.4657)</td>
<td>-1.56473 (-2.64199)</td>
</tr>
<tr>
<td>5. Variables that reflect some</td>
<td>3.9146 (4.5614)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
alternative financing.
BIBLIOGRAPHY


Stiglitz George, and Weist (1981) AER


Gonzalez, Mauricio, Director General de Grupo de Economistas y Asociados. Op-Ed Publisher in Reforma on April 11, 2002.


