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John H. Boyd and Mark Gertler

FEDERAL RESERVE BANK OF MINNEAPOLIS AND
UNIVERSITY OF MINNESOTA, AND NEW YORK UNIVERSITY
AND NBER

U.S. Commercial Banking: Trends, Cycles, and Policy

"The business of banking ought to be simple; if it is hard, it is wrong."

Walter Bagehot (1873)

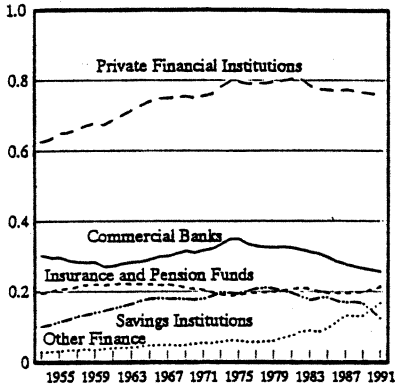
1. Introduction

According to a variety of commonly used indicators, U.S. commercial banking appears to be in both decline and distress. Figure 1 shows that the banking industry's share of the total amount of funds advanced in U.S. credit markets peaked in 1975 at 34%. It has dropped consistently since then, to 26% in 1991. Banks have lost ground to both open market sources of credit and nonbank intermediaries. Open market credit rose relative to all forms of intermediated credit during the 1980s; primarily responsible was the growth of the commercial paper and junk bond markets. Finance companies led the growth of nonbank intermediation over this period.

Another widely cited indicator of banking health is the failure rate. Bank failures averaged less than two per year in the 1970s. Table 1

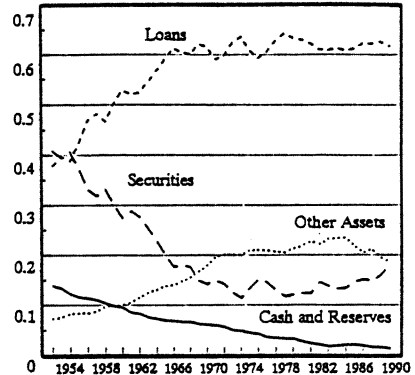
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Figure 1 SHARE OF FINANCIAL INSTITUTIONS IN TOTAL CREDIT^a



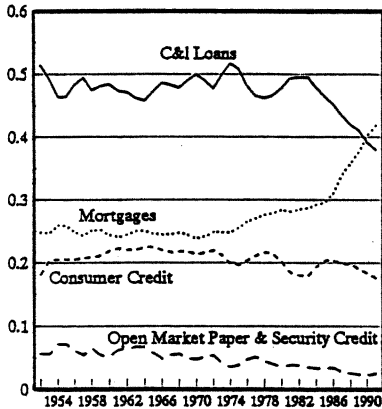
^aFractions of total funds advanced in credit markets to domestic nonfinancial sectors.

Figure 2 COMPOSITION OF COMMERCIAL BANK ASSETS^a



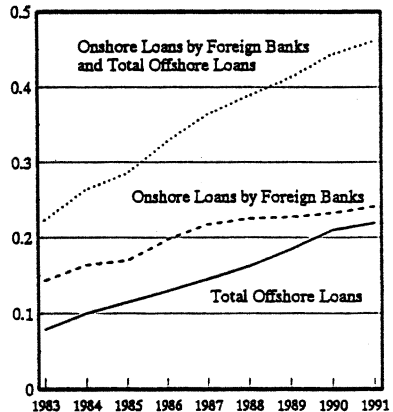
^aFractions of total assets. (Securities include corporate bonds, which are of trivial magnitude.)

Figure 3 COMPOSITION OF COMMERCIAL BANK LOANS^a



^aFractions of total loans.

Figure 4 FOREIGN SHARE OF U.S. C&I LOANS^a



^aFractions of total C&I loans. Total C&I loans include all loans (both onshore and offshore) to U.S. addresses by both foreign and domestic banks. (Flow of funds data on C&I loans excludes foreign offshore loans.)

Sources: Flow of Funds Accounts (Figs. 1–3), Federal Reserve Bulletin and Federal Reserve Bank of New York Quarterly Review (Fig. 4).

Table 1 BANK FAILURES BY CENSUS REGION

Region	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	Total 1980-1991
New England	1	0	1	0	0	0	0	2	0	3	9	12	28
Middle Atlantic	1	3	6	3	1	4	0	3	1	3	7	6	38
South Atlantic	2	2	2	0	3	2	3	4	4	7	6	8	43
East South Central	2	0	5	14	13	9	5	4	0	1	1	2	56
West South Central	0	3	11	7	12	34	58	108	163	150	115	32	693
East North Central	1	3	5	7	8	4	3	7	5	0	1	3	47
West North Central	4	2	5	10	37	46	43	33	28	9	6	4	227
Mountain	2	0	3	5	12	19	26	16	19	11	14	6	133
Pacific	0	2	3	10	11	10	11	11	13	9	4	2	86
United States	13	15	41	56	97	128	149	188	233	193	163	75	1,351

Source: FDIC.

shows that the failure rate jumped dramatically in the 1980s, averaging roughly 130 per year between 1982 and 1991. Accompanying the surge in the failure rate has been a rising number of banks in financial distress. Although the situation has improved recently, in late 1992 the Federal Deposit Insurance Corporation (FDIC) listed 909 U.S. banks with combined assets of \$488 billion as "problem institutions." At the same time, regulators have been phasing in new requirements that mandate closure of banks that fail to meet a minimum standard of financial health.

It is true that after many years of dismal performance banks recorded substantial profits in 1992. But this news is not entirely comforting. Many believe that banks have benefited from an unusually steep yield curve by borrowing short and lending long. While the surge in profits has helped banks replenish their capital, the increased exposure to interest rate risk has discomfited many observers.¹

The types of facts we have just reviewed are well known and are being widely discussed. They have instigated a new debate over bank regulatory policy. The original regulatory design, of course, was a response to the collapse of banking during the Great Depression. However, by starkly illustrating the efficiency cost of providing a public safety net, the savings and loan (S&L) debacle has heavily conditioned the current discussion. Another consideration is that the problems in banking emerged following a movement toward deregulation of financial markets that began in the mid-1970s and escalated in the early 1980s. Although there is substantial debate over what direction new banking reforms should pursue, there is widespread agreement that the regulatory system did not keep pace with the changes in banking that occurred over the last 10 or 15 years.

In this paper we examine the important trends in banking and attempt to pinpoint the sources of problems. Our objective is to evaluate the key policy options. To provide a clear context for doing so, we first dig well beyond the surface facts just described to assess the nature and health of U.S. commercial banking.

Section 2 begins by documenting the important trends. We discuss why commercial banking has become less stable over time. We also document that banking has changed considerably, primarily through the growth of off-balance sheet activities. Thus, despite having a shrinking share of on-balance sheet assets, commercial banks remain vital

1. To quote Charles E. Schumer, senior member of the House Banking Committee: "Any idiot can make money by taking in money at 3 percent and lending it at 7 percent. But anyone who looks at the last four quarters and thinks the banking industry is back on track is making a mistake" (Labaton, 1992).

to the general process of information-intensive lending and liquidity provision. This section also describes the origins of the too-big-to-fail doctrine, which we believe to be one of several key factors central to understanding the recent problems in banking.

Section 3 examines the general performance of banks over the last decade. It is well understood that banking problems have had a strong regional dimension. On the surface, this seems to suggest that historical restrictions on interstate banking may have been the key to contributing regulatory distortion. We present a variety of evidence, however, which suggests that the main source of problems was increased risk taking by large banks—banks that were relatively unconstrained by existing interstate restrictions. In particular, we show in a panel data study of individual bank behavior that, after the influence of regional factors is removed from the data, large banks performed much worse than the mean. From this and other evidence, we conclude that the poor ex post performance by large banks was a product of two factors: enhanced competition for the banking sector and a regulatory environment that encourages risk taking by large banks.² In this spirit, we use our evidence on the differential performance across size classes of banks to compute a rough estimate of the impact of large banks' extra-normal loan loss performance on the industry aggregate and find that this impact was quite sizable. We also present evidence that it was mainly large banks that were deficient of capital during the recent "capital crunch."

Section 4 provides an analysis of policy reform. We discuss both the recent legislation and other basic proposals that are on the table. For reasons we describe in the paper, the most vexing difficulty any policy must confront is the trade-off between safety and efficiency posed by the "Continental Illinois problem," i.e., the appropriate choice of policies for large banks in financial distress.

2. Trends in the Nature of U.S. Banking

In this section, we trace the evolution of the important recent changes in banking. As a way to gauge the nature of these changes, we first examine the trends in the composition of bank assets and liabilities. We then examine the growth of off-balance sheet activities, which has been a significant way in which banks have evolved.

2. Gorton and Rosen (1992) also emphasized the poor performance of large banks, but focus on managerial entrenchment problems. As we discuss later, managerial entrenchment problems may be an important additional factor, although we present no new evidence on this issue.

2.1 THE COMPOSITION OF BANK BALANCE SHEETS

2.1.1 Bank Assets Figure 2 portrays the relative behavior of the broad categories of bank assets over the postwar period. Most striking are the rise in the share allocated to loans and the decline in the shares allocated to securities and to cash and reserves. The drop in the latter reflects mainly a sequence of reductions in reserve requirements. An important reason for the secular decline in the security share was the development of money markets, such as the federal funds and large certificate of deposit (CD) markets. The increased access to short-term money permitted banks to reduce precautionary holdings of securities. Also, certain types of bank loans became increasingly liquid over time because of the advent of securitization and the development of markets for loan sales. Recently, the share of securities has been rising—partly because of the recession, partly because of the problems in banking and the associated regulatory changes, and partly because of banks exploiting the steepness of the yield curve.

Figure 3 disaggregates bank loans. The main categories are commercial and industrial (C&I) loans, mortgages, and consumer credit. Interestingly, the shares of each category in bank loan portfolios were relatively stable from 1952 to about 1973. Since the mid-1970s, though, the share of C&I loans has declined, and the decline has been fairly precipitous since the early 1980s. One factor underlying this trend has been the growth of the commercial paper market, which largely involved a movement of high-quality C&I lending off bank balance sheets. Another factor is the growth of nonbank intermediation, particularly finance company lending, as Figure 1 illustrates.

A less well known factor underlying the relative decline in C&I loans is the recent growth of offshore commercial lending. While the flow of funds measure of C&I lending includes commercial lending both by domestic banks and by branches of foreign banks within the U.S. border, it underestimates loans to U.S. firms by banks located offshore.³ The market for offshore lending grew rapidly during the 1980s. One likely factor, according to McCauley and Seth (1992), was that differences in reserve requirements on large CDs made intermediating (high quality) loans cheaper offshore. Banks lending onshore were required to hold 3% reserves against large CDs; offshore banks faced no reserve requirements. Figure 4 illustrates the growth of offshore commercial loans. Somewhat surprisingly, offshore loans grew from 7% of total C&I lending in the United States in 1983 to more than 20% by 1991. Further,

3. The relative importance of offshore loans has come as a surprise to many observers. See McCauley and Seth (1992) for a detailed analysis.

because the offshore banks are at some disadvantage in the evaluation and monitoring of small- and medium-sized companies, the type of commercial loan business they absorbed was likely lending to larger, better-rated companies.⁴

The rise in offshore lending is symptomatic of the general increased importance of foreign banks to commercial lending in the United States. As Figure 4 indicates, foreign lending from both on- and offshore sources rose from 22% to 45% of C&I loans in the United States over the period 1983–1991. One implication, of course, is increased competition for U.S. banks. Another is that regulatory policy must be designed from an international perspective.

While high-quality commercial lending moved off bank balance sheets to both domestic and foreign competition, the relative importance of mortgage lending grew. This phenomenon began in the mid-1970s and accelerated through the 1980s. Banks undoubtedly picked up some business from failing S&Ls, especially in the latter half of the 1980s. However, the shift to mortgage lending occurred well prior to the S&L debacle.

Disaggregating mortgage lending uncovers another important trend. As Figure 5 shows, commercial mortgage lending has accounted for much of the recent growth in overall bank mortgage lending.⁵ In 1980, home mortgages accounted for about 60% of bank mortgage lending, and commercial lending accounted for about 30%. By 1990, the shares of the two types were about equal, each roughly 45% of overall bank lending.⁶ This phenomenon is of interest since a good fraction of the problems in banking stem from losses in commercial real estate lending, as we discuss later. In this context, it is important to note that the marked shift of banks from residential to commercial mortgages was not symptomatic of mortgage lending in general. Figure 6 shows that, for all financial intermediaries, the shares of aggregate mortgage lending going to the residential and commercial sectors have been relatively stable.

4. Roughly speaking, it is possible to divide commercial loans into two categories: those made to smaller, less well known firms that require evaluation and monitoring and those made to highly rated firms that require relatively little information-processing. The former are typically priced off the prime lending rate, while the latter are typically priced off the cost of issuing large CDs, the banks' marginal source of funds.
5. Underlying the growth of commercial real estate borrowing were both tax incentives and relaxation of regulatory constraints on banks in the early 1980s. Subsequent reversals of the tax incentives contributed to the decline in real estate. See Litan (1992) and Hester (1992).
6. Some qualification is in order since government-sponsored securitized mortgages are treated as securities rather than mortgages in intermediary accounting statements. We thank Myron Kwast for pointing this out.

The movement of banks into commercial real estate reflects part of a broader trend in bank lending since the 1970s. High-quality assets such as securitized residential mortgages or commercial loans to highly rated firms move off bank balance sheets. In a fight to maintain market share, banks exploit their comparative advantage in information-intensive lending by moving into riskier, less liquid assets. Banks' comparative advantage stems partly from experience in evaluating and monitoring. It also stems partly from the nature of the regulatory system, particularly the nature of the public safety net. Later we return to these issues.

2.1.2 Bank Liabilities The flow of funds accounts divide bank liabilities into four categories: checkable deposits, small time and savings deposits, money market liabilities, and long-term debt. Figure 7 shows the long-term trends. There are two important patterns.

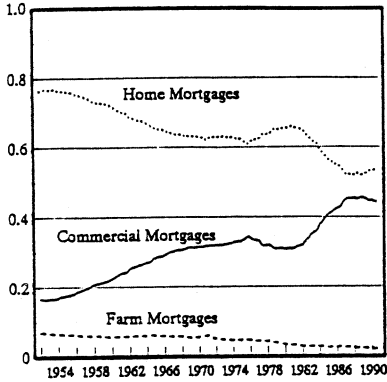
Perhaps the most obvious trend is the secular decline in the relative importance of checkable deposits, in favor of interest-bearing liabilities.⁷ As late as 1960, nearly 60% of bank liabilities were checkable deposits, and only about 30% were small time and savings deposits. The use of money market instruments and long-term debt was negligible. By 1990, checkable deposits were least important, less than 20% of total liabilities. Small time and savings deposits had climbed to 40%, while money market instruments and long-term debt each had climbed to around 20%.

The second important trend, which is closely related to the first, is the increased use of managed liabilities relative to deposits. Managed liabilities are short-term instruments that pay market-determined rates of interest. In contrast to deposits, which are relatively immobile in the short run, managed liabilities are highly interest elastic. Managed liabilities permit banks to rapidly adjust their stock of loanable funds. Money market instruments are the prime example. There are two main types of money market liabilities (also known as *purchased money*): large time deposits and federal funds plus security repurchase agreements. The former (large CDs) typically have maturities that vary from 90 days to a year, while the latter consist largely of overnight and weekly loans. The use of both types of instruments grew sharply in the early 1970s, as deregulation permitted the development of the money market.

Recently, banks also appear to be treating small CDs as managed liabilities. With the deregulation of rates, small CDs have become increasingly sensitive to market forces. About two-thirds of small time

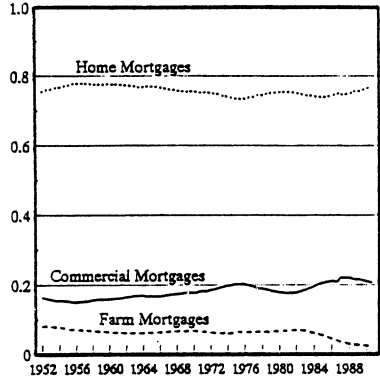
7. Checkable deposits include demand deposits and retail transactions deposits such as NOW accounts. While NOW accounts pay interest, these rates appear much less sensitive to market forces than rates on other interest-bearing bank liabilities.

Figure 5 COMPOSITION OF COMMERCIAL BANK MORTGAGES^a



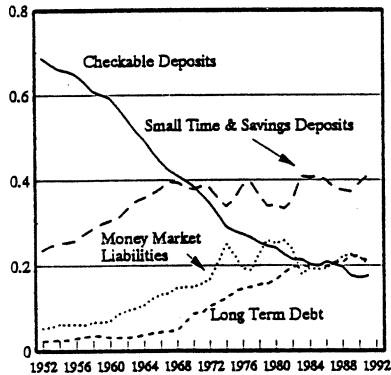
^aFractions of total mortgages. (Home mortgages include multifamily residential mortgages.)

Figure 6 COMPOSITION OF MORTGAGES FOR ALL INTERMEDIARIES^a



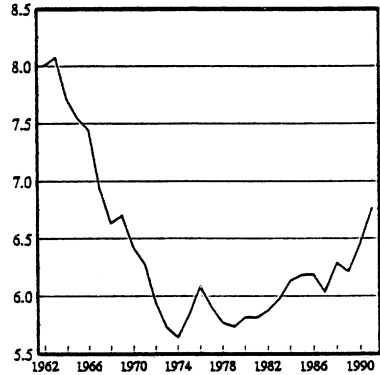
^aFractions of total mortgages. (Home mortgages include multifamily residential mortgages.)

Figure 7 COMPOSITION OF COMMERCIAL BANK LIABILITIES^a



^aFractions of total liabilities. (Money market funds include Federal funds, security repurchase agreements, and large time deposits.)

Figure 8 BANK EQUITY CAPITAL AS A PERCENTAGE OF TOTAL ASSETS



Sources: Flow of Funds Accounts (Figs. 5-7), FDIC (Fig. 8).

and savings deposits are small CDs. Thus, if we include small CDs along with money market instruments in the measure, managed liabilities now constitute more than half of short-term bank obligations.

The increased use of managed liabilities, and of money market instruments in particular, has a number of important implications. One obvious implication is downward pressure on banks' net interest margins (the difference between the return per dollar on the asset portfolio and the interest cost per dollar of liabilities). Another is a rise in the interest sensitivity of bank liabilities. Now, in contrast to years past, an adverse movement in short-term rates may substantially raise banks' interest expenses. The development of the money market has also served to reduce the constraints of restrictions on interstate banking. The money market permits banks to cross state borders to obtain short-term funds (or, in the case of the money center banks, to cross international borders).

It is also true that the development of the money market has posed a vexing problem for regulators. In some ways, the failure of the regulatory system to appropriately adapt to the changes introduced by the money market planted the seeds for the problems the banking industry faces today. With the efficiency gains of the money market came the cost of increased exposure to liquidity risk. While textbook descriptions of bank runs still conjure up images of people rushing through the doors of depository institutions with passbooks in hand, the most likely source of a widespread banking collapse today would be a panic withdrawal of money market instruments. Because these instruments are typically in excess of \$100,000, they are not covered by deposit insurance. For this reason, and because they are highly mobile funds, abrupt withdrawal is a possibility. The key point is that, in the current environment, the stability of the banking system—indeed, the stability of the overall financial system—is tied critically to the judgments of lenders in the money market.

Indeed, the most recent experience with a system-threatening run, the collapse of Continental Illinois in 1984, essentially involved a panic withdrawal by large CD holders. Rumors of insolvency precipitated the run on the money center bank, which had been funding roughly 90% of assets with purchased money (Hetzl, 1991). As Greider (1987) described, the concern of both the Federal Reserve and the FDIC was that, if left unchecked, the Continental crisis could induce a systemwide collapse. Many of the Continental's creditors were other banks. More generally, the regulators feared that losses by Continental's creditors might induce runs on a number of other large banks that had been weakened by the 1981–1982 recession. It was this fear that induced the

banking authorities to intervene in Continental and protect the uninsured creditors.

It was also an outcome of the Continental crisis that the banking authorities in the United States formally certified the policy of too-big-to-fail. The policy was implicitly in practice at least since the early 1970s, with the bailout of Franklin National (Boyd and Runkle, 1993; Hetzel, 1991; Isaac, 1993). However, in September 1984, in the wake of the Continental intervention, the Comptroller of the Currency testified that 11 bank holding companies were too-big-to-fail. Further, in practice, the policy appears to have been extended in varying degrees to banks outside the top 11. It is important to recognize that the doctrine refers loosely to a menu of policies that vary from lenient treatment at the discount window or in the valuation of assets to direct infusion of capital and protection of uninsured creditors.

Plugging one hole in the dike, however, opened up another. The too-big-to-fail policy, of course, indiscriminately subsidized risk taking by large banks. At the same time, it created a nontechnological incentive for banks to become large.⁸ Despite being a well-intentioned effort to protect against liquidity panics in the money market, the policy nonetheless helped create the climate for the current crisis.⁹ We return to this issue repeatedly, because it is fundamental to the policy debate.

Finally, Figure 8 illustrates the secular behavior of the ratio of bank equity capital to assets. By definition, bank equity capital equals the difference between assets and liabilities. It specifically equals the sum of common and preferred stock outstanding and undistributed profits. Capital is important because it provides a buffer to absorb loan losses. Bank capital/asset ratios must satisfy minimum regulatory standards (currently in the process of change). From the early 1960s to the early 1980s, the aggregate capital/asset ratio dropped by roughly a quarter, from around 8% to below 6%. The growth in banking assets afforded by the development of the money market (especially over the period 1962–1974) was not matched by growth in bank equity.

Since the early 1980s, the aggregate capital/asset ratio has climbed on

8. O'Hara and Shaw (1990) presented evidence that news of the Continental bailout policy raised the stock prices of large banks, but not the stock prices of small banks (which O'Hara and Shaw dubbed too-small-to-save [p. 1588]).
9. We are not suggesting that the too-big-to-fail policy completely eliminated market discipline over large banks. Indeed, Continental management was fired. One should not focus on this policy in isolation of other events. As we discuss later, we believe it was the combined climate of too-big-to-fail, competitive pressures on banking, and possibly problems of managerial entrenchment (e.g., Boyd and Graham, 1991; Gorton and Rosen, 1992) that contributed to the substantial rise in risk taking by large banks.

average. It is important to recognize, however, that this growth was largely a response to increased regulatory pressure in the wake of mounting bank and S&L failures and, relatedly, to new capital standards that were phased in over the last five years (which we discuss later). Much of the growth in this ratio also reflected a contraction in the denominator: assets. Because of the kinds of informational asymmetries stressed by Myers and Majluf (1984), issuing new equity is expensive for banks. Banks typically use retained earnings to build equity (Baer and McElravey, 1993). As a number of studies have indicated (Bernanke and Lown, 1991; Peek and Rosengren, 1992), meeting capital requirements in recent years has forced many banks to contract asset growth.

2.1.3 The Relation Between Asset Size and Balance Sheet Composition The aggregate balance sheets mask some important differences across size classes of banks. Generally speaking, smaller banks adopt more conservative asset and liability positions than do large banks. An important policy issue is whether these differences are due to technological factors or to a regulatory environment that favors large banks.

Following the convention of the *Federal Reserve Bulletin*, we divide banks by assets into four size classes: small (those with assets less than \$300 million), medium (\$300 million–\$5 billion), large (greater than \$5 billion), and large and money center (the 10 largest). Figure 9 shows the portfolio composition of interest-bearing assets for each of these size classes. The data are based on averages over the five-year period, 1987–1991. The percentage of loans in the asset portfolio varies positively with size, ranging from 59% for small banks to 72% for the money center banks. Conversely, the percentage of security holdings varies negatively: from 31% for small banks to 10% for the money centers.

Figure 10 disaggregates loans by bank size. The share of loans allocated to business lending—the sum of C&I and commercial real estate lending—varies positively with size. Both the consumer and residential real estate shares vary negatively. Because business lending generally accounts for the substantial majority of loan losses, the general picture, then, is that larger institutions hold riskier asset positions. Later we will present some information on loan performance that is consistent with this contention.

Figure 11 characterizes the composition of liabilities. The key point here is that the relative use of core deposits (transaction and savings and time deposits) shrinks with size, while the relative use of money market instruments increases. Nearly 90% of small bank liabilities are core deposits. Conversely, money market instruments constitute roughly 42% of large bank liabilities and 54% of money center bank

Figure 9 COMPOSITION OF INTEREST BEARING ASSETS—BY BANK SIZE

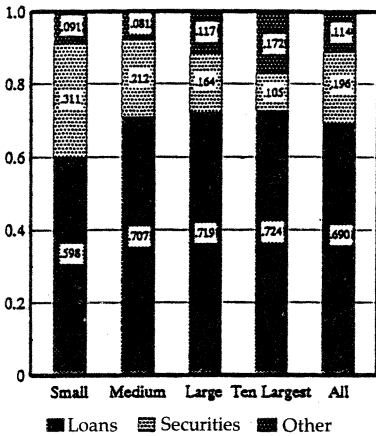


Figure 10 COMPOSITION OF LOANS—BY BANK SIZE

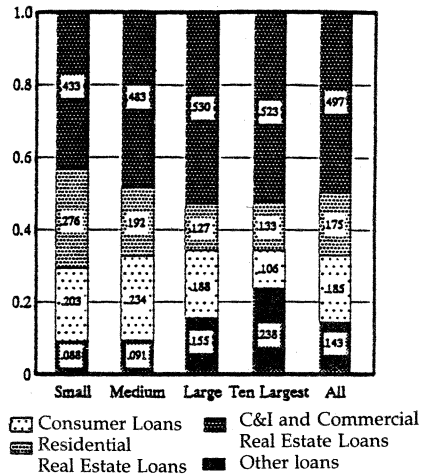


Figure 11 COMPOSITION OF LIABILITIES—BY BANK SIZE

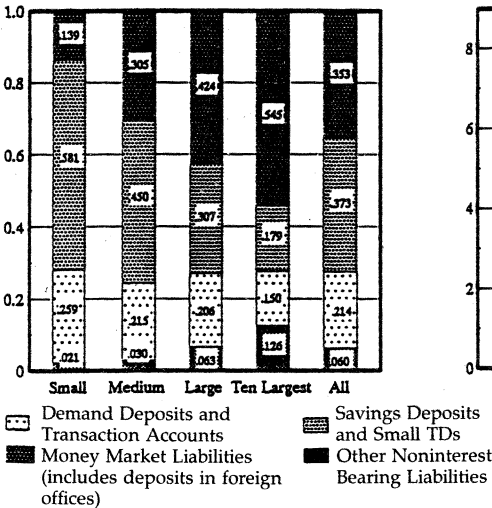
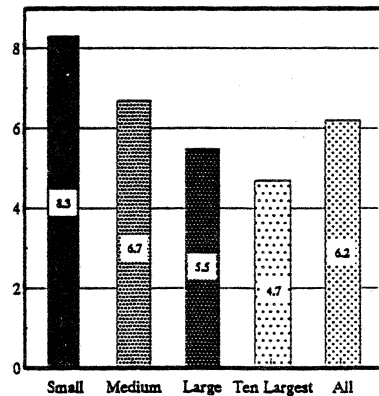


Figure 12 BANK EQUITY CAPITAL AS A PERCENTAGE OF TOTAL ASSETS—BY BANK SIZE



Source: Federal Reserve Bulletin. Data are averaged over the period 1987–1991.

Note: The definitions of bank asset size are as follows: small: \$0–\$300 mil., medium: \$300 mil.–\$5 bil., large: \$5 bil. excluding 10 largest banks.

liabilities. Further, the money center banks obtain more than half of their purchased funds from abroad. (Deposits in foreign offices are mainly money market instruments.) An implication of the differences in liability structures is that larger banks have thinner net interest margins. As Figure 13 illustrates, the net interest margin varies from 3.9% for small banks to 2.8% for the money centers.

In addition to holding riskier asset portfolios and employing greater use of money market instruments, larger banks have lower capital/asset ratios, as Figure 12 shows. Indeed, large banks were responsible for much of the secular thinning of the capital/asset ratio portrayed in Figure 8. Again, a key policy question is, Why? Does this reflect some kind of technological advantage, e.g., a better ability to diversify risks or scale economies in loan processing?¹⁰ Or does it instead reflect mainly the effect of regulatory bias induced at least in part by a too-big-to-fail policy? We return to this issue later with an assessment of the performance of banks across size classes.

2.2 THE GROWTH OF OFF-BALANCE SHEET ACTIVITIES

In recent times, commercial banks have changed considerably the way they do business. To a large extent, these changes have involved moving traditional activities off the balance sheet. A simple but common example is the issuance of a *standby letter of credit*. With this arrangement, a bank guarantees a loan made by some third party, instead of actually funding the loan itself. The loan does not appear on the asset side of the bank's balance sheet; however, its contingent liability is essentially the same as if it did.

Figure 14 provides some indication of the rise in the relative importance of off-balance sheet activities. Fee income (income from off-balance sheet activities) as a percentage of total bank assets doubled between 1979 and 1991, from 0.75% to more than 1.5%.¹¹ At the same time, fee income as a percentage of total income before operating costs (the sum of fee income and net interest income) rose from about 20% to about 33%. Further, the relative importance of off-balance sheet activities varies positively with bank size. Figure 13 indicates that for the money center banks, fee income is about 40% of total income before operating costs.

For several reasons, it is important to account for off-balance sheet activities. First, the unadjusted balance sheet numbers overstate the

10. McAllister and McManus (1992) presented evidence of gains to diversification for smaller banks.

11. Other sources of fee income include service fees on both deposit and loan accounts.

decline in bank activity. A good fraction of the relative drop in bank assets simply reflects an unbundling of the traditional functions involved in intermediating loans, not banks vanishing from the scene. As we discuss, banks remain important for originating information-intensive lending, although the fraction of loans they keep on their balance sheets after origination has been diminishing. Perhaps more significant from a policy standpoint, banks remain extremely important in providing short-term loans to meet working capital needs, i.e., in providing liquidity for businesses. Commercial banks remain involved in virtually all short-term working capital lending, either directly or indirectly through off-balance sheet activity, as we discuss. A banking crisis could have serious ramifications for the flow of short-term business liquidity (Corrigan, 1983, 1991).

A second and closely related reason for examining the off-balance sheet numbers is that most off-balance sheet activities entail some degree of risk. Opinion is divided on the degree of risk exposure, and making a firm judgment requires maneuvering through uncharted territory. Nonetheless, regulators have recently extended capital requirements to banks' off-balance sheet assets. Any policy discussion now requires an understanding and assessment of off-balance sheet activities.

There are three basic types of off-balance sheet activities: loan commitments and standby letters of credit, loan sales and securitization, and provision of derivative instruments (e.g., swaps). We describe each in turn and offer a rough assessment of its relative importance.

2.2.1 Loan Commitments and Standby Letters of Credit Most commercial bank lending now is done on a commitment basis. Firms anticipating needs for funds will arrange for a *loan commitment*, which is essentially a line of credit. In addition to using commitments to fund planned investments, firms also use credit lines as a form of precautionary liquidity (Avery and Berger, 1991a). In times when there is a general scramble for liquidity, such as the onset of recessions when firms must finance unsold inventories and hoarded labor, banks can expect firms to draw down their credit lines. A commitment is thus a liquid claim on a bank, similar in spirit to a deposit claim. It follows that commitments impose a certain degree of liquidity risk on banks, as do deposits.

As discussed earlier, a *standby letter of credit* is a guarantee made by a bank for a loan extended by a third party. In this way, it is an indirect vehicle through which a bank provides a borrower with liquidity. To indicate the general importance of standby letters of credit and commitments, Figure 15 plots the recent behavior of the stock of each instru-

Figure 13 NET INTEREST MARGIN AND NONINTEREST INCOME AS A PERCENTAGE OF ASSETS—BY BANK SIZE

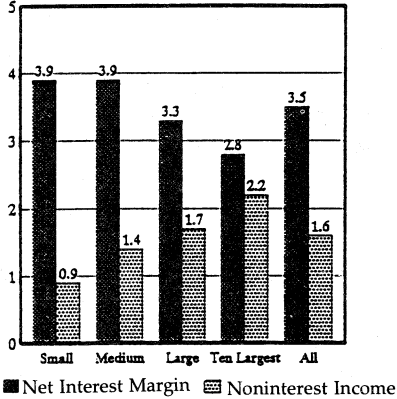


Figure 14 NET INTEREST MARGIN AND NONINTEREST INCOME AS A PERCENTAGE OF ASSETS—ALL BANKS

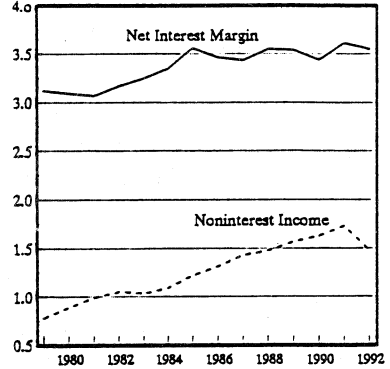
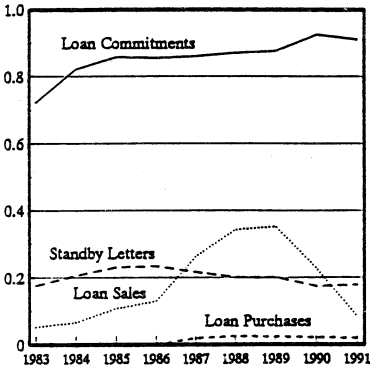
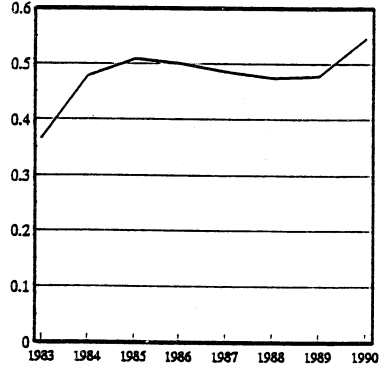


Figure 15 SELECTED GROSS OFF-BALANCE SHEET NUMBERS FOR BUSINESS LENDING^a



^aFractions of total C&I loans.

Figure 16 CREDIT EQUIVALENT OFF-BALANCE SHEET POSITIONS AS A FRACTION OF TOTAL C&I LOANS



Source: Federal Reserve Bulletin (Figs. 13–14), and Call Report (Figs. 15–16).

Note: The definitions of bank asset size in Figure 13 are as follows: small: \$0–\$300 mil., medium: \$300 mil.–\$5 bil., large: over \$5 bil., excluding the 10 largest banks.

ment outstanding relative to C&I lending. The ratio of standby letters of credit to C&I lending was about 20% over the period 1983–1991. The ratio of commitments to C&I lending rose from 74% in 1983 to 90% in 1991.

Part of the relative growth in commitments over this period was due to the rapid development of the commercial paper market. As an outgrowth of the Penn Central crisis in 1974, virtually all commercial paper issuers must secure their loans with backup lines of credit from banks.¹² Viewed in this light, commercial paper issued by a nonfinancial company may be thought of as a C&I loan that is taken off the bank's balance sheet. The bank provides its services to the commercial paper borrower by issuing a backup line of credit and earns a fee for so doing. Because the borrower is sufficiently creditworthy (and, indeed, has been certified by the bank issuing the credit line), nonbanks are willing to hold the paper. But the bank remains in the picture, because the firm issuing commercial paper may have to draw on its credit line in order to meet the obligation on its paper.

The ratio of nonfinancial commercial paper to C&I loans has increased rapidly in recent years, going from less than 5% in 1969 to over 15% in 1991. The firms moving into the paper market were typically large, highly rated companies. Thus, instead of directly providing loans to these firms, banks switched to indirectly supporting loans to these companies by offering backup lines of credit. In this way, the growth of the nonfinancial commercial paper issues represents the movement of a component of lending, a high-quality component in particular, off the banks' balance sheet.

Through a similar mechanism, banks are also involved in supporting lending by finance companies. A recent study by D'Arista and Schlesinger (1992) has documented that 90% of the commercial paper issued by the 15 largest finance companies is backed by a bank line of credit or some other form of bank guarantee (such as a standby letter of credit).

An important corollary implication is that banks remain vitally important to the provision of short-term working capital finance. C&I loans, nonfinancial commercial paper, and finance company loans account for virtually all the short-term business finance in the United States. Thus, either directly or indirectly, commercial banks remain vital to the flow of business liquidity.

2.2.2 Loan Sales and Securitization Another important recent development is the sale of loans that banks initiate. For example, a firm might

12. Brimmer (1989) provides an excellent discussion of the Penn Central crisis and the ramifications for the commercial paper market. See also Calomiris (1989).

come to a bank for a long-term loan to finance capital equipment. The bank provides the necessary evaluation and designs the terms and covenants. After earning a fee, it sells the loan, often in the form of a private placement, to another intermediary, possibly an insurance company. If the bank retains no explicit liability (i.e., if the loan is sold *without recourse*), the loan is removed from the bank's balance sheet.

Although loan sales have grown over time, it is important to recognize that a good fraction of bank loans are not sufficiently liquid to be sold on secondary markets. Figure 15 also presents some information on the recent behavior of commercial loan sales relative to total C&I lending. The ratio of commercial loan sales to C&I loans grew rapidly in the latter half of the 1980s, from about 10% in 1986 to more than 30% in 1989. This phenomenon parallels the surge in junk bond financing over this period. Notably, commercial loan sales, along with junk bond financing, seem to have shrunk in relative importance over the last several years. In 1991, the ratio of loan sales to C&I lending was back down to 10%. Thus, while banks do sell some commercial loans, it would be incorrect to infer that most of their commercial assets are sufficiently liquid to be sold and valued on secondary markets.

A phenomenon closely related to loan sales is securitization. *Securitization* involves pooling a large number of loans with fairly uniform features and repackaging them as asset-backed instruments that may be sold on secondary markets. Candidate types of loans for securitization have fairly homogeneous features, are reasonably well collateralized, and do not require intensive monitoring. Examples include residential mortgages, automobile loans, and credit card balances. Unfortunately, there are no good aggregate data that trace the extent of this activity back to the originating banks. Although innovation in this area is continuing, securitization is still not a common practice for highly idiosyncratic, information-intensive commercial loans.

2.2.3 Derivative Instruments Provision of derivative instruments is the most rapidly growing off-balance sheet activity—and the least understood. *Derivative securities* involve trading of risks on existing securities. A common example is an interest rate *swap* in which two parties exchange sequences of interest payments. For example, in a “plain vanilla swap,” a fixed-rate commitment is exchanged for a floating-rate commitment. Swaps often involve different currencies, e.g., exchanging a U.S. dollar-denominated sequence of interest payments for one denominated in deutsche marks. Indeed, the use of interest rate swaps is believed to have originated in the Eurobond market in 1981. In addition to interest rate and currency swaps, banks now trade a number of derivative securities based on swaps, e.g., “swaptions,” “caps,” and “collars.”

Derivatives are often intermediated through brokers, and large commercial banks are some of the largest brokers in this market. Brokers, including commercial banks, do not always fully net (i.e., hedge) their positions. Acting as a swap broker thus often entails risk taking.

Some regulators, most notably E. Gerald Corrigan (1991), have expressed grave concerns about the risk exposure of commercial banks operating in the swaps and derivatives markets. The markets are largely unregulated, and new securities continue to be developed at a rapid pace. To provide some idea of the size of the market, Greenbaum and Thakor (1992) estimate that in the fourth quarter of 1989, commercial banks held gross swap positions of over \$500 billion. The gross swap position, however, is simply a measure of the principal amount on the security underlying the traded interest payment streams. Therefore, it does not meaningfully measure a bank's net risk exposure. Unfortunately, even among market participants, there is a general lack of agreement over how to quantify risk exposure, especially for the more exotic instruments. As a consequence, there are few, if any, aggregate indicators that are useful to guide thinking about this issue.

Regulators seem mainly concerned that derivatives activity in the United States is concentrated among seven large commercial banks. The fear is that losses on derivatives trading could force the failure of one of these large institutions, which would send shock waves not only through the derivatives markets, but also through money and exchange rate markets to which derivatives trading is closely linked through complex arbitrage strategies (Phillips, 1992). In the absence of any reliable data, it is difficult to assess these arguments. Nonetheless, this clearly seems to be an issue deserving of more attention.

2.2.4 Credit Equivalents of Off-Balance Sheet Activities The new Bank of International Standards (BIS) capital standards explicitly recognize the importance of off-balance sheet activities for risk exposure. They require that off-balance sheet commitments be transformed into *credit equivalents* for the purpose of setting capital requirements against these activities. The procedures for doing this are quite complicated and have been developed by the Federal Reserve System and other central banks over a period of several years. What we do here is to simply take the credit equivalent total for each bank and compute the aggregate. Doing so provides some feel for the aggregate importance of off-balance sheet activities and for the risk exposure they entail.

The Federal Reserve's Board of Governors provided us with the off-balance sheet data. The computer program that does the actual computation of credit equivalents is in Berger and Udell (forthcoming). The earliest year for which data are available is 1983. Although a large num-

ber of off-balance sheet activities are included in these computations (e.g., foreign exchange, future, option, and swap positions), about 90% of the total credit equivalents result from two off-balance sheet items: standby letters of credit and loan commitments.¹³ Figure 16 shows the ratio of off-balance sheet credit equivalents to C&I loans, computed quarterly over the period 1983–1991 with the Berger and Udell procedure. Figure 16 also shows that off-balance sheet activities, in terms of the credit equivalents, now represent a substantial fraction of bank assets, roughly equal to half of C&I lending.

To summarize, increased competition and financial innovation have induced (1) a movement of liquid high-quality assets off bank balance sheets in favor of less liquid assets such as commercial real estate loans and (2) an increased engagement in off-balance sheet activities. Further, there is a strong correlation between size and portfolio structure with large banks appearing to adopt a riskier portfolio stance.

3. *Recent Performance*

In this section, we pinpoint the sources underlying the bleak performance of banks in recent years. We begin by presenting a set of aggregate measures of bank performance. We then turn to an analysis of disaggregated data. The goal here is to sort out the relative importance of regional factors versus risk taking by large banks as determinants of the industry's poor overall performance.

3.1 AGGREGATE PERFORMANCE MEASURES

Figure 17 presents the trend in two commonly used measures of bank profitability: the rate of return on equity and the rate of return on assets. Both measures exhibit similar behavior over the period 1973–1991. Both decline fairly steadily after 1979. The exception (for both measures) is a sharp drop in 1987 followed by a recovery in 1988. However, the plunge in 1987 reflects large write-offs of international loans, the timing of which was somewhat arbitrary. The main point of Figure 17 is that after trending down since 1979, bank profitability in the latter half of the 1980s was significantly below its average for most of the 1970s. The rate of return on equity dropped from about 14% in 1979 to an average of about 8% over 1989–1991. Similarly, the rate of return on assets dropped

13. Some have argued that the capital that banks are required to set against swaps (under the new Bank for International Standards agreement) does not adequately reflect the risk.

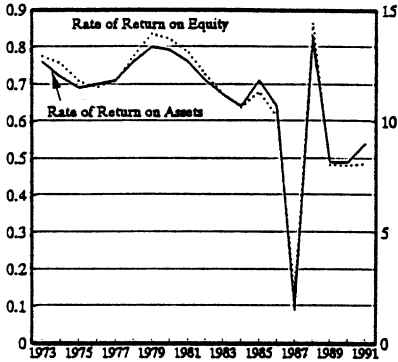
from about 0.75% to 0.5%. Indeed, bank profitability was lower over the last several years than during the severe 1981–1982 recession.

Figure 18 shows that a rise in the rate of loan losses accompanied the general decline in profitability. Provisions for loan losses increased during the 1981–1982 recession, as would normally be the case in a downturn. However, the upward trend in these provisions continued through the 1980s. The loan loss rate rose from about 0.2% of assets in the late 1970s to nearly 1% of assets over the last several years. Conversely, the net interest margin actually rose slightly over this period, from about 3.3% in 1977 to 3.8% in the mid-1980s to an average of about 3.6% over the last several years. The aggregate measures thus suggest that the decline in bank profitability stemmed from loan losses rather than from a shrinking net interest margin. Why didn't the net interest margin drop over this period, despite increased competition and deregulation of interest rates on bank liabilities? In our view, the slight upward trend of the net interest margin is symptomatic of the decline in bank asset quality over the period. That is, the rise in the aggregate loan spread likely reflects the decline in the asset quality mix over the period. The sharp rise in loan losses over the period also fits the general story. In the next several subsections, we bring more evidence to bear on this issue.

3.2 SIZE AND REGIONAL EFFECTS IN BANK PERFORMANCE: DESCRIPTIVE EVIDENCE

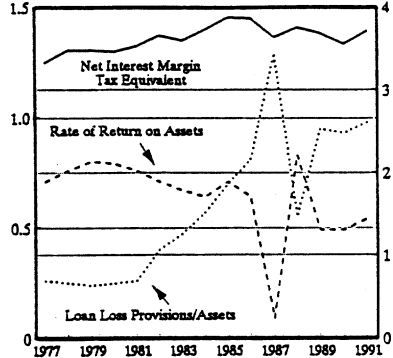
It is first useful to provide some background on the cross-sectional distribution of banks by size and region. We divide banks into six asset-size categories based roughly on the classifications used by the FDIC. The asset-size categories range from less than \$50 million to more than \$10 billion. Figure 19 presents information on the percentage of banks and the percentage of bank assets across the six size classes, based on averages constructed over the period 1983–1991. Clearly, though there are many banks in the United States, bank assets are concentrated among a relatively tiny percentage. Banks with more than \$10 billion in assets constitute only 0.3% of the total number; however, they held 37.4% of aggregate bank assets on average over the nine-year sample. Banks with more than \$1 billion in assets numbered 2.5% of the total, but held about two-thirds of overall assets. At the other extreme, nearly 80% of the banks had less than \$100 million in assets, but these banks in total only held about 13% of the total. Figure 20 similarly portrays the distribution of banks across census regions. In NBER terms, large banks tend to be located near salt water (East and West Coasts), while small banks tend to concentrate around fresh water.

Figure 17 COMMERCIAL BANK PROFITABILITY



Left Axis: Percent — Rate of Return on Assets
 Right Axis: Percent — Rate of Return on Equity

Figure 18 COMMERCIAL BANK PERFORMANCE MEASURES



Left Axis: Percent — Rate of Return on Assets, Loan Loss Provisions on Assets
 Right Axis: Percent — Net Interest Margin

Figure 19 DISTRIBUTION OF BANKS AND BANK ASSETS—BY SIZE CLASS

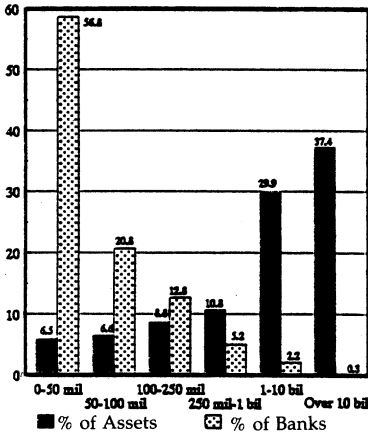
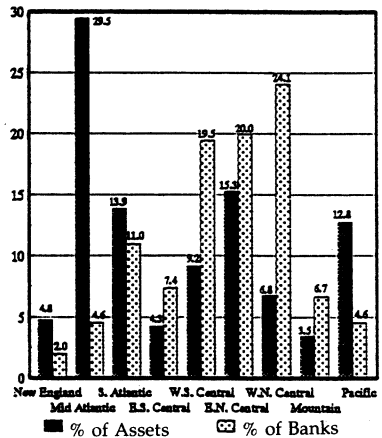


Figure 20 DISTRIBUTIONS OF BANKS AND BANK ASSETS—BY CENSUS REGION



Source: Federal Reserve Bulletin (Figs. 17–18), and Call Report (Figs. 19–20). The data are averages over the period 1983–1991.

Table 1 presents evidence on bank failures disaggregated by census region. Over the period 1980–1991, 1,351 banks failed. The peak was the five-year interval 1986–1990, when 70% of the failures occurred. Not surprisingly, there is a strong regional pattern that is closely associated with the temporal pattern of certain regional economic difficulties. The (West South Central) oil states, principally Texas, accounted for the majority of failures: nearly 700. These failures are bunched during 1986–1990, roughly the period when oil and real estate prices collapsed in this region. A distant second in importance are the (West North Central) agricultural states. Agricultural problems in this region during the mid-1980s precipitated nearly 200 bank failures.

For two related reasons, however, the raw failure numbers portray an incomplete picture. First, these numbers do not take into account the size of failed banks. While small bank failures are far more plentiful, a large bank failure places far greater pressure on the FDIC insurance fund. Despite the rash of failures in the agricultural states, e.g., the assets of closed banks never exceeded 1% of the total in the region, because virtually all of the banks involved were small. Similarly, despite there being only 12 bank failures in New England in 1991, assets of failed banks amounted to 8.8% of the regional total. Table 2 confirms the general point. It shows that in the peak period of 1986–1990, banks with assets more than \$500 million accounted for less than 4% of total bank failures, but nearly 60% of the total assets of failed banks. Further, the three banks with assets more than \$5 billion that failed accounted for more than 30% of the total failed-bank assets. A second reason the failure data are misleading is that they do not take into account the historical regulatory bias in favor of large banks. Because the FDIC has been less willing to close large banks, the failure numbers do not accurately capture overall bank performance.

The biases inherent in using failure data as indicators of bank performance lead us to consider several finer measures. Figures 21 and 22 report, by census region, the ratios of loan loss provisions to assets and net income to assets, respectively. The numbers are averages across individual banks within the respective region over the period 1983–1991. By both indicators, the banks in the West North Central region (which includes Texas) performed worst. Both figures suggest, however, that regional considerations alone do not provide a complete story. In the troubled New England region, e.g., banks on average performed at the national mean in terms of loan loss provisions and only slightly below the national mean in terms of net income. Similarly, the poor performance of the money center banks located in the Middle Atlantic region was at variance with other banks there, which performed above the national mean on average.

Table 2 BANK FAILURES BY SIZE CLASS: 1986-1990

<i>Asset size class</i>	<i>Number of failed banks</i>	<i>Percent of total failures</i>	<i>Assets of failed banks (\$ mil.)</i>	<i>Percent of total failed-bank assets</i>
Less than \$500 million	912	96.6	\$44.4	40.4
\$500 million-\$1 billion	19	2.0	12.1	11.0
\$1 billion-\$5 billion	10	1.1	18.8	17.1
More than \$5 billion	3	0.3	34.6	31.4

Source: FDIC.

Figure 21 PROVISIONS FOR LOAN LOSSES TO ASSETS—BY CENSUS REGION

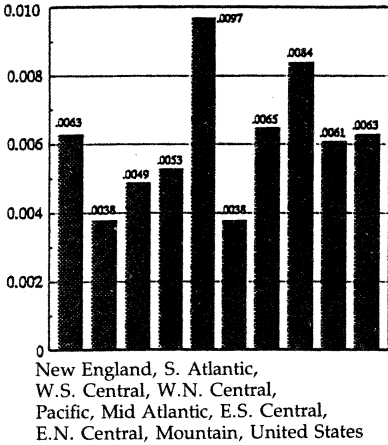


Figure 22 NET INCOME TO ASSETS—BY CENSUS REGION

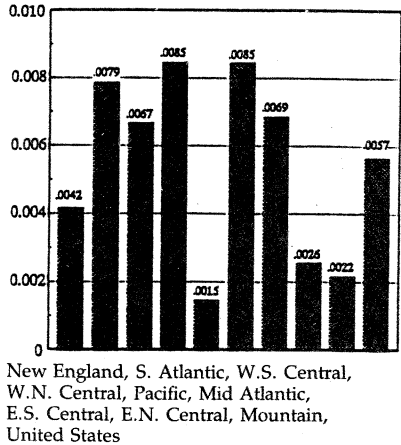


Figure 23 PROVISIONS FOR LOAN LOSSES TO ASSETS—BY BANK ASSET SIZE

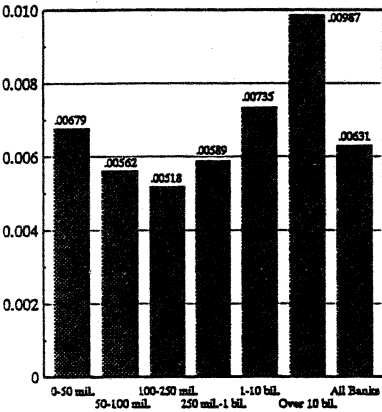
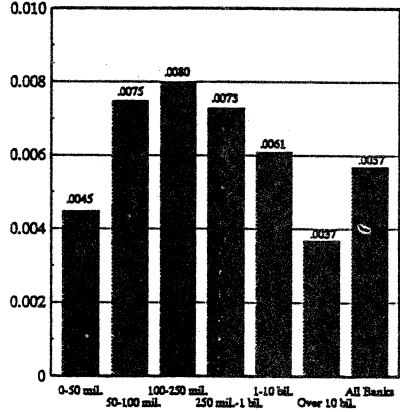


Figure 24 NET INCOME TO ASSETS—BY BANK ASSET SIZE



Source: Call Report. Data are averaged over individual banks over 1983-1991.

Splitting the data by size yields a clearer picture. Figure 23 reports the ratio of loan loss provisions to assets across the six size classes of banks, and Figure 24 reports the ratio of net income to assets. Across size classes, there is a U-shaped pattern to loan loss provisions. Banks in the largest category (more than \$10 billion in assets) performed worst by this measure. The ratio of provisions to assets declines with size, reaching a minimum at the class of banks between \$100 million and \$250 million in assets. The ratio then begins to rise monotonically as size declines further.

Net income to assets is of course a better overall indicator of performance than is provisions to assets. However, the U-shaped pattern of the latter is simply mirrored by a hump-shaped pattern of the former, as Figure 24 illustrates. Gauged by net income to assets, banks larger than \$10 billion still perform least well, and banks between \$100 million and \$250 million still perform best.

Judging from Figures 23 and 24, we see that relative loan loss performance influences the pattern of net income to assets across size classes. Losses on loans to less-developed countries (LDC loans) were likely an important factor because these losses were heavily concentrated among large banks. Perhaps less well known is that large banks also suffered disproportionately from commercial real estate lending. We know from the previous section that the fraction of commercial real estate loans in bank portfolios varied positively with size. However, even within the category of commercial real estate lending, large banks performed less well. Table 3 shows that in the third quarter of 1992, the percentage of noncurrent, or "problem," real estate loans ranged from 1.6% for the smallest banks to 7% for the largest banks. In every case, business-related real estate lending—"construction" and "commercial"—accounted for most of the noncurrent loans, but the share within each category rises steeply with bank size. Astonishingly, 21% of construction loans at the largest banks are noncurrent.

From a policy perspective, it is important to determine how well the negative correlation between size and performance survives, once we control for region. For example, there is a regional dimension as well as a size dimension to commercial real estate problems. Table 4 shows that noncurrent real estate loans are heavily concentrated in the North-East and the West, the two main areas where real estate problems linger. Thus, it is possible that the correlation between size and performance of the real estate loans is simply due to the fact that the banks in the troubled North-East and West are larger on average. If this is the case, then restrictions on interstate banking might be primarily responsible for the disproportionate concentration of loan losses. If the nega-

Table 3 PROBLEM REAL ESTATE LOANS BY BANK SIZE* (THIRD QUARTER 1992)

Category of loans	Size of bank (%)			
	Less than \$100 mil.	\$100 mil. - \$1 bil.	\$1 bil. - \$10 bil.	Over \$10 bil.
All real estate loans	1.64	2.18	4.05	7.07
Construction	2.76	5.62	12.65	21.96
Commercial	2.10	3.01	5.33	10.84
1-4 Family	1.21	1.23	1.50	1.76

Source: FDIC.

*Each entry is the percentage of loans noncurrent. A *noncurrent loan* is one that is past due 90 days or more or that is in a nonaccrual status.

Table 4 PROBLEM REAL ESTATE LOANS BY REGION^a (THIRD QUARTER 1992)

Category of loans	Region					
	North-East	South-East	Central	Mid-West	South-West	West
All real estate	7.2%	2.5%	1.9%	1.5%	2.5%	5.1%
Construction	23.8	6.3	6.0	2.4	4.0	16.9
Commercial	10.0	3.8	2.8	3.1	3.9	5.9
1-4 Family	2.4	1.1	0.9	0.6	1.3	1.5
Home equity	1.7	0.4	0.4	0.3	0.7	0.7

Source: FDIC.

^aEach entry is the percentage of loans noncurrent. A *noncurrent loan* is one that is past due 90 days or more or that is in a nonaccrual status.

tive correlation between size and performance remains after controlling for location, then it is possible that distortions induced by a too-big-to-fail safety-net policy may have been important.

3.3 SIZE AND REGIONAL EFFECTS IN BANK PERFORMANCE: FORMAL EVIDENCE

We now investigate the relation between performance and size, after controlling for the influence of region. The data set we employ contains annual observations on individual banks over the period 1983–1991.¹⁴ The sample is obtained from the FDIC's call report and contains the universe of domestic insured commercial banks over this period.

We consider two performance measures: the ratios of net loan charge-offs to assets and net income to assets.¹⁵ Each, of course, is a measure of ex post performance. Our working hypothesis, particularly for interpreting the behavior of charge-offs, is that over the sample period a poor ex post performance is the consequence of a high degree of ex ante risk taking.¹⁶ The idea is that during the 1980s there was a series of large negative shocks (as Figs. 17 and 18 suggest) to the banking system and that by examining ex post returns we are getting some feel for the outer tails of the respective distributions.

For each bank, we average each of the two performance indicators over the sample period. We work with the time-averaged values of these indicators for several reasons. First, the timing of charge-offs and

14. Thus, the organizational entities we study here are banks. It is true that many banks are owned by bank holding companies, which control one or more banks and often nonbank affiliates as well. For many purposes, the most appropriate organizational entity is the consolidated holding company. However, the objective here is specifically to study bank performance. Consolidated statements for holding company banks are not easily available. Finally, although they do not control for regional effects, Boyd and Runkle (1993) obtain evidence of an inverse relation between performance and holding company size, similar to the inverse relation between size and performance that we find at the bank level.
15. Net loan charge-offs include all loans determined to be uncollectible net recoveries on (previously written-off) loans. This entry is not an accounting expense but rather a reduction in a reserve account. Provision for loan losses is the accounting expense entry that reduces profits and was discussed in Section 3. When the data are averaged over several years as we do here, the two loan loss measures are highly correlated. Thus, for the present purposes, it makes little difference which is employed. We consider charge-offs because we eventually want to make quantitative statements about actual losses.
16. Ideally, we would like to measure ex ante portfolio risk. However, this is extremely difficult to do for banks for several reasons. First, the sample period is relatively short. Second, the data are based on accounting rather than market value measures. There is considerable evidence that the accounting data are intentionally smoothed (e.g., see Boyd and Runkle, 1993). This has the effect of causing accounting measures to systematically understate risk.

income is to some degree arbitrary in the short run. Because clean market value assessments of the overall portfolio are unavailable, banks have some short-run discretion over when they report gains and losses. Over time, the discrepancy between accounting and market value indicators declines. Second, working with time-averaged data permits a more parsimonious representation of a model. In general, bank performance should vary over time with economic conditions. However, because we are mainly interested in uncovering secular relationships, it seems reasonable to average out the time effects: the benefit is a much simpler model to evaluate.

At least two types of bias are possible. First, some banks drop out of the sample over time. Because exit is most often due to failure, exit and performance are likely correlated. Omitting exiting banks from the sample could therefore bias the estimates. We adjust for this problem by averaging each of the performance indicators for a bank over its lifetime in the sample, even if the bank exists partway through the sample period. In this simple way, we include information from the exiting banks in our estimates.

The second possible bias is that bank performance could feed back and affect size. If a bank does not perform well, e.g., it may decide to contract its assets. We address this issue by using presample data to sort banks. Thus, we use the 1983 data (see Appendix) to sort banks into size groups as well as into regions. The performance indicators we use as dependent variables are then time-averaged over 1984–1991. For robustness, we also split the sample and work with time averages of the performance variables over 1987–1991. In this latter case, we use 1986 data to sort the banks.

The initial set of independent variables are dummies for census region and for size. We use the six size classes defined earlier (in Fig. 19). For several reasons, we use discrete indicators rather than a continuous variable for size. First, the earlier descriptive analysis suggests that the relationship between performance and size is likely to be highly nonlinear. Second, by using size class indicators that correspond closely to the categories the FDIC uses to report all types of bank data, we directly link our results with a variety of other types of information on bank performance. A similar consideration motivates the use of census regions to denote location: The FDIC uses this indicator to present information on performance across locations.

Let D_j^r denote a dummy for region j , D_k^s a size dummy for size class k , and \bar{x}_{ijk} the time-averaged value of a bank performance indicator. Then the basic model we estimate is given by

$$\bar{x}_{ijk} = a_j D_j^r + b_k D_k^s + \epsilon_{ijk} \quad (1)$$

where ϵ_{ijk} is a random error term and where, to identify the model, one of the coefficients on the six size class dummies is normalized at zero. We model bank performance as a linear function of a region-specific intercept, a_j , and a slope coefficient, b_k , that depends on the size class of the bank. Under the initial formalization given by Equation (1), we restrict the slope coefficient on size class to be identical across regions. We also consider a more general formulation that permits the size class slope coefficients to vary across regions, as given by

$$\bar{x}_{ijk} = a_j D_j^r + b_{jk} D_k^s \cdot D_j^r + \epsilon_{ijk}. \quad (2)$$

Here the slope coefficient on size, b_{jk} , is region specific.

Under the null hypothesis that size is unimportant to performance, the slope coefficients on size equal zero for each size class. If the null is true, then restrictions on interstate banking may be paramount in explaining bank performance. Roughly speaking, if the region dummies capture all the explanatory power, then it is likely that constraints on the banks' ability to diversify nationally have inhibited banking. But, if the too-big-to-fail policy has been a significant distortion (in the context of significant competitive pressures on banking and managerial entrenchment problems for large banks), then we should expect to reject the null. Further, after controlling for regional effects, we should expect an inverse connection between performance and size, especially at the upper tail of the size distribution.

Table 5 reports the results from estimating the basic model, described by Equation (1). There are four regressions, corresponding to two different dependent variables (the ratios of net charge-offs to assets and net income to assets) and two different sample periods (1984–1991 and 1987–1991).¹⁷ We normalize at zero the coefficient on the banks in size class 3 (\$100 million–\$250 million in assets). In each case, we easily reject the null that size class is unimportant. Further, to a first approximation, both the U-shaped pattern of loan losses and the hump-shaped pattern of net income across size classes that appeared earlier in Figures 23 and 24 remain after we control for the influence of region.

For net charge-offs, the coefficients on the size dummies increase monotonically, moving from size class 3 up to size class 6 (more than \$10 billion in assets).¹⁸ Further, this ordering of coefficients is statistically

17. Although we do not report the statistics here, the general results we obtain are robust to using the first half of the sample period, 1984–1986, and also to running the regressions year by year.

18. The results are the same if we use net charge-offs divided by loans, rather than net charge-offs divided by assets as the dependent variable. We chose the latter because we were interested in analyzing the ex post performance of the entire bank portfolio.

Table 5 MODEL OF BANK PERFORMANCE AND SIZE, CONTROLLING FOR REGIONAL EFFECTS^a

Equation (1)'s dependent variables and time periods ^c	Size class ^b						Adj. R ²	F
	1	2	3	4	5	6		
Net charge-offs/Assets 1984-1991	0.00029 (1.64)	-0.00042 (-2.04)	0	0.00069 (2.16)	0.00149 (4.56)	0.00467 (4.33)	0.11	232.59 (0.00)
1987-1991	-0.00014 (-0.61)	-0.00045 (-1.81)	0	0.00150 (3.37)	0.00254 (6.94)	0.00600 (4.81)	0.12	135.59 (0.00)
Net income/Assets 1984-1991	-0.00108 (-3.72)	0.00077 (2.43)	0	-0.00126 (-2.24)	-0.00237 (-4.47)	-0.00599 (-3.80)	0.10	144.66 (0.00)
1987-1991	-0.00236 (-6.11)	-0.0005 (-1.21)	0	-0.00185 (-2.34)	-0.0035 (-5.57)	-0.00556 (-4.30)	0.12	129.24 (0.00)

^aTable 5 reports estimates of a model that includes 9 region and 6 size class dummies, with size class 3 coefficient-normalized at zero. The *t* statistics are in parentheses and are corrected for heteroskedasticity using a White correction. The *F* statistic and the significance level reported in the last column refer to the test that all regional dummies are equal.

^bAsset-size classes: 1: \$0-\$50 mil. 2: \$50 mil.-\$100 mil. 3: \$100 mil.-\$250 mil. 4: \$250 mil.-\$1 bil. 5: \$1 bil.-\$10 bil. 6: over \$10 bil.

^cDependent variables are time-averaged over the respective sample periods. Independent variables are based on the year prior to the respective sample period.

Table 6 COEFFICIENT TESTS ON THE SIZE EFFECTS^a

<i>Dependent variables and time periods</i>	<i>Size classes compared</i>			
	6=5	6=4	5=4	2=1
Net charge-offs/Assets				
1984-1991	8.37 (0.00)	13.19 (0.00)	4.22 (0.04)	22.44 (0.00)
1987-1991	7.49 (0.01)	12.03 (0.00)	4.22 (0.04)	2.94 (0.09)
Net income/Assets				
1984-1991	5.00 (0.03)	8.36 (0.00)	2.66 (0.10)	68.21 (0.00)
1987-1991	2.32 (0.13)	6.39 (0.01)	3.31 (0.07)	38.23 (0.00)

^aTable 6 reports *F* statistics and significance levels for tests of equality of size coefficients between different size classes.

significant, as Table 6 indicates. An analogous set of results arises when the dependent variable is instead net income to assets.¹⁹

It is also interesting to observe that the smallest size banks (class 1, those with less than \$50 million in assets) performed less well than the next two larger classes. The difference, however, is sharper on average with net income to assets than with net charge-offs to assets. One interpretation is that the smallest size banks do not exploit scale economies that seem available at least up to the size 3 category.

We next turn to the more flexible model described by Equation (2), which permits the slope coefficient on size to vary across regions. Table 7 reports the coefficients on each size class averaged across regions, with the averages weighted by the percentage of banks in the size class of interest that are in the respective region. Table 7 also reports the joint significance of a size class dummy across regions for each size class. The results from the general model correspond to those from the restricted one. Once again, both the U-shaped pattern for net charge-offs and the hump-shaped pattern for net income emerge, and both are highly significant. Analogously to Table 6, Table 8 presents tests of the

19. Because equity is measured in book values, we did not consider the rate of return on equity as an alternative dependent variable. Because this measure does not include capital gains and losses on equity, it could be seriously distorted. For example, a bank with near zero equity due to poor performance could have a high ratio of net income to equity. It is true that there is a size bias in net income to assets, because large banks use systematically more financial leverage. However, a reasonable calculation suggests that this bias is small relative to the differences we observe in the data.

Table 7 MODEL WITH REGION-SPECIFIC SIZE EFFECTS^a

Equation (2)'s dependent variables and time periods ^c	Averages of interaction coefficients by size class ^b						Adj. R ²	% gain in SSR
	1	2	3	4	5	6		
Net charge-offs/Assets								
1984-1991	0.00015 (5.53)	-0.00033 (1.77)	0	0.00048 (1.79)	0.00125 (6.34)	0.00347 (28.35)	0.12	2.87
1987-1991	-0.00038 (1.38)	-0.00047 (1.56)	0	0.00158 (2.48)	0.00233 (9.28)	0.00630 (18.70)	0.12	2.57
Net income/Assets								
1984-1991	-0.00087 (10.79)	0.00082 (2.21)	0	-0.00111 (1.59)	-0.00192 (6.72)	-0.00432 (16.49)	0.12	5.57
1987-1991	-0.00200 (8.75)	-0.00001 (1.36)	0	-0.00154 (1.43)	-0.00315 (8.20)	-0.00389 (11.15)	0.12	4.78

^aTable 7 reports estimates of a model that includes 9 regional and 54 interaction terms between size classes and regions, with the coefficients on the interaction terms for size class 3 banks normalized at zero. Reported are weighted averages of the size coefficients, where the weights depend on the fraction of banks in the size class within the region. The *F* statistics for tests that the coefficient terms for a size class are jointly zero across regions are in parentheses and are corrected for heteroskedasticity using a White correction. The last column reports the percentage gain in SSR from using the model with region-specific size effects instead of the model where size effects are constant across regions.

^bAsset-size classes: 1: \$0-\$50 mil. 2: \$50 mil.-\$100 mil. 3: \$100 mil.-\$250 mil. 4: \$250 mil.-\$51 bil. 5: \$1 bil.-\$10 bil. 6: over \$10 bil.

^cDependent variables are time-averaged over the respective sample periods. Independent variables are based on the year prior to the respective sample period.

equality of coefficients on adjacent size classes within a region, jointly across all regions. The message of Table 6 is preserved: Between size classes 3 and 6, the inverse ordering between size and performance is significant, and the smallest size class of banks performs poorly relative to the two next larger ones.

We know from the previous section that asset structure, as defined by broad categories of loans, varies systematically with size. Does the relation between size and performance operate through these differences in broad categories of lending? That is, have large banks performed less well mainly because they have invested more heavily in C&I and commercial real estate lending? We address this issue by adding to the basic model [Equation (1)] two loan share variables: the ratio of C&I loans to total loans and the ratio of commercial real estate loans to total loans. In each case, we use the presample value of the share variable to minimize the problem of simultaneity.

Tables 9 and 10 show that the explanatory power of the size dummies remains after including the asset share variables. This is true for both net charge-offs and net income and over both the 1984–1991 and 1987–1991 sample periods. The share variables are generally significant, with signs as expected. However, they do not displace the size effect. The size dummies exhibit the same pattern and generally the same levels of significance as in the basic case. These results suggest that even within broad categories of loans, large banks tended to take greater risk. They are compatible with the informal evidence in Table 4 which showed that even within similar categories of commercial real estate lending, the

Table 8 JOINT COEFFICIENT TESTS OF REGION-SPECIFIC SIZE EFFECTS^a

<i>Dependent variables and time periods</i>	<i>Size classes compared</i>			
	6 = 5	6 = 4	5 = 4	2 = 1
Net charge-offs/Assets				
1984–1991	4.63 (0.00)	44.48 (0.00)	6.04 (0.00)	4.39 (0.00)
1987–1991	6.56 (0.00)	11.32 (0.00)	4.67 (0.00)	2.08 (0.03)
Net income/Assets				
1984–1991	2.89 (0.01)	15.55 (0.00)	3.77 (0.00)	10.53 (0.00)
1987–1991	5.86 (0.00)	3.69 (0.00)	3.13 (0.00)	11.57 (0.00)

^aTable 8 reports *F* statistics and significance levels for tests of the hypothesis that the interaction terms for two size classes are jointly equal across regions.

Table 9 MODEL WITH SIZE EFFECTS, CONTROLLING FOR BOTH LOAN COMPOSITION AND REGION^a

Dependent variables and time periods ^b	Size class ^b						Commercial real estate/ total loans	C&I/ total loans	Adj. R ²
	1	2	3	4	5	6			
Net charge-offs/Assets 1984-1991	0.00079 (4.04)	-0.00016 (-0.81)	0	0.00051 (1.63)	0.00108 (3.29)	0.0035 (3.25)	-0.00091 (-1.24)	0.00598 (9.97)	0.13
1987-1991	0.00045 (2.04)	0.0000 (-0.02)	0	0.00127 (2.97)	0.00236 (7.00)	0.00465 (5.89)	0.00585 (5.74)	0.0063 (9.62)	0.14
Net income/Assets 1984-1991	-0.00251 (-8.09)	-0.00011 (0.36)	0	-0.00088 (-1.60)	-0.00163 (-3.21)	-0.00381 (-2.64)	-0.00511 (-4.29)	-0.01372 (-13.28)	0.12
1987-1991	-0.00264 (-7.47)	-0.00083 (-2.24)	0	-0.00117 (-1.53)	-0.00315 (-5.31)	-0.00491 (-4.43)	-0.01583 (-8.77)	-0.0139 (-12.47)	0.14

^aTable 9 reports estimates of model that includes 9 regional, 6 size class dummies, and two portfolio variables: commercial real estate loans (mortgage loans over total loans) and C&I loans over total loans (C&I). The size class 3 coefficient is normalized to zero. The *t* statistics are in parentheses and are corrected for heteroskedasticity using a White correction.

^bAsset-size classes: 1: \$0-\$50 mil. 2: \$50 mil.-\$100 mil. 3: \$100 mil.-\$250 mil. 4: \$250 mil.-\$1 bil. 5: 1 bil.-\$10 bil. 6: over \$10 bil.

^cDependent variables are time-averaged over the respective sample periods. Independent variables are based on the year prior to the respective sample period.

Table 10 COEFFICIENT TESTS ON THE MODEL WITH LOAN COMPOSITION VARIABLES^a

<i>Dependent variables and time periods</i>	<i>Size classes compared</i>			
	6 = 5	6 = 4	5 = 4	2 = 1
Net charge-offs/Assets				
1984–1991	4.91 (0.03)	7.45 (0.01)	2.09 (0.03)	38.62 (0.00)
1987–1991	7.95 (0.00)	15.61 (0.00)	5.24 (0.02)	7.39 (0.00)
Net income/Assets				
1984–1991	2.21 (0.14)	3.82 (0.05)	1.31 (0.25)	126.17 (0.00)
1987–1991	2.29 (0.13)	8.09 (0.00)	4.83 (0.03)	38.43 (0.00)

^aTable 10 reports *F* statistics and significance levels for tests of the equality of size coefficients between different size classes.

large banks fared far worse than the average. Also, owing to the concentration of LDC lending, large bank C&I portfolios were riskier.

A question that remains is whether the abnormal risk taking by large banks could be explained by factors completely unrelated to regulatory policy (i.e., the subsidy inherent in the too-big-to-fail policy). Could it be the case that for technological reasons large banks have simply specialized in different types of loans than smaller banks and that the large banks have just been unlucky? We are skeptical of this hypothesis providing a complete explanation, for a variety of reasons. The largest category of banks (those with assets more than \$10 billion) performed significantly worse than the next largest (from \$1 billion to \$10 billion). It is hard to believe that important differences in scale economies exist between these two kinds of banks that permit the former to make loans the latter cannot. In addition, the banks in the next size class down, from \$250 million to \$1 billion, are still reasonably large and, thus, still relatively unrestricted in the types of loans they can make.²⁰ A pure technological story also has difficulty explaining why the large banks

20. In point of fact, banks in this size category participated in LDC loan syndications. However, they did not typically adopt the same degree of risk exposure as did the larger banks. Indeed, Dornbusch (1986) observed that some money center banks held LDC loans equal to twice their capital. More generally, scale economies may explain why only large banks can originate certain types of loans such as LDC loans. However, because loan sales are possible, scale economies do not explain why large banks hold a larger share of these assets on their balance sheets.

adopted a riskier liability structure as well as a riskier asset structure. As we documented earlier (in Figs. 11 and 12), the large banks operated with both thin equity capital-to-assets ratios and thin net interest margins, in the latter instance because of the extensive use of purchased money. It is worth emphasizing that large bank capital/asset ratios were not only low relative to the industry mean but were also substantially lower than those held by competing nonbank intermediaries such as finance and life insurance companies (Boyd and Rolnick, 1989). A natural explanation is that this policy led to the mispricing of the (technically) uninsured liabilities of these institutions.²¹

We next conduct a simple experiment to determine the quantitative importance of the poor relative performance by large banks. We compute the reduction in total loan losses that would have resulted if the two largest categories of banks (classes 5 and 6) had performed as well as the third-largest category (class 4). Specifically, for each year and each region, we compute values of net charge-offs for the class 5 and 6 banks, assuming that they had the same net charge-off/asset ratio as the class 4 banks in the respective region.²² We then use this information to compute the yearly reduction in aggregate charge-offs that would have resulted. If the extra-normal loan losses of the class 5 and 6 banks reflect the consequences of excessive risk taking encouraged by regulatory policy, then this computation is a rough estimate of the cost of this policy.

Table 11 shows that under these assumptions total charge-offs would have averaged about 25% lower over 1983–1991. This amounts to an extra loss in wealth over the period of \$45 billion—if not quite an Okun gap, then certainly a heap of Harberger triangles. To place the number in context, the total equity capital of the banking system (charge-offs ultimately reduce capital) is \$232 billion. It is worth emphasizing that the class 6 banks (those with assets over \$10 billion) account for the lion's share of the cost. Finally, we observe that two-thirds of the cost—about \$30 billion—arises in the peak period of banking difficulties, 1988–1991, mainly because of the poor performance of the class 6 banks.

Our cost estimate is conservative, we think, for several reasons. First, we did not use the best performing banks, class 3, as the benchmark

21. It is also possible that managerial entrenchment problems may be an important reason why large banks tried to maintain their asset base in the face of significant competitive pressures (Boyd and Graham, 1991; Gorton and Rosen, 1992). However, we believe that the implicit subsidy of purchased money afforded by the too-big-to-fail policy was important in supporting this objective.
22. We are assuming that class four bank portfolios are available in elastic supply (i.e., we are assuming that the type of portfolio held by class four banks is available in elastic supply to class five and six banks).

Table 11 REDUCTION IN AGGREGATE LOAN LOSSES IF LARGE BANKS (> \$1 BIL. ASSETS) HAD EXPERIENCED SAME LOSS RATE AS MIDDLE-SIZED BANKS (\$250 MIL.–\$1 BIL.)

Time period	Reduction by size of bank					
	\$1 bil.–\$10 bil. assets		Over \$10 bil. assets		Over \$1 bil. assets	
	%	\$ bil.	%	\$ bil.	%	\$ bil.
1983	5.3	0.53	7.5	0.75	12.9	1.29
1984	2.6	0.28	19.6	2.12	22.3	2.41
1985	-1.2	-0.16	13.6	1.79	12.4	1.64
1986	-2.1	-0.34	14.6	2.39	12.5	2.04
1987	6.1	0.94	13.0	2.01	19.1	2.96
1988	10.4	1.85	20.9	3.71	31.4	5.57
1989	6.8	1.47	31.3	6.75	38.0	8.20
1990	8.6	2.34	32.4	8.83	41.0	11.17
1991	7.2	2.21	25.6	7.83	32.7	10.01
Total reduction 1983–1991		9.12		36.18		45.29
Mean 1983–1991	4.9	1.01	19.8	4.02	24.7	5.03
Mean 1987–1991	7.8	1.76	24.7	5.83	32.5	7.58

for calculating the cost. Using the size class 3 banks (\$100 million–\$250 million) as the benchmark for performance instead of the size class 4 (\$250 million–\$1 billion) would produce a larger estimate.

Second, to the extent that loan losses forced capital constraints to bind tighter, the shadow value of charge-offs may exceed the dollar amount. Table 12 presents information by size class on the fraction of assets held by banks that were capital-constrained during the height of the “capital crunch”—in 1990 and 1991. Table 12 shows that the capital crunch was almost exclusively a large bank problem. It was mainly large banks that were constrained, and large banks accounted for the vast majority of assets held by constrained banks.²³ These facts correspond to the recent empirical evidence on the impact of bank capital on loan growth during 1990 and 1991. Both Peek and Rosengren (1992) and Furlong (1991) showed that the link between capital declines and loan growth (first documented by Bernanke and Lown, 1991) was stronger in magnitude for large banks than for small banks. Thus, to the degree loan losses forced a reduction in lending (via the impact on bank equity), our cost estimate should be adjusted upward.

Our calculations are only intended to question the efficiency of the

23. Avery and Berger (1991b) make a similar observation for the year 1989.

safety net that existed in the 1980s and not whether the safety net is desirable. As discussed in Section 2, despite the changes in this industry, a major banking crisis could still potentially disrupt the economy. As Summers (1991) observed, a financial crisis that raised the unemployment rate by a percentage point for a year would result in a \$100 billion loss in output. We expand on the general issue of the safety net in the next section.

4. Policy

We now analyze policy reforms in banking, including both reforms that have been recently implemented and those that remain under active debate. Our assessment is that the regulatory changes, although less than ideal, work toward mitigating the main adverse incentive effects of the old regime. Further, we find that the banking industry's recent complaints about overregulation are difficult to substantiate formally. We do think, however, that after a transition period that permits banks to improve their equity capital base, further evolutionary changes would be beneficial. It might be desirable, e.g., to reduce some of the regulatory burden on banks (particularly regulations that micro-manage lending) in return for a moderate scaling back of the federal safety net.

4.1 RECENT REFORMS

In the late 1980s, it became apparent that reform of the banking industry's regulatory/insurance structure was badly needed. The issue could not be ignored, given both the S&L crisis and the mounting loan losses of commercial banks, documented earlier in this study. In addition, the rising share of domestic commercial lending by foreign banks (seen in Fig. 4) and the large share of foreign loans in U.S. bank portfolios

Table 12 PERCENTAGE OF ASSETS OF CAPITAL-CONSTRAINED BANKS BY SIZE CLASS^a

Year	Share of each bank size								
	\$0-\$250 mil.		\$250 mil.-\$1 bil.		\$1 bil.-\$10 bil.		over \$10 bil.		c.a. for all banks
	c.a.	t.a.	c.a.	t.a.	c.a.	t.a.	c.a.	t.a.	
1990	2.86	3.90	4.05	9.81	24.17	20.73	68.92	45.66	26.16
1991	5.65	2.78	6.14	5.16	28.01	8.59	60.20	14.15	9.32

^aFor each size class of banks, this table reports the percent of assets held by capital-constrained banks within that size class over the total assets of all capital-constrained banks (c.a.) and the percent of assets of capital-constrained banks within that size class over the total bank assets of that size class (t.a.).

made regulators realize that banking had become increasingly an international business. The need to coordinate policy across borders became clear.

At the time, a variety of reform proposals were debated, including 100% reserve (narrow) banking, prompt closure of troubled banks, reduced deposit insurance (or coinsurance), market value accounting, risk-based insurance premia (or capital requirements), and reduced restrictions on interstate banking. Two major policy responses emerged from the debate: the BIS capital standards and the FDIC Improvement Act (FDICIA). We consider each here.

The Basle Accord of 1988 introduced the BIS capital standards. The objective was to harmonize regulations on banks that did business across international borders. The standards require that, by December 1992, banks involved in international finance have capital equal to 8% of a (crude) risk-weighted measure of assets. Included in the measure of assets are adjustments for off-balance sheet activities. There are also plans to extend the BIS standards to interest rate risk.

The FDICIA was entirely an initiative by the regulatory authorities in the United States. Generally speaking, it imposes tougher requirements on U.S. banks than those enacted under the Basle Accord. Regulatory implementation of FDICIA extended the BIS standards to all U.S. banks, not just those involved in international lending. It also requires prompt closure of problem banks, regulatory constraints tied to tier capital standards (beyond those in the BIS standards), and tougher supervision and regulation. It also requires the implementation of risk-sensitive insurance premia no later than January 1, 1994.

Other provisions of the FDICIA attempt to roll back the too-big-to-fail policy. Saving a large U.S. bank now requires the formal concurrence of bank regulators, the Secretary of the Treasury, and even the President. These provisions also restrict discount window lending, a favorite tool over the last decade for keeping large banks afloat.²⁴ Finally and importantly, the provisions impose restrictions on interbank lending to banks that fail to meet adequate capital levels. The goal here is to reduce the likelihood that closing a large bank will precipitate a wave of failures throughout the banking system. The idea is to avoid the kind of trap regulators fell into during the Continental Illinois crisis. The policy will increase regulators' ability to commit to a policy of closing large banks that perform poorly.

It is difficult to evaluate the new policy package because it is recently implemented. Nonetheless, the reforms appear to directly confront

24. See Schwartz (1992) for a discussion of how the nature of discount borrowing changed in the 1980s from its traditional role as a mechanism to help banks meet temporary shortfalls in reserves to a channel for helping large banks in trouble.

what our analysis suggests has been the main problem with the existing regulatory system: the subsidy to risk taking by large banks. As we have argued, an important way the subsidy has played out is large banks' holding less capital than they might have otherwise. The new capital requirements offset this distortion. In this way, they force the large banks to better internalize the costs of their portfolio decisions. The increased cushion of capital reduces the probability that taxpayers will have to finance loan losses. Finally, the measures taken under the FDICIA to scale back the too-big-to-fail doctrine will also help to improve market discipline over large banks.

Is the 8% capital requirement excessive? This is a tough question to answer. One difficulty is that the capital standards necessarily use book value rather than market value measures. Book values undoubtedly understate the value of some assets but overstate the value of others. However, a preliminary analysis of holding company data suggests no systematic bias (see, e.g., Kaufman, 1991). It is also relevant that non-bank financial intermediaries tend to be better capitalized. For example, finance companies, which in some ways may be viewed as uninsured banks, operate with capital/asset ratios around 15% (Benveniste, Boyd, and Greenbaum, 1991). Indeed, the 8% risk-weighted requirement amounts to a considerably lower raw capital ratio than the 8% average ratio that banks held in the 1960s (see Fig. 8).

It is true that the banking industry has complained about the regulatory burden that the new reforms impose. A recent study by the Federal Financial Institutions Examination Council (1992) summarized many of the bankers' complaints. The estimated compliance costs, however, do not stem from a careful empirical analysis. The report depends largely on the results of a survey in which the bankers themselves estimated their compliance costs. While some of the estimates include FDIC insurance premiums and the opportunity cost of reserves, none include the subsidy implicit from the protection afforded by the public safety net.

Supervision and regulation has become more intrusive. Determining capital adequacy unavoidably involves examiners having to make subjective judgments about the values of bank loans. Because bank loans are still largely information-intensive and, thus, not publicly traded, objective market value assessments are difficult, if not impossible.²⁵

We are sympathetic to the idea that the bluntness of new capital requirements may adversely penalize lending to small and medium-sized businesses. The risk weights on the capital standards are based on broad classifications of loans. Thus, e.g., LDC loans and working

25. For this reason, widespread adoption of market value accounting seems impractical (see O'Hara, 1992). For an opposing view, see White (1991).

capital loans for small businesses receive the same weight. Our empirical analysis suggests that the main sources of loan losses are LDC and commercial real estate loans by large banks, not working capital and equipment loans to bank-dependent firms, the traditional staple of commercial bank lending. Some of the detailed but blunt restrictions on lending (e.g., crudely standardized loan valuation requirements) merit reconsideration, especially for well-capitalized banks. Generally, imposing capital standards and measures that increase market discipline over large banks is a superior strategy to regulatory micro-management of lending.

4.2 LOOKING AHEAD: FUTURE DIRECTIONS FOR POLICY

We conclude by addressing two major issues which the recent reforms have not addressed. The first is whether to eliminate restrictions on interstate banking; the second (and more fundamental) is whether to scale back the system of deposit insurance.

4.2.1 Interstate Banking Restrictions on interstate banking likely contributed to the high number of failures, particularly failures of small banks in the oil and agricultural regions. But as we have argued earlier, the main stress on the system has not been the raw number of bank failures; rather, it has been the poor performance of large banks. Restrictions on interstate banking do not prevent large banks from diversifying their loan portfolios nationally. Specifically, these restrictions do not preclude banks from opening up loan production offices across state borders. While scale economies may inhibit smaller banks from pursuing this activity, large banks do not face formidable obstacles to national (or even international) lending. Accordingly, we do not think that interstate branching restrictions have been the main culprit.

At the same time, we do think that there is a strong case for further reducing restrictions on interstate banking. It is true that branching facilitates lending to smaller borrowers. In this vein, branches may be more efficient conduits than loan production offices for cross-state lending. Any reform that improves the efficiency of large banks is worth taking seriously.

Our results also suggest that the inability to exploit scale economies rather than disproportionate loan losses may be the main problem for the smallest category of banks (those with less than \$50 million in assets). Encouraging these banks to merge with larger banks may be desirable. At the same time, we are skeptical about the benefits of permitting mergers among very large banks. The clear pattern of our results is that banks in the middle of the size distribution (\$100 million–\$1 billion) performed best in the 1980s. Several detailed studies of the is-

sue also concluded that recent large bank mergers have not produced efficiency gains (see Berger and Humphrey, 1991, and references therein).

4.2.2 Scaling Back Deposit Insurance: Narrow Banking and Coinsurance The toughest question in banking policy, of course, is where exactly to draw the line for the public safety net. The kind of evidence needed to answer this question confidently is not available. Modern banking systems have been heavily regulated and heavily protected. Analysis of this kind of data provides little insight into the consequences of scaling back protection. Further, because financial systems have evolved significantly, insights from historical periods of free banking have limited value as well. As argued earlier, any discussion of banking stability for modern times should center around the performance of the money market, which is a relatively recent phenomenon.

Theory provides surprisingly little guidance. Diamond and Dybvig (1983) provided the most elegant argument for deposit insurance. They formalized the idea that banks are vulnerable to liquidity panics because they offer liquid liabilities but hold illiquid assets, the latter a direct consequence of their involvement in information-intensive lending. Diamond and Dybvig (1983) concluded that deposit insurance provides welfare gains by eliminating panic withdrawals that disrupt the flow of bank lending.

The Diamond and Dybvig paper has stimulated a lengthy academic debate over whether private financial institutions in a *laissez-faire* environment can make the types of arrangements necessary to avoid liquidity panics. A number of papers have pointed out that the Diamond and Dybvig results hinge on exogenous restrictions on the kinds of liabilities that banks offer savers. A key restriction is that deposit liabilities satisfy a "sequential service constraint," which requires that banks honor customer withdrawals at face value until they no longer have funds. This makes depositors' payoffs depend on their respective place in line, creating the potential for a panic run. Several authors, e.g., Wallace (1988) and Chari (1989), have pointed out that banks could in theory avert panics by offering deposits with equitylike features. However, these types of contracts (which condition depositor payoffs on the pace of withdrawals) do not seem to be observed in practice. In the end, we are left with the impression that theory is still sufficiently incomplete to provide crisp answers.

At the same time, there are few contemporary economists who are willing to advocate a purely *laissez-faire* approach to banking. Perhaps coming closest to this position are advocates of *narrow banking*. The idea behind this policy is to separate the money and lending activities of banks. In its simplest form, the policy requires that transaction accounts

be backed 100% by safe assets such as government securities. In this way, the money on the liability side of the banks' balance sheets is completely uncoupled from the loans on the asset side. Under the policy, banks fund loans only with liabilities that are not publicly insured. The motive for narrow banking is to protect the payments mechanism in a way that is free of the kinds of moral hazard problems that are associated with deposit insurance. The idea is not new; it dates at least to Simons (1936). And it has a distinguished and diverse group of advocates, including Friedman (1959) and Tobin (1987).

While we sympathize with the objectives of narrow banking, we have several related concerns. First, in the contemporary financial climate, cleanly separating money from lending is not as straightforward as it was at the time Simons wrote (1936). Because of financial innovation, banks now finance loans, not only with transaction accounts, but also with a wide range of money substitutes, i.e., financial assets that may be quickly converted to money. These include highly liquid instruments such as savings accounts, time and cash management accounts, and money market instruments. Off-balance sheet items such as credit lines and loan commitments also provide liquidity services for bank customers. Today these money substitutes and off-balance sheet commitments are likely a greater overall source of liquidity risk to banks than are transaction accounts, which now make up less than 20% of total bank liabilities (as compared with over 60% at the time narrow banking proposals were first introduced—recall Fig. 7).

More generally, today the process of liquidity provision by banks is tied less closely (if much at all) to the quantity of transaction deposit liabilities they offer. As we have emphasized earlier, financial stability in a contemporary environment hinges mainly on the sound operation of the money market. In this vein, the problem of managed liability runs of the type experienced by Continental Illinois is unlikely to be solved by narrow banking.

We do agree that inferring the consequences of narrow banking based on banks' existing portfolio structures is subject to a Lucas critique, because these portfolio structures would likely change. While the average maturity of bank liabilities might lengthen, we still strongly suspect that, as has been the case historically, banking would still involve the provision of liquid liabilities and the holding of illiquid information-intensive assets. At a minimum, forecasting the outcome of a narrow bank policy involves a huge degree of uncertainty. The downside risk is also great given the central role of commercial banking in short-term lending (both on and off the balance sheet).²⁶

26. As Lucas (1988, p. 288) puts it, "Attempting various policies that may be proposed on actual economies and watching the outcome must not be taken as a serious solution

For these reasons, we think that any scaling back of the public safety net should occur on an incremental basis. In this respect, we see virtue in exploring the possibility of some form of coinsurance, where depositors bear some of the risk, much as a deductible for health insurance. As stressed by Boyd and Rolnick (1989), the policy has the virtue of permitting gradual adjustments, because the fraction of the deposit guaranteed is a continuous choice variable. Indeed, Volcker (1991) has suggested experimentation with some form of coinsurance.

Appendix DISTRIBUTION OF BANKS ACROSS REGIONS
AND SIZE CLASSES, 1983 vs. 1986

1983 <i>Region</i>	<i>Size class^a</i>						<i>Total</i>
	1	2	3	4	5	6	
New England	104	62	56	40	9	1	272
Mid. Atlantic	208	153	120	85	49	10	625
S. Atlantic	859	266	159	75	42	0	1,401
E.S. Central	695	208	94	31	14	0	1,042
W.S. Central	1,741	604	272	101	24	4	2,746
E.N. Central	1,802	572	364	113	31	3	2,885
W.N. Central	2,800	422	179	35	13	0	3,449
Mountain	660	135	73	23	17	0	908
Pacific	340	115	56	38	21	5	575
United States	9,209	2,537	1,373	541	220	23	13,903

^a Asset-size classes: 1: \$0-\$50 mil. 2: \$50 mil.-\$100 mil. 3: \$100 mil.-\$250 mil. 4: \$250 mil.-\$1 bil. 5: \$1 bil.-\$10 bil. 6: over \$10 bil.

1986 <i>Region</i>	<i>Size class^a</i>						<i>Total</i>
	1	2	3	4	5	6	
New England	61	50	62	51	17	1	242
Mid. Atlantic	147	126	144	90	63	13	583
S. Atlantic	682	306	186	86	61	6	1,327
E.S. Central	531	242	122	34	20	0	949
W.S. Central	1,694	615	307	104	24	2	2,746
E.N. Central	1,455	630	421	150	40	3	2,699
W.N. Central	2,461	478	188	45	19	2	3,193
Mountain	633	152	82	27	19	1	914
Pacific	272	138	93	45	25	5	578
United States	7,936	2,737	1,605	632	288	33	13,231

^a Asset-size classes: 1: \$0-\$50 mil. 2: \$50 mil.-\$100 mil. 3: \$100 mil.-\$250 mil. 4: \$250 mil.-\$1 bil. 5: \$1 bil.-\$10 bil. 6: over \$10 bil.

method: Social Experiments on the grand scale may be instructive and admirable, but they are best admired at a distance."

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Comment

FISCHER BLACK

Goldman, Sachs, and Co.

Larry Summers (1987) contrasts the “finance” and “economics” views of the world—views that are so different they hardly overlap. This paper gives me a chance to illustrate his point using contrasting views of banking.

Boyd and Gertler take the “economics” view. While they recognize the fact that a bank can decouple its deposits and loans, they emphasize the ties between traditional bank assets and liabilities. For example, they think the “too-big-to-fail” subsidy to a bank’s stockholders and creditors affects the performance of its assets. They think that bank failures are bad and that a major threat to a bank is a panic that leads to a run on the bank. They think banks affect the economy by varying their willingness to lend and occasionally by triggering or transmitting a major liquidity crisis.

I take the “finance” view. I believe that banks’ main businesses are (1) making and administering loans, and (2) processing transactions. I think bank failures are a symptom of healthy competition and that removal of government restraints on competition will generate failures at an increasing rate. I think the main threat to a bank is bad luck, severe enough to cause the market value of its assets to fall below the face value of its short-term liabilities. I think the economy affects banks, as the areas in which banks concentrate their loans do well or badly. When

a crisis occurs, I view it as a solvency crisis rather than a liquidity crisis. I think banks are innocent victims rather than active participants in the crisis.

Economists like Simon, Friedman, and Tobin have proposed forms of “narrow banking” to deal with potential risks in banking. They suggest backing checkable deposits with 100% primary or secondary reserves. (We can do this without limiting the businesses a bank can engage in.) Under the economics view, this benefits the economy by making liquidity crises less likely, or perhaps by improving government control of the money supply.

Under the finance view, an unregulated banking system will offer its customers many kinds of deposits, including deposits that are fully secured with safe assets. If the government requires that most or all deposits be fully secured, no great harm is done. A bank will simply issue securities to fund its other activities. With unrestrained competition, safe deposits will offer interest and services at the wholesale short-term money rate.

Under the finance view, loans and deposits are unrelated. Loans plus investments on the asset side equals deposits plus securities on the liability side. The cushion provided by investments and securities allows loans and deposits to be decoupled. Moreover, banks can use derivatives like swaps to adjust the risks that stockholders and creditors face.

Thus, when the government subsidizes deposits by offering insurance and “too-big-to-fail” guarantees below cost, the benefits of this flow primarily to stockholders rather than to borrowers. When the government protects banks from competition by regulating its prices and services, and by restricting branching and other forms of growth, both borrowers and users of transaction services pay more than they would in a free market.

Boyd and Gertler analyze the patterns of loan losses and find them concentrated in certain sectors and businesses. They find that fractional loan losses were larger for small and large banks than for medium-sized banks. I assume that returns to stockholders were better in medium-sized banks, too.

To me, this is largely the luck of the draw, especially because the government discourages massive consolidation of banking and, thus, encourages specialization. (Boyd and Gertler also note that the government encourages specialization.) These sectors and regions did poorly for reasons mostly unrelated to banking (although banks may have bid up certain prices), and the banks in these areas did poorly too. Medium-sized banks happened to be concentrated in areas that did relatively well.

They say that luck cannot fully explain the poor performance of large

banks in this period. They think that the “too-big-to-fail” regulatory philosophy was a partial explanation. I feel that this philosophy may have encouraged the banks to use small amounts of capital, but need not in itself encourage them to make bad loans or investments. On the other hand, if regulators are diligent in preventing banks from adjusting their liabilities to add risk, I agree that the banks might eventually start making poor loans to add risk.

In their empirical tests, Boyd and Gertler talk about “significance.” They even refer to some results as “highly significant.” But I believe they are treating different observations as independent that are not at all independent, especially because they use accounting data and cross-sectional analysis. Moreover, their whole study suggests a kind of “data mining.” They chose real estate and LDC loans knowing that these areas did badly in this period.

They cite McCauley and Seth as claiming that CD reserve requirements affect lending. In the language of finance, reserve requirements act as a tax on deposits but need not affect loans. Banks can sell investments to make loans or can issue nondeposit liabilities like common stock and bonds.

They say regulatory policy must be designed from an international perspective. If the goal is deposit safety, I don’t see why. Just require collateral for U.S. deposits, including those in domestic branches of foreign banks.

They say that banks’ liabilities are more and more sensitive to changes in short rates. Yes, but they are less and less sensitive to changes in long rates. And banks can hedge either of these sensitivities, so I don’t know why this matters.

Boyd and Gertler say that a “panic withdrawal of money market instruments” causes individual banks to collapse and may even threaten the whole banking system. The finance view is that a panic withdrawal is not a threat to a solvent bank, especially one that holds collateral for its deposits. A panic certainly doesn’t threaten the whole system, if banks in general are solvent. (A bank is “solvent” if the market value of its assets exceeds the face value of its current liabilities.)

Boyd and Gerlter see banks as using money from deposits (and other liabilities) to make loans to people who have no other sources of financing. I see banks as using money from stock and bonds (along with deposits) to make loans to people who can also borrow from finance companies. In fact, I think if you make a loan to someone with no other sources of funds, you are probably making a bad loan.

I don’t know what to make of Boyd and Gertler’s empirical work.

Everything seems so specific to the period they look at. If real estate and oil prices had risen in that period, their results would have been totally different. Yet they speak of their results as “highly significant.”

They observe that, for the 1984–1991 period, even when we control for region, medium-sized banks did better than large banks or small banks. Because size is important in this period, along with region, they feel that “the too-big-to-fail policy has been a significant distortion.”

If size had not been important in this period, they would have concluded that “constraints on the banks’ ability to diversify nationally have inhibited banking.” They find that large banks did badly even when we control for their large holdings of commercial and industrial loans and commercial real estate loans, as opposed to personal mortgage loans and other personal loans.

I think the pattern they find is simply an accident of the period. In other periods, I think they’ll find large banks doing well; and in yet other periods, doing the same as medium or small banks. And I do not see how we can conclude anything from these cross-sectional correlations about the “too-big-to-fail” policy or about constraints on national diversification.

Boyd and Gertler cite Diamond and Dybvig, who take the economics view of banking and liquidity crises. I would cite Merton and Bodie, who take the finance view of banking and solvency problems (e.g., see Merton and Bodie, 1992).

When Boyd and Gertler discuss proposals for narrow banking, they note that banks might still have liquid liabilities, including contingent liabilities, that are not covered by collateral requirements. They feel that this leaves banks exposed to a liquidity crisis. The finance view is that it leaves banks exposed to solvency problems; and that holders of such liabilities who are concerned about credit risk can ask for collateral even when the government doesn’t require it.

Bagehot said the business of banking ought to be simple. Perhaps, but it seems that “economists” like Boyd and Gertler and “finance people” like Merton and Bodie can’t agree on what the business of banking is. So maybe it’s not so simple.

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*Comment*¹

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The paper by John Boyd and Mark Gertler is both useful and stimulating. Their statistical portrait of the commercial banking industry today and their analysis of trends in recent years provide a careful quantification that supports some of the common assertions about our banking system while refuting others. Anyone interested in U.S. banking can benefit from a careful study of their paper.

There is no doubt that Boyd and Gertler are correct that the nature of commercial banking is changing and that banks' loans, especially bank loans made by large U.S. banks, are playing a relatively smaller role in financing businesses than they did a generation ago. While the relative decline of an industry is generally not a reason to change government policies, in this case I think it is. It is not just that banks play a very special role in the economy. The more compelling case for changing government policies is that it is the existing government policies themselves that are accelerating the decline of banking and moving the role of banking further from what it would be without such adverse policies.

Although much of the traditional lending activity of banks can be carried out by nonbank financial institutions and directly by financial markets, banks are uniquely important in at least three ways. Banks are the principal providers of credit to small and medium-size nonfinancial businesses. Banks are the core of the payment mechanism through check clearing and related transactions. And banks (through the system of reserve requirements) are the link by which the Federal Reserve can in principle control a broad monetary aggregate and therefore nominal GDP.²

I believe that the relative decline of bank lending reflects favorable technological changes as well as inappropriate public policies. To the extent that government policies continue to weaken banks and to reduce

1. These remarks were prepared as a comment on the paper by John Boyd and Mark Gertler at the NBER's Eighth Annual Macroeconomics Conference on March 13, 1993.
2. The Federal Reserve has lost the ability to control short-term movements of M2 because reserve requirements are limited to only about one-fifth of M2. This could be remedied without cost to the government or to the banks by extending reserve requirements and paying interest on those reserves. For a discussion of this, see my 1992 Tinbergen lecture: "The Recent Failure of U.S. Monetary Policy," forthcoming in *The Economist* (NBER Working Paper 4236).

their ability to compete, there is reason to revise those policies. Let me look, therefore, at the reasons for the relative decline of bank loans.

Large corporations have substituted commercial paper and bonds for bank finance. The ability to sell these debt instruments with interest rates that are more attractive to the borrowers than the interest rates on bank loans has been aided by the spread of money market mutual funds and bond funds. Although there are several reasons for the development of these funds, the process has clearly been accelerated by the development of computer and related communication technology. This technological change that reduces the need for intermediaries is a plus for the economy, lowering the cost of funds to borrowers and permitting greater diversification of risks. There is no reason for regret or for policies to reverse this development.

But the ability of banks to compete has also been adversely affected by a series of policies stretching back to the 1930s and even earlier that many experts are now rightly questioning and proposing to change.

The so-called banking reforms of the 1930s had three primary features. First, the government created the deposit insurance system (FDIC), a program that helped the weaker banks to retain deposits and prevented the consolidation of the banking industry into a small number of lower-cost national banks (of the type seen in all other major countries) that could then play a more competitive role in credit markets.³

Second, the Glass-Steagall Act prevented banks from branching across state lines, a type of regulation that reinforced earlier state and federal laws prohibiting the development of nationwide banking. Once again, the intended beneficiaries were the small banks, but the effect was to raise the costs and increase the concentration of risks in the banking system as a whole.

Third, the Glass-Steagall Act separated commercial bank lending from the investment bank activities of underwriting debt and equity securities, denying banks the economies of scope that such one-stop-shopping for financial services would allow. Although it was argued at the time that this would protect unwary individuals from banks that would otherwise entice them into the risky investments that they had

3. The adverse effects of the FDIC were made much worse by the decision in the 1970s to extend deposit insurance to deposits of \$100,000 at a time when interest rates were unregulated only for balances of \$100,000 or more. It allowed very weak institutions to compete for funds in a national market through brokered deposits. It not only put temptation before the incompetent and the unscrupulous but also forced many sound banks and thrifts to follow aggressive deposit-seeking (and, therefore, lending) policies to avoid shrinking.

underwritten, a skeptical view of this as the real reason for the policy may be very well justified.

Old laws are hard to change despite considerable research indicating their adverse effects. The Federal Reserve has granted limited underwriting authority to a few banks, but legislation to repeal the overall prohibition has failed in Congress. Similarly, although there has been an increase in interstate banking, the legislation to authorize general interstate branching failed last year. And, despite the disastrous experience with insolvent thrifts attracting large amounts of federally insured funds, the FDIC system continues to provide protection to all bank deposits up to \$100,000.

The FDIC is an impediment to a stronger banking system, not only because it protects the weak and reduces the forces that would otherwise increase concentration, but also because the charge for FDIC protection raises the cost of bank funds relative to funds raised directly in financial markets. The cost of commercial paper funds to a high-quality corporate borrower is lower than the combination of the bank's cost of deposits and the FDIC premium.

Banks might be able to play a more active role in financing large businesses and might as a result be able to play a more active role in other markets as well, if they were permitted to take uninsured demand deposits and to use those funds for lending. In principle, those deposits might be secured either by the loan portfolio alone or by those assets and some portion of the bank's own equity capital. Although the rationale for precluding this is to protect unwary depositors, those depositors are now permitted to buy checkable money market mutual funds within the banks' offices.

A different major reason for the problems of the commercial banks in the 1980s was the large losses incurred on LDC debts. These losses impaired bank capital and raised the cost of uninsured deposits, further hampering the ability of banks to compete with nonbank sources of funds. Although the banks lent voluntarily to the developing countries, they were encouraged by the U.S. government in the 1970s to make those loans as a way of "recycling petrodollars." After the LDC borrowers got in trouble in the early 1980s, our government temporarily worked to prevent defaults by the major borrowers. At the same time, however, it encouraged the banks to establish large reserves (which weakened the reported capital positions of the banks) and then, in the "Brady Plan," required the banks to accept writedowns in the values of the loans.

Perhaps the most fundamental way in which government policy weakened the banks was by pursuing monetary policies during the

1960s and 1970s that caused inflation to rise sharply. The interaction of inflation and the tax laws made the real after-tax cost of borrowing negative for many borrowers and, thus, encouraged a great overextension of borrowing. This tax-inflation interaction also raised the prices of land and other real estate, again encouraging excessive lending. Inflation contributed to the commodity boom in Latin America that increased lending to those countries.⁴

Other examples of government policies that hurt banking could be added to this list. The government's record in this industry is enough to make one skeptical about the desirability of the most recent major area of regulation, the Basel capital standards. Even if one accepts the need for increased capital to protect the government from the adverse incentives that it has created by providing excessive deposit insurance, the specific features of the Basel rules and the direction in which those rules are evolving should be a source of concern.

The Basel system of risk-based capital requirements is based on a gross mismeasurement of both risks and capital. In assessing risks, all bonds of OECD government are considered to be riskless regardless of maturity. All single-family mortgages are regarded as less risky than all commercial loans (regardless of the credit rating of the commercial borrower or the collateral provided) and regardless of whether the mortgages have fixed or adjustable interest rates, of their loan-to-value ratios, etc. It is not surprising that government bonds and mortgages are crowding out commercial lending in banks' portfolios.

The regulators acknowledge the inadequacy of their risk measures and respond by proposing more detailed systems of risk evaluation. The end may be a micromanagement of banks' portfolios by bank regulators or by differential capital standards. We are already seeing the temptation to use this as a form of industrial policy, targeting small businesses for more favorable treatment.

The capital of the banks is equally badly measured. No credit is given for the value of bank activities as a going business (e.g., a credit card business or money management business or core deposits) unless those assets are sold.⁵ All assets are carried at book values that may bear little relation to market values.

Even if I were convinced by the Boyd-Gertler argument that the too-big-to-fail doctrine was causing the handful of very large banks to take

4. For a more extensive discussion of the way that inflation weakened the financial system, see my introductory essay in Martin Feldstein, *Reducing the Risk of Economic Crisis* (University of Chicago Press, 1991).

5. This is discussed further in my *Wall Street Journal* article of February 21, 1991.

excessive risks, I would not regard imposing the Basel accord rules on *all* of the banks in the United States as an appropriate remedy.⁶

In short, my reading of the current situation is that banks play an important role in the economy and government policies that weaken the banking system are contrary to the national interest. Unfortunately, there is no shortage of such policies and more may be on their way.

Discussion

In response to the Comment by Fischer Black, Gertler made two main points. First, he expressed surprise at Black's characterization of their view of banking: A large part of the paper was devoted to documenting the evolution of banking away from simply taking deposits and making loans toward obtaining money through money markets and engaging in off-balance sheet activities. Second, with respect to Black's story that the banking problems of the 1980s were just bad luck, Gertler noted that of course they were bad luck: The large banks took a gamble and lost. One could say the same thing about the savings and loans. The paper tries to go beyond such a statement and argues that regulatory bias may have induced the large banks to take greater risks than they would have independent of the regulatory structure.

Bob Hall noted that the distinction drawn by Black between finance and economics was misleading: Few economists fall into the traps that he identified (e.g., the notion that reserve requirements limit loans is not something that economists teach). Hall also remarked that the phrase "narrow banking" is an unfortunate choice of words in that it suggests that we have to impose tight regulatory limits on bank activities in order to limit the costs of deposit insurance. On the contrary, we can open up all activities without any regulatory concern if we simply give depositors a security interest in Treasury bills. If the bank enters bankruptcy, the depositor with a security interest receives the asset instead of becoming party to the bankruptcy. By requiring a security interest in Treasury bills, the government could eliminate the pricing of

6. The Boyd-Gertler evidence linking the too-big-to-fail principle to bank performance is not convincing. Their largest class of banks have assets over \$10 billion, far below the cutoff level for "too big to fail." Although the loss ratios are higher in their largest category of banks, that may reflect the fact that large banks do more selling of explicit risk services like lines of credit. When the borrowers take up those lines, they are in trouble and cannot get market credit. There is no reason to regard this form of specialization as excessive if the banks are compensated adequately. If they are not, the stock market will impose its own discipline.

deposit insurance. Gertler noted that in an editorial in the *Wall Street Journal*, one of the previous chairmen of the FDIC discussed a similar proposal, called a modified payout plan. When the bank went under, the FDIC would advance the uninsured depositors an estimate of what they thought they would collect from the bank. However, the magnitude of the expected losses of Continental Illinois bank failure was so large that this plan was scrapped.

In his Comment, Martin Feldstein discussed several reasons why banks play a special role in the economy. Hall took issue with this position. First, Feldstein claimed that banks are special because they facilitate the clearing of payments. But, citing the VISA NET clearing service for Visa transactions, which is jointly owned by banks, Hall argued that VISA NET is really a separate entity and could be spun off easily. There is nothing intrinsic about limiting payments to banks. Feldstein also suggested that banks are special as an agent of monetary control. Hall remarked that here the “finance economist’s” view of Fischer Black is relevant. Monetary control is achieved by identifying some part of the national debt with a special instrument we call the dollar, and we peg its price at one dollar. By changing the terms or the quantity of that instrument, we achieve monetary control. However, it is only because of things like reserve requirements that this has anything to do with the banking system. If we took half of all Treasury bills, called them dollars, and just manipulated the difference between the interest rate that we paid on those special T bills to regular T bills, we would have another system of monetary control that had nothing to do with the banking system.

David Romer noted that a general concern about narrow banking is that the part of banks that were not insured would end up looking very much like banks today. They would issue highly liquid assets such as money market funds as their source of funds and then make illiquid loans. Once again, bank runs, panics, and failures would be possible, and we would have reason to fear their consequences for economic performance.

Feldstein returned to a theme in the paper by noting that the experiment of changing what happens in banks is already occurring. He went on to say that banks are moving aggressively to sell mutual funds and money market funds because depositors do not want deposit insurance; they want slightly higher yields. Stan Fischer responded that he did not think depositors were showing they were willing to bear more risk. Rather, they are showing they want higher returns and do not think they will have to bear the risk. Eventually, though, banks will fail, and the banks will be bailed out through the political system, as David Romer suggested.