R E V I E W

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THE FEDERAL RESERVE BANK of ST. LOUIS

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bank failure cases in which banks were examined in their last 12 months of operation. The information derived from examination reports appears to be important to the efforts of supervisors to limit exposure of BIF to losses when banks get into serious trouble.

53 **On the Macroeconomics of Private Debt**

Keith M. Carlson

During the 1980s, private-sector borrowing expanded to such an extent that many analysts became concerned that the accumulated debt would be a drag on spending, making the recession worse if and when it occurred and slowing the ensuing recovery.

This article examines the role of private nonfinancial debt in the U.S. economy after putting recent debt trends in perspective and discussing the economic role of debt, Carlson considers the macroeconomic effects of debt. He finds that economic activity almost always leads the debt cycle; debt seems to respond to the business cycle rather than the other way around. Furthermore, movements in total spending do not appear to have been systematically related to debt/income ratios over the past 40 years.

The Government's Role in Deposit Insurance

THE DIFFICULTIES OF BANKS and thrift institutions during the last decade have created a great deal of interest in U.S. banking system reform. Among the options that have been considered is restructuring the federal deposit insurance system or eliminating it entirely. The Federal Reserve Bank of St. Louis recently invited six economists who have conducted research on banking and financial regulation to write short articles on deposit insurance and the federal government's role in providing it. These six articles are collected in the following pages.[1]

Each article in this collection addresses one or both of the two basic questions that confront anyone who might contemplate reforming the deposit insurance system. The first question involves the problem of liquidity crises, or financial panics, that troubled the U.S. banking system during the 150 years before the establishment of federal deposit insurance. There have been no liquidity crises since deposit insurance was established, and most economists believe that this is not coincidental—that deposit insurance has in fact prevented liquidity crises. Any proposal for deposit insurance reform that involves limiting the coverage of insurance or eliminating it entirely must address the problem of financial panics. The second question involves the so-called moral-hazard problem of deposit insurance—the fact that it provides insured banks incentives to take excessive risks. Most economists believe that moral-hazard problems played a major role in causing the wave of bank failures that occurred during the 1980s. Proposals for deposit insurance reform that involve retaining an insurance system of approximately the current scope must find some way of solving the moral-hazard problem.

The first article in this collection describes the history of the state deposit insurance systems that preceded the federal insurance system and argues that these systems were also afflicted by moral-hazard problems. The second article argues that the problem of liquidity crises has been overblown, that an unregulated banking system would be stable, and that deposit insurance is not needed. The third article argues that though liquidity problems may have existed in the past, recent innovations in the financial system would enable banks to prevent them without relying on deposit insurance. The fourth article summarizes the theoretical basis for the claim that we need deposit insurance to solve the liquidity crisis problem and challenges the argument that adequate market solutions to this problem are now available. The fifth article presents a theoretical analysis of the prospects of solving the moral-hazard problems of deposit insurance by means of a system of risk-based insurance premiums. The sixth and final article outlines the risk-based premium system recently adopted by the Federal Deposit Insurance Corporation and questions whether it will succeed in solving the problem of bank failures.

The current debate over the role of government in deposit insurance can be adequately under-

[1]Each of the six authors was a participant in "Aspects of Government Deposit Insurance: Opposing Views on the Role of Government," a symposium held December 11, 1992, at the Federal Reserve Bank of St. Louis.

stood only in the context of the U.S. historical experience with monetary and financial institutions. A key feature of this experience has been a sequence of largely unsuccessful attempts to reform the financial system to solve the problems created by bank runs, bank failures and financial panics. This process, which culminated in the establishment of the federal deposit insurance system in 1933, is surveyed in the shaded insert on p. 6.

For its first 50 years of existence, federal deposit insurance seemed to succeed both in preventing financial panics and in sharply reducing the number of bank failures. The losses associated with the failures of banks and thrift institutions were easily covered by their respective insurance funds. After 1980 the failure rates of banks and particularly thrift institutions skyrocketed. The federal savings and loan insurance fund was overwhelmed, and hundreds of billions of dollars in savings and loan losses had to be converted out of general federal revenues, which is to say by federal taxpayers. The policy problem we now face is to reform our financial system to prevent a repeat of the hugely expensive bank failure problems of the period after 1980 without recreating the problem of instability and panics that existed before 1933.

State Deposit Insurance Systems

David Wheelock, an economist in the Research Department of the Federal Reserve Bank of St. Louis, wrote the first article in this collection. Wheelock has written extensively about the history of state deposit insurance systems. He begins his article by pointing out that in 1933, government deposit insurance was neither a new concept nor an unprecedented policy. During the pre-Civil War era, six states established systems to insure state bank notes; during the early twentieth century, eight states established systems to insure state bank deposits. The systems operated under a variety of different regulatory environments and financial arrangements. According to Wheelock, these differences may help explain differences in the systems' performances. For example, mutual-guarantee insurance systems, in which each insured bank could be assessed any amount necessary to cover depositors' claims against insured banks that failed, had better records than conventional systems, in which banks paid premiums that were used to create insurance funds to cover depositors' claims. Wheelock argues that mutual guarantee systems were more successful because they gave insured banks a stronger interest in monitoring the soundness of other insured banks.

Because membership in each of the state insurance systems was effectively voluntary, they were exposed to the problem of adverse selection. Risk-prone banks were more likely to join than conservatively managed banks, and well-managed banks tended to leave insurance systems at the first sign of trouble. Wheelock reports that because a bank's insurance premium was not linked to its degree of failure risk, insured banks were encouraged to increase the riskiness of their loan portfolios. (This moral-hazard problem is a recurring theme in deposit insurance literature and is discussed in each article in this collection.) This was particularly true for insured banks that found themselves in financial distress.

Wheelock concludes by observing that the historical record of state deposit insurance systems has generally not been considered successful. He suggests two options the government might select if it chooses to retain deposit insurance: a mutual guarantee system modeled after the successful systems of the early 19th century or a system of limited insurance combined with continued regulatory restraints on bank risk taking.

The Free Banking Option

Historically, monetary and financial questions have occupied a special place in economics. Economists skeptical of most types of government involvement in economic activity have often been willing to make important exceptions with regard to the monetary and financial sectors. For example, Milton Friedman, a throughgoing free-marketer on most issues, has endorsed both a government monopoly over currency provision and tight government regulation of creation of deposits.[2] He has also written approvingly of federal deposit insurance.[3]

[2]See Friedman (1960), chapter 1. For a more recent statement of Friedman's views on the role of the government in monetary affairs, see Friedman (1986).

[3]Friedman has written, for example, that deposit insurance "has been the most important structural change in our monetary system in the direction of greater stability since the post-Civil War tax on state bank notes" [see Friedman (1960), p. 21] and that it is "a form of insurance that tends to reduce the contingency insured against" [see Friedman and Schwartz (1963), p. 440].

In recent years a small but growing group of economists has argued that monetary and financial institutions are not an exception to the principle of the superiority of *laissez-faire*. These so-called free bankers believe that banks should be allowed to operate in a truly competitive market environment—free from government regulations, such as restrictions on the nature or quantity of their assets and liabilities (including monetary liabilities), and also free from government protections, such as legal restrictions on entry and competition, Federal Reserve System last-resort lending, and federal deposit insurance.

Kevin Dowd, a reader in monetary economics at the University of Nottingham (United Kingdom) wrote the second article in this collection. Dowd is one of the leading advocates of a free banking system. He argues that government insurance, far from protecting banks, weakens them and makes them more likely to fail. Uninsured banks, he asserts, would have incentives to acquire safe assets, obtain adequate capital from investors and provide proof of their soundness to depositors. Competition would ensure that bankers struck the right balance between depositor protection and return to investors. According to Dowd, the historical record indicates that banks in relatively unregulated banking systems maintained strong capital positions and retained depositor confidence. He argues that historians have greatly overestimated the severity of the problem of runs and panics. Bank runs were usually constructive events that weeded out weak banks.

Dowd argues that deposit insurance weakens a banking system by freeing banks from depositor scrutiny, which gives them incentives to weaken their capital positions and make riskier loans. Banks that find themselves in financial distress have incentives to take even greater risks in an attempt to recover, and bank runs no longer put a stop to this process by forcing them to close. Based on their private incentives, regulators act slowly to close insolvent banks, and the resulting losses must be covered by the insurance corporation. Eventually the insurance corporation also becomes insolvent and must seek a financial bailout from taxpayers.[4]

Dowd's concluding recommendation that the federal government eliminate deposit insurance no longer seems as radical as it might have a few years ago. It must be noted, however, that his reading of the historical record regarding bank runs and financial panics is far more optimistic than that of most other economists.[5] Historically, the public seems to have believed that runs and panics constitute a serious problem whose solution requires government intervention. This belief has provided a powerful stimulus for banking reform. Relatively few economists would feel comfortable asserting that it has been entirely misguided.[6]

Market-Based Alternatives to Deposit Insurance

J. Huston McCulloch, a professor of economics at Ohio State University, wrote the third paper. Professor McCulloch has published on the role of banks as financial intermediaries. McCulloch, like Dowd, advocates the elimination of government deposit insurance. Unlike Dowd, however, he is willing to concede that banks and thrift institutions may once have had two special problems that necessitated government intervention: mismatching of the terms of their assets and liabilities and vulnerability to liquidity crises (runs). He argues that financial markets have now developed private solutions to these problems, so government solutions are no longer needed.

Most of McCulloch's article is devoted to a discussion of the problem of liquidity crises. The solution to this problem, he asserts, is the money market mutual fund (MMMF). Because the value of an MMMF's liabilities is tied directly to the value of its assets, a change in the value of the assets does not give depositors an incentive to run. If depositors run anyway, the assets, which are very liquid, can simply be sold. McCulloch notes that MMMFs have already survived runs—large, rapid declines in the total amount invested—that would have been disastrous for banks.

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[4]Though most economists would probably agree that regulation of banks and thrift institutions (particularly the latter) has suffered from serious problems, many might disagree that government regulators are inherently incapable of monitoring and managing the problems of distressed banks. For an analysis that defends the record of bank regulators and challenges certain arguments of their critics, see Gilbert (1991 and 1992).

[5]For an analytical survey of the record of U.S. banking panics between 1857 and 1933, see Dwyer and Gilbert (1989).

[6]Free bankers, it should be noted, argue that the problems of the banking system have usually been caused by bad government regulation rather than by inadequate regulation.

Historical Background

Before the Civil War, virtually all U.S. banks were chartered and regulated by state governments. The principal liabilities of these institutions were bank notes, which provided the economy with the hand-to-hand currency now provided by Federal Reserve notes. These notes were supposed to be convertible—redeemable in gold and silver coins, at par and on demand.

The antebellum state banking systems were afflicted by several problems, including relatively high failure rates and vulnerability to financial panics (periods when banks across the United States were confronted with runs by note holders). In most cases the banks responded to panic-induced runs by suspending convertibility, an unpopular action that reduced the acceptability of their notes and caused them to trade at discounts.[1] Financial panics were usually associated with a large number of bank failures; many banks that suspended payments proved unable to resume them and ultimately closed. In addition, panics were often followed by lengthy periods of economic depression.

The sequential link between financial panics, bank failures and economic depressions convinced many people that panics and failures caused depressions and produced political pressure for banking reform. In 1863 Congress passed the National Bank Act, which was intended to replace the state banking systems with a system of federally chartered banks. Supplementary legislation imposed a prohibitive tax on state bank notes, a move that was intended to force state banks to join the national banking system or close down. The state banks survived and prospered, however, by issuing demand deposits, which were not taxed. National banks also began to issue demand deposits, and checks drawn on these deposits soon became the dominant means of payment in the U.S. economy.

The dual banking system of the post–Civil War period—federally chartered and regulated national banks that issued both notes and deposits coexisting with state-chartered and state-regulated state banks that issued only deposits—also proved to be vulnerable to financial panics. Major panics occurred in 1873, 1884, 1890, 1893 and 1907.[2] These panics

[1] A $5 note issued by a suspended bank might, for example, trade in the open market for $4.50 in specie (a 10 percent discount).

[2] See Sprague (1910). Sprague notes that the 1873 panic was not followed by many bank failures and that the panics of 1884 and 1890 were less severe than the others and did not involve suspensions.

McCulloch argues that the risk of large changes in the value of MMMF assets is too small to discourage consumers from investing and that the risk is also small enough to allow consumers to write checks drawn on their fund balances. He concedes, however, that in a completely competitive market, traditional banks offering conventional checking accounts might coexist with checkable MMMFs. These traditional banks, he argues, should not be insured by the government.

In McCulloch's view, deposit insurance was possible only in an environment of restricted competition between banks. Consumers paid a high but indirect price for these restrictions, which permitted banks to pay artificially low interest rates to depositors. The restrictions also made bank charters very valuable, a fact that prevented bank managers from taking risks that might cause their banks to fail and charters to be forfeited. The financial deregulation of the early 1980s revived interbank competition and reduced the value of bank charters. This inevitably led to increased risk taking, huge losses and insurance fund insolvency.

McCulloch concludes by noting that the most convincing theoretical case for government provision of deposit insurance is based on a formal model developed by Diamond and Dybvig (1983). In the Diamond-Dybvig model, banks provide important risk-sharing services to depositors but can do so effectively only if the government provides deposit insurance. McCulloch contends, however, that uninsured financial institutions could provide equally effective risk-sharing services.

were often followed by many bank failures and prolonged periods of economic depression; the depressions following the panics of 1873 and 1893 were particularly long and severe. After the Civil War, panics came more frequently and seemed to cause more financial disruption.[3] The panic of 1907 seems to have been the last straw prompting the federal government to reform the U.S. banking system. The following year Congress established the National Monetary Commission to study reform options. The commission's report was presented in 1912 and led directly to the Federal Reserve Act of 1913, which established the Federal Reserve System. The new system created 12 federally administered Reserve Banks that were authorized to make last-resort loans to banks facing panic-induced runs.[4]

As in the aftermath of many other major U.S. banking reforms, after the Federal Reserve System was established, many people believed that the problem of banking instability had been definitively solved. The Great Depression of 1929–33 dispelled this belief in very dramatic fashion. Although the Depression was not precipitated by a short, sharp panic of the late–nineteenth century type, it was accompanied by a succession of banking crises during which many banks failed. The existence of a lender of last resort in the form of Reserve Banks did not prevent bank runs and bank failures. The banking crises culminated in the Bank Holiday of early March 1933, when newly inaugurated President Roosevelt closed all the nation's banks for a week in an effort to calm the panic atmosphere. As noted, many U.S. banks had failed before the holiday was declared. Many more did not open afterward, and others closed within a few months of the holiday. Overall, almost a third of the nation's banks failed during the Great Depression. Congress responded to this disaster by passing the Banking Act of 1933, which established the federal deposit insurance system.[5]

[3]Part of the problem was that during suspensions bank deposits were less readily negotiable than bank notes. See Friedman and Schwartz (1963), pp. 110, 161–63.

[4]Only members of the System were eligible to receive these loans. Though national banks were required to join the System, state banks were not, and a great many state banks chose not to become members.

[5]For a brief survey of U.S. monetary history up to the Civil War, see Russell (1991). For an exhaustive historical account covering the period from the Civil War to 1960, see Friedman and Schwartz (1963).

The Case for Retaining Deposit Insurance

Phillip Dybvig, a professor of finance at Washington University in St. Louis, wrote the fourth article. Professor Dybvig is coauthor of the Diamond-Dybvig article, a seminal work on bank runs that provided theoretical support for government deposit insurance. He opens his article by observing that the optimal scope of government regulation is one of the most difficult questions confronting economists. Deposit insurance, he comments, may be an exception to the rule that government intervention rarely improves the outcomes produced by competitive markets.

Dybvig's defense of deposit insurance is based on the Diamond-Dybvig article, which he says made three basic points. The first two points are that banks perform a key role in creating liquidity and that banks' efforts to create liquidity expose them to runs. The third point is that bank runs can be prevented in any one of the following three ways: by laws permitting banks to suspend convertibility of deposits into currency, by government deposit insurance, or by a government lender of last resort. Because suspension is potentially very costly to depositors and last-resort lenders typically suffer from credibility problems, deposit insurance seems like the natural solution. In practice, Dybvig

notes, deposit insurance seemed quite successful before the 1980s.

Dybvig concedes that deposit insurance systems tend to be vulnerable to the problem of moral hazard—insured banks taking excessive risks. Managing this problem by government supervision and regulation is essential to the success of any insurance system. Dybvig's reading of the historical record suggests that it may be possible for government regulatory agencies to do this job effectively—though he admits that the jury is still out on this question.

Dybvig concludes his article by commenting on three policy issues. First, he argues that the recent reduction in the maximum coverage of deposit insurance will not encourage depositors to monitor their banks more carefully. Second he asserts that 100-percent-reserves banking (the type proposed by McCulloch) can be a viable alternative to deposit insurance only if the economy has surplus liquidity and liquidity creation by banks is no longer necessary for efficient functioning of the economy. This, Dybvig writes, seems doubtful. Finally, Dybvig notes that the government's need to control the money supply is another possible reason we might need to retain the current banking system and thus federal deposit insurance.

Resolving Moral Hazard through Risk-Based Deposit Insurance Premiums

Anjan Thakor, a professor of finance at Indiana University who has written on the fair pricing of deposit insurance, contributed the fifth article. Professor Thakor begins by identifying two basic problems confronting deposit insurance systems: private information and moral hazard. The private information problem is that a bank's managers are better informed than its regulators about the risk characteristics of the bank's loans—an informational advantage that may allow them to frustrate regulators' attempts to price deposit insurance efficiently. Insurers, Thakor writes, may attempt to respond to this problem directly by auditing the banks to try to increase their information or indirectly by trying to construct an insurance pricing scheme that is incentive compatible. An incentive-compatible scheme presents a bank with a menu of different insurance contracts that is constructed so that the bank's choice of a particular contract from the menu reveals its private information.

Chan, Greenbaum and Thakor [CGT (1992)] explore an insurance scheme that ties a bank's deposit insurance premium to the value of its equity capital. A bank with risky assets will not wish to maintain a high level of capital because the capital will be lost if the bank fails; it therefore will accept a high insurance premium. A bank with safer assets will be comfortable maintaining a higher level of capital but will desire a lower premium. CGT show that an insurance pricing system of this form can be incentive compatible. If each bank chooses the contract that maximizes its expected profits, its choice reveals the riskiness of its assets. Thakor notes, however, that such a system can work only if banks can earn economic profits from their activities—which means only if there are restrictions on interbank competition or if the government provides banks with subsidies. Economic profits, Thakor observes, can also help control the moral-hazard problem by giving banks an incentive to avoid excessive risk taking. An unfortunate implication is that the public's desire for a more competitive banking system may well be inconsistent with its desire to reform the deposit insurance system.

Thakor goes on to raise two other potential problems with deposit insurance systems: they may encourage government interference in other aspects of banking, and they may induce self-interested regulators to conceal the problems of financially distressed banks. He concludes by observing that the many problems with the current deposit insurance systems make him pessimistic about the prospects for its successful reform and goes on to present a brief discussion of more radical options for banking reform. These include a 100-percent-reserves banking system of the type discussed in the McCulloch and Dybvig articles and a system in which insured banks restricted to acquiring very safe assets would coexist with uninsured banks whose asset choices were not restricted.

The FDIC's System of Risk-Based Insurance Premiums

Mark Flood, an economist in the Research Department of the Federal Reserve Bank of St. Louis, wrote the last article. Mr. Flood has written on the history of deposit insurance and on the use of option pricing models to analyze eposit insurance. His contribution describes

and evaluates the system of risk-based insurance premiums recently adopted by the Federal Deposit Insurance Corporation (FDIC). He begins by reviewing the moral-hazard problem and noting that risk-based insurance premiums are a potential solution to the problem. He goes on to describe the risk-based premium system that has been adopted by the FDIC. Under the new system, a bank's insurance premium is jointly determined by its level of capitalization and an evaluation of its financial health provided by bank regulators. The most important element of this evaluation is the bank's CAMEL rating—a five-point summary ranking of its overall soundness.

Flood identifies two potential problems with the FDIC's proposal. First, it may be possible for people to use a bank's risk premium and other publicly available information to infer its confidential CAMEL rating. This might lead to runs on banks with low CAMEL ratings.[7] Second, banks may try to use window-dressing accounting schemes or other cosmetic devices to deceive regulators about their financial health.

The most controversial aspect of Flood's article is his suggestion that we may have misidentified the cause of many of the bank failures. The moral-hazard explanation says that bank failure rates rose because competent bank managers responded to financial incentives to take increased risks. Flood proposes an alternative explanation: incompetent bank managers were unable to evaluate the risks they were taking. Financial regulation, he speculates, protected these incompetent managers from the rigors of the competitive marketplace. When regulation was rolled back in the early 1980s, they were unable to adapt and many of their banks failed.

Flood argues that we do not yet have enough evidence to determine which of these two problems—moral hazard or inferior management—was the principal cause of the banking troubles of the last decade. He concludes by noting that if inferior management caused many of the recent bank failures, risk-based insurance premiums may not solve the problem of failures and alternative regulatory responses may be needed.

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The six articles in this collection present a wide range of views on the need for deposit insurance and the federal government's role in providing it. This diversity of opinions is an accurate reflection of the current state of the debate on these issues. Virtually every economist and policymaker agrees that the federal deposit insurance system as it existed in the 1980s required major reform. There is, however, no apparent consensus about whether the reforms that have already been implemented are adequate to solve the problems of the U.S. banking system, or if further changes are needed, what the nature of those changes should be.

— Steven Russell

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[7]Flood reports the results of his own attempt to identify banks with low CAMEL ratings, which seems to have been quite successful.

What Have We Learned about Deposit Insurance from the Historical Record?

David C. Wheelock[1]

THE INCREASE IN depository institution failures in the last dozen years and the resulting losses to the bank and thrift insurance funds have understandably generated interest in the costs and benefits of deposit insurance. Calomiris (1989a, p. 12) defines a successful deposit insurance system as "one that fully protects the payments system, without encouraging any excessive risk-taking," that is, risk taking beyond what would be optimal without insurance. The federal government's apparent willingness to guarantee deposit insurance fund liabilities reduces the probability of widespread banking panics that would threaten the payments system.[2] Providing fully credible insurance, however, may increase the likelihood of a significant deposit insurance bailout by giving depository institutions an incentive to take excessive risks. Until the 1980s, risk taking was discouraged by regulations that enhanced the charter values of depository institutions and limited competition for deposits.[3] Deregulation, however, has lowered the value of charters and provided the means for banks to increase risk.

Federal deposit insurance was enacted in 1933 as a response to the bank failures of the Great Depression. Deposit insurance was not, however, a new policy at that time. During the 19th and early 20th centuries, many states experimented with deposit insurance systems. The state systems were funded entirely by insured banks, and the states did not guarantee the liabilities of the insurance funds. Recently, researchers have been studying these systems to gain insights to the effects of deposit insurance in different regulatory environments. This article reviews the historical record and attempts to draw useful lessons for the current debate.

STATE INSURANCE SYSTEMS

Six states operated insurance systems before the Civil War. The Vermont, Michigan and Indiana systems, and the New York system before 1842, insured both bank notes and deposits. In Ohio and Iowa, and in New York after 1842, only bank notes were insured. The performance of the different systems varied considerably. The Michigan system opened on the eve of the Panic of 1837 and subsequently closed without reimbursing any depositors or note holders of failed banks. The New York and Vermont systems were more successful because their insurance funds had time to accumulate assets before significant failures occurred. As a result, note holders and depositors of insured banks that failed in these states received at least some reimbursement for lost funds. In Indiana, Ohio and Iowa, no depositor of an insured bank lost any money. The success of deposit insurance in these states has been traced to the mutual-guarantee form of their insurance systems.

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[1]Senior economist, Federal Reserve Bank of St. Louis. Kevin Dowd, Mark Flood and Steve Russell made helpful comments on a previous draft.

[2]When the FDIC was established, there was no explicit statement that the federal government would bail out the insurance fund if it became insolvent. See Flood (1992).

[3]See Keeley (1990).

In mutual-guarantee systems, insured banks that were still solvent could be assessed any amount to cover the obligations of an insured bank that had failed.

With the exception of the Michigan system, the antebellum deposit insurance systems remained open until the Civil War, though not all of them still had active members. The tax imposed on state bank notes under the National Banking Act of 1863 caused many state banks to reincorporate as national banks. National banks were permitted to issue notes valued at up to 90 percent (later 100 percent) of the face value of the U.S. government bonds they deposited with the Comptroller of the Currency. The notes in turn were guaranteed by the federal government.[4]

During the last two decades of the 19th century, the expanded use of deposits (which were not taxed) and the liberal chartering requirements that many states adopted caused a resurgence of state-chartered banking. By the mid-1880s, Congress and several state legislatures began to consider proposals for deposit insurance. None of these was accepted until 1907, when a surge of bank failures led Oklahoma to establish a deposit insurance system for its state banks. Kansas, Nebraska, South Dakota and Texas followed within two years. Mississippi enacted insurance in 1914, as did North Dakota and Washington in 1917.[5]

LESSONS FROM THE STATE SYSTEMS

The absence of significant bank and savings and loan failures between 1934, when federal deposit insurance began, and 1980 suggests that regulations limiting competition for deposits and maintaining charter values effectively discouraged excessive risk taking. The performance of the 19th and early 20th century state insurance systems also shows that the effects of deposit insurance depend largely on the regulatory environment. For example, each of the states with deposit insurance in the 19th century permitted banks to avoid the insurance system by incorporating as "free banks." In some states, such as New York, weaknesses in the insurance system caused conservative banks to exit and adopt free bank charters. Indiana, on the other hand, had a notorious free banking law that tended to attract risky banks; conservative banks chose to belong to the insurance system.[6] This may be one reason why insured banks in New York had a higher failure rate than those in Indiana.

Each of the states that had a deposit insurance system in the early 20th century prohibited branch banking but set low minimum capital requirements and permitted relatively free entry. Although the states imposed various regulations to limit risk taking by insured banks, such as minimum capital/deposit ratios and deposit interest rate ceilings, supervision tended to be cursory. In each of these states, deposit insurance is generally believed to have encouraged excessive risk taking by banks. Whether this was due to inadequate regulation and supervision or to inherent flaws in the insurance systems is not clear. It seems likely that both the insurance systems and the regulatory environment were to blame.

Alternative Funding Methods

The 19th century insurance systems of New York, Vermont and Michigan, and all eight of the early 20th century state insurance systems, required insured banks to pay into a fund for reimbursing depositors of failed banks. The insurance premiums the banks paid were unrelated to risk of failure, and upper limits were set on the assessments that could be imposed in any year. In each state but one, the liabilities of the insurance system eventually exceeded its assets and depositors of failed banks had to absorb some of the losses.[7]

The mutual-guarantee feature of the 19th century deposit insurance systems in Indiana, Ohio and Iowa ensured that there were ample funds to reimburse depositors and note holders and

[4]National banks also had to contribute 5 percent of the value of their notes to a cash redemption fund maintained by the U.S. Treasury. [See Friedman and Schwartz (1963, pp. 20–21)]. The backing provisions for national bank notes were similar to those of most antebellum state free banking laws. See Dowd (1992) for analysis of free banking in this era.

[5]White (1981) investigates the characteristics of states adopting deposit insurance and concludes that rural farming states were the most likely to adopt insurance and eschew branch banking.

[6]See Calomiris (1989a).

[7]The one exception was Texas, where insured deposits at failed banks were paid off in full. In Mississippi, the insurance fund was unable to pay off all depositors, but the state issued bonds to settle all claims eventually.

discouraged the excessive risk taking that appears to have characterized banks in the other state insurance systems. In mutual-guarantee systems, insured banks could be assessed any amount necessary to reimburse insured depositors or note holders. Insured banks consequently had a strong interest in the behavior of other members of the system—an interest that the state harnessed by giving members considerable supervisory authority over one another. The relatively small number of insured banks operating in each of these states further enhanced regulatory control.[8]

Voluntary vs. Mandatory Insurance

If insurance premiums are inadequately related to risk, then risk-prone banks tend to gain more from deposit insurance than banks that are managed conservatively. In the absence of insurance, depositors will demand risk premiums on deposit interest rates and will withdraw their funds from banks that take unacceptable risks. Deposit insurance removes the incentive for depositors to monitor bank risk and may "create a sense of false security in the public mind and a lack of discrimination between reliable and unreliable banks and bankers."[9] Because risky banks gain the most in terms of increased public acceptance and reduced deposit costs, they will be more likely than conservative banks to join voluntary insurance systems. Historically, this adverse selection problem has hampered the funding of deposit insurance systems.

Because banks in the early 19th century could incorporate as free banks, bank insurance systems of this time were in essence voluntary. As noted above, the performance of each state's insurance system depended on its funding method and on the incentives provided to both insured and free banks. Insurance worked better in states like Indiana, where conservative banks were attracted to the insurance system.

Because a ruling by the Comptroller of the Currency prevented federally chartered banks from participating in state deposit insurance systems, all of the state systems of the early 20th century were also essentially voluntary. Even where insurance was mandatory for state-chartered banks, a bank could opt out by switching to a federal charter. Doing this was costly, however, because national banks were subject to different regulations, including generally more restrictive limits on their lending than were imposed on state banks.

Deposit insurance was optional for state-chartered banks in Kansas, Texas and Washington. Though all eight of the early 20th century deposit insurance systems ultimately collapsed, their survival does not seem to have depended on whether insurance was mandatory. Freedom to exit did cause the Washington system to have the shortest life. When the state's largest insured bank failed in 1921, all other insured banks withdrew from the insurance system, thus ending bank deposit insurance in Washington.

Kansas also permitted insured banks to withdraw from its insurance system, though a withdrawing bank was held liable for funds needed to reimburse depositors of institutions that failed within six months of the bank announcing its intention to drop out. Despite a large number of failures and increasing insurance premiums, banks did not leave the Kansas system *en masse* until 1926, when the state supreme court ruled that a bank could withdraw simply by forfeiting the bonds it had deposited with the state as a guarantee of insurance premium payments. Most insured banks then decided to withdraw, and state deposit insurance in Kansas effectively ended.

Texas banks were given the option of joining the state deposit insurance system or purchasing a private bond to guarantee their deposits. Before 1920 most banks chose to join the state insurance system. Like other commodity-producing states, Texas suffered many bank failures for several years after commodity prices collapsed in mid-1920. In 1925 the state permitted banks to drop out of the insurance system. Membership then fell off dramatically, from 896 banks holding $302 million of deposits in 1924 to 34 banks with just $3 million of deposits by the end of 1926.[10]

The histories of the mandatory deposit insurance systems are not qualitatively different from the history of the Texas system. In each case,

[8]Calomiris (1989a) compares the two types of insurance systems in greater detail and notes that in many large cities bank clearinghouse members often jointly guaranteed the liabilities of each member during financial panics.

[9]See American Bankers Association (1933, p. 39).

[10]See Federal Deposit Insurance Corporation (1957, pp. 66–7).

insurance fund liabilities eventually exceeded assets and the state legislature simply repealed the insurance law instead of raising insurance premiums to cover the shortfall. Only Mississippi required taxpayers to bail out insured depositors.

CHARACTERISTICS OF INSURED INSTITUTIONS

Empirical investigation of the effects of insurance on the behavior of banks today is hampered by the fact that virtually all U.S. bank deposits are insured by the Federal Deposit Insurance Corporation. Comparing the behavior of insured and uninsured banks in the states that had optional insurance systems during the early 20th century is possible, however. In a study of Kansas banks, Wheelock (1992) found that members of the state's deposit insurance system had a greater likelihood of failure than their uninsured competitors and that insurance had its greatest effect on banks that were near failure. Like many banks and thrifts in the 1980s, Kansas banks often took extreme risks as they neared insolvency. Wheelock (1992) found that for banks within one year of failure, insurance system membership was an especially good predictor of failure. Wheelock and Kumbhakar (1991) also show that risky banks were more likely to join the Kansas insurance system and that insurance led banks to reduce their capital/assets ratios over time.

The early history of federal insurance of deposits at thrift institutions provides a similar opportunity to examine the effects of deposit insurance. Although insurance was mandatory for federally chartered thrifts, it was optional for state-chartered institutions and many chose not to become insured. In a study of Chicago and Milwaukee thrifts during the 1930s, Grossman (1992) found that when institutions first acquired insurance, they were less prone to risk than uninsured thrifts. Insured thrifts increased their exposure to risk over time, however, and after being insured for five years were more risky than uninsured thrifts. Grossman attributes the delay in the emergence of excess risk to the examinations the institutions underwent before their deposits were insured.

CONCLUSION

By the mid-1920s, many observers viewed deposit insurance as "an experiment that failed."[11] Despite regulations intended to contain risk taking, the state systems appear to have suffered from adverse selection and moral-hazard problems and in most instances did not fully reimburse depositors of failed banks. Bank failure rates were high in states with deposit insurance systems, and insured state banks had higher failure rates than uninsured state and national banks in the same states.[12]

Deposit insurance also appears to have created greater losses for failed institutions than there might have been otherwise. Without insurance, depositors have an incentive to withdraw their funds once a bank becomes insolvent. Deposit insurance removes this incentive, making it possible for insolvent banks to continue to operate unless closed by regulators. As in the 1980s, regulators during the 1920s sometimes permitted insolvent banks to remain open, hoping that they would regain solvency. Forbearance seems to have been unsuccessful, however, because the average liquidation value of insured state banks that closed was less than that of uninsured state banks that failed.[13]

Although the historical record of deposit insurance is not favorable, it seems unlikely that deposit insurance will be eliminated, or even significantly scaled back, in the near future. Two non-mutually-exclusive options for reform seem available. A mutual-guarantee system like those of 19th century Indiana, Ohio and Iowa could be adopted. Mutual guarantee seems to have discouraged excessive risk taking and ensured ample funds to protect depositors from losses. To operate effectively, however, such a system might require a considerable consolidation of the U.S. banking industry. Any privately funded insurance system, moreover, could be vulnerable if depositors lose confidence in the entire banking system. For insurance to be fully credible, the Federal Reserve must thus be willing to act as lender of last resort—a role it failed to perform during the Great Depression.

An alternative option that would combine some limits on insurance coverage with regulatory

[11]See Harger (1926).

[12]Alston, Grove and Wheelock (1992), after controlling for the extent of agricultural distress and other possible causes of bank failures, found that states with deposit insurance had systematically higher bank failure rates during the 1920s.

[13]See Calomiris (1989b).

contraints on risk taking seems more politically feasible. Recent moves to increase capital standards for insured banks and thrift institutions, and to bring about the early closure of troubled institutions, are steps in the right direction. Historical evidence, including the events of the 1980s, however, illustrates the difficulty of limiting excessive risk taking when there are thousands of institutions to supervise. If monitoring and supervision are left primarily to public officials, moreover, there is likely to be continued political pressure for forbearance.

The United States has paid a high price for forgetting the historical lessons of deposit insurance. When the federal deposit insurance system was set up in the early 1930s, its leading Congressional proponents understood many of these lessons, and implemented regulations that checked excessive risk taking.[14] The United States should not try to restore the post-Depression bank regulatory system. Repeal of New Deal restrictions on branch banking and the securities-related activities of banks would reduce risk through diversification and economies of scope. But if federal deposit insurance is to remain, policies that prevent excessive risk taking will be required.

[14]See Flood (1992). Kareken (1983) was prescient when he argued that deregulation without deposit insurance reform was like "putting the cart before the horse."

Deposit Insurance: A Skeptical View

Kevin Dowd[1]

FEDERAL DEPOSIT INSURANCE is a classic case of the wrong solution offered for the wrong problem. It seeks to protect banks against the runs to which they would be prone under *laissez-faire*, in which they would not have the protection deposit insurance gives them. I argue that this solution is based on a false premise: under *laissez-faire*, banks would *not* in fact be prone to runs and would therefore have no need for protection against them. The real problem is not how to protect banks against runs but how to maintain their financial strength. There are good reasons to believe that the market would provide banks with appropriate incentives to solve this problem without any need for government regulatory intervention. Deposit insurance is the wrong solution because it undermines market incentives and thereby weakens the banking system.

The paradox of deposit insurance is that trying to make banks more stable by protecting them against runs only weakens them and makes them more likely to fail. Deposit insurance transforms a perfectly healthy banking system into a chronic invalid that can be kept alive only by ever-increasing doses of public funds. It is the most effective means yet devised to destroy

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a nation's banking system. The U.S. experience suggests that it has done so at a staggering cost to the long-suffering federal taxpayer.[2]

The Stability of Laissez-Faire *in Banking*

Suppose we had a competitive banking system with no deposit insurance or lender of last resort.[3] Depositors in a bank would be aware that they would stand to lose their funds if their bank failed. They would therefore want reassurance that their funds were safe and would soon close their accounts if they felt any danger of losing their funds. Bank managers would be acutely aware of this possibility. They would understand that their long-term survival depended on their ability to retain the confidence of their depositors.

Bank managers might try to keep depositors' confidence in various ways. They might reassure depositors that they were not taking excessive risks with their funds by pursuing relatively conservative lending policies and exposing these policies to outside scrutiny. The underlying principle is that a bank that is "good" will want to signal its goodness to its customers and will also want to distance itself from "bad" banks the public wants to avoid. A good bank might, for example, hire an independent auditor from time to time to examine its books and issue a report on its financial soundness. The auditor's report would be credible because in the long run the auditor's ability to attract business would depend on the reliability of his reports. Similarly, a good bank would be able to encourage people of proved ability and integrity to sit on its board of directors; their presence on the board would in turn send a strong signal to the public that the bank was in safe hands. The same desire to send out credible signals would also encourage good banks to do things such as develop reliable and accurate accounting conventions to demonstrate their soundness and publish validated accounts of their financial health.

A bank's management would also reassure depositors that their funds were safe by maintaining adequate capital. One function of capital is to give bank shareholders an interest in the safe management of the bank. The shareholders of a well-capitalized bank have a lot to lose if the bank incurs losses. This potential loss gives shareholders an incentive to monitor the bank to ensure that its managers do not take excessive risks at their expense. This incentive is strong because the shareholders are residual claimants to the bank's assets and must therefore bear all the marginal losses the bank might take. The residual nature of their claim also means that the shareholders provide some protection to depositors. If the bank has sufficient equity capital, any losses it takes are borne entirely by the shareholders and the depositors lose nothing. Bank capital thus provides a buffer that absorbs losses and maintains the value of deposits. The bank will be unable to honor all its deposit liabilities only if its losses are so large that they exceed the value of its capital (that is, if its net worth becomes negative and it becomes insolvent).[4]

Under a *laissez-faire* system, a bank's capital strength—the amount of capital it maintains relative to its potential losses—is determined by market forces. The better capitalized the bank is, the more reassurance it provides depositors, and other things being equal, the more attractive it will be to them. But capital is also costly. Greater capitalization results in lower return on equity, which displeases existing investors and discourages potential new ones. There is consequently a tradeoff between reassuring depositors on one hand and discouraging shareholders on the other. The optimal capital position gives depositors the right amount of protection, given the cost of providing it.

There is also a presumption that the market will in fact produce the right amount of protection. If customers want safe banks, they will not patronize banks they consider weak, and these banks will attract no business. If a bank is too

[2]A brief discussion inevitably leaves out many important issues. To prevent any misunderstanding, I do not suggest that all was well with the pre-FDIC regime or that the abolition of deposit insurance alone would solve all U.S. banking problems. For a discussion of why these problems took so long to reveal themselves, see footnote 7.

[3]This is a hypothetical *laissez-faire* benchmark. It is therefore not to be confused with the pre-FDIC regime, though it certainly has some similarities to that regime. The pre-FDIC regime still had various legal restrictions and interventionary agencies (for example, the Federal Reserve System) that would be absent under the *laissez-faire* benchmark.

[4]I am aware of course that the monitoring of bank management must take place in a world where information is scarce and asymmetrically distributed. Such factors constitute a large part of the reason intermediaries exist in the first place. However, the existence of these imperfections does not alter the fact that bank capital still plays an important buffer role.

strongly capitalized, however, it will be able to attract capital only by passing on its higher capital costs to its customers and its services will be too expensive to be competitive. *If bank customers want safe banks, as they presumably do, a competitive market will ensure that they get them. Indeed, banks will be exactly as safe as their customers demand.*

Historical evidence supports the claim that banks have been strong and stable in the absence of deposit insurance. Recent research into historical free banking systems and the U.S. banking system before the introduction of federal deposit insurance indicates that banks typically maintained strong capital positions and were able to keep the confidence of the public despite the absence of deposit insurance or an official lender of last resort.[5] Banks that were not considered sufficiently sound would lose depositors, and competition for market share would force them to maintain the margins of safety and soundness their customers demanded.[6] The evidence from the pre-FDIC period also indicates that bank runs were not the problem that later generations perceived them to have been—that later generations exaggerated the problem—and that the runs that did occur were normally restricted to problem banks whose financial positions were perceived as weak anyway. A typical run was a flight to quality in which depositors would withdraw their funds from weak banks and redeposit them in stronger banks in which they had confidence. Runs were not contagious panics in which depositors withdrew their funds from any bank they could. In short, the evidence indicates clearly that strong banks did not need deposit insurance to protect them from runs.

The Destabilizing Effects of Deposit Insurance

Suppose that we introduce deposit insurance into our hypothetical system of *laissez-faire*. Under *laissez-faire*, banks were forced to maintain their capital strength because they needed capital to reassure depositors and discourage them from running. But once we introduce deposit insurance we take away depositors' incentive to run and relieve bank managers of the need to maintain capital to keep depositors' confidence. Deposit insurance thus reduces the marginal benefit of maintaining capital. Because deposit insurance has little effect on the cost of capital, banks with insurance therefore tend to reduce their capital/assets ratios. (In other words, given that a bank can reduce its capital/assets ratio without facing a run, its rational response is to do so to increase the return it can pay on shareholder equity.) Note also that a bank would be under pressure to reduce its capital/assets ratio even if it wanted to maintain it because other banks that took advantage of insurance protection to economize on capital would be able to outcompete it by offering higher deposit interest rates. The fight for market share would then pressure the responsible bank to follow suit, whether it wanted to or not. Deposit insurance thus makes a strong capital position a liability, putting well-capitalized banks at a competitive disadvantage. The banking system now has a weaker—possibly much weaker—capital position, which means that banks are less able to absorb losses while maintaining their net worth. Deposit insurance thus weakens the banks and makes them more liable to fail.

Deposit insurance also encourages banks to take more lending risks. If a bank adopts a riskier lending policy, it can expect to keep the higher returns it will earn in the event the risks pay off. If the risks do not pay off and the bank becomes insolvent, some of the loss is passed back to the insurance corporation. Deposit insurance thus gives banks some protection against downside risk. The amount of that protection, and hence the incentive to take excessive risks, increases as the bank's capital position worsens. In the end, a bank with zero or negative net worth might face no downside risk at all. It would have everything to gain and nothing more to lose from irresponsible, shoot-for-the-moon lending policies that are almost certain not to pay off. The losses, of course, are then passed back to the insurance corporation and to the other banks or taxpayers that are forced to pay into the insurance fund. To make matters worse, deposit insurance also removes the market mechanism—a run—that would otherwise have put a weak bank out of business and stopped its irresponsible gambling. A zombie institution can always get funds simply by raising its deposit rates and can keep gambling at other people's expense until the regulatory authorities finally get around to closing it.

[5]See, for example, the case studies in Dowd (1992).

[6]See Kaufman (1988), for example.

A point eventually comes when the insurance corporation itself has accumulated so many bad debts that it too has become a zombie with no realistic hope of ever paying its debts. The deposit insurance crisis then escalates out of control. Because the insurance corporation no longer has the resources to close its problem institutions—that is, because it no longer has the funds to pay off their depositors if it closes institutions—it simply allows these institutions to continue operating and run up debts at what is now clearly the expense of the federal taxpayer.[7] The deposit insurance corporation now plays the same game with Congress that zombie insured institutions have been playing with the corporation. It seeks federal bailouts, ostensibly to put itself back on its feet, that just throw good money after bad and only postpone the day of reckoning. The insurance corporation seeks to hide its problems by watering down accounting and capital standards so that weak institutions can meet the regulatory requirements. It therefore replaces the relatively lax Generally Accepted Accounting Principles (GAAP) with the even laxer system of Regulatory Accounting Practices (RAP), which allows expected gains from future transactions, accounting forbearances and even (incredibly) unrecognized losses to count as capital for regulatory purposes.[8] As if that is not enough, the insurance corporation then exempts many institutions that fail to meet these requirements by allowing them to continue operating anyway. It seeks to justify itself by inventing elaborate theories of regulatory forbearance that are little more than smokescreens to cover its own failure to close problem institutions. If all else fails, the insurance corporation blames its difficulties on scapegoats like fraudulent or incompetent management in its problem institutions, oil price shocks, deregulation or just plain bad luck. Congress and the Administration go along with this game for political reasons, and nothing substantial is done to stop it. In the meantime, what might have been a relatively mundane public finance disaster of perhaps a few billion dollars is transformed into a catastrophe that will cost hundreds of billions of dollars to clean up (with the cost still rising).

Policy Implications

Conventional wisdom holds that deposit insurance is sound in principle but flawed in practice. Advocates of this view maintain that correcting deficiencies in the implementation of deposit insurance will resolve the problems insurance creates. I believe that this view is profoundly mistaken. It is the very principle of deposit insurance that is flawed, and no amount of patching will put the problem right. Deposit insurance is fundamentally incompatible with a safe and sound banking system because it tempts insured banks to play Russian roulette. The U.S. Congress therefore faces a simple but unpleasant choice. On one hand, Congress can make the economically sensible but politically difficult decision to come to grips with the problem at last by introducing a program to dismantle deposit insurance and let market forces rebuild the U.S. banking system. On the other hand, it can take the easy way out, as it has done so many times in the past, by doing nothing or by making cosmetic changes that amount to nothing. How much longer will Congress fiddle while the banking system burns?

[7]An interesting and important question is why these problems took so long to reveal themselves. Part of the answer, I suspect, arises from the increasingly erratic Federal Reserve monetary policies of the 1970s and 1980s. A more important factor, however, was probably the relatively tight regulation of banks and thrift institutions that existed from the 1930s until the late 1970s and early 1980s. This regulation managed to keep the moral hazard and adverse selection problems of the system under reasonable control. The deregulation that has occurred in recent years let the genie out of the bottle, as it were, and did much to escalate losses. However, it would be wrong to place the blame for the problems on deregulation (as many people have done). As the *laissez-faire* benchmark case illustrates, there is nothing wrong with bank competition provided it takes place within the right framework. The problem with deposit insurance is that it perverts that framework and thus converts normally healthy competitive pressures into destructive forces that need to be kept under control. Hence deposit insurance creates an artificial need for regulation. The most sensible course of action, of course, is to abolish both deposit insurance and the regulation that goes with it.

[8]See Congressional Budget Office (1990, p. 54).

Banking without Tax-Backed Deposit Insurance

J. Huston McCulloch[1]

TRADITIONAL BANKS and thrift institutions are beset by two special problems that most other firms do not confront. The first special problem is the extreme mismatching of maturities by thrift institutions. Until recently, these institutions were expected and even encouraged to finance 30-year fixed-rate mortgages by accepting savings deposits with maturities of virtually zero. The second special problem is the tendency for institutions that offer checkable deposits to be subject to liquidity crises unless the deposits are backed 100 percent by reserves.

These problems motivated policymakers to introduce federal deposit insurance in the 1930s. During the past three decades, however, financial markets have developed the means of solving these two special problems without government intervention.

The solution to the first problem is the certificate of deposit (CD), which was introduced in the early 1960s. That thrift institutions can issue CDs permits them to reduce interest rate risk to any degree desired. The thrift industry disaster of 1979-82, which ultimately led to the collapse of the Federal Savings and Loan Insurance Corporation (FSLIC) in 1989, could therefore have been prevented. It would never have happened if federal deposit insurance protection had not encouraged depositors to keep their funds in thrift institutions that followed the unsound traditional practice of speculating against an increase in interest rates.[2]

The solution to the second problem was the development of money market mutual funds (MMMFs) in the early 1970s. The value of shares in these funds is predictable enough that owners can write checks against them for any amount up to the total sum deposited.[3] Yet even though MMMFs invest in financial instruments that may not come due for many weeks or months, they are entirely run-proof. Should the volume of withdrawals be high enough to cause a decline in the value of the assets as they are sold off, the fund's liability to its remaining depositors simply falls in the same proportion. At the same time, the prospective return on investments in the fund increases, so as old customers line up to withdraw, new customers will be lining up to invest.

To earn interest revenue, banks and thrift institutions back their transactions liabilities by making loans or purchasing credit instruments with positive maturities. If these transactions

[1]Professor of economics, Ohio State University.

[2]See Kane (1985 and 1989). Robert Van Order has pointed out that the borrower's prepayment option written into most fixed-rate mortgages would leave an institution funded with fixed-maturity CDs exposed to losses if the interest rate fell. Even this risk could be eliminated, however, by making CDs similarly prepayable at the thrift's option, with a penalty to discourage its actually being exercised that could be as large as the sum of the prepayment penalty written into mortgages (in the form of discount points) and the institution's capital/assets ratio.

[3]There is a small possibility that when checks for the amount invested clear, the value of the shares will have fallen slightly. Ordinarily the manager of the fund would have no reason not to commit to lend customers the small difference, at a penalty overdraft interest rate, to prevent checks from bouncing in such a case.

accounts have fixed nominal values, at least a small amount of interest risk is created. Someone must bear this risk. A common argument for government deposit insurance is that no single private issuer has the resources to insure this risk credibly for all the transactions deposits in the country. The fallacy in this argument is that *the depositors themselves* have more than adequate resources. MMMFs simply spread this risk (which is small per dollar deposited but may be large per dollar of bank capital) over all their depositors, much as a stock mutual fund spreads undiversifiable stock price risk over a large pool of investors. Spreading an observable risk in this manner is generally a much closer approximation to optimal risk sharing than concentrating it on the shoulders of an outside insurance company. It is vastly superior to concentrating any possible losses entirely on the last unlucky depositors in line, as occurs in a run on a traditional bank. Most money holders would undoubtedly prefer to bear the small interest rate risk of an MMMF than to forego a market return by holding deposits fully backed by cash reserves.

One important limitation of an MMMF is that its assets must be highly marketable securities, rather than one-of-a-kind customer or commercial loans. These illiquid assets can still be indirectly monetized by MMMFs, however, if the latter buy the marketable commercial paper of finance companies that make illiquid loans (presumably on a matched-maturity basis). Relying on MMMFs to provide checking-account services would thus require bifurcating the traditional bank into a finance company that makes commercial loans and sells its own marketable commercial paper on the open market and an MMMF that buys commercial paper and other similarly liquid short-term securities to back checkable deposits.

It turns out that MMMFs have already weathered one major run, but it was so uneventful that no one remembers it. MMMF deposits fell from $242.8 billion in November 1982 to $184.2 billion in May 1983, as the subsidy provided by federal deposit insurance lured customers to the newly created money market deposit accounts at banks and thrift institutions. Even though the MMMFs suffered a 24.1 percent loss in their deposits over just six months, the episode passed without a noteworthy incident. A similar run on banks or thrifts would have been a calamity comparable to that of the early 1930s.

Unfortunately, some money market funds have attempted to emulate traditional banks by penny-rounding, that is, by ignoring changes in the market values of their portfolios that amount to less than 0.5 percent. This is an inherently destabilizing practice because as the portfolio's true market value is eroded, informed customers will pull their funds out to attain a higher return elsewhere and to avoid the prospective downward discontinuity in the value of their accounts. This actually happened to one large fund in the early 1980s at great expense to its manager. As long as MMMFs behave like true mutual funds, this problem cannot arise.[4]

It may well be that uninsured yet well-capitalized traditional banks investing in safe, short-term loans, as advocated by Kevin Dowd in this issue, would provide adequately safe checking accounts with fewer transactions costs than the bifurcated finance company/MMMF system just outlined. Or perhaps traditional checking accounts and checkable MMMFs would coexist side by side. If these more traditional banks meet the market test, there is no reason the government should either discourage them by imposing restrictions or subsidize them by providing tax-backed deposit insurance.[5]

It is well known that federal deposit insurance creates adverse incentives for institutions to take potentially undesirable risks such as maturity transformation, undiversified lending or outright speculation. Whatever case may once have existed for the Federal Deposit Insurance Corporation (FDIC) and the FSLIC, the development of market solutions to the two prob-

[4]Some MMMFs offer investors a variable number of shares of fixed value instead of a fixed number of shares of variable value. This is merely a cosmetic difference with no substance, however. The penny-rounding problem arises when funds try to offer investors a fixed number of shares of fixed value.

[5]Keeley (1990, p. 1185) shows that the average market value of bank holding company capital relative to assets exceeded 10 percent throughout the early 1960s, when bank failures were uncommon. The pertinent figure for depositor protection is the capital of the subsidiary banking companies themselves, but we may assume that this figure was comparable. Absent government deposit insurance, we may therefore assume that depositors would seek out institutions with capital/assets ratios of 10 percent or even higher and that banks would be forced either to provide such ratios or to close. Without restrictions on competition, the market value of bank capital would correspond more closely to book value than it did during the 1960s.

lems faced by banks and thrift institutions made these two agencies obsolete long before the 1989 collapse of the FSLIC and the 1991 insolvency of the FDIC.[6]

One particularly dangerous argument that is repeatedly put forward in favor of federal deposit insurance is that the government, with its power to print paper money, is the only entity in the economy that is able to insure banks' obligations to their depositors credibly. Though it is true that there is no limit to the number of dollars the Federal Reserve System can circulate, monetary theory tells us that there *is* a limit to the purchasing power of these dollars. Monetizing the existing capital shortfalls of failing banks and thrift institutions through Fed loans to the FDIC's Bank Insurance Fund or the Savings Association Insurance Fund would simply cause a one-time increase in the price level, which is itself a form of taxation. But relying on the Fed to write a blank check for the unconstrained future excesses of insured financial institutions could easily lead to runaway hyperinflation and the complete collapse of the U.S. financial system.

Before many restrictions on competition were relaxed or eliminated during the 1970s and 1980s, federal deposit insurance appeared to be self-supporting, despite the minimal premiums that were charged.[7] In truth, deposit insurance was supported, at great expense to depositors, by the quasi-monopoly rents that were earned by banks and thrifts because of the restrictions on competition. The capitalized value of these rents conveyed substantial value to bank charters, yet the value of the charter did not show up as an asset on the balance sheet of a bank. The market value of the institution was therefore much greater than the value that appeared on the books. Before the 1970s, banks and thrifts were rarely allowed by their owners to fail because failure would mean giving up the valuable charter.[8] In the few instances when banks did actually fail, it was not uncommon for investors to offer to *pay* the FDIC to take over these insolvent institutions. Because the FDIC rarely lost money when troubled institutions failed, it had little bureaucratic incentive not to act promptly to close them. Since 1980, however, investors instead must ordinarily *be paid* out of the deposit insurance fund's limited resources to induce them to take over failed banks.

Thus before deregulation the public paid dearly for deposit safety—not directly through explicit premiums, but indirectly through forgone interest on deposits and higher interest rates on loans. Often this cost depositors hundreds of basis points of interest on insured deposits—much more than the fair value of insuring a safe traditional bank.[9] Deregulation, though beneficial, thus exposed the inherent weaknesses of the federal deposit insurance system.

Diamond and Dybvig (1983) made a challenging case that tax-backed government deposit insurance allows bank-like institutions to serve a valuable risk-sharing function. This service, the authors argued, could not be provided without insurance. Diamond and Dybvig concluded that "government deposit insurance can improve on the best allocations that private markets provide." Their highly technical paper has been widely cited as providing the ultimate case for government deposit insurance.[10]

McCulloch and Yu (1991) have demonstrated that the risk-sharing function Diamond and Dybvig have modeled could be provided as easily by self-funding and run-proof financial institutions through what we call a contingent bonus contract. These institutions would not require taxpayer-backed government deposit insurance

[6]Yu (1991, p. 78) estimates that as of 1989, the cumulative realized losses of the FSLIC plus the still unresolved market-value insolvency of FSLIC-insured institutions was between $157 billion and $184 billion.

[7]These restrictions on competition included the relaxation of restrictions on intrastate branching, the deregulation of interest rates on large CDs, competition from MMMFs, and finally the deregulation of most remaining deposit interest rates by the Depository Institutions Deregulation and Monetary Control Act of 1980. For decades, the statutory deposit insurance premium was one-twelfth percent per annum, or 8.33 basis points. Even then, much of this was rebated to insured institutions.

[8]This effect is documented by Keeley (1990). Surprisingly, he finds that most of the reduction in the apparent monopoly value of bank charters occurred during the 1970s, not after 1980.

[9]McCulloch (1985, p. 150) shows that during 1959-82 the fair value of insuring a bank with a 10 percent capital/assets ratio and two months of duration mismatching (as proxied by three-month assets and one-month liabilities) against interest rate risk was at most 3.29 basis points—even at the height of the interest rate volatility in 1980. The typical volatility estimate for such a bank is only 0.09 basis points, far less than the traditional FDIC premium of 8.33 basis points.

[10]See, for example, John, John and Senbet (1991, p. 902) and Mishkin (1992, p. 220).

to operate smoothly, contrary to the claim of Diamond and Dybvig.[11] Therefore no theoretical case for continuing to underwrite bank or thrift deposits with tax dollars remains.

Now that the last argument in favor of federal deposit insurance has been refuted, it is time for it to go the way of Regulation Q and the ban on checking account interest.

[11]For details, see McCulloch and Yu (1991). See also Wallace (1988), who places a different interpretation than we do on Diamond and Dybvig's ambiguously termed *sequential service constraint,* and Jacklin (1992), who suggests an alternative, more complex mechanism for achieving the same goal as our arrangement. We also provide a mechanism to block the disintermediation that would potentially occur under either the Diamond and Dybvig deposit insurance plan or our contingent bonus contract. We do not advocate that banks actually attempt to implement our *contingent bonus contract,* but merely devise it to demonstrate that government deposit insurance is unnecessary, even in the special world Diamond and Dybvig have modeled.

Remarks on Banking and Deposit Insurance

Philip H. Dybvig[1]

IT IS DIFFICULT to determine the optimal scope of government in a capitalist economy. Most economists might agree that government should provide national defense, internal police and a judicial system to enforce contracts and handle tort claims. Beyond this short list (or even before it ends), political views rather than economic analysis tend to take over. Conservative economists are convinced that the market can accomplish more efficiently almost anything the government might attempt and argue that theoretical possibilities for government intervention that might improve things almost never survive the political process and bureaucratic bungling.[2] Liberal economists are skeptical about the ability of real-world competition to create good incentives and argue that government intervention can improve on the unbridled marketplace in many ways.

If we can avoid falling into one of these two camps as a knee-jerk reaction, optimal bank regulation becomes an interesting borderline case. To what extent are banking functions part of the essential infrastructure of the economy that must be regulated or assisted by govern-

[1]Boatmen's Bancshares Professor of Banking and Finance, Washington University in St. Louis. I am grateful to Doug Diamond for discussions and collaboration on these issues. Most of the arguments made here appeared in some form in Diamond and Dybvig (1983 and 1986). Chris Lamoureux provided useful suggestions. The author takes responsibility for any errors.

[2]Some conservative economists argue that private institutions will arise to meet any function the government fails to provide, unless the government prevents them from doing so. Others argue that the existing level of government intervention must be efficient, or we would have changed it already.

ment? To what extent is banking just another industry—one that should be governed by the same rules as other industries? More specifically, is government-provided deposit insurance beneficial, unnecessary but harmless, or actually harmful?

I have a general belief in the conservative view, and my initial assumption with respect to most issues is that the political process and the incentives in government agencies are much worse than those in the private economy. Nonetheless, there are interesting reasons to suspect that banks with government insurance might improve on purely competitive markets. The basic arguments in support of this position have been made by Bryant (1980) and Diamond and Dybvig (1983).[3] Although this view challenges our intuition that private markets have great flexibility to resolve information problems, and although Diamond and Dybvig (1983) do not prove that it would be impossible to find a private solution to the problems they describe, no subsequent research has come close to identifying a credible private alternative to bank contracts with deposit insurance. There are, however, interesting practical reasons why deposit insurance may not be worthwhile. In addition, ongoing innovation by financial market practitioners is starting to make traditional banking functions appear less important. But before turning to these issues, let us review the basic arguments on behalf of government deposit insurance.

Diamond and Dybvig (1983) made three basic points. First, banks perform a role in creating liquidity. Specifically, banks provide depositors with insurance against the possibility of changes in the timing of their spending needs. In the Diamond-Dybvig model these timing changes are caused by changes in depositors' degree of patience regarding spending. After a bank opens, its depositors learn whether they are impatient or patient spenders, although they cannot demonstrate this directly to the market. The impatient spenders must withdraw their money immediately to make an important purchase. The patient spenders are indifferent about the timing of their withdrawals. In a world of people who face these sorts of liquidity shocks, a simple banking contract can improve welfare over a simple competitive economy in which individuals hold capital (or claims to capital) themselves.

Second, a simple banking contract that improves risk sharing also makes banks susceptible to runs. One efficient outcome of the depositors' optimal withdrawal game is that each depositor withdraws early only if he becomes impatient—that is, only if he discovers he needs funds for a special purchase. Even if the bank's assets are not risky, however, there is another equilibrium outcome—a bank run—in which every depositor withdraws early, knowing that if he waits to withdraw later, the bank's assets will have been depleted.[4] The existence of the alternative bank run equilibrium means that banks are fragile and vulnerable to changes in expectations that can be based on any common information (in the spirit of models of sunspots). This situation is consistent with traditional accounts of banking panics driven by mass hysteria.

Third, there are at least three ways to prevent bank runs:

- modify the deposit contract to permit banks to suspend convertibility of deposits into currency
- provide deposit insurance
- provide a lender of last resort

Suspending convertibility prevents runs by ensuring that enough capital will be preserved to pay off depositors who choose to withdraw late. Deposit insurance ensures that both early- and late-withdrawing depositors will be paid off even if the bank's assets have been depleted. A lender of last resort allows the bank to pay off early depositors without having to liquidate the bank's assets. In all three cases, the essential effect is to give patient depositors the incentive to defer withdrawal, regardless of what they believe the withdrawal strategies of other depositors will be. In a simple version of the model, in which the number of people needing to withdraw early is known in advance, all three of these strategies leave the good equilibrium with staggered withdrawals unaffected, but eliminate the bad equilibrium with a bank run.

Suspension of convertibility is probably very costly to depositors because in practice we do not know the exact number of impatient depositors, and as a result some people may be harmed greatly by being denied access to their deposits.

[3]These arguments have been extended by Diamond and Dybvig (1986) and Dybvig (1992).

[4]These are the only pure (deterministic) strategy equilibria. There are also mixed (probabilistic) strategy equilibria, but these do not seem to be of much independent interest.

For example, a person who had planned to make a down payment on a house using $150,000 in a bank account could lose the house or even be sued for breach of contract if the bank suspends convertibility and does not give him the required funds.

A lender of last resort may have a problem with credibility. As long as the institution that provides last-resort loans has some discretion, depositors who are concerned that it may not come through with an emergency loan may run on the bank. For example, the fact that a bank has access to the Federal Reserve System's discount window may not stop a run if depositors believe that the Fed may refuse to advance funds when fraud or other problems are suspected. A credible last-resort lender with an explicit, general commitment to lend does not seem much different from a deposit insurer. Given this observation and the practical problems with suspension of convertibility, it seems sensible to focus our attention on deposit insurance.

Deposit insurance is an attractive solution in principle and seemed to be successful throughout all but the very recent banking history of the United States. In fact, deposit insurance helped make bank runs and bank failures so rare for many years that when Doug Diamond and I presented early versions of our work, we were "accused" of doing economic history. The bulk of deposit insurance probably must be provided by the government because of the immense size of the collateral that would be needed to make a private insurer credible. (Nothing precludes a fringe of private deposit insurance, however.)[5]

Deposit insurance systems face a crucial problem of moral hazard—they give insured banks incentives to invest in high-risk assets like risky loans or junk bonds. If these assets do well, the bank profits; if they do badly, however, the insurance fund takes the hit. This situation is not included in the Diamond-Dybvig model because our purpose was to show that runs can occur even when bank assets are riskless. Nevertheless, it is an important practical problem.

Resolution of the moral-hazard problem is essential for the success of deposit insurance. Monitoring, capital requirements and rights to close insured banks in weak financial positions are natural ways of reducing the moral-hazard problem and are similar to the bond covenants required by private lenders. Government deposit insurers use these and other strategies to control the moral-hazard problem. Our recent experience is relevant in evaluating the success of these strategies, although opinions on how to interpret the evidence will differ. One interpretation is that the savings and loan fiasco confirms that government regulators are hopelessly incompetent at managing anything as complex as regulating financial institutions—confirming the conservative view. Others may point to the savings and loan situation as a classic example of a conflict between regulators and the regulated that could be resolved if Congress would only oversee regulation properly. The success of commercial bank regulation seems to support the latter view, although cynics would say that the bank insurers have been lucky because the risks that would sink banks have not been realized. I still believe that bank regulation can be competent, especially with nonnegligible capital requirements. However, this seems much less obvious to me than it did 10 years ago!

Before closing, I would like to turn to some policy issues. The first is the recent reduction of the maximum coverage of Federal Deposit Insurance Corporation insurance from $200,000 to $100,000 in the interest of improving incentives for monitoring. Changing contracts to a form that improves monitoring incentives has great visceral appeal, to economists.[6] This particular change is not sensible, however. Returning to our example of the person with $150,000 intended for a house down payment, the absence of insurance may create a painful economic loss for the person if his bank fails, but this rather remote prospect is unlikely to induce him to make arrangements to take a detailed look at the bank's loan portfolio. In the case of a larger depositor with, say, $5 million on deposit, the increase in the uninsured amount from $4.8 million to $4.9 million is also going to have a negligible effect on monitoring. Therefore the net effect of the regulatory change is a very slight savings to the insurance fund, an enormous increase in economic distress for a few unlucky individuals and a negligible change in monitoring. The change was obviously bad policy. It is worth noting that even large changes in

[5]Private deposit insurance systems may only move the question of ability to pay back one level, as several states with such systems have discovered.

[6]It has been advocated by Calomiris and Kahn (1991), for example.

the coverage of large deposits do not necessarily generate *beneficial* monitoring. In the case of Continental Illinois, for example, having large uninsured deposits did not make it difficult for the bank to raise large amounts of money despite a very risky loan portfolio. Instead, large uninsured depositors used their monitoring efforts to time their withdrawals before the bank was taken over by regulators. This type of monitoring makes regulators worse off. Not only does it have no effect on incentives at the time of loan origination, but it also creates a cash-flow crisis for regulators. The crisis limits their options and forces them to move more quickly than they would like when closing a bank.

Another issue I would like to touch on is 100-percent-reserve banking. Supporters of 100-percent-reserve banking argue that if we separate the lending and depository functions into separate institutions, with the depository institutions holding full liquid reserves, no runs could occur. This idea assumes that liquidity creation by banks is redundant. I think casual evidence suggests that there is already a liquidity premium; if banks no longer created liquidity, this premium could only increase. Although the U.S. economy has enough liquid assets such as Treasury bills to stand behind all the bank deposits, the people who now own those assets are presumably holding them for liquidity. Securitization of bank assets may tend to make liquidity creation by banks less important. Securitization has been important for mortgages (albeit with deposit insurance–like government guarantees), but I have the impression that it has initially been less successful for other types of bank loans and illiquid assets that embody more severe moral-hazard problems and are harder to standardize.

If deposit insurance were priced fairly, it would be possible to conduct an interesting market test of conventional vs. 100-percent-reserve banking. A 100-percent-reserve bank would have to pay a deposit interest rate premium reflecting only the possibility of fraud. If our economy has surplus liquidity, these banks would drive insured banks with risky loan portfolios out of the market. Of course, fairly priced deposit insurance is not realistically available, but some sort of market test would still be interesting. In the absence of a market test, 100-percent-reserve banking would represent a big gamble that the economy can prosper without liquidity creation by the banks. Prospering without liquidity-creating banks is inconsistent with the popular notion (which may or may not be correct) that new capital requirements and higher lending standards have hurt the economy recently.

A final policy note concerns whether the current banking system is needed for the setting of the money supply. If it is, then this could be another reason why we might want to maintain government deposit insurance. In any case, whatever happens in the banking industry will continue to have an important effect on the macroeconomy both directly and through the monetary system—just as the contraction of the banking industry over the last several years must have had a big macroeconomic effect, though one that we cannot measure easily.

To summarize, government deposit insurance is an interesting and economically important issue near the boundary of the optimal scope of government. Our experience in the next few years should help us decide whether financial innovations will render the current system of liquidity-creating banks with governmental deposit insurance obsolete.

Deposit Insurance Policy

Anjan Thakor[1]

THIS ESSAY EXPLORES a few basic questions in deposit insurance policy. I approach this issue from two different directions. First, I assume that deposit insurance is essential and examine how an insurance system with some desirable attributes can be implemented. After this, I explore alternatives to the existing deposit insurance system and ask whether deposit insurance is really desirable in light of the implementation difficulties identified in the first half of the paper.

IMPLEMENTING A DESIRABLE DEPOSIT INSURANCE SCHEME: PRIVATE INFORMATION AND MORAL HAZARD

The recent, well-publicized distress among depository institutions has revitalized debate about deposit insurance reform. Much of the discussion has centered on how deposit insurance should be priced to cope with two major problems: private information and moral hazard. The private information problem arises because insured institutions are typically better informed than the deposit insurer about the risks on their asset portfolios and may attempt to exploit this informational advantage to obtain more favorable insurance pricing.[2] It is natural to expect that banks which have originated and underwritten loans, and are responsible for their ongoing monitoring, know considerably more than bank examiners about the risk characteristics of these loans. The moral-hazard problem stems from the possibility that insured institutions may have a tendency to skew their asset choices in favor of more risk to increase the value of deposit insurance and increase the insurer's liability. Reform packages with a variety of institutional designs have been proposed with the aim of reducing the severity of these two problems.

Private Information and Deposit Insurance Pricing

An insurer that recognizes the incentives for insured institutions to exploit private information about their assets may adopt one or both of the following regulatory approaches: (1) direct auditing of insured institutions' assets and (2) designing a risk-sensitive insurance pricing scheme that is incentive compatible. Direct auditing is an attempt to bridge the informational gap between the insurer and the insured by on-site examination of banks' assets. This sort of scheme for eliciting information suffers from two notable drawbacks. First, it can be quite costly to administer. Second, window-dressing by insured institutions may make it ineffective. The history of regulatory supervision and auditing in the United States is blemished with repeated failures: insured institutions seem to have consistently managed to subvert the process by withholding key pieces of financial information. The costs of implementing a direct auditing scheme, moreover, can be expected to rise steeply with the desired effectiveness of the auditing. Chan, Greenbaum and Thakor [CGT (1992)] argue that if the banking industry is perfectly competitive, these costs are unsustainable without subsidies

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[2]Private information problems can be quite severe. For example, in the case of the recent merger between the Citizens and Southern (C&S) and Sovran banks, it was revealed that one of the institutions involved in the merger was unaware of loan problems at the other institution.

from the government because without subsidies, regulatory auditing costs must be paid out of the economic profits generated by the banking industry and under perfect competition these surplus profits are zero.

The other alternative for resolving the private information problem is more sophisticated. It recognizes that it may be more cost-effective to adopt deposit insurance pricing schemes that are *incentive compatible*. These schemes try to make the incentives of privately informed banks regarding disclosure of their information compatible with the regulator's desire that the banks reveal this information truthfully. In other words, can we design a risk-sensitive deposit insurance pricing scheme that will lead a bank to reveal its private information, tacitly but truthfully, by its choice of a contract from a menu of contracts? CGT show that under certain conditions the answer is yes.

CGT propose tying banks' deposit insurance premiums to their capital requirements. To see how this can elicit truthful revelation by banks, we can construct a stylized example. Suppose that banks invest in projects that have only two possible outcomes: success and a relatively high return, or failure with no return whatsoever. Suppose further that there are two types of banks that invest in assets with different payoff distributions but appear identical to outside observers. Type-A banks invest in low-risk projects, and type-B banks invest in high-risk projects. The probability that a type-A bank's project will succeed, which we will denote p_A, is higher than p_B, the corresponding probability that a type-B bank's project will succeed, but the return on a successful type-B project is larger than the return on a successful type-A project. Assuming that banks would prefer to finance their investments with deposits instead of equity capital, CGT propose that regulators offer banks a choice between two distinct deposit insurance contracts: one with a low insurance premium (per dollar of deposits) and a high capital requirement and one with a high insurance premium and a low capital requirement. This sort of scheme can be incentive compatible—that is, type-A banks voluntarily choose the low premium–high capital requirement combination, and type-B banks voluntarily choose the opposite combination. Because this sort of self-selection is predictable, the regulator can infer each bank's private information (its type of assets) from the nature of the contract it chooses.

The logic behind this result goes roughly as follows. Each type of bank wants a low insurance premium. To obtain a lower premium, however, a bank must maintain more equity capital. Because a bank that becomes insolvent loses its capital, high capital requirements are more onerous to banks whose assets are relatively risky—that is, type-B banks. Thus the low premium-high capital requirement combination is more attractive to type-A banks than to type-B banks, and vice versa. Each type of bank selects the combination it prefers, and its choice tacitly reveals its private information. Because the deposit insurer/regulator knows the combination each type of bank will select, it can set the premiums so that deposit insurance is *fairly priced*, that is, so that each bank is charged a premium that covers the average loss a bank of its type will impose on the insurance fund.

A key observation made by CGT is that the preceding scheme for eliciting information will work only if banks earn rents (economic profits) from issuing deposits. These rents cause banks to prefer deposit finance to equity finance—a preference that is crucial to the success of this scheme for revealing information. Where do these rents come from? CGT present a variety of arguments that suggest that such rents can exist only if barriers to entry into banking sustain oligopolistic levels of profits for banks. Thus incentive-compatible, risk-sensitive deposit insurance pricing seems unattainable in a completely deregulated, perfectly competitive banking system unless the government is willing to provide subsidies to banks.

Moral Hazard and Deposit Insurance Pricing

Ever since Merton's (1977) recognition that deposit insurance is equivalent to a common put stock option, it has been repeatedly emphasized that deposit insurance creates potentially powerful incentives for banks to pursue excessive risk.[3] This incentive to exploit the insurer is referred to as *moral hazard*. CGT show, however, that moral hazard can be eliminated if the value of a bank's charter—the present value of its expected future profits—is sufficiently high.

[3]By increased risk, I mean not only increased credit risk, but also possibly greater liquidity and interest rate risks.

In this case a bank may not wish to exploit the deposit insurer by maximizing risk; doing so would also maximize the probability that the bank would become insolvent, and insolvency would lead to closure and loss of the valuable charter.[4] Banks with valuable charters would then face high bankruptcy costs associated with risk-taking, and these costs would counteract their tendency to take measures that would increase the market value of their deposit insurance put option. CGT observe that if banks have sufficiently valuable charters, regulators can optimally control moral hazard by adjusting the probability that a bank in financial distress will be closed.

Under what circumstances can banks be expected to have valuable charters? Once again, if entry barriers are high enough to make banking a profitable business, we can expect bank charters to be valuable enough to ameliorate moral hazard. CGT therefore conclude that, absent government subsidies, neither the private-information nor the moral-hazard problems associated with deposit insurance can be resolved effectively in a perfectly competitive banking system. With the ever-heightening focus on increasing competition in banking, the prospect of overcoming these two problems in implementing an effective deposit insurance scheme seems remote.

OTHER IMPLEMENTATION PROBLEMS

Thus far I have discussed pricing and monitoring (auditing) problems associated with deposit insurance. The problems don't end there, however. Even when it is fairly priced, deposit insurance may create a surplus for the banking system because it provides superior risk sharing or eliminates the possibility of bank runs.[5] The government's recognition of this surplus can lead it to demand that banks behave in ways consistent with the attainment of its social and economic goals. Some suggest that this situation may explain the proliferation of consumer protection and welfare legislation such as the Community Reinvestment Act, the Bank Secrecy Act, and the Real Estate Procedures Settlement Act.[6] Thus deposit insurance has the potential to expand the *scope* of regulation to cover a wide range of activities that have little to do with the safety-net aspects of deposit insurance *per se*. Moreover, safety-net concerns—attempts to limit moral hazard–related distortions—can induce regulators to restrict banking activities. This can interfere with the exploitation of natural economies of scale and scope, as Glass-Steagall restrictions have allegedly done in the United States.

In addition to these difficulties, deposit insurance may encourage distortionary bank closure and liquidation practices conducted by self-interested regulators who wish to enhance their own reputations.[7] Under deposit insurance, regulators have the task both of monitoring banks' asset choices and of determining when distressed banks should be closed. When a bank is revealed to be in financial distress, the bank's regulators come under suspicion for laxity or inefficiency in monitoring its asset choices—a suspicion that damages their reputation as capable monitors. This gives regulators an incentive to suppress the information that a bank is in trouble. Supressing this information often results in delayed closing of a bank that, from a social-efficiency standpoint, should have been shut down sooner. Because the bank whose closing is delayed is likely to have low or even negative net worth, these delays can be very damaging: low-net-worth banks have a well-known propensity to pursue excessive risk.

ALTERNATIVES TO THE PRESENT SYSTEM

It appears that deposit insurance leads to a variety of problems that do not have easy solutions. Many alternatives to insurance have been proposed. Two of the most prominent are the elimination of deposit insurance and the creation of two distinct classes of banks. I will discuss each of these alternatives briefly.

The contemporary rationale for deposit insurance is that it eliminates bank runs. This rationale is based on the Diamond-Dybvig model of banking and liquidity.[8] However, bank runs can occur in the Diamond-Dybvig framework because a sequential service constraint (SSC) is as-

[4]Keeley (1990) provides empirical support for the hypothesis that a higher charter value induces a bank to take lower risk.

[5]See Chan, Greenbaum and Thakor (1992), who suggest that the government may be able to provide risk sharing that the private sector cannot. See also Diamond and Dybvig (1983).

[6]See Greenbaum and Thakor (forthcoming).

[7]See Boot and Thakor (forthcoming) and Kane (1990).

[8]See Diamond and Dybvig (1983).

sociated with demand deposit contracts. This has led some analysts to suggest that it may be efficient to replace demand deposits with equity claims against diversified portfolios of low-risk assets.[9] Because these claims would not be bound by the SSC, they would be immune to runs, and the need for deposit insurance would be eliminated. Clearly, it would not be difficult to endow such claims with all the transactions attributes of a standard demand deposit contract. I believe this is a simple and compelling solution that should be considered seriously.

One possible criticism of this alternative is that equity claims carry with them the risk of market price changes, whereas insured demand deposit contracts are safe claims to fixed nominal (money) amounts. There may be some investors who would like to have access to risk-free nominal claims. A simple way to meet this need would be to create two types of banks. One type would be a narrow bank funded with federally-insured deposits and permitted to invest these deposits only in a very limited set of assets, such as Treasury bills and bankers' acceptances. The other type of bank would be a universal bank funded by uninsured liabilities but virtually unrestricted in its permissible investments. A universal bank could provide insurance and engage in securities underwriting and investment banking. This system would accommodate bankers' desire to be allowed to expand the scope of their activities but would also avoid the pitfalls of expanding the deposit insurance safety net.

CONCLUSION

In this essay, I have briefly examined some key issues related to deposit insurance. I am pessimistic about the possibility of tinkering with the existing deposit insurance system to improve it. Real progress is likely only if fundamental reforms are undertaken, perhaps along the lines of those suggested in the last section.

[9]See, for example, Gorton and Penacchi (1991).

Deposit Insurance: Problems and Solutions

Mark D. Flood[1]

TITLE III of the Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA) requires the Federal Deposit Insurance Corporation (FDIC) to design a new system of insurance assessments involving insurance premiums that are positively related to risk. In this essay I briefly describe the current plan for a risk-based premium structure and consider some

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potential operational problems with it. I also reflect on the role of risk-based premiums in the context of the broader themes of the current debate over bank regulatory policy.

The new premium structure, in which a bank's premium is based on various capital ratios and its supervisory rating (the operational definition of risk), has at least two potentially significant operational problems. First, analysts may be able to infer a bank's confidential CAMEL rating from information about the premiums; disclosure of bad CAMEL ratings could provoke depositor runs.[2] Second, the new system may provide incentives for weak banks to improve their official status by engaging in accounting gimmickry, rather than by improving soundness in reality.

A more fundamental issue concerns the cause of bank failures. Risk-based premiums are a response to the so-called moral-hazard problem of flat-rate deposit insurance. Though risk-based insurance premiums address the moral-hazard problem, they will solve the underlying problem, which is bank failures, only if moral hazard has been the principal cause of failures. I suggest that a different problem—inferior management—may have been responsible for many bank failures and that current evidence may not be sufficient to determine which of these two problems was primarily responsible for the high rate of bank failures during the 1980s.

The Problem: Moral Hazard

In its simplest guise, the moral-hazard argument states that if no one charges a bank a higher price for accepting more risk, optimizing bankers will exploit the risk-return trade-off by assuming as much risk as possible. Under flat-rate deposit insurance, no one charges a risk premium. Depositors do not require a risk premium on deposit interest rates because their funds are not at risk and the insurer by definition does not assess one. Therefore bankers should maximize the risk of their institutions to achieve the highest possible risk-adjusted expected return.

To be precise about moral hazard, we must define *risk*. A standard definition is the variance of the expected future returns on the bank's asset portfolio. Using this definition, it can be shown rigorously that bankers have an incentive to maximize bank risk. There are, however, widely recognized mitigating factors that serve as a counterweight to this incentive. First, there is value attached to property rights in the bank's charter (chartering restrictions and other barriers to entry can reduce competition, giving valuable market power to holders of the charter). This charter value is lost to shareholders in the event of bank failure. Thus shareholders may act to protect the charter, even if it means lower expected profits in the short run. Second, bank managers have professional reputations, which are damaged by bank failure. Bankers may act to protect their reputations, even if it means lower expected profits for shareholders. Third, banks are supervised and regulated. Regulators can legally force bank owners and managers to act more prudently.

The moral-hazard argument is a potential explanation for the high rates of bank failure in the 1980s. If bankers exploit moral-hazard incentives by maximizing the risk of their asset portfolios, they will produce relatively high average rates of bank failure.[3] An auxiliary argument is needed to explain why, despite the fixed-rate premium structure, the failure rate for insured banks was low before 1980. It is often suggested that deregulation early in the decade removed a significant portion of the prudential government supervision and regulation that had artificially contained bankers' risk taking. Another explanation is that constraints on competition kept bank charter values high.

The Solution: Risk-Based Premiums

The role of the moral-hazard argument in the formulation of risk-based premiums is evident both in the FDIC's early recommendations and in the Treasury's recommendations, which laid the groundwork for FDICIA.[4] A system of risk-based deposit insurance premiums confronts the moral-hazard problem directly by ensuring that someone charges a risk premium. Because the insurer now assesses a risk premium, we can no longer conclude that bankers, acting on their private incentives, will maximize the riskiness of

[2]CAMEL is an acronym for capital, asset quality, management, earnings and liquidity. Banks are rated by supervisors on a scale from one (best) to five (worst) for each of these five categories. A single aggregate CAMEL rating (also scaled from one to five) is calculated from the five category ratings.

[3]See, for example, FDIC (1983), pp. II-2 and II-3, and Flannery (1982).

[4]See FDIC (1983), section II, and U.S. Treasury (1991), section VIII, especially pp. VIII-2 and VIII-3.

their assets. Instead, bankers considering a riskier asset portfolio must balance the increased costs of insuring deposits against the increased benefits of risk to their limited-liability stockholders.

Under FDICIA, a system of risk-based premiums must be proposed by December 31, 1992, promulgated by July 1, 1993, and instituted by January 1, 1994. The FDIC has proposed a two-phase plan for risk-based premiums. There is a transitional plan, which began January 1, 1993, and a permanent plan, to begin January 1, 1994. The transitional plan is based on a set of nine risk categories—the product of three capital classes, labelled 1, 2 and 3, and three supervisory classes, labelled A, B and C. The capital classes are based on data from the Reports of Condition and Income (Call Report) and are the same as those established for prompt corrective action (required under Section 131 of FDICIA). The supervisory classes are based on the supervisory reports of each institution's primary federal regulator but may be augmented by other sources, including debt ratings, off-site monitoring and state supervisory reports. The salient factor for determining an institution's supervisory class is its CAMEL rating. Premiums under the transitional plan are set as follows:[5]

Premiums under the Transitional Plan (cents per $100 of deposits)

	A Healthy	B Supervisory Concern	C Substantial Supervisory Concern
1 Well Capitalized	23	26	29
2 Adequately Capitalized	26	29	30
3 Less than Adequately Capitalized	29	30	31

Ultimately, premiums must be set at levels that will achieve an adequate insurance fund—defined under FDICIA as 1.25 percent of insured deposits—within 15 years. The permanent plan, which has not yet been finalized, will most likely mimic the transitional plan outlined here. Some potential differences from the transitional plan are larger differences in premiums between safe and risky institutions, a progressive upward ratcheting of premiums for institutions that remain in a high-risk category for extended periods, and a larger premium matrix, incorporating finer gradations of capitalization and supervisory concern. Whether the plan will be effective in altering risk-taking behavior of banks and thrifts remains to be seen. The FDIC (1992b, p. 45282; 1992c, p. 21619), for example, acknowledges that the magnitude of the risk differential in the premiums under these proposals is probably too small to be actuarially fair (that is, too small to ensure that the aggregate assessments collected from each risk class match the prospective losses for that class). Actuarial fairness should be of secondary importance at this point, however, because premiums can be adjusted quite simply within the proposed structure in light of actuarial experience.

Problems with the Solution

Experience may also require more substantial modifications to the structure of the plan, however. For example, given risk-adjusted premiums, it may be possible to use public information on capital ratios and insurance expenses to infer an institution's confidential CAMEL rating, if only approximately. This information might conceivably provoke runs on weak but solvent institutions, forcing their closure. The costs of closure, which are often substantial, are borne mostly by the FDIC.

As a quick check on the relevance of this problem, I attempted to infer CAMEL ratings solely from public information. At the moment, public information on risk-based assessments is quite limited because the temporary plan has just gone into effect. Nevertheless, using the definitions of the three capital categories given above, accounting information in the quarterly bank Call Reports of June 30, 1992, and table 3 of the FDIC's (1992a) announcement in the Federal Register, I constructed a list of 15 large banks predicted to have CAMEL ratings of either 4 or 5. More specifically, the FDIC (1992a, table 3, p. 62507) reported that there were 15 banks in the Bank Insurance Fund, each with $1 billion or more in assets and with aggregate assets

[5]See FDIC (1992a), table 1, p. 62506. There is a separate, 10th category for bridge banks under the transitional plan (the premium is 26 basis points per dollar of deposits). Under the transitional scheme, supervisory class C essentially means a CAMEL rating of either 4 or 5, although the FDIC may, at its discretion, use additional information to define the supervisory class of a given bank.

totalling $51.5 billion as of June 30, 1992, that would have been in premium class 3-C under the transitional scheme. After making a handful of educated guesses about how this sample was constructed, I attempted to identify the 15 banks using Call Report data to calculate asset sizes and capital ratios.

The results of this casual experiment are suggestive. Twelve of the 15 banks I identified did indeed have CAMEL ratings of 4 or 5 (there were six of each). One bank was rated CAMEL 3, and the other two were rated CAMEL 2; none of the fifteen banks was rated CAMEL 1. It appears that the premium structure might convey some information about confidential CAMEL ratings. Although the FDIC (1992b, p. 45283) has voiced concern about revealing supervisory classifications directly, it will be difficult to control fully information about assessments paid. For example, the ability to identify CAMEL ratings should improve markedly if and when the risk-based assessments appear as expenses on Call Reports and SEC 10-K filings. Some have argued that at least for a large bank, whose failure poses the most significant systemic threat, an efficient market has already discounted this information, so a disclosure of CAMEL ratings would not present a problem. Conclusive evidence does not yet exist to support this argument. In any case, it probably does not extend to small, closely held institutions.

A potentially more serious problem is that a risky institution (as defined by its premium category under the plan) might find it more cost effective to improve its official status by engaging in Call Report window dressing or other cosmetic gimmicks, rather than by making real improvements in safety and soundness. This misinformation option would raise the institution's costs and erode the reliability of supervision without affecting the FDIC's exposure to loss. Although there is evidence that some banks already indulge in window dressing to prevent supervisory attention, the question of the marginal impact of risk-based premiums in this area remains open.

Problems with the Problem

A question with much broader implications is whether we have correctly defined the problem that caused the high rates of bank failures in the 1980s. The moral-hazard hypothesis offered previously states that bankers maximize the riskiness of their bank's assets because flat-rate deposit insurance and limited-liability equity combine to distribute big profits to bank stockholders and big losses to the FDIC and because riskier assets acquired at appropriately risk-adjusted prices have higher expected returns than less risky assets. Calculating bankers therefore select those assets whose expected returns are highest, benefitting from both the higher risk and the larger average return.

An important presumption of this particular diagnosis of the problem is that bankers can accurately calculate the expected risks and returns for available assets, allowing them to reckon appropriate risk-adjusted prices for their assets and to select the optimal (that is, the riskiest) portfolio. A related assumption is that all bank managers behave identically. That is, by positing only one theory of bankers' behavior, the moral-hazard hypothesis, we implicitly presume that all bank managers behave according to this hypothesis, responding to the incentives of flat-rate deposit insurance. No allowance is made for the possibility that individual bank managers may face significant, idiosyncratic, private incentives or that managers may differ in their job aptitudes.

To illustrate the significance of this issue, let me focus on a specific alternative hypothesis about the cause of bank failures: inferior management. Suppose that the talent pool of potential bankers is diverse. Rather than being equally skilled in the profession, bankers cover a range from strategic and financial geniuses to those who are plainly incompetent. For simplicity, imagine that there are only two types of bankers, competent and incompetent. Incompetents are defined as those who cannot accurately assess the expected return or risk of bank assets. In general, we should expect them to select an inefficient portfolio for the bank. By inefficient, I mean that the bank is not appropriately compensated for the portfolio risk it bears.[6] Such managers may plausibly also be worse at such things as asset-liability management, controlling operating expenses, and preventing fraud and self-dealing.

[6]In theoretical terms, *inefficient* means that the portfolio does not lie on the mean-variance efficient frontier. Fraudulent management, which can produce spectacular losses for the FDIC, also represents an instance where bankers fail to maximize the value of the firm to shareholders.

With deposit insurance artificially reducing the bank's cost of funds and with barriers to market entry (for example, restrictive chartering and branching policies) protecting banks from competition, a poorly managed bank may be able to survive indefinitely. This alternative explanation is broadly consistent with the recent U. S. experience with bank failures. Under this scenario, the banking deregulation of the early 1980s provoked more failures less by freeing bankers to act on the incentive to maximize asset risk (moral hazard) than by subjecting previously insulated and relatively poorly managed banks to harsher competitive forces. There is some evidence to support this alternative explanation. The Office of the Comptroller of the Currency (OCC, 1988), for example, states that "poor management and other internal problems are the common denominator of failed and problem banks." It also cites "policies, planning and management" as a significant factor in 90 percent of bank failures.[7] An earlier study [FDIC (1976), p. 3] cited some factors common to all closed banks: "weak, disinterested, uninformed or fraudulent management; a lack of or insufficient internal routines, controls and operating systems; and in many cases 'poor housekeeping.'"

It is worth noting that bad management is a common concern in other areas of corporate finance. For example, there is an extensive academic literature on corporate mergers that deals explicitly with the possibility of poor management, and replacing bad managers is commonly offered as a justification for hostile takeovers. Moreover, the distinction between good and bad bank managers played a central role in an earlier debate over federal deposit insurance. For example, American Bankers Association President Rome Stephenson (1931, p. 592) offered the following explanation for the high rates of bank failure in the 1920s:

> a large element in the internal conditions of the banks that failed was bad management and ... a predominant element in the internal conditions of the bank that remained sound in the face of the same external conditions was good management.

Deposit insurance was frequently opposed at the time on the grounds that it took from well-managed banks to subsidize the poorly managed ones.[8]

One reason the inferior-management story has not received much emphasis may be that, unlike moral hazard, it implies a market failure. If inferior management is a problem, shareholders have an incentive to replace the bank's management. Under the moral-hazard hypothesis, bankers are acting in shareholders' interest by maximizing the portfolio risk of the institution. Employing inferior managers, by contrast, only benefits the managers. Shareholders may be unable or unwilling to monitor management closely enough, however, to prevent the hiring of inferior managers. First, shareholder monitoring in any industry is always imperfect and costly, and banking is no exception. The quality of lending decisions can be especially difficult for outside monitors to evaluate before it is too late. Second, shareholders may be no more qualified than their managers to make the necessary judgements. Indeed, in some smaller institutions owners may manage the bank themselves.

If inferior management is a serious problem, the question naturally arises whether risk-based premiums can solve the problem of bank failures. The logic behind risk-based premiums is that a bank manager will take into account the incentives inherent in the assessment scheme when he selects the risk (and therefore also the return) of the optimal portfolio. But an incompetent banker is unable to effect such a response; he cannot evaluate asset risks and returns. To the extent that failures are caused by incompetence, prudential supervision and the licensing of managers are likely to be more effective tools in reducing failure rates.

It should be stressed that the moral-hazard hypothesis and the inferior-management hypothesis are not mutually exclusive. There are many banks, and there have been many bank failures. Some of these failures may be best explained by moral hazard, whereas others might be best explained by bad management. Some failed banks

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[7]See OCC (1988), pp. 1 and 21. This was the second most commonly cited factor affecting failure, after asset quality, which was a significant problem in 98 percent of failed banks. The next most commonly cited factors are "insider abuse" and "economic environment", each cited in 35 percent of cases.

There is also some evidence of an easing of the conditions for getting a bank charter in the 1980s. New charters rose sharply early in the 1980s, peaking at 489 in 1984. Overall, there were 25 percent more charters issued in the 1980s than there had been in the previous decade. In addition to increasing competition, laxer chartering standards may have made it easier for inferior managers to enter the industry.

[8]See Flood (1992).

might display elements of both problems, and others might display elements of neither. Ultimately, the relative importance of moral hazard and inferior management as explanations for past bank failures is an empirical question that lies beyond the scope of this note, as is the question of whether the pressures of more vigorous competition are likely to weed out incompetent managers before their banks fail. The answers to these questions have implications for the efficacy of risk-based premiums, among other things. They deserve additional research.

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Implications of Annual Examinations for the Bank Insurance Fund

THE FEDERAL DEPOSIT Insurance Improvement Act of 1991 (FDICIA) requires many changes in bank supervision and regulation, including a requirement that the federal supervisory agencies conduct on-site examinations of all insured depository institutions at least once every 12 months.[1] Examinations of small (assets less than $100 million), well-capitalized banks are required only every 18 months. This legislation reduces the discretion that federal bank supervisors once had in scheduling bank examinations.[2]

Annual examinations are designed to reduce federal deposit insurance fund losses. More frequent examinations may reveal depository institution problems that can be corrected before they become more serious. In addition, more frequent examinations may permit supervisors to close seriously troubled institutions before their managers make new business decisions that increase the exposure of federal deposit insurance funds to losses. For example, institutions whose troubles have not been detected by their supervisors could increase exposure of the deposit insurance funds to losses by paying dividends or by increasing their assets in desperate gambles to regain solvency through favorable outcomes on new, risky investments.

This paper investigates whether there is a relationship between the frequency of bank examinations and losses to the Bank Insurance Fund (BIF).[3] Logically, such an association should be based on several links between the information gained during individual examinations, actions taken by supervisors on the basis of the information, and BIF losses associated with the failures of individual banks. First, supervisors must be able to identify the serious troubles of failing banks before they fail. Second, examinations of failing banks must help su-

[1]Examination by state authorities may satisfy this requirement every other 12-month period, at the discretion of the federal agencies. The Conference of State Bank Supervisors recently agreed to general principles for the sharing of examination duties with the Federal Deposit Insurance Corporation (FDIC) and the Federal Reserve, the federal agencies that examine state-chartered banks.

[2]For information on the practices of the federal bank supervisors in scheduling examinations, see Flannery and Guttentag (1980).

[3]The FDIC insures the deposits of banks and savings and loans associations but maintains BIF as a separate fund for banks. Banks pay insurance premiums into BIF, which then covers any losses when a bank fails. The importance of examinations in helping supervisors identify problems that can be corrected without failure is beyond the scope of this paper because it deals only with banks that failed.

pervisors identify problems that had not been revealed in prior reports. Third, supervisors must be effective in changing the behavior of banks whose problems they identify through examinations. This paper investigates whether banks reduce their asset growth and dividends after supervisors classify them as problem banks.[4] If so, BIF losses as a percentage of total assets at failed banks that were examined frequently should be less than BIF losses as a percentage of total assets at failed banks that were examined infrequently. The paper presents evidence on these issues.

Because this paper uses observations for banks that failed before passage of FDICIA, it is limited to investigating the importance of examinations in helping supervisors limit BIF losses in the past. As such, extrapolations of the results into the future must be made with caution. Examinations may be more important for limiting BIF losses under FDICIA than in the past, for the following reasons: First, examination improvement programs required by FDICIA may make supervisors more effective in detecting problems in the future through examinations. Second, because FDICIA *requires* supervisors to take prompt corrective action if the capital ratios of banks fall to relatively low levels, supervisors may now be more effective in limiting the risk assumed by problem banks.[5]

THE ROLE OF EXAMINATIONS IN BANK SUPERVISION

Bank supervision involves the oversight of banking organizations by government agencies to ensure that their activities conform to regulations and that they operate in a safe and sound manner. The major purpose of bank supervision is to prevent losses from bank failures. BIF is likely to incur losses in a bank failure, and uninsured depositors will have losses unless a failed bank is merged with a surviving bank. In addition, failure of a bank may deprive its community of banking services. To minimize these losses, supervisors attempt to identify banks with moderate problems in time to indicate changes they consider necessary to prevent greater problems. In addition, supervisors attempt to identify insolvent banks so that they can be closed in a timely manner to prevent additional losses to uninsured depositors and to BIF.[6]

Federal banking supervisors have two main sources of information on the condition of banks: reports and examinations. Supervisors require insured banks to file the quarterly Reports of Condition and Income (Call Report), which includes a balance sheet (report of condition) and an income statement (report of income). The Call Report forms are changed when banking supervisors determine that additional information would help them monitor the condition of banks or fulfill their other supervisory obligations.

The major limitation of the Call Report for monitoring the condition of banks is that some of the most important information can be verified only through on-site examinations by supervisory officials. For example, information on the quality of loans is very important because loan losses are a major cause of bank failures. Although banks are required to disclose some information on the quality of their loans in the Call Report—those that are 30 days or more past due and nonaccrual loans—supervisors reading these reports at a distance cannot vouch for their accuracy.[7] Moreover, because there are no markets for most of the assets in loan portfolios, supervisors must verify the information provided on loan quality and the adequacy of allowances for loan losses to cover expected

[4]The paper focuses on the dividends and asset growth of problem banks because under FDICIA, undercapitalized banks must constrain their asset growth and dividends and disclose their plans to supervisors for raising their capital ratios. One way to raise a bank's capital ratio is to reduce its assets. By enacting FDICIA, Congress indicated its view that such constraints on undercapitalized banks are important for limiting the exposure of BIF to losses.

[5]For a description of the scheme for prompt corrective action mandated in FDICIA and analysis of its likely effects on the risk assumed by troubled banks, see Gilbert (1991, 1992).

[6]See chapter 10 in Benston et al. (1986) for additional discussion of supervision and examination.

[7]The term *nonaccrual* refers to the treatment of interest due from borrowers in bank income statements. If a borrower is past due on loan payments, the bank continues to accrue the interest due on the loan as income until the bank classifies the loan as nonaccrual.

Table 1

Condition of Banks with Different Composite CAMEL Ratings and Supervisory Response

Composite CAMEL rating	Description and Supervisory Response
1	Strong performance with no significant areas of weakness.
2	Fundamentally sound but may have some areas of weakness; these weaknesses, however, would be considered correctable in the normal course of business.
3	Weaknesses of more significant nature that might leave the bank vulnerable to external shocks. Banks with a rating of 3 are considered to require some corrective action and somewhat closer regulatory supervision than institutions that are rated higher.
4	Weaknesses in the bank's condition that, if left unaddressed, could deteriorate to the point of threatening the bank's viability. Banks with a rating of 4 are closely monitored by their regulatory agency and are expected to take action to remedy their shortcomings.
5	Banks that require urgent aid to avert failure. Such banks receive close supervision and financial surveillance.

Source: Hirschhorn (1987), p. 7.

future losses by examining the information on individual loans.[8]

A major focus of on-site bank examinations is the quality of a bank's loan portfolio. On-site visits also permit examiners to review management procedures and make their evaluation of the competence of bank management. Supervisors consider management evaluation an important part of each examination because deficient management practices are often a major cause of bank failures.[9] After an examination, supervisors rate the quality of each of five aspects of bank operation from 1 to 5: capital, asset quality, management, earnings and liquidity (CAMEL), with 1 being the best and 5 the worst. Supervisors also assign a composite CAMEL rating from 1 to 5 to the bank, reflecting their weighting of the ratings assigned to each of the five aspects of bank operation. Table 1 presents an interpretation of composite CAMEL ratings.

Examination findings may be the basis for supervisory action. Examiners report their findings to a bank's senior officers and board of directors, but examination reports are not made available to the public. If banking supervisors indicate that loan quality is significantly worse than was indicated in past Call Reports, a bank will likely file a revised report or adjust subsequent reports to reflect examiners' evaluations. Alternately, examination reports may focus on deficiencies in management practices. If an examination reveals unsatisfactory conditions, supervisors have a variety of powers, such as legally enforceable orders to cease specific

[8]The *allowance for loan and lease losses* entry in the Call Report represents an accumulation of past earnings set aside to absorb anticipated future losses on loans that become uncollectable. When a bank cannot collect from a borrower, accounting principles call for management to declare the loan a loss and charge it against the allowance for loan losses. Increases in the allowance for loan losses come out of current earnings. The relevant item in the report of income is the *provision for loan losses*, which is included among bank expenses. If a bank makes a large provision for loan losses in a given period, current earnings may be negative, thus reducing equity. See Walter (1991) for a thorough discussion of the allowance for loan losses.

[9]See Graham and Horner (1988).

Table 2
Characteristics of Failed Banks in the Study

	Number of banks	Percentage
Year of failure		
1985	100	12.3
1986	121	14.8
1987	165	20.2
1988	143	17.6
1989	146	17.9
1990	140	17.2
Total	815	100.0
Asset size on failure date (millions of dollars)		
Assets <25	479	58.8
$25 \leq$ Assets < 50	200	24.5
$50 \leq$ Assets < 100	89	10.9
$100 \leq$ Assets	47	5.8
		100.0
Region		
New England (NE)	5	0.6
Middle Atlantic (MA)	9	1.1
South Atlantic (SA)	17	2.1
East South Central (ESC)	17	2.1
West South Central (WSC)	464	56.9
East North Central (ENC)	16	2.0
West North Central (WNC)	169	20.7
Pacific Northwest (PNW)	27	3.3
Pacific Southwest (PSW)	91	11.2
		100.0
Federal supervisor		
OCC	307	37.7
Federal Reserve	49	6.0
FDIC	459	56.3
		100.0

continued

practices or to remove officers from bank operations, to force bankers to change their practices. In each case, supervisors try to prevent the failure of a bank or, if the bank ultimately fails, to limit the size of the loss to BIF and uninsured depositors.

BANKS IN THE STUDY

This study investigates the effectiveness of supervisory examinations in identifying the problems of 815 banks that failed between 1985 and 1990 and the effectiveness of supervisors in constraining the subsequent asset growth and dividend payments of these problem banks. Some of the banks that failed in those years are excluded from the study because of missing data and problems in relating BIF losses to their characteristics before failure.[10]

Table 2 indicates that most of the banks in the study were relatively small: 59 percent had total assets less than $25 million when they failed, and about 94 percent had total assets less than $100 million. Of the failed banks in bank holding companies, only two were in organizations with total banking assets over $1 billion,

[10]A few of the banks that failed in the years 1985–90 are excluded because of missing data on the Call Report. Sixteen banks are excluded because they were involved in mergers within two years of their failure dates; mergers distort observations of asset growth. This study excludes data for 88 bank subsidiaries of six bank holding companies in Texas because the BIF losses attributed to some of these banks reflected problems at their affiliates. Of the remaining banks, 39 are excluded because they were in operation less than three years when they failed, thus limiting the periods for measuring the frequency of examinations.

Table 2

Characteristics of Failed Banks in the Study (continued)

	Number of banks	Percentage
Method of resolving failure		
Purchase and assumption	646	79.3
Transfer of insured deposits	108	13.2
Liquidation	61	7.5
		100.0
Frequency of examinations		
Examined within the last 12 months	508	62.3
Examined within the last 18 months	715	87.7
Longest period between examinations		
Less than or equal to two years	518	63.5
More than two years but less than two and one-half years	131	16.1
More than or equal to two and one-half years but less than three years	56	6.9
Three years or longer	110	13.5
		100.0

NOTE: States in census regions:
New England: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont
Middle Atlantic: New Jersey, New York and Pennsylvania
South Atlantic: Delaware, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia and West Virginia
East South Central: Alabama, Kentucky, Mississippi and Tennessee
West South Central: Arkansas, Louisiana, Oklahoma and Texas
East North Central: Illinois, Indiana, Michigan, Ohio and Wisconsin
West North Central: Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota and South Dakota
Pacific Northwest: Alaska, Idaho, Montana, Oregon, Washingon and Wyoming
Pacific Southwest: Arizona, California, Colorado, Hawaii, Nevada, New Mexico and Utah

and none was in an organization with total assets over $10 billion.

The failed banks were heavily concentrated in certain regions, with about 57 percent in Arkansas, Louisiana, Oklahoma and Texas. Of the 815 failures, 646 (nearly 80 percent) were resolved through purchase and assumption transactions, in which other banks purchased some of the assets of the failed banks and assumed their liabilities. The FDIC resolved another 13 percent of the cases through transfer of the insured deposits of failed banks to other banks. In these cases, the FDIC liquidated the failed banks' assets and made partial payments to uninsured depositors, based on the proceeds of liquidated assets and premiums paid by the banks that assumed the insured deposits. Failed banks were liquidated in the remaining 61 cases.

Table 2 reports that about 62 percent of the banks in this study were examined at least once in their last 12 months of operation. Thus a substantial minority of the failed banks were not examined in their last year of operation. About 88 percent of the banks in this study were examined at least once in their last 18 months of operation. Examinations of state-chartered banks include those by state banking authorities, the Federal Reserve and the FDIC.

Supervisors downgraded the CAMEL ratings of some banks to 5 between their last examinations and failure dates. These changes in CAMEL ratings are called interim changes. A supervisor changes a bank's CAMEL rating on an interim basis without an examination on the basis of information that indicates a substantial change in the condition of the bank. Because this paper

focuses on the value of supervisory examinations, interim changes in CAMEL ratings are excluded from the analysis except where noted.

Table 2 also presents the distribution of the longest periods between examinations for all failed banks, using data on examinations back to the late 1970s. Although the longest period between examinations was two years or less at about 64 percent of the banks, 110 banks (about 14 percent) went three years or longer without examinations.

IMPORTANCE OF EXAMINATIONS FOR EFFECTIVE SUPERVISION

If frequent examinations are important for limiting losses to BIF, examinations must provide supervisors with important information about the problems of banks that is not available from other sources. In addition, after identifying problem banks through examinations, supervisors must be effective in preventing actions that would increase BIF losses. This section investigates how effective bank supervisors are in identifying troubled banks through examinations and in constraining the behavior of problem banks. The next section examines the direct relationship between BIF losses and the frequency of examinations.

Effectiveness in Identifying Troubled Banks

Did supervisors identify the serious problems of failed banks through examinations? If examiners have little ability to distinguish between healthy and troubled banks, more frequent examinations are not likely to make supervisors more effective in limiting BIF losses.

Banks with CAMEL ratings of 4 or 5 are called problem banks, indicating a relatively high probability that they will fail in the near future (table 1). Of the 815 banks in this study, 75 (about 9 percent) had CAMEL ratings of 1, 2 or 3 on their last examinations.[11] Thus the information that triggered the closure of these 75 banks did not come from examinations. Although examinations indicated serious problems in more than 90 percent of the banks that eventually failed, there is room for improvement in the detection of problems through examinations.[12] More frequent examinations will probably increase the proportion of failed banks identified as problem banks on their last examinations, even without improvements in the quality of examinations. Only 10 of the 75 banks (13.3 percent) rated CAMEL 1, 2 or 3 on their last examinations were examined within one year of closing, whereas 67.3 percent of the banks rated CAMEL 4 or 5 on their last examinations were examined within one year of closing.[13]

Importance of Examinations in Detecting Problems

That supervisors rated most failed banks as problem banks in examinations before failure does not necessarily indicate that examinations were important in detecting the problems of these banks. For example, problems cited in examination reports may have been revealed in Call Reports before the on-site examinations. This section investigates whether examinations helped supervisors identify problems that had not been revealed in Call Reports.

Table 3 includes data for 473 banks that had their CAMEL ratings downgraded to 4 or 5 and remained in operation at least one year after the rating changes. *Changes* in equity/total assets ratios of these banks—a measure of solvency from the Call Report—were negative on average and significantly different from zero in each of the three quarters just before the examinations that resulted in ratings reductions (critical examinations). Before these examinations, therefore, changes in the equity/total assets ratios of these banks indicated the deterioration of their

[11]Of these 75 banks, 31 were rated CAMEL 1 or 2 on their last examinations. French (1991) concludes that a CAMEL rating of 3 shortly before failure, instead of a 4 or 5, indicates that the examination process did not detect the severity of the problems. See French for another investigation of the effectiveness of examiners in detecting problems of banks before their failure. Also see Benston (1973) and Bovenzi, Marino and McFadden (1983) for analysis of CAMEL ratings before bank failure.

[12]An analysis by Bowsher (1990), p. 16, of the General Accounting Office, found a similar percentage of banks identified as problem banks before their failure. Bowsher presents the following analysis: "Because a bank's financial condition does not deteriorate overnight, the regulatory supervision process should detect an emerging problem bank before its imminent failure. Of the 406 banks that failed in the last two years, however, we found that 22 failed without ever appearing on the problem bank list and that nine failed after appearing on the list for only one quarter."

[13]The difference in these proportions (0.673 vs. 0.133) is statistically significant at the 5 percent level (t-statistic = 12.61).

Table 3

Changes in Bank Balance Sheets around the Time of Examinations in which CAMEL Ratings Were Downgraded to 4 or 5

Period	Changes in equity/total assets ratio			Changes in ratio of nonperforming loans to total assets		
	Mean	Standard deviation	t-statistic	Mean	Standard deviation	t-statistic
Three quarters before examination	−0.00428	0.01583	5.89*	0.00423	0.01567	5.88*
Two quarters before examination	−0.00419	0.01663	5.48*	0.00468	0.01656	6.15*
One quarter before examination	−0.00728	0.01624	9.75*	0.00673	0.01921	7.62*
Quarter of examination	−0.01308	0.01867	15.24*	0.00416	0.02044	4.43*
One quarter after examination	−0.00444	0.01334	7.24*	0.00931	0.02339	8.66*
Two quarters after examination	−0.00466	0.01315	7.71*	0.00885	0.02522	7.63*
Three quarters after examination	−0.00858	0.01694	11.02*	0.00562	0.02423	5.04*
Changes in Assets and Dividends						
Change in growth rate of total assets[1]				20.49%		11.04*
Change in dividend ratio[2]				0.00292		8.57*

[1]Percentage change in total assets in the four quarters ending in the quarter of the examination minus the percentage change in total assets in the following four quarters.

[2]For each of the 233 banks that paid dividends in at least one of the four quarters just before the examinations, the sum of dividends paid in those quarters, minus the sum of dividends in the following four quarters, divided by total assets in the quarter of the examination.

*Mean significantly different from zero at the 5 percent level.

NOTE: The sample includes 473 banks that failed in the years 1985-90. These banks had examinations during the three years ending in their failure in which their CAMEL ratings were downgraded to 4 or 5 (from 1, 2 or 3). Balance sheet data are available for each of these banks for four quarters before the quarter of the examinations in which their CAMEL ratings were downgraded to 4 or 5 and for four quarters following those examinations.

conditions. The mean decline of 1.31 percentage points in equity/total assets ratios in the quarters of the critical examinations, however, is significantly different from the means of the percentage changes in quarters before or after the critical examinations. The relatively large declines in equity/total assets ratios in critical examination quarters indicate that the banks in this study made relatively large provisions in those quarters to cover current or anticipated loan losses.[14] The observations in table 3 are consistent with the view that examiners identified problems that had not been reflected in these banks' balance sheets before the critical examinations.

A rise in nonperforming loans (NPLs) in Call Reports at the time of critical examinations is

[14]The relatively large declines in equity/total assets ratios in the quarters before the examinations also may reflect the timing of the examinations. If examiners finish their work early in a quarter, the bank may not have filed its Call Report for the prior quarter. In some cases supervisors require banks to refile their most recent Call Reports after examinations. The declines in equity/total assets ratios in the quarters before the examinations may reflect problem loans or loan losses identified by the examiners.

When supervisors first give a bank a CAMEL rating of 4 or 5, they often examine the bank again within a few quarters. The relatively large average decline in equity/total assets ratios three quarters after the banks were first rated CAMEL 4 or 5 may reflect the effects of these follow-up examinations. Of the 473 banks included in the calculations of table 3, 97 were examined three quarters after the examinations that resulted in ratings reductions to CAMEL 4 or 5.

another indicator that examinations help supervisors discover problems not disclosed in prior Call Reports. In table 3 the means of the changes in the NPL/total assets ratios were positive and significantly different from zero in the quarters just before the examinations. The mean change in NPL/total assets ratios, however, was larger in each of the first two quarters after the critical examinations than in the quarters before the examinations.[15] The relatively small increases in NPL/total asset ratios in the critical examination quarters reflect some NPLs charged off as losses in those quarters.[16] These comparisons are consistent with greater accuracy in the reporting of nonperforming loans after banks are examined and their CAMEL ratings are downgraded to 4 or 5.[17]

Finally, the timing of reductions in ratios of equity to total assets to relatively low levels indicates the importance of examinations for accurate data on bank capital ratios. Most banks in this study reported balance sheets with relatively low capital ratios only after examinations in which their CAMEL ratings were downgraded to 4 or 5. Based on data for the three years before failure dates, only 76 of the 815 failed banks (9.3 percent) had their ratios of equity to total assets fall below 5 percent more than one quarter before these critical examinations. In contrast, 133 of the 815 banks had their equity/total assets ratios fall below 5 percent in the quarters of the critical examinations, and an additional 62 banks had their equity/total assets ratios fall below 5 percent in the quarters before these examinations, for a total of 195 banks (23.9 percent). In some cases the effects of examinations on equity/total assets ratios are recorded just before the quarters in which the banks were examined.[18] The timing of declines in equity/total assets ratios to relatively low levels is consistent with the view that examinations revealed information about problems that banks had not disclosed in their Call Reports.

Effectiveness in Constraining the Behavior of Problem Banks

Examinations are important for limiting BIF losses if they disclose the problems of banks with relatively high chances of failure and if bank supervisors are effective in constraining behaviors at problem banks that would tend to increase the exposure of BIF to losses. This section investigates whether banks tend to reduce their asset growth and dividends after critical examinations.

Why look at asset growth and dividends? This paper does not attempt to prove that constraints on asset growth and dividend payments at problem banks limit BIF losses. Instead, these constraints are taken from FDICIA, which requires supervisors to constrain the asset growth and dividends of undercapitalized banks. This section examines whether supervisors were effective before passage of FDICIA in imposing on problem banks the types of constraints that they are required to impose on undercapitalized banks under FDICIA.

Changes in asset growth and dividends after examinations. Table 3 indicates that banks tend to reduce the growth rates of their assets and reduce dividends after supervisors downgrade their CAMEL ratings to 4 or 5. The mean of the growth rate of total assets of the banks discussed in table 3 in the year ending in the quarter of the critical examination minus the growth rate of total assets in the following year is about 20 percentage points, which is significantly different from zero.

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[15]Bowsher (1990), pp. 15–16, reports that the staff of the General Accounting Office found evidence of this association between the timing of examinations and disclosure of NPLs. "Although we did not review the overall quality of Call Reports, we found examples in reviewing certain problem banks that suggest Call Report accuracy often depends on whether there has been a recent examination by the bank regulators. Generally, we found that the regulators reported that these institutions had understated the level of nonperforming loans in their Call Report submissions and thus had established inadequate levels of loss reserves and had overstated interest income and net income."

[16]Banks that had their CAMEL ratings downgraded from 1 or 2 to 3 had significant declines in equity/total assets ratios and significant increases in NPL/total assets ratios in quarters just before critical examinations but not in critical examination quarters. These observations are consistent with the view that downgrades of CAMEL ratings to 3 indicate that examiners recognized the deterioration in the condition of the banks after problems had already been revealed in Call Reports, not that examiners discovered previously unreported problems through examinations.

[17]Critics of bank examinations maintain that supervisors could monitor the condition of banks more efficiently by monitoring reports and examining banks less frequently. See Benston (1973), pp. 64–69, and Benston et al (1986), pp. 245–71. Results in table 3 indicate that examinations are important for ensuring the accuracy of data on bank balance sheets and income statements. With less frequent examinations, Call Reports would provide less accurate information on the condition of banks. It is not appropriate therefore to use past banking data to draw conclusions about how efficiently supervisors could use reports to monitor the condition of banks if supervisors examined banks less frequently.

[18]See footnote 14.

Effects of changes in CAMEL ratings on dividends are investigated for 233 banks (of the 473) that paid dividends in at least one of the four quarters before their critical examinations. The mean of the differences in the dividend ratios before and after critical examinations is positive and significantly different from zero. The mean change in the dividend ratio implies that a bank with total assets of $50 million as of the examination date would reduce its dividends by $146,000 in the four quarters after the critical examination, relative to dividends paid in the previous four quarters.[19]

How large are dividend payments by problem banks? Another way to look at the effectiveness of supervisors in constraining dividend payments by undercapitalized or problem banks is to estimate how much their dividend payments added to BIF losses when they failed. Because dividend payments reduce the capital cushion available to absorb losses, each dollar of dividends paid by an undercapitalized or problem bank may be assumed to increase BIF losses by a dollar when the bank fails.[20] BIF losses caused by dividend payments by undercapitalized and problem banks are estimated for the 815 banks in this study. Using data for the last three years of each bank's operations, dividend payments made by banks in quarters in which their equity/total assets ratios were below 4 percent or their CAMEL ratings were 4 or 5 are summed over all 815 banks. The 4 percent cutoff for the equity/total assets ratio is based on the provision in FDICIA that forbids dividend payments that would make a bank undercapitalized. The supervisory definition of undercapitalized includes a ratio of tier 1 capital (essentially the same as equity) to total assets below 4 percent. The sum of dividends paid by the 815 banks while undercapitalized or rated CAMEL 4 or 5 is 0.8 percent of BIF losses incurred in resolving the failures of the 815 banks. Thus although supervisors have allowed some banks to pay dividends while their capital ratios were low or they were classified as problem banks, eliminating dividend payments in such circumstances would have produced a relatively small reduction in BIF losses.

More on the effects of CAMEL ratings on asset growth. One limitation of the analysis in table 3 of how changes in CAMEL ratings affect asset growth is that the failed banks as a group tend to reduce the growth rates of their assets as they approach failure, as shown in panel A of figure 1. The change in asset growth reported in table 3 therefore represents a mixture of effects: banks getting closer to failure and banks subject to changes in the degree of pressure from their supervisors to raise capital ratios.

Panel B of figure 1 separates these effects on asset growth by comparing the mean growth rates of assets at banks with different CAMEL ratings from 10 quarters up to one quarter before their failures. For each lag, the mean growth rate of assets is significantly lower for banks rated CAMEL 4 or 5 than for those rated CAMEL 1 or 2. Figure 1 therefore indicates that after adjusting for the time to failure, growth rates of assets are lower for the banks rated CAMEL 4 and 5.[21] These results are consistent with the view that supervisors were effective in constraining the asset growth of banks they identified as problem banks.

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[19]See Spong (1990), pp. 64–71, for a description of the policies of federal bank supervisors regarding dividend payments by banks before FDICIA. Banks that had their CAMEL ratings downgraded to 3 did not have significant declines in the growth rates of total assets in the four quarters following their examinations. Those that paid dividends in the four quarters before the examinations, however, had significant reductions in dividends in the four quarters following the downgrades in their CAMEL ratings to 3.

[20]In some cases undercapitalized or problem banks received capital injections from shareholders around the time they paid dividends. The dividend payments may have been important for maintaining the confidence of shareholders in the viability of these banks. In these cases the assumption of a one-to-one relationship between dividends and BIF losses may overstate the effects of dividends.

[21]Numbers above and below the bars in panel B of figure 1 are the numbers of banks used in calculating the mean growth rates of total assets. Panel B in figure 1 reflects interim changes in CAMEL ratings, as well as CAMEL ratings established through examinations. Banks are excluded from the calculations of mean growth rates of assets in those quarters in which their CAMEL ratings were changed. Suppose, for instance, a bank had its CAMEL rating downgraded from 3 to 5 four quarters before its failure. The growth rate of that bank would not be included among the growth rates of CAMEL 4 and 5 banks four quarters before their failures, but the growth rate of that bank would be included among the CAMEL 4 and 5 banks three, two and one quarters before failure. This exclusion eliminates any initial effect of a change of CAMEL rating on asset growth, indicating instead the continuing effects of differences in CAMEL ratings on asset growth after the initial changes.

Figure 1a

Average Growth Rates of Total Assets (All 815 Banks)

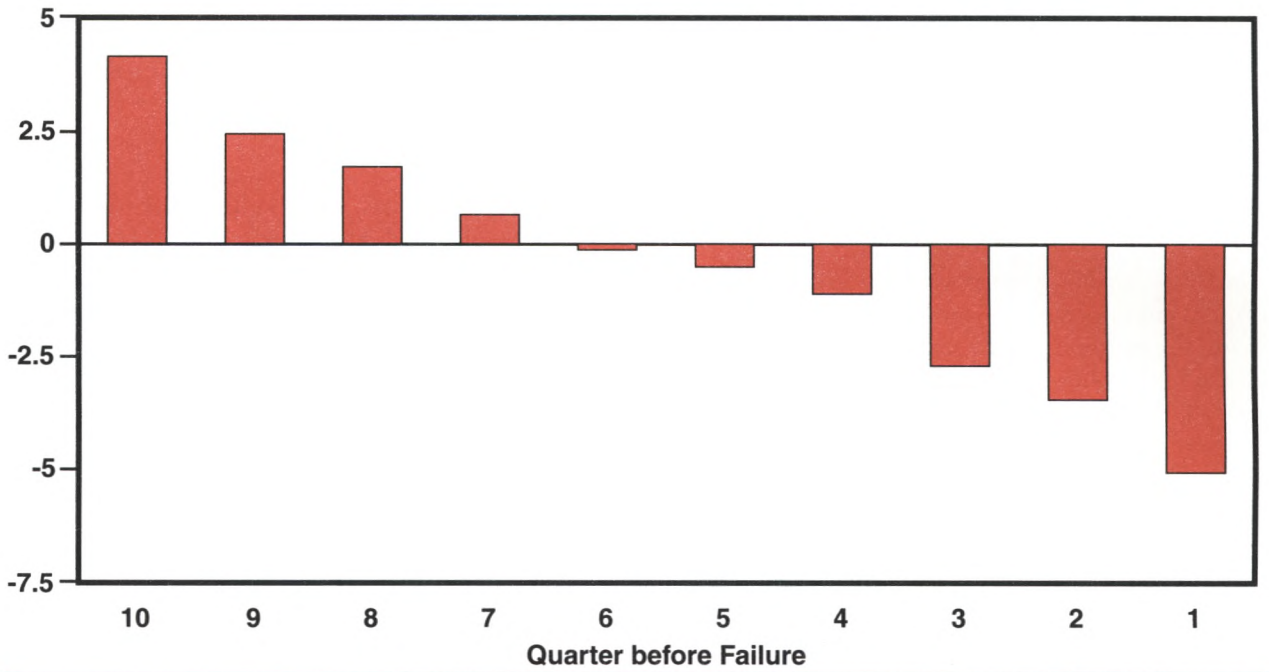

Figure 1b

Average Growth Rates of Total Assets for Banks with Different CAMEL Ratings

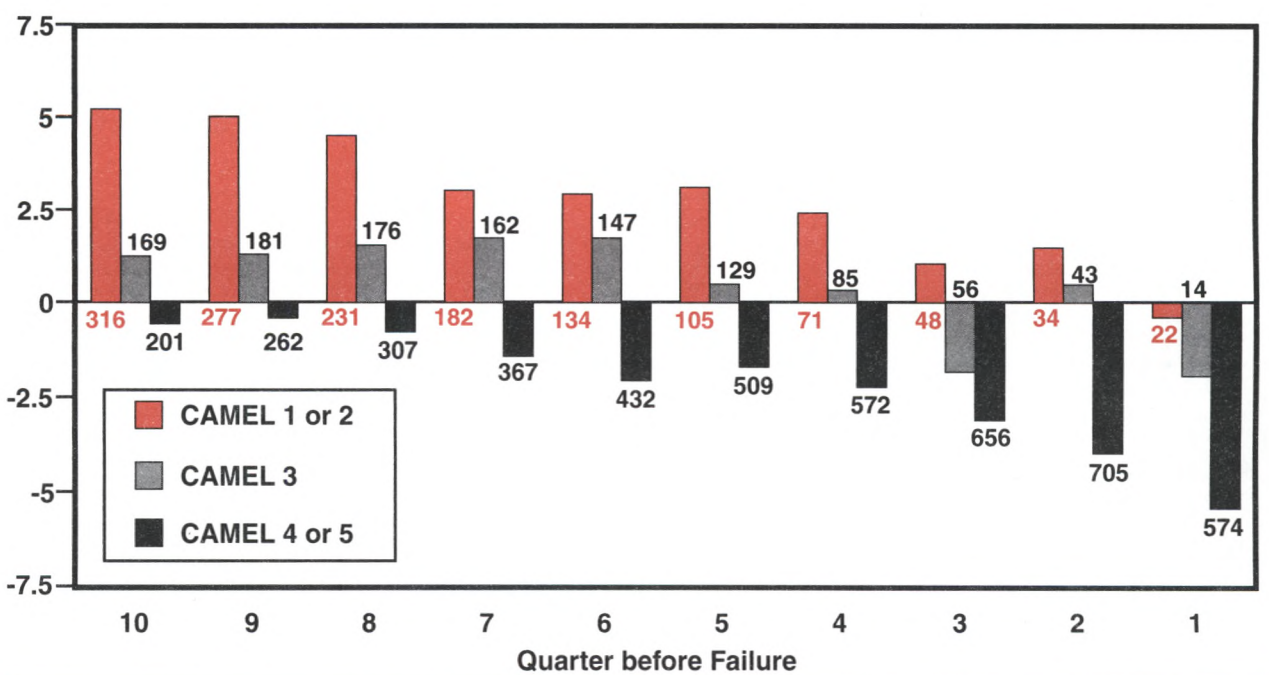

Table 4

Association Between Frequency of Examination and BIF Loss/Total Assets Ratios

Time since last examination	No. of banks	BIF loss/total assets ratios: Mean	BIF loss/total assets ratios: Standard deviation
Examined at least once in last 12 months	508	0.2523	0.1222
Not examined in last 12 months	307	0.2915	0.1344
Not examined in last 18 months	100	0.2922	0.1143
Longest period between examinations			
Less than or equal to two years	518	0.2649	0.1284
More than two years	297	0.2709	0.1281
More than two years but less than two and one-half years	131	0.2833	0.1286
Less than three years but more than or equal to two and one-half years	56	0.2773	0.1348
Three years or longer	110	0.2550	0.1235

FREQUENCY OF EXAMINATIONS AND BIF LOSSES

Data presented in the preceding sections suggest a relationship between BIF losses and the frequency of examination before bank failure. The evidence indicates that examinations helped supervisors identify problem banks that ultimately failed. Moreover, supervisors appear to have constrained the asset growth and dividend payments of banks identified as problem banks through examinations. Together, these results suggest that more frequent examinations should result in lower BIF losses.

It is possible, however, to develop another hypothesis that implies the opposite sign on the relationship between the frequency of examinations and BIF loss/total assets ratios. Suppose supervisors examine more frequently the banks they consider to have more severe problems and allow banks they consider relatively sound to operate for longer periods between examinations. If supervisors schedule examinations according to their estimates of the financial strength of banks and if those estimates are accurate, the banks with relatively high BIF loss/total assets ratios when they fail would be among those examined most frequently.[22] The nature of the relationship between the frequency of examinations and BIF loss/total assets ratios therefore must be settled by examining the data.

Examinations Near Time of Failure

Table 4 compares average BIF loss/total assets ratios at banks examined at least once in their last 12 months of operation with those of failed banks not examined during their last year of

[22]An attempt to identify empirically the determinants of the timing of examinations yielded insignificant results. The dependent variable in a probit regression equation was a dummy variable with a value of unity if a bank was examined in a given quarter, zero otherwise. Independent variables included CAMEL ratings on prior examinations, time since the prior examinations, capital ratios and measures of asset quality for several quarters just before the current quarter, the bank's federal supervisory agency, year of the examination and region. Only a few of the independent variables were significant, and the overall equation had insignificant explanatory power. These results do not support the hypothesis that the timing of examinations varies systematically with information available to supervisors on the condition of banks before examinations.

operation. The average BIF loss/total assets ratio is almost 4 percentage points higher for the banks not examined in their last year of operation, and the difference in these mean BIF loss/total assets ratios is statistically significant (t-statistic = 4.17). The difference is also economically significant. For a bank with total assets of $50 million as of its failure date, this difference would increase the BIF loss by $1.96 million.[23]

This comparison of BIF loss/total assets ratios based on frequency of examination does not necessarily indicate that 12 months is a critical frequency for examinations. Perhaps BIF loss/total assets ratios are higher only for the banks not examined for longer periods before failure, such as their last 18 to 24 months of operation. To explore such a possibility, table 4 also presents the average BIF loss/total assets ratio for banks not examined in their last 18 months, which is about the same as the average BIF loss/total assets ratio for those banks not examined in their last 12 months. Lack of information from examinations in the last 12 months of operations at failed banks appears to hinder the effectiveness of supervisors in limiting BIF losses.

Longest Period Between Examinations

Comparisons in the top half of table 4 may not capture all of the relevant information about the effects of infrequent examinations on BIF loss/total assets ratios. Some banks that went several years between examinations were examined frequently just before being closed. In these cases, the problems that led to failure and relatively large BIF loss/total assets ratios may have gone undetected for several years because of infrequent examinations until near the time of failure.

To capture this additional aspect of examination frequency, the longest period between examinations is identified for each bank. Data on the dates of examinations are available back to the late 1970s. Table 4 presents the distribution of the 815 banks by their longest period between examinations. The mean BIF loss/total assets ratio for each group of banks is *not* significantly different from the mean for each of the other groups. BIF loss/total assets ratios are therefore not related to the length of time between examinations. These observations, however, should not be interpreted as evidence against the requirement of annual examinations. Without regular examinations, supervisors cannot determine which banks should be classified as problem banks and therefore subject to closer supervision.

Table 5

Variation in the Percentage of Banks Subject to Examinations in their Last Year

Region	Percentage of failed banks examined in their last year
New England	80.0
Middle Atlantic	55.6
South Atlantic	64.7
East South Central	52.9
West South Central	53.2
East North Central	75.0
West North Central	79.3
Pacific Northwest	81.5
Pacific Southwest	70.3
Federal bank supervisory agency	
OCC	45.3
Federal Reserve	81.6
FDIC	71.7

REGRESSION ANALYSIS

Table 5 indicates that the proportions of failed banks subject to examinations in their last year vary by region and by federal supervisory agency. For instance, only 45.3 percent of national banks [supervised by the Office of the Comptroller of the Currency (OCC)] were examined in their last year. In Texas only one-third of the national banks were examined in their last year.[24]

[23]The staff of the House Banking Committee (U.S. Congress, 1991) concludes that annual examinations are important for reducing BIF losses. Their conclusion is based on the following observation. The supervisory agencies that subject higher percentages of the banks under their jurisdiction to annual examinations have lower ratios of BIF losses by failed banks to the total assets of all banks under their jurisdiction.

[24]The staff of the House Banking Committee (U.S. Congress, 1991) reports disparities similar to those in table 5 among the federal bank supervisory agencies in the percentages of banks subject to annual examinations.

The association between BIF loss/total assets ratios and examinations in the last years of operations presented in table 4 may actually reflect regional influences, practices of federal supervisors or the effects of other variables that are correlated with proportions of banks examined in their last year. Using multiple regression analysis, this study estimates the association between examinations and BIF loss/total assets ratios, holding constant the influences of other determinants of BIF loss/total assets ratios that may be correlated with the frequency of examinations.

In the regression analysis, the dependent variable is the loss to BIF divided by total assets as of the failure date. The equation is estimated with observations for bank failure cases resolved through purchase and assumption (P&A). In a P&A case, a solvent bank purchases some of the assets of a failed bank and assumes its liabilities. Banks that assume the liabilities of failed banks in P&A cases purchase some of their assets and receive cash from the FDIC in the amount of the difference between the assets purchased and liabilities assumed. Banks bid for a failed bank in terms of premiums, and the cash payment to the winning bidder is net of the premium.

Of the sample of 815 failed banks, about 80 percent were resolved through P&A. The appropriate regression models would be different for the other cases, which were resolved through transfer of insured deposits or liquidation. In particular, BIF shares its losses with uninsured depositors in the cases resolved through transfer of insured deposits or liquidation. Also, the coefficients on regional dummy variables may vary by resolution method because failed banks are more valuable to potential bidders for P&A if state law permits the winning bidders to reopen the offices of the failed banks as their branches. In states that restrict branching, winning bidders must consolidate the assets and liabilities of the failed banks at their existing offices.

For bank failure cases resolved through P&A, BIF loss can be specified as follows:

BIF loss = Decline in the value of assets below book values
– (New worth + the allowance for loan losses)
(1) – Premium

The net worth of a failed bank plus its allowance for loan losses is a buffer for the FDIC as receiver of a failed bank because declines in the value of bank assets relative to their book values may be charged against net worth and the allowance for loan losses before BIF absorbs any losses. The premium paid by the winning bidder in a P&A case reduces the loss to BIF. In the regression equation, the ratio of BIF losses to total assets is estimated as a function of several independent variables selected to reflect the items in equation (1), which are identified in table 6.

Identification of Independent Variables

Net worth plus allowance for loan losses. Banks with larger net worth and allowance for loan losses at the time of failure tend to have lower BIF losses, as indicated in equation (1). The independent variable included to capture this effect is C—equity plus the allowance for loan losses on the last Call Report, all divided by total assets as of the failure date—which is assumed to have a negative coefficient.

Frequency of examinations. A dummy variable for banks examined in their last 12 months (E12) is included as a measure of the frequency of examinations. The book values of assets at banks examined in their last 12 months of operation are assumed to approximate more closely the values of the assets to the FDIC as receiver than the book values of banks not examined in their last 12 months of operation. Thus the percentage declines in the value of assets relative to book values will tend to be smaller for banks examined in their last 12 months of operation. The coefficient on E12 is therefore assumed to be negative.

Decline in the value of securities relative to book value. In the Call Report, banks value securities at book values in the balance sheet but report the market value of their securities as a separate item. When a bank fails, the decline in the value of securities relative to book values is assumed to be proportional to the gap between the market value and book value of securities on the last Call Report. The following variable is included as a measure of the gap between the market value and book value of securities: MARKET—a variable that equals the book value of securities minus their market value listed on the last Call Report, all divided by total assets as of the failure date.

Table 6
Identification of Independent Variables

C - Equity plus the allowance for loan losses on the last Call Report, all divided by total assets as of failure date

E12 - Dummy variable with a value of unity if a bank was subject to an examination in the 12 months before its failure, zero otherwise

MARKET - Book value of securities in the investment account as of the last Call Report, minus the market value of the securities, all divided by total assets as of failure date

NPL - Loans and leases past due 90 days or more plus nonaccrual loans on the last Call Report, all divided by total assets as of failure date

ACCRUED - Interest on loans that had been accrued as income but not received as of the last Call Report, all divided by total assets as of failure date

OREO - Other real estate owned (other than bank premises) on the last Call Report, all divided by total assets as of failure date

IDR - Last observation available on deposits in accounts up to $100,000 each, divided by total assets as of failure date

GROWTH - Change in total assets of failed bank in its last year divided by total assets as of failure date

DIV - Dividends on common stock paid in the year ending in failure divided by total assets as of failure date

OCC - Dummy variable with a value of unity if the bank was a national bank supervised by the Office of the Comptroller of the Currency, zero otherwise

FR - Dummy variable with a value of unity if a bank was supervised by the Federal Reserve, zero otherwise

lnA - Natural log of total assets as of failure date

1985–89 - Dummy variables with values of unity for banks that failed in these years

NOTE: NE, MA, SA, ESC, ENC, WNC, PNW, PSW are dummy variables for the regions in which failed banks were located. See table 2 for identification of the regions.

Decline in the value of loans relative to book value. The gap between the book value of loans before failure and the value of the loans to the FDIC as receiver of a failed bank is assumed to be related to measures of loan quality derived from Call Reports filed before failure. To the extent that the measures of loan quality derived from Call Reports are accurate, the largest declines in the value of loans relative to book values are likely to be among the loans identified before failure as poor-quality loans. The following measures of loan quality are assumed to have positive coefficients.

NPL = Loans and leases 90 days or more past due plus nonaccrual loans, all divided by total assets as of failure date

ACCRUED = Interest on loans that had been accrued as income, but not received as of the last Call Report, divided by total assets as of failure date

OREO = Real estate owned (other than bank premises) according to the last Call Report, divided by total assets as of the failure date

These variables reflect bank accounting practices. When borrowers fall behind on their contracted loan payments to a bank, the bank continues to accrue the interest it is due as current income until the bank classifies the loan as nonaccrual. Thus the variable NPL reflects the book value of both categories of loans. The vari-

able ACCRUED reflects interest accrued but not paid to the bank by its borrowers. The variable OREO, which reflects loan defaults, tends to rise as borrowers default on their loans and banks take possession of real estate their borrowers had pledged as collateral. In the Call Report, foreclosed real estate is valued at the lower of the unpaid balances of loans on which borrowers defaulted or the fair market value of the real estate.

Composition of deposits as a determinant of premiums. The hypothesized sign on the following variable would depend on the method used by the FDIC to resolve a bank failure case.

IDR = Last data available on deposits in accounts up to $100,000 each, divided by total assets as of the failure date.

For cases resolved through liquidation, the hypothesized sign on this variable would be positive. In liquidation cases, the FDIC provides full coverage for insured depositors but shares losses with uninsured depositors. Thus losses to BIF would be higher in those liquidation cases in which the ratio IDR is higher, holding the other determinants of BIF losses constant.

In P&A cases, in contrast, the FDIC does not share losses with uninsured depositors because the winning bidder in a P&A case assumes all of the deposit liabilities of a failed bank. The sign on IDR in P&A cases is hypothesized to be negative because bidders in P&A cases tend to bid higher premiums for banks with higher ratios of fully insured deposits to total assets.[25] Fully insured deposits are valuable to bidders because banks tend to pay relatively low interest rates on fully insured deposits.[26]

Asset growth. Panel B of figure 1 indicates that the banks identified as problem banks had sharper declines in their assets than other banks as they approached failure. These differential rates of asset growth tend to bias the BIF loss/total assets ratios of the banks identified as problem banks upward by reducing the denominators in these ratios. The variable GROWTH is included as an independent variable to adjust for such a bias. GROWTH is the change in a bank's total assets in the 12 months ending with its failure, divided by total assets as of its failure date. GROWTH is expected to have a negative sign because the effect of an increase (decrease) in assets in the last year on the BIF loss/total assets ratio is assumed to be primarily an increase (decrease) in the denominator of this ratio.

Dividends. The coefficient on DIV—dividends in the last year divided by total assets as of the failure date—may be positive for two reasons. First, dividends are payments of capital to shareholders that leave less capital to absorb reductions in asset value. Second, dividends may signal that shareholders saw little reason to attempt to prevent failure. Indeed, they may have paid out capital in anticipation of failure.

Federal supervisory agency. The primary supervisor of nationally chartered banks is the OCC. The Federal Reserve supervises state-chartered banks that are members of the Federal Reserve System, whereas the FDIC supervises the remaining state-chartered banks. Differences in supervisory practices among these agencies may affect BIF losses in ways not accounted for by the other independent variables. Dummy variables (OCC and FR) are included to capture such effects.

Bank size. James (1991) found that FDIC administrative costs were higher per dollar of assets for small failed banks. BIF loss/total assets ratios therefore may be higher for small banks. The bank size variable is the natural log of total assets as of failure date.

Location and year of failure. Dummy variables for the regions of failed banks and the years in which they failed are included as the remaining independent variables. BIF loss/total assets ratios may vary systematically by region and year of failure. Table 2 identifies the abbreviations for regions.

Regression Results

The coefficient on C in table 7, which is negative and statistically significant, is also significantly different from minus one. Equation (1), however, implies a coefficient of negative unity for C. The deviation of the coefficient on C from negative unity probably reflects the fact that observations for equity and the allowance

[25]See James (1991). Berkovec and Liang (1991) found that premiums paid by winning bidders in bank failure cases were positively related to core deposits, measured as transactions deposits and savings deposits.

[26]See Brunner, Duca and McLaughlin (1991).

Table 7

Determinants of Bank Insurance Fund Losses Resulting from Individual Bank Failures

Dependent variable: Bank Insurance Fund loss divided by total assets as of failure date

Independent variables	Regression number	Independent variables	Regression number
Intercept	0.3383* (5.01)	1985	0.0139 (0.73)
C	−0.4698* (4.31)	1986	0.0185 (1.05)
E12	−0.0195* (2.09)	1987	0.0044 (0.29)
MARKET	−0.3200 (0.53)	1988	0.0206 (1.43)
NPL	0.2714* (3.32)	1989	−0.0039 (0.28)
ACCRUED	4.5707* (7.47)	NE	0.0203 (0.27)
OREO	0.6289* (6.30)	MA	−0.0147 (0.19)
IDR	−0.1051* (3.80)	SA	−0.0362 (1.29)
GROWTH	−0.0396* (2.05)	ESC	−0.0849* (2.85)
DIV	−0.1941 (0.16)	ENC	−0.0380 (1.13)
OCC	0.0093 (0.94)	WNC	−0.0754* (5.58)
FR	0.0099 (0.50)	PNW	−0.0492* (2.05)
lnA	−0.0079 (1.43)	PSW	−0.0379* (2.59)

$\bar{R}^2$ = 0.2456 RMSE = 0.1060 N = 646

*Statistically significant at the 5 percent level.

NOTE: t-statistics in parentheses under regression coefficients

for loan losses used in deriving the variable C were from the last Call Reports, which were filed several months before the failure dates. There were probably substantial chargeoffs of loan losses against the allowance for loan losses and against equity between the dates of the last Call Reports and failure dates.

The coefficient on E12 in table 7 is negative and statistically significant, indicating lower BIF loss/total assets ratios for banks examined in their last 12 months of operation, holding other factors constant. The size of the coefficient on E12, however, implies an effect of examination in the last year on BIF loss/total assets ratios that is about half of the effect in table 4, which does not hold constant other determinants of BIF loss/total assets ratios.

The coefficient on MARKET is not significant. The three measures of loan quality (NPL, ACCRUED and OREO) have positive and statistically significant coefficients.

The negative, significant coefficient on IDR indicates that failed banks with higher ratios of fully insured deposits to total assets are more valuable to potential bidders in P&A cases. The coefficient on GROWTH is negative and significant, as hypothesized, whereas the coefficient on DIV is not significant.

The coefficient on OCC is not significant in this equation and is not significant with the variable E12 excluded as an independent variable. Table 5 indicates that a relatively low proportion of national banks were examined in their last year. Correlation between OCC and E12, however, does not account for the insignificance of the coefficient on OCC in the equation reported in table 7. The coefficient on FR indicates no significant effect of Federal Reserve membership on the BIF loss/total assets ratios of state-chartered banks, holding the other independent variables constant.

The coefficient on the natural log of total assets does not support the hypothesis of higher BIF loss/total assets ratios for small failed banks. The coefficients on dummy variables for individual years are not statistically significant. The negative, significant coefficients on some of the regional dummy variables indicate that, holding other independent variables constant, BIF loss/total assets ratios were significantly lower for banks in several regions than for those in the West South Central region, the excluded region.

IS 18 MONTHS TOO LONG BETWEEN EXAMINATIONS?

This paper provides empirical support for the requirements in FDICIA for frequent examinations. This section deals with the implications of the exemption for small, well-capitalized banks, which must be examined only once every 18 months. Given the importance of examinations in identifying problem banks and limiting BIF losses, is 18 months too long between examinations for relatively small, well-capitalized banks?

The answer depends on the objective of supervisors in conducting examinations. The issue of how many failures would be prevented without this exemption is beyond the scope of this paper. A major objective of supervision is to identify the banks with serious problems and to prevent them from taking actions that would increase the exposure of BIF to losses. Given this objective, one way to determine the appropriate length of time between examinations is to determine how many banks failed within 18 months of examinations in which they met the following criteria:

1. Total assets less than $100 million
2. Equity/total assets ratios greater than 6 percent (the level recently set as an indicator of a well-capitalized bank)
3. CAMEL rating of 1 on the examination

FDICIA states that banks that may be examined only once every 18 months must have composite ratings of outstanding on their last examinations.[27]

Of the 815 banks in this study, 124 met these three conditions at least once in the quarters in which they were examined. Only three of the 124 banks failed within 18 months of these examination dates, all in 1987. These observations indicate that few cases of serious problems in banks will go undetected by supervisors because of the 18-month exemption for small, well-capitalized banks.

CONCLUSIONS

FDICIA requires that federal supervisors of insured depository institutions examine each of these institutions annually. Small, well-capitalized institutions need to be examined only once every 18 months. The purpose for this provision in FDICIA is to reduce deposit insurance fund losses.

Evidence in this paper supports the argument that the requirement of annual examinations will reduce losses of BIF. Most of the failed banks in this study were identified through examinations as problem banks before their failure, and examinations helped supervisors identify problems that had not been disclosed in prior Call Reports. In addition, supervisors were effective in slowing asset growth and reducing dividends at banks identified as having serious problems.

Losses to BIF were smaller for banks examined in their last 12 months of operation. If the requirements for prompt corrective action in FDICIA also make supervisors more effective in constraining the behavior of banks classified as problem banks, results in this paper will be underestimates of the contributions of annual examinations to reductions in BIF losses.

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On the Macroeconomics of Private Debt

EARLY LAST YEAR, a survey of the 50 Blue Chip forecasters indicated that the most important factor influencing the outlook for near-term economic growth in the United States was the debt burden carried by governments, households and businesses.[1] Debt and borrowing are common features of economic life, yet not everyone agrees on their role in the economy because borrowing can be viewed either positively or negatively. It is considered prudent to borrow to take advantage of an investment opportunity, but it is considered unwise to borrow simply so that you can consume beyond your means. Consequently, concerns about debt can arise when credit is not available, as well as when it is too readily available. In this sense, debt is a lot like money; it can cause problems when it grows too slowly, as well as when it grows too rapidly.

The current concern in the United States, however, is that the volume of debt has built up so much that it is a drag on spending, thereby dampening the economic recovery.[2] Such a concern applies to all economic units, both private and public. But to limit the discussion here, the focus is private debt—that is, the accumulation of past and present borrowing by households and private (nonfinancial) business.[3] During the recent recession, the term *balance sheet restructuring* has been used to describe the process of businesses and households adjusting their assets and liabilities along with their spending and saving in an effort to lighten debt loads.

The focus of this article is the role of private nonfinancial debt in the economy. Some perspective will be provided on debt's growth, magnitude and composition, along with some explanations of why these trends have occurred and additional consideration of their economic effects. The question of when and why debt becomes a burden is also addressed.

DEBT TRENDS IN PERSPECTIVE

Figure 1 illustrates the basis for recent concern about the burden of debt as it relates to the private nonfinancial sector. In figure 1 the major categories of private debt are expressed relative to gross domestic product (GDP). Debt is defined as credit market debt (at par value) owed by households and domestic nonfinancial businesses as presented in the Federal Reserve flow of funds.[4]

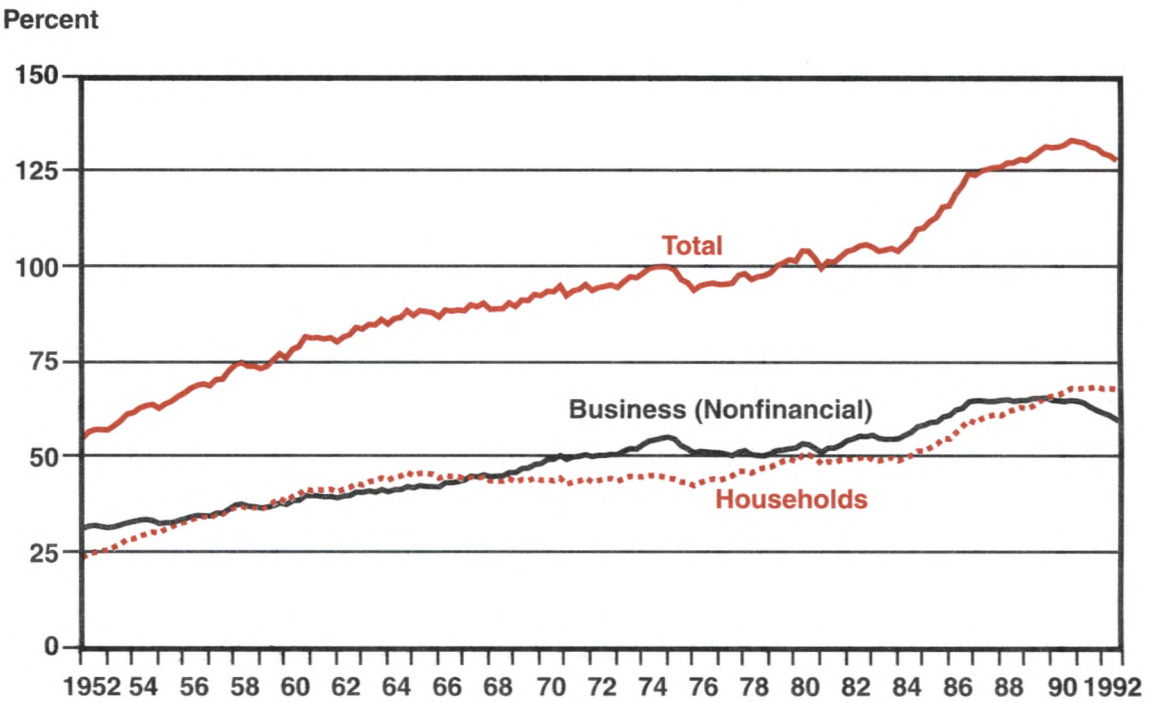
[1]See *Blue Chip Economic Indicators* (1992). For extensive documentation relating to the concerns of the U.S. news media with the size of the debt, both public and private, see McKenzie and Klein (1992).

[2]This was the theme of Chairman Greenspan's testimony before Congress on February 19, 1992. For a discussion of similar concerns in other industrial countries, see International Monetary Fund (1992).

[3]More specifically, the discussion is restricted to the private domestic nonfinancial sector, thereby disregarding the borrowing by governments, financial institutions and foreigners in U.S. credit markets.

[4]The main source of flow-of-funds data is the Federal Reserve's Z.1 release. These releases are published quarterly and contain information on flows and outstanding debt. There is also summary information published in the *Federal Reserve Bulletin*. The household sector in the flow of funds also includes personal trusts and nonprofit organizations.

Figure 1
Private Nonfinancial Debt as a Percent of Gross Domestic Product



The amount of private nonfinancial debt in the economy, the top line in figure 1, rose from 101 percent of GDP in 1981 to 132 percent in 1990 before declining in 1991. Debt of both sectors—households and businesses—rose substantially during the 1980s, although the patterns of growth were different. Of the 31-percentage-point increase in this debt/GDP ratio from 1981 to 1990, the household sector accounted for 18 percentage points.

THE ECONOMIC ROLE OF DEBT

Being in debt is so common that the average person gives little thought to the role of debt in the functioning of a free-market economy. Reasons for borrowing vary greatly among economic units, but the way these diverse borrowers interact with lenders and exchange funds is what interests economists. Financial markets encompass all types of transactions involving flows of funds between borrowers and lenders or exchanges of existing debt.

Functions of Debt

Specific reasons to borrow, that is, to incur debt, are easy to enumerate. An individual, for example, might not be willing to wait to consume a certain product but rather is willing to sacrifice some future consumption to boost present consumption. Future consumption is sacrificed as the borrower makes interest payments out of future income to a lender for the use of borrowed funds. Consumers borrow or lend to smooth consumption over time. The purpose of this smoothing, in turn, is to maximize utility (or satisfaction) over the individual's lifetime.

Businesses borrow in an effort to maximize long-run profit. Businesses need to borrow short term for operational purposes, for example, to accumulate inventory to sell at a profit over time. They borrow long term to purchase capital assets that add to the productivity of the business and enhance profit over a long horizon.

To the extent that debt increases consumer satisfaction over time, it is clear that debt is beneficial. The benefits of exchanging funds are similar to those that occur when individuals exchange goods and services, permitting specialization of labor and increasing the output for society as a whole. In the case of borrowing and lending funds, the payoff can be an enlarged stock of capital goods, which allows for increased production and therefore increased consumption in the future. Financial markets bring those with surplus funds together with deficit units, thereby enabling the ultimate user to direct these funds to the accumulation of capital.

The Market for Debt

Economists refer to the market for debt as the market for loanable funds. The interaction of the suppliers and demanders of funds determines the quantity of debt and its price, more commonly known as the interest rate. In reality, of course, the market is much more complex, involving many kinds of debt and many interest rates.

Debt markets can be classified in many ways. Most commonly these markets are classified by borrower—that is, demanders of funds, such as households, businesses and governments. A second way to look at debt markets is to group them by type of transaction, such as corporate bonds, bank loans, consumer credit and mortgage debt. Finally, it is helpful to know who the lenders are. In other words, where do the funds come from? The lender classification provides information about whether the transfer of funds is direct or indirect. In the early stages of a country's development, most transfers are direct—the lender and the borrower are making the exchange without any intermediary.[5] As a country develops, intermediaries tend to evolve because they bring lenders and borrowers together at a lower cost than if the transactions were conducted directly.

Table 1 summarizes the U.S. credit market in terms of transactions, borrowers and lenders. The government, financial and foreign sectors are included in the table to illustrate the relative size of the domestic, private nonfinancial sector. Of total credit market debt outstanding at the end of 1991, households owed 27.8 percent and domestic nonfinancial businesses owed 25.4 percent. At the same time, households *owned* 12 percent of the credit market debt outstanding and domestic nonfinancial businesses *owned* 1.5 percent.

The dominant role of private financial institutions in the U.S. credit market is evidenced by the fact that they make 50 percent or more of the loans in each market except tax-exempt obligations. Private financial institutions own 61.9 percent of total credit market debt, whereas government-related financial institutions, for example, sponsored agencies, mortgage pools and the monetary authority, own 12.9 percent of the total.

For further discussion of the U.S. market for loanable funds, see the shaded insert on p. 58.

SOME QUESTIONS ABOUT PRIVATE DEBT

The importance and significance of the growth and magnitude of private debt during the 1980s is a matter of dispute. Most of the concern about private debt seems to be among journalists, whereas the number of economists expressing concern is quite small.[6] The reasons for this discrepancy will be examined by trying to answer several questions. Discussion of these questions will not provide definitive answers, but hopefully they will shed light on whether there should be cause for concern about the buildup of private debt.

Question 1: Why Did Debt Ratios Rise Rapidly in the 1980s?

Figure 1 gave a summary picture of the growth of private debt as a percent of GDP, particularly in the 1980s. Most economists agree, however, that the ratio of debt to tangible assets is a more meaningful measure of solvency, or the ability to pay off a loan. The ratio of debt to GDP ignores the asset side of the balance sheet. Changes in the debt/asset ratio provide an indication of whether the net worth of an economic unit is increasing or decreasing.

Some insight into the use of debt/asset ratios can be obtained by looking at the growth rates of the components of the ratio. Table 2 gives a

[5]For a history of the development of intermediaries in the United States, see Blyn (1981).

[6]See McKenzie and Klein (1992).

Table 1

Credit Market Debt in 1991: Who Owes and Who Owns?

Transaction: *U.S. Government Securities*—$4337.7 billion (30.6% of total credit market debt)

Lender		Borrower	
Households	14.9%	Households	- - -%
Business	2.2	Business	- - -
Government	9.4	Government	64.0
U.S.	- - -	U.S.	64.0
State and local	9.4	State and local	- - -
Finance	61.6	Finance	36.0
Private	53.7	Private	- - -
Government related	7.9	Government related	36.0
Foreign	11.9	Foreign	- - -

Transaction: *Mortgages*—$4042.1 billion (28.5% of total credit market debt)

Lender		Borrower	
Households	5.8%	Households	71.2%
Business	0.9	Business	28.6
Government	5.2	Government	- - -
U.S.	2.4	U.S.	- - -
State and local	2.8	State and local	- - -
Finance	88.1	Finance	0.1
Private	54.9	Private	0.1
Government related	33.2	Government related	- - -
Foreign	- - -	Foreign	- - -

Transaction: *Corporate and Foreign Bonds*—$1766.4 billion (12.5% of total credit market debt)

Lender		Borrower	
Households	7.1%	Households	- - -%
Business	- - -	Business	59.6
Government	- - -	Government	- - -
U.S.	- - -	U.S.	- - -
State and local	- - -	State and local	- - -
Finance	79.3	Finance	33.4
Private	79.3	Private	33.4
Government related	- - -	Government related	- - -
Foreign	13.6	Foreign	7.0

Transaction: *Tax Exempt Obligations*—$1101.4 billion (7.8% of total credit market debt)

Lender		Borrower	
Households	52.6%	Households	8.6%
Business	1.0	Business	10.4
Government	1.3	Government	81.0
U.S.	- - -	U.S.	- - -
State and local	1.3	State and local	81.0
Finance	45.1	Finance	- - -
Private	45.1	Private	- - -
Government related	- - -	Government related	- - -
Foreign	- - -	Foreign	- - -

continued

Table 1 (continued)

Credit Market Debt in 1991: Who Owes and Who Owns?

Transaction: *Bank Loans Not Elsewhere Classified*—$788.0 billion (5.6% of total credit market debt)

Lender		Borrower	
Households	---%	Households	6.0%
Business	---	Business	86.0
Government	---	Government	---
U.S.	---	U.S.	---
State and local	---	State and local	---
Finance	100.0	Finance	5.3
Private	100.0	Private	5.3
Government related	---	Government related	---
Foreign	---	Foreign	2.7

Transaction: *Consumer Credit*—$796.7 billion (5.6% of total credit market debt)

Lender		Borrower	
Households	---%	Households	100.0%
Business	8.2	Business	---
Government	---	Government	---
U.S.	---	U.S.	---
State and local	---	State and local	---
Finance	91.8	Finance	---
Private	91.8	Private	---
Government related	---	Government related	---
Foreign	---	Foreign	---

Transaction: *Other Loans*—$773.2 billion (5.5% of total credit market debt)

Lender		Borrower	
Households	---%	Households	15.5%
Business	---	Business	63.9
Government	19.1	Government	1.3
U.S.	19.1	U.S.	---
State and local	---	State and local	1.3
Finance	71.6	Finance	10.8
Private	54.3	Private	10.2
Government related	17.3	Government related	0.6
Foreign	9.2	Foreign	8.4

Transaction: *Open Market Paper*—$565.9 billion (4.0% of total credit market debt)

Lender		Borrower	
Households	19.0%	Households	---%
Business	9.4	Business	17.4
Government	---	Government	---
U.S.	---	U.S.	---
State and local	---	State and local	---
Finance	69.5	Finance	68.1
Private	67.6	Private	68.1
Government related	1.9	Government related	---
Foreign	2.0	Foreign	14.5

The Market for Loanable Funds

To understand the general role of credit in the U.S. economy and more specifically the role of privately owed debt, it is useful to look at the operation of the entire market in terms of the supply and demand for funds.

The Demand for Funds

Households constitute an important sector on the demand side for credit, seeking funds primarily for purchases of durable goods, housing and perhaps education (human capital). Businesses are another important borrowing sector, which seeks funds to assist in the purchase of plant equipment and inventories. Federal, state and local governments also tend to demand funds because their spending usually exceeds their revenues. The sum of these sectors makes up the nonfinancial demand for funds. Financial institutions also demand funds, but their purpose is much different from those of households and businesses. They demand funds to make them available for loan.

A drawback of looking at borrowing by sector is that the identification of purpose is not always clear. Nonetheless, this classification is usually the basis for discussions of debt because these sectors generally match the classifications in the national income accounts.

The Supply of Funds

To understand the market for debt fully, it is necessary to examine the lending side, that is, who made the funds available to the borrower. As was the case for borrowing, there is a breakdown of lending by sector.

When the total of credit-market debt is examined in terms of the lender, it is clear that most funds are funneled through financial intermediaries. The portion of credit-market debt owned by financial intermediaries (private finance plus government-related finance) has varied between 65 percent and 75 percent of the total from 1952 to 1991. Credit-market debt held by households trended downward from 22 percent in 1952 to 12 percent in 1981 and has held steady since then. All other sector holdings are very small, although foreign holdings of U.S. debt have increased from 1 percent in 1952 to 6 percent in 1991.

The ultimate lenders tend to be households, however. It is difficult to determine what portion of intermediaries' sources of funds are from the household sector, but in 1991 their deposits and insurance and pension fund reserves constituted about 61 percent of total liabilities for private financial institutions.

summary for the past three decades. Households and businesses exhibit a similar pattern in the 1970s and 1980s. During the 1960s, debt grew faster than assets for businesses but not for households. During the 1970s, debt surged, but asset values rose even faster. When the increase in asset values slowed in the 1980s, continued expansion of debt, especially in the early part of the decade, resulted in an acceleration in debt/asset ratios. In retrospect, a reaction lag of debt growth behind asset values should not have been surprising because following the rapid inflation of the late 1970s, perceptions of low real interest rates and expectations of rapidly rising asset values were deeply entrenched.[7] It appears that households and businesses reduced their expectations of inflation and scaled back their expectations of rising asset values only after inflation was reduced. These revisions eventually led to a slowing in debt growth although, on balance, debt/asset ratios rose in the 1980s.

Regardless of what underlies an increase in the debt/asset ratio, whether it is an explosion of debt or a fall in asset values, the chief variable under the control of the individual economic unit is debt. Indications are that businesses started to reign in debt growth by the mid-1980s. The nonfinancial corporate sector did not show signs of reducing debt growth until the late 1980s, after the period of leveraged buyouts, mergers and takeovers. Total business debt rose

[7]See Rutledge and Allen (1989).

Table 2
Growth Rates of Credit Market Debt and Tangible Assets[1]

Sector	1981–91		1971–81		1961–71	
	Debt	Assets	Debt	Assets	Debt	Assets
Household	11.9%	6.1%	9.3%	13.2%	4.7%	6.9%
Business	8.1	3.1	11.2	13.4	10.0	7.3
Farm	−2.4	−2.0	13.2	13.2	9.1	5.1
Nonfarm noncorporate	9.1	5.2	15.0	13.9	15.2	7.5
Nonfinancial corporate	8.8	3.2	9.5	13.3	9.0	8.0

[1]Includes residential structures, nonresidential plant and equipment, inventories, consumer durables and land at market value.

at only a 1.1 percent annual rate from 1989 to 1991, after growing at a 10 percent rate during the previous eight years.

Question 2: Are Aggregate Debt Ratios Meaningful?

Most of the concern about debt buildup in the 1980s stemmed from an examination of the quantity of debt relative to either GDP or the value of tangible assets. Economists have noted that it is not the quantity of debt that matters as much as the structure—who borrows what, how much and on what terms from whom. This is probably the reason that discussions of private debt are seldom found in macroeconomic texts—problems of private debt seem to be microeconomic in nature. Yet Benjamin Friedman, a Harvard economist, has found that some direct measures of financial distress—like delinquencies and business failures—seem to be correlated with movements in aggregate debt/asset ratios.[8]

Allan Meltzer of Carnegie Mellon University is most vocal in his skepticism about the usefulness of aggregate debt ratios.[9] He stresses the *uses* of debt, rather than the quantity. Movements in a particular ratio do not tell whether borrowing is a reflection of profligacy or a response to an attractive investment opportunity. Furthermore, construction of such ratios is arbitrary both in terms of which economic units to include and which liabilities to define as debt.[10]

Question 3: When Does Debt Become a Burden?

Much has been made of the burden of private debt in the current recovery. Initially, there was concern that the debt buildup in the mid-1980s carried the risk of worsening the recession, if and when it occurred. When this apparently did not happen (the 1990-91 recession was relatively mild), the argument shifted to the effect of the debt load on the strength of the recovery. This view was prominent in 1991 and 1992 monetary policy reports to Congress, except that the term *restructuring of balance sheets* was used to describe the phenomenon.

Defining when debt becomes a burden is difficult to do. At the time the debt is incurred, it reflects conditions and expectations at that time. It can become a burden when those conditions and expectations change. Irving Fisher used the term *overindebtedness*, which he defined as "whatever degree of indebtedness multiplies *unduly* the chances of becoming insolvent . . . the standards [of overindebtedness] are somewhat rough. The line of balance is more or less a twilight zone."[11]

To examine the conditions or factors that determine when debt seems to become a burden,

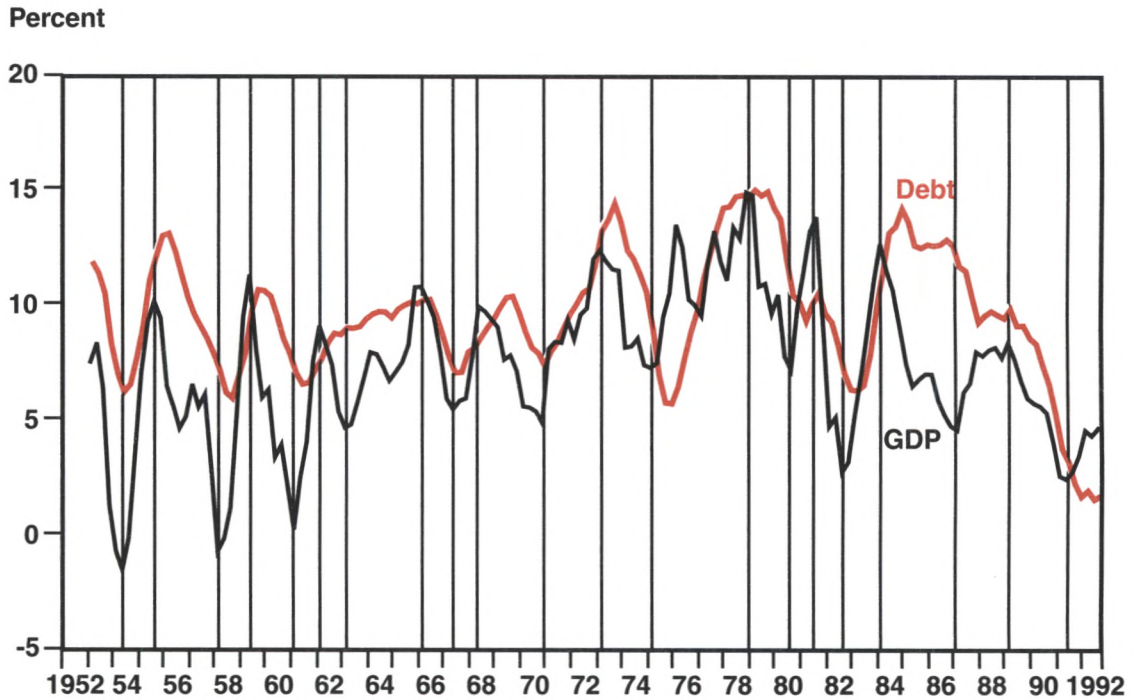
[8]See Friedman (1986). This will be examined in detail later.

[9]See Meltzer (1986).

[10]See McCallum (1989).

[11]See Fisher (1932), pp. 9-10.

Figure 2
Private Nonfinancial Debt and Gross Domestic Product



Data are four-quarter rates of change.
Vertical lines are peaks and troughs in the four-quarter GDP rates of change.

we must identify those periods when households and businesses attempt to reduce their debt growth. This does not tell us whether the debt is a burden, but it does identify periods of adjustment, or, to use the Federal Reserve's term, periods of balance sheet restructuring.

These restructuring periods are quite obvious in figure 2, which shows the four-quarter percent change in private debt and GDP. The peaks and troughs are determined visually and specifically summarized in table 3. The pattern of GDP peaks and troughs indicates that the growth rate of output almost always peaks before debt and that debt appears to be responding to GDP rather than the other way around. Restructuring does not seem to occur until after GDP starts to falter. This also seems to be true for troughs; GDP tends to rebound before private debt. The period since 1985, however, is more difficult to interpret. GDP slowed after 1984, and the restructuring began simultaneously for businesses but about a year later for households. The restructuring has been going on (at different rates) since 1985 and conforms with the drop in GDP growth. In summary, the debt seems to become a burden after GDP weakens.

Question 4: Are Consumption and Investment Affected by Debt Growth?

Although it seems clear that accelerations and decelerations of debt lag rather than lead economic activity, the question of economic effect can be approached more directly by examining household debt and personal consumption expenditures and business debt and capital expenditures.

Household sector. Figure 3 shows personal consumption compared with disposable personal income and household debt compared with dis-

Table 3

Private Debt[1] and GDP: An Analysis of Leads and Lags

Troughs (year.quarter) in the four-quarter rates of change of:		GDP to Debt
GDP	Private debt	Lag in quarters
54.2	54.2	0
58.1	58.3	2
61.1	61.2	1
63.1	--	-
67.2	67.2	0
70.4	70.4	0
75.1	75.4	3
80.3	81.1	2
82.3	83.1	2
87.1	--	-
91.2	92.2	4

Peaks (year.quarter) in the four-quarter rates of change of:		GDP to Debt
GDP	Private debt	Lag in quarters
55.3	56.1	2
59.2	59.3	1
62.1	--	-
66.1	66.2	1
68.2	69.3	5
73.1	73.3	2
78.4	79.1	1
81.3	81.3	0
84.1	84.4	3
89.1	89.1	0

[1]Private domestic nonfinancial debt

posable personal income. The vertical lines correspond to recession periods. Before the 1980s it is apparent that the consumption/income ratio was not systematically related to the debt/income ratio. The consumption/income ratio showed some cyclical regularities, but the debt ratio did not. On a trend basis the two ratios seemed inversely related from the early 1950s to the mid-1960s, but the nature of the relationship isn't clear for the rest of the 1960s and the 1970s.

During the 1980s, the two measures tended to rise and fall together, running counter to the notion that rapid debt growth inhibits consumption. As pointed out previously, consumption seems to drive debt rather than the other way around. See table 4.[12]

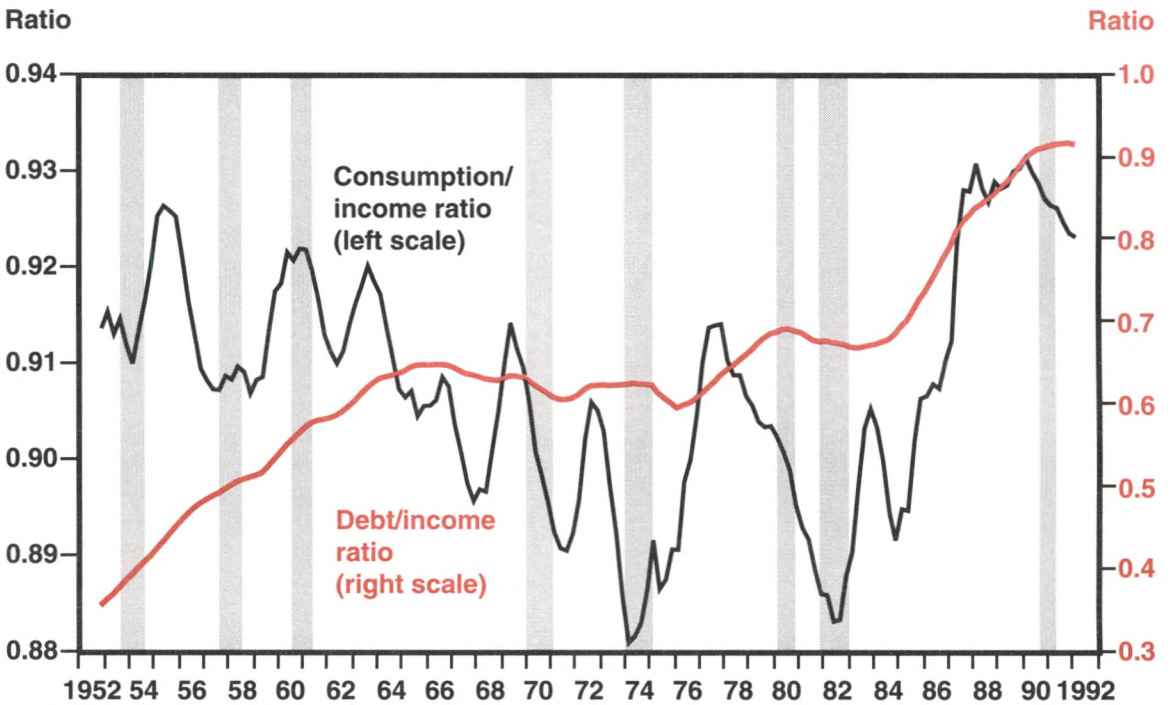
Figure 4 shows the debt/income ratio along with delinquency rates to see whether financial difficulties for consumers are systematically related to debt growth.[13] The delinquency rates for both consumer installment credit and for

[12]Table 4 summarizes measures of the relationship of personal consumption and household debt movements, using annual averages of the data in figure 3. The consumption/income ratio and the debt/income ratio were negatively related during the 1953-72 period, but this relationship was reversed from 1973-91. Because debt is a stock variable, its first difference might be viewed as more appropriate when being compared with consumption, a flow variable. On this basis, the correlation coefficient is positive for the whole period, as well as for the two subperiods. If there is a relationship between the consumption/income ratio and the debt/income ratio, it is that they tend to be positively correlated, quite the opposite of the implication of the debt-burden hypothesis.

[13]For further discussion of these measures of payment difficulties, see Canner and Luckett (1991).

Figure 3

Personal Consumption Expenditures and Household Debt Relative to Disposable Personal Income



Data are centered four-quarter moving averages.

Vertical gray bars represent recessions.

Table 4

Correlation between Consumption and Debt

Variables	Coefficient of correlation 1953–91	1973–91	1953–72
Consumption/ income ratio and debt/income ratio	.22	.83	–.49
Consumption/ income ratio and change in debt/ income ratio	.70	.67	.87

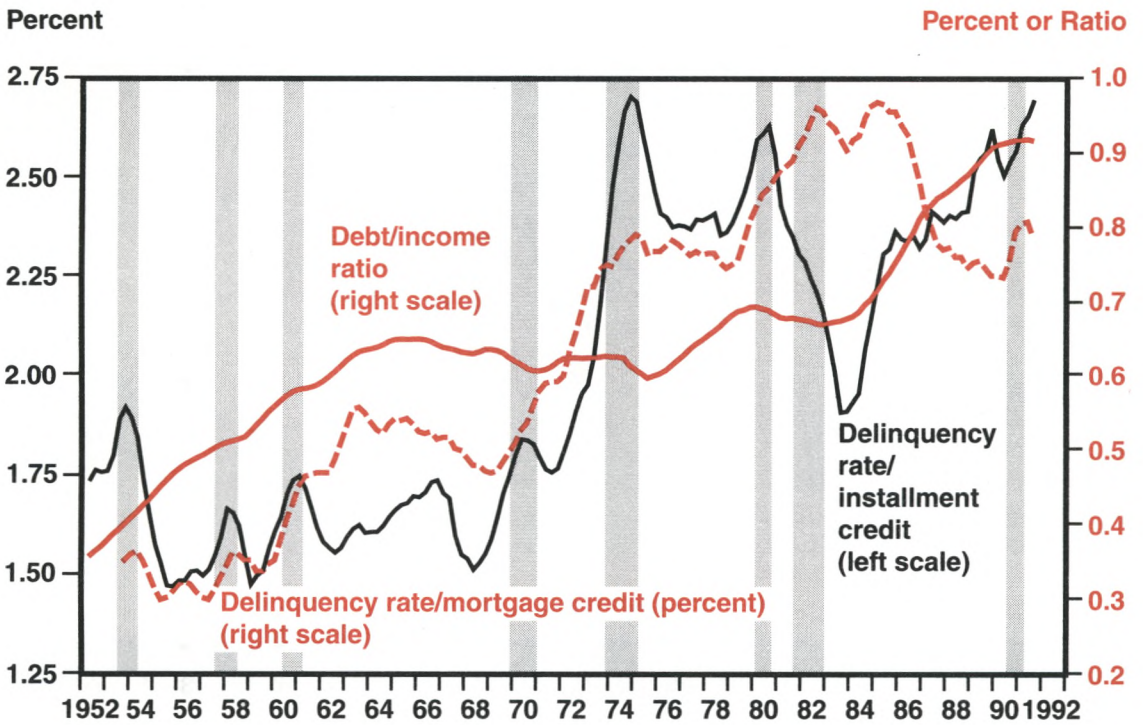
mortgages are responsive to the business cycle but seem to move quite independently of the debt/income ratio.

In general, the accumulation of debt by households, because it is done voluntarily, does not lead to systematic movements of consumption relative to income. Some relationship might be revealed with alternative methods of analysis, but with the graphical approach used here, there is little support for the notion that high debt ratios lead to reduced consumption relative to income.[14]

Business sector. Figure 5 shows the ratio of investment spending by businesses to gross domestic product along with the debt/income

[14]Consumption functions have been a part of economic analysis for many years. Household debt is seldom mentioned as a determining variable, however, except to the extent that it might operate through the wealth effect as measured by household net worth. See Blinder and Deaton (1985) for a survey of time series consumption functions.

Figure 4
Delinquency Rates and Household Debt Relative to Disposable Personal Income



Data are centered four-quarter moving averages.
Vertical gray bars represent recessions.

ratio of the private business sector. The conclusions are somewhat the same as for households, although the two ratios move much differently. Part of the explanation might be that businesses borrow for different reasons, choosing "their financial structures to fit their plans for future expansion."[15] Before the 1980s, the investment ratio showed pronounced cyclical movements about an upward trend. The debt ratio also trended upward and perhaps with some cyclical regularity, but not nearly as pronounced as for investment. During the 1980s all signs of similar movement seemed to vanish; the debt ratio accelerated, and the investment ratio fluctuated sharply before collapsing during the second half of the decade.[16] This experience would suggest that debt became a burden that contributed to a sharp decline in the investment ratio. See table 5.[17]

Possible concern about rising debt for the business sector involves the risk of bankruptcy. One way to look at this risk is to examine evidence on business failures.[18] Figure 6 shows

[15]See Kopcke (1989).

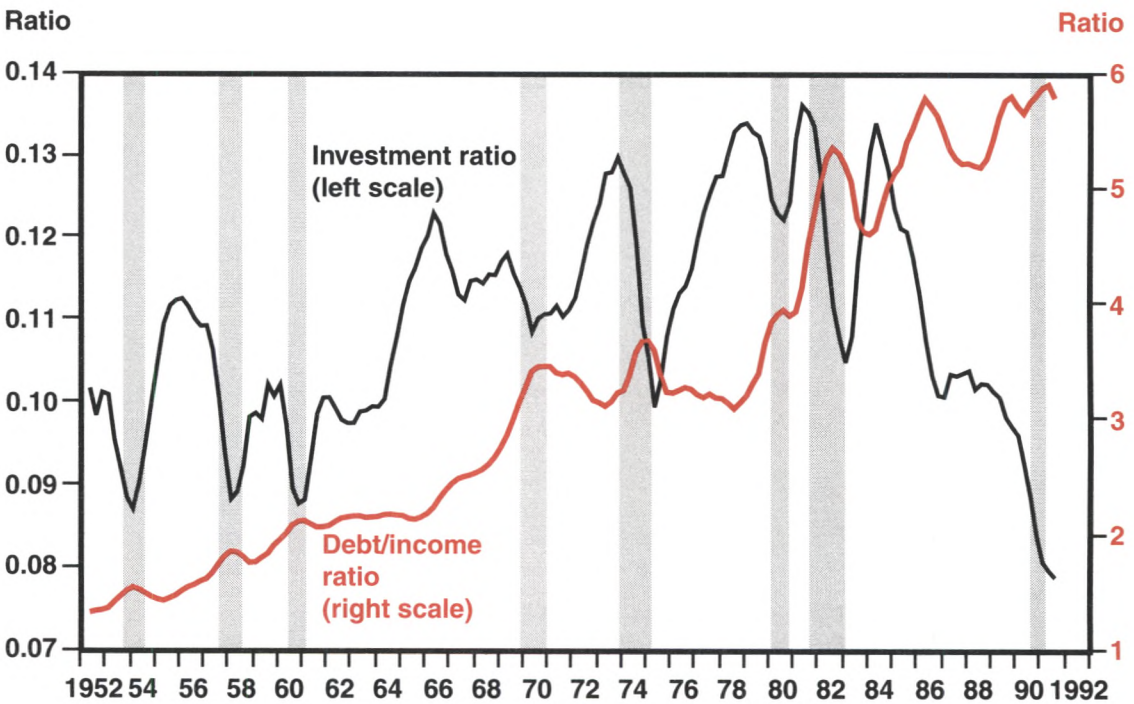
[16]The Tax Reform Act of 1986 made interpreting the 1980s complicated. This legislation had the affect of discouraging investment, while at the same time providing some incentive to increase debt financing. See Slemrod (1990).

[17]Table 5 summarizes the relationship between investment and debt movements for the nonfinancial business sector. The correlations in table 5 confirm the results obtained from the graphical analysis. For the period as a whole, no relationship between investment and debt is apparent. The experience of the 1980s, however, suggests a negative relationship. As with consumption functions, estimated investment functions generally disregard debt as a variable. Only cash-flow models of investment would allow for debt effects by including costs of servicing debt. For a survey of investment functions, see Kopcke (1985).

[18]For a more complete analysis of business debt and the risk of bankruptcy, see Faust (1990).

Figure 5

Investment Relative to GDP and Debt/Income Ratio for Nonfinancial Business



Data are centered four-quarter moving averages.

Vertical gray bars represent recessions.

Table 5

Correlation between Investment and Debt

	Coefficient of correlation		
Variables	**1953–91**	**1973–91**	**1953–72**
Investment/GDP ratio and debt/income ratio	.09	–.65	.50
Investment/GDP ratio and change in debt/income ratio	.02	–.01	.02

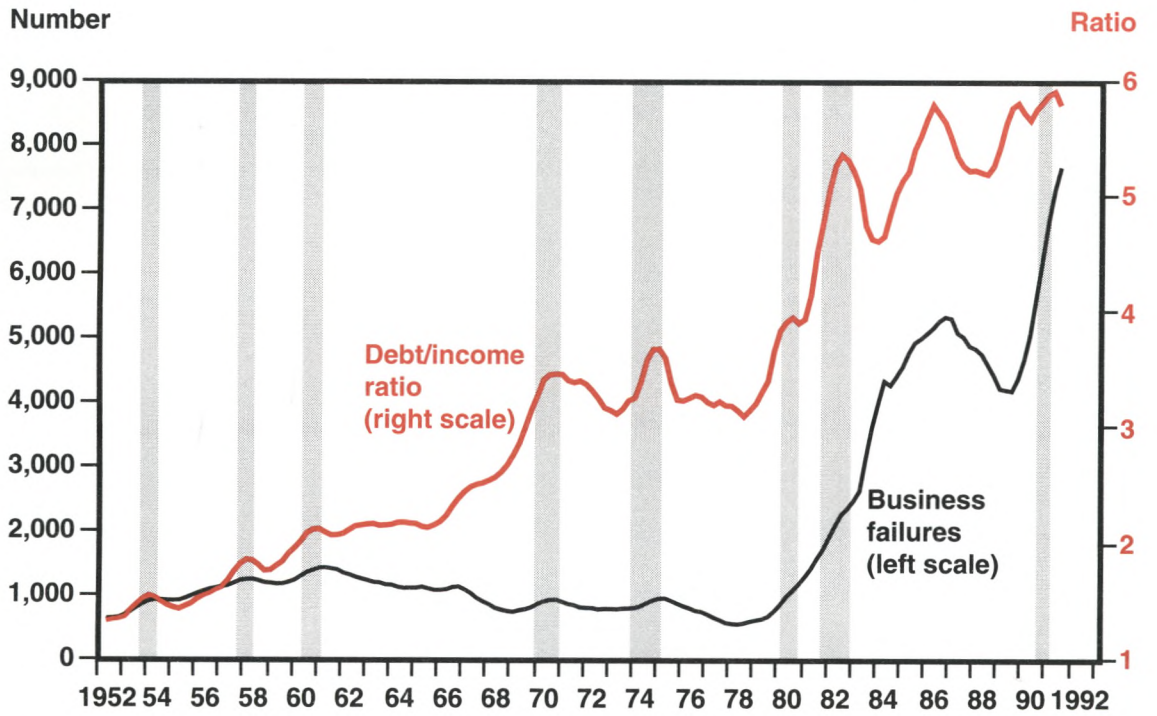
business failures along with the debt/income ratio for nonfinancial business. Before the 1980s, no relationship was apparent. During the 1980s, the two measures showed similar movement. Consequently, even though a simple graphical analysis does not reveal any systematic relationship between debt growth and investment spending during the entire period from 1952 to the present, evidence from the 1980s supports the notion that rapid debt growth makes businesses more vulnerable to failure.

CONCLUSIONS

Debt plays a key role in the functioning of a free market economy. Households, business and government all borrow and lend for a variety of reasons. Financial markets bring those holding surplus funds together with those seeking funds and allow a reallocation of funds that leads to a more efficient use of resources.

This article discussed the role of debt in the economy, focusing on private-sector borrowing. The participating sectors on both the supply and demand sides of the loanable funds market were identified, and trends in the extent of their participation were summarized.

Figure 6
Business Failures and Debt/Income Ratio for Nonfinancial Business



Data are centered four-quarter moving averages.
Vertical gray bars represent recessions.

Several questions relating to trends in private debt were examined. There is no doubt that private-sector debt/asset ratios have risen sharply in the 1980s. Although such ratios have their limitations, they help us understand what economic forces are at work. An examination of these debt/asset ratios indicates that the primary source of their increase in the 1980s was the sharp deceleration in asset values. A sector-by-sector analysis indicates that the private-sector groups have been slowing their borrowing for quite some time. This restructuring is well under way and is not that unusual compared with previous recessions. What is different about the current restructuring is that it also seems of a longer-term nature, representing an unwinding of the distortions resulting from inflation during the 1970s. It was that experience that contributed to a rise in debt/asset ratios in the early 1980s because asset values weakened when inflation was tamed by restrictive monetary policy. Debt continued to expand in the 1980s apparently because the perception of low real interest rates carried over from the 1970s. In addition, it is difficult to reduce debt instantaneously even when it becomes apparent that asset values are rising more slowly (or even falling).

An examination of the movements of private debt relative to the business cycle shows that economic activity leads the debt cycle almost all of the time. The debt cycle is a part of the business cycle mechanism but does not appear to be a factor initiating cyclical movements.[19] On the other hand, an examination of consumption and investment along with debt/income ratios did not reveal any systematic association over the last 40 years. The 1980s stand out as unusual when viewed in a historical context. Perhaps a relationship has developed between debt and spending, but from an empirical standpoint the evidence is limited.

[19]See Mullineux (1990) for a survey of such theories, and also Minsky (1986).

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