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The Transformation of the U.S. Banking Industry: What a Long, Strange Trip It's Been

VIRTUALLY ALL ASPECTS of the U.S. banking industry have changed dramatically over the last fifteen years. For instance, over one-third of all independent banking organizations (top-tier bank holding companies and unaffiliated banks) disappeared over the period 1979–94, even

while the assets of the industry were growing. On the asset side, the industry has lost market power over many of its large borrowers, who can now choose among many alternative sources of finance. On the liability side, the industry has evolved from a position of protected monopsony, in which banks purchased deposit funds at regulated, below-market interest rates, toward a market setting in which they must pay more competitive prices in order to raise funds. With respect to individual consumers, electronic interfaces such as automated teller machines and on-line banking have altered the way in which many customers deal with their banks.

These changes raise policy concerns because the banking industry is an integral part of the U.S. economy. Banks pool and absorb risks for depositors and provide stable sources of investment and working capital funds for nonfinancial industries. In addition, banks provide a smoothly functioning payments system that allows financial and real resources to flow relatively freely to their highest-return uses. Through its access to the discount window, the banking industry is also a backup source of liquidity for any sector in temporary difficulty. Similarly, open market operations that are essential to the monetary control mechanism involve interventions that alter the balance sheets of banks. Finally, banks are a particularly important source of funds for small, information-problematic borrowers who often have limited access to other sources of external finance. Thus in addition to affecting overall macroeconomic performance, shocks to the banking system can have significant distributional consequences across a wide range of nonfinancial firms and industries.

This paper summarizes and quantifies past changes in the U.S. commercial banking industry and forecasts what the future may hold. It emphasizes regulatory changes and technical and financial innovations as the central driving forces behind the transformation of the industry. Changes in the regulatory environment include the deregulation of deposit accounts, several major changes in capital requirements, reductions in reserve requirements, expansion of bank powers, and liberalization of geographic restrictions on intrastate and interstate banking. Important technical innovations that have affected the banking industry include the advances in information processing and telecommunications technologies that facilitate the low-cost, rapid transfer of information and funds that fuel modern financial markets. Innovations in applied

finance include those that have allowed the securitization of many tra-
ditional bank assets and have expanded the scope and volume of finan-
cial derivative activity. Many of these regulatory, technical, and finan-
cial changes have altered the way in which banks compete with each
other and have brought about substantial external competition to U.S.
banking organizations from foreign banks and from nonbank financial
intermediaries.

To document and assess the effects of these different forces, we
examine the evolution over time of the balance sheets, off–balance
sheet activities, and income statements of all insured U.S. commercial
banks. Our sample period begins in 1979, shortly before the deregula-
tion of bank deposit accounts, the formalization and tightening of bank
capital requirements, innovations in off–balance sheet activities, and
many of the important advances in information and financial technol-
ogy. Our sample period ends in December 1994, shortly after the large
spate of bank failures of the mid-1980s and early 1990s, the implemen-
tation of risk-based capital standards and prompt corrective action by
regulators, and the so-called bank credit crunch of the early 1990s. The
1980s and the first half of the 1990s, a period which some have dubbed
''the decline of banking,'' is undoubtedly the most turbulent period in
U.S. banking history since the Great Depression. Moreover, it leads us
to the brink of the next era in banking—nationwide banking, including
coast-to-coast branching networks—which is being implemented over
the 1995–97 time period. We hope that the facts and figures presented
in the tables, many of which are difficult to obtain outside the federal
regulatory agencies, will provide useful reference material for others
wishing to teach, research, or simply learn more about banking.

The most novel aspect of our analysis derives from our estimation
of the patterns of bank lending to borrowers of different sizes over time.
Large banking organizations tend to lend to medium and large business
borrowers, whereas small banking organizations more often specialize
in lending to small businesses. A key question is how the well-known
reduction in bank commercial and industrial lending of the early 1990s
affected different sizes of borrowers. Based on a sample of over 1.6
million individual loans to domestic businesses by U.S. banks over
time, we estimate that there was a 34.8 percent real contraction in loans
to borrowers with bank credit of less than $1 million during the first
half of the 1990s. Based on this same sample, we also estimate a

substantial decline in lending to large borrowers, whereas lending to medium-sized borrowers appears to have recovered nearly to its level before the 1990s. Several hypotheses are put forward to explain these findings.

After reviewing the evidence of the past, we turn to the future and the effects of the impending shift to nationwide banking. We estimate the possible impact of this change on the structure of the industry and on credit flows to various sizes of bank borrowers by extrapolating from the effects of earlier liberalizations of geographic restrictions. The estimates suggest that several thousand banking organizations are likely to disappear under nationwide banking, but that the remaining banks will still number in the thousands. We also predict further contractions in the extension of bank credit to small businesses, although these may not be as large as the reductions that have already taken place, in the first half of the 1990s. Perhaps surprisingly, our model projects that virtually all of these changes will occur within the first five years after the implementation of nationwide banking.

We emphasize that at least some of the reductions in small business lending by banks that have occurred, or that might occur in the future, may represent improvements in economic efficiency. Geographic restrictions on intrastate and interstate banking have created barriers to entry into local markets and may have reduced competition and allowed banks to exploit market power in pricing deposit and loan services. Similarly, these geographic restrictions may have reduced the effectiveness of the market for corporate control in banking by limiting the set of firms that could potentially take over a bank and restrain inefficient or self-serving bank managers or directors. These limitations on market discipline in both the product and corporate control markets may have allowed some negative net present value loans to be made. To the extent that such loans are reduced and financial resources are freed for other endeavors, overall economic efficiency is likely improved. To the extent that some positive net present value loans may also be reduced due to consolidation in the banking industry, these loans will likely be reissued in the long run, either by other banks or by nonbank financial intermediaries.

The paper is organized as follows. The second section describes the major regulatory changes and technical and financial innovations that have affected the industry over the last fifteen years, and the third

section shows how these changes have affected the basic characteristics of the industry. The fourth section presents evidence on changes in lending to small, medium, and large borrowers in the first half of the 1990s. The fifth section displays our estimates of the effects of nationwide banking on the distribution of banking assets between large and small banking organizations, the number of organizations that will exist in the future, and lending to various size categories of borrower. The sixth section gives our conclusions. Appendix A presents ten detailed data tables, including year-by-year summary statistics on the banking industry, balance sheet and income statements, and data on bank failures. Appendix B provides details on changes in bank regulation, and appendix C gives background information for some of our calculations.

Regulatory Changes and Technical and Financial Innovations, 1979–94

This section briefly reviews the key regulatory changes and technical and financial innovations that have driven the transformation of the banking industry over the last fifteen years. The following section analyzes the quantitative effects of these changes.

The changes in regulation have had a mixed impact on the profitability and competitive position of U.S. commercial banks relative to other financial intermediaries. These developments can be divided into five areas: expansion of bank powers, reduction in reserve requirements, formalization and tightening of capital requirements, deregulation of deposit accounts, and liberalization of the rules and policies regarding geographic diversification. These issues are discussed in greater detail in appendix B.

In the most general terms, the changes regarding reserve requirements and bank powers likely improved the competitive position of the banking industry. Reserve requirements were reduced three times during the sample period; as of 1994 the only reserve requirement for U.S. banks was a 10 percent requirement for transaction balances. Bank powers also grew, as regulators allowed banking organizations to enter a steadily growing number of new product markets. Bank holding companies can now have separately capitalized subsidiaries that offer investment advice, provide discount brokerage services, and un-

derwrite various securities, including commercial paper, municipal revenue bonds, and some corporate bonds and equity under limited circumstances.[1]

In contrast, the changes in capital standards were likely costly for many banks, especially the largest institutions. At the end of the 1970s, capital regulation was relatively ad hoc and depended largely on the judgment and discretion of a bank's supervisors. Starting in 1981, new regulations required banks to hold capital equal to a flat percentage of their balance sheet assets (see table B1 for a complete chronology of the major changes in capital requirements between 1979 and 1994). Since banks were not required to hold capital against off–balance sheet items, and all on–balance sheet assets had the same capital requirements regardless of risk or return, these rules may have given some banks incentives to reorganize their on–balance sheet portfolios or to shift into off–balance sheet activities.

The Basle Accord risk-based capital standards, which were implemented starting in 1990, corrected some of the problems with the flat-rate standards by requiring banks to hold different amounts of capital, depending on the perceived credit risk of different on– and off–balance sheet assets (see table B2 for details). Furthermore, to reduce discretion in the enforcement of the standards and the closure of capital-impaired banks, Congress included "prompt corrective action" provisions in the FDIC Improvement Act of 1991 (FDICIA). Under prompt corrective action, banks with capital ratios below certain thresholds are subject to various mandatory and discretionary sanctions. A summary of the prompt corrective action rules is given in tables B3–B5. As shown below, a cumulative effect of the many changes in capital regulation between 1979 and 1994 was that banks held much more capital at the end of the period than at the beginning. This is especially true of the largest banking organizations, which began the period with much less capital and were hardest hit by the risk-based capital provisions.

The effects of the other two major regulatory changes, deposit account deregulation and liberalization of geographic expansion rules, were more ambiguous. Before the 1980s, the interest rates that banks could pay on

1. A bank holding company is a separate legal entity that owns at least 25 percent of a bank, or exercises control of it. In our empirical analysis we assign each bank to the holding company with the largest share to avoid double-counting banks that are owned by more than one holding company.

deposits and the types of accounts that they could offer were tightly restricted. As a result, banks earned monopsony profits by being able to acquire deposit funds at below-market rates. However, higher market interest rates and some market innovations in the late 1970s, including the expansion of money market mutual funds (MMMFs), started to reduce the competitive advantage of the banking industry over its less-regulated competitors. In the early 1980s these restrictions were gradually lifted, and by 1986 bank deposit rates were completely deregulated. While the deregulation was necessary to help banks stop deposits from flowing to unregulated competitors, the shift to a competitive market for deposits meant that banks lost a supply of funds that had historically been available to them at below-market rates.

It is important to recognize that market factors and innovations, not the deregulation of deposits, were primarily responsible for the loss of monopsony power. It is not clear whether banks were made better or worse off in the long run due to deposit deregulation. Without deregulation, banks would have held many fewer deposits, but the deposits that they did acquire might have been much less costly.

The changes regarding the ability of banks to diversify geographically had quite different effects on different parts of the banking industry; in general, favorable for organizations that wished to expand geographically and unfavorable for those whose markets were invaded. The past fifteen years have witnessed a significant liberalization of intrastate branching and the rules for affiliation with multibank holding companies (MBHCs).[2] This period also marks the beginning of the modern interstate banking era in which MBHCs have been allowed to own banks in more than one state, usually through regional compacts approved by the legislatures of nearby states. At the same time, there has been considerable liberalization of antitrust policy as it applies to banking organizations.[3] Despite these very significant changes, as of

2. A multibank holding company owns or controls more than one bank.
3. From the late 1970s through the mid-1980s a number of decisions by the courts, the Justice Department, and the Federal Reserve moved policy toward permitting mergers and acquisitions that earlier would have been denied (see Rhoades and Burke, 1990). For example, the Justice Department and the Federal Reserve in 1985 began allowing bank mergers in highly concentrated markets that raised the Herfindahl index measure of concentration (the sum of squares of the local market shares) by as much as 200 points, rather than the 50-point limit applied to other industries, on the assumption that banks face substantial competition from nonbank financial intermediaries. Other changes

the end of 1994 MBHCs still could not expand nationwide and all interstate branching remained prohibited under the McFadden Act of 1927 and state regulations.

The Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994 essentially expands the existing regional compacts to the nation as a whole and overturns the McFadden Act's prohibition on interstate branching. Under Riegle-Neal, bank holding companies are permitted to acquire banks in any other state (under essentially the same conditions as holding companies that are already in that state) as of September 29, 1995. States may act to "opt out" of interstate *branching* before this date, or they may act to "opt in" and allow interstate branching to commence earlier. As of this writing, only Texas has opted out of interstate branching, while a number of states have opted in early.[4]

Although settled as a matter of policy, the consequences of nationwide banking are still unknown. Standard neoclassical analysis would likely project that the future will be driven primarily by shifts in technology, economies of scale and scope, and risk diversification. While these factors are undoubtedly quite important, this view ignores the fact that the Riegle-Neal legislation should remove two related distorting features of past rules regarding the ability of banks to expand geographically.

First, past intrastate and interstate regulations prevented full-scale competition in many local deposit and loan markets. To the extent that some banks were thus allowed to acquire market power in the pricing

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include the use of savings and loan data in computing the Herfindahl index for banks, the consideration of possible competition, and the ruling out of sheer size as a reason for denying a merger.

Today, most banking mergers are approved, although the parties are often required to divest some offices in local markets with significant market overlap. An important recent development is that the Justice Department and the bank regulatory agencies issued information regarding some simple screens that they apply to determine whether a merger is likely to be investigated further for possible challenge (see U.S. Department of Justice, Office of the Comptroller of the Currency, and Board of Governors of the Federal Reserve, 1995). It is also notable that because the rules are couched in terms of *increases* in concentration from each merger and do not specify a maximum level of concentration, they would not necessarily prevent a situation in which fewer than ten nationwide banking organizations were the only competitors in every local banking market (see Burke, 1984, and Rhoades, 1992).

4. See Kane (1996) for a detailed discussion of Riegle-Neal.

of deposit and loan products, these banks may have been able to operate inefficiently or pursue other goals. For instance, by using deposit funds that are acquired at below-competitive rates or by using extra profits from above-competitive rates charged on other loans, a bank with market power can make loans that would have negative net present value (NPV) if evaluated at competitive market prices and still remain profitable. Such negative NPV investments may be made because bank managers are inefficient or because they are pursuing goals other than profit maximization, perhaps without the knowledge of bank owners. Similarly, it is possible that negative NPV loans are sometimes issued to companies that are owned or controlled by the directors of the bank, although there are legal limits on the amounts of such "insider" loans.

Second, geographic restrictions may have inhibited the functioning of the market for corporate control in banking. In other industries, even if competition in the product market were not possible, some of this inefficient behavior might be prevented if there were an active market for corporate control. That is, competition for ownership and control might lead firms with market power to be more efficient at keeping costs down and avoiding negative NPV investments. However, in the banking industry the market for corporate control has also been very limited. For instance, the separation of commercial banking from other industries mandated by the Glass-Steagall Act means that the only corporate entities that can take over, or threaten to take over, and reform a commercial bank that is operating inefficiently are other banking organizations (see appendix B for details). Furthermore, the intrastate and interstate geographic barriers to entry have also limited the set of organizations that are eligible to acquire and reform inefficient banks to banking organizations in the same locality, state, or region.

The move to nationwide banking should not only help to eliminate local market power by facilitating new competition, but should also help to improve the market for corporate control by giving organizations from throughout the nation the potential to take over and reform an inefficient bank. Exactly how the previously protected banks might respond to increased competition or the threat of a takeover is not known. An extension of arguments made by Michael Jensen would suggest that the regulations that restrained competition may have bred considerable inefficiency and nonalignment of management and own-

ership interests, so that the opening up of competition and the market for corporate control may significantly alter the behavior of banking organizations in the formerly protected markets.[5]

We turn next to the technical and financial innovations of the last fifteen years. Improvements in information processing have been important ingredients in most cases. Automated teller machines (ATMs) have changed the way in which many Americans do their banking by providing a more convenient substitute for human tellers, particularly for cash acquisition. Advances in computing power and telecommunications have also changed the back-office operations of banks and made electronic payments significantly more efficient. Similarly, the application of credit-scoring software has greatly facilitated the efficiency and standardization of credit evaluation. For instance, the recent experience of several banks suggests that reliance on computerized credit-scoring models may result in fewer loan losses than conventional methods that rely on the judgment of loan officers.[6]

Recent developments in applied finance, along with improvements in information processing technology, have also led to a tremendous explosion in the number of products that banks can offer and hold. For instance, the development of secondary markets for mortgages and credit card receivables has given banks greater flexibility in their operations. A complete list of new banking markets and products developed over the last fifteen years would be excessively long, but it is important to note the tremendous growth in the use of derivative securities—contracts with payoffs that are derived from the prices of other securities or commodities. Derivatives allow bank customers to hedge market risks and exploit their own comparative advantage without the banks having to take on significant market risk themselves (that is, as long as the banks hedge by maintaining matched books).[7]

Importantly, these technical and financial advances have often helped nonbanks more than banks and reduced the shares of financial markets supplied by commercial banks. Decreases in the cost of direct access

5. See Jensen (1986, 1989, 1993). Some limited empirical evidence is provided by Schranz (1993), who finds higher profitability ratios for banks in states with relatively liberal takeover policies.

6. See Saul Hansell, "Company News: Need a Loan? Ask the Computer; 'Credit Scoring' Changes Small-Business Lending," *New York Times*, April 18, 1995, pp. D1, D4.

7. See Merton (1995) for more discussion of this phenomenon.

to financial markets has led some firms that previously would have borrowed from banks to issue commercial paper or corporate bonds (although this debt is sometimes backed by bank lines or letters of credit). Similarly, nonbank financial intermediaries have developed bank-like products, such as money market mutual funds, and compete with banks for depositors' funds. In addition, improvements in information processing and telecommunications have opened U.S. (and other) markets to global competition by allowing external competitors to more easily transfer and process information and move funds across international boundaries.

The Transformation of Banking, 1979–94

As discussed in the previous section, both the regulatory changes and the technical and financial innovations have had mixed impacts on banks' profitability and competitive market positions. This section examines the recent transformation of the industry and assesses the importance of the underlying regulatory, technical, and financial factors behind the transformation. A goal is to improve the understanding of the role that these factors are likely to play in the future transformation of the industry in the nationwide banking era.

Overview of the Data

Most of the data shown in the tables that follow come from the Reports of Condition and Income (''Call Reports'') that all federally insured commercial banks file with regulators each quarter. To remove the effects of inflation, all dollar figures and size classes in the tables are reported in 1994 dollars, calculated using the GDP implicit price deflator. For example, table A2 shows balance sheet, off–balance sheet, and income statement data for the industry for each year during the period 1979–94, all in real 1994 dollars.

For the empirical analysis, we treat each top-tier bank holding company as a single, integrated banking organization. That is, we combine the assets of all the banks directly controlled by a holding company, or indirectly controlled through the ownership of a lower-tier holding company, into a single economic unit. There are good regulatory and eco-

nomic reasons for following this convention.[8] This treatment is also needed for a pragmatic reason. We forecast future bank consolidation by extrapolating from past data on interstate bank holding companies because, due to the prohibition on interstate branching, there are no data on interstate activity at the bank level.[9]

We track the distribution of gross domestic assets (gross assets include loan loss reserves) by five size classes of banking organizations defined in terms of total assets: under $100 million, from $100 million to $1 billion, from $1 billion to $10 billion, from $10 billion to $100 billion, and over $100 billion in real 1994 dollars. For brevity's sake, some of the tables combine the middle three size classes into a single group with assets between $100 million and $100 billion, even though the analysis always uses all five size classes. Also, for expositional purposes we frequently refer to the class with under $100 million in assets as ''small banks,'' the middle three classes as ''mid-sized banks,'' and the largest class as ''megabanks.''

The most striking fact about the industry over the last fifteen years is the amount of consolidation that has taken place. Table 1 shows that the number of independent banking organizations has fallen by 4,537,

8. For instance, legislation requires cross-guarantees whereby all banks within a holding company may be held liable for any deposit insurance funds that are used to assist any other bank within the holding company. Similarly, the Federal Reserve's source-of-strength policy requires the holding company itself to stand ready to provide funds when any of its banks become distressed (see Davies, 1993a). Thus the top-tier holding company is effectively made to be the risk-management unit by regulation. Moreover most MBHCs are in fact managed on a consolidated basis: policies and procedures and important business decisions are typically made at the holding company level.

Finally, analysis at the bank level of a large holding company might lead to distortions because holding company affiliates often exchange portfolio instruments. For example, because of legal lending limits, the largest loans are likely to be booked in the largest bank in the holding company, even if they are issued to the customer of one of the smaller affiliates. Similarly, large New York City banks often book their fee-generating services at the Delaware affiliates of their holding company because Delaware taxes on fee income are relatively low. Thus looking at the holding company rather than at an individual bank within an MBHC may give a more accurate description of the relevant economic entity.

9. As an empirical matter, the use of data at the holding company level may make little difference in most cases because most bank holding companies have only a single bank, and even large MBHCs tend to be dominated by a single bank. In 1994, among holding companies with more than $100 billion in banking assets, an average of 70 percent of the assets were in the single largest bank.

Table 1. The Transformation of the U.S. Commercial Banking Industry

Units as indicated

Item	1979	1994
Total number of banking organizations	12,463	7,926
Small banks	10,014	5,636
Real industry gross total assets[a]	3.26	4.02
Industry assets in megabanks[b]	9.4	18.8
Industry assets in small banks[b]	13.9	7.0

Source: Table A1.
a. Trillions of 1994 dollars.
b. Percent.

from 12,463 in 1979 to 7,926 at the end of 1994 (year-by-year data are shown in table A1). This 36.4 percent decline in the number of organizations is perhaps even more surprising, given the fact that industry gross total assets grew 23.4 percent in real terms over the same time period.[10] This consolidation was likely fueled by a combination of regulatory changes and innovations that moved the industry in the same direction, specifically, the relaxation of geographic restrictions on branching and MBHCs, an easier merger approval process, and innovations in information processing and telecommunications.

Table 1 also shows that a net total of 4,378 small banking organizations disappeared during this period. Thus almost all of the reduction in the number of organizations is explained by the disappearance of small organizations. Accompanying the shift toward fewer organizations has been a reallocation of assets from smaller organizations to larger organizations. The fraction of gross domestic assets held by the smallest size class dropped by nearly half, from 13.9 percent to 7.0 percent, while the fraction held by the megabanks doubled from 9.4 percent to 18.8 percent.

If it were the case that behavior did not change as the industry consolidated and assets were transferred from smaller banking organizations to larger ones, then there would be little purpose in reviewing these past changes and trying to relate them to the industry's future under nationwide banking. Previous research has suggested that there

10. Note that during this consolidation wave, there was also considerable new entry into the industry. Between the end of 1979 and the end of 1994, 3,111 new insured U.S. commercial banks opened for business. Accordingly, the net change shown at the top of table 1 understates the number of banking organizations that exited the industry due to failure or merger.

are very few scale economies in banking, and that the mergers of the 1980s resulted in very little cost savings on average.[11]

Nevertheless, the data reviewed below strongly suggest that there are good reasons to examine the past transformations in order to shed light on the future. The dismantling of geographic barriers to intrastate and interstate banking over the past several years has opened the door to more intensive competition in local banking markets throughout the nation. This has likely reduced the exercise of market power in some banking markets and improved the market for corporate control of banks, making it easier to uproot entrenched, inefficient, or self-serving managers and directors. Moreover, during this period there have been significant changes in the estimated patterns of bank lending across small, medium, and large borrowers. The model of the nationwide banking era presented below predicts more of these same types of changes in the future.

Behind the Transformation: The Role of Technical and Financial Innovations

As noted above, technical and financial innovations have been important to the transformation of the industry. Many of the new lines of business that banks have entered did not exist fifteen years ago. Derivative contracts such as swaps and some of the futures and forwards are a few examples. These new products of financial engineering would not have been available without advances in applied finance and computing. Table 2 shows that large banking organizations have had rapidly growing derivative activities since 1983, when derivative data were first available on the Call Report. Megabanks have increased the notional value of their derivatives positions from 82.3 percent of assets in 1983 to more than eleven times the value of assets in 1994.[12] There has also been a corresponding increase in reported "other noninterest income," which includes fees from issuing counterparty guarantees and derivative instruments. For megabanks, this item rose from 7.0 percent of operating income in 1979 to 20.9 percent in 1994 (financial statements for megabanks are shown in table A3).[13]

11. See Berger, Hunter, and Timme (1993).

12. Notional values may be rather poor indicators of the market values or risks of derivative activities, but these values are all that are available on the Call Report.

13. The sharp drop in other noninterest income from 31.1 percent of operating

Table 2. Technical and Financial Innovations Affecting U.S. Banking

Units as indicated

Item	1979[a]	1994
Number of automated teller machines	13,800	109,080
Real cost of an electronic deposit[b]	0.0910	0.0138
Real cost of processing a paper check[b]	0.0199	0.0253
Megabanks		
Notional value of derivatives/assets	0.823	11.45
"Other noninterest income"/operating income[c]	7.0	20.9
Small banks		
Notional value of derivatives/assets	0.001	0.002
"Other noninterest income"/operating income[c]	3.5	8.3

Source: Tables A1, A3, and A5. Data on the costs of electronic deposits and processing a paper check are from Bauer and Hancock (1995).
a. Data for notional value of derivatives divided by assets are from 1983 because prior data are not available.
b. 1994 dollars.
c. Percent.

Table 2 also shows that small banking organizations approximately doubled their derivative positions from 0.1 percent of percent of assets in 1983 to 0.2 percent in 1994, and "other noninterest income" rose from 3.5 percent of operating income in 1979 to 8.3 percent in 1994 (financial statements for small banks are shown in table A5). However, the positions of these organizations are still minuscule compared with those of the megabanks.

Thus the development of these risk management tools has permanently changed the business of banking, at least for large banking organizations. Where once mostly liquid liabilities were pooled and converted into mostly illiquid assets, now off–balance sheet activities are also of critical importance and the management of market risks is a crucial skill.

Other products of technical change have also been important in transforming the business of banking. On the consumer side, table 2 shows that there were 109,080 ATMs in 1994, almost eight times as many as the 13,800 available to consumers in 1979 (see table A1 for the annual data). On the production side, table 2 shows that between 1979 and 1994 the real, direct cost of an automated clearinghouse payment (for example, the electronic deposit of a paycheck) fell from 9.10 cents to 1.38 cents, while the cost of processing a paper check rose from 1.99

income to 20.9 percent between 1993 and 1994 appears to reflect, in part, a reduction in the sales of some derivative contracts.

cents to 2.53 cents in 1994 dollars.[14] We discuss below other important technical and financial advances, such as improvements in information processing and telecommunications and the development of sophisticated statistical analysis packages and credit-scoring models that make it easier for banks and nonbanks alike to evaluate credit and monitor borrowers.

The technical and financial developments discussed here may have had marginal impacts in encouraging consolidation because larger organizations may be better able to exploit the scale economies associated with these procedures and products. However, as shown below, regulatory changes have likely been much more important factors in the consolidation of the banking industry.

Behind the Transformation: The Role of Changes in Geographic Restrictions

The regulatory changes affecting the ability of banking organizations to expand geographically have unambiguously facilitated consolidation. Both intrastate and interstate rules changed dramatically between 1979 and 1994. Because most of the intrastate restrictions on branching and affiliation with multibank holding companies were lifted several years ago and will likely have little further effect in the future, we focus our discussion on the interstate regulations (see table B6 for a state-by-state history of the rules on geographic expansion).

Until 1982, except for grandfathering arrangements, *not a single state* permitted MBHCs from other states to own banks within its borders. In sharp contrast, by the end of 1989 all but six small states accounting for less than 4 percent of gross domestic banking assets allowed some interstate activity, and by 1993 only Hawaii did not allow any interstate MBHCs. Before these changes in regulation, there was no way for the industry to consolidate significantly, nor for the market for corporate control of banks to work well.

To summarize these changes, we first calculate the fraction of the nation's gross domestic bank assets in states to which an MBHC headquartered in each state had access, including the assets in its home state

14. See Bauer and Hancock (1995).

Table 3. Liberalization of Regulations Regarding Geographic Diversification

Percent

Item	1979	1989	1994
National assets legally accessible from the typical U.S. state	6.5	29.0	69.4
Typical state's assets controlled by out-of-state multibank holding companies	2.1	18.9	27.9

Source: Tables A6 and A7.

(complete annual data for all states are presented in table A6).[15] The weighted average of the state data, shown in the first row of table 3, indicate a massive expansion of interstate privileges in the first half of the 1990s. The average potential reach of an MBHC rose from 29.0 percent of the nation at the end of 1989 to 69.4 percent by the end of 1994. These estimates imply that by 1994 the typical MBHC already had the *right* to operate in states accounting for 69.4 percent of the nation's banking assets. Thus the industry had already moved most of the way toward nationwide banking privileges by the end of the sample period, even though interstate *branching* was not yet permitted.

In addition, we measure changes in *actual* interstate banking activity by examining how many assets were controlled by out-of-state banking organizations. The weighted average data for the nation as a whole are also reported in table 3 (full year-by-year data for all states are presented in table A7). In 1979, only 2.1 percent of state assets were owned by out-of-state banking organizations, all through grandfathering agreements. By 1989 this fraction had grown to 18.9 percent, reflecting the effects of regional compacts and other reciprocity agreements. By the end of 1994, 27.9 percent of U.S. gross domestic assets were controlled by out-of-state bank holding companies.

Taken together, the two measures in table 3 indicate that the actual spread of interstate banking has lagged noticeably behind the progress that could have legally taken place. Most of the large banking organizations have chosen to consolidate in a limited number of states, usually

15. To interpret the data in table A6, consider the case of Alabama. The entry of 0.280 for 1994 indicates that an MBHC headquartered in Alabama had the legal right to operate banks in states encompassing 28 percent of the nation's gross domestic banking assets (including its home state). The year in which each state first permitted at least some interstate banking activity is indicated by a switch to bold characters in the table. As shown, interstate banking first became possible for Alabama organizations in 1987.

on a local or regional basis. For instance, as of 1994 Norwest Corporation held commercial banking assets in fourteen states, the most of any MBHC. Six other MBHCs—NationsBank Corporation, Banc One Corporation, First Interstate Bancorp, BankAmerica Corporation, Keycorp, and First Union Corporation—also had commercial banks in at least ten states (these data do not include the savings and loan institutions owned by some MBHCs).

The apparent desire to consolidate on a less-than-nationwide basis in the short run is important for understanding the future impact of the Riegle-Neal legislation. One possible explanation is that in the short run it is easier to consummate mergers of rivals who are nearby.[16] Under this scenario, predictions for further consolidation under nationwide banking based on this historical experience would substantially understate the long-run consolidation of the industry. An alternative interpretation is that banking organizations have already responded to the options that have become available. Whether the motivation is to take advantage of opportunities to consolidate back-office or branching operations or to gain local market power in pricing, this interpretation would suggest that banks have responded quickly to the available opportunities and have decided that expanding on a nationwide, or nearly nationwide, basis is not the most profitable course of action. Under this scenario, further consolidation is likely to be limited in the future and it is unlikely that the industry will ever converge to a mere handful of banks.

We return to the discussion of the alternative ways to interpret the data in table 3 when we analyze the future. For the purposes of summarizing the past, the table shows that easing of geographic restrictions on banking activities has played a substantial role in the transformation of the industry, even though banking organizations have not fully exploited the interstate opportunities that are already available.

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16. The reasons given for mergers among large banking organizations often include improvements in cost efficiency and greater geographical diversification of risks. The evidence to date, which is taken from the megamergers of the 1980s, suggests that, on average, these mergers did not improve cost efficiency but may have improved profits through improved diversification (see Berger and Humphrey, 1992b; and Akhavein, Berger, and Humphrey, 1996). The evidence from the megamergers of the 1990s is still being assembled and could yield different results because of changes in the economic and regulatory environments.

Behind the Transformation: The Role of External Competition

Together, the changes in regulation, technology, and applied finance have altered the competitive position of U.S. banks relative to their rivals, often by increasing the amount of external competition that banks must face in the market. This subsection examines the effects of external competition in transforming the U.S. banking industry, while recognizing that the degree of external competition is itself largely an endogenous outcome of the primary forces driving the industry.

The literature on this subject has typically been couched in terms of whether or not the U.S. banking industry is in decline.[17] Most of the arguments center on a loss of share in the lending market to direct financing, to less-regulated domestic financial institutions, and to foreign institutions. As shown below, the data are consistent with the notion that these other institutions have gained market shares relative to U.S. banks, but this finding does not necessarily imply that the banking industry is in decline.[18]

We begin by noting that several simple indicators suggest that the banking industry is growing. Table 4 shows that between 1979 and 1994 the gross total assets of the industry grew from $3.26 trillion to $4.02 trillion, a cumulative increase of 23.4 percent in real terms, or an annual growth rate of 1.40 percent (compounded on a continuous time basis). Similarly, the data show that in real terms domestic banking assets grew by 29.3 percent, or 1.71 percent per year (table A1), and

17. See, for example, Gorton and Rosen (1995), Boyd and Gertler (1994), American Bankers Association (1994), Ettin (1994), and Edwards and Mishkin (1995).

18. Perhaps suprprisingly, the literature generally does not look at measures such as Tobin's *q* or the market-to-book ratio (Davies, 1993b, is an exception). These ratios suggest whether market participants believe that resources should flow into or out of the industry. It is not possible to measure these ratios on an industrywide basis because most banking organizations are not publicly traded. There are also measurement problems in obtaining market prices for deposits and other debt, even for publicly traded firms. Nevertheless, most of the largest bank holding companies are publicly traded. The last row in the top panel of table A1 shows the average market-to-book ratio for the fifty largest bank holding companies which, in total, control well over half of the assets in the banking system. Over the period 1979–84 the average ratio was consistently below 1.0, suggesting that market participants did not believe that further investments in bank holding company equity were warranted. However, for nine out of the ten years between 1985 and 1994 the market-to-book ratio was above 1.0. Moreover, the estimates are larger than the market-to-book statistics that are available for nonfarm, nonfinancial corporations from the Flow of Funds reports. This evidence is consistent with the other data that we present below suggesting that the industry is not necessarily in decline.

Table 4. U.S. Commercial Banks and External Competition

Units as indicated

Item	1979	1994
U.S. banking industry real gross total assets[a]	3.26	4.02
Total credit market debt of individuals, businesses, and governments[a]	8.27	17.14
U.S. banks' share[b]	25.8	17.0
Total non–credit market debt of financial intermediaries[a]	9.06	18.57
U.S. banks' share[b]	22.6	14.4
Total nonfarm, nonfinancial corporate debt[a]	1.58	2.75
U.S. banks' share[b]	19.6	14.5
Foreign banks' share[b]	5.6	13.4

Source: Tables A1 and A8.
a. Trillions of dollars.
b. Percent.

domestic loans and leases grew 36.8 percent, or 2.09 percent per year (table A2), over the fifteen-year sample period. To put these figures into context, real GDP grew by 40.7 percent (from $4.79 trillion to $6.74 trillion), or 2.28 percent per year, over the same period. Thus, the banking industry appears to be growing at a slower rate than real GDP. John Boyd and Mark Gertler show that if off–balance sheet activities and loans by foreign banks to U.S. firms are included, the (combined domestic and foreign) banking industry has actually grown about as fast as, or faster than, GDP.[19] Thus the raw data on the growth of U.S. banks suggest that the industry has been growing in real terms over the long term, but at a moderate pace.

An alternative benchmark is how the banking industry stacks up against its market competitors. We focus on debt markets because banks specialize in debt finance and generally do not make equity investments. We also exclude off–balance sheet activities from these comparisons because off–balance sheet data for nonbank financial intermediaries are not publicly available, and because the reported notional values of off–balance sheet activities are often difficult to compare to on–balance sheet values.[20]

19. See Boyd and Gertler (1994).
20. Given that banks issue large amounts of most counterparty guarantees and de-rivative instruments, and given that these products have grown tremendously since 1979, this exclusion implies that we likely understate the growth of the banking industry relative to its competitors.

To look at competition on the asset side of the banking business, table A8 reports the full pattern of year-by-year variation in total U.S. credit market debt of individuals, businesses, and governments. The summary information in table 4 shows that this debt grew by 107.2 percent from 1979 to 1994, or 4.86 percent per year in real terms, more than twice the growth rate of GDP and the measures of bank assets and loans. This high growth rate undoubtedly was partially due to technical progress in the fields of applied finance, telecommunications, and information processing. Such progress has allowed far greater amounts of intermediated and nonintermediated debt to circulate because lenders can more easily evaluate and control potential risks.[21]

Table 4 also shows that the share of total credit market debt held by U.S. commercial banks fell from 25.8 percent to 17.0 percent, a loss of about one-third of their share over fifteen years.[22] The combined effect of the sharp decline in market share and the massive expansion in the size of the market was to increase the overall value of domestic credit market instruments held by banks by 36.5 percent over the period, about the same as the growth in domestic loans and leases discussed above.

Total non–credit market debt, which includes most bank liabilities, gives a similar picture, as can also be seen from table 4. The total non-credit market debt of intermediaries grew by 105.0 percent over the fifteen-year interval, while the share held as deposits at U.S. commercial banks dropped by about a third (from 22.6 percent to 14.4 percent) from 1979 to 1994, similar to the decline in credit market debt.[23] In terms of volume, the doubling of non–credit market debt outweighed the banks' one-third loss of share, so that bank non–credit market liabilities grew by 30.6 percent in real terms over the fifteen-year sample period.

Finally, table 4 shows data on lending to U.S. businesses, which is

21. There was also a tremendous real increase in the debt issued by the U.S. government, government-sponsored enterprises, and federal mortgage pools during this period, but even after removing these items the remaining debt still grew by 4.42 percent per year in real terms.

22. It is interesting to note that table A8 shows an 8.8 percentage point loss of credit market share by commercial banks, almost as great as the 10.0 percentage point loss by the essentially collapsed thrift industry.

23. Table A8 shows that the largest proportional gains in share were by mutual funds, which more than septupled, and money market funds, which more than tripled.

the bailiwick of the banking industry and the financial product that may be most important to the health of the macroeconomy. Real lending to nonfarm, nonfinancial corporate business grew by 74.1 percent, from $1.58 trillion to $2.75 trillion, over the period, somewhat less than the other debt aggregates but still much more than the 40.7 percent real growth in GDP. The share of this debt that was issued as loans by U.S. banks fell by about one-quarter, from 19.6 percent to 14.5 percent.[24] The annual data, broken out in lower panel of table A8, reveal that most of the decline in share (3.9 percentage points of the total 5.1 percentage point fall) occurred in a period of only three years, between the end of 1989 and the end of 1992. This amounts to a 21.5 percent real decline in the dollar volume of corporate lending by U.S. banks in just three years. Moreover, banks had recovered very little of this lost share by 1994. The absence of a rebound in lending after 1992 (which is explicitly documented in subsequent tables) suggests that the lending slowdown of the early 1990s may be more long term than was at first believed.

More than offsetting the decline in loans by U.S. banks was an increase in lending to U.S. corporations by foreign banks, which grew by 7.8 percentage points, from 5.6 percent to 13.4 percent of U.S. corporate debt from 1979 to 1994. The detailed data in table A8 show that almost all of this growth came from offshore, rather than onshore, lending.[25] Perhaps more surprising is the fact that as a result of the

24. The lower portion of table A8 shows that the biggest shifts in corporate lending were in commercial paper, which approximately tripled in dollar volume from 1979 to 1994; corporate bonds, whose share of financing slid from 41.2 percent in 1979 to 36.4 percent in 1984 and then more than recovered to reach 45.6 percent by 1994; and mortgage indebtedness for corporations, whose share declined from 15.4 percent in 1979 to 5.7 percent in 1994. The evidence on bonds and commercial paper is consistent with the findings discussed below regarding financing patterns for large bank customers (see Calomiris, Himmelberg, and Wachtel, 1995, for more details on the commercial paper market). The change in mortgage indebtedness likely reflects changes in tax law that made it more lucrative to undertake commercial property development as a limited partnership than as a corporation.

25. Onshore lending by foreign banks consists of loans issued by agencies and branches of foreign banks operating on U.S. soil. We exclude from foreign lending the loans of separately capitalized subsidiaries of foreign banks that have U.S. charters (for example, the Bank of California). Instead, we treat these as U.S. banks that are owned by foreigners, since they are subject to essentially the same regulatory and economic environments as other banks chartered in the United States. This differs from the treat-

more-than-doubling of their share of lending to U.S. corporate busi-
ness, foreign banks are now almost on par with U.S. banks, with an
estimated 48.0 percent share of total bank nonfarm, nonfinancial cor-
porate loans.[26] There are a number of potential reasons for the rise of
foreign bank lending to U.S. corporations, including technical advances
in credit scoring and securitization that have allowed foreign banks to
purchase, participate in, or originate loans that would have been too
difficult or expensive to research and monitor in the past.[27]

However, there are several reasons to believe that the substitution of
foreign for domestic bank loans is not neutral with respect to the dif-
ferent size categories of borrower, and that the 48.0 percent share of
bank corporate lending may overstate the importance of foreign lend-
ing. First, Allen Berger and Gregory Udell show that foreign banks are
much more likely than domestic banks to buy loans originated by large
banks (which tend to be large loans). Second, Charles Calomiris and
Mark Carey find that the average customer of a foreign bank is more
highly rated and receives lower loan spreads than the average customer
of a domestic bank. Third, James Ang finds that small businesses are
more likely to borrow from local lenders with whom their owners have
personal relationships—lenders that are much more likely to be domes-
tic rather than foreign institutions.[28] Finally, much offshore lending is

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ment in other studies, such as Boyd and Gertler (1993, 1994) and Nolle (1994, 1995).

Offshore lending by foreign banks to U.S. corporations includes direct loans from
foreign banks in their home countries and loans arranged by agencies and branches of
foreign banks located in the U.S., but booked at their own offshore offices (usually
located in the Caribbean). Thus some of the growth in offshore lending may be due to
the activities of onshore foreign agencies and branches that are booked offshore to take
advantage of tax or regulatory differences. Following McCauley and Seth (1992), Seth
(1992), Boyd and Gertler (1993, 1994), Nolle (1994), and DeYoung and Nolle (1995)
among others, our figures for offshore lending for the period reflect the replacement of
the Flow of Funds data on offshore lending by what is considered to be more accurate
data from the Bank for International Settlements' (BIS) international banking statistics
(beginning in 1983, when the BIS data were first available).

26. Although some studies use slightly different assumptions and arrive at different
figures, most obtain a similar share, in the range of 40 to 50 percent.

27. Many foreign banks initially entered the U.S. market to service home country
clients that were starting U.S. operations (see Budzieka, 1991; Grosse and Goldberg,
1991; Seth and Quijano, 1993; and Terrell, 1993). In addition, growing differences in
regulation between the United States and Japan in the early part of the sample period
may have spurred some Japanese banks and other firms to begin moving business to the
United States (see Hoshi, Kashyap, and Scharfstein, 1993).

28. See Berger and Udell (1993), Calomiris and Carey (1994), and Ang (1992).

to multinational home country clients with U.S. operations, which perhaps often replaces a foreign bank loan booked to the client in the home
country, rather than replacing a U.S. bank loan. This evidence suggests
that foreign banks tend to deal with large borrowers who often have
other low-cost sources of external finance, and that these banks are not
likely to pick up many small borrowers who are more dependent on
bank credit. Accordingly, foreign banks are probably not as important
a source of financing for U.S. business as their market share might
indicate.

Taken together, the results in table 4 provide a somewhat mixed
picture of the evolving market position of the banking industry. Over
the last fifteen years U.S. banks have lost considerable share in the debt
markets on both their asset and liability sides, but banking has still
grown moderately in real terms because of the substantial overall real
growth of financial markets. Put differently, despite the loss of share
to foreign banks and nonbank competitors, banks have found enough
new customers, or have sufficiently extended their ties to existing customers, to grow at a moderate pace over the long term. As we discuss
further below, however, some of the loss of lending in the first half of
the 1990s may be of concern.

For the purposes of looking to the future, it is not possible to keep
track of all these subtle interactions. However, the findings in table 4
do suggest that industry growth can perhaps be used as a summary
indicator that, at least indirectly, picks up some of the effects of the
continued changes in external competition. Thus in analyzing the future
below, we allow for different scenarios regarding the overall growth of
the banking market.

Behind the Transformation: The Role of Deposit Rate Regulation

As discussed above, another way in which market innovations have
affected external competition is through the role they have played in
the dismantling of regulatory restrictions on deposit interest rates and
account types. As a consequence of the invention of safe, deposit-like
instruments that paid market interest rates, the banking industry lost
much of its monopsony power over depositors in the early 1980s. To
provide a rough indication of the cost to banks of having to pay more
market-oriented rates on deposits, table 5 presents data on various mea

Table 5. Expenses of the U.S. Commercial Banking Industry

Percent, except where indicated

Item	1979	1986	1994
Interest expenses/assets	5.17	5.13	2.73
One-year Treasury bill rate	10.65	6.45	5.32
(Interest expenses/assets) less one-year Treasury rate	−5.48	−1.32	−2.59
Noninterest expenses/assets	2.39	3.03	3.55
[(Interest and noninterest expenses)/assets] less one-year Treasury rate	−3.09	1.71	0.96
Number of banking offices	50,136	58,063	65,610
Number of automated teller machines	13,800	64,000	109,080

Source: Tables A1 and A4. One-year Treasury rate is obtained directly from the Federal Reserve Bank of New York.

sures of bank costs and levels of open-market interest rates. As of 1979, total bank interest expenses were 5.17 percent of gross total assets, or 5.48 percentage points below the average one-year Treasury rate for that year of 10.65 percent. By 1986, when deposit interest rates were totally deregulated, the interest expense ratio was only 1.32 percentage points below the Treasury rate of 6.45 percent—an increase in interest costs of 4.16 percentage points of assets—reflecting a very significant loss of market power on the deposit side.

These extra interest costs would not have been so expensive for banks if they had been able to offset them by reducing noninterest expenses. Such a reduction could have been achieved by pruning extra branches and other services that provided customer convenience in the more highly regulated era before the 1980s, when banks could not compete for customers with market interest rates. However, the data suggest that this was *not* done. As table 5 illustrates, the number of banking offices increased by 15.8 percent, from 50,136 to 58,063, between 1979 and 1986, despite the fact that the number of ATMs more than quadrupled over this same interval, from 13,800 to 64,000. In addition, total noninterest expenses rose from 2.39 percent to 3.03 percent of assets over this period.[29] As a result, the total real interest plus noninterest cost

29. When making cost comparisons over time, it is important to account for all noninterest expenses, including the residual category of "other noninterest expense." As shown in table A2, other noninterest expense rose from 10.0 percent of operating expenses in 1979, to 14.1 percent in 1986, to 25.4 percent in 1994, and now exceeds total salary and benefits costs. The biggest item in other noninterest expense appears to be data processing costs paid to holding company subsidiaries. The tremendous increase in this "outsourcing" may reflect a move to delegate processing to separate service

rose from 3.09 percentage points *below* the one-year Treasury rate in 1979 to 1.71 percentage points *above* the Treasury rate in 1986, and has remained above it ever since.[30]

These data suggest that market innovations and the external competition to the banking industry, particularly on the liability side, encouraged banks to provide not only additional interest payments, but also increased customer convenience during the early 1980s.[31] This, in turn,

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bureaus in order either to gain efficiencies or to help to market these services to others.

One implication for banking research is that measures of input usage that exclude these costs can be misleading. For example, labor productivity as measured by gross total assets per employee rose from $2.32 million in 1979, to $2.48 million in 1986, to $2.74 million in 1994 (calculated from table A1), suggesting an improvement in costs. However, as shown in table 5, total noninterest expenses per dollar of assets actually increased over time, reflecting labor and capital costs incurred outside the banks.

30. We recognize the limitations of this simple analysis, including the fact that about half of the noninterest expenses are not properly attributable to funding. Nevertheless, these results are generally consistent with the findings of more rigorous studies of productivity growth and technical change in banking that use a multiproduct cost function approach to map out the movement of the efficient frontier over time. Berger and Humphrey (1992a) and Bauer, Berger, and Humphrey (1993) find that the cost increases associated with the increase in external competition and the deregulation of deposit rates in the early 1980s were larger in magnitude than the cost decreases from improved cost efficiency over the same time period. However, the losses for banks were more than made up for by the gains for consumers in terms of higher deposit interest rates and the greater convenience from ATMs.

31. In terms of the direct compositional effects on bank balance sheets, table A2 shows that until the passage of the Garn–St Germain Act in late 1982, banks were rapidly losing demand and transaction accounts—as a share of assets, these accounts fell from 25.3 percent to 16.8 percent between the end of 1979 and the end of 1982. After the passage of the Garn–St Germain Act banks were able to compete more effectively by using deposit accounts that paid market rates of interest, such as money market deposit accounts (MMDAs). Overall, between 1983 and 1992 domestic deposits were a stable source of funding, rising from 65.0 percent to 67.7 percent of gross total assets, before falling to 60.0 percent in 1994.

Table A3 shows that most of the drop in domestic deposits after 1992 comes from decreases in the deposit ratios of the megabanks. This shift is partly due to an accounting change that forces banks to account separately for profitable and unprofitable derivative positions, and has thereby increased the "other liabilities" category, especially for large banking organizations with substantial derivative positions. Financial Accounting Standards Board interpretation 39 (FIN 39) was adopted by all banks as of the 1994 Call Report, but some banks adopted it earlier. Under FIN 39, banks are no longer allowed to net out their derivative positions across all counterparties jointly and report a single net derivative position as an asset if positive, or a liability if negative. Instead, netting is now limited to positions with the same counterparty when certain legal conditions are also met. After this limited netting, derivative contracts or net positions with positive market values are recorded as assets, and those with negative values are recorded as

Table 6. Profitability of U.S. Banking Organizations

Percent

Return on equity	1979	1986	1994
All banks	14.0	10.0	15.0
Megabanks	14.3	6.9	14.2
Small banks	14.0	4.8	11.0

Source: Tables A2, A3, and A5.

suggests a substantial rise in costs in the banking industry and a corresponding fall in the franchise value of banks. Again, note that these losses were mainly due to the exogenous innovations and external competition that led to the deregulation of deposits, rather than the deregulation itself.

These higher costs of funds appear to have affected bank profitability substantially. Although the industry absorbed many shocks that affected their profits during the period—including unexpected swings in interest rates, difficulties with loans to less developed countries, problems in the agricultural and natural resource sectors, and regional recessions—the rise in funding costs likely contributed significantly to the decline in return on equity, which decreased from 14.0 percent in 1979 to 10.0 percent in 1986, as shown in table 6. The reduction in profitability was most significant for small banking organizations that are typically most dependent on deposits for funding. Table 6 also shows that the return on equity for organizations with less than $100 million in assets fell from 14.0 percent in 1979 to 4.8 percent in 1986, when interest rate ceilings were completely phased out. The largest organizations suffered a slightly smaller drop in profitability, in part because they were already paying market rates for significant portions of their funds.

This decline in industry profitability, along with severe problems of loan performance experienced by many banks, also may have helped to create a dramatic increase in the number of bank failures. Information on the failures is presented in figure 1. The lighter bars show that at the beginning of the sample period there were typically fewer than ten failures per year, but that by the end of the 1980s, more than two

liabilities. In 1994, this convention resulted in the artificial inflation of bank assets by approximately $90 billion. The effects of this change are captured in tables A2–A5 under "Assets in Trading Accounts" (for positive market positions) and "Other Liabilities" (for negative market positions). See English and Reid (1995).

Figure 1. U.S. Commercial Bank Failures, 1979–94

Number of failures   Billions of 1994 dollars
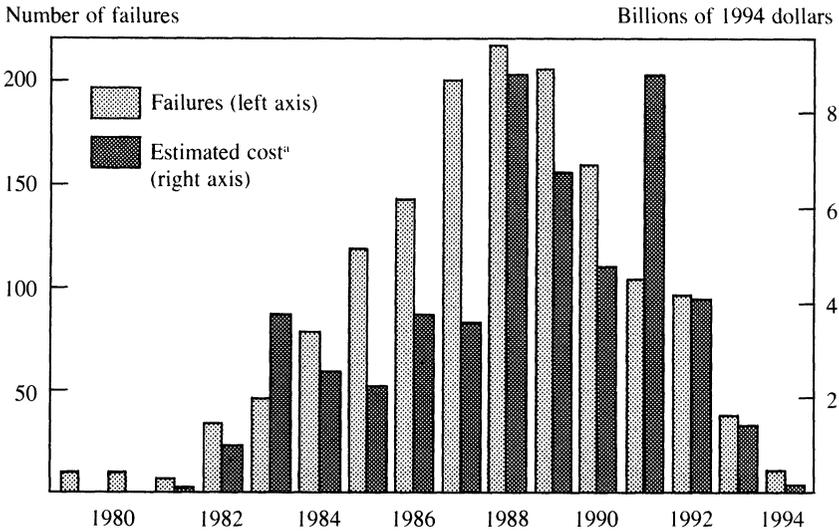
Source: Authors' calculations based on unpublished data from the FDIC and from the Consolidated Report of Condition and Income for Banks.
a. Estimated cost to the bank insurance fund at time of failure. Cost data are unavailable for the period before 1981.

hundred banks were failing annually—a twentyfold increase. The full data on failures, contained in table A9, also indicate that there was a significant increase in the size of the institutions that were closed by regulators. Before 1988, only five banks with assets over $1 billion had been closed, but in the next five years, twenty-seven banks of at least this size failed. The darker bars in figure 1 show the estimated cost to the bank insurance funds of the failures at the time when they occurred (actual costs may differ). Overall, the estimated cost of the 1,455 failures from 1981 through 1994, was $51.7 billion in real 1994 dollars.

The exact relationship between the increase in costs from external competition and deposit rate deregulation, on the one hand, and the greater incidence and public costs of bank failures, on the other hand, is unknown, but several theories exist. The reduction in profitability from paying higher deposit rates may have directly contributed to the weakness of some banks by consuming their capital. This reduction in capital may have created further problems if it led troubled banks to gamble by increasing their portfolio risks. Most banks that failed in the late 1980s and very early 1990s had both high costs and large quantities

of problem loans before the failure. Unfortunately there is no consensus as to whether this empirical relationship primarily indicates that high costs led to problem loans through the moral hazard channel, that problem loans created high costs because of the difficulties of dealing with these loans, or that bad managers handled both operating costs and portfolio risks poorly.[32] While a full analysis of the failures is beyond the scope of this paper, the dramatic increase in bank failures is likely to be remembered as the defining characteristic of the subperiod from the mid-1980s to the very early 1990s.[33]

Overall, it seems clear that the deregulation of deposit rates was involved with many of the important changes in the banking industry during the 1980s and very early 1990s. However, it appears that the impact of this change in regulation has now been largely played out, and therefore we need not model it in our prediction of the future.

Behind the Transformation: The Role of Changes in Capital Regulation

Before 1981 capital regulation was relatively discretionary and ad hoc. Standard supervisory practice generally required less capital for large banks because of their presumed superior diversification of risks. Table 7 shows that, in part because of this practice, the ratio of equity to gross assets for megabanks was 3.9 percent in 1979, while it was 8.5 percent for small banking organizations. The formal flat-rate capital standards implemented in the early 1980s (described in table B1) forced large banks, in particular, to hold more capital, thus pushing the equity ratio for megabanks up to 5.2 percent by 1989.

The flat-rate standards did not require any capital against off–balance sheet activities, and therefore likely encouraged the substitution of off–balance sheet counterparty guarantees—such as standby letters of credit and loan commitments that back up commercial paper—for on–balance sheet loans. As shown in table A3, the largest banking organizations, which were best positioned to take advantage of these types of products, quickly increased their off–balance sheet activities relative to their on–

32. See Berger and Humphrey (1992a), Coyne, McManus, and Stagliano (1993), Barr and Siems (1994), Berger and DeYoung (1995), and Wheelock and Wilson (1995) for evidence on these points.

33. See Barth, Brumbaugh, and Litan (1990), Kane (1993), and Mishkin (1995) for different perspectives on this issue.

Table 7. Bank Capital and Portfolio Ratios

Percent

Item	1979	1989	1994
Equity/assets			
All banking organizations	5.7	6.1	7.7
Megabanks	3.9	5.2	7.0
Small banks	8.5	9.1	9.9
Total loans/assets			
All banking organizations	55.5	61.3	58.0
Megabanks	57.7	69.8	56.6
Cash and securities/assets			
All banking organizations	38.3	31.5	31.4
Megabanks	32.2	19.4	22.1
Commercial real estate loans/assets			
All banking organizations	6.3	11.6	9.8
Megabanks	2.9	8.5	4.4
Loan loss provisions/assets			
All banking organizations	0.2	1.0	0.3

Source: Tables A2, A3, and A5.

balance sheet financing, and thus reduced their required capital. The empirical literature generally suggests that the flat-rate capital requirements of the 1980s played some role in the expansion of off–balance sheet activities, but that economic factors, including the technical and financial innovations discussed above, were likely even more important.[34]

One potentially important effect of any capital standard is that it can give some banks incentives to either raise or lower their portfolio risks. However, it is quite difficult to precisely document any purposeful changes in portfolio risk that may have occurred and link them directly to the changes in capital standards. It appears that in the 1980s the largest banking organizations increased their credit risk exposure by substituting from cash and securities holdings into loans. Between 1979 and 1989, organizations with more than $100 billion in total banking assets increased the fraction of their assets invested in loans and leases from 57.7 percent to 69.8 percent and decreased their cash and securities holdings by about the same amount, from 32.2 percent to 19.4 percent (see table 7). Almost half of the new loan growth came from

34. See Benveniste and Berger (1987), Pavel and Phillis (1987), Baer and Pavel (1988), Koppenhaver (1989), Berger and Udell (1993), and Jagtiani, Saunders, and Udell (1995).

increases in commercial real estate lending, one of the riskiest and least diversifiable investments that banks make. In fact, for the entire industry, between 1979 and 1989 the share of assets going into commercial real estate nearly doubled from 6.3 percent to 11.6 percent (see table 7).

Table 7 also shows that the industry's provisions for loan and lease losses rose from 0.2 percent of assets in the 1979 to 1.0 percent by the end of the decade. Certainly, some of these losses were caused by bad luck (for example, the unexpectedly restrictive U.S. monetary policy of the early 1980s, or the steep drop in commercial real estate prices in the late 1980s) rather than intentional increases in risk-taking. Nevertheless, given first, the increase in loan loss provisions; second, the twentyfold increase in bank failures; third, the rise in the proportions of assets invested in loans, particularly risky commercial real estate loans; and fourth, the explosion in off–balance sheet risks, it seems likely that a substantial portion of the banking industry intentionally raised its portfolio risks during the 1980s. The extent to which these shifts may have been a reaction to the formalization and tightening of capital requirements over the period 1981–85, or alternatively, whether the capital standards may have mitigated some of the risk-taking, is difficult to determine.[35]

One regulatory response to the problems of the late 1980s and the deficiencies of the flat-rate capital standards was the Basle Accord risk-based capital standards that were adopted by bank regulatory agencies from twelve major industrialized nations in July 1988, and in the United States were phased in from 1990 to 1992. The Basle standards penalize portfolio risk by requiring more capital against assets and off–balance sheet activities in categories with higher perceived credit risks. As the risk-based capital standards were being implemented, industry equity

35. See Koehn and Santomero (1980), Keeton (1988), Kim and Santomero (1988), Furlong and Keeley (1989), Keeley and Furlong (1990), Gennotte and Pyle (1991), Avery and Berger (1991), and Berger, Herring, and Szegö (1995) for discussions of the theoretical conditions under which capital standards give banks incentives to raise or lower their portfolio risks. The empirical literature generally finds that banks with higher capital in the 1980s had lower portfolio risks, lower failure rates, and higher earnings (see, for example, Lane, Looney, and Wansley, 1986; Avery and Berger, 1991; Berger, 1995; and Cole and Gunther, 1995). Nevertheless, the policy issue remains somewhat clouded because most of the observed variation in capital ratios is likely due to voluntary differences in capital ratios, rather than changes in regulatory capital requirements.

rose from 6.1 percent of gross total assets at the end of 1989 to 7.4 percent at the end of 1992 (see table A2). The megabanks were again affected the most by the regulatory change, and their equity ratio rose from 5.2 percent to 7.0 percent, over this period (see table A3). This differential effect on the megabanks is not surprising, given that until the implementation of risk-based capital standards, the largest banking organizations had higher proportions of off–balance sheet activities, and higher proportions of their on–balance sheet assets in the risk categories that required the most capital than smaller banking organizations.[36] The industry's overall equity ratios continued to rise gently after the risk-based capital standards had been fully implemented at the end of 1992, likely in part due to the unprecedented profitability of the industry over the period 1992–94.

Lending Patterns in the First Half of the 1990s

Collectively, the information in the first seven tables and figure 1 summarizes most of the key changes in the banking industry over the last fifteen years. However, because the business lending patterns of the industry affect the economy as a whole, they deserve special attention. In our analysis of the future below, we explore the possibility that lending to business, particularly small businesses, will be affected by the transition to nationwide banking. As a starting point, we review the developments in bank lending over the first half of the 1990s.

Aggregate Commercial and Industrial Lending Patterns

The first half of the 1990s seems to fall into two distinct periods: one from the end of 1989 through the end of 1992, and the other from the end of 1992 through the end of 1994. During 1989–92 there was a reduction in aggregate bank lending. Table 8 shows that for the banking industry as a whole, the proportion of gross assets invested in domestic loans fell from 55.5 percent to 51.7 percent over these three years. The table also shows that 57.1 percent of the decline occurred in domestic commercial and industrial (C&I) loans, which dropped from $596.7 billion to $458.2 billion in real dollars, or from 15.4 percent to 12.5

36. See Avery and Berger (1991).

Table 8. Recent Domestic Commercial and Industrial Lending Patterns

Units as indicated

Item	1989	1992	1994
Total domestic loans/assets[a]	55.5	51.7	52.3
Total commercial and industrial loans/assets[a]	15.4	12.5	11.9
U.S. commercial banks' share of total nonfinancial			
corporate debt[a]	18.1	14.2	14.5
Total commercial and industrial loans[b]	596.7	458.2	480.6
Megabanks[b]	40.1	74.0	92.2
Small banks[b]	30.0	23.5	21.9
Total commercial and industrial loans under $1 million[b]	143.7	88.4	93.7
Megabanks[b]	0.6	2.6	2.3
Small banks[b]	29.2	18.8	17.9
Total commercial and industrial loans betweeen $1 million			
and $25 million[b]	283.3	243.8	277.1
Total commercial and industrial loans over $25 million[b]	169.7	126.0	109.7
Megabanks[b]	19.2	38.6	40.8
Small banks[b]	0.0	1.2	0.1

Source: Tables A2, A8, and A10.
a. Percent.
b. Billions of 1994 dollars.

percent of gross assets. This finding is consistent with the fall in the domestic banking industry's share of the nonfarm, nonfinancial corporate loan market from 18.1 percent to 14.2 percent over the same three-year period. Moreover, if lending by U.S. banks is excluded from the total of this debt aggregate, the remainder is approximately constant over this subperiod (see table A8). Thus it appears that the slowdown in corporate lending was relatively concentrated in the domestic commercial banking industry.

Some slowdown in aggregate lending might have been expected as a result of the macroeconomic and regional recessions and the reactions by nonfinancial firms to the leveraging problems of the 1980s. Further reductions in bank lending might also have been expected from the implementation of risk-based capital standards, given that domestic C&I loans are in the risk category requiring the most capital under the Basle Accord (see table A12). However, the data suggest that risk-based capital standards were *not* principally responsible for the slowdown in these loans.

If the imposition of risk-based capital standards were the dominant explanation of the decline in bank lending, this decline would be expected to be concentrated in the largest banking organizations, which

are most often either in violation of, or close to, the capital minimums. Lending by small banking organizations, which are almost always well in excess of the standards, would be expected to be relatively unaffected. The data are not consistent with these predictions. As shown in table 8, banking organizations with less than $100 million in assets reduced their domestic C&I lending by 21.7 percent, from $30.0 billion to $23.5 billion, over 1989–92; taking account of the declining number of organizations, the decline is 11.8 percent per banking organization. Megabanks, with assets over $100 billion, appear actually to have increased their domestic C&I lending during this period, but this result is an artifact of the fact that the number of megabanks increased over this time interval. Focusing only on the set of banking organizations that had over $100 billion in assets in every year of the 1990s, the data show that these "constant megabanks" cut back their lending by much less than the smaller banking organizations. They reduced their lending from $40.1 billion in 1989 to $37.4 billion in 1992, a drop of just 6.7 percent. As a rough comparison of bank behavior in the two categories, this is about one-half of the decline in loans per banking organization for the small banking organizations.[37]

Moreover, there has not been a substantial rebound in bank C&I lending for the industry as a whole after 1992. Over the period 1992–94, total domestic C&I lending recovered only $22.4 billion, or 16.2 percent, of its $138.5 billion fall between 1989 and 1992, and all of the recovery was concentrated in 1994. Similarly, the share of nonfarm, nonfinancial corporate debt held by banks recovered only from 14.2 percent to 14.5 percent, as shown in table 8. As discussed further below, the weak rebound in bank lending suggests that the slowdown may be more long-term than at first appeared; something more than a very short-term reaction to a recession or change in capital regulations now appears to be at work.

To gain further insights, we go behind the aggregate data and look

37. These data are consistent with the more detailed analysis of Berger and Udell (1994), who find that the C&I lending decline was not concentrated either in banks with low risk-based capital ratios or in large banks, as would have been expected if banks were reducing their lending to try to meet the Basle standards.

It is interesting to note the proportion of their gross assets that megabanks invested in loans as a whole fell from 69.8 percent to 63.7 percent over 1989–92. But this essentially reflects a drop in their foreign lending from 25.6 percent of gross assets to 18.3 percent (see table A3).

at the distribution of lending across borrowers of different size categories. If the decline in bank lending was concentrated on large borrowers, then this shift may not have had much impact on the economy as a whole since large borrowers typically have alternative sources of low-cost external finance. However, if small borrowers lost their bank funding, they may not have been able to raise funds quickly and cheaply from other sources, at least in the short run. The empirical literature on relationship lending suggests that small borrowers pay progressively lower loan rates and have easier collateral requirements as their banking relationship matures.[38] These relationship borrowers may find it costly, and possibly time-consuming, to form new relationships if their regular banks deny them credit.

It is also important to examine the different lending patterns of small and large banking organizations. As the industry continues to consolidate in the future under nationwide banking, banking assets will, on average, be transferred from smaller organizations to larger ones. If organizations of different sizes tend to lend to different groups of borrowers, then changes in the patterns of lending might be coincident to the consolidation.

Estimating the Distribution of Commercial and Industrial Loans

To address these concerns we estimate the distribution of loans by U.S. banks to different size categories of domestic C&I borrowers for every year of the sample period, 1979–94. Because such data have not previously been constructed, we briefly explain the key elements of our calculations (more details are given in appendix C). The estimates are based on the Federal Reserve's Survey of the Terms of Bank Lending to Businesses (STBL), an unpublished survey that records the characteristics of all domestic C&I loans made by a sample of banks on one or more days of the first week of the second month of each quarter. The STBL queries approximately three hundred banks each quarter, including the forty-eight largest U.S. banks and a representative stratified sample from smaller size classes. On average, about 25,500 loans are reported per quarter, for a total of 1,631,614 loans over the entire period 1979–94. Due to the inclusion of the largest banks, organizations with STBL representation held 73 percent of the nation's gross total assets

38. See Petersen and Rajan (1994) and Berger and Udell (1995).

in 1994. Despite this rich sample, our estimates of lending totals by borrower size category are considerably less reliable than the other balance sheet and income figures shown in the tables, which are essentially population totals aggregated directly from regulatory filings made by all federally insured commercial banks.

To proxy for the size of the borrower for each loan, we record the maximum of, first, the size of the loan from the bank; second, the total commitment (if any) under which the loan was drawn from the bank; and third, the total size of the participation (if any) by all banks in a loan participation. This measure is an estimate of the total credit available to the borrower from the bank, or group of banks, involved in the loan.

We convert the flow of loans from the STBL into estimates of the proportions of balance sheet loans in each of seven categories of borrower credit size: under $100,000 in borrower credit, from $100,000 to $250,000, from $250,000 to $1 million, from $1 million to $10 million, from $10 million to $25 million, from $25 million to $100 million, and over $100 million. For convenience, we sometimes refer to all the borrowers with bank credit of less than $1 million—that is, those in the three smallest size categories—as "small borrowers." Similarly, we sometimes refer to borrowers with credit of less than $250,000 as "very small borrowers," to those with credit of between $1 million and $25 million as "medium-sized borrowers," and to those with credit of more than $25 million as "large borrowers." However, these broader groupings are used only to interpret the results; we use all seven size categories to perform the calculations.

To convert the flow of loans from the STBL into representation in the stock of the portfolio, each of the loans originated is weighted according to its amount and repayment duration (see appendix C). For example, a three-year, $5,000 loan receives fifteen times the representation of a one-year, $1,000 loan since on average over time the first loan will have fifteen times the proportion of total loans as the second loan. For banking organizations that did not respond to the STBL (which represented 27 percent of gross assets in 1994), this information is extrapolated by means of a prediction model that is estimated by using data on the STBL respondents, based on the available balance sheet information (see appendix C). The full, year-by-year, estimated

breakout of domestic C&I loans across borrower credit categories is shown in table A10.

Commercial and Industrial Lending to Small, Medium, and Large Borrowers

The estimates of the distribution of loans suggest several stylized facts. First, table 8 shows that large banking organizations appear to make very few C&I loans to small businesses. As of 1994, banking organizations with more than $100 billion in assets had an estimated $2.3 billion, or 2.5 percent of their $92.2 billion of domestic C&I loans, devoted to small borrowers, with bank credit of less than $1 million. Only $0.7 billion of the total, well under 1 percent of their domestic C&I loans, is estimated to go to very small borrowers, with bank credit of under $250,000 (see table A10). In contrast, table 8 shows that these megabanks are estimated to have issued $40.8 billion, or 44.3 percent, of their loans to large borrowers, with bank credit exceeding $25 million.

Second, the data also suggest that the converse is true—small banking organizations primarily lend to small borrowers. As shown in table 8, in 1994 organizations with less than $100 million in assets are estimated to make 81.7 percent of their loans ($17.9 billion out of $21.9 billion) to borrowers with bank credit below $1 million; in fact, most of the lending is to the very small borrowers, with less than $250,000 in bank credit. Similarly, table 8 also shows that these organizations make almost no measurable quantity of loans to large borrowers: only $0.1 billion to borrowers with credit exceeding $25 million in 1994. Both of these stylized facts—that large banking organizations generally make very few small business loans and that small banking organizations tend to specialize in these loans—are corroborated by the new Call Report data on small business lending available for June 1994.[39]

39. See Berger and Udell (1996, table 1). As discussed further in the text below and in appendix C, data are available on the quantity of lending to small businesses for June 1994 from a new section of the Call Report, and these data have been analyzed by Berger and Udell, and Peek and Rosengren (1996). Berger and Udell find some differences between the new Call Report figures and the STBL figures for the same banks, but they also find that these differences may be explainable. In any event, only the STBL data are suitable for conducting comparisons over time, which is the primary concern here.

Using the estimated distribution of C&I lending across borrower credit size categories, it is possible to look behind the aggregate information on the lending slowdown of the period 1989–92. The data suggest that the slowdown was most concentrated on the smallest borrowers, consistent with many of the public complaints at that time. Table 8 shows that lending to firms with less than $1 million in bank credit fell by an estimated $55.3 billion, or 38.5 percent, from 1989 to 1992. For very small business borrowers, with credit below $250,000, the estimated reduction in credit is even greater: 45.2 percent (see table A10). These figures contrast with the 23.2 percent drop in aggregate C&I lending during these three years.

Furthermore, our estimates suggest that over the period 1992–94, C&I lending to borrowers with bank credit of less than $1 million and those with credit of less than $250,000 recovered only 9.6 percent and 7.3 percent, respectively, of their declines over the period 1989–92. Thus at the end of 1994, real loans to these two borrower categories were still 34.8 percent and 41.9 percent below 1989 levels, respectively.

In contrast, table 8 shows that C&I borrowers who received between $1 million and $25 million in bank credit fared very differently. During the lending slowdown of 1989–92 these medium-sized borrowers experienced only a 13.9 percent decline in lending. Moreover, their bank credit jumped from $243.8 billion at the end of 1992 to $277.1 billion at the end of 1994. After this rebound, medium-sized borrowers received only an estimated 2.2 percent fewer loans in 1994 than in 1989— a far cry from the estimated 34.8 percent and 41.9 percent drops for smal and very small borrowers, respectively.

Still a third pattern emerges for the large borrowers—firms with bank credit exceeding $25 million. During 1989–92 their real bank loans fell by an estimated $43.7 billion, or 25.8 percent; less than for the small borrowers, but more than for the medium-sized borrowers. Perhaps surprising, loans to these borrowers continued to decline after this point. Table 8 shows that loans to large borrowers dropped again, from $126.0 billion to $109.7 billion, between 1992 and 1994, so that by the end of 1994 their bank credit was estimated to be 35.4 percent below 1989 levels. Thus our estimates suggest that although the paths were quite different, the proportional loss over the full 1989–94 interval was about the same for both large and small borrowers.

The continuing downward trend in lending to large businesses is

consistent with Berger and Udell's "monitoring technology hypothesis."[40] Under this hypothesis, improvements in information processing technology and applied finance allow direct financing alternatives (such as commercial paper and corporate bonds) and other intermediaries (such as foreign banks and finance companies) to compete more effectively for larger borrowers.[41] Nevertheless, as discussed above, the fate of large bank borrowers is of less concern than that of small borrowers because creditworthy borrowers with bank credit of over $25 million almost surely are able to avail themselves of low-cost financing opportunities elsewhere. The information on debt market shares presented above also suggests that many corporate borrowers did switch to other types of market debt.[42]

Alternative Hypotheses to Explain the Lending Slowdown

This estimated breakdown of the data by borrower size categories may shed some additional light on the lending slowdown of the early 1990s. Some have argued that a credit crunch—a short-term reduction in the supply of bank credit—occurred over the 1989–92 interval. The supply shift may have been due to regulatory factors (for example, risk-based capital standards, the new leverage requirement, tougher examination standards) or nonregulatory factors (for example, banks' depleted capital positions, their choice of a lower portfolio risk). Other

40. Berger and Udell (1993).

41. However, the finding that banks are reducing their small business lending over time runs contrary to another prediction of the monitoring technology hypothesis—that improvements in technology should also open up markets for banks in small loans that previously were too expensive or information-intensive for them to make. Other hypotheses are offered below to explain the reduction in lending to small businesses.

42. As a robustness check on our breakout of domestic C&I loans into different borrower credit size categories, we also examine the data for the subset of banking organizations with STBL respondents. That is, we try dispensing with the extrapolation to non-STBL banks described in appendix C. The results for this subsample confirm the patterns found in our main results. Lending to small borrowers, with less than $1 million in bank credit, falls from $35.8 billion in 1989 to $25.5 billion in 1992 and then partially recovers, to $32.8 billion, in 1994. For very small borrowers, with less $250,000 in credit, the corresponding figures are $17.3 billion in 1989, $9.7 billion in 1992, and $12.6 billion in 1994. For large borrowers, with over $25 million in credit, lending falls from $112.7 billion in 1989 to $96.7 billion in 1992, and continues to fall to reach $90.5 billion in 1994. Note that this STBL subsample is skewed toward the large banking organizations and therefore should be considered more accurate for the loans to medium and large businesses in which these organizations specialize.

analysts point to a reduction in the demand for bank loans during this
period because of macroeconomic and regional recessions, or because
business borrowers may have restructured their balance sheets away
from bank debt and other debt and toward equity as a result of problems
associated with high leverage positions in the 1980s.[43]

Under most of these explanations, the quantity of C&I lending is
expected to rebound fully, or almost fully, after the complete imple-
mentation of a regulatory change or the onset of an economic recovery.
By the end of 1992 most observers believed that the credit tightening
was essentially over, the implementation of risk-based capital standards
was complete, the economy was recovering, and bank profits were near
record levels. The lack of a substantial recovery in aggregate C&I
lending, along with the very different patterns of lending to different
sizes of borrower, suggests that something more complicated than a
simple, across-the-board reduction in loan supply or demand is likely
to have been at work in the 1990s.

We examine several alternative hypotheses to explain these lending
patterns. First, the recent lending patterns may be due to factors com-
mon to macroeconomic recessions and recoveries. We evaluate this
hypothesis by comparing lending during this episode to the lending
around the time of the previous recession that began in the third quarter
of 1981 and lasted through the end of 1982. During the earlier recession,
real domestic C&I lending actually rose substantially, from $523.8
billion at the end of 1981 to $570.9 billion at the end of 1982 (see table
A10). This increase contrasts with the slowdown in lending during the
recent recession, when C&I lending dropped from $596.7 billion to
$491.7 billion between the end of 1989 and the end of 1991. More
important, lending patterns were quite different during the three-year
recovery periods after these recessions. Over 1982–85 total real C&I
lending rose by 4.3 percent, from $570.9 billion to $595.5 billion. In
contrast, total real lending in the three recovery years following the
latest recession fell by 2.3 percent, from $491.7 billion in 1991 to
$480.6 billion in 1994. Loan pricing data presented below suggest
further differences between these two recessions and their recoveries.[44]

43. See, for example, Bernanke and Lown (1991), Perry and Schultze (1993), Berger
and Udell (1994), Hancock, Laing, and Wilcox (1995), and Peek and Rosengren (1995)
for discussions and tests of both the credit crunch and the demand hypotheses.
44. We estimate that the proportion of total C&I lending devoted to borrowers with

A second possible explanation for the behavior of C&I lending is that some of these loans may now be recorded in different ways by the banks. Small businesses may have switched to borrowing by means of pledging real estate, through credit card debt, or by personal loans issued to the owners. Table A2 shows that commercial real estate lending fell as a percentage of assets from 11.6 percent to 10.7 percent over 1989–92 and continued to fall, reaching 9.8 percent by 1994. Thus a switch from C&I loans to commercial real estate loans does not appear to explain the C&I results. However, as new home mortgage rates slid from 10.13 percent in 1989 to 8.24 percent in 1992, and then to 7.49 percent in 1994, one-to-four-family residential real estate loans jumped from 10.4 percent of assets in 1989 to 13.0 percent in 1992, and then to 13.9 percent in 1994. Loans to individuals and credit card loans both decreased slightly over 1989–92 and increased over 1992–94. Therefore it is possible that by the end of the period the estimated loss of small business lending was partially offset by small business owners switching to borrowing directly, through home equity loans, credit card loans, or personal loans; but determining to what extent such increases in personal debt really represent small business debt is beyond the scope of this paper.[45]

Finally, there is the possibility that the significant liberalization of geographic restrictions on banking and the increase in the proportion of industry assets controlled by the largest banking organizations in the 1990s may be responsible for some of the recent changes in lending behavior. As discussed above, during the first half of the 1990s interstate banking privileges increased tremendously, and the banking system responded with a significant increase in out-of-state bank ownership and a substantial amount of industry consolidation.

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credit of less than $1 million shrank considerably during both recessions and did not rebound substantially during either recovery. As emphasized by Bernanke, Gertler, and Gilchrist (1996), the drop in small business lending during recessions may be in part due to a "flight to quality" whereby banks reduce their risk exposures. The lack of a rebound in these loans during the recovery periods is less easily explained.

45. Another possibility is that small businesses may have temporarily offset some of the reductions in bank credit by using trade credit from larger suppliers. Calomiris, Himmelberg, and Wachtel (1995) find that evidence that this type of substitution sometimes occurs. However, their evidence also suggests that this substitution is likely to be relatively short-term in nature. Thus it seems unlikely that the trade credit channel could be offsetting the five-year decline in lending that we are attempting to explain.

It seems likely that the reallocation of assets from smaller banking organizations to larger organizations and to interstate organizations would tend to reduce small business lending. Legal lending limits usually restrict lending to a single borrower to no more than 15 percent of the bank's equity capital. Because of these limits, as well as problems of diversification, small banking organizations are virtually restricted to lend *only* to small businesses. For instance, a bank with $100 million in assets and $6 million in equity usually can legally lend only $900,000 (15 percent of equity) to a single borrower, although it can have a small portion of a large participated loan. As shown above, organizations with less than $100 million in assets made the vast majority of their C&I loans in 1994 to small borrowers with bank credit of less than $1 million. Also shown above, the largest banking organizations typically do very little lending to small businesses. The greater geographic reach of the large banks in the 1990s may also have increased their opportunities to make, or lowered their costs of making, large loans. Thus the liberalization of interstate banking rules, as well as the removal of within-state branching requirements and geographic restrictions on bank holding companies, may have shifted lending from small borrowers to large borrowers as banks were able to become larger and have easier access to large borrowers in more locations.

Of course, this "consolidation hypothesis" cannot explain all of the major changes in lending patterns, since banks also reduced lending to the very largest borrowers during the first half of the 1990s. However, it might be part of the reason that small business lending declined drastically relative to lending to medium-sized borrowers (with credit of between $1 million and $25 million) during these five years, given that medium-sized loans are virtually out of reach for small banking organizations.

There is some limited evidence to support the consolidation hypothesis. Joe Peek and Eric Rosengren combine a single cross-section of Call Report data on lending to small businesses in the New England states for June 1994 (discussed in appendix C) with some information on mergers and de novo entry. They find that after larger banking organizations merge with smaller organizations, the consolidated organization typically reduces the amount of small business lending that was conducted earlier by the acquired institution. Their limited evidence on de novo entry also suggests that new banks pick up only a

small portion of the ''lost'' loans. These data support the consolidation hypothesis, although they are only for one year and one region.[46]

In addition, using STBL data Berger and Udell find that large banks not only tend to make much smaller proportions of their loans to small borrowers, but also tend to charge lower average prices to the small borrowers that receive credit from them, both in terms of reduced interest rates and fewer collateral requirements.[47] This pattern is consistent with the view that large banks tend to issue small business loans only to higher-quality credits that can be evaluated in the same way as large borrowers, through analysis of financial ratios. These banks may tend to eliminate relationship loans that generally have higher interest rates and collateral requirements, because these loans demand more intimate knowledge of the small business, its owner, and the local community that is gained through contact over time. This effect may occur because of organizational diseconomies of the type described by Oliver Williamson—in this case associated with trying to manage transaction-driven and relationship-driven loans within the same bank.[48] These results also support our consolidation hypothesis.

To further explore the empirical implications of the consolidation hypothesis, we examine the price behavior over time of the STBL loans to small borrowers, medium borrowers, and large borrowers. For the 1,631,614 loans in our sample, we regress the loan premium (the rate charged on the loan less the rate on a Treasury security of the same repayment duration) on a number of regressors that control for the characteristics of the loan (which are often correlated with the risk of the borrower), the economic environment in the state in which the issuing bank is located, and a series of dummies and interactions for the year and the size category of the borrower.[49] The objective is to

46. See Peek and Rosengren (1996). Keeton (1995) similarly analyzes the June 1994 Call Report data on small business lending for banks in the tenth Federal Reserve District. He finds that banks with a high degree of branching, small banks in single-state MBHCs, and banks owned by out-of-state MBHCs tend to invest smaller proportions of their funds in loans to borrowers with less than $100,000 in bank credit than did other banks without these characteristics. These findings are consistent with the consolidation hypothesis, since they suggest that larger banks, banks that are part of MBHCs, and multistate banking organizations all lend less to very small borrowers.

47. See Berger and Udell (1996).

48. See Williamson (1967, 1988).

49. The regressors include the estimated repayment duration and contract terms as to whether the loan was issued under a commitment, was part of a participation, had

determine whether the prices of small business loans increased or de-
creased during the first half of the 1990s when the quantity of these
loans decreased, controlling for a number of demand factors. We as-
sume that if the supply of loans decreases, the borrowers that no longer
receive credit would have been paying a higher-than-average price for
their size category, year, environment, and so forth. This implies that
if there is an observed price decrease, supply and demand cannot be
identified—the observed lower price may be due to either a reduced
demand by borrowers, or a flight to quality by lenders that has elimi-
nated many of the higher-priced borrowers. However, if a price increase
is observed as the quantity of lending is falling, this would indicate a
reduction in bank supply due to the consolidation hypothesis or other
supply factors.

For convenience, we normalize the coefficients of the dummies and
interactions of the borrower credit size and year so that average adjusted
premium over the entire period 1979–94 is zero for loans to each of the
three size categories of borrower. The results are displayed in figure 2.

The clearest result is that the premiums for all size categories of
borrower fluctuated much more around the time of the recession and
recovery of the early 1980s than in the early 1990s. By comparison,
loan prices have been rather stable recently. There are some small, but
discernible price changes in the 1990s. In 1990 the premiums for all
three size categories of borrowers fell, consistent with either reduced
loan demand or supply during the recession. After 1990 the gap between
the rates paid by small and large borrowers widened. From 1990 to
1992 the difference between the adjusted premiums paid by small and
large borrowers increased by 25 basis points, and this difference had
widened to 54 basis points by 1994. This result is consistent with the
hypothesis that small business C&I borrowers faced higher prices and
a reduced supply of credit after 1990. It is relatively weak evidence,

collateral pledged, was on a floating-rate basis, had pricing based on prime, or had a
fixed maturity. Control variables for the economic environment include the state un-
employment rate, state income growth rate, and dummies for all the states (except the
base case of California). The key variables that track the loan premium over time for
each size category of borrower are dummy variables for medium and large borrowers
and interactions between dummies for all three borrower size categories, and dummies
for the years from 1980 to 1994. Thus a small borrower in 1979 is the excluded base
case and the differences for all other combinations of borrower category and year can
be estimated from the coefficients on the borrower size and interaction dummies.

Figure 2. Adjusted Premium for Commercial and Industrial Loans by Borrower Size Category, 1979-94ᵃ

Basis points
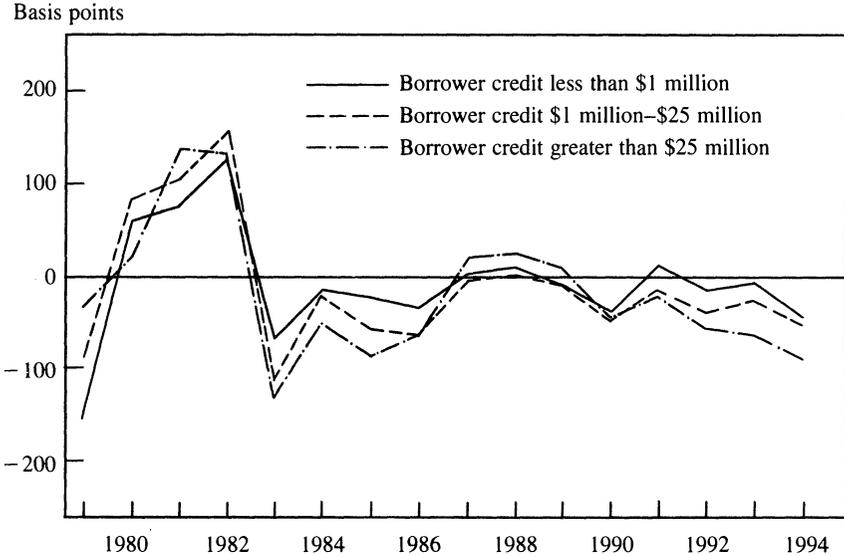
Source: Price and other loan contract information are unpublished data from the Federal Reserve's Survey of Terms of Bank Lending. Data for demographic variables are obtained directly from the Bureau of Economic Analysis.
   a. Based upon regression results of loan rate less the Treasury rate of equal repayment duration on a number of regressors that control for the characteristics of the loan, the economic environment in the state in which the issuing bank is located, and a series of dummy and interaction variables for the year and the size category of borrower. Data are normalized so that the average adjusted premium over time equals zero for all three borrower size categories.

however, because the price changes are so small and because the observed prices combine demand and supply effects with unobserved changes in the quality pools of borrowers who receive loans.

Implications of the Consolidation Hypothesis

It is important to recognize that if the consolidation hypothesis is correct—that is, the lifting of geographic restrictions leads to mergers, which reduce small business lending—economic efficiency is likely to be improved by the new allocation of funds. There is a presumption in economics that the relaxation of artificial constraints on trade, such as the restrictions on geographic diversification in banking, will improve allocative efficiency by allowing resources to flow more freely toward activities that yield higher returns and more efficient producers.[50]

   50. An exception to the presumption that removal of restrictions on consolidation

One way in which efficiency may have been impaired in the banking industry by the constraints on consolidation is that the geographic barriers to competition may have allowed banking organizations in some communities to exercise market power and buy deposit funds at below-competitive rates. For instance, it has been found that banks in concentrated markets pay about 50 basis points less for their deposits.[51] This source of cheap funds may have allowed such organizations to invest profitably in loans that would have had negative NPVs if funded at competitive rates. Similarly, the lack of market discipline engendered by the geographic restrictions may have created a cushion of above-normal profits for some banking organizations, allowing them to make investments with negative NPVs even given the below-market prices paid for deposits. That is, the extra profits from noncompetitive pricing on some deposit or loan products may have allowed banking organizations in some protected markets to make unprofitable investments because the management of these organizations was either inefficient or had motives other than profit maximization.

Moreover, these same geographic barriers may have made takeovers more difficult and thus may have partially thwarted the market for corporate control. These barriers may have permitted entrenched, inefficient managers to run some banks, yielding suboptimal cost minimization and portfolio investments. In addition, this blocking of competition in the market for ownership and control of banking organizations may have allowed local managers to extend loans to suit their personal interests or those of the directors, even though these may have run contrary to the interests of the organization as a whole.

If the consolidation that follows the removal of geographic barriers eliminates some small business loans that are negative NPV investments when evaluated at competitive market prices, such loans are not likely to be picked up by other lenders. However, it is also possible that consolidating banks do not reissue some relationship-based or character loans that are positive NPV investments, even at competitive prices, because they do not fit into the consolidating banks' existing loan pro-

would improve economic efficiency occurs if the consolidation results in an increase in the exercise of market power. However, the removal of geographic restrictions likely *reduces* the exercise of market power, if anything, by unleashing more actual or potential customers into local banking markets.

51. See Berger and Hannan (1989).

grams. As noted above, this can occur because of organizational dis-economies in issuing both transaction-driven and relationship-driven loans within the same large banking organization. For example, the president of a small bank may be able to approve a positive NPV relationship loan based on personal contact with the small business owner. However, when the bank is taken over by a larger organization, the loan may not be reissued because it is too costly for the local loan officer to transmit the relationship information through the loan ap-proval channels of the larger organization. In the long run, other bank or nonbank lenders are likely to step in and make many of these prof-itable loans, although there may be some short-term costs during the transition.[52] It also may be the case that some marginal loans that had positive NPV at competitive prices based on the private information of the issuing banks are not reissued after industry consolidation because it is not profitable, ex ante, for a new lender to reinvest in developing the private information needed to extend the loans.

The next section evaluates the consolidation hypothesis further by estimating a model of how the banking system responds to changes in state geographic restrictions. We simulate the effects of moving to full nationwide banking on the distribution of bank assets, the number of banking organizations, and the amounts of bank lending to different size categories of borrower.

The Simulated Effects of Nationwide Banking on Consolidation and Lending Patterns

The information reviewed in the previous section reveals several interesting points that may bear on the future of bank consolidation and lending. First, large banking organizations tend to make very few C&I loans to small business borrowers, whereas small organizations lend primarily to small borrowers. Second, in the 1990s there has been a pronounced increase in the ability of banking organizations to expand

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52. For instances in which small business borrowers have switched to smaller bank-ing organizations following the acquisition of their previous lending organizations, see Jonathan D. Glater, "Lenders with a Little Edge; In the Race for Small Companies' Business, Smaller Banks May Have the Advantage," *Washington Post,* August 28, 1995, pp. F1, F12–13.

geographically. In response, there have been substantial increases both in the fraction of the nation's banking assets that reside in the largest organizations (from 8.6 percent in 1989 to 18.8 percent in 1994), and in the proportion of banking assets controlled by out-of-state multibank holding companies (from 18.9 percent in 1989 to 27.9 percent in 1994). Third, during the 1990s there has been a significant reduction in the amount of domestic C&I lending by the banking industry. Our estimates suggest that the biggest cutbacks have occurred in C&I lending to the smallest and the largest businesses. It was originally thought that much of the lending slowdown was associated with short-term regulatory factors and general economic conditions that had mostly played themselves out by 1992, but our estimates show that C&I lending to small and large borrower groups still had not recovered by the end of 1994. Finally, on the legislative front, the Riegle-Neal Act will deliver the potential for essentially full nationwide banking over the next few years.

Together these observations raise two important questions about industry consolidation in the future. First, how much consolidation is likely to occur? And second, what will be the effect of any such consolidation on lending, particularly to small businesses? Under the consolidation hypothesis offered above, the net transfer of assets from smaller organizations with limited market access to larger ones with greater geographic reach is likely to reduce the amount of credit issued to small borrowers, at least in the short term. To the extent that some of the eliminated credits are negative NPV investments that were the consequence of protection from product market competition and limitations on the market for corporate control, the loss of these loans is likely to be permanent and represents an improvement in economic efficiency.

To address these questions we use a two-step procedure. First, we extrapolate from past experience with the liberalization of geographic restrictions to predict how the movement toward nationwide banking is likely to influence the future size distribution of the banking industry. Second, given this simulated size distribution, we estimate the likely impact on lending patterns.

At the outset, it is useful to recognize the degree of discord over the likely consequences of nationwide banking. For instance, at a recent symposium a representative of NationsBank argued that Riegle-Neal

would have virtually no effect on community banks in the United States, while the Legislative Counsel for the Independent Bankers Association of America insisted that interstate branching would take away a significant amount of business from community banks.[53] Given this disagreement, a systematic assessment of the effects of nationwide banking based on the experience to date with interstate and intrastate banking rules would seem appropriate.

A Model of the Distribution of Banking Assets

We begin by building a model that explains the distribution of domestic bank assets across banking organization size classes within a state. We estimate the proportions of each state's assets that will reside in the five size classes of banking organization (under $100 million in total assets, between $100 million and $1 billion, between $1 billion and $10 billion, between $10 billion and $100 billion, and over $100 billion). We make these proportions functions of the geographic restrictions on branching and MBHC acquisitions, and on the demographic characteristics of the state. We estimate over the entire period 1979–94 to get sufficient variation in the regulatory conditions. For example, all but one state allowed at least some interstate MBHC affiliations as of 1994.

The analysis is performed at the state level in order to allow for the possibility that difficult-to-measure characteristics of particular states will continue to be important determinants of the distribution of bank assets. For example, even if the amount of banking assets and regulatory rules in Illinois and Ohio were the same, we would not assume that the distributions of bank assets across organization size are identical in these two states. In Illinois most of the population and banking assets are concentrated in a single large metropolitan area; in Ohio they are not. In addition, it seems plausible to model the domestic assets of each state as exogenous, and to let the state's geographic restrictions help to determine the distribution of assets across organization size classes. After estimating the state-level distributions of assets, we simply aggregate the results to recover the national estimates reported below.

The regressions are specified so that each dependent variable is the natural log of the ratio of the proportion of the state's assets in a given

53. Levy Institute (1995, p. 35).

banking organization size category to the proportion in the smallest size category. Thus the four dependent variables take the form $\ln(P_i/P_5)$, $i = 1, \ldots, 4$, such that ln indicates natural log, and P_i is the proportion of the state's assets in size class i, where 1 is the largest size class (assets greater than \$100 billion) and 5 is the smallest (assets less than \$100 million). The right-hand side of the regressions contains demographic control variables for the state, regulatory variables measuring the bank branching and MBHC privileges granted by the state and how long ago these privileges were granted, some interaction effects, and some demographic information on the external region that the state's MBHCs can enter. Thus the four main estimated equations of the model are of the form:

$$\ln(P_i/P_5) = f(\text{state demographics and dummies, branching and}$$
$$\text{MBHC privileges, time since privileges granted,}$$
$$\text{interactions of privileges and time since}$$
$$\text{privileges granted with size of state or external}$$
$$\text{region, interaction of interstate privilege}$$
$$\text{with external region demographics}), \quad i = 1, \ldots, 4.$$

The fifth equation that completes the model and allows us to estimate and simulate all five proportions is the identity that the five proportions must sum to one.[54]

This grouped log-odds specification is a special case of a multinomial logit model that accounts for the fact that the bank asset data are grouped at the state level. The variables and regression results are shown in table 9. The four regressions are estimated separately by weighted least squares to remove heteroskedasticity problems.[55]

The demographic variables included in the model are the ratio of the state's population to the state's gross domestic assets (*STPOP/STGDA*), the natural log of per capita income in the state (*LNSTINC/STPOP*), the population density of the state (*STPOP/STAREA*), the proportion of the population in metropolitan statistical areas (*STPOPINMSA*), the natural log of gross domestic banking assets in the state (*LNSTGDA*),

54. Some states have no banking organizations in the three largest size classes; in these cases the value 0.000001 is used to replace a zero value for P_i. Later we also set very small predicted future values of P_i to zero; that is, it is predicted that some states will not have any large banking organizations within their borders, even after nationwide banking is allowed.

55. Note that in this logit form there is no gain to estimating the equations jointly.

Table 9. Log-Odds Model for Predicting the Distribution of State Gross Domestic Assets across Organization Size Classes

Independent variable and summary statistics	LN{P(TA>$100B)/P(TA<$100M)}		LN{P(TA$10B−$100B)/P(TA<$100M)}		LN{P(TA$1B−$10B)/P(TA<$100M)}		LN{P(TA$100M−$1B)/P(TA<$100M)}	
	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic
INTERCEPT	−164.29	−1.26	17.93	3.00	10.61	1.78	−26.27	−8.85
STPOP/STGDA	11.03	2.60	−37.56	−10.81	−7.74	−2.60	2.41	1.57
LNSTINC/STPOP	−2.74	−5.35	0.04	0.10	1.54	3.74	2.47	12.40
STPOP/STAREA	1.79	0.98	−1.07	−1.59	0.62	1.01	1.32	3.54
STPOPINMSA	0.02	0.03	−1.99	−2.46	1.99	2.54	−0.41	−1.25
LNSTGDA	9.39	1.33	−0.56	−2.13	−1.37	−5.11	0.15	1.11
LIMBRAN	−18.96	−0.20	4.21	3.92	−4.20	−3.21	−1.34	−2.57
LIMBRAN×LNSTGDA	1.64	0.33	−0.24	−4.03	0.23	3.25	0.08	2.87
1/LIMBRANTIME	−115.82	−4.19	2.21	3.17	−0.59	−0.76	0.75	2.16
1/LIMBRANTIME×LNSTGDA	5.98	4.17	−0.12	−3.08	0.03	0.69	−0.04	−2.25
STATEBRAN	−11.54	−2.20	10.83	8.94	6.27	5.31	1.24	2.25
STATEBRAN×LNSTGDA	0.69	2.43	−0.57	−8.66	−0.37	−5.60	−0.07	−2.36
1/STATEBRANTIME	2.01	1.55	−3.60	−5.87	0.78	1.17	0.44	1.34
1/STATEBRANTIME×LNSTGDA	−0.12	−1.71	0.19	5.86	−0.04	−1.08	−0.02	−1.33
LIMMBHC	162.95	1.35	−6.36	−2.58	4.38	2.63	−0.11	−0.17
LIMMBHCB×LNSTGDA	−9.28	−1.39	0.37	2.80	−0.20	−2.10	0.01	0.02
1/LIMMBHCTIME	−396.95	−5.92	−1.01	−0.30	−0.39	−0.23	−1.50	−2.13
1/LIMMBHCTIME×LNSTGDA	22.58	5.96	0.01	0.08	0.01	0.06	0.09	2.12
STATEMBHC	26.96	2.51	−3.90	−1.13	−11.41	−4.05	3.03	2.00
STATEMBHC×LNSTGDA	−0.82	−1.66	0.21	1.11	0.62	4.11	−0.17	−2.05
1/STATEMBHCTIME	155.63	7.21	16.73	4.03	6.90	1.85	−1.30	−0.60
1/STATEMBHCTIME×LNSTGDA	−8.51	−7.55	−0.89	−4.07	−0.36	−1.82	0.07	0.64
INTERSTATE	−16.50	−3.46	−6.24	−1.18	−5.32	−1.00	−3.49	−1.27
INTERSTATE×LNRGGDA	0.58	6.99	0.14	3.00	−0.04	−0.90	−0.07	−3.00
INTERSTATE×RGPOP/RGGDA	−7.60	−1.30	−3.90	−1.04	4.69	1.34	−2.29	−1.25

(continued)

Table 9. (*continued*)

Independent variable and summary statistics	LN{P(TA>$100B)/ P(TA<$100M)}		LN{P(TA$10B − $100B)/ P(TA<$100M)}		LN{P(TA$1B − $10B)/ P(TA<$100M)}		LN{P(TA$100M − $1B)/ P(TA<$100M)}	
	Coefficient	*t statistic*	*Coefficient*	*t statistic*	*Coefficient*	*t statistic*	*Coefficient*	*t statistic*
INTERSTATE×LNRGINC/ RGPOP	1.36	2.29	0.54	1.02	0.53	0.97	0.50	1.79
INTERSTATE×RGPOP/ RGAREA	−0.58	−4.97	−0.12	−1.16	−0.43	−3.95	0.03	0.59
INTERSTATE×RGPOPINMSA	−9.60	−8.76	−1.18	−2.25	0.58	1.13	0.01	0.02
1/INTERSTATETIME	−1.18	−2.87	0.63	1.36	−0.04	−0.07	−0.35	−1.30
1/INTERSTATETIME ×LNRGGDA								
AL	0.06	2.71	−0.03	−1.43	0.01	0.18	0.02	1.30
AK	−10.25	−1.12	−3.73	−6.68	−1.14	−2.08	−0.57	−2.15
AZ	7.88	7.93	−5.30	−4.44	−1.92	−1.61	0.71	1.23
AR	4.55	9.39	−1.24	−2.18	−1.41	−2.37	−0.14	−0.48
CA	11.16	0.83	−16.97	0.59	−3.09	−4.27	0.37	1.08
CO	1.26	0.10	−3.21	−5.62	−2.50	−4.41	−1.04	−3.71
CT	4.76	3.89	−0.47	−0.59	−2.35	−3.19	−1.43	−3.69
DE	5.97	7.20	−3.00	−3.58	0.20	0.23	0.50	1.20
DC	−10.21	−0.59	5.93	0.85	−8.49	−1.31	−13.78	−3.54
FL	−0.94	−3.40	−1.06	−4.18	−1.14	−4.32	−0.21	−1.63
GA	13.20	2.52	−2.98	−6.53	−1.91	−4.22	−0.93	−4.30
HI	−2.44	−0.16	0.51	0.24	0.64	0.57	2.63	4.69
ID	4.70	5.60	−5.14	−4.96	−0.58	−0.55	0.16	0.32
IL	−1.97	−5.92	−2.93	−10.82	−2.02	−7.66	−0.53	−4.18
IN	−0.82	−0.09	−3.35	−7.07	−1.45	−3.17	0.13	0.58
IA	3.45	0.33	−6.47	−9.54	−3.56	−5.26	−0.94	−2.93
KS	13.08	1.07	8.33	−10.92	−4.35	−6.46	−0.86	−2.62
KY	10.73	2.02	−4.66	−7.27	−1.88	−3.03	0.00	0.02
LA	1.65	0.16	−6.02	−8.91	−1.63	−3.25	0.34	1.38
ME	5.24	7.61	−1.72	−2.08	−2.67	−3.05	0.69	1.70
MD	2.26	2.78	−1.65	−2.76	−0.56	−0.99	−0.74	−2.53

Dependent variable

MA	-6.97	-1.10	0.40	0.60	-1.13	-1.84	-0.53	-1.57
MI	-10.52	-1.83	-1.19	-3.84	-0.70	-2.17	-0.08	-0.53
MN	-6.55	-0.89	-3.83	-7.45	-3.87	-7.46	-1.62	-6.54
MS	10.50	0.71	-7.87	-4.96	-1.08	-1.43	0.61	1.73
MO	15.00	1.58	-4.62	-9.48	-1.53	-3.25	-0.54	-2.34
MT	-0.24	-0.01	-4.63	-4.40	-4.19	-3.46	-0.72	-1.44
NE	15.59	1.14	-7.05	-9.12	-4.09	-5.26	-1.12	-2.94
NV	8.00	11.44	-2.82	-3.17	-2.16	-2.41	0.56	1.24
NH	9.71	0.47	-3.60	-4.07	-4.84	-5.63	0.43	1.01
NJ	0.58	0.33	0.13	0.16	-0.92	-1.29	-0.96	-2.39
NM	3.11	4.55	-3.99	-4.83	-1.76	-2.08	0.40	1.00
NY	4.57	7.09	-0.07	-0.30	0.25	1.02	-0.01	-0.04
NC	2.68	6.64	-1.40	-2.89	1.01	2.01	0.45	1.93
ND	0.44	0.02	-5.85	-5.54	-5.10	-4.80	-1.07	-2.12
OH	-1.80	-5.10	-1.35	-4.44	-0.28	-0.92	-0.21	-1.43
OK	10.30	0.94	-6.61	-10.79	-3.37	-5.74	-0.35	-1.24
OR	4.19	7.89	-1.63	-2.61	-1.73	-2.66	-0.34	-1.08
PA	-8.58	-1.60	-0.98	-3.45	0.32	1.10	0.26	1.84
RI	9.46	0.58	-1.21	-1.00	-3.12	-2.76	-0.14	-0.24
SC	2.88	6.57	-2.51	-4.27	-1.02	-1.74	-0.29	-1.03
SD	5.44	6.10	-7.73	-7.68	-4.34	-4.19	-0.23	-0.49
TN	12.71	2.40	-4.00	-7.78	-1.54	-3.10	-0.12	-0.51
TX	10.22	1.96	-3.08	-12.72	-1.27	-5.30	-0.52	-4.57
UT	1.77	2.65	-3.27	-4.50	-1.63	-2.20	0.15	0.42
VT	-3.96	-0.17	-18.27	-0.31	-2.53	-2.17	0.86	1.54
VA	1.91	3.92	-2.81	-4.84	-0.21	-0.35	-0.82	-3.09
WA	3.37	9.02	-1.54	-3.28	-1.72	-3.53	-0.56	-2.35
WV	15.70	1.09	-6.88	-8.29	-3.10	-3.91	0.44	1.18
WI	-10.23	-1.29	-4.49	-9.00	-2.13	-4.26	-0.96	-4.02
WY	-6.27	-0.27	-5.99	-4.98	-4.02	-3.32	-0.46	-0.81

Summary statistics

Adjusted R^2	0.95		0.93		0.89		0.92	
N	816		816		816		816	

Source: Authors' regressions based on model described in test.

and dummy variables for each state (*AL, AK, AZ*, and so forth), except
the base case of California. Collectively, these variables are intended
to capture the main determinants of what bank market structure in the
state would be in the absence of geographic restrictions on branching
and expansion by bank holding companies.

The regulatory variables in the model include measures of five priv-
ileges of geographic expansion granted to banking organizations in a
state. These rights include: at least limited branching in the state (*LIM-
BRAN*); unlimited statewide branching (*STATEBRAN*); at least limited
opportunities for multibank holding companies (*LIMMBHC*); unlimited
statewide opportunities for MBHCs (*STATEMBHC*); and interstate
MBHC affiliations (*INTERSTATE*). Each of these privileges is repre-
sented by a dummy variable set equal to one when permitted by the
state, and set equal to zero otherwise.[56]

The adjustment to the removal of geographic restrictions is not in-
stantaneous—it takes time to plan, to get regulatory approval for, and
to consummate mergers.[57] We allow for transition periods by including
in the regressions some "time-since-liberalization" variables, *LIM-
BRANTIME, STATEBRANTIME, LIMMBHCTIME, STATEMBHC-
TIME*, and *INTERSTATETIME*, which represent the number of years
that each geographic banking privilege has been available. These vari-
ables enter the regressions as inverses; for example, 1/*STATEBRAN-
TIME* is equal to 0.1 for a state that has allowed statewide branching
for ten years. The inverse form allows the variable to have an asymp-
totically decreasing effect such that the transitional effects go to zero
in the long run. As noted below, other functional forms of these time-
since-liberalization variables were tried and found to have no material
effects on our simulations of the future structure of the banking indus-
try. The dates at which each state granted each of these privileges are
shown in table B6.

Importantly, we incorporate the potential geographic reach of bank-
ing organizations in the state by interacting the regulatory dummies and
time-since-liberalization variables with the amount of banking assets to

56. Since *LIMBRAN* and *LIMMBHC* are defined in terms of having *at least* limited
powers within the state, they remain equal to one after statewide privileges are granted.
57. For example, when two bank holding companies wish to merge, it may take
time to obtain approval from both the Federal Reserve and the U.S. Department of
Justice, and to divest offices where there is significant local market overlap.

which they might have access. The four within-state regulatory dummies (that is, *LIMBRAN*, *STATEBRAN*, *LIMMBHC*, and *STATEMBHC*) are interacted with the natural log of state gross domestic assets (*LNSTGDA*), which was also included as a separate demographic variable above. The larger are a state's banking assets, the greater should be the effects of liberalizing the branching and holding company affiliation rules on the size of banking organizations in the state. For example, the statewide branching privilege should increase the average size of banking organizations more, the greater are the state's assets to which the branching network can have access. The time-since-liberalization variables (for example, 1/*STATEBRANTIME*) are also interacted with *LNSTGDA* because the transition time to taking full advantage of the privileges to expand within the state is expected to be longer, the larger is the state.

Similarly, the *INTERSTATE* dummy and the 1/*INTERSTATETIME* variable are interacted with the natural log of gross domestic assets in the external region to which MBHCs in the state have access (*LNRGGDA*), that is, the natural log of the assets in all the states that the local MBHCs can enter, other than their home state. Note that *LNRGGDA* also measures the size of the region from which banking organizations headquartered in other states can enter the home state. It is expected that the larger is the region into which the state's banking organizations can enter and from which the state can be entered by other organizations, the greater is the effect of allowing the access. In our simulation of nationwide banking described below, *LNRGGDA* plays an important role because we expand the external region to include all the states, other than the home state. In the model we also interact *INTERSTATE* with the other demographic variables, but computed on the basis of the external interstate banking region, rather than the home state. These variables, shown in table 9, have the letters *RG* replacing *ST* to indicate the same demographic variables as defined above for the home state, but applied to the external region to which an organization has access. Note that *LNRGGDA* and all the other external region variables are determined as the averages over the period of time that the state has allowed interstate MBHCs (that is, when *INTERSTATE* is equal to one), since the external region for a given state often changes radically from year to year.

The results shown in table 9 suggest that the model fits the data fairly

well. The adjusted R^2 values lie between 0.89 and 0.95. A number of the individual coefficients of the regulatory variables and their interactions are statistically significant, despite the fact that there are eighty coefficients in each equation and the fact that all of the regulatory variables appear at least twice in each equation (alone and interacted with a state or external region size variable). The more appropriate tests of statistical significance in this situation may be to examine whether groups of the parameters are statistically significant. For each equation, we therefore test the coefficients of the sixteen within-state regulatory variables and interactions jointly, the eight variables and interactions involving interstate banking privileges jointly, and all twenty-four of these parameters jointly. In all cases, the null hypothesis of no statistical significance was easily rejected at the 1 percent level.

Model Simulations of the Effects of Nationwide Banking on the Distribution of Banking Assets and Number of Organizations

We simulate the future distribution of gross domestic assets across banking organization size classes and the total number of banking organizations under nationwide banking in two different ways: first, assuming zero asset growth, and second, assuming growth at the national trend rate over the sample period.

The ''zero-growth'' simulations shown in the top panel of table 10 reflect the changes in the distribution of banking assets as a result of lifting all geographic restrictions in the model for five, ten, and twenty-five years in the future, and in the ''long run,'' keeping total gross domestic assets in each state at 1994 levels. This scenario may alternatively be thought of as what the structure of the banking industry would have been in 1994 had full nationwide banking been in effect for the past five, ten, or twenty-five years, or permanently. We hold all the demographic variables in each state constant in order to focus specifically on the effects of liberalizing geographic restrictions, while minimizing other effects.

We assume that nationwide banking occurs immediately and therefore set all the dummy variables for the liberalization of geographic restrictions (*LIMBRAN*, *STATEBRAN*, *LIMMBHC*, *STATEMBHC*, and *INTERSTATE*) equal to one, although in most cases these variables were already equal to one by 1994. For each successive year into the

Table 10. Simulated Future Distribution of Gross Domestic Banking Assets[a]

Units as indicated

Organization size	1994	Number of years into the future			Long run
		5	10	25	

Simulations assuming zero growth in gross domestic banking assets

Proportion of gross domestic assets

Organization size	1994	5	10	25	Long run
Less than $100 million	0.070	0.035	0.035	0.034	0.033
$100 million–$1 billion	0.138	0.079	0.078	0.075	0.072
$1 billion–$10 billion	0.157	0.092	0.090	0.088	0.085
$10 billion–$100 billion	0.446	0.372	0.376	0.382	0.395
Greater than $100 billion	0.188	0.421	0.420	0.421	0.416
All organizations	1.000	1.000	1.000	1.000	1.000

Number of organizations

Less than $100 million	5,636	2,763	2,800	2,748	2,626
$100 million–$1 billion	2,051	1,179	1,162	1,120	1,065
$1 billion–$10 billion	178	104	102	99	96
$10 billion–$100 billion	55	46	46	47	49
Greater than $100 billion	6	13	13	13	13
All organizations	7,926	4,106	4,125	4,028	3,849
Market share[b]	0.214	0.222	0.224	0.227	0.231
Herfindahl index[c]	0.058	0.059	0.059	0.058	0.057
Gross domestic assets[d]	3,491	3,491	3,491	3,491	3,491

Simulations assuming growth in gross domestic banking assets equal to the historical average of 1.71 percent per year[e]

Proportion of gross domestic assets

Less than $100 million	0.070	0.029	0.024	0.016	. . .
$100 million–$1 billion	0.138	0.068	0.058	0.037	. . .
$1 billion–$10 billion	0.157	0.067	0.050	0.025	. . .
$10 billion–$100 billion	0.446	0.400	0.421	0.450	. . .
Greater than $100 billion	0.188	0.436	0.447	0.471	. . .
All organizations	1.000	1.000	1.000	1.000	. . .

Number of organizations

Less than $100 million	5,636	2,287	1,946	1,285	. . .
$100 million–$1 billion	2,051	1,015	857	556	. . .
$1 billion–$10 billion	178	76	56	29	. . .
$10 billion–$100 billion	55	49	52	56	. . .
Greater than $100 billion	6	14	14	15	. . .
All organizations	7,926	3,440	2,925	1,939	. . .
Market share[b]	0.214	0.212	0.207	0.195	. . .
Herfindahl index[c]	0.058	0.058	0.056	0.050	. . .
Gross domestic assets[d]	3,491	3,803	4,143	5,358	. . .

Source: Authors' simulations based on model described in text, using data from the Consolidated Report of Condition and Income for Banks and Amel (1993).

a. Financial values are expressed in 1994 dollars.

b. Average share of market deposits controlled by each organization in the market weighted by the proportion of the state's gross domestic assets in the market.

c. The Herfindahl index is the sum of the squares of the market shares of each organization in the market. The number reported is the weighted average Herfindahl—the average Herfindahl across markets in each state weighted by the proportion of the state's gross domestic assets in the market.

d. Billions of 1994 dollars.

e. Equal to the annual growth rate of gross domestic assets for the nation as a whole over 1979–94.

future, we also add one more year to the denominators of each of the time-since-liberalization variables (1/*STATEBRANTIME*, 1/*INTER-STATETIME*, and so forth). In the long-run case, these variables are set equal to zero in order to remove all of the transitional effects. As noted above, the *LNRGGDA* variable and the other external regional demographic variables are set to reflect nationwide banking by including the assets, population density, and other characteristics of the forty-nine states and the District of Columbia, other than the home state.

To illustrate, consider the values of the right-hand-side variables that are used to predict the distribution of banking assets in Alabama five years into the nationwide banking regime. As shown in table B6, Alabama granted statewide branching privileges in June 1990 and interstate MBHC access in July 1987, and had granted all the other privileges before 1960.[58] For the simulation, none of the regulatory dummies need to be changed because Alabama institutions already had these powers in 1994. We add five years to all the denominators of the time-since-liberalization variables; for example, 1/*INTERSTATETIME* changes from 1/(4.5) to 1/(9.5). Importantly, we also adjust all the external region variables to reflect five years of access to the forty-nine states and the District of Columbia, other than Alabama.

The changes in the predicted P_is for each state due to the changes in the geographic restrictions and the time-since-liberalization variables are added to the *actual* P_is for that state in 1994, effectively maintaining any idiosyncracies of the state in that year. This procedure ensures that any errors in predicting the 1994 values do not affect our simulations of the changes due to nationwide banking. The overall proportions of banking assets in the different size classes shown in the top panel of table 10 are the weighted averages of the state distributions. The number of banking organizations in each size class is obtained by dividing the total dollar value of assets in each size class by the average size of organization in that size class in 1994. That is, we assume that the average size of organization in each size class remains constant over time, even while banking assets are shifting into and out of the classes. Once again we make the most neutral assumption possible, so that the simulations reflect only the changes predicted from the regulatory variables in table 9.

58. Because our geographic restriction data are generally only accurate back to 1960, we act as if the liberalizations before this date took place in 1960.

The zero-growth simulations shown in table 10 suggest that the removal of all geographic barriers to nationwide banking is likely to result in substantial consolidation of the banking industry, and that this consolidation would likely occur rather quickly. The model predicts that within five years of the full implementation of nationwide banking, all else held constant, the share of domestic assets controlled by megabanks would more than double from 18.8 percent to 42.1 percent, while the share held by the smallest banking organizations would fall by about half, from 7.0 percent to 3.5 percent. The number of banking organizations is also simulated to fall by almost 4,000, from 7,926 to 4,106, over the five-year horizon.

It is interesting to note that these changes are similar to the trends that have already occurred in the recent past, as documented above. The halving of the share of the smallest banking organizations and the elimination of about four thousand institutions essentially replicates what has occurred in the industry over the last fifteen years. Thus nationwide banking appears likely to accelerate the process of reducing the number and market share of small banking organizations that is already underway. The slightly more than doubling of the share of assets controlled by megabanks essentially matches the gains made in the last five years, and thus continues the increase in market shares of very large banking organizations with no substantial change.

The data also show very little change in the distribution of industry assets across organization size after the first five years of nationwide banking in this simulation. The industry is predicted to lose only seventy-eight additional banks over the subsequent twenty years. The simulation of the long run—in which all transitional effects represented by the time-since-liberalization variables are eliminated—yields an additional loss of only 179 banking organizations after the first twenty-five years, leaving 3,849 organizations. The long-run prediction also provides a check on the model, verifying that the estimated parameters predict a smooth asymptotic transition to nationwide banking. Of course, the precise amount of consolidation that will actually occur depends on many factors that are not included in the model, but these projections are only intended to gauge the general importance of lifting the restrictions on nationwide banking.

This simulated rapid adjustment to nationwide banking may seem surprising at first, but some intuitive explanations for it can be gleaned

from the data presented above. Table 3 shows that by 1994 nationwide access was well on the way to being a reality, with the average MBHC having access to 69.4 percent of the nation's banking assets, up from 29.0 percent in 1989. At least partly in reaction to this increased market access, a great deal of consolidation occurred in the first half of the 1990s. Megabanks more than doubled their national share from 8.6 percent to 18.8 percent (see table A1) and interstate penetration increased from 18.9 percent to 27.9 percent (see table 3) in the last five years. Given that past opportunities to expand geographically were quickly seized, it is not surprising that the model predicts that the future response to regulatory liberalization may also happen relatively quickly.[59]

Reading the simulation results from a slightly different angle, the model predicts that the top sixty or so banking organizations with assets of over $10 billion may control approximately 80 percent of industry assets under nationwide banking. These organizations may be thought of as including regional banks, superregionals, and money center banks. This finding of a dominant, but not overwhelming position for these large banking organizations represents a middle position between the extreme positions discussed above of no effect on community banks versus the devastation of such banks and consolidation of the industry into tens or hundreds of large organizations. In effect, the model has common ground with both extremes—many small community banks are predicted to survive and the number of banking organizations is predicted to remain in the thousands, but the vast majority of assets are

59. Bolstering the argument for rapid consolidation at the large end of the market, there were at least five announcements of mergers of banking organizations with assets between $10 billion and $100 billion in the first eight months of 1995 (see Saul Hansell, "Wave of Mergers is Transforming American Banking," *New York Times,* August 21, 1995, pp. A1, A12). Together, the two largest, First Union–First Fidelity Bancorp and First Chicago–NBD Bancorp, would push almost another 7 percent of the nation's assets into the megabank category. Moreover, if the proposed takeover of First Interstate by Wells Fargo is consummated, an additional 3 percent of national assets would be shifted into the largest banking organization size class (although no shift in size classes will occur if First Interstate alternatively merges with First Bank Systems). Finally, the recently announced megamerger between Chemical and Chase Manhattan will create the largest U.S. banking organization, with combined assets of nearly $300 billion, although it will not move any assets between our size classes since both organizations already have assets of over $100 billion.

also predicted to be controlled by a relatively small number of large banking organizations.

Importantly, this common ground of substantial consolidation with thousands of small banks remaining is consistent with the past behavior of the banking industry. In reaction to past liberalizations of interstate banking rules, most large banking organizations responded quickly, but stayed primarily within their regions; no organization expanded so as to have commercial banks in more than fourteen states. As discussed above, it is possible that the simulations understate the amount of consolidation in the long run, since access to large portions of the nation is relatively new, and the banking system may not yet have had sufficient time to take advantage of the previously available options.

To examine this issue further and to see whether our finding of thousands of banking organizations seems reasonable and robust, we consider the experience of California. California has allowed full state-wide branching since 1909 and has an economy larger than all but a few countries. Presumably, by consolidating throughout the entire state, its banking system should already have gone much of the way toward achieving the long-run size distribution of banking organizations and the effective market for ownership and corporate control that might be expected in equilibrium under nationwide banking. As of the end of 1994, there were gross domestic banking assets of $298 billion located in California, or 8.5 percent of the national total of $3,491 billion. California also had the equivalent of 342 full banking organizations operating in the state (after removing the non-California portions of some interstate organizations).[60] If we simply ''blow up'' California to a national scale, the country would have approximately 4,024 banking organizations (342/0.085), which is nearly identical to the 4,028 predicted by the model after twenty-five years of nationwide banking. Likewise, Timothy Hannan and Stephen Rhoades project the number of banking organizations in the nation twenty years from 1990 by using California trends and predict about 3,500 organizations in 2010.[61] Such

60. A total of 352 organizations had some domestic assets in the state, but some of these organizations also had assets in other states. The figure of 342 is derived by counting multistate banking organizations as their fraction of assets in California banks.

61. See Hannan and Rhoades (1992). They also use the past experience of the

calculations based on raw data for California are obviously simplistic because they do not take into account the specific demographics and idiosyncracies of California, yet they give figures very close to our estimates that do embody the demographics and idiosyncracies of all the states.[62] The California experience also makes it highly improbable that the number of banking organizations would number in the tens under nationwide banking, since the industry did not reduce the number of California institutions to the tens when it legally could have done so.[63]

We also run four additional robustness checks on these results, changing the specifications of the regulatory variables. The results are consistent with the California robustness check and support our main findings. In all cases the vast majority of the consolidation is complete within five years, and the number of banking organizations simulated after twenty-five years ranges between 4,000 and 4,900.[64]

Southeast region, New England, and the nation as a whole, and obtain estimates of five thousand to six thousand organizations remaining in the year 2010.

62. Berger and Humphrey (1988) simulate the effects of nationwide banking on the payments system using similar techniques to those employed here and find that the Federal Reserve is likely to lose about half of its market share in check clearing after consolidation. Similarly, they compare their results to the raw data from California and find that the California raw data somewhat overstate the predicted change in the check clearing system. That is, the California raw data predict a drop of two-thirds in Federal Reserve market share, relative to a loss of about half in the simulations that account for the demographics and other characteristics of all the areas of the country.

63. It is also notable that in some countries with universal banking, such as Germany and Switzerland, where banks have almost unlimited powers to grow and enter other industries, many small banking organizations operate alongside the large, universal *Grossbanken*.

64. First, we change the specification of the time-since-liberalization variables in the model in order to be sure that the simulated rapid consolidation of the industry is not an artifact of the functional form of these variables. We add second-order terms in the inverse of the number of years that a banking privilege has been available (for example, $1/2 \times 1/[STATEBRANTIME]^2$) to allow more flexibility in the specification. Second, we specify the natural log of the number of years in the denominator in place of the level (for example, $1/\ln[STATEBRANTIME]$). Third, we remove from the specification all the terms related to limited banking privileges within the state (*LIMBRAN*, $1/LIMBRANTIME$, *LIMMBHC*, $1/LIMMBHCTIME$, and all the interactions of these variables), in order to allow for the possibility that these minor privileges are no longer very relevant because most states have allowed them for some time so that they may be mostly adding noise to the process. Fourth, we try running the regression model excluding the thirteen states of the Southeast, since the organizations in this region are known to have engaged in unusually large amounts of interstate banking activity during the

One reason that there will likely continue to be many small banking organizations in the future is that the system has adapted to them, thus making it difficult to drive them out of the industry, even in cases when they might be somewhat inefficient. The existence of federal deposit insurance means that small banks can offer depositors virtually the same safety for their funds as a nationally diversified organization. It is likely that deposit insurance subsidizes some small banks that would not otherwise be economically viable, in part because the premiums paid for the deposit insurance vary within a relatively narrow band that does not fully account for risk. Similarly, in cases in which small organizations cannot adequately exploit economies of scale or diversification, such as back-office payments processing and issuing large loans, the correspondent banking system and (in the case of the payments processing) the Federal Reserve have evolved to pool these services and offer them to small banking organizations on a secondary market basis. In addition, many small banking organizations have built up capital over time in the form of branch offices, relationships with customers, and so forth, that might be expensive to replace. Moreover, as mentioned above, small banking organizations may have comparative advantages in some types of relationship lending or character lending for which personal knowledge of local business owners is important.

We also simulate the average local market structure of the banking industry—the weighted average market share and Herfindahl index. For each local market, defined as the metropolitan statistical area (MSA) or non-MSA county, the Herfindahl index of the concentration of deposits (the sum of squares of local market shares) is calculated and the average market share is tallied. The weighted averages of market share and the Herfindahl index for the state are used as dependent variables and simulated analogously to the size class log-odds ratios. The results, in the top panel of table 10, show very little change in local market structure, suggesting that most of the consolidation will take place through mergers between organizations in different local markets.[65]

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sample period. The states thus excluded are Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia. None of these alternative specifications affect the main results of the model.

65. In principle, the predicted values of the market share and the Herfindahl index may go up, go down, or remain constant as a result of the consolidation of the banking

Our second simulation of the future distribution of gross domestic assets, shown in the bottom panel of table 10, adds the assumption that each state's future banking assets grow by 1.71 percent per year, the national trend rate over the period 1979–94. This scenario may be more realistic than the zero-growth simulation in terms of predicting the future, but it requires some speculation about the growth of bank assets. This growth simulation introduces some dynamics as unobtrusively as possible, remaining neutral regarding any more controversial assumptions about cyclical fluctuations, migration, population growth, and wealth accumulation in each state. In other words, this approach allows us to extend the results while still focusing on the effects of the liberalization of geographic constraints. The growth simulation also allows us to examine the interaction between the growth of the industry and the lifting of geographic constraints.

As discussed above, the future growth of the industry may be largely determined by the success of external competitors in increasing their shares of U.S. debt markets, so the actual future growth path for banking assets is highly uncertain. Our two point estimates—zero-growth and average past growth—are intended to give a rough idea of the effect of different assumptions about external competition and other factors affecting growth on the future consolidation of the banking industry.

The procedure for the growth simulation requires only a few changes from the zero-growth simulation. The assets in the states and in the external regions increase by 1.71 percent for each year ahead of the simulation, affecting the logs of these variables and the population-to-asset ratios, and increasing the total assets that are apportioned among the banking organization size classes. To obtain the number of organizations in each size class, we assume that the average size of banking organizations within each size class also grows at the rate of 1.71 percent per year, the same as the rate of growth of domestic assets. This is a neutral assumption, in the sense that if the model were to predict no change in the proportions of assets in the different size

industry. Local concentration will increase if banking firms in the same market are joined, remain unchanged if banking organizations in different markets are simply merged, and decrease if deregulation spurs entry into new markets or more aggressive competition from organizations with small shares. The result of very little change in local market concentration during industry consolidation is corroborated by Akhavein, Berger, and Humphrey (1996), who find that the large banking mergers of the 1980s were accompanied by very little increase in local market Herfindahl indexes, on average.

classes, we would predict no change in the number of banking organizations because the growth in total assets would be absorbed by all banking organizations growing at a rate of 1.71 percent per year.[66]

As shown in the bottom panel of table 10, allowing for growth in the industry raises the amount of consolidation by a small amount over five years relative to the zero-growth simulation: the number of organizations shrinks to 3,440 rather than 4,106. However, after five years the amount of consolidation is substantially increased, relative to the zero-growth simulation. The number of banking organizations is projected to fall by about three-quarters in twenty-five years, from 7,926 to 1,939, a loss of almost 6,000 banking organizations, or about half again as many as under the zero-growth scenario. The megabank category grows to fifteen institutions controlling 47.1 percent of all banking assets, as opposed to the thirteen megabanks with 42.1 percent of assets in the zero-growth simulation. Moreover, the share of all organizations in the top two size classes with over $10 billion in assets (regionals, superregionals, and money centers) is predicted to be 92.1 percent after twenty-five years. In comparison, banking organizations in these size classes currently have 63.4 percent of assets, and are forecast to have 80.3 percent under the zero-growth scenario.

Some of the additional movement into larger size classes under the growth scenario, relative to the zero-growth scenario, reflects the fact that the growth of assets would push some banking organizations into larger size classes. However, the historically strong positive relationship between the amount of bank assets in a state and the proportion of these assets in large banking organizations is likely a more important factor. Larger states tend to have even more disproportionately large banking organizations, perhaps because of economies in collecting deposits and creating assets where financial resources are more densely concentrated. The positive relationship between growth in industry assets and consolidation also accords well with the aggregate figures for the period 1979–94, during which gross domestic assets grew by 29.3 percent, while the industry consolidated into 36.4 percent fewer organizations. Thus the basic trends in the historical data suggest that asset growth gives an extra kick to bank consolidation.

66. Note that even with 1.71 percent annual growth for twenty-five years, the average size of organization in every size class still remains well within the range of assets for that size class.

These findings reinforce our earlier conclusions and again illustrate the common ground that our simulated results share with both of the extreme positions noted earlier. These results appear to agree with the prediction of one extreme that the vast majority of industry assets will be tied up in tens of large organizations (in this case, seventy-one organizations that control 92.1 percent of assets). Our results also agree with the prediction of the other extreme that the total number of organizations will still be counted in the thousands (in this case, about two thousand).

Overall, these simulations are meant to be suggestive, rather than precise forecasts of the future. The zero-growth simulation likely more accurately reflects the pure effects of liberalizing geographic restrictions on banking, and yields a reasonable estimate of what the industry might have been like had the geographic restrictions been relaxed much earlier. The growth simulation helps to show how the growth of the industry is likely to result in additional consolidation, as it has done in the past.[67]

The Effects of Nationwide Banking on Credit Flows

With these two paths of consolidation, it is possible to investigate the effects of nationwide banking on credit flows. Under the consolidation hypothesis outlined above, the consolidation of the industry into larger organizations would be expected to result in a reduced supply of credit to small borrowers. As assets are shifted on net from smaller to larger organizations, it is likely that some loans to small businesses that would otherwise be issued or reissued may be dropped. As discussed above, the lowering of geographic barriers to competition under nationwide banking is likely to reduce the exercise of local market power and open up the market for corporate control in banking. Consequently, some small business loans that have negative NPVs when evaluated at competitive market prices will likely be eliminated and not be reissued

67. One caveat that applies to both simulations is that they may understate the effects of geographic deregulation because they are based on past interstate experience with MBHC consolidation but not with interstate branching. It is likely that the opportunity to branch outside the state as well as expand through holding companies may increase the amount of industry consolidation, but we do not have interstate branching experience from which to extrapolate. In this regard, it is again worth noting that the simulation for California yields similar results, since branching is not restricted in that state.

by other lenders. The reallocation of these funds to other uses likely represents an improvement in economic efficiency.

Consolidating banks might also fail to reissue some positive NPV relationship-based or character loans that simply do not fit into their existing loan programs. As discussed above, there may be organizational diseconomies to providing small relationship-driven loans that require personal knowledge of the small business owner along with transaction-driven loans that are based primarily on credit analysis of financial statements. In the long run, many of these loans are likely to be picked up by other bank or nonbank lenders that can profit from them, although there may be significant short-term costs for these borrowers during the transition. However, some loans that have positive NPV based on private information generated by their bank over time may not be reissued because the private information is "lost" in the consolidation process and it is not profitable for another lender to reinvest in "finding" this information.

Rather than trying to disentangle all of these effects, we simply try to estimate the first-order, or first-round, effects of consolidation on lending. We assume that banking organizations in a given size class will continue to devote the same proportions of their gross domestic assets to loans to borrowers in each credit category as they did in 1994. For example, in 1994 banking organizations with less than $100 million in assets lent an estimated 2.68 percent of their gross domestic assets to borrowers with bank credit of $100,000 or less, whereas organizations with over $100 billion in assets made loans of only an estimated 0.05 percent of their assets to this smallest borrower category (percentages are not shown in the tables). Thus if the simulated consolidations were to redistribute $1 million in assets from the smallest banking organization size class to the largest, we would predict a fall of $(0.0268 - 0.0005) \times \$1$ million $= \$26,300$ in C&I lending to the smallest borrower category.

We recognize that this calculation is inherently partial equilibrium, and that there will likely be an adjustment in the long run as either other banks or nonbank financial intermediaries pick up some of the lost loans that have positive NPVs based on publicly available information. Only those loans with negative NPVs, and those for which it is not worthwhile to reincur the costs to find out that they are positive NPV loans, will likely be permanently lost. For these reasons, our estimates should

generally be considered as upper bounds on the amount of redistribution of lending that might take place in the long run.

The lending results for the zero-growth simulation are shown in the top panel of table 11. Since this simulation predicts a fast and significant shift of assets away from small banks and toward much larger banks (see table 10), it is not surprising that small business credit is also projected to shrink quickly and noticeably. More specifically, loans to small borrowers, with less than $1 million in bank credit, are projected to drop by $30 billion in five years, from $93.7 billion to $63.7 billion, or 32.0 percent. Very little change is estimated to occur after five years. Similarly, loans to very small borrowers, with less than $250,000 in bank credit, are projected to fall by $17.5 billion, from $47.8 billion to $30.3 billion, or 36.6 percent, over the same short interval and to remain relatively constant thereafter.

While these may seem like large adjustments over short time periods, they are actually smaller, both in real dollar value and in percentage terms, than the declines in small business C&I lending that are esti-mated to have already taken place, over the *last* five years. As shown above in table 8, we estimate that C&I loans to borrowers with credit of less than $1 million fell by $50 billion, or 34.8 percent, over 1989–94, and C&I loans to borrowers with less than $250,000 in credit fell by $34.5 billion, or 41.9 percent, over the same period. These past declines are larger, in all cases, than the simulated future reductions in lending to small businesses.

The growth simulation, shown in the bottom panel of table 11, is both more interesting and more complex. In this case there are two additional effects on small business lending that approximately cancel each other out. First, the share of lending to small businesses falls by more than in the zero-growth scenario because of the greater degree of industry consolidation under the growth scenario. For example, after five years the proportion of loans to borrowers with credit of less than $1 million falls from 2.69 percent of gross domestic assets to 1.68 percent in the growth simulation, whereas it falls only to 1.83 percent in the zero-growth simulation. Second, because assets (and therefore loans) are growing, the effect of the reduced share of small business lending is essentially offset in terms of total dollars, yielding about the same quantity of this lending as in the zero-growth case. For example, lending to borrowers with credit of less than $1 million is predicted to

Table 11. Simulated Future Distribution of Domestic Commercial and Industrial Loans[a]

Units as indicated

| Credit size of borrower | 1994 | Number of years into the future | | | Long run |
		5	10	25	
Simulations assuming zero growth in gross domestic banking assets					
		Total dollar volume[b]			
Less than $100,000	22.5	14.0	14.0	13.7	13.4
$100,000–$250,000	25.3	16.3	16.3	16.1	15.8
$250,000–$1 million	45.9	33.4	33.4	33.1	33.0
$1 million–$10 million	152.7	146.2	146.4	146.9	148.1
$10 million–$25 million	124.4	138.5	138.8	139.5	140.5
$25 million–$100 million	86.5	115.9	116.0	116.6	117.0
Greater than $100 million	23.2	29.7	29.7	29.7	29.6
All borrowers	480.6	494.0	494.5	495.6	497.6
		Proportion of gross domestic assets			
Less than $100,000	0.0064	0.0040	0.0040	0.0039	0.0039
$100,000–$250,000	0.0073	0.0047	0.0047	0.0046	0.0045
$250,000–$1 million	0.0132	0.0096	0.0096	0.0095	0.0095
$1 million–$10 million	0.0438	0.0419	0.0420	0.0421	0.0424
$10 million–$25 million	0.0356	0.0397	0.0397	0.0400	0.0403
$25 million–$100 million	0.0248	0.0332	0.0332	0.0334	0.0335
Greater than $100 million	0.0067	0.0085	0.0085	0.0085	0.0085
All borrowers	0.1377	0.1415	0.1417	0.1420	0.1425
Gross domestic assets[b]	3,491	3,491	3,491	3,491	3,491

Simulations assuming growth in gross domestic banking assets equal to the historical average of 1.71 percent per year[c]

		Total dollar volume[b]			
Less than $100,000	22.5	13.6	13.4	13.9	. . .
$100,000–$250,000	25.3	16.1	16.2	17.6	. . .
$250,000–$1 million	45.9	34.4	35.8	42.4	. . .
$1 million–$10 million	152.7	161.3	177.6	233.3	. . .
$10 million–$25 million	124.4	155.8	173.9	233.5	. . .
$25 million–$100 million	86.5	131.3	147.2	200.0	. . .
Greater than $100 million	23.2	32.7	35.9	47.6	. . .
All borrowers	480.6	545.2	600.0	788.3	. . .
		Proportion of gross domestic assets			
Less than $100,000	0.0064	0.0036	0.0032	0.0026	. . .
$100,000–$250,000	0.0073	0.0042	0.0039	0.0033	. . .
$250,000–$1 million	0.0132	0.0090	0.0086	0.0079	
$1 million–$10 million	0.0438	0.0424	0.0429	0.0435	. . .
$10 million–$25 million	0.0356	0.0410	0.0420	0.0436	. . .
$25 million–$100 million	0.0248	0.0345	0.0355	0.0373	. . .
Greater than $100 million	0.0067	0.0086	0.0087	0.0089	. . .
All borrowers	0.1377	0.1434	0.1448	0.1471	. . .
Gross domestic assets[b]	3,491	3,803	4,143	5,358	. . .

Source: Authors' simulations based on model described in text, using data from the Consolidated Report of Condition and Income for Banks and Amel (1993).

a. Financial values are expressed in 1994 dollars using the GDP implicit price deflator.

b. Billions of 1994 dollars.

c. Equal to the annual growth rate of gross domestic assets for the nation as a whole over 1979–94.

be $64.1 billion after five years, nearly the same as the $63.7 billion
predicted in the zero-growth scenario. For subsequent years, somewhat
more small business lending is predicted under the growth scenario than
under the zero-growth scenario, as the effects of the larger asset base
eventually outweigh the effects of the smaller share for small business
loans.

To this point, we have focused exclusively on lending to small busi-
nesses, which is of most interest for policy purposes and is most likely
to be affected by nationwide banking legislation. Another interesting
finding of the model is the prediction that lending to large businesses
will increase as assets are transferred to larger banking organizations
that are able to make loans to large business borrowers. The zero-
growth case shows that loans to borrowers with more than $25 million
in bank credit are projected to rise by 32.7 percent in five years, from
$109.7 billion to $145.6 billion, with very little change thereafter. The
growth scenario predicts an increase of 49.5 percent in these loans in
five years, raising their value to $164.0 billion, and predicts further
increases in the future as industry assets continue to grow. These results
generally indicate that the banking industry will be in a better market
position to compete for a larger share of the large borrower loan market
than it otherwise would have been.

However, our nationwide banking simulations—which are geared
toward making predictions about small business lending—exclude the
important fact that the industry's propensity to lend to large borrowers
has been declining. Since 1989 the estimated proportion of gross total
assets devoted to domestic C&I loans to borrowers with credit of over
$25 million has declined from 4.39 percent to 2.73 percent (not shown
in the tables). As discussed above, the loss of these large business loans
is likely primarily due to increased external competition resulting from
improvements in technology and applied finance that helped alternative
sources of finance more than U.S. banks, as predicted by the monitoring
technology hypothesis. Since this hypothesis is not incorporated into
the nationwide banking simulations, we place considerably less weight
on the accuracy of the predictions for lending to large businesses.

Nevertheless, note that any change in large business lending by banks
is likely to be reflected either in a fall in assets or in a rise in securities,
and is not likely to affect small business lending by banks significantly.
Recall that large and small business loans are generally made by bank-

ing organizations in different size classes, and that bank lending to *both* large and small borrowers fell during the first half of the 1990s. Thus, although large business lending may be driven by factors that are not incorporated into our model, this should not seriously affect our prediction of a fall in small business lending resulting from consolidation.

Collectively, the results of the simulations suggest two main conclusions about the likely responses to the Riegle-Neal Act. First, consolidation will likely occur relatively quickly, similar to the response to the lifting of interstate banking restrictions that occurred in the first half of the 1990s. Second, the share of C&I lending flowing to small businesses will likely continue to decline along with the number of small banking organizations that tend to specialize in this type of lending.

In terms of general equilibrium considerations, a key question is what portion of these loans will be picked up by other banking organizations or nonbank financial intermediaries. Presumably, most of the loans that are positive NPV investments based on publicly available information will eventually be reissued. Although investigation of nonbank behavior is outside the scope of this paper, several pieces of evidence suggest that other commercial banks *will not* pick up most of the slack.

First, the data from the first half of the 1990s suggest that small business lending slowed down and was not significantly compensated for by banking organizations of any size. Table A10 shows that small banking organizations (assets of less than $100 million) and midsized organizations (assets of between $100 million and $100 billion) both cut back their C&I loans to small businesses substantially during the consolidation of the first half of the 1990s, and megabanks increased their lending to borrowers with credit of under $1 million by only $1.7 billion. As noted above, the estimated decline in small business lending during this period exceeds the decline that the model predicts for the future under nationwide banking. However, for many reasons the first half of the 1990s was a period of unusual changes and therefore it may not provide the best controlled experiment.

Second, we examine the lending behavior of California banks in 1994. Presumably, if other banks will pick up the slack from consolidation, this would already be seen in a very large state that has been relatively free from geographic restrictions for the last eighty-five years. In fact, ''blowing up'' California's lending experience in 1994 to the

national level yields much less lending to small borrowers than actually occurred nationally in that year, and yields similar numbers to our zero growth forecasts for the very small borrowers. This finding suggests that adjustment to a relatively unrestricted banking environment may not involve other banks making up for the effect of consolidation on small business lending.[68]

Third, we address the possibility that the lending propensities used in the simulations might be unstable if the propensities in the base year of 1994 were particularly unusual. To test this, we rerun the simulations in four different ways using first, the 1989 propensities; second, the average propensities over 1990–94; third, the average propensities over 1979–94; and fourth, the average propensities from California in 1994 discussed above. In all cases, simulated lending to small businesses decreased by proportions similar to those shown in table 11.

As a final check on our results, recall Peek and Rosengren's research that draws on a single cross-section of Call Report data on lending to small businesses in the New England states for June 1994. They find that mergers typically reduce the small business lending that has traditionally been conducted by the acquired institution, and that de novo entry appears to pick up only a small portion of the lost loans.[69]

Conclusions

This paper has presented many facts, figures, and analyses of the banking industry, but the main findings can be summarized by a few

68. For purposes of comparison with the first column in table 11, "blowing up" the lending for California in 1994 to the national level yields, in ascending order of borrower size class, $15.4 billion, $16.0 billion, $49.3 billion, $197.7 billion, $127.0 billion, $81.7 billion, and $25.7 billion, for a total of $512.8 billion.

The distribution of lending propensities in California is also interesting. Although the proportion of gross total assets devoted to domestic C&I lending in California is very close to that for the nation—11.57 percent in California compared to 11.94 percent for the nation in 1994—California banks are skewed away from small business lending, with only 1.21 percent of assets lent out to small C&I borrowers with credit of less than $1 million, compared to 2.33 percent nationally. The smallest banking organizations, with assets of less than $100 million, and the largest organizations, with assets of more than $100 billion, both have more small business lending in California than in the nation, but this is more than offset by the behavior of the midsized California organizations, which have a much lower propensity to lend to small borrowers.

69. Peek and Rosengren (1996).

broad propositions. First, the banking industry was transformed over the period 1979–94, as evidenced by the massive reduction in the number of banking organizations; the significant increase in the number of failures; the dramatic rise in off–balance sheet activities; the major expansion in lending to U.S. corporations by foreign banks; the widespread adoption of ATMs; the loss of monopsony power over depositors and the resulting higher costs of funds; the increase in equity capital ratios, particularly for the largest banking organizations; the opening up of interstate banking markets and the rapid penetration of banking organizations across state lines; and the estimated reductions in commercial and industrial lending to both small and large businesses in the first half of the 1990s.

Second, most of these major changes in banking can be explained by two factors: first, the extraordinary number of major regulatory changes that occurred during this period, including deposit deregulation, increases in capital requirements, the lifting of geographic restrictions, the expansion of bank powers, and the reduction of reserve requirements; and second, clearly identifiable innovations in technology and applied finance, including improvements in information processing and telecommunications technologies, the securitization and sale of bank loans, and the development of derivatives markets. In many cases, the clearest manifestation of the regulatory changes or innovations was in the form of a shift in external competition. For example, improvements in data processing, electronic funds transfers, and statistical techniques for analyzing credit likely helped to open U.S. loan markets to global competition and may have contributed to the substantial loss of domestic banks' share of U.S. corporate lending to foreign banks.

Third, despite the tumult of this period, the size of the banking industry—as measured by assets, deposits, or corporate loans—grew at a moderate pace over the fifteen-year interval. Although banks lost market shares of one-quarter to one-third in the major debt markets over 1979–94, the tremendous growth in these markets offset the loss of shares and left the banking industry enough room to continue growing. This evidence yields a somewhat mixed answer to the question of whether the banking industry is declining, advancing, or remaining about constant, relative to the rest of the economic environment.

Fourth, one of the most interesting recent developments has been the change in bank lending patterns in the first half of the 1990s. As is well

known, commercial and industrial lending by U.S. banks fell from the
end of 1989 to the end of 1992, and a number of demand- and supply-
based theories have been put forward to help to explain this lending
slowdown. This paper reports the perhaps surprising finding that aggre-
gate C&I lending did not rebound substantially between the end of 1992
and the end of 1994, when the macroeconomy was recovering.

To look behind these aggregate data, we estimate the changes in
lending to borrowers of different size categories based on a sample of
over 1.6 million bank loans issued over 1979–94. The data suggest that
C&I loans to small business borrowers exhibited the greatest propor-
tional decline over 1989–92, and rebounded only minimally over 1992–
94, although it is possible that some of these loans were transferred to
personal loans by the owners of the small businesses. Loans to medium-
sized borrowers had a much smaller estimated decline over 1989–92,
and had almost completely recovered by 1994. In contrast, C&I lending
to large business borrowers is estimated to have declined significantly
during 1989–92, and to have continued to decline over 1992–94. Al-
though these breakdowns of C&I loans by borrower size category com-
puted from the Survey of Terms of Bank Lending are less accurate than
the total C&I lending figures taken from the Call Report, we believe
that the general movements of the data are reliably portrayed.

These findings imply that something more complicated than a simple,
across-the-board reduction in loan demand or supply occurred during
the first half of the 1990s. The continuing decline estimated for large
business lending is consistent with Berger and Udell's monitoring tech-
nology hypothesis, under which improvements in technology and ap-
plied finance may support other types of financing in the large loan
market more than lending by U.S. banks.[70] The estimated fall in C&I
lending to small business borrowers may, in part, be explained by the
rapid consolidation of the banking industry in the first half of the 1990s.
Under this consolidation hypothesis, the transfer of assets from smaller
banking organizations to larger organizations may have reduced lending
to small businesses. Such a drop in small business loans may occur
because organizational diseconomies make it difficult for large organi-
zations to invest in small, relationship-based loans. As discussed further

70. See Berger and Udell (1993).

below, the elimination of some of these loans is likely to improve economic efficiency.

These recent trends are particularly important because the industry is poised for yet another transformation as it enters the nationwide banking era over the next few years. The passage of the Riegle-Neal Act opens the way for coast-to-coast branch banking, which has the potential to increase competition in local banking markets and reduce the exercise of market power in the pricing of banking products. Nationwide banking is also likely to enable the market for corporate control in banking to operate more effectively by allowing potential takeovers of poorly run banks by other organizations from across the nation.

To quantify the possible effects of nationwide banking, we construct a simulation model to predict how much consolidation is likely to occur, and the effects of this consolidation on C&I lending, particularly to small businesses that often have few alternative sources of external finance. The simulations extrapolate from prior experience with variations in geographic restrictions on banking across states and across time. Although the recent past has been a turbulent, and possibly atypical, period, extrapolation from models based on recent data still appears to be the best way to predict the future.

The data suggest that as a result of the Riegle-Neal Act several thousand banks may disappear and the proportion of banking assets controlled by large banking organizations is likely to increase substantially. The scenarios predicted by our model share common ground with the extreme positions that have been taken by others on both sides of this issue: thousands of small banking organizations are predicted to survive, but also, the vast majority of assets are predicted to be controlled by a relatively small number of large banking organizations. Furthermore, the model predicts that the change is likely to occur relatively quickly, to be mostly completed within five years. These predictions are consistent with the rapid consolidation that has already occurred over the last five years, as well as recently announced plans for still more large bank mergers.

The data also suggest that consolidation has clear limits. There is no evidence to suggest that the number of banking organizations will be counted in the tens, or even the hundreds, over the foreseeable future. The past experience of California—where there has been relatively

uninhibited consolidation across a very large state for decades and there are currently well over three hundred banking organizations—corroborates the conclusion that there will continue to be many organizations in the nation as a whole in the future.

In terms of credit flows, this shift toward larger banking organizations may lead to a reduction in the share of loans made to small businesses, as larger banking organizations take over assets that were previously controlled by smaller organizations. Because of organizational diseconomies, it may be difficult for the larger organizations to invest profitably in relationship-based small business loans. The loss of share for small loans due to the consolidation of banking assets predicted by the model should be considered as an upper bound, because other banks or nonbank competitors will likely step in and reissue some of these loans.

However, many of the eliminated loans likely will not be reissued because they are negative NPV investments. The earlier barriers to geographic competition in banking product markets, as well as the restrictions on the market for corporate control of banks implied by these geographic barriers, may have permitted some managers who were inefficient or pursuing goals other than profit maximization to exercise market power and issue some loans that would not be profitable at competitive market prices. Such negative NPV loans are not likely to be reissued by other lenders and their elimination, along with reallocation of the funds to other uses, likely improves economic efficiency.

Some loans that are positive NPV investments might also be eliminated by consolidation because of difficulties of combining relationship-driven loans in the same organizational structure as transaction-driven loans. Most of the eliminated loans that have positive NPV based on publicly available information are likely to be reissued by other lenders in the long run. Some additional data suggest that most of the lost lending is unlikely to be picked up by other U.S. commercial banks, although we do not have information on other types of lenders.

APPENDIX A

Data on the Banking Industry, 1979–94

THE TEN TABLES in this appendix provide detailed data assembled by the authors from official data sources. These data quantify the transformation of the U.S. commercial banking industry over the sample period 1979–94, and underlie the tables, figures, and discussion in the text.

Table A1. U.S. Commercial Banking Industry Aggregates over Time[1]

	1979	1980	1981	1982	1983	1984	1985	1986
Industry Totals								
Number of banking organizations[2]	12,463	12,380	12,221	11,974	11,729	11,422	11,089	10,571
Number of chartered banks	14,336	14,404	14,387	14,402	14,402	14,375	14,263	14,041
Number of offices	50,136	51,755	53,224	54,625	55,589	56,376	57,370	58,063
Number of automated teller machines	13,800	18,500	25,790	35,721	48,188	58,470	61,117	64,000
Number of employees (thousand)	1,403	1,477	1,489	1,489	1,501	1,516	1,549	1,548
Total assets (billion)	$3,243	$3,250	$3,231	$3,290	$3,375	$3,456	$3,627	$3,800
Loan & lease loss reserve[3]	$18	$18	$18	$20	$22	$26	$31	$37
Gross total assets[4]	$3,260	$3,267	$3,250	$3,310	$3,398	$3,482	$3,658	$3,838
Gross domestic assets[4]	$2,700	$2,700	$2,695	$2,819	$2,942	$2,984	$3,162	$3,353
Proportion of gross domestic assets								
By organization total asset size[5]								
Less than $100 million	0.139	0.139	0.138	0.130	0.123	0.117	0.108	0.097
$100 million–$1 billion	0.194	0.189	0.181	0.171	0.166	0.168	0.154	0.144
$1 billion–$10 billion	0.293	0.301	0.318	0.296	0.299	0.276	0.249	0.222
$10 billion–$100 billion	0.280	0.274	0.269	0.310	0.320	0.346	0.396	0.446
Greater than $100 billion	0.094	0.097	0.093	0.094	0.093	0.093	0.092	0.091
Average market-to-book ratio for the top 50 bank holding companies[6]	0.785	0.831	0.906	0.865	0.986	0.947	1.158	1.157
Organizations with Greater Than $100 Billion in Total Assets								
Number of banking organizations	3	3	3	3	3	3	3	3
Number of chartered banks	4	4	5	7	9	13	15	19
Number of offices	2,034	2,043	2,049	2,087	2,225	2,258	2,260	2,319
Number of employees (thousand)	147	153	161	163	170	176	185	177
Total assets (billion)	$520	$510	$487	$474	$462	$458	$480	$481
Loan & lease loss reserve[3] (billion)	$3	$2	$3	$3	$3	$3	$5	$6
Gross total assets[4] (billion)	$522	$513	$490	$477	$466	$461	$485	$487
Gross domestic assets[4] (billion)	$255	$261	$252	$264	$273	$278	$292	$304

	1987	1988	1989	1990	1991	1992	1993	1994
Industry Totals								
Number of banking organizations[2]	10,170	9,787	9,514	9,277	9,061	8,775	8,357	7,926
Number of chartered banks	13,538	12,965	12,554	12,194	11,788	11,346	10,865	10,357
Number of offices	58,690	59,253	60,351	62,312	63,347	63,645	64,009	65,610
Number of automated teller machines	68,000	72,492	75,632	80,156	83,545	87,330	94,822	109,080
Number of employees (thousand)	1,531	1,513	1,516	1,500	1,470	1,461	1,477	1,468
Total assets (billion)	$3,761	$3,777	$3,804	$3,739	$3,649	$3,625	$3,749	$3,973
Loan & lease loss reserve[3]	$63	$56	$62	$61	$59	$56	$53	$52
Gross total assets[4]	$3,823	$3,833	$3,866	$3,801	$3,707	$3,681	$3,803	$4,024
Gross domestic assets[4]	$3,291	$3,355	$3,408	$3,377	$3,298	$3,298	$3,367	$3,491
Proportion of gross domestic assets								
By organization total asset size[5]								
Less than $100 million	0.095	0.090	0.085	0.084	0.085	0.082	0.077	0.070
$100 million–$1 billion	0.142	0.141	0.141	0.144	0.150	0.153	0.148	0.138
$1 billion–$10 billion	0.212	0.204	0.202	0.190	0.191	0.176	0.163	0.157
$10 billion–$100 billion	0.443	0.481	0.485	0.496	0.415	0.436	0.428	0.446
Greater than $100 billion	0.107	0.085	0.086	0.085	0.159	0.153	0.184	0.188
Average market-to-book ratio for the top 50 bank holding companies[6]	1.023	1.233	1.201	0.783	1.320	1.573	1.450	1.334
Organizations with Greater Than $100 Billion in Total Assets								
Number of banking organizations	4	3	3	3	5	4	6	6
Number of chartered banks	47	20	21	23	74	59	52	45
Number of offices	2,685	2,271	2,312	2,504	5,479	5,652	6,139	6,009
Number of employees (thousand)	189	158	161	165	255	244	294	292
Total assets (billion)	$563	$449	$463	$447	$715	$656	$900	$1,016
Loan & lease loss reserve[3] (billion)	$15	$12	$12	$10	$13	$12	$15	$15
Gross total assets[4] (billion)	$578	$461	$475	$457	$728	$668	$915	$1,031
Gross domestic assets[4] (billion)	$353	$284	$294	$288	$525	$504	$621	$658

(continued)

Table A1. *(continued)*

	1979	1980	1981	1982	1983	1984	1985	1986
Organizations with $100 Million–$100 Billion in Total Assets								
Number of banking organizations	2,446	2,387	2,331	2,333	2,433	2,481	2,455	2,432
Number of chartered banks	4,282	4,363	4,425	4,670	4,968	5,240	5,384	5,626
Number of offices	32,690	33,961	35,297	36,887	38,300	39,555	40,948	42,563
Number of employees (thousand)	1,046	1,110	1,112	1,117	1,134	1,150	1,179	1,202
Total assets (billion)	$2,350	$2,367	$2,374	$2,452	$2,554	$2,652	$2,808	$2,996
Loan & lease loss reserve[3] (billion)	$13	$13	$14	$15	$17	$20	$24	$29
Gross total assets[4] (billion)	$2,363	$2,380	$2,388	$2,467	$2,571	$2,672	$2,832	$3,025
Gross domestic assets[4] (billion)	$2,070	$2,064	$2,072	$2,189	$2,308	$2,357	$2,528	$2,724
Organizations with Less Than $100 Million in Total Assets								
Number of banking organizations	10,014	9,990	9,887	9,638	9,293	8,938	8,631	8,136
Number of chartered banks	10,050	10,037	9,957	9,725	9,425	9,122	8,864	8,396
Number of offices	15,412	15,751	15,878	15,651	15,064	14,563	14,162	13,181
Number of employees (thousand)	210	214	217	209	197	190	184	169
Total assets (billion)	$373	$373	$370	$364	$359	$347	$339	$323
Loan & lease loss reserve[3] (billion)	$2	$2	$2	$2	$2	$2	$2	$3
Gross total assets[4] (billion)	$375	$374	$372	$366	$361	$349	$342	$325
Gross domestic assets[4] (billion)	$375	$374	$372	$366	$361	$349	$342	$325

	1987	1988	1989	1990	1991	1992	1993	1994
Organizations with $100 Million–$100 Billion in Total Assets								
Number of banking organizations	2,355	2,313	2,311	2,330	2,342	2,379	2,332	2,284
Number of chartered banks	5,399	5,203	5,068	4,963	4,747	4,645	4,546	4,419
Number of offices	43,098	44,398	45,690	47,566	45,790	46,279	46,673	48,897
Number of employees (thousand)	1,180	1,199	1,203	1,185	1,069	1,076	1,046	1,047
Total assets (billion)	$2,889	$3,030	$3,052	$3,010	$2,657	$2,699	$2,592	$2,713
Loan & lease loss reserve[3] (billion)	$45	$42	$47	$48	$44	$42	$36	$35
Gross total assets[4] (billion)	$2,934	$3,072	$3,099	$3,089	$2,700	$2,742	$2,628	$2,747
Gross domestic assets[4] (billion)	$2,626	$2,771	$2,823	$2,804	$2,494	$2,522	$2,486	$2,587
Organizations with Less Than $100 Million in Total Assets								
Number of banking organizations	7,811	7,471	7,200	6,944	6,714	6,392	6,019	5,636
Number of chartered banks	8,092	7,742	7,465	7,208	6,967	6,642	6,267	5,893
Number of offices	12,907	12,584	12,349	12,242	12,078	11,714	11,197	10,704
Number of employees (thousand)	163	156	152	149	146	141	137	130
Total assets (billion)	$309	$298	$289	$282	$277	$269	$258	$244
Loan & lease loss reserve[3] (billion)	$3	$3	$3	$3	$3	$2	$2	$2
Gross total assets[4] (billion)	$312	$301	$291	$285	$279	$271	$260	$246
Gross domestic assets[4] (billion)	$311	$301	$291	$285	$279	$271	$260	$246

Source: Consolidated Report of Condition and Income for Banks and the Federal Reserve's *Financial Condition of the Largest Bank Holding Companies: Statistical Tables* for the six months ending June 30, 1995. Data for ATMs are from Bank Network News, various years, *EFT Network Data Book* (New York: Faulkner and Gray, Inc.).
 1. All financial values are expressed in 1994 dollars using the GDP implicit price deflator. All stock values represent end-of-year figures.
 2. A banking organization is defined here as either an independent bank or the consolidated banking assets of a top-tier holding company.
 3. For the purposes of this paper the loan & lease loss reserve includes the allocated transfer risk reserve.
 4. Gross assets include the loan & lease loss reserve.
 5. Organization size is measured by the conventional total assets figure.
 6. Simple average of market-to-book ratios for top 50 bank holding companies (BHCs) as of year end. 1985 value reflects the top 50 BHCs as of 1986, 1981–1983 values reflect the top 50 BHCs as of 1984, 1979–1980 values reflect the top 25 BHCs as of 1982.

Table A2. Financial Statements for the U.S. Commercial Banking Industry[1]

	1979	1980	1981	1982	1983	1984	1985	1986
Balance Sheet								
Gross total assets[2] (billion)	$3,260	$3,267	$3,250	$3,310	$3,398	$3,482	$3,658	$3,838
Fraction of gross total assets								
Cash & securities	0.383	0.389	0.371	0.364	0.364	0.323	0.331	0.338
Total loans & leases less unearned income	0.555	0.545	0.555	0.556	0.559	0.598	0.593	0.592
Domestic loans & leases	0.472	0.455	0.462	0.472	0.484	0.505	0.510	0.520
Commercial & industrial	0.151	0.151	0.161	0.173	0.172	0.169	0.163	0.164
Commercial real estate	0.063	0.062	0.063	0.064	0.068	0.077	0.083	0.093
1-4 family residential property	0.080	0.079	0.076	0.072	0.071	0.072	0.072	0.075
Loans to individuals	0.092	0.081	0.075	0.070	0.073	0.094	0.096	0.094
Credit card and related plans	0.018	0.016	0.016	0.017	0.019	0.024	0.029	0.031
Loans to depository institutions	0.014	0.015	0.018	0.023	0.023	0.005	0.004	0.004
Loans to foreign governments	0.001	0.002	0.003	0.005	0.009	0.002	0.001	0.001
Agricultural loans	0.018	0.017	0.016	0.016	0.017	0.016	0.013	0.011
Leases	0.006	0.006	0.007	0.006	0.006	0.007	0.007	0.008
Other domestic loans	0.029	0.026	0.027	0.027	0.026	0.041	0.043	0.040
Foreign loans	0.097	0.102	0.104	0.092	0.084	0.100	0.089	0.077
Unearned income on loans	0.013	0.011	0.010	0.009	0.008	0.008	0.006	0.005
Other real estate owned	0.001	0.001	0.001	0.002	0.002	0.002	0.003	0.003
Assets in trading accounts	0.006	0.005	0.006	0.009	0.007	0.011	0.015	0.015
Fixed assets	0.014	0.014	0.015	0.015	0.016	0.015	0.015	0.014
Other gross assets	0.041	0.045	0.052	0.055	0.052	0.050	0.044	0.039
Total deposits	0.801	0.794	0.779	0.773	0.782	0.777	0.769	0.769
Domestic deposits	0.640	0.636	0.622	0.633	0.650	0.650	0.652	0.662
CDs ≥ $100,000	0.125	0.137	0.150	0.152	0.127	0.118	0.113	0.104
Time & savings	0.262	0.267	0.284	0.314	0.358	0.324	0.327	0.328
Demand & transaction accounts	0.253	0.231	0.188	0.168	0.165	0.164	0.164	0.172
Foreign deposits	0.161	0.158	0.157	0.140	0.131	0.126	0.118	0.106
Federal funds purchased	0.066	0.071	0.080	0.082	0.076	0.075	0.081	0.084
Other liabilities	0.076	0.077	0.083	0.087	0.083	0.088	0.089	0.086
Equity	0.057	0.058	0.058	0.058	0.060	0.061	0.061	0.061

	1987	1988	1989	1990	1991	1992	1993	1994
Balance Sheet								
Gross total assets² (billion)	$3,823	$3,833	$3,866	$3,801	$3,707	$3,681	$3,803	$4,024
Fraction of gross total assets								
Cash & securities	0.331	0.321	0.315	0.311	0.329	0.345	0.335	0.314
Total loans & leases less unearned income	0.600	0.608	0.613	0.612	0.588	0.570	0.572	0.580
Domestic loans & leases	0.531	0.546	0.555	0.555	0.532	0.517	0.516	0.523
Commercial & industrial	0.158	0.158	0.154	0.149	0.133	0.125	0.118	0.119
Commercial real estate	0.105	0.111	0.116	0.117	0.113	0.107	0.102	0.098
1-4 family residential property	0.086	0.095	0.104	0.116	0.123	0.130	0.137	0.139
Loans to individuals	0.092	0.092	0.090	0.088	0.084	0.084	0.086	0.089
Credit card and related plans	0.034	0.037	0.039	0.039	0.040	0.038	0.041	0.046
Loans to depository institutions	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.002
Loans to foreign governments	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000
Agricultural loans	0.010	0.010	0.009	0.010	0.010	0.010	0.010	0.010
Leases	0.009	0.010	0.010	0.010	0.009	0.009	0.009	0.010
Other domestic loans	0.035	0.031	0.029	0.024	0.017	0.011	0.011	0.009
Foreign loans	0.073	0.067	0.063	0.061	0.059	0.056	0.058	0.058
Unearned income on loans	0.005	0.005	0.004	0.004	0.003	0.002	0.002	0.001
Other real estate owned	0.004	0.004	0.004	0.006	0.008	0.007	0.005	0.003
Assets in trading accounts	0.011	0.011	0.013	0.014	0.019	0.023	0.033	0.048
Fixed assets	0.015	0.014	0.014	0.015	0.015	0.015	0.015	0.015
Other gross assets	0.040	0.042	0.040	0.042	0.041	0.039	0.041	0.041
Total deposits	0.766	0.765	0.760	0.769	0.771	0.758	0.733	0.707
Domestic deposits	0.653	0.665	0.666	0.683	0.683	0.677	0.644	0.600
CDs ≥ $100,000	0.113	0.119	0.118	0.109	0.086	0.062	0.053	0.054
Time & savings	0.328	0.338	0.348	0.375	0.393	0.386	0.363	0.336
Demand & transaction accounts	0.211	0.208	0.200	0.199	0.203	0.228	0.228	0.211
Foreign deposits	0.113	0.100	0.094	0.086	0.088	0.081	0.089	0.107
Federal funds purchased	0.078	0.074	0.083	0.072	0.067	0.071	0.073	0.077
Other liabilities	0.097	0.099	0.097	0.096	0.096	0.097	0.115	0.139
Equity	0.059	0.062	0.061	0.063	0.066	0.074	0.079	0.077

Table A2. (continued)

	1979	1980	1981	1982	1983	1984	1985	1986
Off–Balance Sheet Activities								
Notional value to gross total assets								
Counterparty guarantees					0.243	0.264	0.269	0.256
Unused loan commitments					0.184	0.197	0.198	0.194
Net standby letters of credit³	0.018	0.022	0.030	0.038	0.043	0.051	0.057	0.051
Other counterparty guarantees					0.017	0.016	0.014	0.012
Derivatives					0.226	0.261	0.310	0.376
Loans sold					0.015	0.020	0.028	0.037
Loans purchased								
Mortgages sold with recourse								
Amount of recourse exposure								
Income Statement								
Operating income (billion)	$288	$334	$396	$388	$347	$381	$371	$354
Fraction of operating income								
Interest income	0.920	0.920	0.923	0.917	0.903	0.873	0.863	0.855
From cash & securities	0.233	0.247	0.258	0.262	0.262	0.210	0.205	0.214
From domestic loans	0.558	0.536	0.523	0.533	0.536	0.541	0.550	0.553
From foreign loans	0.130	0.138	0.143	0.122	0.105	0.122	0.108	0.089
Noninterest income	0.080	0.080	0.077	0.083	0.097	0.127	0.137	0.145
Service charges on deposits	0.017	0.017	0.016	0.018	0.023	0.024	0.027	0.029
Trading account income						0.011	0.015	0.017
Other noninterest income	0.063	0.063	0.061	0.065	0.074	0.093	0.096	0.099

	1987	1988	1989	1990	1991	1992	1993	1994
Off–Balance Sheet Activities								
Notional value to gross total assets								
Counterparty guarantees	0.263	0.266	0.264	0.383	0.396	0.410	0.438	0.487
Unused loan commitments	0.202	0.208	0.206	0.326	0.342	0.360	0.391	0.439
Net standby letters of credit[3]	0.049	0.047	0.047	0.048	0.045	0.042	0.040	0.039
Other counterparty guarantees	0.012	0.011	0.010	0.009	0.009	0.008	0.008	0.008
Derivatives	0.588	0.694	0.939	1.995	2.124	2.485	3.193	3.923
Loans sold	0.065	0.091	0.078	0.048	0.030	0.032	0.026	
Loans purchased	0.005	0.006	0.006	0.005	0.004	0.006	0.006	
Mortgages sold with recourse			0.003	0.004	0.005	0.003	0.002	0.002
Amount of recourse exposure			0.002	0.003	0.003	0.002	0.001	0.001
Income Statement								
Operating income (billion)	$359	$383	$425	$414	$371	$332	$324	$331
Fraction of operating income								
Interest income	0.832	0.830	0.817	0.709	0.686	0.643	0.614	0.741
From cash & securities	0.202	0.196	0.172	0.074	0.074	0.069	0.057	0.172
From domestic loans	0.550	0.549	0.558	0.553	0.542	0.501	0.479	0.499
From foreign loans	0.080	0.085	0.088	0.083	0.070	0.074	0.079	0.070
Noninterest income	0.168	0.170	0.183	0.291	0.314	0.357	0.386	0.259
Service charges on deposits	0.031	0.030	0.028	0.031	0.037	0.044	0.047	0.046
Trading account income	0.018	0.020	0.017	0.020	0.023	0.026	0.040	0.035
Other noninterest income	0.120	0.120	0.138	0.240	0.254	0.287	0.299	0.177

Table A2. *(continued)*

	1979	1980	1981	1982	1983	1984	1985	1986
Operating expenses (billion)	$246	$292	$356	$346	$304	$335	$318	$301
Fraction of operating expenses								
Interest expense	0.684	0.721	0.760	0.734	0.683	0.696	0.657	0.613
Domestic deposits	0.368	0.380	0.414	0.432	0.433	0.431	0.420	0.399
CDs ≥ $100,000	0.141	0.149	0.175	0.163	0.108	0.107	0.096	0.085
Nontransaction accounts	0.227	0.231	0.239	0.270	0.326	0.323	0.323	0.314
Transaction accounts								
On foreign deposits	0.191	0.210	0.210	0.182	0.138	0.148	0.127	0.106
Federal funds purchased	0.096	0.101	0.107	0.090	0.078	0.080	0.070	0.069
Other borrowed money	0.029	0.030	0.029	0.030	0.033	0.038	0.041	0.041
Noninterest expense	0.316	0.279	0.240	0.266	0.317	0.304	0.343	0.387
Salary & benefits	0.167	0.148	0.125	0.136	0.161	0.152	0.167	0.184
Fixed assets	0.049	0.044	0.039	0.043	0.053	0.049	0.056	0.062
Other noninterest expense	0.100	0.088	0.076	0.087	0.104	0.103	0.121	0.141
Net Income & Returns								
Provisions for loan & lease losses as a fraction of gross total assets	0.002	0.002	0.003	0.004	0.005	0.006	0.007	0.008
Net income before taxes (billion)	$33.1	$32.6	$29.6	$26.8	$27.3	$27.8	$31.3	$29.2
Net income (billion)	$24.6	$24.5	$23.5	$22.3	$21.5	$21.3	$23.8	$22.4
Return on gross total assets	0.008	0.008	0.008	0.007	0.006	0.006	0.007	0.006
Return on equity	0.140	0.137	0.131	0.121	0.112	0.106	0.112	0.100

	1987	1988	1989	1990	1991	1992	1993	1994
Operating expenses (billion)	$304	$321	$361	$354	$310	$261	$248	$253
Fraction of operating expenses								
Interest expense	0.599	0.620	0.655	0.639	0.573	0.482	0.431	0.435
Domestic deposits	0.370	0.379	0.395	0.396	0.387	0.303	0.240	0.231
CDs ≥ $100,000	0.081	0.088	0.097	0.087	0.070	0.045	0.031	0.031
Nontransaction accounts	0.254	0.257	0.268	0.279	0.284	0.230	0.185	0.178
Transaction accounts	0.035	0.034	0.030	0.031	0.033	0.028	0.024	0.022
On foreign deposits	0.108	0.108	0.108	0.107	0.087	0.085	0.084	0.080
Federal funds purchased	0.066	0.070	0.080	0.071	0.049	0.037	0.035	0.049
Other borrowed money	0.056	0.064	0.073	0.065	0.050	0.057	0.072	0.076
Noninterest expense	0.401	0.380	0.345	0.361	0.427	0.518	0.569	0.565
Salary & benefits	0.186	0.175	0.157	0.161	0.182	0.217	0.237	0.237
Fixed assets	0.063	0.059	0.053	0.054	0.061	0.071	0.075	0.074
Other noninterest expense	0.152	0.146	0.135	0.145	0.185	0.231	0.257	0.254
Net Income & Returns								
Provisions for loan & lease losses as a fraction of gross total assets	0.013	0.006	0.010	0.010	0.010	0.008	0.005	0.003
Net income before taxes (billion)	$10.2	$42.0	$28.9	$26.2	$27.8	$47.8	$63.4	$66.5
Net income (billion)	$3.4	$29.9	$17.9	$17.6	$19.0	$33.0	$43.6	$44.3
Return on gross total assets	0.001	0.008	0.005	0.005	0.005	0.009	0.012	0.012
Return on equity	0.015	0.134	0.078	0.076	0.080	0.132	0.157	0.150

Source: Consolidated Report of Condition and Income for Banks.
1. All financial values are expressed in 1994 dollars using the GDP implicit price deflator. All stock values represent end-of-year totals. All flow values are for the entire year. Mixed values under Net Income & Returns are flow values divided by stock values averaged over the end of the year and the end of the previous year. Missing values indicate data unavailability.
2. Gross assets include the loan & lease loss reserve.
3. Calculated as the gross volume of standby letters of credit less the portion conveyed to others through participations.

Table A3. Financial Statements for Organizations with Greater Than $100 Billion in Total Assets[1]

	1979	1980	1981	1982	1983	1984	1985	1986
Balance Sheet								
Gross total assets[2] (billion)	$522	$513	$490	$477	$466	$461	$485	$487
Fraction of gross total assets								
Cash & securities	0.322	0.298	0.256	0.224	0.217	0.194	0.224	0.225
Total loans & leases less unearned income	0.577	0.595	0.625	0.639	0.654	0.673	0.651	0.651
Domestic loans & leases	0.284	0.290	0.301	0.332	0.368	0.348	0.349	0.385
Commercial & industrial	0.117	0.113	0.114	0.126	0.135	0.107	0.087	0.093
Commercial real estate	0.029	0.035	0.041	0.043	0.048	0.053	0.058	0.066
1-4 family residential property	0.044	0.049	0.050	0.050	0.053	0.055	0.057	0.058
Loans to individuals	0.025	0.027	0.027	0.027	0.030	0.057	0.057	0.050
Credit card and related plans	0.023	0.022	0.024	0.027	0.035	0.049	0.062	0.071
Loans to depository institutions	0.012	0.013	0.013	0.025	0.028	0.000	0.001	0.003
Loans to foreign governments	0.000	0.002	0.003	0.006	0.012	0.003	0.002	0.002
Agricultural loans	0.006	0.005	0.006	0.006	0.007	0.006	0.004	0.003
Leases	0.007	0.007	0.007	0.006	0.006	0.007	0.007	0.006
Other domestic loans	0.022	0.019	0.017	0.019	0.017	0.012	0.014	0.032
Foreign loans	0.303	0.315	0.332	0.314	0.293	0.331	0.308	0.273
Unearned income on loans	0.009	0.010	0.007	0.007	0.006	0.006	0.006	0.007
Other real estate owned	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002
Assets in trading accounts	0.013	0.014	0.016	0.019	0.016	0.022	0.028	0.037
Fixed assets	0.009	0.010	0.010	0.011	0.013	0.013	0.013	0.014
Other gross assets	0.077	0.082	0.092	0.105	0.098	0.096	0.082	0.071
Total deposits	0.767	0.764	0.750	0.731	0.744	0.729	0.714	0.696
Domestic deposits	0.311	0.331	0.330	0.352	0.387	0.388	0.383	0.389
CDs ≥ $100,000	0.091	0.116	0.143	0.144	0.112	0.082	0.074	0.063
Time & savings	0.082	0.085	0.090	0.118	0.176	0.186	0.181	0.176
Demand & transaction accounts	0.138	0.130	0.097	0.090	0.099	0.106	0.112	0.128
Foreign deposits	0.455	0.433	0.419	0.380	0.357	0.342	0.332	0.307
Federal funds purchased	0.067	0.065	0.066	0.065	0.054	0.061	0.072	0.076
Other liabilities	0.127	0.132	0.143	0.161	0.156	0.158	0.162	0.174
Equity	0.039	0.040	0.042	0.043	0.047	0.051	0.052	0.055

	1987	1988	1989	1990	1991	1992	1993	1994
Balance Sheet								
Gross total assets[2] (billion)	$578	$461	$475	$457	$728	$668	$915	$1,031
Fraction of gross total assets								
Cash & securities	0.250	0.206	0.194	0.171	0.231	0.239	0.236	0.221
Total loans & leases less unearned income	0.634	0.685	0.698	0.721	0.655	0.637	0.585	0.566
Domestic loans & leases	0.396	0.425	0.447	0.462	0.464	0.456	0.396	0.387
Commercial & industrial	0.095	0.081	0.084	0.082	0.112	0.111	0.090	0.090
Commercial real estate	0.075	0.073	0.085	0.083	0.080	0.076	0.057	0.044
1-4 family residential property	0.064	0.086	0.102	0.118	0.105	0.121	0.107	0.102
Loans to individuals	0.050	0.055	0.057	0.062	0.071	0.069	0.068	0.062
Credit card and related plans	0.067	0.091	0.096	0.094	0.069	0.052	0.050	0.055
Loans to depository institutions	0.001	0.001	0.001	0.011	0.009	0.008	0.006	0.006
Loans to foreign governments	0.001	0.001	0.001	0.000	0.001	0.001	0.000	0.000
Agricultural loans	0.003	0.002	0.002	0.002	0.002	0.003	0.002	0.002
Leases	0.006	0.007	0.008	0.009	0.008	0.010	0.008	0.008
Other domestic loans	0.035	0.029	0.012	0.000	0.007	0.006	0.007	0.018
Foreign loans	0.244	0.267	0.256	0.265	0.195	0.183	0.191	0.181
Unearned income on loans	0.006	0.007	0.006	0.006	0.003	0.003	0.002	0.001
Other real estate owned	0.002	0.002	0.002	0.006	0.009	0.013	0.008	0.004
Assets in trading accounts	0.028	0.026	0.024	0.021	0.029	0.035	0.082	0.132
Fixed assets	0.014	0.014	0.015	0.017	0.016	0.016	0.016	0.015
Other gross assets	0.071	0.068	0.068	0.063	0.059	0.061	0.073	0.062
Total deposits	0.692	0.683	0.678	0.702	0.719	0.706	0.654	0.605
Domestic deposits	0.390	0.391	0.388	0.408	0.490	0.514	0.418	0.350
CDs ≥ $100,000	0.068	0.073	0.078	0.076	0.071	0.045	0.034	0.032
Time & savings	0.176	0.181	0.181	0.205	0.263	0.275	0.218	0.176
Demand & transaction accounts	0.146	0.137	0.129	0.126	0.156	0.194	0.166	0.143
Foreign deposits	0.302	0.293	0.290	0.295	0.230	0.192	0.237	0.255
Federal funds purchased	0.061	0.048	0.063	0.046	0.074	0.081	0.080	0.074
Other liabilities	0.199	0.214	0.208	0.196	0.151	0.143	0.191	0.251
Equity	0.048	0.055	0.052	0.056	0.056	0.070	0.075	0.070

Table A3. (*continued*)

	1979	1980	1981	1982	1983	1984	1985	1986
Off–Balance Sheet Activities								
Notional value to gross total assets								
Counterparty guarantees					0.457	0.472	0.461	0.429
Unused loan commitments					0.328	0.323	0.301	0.281
Net standby letters of credit[3]	0.046	0.054	0.071	0.083	0.100	0.114	0.129	0.119
Other counterparty guarantees					0.029	0.036	0.031	0.029
Derivatives					0.823	0.909	1.076	1.305
Loans sold					0.011	0.042	0.086	0.099
Loans purchased								
Mortgages sold with recourse								
Amount of recourse exposure								
Income Statement								
Operating income (billion)	$49	$58	$67	$61	$58	$57	$56	$53
Fraction of operating income								
Interest income	0.926	0.917	0.915	0.906	0.887	0.868	0.838	0.808
From cash & securities	0.210	0.202	0.198	0.183	0.154	0.136	0.132	0.135
From domestic loans	0.314	0.316	0.313	0.339	0.370	0.348	0.356	0.374
From foreign loans	0.402	0.398	0.405	0.384	0.363	0.383	0.351	0.299
Noninterest income	0.074	0.083	0.085	0.094	0.113	0.133	0.162	0.192
Service charges on deposits	0.004	0.004	0.005	0.006	0.008	0.009	0.010	0.012
Trading account income						0.023	0.032	0.032
Other noninterest income	0.070	0.079	0.080	0.089	0.105	0.101	0.120	0.149

	1987	1988	1989	1990	1991	1992	1993	1994
Off–Balance Sheet Activities								
Notional value to gross total assets								
Counterparty guarantees	0.451	0.445	0.422	0.688	0.592	0.568	0.586	0.583
Unused loan commitments	0.309	0.300	0.287	0.546	0.474	0.466	0.487	0.489
Net standby letters of credit[3]	0.115	0.120	0.111	0.118	0.098	0.085	0.084	0.079
Other counterparty guarantees	0.027	0.025	0.024	0.024	0.020	0.017	0.015	0.016
Derivatives	2.030	2.469	3.156	5.950	5.748	6.364	9.305	11.452
Loans sold	0.099	0.078	0.106	0.071	0.058	0.102	0.061	
Loans purchased	0.001	0.001	0.004	0.001	0.002	0.004	0.006	
Mortgages sold with recourse			0.012	0.018	0.017	0.009	0.006	0.004
Amount of recourse exposure			0.009	0.008	0.004	0.003	0.002	0.002
Income Statement								
Operating income (billion)	$65	$61	$67	$66	$83	$70	$90	$89
Fraction of operating income								
Interest income	0.776	0.782	0.794	0.715	0.676	0.622	0.565	0.678
From cash & securities	0.145	0.130	0.095	0.020	0.039	0.032	0.030	0.131
From domestic loans	0.373	0.351	0.365	0.378	0.422	0.375	0.309	0.328
From foreign loans	0.259	0.301	0.335	0.316	0.215	0.216	0.227	0.219
Noninterest income	0.224	0.218	0.206	0.285	0.324	0.378	0.435	0.322
Service charges on deposits	0.013	0.014	0.014	0.016	0.024	0.034	0.030	0.032
Trading account income	0.047	0.059	0.032	0.031	0.037	0.046	0.093	0.081
Other noninterest income	0.165	0.145	0.161	0.239	0.264	0.298	0.311	0.209

(continued)

Table A3. (*continued*)

	1979	1980	1981	1982	1983	1984	1985	1986
Operating expenses (billion)	$43	$52	$62	$56	$47	$51	$48	$45
Fraction of operating expenses								
Interest expense	0.774	0.801	0.826	0.783	0.729	0.725	0.678	0.615
Domestic deposits	0.172	0.185	0.215	0.233	0.232	0.216	0.202	0.185
CDs ≥ $100,000	0.068	0.102	0.137	0.133	0.076	0.060	0.051	0.040
Nontransaction accounts	0.104	0.083	0.079	0.099	0.156	0.156	0.151	0.145
Transaction accounts								
On foreign deposits	0.482	0.498	0.489	0.433	0.361	0.371	0.331	0.286
Federal funds purchased	0.078	0.074	0.075	0.062	0.056	0.058	0.054	0.055
Other borrowed money	0.042	0.044	0.047	0.056	0.080	0.079	0.092	0.088
Noninterest expense	0.226	0.199	0.174	0.217	0.271	0.275	0.322	0.385
Salary & benefits	0.124	0.107	0.092	0.108	0.137	0.132	0.148	0.179
Fixed assets	0.033	0.030	0.028	0.034	0.046	0.047	0.055	0.067
Other noninterest expense	0.068	0.062	0.055	0.074	0.087	0.096	0.118	0.139
Net Income & Returns								
Provisions for loan & lease losses as a fraction of gross total assets	0.002	0.002	0.003	0.004	0.006	0.005	0.010	0.011
Net income before taxes (billion)	$4.6	$4.6	$3.9	$3.7	$3.3	$4.2	$3.0	$3.5
Net income	$2.8	$2.8	$2.4	$2.4	$1.8	$2.5	$1.5	$1.8
Return on gross total assets	0.006	0.006	0.005	0.005	0.004	0.006	0.003	0.004
Return on equity	0.143	0.140	0.123	0.123	0.084	0.114	0.064	0.069

	1987	1988	1989	1990	1991	1992	1993	1994
Operating expenses (billion)	$55	$51	$59	$58	$71	$56	$72	$71
Fraction of operating expenses								
Interest expense	0.620	0.653	0.685	0.656	0.580	0.508	0.480	0.480
Domestic deposits	0.162	0.152	0.161	0.160	0.223	0.161	0.099	0.092
CDs ≥ $100,000	0.039	0.031	0.038	0.036	0.042	0.024	0.015	0.011
Nontransaction accounts	0.112	0.111	0.115	0.116	0.165	0.124	0.076	0.073
Transaction Accounts	0.011	0.010	0.008	0.008	0.016	0.012	0.008	0.008
On foreign deposits	0.273	0.275	0.262	0.287	0.202	0.197	0.195	0.200
Federal funds purchased	0.055	0.048	0.049	0.040	0.053	0.042	0.036	0.045
Other borrowed money	0.131	0.178	0.214	0.169	0.102	0.109	0.151	0.143
Noninterest expense	0.380	0.347	0.315	0.344	0.420	0.492	0.520	0.520
Salary & benefits	0.172	0.153	0.134	0.145	0.176	0.192	0.205	0.217
Fixed assets	0.064	0.059	0.051	0.052	0.065	0.073	0.076	0.074
Other noninterest expense	0.144	0.135	0.130	0.146	0.179	0.227	0.240	0.230
Net Income & Returns								
Provisions for loan & lease losses as a fraction of gross total assets	0.021	0.007	0.012	0.011	0.012	0.012	0.007	0.004
Net income before taxes (billion)	$−2.2	$6.9	$4.0	$2.9	$4.3	$7.6	$14.7	$15.2
Net income	$−4.0	$4.7	$1.7	$1.4	$2.5	$4.8	$9.9	$10.0
Return on gross total assets	−0.007	0.010	0.004	0.003	0.003	0.008	0.011	0.010
Return on equity	−0.136	0.198	0.071	0.059	0.061	0.119	0.157	0.142

Source: Consolidated Report of Condition and Income for Banks.
1. All financial values are expressed in 1994 dollars using the GDP implicit price deflator. All stock values represent end-of-year totals. All flow values are for the entire year. Mixed values under Net Income & Returns are flow values divided by stock values averaged over the end of the year and the end of the previous year. Missing values indicate data unavailability.
2. Gross assets include the loan & lease loss reserve.
3. Calculated as the gross volume of standby letters of credit less the portion conveyed to others through participations.

Table A4. Financial Statements for Organizations with $100 Million–$100 Billion in Total Assets[1]

	1979	1980	1981	1982	1983	1984	1985	1986
Balance sheet								
Gross total assets[2] (billion)	$2,363	$2,380	$2,388	$2,467	$2,571	$2,672	$2,832	$3,025
Fraction of gross total assets								
Cash & securities	0.392	0.400	0.381	0.377	0.377	0.331	0.336	0.342
Total loans & leases less unearned income	0.551	0.539	0.549	0.548	0.551	0.595	0.593	0.592
Domestic loans & leases	0.497	0.478	0.486	0.494	0.501	0.529	0.536	0.544
Commercial & industrial	0.165	0.166	0.178	0.189	0.186	0.186	0.181	0.181
Commercial real estate	0.067	0.065	0.066	0.067	0.071	0.080	0.086	0.097
1-4 family residential property	0.082	0.079	0.076	0.071	0.070	0.070	0.070	0.073
Loans to individuals	0.096	0.083	0.076	0.071	0.075	0.096	0.100	0.099
Credit card and related plans	0.019	0.017	0.017	0.017	0.019	0.023	0.026	0.028
Loans to depository institutions	0.016	0.018	0.021	0.024	0.025	0.006	0.005	0.005
Loans to foreign governments	0.001	0.002	0.003	0.006	0.009	0.002	0.001	0.001
Agricultural loans	0.010	0.010	0.009	0.010	0.010	0.010	0.008	0.007
Leases	0.007	0.007	0.007	0.007	0.007	0.008	0.008	0.009
Other domestic loans	0.033	0.031	0.032	0.031	0.030	0.049	0.051	0.044
Foreign loans	0.066	0.072	0.073	0.063	0.057	0.074	0.063	0.054
Unearned income on loans	0.013	0.011	0.010	0.009	0.008	0.007	0.006	0.005
Other real estate owned	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.003
Assets in trading accounts	0.005	0.004	0.005	0.008	0.007	0.011	0.014	0.012
Fixed assets	0.014	0.015	0.015	0.016	0.016	0.015	0.015	0.014
Other gross assets	0.037	0.042	0.049	0.050	0.048	0.046	0.041	0.036
Total deposits	0.795	0.786	0.770	0.766	0.774	0.771	0.765	0.768
Domestic deposits	0.674	0.662	0.642	0.652	0.665	0.666	0.670	0.682
CDs ≥ $100,000	0.139	0.149	0.159	0.160	0.134	0.126	0.121	0.111
Time & savings	0.262	0.265	0.279	0.310	0.353	0.320	0.326	0.330
Demand & transaction accounts	0.274	0.249	0.205	0.181	0.178	0.176	0.175	0.182
Foreign deposits	0.121	0.124	0.127	0.114	0.109	0.106	0.095	0.085
Federal funds purchased	0.075	0.083	0.094	0.095	0.089	0.086	0.091	0.094
Other liabilities	0.073	0.074	0.080	0.083	0.079	0.084	0.085	0.079
Equity	0.057	0.057	0.057	0.057	0.058	0.059	0.060	0.060

	1987	1988	1989	1990	1991	1992	1993	1994
Balance Sheet								
Gross total assets[2] (billion)	$2,934	$3,072	$3,099	$3,059	$2,700	$2,742	$2,628	$2,747
Fraction of gross total assets								
Cash & securities	0.334	0.325	0.321	0.319	0.343	0.360	0.359	0.339
Total loans & leases less unearned income	0.603	0.606	0.610	0.605	0.578	0.561	0.572	0.588
Domestic loans & leases	0.561	0.567	0.575	0.572	0.553	0.532	0.557	0.572
Commercial & industrial	0.176	0.175	0.170	0.163	0.142	0.132	0.131	0.133
Commercial real estate	0.111	0.117	0.121	0.122	0.121	0.113	0.114	0.115
1-4 family residential property	0.087	0.093	0.102	0.113	0.126	0.130	0.145	0.152
Loans to individuals	0.099	0.097	0.095	0.092	0.088	0.088	0.093	0.100
Credit card and related plans	0.031	0.032	0.034	0.034	0.036	0.039	0.042	0.047
Loans to depository institutions	0.004	0.003	0.003	0.003	0.002	0.002	0.001	0.001
Loans to foreign governments	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000
Agricultural loans	0.006	0.006	0.006	0.006	0.007	0.007	0.008	0.008
Leases	0.010	0.011	0.011	0.011	0.011	0.009	0.010	0.012
Other domestic loans	0.037	0.034	0.033	0.028	0.020	0.013	0.012	0.006
Foreign loans	0.047	0.043	0.039	0.036	0.029	0.031	0.017	0.017
Unearned income on loans	0.005	0.004	0.004	0.003	0.003	0.002	0.002	0.001
Other real estate owned	0.003	0.004	0.004	0.006	0.008	0.006	0.004	0.002
Assets in trading accounts	0.008	0.010	0.012	0.014	0.018	0.022	0.019	0.021
Fixed assets	0.015	0.014	0.014	0.015	0.015	0.014	0.014	0.014
Other gross assets	0.037	0.041	0.038	0.041	0.038	0.036	0.033	0.035
Total deposits	0.767	0.766	0.761	0.768	0.773	0.758	0.746	0.731
Domestic deposits	0.680	0.685	0.688	0.705	0.714	0.696	0.700	0.670
CDs ≥ $100,000	0.124	0.127	0.126	0.114	0.090	0.065	0.058	0.060
Time & savings	0.336	0.343	0.356	0.385	0.412	0.398	0.397	0.380
Demand & transaction accounts	0.220	0.215	0.207	0.207	0.212	0.233	0.246	0.231
Foreign deposits	0.087	0.081	0.072	0.063	0.059	0.062	0.046	0.061
Federal funds purchased	0.089	0.085	0.093	0.082	0.071	0.075	0.077	0.084
Other liabilities	0.085	0.089	0.087	0.088	0.090	0.094	0.098	0.108
Equity	0.058	0.060	0.060	0.062	0.067	0.073	0.078	0.077

(continued)

Table A4. (*continued*)

	1979	1980	1981	1982	1983	1984	1985	1986
Off–Balance Sheet Activities								
Notional value to gross total assets								
Counterparty guarantees					0.237	0.261	0.266	0.254
Unused loan commitments					0.182	0.199	0.203	0.198
Net standby letters of credit[3]	0.014	0.019	0.026	0.035	0.038	0.047	0.051	0.045
Other counterparty guarantees					0.016	0.014	0.012	0.010
Derivatives					0.149	0.184	0.216	0.267
Loans sold					0.013	0.018	0.020	0.030
Loans purchased								
Mortgages sold with recourse								
Amount of recourse exposure								
Income Statement								
Operating income (billion)	$207	$240	$287	$283	$256	$286	$279	$269
Fraction of operating income								
Interest income	0.917	0.919	0.923	0.915	0.900	0.868	0.861	0.857
From cash & securities	0.231	0.249	0.260	0.265	0.270	0.210	0.205	0.216
From domestic loans	0.600	0.574	0.560	0.565	0.563	0.572	0.583	0.584
From foreign loans	0.085	0.096	0.102	0.085	0.067	0.086	0.073	0.058
Noninterest income	0.083	0.081	0.078	0.085	0.100	0.132	0.139	0.143
Service charges on deposits	0.018	0.018	0.016	0.019	0.024	0.025	0.028	0.031
Trading account income						0.010	0.014	0.016
Other noninterest income	0.066	0.064	0.061	0.067	0.075	0.097	0.097	0.095

	1987	1988	1989	1990	1991	1992	1993	1994
Off–Balance Sheet Activities								
Notional value to gross total assets								
Counterparty guarantees	0.251	0.263	0.261	0.368	0.377	0.403	0.420	0.482
Unused loan commitments	0.200	0.212	0.210	0.319	0.335	0.361	0.386	0.449
Net standby letters of credit[3]	0.041	0.041	0.042	0.042	0.035	0.035	0.028	0.027
Other counterparty guarantees	0.010	0.010	0.009	0.008	0.007	0.007	0.006	0.006
Derivatives	0.366	0.495	0.687	1.590	1.367	1.786	1.381	1.450
Loans sold	0.065	0.101	0.080	0.049	0.026	0.018	0.015	
Loans purchased	0.006	0.007	0.006	0.006	0.004	0.007	0.007	
Mortgages sold with recourse			0.002	0.003	0.003	0.002	0.001	0.001
Amount of recourse exposure			0.001	0.003	0.002	0.002	0.001	0.001
Income Statement								
Operating income (billion)	$266	$294	$329	$321	$261	$239	$213	$222
Fraction of operating income								
Interest income	0.839	0.834	0.816	0.692	0.668	0.626	0.611	0.756
From cash & securities	0.205	0.199	0.176	0.065	0.062	0.058	0.048	0.182
From domestic loans	0.589	0.586	0.595	0.586	0.575	0.530	0.539	0.558
From foreign loans	0.045	0.049	0.045	0.042	0.031	0.039	0.023	0.016
Noninterest income	0.161	0.166	0.185	0.308	0.332	0.374	0.389	0.244
Service charges on deposits	0.033	0.032	0.030	0.033	0.040	0.046	0.053	0.051
Trading account income	0.012	0.014	0.016	0.019	0.021	0.023	0.022	0.020
Other noninterest income	0.115	0.120	0.139	0.257	0.271	0.306	0.315	0.173

Table A4. (*continued*)

	1979	1980	1981	1982	1983	1984	1985	1986
Operating expenses (billion)	$178	$211	$258	$254	$224	$251	$239	$229
Fraction of operating expenses								
Interest expense	0.677	0.714	0.754	0.729	0.677	0.694	0.654	0.614
Domestic deposits	0.387	0.395	0.426	0.441	0.444	0.443	0.436	0.417
CDs ≥ $100,000	0.167	0.167	0.193	0.177	0.118	0.118	0.105	0.093
Nontransaction accounts	0.221	0.227	0.234	0.265	0.326	0.325	0.331	0.323
Transaction accounts								
On foreign deposits	0.148	0.169	0.172	0.153	0.112	0.123	0.102	0.083
Federal funds purchased	0.113	0.120	0.128	0.107	0.093	0.094	0.081	0.079
Other borrowed money	0.028	0.029	0.028	0.028	0.028	0.034	0.036	0.036
Noninterest expense	0.323	0.286	0.246	0.271	0.324	0.306	0.346	0.386
Salary & benefits	0.170	0.151	0.128	0.139	0.164	0.154	0.169	0.184
Fixed assets	0.051	0.046	0.040	0.045	0.055	0.049	0.056	0.061
Other noninterest expense	0.102	0.089	0.078	0.088	0.105	0.103	0.121	0.141
Net Income & Returns								
Provisions for loan & lease losses as a fraction of gross total assets	0.002	0.003	0.003	0.004	0.004	0.006	0.006	0.007
Net income before taxes (billion)	$23.1	$22.4	$20.5	$18.4	$20.1	$20.6	$25.7	$23.9
Net income (billion)	$17.6	$17.4	$17.0	$16.1	$16.6	$16.3	$20.3	$19.3
Return on gross total assets	0.008	0.008	0.007	0.007	0.007	0.006	0.008	0.007
Return on equity	0.139	0.136	0.132	0.121	0.118	0.109	0.127	0.113

	1987	1988	1989	1990	1991	1992	1993	1994
Operating expenses (billion)	$224	$246	$278	$272	$217	$187	$161	$167
Fraction of operating expenses								
Interest expense	0.595	0.615	0.652	0.638	0.570	0.473	0.409	0.417
Domestic deposits	0.399	0.406	0.425	0.429	0.422	0.327	0.285	0.274
CDs ≥ $100,000	0.092	0.100	0.110	0.097	0.078	0.050	0.037	0.037
Nontransaction accounts	0.271	0.271	0.284	0.299	0.308	0.248	0.220	0.211
Transaction accounts	0.037	0.036	0.032	0.032	0.036	0.029	0.028	0.025
On foreign deposits	0.079	0.083	0.085	0.078	0.058	0.060	0.043	0.036
Federal funds purchased	0.075	0.081	0.093	0.084	0.053	0.039	0.037	0.055
Other borrowed money	0.042	0.045	0.049	0.048	0.038	0.047	0.044	0.053
Noninterest expense	0.405	0.385	0.348	0.362	0.430	0.527	0.591	0.583
Salary & benefits	0.188	0.177	0.159	0.162	0.182	0.222	0.247	0.242
Fixed assets	0.063	0.059	0.053	0.055	0.060	0.070	0.075	0.074
Other noninterest expense	0.154	0.149	0.136	0.145	0.189	0.235	0.269	0.267
Net Income & Returns								
Provisions for loan & lease losses as a fraction of gross total assets	0.012	0.005	0.010	0.010	0.010	0.007	0.004	0.003
Net income before taxes (billion)	$10.3	$32.6	$22.1	$20.7	$20.6	$36.4	$44.7	$47.7
Net income (billion)	$6.0	$23.5	$14.2	$14.4	$14.5	$25.6	$30.9	$31.7
Return on gross total assets	0.002	0.008	0.005	0.005	0.006	0.010	0.012	0.012
Return on equity	0.036	0.135	0.079	0.080	0.085	0.138	0.162	0.157

Source: Consolidated Report of Condition and Income for Banks.
1. All financial values are expressed in 1994 dollars using the GDP implicit price deflator. All stock values represent end-of-year totals. All flow values are for the entire year. Mixed values under Net Income & Returns are flow values divided by stock values averaged over the end of the year and the end of the previous year. Missing values indicate data unavailability.
2. Gross assets include the loan & lease loss reserve.
3. Calculated as the gross volume of standby letters of credit less the portion conveyed to others through participations.

Table A5. Financial Statements for Organizations with Less Than $100 Million in Total Assets[1]

	1979	1980	1981	1982	1983	1984	1985	1986
Balance Sheet								
Gross total assets[2] (billion)	$375	$374	$372	$366	$361	$349	$342	$325
Fraction of gross total assets								
Cash & securities	0.415	0.446	0.458	0.461	0.460	0.439	0.445	0.461
Total loans & leases less unearned income	0.554	0.519	0.503	0.497	0.496	0.516	0.510	0.494
Domestic loans & leases	0.573	0.537	0.519	0.511	0.508	0.527	0.519	0.501
Commercial & industrial	0.107	0.109	0.115	0.119	0.118	0.122	0.120	0.114
Commercial real estate	0.083	0.077	0.072	0.069	0.074	0.079	0.086	0.093
1-4 family residential property	0.122	0.116	0.109	0.102	0.103	0.105	0.109	0.112
Loans to individuals	0.161	0.140	0.129	0.122	0.120	0.121	0.118	0.108
Credit card and related plans	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Loans to depository institutions	0.002	0.003	0.007	0.010	0.006	0.002	0.001	0.001
Loans to foreign governments								
Agricultural loans	0.086	0.079	0.075	0.075	0.076	0.075	0.065	0.058
Leases	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Other domestic loans	0.011	0.011	0.011	0.010	0.010	0.020	0.018	0.014
Foreign loans			0.000	0.000	0.000	0.000	0.000	0.000
Unearned income on loans	0.019	0.017	0.016	0.014	0.012	0.011	0.009	0.007
Other real estate owned	0.001	0.002	0.002	0.003	0.003	0.004	0.005	0.007
Assets in trading accounts						0.000	0.001	0.001
Fixed assets	0.018	0.019	0.019	0.019	0.019	0.019	0.018	0.018
Other gross assets	0.012	0.015	0.018	0.020	0.022	0.022	0.021	0.019
Total deposits	0.887	0.884	0.875	0.877	0.881	0.880	0.884	0.886
Domestic deposits	0.887	0.884	0.875	0.877	0.881	0.880	0.883	0.886
CDs ≥ $100,000	0.084	0.091	0.099	0.103	0.095	0.105	0.108	0.101
Time & savings	0.518	0.534	0.571	0.593	0.625	0.540	0.543	0.537
Demand & transaction accounts	0.285	0.258	0.205	0.180	0.161	0.151	0.143	0.143
Foreign deposits					0.000	0.000	0.000	0.000
Federal funds purchased	0.006	0.007	0.013	0.011	0.008	0.007	0.005	0.005
Other liabilities	0.021	0.022	0.024	0.023	0.022	0.024	0.023	0.021
Equity	0.085	0.087	0.088	0.089	0.089	0.089	0.089	0.087

	1987	1988	1989	1990	1991	1992	1993	1994
Balance Sheet								
Gross total assets[2] (billion)	$312	$301	$291	$285	$279			
$271	$260	$246						
Fraction of gross total assets								
Cash & securities	0.455	0.448	0.444	0.445	0.450	0.455	0.446	0.418
Total loans & leases less unearned income	0.501	0.508	0.513	0.513	0.508	0.506	0.517	0.543
Domestic loans & leases	0.507	0.514	0.518	0.518	0.513	0.509	0.520	0.546
Commercial & industrial	0.109	0.106	0.103	0.098	0.092	0.087	0.086	0.089
Commercial real estate	0.102	0.107	0.111	0.114	0.120	0.127	0.134	0.144
1-4 family residential property	0.123	0.129	0.135	0.139	0.144	0.148	0.151	0.157
Loans to individuals	0.099	0.097	0.096	0.092	0.085	0.079	0.077	0.080
Credit card and related plans	0.003	0.003	0.003	0.004	0.004	0.003	0.004	0.004
Loans to depository institutions	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Loans to foreign governments								
Agricultural loans	0.055	0.055	0.056	0.057	0.058	0.056	0.059	0.062
Leases	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002
Other domestic loans	0.015	0.015	0.012	0.013	0.009	0.008	0.007	0.007
Foreign loans	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Unearned income on loans	0.006	0.005	0.005	0.005	0.004	0.004	0.003	0.003
Other real estate owned	0.008	0.008	0.007	0.007	0.007	0.006	0.004	0.003
Assets in trading accounts	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000
Fixed assets	0.018	0.017	0.017	0.017	0.017	0.016	0.017	0.017
Other gross assets	0.018	0.018	0.019	0.018	0.018	0.016	0.016	0.019
Total deposits	0.885	0.884	0.882	0.882	0.881	0.879	0.872	0.866
Domestic deposits	0.885	0.883	0.882	0.882	0.880	0.879	0.872	0.866
CDs ≥ $100,000	0.102	0.104	0.106	0.103	0.091	0.078	0.075	0.081
Time & savings	0.533	0.533	0.537	0.544	0.549	0.537	0.525	0.513
Demand & transaction accounts	0.249	0.246	0.239	0.235	0.241	0.263	0.271	0.272
Foreign deposits	0.001	0.000	0.001	0.001	0.000	0.000	0.000	0.000
Federal funds purchased	0.005	0.006	0.005	0.005	0.007	0.006	0.008	0.012
Other liabilities	0.021	0.021	0.022	0.022	0.021	0.021	0.022	0.024
Equity	0.088	0.090	0.091	0.091	0.092	0.094	0.098	0.099

(continued)

Table A5. *(continued)*

	1979	1980	1981	1982	1983	1984	1985	1986
Off–Balance Sheet Activities								
Notional value to gross total assets								
Counterparty guarantees								
Unused loan commitments					0.014	0.017	0.018	0.020
Net standby letters of credit[3]	0.000	0.000	0.000	0.000	0.011	0.014	0.016	0.018
Other counterparty guarantees					0.000	0.001	0.000	0.000
Derivatives					0.004	0.002	0.002	0.002
Loans sold					0.001	0.000	0.000	0.001
Loans purchased					0.031	0.008	0.007	0.006
Mortgages sold with recourse								
Amount of recourse exposure								
Income Statement								
Operating income (billion)	$32	$36	$43	$43	$38	$39	$36	$31
Fraction of operating income								
Interest income	0.934	0.938	0.940	0.949	0.944	0.918	0.917	0.915
From cash & securities	0.277	0.307	0.336	0.352	0.360	0.324	0.318	0.325
From domestic loans	0.657	0.631	0.604	0.597	0.584	0.594	0.598	0.590
From foreign loans					0.000	0.000	0.000	0.001
Noninterest income	0.066	0.062	0.060	0.051	0.056	0.082	0.083	0.085
Service charges on deposits	0.031	0.031	0.030	0.029	0.032	0.035	0.038	0.041
Trading account income					0.000	0.000	0.000	0.001
Other noninterest income	0.035	0.031	0.030	0.023	0.024	0.047	0.046	0.044

	1987	1988	1989	1990	1991	1992	1993	1994
Off–Balance Sheet Activities								
Notional value to gross total assets								
Counterparty guarantees	0.025	0.030	0.032	0.050	0.075	0.095	0.111	0.132
Unused loan commitments	0.023	0.027	0.031	0.045	0.070	0.092	0.107	0.128
Net standby letters of credit[3]	0.000	0.000	0.000	0.003	0.003	0.003	0.003	0.003
Other counterparty guarantees	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001
Derivatives	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.002
Loans sold	0.006	0.006	0.005	0.005	0.005	0.006	0.006	
Loans purchased	0.004	0.004	0.004	0.003	0.003	0.003	0.003	
Mortgages sold with recourse			0.000	0.000	0.000	0.000	0.000	0.000
Amount of recourse exposure			0.000	0.000	0.000	0.000	0.000	0.000
Income Statement								
Operating income (billion)	$28	$28	$29	$28	$26	$23	$20	$19
Fraction of operating income								
Interest income	0.891	0.888	0.894	0.899	0.894	0.887	0.869	0.859
From cash & securities	0.308	0.301	0.303	0.308	0.302	0.296	0.274	0.250
From domestic loans	0.583	0.587	0.591	0.591	0.592	0.591	0.595	0.609
From foreign loans	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Noninterest income	0.109	0.112	0.106	0.102	0.106	0.113	0.131	0.141
Service charges on deposits	0.044	0.045	0.043	0.044	0.048	0.054	0.059	0.058
Trading account income	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000
Other noninterest income	0.064	0.067	0.063	0.057	0.058	0.059	0.072	0.083

Table A5. (continued)

	1979	1980	1981	1982	1983	1984	1985	1986
Operating expenses (billion)	$25	$30	$36	$37	$33	$33	$31	$27
Fraction of operating expenses								
Interest expense	0.583	0.631	0.688	0.692	0.660	0.674	0.643	0.610
Domestic deposits	0.566	0.617	0.670	0.675	0.651	0.663	0.634	0.602
CDs ≥ $100,000	0.088	0.101	0.116	0.112	0.084	0.095	0.095	0.088
Nontransaction accounts	0.478	0.516	0.553	0.562	0.567	0.568	0.539	0.513
Transaction accounts								
On foreign deposits	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Federal funds purchased	0.010	0.009	0.013	0.014	0.007	0.007	0.005	0.005
Other borrowed money	0.007	0.006	0.005	0.004	0.003	0.004	0.003	0.003
Noninterest expense	0.417	0.369	0.312	0.308	0.340	0.326	0.358	0.390
Salary & benefits	0.220	0.194	0.162	0.157	0.172	0.165	0.177	0.189
Fixed assets	0.059	0.054	0.047	0.047	0.053	0.050	0.056	0.061
Other noninterest expense	0.138	0.122	0.103	0.104	0.115	0.111	0.125	0.140
Net Income & Returns								
Provisions for loan & lease losses as a fraction of gross total assets	0.002	0.002	0.003	0.004	0.005	0.006	0.008	0.009
Net income before taxes (billion)	$5.4	$5.6	$5.2	$4.6	$3.9	$3.1	$2.6	$1.8
Net income (billion)	$4.2	$4.3	$4.1	$3.7	$3.1	$2.5	$2.0	$1.3
Return on gross total assets	0.010	0.011	0.011	0.010	0.009	0.006	0.005	0.004
Return on equity	0.140	0.140	0.133	0.121	0.103	0.084	0.069	0.048

	1987	1988	1989	1990	1991	1992	1993	1994
Operating expenses (billion)	$24	$24	$25	$24	$22	$18	$16	$15
Fraction of operating expenses								
Interest expense	0.580	0.590	0.615	0.611	0.578	0.494	0.430	0.425
Domestic deposits	0.572	0.582	0.606	0.604	0.571	0.488	0.423	0.413
CDs ≥ $100,000	0.079	0.085	0.095	0.091	0.077	0.057	0.046	0.048
Nontransaction accounts	0.425	0.428	0.447	0.450	0.429	0.372	0.323	0.311
Transaction accounts	0.068	0.070	0.065	0.064	0.066	0.059	0.054	0.053
On foreign deposits	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Federal funds purchased	0.005	0.005	0.006	0.004	0.004	0.003	0.003	0.006
Other borrowed money	0.003	0.003	0.003	0.002	0.002	0.003	0.004	0.006
Noninterest expense	0.420	0.410	0.385	0.389	0.422	0.506	0.570	0.575
Salary & benefits	0.203	0.200	0.189	0.190	0.202	0.242	0.275	0.280
Fixed assets	0.064	0.062	0.057	0.056	0.059	0.068	0.075	0.076
Other noninterest expense	0.153	0.149	0.139	0.143	0.162	0.196	0.220	0.220
Net Income & Returns								
Provisions for loan & lease losses as a fraction of gross total assets	0.007	0.005	0.005	0.004	0.004	0.003	0.002	0.002
Net income before taxes (billion)	$2.1	$2.5	$2.8	$2.6	$2.9	$3.8	$4.0	$3.7
Net income (billion)	$1.4	$1.7	$1.9	$1.7	$2.0	$2.6	$2.8	$2.6
Return on gross total assets	0.004	0.006	0.007	0.006	0.007	0.010	0.011	0.011
Return on equity	0.052	0.066	0.076	0.069	0.079	0.108	0.114	0.110

Table A6. Proportions of U.S. Gross Domestic Assets to Which Organizations in Each State Had Access[1]

	1979	1980	1981	1982	1983	1984	1985	1986
Gross Domestic Assets of the United States (billion)	$2,700	$2,700	$2,695	$2,819	$2,942	$2,984	$3,162	$3,353
Change to boldface indicates first removal of interstate barriers								
Alabama	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011
Alaska	0.001	0.001	0.001	**0.180**	**0.173**	**0.170**	**0.175**	**0.211**
Arizona	0.009	0.009	0.009	0.009	0.009	0.010	0.010	**0.075**
Arkansas	0.007	0.007	0.007	0.007	0.007	0.008	0.007	0.007
California	0.115	0.115	0.119	0.116	0.113	0.104	0.102	0.098
Colorado	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.010
Connecticut	0.009	0.009	0.009	0.009	**0.030**	**0.039**	**0.043**	**0.050**
Delaware	0.002	0.002	0.003	0.004	0.006	0.009	0.012	0.013
District of Columbia	0.005	0.005	0.005	0.005	0.005	0.005	**0.094**	**0.413**
Florida	0.030	0.031	0.031	0.032	0.034	0.036	**0.115**	**0.139**
Georgia	0.016	0.015	0.015	0.016	0.017	0.018	**0.110**	**0.122**
Hawaii	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.004
Idaho	0.003	0.003	0.003	0.003	0.003	0.003	**0.010**	**0.018**
Illinois	0.076	0.073	0.074	0.070	0.068	0.062	0.059	**0.119**
Indiana	0.022	0.021	0.020	0.019	0.020	0.020	0.019	**0.153**
Iowa	0.014	0.014	0.014	0.014	0.013	0.013	0.012	0.012
Kansas	0.011	0.011	0.011	0.011	0.010	0.011	0.010	0.010
Kentucky	0.013	0.013	0.013	0.013	0.013	0.013	**0.080**	**0.352**
Louisiana	0.016	0.016	0.017	0.017	0.016	0.016	0.016	0.014
Maine	0.002	0.002	0.002	**0.180**	**0.173**	**0.202**	**0.208**	**0.243**
Maryland	0.011	0.011	0.010	0.010	0.011	0.013	**0.037**	**0.040**
Massachusetts	0.019	0.019	0.019	0.020	**0.030**	**0.039**	**0.043**	**0.050**
Michigan	0.035	0.034	0.032	0.030	0.031	0.030	0.030	**0.141**
Minnesota	0.020	0.020	0.019	0.020	0.021	0.021	0.021	0.021
Mississippi	0.008	0.008	0.008	0.007	0.007	0.007	0.007	0.007

	1987	1988	1989	1990	1991	1992	1993	1994
Gross Domestic Assets of the United States (billion)	$3,291	$3,355	$3,408	$3,377	$3,298	$3,298	$3,367	$3,491
Change to boldface indicates first removal of interstate barriers								
Alabama	0.177	0.250	0.260	0.260	0.258	0.265	0.270	0.280
Alaska	0.377	0.454	0.495	0.590	0.711	0.723	0.720	0.781
Arizona	0.433	0.520	0.563	0.658	0.771	0.784	0.780	0.842
Arkansas	0.007	0.007	0.222	0.222	0.220	0.234	0.236	0.244
California	0.184	0.181	0.190	0.192	0.724	0.737	0.734	0.795
Colorado	0.009	0.034	0.036	0.045	0.743	0.766	0.765	0.806
Connecticut	0.058	0.065	0.062	0.532	0.725	0.737	0.734	0.795
Delaware	0.017	0.160	0.166	0.522	0.743	0.754	0.750	0.820
District of Columbia	0.558	0.591	0.643	0.682	0.888	0.906	0.907	0.927
Florida	0.188	0.192	0.197	0.208	0.207	0.213	0.217	0.231
Georgia	0.177	0.181	0.188	0.197	0.195	0.202	0.206	0.218
Hawaii	0.004	0.004	0.005	0.005	0.006	0.006	0.006	0.005
Idaho	0.019	0.467	0.526	0.622	0.743	0.756	0.756	0.797
Illinois	0.137	0.137	0.137	0.138	0.772	0.766	0.763	0.823
Indiana	0.188	0.190	0.190	0.191	0.212	0.773	0.770	0.811
Iowa	0.012	0.011	0.011	0.011	0.133	0.135	0.135	0.133
Kansas	0.010	0.009	0.009	0.010	0.010	0.065	0.065	0.064
Kentucky	0.452	0.496	0.547	0.640	0.787	0.780	0.776	0.814
Louisiana	0.260	0.259	0.595	0.690	0.896	0.913	0.915	0.934
Maine	0.339	0.418	0.466	0.532	0.725	0.737	0.734	0.795
Maryland	0.216	0.257	0.273	0.277	0.275	0.284	0.290	0.298
Massachusetts	0.058	0.065	0.062	0.054	0.725	0.737	0.734	0.795
Michigan	0.159	0.161	0.506	0.597	0.761	0.773	0.770	0.811
Minnesota	0.036	0.034	0.037	0.045	0.086	0.119	0.122	0.800
Mississippi	0.007	0.048	0.054	0.236	0.236	0.244	0.250	0.253

(continued)

Table A6. (*continued*)

	1979	1980	1981	1982	1983	1984	1985	1986
Missouri	0.023	0.023	0.023	0.022	0.021	0.021	0.021	**0.049**
Montana	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Nebraska	0.008	0.008	0.008	0.007	0.007	0.007	0.007	0.006
Nevada	0.003	0.002	0.002	0.002	0.002	0.003	**0.012**	**0.031**
New Hampshire	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003
New Jersey	0.024	0.023	0.023	0.022	0.023	0.024	0.025	**0.120**
New Mexico	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
New York	0.171	0.175	0.164	**0.180**	**0.173**	**0.166**	**0.167**	**0.186**
North Carolina	0.015	0.015	0.016	0.016	0.017	0.018	**0.115**	**0.128**
North Dakota	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Ohio	0.037	0.036	0.035	0.034	0.033	0.033	**0.047**	**0.181**
Oklahoma	0.014	0.015	0.017	0.016	0.015	0.015	0.014	0.011
Oregon	0.009	0.008	0.008	0.008	0.008	0.008	0.007	**0.031**
Pennsylvania	0.056	0.053	0.053	0.053	0.052	0.054	0.054	**0.120**
Rhode Island	0.004	0.004	0.005	0.004	0.005	**0.039**	**0.043**	**0.050**
South Carolina	0.005	0.005	0.005	0.006	0.006	0.006	0.006	**0.128**
South Dakota	0.003	0.003	0.005	0.005	0.005	0.006	0.007	0.007
Tennessee	0.016	0.016	0.016	0.015	0.015	0.015	**0.122**	**0.156**
Texas	0.068	0.073	0.080	0.082	0.085	0.088	0.085	0.079
Utah	0.005	0.004	0.004	0.004	0.004	0.007	**0.012**	**0.031**
Vermont	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Virginia	0.016	0.016	0.016	0.016	0.016	0.017	**0.141**	**0.156**
Washington	0.014	0.014	0.014	0.013	0.013	0.013	0.013	0.012
West Virginia	0.007	0.007	0.007	0.006	0.006	0.006	0.006	0.006
Wisconsin	0.018	0.017	0.017	0.016	0.016	0.016	0.016	0.016
Wyoming	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Asset weighted average for the U.S.	0.065	0.067	0.065	0.069	0.066	0.063	0.075	0.108

	1987	1988	1989	1990	1991	1992	1993	1994
Missouri	0.060	0.059	0.065	0.074	0.087	0.099	0.098	0.098
Montana	0.003	0.003	0.002	0.002	0.002	0.002	0.037	0.035
Nebraska	0.006	0.006	0.006	0.057	0.776	0.799	0.795	0.836
Nevada	0.032	0.032	0.509	0.603	0.725	0.737	0.734	0.795
New Hampshire	0.058	0.065	0.062	0.532	0.725	0.737	0.734	0.795
New Jersey	0.124	0.436	0.491	0.503	0.725	0.737	0.734	0.777
New Mexico	0.004	0.004	0.518	0.612	0.725	0.737	0.734	0.795
New York	0.272	0.324	0.412	0.503	0.725	0.737	0.734	0.795
North Carolina	0.177	0.181	0.253	0.260	0.258	0.265	0.270	0.934
North Dakota	0.003	0.003	0.002	0.003	0.725	0.737	0.734	0.795
Ohio	0.203	0.321	0.526	0.538	0.761	0.754	0.751	0.811
Oklahoma	0.318	0.403	0.448	0.540	0.754	0.776	0.772	0.833
Oregon	0.123	0.125	0.509	0.603	0.725	0.737	0.734	0.795
Pennsylvania	0.141	0.166	0.172	0.522	0.743	0.754	0.750	0.820
Rhode Island	0.058	0.381	0.466	0.532	0.725	0.737	0.734	0.795
South Carolina	0.177	0.181	0.195	0.204	0.203	0.209	0.214	0.226
South Dakota	0.008	0.324	0.412	0.503	0.725	0.737	0.734	0.795
Tennessee	0.208	0.241	0.254	0.259	0.936	0.935	0.935	0.956
Texas	0.389	0.480	0.553	0.656	0.779	0.794	0.795	0.825
Utah	0.044	0.476	0.518	0.612	0.725	0.737	0.734	0.795
Vermont	0.002	0.065	0.062	0.532	0.725	0.737	0.734	0.795
Virginia	0.191	0.195	0.208	0.218	0.217	0.223	0.228	0.934
Washington	0.135	0.324	0.412	0.503	0.725	0.737	0.734	0.795
West Virginia	0.006	0.324	0.412	0.503	0.725	0.737	0.734	0.795
Wisconsin	0.179	0.179	0.178	0.180	0.194	0.195	0.197	0.198
Wyoming	0.294	0.375	0.438	0.537	0.640	0.756	0.756	0.797
Asset weighted average for the U.S.	0.186	0.231	0.290	0.360	0.595	0.611	0.610	0.694

Source: Amel (1993), Swamy and others (1995), and Consolidated Report of Condition and Income for Banks.
1. Proportions are the gross domestic assets of the home state plus the gross domestic assets of all the states to which a multibank holding company in the state had legal access divided by the gross domestic assets of the nation. Financial values are expressed in 1994 dollars using the GDP implicit price deflator.

Table A7. Proportions of State Gross Domestic Assets Controlled by Out-of-State MBHCs[1]

	1979	1980	1981	1982	1983	1984	1985	1986
Gross Domestic Assets of the United States (billion)	$2,700	$2,700	$2,695	$2,819	$2,942	$2,954	$3,162	$3,353
Change to boldface indicates first removal of interstate barriers								
Alabama	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Alaska	0.000	0.000	0.000	**0.000**	**0.019**	**0.019**	**0.132**	**0.148**
Arizona	0.261	0.276	0.280	0.271	0.256	0.265	0.248	**0.465**
Arkansas	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
California	0.000	0.004	0.004	0.004	0.004	0.004	0.007	0.007
Colorado	0.037	0.035	0.035	0.033	0.131	0.113	0.105	0.103
Connecticut	0.000	0.000	0.000	0.000	**0.000**	**0.000**	**0.351**	**0.420**
Delaware	0.000	0.000	0.192	0.483	0.612	0.665	0.719	0.660
District of Columbia	0.000	0.000	0.000	0.096	0.082	0.092	**0.180**	**0.250**
Florida	0.000	0.000	0.000	0.047	0.045	0.065	**0.307**	**0.332**
Georgia	0.000	0.000	0.000	0.000	0.000	0.000	**0.165**	**0.278**
Hawaii	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Idaho	0.391	0.380	0.390	0.383	0.388	0.379	**0.362**	**0.369**
Illinois	0.005	0.005	0.005	0.006	0.007	0.062	0.067	**0.076**
Indiana	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.133**
Iowa	0.077	0.083	0.080	0.080	0.079	0.082	0.081	0.081
Kansas	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Kentucky	0.000	0.000	0.000	0.000	0.000	0.000	**0.004**	**0.047**
Louisiana	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Maine	0.000	0.000	0.000	**0.000**	**0.134**	**0.534**	**0.705**	**0.863**
Maryland	0.023	0.021	0.021	0.019	0.157	0.159	**0.262**	**0.374**
Massachusetts	0.000	0.000	0.000	0.000	**0.000**	**0.000**	**0.018**	**0.030**
Michigan	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.007**
Minnesota	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mississippi	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

	1987	1988	1989	1990	1991	1992	1993	1994
Gross Domestic Assets of the United States (billion)	$3,291	$3,355	$3,408	$3,377	$3,298	$3,298	$3,367	$3,491
Change to boldface indicates first removal of interstate barriers								
Alabama	0.000	0.001	0.003	0.004	0.004	0.026	0.036	0.038
Alaska	0.143	0.178	0.213	0.224	0.226	0.211	0.220	0.214
Arizona	0.586	0.584	0.602	0.680	0.683	0.648	0.877	0.909
Arkansas	0.000	0.000	0.000	0.021	0.020	0.021	0.019	0.027
California	0.045	0.003	0.002	0.002	0.007	0.010	0.012	0.017
Colorado	0.107	0.182	0.176	0.153	0.363	0.439	0.593	0.583
Connecticut	0.404	0.384	0.371	0.339	0.402	0.388	0.399	0.356
Delaware	0.652	0.581	0.644	0.648	0.548	0.549	0.540	0.514
District of Columbia	0.526	0.564	0.581	0.629	0.640	0.641	0.625	0.479
Florida	0.337	0.356	0.368	0.427	0.509	0.512	0.522	0.541
Georgia	0.253	0.249	0.251	0.241	0.402	0.415	0.442	0.452
Hawaii	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Idaho	0.359	0.436	0.464	0.493	0.515	0.551	0.549	0.559
Illinois	0.117	0.131	0.147	0.152	0.228	0.246	0.269	0.379
Indiana	0.230	0.242	0.250	0.254	0.254	0.530	0.551	0.559
Iowa	0.080	0.076	0.081	0.103	0.185	0.261	0.275	0.295
Kansas	0.000	0.000	0.000	0.000	0.000	0.002	0.118	0.140
Kentucky	0.219	0.367	0.379	0.378	0.369	0.401	0.395	0.508
Louisiana	0.000	0.007	0.008	0.049	0.054	0.053	0.053	0.100
Maine	0.863	0.863	0.851	0.835	0.830	0.801	0.791	0.766
Maryland	0.368	0.384	0.399	0.412	0.420	0.390	0.591	0.779
Massachusetts	0.030	0.139	0.132	0.120	0.221	0.265	0.334	0.329
Michigan	0.024	0.027	0.031	0.031	0.031	0.033	0.033	0.032
Minnesota	0.007	0.014	0.021	0.024	0.027	0.027	0.029	0.033
Mississippi	0.000	0.000	0.026	0.024	0.022	0.021	0.022	0.105

(continued)

Table A7. (continued)

	1979	1980	1981	1982	1983	1984	1985	1986
Missouri	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.000**
Montana	0.422	0.407	0.407	0.412	0.427	0.409	0.409	0.408
Nebraska	0.080	0.083	0.082	0.085	0.084	0.097	0.091	0.096
Nevada	0.486	0.477	0.488	0.513	0.495	0.497	**0.640**	**0.663**
New Hampshire	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
New Jersey	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.032**
New Mexico	0.121	0.118	0.116	0.113	0.106	0.097	0.099	0.104
New York	0.014	0.016	0.017	0.016	0.016	**0.061**	**0.060**	**0.062**
North Carolina	0.000	0.000	0.000	0.000	0.000	0.000	**0.000**	**0.004**
North Dakota	0.322	0.330	0.322	0.316	0.317	0.307	0.304	0.300
Ohio	0.000	0.000	0.000	0.000	0.001	0.002	**0.009**	**0.008**
Oklahoma	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.047
Oregon	0.389	0.367	0.349	0.364	0.360	0.343	0.347	**0.379**
Pennsylvania	0.000	0.000	0.000	0.000	0.000	**0.000**	0.000	**0.000**
Rhode Island	0.000	0.000	0.000	0.000	0.000	0.000	**0.349**	**0.349**
South Carolina	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.464**
South Dakota	0.354	0.348	0.548	0.559	0.643	0.706	0.749	0.767
Tennessee	0.017	0.017	0.018	0.020	0.022	0.024	**0.023**	**0.163**
Texas	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Utah	0.118	0.113	0.102	0.105	0.100	0.101	**0.127**	**0.147**
Vermont	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Virginia	0.046	0.046	0.045	0.045	0.054	0.055	**0.056**	**0.066**
Washington	0.089	0.086	0.073	0.100	0.416	0.398	0.413	0.407
West Virginia	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Wisconsin	0.032	0.031	0.031	0.031	0.028	0.031	0.035	0.036
Wyoming	0.143	0.144	0.140	0.137	0.133	0.132	0.124	0.124
Asset weighted average for the U.S.	0.021	0.022	0.023	0.027	0.036	0.052	0.077	0.100

	1987	1988	1989	1990	1991	1992	1993	1994
Missouri	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.007
Montana	0.394	0.363	0.354	0.347	0.330	0.319	0.307	0.387
Nebraska	0.093	0.094	0.091	0.084	0.094	0.100	0.123	0.088
Nevada	0.659	0.715	0.801	0.755	0.745	0.935	0.816	0.812
New Hampshire	0.000	0.306	0.371	0.364	0.343	0.276	0.245	0.254
New Jersey	0.030	0.092	0.153	0.163	0.329	0.357	0.420	0.316
New Mexico	0.095	0.084	0.096	0.083	0.099	0.353	0.443	0.615
New York	0.069	0.126	0.136	0.100	0.104	0.106	0.131	0.163
North Carolina	0.004	0.004	0.004	0.006	0.004	0.002	0.007	0.007
North Dakota	0.252	0.304	0.309	0.301	0.292	0.313	0.317	0.328
Ohio	0.019	0.073	0.073	0.073	0.042	0.040	0.042	0.039
Oklahoma	0.051	0.053	0.057	0.050	0.064	0.118	0.168	0.201
Oregon	0.450	0.444	0.428	0.418	0.449	0.447	0.439	0.467
Pennsylvania	0.040	0.125	0.125	0.125	0.113	0.102	0.093	0.025
Rhode Island	0.370	0.355	0.321	0.208	0.219	0.266	0.253	0.215
South Carolina	0.480	0.478	0.487	0.460	0.711	0.694	0.681	0.735
South Dakota	0.770	0.784	0.763	0.736	0.692	0.655	0.691	0.755
Tennessee	0.302	0.311	0.313	0.319	0.298	0.287	0.288	0.291
Texas	0.098	0.169	0.356	0.433	0.445	0.489	0.557	0.555
Utah	0.315	0.345	0.337	0.304	0.283	0.270	0.256	0.260
Vermont	0.000	0.000	0.000	0.062	0.052	0.046	0.040	0.038
Virginia	0.067	0.069	0.069	0.271	0.243	0.206	0.288	0.278
Washington	0.793	0.790	0.789	0.780	0.752	0.740	0.816	0.811
West Virginia	0.000	0.009	0.036	0.042	0.041	0.047	0.281	0.269
Wisconsin	0.042	0.154	0.156	0.190	0.180	0.184	0.197	0.201
Wyoming	0.112	0.318	0.324	0.335	0.414	0.420	0.523	0.632
Asset weighted average for the U.S.	0.136	0.169	0.189	0.195	0.216	0.230	0.259	0.279

Source: Amel (1993), Swamy and others (1995), and Consolidated Report of Condition and Income for Banks.
1. Financial values are expressed in 1994 dollars using the GDP implicit price deflator.

Table A8. The Growth and Shares of U.S. Debt Markets[1]

	1979	1980	1981	1982	1983	1984	1985	1986
Credit Market Debt of Individuals, Enterprises, & Governments[2,3]								
Total (billion)	$8,269	$8,353	$8,402	$8,619	$9,239	$10,123	$11,302	$12,528
Proportion of market								
Financial sector	0.781	0.782	0.783	0.778	0.771	0.772	0.760	0.776
U.S. commercial banking industry	0.258	0.252	0.246	0.244	0.241	0.233	0.221	0.211
Foreign banks	0.028	0.032	0.032	0.023	0.018	0.019	0.020	0.023
Onshore	0.017	0.020	0.020	0.015	0.014	0.014	0.014	0.016
Offshore	0.010	0.012	0.012	0.009	0.005	0.006	0.007	0.007
Thrift institutions	0.168	0.163	0.153	0.142	0.149	0.151	0.141	0.135
Finance n.e.c.[4]	0.065	0.063	0.066	0.065	0.063	0.069	0.069	0.074
Mutual funds	0.004	0.004	0.004	0.005	0.006	0.007	0.015	0.026
Money market mutual funds	0.006	0.009	0.020	0.024	0.019	0.022	0.021	0.022
Insurance co.s & pension funds[5]	0.166	0.169	0.170	0.177	0.175	0.172	0.171	0.176
Mon. auth., Mortg. pools, & GSE's[6]	0.088	0.090	0.092	0.097	0.100	0.099	0.100	0.109
Nonfinancial sector	0.219	0.218	0.217	0.222	0.229	0.228	0.240	0.224
Non–Credit Market Debt of Financial Intermediaries[7]								
Total (billion)	$9,057	$9,374	$9,380	$9,782	$10,523	$11,130	$12,235	$13,544
Proportion of market								
U.S. commercial banks	0.226	0.221	0.219	0.218	0.211	0.208	0.202	0.194
Checkable deposits & currency	0.072	0.065	0.061	0.058	0.054	0.052	0.052	0.055
Small time & savings deposits	0.091	0.089	0.088	0.094	0.102	0.102	0.098	0.093
Large time deposits	0.043	0.046	0.049	0.045	0.034	0.035	0.032	0.028
Security repos & federal funds	0.020	0.022	0.022	0.021	0.021	0.019	0.020	0.018
Mutual funds	0.011	0.012	0.010	0.012	0.015	0.017	0.026	0.040
Money market mutual funds	0.010	0.014	0.032	0.034	0.025	0.029	0.027	0.028
Other financial institutions	0.178	0.172	0.168	0.169	0.183	0.188	0.176	0.171
Insurance & pension fund reserves	0.212	0.219	0.216	0.230	0.239	0.238	0.250	0.258
Miscellaneous[8]	0.363	0.362	0.355	0.338	0.327	0.320	0.319	0.310

	1987	1988	1989	1990	1991	1992	1993	1994
Credit Market Debt of Individuals, Enterprises, & Governments[2,3]								
Total (billion)	$13,494	$14,209	$14,771	$15,111	$15,273	$15,705	$16,428	$17,136
Proportion of market								
Financial sector	0.771	0.766	0.766	0.762	0.769	0.771	0.777	0.770
U.S. commercial banking industry	0.200	0.193	0.189	0.184	0.178	0.173	0.172	0.170
Foreign banks	0.026	0.028	0.029	0.032	0.034	0.034	0.033	0.032
Onshore	0.017	0.018	0.019	0.020	0.022	0.022	0.020	0.020
Offshore	0.008	0.009	0.010	0.012	0.012	0.012	0.013	0.012
Thrift institutions	0.135	0.133	0.116	0.097	0.084	0.075	0.070	0.068
Finance n.e.c.[4]	0.074	0.076	0.087	0.089	0.093	0.095	0.096	0.096
Mutual funds	0.025	0.024	0.024	0.027	0.032	0.038	0.046	0.044
Money market mutual funds	0.020	0.019	0.023	0.027	0.028	0.027	0.026	0.026
Insurance co.s & pension funds[5]	0.177	0.177	0.183	0.184	0.193	0.193	0.194	0.188
Mon. auth., Mortg. pools, & GSE's[6]	0.115	0.116	0.115	0.121	0.128	0.135	0.139	0.146
Nonfinancial sector	0.229	0.234	0.234	0.238	0.231	0.229	0.223	0.230
Non–Credit Market Debt of Financial Intermediaries[7]								
Total (billion)	$14,125	$14,805	$15,820	$15,757	$16,485	$17,023	$18,121	$18,567
Proportion of market								
U.S. commercial banks	0.185	0.182	0.174	0.174	0.161	0.155	0.148	0.144
Checkable deposits & currency	0.049	0.046	0.041	0.041	0.040	0.044	0.044	0.041
Small time & savings deposits	0.089	0.088	0.086	0.091	0.089	0.084	0.077	0.073
Large time deposits	0.029	0.030	0.028	0.026	0.019	0.013	0.011	0.012
Security repos & federal funds	0.018	0.018	0.019	0.016	0.013	0.014	0.016	0.019
Mutual funds	0.041	0.039	0.042	0.043	0.053	0.064	0.081	0.084
Money market mutual funds	0.028	0.028	0.031	0.035	0.035	0.033	0.032	0.033
Other financial institutions	0.165	0.163	0.153	0.145	0.132	0.121	0.111	0.107
Insurance & pension fund reserves	0.260	0.261	0.276	0.273	0.296	0.303	0.307	0.296
Miscellaneous[8]	0.320	0.327	0.325	0.331	0.323	0.323	0.322	0.335

(continued)

Table A8. (*continued*)

	1979	1980	1981	1982	1983	1984	1985	1986
Nonfarm, Nonfinancial Corporate Debt								
Total[3] (billion)	$1,578	$1,557	$1,596	$1,601	$1,694	$1,882	$2,055	$2,291
Proportion of market								
U.S. commercial bank loans	0.196	0.205	0.206	0.259	0.256	0.253	0.237	0.226
Foreign bank loans	0.056	0.061	0.071	0.060	0.061	0.066	0.075	0.082
Onshore	0.053	0.055	0.056	0.040	0.035	0.035	0.038	0.043
Offshore	0.004	0.005	0.016	0.020	0.026	0.031	0.036	0.039
Savings institutions	0.001	0.002	0.002	0.003	0.005	0.008	0.010	0.011
Commercial paper	0.030	0.032	0.043	0.035	0.031	0.043	0.047	0.036
Finance companies	0.082	0.080	0.080	0.076	0.077	0.081	0.083	0.080
Corporate bonds	0.412	0.413	0.391	0.396	0.382	0.364	0.376	0.400
Industrial revenue bonds	0.043	0.052	0.059	0.070	0.072	0.077	0.083	0.067
Mortgages	0.154	0.128	0.116	0.072	0.083	0.078	0.063	0.073
Other loans	0.025	0.029	0.031	0.030	0.032	0.031	0.028	0.024

	1987	1988	1989	1990	1991	1992	1993	1994
Nonfarm, Nonfinancial Corporate Debt								
Total[3] (billion)	$2,486	$2,631	$2,739	$2,722	$2,650	$2,632	$2,682	$2,746
Proportion of market								
U.S. commercial bank loans	0.197	0.188	0.181	0.171	0.152	0.142	0.139	0.145
Foreign bank loans	0.092	0.102	0.109	0.123	0.130	0.136	0.135	0.134
Onshore	0.048	0.051	0.054	0.056	0.063	0.063	0.057	0.060
Offshore	0.044	0.050	0.055	0.067	0.067	0.073	0.078	0.075
Savings institutions	0.010	0.011	0.010	0.007	0.004	0.002	0.002	0.002
Commercial paper	0.037	0.040	0.045	0.048	0.040	0.042	0.045	0.051
Finance companies	0.087	0.091	0.092	0.096	0.095	0.094	0.090	0.098
Corporate bonds	0.398	0.410	0.408	0.412	0.440	0.457	0.468	0.456
Industrial revenue bonds	0.059	0.054	0.049	0.047	0.046	0.045	0.043	0.041
Mortgages	0.097	0.086	0.086	0.079	0.078	0.066	0.062	0.057
Other loans	0.022	0.020	0.020	0.017	0.015	0.015	0.016	0.015

Source: Flow of Funds Accounts and Bank for International Settlements, various issues.
1. All financial values are expressed in 1994 dollars using the GDP implicit price deflator.
2. Excludes Corporate Equities and Mutual Fund Shares.
3. Bank for International Settlements estimates of external lending to the nonbank sector in the U.S. are used in place of the conventional Flow of Funds estimates starting in 1983.
4. Funding Corporations, Finance Companies, Mortgage Companies, Closed-end Funds, REITS, Brokers and Dealers, ABS Issuers, and Bank Personal Trusts.
5. Life Insurance Companies, Other Insurance Companies, Private Pension Funds, and State and Local Government Retirement Funds.
6. Monetary Authority, Federally Related Mortgage Pools, and Government Sponsored Enterprises.
7. Includes some nonintermediary debt in the Miscellaneous category.
8. Official Foreign Exchange, SDR Certificates, Treasury Currency, Interbank Claims, Security Credit, Trade Debt, Taxes Payable, Investments in Bank Personal Trusts, and Miscellaneous Financial Claims.

Table A9. Failures of U.S. Commercial Banks[1]

	1979	1980	1981	1982	1983	1984	1985	1986
Total number of failures	10	10	7	34	46	78	118	143
Failures by bank size[2]								
Less than $100 million	9	9	7	30	35	67	108	117
$100 million–$1 billion	1	1	—	4	9	11	10	24
$1 billion–$10 billion	—	—	—	—	2	—	—	2
$10 billion–$100 billion	—	—	—	—	—	—	—	—
Greater than $100 billion	—	—	—	—	—	—	—	—
Total assets at failure[3] (billion)	$0.26	$0.42	$0.17	$2.74	$6.36	$3.82	$4.06	$10.82
Total assets two years prior to failure[4] (billion)	$0.43	$0.46	$0.23	$2.05	$7.17	$4.35	$5.05	$14.44
Estimated cost to bank insurance fund[5] (billion)			$0.09	$0.98	$3.78	$2.55	$2.21	$3.75

	1987	1988	1989	1990	1991	1992	1993	1994
Total number of failures	200	217	205	159	104	96	37	11
Failures by bank size[2]								
Less than $100 million	173	159	150	128	70	56	25	5
$100 million–$1 billion	26	49	48	29	28	37	12	6
$1 billion–$10 billion	1	7	7	2	3	3	—	—
$10 billion–$100 billion	—	2	—	—	3	—	—	—
Greater than $100 billion	—	—	—	—	—	—	—	—
Total assets at failure[3] (billion)	$9.75	$78.68	$31.48	$11.57	$45.84	$16.24	$2.69	$0.82
Total assets two years prior to failure[4] (billion)	$13.43	$78.05	$41.38	$16.21	$60.94	$26.73	$3.32	$1.60
Estimated cost to bank insurance fund[5] (billion)	$3.59	$8.77	$6.76	$4.78	$8.75	$4.13	$1.40	$0.15

Source: Unpublished data from the FDIC and the Consolidated Report of Condition and Income for Banks.
1. All financial values are expressed in 1994 dollars using the GDP implicit price deflator.
2. Bank size is determined by total assets two years prior to failure.
3. In 19 cases total assets two years prior to failure was substituted for missing values of total assets at failure.
4. In 12 cases total assets at failure was substituted for missing values of total assets two years prior to failure.
5. Estimated cost to the bank insurance fund at time of failure. Data unavailable prior to 1981.

Table A10. Estimated Distribution of U.S. Bank Domestic Commercial and Industrial Loans by Borrower Size Category[1]

Billions of 1994 dollars

	1979	1980	1981	1982	1983	1984	1985	1986
Industry Totals								
Total dollar volume	491.5	493.4	523.8	570.9	583.7	588.8	595.5	630.3
Dollar volume by credit size[2]								
Less than $100,000	66.1	62.3	54.6	50.2	44.4	46.8	40.5	39.5
$100,000–$250,000	48.3	46.2	45.3	38.1	36.6	38.8	36.5	37.3
$250,000–$1 million	97.6	96.9	91.9	76.2	66.4	73.5	72.3	77.3
$1 million–$10 million	177.1	169.1	169.9	194.3	172.2	172.3	176.5	182.0
$10 million–$25 million	41.7	50.7	53.7	83.5	104.4	114.1	97.1	114.4
$25 million–$100 million	59.4	56.1	93.5	101.2	118.3	113.5	135.6	134.5
Greater than $100 million	1.3	12.0	14.8	27.2	41.5	29.8	36.9	45.2
Organizations with Greater Than $100 Billion in Total Assets								
Total dollar volume	60.9	57.9	55.7	59.9	62.7	49.3	42.3	45.2
Dollar volume by credit size[2]								
Less than $100,000	6.1	4.6	3.0	2.6	0.8	0.9	0.6	0.3
$100,000–$250,000	4.2	3.1	2.0	1.9	0.9	1.0	0.6	0.4
$250,000–$1 million	4.7	3.8	3.1	2.7	3.1	3.3	2.8	2.4
$1 million–$10 million	21.7	14.9	16.3	16.9	13.6	14.8	14.8	14.4
$10 million–$25 million	4.7	12.7	11.1	12.2	11.9	11.0	8.1	6.4
$25 million–$100 million	19.2	15.1	16.9	18.9	17.7	15.5	11.9	17.8
Greater than $100 million	0.3	3.8	3.3	4.9	14.8	2.7	3.4	3.4

	1987	1988	1989	1990	1991	1992	1993	1994
Industry Totals								
Total dollar volume	603.7	605.4	596.7	565.3	491.7	458.2	449.3	480.6
Dollar volume by credit size[2]								
Less than $100,000	37.6	41.0	43.4	33.7	23.7	22.9	23.6	22.5
$100,000–$250,000	38.0	40.8	38.9	30.1	25.7	22.2	23.0	25.3
$250,000–$1 million	74.2	64.9	61.4	54.0	40.7	43.3	41.1	45.9
$1 million–$10 million	178.5	154.8	173.0	163.9	142.5	142.9	135.5	152.7
$10 million–$25 million	101.9	127.3	110.3	134.5	107.4	100.9	116.2	124.4
$25 million–$100 million	141.6	123.0	137.5	110.3	100.5	95.7	90.9	86.5
Greater than $100 million	31.8	53.7	32.2	38.8	51.2	30.3	19.0	23.2
Organizations with Greater Than $100 Billion in Total Assets								
Total dollar volume	54.8	37.1	40.1	37.5	81.4	74.0	82.4	92.2
Dollar volume by credit size[2]								
Less than $100,000	0.3	0.1	0.0	0.1	0.2	0.3	0.2	0.3
$100,000–$250,000	0.3	0.1	0.1	0.2	0.3	0.6	0.5	0.4
$250,000–$1 million	1.8	0.4	0.5	0.8	1.3	1.7	2.0	1.6
$1 million–$10 million	18.8	5.8	8.6	7.2	14.0	14.9	15.3	21.0
$10 million–$25 million	9.8	7.4	11.5	11.3	17.4	18.0	25.1	28.1
$25 million–$100 million	17.8	11.8	16.5	10.7	33.5	28.7	32.0	32.3
Greater than $100 million	6.1	11.6	2.7	7.2	14.7	9.9	7.2	8.5

(continued)

Table A10. (continued)

	1979	1980	1981	1982	1983	1984	1985	1986
Organizations with $100 Million–$100 Billion in Total Assets								
Total dollar volume	390.5	394.6	425.3	467.3	478.3	496.8	512.1	548.0
Dollar volume by credit size[2]								
Less than $100,000	46.4	43.3	39.3	32.6	28.8	29.4	29.2	28.7
$100,000–$250,000	35.4	35.7	31.9	26.9	27.5	25.9	28.7	26.5
$250,000–$1 million	79.7	74.1	74.0	60.2	49.4	59.2	57.6	64.0
$1 million–$10 million	150.9	154.2	149.3	172.3	153.4	154.2	150.3	163.8
$10 million–$25 million	37.1	37.9	42.6	70.6	92.5	103.0	89.0	108.0
$25 million–$100 million	40.1	41.1	76.6	82.3	100.0	98.0	123.8	115.2
Greater than $100 million	1.0	8.2	11.5	22.4	26.7	27.0	33.5	41.8
Organizations with Less Than $100 Million in Total Assets								
Total dollar volume	40.1	40.9	42.7	43.6	42.7	42.7	41.1	37.1
Dollar volume by credit size[2]								
Less than $100,000	13.5	14.5	12.4	15.0	14.9	16.5	10.6	10.4
$100,000–$250,000	8.7	7.4	11.4	9.3	8.2	12.0	7.2	10.5
$250,000–$1 million	13.3	19.0	14.7	13.4	13.9	11.0	11.9	11.0
$1 million–$10 million	4.5	0.0	4.3	5.1	5.1	3.2	11.4	3.8
$10 million–$25 million	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0
$25 million–$100 million	0.0	0.0	0.0	0.0	0.6	0.0	0.0	1.4
Greater than $100 million	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	1987	1988	1989	1990	1991	1992	1993	1994
Organizations with $100 Million–$100 Billion in Total Assets								
Total dollar volume	514.8	536.4	526.6	499.8	384.6	360.7	344.6	366.5
Dollar volume by credit size[2]								
Less than $100,000	26.4	29.4	30.5	24.6	17.6	16.4	16.7	15.5
$100,000–$250,000	28.4	33.6	29.9	22.4	17.2	15.7	16.0	18.2
$250,000–$1 million	61.4	54.7	53.3	45.4	33.9	34.9	32.4	39.7
$1 million–$10 million	156.9	147.8	163.6	153.8	126.3	125.4	117.9	128.0
$10 million–$25 million	92.2	119.8	98.8	122.5	89.9	82.0	91.1	96.3
$25 million–$100 million	123.9	111.2	121.0	99.6	67.1	66.2	59.0	54.1
Greater than $100 million	25.7	39.8	29.5	31.5	32.6	20.0	11.5	14.8
Organizations with Less Than $100 Million in Total Assets								
Total dollar volume	34.0	31.9	30.0	28.0	25.7	23.5	22.3	21.9
Dollar volume by credit size[2]								
Less than $100,000	11.0	11.6	12.8	9.0	6.0	6.2	6.7	6.6
$100,000–$250,000	9.3	7.0	8.8	7.5	8.3	5.9	6.4	6.7
$250,000–$1 million	11.0	9.8	7.6	7.9	5.5	6.7	6.8	4.6
$1 million–$10 million	2.8	1.2	0.7	2.9	2.1	2.6	2.3	3.8
$10 million–$25 million	0.0	0.0	0.0	0.7	0.0	0.9	0.0	0.0
$25 million–$100 million	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.1
Greater than $100 million	0.0	2.3	0.0	0.1	3.8	0.4	0.2	0.0

Source: Consolidated Report of Condition and Income for Banks, and Survey of Terms of Bank Lending.
1. All financial values are expressed in billions of 1994 dollars using the GDP implicit price deflator.
2. Credit size is measured as the maximum of 1) the amount of the loan borrowed from the bank, 2) the size of the loan commitment under which the loan was drawn (if any), and 3) the size of the entire participation across banks (if any). For the period before 1982:3 no information is available on the size of the loan commitment or the participation amount, so borrower credit size is calculated as the loan amount.

APPENDIX B

Changes in Banking Regulation, 1979–94

THIS APPENDIX provides supporting background information on the con-
clusions in the text regarding the five major types of regulatory changes:
deregulation of deposit accounts, reduction in reserve requirements,
formalization and tightening of capital requirements, expansion of
bank powers, and liberalization of the rules regarding geographic di-
versification.

Deposit Deregulation

The first major regulatory change of the 1980s was the removal of
interest rate ceilings on bank deposits. Ever since the Banking Act of
1933, U.S. financial intermediaries had been restricted in the rates that
they could pay depositors. The best known of these rules, regulation
Q, placed ceilings on the interest rates offered on time deposits. Other
regulations also prohibited the payment of interest on demand deposit
accounts. With the dramatic rise in inflation during the 1970s, banks
found that the restrictions on nominal interest rates were allowing less
tightly regulated competitors, such as money market mutual funds, to
harvest many of their deposits. Another innovation, the invention of
repurchase agreements, was allowing businesses to earn market-based
interest rates on their demand deposit balances at banks. These circum-
stances prompted a drive by banks to create accounts that could legally
pay market interest rates.

Congress responded by passing the Depository Institutions Deregu-
lation and Monetary Control Act of 1980 (DIDMCA). Among other
provisions, this legislation permitted banks throughout the country to
offer negotiable order of withdrawal (NOW) and automatic transfer
system (ATS) accounts.[71] A NOW account essentially operates as a
checking account that pays interest, while an ATS account permits the
bank to sweep the balances in a customer's account at the end of each
day into an interest-bearing overnight account. Therefore the DIDMCA

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71. NOW accounts had been introduced in Massachusetts in 1973 and had spread
throughout New England by 1980.

allowed banks to begin offering competitive market rates on checking accounts.

The DIDMCA also mandated that the regulation Q interest rate ceilings be phased out by March 1986. This gradual elimination of price controls was not sufficient to keep banks from continuing to lose depositors, so in October 1982 Congress passed the Depository Institutions Act (commonly referred to as the Garn–St Germain Act), which authorized banks to offer money market deposit accounts (MMDAs). These accounts carried no reserve requirements and were exempt from the regulation Q ceilings, and therefore could compete effectively with the MMMFs.[72]

These changes were pivotal because the banking industry's monopsony on insured deposits had provided an easy source of profits and helped to keep the industry stable and virtually free of failure for almost fifty years. The exodus of funds from the industry caused by technical and financial innovations and the subsequent deregulation allowed the banks to compete with nonbanks and other banks for funds at market interest rates, but left them with much higher interest costs. As shown in table 5, the increased interest costs were substantial and were not offset by noninterest expenses, which also rose over this period. These extra costs appear to have had a significant effect in reducing profitability in the industry. As discussed in the text, the reduced profits may be linked, directly or indirectly, to the dramatic increase in the number of bank failures later in the decade. Also noted in the text, it is important to recognize that the key factors driving these higher costs were the technical and financial innovations that allowed nonbanks to offer deposit-like products, rather than the deregulation itself.

Capital Regulation

At the start of our sample period, capital regulation was extremely fragmented because the various regulatory agencies were not using consistent standards.[73] For example, in the 1950s the Federal Reserve

72. The MMDAs were subject to regulatory restrictions on minimum balances, numbers of checks per month, and so forth.

73. Banks are regulated by the Federal Deposit Insurance Corporation, the Federal Reserve, the Office of the Comptroller of the Currency, and various state regulators.

alone adopted the "analyzing bank capital" (ABC) approach to capital adequacy. These guidelines required banks to hold different amounts of capital depending on the riskiness and liquidity of their assets, and therefore were very similar in spirit to the current risk-based guidelines. For instance, as in the current system, no capital was required to be held against short-term government securities. The ABC requirements were somewhat cumbersome to administer and were dropped by the Federal Reserve in the mid-1970s. Thus by the start of our sample in 1979, capital regulation was relatively ad hoc and depended largely on the judgment and discretion of bank supervisors.

Against this backdrop, the share of foreign assets in U.S. bank portfolios was rising and capital levels were falling in the 1970s. Regulators responded by taking steps to eliminate some of the discretion in the system. Table B1 gives a chronology of the major changes in capital requirements from 1979 to 1994.[74] Starting in 1981, a new set of standards required that banks hold capital equal to a fixed percentage of their balance sheet assets. The flat-rate standards initially required large banks to hold less capital than small banks, but the standards were equalized in 1985. There were no capital requirements for off–balance sheet activities, such as standby letters of credit and loan commitments. The differential treatment of balance sheet and off–balance sheet activities, along with several innovations discussed in the text, helped to encourage banks to shift some activities off their balance sheets. Foreign banks were not subject to these rules and thus benefited relative to their U.S. competitors.

The Basle Accord risk-based capital standards, which were agreed upon in 1988, provided responses to a number of problems raised by the flat-rate requirements, particularly the lack of capital required against off–balance sheet risks, the equal treatment of on–balance sheet assets that have very different risk characteristics, and the competitive inequities of multinational banks operating with different capital standards.[75] The Basle Accord's risk-weighted assets (RWA) denominator

74. The entries in table B1 are arranged by the dates on which the capital rules were made, rather than by when they went into effect, since new rules were sometimes added before the old rules were fully implemented. For example, the Tier 1 leverage requirement and the prompt corrective action features of FDICIA were decided upon before the risk-based capital standards were fully implemented.

75. The risk-based capital requirements were partially implemented as of December 1990, and fully implemented as of December 1992.

Table B1. Major Changes in Capital Requirements, 1979–94

Date	Capital requirements
January 1979– December 1981	No formal minimum capital ratios. Banks subject only to supervisory oversight.
December 1981	Primary capital (common equity, loan loss reserves, some convertible debt and preferred stock) and secondary capital (subordinated debt and the remaining preferred stock) defined. Regional banks (total assets ≥ $1 billion, not multinational) required to hold at least 5 percent primary capital and 5.5 percent total capital (primary plus secondary) against gross total assets (total assets plus loan loss reserves). Community banks (total assets < $1 billion, not multinational) required to hold primary capital and total capital ratios of at least 6 percent. Multinational banks still had no formally established capital ratios.
June 1983	Standards for regional banks extended to cover multinational banks.
April 1985	Disparities between large and small banks and multinational and domestic banks eliminated. All U.S. banks required to have primary and total capital ratios of at least 5.5 percent and 6.0 percent, respectively.
July 1988	Basle Accord sets minimum risk-based capital standards for banks operating internationally in twelve participating nations.
January 1989	U.S. regulators publish guidelines for implementing risk-based capital requirements based on the Basle Accord. All U.S. banks covered (not only multinationals). Similar requirements set for U.S. bank holding companies and thrifts. 　　All assets and off–balance sheet instruments are assigned risk weights of 0 percent, 20 percent, 50 percent, or 100 percent, depending on the perceived credit risk of the instrument and obligor. Examples are commercial loans (100 percent), most residential mortgages (50 percent), most claims on other banks (20 percent), and Treasury securities (0 percent). Risk-weighted assets (RWA) is the sum of the notional value of the instruments times the risk weights. Other risks (for example, interest rate risk, foreign exchange risk, concentration risk) were to be included later. 　　Requirements are set in terms of Tier 1 capital (common equity, some preferred stock, other) and Tier 2 capital (some subordinated debt, some loan loss reserve, other) per dollar of RWA. 　　As of December 1990, banks must hold Tier 1 capital of at least 3.625 percent of RWA, and Total capital (Tier 1 plus Tier 2) of at least 7.25 percent of RWA. Starting in December 1992 the Tier 1 ratio must be at least 4 percent and the Total risk-based ratio must be at least 8 percent. See table B2 for additional details.

Table B1. (*continued*)

Date	Capital requirements
August 1990	Regulators begin setting new leverage requirements. Banks with the best CAMEL rating and meeting other conditions must hold Tier 1 capital of at least 3 percent of (unweighted) gross total assets. Other banks must hold at least 4 percent or higher, depending upon the CAMEL rating and discretion of the supervisors. The leverage requirement is effective in 1991.
December 1991	FDIC Improvement Act (FDICIA) mandates stricter enforcement of capital standards and closure rules on regulators and risk-based deposit insurance premiums that vary with capital ratios, among other regulatory changes. Prompt corrective action (PCA) rules specify a series of successively more severe regulatory penalties (some mandatory, some discretionary) as capital deteriorates through five capital categories. Supervisors can also downgrade the bank by one category. These categories and the mandatory and discretionary actions are in tables A3, A4, and A5. Importantly, the well-capitalized category (at least 6 percent Tier 1, at least 10 percent Total, at least 5 percent Tier 1 leverage ratio) requires capital *above* the full risk-based capital minimums.

Source: Federal Reserve press releases.

focuses on credit risk, reflecting the perception that credit risk poses the most serious threat to bank solvency. Other types of risk were to be incorporated later. To compute RWA, all assets and off–balance sheet instruments are assigned risk weights of 0 percent, 20 percent, 50 percent, or 100 percent, depending on the credit risk group to which the obligor belongs and the type of financial instrument. The Basle Accord sets a minimum standard of 4 percent for Tier 1 capital (which contains equity) and a minimum standard of 8 percent for total capital (which contains both equity and subordinated debt). Thus an asset in the 100 percent risk category, such as a C&I loan, requires 4 percent of Tier 1 capital and 8 percent of Total capital to be held against it, and an asset in the 50 percent risk category requires half of these amounts. Although the Basle Accord applies only to multinational banks, U.S. regulators chose to apply versions of it to all banks, bank holding companies, and thrift institutions. Details of the RWA categories, cap-ital categories, and risk-based capital requirements for banks are given in table B2.

The risk-based capital standards do not account for some obvious

Table B2. The Basle Accord Risk-Based Capital Standards

RISK-WEIGHTED ASSET CATEGORIES

0 percent risk category
  Cash, Federal Reserve Bank balances
  Securities of the U.S. Treasury, OECD governments, and some U.S. agencies

20 percent risk category
  Cash items in the process of collection
  U.S. and OECD interbank deposits and guaranteed claims
  Some non-OECD bank and government deposits and securities
  General obligation municipal bonds
  Some mortgage-backed securities
  Claims collateralized by the U.S. Treasury and some other government securities

50 percent risk category
  Loans fully secured by first liens on 1–4 family residential properties
  Other (revenue) municipal bonds

100 percent risk category
  All other on–balance sheet assets not listed above, including:
     loans to private entities and individuals, some claims on non-OECD
     governments and banks, real assets, and investments in subsidiaries

Off–balance sheet activities[a]
  Direct-credit-substitute standby letters of credit (mainly 100 percent)
  Performance-related standby letters of credit (mainly 50 percent)
  Unused portion of loan commitments with original maturity of more than one year
     (mainly 50 percent)
  Other loan commitments (0 percent)
  Commercial letters of credit (20 percent)
  Bankers acceptances conveyed (20 percent)
  Derivative contracts—interest rate swaps, forward commitments to purchase foreign
     exchange, and other items (between 0 and 5 percent of the notional
     value, plus the mark-to-market value of the contract, capped at 50 percent)

CAPITAL CATEGORIES

Tier 1
  Common equity, some preferred stock, minority interest in consolidated subsidiaries
     less goodwill

Tier 2
  Loan loss reserve (limited to 1.25 percent of risk-weighted assets), subordinated debt
     (limited to 50 percent of Tier 1), and other preferred and convertible stock
  Tier 2 capital cannot be larger than Tier 1 capital

Total capital
  Tier 1 plus Tier 2

CAPITAL REQUIREMENTS

  Tier 1 capital must be at least 4 percent of risk-weighted assets
  Total capital must be at least 8 percent of risk-weighted assets

determinants of credit risk, such as differences in credit quality across
C&I loans (all of which are in the 100 percent category); concentrations
of risk to a particular counterparty, industry, region, or nation; and
covariances among the values of financial instruments. In part, these
potential shortcomings reflect concerns that the capital standards be
reasonably simple, be uniformly applied across banks, and avoid ex-
cessive governmental control or direction of credit flows. It was planned
that the standards would later take into account interest rate risk and
other market risks, although this has not yet occurred for U.S. banking
organizations.[76] In order to capture risks that might be missed by the
risk-based capital standards, in 1990 U.S. regulators added a leverage
requirement which mandated that banks hold Tier 1 capital of 3 percent
or more against unweighted assets. The amount above 3 percent de-
pends upon examination ratings and the discretion of the regulator.

Several empirical studies have found that the relationship between
the risk-based capital standards and bank risk is relatively weak, and
that some of the relative risk weights in RWA are not well aligned with
actual risks.[77] Furthermore, some studies show that RWA can be im-
proved significantly by adjusting the requirements using either public
information on nonperforming loans from the Call Report or private
information on classified assets from examination reports.[78]

Legislators were also concerned that there might be too much dis-
cretion in the enforcement of the standards and the closure of capital-
impaired banks. Therefore, the prompt corrective action provisions of
the FDIC Improvement Act of 1991 stipulate that banks with capital
ratios below certain thresholds be subject to various mandatory and
discretionary sanctions.[79] For instance, the asset growth of undercapi-
talized banks with less than 4 percent Tier 1 capital and 8 percent Total
capital is restricted. Summaries of the prompt corrective action cate-
gories, mandatory actions, and discretionary actions are shown in tables
B3, B4, and B5, respectively. Despite these steps, there is evidence to

76. In July 1995 the federal banking agencies released for public comment proposals
for incorporating the market risks of a bank's trading account into the risk-based capital
standards.

77. See, for example, Avery and Berger (1991) and Cordell and King (1995).

78. See Berger, King, and O'Brien (1991) and Jones and King (1995).

79. Among other provisions, the FDICIA also recapitalized the Bank Insurance
Fund, mandated that annual examinations be performed for all banks, and dictated that
risk-based deposit insurance be implemented.

Table B3. Prompt Corrective Action Capital Categories
Percent

Capital category	Total risk-based ratio	Tier 1 risk-based ratio	Tier 1 leverage ratio	Other
Well capitalized	≥ 10; and	≥ 6; and	≥ 5, and	Not subject to a capital directive
Adequately capitalized	≥ 8; and	≥ 4; and	≥ 4ᵃ, and	Does not qualify as well capitalized
Undercapitalized	< 8; or	< 4; or	< 4ᵇ, and	Does not qualify for lower categories
Significantly undercapitalized	< 6; or	< 3; or	< 3, and	Does not qualify for lowest category
Critically undercapitalized				Ratio of tangible equity to total assets of 2 or underᶜ

Source: Federal Reserve press releases.
a. Leverage ratio ≥ 3 for CAMEL 1-rated banks that are not experiencing or anticipating significant growth.
b. Leverage ratio < 3 for CAMEL 1-rated banks that are not experiencing or anticipating significant growth.
c. Tangible equity is Tier 1 plus cumulative perpetual preferred stock, net of all intangibles except those amounts of purchased mortgage servicing rights allowable in Tier 1 capital.

suggest that because the risk-based capital ratios do not measure risk very precisely, prompt corrective actions are not likely to be triggered soon enough to make a difference to most failing institutions.[80]

Geographic Banking Rules

Since the 1800s, branching by banking organizations in the United States has been primarily governed by state laws.[81] The McFadden Act of 1927 required national banks to obey state restrictions on branching, which effectively prohibited interstate branching. Over time, individual states developed a wide range of rules governing intrastate branching. The most restrictive regime limited each bank to a single office. Known as unit banking, this system inhibited banks' ability to grow and diver-

80. See Jones and King (1995). Note that many of the mandatory actions contain exceptions that allow supervisors flexibility in choosing not to enforce restrictions under certain circumstances. Also, although the prompt corrective action rules do not explicitly provide for differential treatment of banks in the well-capitalized and adequately capitalized categories, a number of other regulatory rules do give preferential treatment to well-capitalized banks. For additional details and discussion of FDICIA and prompt corrective action rules, see Jones and King (1995), Kaufman (1995), and Garcia (1995).

81. See Calomiris (1993) for a discussion of the historical reasons for this fragmentation.

Table B4. Mandatory Actions under Prompt Corrective Action[a]

Well capitalized and adequately capitalized categories
  Prohibit payment of dividends, other capital distributions, or management fees that
    would leave institution undercapitalized

Undercapitalized category
  Subject to increased monitoring
  Require institution to submit and implement capital plan within 45 days
  Growth of total assets must be restricted
  Prior supervisory approval needed for acquisitions, new branches, and new lines of
    business

Significantly undercapitalized category
  Restrict bonuses and raises for senior officers

Critically undercapitalized category
  Must be placed in conservatorship or receivership within 90 days, unless the
    appropriate agencies concur that other action would better achieve purpose of prompt
    corrective action
  Continual review, meeting of conditions, and certification by heads of banking
    agencies must occur after 90 days to avoid receivership
  After 60 days, prohibited from paying principal or interest on subordinated debt
    without prior approval of the FDIC
  Restrict activities. May not do the following without prior written approval of the
    FDIC:
    —Enter into any material transaction, other than in the usual course of business
    —Extend credit for any highly leveraged transaction
    —Make any material change in accounting methods
    —Engage in any 'covered transactions'
    —Pay excessive compensation or bonuses
    —Pay interest on new or renewed liabilities at a rate significantly exceeding local
      market rates

Source: Federal Reserve press releases.
a. Actions mandated for any one capital category also apply to lower categories.

sify their risks, but it was often supported by rural interests fearing that local deposits would be invested outside their communities. In August 1991, Colorado became the last state to discard the unit banking system. Other states allowed branching, but limited either the number or location of branches to reduce interbank competition. Although thirteen states still restricted branching as of the end of 1994, all of the others have shifted to an unimpeded statewide branching model.

In some cases, banks reacted to branching restrictions by forming multibank holding companies that owned more than one bank in unit banking or limited branching states.[82] In turn, states often placed re-

82. Additional benefits of the bank holding company form include the ability to

Table B5. Discretionary Actions under Prompt Corrective Action[a]

Well capitalized and adequately capitalized categories
  None

Undercapitalized category
  Require institution to raise capital
  Restrict transactions with affiliates
  Restrict deposit interest rates
  Replace senior officers and directors
  Restrict activities of the institution and holding company
  Require divestiture or sale of the institution
  Other actions that would better carry out purposes of prompt corrective action

Significantly undercapitalized category
  Restrict the institution's asset growth or require a reduction in total assets
  Restrict any activity that poses excessive risk
  Prohibit the institution from accepting deposits from correspondent depository
    institutions
  Holding company may be prohibited from paying dividends without prior Federal
    Reserve approval
  Require the institution to be acquired, or require the holding company to divest
  Require divestiture or liquidation of any subsidiary or other affiliate

Critically undercapitalized category
  Additional restrictions may be placed on activities

Source: Federal Reserve press releases.
a. Actions for any one capital category generally also apply to all lower categories.

strictions on the activities of the MBHCs. Intrastate restrictions on MBHCs usually focus on market share and concentration, leaving geographic expansion within the state unregulated. As with branching regulation, the trend over time has been to gradually ease state-level restrictions on MBHCs.

Perhaps more important than the changes in intrastate banking legislation has been the recent trend for individual states to cooperate in opening their banking markets to competition from MBHCs in other states. Such cooperation among the states has taken a range of forms, from the specific enumeration of eligible states in a regional compact to blanket permission for all states. Table B6 gives historical information about when each of the fifty states and the District of Columbia eased their geographic restrictions on bank branching and MBHC affil-

expand into activities prohibited at the bank level, such as securities underwriting, and greater financial flexibility in overcoming bank-level constraints on leverage, asset acquisition, and liability issuance. There are also substantial tax advantages to the bank holding company form.

Table B6. Dates of State-Level Liberalizations of Banking Structure[a]

Month, year

State	Limited branching	Statewide branching	Limited MBHCs	Statewide MBHCs	Interstate MBHCs
Alabama	Before 1960	June 1990	Before 1960	Before 1960	July 1987
Alaska	Before 1960	Before 1960	Before 1960	Before 1960	July 1982
Arizona	Before 1960	Before 1960	Before 1960	Before 1960	Oct. 1986
Arkansas	Apr. 1973	Forbidden	Oct. 1983	Forbidden	Jan. 1989
California	Before 1960	Before 1960	Before 1960	Before 1960	July 1987
Colorado	Aug. 1991	Forbidden	Before 1960	Before 1960	July 1988
Connecticut	Before 1960	Oct. 1988	Before 1960	Before 1960	June 1983
Delaware	Before 1960	Before 1960	Before 1960	Before 1960	Jan. 1988
District of Columbia	Before 1960	Before 1960	Before 1960	Before 1960	Dec. 1985
Florida	Jan. 1977	Dec. 1988	Before 1960	Before 1960	July 1985
Georgia	Before 1960	Forbidden	July 1976	Forbidden	July 1985
Hawaii	Before 1960	Jan. 1986	Before 1960	Before 1960	Forbidden
Idaho	Before 1960	Before 1960	Before 1960	Before 1960	July 1985
Illinois	Sept. 1988	June 1993	Before 1960	July 1986	July 1986
Indiana	Before 1960	May 1991	July 1985	Forbidden	Jan. 1986
Iowa	July 1972	Forbidden	Before 1960	Forbidden	Jan. 1991
Kansas	May 1987	Feb. 1990	July 1985	Forbidden	July 1992
Kentucky	Before 1960	Forbidden	July 1984	Forbidden	July 1984
Louisiana	Before 1960	July 1988	Jan. 1985	Forbidden	July 1987
Maine	Before 1960	Oct. 1975	Before 1960	Before 1960	Jan. 1978
Maryland	Before 1960	Before 1960	Before 1960	Before 1960	July 1985
Massachusetts	Sept. 1961	Oct. 1984	Before 1960	Before 1960	July 1983
Michigan	Sept. 1969	Aug. 1988	Apr. 1971	Apr. 1971	Jan. 1986
Minnesota	Apr. 1980	Forbidden	Before 1960	Before 1960	July 1986
Mississippi	Before 1960	Forbidden	July 1990	Forbidden	July 1988

State					
Missouri	Dec. 1990	Dec. 1990	Jan. 1975	Forbidden	Aug. 1986
Montana	Jan. 1990	Forbidden	Before 1960	Before 1960	Oct. 1993
Nebraska	Sept. 1983	Forbidden	Apr. 1983	Forbidden	Jan. 1990
Nevada	Before 1960	Before 1960	Before 1960	Before 1960	July, 1985
New Hampshire	Oct. 1963	July 1987	Before 1960	Forbidden	Sept. 1987
New Jersey	Before 1960	Feb. 1983	Jan. 1968	July 1989	Sept. 1986
New Mexico	Before 1960	July 1991	Before 1960	Before 1960	June 1989
New York	Before 1960	Forbidden	Before 1960	July 1976	July 1982
North Carolina	Before 1960	Before 1960	Before 1960	Before 1960	Jan. 1985
North Dakota	July 1987	Forbidden	Before 1960	Before 1960	June 1991
Ohio	Before 1960	Jan. 1989	Before 1960	Before 1960	Oct. 1985
Oklahoma	Oct. 1983	Forbidden	Before 1960	Forbidden	July 1987
Oregon	Before 1960	Mar. 1985	Before 1960	Before 1960	July 1986
Pennsylvania	Before 1960	Mar. 1990	Mar. 1982	Mar. 1990	Sept. 1986
Rhode Island	Before 1960	Before 1960	Before 1960	Forbidden	July 1984
South Carolina	Before 1960	Before 1960	Before 1960	Before 1960	Jan. 1986
South Dakota	Before 1960	Before 1960	Before 1960	Before 1960	Feb. 1988
Tennessee	Before 1960	Mar. 1990	Before 1960	Forbidden	July 1985
Texas	Jan. 1987	Nov. 1988	Sept. 1970	Forbidden	Jan. 1987
Utah	Before 1960	July 1981	Before 1960	Before 1960	May 1984
Vermont	Before 1960	Jan. 1970	Before 1960	Before 1960	Jan. 1988
Virginia	Jan. 1962	Jan. 1987	Before 1960	Before 1960	July 1985
Washington	Before 1960	July 1985	May 1981	May 1981	July 1987
West Virginia	July 1982	Jan. 1987	July 1982	Forbidden	Jan. 1988
Wisconsin	Jan. 1967	Aug. 1989	Before 1960	Before 1960	Jan. 1987
Wyoming	Before 1960	Forbidden	Before 1960	Before 1960	June 1987

Sources: Amel (1993), and Swamy and others (1995).

a. An entry of "Before 1960" indicates that the activity was permissible prior to January 1960.

Figure B1. Marginal Reserve Tax on Transaction Deposits, 1959:1–1994:4[a]

Basis points
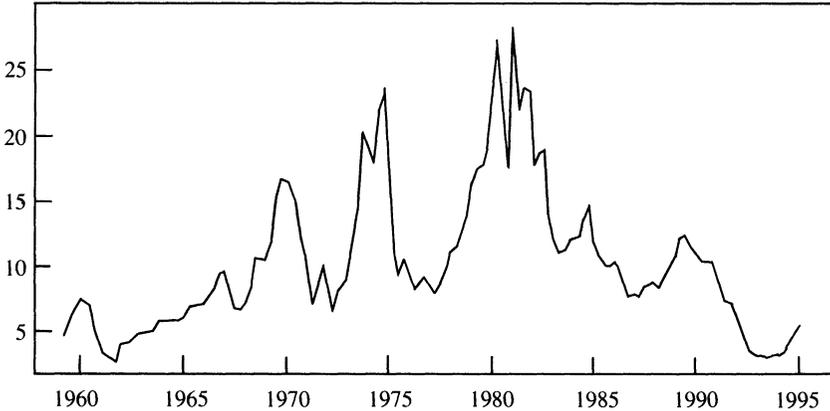
Source: Data on the effective federal funds rate are obtained directly from the Federal Reserve Bank of New York. Data on reserve requirements are from Feinman (1993).

a. The marginal reserve tax is the quarterly average effective federal funds rate multiplied by the highest reserve requirement on transaction deposits during the quarter.

iation. Interstate bank branching was prohibited before 1995, but is starting to be allowed under the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994.

Reserve Requirements

The Bank Act of 1935 required the Federal Reserve to impose reserve requirements on banks belonging to the Federal Reserve System. Throughout the 1960s and 1970s the Federal Reserve actively adjusted these requirements as part of its efforts to steer the expansion of domestic money and credit.[83] National banks were all members of the Federal Reserve and had to abide by its rules. However, state-chartered banks had the option of being governed by state regulatory authorities, rather than belonging to the Federal Reserve System. One important difference was that state regulators often allowed banks to count interest-bearing assets as reserves, whereas the Federal Reserve paid no interest on reserves.

Figure B1 shows the marginal reserve tax on transactions deposits

83. See Feinman (1993).

that is implied by multiplying the quarterly average level of the federal funds rate (the opportunity cost of reserves) by the highest level of reserve requirements on transactions accounts. The figure shows that the steady drift in inflation and interest rates over the 1960s and 1970s increased the cost of complying with reserve requirements. The higher cost of compliance drove banks to leave the Federal Reserve System, so that between the mid-1960s and 1980 the fraction of the nation's deposits at member banks had fallen from almost 80 percent to less than 65 percent. This slippage may have reduced the effectiveness of the new operating procedures that the Federal Reserve adopted in 1979, which emphasized reserve targets, because deposits were less tightly linked to reserves.

The DIDMCA sought to correct these problems by requiring that all banks, regardless of whether or not they belonged to the Federal Reserve System, adhere to a single set of reserve requirements chosen by the Federal Reserve. Simultaneously, the act lowered reserve requirements on nontransaction accounts from 12 percent to 3 percent.[84] Aside from a minor adjustment in the 1982 Garn–St Germain Act, reserve requirements remained largely unchanged during the rest of the 1980s.

During the first half of the 1990s, however, the Federal Reserve twice relaxed reserve requirements. In December 1990 it removed all reserve requirements on nontransaction accounts, and in April 1993 it reduced the requirement for transaction deposits from 12 percent to 10 percent.[85] Joshua Feinman estimates that given the prevailing levels of interest rates, the first cut saved the banking industry approximately $800 million in forgone interest, and the second recouped another $350 million.[86] Thus regulatory changes regarding required reserves have been quite favorable for banks.

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84. The DIDMCA also forced the Federal Reserve to begin charging for payment services. This was, in part, intended to compensate for the lower reserve "tax" on deposits. These changes may have benefited large banking organizations relative to small ones, because large organizations carry more required reserves and because the pricing of payments services created business opportunities for large correspondent banks to compete with the Federal Reserve in providing these services to small organizations.

85. The DIDMCA prohibits the Federal Reserve from setting reserve requirements of less than 8 percent on transactions accounts. This limit appears to be based on concerns about the amount of revenue that the Federal Reserve turns over to the Treasury (see Feinman, 1993).

86. See Feinman (1993).

Expansion of Bank Powers

In contrast to the relatively mild debate over how to handle reserve requirements, the issue of bank powers has proven to be extremely contentious. The Bank Act of 1933 (commonly referred to as the Glass-Steagall Act) separates both the ownership and the activities of commercial banks and other enterprises. In particular, it prohibits commercial banks from underwriting corporate securities and serving as securities brokers, and also separates the ownership of commercial banks and nonfinancial firms. The act reflects the turmoil in the early 1930s, when more than a third of U.S. banks failed or were taken over by other banks. There was also a belief that deposit insurance could be put in place to protect depositors and increase the stability of the banking system. Accordingly, the Glass-Steagall Act established the Federal Deposit Insurance Corporation to provide deposit insurance.[87]

There have been many attempts in the last fifteen years to dilute the Glass-Steagall restrictions on bank powers. While the rules on the separation of ownership are still largely intact, many of the restrictions on activities have gradually been lifted, at least for bank holding companies. Currently, bank holding companies are allowed to have separately capitalized subsidiaries that offer investment advice, provide discount brokerage services, and underwrite various securities, including commercial paper, municipal revenue bonds, and some corporate bonds and equity under limited circumstances.[88]

Despite these changes, the market for corporate ownership and control of banks is still essentially closed to nonbanking firms—a commercial bank or bank holding company can only be purchased by another banking organization.[89] In addition, whether banking organizations should be permitted to enter more lines of business, such as insurance underwriting, remains a major source of debate. On the one hand, it is argued that the combination of banks and nonbanks may lead to the undesirable extension of the federal safety net to other endeavors.

87. See Kroszner (1996).
88. See Hubbard (1995).
89. One important exception is that nonfinancial firms can own "nonbank banks," which do not qualify as commercial banks because they either do not issue demand deposits or do not make commercial loans. However, the ability to form or expand nonbank banks has been significantly limited by the Competitive Equality Banking Act of 1987 (see Saunders, 1994).

On the other hand, it is argued that the gains from diversification or production synergies resulting from such combinations would outweigh any extension of the safety net, or that such extension can be controlled effectively through the use of firewalls, capital requirements, or other means. The expansion of bank powers may also improve efficiency by broadening the market for corporate control of banks, adding to the pool of firms that could take over, or threaten to take over, a poorly run banking organization.

APPENDIX C

Estimation of the Distribution of Loans across Borrower Credit Size Categories

THIS APPENDIX describes the procedures employed to estimate the distribution of loans across borrower credit size categories shown in table A10. Our breakdown of the domestic commercial and industrial bank loans into borrower credit size categories for each year-end, 1979–94, involves two major steps. The first is to construct these data for organizations that responded to the Federal Reserve's Survey of Terms of Bank Lending to Business. The second is to extrapolate this information to non-STBL organizations. As noted in the text, the STBL is an unpublished source that contains detailed contract information on some of the loans issued each quarter by respondent banks, which include all of the largest U.S. banks and a stratified sample of smaller banks. As of 1994, organizations with STBL respondents accounted for 73 percent of U.S. banking assets.

STBL loans are divided into seven borrower credit size categories, based on the maximum of the loan amount, the commitment amount (if any), and the participation amount (if any), as shown in table A10.[90] This measure conforms as well as possible to the notion of the amount of bank credit available to the borrower at the time, but may understate

90. Before the third quarter of 1982 no information was available from the STBL on the commitment amount or participation amount, so borrower credit size is calculated as the loan amount for these observations.

the total bank credit for some borrowers who have unrelated loans or commitments at the same or other banks. Note that even small organizations can extend credit to large borrowers through the loan participation market. For example, a small bank can have a $100,000 portion of a $100 million loan without violating its legal lending limits, although in practice, this is very rare.

To convert the flow of loan originations into estimates of the stocks of loans in different credit size categories, we assume that the flow of loans made by a banking organization during a given year is representative of the flow that comprises the stock of loans on December 31 of that year. That is, although some loans originated during the year will not remain on the books at the end of the year, and some of the loans in the portfolio at the end of the year were originated in earlier years, we assume enough consistency in lending policy over time that loan data collected from throughout the year should be reasonably representative of the portfolio at the end of the year. Since most loans have maturities that are well under one year, we do not expect significant problems from this assumption.[91]

The formula for the proportion of the organization's gross total assets in category i in December of a given year is $P_i = (DOLYEARS_i/DOLYEARS_{tot}) \times (DCILN/GTA)$, where *DOLYEARS* indicates the sum across loans of the loan amounts times their repayment durations, and *DCILN* and *GTA* are domestic C&I loans and gross total assets for the organization, respectively, both taken from the Call Report. That is, *DOLYEARS* turns the flow of new credit into the quantity it is expected to represent on average over time in the portfolio. Thus $DOLYEARS_i/DOLYEARS_{tot}$ is an estimate of the proportion of the domestic C&I loans that are invested in credit size category i.[92] Multiplication by *DCILN/GTA* is needed to put P_i in terms of the proportion of gross total

91. Consistent with the basic assumptions of the paper, we aggregate the loans within a holding company and treat the holding company as a single decisionmaking unit. When only some of the banks within a holding company were STBL respondents, we use the STBL loans as representative of the entire organization. This should not pose a significant problem in most cases, since the STBL usually captures the largest bank within the MBHC, and therefore is fairly representative of the holding company's assets.

92. For example, if an organization made a two-year loan for $500,000 (one million *DOLYEARS*) and a one-year loan for $19 million (nineteen million *DOLYEARS*), then we would infer that 95 percent (nineteen million of twenty million *DOLYEARS*) of the portfolio is in the $10 million to $100 million category, and 5 percent is in the $250,000 to $1 million category.

assets. Note that in this analysis we treat *GTA* as exogenous and model the banking organization as choosing how to allocate its assets among loans to various sizes of borrowers and other assets.[93]

The second step is to estimate the proportions of *GTA* allocated to the various borrower credit size categories for organizations that did not have STBL respondents. With some important exceptions discussed below, this extrapolation is performed by running a set of grouped log-odds regressions for the proportion of *GTA* that is in a given borrower credit size category *i*, using data on the organizations with STBL representation. The seven dependent variables take the form $\ln[P_i/(1 - P_i)]$, $i = 1,. . .,7$. The model is run separately for each year, allowing the probabilities of being in different borrower credit size categories to vary freely over time.[94] Each equation is estimated using weighted least squares in order to avoid heteroskedasticity problems.[95]

Table C1 presents a representative regression in which P_i refers to the proportion of *GTA* in the third borrower credit size category (between \$250,000 and \$1 million) for the year 1994. The independent variables include dummies for the size class of the banking organization (the smallest class, total assets below \$100 million, is excluded as the

93. There is some concern that because the STBL data are based on loan originations, rather than on the loans that remain on the balance sheet, biases could occur if some types of loans are more often prepaid or sold. For example, large business loans are more often sold without recourse than are small business loans. However, we do not believe this to be a serious problem for our purposes. For the goal of evaluating credit availability, the act of originating a loan is more important than whether that bank keeps the loan on its books. Moreover, most of the loan sales are to other banks, especially foreign banks, so that the reshuffling of large loans likely still leaves most of them held by banks. Most important, we are primarily interested in the variation in these data over time, and any biases that are reasonably constant over time should not impair our comparisons of different time periods.

94. A more standard methodology for this problem would be to set up a model in which all of the dependent variables are expressed relative to the eighth asset category, assets other than domestic commercial and industrial loans; that is, $\ln(P_i/P_8)$, $i = 1,...,7$. Completing this model would be an identity that the eight probabilities must sum to one. However, here such a method would be excessively complicated and cumbersome because of some important deletions from the model discussed below. Essentially, we remove the data when a banking organization size class makes no loans or almost no loans to a given borrower size category. This procedure removes both data and right-hand-side variables from consideration in some of the probabilities but not others, making the estimation of a fully integrated model extremely difficult, if not impossible.

95. Each observation is divided by a number proportional to the estimated standard error of its error term $[\{(1/P_i) + [1/(1 - P_i)]\}/DOLYEARS_i]^{1/2}$.

Table C1. Log-Odds Regression for Gross Total Assets Being in the $250,000–$1 Million Borrower Credit Class for 1994

Variable	Coefficient	t statistic	Variable	Coefficient	t statistic
INTERCEPT	2.663	1.05	KY	1.119	0.58
$100 MILLION—$1 BILLION	1.548	1.14	LA	0.248	0.34
$1 BILLION—$10 BILLION	1.215	0.89	ME	-2.100	-0.53
$10 BILLION—$100 BILLION	0.427	0.31	MD	-0.020	-0.02
$100 BILLION	-0.651	-0.47	MA	-1.565	-3.45
EQUITY/GTA	-162.144	-3.11	MI	1.022	3.43
½(EQUITY/GTA)²	1843.448	2.83	MN	0.054	0.16
TIER 1/RWA	51.227	1.69	MS	-1.110	-2.38
½(TIER1/RWA)²	-361.005	-1.26	MO	0.121	0.36
TOTAL/RWA	-55.049	-2.09	MT	0.781	0.51
½(TOTAL/RWA)²	364.887	1.81	NE	-0.190	-0.21
LLR/GTA	-113.832	-2.81	NV	⋯	⋯
½(LLR/GTA)²	4169.245	2.20	NH	-0.187	-0.01
OREO/GTA	128.772	2.01	NJ	0.756	1.86
½(OREO/GTA)²	-14679.383	-1.75	NM	-11.963	-0.04
NPCILN/DCILN	143.839	3.27	NY	-1.041	-3.47
½(NPCILN/DCILN)²	-8912.146	-2.55	NC	-0.220	-0.81
DCILN/GTA	-6.731	2.67	ND	-19.988	-0.01
½(DCILN/GTA)²	-16.573	-1.87	OH	0.080	0.29
HERF	2.978	2.89	OK	-1.474	-3.46
SHARE	-1.139	-1.30	OR	0.741	2.55
MSA	-0.618	-1.63	PA	-1.257	-4.28
AL	0.674	2.04	RI	-0.254	0.66
AK	⋯	⋯	SC	0.103	0.13
AZ	0.047	0.02	SD	-0.220	-0.39
AR	-0.728	-0.37	TN	-1.219	-3.14
CO	0.940	0.46	TX	-0.101	-0.24
CT	-0.998	-1.70	UT	0.177	0.38
DE	⋯	⋯	VT	-0.860	-1.10
DC	-1.110	-0.65	VA	-0.690	-0.40
FL	-0.181	-0.36	WA	0.867	1.95
GA	-1.405	-3.93	WV	-14.400	-0.05
HI	-0.264	-0.47	WI	-0.297	-0.79
ID	⋯	⋯	WY	⋯	⋯
IL	-0.826	-2.21	FO	1.237	-4.10
IN	-11.020	-0.03			
IA	-0.048	-0.05	Summary statistics		
KS	3.478	1.21	Adjusted R²	0.85	
			N	242	

Source: Authors' regression based on model described in text.

base case), the ratio of equity to *GTA* (*EQUITY/GTA*), the Tier 1 and Total risk-based capital ratios (*TIER1/RWA* and *TOTAL/RWA*), the ratio of loan loss reserve to *GTA* (*LLR/GTA*), the ratio of other real estate owned to *GTA* (*OREO/GTA*), the ratio of nonperforming (past due and nonaccrual) domestic C&I loans to total *DCILN* (*NPCILN/DCILN*), the ratio of *DCILN* to *GTA* (*DCILN/GTA*), second-order terms in all these ratios to allow for nonlinearities, the Herfindahl index (*HERF*) for the average local market of the banking organization (defined as the MSA or non-MSA county), the market share of organization's average local market (*SHARE*), a dummy for the lead bank or largest bank in the holding company being in an MSA (*MSA*), and dummies for the state in which the top-tier holding company is located (including the District of Columbia; California is excluded as the base case; and *FO* is for foreign ownership). As indicated in table C1, a few of the state dummies drop out of the estimation because no banks from those states are in the STBL for a given year. Every state other than Idaho is represented in the STBL sample in at least one year between 1979 and 1994.[96]

We next take predicted values from these equations for the proportions of the portfolio invested in loans to the various credit size categories and multiply them by the bank's actual *GTA*.[97] For banks in states without STBL representation in a particular year, we use the coefficient of the dummy variable for a nearby state with similar demographics, economic conditions, and regulatory environment. For example, Idaho organizations are usually assigned predicted values as if they were facing the same circumstances as organizations in Montana. Thus the model predicts the loan distributions for non-STBL institutions

96. Note that some of the right-hand-side variables are obviously endogenous. For example, the proportion of total domestic C&I loans (*DCILN/GTA*) virtually has to be endogenous to the choices of the borrower size classes of these loans. Similarly, non-performing loan ratios are likely to be outcomes of the choice of borrower size. However, this does not create an econometric problem here because our purpose is purely to predict what occurred in past portfolios, rather than to build a structural or reduced-form model. Any information from the portfolio itself is likely to be helpful in estimating the credit size classes of the borrowers in the portfolio.

97. We set P_i to $\exp(X\beta)/(1 + \exp[X\beta])$, where $X\beta$ is the predicted value from the log-odds equation. This procedure ignores the effect of the error term on the expected value of P_i, which could matter because of the nonlinearity. We tried adding $0.5s^2$ (half the estimated variance of the error term), on the assumption of normality of the error term. This modification made no appreciable difference to the predicted values and was dropped.

on the basis of what would be predicted for an STBL bank in the same size class, with the same capital ratios, portfolio problems, percentage of domestic loans, local market concentration, market share, and in the same or a similar state.[98]

A problem which requires the use of an alternative model in some cases is that some size classes of organizations make very small amounts of loans or no loans to some credit size categories of borrower. For example, organizations in the very smallest organization size class make almost no loans to credits in the largest borrower size category. Such outliers might dominate the sample and create estimation problems if they are not treated separately.[99] To overcome this problem and obtain more accurate estimates for such cases, we delete the mismatches between banking organization size class and borrower credit category from the log-odds regression models.[100] In these cases, we instead use what amounts to a one-variable prediction model in which the weighted average STBL proportion for a particular size class for a given year is

98. Several slightly different versions of the set of right-hand-side variables were also specified for different years and different organizations. For the period before 1984, the prediction models exclude the risk-based capital ratios and nonperforming C&I loans because these variables were not reported during the early time periods. In addition, because some entities were missing data on *HERF* and *SHARE*, and some were missing data on the risk-based capital ratios (even in the 1984–94 interval), additional equations were run first, without *HERF* and *SHARE*, but with risk-based capital; second, without risk-based capital, but with *HERF* and *SHARE*; and third, without either group of variables. The three additional models provide a prediction model for every organization in the country, no matter which variables they are missing. The use of models with fewer variables is essentially equivalent to replacing the missing variables in the full model with their predicted values based on the other available variables.

99. For example, if the largest organizations made no loans to the smallest borrower credit size class, then the coefficient of the large organization dummy variable in the log-odds model described above would be equal to negative infinity.

100. Note that even after these deletions from the main prediction models, the log-odds models do contain some observations with very small, or zero, values for the dependent variable, such as the case of one individual, very large banking organization that made no very large loans. For these observations, we set the P to 0.000001, or one-millionth of the portfolio in the estimation, a standard procedure (in fact, everything below 0.000001 is set to 0.000001). The log-odds model can only predict positive probabilities, and therefore will predict a nonzero P_i for an observation that is very likely zero. For predicted values of around 0.000001, the true proportion is likely exactly zero. Since the model is nonlinear and it is more likely to go further above than below 0.000001, we set all predicted values that are below 0.00001 (one-hundred-thousandth of the portfolio or below) to a predicted value of zero. Similar procedures were applied to proportions of one and close to one.

simply applied to all observations in that group for that year (the weights are based on *GTA*). For example, for most of the years exact zeros are given for the predicted proportions of the portfolios of the smallest organizations devoted to loans to the largest borrowers, since no loans by small organizations to large borrowers were found in the STBL for those years.

The two-part "rule" used to determine the deletions from the log-odds prediction models is first, that any pairing of organization size class and borrower size category in which less than 0.1 percent of *GTA* is invested be deleted; and second, in order to be consistent over time, that other time periods close to a deletion also be deleted, even if the proportion of *GTA* is slightly above 0.1 percent.[101]

Note that we adjust the proportions for *all* banks (STBL banks using observed STBL proportions, non-STBL banks using the log-odds model predictions, and non-STBL banks using the sample proportions) by employing data on *actual* domestic C&I loans. Recall that our model is specified in terms of proportions of assets, but there is also accurate Call Report information on total *DCILN* (although not its breakdown across borrower sizes). To take this extra information into account, the proportion of *GTA* in each size category for each bank is multiplied by the actual *DCILN*-to-*GTA* ratio divided by the estimated sum of the ratios across categories. This procedure gives the same proportionate correction to each credit size category. Finally, the total loan dollars in each category is simply obtained by multiplying each organization's *GTA* by the estimated proportions of *GTA* in each credit size category.

As noted in the text, the breakdown of these loans across borrower credit categories is considerably less accurate than the balance sheet and income data that are taken from the Call Report. This appendix indicates that a number of assumptions are needed to extrapolate from

101. The deletions from the log-odds prediction models are as follows. For banking organizations with assets above $100 billion, we delete the two smallest borrower credit classes (credit of less than $250,000) over 1988–94. For organizations with between $1 billion and $10 billion in assets, we delete the largest credit class (credit of more than $100 million) over 1979–94. For organizations with between $100 million and $1 billion in assets, we delete the two largest credit classes (credit of over $25 million) over 1979–94, and the next smaller credit class (between $10 million and $25 million in credit) over 1979–89. For organizations in the smallest size class, with less than $100 million in assets, we delete the four largest credit classes (credit of more than $1 million) over 1979–94.

the STBL data in order to complete the estimates. In addition, the repayment durations of the loans that are used in the *DOLYEAR* weighting are often difficult to determine, and will be in error if the loan is prepaid or sold to a nonbank. It is not known whether any of these problems create serious biases or inaccuracies. However, we believe that the data that we report in the tables are generally indicative of the direction of change over time, since there is no reason to believe that the biases have *changed* substantially over time. Thus when we estimate that there was a 34.8 percent real contraction in loans to borrowers with bank credit of less than $1 million during the first half of the 1990s, it seems fairly certain that there was a substantial drop in small business lending by banks over this period, but we do not presume that the point estimate is precise.

The only other data source available for the distribution of loans across borrower credit size categories is a new section of the June Call Reports that first appeared in 1993. Because of start-up difficulties, the June 1993 data are problematic and only the June 1994 results are available for use at this time. Since there is only one time period available, these data are not useful for evaluating changes over time. However, the Call Report and the STBL data can be compared for the single time period of June 1994. In this case, the Call Report finds much more lending to small businesses, particularly to borrowers with credit of less than $100,000. Berger and Udell find some potential explanations for the differences.[102] Fortunately our main results from

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102. See Berger and Udell (1996). On the Call Report, banks that report that "all or substantially all" of their C&I loans have borrower credit amounts of $100,000 or less avoid having to provide most of the information on the distribution of these loans. As a result, researchers using these data typically assume that *all* of these loans are made to the borrower credit size class of $100,000 or less, and thus may overstate these small loans. This may, in part, explain why the distribution of borrower credit sizes computed from the Call Report typically finds more lending to small businesses than the STBL data. Berger and Udell go further and investigate how two potential reporting errors might also narrow the differences between the STBL and the Call Report data. First, it appears that some banks might have used the proportion of the *number* of loans that were $100,000 or less, rather than the dollar value, as instructed. Again, this would overstate the smallest loan category in the Call Report results since the small percentage of large loans may yield a rather high percentage of the dollars of these loans. Second, it is possible that some banks might have erroneously reported their size categories by loan size, rather than the maximum of loan size, commitment size, and participation size. Berger and Udell evaluate both of these possibilities by matching the STBL and

using the STBL concerning the relationship between organization size and borrower size are replicated by both Berger and Udell, and Peek and Rosengren using cross-section data from the 1994 Call Report.[103]

Call Report data for June 1994 and find that it is possible that these factors could explain most of the difference between the results from the two data sources.

103. See Berger and Udell (1996) and Peek and Rosengren (1996).

Comments
and Discussion

Mark Gertler: Certainly anyone interested in learning what has gone on in banking over the last fifteen years will find this paper a very useful resource. As I would expect from these authors, a breathtaking amount of interesting information is tabulated and analyzed. They no doubt smash the record for the quantity of numbers reported in a single *BPEA* paper. If you need a time series on the quantity of ATM machines, here it is.

The paper contains a detailed review of the developments in banking since 1979 and a survey of the associated literature. What is new, however, is the energetic attempt to estimate the impact of the relaxation of interstate banking rules on both industry consolidation and the size distribution of lending. Among the results is the startling conclusion that industry consolidation may be hampering the flow of credit to small businesses.

I begin with some general remarks about measuring trends in bank activity and then turn to the authors' predictions about consolidation and the size distribution of bank loans.

Measuring Trends in Commercial Bank Activity

To comprehend the recent trends in banking, it is first important to appreciate that the industry is not in decline. Figure D1 shows the ratio of bank assets to GDP over the postwar period. The line labeled "Flow of Funds" plots this ratio when the measure of bank assets is total loans

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Figure D1. Ratio of Bank Assets to GDP, 1957–92

Percent
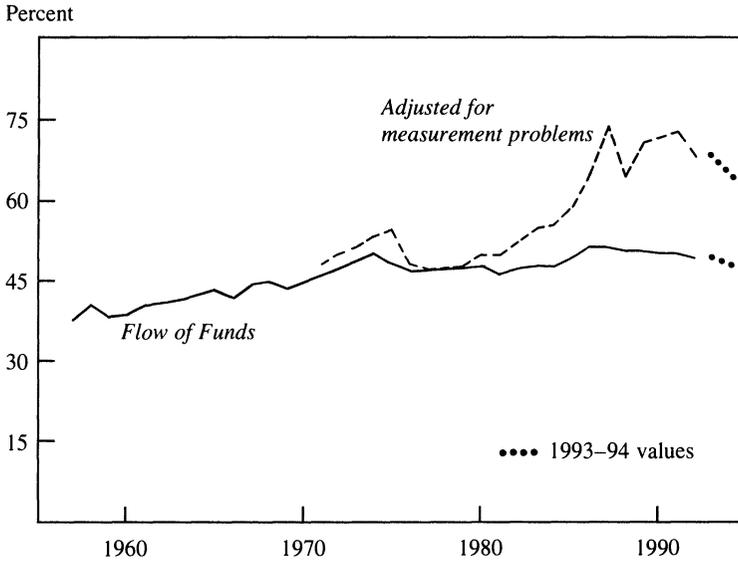
Source: Unadjusted data is from the Flow of Funds Accounts. Adjusted data are from Boyd and Gertler (1994).

and securities as reported in the Flow of Funds data. Note that it has steadily increased, even after 1979, the period of deregulation. It is true that the ratio of bank assets to total credit has been shrinking, but this reflects an astonishing growth in total credit market debt, not a decline in bank credit.

The Flow of Funds numbers also understate the growth in banking. First, they underreport loans to U.S. firms made by foreign banks, which grew rapidly during the 1980s. Second, and more fundamental, their simple balance sheet measures fail to account for the rapid rise in off–balance sheet activities.

One of the most striking developments in banking has been the relative shift in business from on to off the balance sheet. By engaging in off–balance sheet activities, banks unbundle the intermediation process, but they do not disappear from the scene. For example, an important way in which banks facilitate lending off the balance sheet is by providing cross-party guarantees, either in the form of explicit loan guarantees or as backup lines of credit that may be used as collateral. A good example of this phenomenon is the commercial paper market. On the surface, the shift of high-quality borrowers from banks to the

paper market over the last twenty years or so appears to be a pure loss of market share for banks. In fact practically all paper borrowers, except for a few of the very largest, collateralize their issues with backup lines of credit at commercial banks. Banks earn nearly as much in fees from this activity as they would by holding these high-quality assets directly on their balance sheets. For the present purpose, one key implication is that simple balance sheet measures, such as those taken from the Flow of Funds, may have become a far less reliable indicator of overall bank activity.

The line labeled "adjusted for measurement problems" in figure D1 adjusts the Flow of Funds numbers to account for these measurement issues. Underreported foreign lines are added in from information from the Bank for International Settlements, following Robert McCauley and Rama Seth.[1] Off–balance sheet activity is accounted for by capitalizing the income earned from these activities.[2] The adjustments make a big difference: they suggest that the growth in banking is about 30 percent larger than the unadjusted numbers indicate. There is considerable measurement error involved in estimating the off–balance sheet numbers, but there is likely to be far greater error if they are ignored. Finally, it is true that some of the off–balance sheet activity reflects derivatives trading. Here banks are performing their traditional role of asset transformation, but they are doing so off the balance sheet. However, derivatives probably account for no more than a quarter of the total.

Industry Consolidation and the Size Distribution of Bank Loans

The new part of this paper concerns predictions about industry consolidation and the size distribution of bank loans. The most controversial claim is that consolidation stemming from deregulation will likely reduce the flow of credit to small borrowers. The authors' logic consists of three steps. First, small and large borrowers have historically operated in separate niches, the former providing funds mainly for small borrowers and the latter mainly providing funds for large borrowers. Second, the relaxation of interstate banking is likely to result in a loss of market share by small banks in favor of large banks. Third, assuming

1. See McCauley and Seth (1992).
2. See Boyd and Gertler (1994).

that large banks maintain their historical propensity to lend to large rather than small borrowers, the latter will suffer.

The third is the critical and controversial step in the argument. The key issue is whether these historical lending propensities will remain invariant to the shift in interstate banking laws; that is, whether the Lucas critique is relevant. This, in turn, depends on whether the historical lending patterns of large and small banks were due to regulatory or technological factors.

My prior was that regulatory factors were mainly responsible. Limits on the size of loan that a bank can make, relative to its capital, provide large banks with an edge in lending to large borrowers. Conversely, interstate banking restrictions have historically helped small banks to keep large banks out of local markets. Given this regulatory setting, it is natural than an arrangement where large banks service large borrowers and small banks service localized small borrowers should have evolved.

The movement towards nationwide banking should eliminate this regulatory bias by permitting large banks to penetrate local markets. If this is the case, then the lending propensities of large banks should change, as they absorb some small business lending. Some small business lending could be lost, but this would be mainly to borrowers with negative net present value projects who were subsidized under the old arrangement.

To argue that the historical lending propensities will continue (to borrowers with positive net present value projects) requires that market niches were due to technological factors. In particular, there must be diseconomies of scale in lending to small borrowers. This is hard to see. At a minimum, it seems likely that there would be large gains to small banks from regional diversification.

On the other hand, suppose that these diseconomies do exist; then small banks would remain in business. That is, with the elimination of regulatory bias, the size distribution of banking ought to be determined purely by technological factors. If small banks are most efficient at servicing small customers, then they should remain in business.

While I am not convinced by the theoretical underpinnings of the authors' arguments, I do believe that they have identified a very important issue. There has been a sustained decline in lending to small businesses since 1993–94. It seems unlikely that the recession and

credit crunch could account for lending behavior beyond the end of 1992. While there could be a number of explanations for this phenomenon (for example, continued inroads of finance companies at this end of the bank loan market), the authors' consolidation hypothesis is at least a reasonable contender. Evidence by Peek and Rosengren shows that large banks that acquired small banks in New England did, in fact, reduce the small business lending of the acquired entity.[3] More direct evidence of this type would be highly desirable. I am not persuaded by the California example. The recession and credit crunch hit California later than the rest of the country, and this could have affected small business lending.

It is possible, therefore, that consolidation could be reducing small business lending in the short run—large banks take time to adjust to the new market environment. As a long-run phenomenon, this seems implausible. While the new regime may eliminate an implicit subsidy to small business lending, it should not distort against lending to small businesses with positive net value projects.

Finally, in regard to the predictions about consolidation in general, my belief is that the most important question is what will happen to the degree of concentration at the top end of the market. Currently, about sixty banks hold about two-thirds of total on–balance sheet bank assets. It would be a different regulatory world if that shrank to ten or twelve that controlled over 80 percent. I do not think that the authors' estimates rule out this possibility.

First, they extrapolate from a relatively limited experience with regional MBHCs to determine the effects of nationwide banking. Second, they extrapolate on the basis of a few large banks to determine the concentration at the high end. Until recently, U.S. banks grew to become large by expanding into foreign markets because they were restricted in domestic markets. Now that these restrictions have been eliminated, they may expand into U.S. markets—there could be "supermegabanks." The recent merger of Chase Manhattan and Chemical Bank is one example. Further, it is instructive that after the merger, this bank will only be the twenty-first largest in the world. At least from a technological perspective, there could possibly be even larger banks in the United States.

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3. See Peek and Rosengren (1996).

Benjamin M. Friedman: This paper not only provides a fascinating window onto recent developments in the banking industry, but also raises two questions with a very long tradition in the economics of monetary policy: To what extent do the restrictive effects of tight money bear disproportionately on small firms? And, what special role, if any, do banks play in how monetary policy works? Neither of these issues rises to the surface in the authors' exposition, but both are present, nonetheless. Indeed, the bearing of the authors' work on these two questions is what makes their paper relevant to macroeconomics, rather than merely to the banking industry, narrowly construed.

The empirical analysis supports four main conclusions. First, the record is clear that small banks lend disproportionately to small firms (or at least, to firms that borrow in small amounts), while large banks lend disproportionately to large firms. Second, the consolidation of the U.S. banking industry that has taken place over the last decade and a half has pushed banks away from lending to small firms and toward lending to large ones. Third, at least some part of this consolidation has been due to the relaxation of the legal and regulatory restraints that used to prohibit bank combinations; with further relaxation already legislated, therefore, further consolidation is likely to follow. Fourth, this further bank consolidation in coming years will, in turn, push banks further in the direction of lending to large firms, rather than small ones. I agree with each of these conclusions.

The authors also push their analysis to provide *quantitative* estimates of these future developments, including, in particular, the likely consequences of the 1994 Riegle-Neal Act, which will open the door even wider for bank consolidations across state lines. How much confidence to place in these quantitative estimates is difficult if not impossible to judge, however. The authors have made a valuable contribution in estimating so carefully the size distribution of loans by size of bank, and the model that they estimate to establish the effects of regulatory changes (and other influences) on the distribution of bank assets across bank size seems comprehensive, to say the least. Nevertheless, there seems no practical way to evaluate the estimates of the model's parameters which, in turn, underlie the simulations that the authors present to show to what extent, and how rapidly, banks will consolidate as the key provisions of Riegle-Neal take effect.

Not counting state dummies (or intercepts), the authors' model in-

cludes 116 estimated coefficients, of which about one-half are individually significant by the conventional standard of *t* statistics equal to or greater than two in absolute value. As is usually the case, some of the estimated parameters are more important than others for the purposes of the simulations presented. Of the thirty-two coefficients that jointly give the effects of changes in interstate banking arrangements, only eleven are individually significant. Of the eight coefficients that jointly give the dynamics with which these interstate effects occur, only two are individually significant. The authors report the results of tests for joint significance across broad classes of variables in their model, but these tests merely reconfirm that changes in within-state regulation and interstate privileges do have effects. They do not show that the effects are of a specific magnitude or that they occur according to a specific pattern of timing.

To cite these empirical limitations is not to minimize the authors' contribution. Their model is clever, and their handling of difficult, detailed data matters has clearly been thoughtful and painstaking. But whether, in the end, to accept their quantitative estimates of the extent of further bank consolidation, or of the further shift in lending away from small firms and toward large ones, or especially, the claim that these changes will mostly play out by the end of this decade, is another matter. I am more inclined to accept the authors' qualitative conclusions and leave it at that.

The one aspect of the analysis that I would challenge more seriously is the attribution of the slowdown in commercial and industrial lending by banks during the most recent recession, and especially the failure of C&I lending to recover significantly since, to the effects of bank consolidation. The authors' hypothesis addresses two familiar questions about this experience. First, as to whether the absence of growth in business loans was a supply- or a demand-driven phenomenon, the authors identify it as a backward shift in banks' willingness to lend. And second, they ascribe this shift to bank consolidation.

I am dubious on both counts. Notwithstanding the discussion in connection with tables 8 and A8, the slowdown in U.S. business borrowing since 1989 has been more general than just in borrowing from banks. The Flow of Funds Accounts show that all credit market debt owed by U.S. nonfinancial businesses grew by 10.6 percent per annum, on average, between the end of the 1981–82 recession and year-end

1989; by 1.0 percent per annum, on average, during the recession years 1990–91; and by 1.6 percent per annum, on average, during 1992–94. The same firms' credit market debt, *not including bank loans,* grew by 11.5 percent per annum during 1983–89, 1.7 percent per annum during 1990–91, and 1.5 percent per annum during 1992–94. The slowdown in business borrowing since 1990—including, in particular, the absence of any significant pick-up during the recovery—is therefore a broader phenomenon, not confined to small or bank-dependent borrowers. It is true that bank lending has slowed more than other forms of credit, in percentage terms. But because bank loans comprise only a small fraction of total business sources of credit (see, for example, table A8), *nonbank* forms of credit have accounted for most of the slowdown in total business borrowing during recent years.

What might account for such a broadly based slowing of credit extensions? I and others have often emphasized the extraordinary nature of the corporate borrowing wave of the 1980s: not only did U.S. corporations borrow in record volume, but they did so, to a great extent, to pay down equity by means of acquisitions, leveraged buy-outs, and stock repurchases, rather than to finance new earning assets. As a result, by the end of the 1990s corporate America was seriously overleveraged. Especially once the recession had demonstrated that the earnings growth of the 1980s could not be extrapolated indefinitely, some borrowers chose to ''deleverage'' voluntarily (not necessarily by issuing new equity, but by refraining from further borrowing), and others had deleveraging forced upon them by reluctant lenders (including not only banks, but also investors in bonds, commercial paper, and other market obligations). Indeed, since bank loans accounted for only 24 percent of the corporate business sector's credit market debt at year-end 1982 and only 18.5 percent at year-end 1994, open market investors have played a much larger role in this deleveraging process than have the banks.

Further, to the extent that the banks *have* been an important influence in the corporate deleveraging since 1989, the authors' consolidation hypothesis is only part of the explanation. The need for banks to restore their capital positions has been an important factor, especially in the context of the Basle system under which loan assets require more capital than do securities, so that portfolio shifts from loans to securities are a substitute for building capital.

To return to the central thrust of the paper, I certainly agree that the

U.S. banking industry will continue to consolidate, and that this process will further skew bank lending away from small firms toward large ones. But what do these developments mean? Is there reason for concern about the shrinking base of lending to small, bank-dependent businesses? Will banks still be ''special'' if they increasingly lend to large, rather than small, firms? And if monetary policy affects real economic activity primarily through borrowers who are either wholly or partly dependent on banks as their sources of credit (as Anil Kashyap and his earlier coauthors have often argued), but these small firms are now becoming quantitatively less important as recipients of bank loans, how far can this process go before monetary policy must either evolve new ways to affect real activity, or cease having any quantitatively important real effects at all? The authors do not address such broader questions, but these would usefully make the subject for a further paper.

General Discussion

James Duesenberry warned of the uncertainty inherent in trying to predict the future of the banking industry by looking at past trends, especially in light of the rapid changes in the technologies available to banks and in the ways in which their services are provided. He offered the evolution of the grocery industry as a case where change had not been predictable from an extension of past trends: Initially, national chains such as A&P, which were basically buying up conventional neighborhood stores, were expected to dominate the business by exploiting some economies of scale. Then innovative local chains dominated as self-service supermarkets took over. Today specialty stores are becoming increasingly important. Duesenberry found it perfectly conceivable that the banking industry would evolve beyond its current institutional framework, departing in important ways from historical trends. As an example, he suggested that small business lending might become entirely divorced from banking, with small investment houses specializing in relationship lending on a local basis and raising their funds from sources other than bank deposits. Duesenberry also suggested that, in evaluating the prospects for small business lending, the paper should have discussed the impact of the Community Reinvestment Act, which is generating controversy in the banking industry.

Robert Shiller suggested that the recent literature on herd behavior could help in understanding the effects of bank consolidation on small business lending. In a small bank, the president often makes the ultimate decision of whether to award a loan to a small business, while in a larger bank this decision is made by a loan officer and is subject to review by the officer's superiors. Since many intangibles enter into whether a small business is a good investment opportunity, while for a large company there is a lot of objective information available to guide a loan decision, loan officers will find it easier to justify a large company loan and thus may be biased against small business lending. To make such loans would be to break away from the herd, and a reluctance to break away will reduce such loans even further.

George Akerlof applauded the study of California as a way of anticipating the future of nationwide consolidation, since California is bigger than most countries and has had statewide branching for most of this century. However, he wondered whether the authors had any explanation for the unusual pattern of small business lending in California and whether the low overall level of small business lending had disadvantaged the state's economy in any identifiable way. On the first question, Allen Berger responded that the structure of the banking industry in California is somewhat different from that of the rest of the nation, in that both the very large and the very small banks are actively involved in small business lending, while banks of intermediate size do relatively little. He speculated that this might be due to the fact that the Bank of America likes to be big in everything it does, including small business lending. Berger acknowledged that such an institutional peculiarity of the California banking system may reduce the usefulness of California-based simulations for the nation as a whole.

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