



Bank Failures, Systemic Risk, and Bank Regulation

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Bank (depository institutions) failures are widely perceived to have greater adverse effects on the economy and thus are considered more important than the failure of other types of business firms. In part, bank failures are viewed to be more damaging than other failures because of a fear that they may spread in domino fashion throughout the banking system, felling solvent as well as insolvent banks. [1] Thus, the failure of an individual bank introduces the possibility of systemwide failures or systemic risk. This perception is widespread. [2] It appears to exist in almost every country at almost every point in time regardless of the existing economic or political structure. As a result, bank failures have been and continue to be a major public policy concern in all countries and a major reason that banks are regulated more rigorously than other firms. [3]

Unfortunately, whether bank failures are or are not in fact more important than other failures, and I will argue in this paper that they are not, the prudential regulations imposed to prevent or mitigate the impact of such failures are frequently inefficient and counterproductive. Mark Flannery (1995) comes to a similar conclusion. The regulators have often increased both the probability of bank failure and the costs of such failures. In the process, the regulations have tended to socialize the costs of failure by shifting them from private depositors of the failed banks to general taxpayers.

In addition, the imposition of prudential regulations have identified banking as "unique," and at times have involved potential government financial assistance. This has often made it easier for governments to justify imposing other regulations that have primarily social and political objectives and are often in conflict with the objectives of the prudential regulations, e.g., credit allocation schemes. [4] However, the bulk of the evidence suggests that the greatest danger of systemic risk comes not from the damage that may be imposed on the economy from a series of bank failures, but from the damage

that is imposed on the economy from the adverse effects of poor public policies adopted to prevent systemic risk. As a result, it can be argued that the poor performance of banking experienced in almost all countries in the last two decades reflects primarily regulatory or government failures, rather than market failures. Prevention of reoccurrences of the recent banking problems requires better developed and more incentive compatible and market assisted prudential regulation and reduced nonprudential regulations.

Implications of Bank Failures

A bank fails economically when the market value of its assets declines below the market value of its liabilities, so that the market value of its capital (net worth) becomes negative. At such times, the bank cannot expect to pay all of its depositors in full and on time. The bank, or indeed any firm, should be resolved as quickly as possible in order to treat all depositors (creditors) fairly and not allow a run by depositors holding demand and short-dated deposits. The longer an insolvent bank is permitted to operate, the more time such informed depositors have to withdraw their funds at par value and effectively strip the bank of its valuable assets. The entire loss will then be borne by less informed depositors and holders of longer-dated deposits.

In most countries, the failure of an individual bank should be no more important than the failure of any other firm of comparable size in the community. This is particularly true today when most bank products are no longer unique and are being provided in many countries by an ever growing number of nonbank firms that are gaining market share at the expense of banks. Moreover, to the extent that bank or branch office charters are not restricted, if the demand for banking services in the community is sufficiently strong, a new bank or office should be expected to enter. In the absence of deposit insurance, potential adverse effects to the community would be minimized, the faster the insolvent bank is resolved and the smaller the losses to depositors.

This is not to argue that bank failures are costless. Losses accrue to shareholders and most likely also to depositors, unsecured creditors, and the deposit insurer. Small loan customers may be particularly inconvenienced by changes in their loan officers, loan standards, and other aspects of their ongoing bank relationship. But this is no different from the losses and disruptions in firm-customer relationships that accompany the failure of almost any business entity of comparable size in the community.

What makes, at least, the perception of bank failures more important, particularly for public policy, is the fear that the failure may spill over to other banks and possibly even beyond the banking system to the financial system as a whole, the domestic macroeconomy, and other countries. Similar fears are generally not perceived for the failure of other firms. The failure of a steel mill, software manufacturer, or grocery store is not widely perceived to spill over to other firms in the same industry. Indeed, as Larry Lang and Rene Stulz (1992) note, the surviving firms frequently benefit from losing a competitor and being able to expand their market shares.

Whether or not bank failures are more serious than other failures, individual banks are viewed as more susceptible to failure or more "fragile" than other firms and the banking industry more susceptible to contagion than other industries. Banks are viewed as more fragile for three reasons (Kaufman

1996). They have

(1) low capital-to-assets ratios (high leverage), which provides little room for losses; (2) low cash-to-assets ratios (fractional reserve banking), which may require the sale of earning assets to meet deposit obligations; and (3) high demand debt and short-term debt-to-total debt (deposits) ratios (high potential for a run), which may require hurried asset sales of opaque and non-liquid earning assets with potentially large fire-sale losses to pay off running depositors.

The adverse implications of this fragility are intensified by the fear that banks invest in assets that are opaque, illiquid and difficult to market, contain private information, and can change in market value abruptly and that depositors may run "irrationally" on banks, forcing unnecessarily large fire-sale losses. Thus, the greater fragility is believed to lead to greater failure.

Moreover, because banks are closely intertwined financially with each other through lending to and borrowing from each other, holding deposit balances with each other, and the payments clearing system, a failure of any one bank is believed to be more likely to spill over to other banks and to do so more quickly. Thus, the banking system is seen as more susceptible to systemic risk, where I define systemic risk as "the probability that cumulative losses will occur from an event that ignites a series of successive losses along a chain of institutions or markets comprising a system (Kaufman 1995b: **insert page**). [\[5\]](#)

A default by one bank on an obligation to another bank may adversely affect that bank's ability to meet its obligations to other banks and so on down the chain of banks and beyond.

In a recent review of the literature on bank contagion, I identified five reasons that have been cited for more serious contagion in banking than in other industries (Kaufman 1994). In banking, contagion is perceived to (1) occur faster; (2) spread more widely within the industry; (3) result in a larger number of failures; (4) result in larger losses to creditors (depositors) at failed firms; and (5) spread more beyond the banking industry to other sectors, the macroeconomy, and other countries. I concluded that the evidence suggests that, while contagion in banking may be faster, be more likely to spread to a larger percent of the industry, lead to a larger number of failures, and be more likely to spill over beyond banking, losses to depositors at failed institutions--the primary transmitter of systemic risk--are smaller and bank runs--which can increase the risk by increasing the losses --tend to be informational and bank specific. At least marginal depositors are generally able to differentiate solvent from insolvent banks, particularly when they are given the incentive to do so by the fear of suffering losses. As a result, contrary to folklore, bank contagion on a nationwide scale has not been a common experience and, while large-scale banking failures exacerbate economic downturns, they do not appear to start them.

Nevertheless, the perception of both great likelihood and great damage persists and much extant prudential bank regulation is based on this perception. The remainder of this paper examines the potential for systemic risk in banking more carefully and recommends public policy initiatives that would greatly reduce, if not eliminate, this risk.

Systemic Risk and Public Policy

Although banking may be more fragile than other industries, this does not imply a higher breakage or failure rate. Rather, greater fragility implies "handle with greater care," much as it does with glass and porcelain objects. And apparently that is what the private market did in the United States when the proper incentives to encourage such behavior were in place. Before the introduction of government safety nets, banks held considerably higher capital ratios and assumed considerably less credit and interest rate risks in their portfolios. The average annual failure rate for U.S. banks from the end of the Civil War in 1865 to before the establishment of the Federal Reserve System in 1914 was somewhat lower than for nonbank firms, although the annual variance was greater (Kaufman 1996). In addition, losses to depositors as a percent of deposits at failed banks were lower than losses to creditors at failed nonbanks (Kaufman 1994). Jack Carr, Frank Mathewson, and Neil Quigley (1995) describe the stability of the Canadian banking system before the introduction of deposit insurance in 1967. Anna Schwartz (1988) argues that until the recent worldwide rash of bank failures--which are described in Herbert Baer and Daniela Klingebiel (1995), Gerald Caprio and Daniela Klingebiel (1995), Gillian Garcia (1995), Charles Goodhart (1995, particularly chapter 16), and Zenta Nakajima and Hiroo Taguchi (1995)--while banks failed, bank panics and contagion had almost disappeared in developed countries, other than the United States, by the late 1920s.

Ironically, the introduction of government regulations and institutions in the United States intended to provide protection against the fragility of banks appears to have unintentionally increased both the fragility of the banks and their breakage rate. By providing a poorly designed and mispriced safety net under banks for depositors, first through the Federal Reserve's discount window lender of last resort facilities in 1914, and then reinforced by the FDIC's deposit guarantees in 1934, market discipline on banks was reduced substantially. As a result, the banks were permitted, if not encouraged, to increase their risk exposures both in their asset and liability portfolios and by reducing their capital ratios. As noted by Edward Kane (1985, 1989, and 1992), George Benston and Kaufman (1995), Kaufman (1995a), George Selgin (1989), and others, this represents a classic and predictable moral hazard behavior response. Public (taxpayer) capital has largely replaced private (shareholder) capital as the ultimate protector of depositors. For example, in its 1994 Annual Report, the FDIC (1995: 35) declared that "the FDIC remains today the symbol of banking confidence." [\[6\]](#)

Moreover, it could also be argued that the introduction of the safety net encouraged the federal government to impose greater risk on the banks. For example, national banks were not permitted to make mortgage loans before the Federal Reserve Act in 1913 and then only one-year loans until 1927. Likewise, the government did not encourage banks and thrifts to make long-term fixed-rate mortgages until after the introduction of deposit insurance. It is interesting to speculate whether the government would have introduced such risk increasing policies in the absence of a safety net.

But, in addition, as repeatedly emphasized by Kane (1989, 1995a and b), the establishment of the Federal Reserve and FDIC in the U.S. introduced severe principal-agent problems. The Federal Reserve was charged with acting as the lender of last resort to the macroeconomy by, among other things, offsetting the impact of losses of reserves from the banking system for reasons such as a run to currency by depositors or gold outflows that threatened to reduce the money supply below appropriate levels. But the Federal Reserve was given

discretion with respect to when and to what extent to do so. Unfortunately, as Milton Friedman and Anna Schwartz (1963) document, when the banking system experienced a run into currency during the Great Depression from 1929 to 1933, which dramatically reduced aggregate bank reserves, money supply, and bank credit, the Federal Reserve failed to inject sufficient offsetting reserves. As a result, the simultaneous attempt by nearly all banks to contract by selling assets led to large fire-sale losses and the largest number of bank failures in U.S. history.

To prevent another misuse of discretionary power, the FDIC was effectively established to automatically guaranty a given dollar amount of deposits per bank account. Most depositors would, therefore, have little, if any, reason to run on their banks regardless of the bank's financial condition. Rules were imposed to supplant discretion. But the law of unintended consequences was not absent. The absence of runs removed a major automatic mechanism by which troubled banks were previously closed and resolved. Runs on troubled banks caused liquidity problems, which forced regulators to suspend their operations until their solvency could be determined. In this way, depositors prevented insolvent institutions from remaining in operation for long and thereby limited the ability of these banks to enlarge their losses.

In contrast, after deposit insurance ended most runs, the bank agencies were able, for whatever reason, to permit insolvent banks to remain in operation and continue to generate losses. The failure of the late Federal Savings and Loan Insurance Corporation (FSLIC) to promptly resolve insolvent savings and loan associations in the 1980s, led to its own insolvency, the shifting of its approximate \$150 billion negative net worth to the U.S. taxpayer, and a record number of thrift failures. Capital forbearance was also practiced in this period by the FDIC for commercial banks with high costs that were, however, able to be absorbed by the FDIC, primarily because a sharp fall in interest rates in the early 1990s, an equally sharp steepening in the yield curve, and new federal legislation requiring recapitalization of banks abruptly improved the economic health of the surviving banks before the FDIC's cash reserves ran out (Brinkmann, Horvitz, and Huang 1996; 1995a). [\[7\]](#)

The forbearance not only contributed to increasing the cost of bank failures, but, by delaying the imposition of regulatory sanctions on troubled institutions, also contributed to increasing the number of failures. The average annual bank failure rate (1.09 percent) after the imposition of the initial bank safety net by the Federal Reserve in 1914 (1914-94) somewhat exceeds that (0.91 percent) for the pre-safety net period (1870-1913). This increase occurred despite a sharp decline in the nonbank failure rate from 1.01 percent to 0.65 percent. This suggests that the failure of the bank failure rate to decline likewise could not be attributed to increased instability in the economy or reduced market discipline, but rather to the adverse effects of the moral hazard and agency problems introduced by the poorly designed safety net.

Paradoxically, the Federal Reserve, the FDIC, and FSLIC used their discretionary authority in opposite directions with equally adverse effects for the economy. Friedman and Schwartz (1963) argue convincingly that the Federal Reserve was overly restrictive in the 1930s. In the 1980s, however, after the government had introduced a system that would prevent overrestrictiveness but not underrestrictiveness (which had not been a problem in the 1930s), both the FDIC and FSLIC used their discretionary powers to be less restrictive on troubled insured institutions than they should have been. In retrospect, both agencies were poor agents for their

principals--the Congress, taxpayers, and healthy banks and thrifts that paid premiums to the insurance funds.

The Causes of Systemic Risk

To design public policies that can efficiently prevent the fragility of banks to be translated into a high failure rate, it is necessary to understand the potential causes of both individual bank failures and systemic risk. The causes of individual bank failure have been considered adequately by J.F.T. O'Conner (1938) and Fred Graham and James Horner (1988) among others, and need not be reconsidered here. The same is less true for systemic risk, although an exception is E.P. Davis (1992).

Systemic risk is perceived to occur because all economic agents are interconnected. This interconnection provides a chain along which shocks to any one agent are transmitted to others. The personal or institutional balance sheet of each agent includes assets that are either liabilities of other agents or whose values depend on the behavior of other agents. Likewise, the liabilities of each agent are the assets of others. If an agent suffers a decline in the value of its assets, the value of its capital will decline. This will likely reduce the spending behavior of the agent and thereby also the income and asset values of other agents. Moreover, if the loss in asset values were sufficiently large to exceed an agent's capital, it would cause the agent to default on its debt obligations. This, in turn, will reduce the values of assets on the balance sheet of the agent's creditors and ignite a chain reaction of reduced spending and defaults.

Losses to shareholders are generally viewed as less serious than losses to creditors, who are assumed more risk averse and often consider themselves not fully compensated for any losses they may experience. This is particularly true for depositors, who generally view these funds as the safest and most liquid component of their wealth portfolios. Thus their "harm" is greater and their response in rearranging their portfolios to avoid further losses is more severe. However, it should be noted that defaults lead primarily to redistributions in wealth rather than to aggregate reductions, as the creditor's loss is the debtor's gain. But the economic impacts are unlikely to be offsetting. The consequences of the losses outweigh those of the gains.

[\[8\]](#)

Because of their continuous lending to and borrowing from each other and their need to pay other banks for third-party transfers, banks tend to be more tightly financially interconnected with each other than are most other types of firms. Thus, banks are widely perceived to be particularly susceptible to systemic risk, and shocks at any one bank are viewed as likely to be quickly transmitted to other banks, which in turn can transmit the shock down the remaining chain of banks. The adverse cumulative effects of the initial shock are intensified because bank deposits make up the larger part of most countries' money supply. As a result, depositors experiencing losses are likely to cut back on their spending by more than they would for an equal dollar reduction in other, less liquid forms of wealth. Such cutbacks will, in turn, reduce the income of other agents and thereby also their spending. Any impact of the reduced money supply, however, may be offset by deposit expansion by solvent banks that now have excess reserves or by the central bank through the injection of additional reserves.

Absent deposit insurance protection, bank depositors tend to be aware of the

unique fragility of banks. If they perceive a shock to their bank or banks to be sufficiently great to threaten the solvency of those banks, they are likely to withdraw their deposits in anticipation of a default by the banks. Banks must sell assets quickly to pay these depositors, so that such a run is likely to lead to liquidity problems and fire-sale losses, which would both accelerate and intensify the transmission of the shock. Of course, for a given adverse shock, the greater capital a bank has, the less likely is it to default. In the absence of full deposit insurance, bank customers are thus motivated to encourage their banks to hold sufficient capital to avoid default from adverse shocks originating at other banks.

Runs occur in response to an actual or perceived default and, while they may hasten the transmission to other banks, Frederic Mishkin (1991) and Selgin (1992) show that they generally do not ignite the initial shock. The poor financial state of the bank is unlikely to have started with the run. Although popular in folklore, Benston and Kaufman (1995), Charles Calomiris and Gary Gorton (1991), and Carr, Mathewson, and Quigley (1995) document that history provides little evidence that liquidity problems caused by runs drove economically solvent banks into insolvency. [9] Benston et al. (1986) and Kaufman (1988) note that the effects of a run on the bank, other banks, and the macroeconomy will depend on the running depositors perception of the financial solvency of other banks. If they perceive some other banks in the system to be solvent and redeposit at those institutions, the effect of the run in terms of aggregate impact will be relatively small. There will be no or only little change in aggregate bank deposits or credit. Some adverse effects will be suffered by customers whose relationships with their banks might be changed or terminated, but, as discussed earlier, this is no different from the costly effects of any firm failure, and does not make bank failure a special public policy concern.

However, if the running depositors do not perceive any bank in their market area to be safe, they may flee into safe nonbank securities, most likely those of the federal government. Ownership of the deposits are transferred to the sellers of the securities and the implications depend on what they do with the deposits. If the sellers perceive other banks in their market area to be sufficiently financially secure, as is likely to be the case for the sellers to sell the safe securities, the funds will be redeposited in those banks. Again, there are no changes in either aggregate bank deposits or credit, only a redistribution of the banks holding the deposits. Adverse effects, however, may be somewhat greater than in the earlier direct redeposit scenario. Not only may some bank customer relationships deteriorate, but the initial shift to government securities will bid up the prices and lower the interest rates on public securities relative to private securities. This may redirect investment from private to public sectors.

Moreover, if the perceived safe banks are located in a foreign country and the deposits are denominated in domestic currency, the first country's exchange rates will depreciate if the running depositors or receiving banks do not wish to hold the funds in that country's currency. The importance of this impact depends on the size and international openness of the country. For large countries, neither effect is likely to be sufficiently important to justify special public policy concern. For smaller, open countries, however, the percentage of deposits fleeing abroad is likely to be larger and the depreciation in their exchange rates is likely to be more important. If such a country attempts to offset the decline, it will run down its holdings of foreign reserves. To the extent the central bank cannot offset the impact of this loss on bank reserves, the country will experience a contraction in its

money supply. Thus, for smaller countries, a run or a threat of a run to banks in other countries is more likely to be a special public policy concern.

If neither the running depositors nor the sellers of the government securities perceive any bank in any country to be sufficiently sound to warrant a redeposit, then there will be a flight to currency. The increase in currency held by the public will, unless offset by the central bank, reduce aggregate bank reserves and ignite a multiple contraction in bank assets and deposits. In the process, fire-sale losses will be greater and bank failures more frequent. Systemic problems are likely to occur. Indeed, it is a depositor run to currency that enlarges fire-sale losses and is likely to produce the major adverse effects generally perceived to result from widespread bank failures. In this scenario, banking becomes a special public policy concern.

Public Policy Remedies

What can public policy do to further mitigate the likelihood of systemic risk in banking and its severity if it does occur? For the sake of reality, we assume that some form of government deposit insurance, like central banks, is a political fact of life. Indeed, the evidence for countries that do not have explicit government insurance indicates that they generally have implicit 100 percent insurance. In the absence of permanently abolishing such insurance, there are three basic options. [\[10\]](#)

1. Policy can be directed at increasing macroeconomic stability and avoiding first abrupt increases and then declines (bubbles) in asset values and defaults. Schwartz (1988) and Goodhart (1995, particularly chapter 14) show that such instability has been a major cause of bank failures. Unfortunately, history has amply demonstrated that our current knowledge of macroeconomics is far short of what is required to achieve such results consistently.
2. Discretionary powers can be delegated to bank regulatory agencies to provide a safety net under banks to prevent both undue fire-sale losses from hurried asset sales by banks from affecting depositors and runs on the banking system into currency that exacerbate such losses. As noted earlier in this paper, it appears highly unlikely that such agencies, e.g. the Federal Reserve and FDIC, can do much better in the future than they have in the past in avoiding serious agency problems for themselves and moral hazard behavior by banks.
3. Policy can be directed at avoiding the pitfalls of excessively discretionary and incentive incompatible safety nets and other prudential policies and focus directly on the cause of both losses to depositors in bank insolvencies and depositor runs on banks, namely economic insolvency of banks with negative net worth. Such a policy would attempt to reduce, if not eliminate, both moral hazard behavior by banks and agency problems by regulators by properly aligning the incentives of all parties in the same and appropriate direction. The incentive for banks to engage in moral hazard behavior can be reduced by requiring sufficient private capital and imposing a series of sanctions in the form of structured early intervention or prompt corrective action on troubled banks that mimic the sanctions imposed by the private market on troubled noninsured bank competitors in an attempt to have the banks reverse direction before insolvency. The ability of regulators to incur principal-agent problems is reduced by having them be required to impose these sanctions on troubled institutions and to resolve a bank which

was not turned around by these sanctions through recapitalization by current shareholders, sale, merger, or liquidation before its capital could be totally depleted and losses imposed on depositors. The best way to reduce the costs of bank insolvencies to "innocent" third parties is to restrict them solely to shareholders, who may be expected to be more aware of the risks and be compensated for them more commensurately.

Benston and Kaufman (1988, 1994a), Benston et al. (1989), Richard Carnell (1992), and the Shadow Financial Regulatory Committee (1992) describe how many of the parts of such a structured early intervention and resolution (SEIR) program are included in the prudential prompt corrective action and least-cost resolution provisions of the FDIC Improvement Act (FDICIA) enacted in the United States at yearend 1991. Unfortunately, the prompt corrective action and least-cost resolution provisions of FDICIA as well as the implementing regulations were weakened by Congress and particularly by the regulators both before and after the act was enacted, so that failure and losses will be larger than necessary. In particular, Benston and Kaufman (1994b) argue that the numerical values for the capital tripwires are set too low.

The SEIR program focuses on the following six areas:

1. Explicit full government deposit insurance for "small" depositors. Full insurance would be provided up to a specified maximum amount per account and no insurance would be provided above that amount. The precise amount at which to cap the insurance is difficult to establish theoretically, but should be near the level that depositors with larger amounts may be expected to have other investments that require the ability, knowledge, and experience to evaluate credit worthiness and may be widely expected to bear losses without much public sympathy and are unlikely to be able to conduct their business in currency and therefore run into currency rather than to other banks. These depositors would not only not be protected by deposit insurance, but would be expected to monitor and discipline their banks through market forces and thereby supplement regulatory discipline. Explicit full deposit insurance for small depositors is desirable, because (a) social externalities exist in providing a safe depository in the intermediation process for funds owned by agents for whom the costs of financial analysis of private banks outweigh the benefits, (b) these depositors are the most likely to run into currency and threaten systemic problems, and (c) insurance for such depositors is a political reality in almost all countries and explicit guarantees are more likely than implicit guarantees to avoid political battling when a failure does occur, which generally will result in the government providing full coverage and signal the willingness of the government to retreat in the face of pressure (Kaufman 1996a).

2. Capital levels on banks that are equal to those that the private market expects noninsured bank competitors to maintain in the particular country. This provision is supported by Davis (1992), Flannery (1995), and Kaufman (1992). Thus, insured banks would increase their self-insurance to more market-determined levels. [\[11\]](#)

3. A system of graduated regulatory sanctions imposed on banks as their performance deteriorates through a series of zones (tranches or tripwires) that resemble the sanctions imposed by market forces on noninsured firms through bond covenants and creditor negotiation. [\[12\]](#) These sanctions are explicit, publicly announced, and become progressively harsher and more mandatory as the financial condition of the bank deteriorates through the

tranches. (The sanctions introduced under FDICIA and the capital levels defining each tranche are shown in Table 1.)

insert Table 1

4. An explicit, publicly announced "closure rule" requiring the regulators to promptly resolve troubled institutions before their net worths decline below some low but positive critical level. The critical cutoff value of the capital-to-asset ratio should be sufficiently high so that, in the absence of large-scale fraud and unusually abrupt adverse changes in market values of a diversified portfolio of earning assets and liabilities, no losses are suffered by depositors or the deposit insurance agency. Losses from bank insolvencies are thus restricted to bank shareholders and deposit insurance becomes effectively redundant.

5. Risk-based deposit insurance premiums, both to discourage banks from assuming excessive risk and to prevent less risky banks from cross-subsidizing riskier banks. Because the closure rule should minimize losses to the insurance agency, overall premiums to be charged insured banks would be low and necessary only to cover these small losses and to finance operating costs, including monitoring market values.

6. Market or current value accounting, so that economic values rather than historical or book values are the basis for decisions by bank customers, bank managers, and regulators. This would also make for greater disclosure and transparency and increase the accountability of both banks and their regulators.

Although all six parts of the SEIR scheme contribute to its effectiveness, the key provision is the firm and explicit "closure rule." Indeed, no deposit insurance structure is effective in minimizing the costs from failures unless it includes such a rule. The prompt corrective actions increase the effectiveness of the closure rule by progressively increasing the cost to financially deteriorating banks of "gambling for resurrection" as they approach the closure capital ratio. The program must be compulsory for all banks in order that no banks remain implicitly insured.

The scheme operates more effectively if capital were measured relative to total assets--the leverage ratio--rather than to risk-based assets. This is not because the amount of capital that a bank is required to maintain by the market is not related to its riskiness, but because the necessary information appears to be too difficult to be incorporated accurately in the risk classifications adopted by the regulators. The risk classifications and weights adopted by the regulators to date have been arbitrary, incomplete, insufficiently reflective of the riskiness of the bank as a whole as opposed to individual activities, and modified to pursue political and social objectives. As a result, Elroy Dimson and Paul Marsh (1995) and Michael Williams (1995) demonstrate that they provide distorted incentives, which differ significantly from those the market imposes, and encourage arbitrage within risk classifications. Capital should also be defined to include all bank liabilities that are subordinated to bank depositors and the deposit insurance agency and are not in a position to run. Thus, bank capital should give full weight to nonperpetual preferred stock and subordinated debt with maturities of, say, one year or longer, as well as to equity.

The benefits of a system of SEIR are substantial. In contrast to most

government-provided deposit insurance schemes, this structure is both incentive compatible, so that all involved parties row in the same and appropriate direction, and market oriented, so that regulatory discipline is reinforced by that of de facto as well as de jure uninsured depositors. No institution would be "too big to fail" in terms of protecting uninsured depositors, shareholders, or senior management. By providing a number of triggers for regulatory intervention rather than only one, the progressivity of severity of the sanctions will be more moderate and both the likelihood and credibility of intervention by the regulators increased. Moreover, because losses to the insurance agency are no longer a major concern, banks could be permitted to engage in a wide range of activities, at least with respect to prudential concerns. The permissibility of the activities would be judged on the ability of the regulators to monitor their values accurately and timely for purposes of prompt corrective action and resolution. It follows that more difficult to monitor activities could be permitted banks with higher capital ratios. This flexibility would provide incentives for banks to improve their capital positions and introduce carrots as well as sticks in the structure. Banks would be risking their own private capital rather than that of the insurance agency.

If structured correctly, for any given degree of macroeconomic instability, SEIR should reduce the probability of individual bank failure, the cost of failure to depositors, other bank customers, and the community, and, by reducing if not eliminating depositor losses and the need for depositors to run on their banks, also the likelihood of systemic risk. The greater the macroeconomic instability in a country, the higher would have to be the relevant capital ratios for prompt corrective action and resolution to achieve these objectives. By itself, SEIR is not a substitute for stabilizing macroeconomic policy. Although reducing the likelihood of failure, the scheme does not eliminate failure, only the cost of failure to depositors and other creditors. Thus, the exit of poorly performing banks, which is required in any efficient industry, is not affected. Banks would no longer be unique and different from other firms because of any perceived or actual greater adverse impact of their failure and therefore no longer warrant specific public policy concern for prudential reasons. Benston and Kaufman (1996) conclude that restrictions on bank product and geographic powers that may have been imposed for prudential reasons may be removed and banks subject only to those public policies applied to other industries.

Systemic Risk and the Payments System

As noted earlier, banks are closely interconnected not only by depositing funds with each other and lending to and borrowing from each other (interbank balances), but also by making and receiving funds transfers from each other in the process of clearing payments due to or from other banks (interbank transfers). Because such transfers are frequently in very large amounts, are processed almost immediately, and are highly concentrated among a few large participating banks, the impact of defaults is more likely to spread quickly to other banks participating in the clearing process and is considered particularly disruptive as it may cause at least temporary gridlock in the payments system.

Defaults in the payments clearing process can occur when the payment and receipt of funds are not simultaneous, so that funds are disbursed before they are received. As a result, credit is extended by one party to another. In generic modern interbank clearing systems, payment for individual large value transactions may be made to other banks at the time delivery is made,

generally electronically by wire transfer, but final settling of net outstanding balances at each participating bank is not made until dayend. Thus, for example, a bank may accept delivery of previously purchased securities, either for themselves or their customers, in midday and pay for them at that time even though it may not have the necessary funds on deposit at the clearing facility at the time. An intraday or daylight overdraft occurs. The bank anticipates having sufficient funds in its account at dayend through scheduled inflows to settle the overdraft, but these inflows are not certain and may not occur. If they do not and represent defaults on obligations from third parties and the resulting losses exceed the bank's capital, the bank in turn will default on its obligations to other banks. Because the same funds may be transferred a number of times among banks before dayend settlement, in case of default, these transfers must be reversed in order to identify who owes whom what. This process is costly, time consuming, and disruptive. Moreover, as described in Bank for International Settlements (1994), Robert Eisenbeis (1995), Flannery (1988), Baer et al. (1991), David Humphrey (1987), George Juncker et al. (1991), Robert Parry (1996), Heidi Richards (1995), and Bruce Summers (1994), because the unwinding may result in losses that could cause other banks along the chain to default, so that losses cascade through the banking system, the payments system is commonly viewed as a source of systemic risk.

To reduce the severity of such disruptions from default, some clearing systems guarantee or provide finality for each individual funds transfer as it occurs. The costs of later, dayend settlement defaults are then borne by the sponsors of the clearing facility (house). Such finality is more credible when the facility is operated by a government agency, e.g., the central bank, than by private entities, e.g., private banks. In the United States, an example of the first type of facility is Fedwire, operated by the Federal Reserve, and of the second type is CHIPS, operated by large New York City banks. Clearings on Fedwire are thus free of systemic risk.

Except for larger and more concentrated exposures, the credit risk assumed by banks in the clearing process is little different from that assumed by them in any transaction. Thus, basically the same techniques for reducing this exposure apply. The bank needs to know and monitor its counterparties, require margin when necessary, impose maximum loan limits, and charge a commensurately high interest rate on any credit extension. The bank's own risk of default is reduced by maintaining sufficient capital in light of its overdraft exposures. The bank may also delegate some of these decisions to the clearing house.

Until recently, the Federal Reserve did little to encourage banks to be greatly concerned about daylight overdrafts in their use of Fedwire. Because all payments were guaranteed by the Fed when made, the risk of default was borne only by the Fed. The Fed neither charged for daylight overdrafts nor applied bank limits on their use. As a result, Richards (1995) shows that the volume rose rapidly increasing the risk exposure to the Fed and, indirectly, the taxpayers. Since the early 1990s, the Fed has both charged for and limited the use of these overdrafts, but it has been reluctant to impose market-based charges for fear of losing business to competing payments systems. Moreover, David Mengle (1995) believes that the Fed may have provided a perception that it had spread the safety net under the payments system broadly by implying that it would assist banks experiencing liquidity problems on private clearing systems. In fact, as described in Eisenbeis (1995), the Fed provided such assistance in 1985 to the Bank of New York when it suffered a computer breakdown in its securities clearing operations and

experienced a large deficit in its reserve balance. Thus, similar to the government guarantees on bank deposits, as structured, the Federal Reserve guarantees on payments system transfers in the United States appear to encourage risk taking by banks.

Ironically, the Federal Reserve views itself as a retarder rather than as an engine of risk taking in the payments system. Parry (1995: 2-3), president of the Federal Reserve Bank of San Francisco, recently argued that

central banks do have responsibilities for reducing settlement risk....settlement risk is a source of systemic risk....Central banks need to worry about systemic risk because the private sector simply doesn't have the incentives to address this risk adequately. In fact, that's the very genesis of central banks' traditional oversight role in payments system issues....There's a second role for central banks in reducing settlement risk. It stems from the unique advantage central banks have in being able to provide irrevocable, final settlement through the use of central bank money.

Similar to losses from bank failures for other reasons, the probability of a default by a bank and the magnitude of any resulting loss to other banks and parties from the payment system is reduced greatly if not eliminated by an appropriately designed SEIR structure. But, because of the large amounts, quick transfers, and high concentrations, additional precautions may be warranted to protect both the payments system itself and banks from defaults in the clearing process. The Bank for International Settlements (1994) notes that this may be done for large value transfers by permitting only simultaneous payments and receipts, or payments only in "good funds" against either other such payments, e.g., in foreign exchange trading, or delivery, e.g., in securities trading. This would eliminate the need for net settlement at dayend. Because almost all clearing facilities now have the ability to monitor in real time, such gross clearings for large value transfers are likely to be neither excessively costly nor disruptive relative either to the cost and disruption from defaults or to the long-run cost of providing an inappropriately designed safety net. Alternatively, Benston (1994) argues that market determined intraday interest rates may be charged for daylight overdrafts, maximum loan limits established for each bank, collateral required against debit positions, and participants in the clearing process subject to minimum capital requirements determined by the clearing house. To the extent the operator of the clearing facility is the government, the principal-agent problems discussed earlier are likely to exist so that appropriate measures to deter private defaults may not be imposed and resulting losses socialized. This suggests that economic welfare is enhanced if the clearing facility is private and its sponsoring banks subject to the provisions of SEIR.

A similar but more difficult problem to solve arises if payments are settled in different clearing facilities when settlement dayend is not at the same time at each facility. This is particularly likely for clearing facilities in different countries in different time zones. This problem was responsible for losses to some U.S. banks in 1974 when the Herstatt Bank in Germany failed and was closed by the German authorities after payment was made to it by U.S. banks at dayend in marks on the German clearing house but before it could make payments to U.S. banks at dayend in dollars in New York, which was later the same day. Because this problem cuts across different national sovereignties and thus laws, its solution is more difficult and requires coordination among the clearing facilities and respective governments. But as international markets evolve toward 24-hour operations, clearing in only good

funds becomes increasingly feasible. Indeed, Philip Gawith (1996) and George Graham (1996a, 1996b) report that real time gross settlement is the solution recently proposed by a number of the world's largest banks and already activated on the London Clearing House Automated Payments System or CHAPS.

Conclusion

The evidence suggests that banks fail. But so do other firms. Bank failures are costly to their owners, customers, and some third parties. But so are the failures of other firms. To the extent that failures reflect market forces, public policies to prevent exit harm other economic agents, such as competitors and those who will benefit from entry, including consumers of banking services. Nevertheless, bank failures are widely perceived to be more damaging to the economy because of the belief that they are more likely to spill over to other banks and beyond. Thus, almost all countries have imposed special prudential regulations on banks to prevent or mitigate such adverse effects.

This paper argues that these policies (both regulations and institutions) have frequently been incentive incompatible and counterproductive and have unintentionally introduced both moral hazard behavior by the banks and principal-agent problems by the regulators that have intensified the risk and costs of banking breakdowns. In the absence of such anti-systemic risk regulations, the greater fragility of banks did not often translate into greater failures nor did the payments system necessarily introduce greater risk for the banks. Indeed, the two periods of by far the largest number and greatest cost of bank failures in U.S. history occurred after the introduction of policies intended specifically to reduce cascading failures. The first occurred in 1929 and ended in 1933, two decades after the introduction of the Federal Reserve System. The second occurred in the 1980s, 50 years after the introduction of the FDIC to supplement the Fed. Moreover, the average annual rate of bank failures was somewhat greater after the introduction of the safety net in 1914 than before and the failure of large banks occurred only in the 1980s. In contrast, the average failure rate for nonbank firms decreased significantly. This suggests that bank instability is more a regulatory phenomenon than a market phenomenon. As Schwartz (1995) has noted, omitting the government as a cause of instability in banking in a play about systemic risk is like omitting the Prince of Denmark from the first act of *Hamlet*.

Although systemic risk may exist without government regulation, on net, the probability of instability occurring in banking and the intensity of any resulting damage are likely to be greatly increased by some government policies adopted in the name of preventing systemic risk. This conclusion is not unique to banking. For example, modifying an analogy developed by Robert Merton (1995), just as governments may reduce the monetary damage from floods by providing information about water levels to threatened home owners, they may simultaneously increase the damage by providing flood insurance and encouraging the home owners to build and rebuild in flood plains. The latter adverse affect is likely to dominate the former beneficial effect. A similar conclusion was reached by the late Fischer Black (1995: 8), who noted:

When you hear the government talking about systemic risk, hold on to your wallet! It means they want you to pay more taxes to pay for more regulations, which are likely to create systemic risk by interfering with private contracting....In sum, when you think about systemic risks, you'll be close to the truth if you think of the government as causing them rather than

protecting us from them.

Governments appear to face a tradeoff between two types of banking problems--potential systemic risk from the failure of one or more banks and non-systemic bank failures from excessive risk-taking and inadequate regulatory discipline. The first problem may be solved by introducing a safety net in the form of government deposit insurance and having the central bank act as lender of last resort. But, if poorly designed or implemented, this solution is likely to increase the fragility of banks and exacerbate the second problem. Thus, governments appear to have a no-win choice. But the evidence, at least for the United States, is quite clear. The cost of systemic risk before the introduction of the safety net under banking in 1914 was far smaller than the cost of bank failures since then.

The counterproductive prudential policies have been imposed more in response to perceptions of systemic risk and "horror stories" in the popular press than in response to empirical evidence by public policymakers, who were responding to public outcries and were highly risk-averse. Similar to nuclear plant accidents, even if the probability of systemic risk in banking was very low, if it ever did occur, the expected losses would be very great, and reflect poorly on government officials and regulators. Moreover, through time, the regulators have developed a vested interest in maintaining and even expanding prudential regulations designed to combat systemic risk as they have become aware of the public prestige and power these regulations bestowed on them as protectors of society from financial collapse. In recent years, regulators have been among the most vociferous expositors and prophets of the dangers of systemic risk. [\[13\]](#)

The best protection against widespread bank failures and systemic risk is macroeconomic policies that achieve stability and avoid price bubbles that leave banks highly vulnerable to failure. But since the success of such policies is highly questionable, backup prudential policy is desirable. This paper argues that it is possible to reduce both the likelihood and costs of future bank failures as well as any resulting systemic problems without suffering the undesirable side-effects of moral hazard and agency problems that plague many prudential policies. This result can be achieved by introducing an effective system of structured early intervention and resolution (SEIR)--a system that is both incentive compatible and market oriented. Under SEIR, bank failures would be reduced but not eliminated, so that inefficient institutions can exit the industry.

The key feature of the SEIR scheme is an explicit and enforced "closure rule" that resolves banks before their own capital is fully depleted and thereby effectively restricts losses only to shareholders. Explicit full deposit insurance is provided for smaller accounts to prevent systemic risk, but becomes effectively redundant. Because uninsured depositors suffer only small if any losses in bank insolvencies, the major transmission process of systemic risk is not activated and failures of individual banks will not spill over to others. Bank runs, even on individual banks, are far less likely than in a system without a closure rule. A system of SEIR, although in weakened form, has been included in the United States in the prompt corrective action and least-cost resolution provisions of FDICIA of 1991. Whether it will prevent repeats of the bank failures of the 1930s and 1980s, for the same degree of macroeconomic instability, depends on the ability and will of the regulators to enforce the intent of those provisions.

Footnotes

[1]Some argue that not only banks but all financial firms are potential sources of systemic risk. For example, in their study of capital requirements for securities firms, Dimson and Marsh (1995, p. 823) note: Implicitly, competition is assumed to generate appropriate capital structures, and the financial distress costs are an integral part of their decision process. Most countries take a different line for financial businesses, however. The systemic costs of default...have persuaded regulators to impose minimum capital requirements. See also Davis (1992).

[2]The public fear of systemic risk in the financial sector and in banking in particular is intensified both by its relative lack of understanding of financial matters and by a constant barrage of fictional "scare" stories. Most persons are far more baffled and mystified about how firms dealing in intangibles, such as banks, operate than how firms dealing in tangibles, such as automobile companies, operate. Thus, they have greater difficulty distinguishing between factual and folklore explanations of the causes and effects of breakdowns in the financial system than elsewhere and their perceptions are more likely to reflect the greater fear generally shown of the unknown than the known superstitions gain credence. In addition, potential severe adverse contagious effects of bank failures and financial market crashes have long been a popular subject for novelists, who spin colorful and frightening stories, and movie makers. For example, the human blight caused by bank failures is vividly described in the best-selling novel of the mid-1990s, *A Dangerous Fortune*, by the best-selling author Ken Follet (1994). More recently, the *Washington Post*, which prides itself on accuracy in reporting, published a fiction story disguised as a news article about the potential collapse of the world financial markets from a default by the U.S. Treasury during the budget crisis of January 1996, authored by long-time successful scare monger and best-selling author Paul Erdman (1996).

[3]Gerald Corrigan (1991: 3), former president of the Federal Reserve Bank of New York, has noted: More than anything else, it is the systemic risk phenomenon associated with banking and financial institutions that makes them different from gas stations and furniture stores. It is this factor -- more than any other -- that constitutes the fundamental rationale for the safety net arrangements that have evolved in this and other countries.

[4]Although not the subject of this paper, credit allocation schemes, which have been a major cause of bank insolvencies, particularly at state owned or controlled banks, in many developing and traditional economies, are not possible without a government safety net that removes the concern of depositors. Indeed, many authors, including Kane (1989) and Kaufman (1995a), have pointed to credit allocation in favor of residential housing in the form of encouraging long-term fixed rate mortgage loans funded by short-term deposits as a major cause of the savings and loan debacle in the United States in the 1980s.

[5]This definition is consistent with the one used by the Bank for International Settlements (BIS) (1994: 177): Systemic risk is the risk that the failure of a participant to meet its contractual obligations may in turn cause other participants to default, with the chain reaction leading to broader financial difficulties. and by Robert Parry (1996: 2), president of the Federal Reserve Bank of San Francisco: Systemic risk is the risk that one bank's default may cause a chain reaction of...failures and even threaten the solvency of institutions. Alternative definitions are developed in Bartholomew and Whalen (1995). The importance of defining systemic risk accurately has recently been emphasized by Alan Greenspan (1995: 7), chairman of the Board of Governors of the Federal Reserve System, when he noted: It would be useful to central banks to be able to measure systemic risk accurately, but its very definition is still somewhat unsettled. It is generally agreed that systemic risk represents a propensity for some sort of significant financial system disruption. Nevertheless, after the fact, one observer might use the term "market failure" to describe what another would deem to have been a market outcome that was natural and healthy, even if harsh...Until we have a common theoretical paradigm for the causes of systemic stress, any consensus of how to measure systemic risk will be difficult to achieve.

[6]Much of the general public considers the government to be the ultimate guarantor of nearly all financial transactions, regardless of the size or type of transaction. In his analysis of the Daiwa Bank's problems in the United States, Robert Samuelson (1995: 5), a well-known economic columnist, writing in the *Washington Post*, noted: Financial markets (banking, the trading of securities) depend upon trust and confidence. Hundreds of billions of dollars of daily transactions occur on nothing more than a phone call or a computer key...In part, trust rests on faith that government regulators will supervise the complex payments system and police for fraud and financial failure. Likewise, Robert Kuttner (1991:

28), another Washington Post columnist ended his column on deposit insurance, the troubled Bank of New England (which failed shortly thereafter), and why he did not join the "irrational" run, by noting: So my account is still at the Bank of New England. And my money is still at the FDIC.

Even some bankers do not believe that depositors should look only to their banks for safety. In criticizing the banking agencies' proposed capital requirements for market risk, Fox (1995: 3) reported that Jill Considine, president of the New York Clearing House Association, argued: These standards are "unnecessarily rigid and extremely conservative"...The market risk rules should be used to "protect banks against normal market risks in their portfolios, [not] as a tool to protect the banking system against systemic risk."

[7]The FDIC's reserves were estimated to have been negative, however, if adjusted for expected bank failures and losses.

[8]A more complete listing of alternative paths along which systemic risk may travel appears in Schwartz (1995).

[9]An example of the more common view is provided by Krugman (1994: 38-39), who states, without analysis, that in the 1930s there was "a wave of bank failures, which proved self-reinforcing as it led to runs on banks that otherwise might have survived."

[10]All these options assume that the banks in the country start with a positive net worth or if not have, at minimum, a schedule for regaining positive net worth. These policy options do not deal with the issue of who pays for any negative net worth that banks may have -- depositors, positively capitalized banks, taxpayers, or some other party. Kaufman (1997) notes that this is as much a political problem as an economic problem and the basis for much poor macroeconomic policy as many governments assume responsibility for the negative net worths and monetize this addition to their deficits.

[11]Merton (1995) identifies three ways for banks to reduce their risk exposures: (1) hedging, (2) insuring with others, and (3) a capital cushion.

[12]The effectiveness of private market sanctions in reducing moral hazard behavior on non-insured nonbank firms is examined by DeAngelo and DeAngelo (1990).

[13]For example, John LaWare (1991: 34), a former governor of the Federal Reserve System, testified before Congress when he was governor that it is systemic risk that failed to be controlled and stopped at the inception that is a nightmare condition, unfair to everybody. The only analogy that I can think of for the failure of a major international institution of great size is a meltdown of a nuclear generating plant like Chernobyl. The ramifications of that kind of failure are so broad and happen with such lightning speed that you cannot after the fact control them. It runs the risk of bringing down other banks, corporations, disrupting markets, bringing down investment banks along with it ... We are talking about the failure that could disrupt the whole system. Similarly, C.T. Conover (1991: 288), who was the Comptroller of the Currency at the time of the Continental Illinois National Bank failure in 1984, testified in Congress at the time that had Continental failed and been treated in a way in which depositors and creditors were not made whole, we could very well have seen a national, if not an international, financial crisis, the dimensions of which were difficult to imagine. None of us wanted to find out. Moreover, in 1993, nearly 10 years after the failure of the Continental Bank, Governor LaWare (1993: 96) was still arguing that the bank's failure would have led to the insolvency of several hundred [banks]...many large companies and banks, both in the United States and in foreign countries, would have lost large amounts as their...claims were not honored...[This might] have created a crisis of confidence...[and] would have seriously destabilized the entire banking system. In fact, as was known at the time, had the Continental been resolved on a timely basis, most likely through sale or merger, the loss would have been no greater than 5 percent of its total assets. This is about the same loss as the FDIC suffered when it finally resolved the institution in the early 1990s, after protecting all depositors and creditors. LaWare argued this despite the results of a U.S. Congressional study (1984) which estimated that if Continental's loss had been as large as 60 cents on the dollar, more than 10 times either the estimated or actual loss, only 27 of the 2,299 banks with exposures to the Continental would have suffered uninsured losses in excess of their capital and become insolvent. These losses would have totalled only \$137 million. Another 56 banks would have suffered losses equal to between 50 and 100 percent of their capital in an amount totalling \$237 million. If Continental's losses were 10 cents on the dollar, twice the actual amount, not one bank

would have suffered losses greater than its capital and only two banks would have suffered losses between 50 and 100 percent of their capital, for a total loss of only \$1 million. Systemic risk does not appear to have been a very likely outcome. LaWare's statement represents more "scare talk" and bluster than fact and objective analysis.

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