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When Are Failing Banks Closed?

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Have Small Banks Been Caught Off-Balance?

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Contents

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Recent financial-sector difficulties have increased the legislative and regulatory attention given to the resolution of bank failures. On the legislative front, concerns over perceived shortcomings in the resolution process have culminated in the passage of the Financial Institutions Reform, Recovery, and Enforcement Act of 1989 (FIRREA) and the Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA), both of which contain provisions to improve the regulatory treatment of troubled financial institutions.

Many of the shortcomings perceived in the resolution process are related to the promptness with which failing banks are closed, and many factors are thought to contribute to unnecessary and potentially expensive resolution delays. In response to these concerns, much of FDICIA is aimed at speeding up the resolution process in general and reducing the potential effects of case-specific attributes, such as bank size, on the regulatory treatment of troubled banks.

Despite these far-reaching legislative changes, little evidence exists regarding the degree to which different factors actually have influenced the survival time of failing banks. While numerous studies have attempted to identify the causes of bank failures,[1] few have analyzed the potential determinants of the timing of bank failures.

Knowledge of the factors determining the timing of bank failures is valuable for several reasons. From a policy perspective, knowledge of the degree to which regulatory factors have influenced how long failing banks survive would be useful in designing new resolution policies and procedures. In addition, knowledge of the financial characteristics that influence the survival time of failing banks would benefit bank regulators, bank investors, and other parties interested in assessing the financial condition of individual banks. In particular, such knowledge could facilitate a type of regulatory triage. Based on expected survival times, bank regulators could seek to rehabilitate those financially impaired institutions that possess sufficient lead times for corrective measures and enforcement actions to take effect. Similarly, failing institutions with financial characteristics associated with short expected survival times could be targeted for prompt closure.

This article summarizes the findings of a recent study in which we provide new evidence on the factors influencing the survival time of failing banks.[2] Specifically, we use data from the December 1985 call report to predict bank failures and the survival time of failing banks during the period from the first quarter of 1986 through the second quarter of 1992. This period covers most of the recent banking downturn. Survival time is defined as the number of quarters, starting with the first quarter of 1986, in which a bank operates before it is resolved by regulators. Our results suggest that only a limited number of the variables typically used to explain bank failure also are useful in explaining the survival time of failing banks. And, interestingly, we find little evidence to suggest that a failing bank's size has been an important determinant of its survival time.

[1] See Demirguc-Kunt (1989b) for a literature review.

[2] See Cole and Gunther (1995, 1993).

Potential Determinants of Bank Survival Time

For the purposes of this analysis, we group the factors that might influence bank survival time under four main headings: financial factors, managerial factors, regulatory factors, and economic factors. Because variables in each category have been shown to influence the likelihood of bank failure, it is reasonable to suspect that the same variables also might be important determinants of the survival time of failing banks. Although many of the variables we employ are related to more than one heading, we attempt to categorize each variable under its most relevant heading.

Financial Factors. Broadly speaking, we expect that measures of a bank's financial condition should be useful in explaining both the likelihood of bank failure and the survival time of failing banks. All else being equal, financial weakness should increase the likelihood of bank failure. Similarly, a severely impaired bank would be expected to fail sooner than a moderately troubled bank.

The financial factors we analyze include proxies for capital adequacy, asset quality, earnings, and liquidity. These factors are defined in Table 1, which also shows the expected influence of each factor on the likelihood and timing of bank failure. The entry "Increase" indicates that high values of a variable are expected to be associated with a high likelihood of survival or a long survival time, whereas the entry "Decrease" indicates that high values of a variable are expected to be associated with a low likelihood of survival or a short survival time. When the nature of a variable's expected effect on bank survival or survival time is ambiguous, as in Table 2, a question mark (?) appears.

We measure capital adequacy by the ratio of equity capital and loan loss reserves to gross assets. Because capital serves as a buffer against losses, a high value for the ratio of capital to assets is expected to increase both the likelihood of survival and the expected survival time of failing banks.

Asset quality difficulties are measured by the ratio of loans past due ninety days or more, nonaccrual loans, and other real estate owned to gross assets. Banks typically must provide for losses on a significant portion of their troubled assets, which reduces net earnings and, ultimately, capital. Therefore, a high value for the troubled asset ratio is expected to reduce both the probability of survival and the expected survival time of failing banks.

We measure the effects of earnings using the return on bank assets. Strong earnings enable a bank to boost capital and signal to regulators that a bank is viable. As a result, the ratio of net income to average net assets is expected to be positively related to both the probability of survival and the expected survival time of failing banks.

The ratios of investment securities to gross assets and large certificates of deposit to gross assets serve as indicators of bank liquidity. Liquid assets enable a bank to respond quickly to unexpected demands for cash, so that a high value for the ratio of investment securities to gross assets should increase both the probability of survival and the expected survival time of failing banks. For troubled banks, large certificates of deposit, portions of which are not insured explicitly, are a less stable and potentially more expensive funding source than retail deposits. As a result, a high value for the ratio of large certificates of deposit to gross assets is expected to reduce both the likelihood of survival and the expected survival time of failing banks.

Because bank management can, in many instances, control the level of bank liquidity fairly closely, the liquidity variables discussed here in the context of financial factors also can be viewed as measures of managerial influence. In particular, low liquidity often is associated with aggressive strategies and a high-risk profile. However, this alternative interpretation does not change the expected relationships between the liquidity variables and both bank survival and bank survival time.

Managerial Factors. In addition, we expect

Table 1
Financial Factors Associated with Bank Survival and Survival Time

Variable	Definition	Expected effect*	
		Survival	Survival time
Capital	Ratio of equity capital and loan loss reserves to gross assets	Increase	Increase
Troubled assets	Ratio of loans past due 90 days or more, nonaccrual loans, and other real estate owned to gross assets	Decrease	Decrease
Net income	Ratio of net income to average net assets	Increase	Increase
Securities	Ratio of investment securities to gross assets	Increase	Increase
Large CDs	Ratio of large certificates of deposit (CDs) ($100,000 and greater) to gross assets	Decrease	Decrease

* "Increase" indicates that high values of the variable are expected to be associated with a high likelihood of survival or a long survival time. "Decrease" indicates that high values of the variable are expected to be associated with a low likelihood of survival or a short survival time.

DATA SOURCE: FFIEC Report of Condition and Income.

that risk-taking might play an important role in determining both whether an individual bank fails and the timing of its failure. In a theoretical article about financial deregulation and bank risk-taking, Marcus (1984) predicts a tendency for individual banks to gravitate toward either a high-risk or low-risk posture, depending on the magnitude of their charter value.[3] Such a process could give rise to a split among banks between high-risk and low-risk institutions, so that a period of adverse economic conditions would result in an industry shakeout, during which the high-risk institutions fail while the low-risk institutions survive. As a result, measures of a bank's risk posture should be useful in explaining the likelihood of its failure. And, similarly, a high-risk posture might work to shorten the life of a failing bank.

As proxies for managerial decision-making, we include in the analysis information on seven categories of bank loans, which are identified in Table 2. Insofar as a high proportion of assets in any of these lending categories reflects high credit risk, we expect the loan portfolio variables to reduce the probability of survival.

However, predicting the relationship of the lending variables with bank survival time is more complicated. While the credit risk associated with bank lending could shorten the expected life of a failing bank, certain peculiarities of bank lending and the institutional arrangements surrounding it could work to extend, rather than reduce, a failing bank's expected survival time.

The role of banks in monitoring borrowers implies that banks possess information about the financial condition of their borrowers superior to that available to other parties (Diamond 1984). In this regard, the

[3] An article by Ritchken, Thomson, DeGennaro, and Li (1993) extends the analysis of Marcus (1984) to allow for portfolio adjustments between examination dates. While these authors find that bank portfolio decisions may not be extreme, their results also suggest that the flexibility to adjust asset allocations increases the range of capital ratios for which the optimal portfolio decision places a bank's charter at risk.

Table 2
Managerial Factors Associated with Bank Survival and Survival Time

Variable	Definition	Expected effect*	
		Survival	Survival time
C&I loans	Ratio of commercial and industrial (C&I) loans to gross assets	Decrease	?
Agricultural loans	Ratio of agricultural production loans to gross assets	Decrease	?
Commercial real estate loans	Ratio of construction loans and loans secured by multifamily, nonresidential, or farm real estate to gross assets	Decrease	?
Residential real estate loans	Ratio of loans secured by one- to four-family residential properties to gross assets	Decrease	?
Consumer loans	Ratio of consumer loans to gross assets	Decrease	?
Other loans	Ratio of all other loans to gross assets	Decrease	?
Insider loans	Ratio of insider loans to gross assets	Decrease	?
Salary expense	Ratio of salaries and employee benefits to average net assets	Decrease	Decrease
Premises expense	Ratio of expenses for premises and fixed assets to average net assets	Decrease	Decrease
Other noninterest expense	Ratio of all other noninterest expenses to average net assets	Decrease	Decrease

* "Increase" indicates that high values of the variable are expected to be associated with a high likelihood of survival or a long survival time. "Decrease" indicates that high values of the variable are expected to be associated with a low likelihood of survival or a short survival time. When the nature of a variable's expected effect on bank survival or survival time is ambiguous, a question mark (?) appears.

DATA SOURCE: FFIEC Report of Condition and Income.

importance of on-site bank examinations to the regulatory process can be viewed as deriving from regulators' efforts to mitigate their informational disadvantage relative to banks. In the event of an impending default by its borrowers, a bank could exploit the information asymmetries associated with its lending activities by concealing knowledge of the borrowers' true financial condition from regulators. The success of this strategy would be enhanced to the extent that resource constraints or other institutional features hampered the efforts of regulators to obtain accurate information about the market value of the bank's loans. If such a strategy were successful, a high proportion of assets invested in a certain category of loans could extend a troubled bank's expected survival time, reflecting regulatory costs in the resolution process. Given the potential importance of these regulatory factors, the expected effect of the lending variables on bank survival time is ambiguous.

An additional complication arises in the interpretation of the effects of the loan variables on survival time. The estimated effects of the loan variables may reflect differences in the timing of economic down-

turns across industries. For example, a high proportion of assets in agricultural production loans could reduce expected survival time if the effects of the downturn in the agricultural sector were most pronounced in the early part of the sample period. Such considerations suggest that, in this particular regard, the estimation results should be interpreted in the context of the events peculiar to our sample period.

Besides risk-taking, an additional potential managerial influence involves efficiency. A low cost structure would be expected to increase the likelihood of bank survival. Similarly, efficient banks would be expected to survive longer than inefficient ones.

To capture the effects of these managerial factors on the likelihood and timing of bank failure, we include measures of banks' cost structures. For this purpose, three measures of noninterest expense are used, each expressed relative to average net assets. Because excessive overhead costs can reduce a bank's competitive position, we expect high levels of salaries and employee benefits, expenses of premises and fixed assets, and other noninterest expenses to reduce both the likelihood of survival and the expected survival time of failing banks.

Regulatory Factors. While the potential influence of regulatory factors on the relationship between the lending variables and bank survival time is somewhat subtle, other, more clearly recognizable avenues of potential regulatory influence also exist. In this section, we single out certain readily identifiable aspects of bank structure that may be more directly related to the regulatory process of resolving banking difficulties.

Many recent academic contributions to the explanation of bank failures have analyzed the considerations regulators face when deciding whether to close failing depository institutions (Gajewski 1988; Cole 1994, 1990; Demirguc-Kunt 1991, 1989a; and Thomson 1992). This focus on regulatory closure rules was motivated largely by the ideas of Kane (1989, 1986) and others who drew attention to the sharp distinction that exists between the economic solvency of a financial institution and its survival. The closure or, more generally, resolution, of a troubled financial institution is a regulatory action that may depend on factors other than the institution's economic net worth. As a result, a financial institution that has failed in the economic sense can avoid resolution if its regulators, for whatever reason, choose not to act.

While many different regulatory factors have been identified as potential contributors to delays in the closure of failing banks, the consideration that seems to have drawn the most attention has to do with the potential influence of bank size on the resolution process. If regulators perceive that the failure of a large bank might greatly disturb the financial system, they might attempt to insulate that bank from the impact of its financial difficulties. Under what has come to be known as the policy of "too big to fail," the resolution process has been perceived as favoring large banks.

The favorable treatment extended under too big to fail could include such subsidies as special access to the discount window, the protection of creditors not explicitly covered by deposit insurance, or the lenient regulatory valuation of bank assets. Under the latter type of subsidy, the value of the assets of a financially impaired bank would be overstated, so that the bank's capital would remain above levels generally associated with closure. Such actions would be expected to enhance the survivability of large banks. In addition, they also could extend the survival time of large banks that eventually fail. Hetzel (1991), for example, argues that the policy of too big to fail has resulted from the institutional need of regulators to control, and often delay, bank closures.

The potential effects of bank structure on the regulatory treatment of financially impaired banks are captured by variables measuring bank size and holding company affiliation, as shown in Table 3. To the extent that the policy of too big to fail has enhanced the survivability of large banks, we expect that, all else being equal, bank

Table 3
Regulatory Factors Associated with Bank Survival and Survival Time

Variable	Definition	Expected effect*	
		Survival	Survival time
Asset size	Logarithm of gross assets	Increase	Increase
Holding company affiliation	Indicates that a bank is a subsidiary of a bank holding company	Increase	Increase

* "Increase" indicates that high values of the variable are expected to be associated with a high likelihood of survival or a long survival time. "Decrease" indicates that high values of the variable are expected to be associated with a low likelihood of survival or a short survival time.

DATA SOURCES: FFIEC Report of Condition and Income; Board of Governors of the Federal Reserve System, Bank Structure Data Base.

size, as measured by the logarithm of gross assets, should be positively related to the likelihood of survival. We should be careful to note, however, that other factors besides differences in regulatory treatment also might work to increase the survivability of large banks. For example, large banks tend to possess more flexibility in financial markets than small banks and also are better able to diversify credit risk. These factors also might contribute to a positive relationship between bank size and bank survival.

In addition to enhancing survivability, the complications and costs associated with the regulatory resolution of large failing banks also could result in resolution delays. To the extent that the resolution of large failing banks has been delayed, our measure of bank size should be positively related to the survival time of failing banks. However, we should again be careful to note that other factors besides differences in regulatory treatment also might work to extend the life of large failing banks. For example, among large banks that fail, relative flexibility in the short-term funding market may work to extend their survival time.

Any complications and costs associated with the resolution of a bank belonging to a holding company also could work to increase both the likelihood of survival and expected survival time. To the extent that significant regulatory costs are associated with the resolution of a subsidiary bank, we expect our variable measuring holding company affiliation to increase both the probability of survival and expected survival time. However, as was the case with bank size, factors other than differences in regulatory treatment also could work to enhance the survivability and survival time of subsidiary banks. For example, holding company affiliation might enhance the financial resources available to troubled banks.

Economic Factors. The economic environment also might exert an important influence on bank survival and bank survival time. An economic upturn would be expected to increase the likelihood of bank survival, primarily through associated increases in asset quality. Similarly, all else being equal, a positive economic shock would be expected to increase the life of a financially impaired bank.

We include in our analysis two additional variables to control for the effects of economic conditions (*Table 4*). During the recent episode of banking difficulties, states with oil-dependent economies ranked among the highest in terms of the bank failure rate. To control for the lingering effects of the oil-price shock that occurred in 1986, the predicted growth in state nonagricultural employment resulting from a $5 per barrel oil-price *decline*, as calculated by Brown and Hill (1988), is included in the model. This variable tends to take on large, negative values for states with prominent energy

Table 4
Economic Factors Associated with Bank Survival and Survival Time

Variable	Definition	Expected effect*	
		Survival	Survival time
Oil-price sensitivity	Growth in state nonagricultural employment resulting from a $5 reduction in oil prices	Increase	?
Rural location	Indicates that a bank is not located in a metropolitan statistical area	?	?

* "Increase" indicates that high values of the variable are associated with a high likelihood of survival or a long survival time. When the nature of a variable's expected effect on bank survival or survival time is ambiguous, a question mark (?) appears.

DATA SOURCES: Board of Governors of the Federal Reserve System, Bank Structure Data Base; Brown and Hill (1988).

production sectors, such as Texas. While we expect that relatively high values of the oil-price variable should be associated with a relatively high likelihood of bank survival, the variable's relationship with survival time is unclear. To the extent that adverse economic conditions shorten a failing bank's expected survival time, banks in regions hurt by the oil-price shock might be expected to fail relatively early. However, for regions where the economic impact of the shock was the most severe, the associated large number of failing banks may have overwhelmed the resources available to regulators, resulting in closure delays.

In addition to the oil-price variable, an indicator variable for banks in rural counties also is included in the model to help control for differences in economic conditions. Because many rural counties were relatively unaffected by the real estate boom and bust that occurred during the sample period, and because rural banks may enjoy a degree of monopoly power in their relatively limited markets, banks in rural areas may have had a higher probability of survival than urban banks. Problems in the farm sector during the mid-1980s, however, may have worked in the opposite direction to lower the probability of survival for rural banks. Similar considerations apply to the effect of a rural location on bank survival time. As a result, the expected impact of a rural location on both bank survival and bank survival time is ambiguous.

Data and Methodology

Most of the data in our study come from statements filed by FDIC-insured commercial banks in the quarterly Report of Condition and Income ("call report"). We use data from the December 1985 call report to predict bank failures and the survival times of failing banks during the period from the first quarter of 1986 through the second quarter of 1992. This period covers most of the recent banking downturn.

We use FDIC press releases to identify bank failures, including failures resolved by open bank assistance. For multibank holding companies, we include only the lead (largest) bank in our sample. This sample restriction allows us to avoid the unwieldy task of attempting to model bank failures precipitated by the insolvency of a multibank holding company's lead bank. We also exclude from the sample banks established during 1985 because measurement of the earnings and expense variables used in the analysis requires that each bank operated for that entire year. The resulting sample consists of 10,843 banks, of which 811, or 7.5 percent, failed during the sample period.

The findings we present in the next

section are based on the statistical results produced by a split-population survival-time model (Cole and Gunther 1995, 1993).[4] Because the split-population model allows the determinants of failure to differ from the determinants of survival time, it facilitates inferences about the separate effects of a given variable on failure and the timing of failure.[5]

Empirical Findings

Table 5 presents both the expected and estimated effect of each variable on both the likelihood of survival for all banks and the expected survival time of failing banks. Under the column for the estimated effect, the entry "Increase" indicates that considerable statistical evidence exists to suggest that high values of a variable are associated with a high likelihood of survival or a long survival time. Conversely, the entry "Decrease" indicates that statistical evidence suggests that high values of a variable are associated with a low likelihood of survival or a short survival time. When the evidence regarding the nature of a variable's effect on bank survival or survival time is relatively scant, a question mark (?) appears.

Likelihood of Survival. The results explaining bank survival contain few surprises and largely confirm the results of previous bank failure studies. As shown in Table 5, the estimated effect corresponds to the expected effect in fourteen cases, and an additional variable for which the expected effect is ambiguous—location in a rural county—is estimated to increase the likelihood of survival. Our estimation results indicate that surviving banks have been characterized by high capital, low troubled assets, high net income, high securities, low large certificates of deposit, low lending levels outside residential real estate, low premises expense, high asset size, high insulation from negative oil-price shocks, and a rural location.

The positive relationship between asset size and bank survival indicates that, *after* controlling for the potential influences of the other explanatory variables, large banks have been less likely to fail than smaller ones. This finding is consistent with the existence of the regulatory policy of too big to fail. However, other factors potentially associated with size, such as financial flexibility and loan diversification, also would be expected to support the estimated size–survival relationship.

The estimated positive relationship between bank survival and the variable measuring the economic impact of a reduction in oil prices indicates that the energy-induced declines in regional economic activity that occurred during our sample period reduced the likelihood of bank survival. This result underscores the pernicious and pervasive effects of declining oil prices on the financial health of banks located in energy-producing areas.

Only four variables do not possess a statistically significant relationship with bank survival—residential real estate loans, salary expense, other noninterest expense, and holding company affiliation. The lack of statistical significance for residential real estate loans is consistent with the view that the boom-to-bust lending pattern evident in the commercial real estate sector did not carry over to the residential sector. It should be noted that, while these four variables

[4] Schmidt and Witte (1989, 1984) were among the first researchers to apply the split-population survival-time model to economic problems. Subsequently, Hunter, Verbrugge, and Whidbee (1994) have applied the split-population survival-time model to the failure of de novo thrifts, and Dahl and Spivey (1994) have used the model to examine recoveries of undercapitalized banks. For a detailed discussion of survival-time models, see Lancaster (1990).

[5] Lane, Looney, and Wansley (1986) and Whalen (1991) are the only published empirical studies of which we are aware that explicitly model bank survival time. However, both of these studies use the Cox proportional hazards model, which assumes implicitly that all banks eventually fail. As a result, these studies cannot identify any differences that may exist between the determinants of bank failure and the factors influencing the survival time of failing banks.

Table 5
Summary of Factors Associated with Bank Survival and Survival Time

	Survival		Survival time	
Variable	Expected*	Estimated*	Expected*	Estimated*
Capital	Increase	Increase	Increase	Increase
Troubled assets	Decrease	Decrease	Decrease	Decrease
Net income	Increase	Increase	Increase	Increase
Securities	Increase	Increase	Increase	?
Large CDs	Decrease	Decrease	Decrease	?
C&I loans	Decrease	Decrease	?	Decrease
Agricultural loans	Decrease	Decrease	?	Decrease
Commercial real estate loans	Decrease	Decrease	?	?
Residential real estate loans	Decrease	?	?	?
Consumer loans	Decrease	Decrease	?	?
Other loans	Decrease	Decrease	?	?
Insider loans	Decrease	Decrease	?	Decrease
Salary expense	Decrease	?	Decrease	?
Premises expense	Decrease	Decrease	Decrease	?
Other noninterest expense	Decrease	?	Decrease	?
Asset size	Increase	Increase	Increase	?
Holding company affiliation	Increase	?	Increase	Increase
Oil-price sensitivity	Increase	Increase	?	Increase
Rural location	?	Increase	?	?

* "Increase" indicates that high values of the variable are associated with a high likelihood of survival or a long survival time. "Decrease" indicates that high values of the variable are associated with a low likelihood of survival or a short survival time. When the nature of a variable's effect on bank survival or survival time is ambiguous, a question mark (?) appears.

DATA SOURCES: FFIEC Report of Condition and Income; Board of Governors of the Federal Reserve System, Bank Structure Data Base; Brown and Hill (1988).

are not found to have the expected effect on bank survival, in no case does the estimated effect oppose the expected effect.

Expected Survival Time. Our interest here focuses on new evidence regarding the relationship between the explanatory variables and the survival time of failing banks. As shown in Table 5, a statistically significant relationship is found for only eight of the nineteen variables. For the other eleven variables, no firm evidence exists to support a relationship with bank survival time. In contrast, fifteen of the nineteen variables we entertain are found to be useful in explaining bank survival. Based on these results, it appears that only a limited number of the variables typically relied on to explain bank failure actually are useful in explaining the survival time of failing banks.

Among the ten variables for which the expected relationship with bank survival time is not ambiguous, evidence supporting the expected relationship is found in only four cases. The four variables for which the estimated effect matches the predicted effect are capital, troubled assets, net income, and holding company affiliation. High

capital, low troubled assets, high net income, and holding company affiliation each lengthen the survival time of failing banks.

Among the lending variables, only C&I loans, agricultural production loans, and insider loans are statistically significant in explaining bank survival time. A high value for any of these credit variables reduces the expected survival time of a failing bank. The estimated negative effect of agricultural production loans on bank survival time partly reflects the occurrence of the agricultural loan crisis in the first part of our sample period. No evidence is found to suggest that higher concentrations of assets in lending categories leads to longer survival times.

The only other significant variable with regard to bank survival time is the growth in regional employment resulting from a reduction in oil prices. The estimated effect for the oil-price variable is positive, which suggests that banks in states hurt by the energy recession failed relatively early in the sample period. In contrast, the distinction between a rural and urban location is not significant in explaining the survival time of failing banks. It should be noted that, while many of the variables fail to possess the expected relationship with bank survival time, in no case does the estimated effect oppose the expected effect.

Finally, our estimation results suggest that the closure of large failing banks has not been delayed relative to the closure of small banks, as no firm evidence is found to support either a positive or a negative relationship between asset size and bank survival time. This finding suggests that any regulatory costs associated with the resolution of large bank failures have not been allowed to extend the survival time of large failing banks. The policy of too big to fail does not appear to have affected the timing of failure resolutions.

Conclusion

Our results indicate that only a select group of the variables commonly used to predict bank failure actually help explain the survival time of failing banks. We find that basic indicators of a bank's condition, such as capital, troubled assets, and net income, are related significantly to the timing of bank failure. However, we do not find that variables often included in bank failure models as measures of liquidity, such as investment securities and large certificates of deposit, are important determinants of bank survival time. These findings suggest that, in attempting to project the survival time of financially impaired banks, regulators can focus exclusively on basic financial indicators, such as capital adequacy, asset quality, and earnings.

In addition, our results suggest that the survival time of failing banks has not been related to asset size. This finding casts doubt on the notion that favorable regulatory treatment has extended the lifetime of large, failing banks. At the same time, however, we also find that a large size has tended to enhance the ability of banks to avoid failure, everything else equal. Taken together, these results suggest that, to the extent that the policy of too big to fail has been important, it has worked to prevent the failure of large banks, but has not extended the survival time of large banks that eventually fail.

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Have Small Banks Been Caught Off-Balance?

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The definitive trend in the epoch of modern banking has been the shift to activities conducted off-balance-sheet. Beset by an increasingly complex and competitive environment, U.S. banks have lost market share in loans and deposits to foreign and nonbank financial services providers. Banks are coping with these challenges by pursuing growth through a myriad of nontraditional activities not captured on the balance sheet.

Although somewhat difficult to measure, off-balance-sheet activities are more important to the banking industry than ever before. Boyd and Gertler (1994) and Kaufman and Mote (1994) consider such activities in their studies of the competitive position of commercial banks relative to other financial intermediaries. They conclude that the widespread belief that banking is a declining industry may be more perception than reality—due, in part, to an underestimation of the importance of off-balance-sheet activities. The increasing importance of off-balance-sheet activities suggests that the banking industry is not retrenching but, rather, growing with and adapting to the changing needs of financial customers.

This article looks at the effects of off-balance-sheet activities on competition within the banking industry. Large banking organizations were the first to participate in off-balance-sheet activities on any significant scale. Certain characteristics of these nontraditional activities tend to favor large banks. But is the movement off the balance sheet a race for economic survival that small banks are destined to lose?

A number of studies conducted in the mid-1980s examined the competitive position and economic viability of small banks in a deregulated environment (see, for example, Benston 1985, Fant 1985, Fraser and Kolari 1985, and Kolari and Zardkoohi 1986). The consensus appears to have been that, although increasing competition posed a serious challenge for small bankers, small banks would continue to maintain their competitive vigor relative to larger institutions.

However, much of this earlier analysis focused on banking activity as measured by the balance sheet. We supplement traditional measures of balance-sheet activity with newly developed estimates of off-balance-sheet activities to assess the extent to which small banks have maintained their importance within the banking industry.

A Traditional Analysis: Balance-Sheet Trends

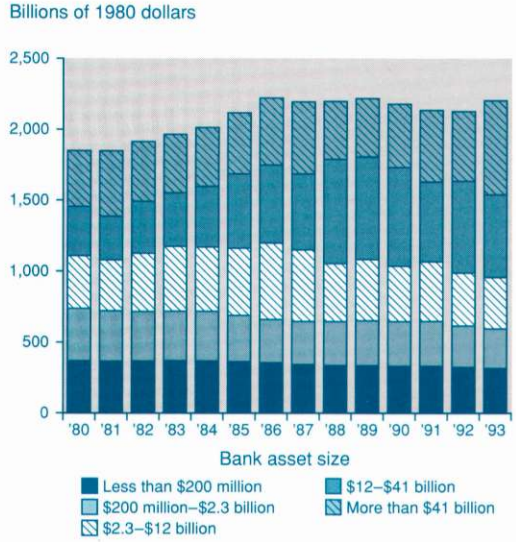
We begin our study of changes in the competitive position of small banks by documenting recent trends in asset growth and market share for various size classes of banks, both nationwide and within the Eleventh District.[1] By focusing on the balance sheet, the analysis in this section conforms to traditional methods frequently used in the study of market share.

National Trends. For this analysis, banks are sorted into five groups based on their asset size.[2] The cutoff points separating the

[1] The Eleventh Federal Reserve District comprises Texas, northern Louisiana, and southern New Mexico.

[2] In this context, we use the term *bank* to indicate either a single insured commercial bank that does not belong to a holding company or the group of all insured commercial bank subsidiaries within a given holding company. We analyze banking organizations rather than individual banks because, within a bank holding company, sister banks do not truly compete with one another and, to some extent, may act as branches of the lead bank.

Chart 1
Total Assets of U.S. Insured Commercial Banks



DATA SOURCE: Consolidated Reports of Condition and Income.

five size-groups are constructed so that, in the 1980 base year, each group represents about 20 percent of total industry assets.[3] Based on this categorization, the five asset-size groups are as follows: (1) less than $200 million, (2) $200 million to $2.3 billion, (3) $2.3 billion to $12 billion, (4) $12 billion to $41 billion, and (5) more than $41 billion. For each year after 1980, banks are categorized into the various size-groups according to the size of their inflation-adjusted assets relative to the cutoff points.[4]

As indicated by Chart 1, total inflation-adjusted banking assets increased 19 percent over the 1980–93 period. Growth was uneven across institutions grouped by asset size, however, as small banks lost ground to their larger competitors. After adjusting for inflation, banks in the two groups of smaller banks had a decline in total assets of 19 percent over the 1980–93 period, while those in the two large-bank classes had an increase of 68 percent. The banks in the middle group showed little change. The gains made by the largest organizations exceeded the losses sustained by the smallest organizations, as the large institutions were not only acquiring market share from the small ones but also were participating in an expansion of the overall market. By year-end 1993, the banks in the two large-bank groups had increased their share of total industry assets from 40 percent in 1980 to 57 percent, while the banking organizations in the two groups of smaller banks saw their market share slide from 40 percent to 27 percent.

The number of entities within each size category is another indicator of the industry's changing structure.[5] The massive consolidation that occurred within the industry centered around the smallest institutions. Between 1980 and 1993, the number of U.S. banking organizations declined 32 percent, from 12,363 to 8,415. The group comprising the smallest banks contained 11,653 institutions in 1980 and only 7,761 in 1993, a decline of 33 percent. In contrast, the group with the largest banks, which was composed of five banks in 1980, increased to nine by 1993.

Despite external pressures, then, the U.S. banking industry has steadily expanded in terms of asset size. Turbulence within the industry has taken a toll on the smaller banking organizations, however, as they have lost considerable market share to the larger banking organizations. Furthermore,

[3] It is not possible to form the groups so that each one contains exactly 20 percent of total industry assets. Particularly in the case of the largest banks, moving an organization from one group to another has a significant effect on group assets.

[4] Throughout this study, all statistics measured in dollars are controlled for inflation. Such adjustments to reflect the effects of inflation mean that a banking organization could not grow out of its size category unless the growth rate of its total assets exceeded the rate of inflation.

[5] Wheelock (1993) provides a long-term perspective on bank consolidation, with an analysis of market structure for the period 1900–92.

far fewer small organizations existed in 1993 than in 1980.

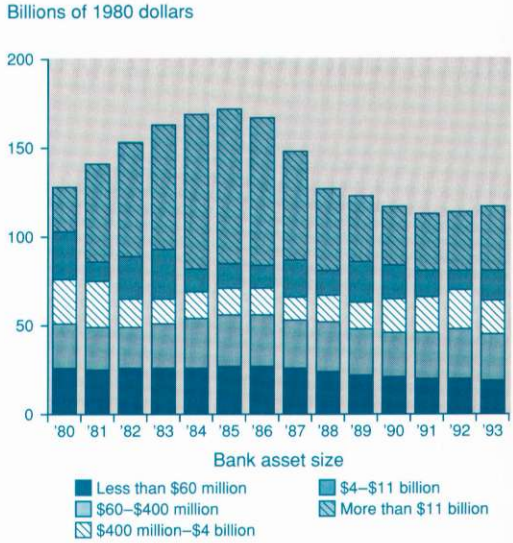
Regional Trends: The Eleventh District. Data from the Eleventh District reflect a significantly different trend than that exhibited at the national level. The rapid expansion of the District banking industry in the early 1980s and its subsequent difficulties in the latter part of the decade have been the subject of extensive study.[6] Total District banking assets, which were $128 billion in 1980, declined 9 percent to $117 billion in 1993, after adjusting for inflation.

As can be seen from Chart 2, the District's smaller institutions were less affected as a group by the 1980s boom and bust than were the larger organizations. Using the same method as was used for the analysis of the U.S. banking industry, the District's banks are divided into five groups, with each group holding about 20 percent of the District's total banking assets in 1980.[7] The banks in the two groups of smaller banks had an 11-percent decline in the inflation-adjusted value of their assets from 1980 to 1993. But, despite a decline in their market share to a low of 32 percent in 1983, by 1993 they almost regained the 40-percent market share they had in 1980. On the other hand, the banks in two groups of large banks saw their market share peak at 60 percent in 1983. By 1993, their market share of 45 percent represented only a modest gain over the 1980 level.

Over this period, the number of banking organizations in the District declined 26 percent, from 1,342 to 998. The decline was concentrated among the institutions in the smallest-size category, which fell from 1,113 banking organizations at the end of 1980 to 751 at the end of 1993. No change occurred in the largest-size category, which contained two organizations in both 1980 and 1993. An increase in the average asset size of banks in the smallest-size group enabled that group to maintain its market share of assets, even as the number of banks in the group was sharply declining.

To summarize, Eleventh District banking industry assets have contracted, running counter to the national trend of slow industry growth. And, while small banking organizations here have become fewer in number, they have not suffered the same decline in share of total assets as their counterparts at the national level. The enduring strength of the District's small banks partly reflects the shakeout of the District's largest institutions that occurred during the tumultuous 1980s.

Chart 2
Total Assets of Eleventh District Insured Commercial Banks



DATA SOURCE: Consolidated Reports of Condition and Income.

[6] See, for example, Short (1991), Gunther (1989), and Robinson (1990).

[7] Our analysis of Eleventh District banking organizations is complicated by the fact that some bank holding companies operate in multiple Districts. For multi-District bank holding companies, only the assets held in subsidiary banks in the Eleventh District are included in the analysis. For example, suppose that XYZ Bankshares, Inc. controls three $20 million banks, one in Oklahoma and two in Texas. For the analysis of the Eleventh District, XYZ Bankshares, Inc. is considered to be a $40 million bank.

Beyond the Balance Sheet

Total assets provide a simple and easily obtainable measure of banking activity, but traditional balance-sheet analysis does not reveal the full scope of the importance of banks as financial intermediaries.[8] Sparked by advances in computer and communications technology and the proliferation of competition in the financial services industry, commercial banks are turning to other ways to increase their profitability. While traditional deposit-based lending remains the core business of most commercial banks, recent data show an increasing reliance on noninterest income from off-balance-sheet activities. An associated trend is the expansion of asset securitization, which, like loan participations and outright sales, is a means of removing loans from the balance sheet while generating noninterest income. Securitization has afforded banks additional business opportunities as issuers and purchasers of asset-backed securities, as well as originators and servicers of the underlying assets.

Many fee-based services, such as fiduciary activities and mutual fund sales, do not correspond to assets or liabilities subject to entry on banks' balance sheets. Trust department assets, for example, are managed for a fee but are not owned by the banks. Similarly, mutual funds do not appear on the balance sheet, but banks receive sales-related fees and, in some cases, additional compensation for their services as investment advisors, custodians, and administrators of the funds.

Credit enhancement is another fee-based service that isn't reflected on the balance sheet. Two of the most common transactions are loan commitments and letters of credit. Loan commitments are irrevocable obligations made by a bank to advance funds at a future date in the form of loans or participations in loans, lease financing receivables, or similar transactions. Usually extended for working capital or seasonal or cyclical needs, loan commitments allow the customer to obtain credit from the bank under prearranged terms. Generally, the bank receives an upfront fee and fees on the unused balance.

Letters of credit are documents issued by a bank for a fee on behalf of its customer authorizing a third party, the beneficiary, to draw drafts on the bank up to a specified amount, with certain terms and conditions. Under the terms of a standby letter of credit, drafts are drawn only when an underlying event fails to occur. Financial standby letters of credit back direct financial obligations, such as the customer's payment of commercial paper. Performance standby letters of credit back the customer's completion of a specific contract, such as the delivery of merchandise or the completion of construction.

Financial standby letters of credit are often used to support U.S. commercial paper issues. Because the bank performs the credit analysis and assumes the credit risk, commercial paper backed by letters of credit may be sold at more attractive interest rates and achieve a wider distribution than issues sold without the benefit of such credit enhancement.

Other important off-balance-sheet items are interest rate contracts and foreign exchange rate contracts, which are used to hedge against risk. These include swaps, options, futures, and forward contracts.[9]

Asset securitization also has had a significant impact on bank activities. Securitization is the packaging of similar loans into marketable securities for sale to investors. These securities are most often backed by residential mortgages, although other securitized assets include automobile loans, boat loans, commercial real estate loans, student loans, home equity loans,

[8] Some material in this section was derived from internal Federal Reserve System examination guidelines issued May 25, 1990.

[9] For additional discussion of these derivative instruments, see Siems (1994).

credit card receivables, lease receivables, nonperforming loans, and other loans. Small business loans may soon be added to this list, as legislation signed into law on September 23, 1994, was designed to encourage the formation of a secondary market for small-business-backed securities.

Banks may participate in many facets of the securitization process. They may originate, package, or service the assets; serve as trustee for the pool; provide credit enhancement; underwrite the issue; or invest in the securities. In addition to providing a source of income, asset securitization enhances an institution's liquidity, as loans are converted into marketable securities and can be used as a tool in asset/liability management, helping reduce interest rate risk. Further, purchases of asset-backed securities allow a bank to diversify its asset base both geographically and by industrial sector. This feature is particularly attractive to small banks, whose access to a wide variety of top-quality borrowers may be limited.

Some of the characteristics of off-balance-sheet activities tend to provide large banks with a competitive advantage relative to small banks. To the extent that off-balance-sheet activities involve large fixed costs, these activities have to operate on a large scale to be profitable. Proprietary mutual funds are one such example. Other off-balance-sheet activities, such as mortgage servicing, require a high volume of activity to produce significant income because of their slim margins. Financial standby letters of credit to support commercial paper issues are generally large due to the large size of typical commercial paper issues. Derivative contracts also tend to involve large notional amounts. Certain other off-balance-sheet activities, however, are accessible to smaller institutions, including some types of asset securitization and fiduciary activities.

Measurement of Off-Balance-Sheet Activities

Because of their growing importance, off-balance-sheet activities have to be included in any accurate measure of banking activity. However, the notional value of these nontraditional activities is not comparable to the total asset value of traditional banking activities. For example, an unused loan commitment of $1 million is not equivalent to a loan of $1 million because it may never be funded, it does not entail the same risks, and it does not provide equal income to the lender. Thus, dollar-for-dollar comparison of the notional value of off-balance-sheet activities to balance-sheet assets is not meaningful.

An alternative approach would gauge the importance of off-balance-sheet activities by the income they generate. Two methodologies, discussed in detail below, are based on the simple idea that the greater the amount of income generated off-balance-sheet, the greater the importance of these activities to the business of banking.

The Capitalization-of-Income Approach. The first method of measuring off-balance-sheet activity is predicated on the notion that the rate of return on off-balance-sheet activities may be comparable to the rate of return on balance-sheet activities. To maximize profits, banks can be expected to adjust their participation in balance-sheet and off-balance-sheet activities until the payoffs from the two activities are equal at the margin. Under certain assumptions, this implies that the rates of return on the balance-sheet and off-balance-sheet activities would be equal. The income generated by off-balance-sheet activities could then be used to estimate their value.[10] Data obtained from the Consolidated Reports of Condition and Income (or call reports) collected by federal bank regulatory agencies provide the return on balance-sheet assets and an estimate of income received from off-balance-sheet activities, which are

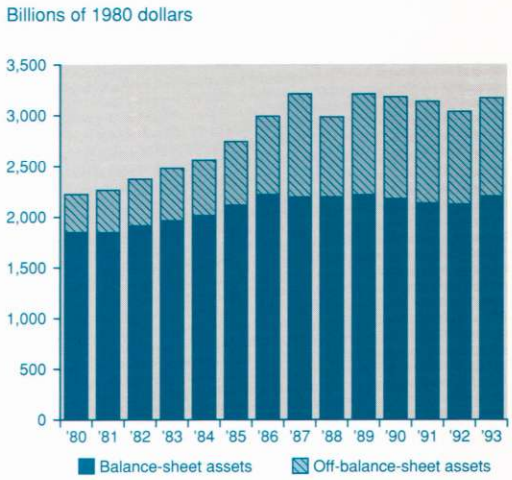
[10] See Boyd and Gertler (1994) for further discussion of this approach.

used to calculate a dollar value for off-balance-sheet activities.[11, 12]

The Value-Added Approach. A second method of measuring the importance of off-balance-sheet activities is based on the concept of value added. Broadly speaking, an industry's value added is equal to the revenue generated from the sale of its products or services, minus the value of the raw materials that it purchases. The value added of a given industry can be used to assess the contribution of that industry to overall economic activity, which is represented by the gross domestic product (GDP).

The banking industry's value added stems from two components: the value added by balance-sheet activities and the value added by off-balance-sheet activities.[13] The value added by balance-sheet activities is estimated in this study as the sum of interest income and service charges on deposits less the sum of interest expense and the provision for loan losses. The value added by off-balance-sheet activities is estimated as noninterest income exclusive of service charges on deposit accounts.

Chart 3
Adjusted Assets of U.S. Insured Commercial Banks



DATA SOURCE: Consolidated Reports of Condition and Income.

A Comprehensive Analysis: Combined Balance-Sheet and Off-Balance-Sheet Trends

We now reassess the competitive position of small banks by documenting recent trends in balance-sheet and off-balance-sheet activities for various size-classes of banks, both nationwide and within the Eleventh District. By accounting for off-balance-sheet activities, the analysis presented in this section goes beyond the traditional methods used in previous studies of market share.

National Trends. The estimates generated by the capitalization-of-income approach for the dollar value of off-balance-sheet activities for U.S. banks appear in Chart 3. The upper portion of each bar shows the estimate of off-balance-sheet activities, and the lower portion shows actual balance-sheet assets. The sum of balance-sheet assets and off-balance-sheet assets is hereafter referred to as "adjusted assets."

[11] The return on assets used in the calculations here is not the conventional measure, which compares net income with total assets. Instead, the return on balance-sheet assets is the ratio of interest income and service charges on deposits less interest expense and the provision for loan losses to total assets. Noninterest income exclusive of service charges on deposits is excluded from the numerator because it is attributed to off-balance-sheet activities for purposes of this study.

[12] The best estimate of income received from off-balance-sheet activities that can be obtained from the call reports is noninterest income less service charges on deposits. This measure may understate the income actually generated by off-balance-sheet activities, however. Some of the income received from off-balance-sheet activities is included in interest income instead of noninterest income. For example, under certain circumstances, loan commitment fees are included in interest income, even though loan commitments are an off-balance-sheet activity.

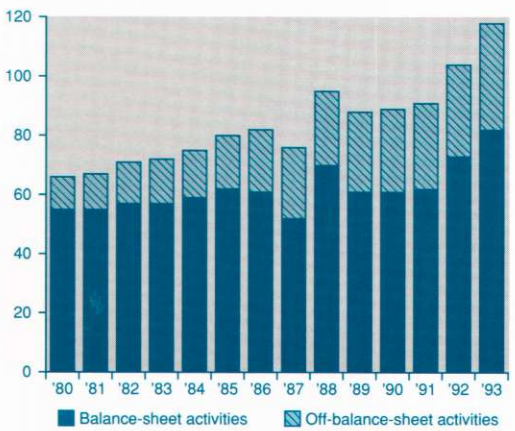
[13] Value added in the banking industry is discussed in detail by the American Bankers Association (1994).

Chart 3 shows clearly that the banking industry has relied heavily on off-balance-sheet activities to generate growth. Over the 1980–93 period, the industry's adjusted assets increased 42 percent, more than double the 19-percent growth in balance-sheet assets during this period. This finding highlights the importance of accounting for off-balance-sheet activities in the analysis of market share.

Similar results are obtained using the value-added approach. Estimates of the banking industry's value added appear in Chart 4. The lower portion of each bar represents the value added by balance-sheet activities, and the upper portion represents the value added by off-balance-sheet activities. Together, they represent total value added. Between 1980 and 1993, total value added increased 79 percent, while real GDP increased 36 percent. Thus, the industry's contribution to overall economic activity was growing as a fraction of total economic activity between 1980 and 1993, with nearly half of that growth coming from off-balance-sheet activities. The value added from off-balance-sheet activities grew by $25 billion, or 222 percent, while the value added from balance-sheet activities increased by $27 billion, or 50 percent.

Chart 4
Value Added to the Economy by U.S. Insured Commercial Banks

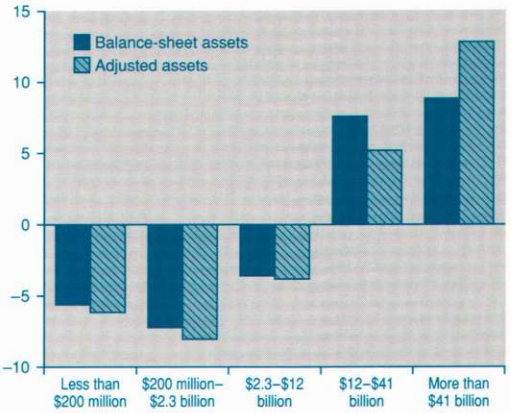
Billions of 1980 dollars



DATA SOURCE: Consolidated Reports of Condition and Income.

Chart 5
Changes in Market Share, Based on Assets Of U.S. Insured Commercial Banks, 1980–93

Percentage point gain or loss from 1980 to 1993



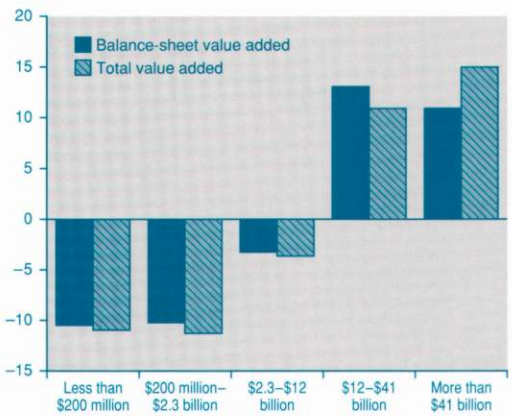
DATA SOURCE: Consolidated Reports of Condition and Income.

Adding off-balance-sheet activities to traditional balance-sheet activities slightly amplifies the market share losses suffered by small banks over the 1980–93 period. Chart 5 compares the changes that occurred over this period in the market shares for the various size-groups using balance-sheet assets alone and also with off-balance-sheet activity as estimated by the capitalization-of-income approach.[14] The share of balance-sheet assets controlled by the two groups of smaller banks fell 13 percentage points from 40 percent in 1980 to 27 percent in 1993. The share of adjusted assets controlled by the two groups of smaller banks fell 14 percentage points, from 36 percent in 1980 to 22 percent in 1993.

Similar market share results are obtained using the value-added approach. Total value added by banking organizations in

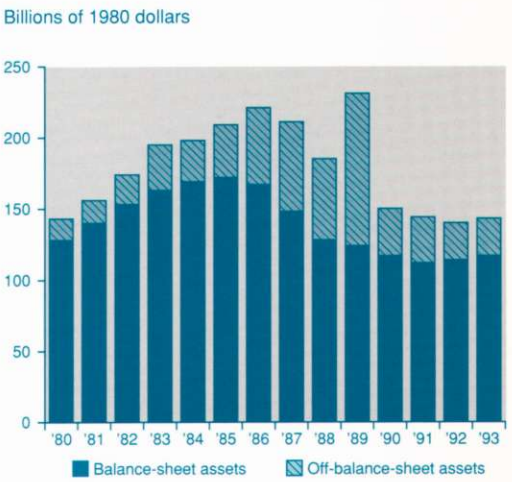
[14] These are the same size-group definitions that were used in the traditional analysis.

Chart 6
Changes in Market Share, Based on Value Added by U.S. Insured Commercial Banks, 1980–93



DATA SOURCE: Consolidated Reports of Condition and Income.

Chart 7
Adjusted Assets of Eleventh District Insured Commercial Banks



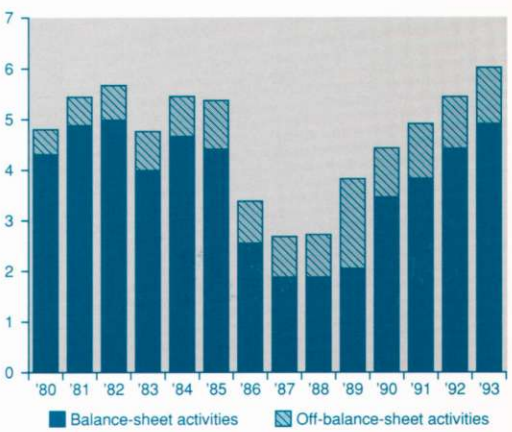
DATA SOURCE: Consolidated Reports of Condition and Income.

the two groups of smaller banks was fairly stable—$31 billion in 1980 and $30 billion in 1993 in inflation-adjusted dollars. Nevertheless, their share of the industry's total value added declined 23 percentage points over this period, from 48 percent in 1980 to only 25 percent in 1993. When only the value added associated with balance-sheet activities is considered, the decline in market share is somewhat less, as shown in Chart 6. The share of balance-sheet value added controlled by the two groups of smaller banks fell 20 percentage points, from 51 percent in 1980 to 31 percent in 1993.

To summarize, the estimates obtained under both the capitalization-of-income approach and the value-added approach indicate that off-balance-sheet activities have become increasingly important for the U.S. banking industry. Much of the industry's growth was derived from its tactical shift into off-balance-sheet activities. Moreover, the movement to off-balance-sheet activities slightly increased the losses in market share suffered by small banks over the 1980–93 period.

Regional Trends: The Eleventh District. Eleventh District banks have not pursued off-balance-sheet activities to the same extent as banks nationwide. As shown in

Chart 8
Value Added to the Economy by Eleventh District Insured Commercial Banks



DATA SOURCE: Consolidated Reports of Condition and Income.

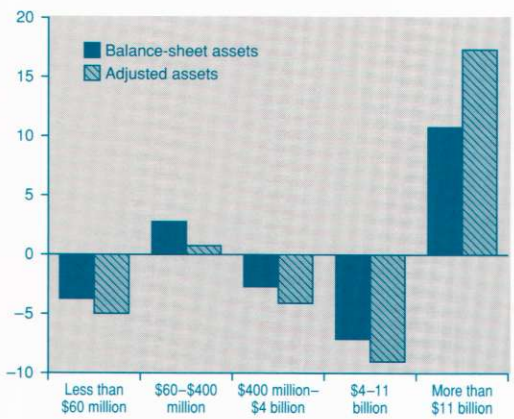
Chart 7, adjusted assets in the District increased by less than 1 percent over the 1980–93 period. And, as shown in Chart 8, the value added generated by off-balance-sheet activities in the District increased 127 percent over the 1980–93 period, substantially less than in the rest of the nation.

Chart 9 compares changes in market share for the various size-groups of District banks using balance-sheet assets and adjusted assets as estimated by the capitalization-of-income approach.[15] The combined share of balance-sheet assets controlled by the two groups of smaller District banks fell 1 percentage point, from 40 percent in 1980 to 39 percent in 1993. Their combined share of District adjusted assets declined by 4 percentage points, from 38 percent in 1980 to 34 percent in 1993.

Using the value-added approach, small banks' loss in market share was greater than under the capitalization of income approach. The two groups of smaller banks controlled 44 percent of the value added associated with District balance-sheet activities in 1993, down from 50 percent in 1980. As shown in Chart 10, the share of total value added controlled by these two groups of District banks fell 9 percentage points, from 48 percent in 1980 to 39 percent in 1993.

Chart 9
Changes in Market Share, Based on Assets of Eleventh District Insured Commercial Banks, 1980–93

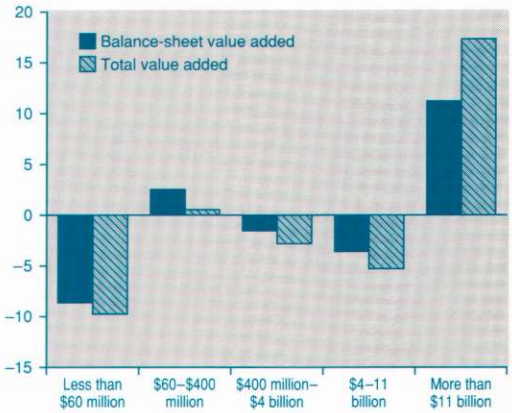
Percentage point gain or loss from 1980 to 1993



DATA SOURCE: Consolidated Reports of Condition and Income.

Chart 10
Changes in Market Share, Based on Valued Added by Eleventh District Insured Commercial Banks, 1980–93

Percentage point gain or loss from 1980 to 1993



DATA SOURCE: Consolidated Reports of Condition and Income.

In summary, our findings indicate that small banks in the District have suffered a smaller decline in market share than small banks in the United States as a whole. At the national level, the two groups of smaller banks controlled 22 percent of the total quantity of assets adjusted for off-balance-sheet activities in 1993, down from 36 percent in 1980. In contrast, the District's small banks controlled 34 percent of the total quantity of assets adjusted for off-balance-sheet activities in 1993, down only slightly from 38 percent in 1980. At both the District and national levels, expanding the definition of the banking market to include off-balance-sheet activities reveals an increase in the loss of market share by small banks.

[15] These are the same size-group definitions that were used in the traditional analysis.

Conclusion

The difficulties faced by small banks have been well documented by traditional analyses. The consolidation of the industry has had by far the most impact on the smallest banks. Further, small banks have lost a significant amount of market share, as measured by total assets.

In light of the industry's shift to off-balance-sheet activities, however, it has become increasingly important to extend banking analysis beyond the balance sheet. Both large and small banks have used off-balance-sheet activities as a vehicle for growth, although, due to the nature of off-balance-sheet activities, large banks have pursued them more effectively than have small banks. When the definition of the banking market is expanded to include off-balance-sheet activities, small banks have had an even greater loss of market share than has been suggested by traditional analysis.

In the Eleventh District, small banks have been much more successful in maintaining their competitive position, having lost a much smaller share of the banking market between 1980 and 1993 than their counterparts nationwide. National trends, however, continue to underscore the potentially fragile position of small banks in the current banking environment.

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