Financial Safety Nets and Incentive Structures in Latin America

Philip L. Brock  
University of Washington  
Seattle, Washington  

206-543-5796  
FAX 206-685-7477  
plbrock@u.washington.edu

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1. Introduction

Financial safety nets are, in general terms, a set of institutions, laws, and procedures that strengthen the ability of the financial system to withstand bank runs and other systemic disturbances. Safety nets evolve over time so that in any one country the existing safety net has been shaped by that country's history of financial crises and regulatory pressures. Some innovations in financial safety nets, however, spread contemporaneously between countries. A recent example is the widespread adoption of deposit insurance by developing countries.

Safety nets shift risk to the government at the same time that they promote financial deepening. In the same way that banks can bear the residual risk from many diversified projects better than any single agent, the government by insuring a diversified set of banks can bear the residual risk of bank failure better than any set of depositors at a single bank. Although it is frequently said that the best safety net is one that results in market participants behaving as if the safety net did not exist, well-designed bank safety nets should alter bank behavior and deepen financial intermediation by shifting some risk to the government.

A good institutional safety net will balance the benefits of financial deepening to society with the costs of risk-shifting to the government. The design of a good safety net must balance its components--including lender-of-last-resort facilities, deposit insurance, capital requirements, supervision, and closure and recapitalization rules--in such a way as to carefully control the amount of risk borne by the government. To the extent that a formal safety net fails to anticipate political and economic pressures during a crisis, an ex-post safety net will emerge in which risk shifting is driven by governmental discretion rather than by rules.

Many books have been written in the last decade on financial safety nets, including Benston and colleagues (1986), Brock (1992), Dewatripont and Tirole (1993), Hausman and Rojas-Suárez (1996), Lindgren, Garcia, and Saal (1996), and Rojas-Suárez (1997). Some textbooks, such as Garber and Weisbrod (1992), have also included expanded sections on safety nets. Papers by Calomiris (1996), Mishkin (1996), and Garber (1997) are particularly valuable.
recent contributions to the growing safety net literature for developing countries. The literature on safety nets has become technically more precise by drawing on advances in contract theory and optimal governance structure. Dewatripont and Tirole (1993) is an example of the good application of newer theory to the design of financial safety nets. In this paper I begin with a treatment of some aspects of the theory, but leave more extensive coverage to the papers cited above. My approach draws more on institutional economics, and more precisely on the approach taken by Kindleberger (1978), in the sense that I believe the design of good financial safety nets for Latin America depends upon an understanding of the way that formal ex-ante safety nets have broken down during times of crisis over the past one hundred years. Such an understanding requires historical examples, and leads to the conclusion that applications of contract theory and optimal governance structure have not yet solved the technical problem of designing an optimal safety net for economies that are subject to large aggregate shocks.

In this paper I explore these issues surrounding safety nets for financial systems in small open economies like those in Latin America. The starting point in Section 2 is the idea that asymmetric information will generally restrict the scope for lending to potential borrowers. In the presence of asymmetric information the creation of loan covenants will generally benefit both borrowers and lenders by reducing the cost of lending. These loan covenants usually involve capital ratios, provisions for monitoring, and mechanisms for shifting control of assets to lenders when borrowers cannot repay.

Section 3 shows that government regulation of financial intermediaries can frequently lower the cost of lending. The creation of better bankruptcy laws, the granting of special legal powers to bank boards, and the requirement that liquid bank liabilities be backed up by liquid assets are all ways in which prudential state regulation can expand the scope for intermediation. Although prudential regulation may sometimes not imply the creation of an explicit safety net, the section shows that state regulation of the financial system frequently results in state intervention during times of crisis, even when there is no formal role for the government. The diversion of government funds to borrowers or the devaluation of the exchange rate are common ways to
provide an *ex-post* safety net to banks and borrowers (but not generally to depositors). Section 4 discusses the creation of central banks in Latin America in the 1920s as an innovation to promote financial deepening. In addition to the basic goals of prudential state regulation, a central bank has the goal of expanding intermediation by more formally monitoring bank operations and by acting as lender of last resort to assure the liquidity of the banking system. The section examines in particular why orthodox institutions adhering to the gold standard were forced to extend an *ad hoc* safety net to rescue banks and bank borrowers at the start of the Great Depression. The section then examines the operation of the safety net under financial repression and during financial liberalizations. Ex-ante safety nets have almost never been in place during financial liberalizations, but ex-post safety nets always emerge during financial crises that frequently follow the liberalizations. These ex-post safety nets are often complex and take many years to unravel once they have been put into place.

Depositors are typically left out of the informal safety net. During crises depositors may suffer explicit losses ("haircuts"). More likely is the imposition of capital controls and exchange rate devaluation that lowers the foreign exchange value of deposits. Section 5 shows that the extension of the safety net to depositors is a relatively new and untested development. Like other state interventions, deposit insurance has the goal of expanding the scope of intermediation by lowering the cost of funds to banks. If the state has a comparative advantage in monitoring banks, deposit insurance has the potential to improve welfare and expand output. As with other innovations that expand the scope for intermediation, the safety net created by deposit insurance may seriously misallocate an economy's resources. The section then poses the issues raised by deposit insurance within the framework of catastrophe insurance. For most Latin American countries the long-term challenge to the credibility of deposit insurance will be the ability of their governments to secure a large enough access to world capital markets to protect depositors following "catastrophic" macroeconomic shocks.

Section 6 concludes with a discussion of the design of safety nets that takes into account the principles developed in the paper.
2. Capital, Monitoring, and Closure

The discussion of safety nets can usefully be centered around the concepts of asymmetric information, adverse selection and moral hazard. The problem for a bank and its borrowers is the presence of asymmetric information regarding the \textit{ex ante} profitability of projects. If the bank cannot distinguish between projects it must charge a "lemons" premium across all projects that takes into account the probability of mistakenly funding a bad project.\textsuperscript{1} As a result, borrowers with good projects have an incentive to look elsewhere for funding, leaving the bank with a worse pool of borrowers from which to choose. If this \textit{adverse selection} problem is severe enough, no lending takes place.\textsuperscript{2} Even if the adverse selection problem is not severe, asymmetric information creates a \textit{moral hazard} that gives borrowers an incentive to add risk or take other actions that increase the probability of default after the loan has been made. These same forces are at work between depositors and banks, creating problems of adverse selection ("bad" banks are more apt to enter a market) and moral hazard (banks have an incentive to add risk or take other actions that harm depositors).

An institutional safety net shifts responsibility to the government for managing some of the incentive problems arising from asymmetric information. Deposit insurance, for example, relieves depositors of the need to worry about banks' incentives to add risk in the presence of asymmetric information by giving that responsibility to the deposit insurance agency. The effectiveness of the institutional safety net depends on its ability to promote adequate capital adequacy levels in banks and firms, to create effective monitoring and supervision mechanisms, and to impose appropriate punishments (such as bank closure or removal of bank management) when the resources of the safety net are called upon.

\textsuperscript{1}See Akerlof (1970)
\textsuperscript{2}See Stiglitz and Weiss (1981)
Although safety net issues especially involve deposit contracts, the analysis of loan contracts provides a simpler starting point. When banks lend money to firms, they write loan contracts. Loan contracts are a form of put option, in which the firm pays if it can and defaults if it cannot pay. The bank collects an "insurance" premium if the firm can repay, and otherwise collects the collateral on the loan or the residual value of the firm.

The problem for the firm and the bank is the presence of asymmetric information regarding the \textit{ex ante} profitability of the project. Both adverse selection and moral hazard hurt the firm by limiting the willingness of banks to lend and by raising the cost of loans that are made. The bank is hurt by a loss of profits from a limited use of fixed factors of production. Both the firm and the bank have an incentive to incorporate elements into a loan contract the reduce the effects of asymmetric information. One standard element of a contract is a restriction on the amount of debt that a firm can have, and a requirement that loans from other lenders be reported to the bank. These restrictions are a form of capital requirement, since they limit the leverage of the firm. Another element is the requirement that the firm be audited by an independent auditor, or that the bank have a representative on the firm's board of directors. Finally, many loan contracts are short term but rolled over so that the bank can force the firm to default if it becomes clear that the firm will not be able to pay back the loan. This provision limits the bank's losses from actions the firm could take to run down the value of its assets once it ceases to be a viable enterprise.

In summary, when a bank lends to a firm the loan contract is a form of insurance contract (a put option on the firm's assets). There are two common ways in which a firm can hurt the bank: misrepresentation of its assets (leading to a problem of adverse selection) and misuse of those assets once the loan is approved (moral hazard). In order to lower contracting costs associated with asymmetric information, both banks and firms find it advantageous to include capital requirements, monitoring provisions, and closure mechanisms. These measures lower the cost of intermediation by allowing the bank to sort out good borrowers from bad borrowers, and by influencing the incentives of good borrowers once loans have been made. Successful use of these measures results in \textit{financial deepening}: more projects are undertaken, and their adoption
does not depend on self-financing. At the same time, bank financing of these projects results in financial risk shifting: limited liability firms bear only part of the downside risk for their projects, with banks assuming the remainder of the risk. The loan rate reflects, in part, the compensation the bank must receive for bearing the residual risk.

Deposit Contracts

Deposits are formally equivalent to a put option on a bank's assets. Deposits must pay a return that includes an implicit premium to cover possibility of default (the premium on the implicit put option). Asymmetric information between depositors and the bank's owners and managers once again causes problems due to adverse selection and moral hazard. If depositors cannot distinguish between good and bad bankers, the adverse selection problem will create a lemons premium that penalizes good banks and makes bad bankers more likely to enter the business. Once depositors give their money to a given bank at fixed terms, the bank has an incentive to undertake actions that help bank owners at the expense of depositors. This moral hazard can result in bank managers adding risk to the bank's loan portfolio, misrepresenting earnings and paying out increased dividends to shareholders, and other actions that hurt depositors.

Unregulated banks have an incentive to create mechanisms that mitigate the effects of asymmetric information. Without such mechanisms the lemons problem may create an equilibrium in which there are no deposits. Even if there are some depositors willing to lend their funds to the bank, the deposits may come at a high cost, thereby limiting the scope for intermediation. Asymmetric information poses greater difficulties at the level of deposit contracts than loan contracts, because the free riding problem is greater at the deposit level than at the loan level. At the loan level, the benefits of the bank's information-gathering expenditure on a borrower accrue primarily to the bank. At the deposit level, expenditure on monitoring by one depositor is more readily useable by other depositors of the same bank, so that no depositor has
an incentive to enforce deposit covenants that mimic loan covenants imposed by a bank. To partially solve this problem, a bank may be willing to submit to an external audit in order to create publicly available information about assets, reserves, loans to bank directors, and other data that signal the quality of the bank. Banks may also issue demandable debt, such as bank notes or demand deposits, rather than time deposits. As Calomiris and Kahn (1991) show, demandable debt creates a sequential service constraint (first-come, first-serve) that makes it worthwhile for some depositors to invest resources in monitoring the bank. Demandable debt reduces the problem of free riding, since depositors that rely on others to monitor are less apt to recover their funds if there is a run on the bank.

Unregulated banks must generally offer demandable debt in order to induce enough expenditure on monitoring by depositors to lower the lemons premium. Runs on the bank become the mechanism for detailed monitoring of the bank, since a run causes the bank to stop operations and open its books to depositors. If the bank is not solvent, the bank run forces the bank's closure and exit from the industry.

3. Prudential Regulation without a Safety Net

Banks have more often been subject to a "light" amount of prudential regulation rather than no regulation prior to the development of a bank safety net. The key similarity between no regulation and light regulation is that the closure mechanism is generally triggered by bank runs, and the government remains outside of the compensation process for bank creditors. The key difference is that the government creates laws and norms that commit banks to more stringent prudential practices than banks could guarantee depositors without such regulation.

The key features of "light" regulation can be seen by examining free banking legislation in the United States in the nineteenth century. Following the 1838 New York State Free Bank Law, free bank legislation in most states created a form of "narrow banking." States would give bank notes to free banks in exchange for U.S. government bonds or approved state bonds. Free banks
would then circulate the bank notes and, equally importantly, take deposits to make loans. Free banks were subject to minimum capital requirements and sometimes "double liability" requirements (where shareholders were personally responsible for an additional amount up to the par value of bank capital in case of the bank's liquidation). The comptroller of a state could, upon petition by depositors, order the detailed inspection of a free bank and have the results published.

Between 1838 and 1863 many free banks failed in U.S. Only a small portion of note holders lost money, but deposit holders lost much more. Despite each state's role in the regulation of free banks, state governments avoided becoming insurers of bank notes or deposits.3

_Pressures for Bank Safety Nets Before Central Banks_

Free banking and other forms of narrow banking worked successfully in the nineteenth century United States in the sense that they protected the means of payment (bank notes) and did not result in government bank rescues in crisis times. Despite the fact that depositors did lose deposits during crisis times and banks failed, there appears to have been no effective pressure for a safety net to be provided by the government. Part of the lack of government response was tied to successive U.S. governments' commitment to the gold standard. Part of the lack of response may also have been associated with the decentralized federal form of government. These characteristics are unusual from the perspective of the small open economies of Latin America. An historical example from the nineteenth century will help illustrate how the borrowers of a financial institution with no explicit safety net could generate enough pressure on the government to create an ex-post safety net.

The earliest documented ex post governmental safety net in Latin America was created in Chile about 140 years ago. During the early 1850s foreign gold rushes had created pressures to

3New York's 1838 Free Bank Law, for example, states "...nothing in this act contained shall be considered as implying any pledge on the part of the state for the payment of said bills or notes beyond the proper application of the securities pledged to the comptroller for their redemption." See Brock (1992a, p. 431)
increase grain exports from the Central Valley of Chile to California and Australia. But the large Chilean landowners wishing to expand their production had no access to long-term credit since existing mortgage laws were poorly defined in legal terms. In addition, potential lenders were faced with the lack of reliable information on the holdings, quality, and legal status of landholdings. *Asymmetric information* and potential *adverse selection*, coupled with lack of legal mechanisms to enforce contracts resulted in a *lemons problem* where no long-term lending took place.

The Chilean Congress responded in 1856 by creating a "special" mortgage that gave clear rights to the lender. Property registries were set up to make information on mortgages, sales, and censuses readily available to the public. In addition the Congress also created a state-sponsored mortgage bank, the Caja de Crédito Hipotecario, to accompany the new mortgage law. The property registries helped to mitigate the asymmetric information problem facing lenders. Equally importantly, the Caja became a delegated monitor that could reduce the costs of lending by adhering to legally-mandated *collateral requirements*, holding a diversified portfolio of loans, and by economies of scale in *monitoring*. The new mortgage law gave clear authority to the Caja to enforce bankruptcy proceedings (i.e., a *closure rule*) if a landholder fell sufficiently behind in making mortgage payments.

The reform of mortgage laws and the creation of the Caja solved the lemons problem, thereby permitting some *risk shifting* from landowners to the Caja and to purchasers of the Caja's securities. The accompanying *financial deepening* propelled the expansion of irrigation and other land improvements by landholders. By the end of 1860 there were over 5 million pesos of the Caja's securities in circulation (equal in value to ten percent of exports).

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4The Caja was authorized to lend up to fifty percent of the assessed value of the real estate and was given legal precedence in the collection of its loans. In exchange for the mortgages the Caja issued letras de crédito with maturities of 21-25 years and coupon rates of 5-8 percent. Borrowers could then sell the letras on a secondary market for cash. When landholders went to sell the letras on the secondary market, they received a higher price because purchasers demanded a smaller insurance premium knowing that the Caja, via its capital and reserves, was the primary insurer of the mortgages.
Although the rapid five-year credit expansion permitted landowners to undertake capital improvements to their land, it also exposed them to macroeconomic shocks. Many landowners became unable to make their mortgage payments at the end of the 1850s when the Californian and Australian export markets collapsed. Responding to intense pressure to prevent the foreclosure of landholdings, the government in 1858 and 1859 clandestinely channeled to landholders about 2 million pesos of a 7 million peso railroad loan that had been financed in the London bond market by the government. This government action caused risk-shifting to taxpayers that was not envisioned by the Caja Hipotecaria's institutional structure. Pressures by foreign investors in the railroad loan as well as the installation of a new government led to an attempt to recover the clandestine loans in 1860. The resulting economic contraction of 1861 and 1862, which produced the liquidation of a large number of landholdings, was Chile's first financial crisis and one of its most severe economic contractions of the nineteenth century.$^5$

The example highlights features common to the dynamics of many implicit financial safety nets. The Caja Hipotecaria and the accompanying legal reforms were created to promote financial deepening. Prudential lending practices were legally mandated, so that risk-shifting to the Caja was carefully controlled in theory. In practice, the Caja expanded its mortgage lending so quickly that it became overly-exposed to the risk of a mass default by landowners in response to an external shock. The threat of massive bankruptcies initially created pressure for an ex-post safety net financed by the government and then contributed to a severe economic downturn as liquidation of properties finally took place.

$^5$See Brock (1992b), Fetter (1931).
4. Central Banks

The introduction of Central Banks into Latin America in the 1920s and 1930s had far-reaching consequences for financial deepening and for incentives to shift risk onto the governments. The Central Bank of Chile, like several others, was the outcome of a mission led by Edwin Kemmerer, which was invited to establish a set of institutions that would allow Chile to return to the gold standard and eliminate the inflation that began in 1878. The Kemmerer Commission made recommendations for a central bank and a superintendency of banks that would jointly watch over the financial system.

The institutions and laws created by the Kemmerer commissions had the following characteristics. First, they attempted to modernize banking rules and make them uniform. Bank laws were passed that established minimum capital/asset ratios and minimum ratios of reserves to liabilities. Superintendencies of banks were created to examine the banks and to enforce the rules contained in the banking legislation or the norms issued by the central banks. The superintendences were located outside the central banks as part of the finance ministries. The central banks were semi-public institutions that were guaranteed independence from the finance ministries and the rest of the government. Gold and foreign exchange reserves were typically required to cover at least fifty percent of the central bank's demandable liabilities.

The key policy tool of the central banks was the rediscount window, which was the only mechanism available for regulating the money supply. The new central banks were authorized to extend their credit against the collateral of short-term commercial paper. Central banks established one set of discount rates for dealing with banks and another slightly higher set of discount rates for dealing with the public. The rates favoring the banks were intended to foster the role of the central bank as the lender of last resort. The slightly higher, but moderate, discount rates to the public were designed to put pressure on banks to lower their loan rates and make them more uniform.

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6Tamagna (1965), p. 108
The new legislation and institutions did not create an explicit safety net for banks. It did set up *capital requirements*, provisions for *monitoring*, and *authority to close banks*. For example, Chile closed the second largest bank in the first year of the operation of the new institutions. The Central Banks also had additional power to reduce moral hazard by their control over discount rates to banks and the public. These measures reduced the cost of financial intermediation and permitted *financial deepening* to take place. This deepening was not automatic, however. The public relied heavily on the Banco de Mexico as a depository institution, for example, as a result of continued distrust of commercial banks.

Against these achievements, the legislation in these countries created a guarantee that domestic currency would be convertible into foreign exchange at a fixed exchange rate. This, in combination with the newly-instituted oversight of the banking system, created strong pressures for capital inflows. In essence, the fixed exchange rate with fiscal oversight of banks created an implicit guarantee on banks' foreign exchange liabilities, thereby allowing *risk-shifting* to take place along with *financial deepening*.

Safety nets emerged in Latin America, just as in the United States, as an ad-hoc response to the Great Depression. It is worth recounting the steps leading to the creation of the safety net in Chile because they contain elements that have become standard in more recent financial crises in the region. In terms of measures that ensure financial stability, the Chilean system in the late 1920s operated with capital/asset ratios of 20 to 30 percent, monitoring by the Superintendencia de Bancos was rigorous, and closure was enforced. By normal standards the financial apparatus erected in 1926 was sufficient to render moral hazard and adverse selection unimportant. And by normal standards there was no need for a safety net for the banks. Indeed, the whole apparatus lowered the cost of financial intermediation, so that depositors required a smaller premium, borrowers paid lower loan rates, and foreigners had the assurance that their loans would be repaid in foreign currency. All of these effects enhanced financial deepening between 1925 and 1929. The main theme of the boxed discussion of Chile's *ex post* safety net is that orthodox governments
frequently respond to a financial crisis by initially affirming that there is no safety net, followed later by a series of emergency rescue measures that create an *ex-post* safety net.

Did the new institutions and legislation lower the cost of financial intermediation too much? Too much here refers in a narrow sense to the ability of the government to make good on its fixed exchange rate guarantee. In a broader sense it refers to the ability of the government to insure against large macroeconomic shocks. In much of Latin America the answer was that governments could not guarantee the functioning of the banking system under the rules of the gold standard. The ad hoc bank safety nets created at the start of the Great Depression saved the banks at the cost of capital levies on depositors, moratoriums on foreign debt service, and emergency loans from the central banks.
The Chilean Safety Net for the Great Depression

Following the creation of the Chilean Central Bank and accompanying banking legislation, the Chilean economy grew at an average rate of about ten percent per year during the four years from 1926 through 1929. With the start of the Great Depression, Chile's GDP fell by 11 percent in 1930, 17 percent in 1931, and 27 percent in 1932 for a cumulative decline of over 50 percent in three years.

As the economy went into the Depression, the Superintendency of Banks and the Central Bank raised deposit rates in several incremental steps up to the third quarter of 1931. The Superintendency also took strong steps to force banks to adjust to the deterioration of the quality of their loans and investments. Included in its measures were stepped up inspections of the loan portfolio of banks, the pricing to market of bonds and real estate investments, the enforcement of provisioning against possible loan losses, and the setting of penalty interest rates on nonperforming loans.

The immediate impact of the economy's deterioration and Superintendency's increased supervision was a rise in past-due loans. Nonperforming loans as a percentage of total bank assets rose from 4.3 percent in 1929 to 15.3 percent by the end of 1931. As a result of the economic and financial deterioration, four out of twenty-two banks were forced to close in 1930 and 1931.

The economy's adjustment through mid-1931 took place according to the rules of the gold standard. Even though the Central Bank lost over half its gold holdings between January 1930 and July 1931, it still had a reserve of 72 percent against its demandable liabilities (notes and deposits). The political adjustment of the country to the onset of the Depression included decree laws restricting freedom of expression, suppression of the press, and the imprisoning or deportation of opponents of the government.

During the period from July 1931 to the beginning of June 1932 economic policy began to move away from orthodoxy. Exchange controls were announced on July 30th with the objective of protecting Chile's remaining gold reserves, following an earlier default on Chile's foreign debt.

Amid growing civil unrest to the still largely orthodox adjustment measures, a military coup overthrew the government in mid-1932 and, after a few weeks, set up the 100-day Socialist Republic. The government passed legislation that gave the president vast powers to intervene in enterprises, introduced trade quotas and import licenses, and created jobs for unemployed workers. The government also devalued the exchange rate by 70 percent and declared a three-day bank holiday (June 6-8, 1932), during which bank deposits were frozen and foreign funds in the banking system were declared property of the State. In an effort to bail out private debtors, the Socialist Republic established a moratorium on the repayment of debts.

Over the course of 1932 successive governments increased domestic credit by about 800 million pesos, a figure equal to about 70 percent of the banking system's total loan portfolio. During 1933 and 1934 the Chilean economy recovered very quickly, with real GDP rising by 16 percent in the first year. The recovery was partly due to the sharp improvement in the external conditions facing Chile and to the restoration of political stability. In addition, a ten-year tax holiday for all new commercial and residential construction begun before the end of 1935 created a construction boom that succeeded in raising depressed property values. Debt relief was provided by the 30 percent price level increase that took place between June 1932 and June 1933 while interest rates were controlled at low rates and penalty interest rates were rescinded. The real value of debts was substantially reduced and non-performing loans declined rapidly in 1933 and 1934.


Safety Nets Under Financial Repression

With the closing of Latin American economies during the 1930s and the advent of import-substituting industrialization, many financial systems became largely instruments of government economic policy. Banks were subject to high non-interest-bearing reserve requirements, were forced to buy government debt as part of their secondary reserve requirements, and were directed to lend substantial portions of their portfolio to sectors of the economy favored by the government. Deposits frequently paid rates of return that were negative in real terms.

Under financial repression, banks rarely failed. Asymmetric information became less of a problem for banks and bank supervisors because much of bank portfolios was held as central bank reserves, treasury bonds, and low-risk directed credit to import-substituting industries. Bank capital was allowed to erode. For example, in Chile bank capital and reserves as a fraction of assets fell from 27 percent in 1932 to 20 percent in 1940, 14 percent in 1948, 9 percent in 1955, and 6 percent in 1962 (Behrens). Government institutional capital in monitoring eroded. But the stability of the financial systems came at a price: during the period from the 1930s to the 1970s financial shallowing took place in many countries. The safety net for banks that consisted of imposing low-yielding loan and investments and paying negative real returns to depositors caused the financial system to atrophy. Sporadic attempts to liberalize usually met with crisis, as in Chile during 1959-62 and Colombia during 1962-66.

Financial Liberalization

Attempts at financial liberalization in Latin America beginning in the Southern Cone in the 1970s and spreading through much of the rest of the region during the 1980s and 1990s have not been painless. In most countries financial regulatory structures had not changed appreciably since the 1940s. But information problems during liberalizations became more severe than in the preceding forty years as banks' portfolios switched from low-risk, low-yield government paper and
directed loans to much higher yield and higher risk loans to companies, construction, and consumers. Monitoring of borrowers by banks was difficult, and there was much incompetence among bankers regarding both initial and ongoing loan evaluations. There was equally great incompetence by bank examiners in their examinations of banks. Many of the best bank examiners were hired away at high salaries by banks, and the remaining examiners were too few and too powerless to engage in prudential supervision. During the liberalizations bank capital was inadequate, and even published capital/asset ratios were frequently overstated by concealing (not reporting) bad loans and by double gearing within an economic group.\(^7\)

One would expect that the cost of financial intermediation (the spread between the loan rate and the deposit rate) would be higher with the lack of bank capital and the greater problems associated with asymmetric information. And that has generally been the case. But the difference between a Chile of the 1920s and a Chile of the 1970s, for example, is that the government of the 1970s felt that it could not afford to follow orthodox banking rules for fear that the entire economic liberalization would be derailed. The rescue of Banco Osorno in early 1977 saved foreign creditors from losses that would have put an end to capital inflows that were helping to fuel the economic recovery. The implicit government guarantees meant that bank spreads were much lower than they would have been otherwise after 1977. The lower bank spreads encouraged financial deepening. The ratio of private sector domestic credit to GDP rose from 8.8 percent in 1977 to 39.3 percent in 1981 (Brock 1996). But the implicit guarantees--in the context of severe problems of asymmetric information, poor monitoring capacity, and low bank capital--also caused excessive risk-shifting to the government.

So although the Chilean financial liberalization and many other Latin American liberalizations appeared orthodox on the surface, the apparent initial success of the liberalizations was held together by the strength of an implicit government guarantee to depositors and other bank creditors. This was the case in Argentina, Uruguay, and Chile at the beginning of the 1980s,

\(^7\)Double gearing refers to a situation where a bank will lend, say, $100 to a firm within its group so that the firm can buy $100 of the bank's stock. The bank's reported capital rises by $100, but the group's capital remains the same.
Colombia in 1985, Venezuela in 1994, and Mexico in 1995. In each case the true bank safety net was only unveiled as the financial crisis began.

Since ex-post safety nets virtually always save banks even when there are no ex-ante safety nets, design of financial structures should take into account past experience with these ex-post safety nets. The accompanying box provides details on the Chilean safety net that was put into place following the June 1982 devaluation of the peso. The Chilean experience is instructive, not only because it illustrates the potential dynamics and scope of an ex-post safety net, but also because Mexico's measures to create a safety net in 1995 were patterned to some extent after the Chilean measures. The Chilean saga demonstrates that once the financial safety net has been thrown out to save the banks, untangling it may be complex and time consuming.
The Chilean Safety Net for the 1980s

Following Chile's June 1982 devaluation, the first major step to stabilize the financial system was the creation of a preferential dollar exchange rate for dollar debtors. This step was taken because of the government's previous implicit guarantee that the fixed exchange rate would be a permanent anchor for the economy. The preferential exchange rate provided a subsidy to dollar debtors that amounted cumulatively to about US$3.4 billion by the end of 1987.

In July 1982 the central bank began to buy part of banks' bad loan portfolios at face value. As a counterpart to this transaction the banks would agree to buy back the portfolios over a period of three to five years. This action improved the balance sheets of banks by replacing nonperforming assets with a central bank bond, but because the central bank bond was not interest bearing and was not transferable, there was no transfer of resources to the banks. There was, of course, a contingent transfer created for those banks that would not be able to repurchase their nonperforming loans within the three to five year period.

Regulatory forbearance also played a role in the safety net. In September 1982 the Superintendency of Banks allowed banks to use the June 30 exchange rate when calculating the peso value of their dollar liabilities. This represented a 35 percent underestimation of the value of dollar liabilities by the end of 1982, but prevented a number of banks from violating minimum regulatory capital ratios. Banks were originally to provision against these losses by the end of 1982, but were later given an extension until the end of 1986. In addition, in October the superintendency extended the time limit to declare a loan non-performing from 30 to 90 days.

The intervention in the flagship banks of the two largest economic conglomerates on January 13, 1983 also stabilized the financial system by terminating the creation of shell companies and other measures that were used to evade prudential regulations. This step brought more than 50 percent of financial system assets and liabilities under the direct control of the government with explicit state backing of the liabilities of the remaining institutions. The step also gave the government control of a number of the largest firms in the economy.

A major departure from previous policy—that all bank debt, both external and domestic, was private and not government-guaranteed—came shortly after the bank interventions. Although the new law created a huge contingent liability for the government, it prevented a run on the banks and converted the banks' external debt into sovereign debt that would prevent the forced liquidation of banks by foreign creditors.

By early 1983 it had become clear that many debtors would not be able to repay their loans at the contracted terms. In response to the growing threat of a widespread debtor revolt, the government announced a "productive debtor" restructuring plan in April 1983. The plan rescheduled 30 percent of an eligible company's debts for a period of 11 years, with a one-year grace period for interest and a five-year grace period for principal. The operation created a flow subsidy to the banks of 7 percent of the amount of the restructured loans. This flow subsidy was the carrot to encourage the banks to restructure their loans. Despite this carrot, only 48,200 debtors out of 130,150 eligible participated in the program, with about 39 percent of the eligible debt reprogrammed.

The last major stabilization measure, announce in June 1983, involved the creation of a program for home mortgages that rescheduled unpaid installments since 1981.
By one year after the June 1982 devaluation, all the safety net measures were in place for the financial system. Three of the programs were substantially modified during the second year following the devaluation. The repurchase of banks' bad debt was expanded in February 1984, the productive debtor plan was extended in June 1984, and the home mortgage refinancing plan was augmented in July 1984. However, none of these measures resulted in any restructuring of the financial system. The largest banks and the largest enterprises were still in limbo, under temporary government control but without any plan to restore private ownership.

When Hernan Bucchi took over as finance minister in 1985 he pressed the argument with foreign creditors that the Chilean government had provided assistance of US$3.4 billion to help borrowers repay their dollar loans, and that now it was time for the creditor banks to bear their share of the losses. The creditor banks were pressing Chile to renew its guarantee on the Chilean banks' debt, especially since much of the debt was maturing during 1985-87. Out of this negotiation came Chile's renewal of its guarantee on bank debt, combined with tacit creditor approval for the creation of debt buyback and debt-equity conversion mechanisms. Between mid-1985 and mid-1987 about US$3.2 billion of bank debt was written down or converted into equity by these mechanisms at market discounts of about 30 percent. These transactions were an important element in the recapitalization of Chilean banks.

Between 1982 and 1984 seventeen private national banks had sold bad loans to the Central Bank in exchange for Central Bank bonds. In January 1985 a law creating "popular capitalism" authorized the Central Bank to capitalize a portion of the Central Bank's loans to the five intervened banks. The law resulted in the recapitalization of four of the five intervened banks. Existing stockholders had first claim on stock purchases, followed by third parties. The remainder of the stock was given to CORFO (the Chilean Development Corporation), which purchased an equivalent nominal amount of the Central Bank's emergency credits to the intervened banks (so that the emergency credits were capitalized). The capital was then sold in small amounts to individual investors.

In 1989 due to concern regarding the possible fiscal manipulation of banks' ability to repay, the outgoing military government redrafted the agreements between the banks and the Central Bank. In place of a fixed obligation, the new law created "subordinated debt" that was equal in nominal value to the fixed obligation, but which had no fixed timetable of payments. The new contracts with the Central Bank were guaranteed protection by the law against unilateral changes by the Central Bank. For the five heavily indebted banks there was effectively no date at which the subordinated debt would ever be repaid.

When the newly-elected democratic government took power in 1990, one of the pressing questions was an acceptable resolution of the subordinated debt issue. The total value of the subordinated debt of eleven banks in 1991 reached about US$3.3 billion while the value of paid-in capital was only $1.3 billion. Despite renewed efforts in 1992 and 1993, the government made no appreciable progress in drafting a law that would replace the subordinated debt law and which would be acceptable to the banks.

After a series of disputes, the government entered into talks with the banks which produced an agreement in April 1995 to resolve the subordinated debt problem by the end of July 1996. The solution created mechanisms for the banks to repay part of their debt in exchange for forgiveness of the remainder. During the intense period of negotiations in June 1996, the Central Bank president became convinced that the banks were being let off too easy and resigned. In the end the Central Bank wrote off approximately $2 billion in order to recapitalize the banks.
5. Deposit Insurance and Aggregate Risk

Any financial system will have an implicit as well as explicit safety net. Until the last decade depositors have not generally been included in explicit safety nets in Latin America. Indeed, depositors have generally become part of the ex post safety nets to save banks. In Argentina and Brazil in the 1980s deposits were frozen and then reduced in real value by high inflation as a way of improving bank solvency. Even in Chile where deposits were guaranteed in January 1983, interest rates on deposits were kept artificially low by a combination of capital controls and Central Bank "suggestions" regarding the appropriate rates to pay.

Since 1981 the number of countries with explicit deposit insurance programs has risen from fifteen to forty-five. These programs represent a significant, but untested, institutional innovation in the adopting countries. Creating an ex-ante safety net for depositors will lower the cost of deposits to banks by moving contracting problems associated with asymmetric information to the government insuring agency. As with other contractual innovations, deposit insurance will lead to both financial deepening and financial risk-shifting. In this way it is no different than loan contracts that banks negotiate with their borrowers. For loan contracts to remain viable in the long run, banks must have ways of imposing covenants that restrict the ability of borrowers to shift risk to the banks. Likewise, for deposit insurance to remain viable in the long run, the government must have ways of imposing restrictions on banks that limit their ability to shift risk to the insurance agency and to taxpayers in general. The best example of the perverse dynamics of risk-shifting coupled with financial deepening in the context of deposit insurance comes from the example of the crisis in the U.S. savings and loan industry in the 1980s, which is discussed in the box.
The U.S. S&L Crisis

As a result of high interest rates during the late 1970s and early 1980s, the net worth of many S&Ls severely deteriorated. The Fed originally responded to the problem by imposing interest rate ceilings on deposits, thereby taxing primarily small depositors to keep the S&Ls solvent. When the creation of new financial instruments caused a flight of funds away from S&Ls, Congress responded by passing legislation to help the thrift industry, primarily by deregulating asset powers of thrifts.

The new legislation permitted S&Ls to issue credit cards and to make consumer loans up to 30 percent of assets, to make commercial real estate loans up to 40 percent of assets, to make commercial loans up to 11 percent of assets, and to take direct equity positions up to 3 percent of assets. State-chartering authorities, especially in Texas, California, and Florida, provided even wider asset powers to thrifts in what appears to have been regulatory competition to keep thrifts from adopting national charters. During 1983 and 1984 the resulting asset growth of S&Ls (19 percent per year) far outstripped the asset growth of commercial banks (7 percent per year).

White (1991), drawing on work by Barth, Bartholomew, and Labich (1989), shows that heterogeneity among thrifts played an important role in the credit boom. The fastest growing thrifts (with asset growth exceeding 50%) placed far less reliance on residential mortages than slow-growing thrifts (53% versus 68.1%), and far more reliance on commercial mortgages (10.8% versus 6.6%), land loans (5.8% versus 1.2%), nonmortgage loans (5.0% versus 3.7%), and direct equity investments in real estate (1.2% versus 0.2%). Fast-growing thrifts placed far less reliance on retail deposits than slow-growing thrifts (59% of liabilities versus 80.9%) and far more reliance on large denomination brokered deposits (18.1% versus 7.3%) and short-term repurchase agreements (10.4% versus 2.4%).

Romer and Weingast (1990) argue that the fast growing thrifts were gambling for resurrection and were able to do so because Congress forced the Federal Savings and Loan Insurance Corporation (FSLIC) to pursue a policy of forbearance that prevented the closure of undercapitalized S&Ls. "By delaying FSLIC recapitalization and by keeping recapitalization to low levels, Congress ensured that regulators could force only some insolvent S&Ls to close or reorganize.... By intervening in the regulatory process, Congress prevented enforcement of existing rules and, through new legislation, relaxed many regulatory provisions. In sum, congressional action and inaction -- motivated largely by normal legislator strategies of constituent service -- resulted in policies that created the debacle."

The deregulation of the thrifts produced financial deepening in the S&L industry, but it also produce excessive risk shifting to the government. The government as a whole failed to enforce capital standards and curtailed inspections of S&Ls during 1984 and 1985. Although the formal safety net (the funds of the FSLIC) was modest in size, the informal safety net (the funds of the U.S. Treasury) was almost unlimited in size. Depositors did not worry about risk and, indeed, fast-growing thrifts only needed to offer small premia on certificates of deposit to generate large deposit inflows.

The ex-post safety net to depositors involved shutting down over 700 intermediaries with assets of $400 billion. The Resolution Trust Corporation (RTC), which directly or indirectly employed up to 20,000 people during a three-year period, either liquidated the assets it acquired from failed thrifts or reorganized existing institutions. The cleanup operations of the RTC involved realizing a loss to taxpayers of approximately $200 billion.
Deposit Insurance as a Form of Catastrophe Insurance

Much discussion of safety nets is based on the premise that unobservable idiosyncratic risk poses the major challenge for the design of bank capital, supervision, and closure mechanisms. Financial intermediaries need to bear idiosyncratic risk for incentive purposes—otherwise they would have no incentive to hold diversified portfolios. Government safety nets dampen that incentive, even when regulators attempt to impose risk-adjusted deposit insurance premia. Advocates of subordinated debt, such as Calomiris (1996), see it as a mechanism that forces banks to worry about idiosyncratic risk.

Much of the risk faced by banks in Latin America and elsewhere, however, is aggregate (systematic) risk rather than idiosyncratic (loan specific) risk. Aggregate risk is observable by all agents in an economy: everyone knows when and by how much the price of copper or coffee changes or by how much the London interbank offer rate moves. Aggregate risk need not be borne by intermediaries and, indeed, being forced to bear aggregate risk may interfere with intermediaries' incentives. Enforcing penalty loan rates on firms, a change of ownership on banks, or liquidation of assets may be a socially inefficient response to a negative aggregate shock. Such actions penalize competent owners and managers and may result in an inferior utilization of an economy's assets.

One theoretical response to the issues raised by aggregate risk is to attempt to insulate banks, either by letting them issue state contingent deposit contracts or by allowing them to buy insurance against aggregate risk (Diamond 1984). It is difficult in practice, however, to write deposit contracts that are state contingent. This is partly because of the difficulty of specifying how the range of aggregate disturbances affect the value of a deposit, and partly because fixed return deposits may be a characteristic of optimal bank structure (Gorton and Pennacchi 1990). Having banks buy insurance supposes that there is an international reinsurance market for...
aggregate risk to banks. The boxed discussion on catastrophe insurance indicates the difficulty of insuring against aggregate risks of the sort faced by most Latin American economies.

A second response is to assume that banks bear aggregate risk in addition to idiosyncratic risk, and to examine rules for government recapitalization of banks following a negative aggregate shock. This approach runs into problems of lack of government resources for the recapitalizations as well as moral hazard. If banks know they will be recapitalized following a negative aggregate shock, they have more of an incentive to lend to risky activities whose returns are sensitive to aggregate fluctuations. Given that incentive, the monitoring problem for the government involves a difficult intertemporal comparison of investment strategies of banks, as elaborated in the boxed discussion on aggregate shocks, recapitalizations, and incentives.
Catastrophe Insurance in the U.S. and Latin America

In the wake of the Northridge earthquake in 1994 and Hurricane Andrew in the Miami area in 1995, private catastrophe insurance came close to drying up in the United States. Companies representing 93 percent of the homeowners' market in California either stopped writing earthquake insurance policies or severely limited their exposure to liability. Similarly, insurance companies operating in Florida increased their hurricane coverage rates by 65 percent following Hurricane Andrew.

For many types of insurance, such as life insurance and auto insurance, the law of large numbers allows insurance companies to predict accurately the level of claims. Insurance premia can be adjusted so that there is little mismatch between premia collected and claims paid out in any given year. Catastrophe insurance is a major exception to the rule. Catastrophe insurance claims require a large point-in-time payout after a catastrophe occurs, but can be funded only by collecting premiums over a long time period.

As a result of the intertemporal mismatch between claims payouts and premia collections, catastrophes in the U.S. have become "uninsurable risks." According to Jaffee and Russell (1996) "The contract of catastrophe insurance, as presently structured, requires that the seller have access to a large pool of liquid capital in every year in which the contract stands. Since such large pools of capital do not exist, firms have withdrawn form this market rather than bear the risk of insolvency." Large pools of liquid capital do not exist because tax incentives do not promote their accumulation (reserve funds are considered taxable) and because large cash reserves attract hostile takeovers, among other reasons.

Insurance firms have not been able to reinsure against losses from catastrophes to any great extent, since the international reinsurance catastrophe capacity is only $15 billion. Catastrophe futures and options are only lightly traded on the Chicago Board of Trade. One difficulty is the lack of any options pricing formula, like the Black-Scholes, for catastrophe losses. Catastrophe losses have a sample path characterized by jumps which, unlike the paths of stocks for example, are difficult to fully hedge. Some investment banks issue Act of God bonds for certain catastrophes which pay interest at 10 percent over Treasury rates, and which require holders to forgive the loan in the event of the catastrophes. However, the total amount of catastrophe reinsurance offered by capital markes in the U.S. is quite small.

Some countries self-insure against "catastrophic" declines in their terms of trade. Colombia, for example, has long made use of a coffee stabilization fund while Chile began a copper stabilization fund in the latter half of the 1980s. These funds are pools of liquid resources that can potentially serve to insure against economic catastrophes. However, in the same way that insurance funds with large reserves attract hostile takeovers, large stabilization funds invite the government (and even the private sector) to neutralize the funds by borrowing from international investors who view the stabilization fund as a guarantee of the government's ability to repay. This problem is especially acute when several groups within the government interact non-cooperatively to generate spending decisions. Some economists even regard such large pools of contestable funds as a "curse" because of the rent seeking that accompanies the pools.
Aggregate Shocks, Recapitalizations, and Incentives

Figures 1 and 2 show a two-period setting for a bank in which the expected second-period return to depositors (D) is graphed on the vertical axis while the expected second-period return to loans (L) is graphed on the horizontal axis. The expected second-period return on loans depends on the observable expected second-period state of nature (s). The government requires the bank to invest in reserves which have a second-period riskless payoff (R).

The payoff to depositors in Figure 1 is kinked at the point where loans equal deposits minus reserves (L=D-R). At this point bank equity (E) is zero, and for any lower realizations of loan returns the bank must default on the deposit contracts, leaving depositors with claims worth only the realized loan payoffs. Figure 2 graphs the payoff to equity holders. Once again there is a kink at the point where returns on loans equal promised payments to depositors minus returns on reserves. With lower payoffs on loans the return on equity is zero.

The kinks define control rights over the bank: to the left of the kink depositors (or the government acting on behalf of depositors) control the bank, and to the right bank shareholders control the bank. The bank’s debt-equity structure gives depositors a concave stream of returns over different states of nature while shareholders have a convex stream of returns. The concavity and convexity are especially pronounced near the kinks (where bank equity is zero), causing even risk-neutral deposit holders to act risk averse (because bad realizations will cause them to forfeit returns and principal on deposits) and stockholders to act risk loving (because adding risk allows them to gamble for resurrection).

For a bad expected state of nature s_b the expected payoff on loans L(s_b) creates a low equity value for the bank, which is shown by the points just to the right of the kinks. At these points the concavity of returns to depositors induces conservative behavior to transfer control rights of the bank’s assets to depositors (via mechanisms such as a run on the bank), even if the bank is still solvent. The convexity of returns to stockholders induces them to find ways to add risk to the loan portfolio. For a good state of nature s_g the expected payoff on loans L(s_g) creates a high net worth for the bank, placing depositors and shareholders well to the right of the kinks. Returns are more nearly linear for depositors and shareholders, reducing incentives for excessive conservative or risk-loving behavior.

Because the expected state of nature is an aggregate, observable risk, banks should not be forced to bear that risk. If the expected state of nature is the bad one s_b, there is no good reason to penalize bank shareholders (and managers) by liquidating the bank’s assets. As an alternative, the government could recapitalize the bank by an amount G, thereby shifting the funds available for loans to the right (L(s_b)+G), where depositors and bankers have the appropriate incentives to run the bank well.
The major difficulty with recapitalization schemes is the moral hazard problem: bankers who understand the incentives to recapitalize have an incentive to create loan portfolios whose returns are highly correlated with aggregate disturbances to the economy. Such strategies maximize returns to bankers while assuring that the owners will retain control of the bank in bad times. Dewatripont and Tirole (1993) have suggested that recapitalization decisions be based on an ex ante assessment of the performance and riskiness of banks, but they acknowledge the difficulties of implementing such a proposal.

Chile's use of subordinated Central Bank debt in 1982 and 1983 to rescue banks imposed an ex-post penalty on those banks whose performance prevented them from repurchasing the debt, since extinguishing the debt carried with it the privilege of expanding into new and lucrative areas of banking in the economy. If continued as policy into the future, Chile's recapitalization mechanism removes much of the moral hazard problem of recapitalizing banks following aggregate shocks, although it requires institutional discipline over many years of debt repurchasing (e.g., 1982-1996) if it is to operate successfully.
6. The Design of Safety Nets

In this paper I have stressed three principles that should guide the design and ongoing operations of a safety net. *First, safety nets should strengthen rather than supplant private capital, monitoring, and closure mechanisms.* I have shown that the presence of asymmetric information provides borrowers, bankers, and depositors with incentives to voluntarily impose capital requirements, monitoring arrangements, and contractual provisions for closure or recapitalization of firms and banks. Government regulations or safety net provisions should be designed to work in harmony with the incentives already faced by private agents. *Second, safety nets must take into account both aggregate risk and idiosyncratic risk.* In particular, good safety nets must be designed that take into account large but infrequent macroeconomic shocks as well as to encourage prudential bank behavior during normal times. *Third, safety net design should be grounded in the historical and institutional framework of any given country.* Much work in institutional economics has emphasized that institutions such as safety nets evolve over time. The paper has referred to various innovations in Latin America's financial history--nineteenth century mortgage banks, 1920s central banks, 1970s financial liberalizations, and the more recent adoption of deposit insurance--to make it easier to appreciate that today's safety net faces problems that are common to those of a century ago. The design of safety nets today, nevertheless, must take into account the current set of political pressures and generally higher expectations regarding the ability of the government to insure the financial system against aggregate shocks. Following these three principles will produce differences across countries in the specific institutions and rules that make up the safety net, but similarities in the overall objective of financial deepening and the control of risk shifting to the government.
Prudential Regulation that Lowers the Cost of Macroeconomic Shocks

The discussion on catastrophe insurance in Section 5 emphasized that governments in virtually all countries are the providers of such insurance, rather than private insurance companies. For example, when hurricanes hit populated oceanfront areas, governments come to the aid of homeowners whose homes are damaged or destroyed. Nevertheless, if the homeowners build close to the ocean knowing that the government will provide insurance against such a catastrophe, then the size of the government's outlay grows due to moral hazard. The moral hazard associated with the government's policy calls for the government to create an agency to implement tough rules that prevent homebuilders from building too close to the ocean or building with too flimsy construction materials.

Governments should similarly provide a safety net to the financial system in the event of a "catastrophic" shock to the economy. But the size of the bailout associated with the safety net will be affected by the government's ability to control moral hazard in the years prior to the shock. It is in the good years prior to a shock (like the calm years with no hurricanes) that government agencies should be given the incentives to strictly enforce conservative capital, monitoring, and closure policies. The following discussion gives some indication of the relevant issues.

Closure Policy. Closure policy is the Achilles' Heel of any explicit or implicit government safety net to the financial system. The inability to close failing banks permits bank equity holders to engage in the rollover of loan losses and other risky lending practices, thereby bidding deposits away from other institutions and transmitting incentives for risky lending to the rest of the financial system. Just a few banks operating in this way during good times can weaken the whole system's ability to withstand a large aggregate shock.

Both technical and political reasons explain why closure policy is such a thorny issue for bank regulation. From a technical standpoint, bank liquidation is generally only undertaken as a last resort to avoid the loss of the ongoing operation value of the bank. In between forbearance and liquidation are a wide range of possibilities, including voluntary recapitalization by the bank's
owners, cash-assisted acquisition by another bank, temporary administration by a government work-out agency, and forced capital levies on depositors. Knowing which intervention to choose and creating the human capital to implement the intervention are difficult technical problems.

From a political standpoint, allowing a bank to fail will not only incur the wrath of noninsured lenders to the bank but will also go against the interest of politicians who depend on bank owners for political support. The problem for designers of bank safety nets is to create ex ante agreements that make it difficult ex post to renege on the "no bailout" position. Because the impending failure of a large bank may disrupt the payments system, the various intervention options must be spelled out in some detail in advance in order to facilitate the bank resolution process without resort to a political rescue of the bank's owners. About one fourth of the 1986 Chilean bank law, for example, is devoted to the precise specification of alternative closure and recapitalization mechanisms for banks in Chile.

A more subtle political problem involves inter-agency cooperation in bank interventions and closures. The superintendency of banks has responsibility for determining whether intervention is called for, the deposit insurance agency must be willing to provide the necessary funds to resolve the insurance problem, and the central bank must provide the liquidity while the intervention is resolved. Lack of cooperation by any one of these agencies can derail the closure or recapitalization process. Under-funding of the deposit insurance agency, for example, may cause that agency to push for the delay of a bank intervention that would deplete the agency's funds. One possible solution is to create a truly independent central bank that would have the incentive to be tough on banks and the deposit insurance agency in order to guard its capital. This also implies, of course, that the central bank may be unwilling to provide emergency liquidity if it cannot be assured of eventual recovery of those funds.

**Monitoring.** Compounding the technical problems associated with bank closure are additional technical problems stemming from difficulties in monitoring the true net worth of banks. For example, regulators must decide when loans that are current should be classified as of doubtful recovery. When the collateral value of the real estate securing a $30 million mortgage
falls from $35 million to $25 million, the loan may stay current for a while, but eventual default is almost inevitable. Regulatory enforcement is especially difficult when the fall in collateral values is perceived to be the result of an external shock rather than due to reckless lending practices. Given that there can be disagreement over market values during a collapse in the real estate market, even market value accounting permits long delays in recognizing losses. A two-year delay in forcing the recognition of losses while the real estate market is adjusting downward, for example, will create the incentives and provide sufficient time for even "good" bankers to gamble away a bank's future by taking on excessive risk.

Capital. In general it appears that risk-adjusted capital requirements can play an important role in the design of a financial safety net, provided that there are adequate bank closure policies and monitoring of banks. Without good monitoring, banks have the incentive to engage in double gearing to artificially raise book value capital. The main bank in an economic group may, for example, make a loan to a company in the group on the understanding that the company use the funds to purchase equity in the bank. This action increases the bank's regulatory capital without increasing the economic group's real capital.

Without good monitoring and closure policies, banks also have the incentive to underreport and underprovision bad loans. Adequate provisioning is crucial for the long-term viability of risk-adjusted capital requirements. Underprovisioning keeps the return to bank equity artificially high, so that the cumulative excess flow of dividends destroys market value capital in a process that resembles "looting" of the bank. Looting of this sort is easy when an increase in the value of implicit or explicit deposit guarantees automatically offsets the decline in the value of the bank's capital.

A number of writers, including Benston and colleagues (1986) and Calomiris (1996) have advocated the use of subordinated debt requirements. Subordinated debt can complement risk-adjusted capital requirements by creating additional pressures to adequately provision bad loans.

When to Overrule Prudential Regulators
Different institutional arrangements for prudential regulation do tolerably well in preventing risk shifting to the government during normal times. The big problems arise in the aftermath of a negative aggregate shock when borrowers' debt becomes impossible to service and banks' capital and reserves become inadequate to cover probable losses. In all these cases it is unlikely that subordinated debt will prevent the incentives for risk taking that follow the shock, since subordinated debt holders may have been wiped out along with the shareholders. Many of the examples in this paper have focused on ex post financial safety nets that have emerged in the wake of negative aggregate shocks. The collapse of Chilean export markets in 1859, the Great Depression, and the 1982-83 recession all created pressures for a safety net to save the banks and bank borrowers. Similarly, the safety net for U.S. S&Ls was created following the aggregate shock of a rise in interest rates that compromised the capital of most S&Ls.

At some point for virtually any country in Latin America, a well-designed safety net--meaning one that controls risk shifting to the government and simultaneously promotes financial deepening--will be overwhelmed by a negative macroeconomic shock. Imposing penalty interest rates and shutting down banks, which is the correct course of action given the incentives of bank regulators, will in fact be counterproductive. Chile's decision in the early 1930s to stand by the gold standard and to enforce prudential bank regulation eventually resulted in a military coup and the adoption of a series of ad hoc economic policies that later formed the basis for import substitution in that country.

Regulators should be given "hard control rights" in order to control risk-taking behavior that could cause an expensive bailout when a shock occurs. But having controlled the risk-taking behavior, the broader government has an incentive to assume the remaining macroeconomic risk borne by banks. As discussed in the box on catastrophe insurance, one way to insure the macroeconomic risk is for the government to self-insure by accumulating a large fund of liquid resources. Another way is to secure lines of credit internationally, as Argentina has done, that can be used in the event of a macroeconomic shock. A third way is to rescue the banks using
government debt, but to require repayment (over many years if necessary) if a bank wishes to expand into new areas of operations. This was the Chilean solution in the 1980s and 1990s.

There is a cost in establishing prudential regulation and safety net institutions that are immune to political pressures. Although these regulations and institutions minimize the cost of moral hazard in good years, they may prove too rigid when a macroeconomic shock hits. If no one in the government can overrule the central bank, and the central bank is intent on enforcing prudential regulations and on guarding its capital, then it may take a revolution to put a more extensive safety net in place. Conservative prudential regulation and enforcing agencies should therefore be insulated from political pressure, but not so much that true economic "catastrophes" are made worse by actions taken by the agencies.

Since economic catastrophes such as the Great Depression and the 1980s depression in Latin America are rare events, one may question whether it is worth preparing for times when prudential standards are lifted. Perhaps it is enough to put strong prudential regulations and safety nets into place that control moral hazard during normal times. However, the costs associated with not knowing when to relax prudential standards and not knowing how to implement rescue packages are quite large. Since bank and debtor rescue packages, like catastrophe insurance, require access to international capital markets, it makes sense for governments to plan for the future. At present, unfortunately, there are few studies of the actual transitions that governments have made going from enforcing standard prudential regulation to adopting the ex-post safety nets generally associated with the arrival of large macroeconomic shocks.

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