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The Roots of Banking Crises: The Macroeconomic Context — Source link

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The Roots of Banking Crises: The Macroeconomic Context

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Introduction

Most discussions of banking crises begin, not unreasonably, with an examination of the special characteristics of the financial institutions that have failed. Often, we find that the bankrupt institutions were poorly managed and, in some instances, even vehicles for outright fraud. It is typically possible, with the benefit of hindsight, to point toward specific failures of the regulatory system that permitted the mistakes or malfeasance that were the proximate cause of the failures. From inquests of this sort, valuable lessons can be drawn about the design of regulatory mechanisms for prevention, or at the very least early detection, of dangerous or malfeasant behavior by managers of individual banks.

This is a sensible and necessary line of investigation. There can be no doubt that many bank failures are due in large part to bad decisions by bankers that are possible to understand after the fact, and that may even be predictable and thus preventable by competent bank supervision and regulation. And in many cases of isolated failures such as those of Barings and BCCI, this may even be the whole story.

However, particularly when trying to understand a major crisis in which a substantial fraction of the banking system is endangered, this focus on the characteristics of institutions that happened to fail is incomplete and potentially misleading. The question arises whether observed shortcomings of the failed banks actually explain the crisis, or merely which banks failed as a result of the crisis. A metaphor may be useful here. Chains break at their weakest link, but that does not mean that the specific flaws in the weakest link fully explain why the chain broke: one needs also to understand what caused the tension on the chain. Indeed, strengthening weak links in the chain only works if one succeeds in identifying the weakest link before it snaps, and even then will accomplish nothing more than causing the chain to break at another link if the tension on the chain is sufficiently high.

In our metaphor, the individual links in the chain represent the specific institutions that comprise the domestic financial system. Their strength is determined by their investment and funding decisions, which can be influenced by supervisory and regulatory structures. Tension is placed on the chain by economy-wide factors including, in particular, macroeconomic developments. When macroeconomic forces place great strain on the banking system, the weakest banks are the ones most likely to fail, but it is the macroeconomic tension, as much as the weakness of individual banks, that causes the failures.

As with a chain, the quality of the institutional and regulatory regime and macroeconomic factors clearly interact: to the extent that regulation and supervision strengthen each bank in the system, they permit the system to withstand larger macroeconomic stresses without falling into crisis. But institutional arrangements and supervisory systems that eliminate the risk of bank failure and financial crisis do not exist in any region, certainly not in Latin America, and would probably be counterproductive if they did. Thus, no matter how well regulated and supervised, banking systems are likely to remain vulnerable to macroeconomic shocks. The question therefore arises how policy should respond to this vulnerability.

This paper discusses the ways in which macroeconomic developments can put stress on banks, and in extreme cases lead to banking crises.[1] Just as there are many ways to die, there are many ways in which macroeconomic developments can contribute to financial crisis, and we do not argue for the special importance of any specific mechanism. Adverse macroeconomic shocks may make it difficult for bank borrowers to pay their debts in full and on time, thus threatening the solvency of banks. Adverse shocks to domestic money demand or international capital flows may undermine domestic banks' ability to fund their lending commitments, leading to crisis through another channel. A sudden increase in demand for bank deposits or surge of foreign capital may trigger a bank lending boom, at the end of which banks may find themselves holding a large number of doubtful loans, making the system highly vulnerable to even a small shock.

These macroeconomic causes of bank vulnerability and crisis have important implications for regulatory regimes, and for macroeconomic policy itself. Some implications that we discuss:

PThe recognition that macroeconomic shocks are an important source of bank crisis raises questions about the appropriate framework for bank regulation and supervision in Latin America. Is a regulatory environment that is adequate for banks located in the relatively stable industrial countries sufficient for a region as volatile as Latin America? Are the BIS standards for bank capitalization conservative enough for Latin America? Are industrial-

1 [1]While macroeconomic developments can lead to financial vulnerability, it is equally true that imperfections in financial intermediation can contribute to macroeconomic instability. This important point is not discussed in this paper, but deserves more attention. See Goldfajn and Valdéz (1995) for a theoretical treatment of one linkage, and Calvo and Mendoza (1995) for discussion in the context of the recent Mexico crisis.

country practices in the area of bank reserve or liquidity requirements appropriate for Latin America?

PVolatile fiscal policy is an important source of shock to the financial system. Fiscal shocks can create destabilizing increases in domestic interest rates and, through their effects on expectations of inflation, equally destabilizing fluctuations in domestic deposit demand. The structure of domestic public debt has also proven highly destabilizing in some countries. This raises the question how fiscal and public debt policy can be structured to avoid creating large strains on the domestic banking system.

PWhile there is not much that macroeconomic policy can do to prevent shocks to the terms of trade or world interest rates, the impact of the shock on the banking system will depend upon the macroeconomic policy regime, and particularly the monetary and exchange- rate regime, in place when the shock arrives. We highlight the role of monetary and exchange rate policy, and argue that when banking systems are fragile, some degree of exchange-rate flexibility will reduce the likelihood that an adverse shock will be transformed into a highly disruptive banking crisis. Financial fragility is, then, an important factor in the choice of exchange rate regime.

PBank lending booms often end in tears. We put forward some explanations why rapid loan growth can generate financial-system vulnerability, and provide reasons to believe that regulatory oversight may not be well suited to coping with the problem of lending booms, even if well designed and effectively implemented. Monetary policy instruments - and specifically management of bank reserve or liquidity requirements - may be better suited to the task.

PA serious "credit crunch", such as may be created by a rapid decline in demand for bank deposits or other sources of funding, can be equally disruptive. While commercial banks will hold liquidity to avoid the private costs of illiquidity, they may not have incentives to remain sufficiently liquid. This provides a policy interest in establishing standards for bank liquidity, and in managing required liquidity levels as required to offset the disruptive economic impact of aggregate liquidity shocks.

Much of the discussion in this paper will emphasize the need for monetary policy to be set with an eye on the state of the domesic banking system - not always, and not as the main preoccupation, but as an occasionally very important consideration. In this, the discussion has the ring of unconventionality - "textbook" discussions of monetary policy seldom focus on the health of the domestic banking industry as either an objective of or a constraint on policy. But the fact is that monetary policy already is, if occasionally, importantly influenced by these considerations. It is widely believed, for example, that in the United States during the late 1980s, monetary policy was made less contractionary, and the speed of disinflation thereby reduced, in part because of concerns that high interest rates were threatening the health of the domestic banking industry, already made vulnerable by losses on international lending that went bad in the debt crisis of the 1980s. Similarly, the failure by Mexican authorities to raise interest rates by enough to compensate for the external and political shocks of 1994 is partly attributed to their concerns about the impact of higher rates on fragile domestic banks. One purpose of this paper is to promote a discussion of how to do a better job of incorporating weak banking systems into macroeconomic policy management.

The paper is organized as follows. Section 2 discusses some relevant characteristics of banks and the banking industry, giving some reasons why the banking industry is so vulnerable to crisis, and why it must be regulated. While much of this material is well understood, our review of the underlying market failures that beset the industry highlights, in addition to the importance, also certain limitations of prudential regulation that are relevant for the role of macroeconomic policy toward the banking sector that we discuss in later sections of the paper. Section 3 provides a general overview of alternative explanations for how banking crises arise, focusing on the role of "shocks" and "vulnerability". Section 4 discusses the role of macroeconomic shocks in the creation of crises, and some ways in which the macroeconomic policy response to such shocks can either reduce or increase the likelihood that the shocks will lead to banking crisis. Section 5 takes up macroeconomic sources of banking system vulnerability, focusing on the role of bank lending booms, and Section 6 concludes with a discussion of some policy implications.

2. Relevant characteristics of banks

What is special about banks? Why is the banking industry so prone to crisis, and why is there a special policy interest in preventing and dealing with such crises?

Banks are leveraged. The incentive problems that make banks "special" ultimately stem from the fact that they are leveraged; when managing their investments they are putting other people's money at risk. In addition, the nature of banks' liabilities renders normal mechanisms for controlling the implied incentive problems ineffective.

Bank leverage has two important implications. First, capital is the "cushion" that stands between adverse shocks and bankruptcy, and because that cushion is relatively thin for

banks, relatively small shocks can drive a bank to insolvency. Capital is, then, a crucial buffer stock for banks and, as with other buffer stocks, the amount of capital that should be held depends upon the volatility of the environment in which the bank is embedded. Thus, in volatile regions such as Latin America, the problems generated by leverage may be larger than would be the case in more stable regions.

Second, leverage, combined with limited shareholder liability, generates incentives for bank managers - acting rationally on behalf of shareholders - to hold an excessively risky portfolio. This arises from the fact that shareholders receive the entire benefit of good outcomes, while debtors pay the price of outcomes sufficiently bad to drive the bank to insolvency.

Banks are not, of course, unique in being leveraged. Nonfinancial firms are leveraged as well, and are therefore subject to similar conflicts of interest between shareholders and debt-holders. Creditors generally address the problem by: (i) demanding higher interest rates when lending to firms that engage in riskier activities, (ii) attempting to control subsequent risk-taking by negotiating and enforcing loan covenants and other contractual restrictions, (iii) standing ready to assert control over the firm's assets in the event of bankruptcy.

While not unique to banks, the problems created by leverage are more serious for them for two reasons. First, banks are much more leveraged than is the typical nonfinancial firm. The value of a bank's equity typically totals about a tenth the value of its debt, making banks an order of magnitude more leveraged than the typical nonfinancial enterprise.[2] Second, for reasons that will be discussed below, bank depositors are in a poor position to perform the functions of corporate governance that are typically performed by creditors of a nonfinancial corporation.

Banks are illiquid. In most economies, banks perform an explicit transformation of maturities, taking relatively short-term deposit liabilities and holding longer-term loan assets. In Latin America, bank lending tends to be relatively short term, but the banking system is nonetheless illiquid. First, while Latin American bank lending tends to be short-term, loans are nevertheless longer-term than are deposits. More importantly, even though loans are written as short-term contracts, they are in fact longer-term commitments because enterprises count on the loans being rolled over, and use the resources to finance activities that cannot abruptly be terminated, except at high cost. If loans are not rolled over firms will be forced into actions that undermine their own profitability, and perhaps that of their business partners, thus resulting in a decline in the quality of banks' loans. Thus, whatever the stated maturity of its loan portfolio, the banking system is illiquid in the sense that an attempt to rapidly liquidate its portfolio would sharply reduce the value of its assets.

This illiquidity has important ramifications, especially in volatile regions such as Latin America where, as will be discussed in more detail below, macroeconomic shocks to banks' funding sources are very large. To prevent such shocks from disrupting the flow of credit upon which the real economy depends, banks hold buffer stocks of liquid reserves which allow them partially to insulate lending from shocks to deposits and other funding sources. Below we will ask whether banks face incentives to be sufficiently liquid, or if instead there is a justification for enforcing minimum liquidity requirements at levels higher than banks would choose if unconstrained.

Banks manage information problems. A third and crucial feature of banks is their role in resolving the information problems that beset financial markets everywhere. This is what financial intermediation is all about.[3] Over time, banks learn about their borrowers through a variety of mechanisms, including periodic "liquidity tests" of borrowers' ability to service short-term credits. In Latin America, where the institutional structure provides for few other signals of firm solvency, liquidity may be a particularly important signal of solvency, although other information would undoubtedly become available to banks in the course of a long-term relationship with their borrowers.[4]

On this, two points are particularly relevant for the discussion that follows. First, *it is the business of banks to generate private information about their borrowers*, a situation that puts both depositors and supervisors at an informational disadvantage vis-à-vis the banks. This is one important reason that depositors would have a hard time monitoring bank managers in the way that creditors of non-

2 [2]In the United States in the mid 1980s, commercial bank debt was about 11 times its equity, compared with a ratio of 1.20 in the manufacturing sector. (Dewatripont and Tirole (1994) p. 23.)

3 [3]Diamond (1984) is the classic theoretical treatment of banks as financial intermediaries that specialize in the processing of information.

4 [4]Liquidity as a signal of borrower solvency is emphasized in the Latin American context by Rojas-Suarez and Weisbrod (1994).

financial enterprises must do. A similar constraint applies to bank supervisors; the information possessed by supervisors about a banks' asset quality is a subset, and perhaps a small one, of the information available to bank managers.

Second, to the extent that borrower liquidity is an important signal of solvency, *the quality of the signal received by an individual bank depends very much upon conditions in the loan market as a whole*. When credit is freely available, a firm can repay a loan to one bank with funds received from another, which means that liquidity may be a poor signal of loan quality during credit booms: "good times are bad times for learning" about the creditworthiness of borrowers. Lending booms tend also to be periods of buoyant economic activity and transitorily high profitability, so that even shaky enterprises will be liquid and appear solvent, whether they have access to other sources of credit or not. In short, during lending booms banks may have a very difficult time determining which of their loans are going bad. And, if bank managers have a hard time determining which loans are experiencing difficulties, it should be clear that supervisors will be at least as deeply in the dark, and probably more so.

Bank solvency and liquidity interact. As was discussed above, the essential illiquidity of banks means that a sudden need to contract lending of the banking system as a whole is likely to reduce the quality of bank assets and, if abrupt and extreme enough, to force borrowers into default. Banks may then be forced to take over and sell the assets of bankrupt enterprises at "firesale" prices, leading to a downward spiral in asset prices that may lead to a further deterioration in bank balance sheets. Thus, bank liquidity problems can immediately be translated into solvency problems, and to the extent that there is a policy interest in ensuring that banks are solvent, there is an interest in ensuring that they are liquid. At the same time, real or imaginary bank solvency problems are likely to generate a flight by depositors, generating a liquidity shock that will, in turn, reduce the quality of the bank portfolios, possibly by enough to validate the initially exaggerated fears that motivated the bank run. This means that bank runs can occur as self-fulfilling prophecies of bank failure, driving even well-run banks into insolvency. The "exit" option for bank depositors is, therefore, a poor mechanism for exercising control over bank managers.

Banks manage the payments mechanism. A fourth central feature of banks is that an important class of their liabilities provides the vehicle through which the payments system operates. The payments system may furnish important externalities for the economy as a whole, providing a policy interest in ensuring that it operates without disruption. The externality results from the fact that the inability of one bank to honor its commitments may undermine the ability of other, otherwise healthy, banks to honor theirs. This potential cascading of interruptions in the payments mechanism reduces the usefulness of all deposits as a means of payment.

Efficient functioning of the payments system also has important implications for the structure of bank liabilities. It requires, in particular, that deposit claims on banks be highly liquid. It also implies that a substantial fraction of banks' liabilities will be owned by a huge number of very small creditors, who are ill-equipped to obtain reliable information about the quality of a bank's management, or to coordinate a response to bad behavior. The only response available to such depositors is flight to another apparently safer bank or to cash. For reasons discussed above, such bank runs are a highly unreliable and inefficient way to discipline bank managers.

Bank depositors are protected. As noted above, the fact that banks are in the business of generating private information about the quality of their assets means that monitoring their behavior will be particularly difficult. Even if this were not the case, depositors would be particularly ill-placed to perform the tasks required to control the incentive problems that face bank managers, and if depositors are exposed to the consequences of bank mismanagement, the banking system will be vulnerable to runs. To reduce the likelihood of such runs, and perhaps to advance a more fundamental political interest in protecting the interests of small depositors, implicit or explicit government-provided deposit insurance is a common feature of banking systems.[5] This insurance completely short-circuits the corporate governance of banks, for it eliminates any incentive for bank depositors to monitor managers of the banks in which they've left their money, leaving the field open for abusive behavior by banks at the ultimate expense of taxpayers.

Banks are regulated. For this reason, banks must be regulated. If the riskiness of banks' assets could be measured precisely, the most direct way to address the incentive problems that face banks would be to charge bank-specific deposit insurance premia that are precisely

5 [5]Diamond and Dybvig (1983) model deposit insurance as a response to the problem of bank runs. Dewatripont and Tirole (1994) start from the presumption that protection of small depositors is itself an objective of policy toward the banking system.

calibrated to the riskiness of a bank's investments. However, because information about portfolio quality is largely private to the bank, this is infeasible, and indirect measures are required. In particular:

- Regulators establish and enforce ground rules for bank portfolio choice, including rules about the permissible degree of loan concentration along various dimensions, restrictions on the types of instruments that banks may hold as investments, restrictions on international activities, and the like.
- Regulators establish minimum standards for bank capitalization and liquidity, monitor banks, and enforce compliance with the standards.
- Regulators play the role of debtors in a private bankruptcy, asserting control over the assets of the bank in the event of bankruptcy.

By limiting leverage and ensuring that shareholders have something to lose when risky loans go bad, minimum capital standards limit the magnitude of the incentive problem that faces bank managers. They are, therefore, the first and arguably most important line of supervisory defense in the attempt to discourage excessively risky behavior by bankers.

Limits of bank regulation. One of the messages that we have tried to convey in this brief discussion is that bank supervision and regulation are attempting to solve a problem that would be difficult to resolve even outside the political-economic hothouse in which decisions must actually be made. These difficulties place important limits on bank supervision and regulation that will be important in the discussion that follows. We highlight a few of these now:

- *Prudential regulation is costly:* Bank regulators deal with bankers' moral-hazard problems by attempting to ensure that banks are more heavily capitalized and liquid than they would choose to be in an unregulated environment. Regulators could, in principle, eliminate risk in the banking system by forcing banks greatly to reduce their leverage and increase their holdings of safe, liquid assets. But in so doing they would at the same time reduce the efficiency with which domestic savings are channeled into the productive, and inherently risky, investments required for economic growth. A balance needs to be struck between the need to contain bad incentives created by bank leverage and information problems, and the advantages of financial intermediation.
- *Supervision must be transparent:* In an economic and political system based upon individual property rights, bank supervisory determinations must be made in a transparent fashion that respects private ownership and business judgment, and that restricts the potential for arbitrary or discriminatory treatment of individual banks. This means that supervision must be based upon observables, with limited scope for discretionary decisions based upon undocumentable "gut feelings" or "instincts". This introduces a "regulatory lag", as observable indicators of problems typically arrive well after problems have actually begun to emerge. This lag is illustrated in Table 1, below, which provides indicators of doubtful or defaulted loans in years leading up to the Chilean and Colombian banking crises (both of which began around 1982). In both countries these key indicators of portfolio quality were stable or even improving in the years leading up to the crisis, and only revealed problems in 1982, when the crisis actually materialized. In matters of bank regulation, it's not "what you see is what you get", it's what you *don't* see that gets you.

Table 1
Loan delinquencies are lagging indicators of banking crisis

	Doubtful or defaulted loans (percent of total)	
	Chile[1]	Colombia[2]
1975	2.8	4.0
1976	1.7	4.0
1977	1.4	3.0
1978	1.2	2.8
1979	1.1	3.3
1980	0.9	3.3
1981	2.4	3.7
1982	8.2	8.4
1983	18.7	---

1. Velasco (1988).
2. Montenegro (1983).

The need for transparency also means that the "burden of proof" facing regulators must be higher than that facing private bank creditors. It is acceptable for large depositors to flee from or demand a higher risk premium of banks on the basis of market rumors or "gut feelings". But permitting regulators to act on the basis of essentially subjective indicators provides too much scope for abuse. And even if permitted to act on such a basis, regulators are likely to be reluctant to do so because, like shouting "fire" in a crowded theatre, regulatory interventions may frighten the market and thus create a problem where one did not previously exist. In order to avoid criticism for having themselves created a crisis, regulators are likely to wait for

concrete evidence of problems before taking observable action.[6]

- *Supervision is limited by regulators' information set:* It is the job of banks to generate private information about the value of their portfolio. In many circumstances, they will have an incentive to hide portfolio problems from supervisors, and in the all-important short run this can be done in a number of ways, including rolling over problem loans, "gains trading", and so on. This places important limits on the ability of regulators to detect and prevent problems, particularly, as we shall argue below, during credit booms when problems are most likely to develop.

The need for transparency and the information disadvantage create serious problems for bank regulators, particularly during the credit booms upon which we focus below. If bankers have a poor idea of asset-quality problems, the problem will be worse for regulators. Even when bankers know about problems, they will be able to disguise them, at least temporarily, from regulators. And there will probably be cases in which regulators suspect the existence of problems but are constrained from acting because the problems cannot adequately be documented.

3. Explaining bank crises: shocks and vulnerability

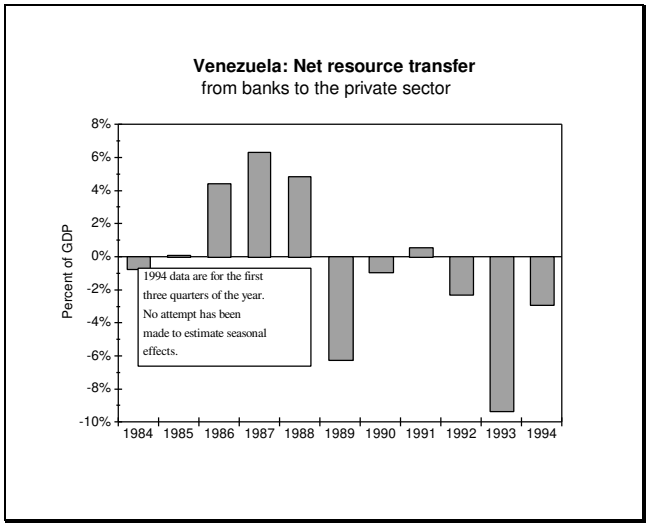
How do banks fail? Although there are many ways to die, they all involve certain physiological mechanisms, such as the cessation of heartbeat. Similarly, the mechanics of bank failure involve a common mechanism. This is the inability of banks to deliver funds that depositors demand. This will pose no problem if the rate of growth of bank deposits is higher than the deposit interest rate: in this case, depositors are actually transfering financial resources to the banking system, and banks are able to remain liquid even if they roll over all their loans and make even more.[7]

However, when the rate of growth of bank deposits is lower than the deposit interest rate, banks must make a net transfer of funds to depositors. In order to do so, they must either extract a transfer of resources from their borrowers, or run down their stock of liquidity. Problems occur when the required transfer to depositors is so high - either because domestic interest rates are high or because deposit growth is low or negative - that banks cannot extract the required resources from their borrowers or their stock of liquidity.

In principle, banks can obtain the required transfer simply by calling in loans as they mature. In reality, banks are limited in their ability to do so because, whatever the nominal maturity of bank loans, nonfinancial firms would find a sudden curtailment of access to credit highly disruptive. If the "credit crunch" is not too large or long-lasting, firms will be able to make the required transfer by cutting back investments that can be postponed, running down inventories, and so on. But if it is large or long-lasting, a contraction of credit may imply a transfer that is simply unpayable, or that forces firms into default.

The destabilizing effect of large net resource transfers to depositors is evident in the recent Venezuelan crisis. In 1993, domestic interest rates rose to about 60 percent, while deposits grew only 17 percent, requiring a net resource transfer from banks to depositors of more than 9 percent of GDP. As Figure 1, below, indicates, this was very large by historical standards, large enough to drive the banking system into crisis.

Figure 1



Following this logic, we can identify two components of a banking crisis. The first is the magnitude of the net resource transfers that the system is required to make. The second is the threshhold of resource transfers above which the system will crumble. The first element constitutes a shock, because under normal conditions net resource transfers should not pose important difficulties for banks. The second element defines the vulnerablity of the banking system. Banking crises are due to both shocks and vulnerability. We will deal with macroeconomic dimensions of these two elements of bank crises in the following two sections.

6 [6]Indeed, they may have incentives to delay action even after troubles are apparent. Kane (1989) discusses the incentive problems facing bank regulators.

7 [7]This is akin to a Ponzi scheme, and can be only a temporary condition.

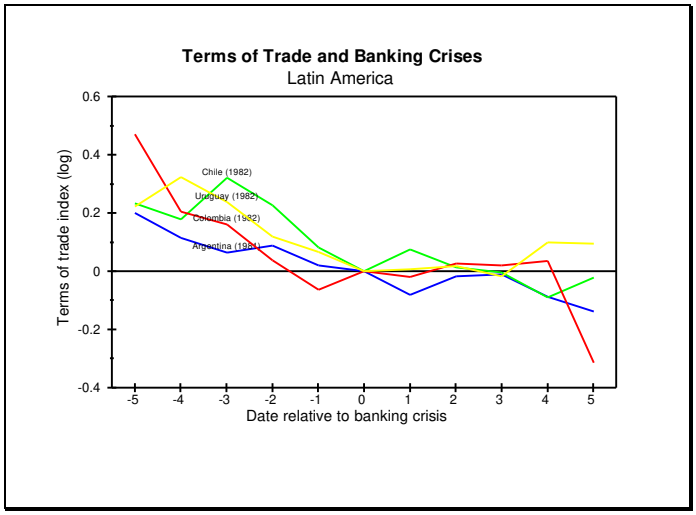
4. Macroeconomic shocks and bank crisis

It is hard to think of a major banking crisis in which a macroeconomic shock of some sort was not at least part of the story. Such shocks can take various forms and affect bank solvency in a number of ways. A major recession, decline in the terms of trade, or other adverse shock to national wealth will reduce the profitability of bank borrowers; some will find themselves unable to service their bank debt, and what had been good loans will turn out to be bad. Funding shocks may demand a sudden contraction of bank balance sheets, with adverse implications for the health of borrowers and, therefore, of banks.

Macroeconomic shocks to asset quality: One does not have to search far to find examples of adverse shocks to domestic income that, by reducing the debt servicing capacity of domestic bank borrowers, have adversely affected bank assets and contributed to bank crisis. The sharp decline in oil prices of the middle 1980s had a severe impact on banking systems in both Texas and Venezuela, as well as other oil-exporting regions. (That there was a crisis in Texas and not Venezuela has much to do with the different monetary policy and exchange-rate responses to the crisis, as will be discussed below.) As Figure 2 illustrates, adverse terms-of-trade shocks have been important factors in most Latin American crises, including Argentina, Chile, Colombia, and Uruguay.[8]

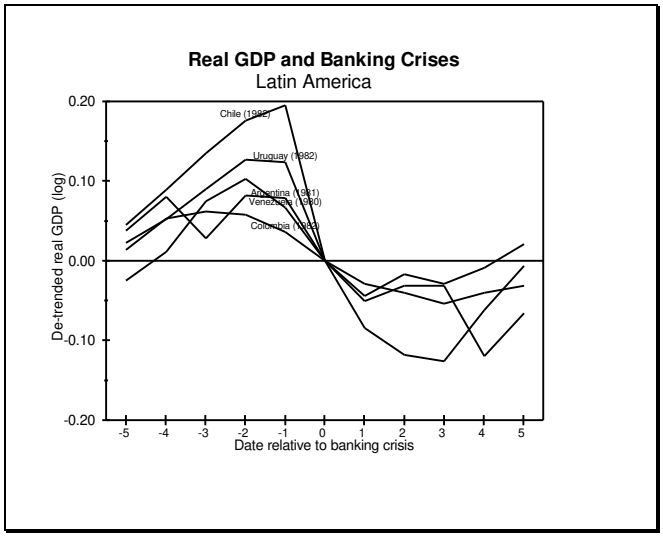
Substantial declines in the terms of trade also preceded banking crises in several industrial economies, including Norway, Finland (which was also adversely affected by the collapse of trade with the Soviet Union), and Spain, although not in Japan or Sweden.

Figure 2



And in fact most banking crises are preceded by a generalized deterioration of the macroeconomic environment. This is illustrated in figures 3 and 4, which show that there is a fairly typical cyclical pattern displayed by countries that have experienced banking crises. In general, a strong macroeconomic boom gives way to recession a year or two before the crisis actually materializes, after which the recession deepens for several years.

Figure 3

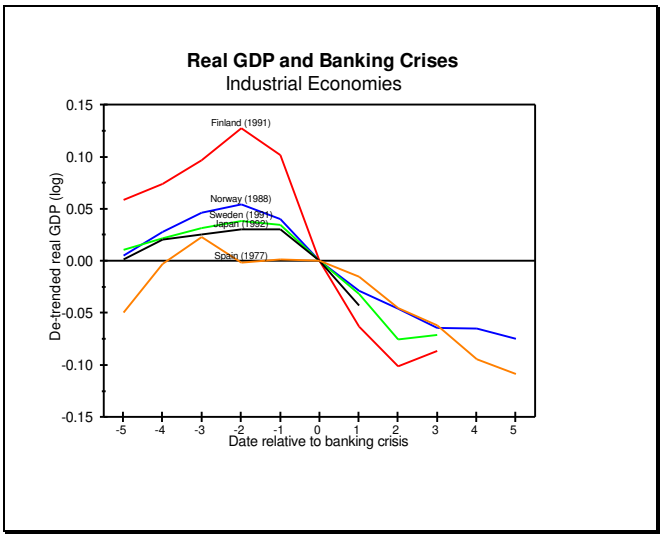


As we will discuss in more detail below, our explanation for this stylized fact is that systemic vulnerabilities develop during lending and macreoconomic booms that typically

8 [8]Morris *et al.* (1990) and IMF (1993) also highlight the importance of terms of trade shocks for several of the banking crises that they analyze.

precede crises, and the vulnerabilities lead to crisis after an adverse macroeconomic shock, which is typically associated with recession.

Figure 4



Adverse macroeconomic shocks may also directly affect bank balance sheets through induced effects on asset prices. A particularly important example of banks' exposure to asset prices is real estate: while banks typically do not speculate directly in the land or real estate markets, they do make loans to construction companies whose ability to repay is threatened if the real estate market takes a dive. And bad real estate loans, associated with poor real estate markets, have in fact been an important feature in many bank crises.[9] If banks do hold marketable assets in their portfolio, they will be exposed to fluctuations in market prices. This was an important factor in the failures of several Argentine *bancos mayoristas* in early 1995. Those banks owned large quantities of Brady bonds, and the capital losses that those bonds suffered during the selloff that followed the Mexican devaluation were fatal for the banks. Similarly, Japanese bank portfolios have been adversely affected by the collapse of land and equity prices that has taken place in the 1990s. As banks become more involved in taking market positions through proprietary trading operations and the use of derivatives, their exposure to asset-price risk is likely to increase.

But more often, the effect on banks of asset-price shocks is more indirect. For example, during the years leading up to the Chilean banking crisis, banks were permitted to borrow in foreign currency, but prohibited from taking the exchange-risk, so that lending funded by international borrowing was required to be denominated in foreign currency.[10] This was supposed to transfer the currency risk from banks to the nonfinancial firms to which banks made loans, but after the unexpected devaluation many firms found themselves unable to repay their loans in full and on time. Thus, the exchange-rate risk that faced nonfinancial firms was, in fact, to a substantial extent borne by the banking system in the form of credit risk.

It is intuitively obvious that a decline in national income or wealth will lead to a reduction in the quality of bank portfolios. Less obvious is the fact that a large macroeconomic disturbance can harm banks' portfolios even when the country as a whole benefits from the shock, if the disturbance has large distributional effects. The reason is that bank loans extended to sectors adversely affected by the disturbance are likely to fall into arrears, while the increased income that accrues to sectors that receive a windfall from the shock is not captured by the banks, which mainly own debt rather than equity claims on firms. For example, the major macroeconomic reforms initiated in Venezuela in early 1989 included import liberalization and substantial realignments of relative prices that led to insolvencies in some productive sectors, with adverse effects on the quality of commercial bank balance sheets.

In short, macroeconomic disturbances of almost any sort can adversely affect bank balance sheets, and if large enough, threaten the solvency of large parts of the banking system. In addition to recession, other factors have importantly undermined the ability of bank debtors to service their debts. In the Chilean crisis of 1982-83, firms were undermined by a long period of exchange-rate overvaluation and high interest rates, themselves the result of the disinflation strategy adopted by the country. In Argentina, too, the 1980 financial panic was preceded by a period of highly unstable macroeconomic and financial policy, during which an increasingly overvalued peso put pressure on producers of tradeables, triggering a period of "distress borrowing" that put upward pressure on interest rates and downward pressure on the quality of banks' assets.[11] In Uruguay and Colombia, too, the crises of the early 1980s were precipitated by a prolonged period of currency overvaluation and a generalized economic downturn in the aftermath of adverse external shocks.

It is important to recognize that the policy regime in place at the time of a macroeconomic shock will affect the

9 [9]See IMF (1993).

10[10]Velasco (1988).

11[11]Morris *et al.* (1990).

probability that the shock is transformed into a banking crisis. Here we highlight as a particularly important example the role of alternative exchange-rate regimes. Consider an adverse external shock that reduces the capacity of domestic borrowers to service their debts to the banking system. If the shock is large and the banking system fragile, banks will be unable to write the debts down to realistic levels without themselves becoming insolvent, because they are unable at the same time to reduce the real value of their liabilities. But if nothing is done, depositors may begin to flee from the now precariously situated banks, creating a highly destabilizing situation threatening to both the banking system and the exchange rate regime.

Some kind of a restructuring of bank assets and liabilities is clearly required; with the real value of assets having fallen, either bank creditors (in practice, depositors) must take a hit or taxpayers must pay for a recapitalization of the banking system. Under fixed exchange rates, depositors are protected: with the price level largely determined by the domestic exchange rate, the external shock will have no direct effect on the real value of bank liabilities, which will exceed bank assets until an explicit restructuring is arranged. Under flexible exchange rates, however, the adverse external shock is likely to lead to a depreciation of the exchange rate, automatically writing down the real value of banking system assets to levels that can realistically be expected to be paid, and at the same time writing down the real value of bank liabilities so that banks are not thereby broken.[12]

Of course, depositors will demand higher deposit interest rates as compensation for the exchange-rate risk, but this is arguably as it should be: better to put the aggregate risk on bank deposits where it can be priced and allocated than to offload it to taxpayers where it cannot be. But the main point is that in a fragile financial system, external shocks are more likely to create a banking crisis under fixed than under floating exchange rates.

A case in point is the impact of the collapse in oil prices of the middle 1980s on the banking systems of Venezuela and Texas. In Texas, the collapse led to a crisis in the banking and the savings and loan industries, while in Venezuela a crisis did not result. Whatever the weaknesses that may have been present in the supervision of depository institutions in Texas, it seems highly implausible to argue that the absence of crisis in Venezuela was due to a supervisory framework superior to the one that was in place in Texas. Instead, a key reason for the absence of crisis in Venezuela was the fact that the oil shock was followed by a maxi-devaluation that effectively wrote down the real value of bank assets to levels that could - in the new and less prosperous circumstances - actually be paid, while simultaneously writing down the real value of deposits and other bank liabilities in the manner required to maintain bank solvency.

Macroeconomic shocks to bank funding: Macroeconomic shocks can also affect the demand for deposits and other bank liabilities, and therefore the ability of banks to fund their lending portfolio. The two most important funding sources for banks in Latin America are deposits and, in some countries and time periods, foreign borrowing. Both the demand for deposits and the availability of international capital are notoriously volatile in Latin America.[13] Deposit demand may contract because of an increase in expected depreciation, perhaps associated with an unsustainable balance of payments or real exchange rate. This was an important factor in the Swedish crisis of 1991, which was preceded in 1990 by a decline in deposits of roughly 5 percent of GDP. Expectations of inflation and devaluation may also be driven by worrisome fiscal developments, leading, again, to a decline in deposit demand and a rise in interest rates, as in the case of Venezuela in 1993. A sudden fiscal expansion may also crowd out private-sector borrowers, leading to a private sector "credit crunch" even if total bank credit does not decline.

Whatever the cause, a sharp decline in deposit demand or in the ability of domestic banks to borrow abroad will severely reduce the domestic banking system's liquidity. To restore their liquidity, banks will be forced to sell assets if possible, or more likely to reduce the size of their loan portfolio by failing to renew credits as they come due. But, as discussed above, such a sudden withdrawal of credit is likely to be extremely destabilizing for the nonfinancial private sector, and may lead to a severe business contraction, with highly adverse effects on the quality of bank loan portfolios.

Recent developments in Argentina provide a good example of the consequences of a severe liquidity shock. The Mexican devaluation of December 1994 led to a sharp increase in the perceived riskiness of Argentine assets, and

12[12]We are implicitly assuming here that the banking system is not dollarized. To the extent that it is dollarized, exchange-rate depreciation will not affect the real value of bank assets or liabilities.

13[13]Inter-American Development Bank (1995) documents the high volatility of both money demand and international capital flows to Latin America. They are roughly twice as volatile in Latin America as in the industrial economies.

in particular of the country's monetary liabilities. These fears were compounded by the failure of some small wholesale banks, which raised questions about the stability of the domestic banking system. These factors led to a sharp decline in domestic money demand; from the beginning of the Mexican crisis to the end of March 1995, Argentine bank deposits fell by nearly 8 billion pesos, a decline of nearly one-fifth.[14] At the same time Argentine commercial banks, like other Argentine borrowers, lost access to international financial markets, which were essentially paralyzed during the first half of 1995. The result was a sharp decline in commercial bank credit to the nonfinancial public, which has contributed greatly to the deep recession now being experienced by the country.

Macroeconomic policy played an important role in limiting the impact of the "liquidity shock" on the domestic banking system and the economy more generally. While severe, the contraction of credit to the Argentine nonfinancial sector was reduced substantially because the central bank was, within the limits of the convertibility law, able to provide some credit to the banking system during the crisis, and more importantly was able to permit the commercial banks to utilize their own reserves by relaxing the relatively high reserve requirements that had been in place going into the crisis.[15] The relaxation of reserve requirements made roughly $3.4 billion of liquidity available to the banking system when it needed it most, greatly reducing the macroeconomic and financial impact of the "liquidity shock". This highlights the importance of an active policy toward bank liquidity in responding to aggregate liquidity shocks.

The Argentine "liquidity shock" originated in an external shock that created concerns about the viability of domestic policy and financial institutions. Such a shock can also result from monetary policy choices. The ongoing Mexican stabilization is an illuminating example. During the first five months of 1995, Mexican bank deposits rose roughly 14 percent, representing a decline of roughly 12 percent in real terms.[16] At the same time, banks' net foreign liabilities fell by nearly a third in real terms, further contributing to a sharp reduction in their lending capacity. Unlike in Argentina, bank reserves could provide no buffer, because at the beginning of the crisis they were only about 2.5 percent of deposits. As a result, domestic credit became very tight: bank lending to the private sector grew by only about 17 percent in nominal terms, and fell by roughly 10 percent in real terms.

While bank credit has been growing slowly, Mexican banks have been forced by financial market conditions to charge high interest rates to their borrowers. The net result has been a sharp swing in the net resource transfer between the banking system and the nonfinancial private sector. After being the recipient of large net transfers during the several years leading up to the crisis, the private sector has had to make large transfers to the banks in its aftermath. These transfers were small in the first three months of the year, as credit growth roughly matched domestic interest rates, but they rose dramatically in April and May, when credit growth slowed and domestic interest rates remained high. In those months, we estimate that the nonbank private sector was asked to transfer financial resources to the banks in the amount of more than NP25 billion per month, or 300 billion per year, representing some 15-20 percent of GDP.

Of course, transfers so large cannot be sustained for long, which explains the need for the various schemes for the rescheduling and restructuring of domestic private debt that are now being sponsored and supported by the government. In the absence of such schemes, the inability of bank borrowers to make the transfers that banks need to pay their depositors would generate bank insolvencies, runs, and a breakdown of the financial system. Here we point out that the magnitude of the crisis that must be dealt with through these programs is importantly influenced by the macroeconomic strategy adopted by the government, in particular, by the very tight credit policies that were dictated by an apparent desire to bring the exchange rate to around 6 pesos to the dollar. That policy was motivated, in turn, by a strong and understandable desire to contain the inflationary implications of the financial crisis.

Our purpose is not to question this strategy or the policy objectives that underlie it, but merely to point out some of its implications for the domestic banking system. This strategy has meant very high domestic interest rates and slow credit growth. The result has been an enormous "net resource transfer" from bank borrowers to banks, which has

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14[14] Banco Central de la República Argentina (1995). IMF data show smaller declines, although the story is otherwise consistent.

15[15] Reserve requirements were 43% for demand deposits and 3% for time deposits of duration up to 60 days, resulting in an average reserve requirement of 17%, or $7.7 billion. During the course of the crisis, the reserve requirements were reduced in stages to 30% for demand deposits and 1% for time deposits.

16[16] All data are from *International Financial Statistics.* Deposits include money market instruments. We have no data on bank lending rates, which we conservatively estimate at 10 percentage points over the Treasury bill rate reported in *IFS.*

clearly dealt a severe blow to the real economy, and which would almost certainly have been unpayable in the absence of officially-sponsored debt workout programs. What was the alternative? If the authorities had aimed at a less ambitious target for the price level, perhaps by engaging in unsterilized purchases of foreign exchange when the peso started to strengthen in April and May, bank credit would not have been so tight, interest rates would not have been so high, and the magnitude of the problem facing bank debtors - and therefore banks - would not have been so large.[17]

5. Macroeconomic sources of financial vulnerability - the role of credit booms

Until now, we have been considering situations in which the banking system, and the economy more generally, is taken by surprise by some macroeconomic shock that undermines the viability of financial institutions and creates a crisis. But macroeconomic surprises are not themselves a complete explanation for banking crises. We also need to understand why some banking systems are weak enough to be submerged by macroeconomic shocks, and others strong enough to survive them. As we have emphasized repeatedly, crises result from the interaction of shocks and vulnerability: here we explore macroeconomic determinants of bank vulnerability.

What exactly do we mean by vulnerability? A vulnerable bank is one in which relatively small shocks to income, asset quality or liquidity either make the bank insolvent or sufficiently illiquid that its ability to honor short-term financial commitments is brought into doubt. Vulnerability is thus present when the bank's "buffer stocks" of capital and liquidity are small in relation to the riskiness of its assets and its funding sources. A decision to engage in riskier lending or investment activities will thus increase vulnerability unless there is at the same time a commensurate increase in the bank's capital base. An increasing proportion of doubtful or bad loans will also increase vulnerability by reducing the capital available to cover further losses. As we have emphasized, such loan losses are often temporarily invisible to both bankers and supervisors, in which case the latent vulnerability will not become apparent until an adverse shock forces bad loans to the surface, but it is nevertheless present.

Many features of the institutional and regulatory environment can contribute to the vulnerability of the banking system. Here we focus on the role of macroeconomic forces, and in particular on the lending booms which, we will argue, can foster financial vulnerability by contributing to an endogenous decline in the quality of banks' assets.

Why the focus on lending booms? The empirical link between such booms and financial crisis is very strong. The attached charts illustrate that nearly every financial crisis in the countries in question was preceded by a period of rapid growth in banking-system credit, measured as a proportion of domestic GDP. This was the case in Argentina (1981), Chile (1981-82), Colombia (1982-83), Mexico (1995), Uruguay (1982), Norway (1987), Finland (1991-92), Japan (1992[18]), and Sweden (1991).[19]

This has not gone unnoticed in recent discussions of banking crises,[20] and those discussions have provided some explanations for why lending booms may precede crisis. In this section we review some of those explanations, and an alternative that is, in our view, more convincing and that has somewhat different policy implications. Briefly, we consider the following stories:

P*"Rope for their own hanging": Liberalization, bad banking, and crisis.* This story focuses on the fact that liberalization often permits bankers to engage in businesses from which they were previously restricted, and argues that they are likely to make big mistakes simply because they are unskilled.

P*Competition, bank "franchise value", and attitudes toward risk.* This story emphasizes that bank liberalization is typically associated with an increase in competitive pressures, which puts downward pressure on the expected future profitability of being in the banking business. By reducing the value of the equity that would be lost in a

17[17] See Gavin and Hausmann (1995) for a more detailed discussion of the tradeoffs involved.

18[18] It is a little hard to date the onset of the Japanese crisis, which is only now coming to a head, but whose dimensions were at least approximately apparent in the early 1990s. We choose the year 1992 because by that year it was apparent to informed observers that Japanese banks had serious problems with asset quality, although the actual magnitude of the problems are only now becoming clear.

19[19] Our data show a lending boom in the United States in 1985-1990. While no banking crisis resulted, it was a close call. In 1990 the U.S. deposit insurance fund was nearly wiped out by a large number of bank failures, leading to speculation that a crisis was imminent (including presidential candidate Ross Perot's prediction of a "January surprise" announcement of a crisis after the presidential elections). In the event, the banking system was rescued by several years of monetary and macroeconomic conditions highly conducive to bank profitablity.

20[20] For example, see IMF (1993).

bankruptcy, this exacerbates the underlying incentive problems, discussed above, that encourage bank managers to take excessive risks in their lending.

P*"One bad apple spoils the bunch": Destructive competition in the market for deposits.* This story focuses on perverse incentives that may be created when deposit interest rates are deregulated. The suggestion is that competition in the market for deposits may force prudent borrowers to adopt the risky strategies of less prudent borrowers.

P*" Good times are bad times for learning": Lending booms, information, and collapse.* This story emphasizes information, rather than incentive problems in the link between lending booms and financial vulnerability, arguing that when credit is abundant and the economy booming, banks have a difficult time sorting good risks from bad. Bad loans therefore tend to accumulate during lending booms, and result in crisis when the boom is interrupted by an adverse macroeconomic shock.

"Rope for their own hanging": It is frequently argued that bankers in recently liberalized financial systems are likely to take make excessively risky loans and incur large loan losses simply because they are unpracticed in the new lines of business in which they are operating. This argument is particularly common in the cases of recently privatized banks, as in Mexico in the late 1980s, but it applies in principle to any market in which the regulatory environment has recently been relaxed in ways that permit bankers to take risks from which they were previously sheltered by legal restrictions. The lending boom, and accompanying decline in banks' portfolio quality, are in this story viewed as resulting from the youthful exuberance of an adolescent industry - like the teenage years, a dangerous but, one can hope, temporary period.

We have two main problems with this story. First, it seems to rely not only upon a lack of skills, but also on a degree of irrationality in the actions of private bankers. It may well be that recently privatized banks, which had been primarily in the business of taking deposits and buying government paper, have relatively unrefined skills in commercial risk assessment. But if bank managers are rational, they would take this lack of skill into account in their lending decisions. Understanding the need to hone skills and develop institutional expertise, unpracticed but unskilled bankers would presumably expand their balance sheet cautiously, and not engage in the sort of lending boom that generally precedes a financial crisis. Second, the fact is that the regulatory and business environment that faces bankers is in almost continual change, as new technology, ideas, and policies change the opportunities and constraints facing bankers. Advocates of this story as an explanation for banking crises need to explain why other market developments and regulatory reforms did not lead to lending booms or banking crisis.

"Competition, 'franchise value', and risk-taking": This story emphasizes that in many episodes of financial-system liberalization, the liberalization was accompanied by an increase in competition in the banking sector.[21] In some cases, the increase in competition was a cause of the liberalization; as institutions grew in unregulated sectors at the expense of highly regulated banks, regulators responded by relaxing restrictions on banks. The competition was also a direct consequence of the reforms themselves, which in many cases eliminated a *de facto* cartelization of the industry and allowed other institutions to compete with banks, and banks to compete with other banks in ways that had not previously been permitted. The increased competition lowered the 'franchise value' of a bank; that is, the expected stream of future profits from banking. This effectively reduced the equity at stake in domestic banks - not, perhaps, by standard accounting or regulatory definitions, but in the economically meaningful sense of the value that shareholders would lose in the event that a bad roll of the dice leads to bankruptcy. In so doing, the increased competition raised the incentive for bankers, for reasons discussed in detail above, to adopt excessively risky investment strategies.

This story has the advantage of focusing on well-understood incentive problems that face rational bank managers. It makes good logical sense. Our doubts about the story are factual. First, while deregulation generates increased competition, it also provides opportunities for bankers to enter profitable new activities.[22] The impact of liberalization on bank profitability is, therefore, not obviously negative. The empirical question can be settled by looking at bank equity prices: if liberalization actually reduced the 'franchise value' of banks, the reduction should have been reflected in banks' stock market valuation. In

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21[21]A prominent exponent of this view is IMF (1993). That report argues that the "...common thread running through many banking crises....is the recognition that the competitive pressures unleashed by financial liberalization do not merely increase efficiency: they also carry risks, as banks and other financial institutions alter their behavior to ward off institutional downsizing." (IMF (1993), p. 2-3.)

22[22]Bankers tend to favor bank liberalization, which suggests that any adverse effects on profitability are probably not too large.

fact, bank stocks do not appear to have been particularly depressed during many of the lending booms that preceded banking crises in Latin America and the industrial economies, whether they followed a major liberalization or not, casting doubt on the 'franchise value' hypothesis.[23]

"One bad apple spoils the bunch": This story focuses on a different aspect of financial liberalization, the deregulation of deposit interest rates. When deposit interest rates are freed, banks are linked to one another through the competition for deposits. Unfortunately, this may not be a competition in which the fittest survive, but rather one in which bad behavior drives out the good. Suppose there exists a "bad" bank, whose managers are more prone to make risky investments, perhaps because the bank is insufficiently capitalized, its managers are particularly risk-loving, or for some other reason. This bank will be willing to pay more for deposits than safe banks, and will bid aggressively for deposits and, if it exists, in the interbank market as well. Because of deposit insurance, depositors will be happy to move their deposits from the safe to the riskier banks. This presents the "good" banks with the choice of either downsizing dramatically or matching the interest rates offered by the "bad" banks, a strategy that may be infeasible unless the "good" banks adopt the aggressive and risky lending strategy adopted by the "bad" bank. Whether the "good" banks choose to downsize or emulate the bad bank, the outcome is the same: the portfolio of banks adopting risky lending practices will grow at the expense of more conservative banks, and the banking system as a whole will therefore become more fragile.

This is an interesting and potentially important story about a channel through which financial vulnerability can be generated and transmitted from one institution to others. It raises important questions about the appropriate regulatory response to, for example, aggressive bidding for deposits by individual banks. But it has little to do with the macroeconomic factors that are the subject of this paper, and in particular does not explain the aggregate lending booms that precede crises, so we will little more to say about the story.

"Good times are bad times for learning": Information, credit booms, and banking collapse: The preceding explanations for the observed link between lending booms and financial collapse have placed responsibility for both credit booms and deteriorating bank portfolios on financial liberalization. The following story has a somewhat different structure. In it we suggest that the causes of the lending boom are macroeconomic developments, largely unrelated to developments in the banking industry, but that the credit boom then creates information and incentive problems for banks that lead to a deterioration of portfolio quality, and an increase in financial vulnerability.

A key idea is that, when the banking system as a whole is expanding rapidly, it is very difficult for bankers to obtain information about the creditworthiness of borrowers. This is for several reasons. Lending booms tend to take place during periods of macroeconomic expansion, when borrowers are transitorily very profitable and, therefore, liquid. In addition, the speed with which loan portfolios grow during a lending boom may itself worsen the information problems that confront bankers. First, in order to expand a loan portfolio very rapidly, bankers will typically need not only to increase the size of their exposure to their existing clientele, but also to find new borrowers. But, almost by definition, new customers are those about whom bankers have relatively little information, so that as the lending boom proceeds, the riskiness of the portfolio will rise and loans to uncreditworthy enterprises are likely to increase. A second reason why "good times are bad times for learning" about creditworthiness is that, when credit is plentiful, borrowers can easily pass "liquidity tests" for solvency by obtaining credit from another lender, rendering the test of much less use than in times of scarce credit. Not only does this predict that credit booms will be associated with deteriorating loan portfolios, but it also suggests the presence of an information externality in the credit market: because bankers do not account for the adverse impact of the loans that they grant on other bankers' information, they will be excessively willing to grant loans. This provides an additional reason to worry that, in the absence of official intervention, credit booms will be excessively rapid.

In short, these information problems imply that the very rapid expansion of bank balance sheets that occurs during a

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23[23]IMF (1993) shows that bank stocks lagged behind broad indexes of equity prices in most of the countries that they examined. But the economically relevant question is what happened to the stock prices themselves, not relative to a broad market index. Equity markets boomed during the period of the analysis, and it appears that bank stock prices increased as well, although more slowly than did the markets as a whole. As a related aside: at the time of this writing, concern has been expressed in several policy circles about aggressive and apparently risky lending behavior by industrial-country commercial banks in the syndicated loan market. This has taken place in an environment of relatively high bank prices and strong bank capitalization, at least in the United States. Interestingly, some commentary attributes aggressive competition to the *high* degree of bank capitalization (outside, of course, Japan). (See *The Economist,* Sept. 23, 1995.)

lending boom is likely, over time, to generate a deterioration of banks balance sheets, although the deterioration is unlikely to be visible to either bankers or regulators until after the lending boom slows and the ability of borrowers to generate the financial resources required for repayment is put to the test. But, while they explain why lending booms may be dangerous, the information problems do not explain why they occur. What might generate the boom?

Here we can make a conceptual distinction between "demand-driven" and "supply-driven" lending booms. In demand-driven booms the shock is to the demand for domestic credit, perhaps because of an actual or perceived "productivity shock" that raises investment demand and expectations offuture income, which may raise demand for credit to finance consumption spending, or some other reason. In supply-driven lending booms, the initial shock is to the supply of loanable funds at banks' disposal, either because of an increase in deposit demand or a surge of international capital flows to the domestic banking system.

Mexico during 1990 to 1994 appears to be a good example of a lending boom driven by the supply of loanable funds at the disposal of the domestic banking system. Due in large part to consolidation of the inflation stabilization that began in the mid-1980s, bank deposits rose from about 20 percent of GDP in 1989 to 30 percent in 1994, while at the same time government demand for bank credit was declining and the ability of banks to borrow abroad was increased. The increase in real deposit demand provided banks with resources to lend, and in fact lending to the private sector exploded, from about 10 percent of GDP in 1990 to nearly 40 percent in 1994. In retrospect, it seems plausible that this rapid rate of growth in lending was at least partly responsible for the loan-quality problems that were becoming apparent in many Mexican banks even before the crisis that began in December 1994.

Does this mean that it was a bad idea to permit Mexican banks to lend to the private sector? Of course not: one of the most important reasons for securing an inflation stabilization is to reap the benefits provided by normal patterns of financial intermediation. However, if the information problems that we have discussed in this section are taken seriously, a case can be made in favor of policy initiatives designed to slow the rate at which bank credit rises to its new steady state. We take up this and other policy conclusions in the next section.

6. Conclusions and policy implications

What does a macroeconomic perspective on banking crises add to the policy discussion? We raise questions for discussion in three major categories. First, a recognition of the macroeconomic roots of many banking crises leads to certain questions about appropriate regulatory and supervisory structures for macroeconomically volatile regions such as Latin America. This is not the place to discuss the structures in detail, but we do want to point out some of the questions that might otherwise go unasked. Second, we discuss ways in which the fragility of banking systems can greatly complicate domestic monetary and exchange-rate policy. And third, a recognition of the importance of lending booms in the generation of banking crises leads naturally to the question whether policymakers should intervene to prevent such booms, and if so how. We argue that authorities should attempt to slow down lending booms, that prudential regulation that focuses on the capitalization of individual banks is likely to be least effective when it is most required, and that monetary policy instruments may be better suited to the task of slowing lending booms.

Macroeconomic volatility and the structure of prudential regulation: What are the implications of Latin America's highly volatile macroeconomic environment for the structure of bank regulation and supervision in the region? With respect to mandated *capital asset ratios*, we note that a bank's capital can be thought of as a buffer stock which permits the bank to weather shocks to asset quality without becoming insolvent. The more frequent and the larger are such shocks, the larger the buffer stock of capital that will be required to keep the probability of bankruptcy to acceptable levels. Latin America is much more volatile than the industrial economies: during the past quarter-century or so, the volatility of Latin American GDP and terms of trade have been twice that of the industrial economies, and the volatility of the real exchange rate has been nearly three times as high.[24] All these factors, and others, impart greater volatility to the earnings and net worth of Latin American banks than is found in those of industrial economies. The question then arises: are the BIS standards for capital adequacy appropriate for the region? Or should Latin American banks be more highly capitalized than are banks in industrial countries? Are there ways in which the specific macroeconomic risks that face Latin American banks can be better reflected than in the Basle standards?

Bank liquidity is the second important buffer stock held by banks. A stock of liquid assets helps the banking system

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24[24]Volatility is measured here by the standard deviation of percentage changes. See Inter-American Development Bank (1995) for an extended discusion of causes, consequences, and policy responses to volatility in Latin America.

withstand a sudden drop in deposit demand or in international credit without an abrupt and potentially very costly contraction of lending. However, holding liquid assets is costly for banks, because the interest rate earned on such assets is lower than could be earned on loans and other nonliquid investments.[25] It is costly to society as well, in the sense that the long-term investments that are foregone when banks hold high levels of liquidity are those that are required for growth and development. So a tradeoff must be struck between the dangers of illiquidity and the benefits of effective financial intermediation, just as bankers must strike a private balance between costs and benefits of holding liquid assets. The question is: will bankers have an incentive to hold sufficient levels of liquid assets?

There are reasons for concern that banks will choose socially suboptimal levels of liquidity if left to their own devices. First, the presumption in many countries that the central bank will act as lender of last resort to banks that need liquidity weakens banks' incentives to remain sufficiently liquid. Also, the financial disruption that is associated with an aggregate liquidity shock may be felt not only by illiquid banks, but also by other banks and indeed the entire economy, and these external consequences will not be borne in mind when individual banks decide how much liquidity to hold. And more generally, because bank losses are borne in part by the deposit insurance fund, banks have incentives to engage in excessively risky behavior, and illiquidity is one manifestation of such behavior. Prudential regulation reduces but does not eliminate this distortion, and there may therefore be a policy interest in requiring that banks be more liquid than they would choose to be if unconstrained.

Of course, high liquidity requirements are not of much help if the banks have no access to the liquidity when it is needed. The point, therefore, is to maintain liquidity requirements high enough in normal times so that they can be lowered in the event of an aggregate liquidity shock, to prevent the adverse consequences of an excessively rapid contraction of bank credit. The recent Argentine experience illustrates the advantages of such a policy.

So far we have taken the riskiness of the environment in which Latin American banks operate pretty much as given, emphasizing some implications of the fact that this environment forces banks in the region to confront more volatility than do banks in many other regions. But the riskiness of Latin American banks and banking systems may be reduced through regulatory initiatives. In particular, internationalization of domestic banking systems may substantially reduce macroeconomic risks faced by the system. Permitting domestically owned banks to diversify internationally will render them less vulnerable to large economy-specific shocks. Similarly, since foreign banks are less concentrated in local investments, a shock to the domestic economy will have a smaller effect on their capital base, and foreign banks may also have better access to foreign liquidity. For these reasons, we expect foreign banks to provide a stabilizing influence in the domestic banking system.

Financial fragility and macroeconomic policy: Just as macroeconomic considerations may play a role in the design of bank regulatory regimes, the fragility of domestic banking systems has important implications for the conduct of macroeconomic policy. We first discuss the implications of financial fragility for choice of exchange rate regime, then turn to contraints on macroeconomic policy that may be imposed by fragile banking systems.

When choosing an exchange rate regime, the first question that should be addressed is the sustainability of the alternatives. While there is room for disagreement about the insulating properties of alternative exchange rate regimes, there is no room for doubt about the destabilizing consequences of being forced to abandon a regime that has proven unable to withstand a serious shock.[26] And there is good reason to believe that fragile financial systems are a major stumbling block in the attempt to maintain a fixed exchange rate regime.

To see this, consider the adjustment to an adverse external shock under fixed exchange rates, from the perspective of the financial system. Balance of payments deficits resulting from the shock will lead to a decline in the domestic money supply and an increase in domestic interest rates. The higher interest rates will make it more difficult for domestic borrowers to service their debts to the banking system, and the contraction in bank credit that is the counterpart of the decline in money supply will put further pressure on borrowers and, therefore, banks. And on top of all this, the

25[25] Often liquidity requirements take the form of unremunerated reserve assets, which generate a tax on financial intermediation. Nothing requires that liquidity requirements be associated with such a tax, and our discussion will assume that officially-mandated liquidity is held in safe and liquid but interest-bearing assets.

26[26] Inter-American Development Bank (1995) documents the destabilizing consequences of frequent changes in the exchange-rate regime.

adverse external shock may itself have caused a decline in the quality of bank assets.

The mechanisms of adjustment under flexible exchange rates are different in important ways. In that case, the external shock will lead to exchange-rate depreciation and a rise in the domestic price level. As was emphasized above, this will reduce the real value of bank loans to levels that can actually be paid, while at the same time reducing the real value of bank liabilities in the manner required to maintain bank solvency.

This suggests that adjustment under flexible exchange rates will be substantially less traumatic for fragile domestic banking systems than would be the case under fixed rates, and that under fixed rates, adjustment to a large shock may place unbearable stresses on the banking system. And, if forced to choose between the banking system and the exchange-rate regime, policymakers will always save the banks.

This problem can be viewed, in part, as an issue in optimal tax policy. Under fixed exchange rates, bank depositors are largely protected against macroeconomic shocks that impinge upon the banking system, and taxpayers assume responsiblity when shocks are large enough to require a bailout. Under flexible exchange rates, a substantial part of the cost of bank crises are borne by depositors when the underlying macroeconomic shock generates an exchange-rate depreciation, thus lowering the real value of bank deposits.

From this perspective, the question becomes whether it is appropriate to finance the cost of restoring bank balance sheets that have been damaged by macroeconomic shocks solely through ordinary tax revenue, or if instead depositors should finance part of the cost by paying a state-contingent inflation tax. There is no answer that is obviously right for all countries under all circumstances; volatile inflation creates economic distortions, but then again so do other forms of taxation. There are some reasons, however, to believe that depositors should be liable. On pure public-finance grounds, Calvo and Guidotti (1993) have shown that the inflation tax should be highly responsive to "shocks", when authorities are able to make credible commitments. This will, of course, introduce an element of uncertainty about the real value of bank deposits, but an argument can be made that it is preferable to place such uncertaintly on bank deposits, where it can be priced and allocated in a market setting, rather than on individuals' ordinary tax liabilities, which are not marketable.

We add two caveats to this discussion. First, when the domestic financial system is highly dollarized, exchange-rate depreciation has a correspondingly smaller effect on the real value of financial assets and liabilities. Second, in a dollarized economy where the exchange rate has been *credibly* fixed, the structure of assets and liabilities will reflect the expectation of exchange rate stability, and consequently will cause an accumulation of dollar-denominated debts in both the nontradeable and household sectors. This will make an exchange-rate adjustment particularly devastating for bank solvency, since there will be significant exchange-rate risk hidden in the form of credit risk, as in the Chilean crisis of 1982.

Fragile financial systems complicate the management of macroeconomic policy in other dimensions as well. Consider, for example, choosing the speed of disinflation. A rapid disinflation may involve very high interest rates and low monetary growth, particularly if the rapid disinflation is less credible than a less rapid one would have been. This will lead to strongly negatively net resource transfers, potentially dealing a fatal blow to the domestic banking system.

As another example, consider the monetary response to a fiscal shock that increased public-sector demand for credit. This will crowd out private borrowers and raise domestic interest rates. If the banking system is strong, the central bank can offset the potential inflationary implications by maintaining a tight monetary policy. But if the banking system is vulnerable, the high interest rates, by damaging the banks, may create the need for a costly bailout, causing higher expected inflation. Thus, when the banking system is weak, tight money may only postpone, rather than reduce, inflation. And it may not even do that if individuals, anticipating the higher inflation, flee the domestic currency.

Managing lending booms: We have emphasized the apparent role of lending booms in creating financial vulnerability. This means that macroeconomic policy should not be indifferent to the speed with which banks expand their portfolios. Central banks should monitor the rate of credit growth, and take action when it appears to be growing too rapidly.

We have also argued that, during such booms, prudential regulation that is based largely upon enforcement of capital-adequacy standards is likely to be ineffective in preventing the booms. The reason is that during a boom loan problems are not visible, bank income appears high, and bank capital appears to be growing at a rate sufficient to support the rapidly growing loan portfolio. However, banks are incurring greater risks because they are lending to new

borrowers, borrowers whose cash flow is only temporarily high, and borrowers whose ability to pay depends upon the availability of credit from other banks.

Since supervision cannot be expected to adequately limit the expansion of bank assets, an active monetary policy may be required. For example, when the credit boom is driven by a surge in deposit demand, it may be appropriate to adjust bank reserve or liquidity requirements as needed to ensure that banks expand their loan portfolio gradually, rather than abruptly. This would involve temporarily high liquidity requirements that would gradually be lowered, or more generally, a policy of "leaning against the wind" of credit growth.

References

Banco Central de la República Argentina (1995) "Managing a Liquidity Shock: Regulating the Financial System in Argentina, December 1994 to July 1995", mimeo, Gerencia Estudios Económicos.

Brock, Philip, ed. (1992) *If Texas Were Chile: A Primer on Banking Reform,* San Francisco: Institute for Contemporary Studies Press.

Calvo, Guillermo (1994) "Financial Vulnerability and Capital Flows", mimeo, University of Maryland.

Calvo, Guillermo and Enrique Mendoza (1995) "Reflections on Mexico's Balance-of-Payments Crisis: A Chronicle of a Death Foretold", mimeo, University of Maryland.

Calvo, Guillermo and Pablo Guidotti (1993) "On the Flexibility of Monetary Policy: The Case of the Optimal Inflation Tax", *Review of Economic Studies,* 60(3), pp. 667-87.

Dewatripont, Mathias and Jean Tirole (1994) *The Prudential Regulation of Banks,* Cambridge: MIT Press.

Diamond, Douglas W. and Philip H. Dybvig (1983) "Bank Runs, Deposit Insurance, and Liquidity", *Journal of Political Economy,* 91(3), pp. 401-19.

Diamond, Douglas W. (1984) "Financial Intermediation and Delegated Monitoring", *Review of Economic Studies,* 51(3), pp. 393-414.

The Economist, "Syndicated Lending: Chemical Reaction", Sept. 23, 1995, p. 65.

Gavin, Michael and Ricardo Hausmann (1995) "Will the Mexican Stabilization Program Allow the Banks to Survive?", mimeo, Inter-American Development Bank.

Goldfajn, Ilan and Rodrigo Valdés (1995) "Balance of Payments Crises and Capital Flows: The Role of Liquidity", mimeo, MIT.

Inter-American Development Bank (1995) "Overcoming Volatility in Latin America", in *Report on Economic and Social Progress in Latin America: 1995,* Washington, DC: Johns Hopkins University Press for the Inter-American Development Bank.

International Monetary Fund (1993) *International Capital Markets, Part II: Systemic Issues in International Finance.*

Kane, Edward J. (1989) "How Incentive-Incompatible Deposit-Insurance Fails", NBER working paper no. 2836, Feb.

Mayer, Colin and Xavier Vives, eds. (1993) *Capital Markets and Financial Intermediation,* Cambridge: Cambridge University Press.

Montenegro, Armando (1983) "La Crisis del Sector Financiero Colombiano", in *Ensayos Sobre Política Económica*, (December), pp. 51-89.

Morris, Felipe with Mark Dorfman, José Pedro Ortíz, and María Claudia Franco (1990) "Latin America's Banking Systems in the 1980s: A Cross-Country Comparison", World Bank Discussion Paper no. 81.

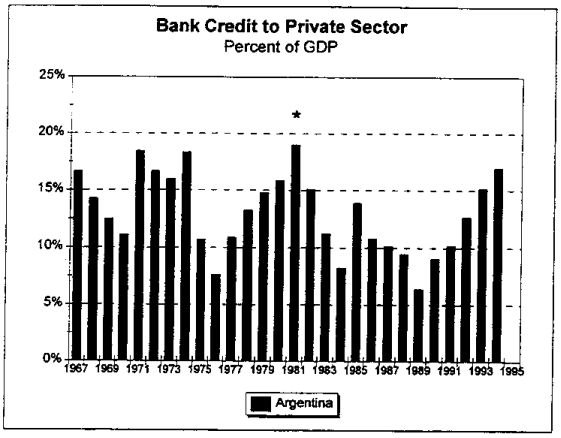
Rigobón, Roberto (1995) "Notes on Financial Crisis", mimeo, Inter-American Development Bank.

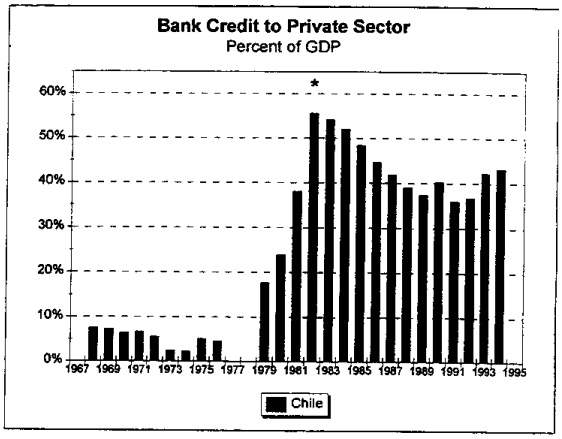
Rojas-Suarez, Liliana and Steven R. Weisbrod (1994) "Financial Market Fragilities in Latin America: From Banking Crisis Resolution to Current Policy Challenges", mimeo.

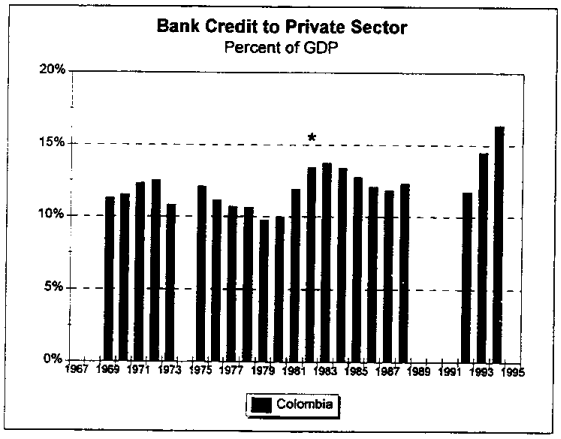
Roldós, Jorge E. (1991) "La Crisis Bancaria Uruguaya de los '80", working paper, Centro de Estudios de la Realidad Economica y Social.

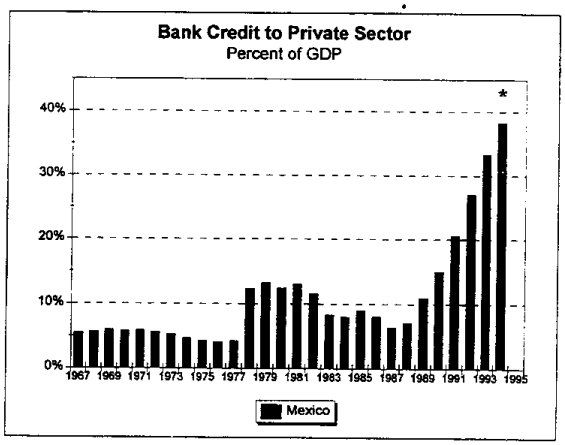
Stiglitz, Joseph E. and Andrew Weiss (1981) "Credit Rationing in Markets with Imperfect Information", *American Economic Review,* 71, pp. 393-410.

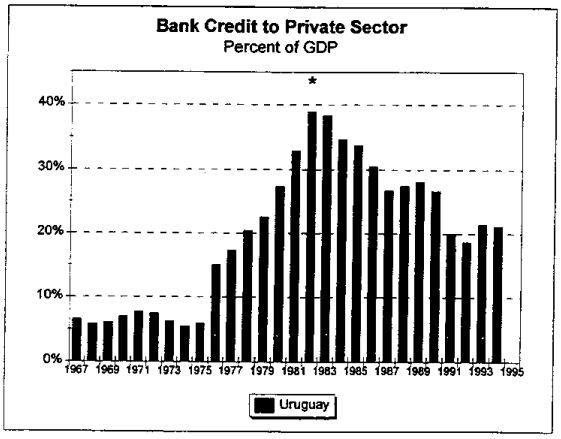
Velasco, Andrés (1988) "Liberalization, Crisis, and Intervention: The Chilean Financial System - 1975-1985, mimeo, International Monetary Fund.

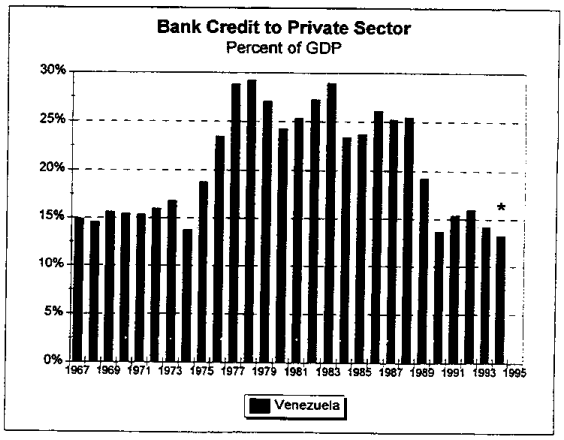




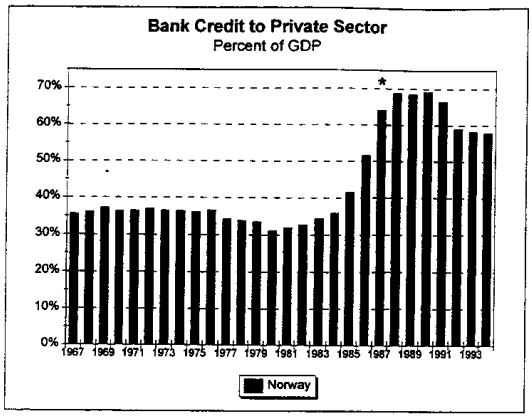


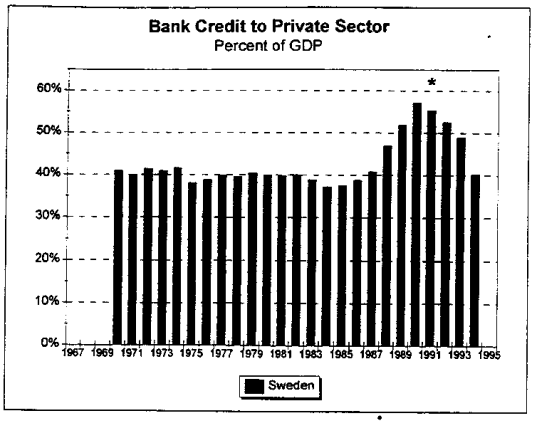


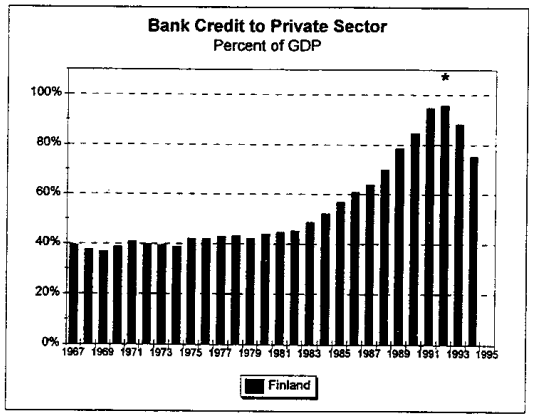


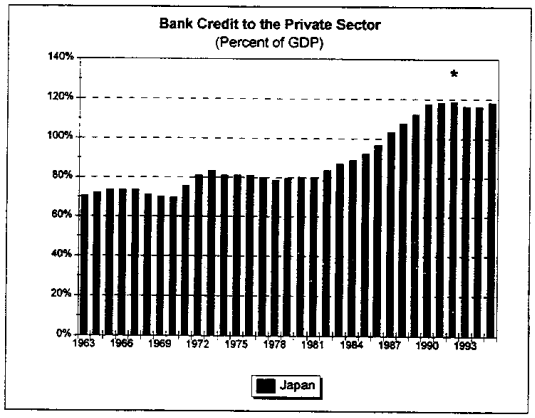


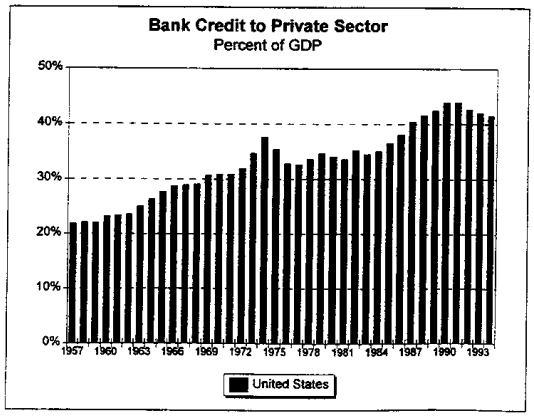
NOTE: Asterisks denote date of banking crisis











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