Investigating the Banking Consolidation Trend

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Lately, the U.S. commercial banking industry has been consolidating. Although some firms have left the industry, many more have simply combined with other firms, resulting in fewer, bigger banks. Many legislators, regulators, bankers, and economists have roundly applauded this consolidation trend. In their view, consolidation is a laudable market response to industry changes that will bring significant benefits such as greater efficiency and a lower rate of bank failures. They also see consolidation as an effective way to shift resources out of banking, an industry they think is plagued with excess capacity.

We take exception to this widely held positive view of consolidation. After examining the available evidence, we do not think consolidation will deliver any of the benefits its proponents expect from it. That's because consolidation in banking does not appear to be primarily due to market forces. Although we cannot definitely explain why this trend is occurring, the data suggest that a major cause is incentives created by government policy. In fact, our investigation raises serious questions about the wisdom of certain bank regulatory practices.

The Trend

The first step in our investigation of the recent banking consolidation trend is to define more precisely what we mean by *consolidation* and document that it is actually occurring. *Consolidation*, by our definition, means a decrease in the number of firms in the industry combined with an increase in their average size.

Fewer Banks

There's no doubt that the number of banks has declined recently. After reaching a post-Depression high of about 14,500 in 1984, the number of U.S. insured commercial banks dropped to about 12,300 by 1990, a decline of 15 percent. As Chart 1 reveals, the decline partly reflects the exit of failed banks from the industry, but much more it reflects the absorption of both ailing and healthy banks into branch offices of other banks.[1] Chart 1 also reveals that the large decline in the number of banks does not necessarily reflect a sick industry, for the number of new banks has not dropped dramatically. In fact, in the past five years, new banks have entered the industry at a 1.6 percent annual rate (newly chartered banks as a percentage of total banks). This is only slightly slower than in the first half of the 1980s, and it's faster than in the 1960s or the 1970s.

The evidence for consolidation is even more compelling when we shift from banks to banking organizations. A banking organization, such as a bank holding company,

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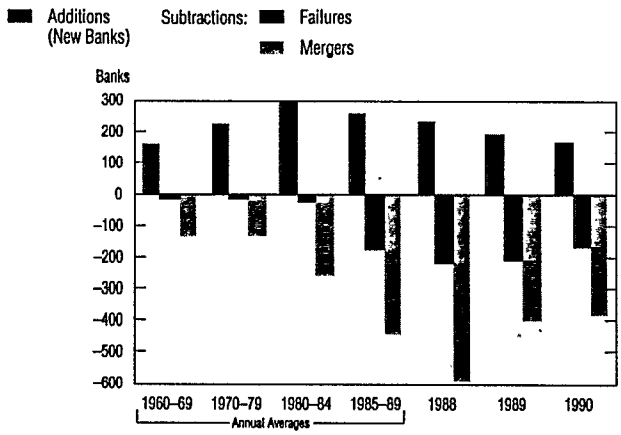
[1]A high proportion of failed banks are absorbed by healthy banks under the Federal Deposit Insurance Corporation's (FDIC's) purchase and assumption option. The acquiring bank purchases some of the assets and assumes the deposits and other liabilities of the failed bank. The acquiring bank may also pay a premium to the FDIC representing in part the value of the failed bank's charter.

Chart 1

Although Still Healthy, Entries Have Lately Been Outweighed by Exits in the Banking Industry.

Changes in the Number of U.S. Insured Commercial Banks Annually, 1960–90



Source: Federal Deposit Insurance Corporation

usually includes more than one bank. Changes in the number of these firms provide a better measure of banking consolidation because in them management decisions are generally made at the top; the true economic entity is the total organization. Between 1976 and 1990, the number of U.S. banking organizations declined 24 percent, roughly ten percentage points more than the number of banks declined. The larger contraction in the number of banking organizations reflects the acquisition and conversion of independent banks into bank holding company subsidiaries (which retain their individual bank charters), rather than into branches. This multibank ownership structure largely reflects state branching restrictions.

Bigger Banks

Now let's complete our documentation of consolidation: While the number of banking firms has been shrinking, the average size of banking firms has been growing.

To see this, we can't look just at the changes in the share of all assets held by firms of different sizes; we must also look at the changes in the number of firms of each size. Between 1976 and 1987, the number of banking organizations with total assets less than $50 million dropped from 85 percent to 62 percent of all banking organizations, and their share of total assets dropped from 17 percent to 6 percent (Table 1). At the high end, firms with total assets of $5 billion or more, the number of firms rose from 0.2 percent to 0.9 percent of all banking organizations, and their share of total assets rose from 30 percent to 59 percent. Note that this group of large banks is the only size group that increased its share of assets between 1976 and 1987. This remains true even after the asset data are adjusted for inflation.

The growth in asset size, however, does not seem to be concentrated at the very top. Chart 2 shows the domestic market share of the 100 largest U.S. banking organizations. Between 1977 and 1990, it increased from 50 percent to 65 percent. Most of the gains, though, occurred at banks ranked 11th or lower.[2]

Are Market Forces Behind the Trend?

Thus, the evidence reveals a recent rapid consolidation trend in the U.S. banking industry. Why is this trend occurring? The popular belief is that market forces are causing banking consolidation; the industry is adjusting to take advantage of economies of scale, to eliminate excess capacity, and to reduce the risk of bank failure. The available evidence, however, does not generally support this popular belief.

Scale Economies?

> Consolidation, particularly in-market mergers, will reduce the number of institutions chasing marginal business and running up the cost of funds. And it will allow substantial overhead reductions without impairing the ability of banks to serve their customers properly.

This comment (Isaac 1990, p. 4) reflects the popular view that banking is an industry which exhibits broad economies of scale. If that were true, then the recent consolidation in banking could be the result of natural market forces driving the industry toward bigger firms in order to achieve lower costs and higher profitability. Unfortunately, however, the popular view appears to be largely incorrect.

A firm is said to exhibit *economies of scale* when its average cost of production declines as the quantity of its output increases. In theory, such economies could extend indefinitely. In fact, however, the available data show something different for commercial banking: after banks reach a fairly modest size, there is no cost advantage to further expansion. Some evidence even suggests diseconomies of scale for the very largest banks.

[2]One explanation for the small gain in the industry share of the 10 largest banking firms is that they generally have been excluded from interstate banking expansion. Most state laws permitting entry by out-of-state banks restrict entry to banks from specified states, once reciprocity is established. All but one of the top 10 firms are domiciled either in New York or in California, and these states are not generally included in reciprocity agreements.

Table 1

Bigger Banks Have Been Getting Bigger . . .

Number of U.S. Banking Firms and the Assets They Held, Grouped by Size of Firm, 1976 vs. 1987

	Number of Firms						Assets Held					
	Firms			% of All Firms			Billions of $			% of All Assets		
Asset Size of Firms	1976	1987	Deflated 1987*	1976	1987	Deflated 1987*	1976	1987	Deflated 1987*	1976	1987	Deflated 1987*
Less Than $50 Mil.	10,542	6,389	8,902	85.0	62.2	86.6	167.7	152.0	133.7	16.7	5.9	13.3
$50 Mil.–$100 Mil.	943	2,071	719	7.6	20.1	7.0	64.0	143.9	48.5	6.4	5.5	4.8
$100 Mil.–$1 Bil.	767	1,557	511	6.2	15.1	5.0	207.7	358.9	142.5	20.7	13.8	14.2
$1 Bil.–$5 Bil.	130	173	108	1.0	1.7	1.1	265.2	401.9	242.3	26.4	15.5	24.1
$5 Bil. or More	22	89	39	.2	.9	.4	299.1	1,540.6	436.7	29.8	59.3	43.5

*These columns represent the distribution after bank assets have been deflated by the change in total domestic banking assets between 1976 and 1987.

Source: Federal Reserve Board of Governors

☐ *Past Studies*

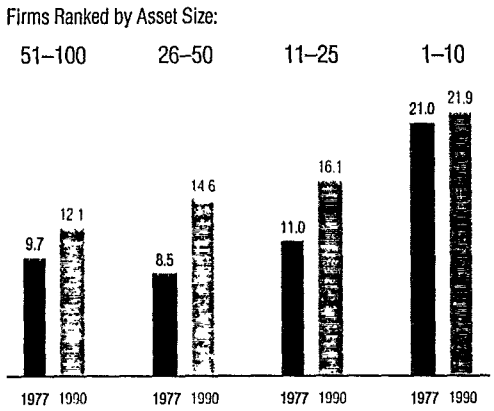
Many researchers have studied scale economies among U.S. banking firms. Most such studies find significant scale economies in the industry, as predicted by theory, but they also suggest that these are exhausted below the relatively modest size of $100 million in deposits. (In 1988, for example, over 3,000 banks had total deposits between $50 million and $200 million.) Clark (1988) provides an excellent survey of this large literature. He reports that of 13 studies of economies of scale in banking, only 2 have found significant scale economies above $100 million in deposits. And since Clark's survey, several studies have actually found diseconomies of scale for very large banking firms, those in the multibillion-dollar range (for example, Berger and Humphrey 1990).

Although there is a general consensus in this literature, researchers have not been unanimous in their conclusions. Thus, it would be reassuring if we could explain why different researchers have obtained somewhat different results. And we can. A recent study by Humphrey (1990) considers these studies and concludes that different results can generally be explained by differences in assumptions, methodology, or both.[3] Humphrey (1990, p. 48) ends his

Chart 2

. . . But Not, Primarily, the Top 10.

% of All U.S. Assets Held by the 100 Largest Banking Firms, 1977 vs. 1990



Source: Federal Reserve Board of Governors

[3]Humphrey (1990) makes three main points. First, some studies have examined just operating costs which, he argues, will bias their results in the direction of finding scale economies. The more appropriate variable to consider is total costs, including overhead and indirect costs. Second, early studies used linear (Cobb-Douglas) production functions, which are also biased in the direction of finding economies of scale. Humphrey argues for the use of nonlinear production functions in this research. Third, and finally, some studies have taken as their size measure individual office size instead of the overall size of the banking firm. Such studies also ignore overhead and administrative costs.

Tables 2 and 3

Bigger Doesn't Mean More Profitable . . .

Table 2

. . . Among All U.S. Banks . . .

Measures of Profitability and Leverage for All U.S. Commercial Banks by Size of Assets
Annual Averages, 1972–90†

		Asset Size			
		Less Than $25 Mil.	$25 Mil.–$100 Mil.	$100 Mil.–$1 Bil.	$1 Billion or More
Profitability	Return on Assets (Net Income as % of Total Assets)				
	1972–75	.92	.86	.75	.72
	1976–79	.97	1.00	.84	.59
	1980–83	1.01	1.07	.88	.59
	1984–87	.86	1.02	.98	.69
	1988–90‡	n.a.	.72	.82	.54
	Return on Equity (Net Income as % of Equity Capital)				
	1972–75	11.9	12.2	11.6	12.0
	1976–79	11.3	12.9	12.2	12.2
	1980–83	10.7	13.0	12.4	12.5
	1984–87	9.0	12.3	13.9	8.8
	1988–90‡	n.a.	8.2	10.9	10.0
Leverage	Equity/Asset Ratio (Equity Capital as % of Total Assets)				
	1972–75	7.8	7.0	6.5	6.0
	1976–79	8.5	7.7	6.9	6.5
	1980–83	9.5	8.7	7.1	6.3
	1984–87	9.0	8.0	6.9	5.2
	1988–90‡	n.a.	8.9	7.5	5.6

†Because of data irregularities, for 1972–75, bank size is based on total deposits; for all other periods, it is based on total assets. Annual averages are weighted (aggregate) averages of banks in each size class except those for 1984–87, which are medians of individual bank ratios. Where size classes have been combined, the 1984–87 measures are weighted averages of the median values.

‡Data for 1990 are preliminary. For banks with total assets less than $25 million, 1990 data are not available; these banks are included in the next largest size class.

Source: Federal Deposit Insurance Corporation

study this way:

> Overall, a consensus conclusion of the preferred studies on bank scale economies suggests that the average cost curve in banking reflects a relatively flat U-shape at the firm level, with significant economies at small banks . . . but small and significant diseconomies at the largest . . . . This relatively flat U-shape also holds even when large banks are viewed separately.

☐ *Another Look*

Having examined what other researchers have found, we now look at the data ourselves. Rather than examining bank costs, though, we study bank profitability. Profits are a

Table 3

. . . Or Among the Largest.

Measures of Profitability and Leverage for a Sample of U.S. Bank Holding Companies by Size of Assets
Annual Averages (Group Means), 1971–87

		Full Sample	Asset Size: $1 Bil.–$2.5 Bil.	$2.5 Bil.–$5 Bil.	$5 Bil.–$10 Bil.	$10 Bil. or More	Test for Significant Differences†
Profitability	Return on Assets (Net Income as % of Total Assets)	1.0	1.5	.9	.9	.5	14.5*
	Return on Equity (Net Income as % of Equity Capital)	12.8	13.2	12.7	13.5	11.5	1.43*
Leverage	Equity/Asset Ratio (Equity Capital as % of Total Assets)	5.9	6.6	5.9	5.7	4.4	21.3
The Sample	Number of Firms	131	48	36	27	20	
	Average Total Assets ($ Bil.)	8.13	2.01	3.39	6.55	33.50	

†*F*-test for significance of difference of group means (one-way ANOV).
*Significant at 99% confidence level.
Source: Standard and Poor's Compustat Services, Inc.

broader measure than costs, but obviously the two are closely related. Profits have the advantage of being a more readily available measure.

Table 2 displays two standard profitability measures for U.S. insured commercial banks over the period 1972–90: the rate of return on assets (ROA) and the rate of return on equity (ROE). Banks are grouped there in four size categories based (primarily) on their total assets. Weighted average annual rates of return are averaged in four-year intervals, except that median annual rates of return are averaged in the 1984–87 period. Of necessity, the final period is shorter than four years.

Key features of these data are consistent with the findings of the literature just reviewed: specifically, neither very small nor very large banks are the most profitable. In Table 2 profitability generally increases with bank size, but reaches a maximum before the largest. The single exception to the pattern of interior maximum is the ROA profitability measure for 1972–75, when the highest return was recorded by the *smallest* banks, those with assets less than $25 million.

You may notice an apparent discrepancy in the two profitability measures: the largest banks appear to have done much worse than the other bank groups according to the ROA, but not according to the ROE. This can be understood by examining the leverage measure that is also displayed on Table 2. The equity/asset ratio measures capital adequacy—what decline in asset values could be covered by a firm's equity. The smaller this measure is, the riskier is the firm (with other relevant factors held constant). As is clear in Table 2, larger banks tend to be more highly leveraged than other banks. Of course, the smaller equity is, the greater income will appear as a percentage of equity. Therefore, to compare banks across size classes, the ROE is a somewhat deceptive measure of profitability.[4] (The Appendix provides a more detailed analysis of the relationship between

[4]For that reason, many researchers prefer to use the ROA measure in such comparisons by size group.

the ROA and the ROE.)

The published banking industry data are not very enlightening for very large banks—those with assets of $1 billion and more. That broad size category could be masking economies of scale at some very large size. Unfortunately, we cannot look for that in the published data; size categories have been changed repeatedly over the last two decades, making intertemporal comparisons difficult. However, we can study data for a sample of 131 large bank holding companies.

Table 3 shows for that sample the same profitability and leverage measures used for banks in Table 2. We've displayed these measures for the whole sample and for four size classes, all over the full period 1971–87. The results of tests for the statistical significance of differences in group means are also provided.

The sample results are generally consistent with the published banking industry data. For the large banking firms, the ROE measure of profitability is not significantly different across size classes. But the largest size class does have the lowest average ROE, consistent with the finding of diseconomies of scale for very large firms. For the ROA measure, the differences among size classes are statistically highly significant, and they favor the smaller firms. Here, as in the bank data, there is a definite relationship between size and the use of financial leverage.

☐ *Summary*

Our analysis of bank and bank holding company data over the last two decades is fully consistent with the main conclusions of the literature. Economies of scale are captured at a modest size, and once that size is reached, further increases do not improve profitability. In fact, there is some evidence that very large banking firms are less profitable than middle-sized ones. Thus, the evidence does not support the popular belief that a quest for economies of scale is behind the banking industry's consolidation.[5]

Excess Capacity?

> The U.S. banking system must wring out its excess capacity .... The real driving force in the cutback in capacity will be an inevitable, sweeping consolidation. That alone should help U.S. banks compete with foreign banks.

This notion that the banking industry is sodden with excess capacity is another popular market explanation for the current consolidation trend (McColl 1991, p. 7). This explanation, like the first, does not stand up well to scrutiny.

☐ *A Fuzzy Picture*

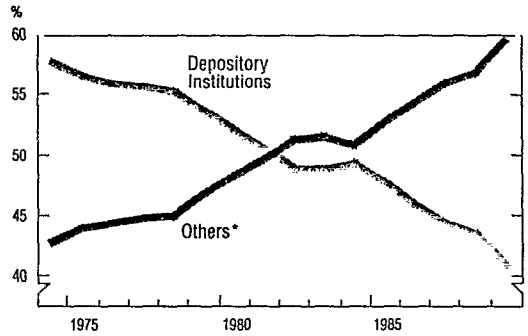
Some seem to think excess capacity in banking is an established fact. Chart 3, for example, is an illustration from the recent report describing the U.S. Treasury's (1991) proposals for reform of the banking industry. The picture it paints seems clear: The industry's share of financial inter-

Chart 3

Is Banking a Declining Industry? . . .

% of All Financial Assets Held by Depository Institutions and the Rest of the Financial Sector*

Annually, 1974–89



*Includes pension and retirement funds, insurance companies, agencies and mortgage pools, mutual and money market funds, and the monetary authority.

Source: U.S. Treasury 1991

[5]In one situation, the merger of two banks seems bound to deliver substantial cost savings: when the banks both have large networks of branches which substantially overlap. By merging, it seems, the two banks can close many duplicating branches and reduce overhead costs considerably.

However, a recent study of such mergers (Savage 1991) concludes that the resulting cost savings are likely to be trivial. It offers several reasons for this conclusion. First, careful investigation reveals that, although U.S. banks have over 48,000 branches in this country, their branching networks don't overlap much. Thus, "even massive closings of overlapping branches would result in only a small percentage change in the national total of bank branches" (Savage 1991, p. 1). Second, indirect branch costs are not high relative to the direct costs of serving bank customers. And third, the study's estimates are based on a statistical cost function (developed by Berger and Humphrey 1990) which exhibits diseconomies of scale.

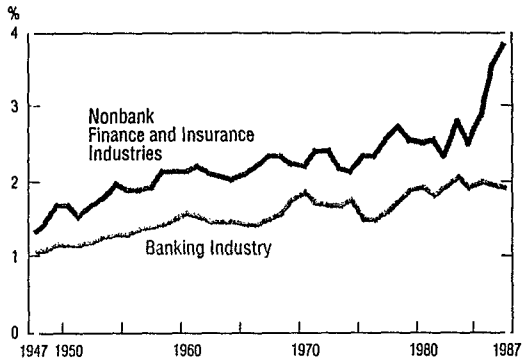
The merger study does not mention one significant point: when two banks have large, overlapping branching systems, they are (by definition) large banks and direct competitors. Merging them will necessarily reduce competition and may render the survivor more profitable simply because of its enhanced ability to earn monopoly rents (a subject we will discuss further later in this paper). For obvious reasons, bankers are loathe to mention rent-seeking as a possible motive for merging. But banking industry security analysts are less inhibited, and they clearly recognize the link between market concentration and profitability. For example, Alpert and Lynch (1991a, p. 68) state that "the lack of competition in Arizona, Nevada, and Oregon has allowed . . . [two banks] . . . to scrape by despite their horrendous losses in real estate lending" and that a "healthy Maine bank . . . also should benefit from the disappearance of so much competition." Elsewhere Alpert and Lynch (1991b, p. 35) state that "Ideally, the benefits of a large intramarket merger should include . . . reduction of competition. If enough competitors in a market consolidate, a resulting oligopoly should lead to more control over pricing. Deposit rates could be set low and consumer and middle-market lending rates set high."

Chart 4

. . . Maybe Not.

Shares of U.S. Gross National Product Produced by Banking and by Other Finance and Insurance Industries*

Annually, 1947–87



*The nonbank finance and insurance industries do not include real estate.

Source. U.S. Department of Commerce

mediation has declined substantially over 15 years. Such seemingly irrefutable evidence suggests to some that resources need to be moved from banking to other industries, and that is why we see banks consolidating.

Actually, the picture is not nearly so clear.

First, much of the nonbank financial intermediary claims produce profits for commercial banks, even though banks don't hold them. One example is commercial paper borrowing. Although this borrowing is not in the form of bank loans, commercial paper issuers must have backup credit lines. These are usually issued by banks—which do not provide them for free. Another example is money market mutual funds, an important competitor to bank deposits. While these balances are not held by commercial banks, virtually every check written against them clears through the commercial banking system. And again, banks charge a fee for this service. Other examples abound.

A second reason the declining market share picture is not as clear as it may seem is that an increasingly substantial amount of the business done by commercial banks will not show up in the asset totals used to measure market share. The most rapidly growing product lines of banks are off–balance sheet activities that are invisible in these totals. Examples include standby letters of credit and other off–balance sheet guarantees, options, and forward contracts. Moreover, banks now originate billions of dollars of loans which are sold in the secondary market and don't appear on their balance sheets. That activity covers a wide spectrum of loans, including residential mortgages, credit card and other consumer loans, and commercial loans. Although banks may not be the ultimate holders of these loans, they are key players in originating and servicing them, and they earn substantial fee income in the process.

So, to a considerable extent, what pictures like Chart 3 reflect is not a loss of market share by commercial banks as much as a massive change in the way banks do business. In particular, it reflects the spectacular growth of off–balance sheet activity, fee income, and secondary-market loan sales.

Perhaps a better measure of market share change would be the disaggregation of the gross national product (GNP) by industry. This is assembled and published by the U.S. Department of Commerce. Chart 4 shows, for 1947–87, the share of GNP accounted for by the nonbank finance and insurance industries and the share accounted for by banking. Note that both banking and nonbank finance and insurance industries increased their share of GNP over this period. Moreover, they grew at almost the same rate over the period 1947–85. In 1986 and 1987, however, the nonbank sector grew much faster than the banks. Overall, this is a totally different picture than the 15-year decline shown by the balance sheet data. In particular, the GNP data suggest that both types of industries have been growing faster than the overall economy.

☐ *Some Fuzzy Economics*

Determining if banks really are losing market share (and, if so, the timing and extent of that loss) is beyond the scope of this study. But, then, it's more than we need to do. For even if the aggregate demand for bank services is declining, it does not follow that consolidation in banking is inevitable or desirable.

Assume for a moment that banking is indeed a declining industry. If this is true, then redeployment of resources to other industries would be the expected and economically desirable response. However, that objective would not necessarily require consolidation. Nor would consolidation necessarily achieve that objective. Larger average firm size would not lower costs—it could raise them—and larger banks would be at a strategic disadvantage.

In and of themselves, combinations of banks merely shift resources around within the industry, resulting in larger average firm size. Obviously, after banks merge, some resources are often let go to other industries. However, banks can achieve that objective without merging: by increasing their dividend payout ratios to redeploy equity, firing some employees to redeploy labor, and so on. If all banks were to do this proportionally to size, resources would be appropriately shifted out of the industry, and the average

size of banks would fall, not rise.

The idea that mergers are a natural and inevitable response of banks to a decline in demand follows from an invalid, often implicit, assumption that there are economies of scale to be captured by increasing firm size. As we have seen, economies of scale in banking are fully achieved at a modest size, and diseconomies may exist at very large banks.[6]

The relevant economic theory does not predict consolidation; it predicts exit by large banking firms. Ghemawat and Nalebuff (1985), for example, have studied structural changes in a model of an oligopoly industry which is experiencing declining demand. They find that when there are constant returns-to-scale, the largest firms exit first. This occurs for strategic reasons: as demand falls in an oligopoly market, the smaller firms can remain profitable longer, and this greater survivability allows them to drive larger firms out of business. Ghemawat and Nalebuff further show that under certain circumstances large firms will have an incentive to acquire small ones and simply eliminate their productive capacity. However, there is never an incentive to combine large firms, since size alone produces a strategic disadvantage.

Although Ghemawat and Nalebuff's study is theoretical, they cite case studies of declining industries which conform to the predictions of the theory. Among these are the U.K. steel casings industry and the U.S. machine tool industry. Research in business policy also emphasizes the advantage small plants have in industries experiencing declining demand (for example, Hall 1980). And commercial banking fits Ghemawat and Nalebuff's assumptions reasonably well, if we assume the industry is declining. As we have seen, all feasible economies of scale are attained by relatively small banks. If there are diseconomies for very large banks, as some believe, that would only sharpen the theory's predictions. Considerable evidence also exists that at least some bank loan and deposit markets are imperfectly competitive. Finally, the key prediction of the theory—that large firms will exit first—is consistent with the severe financial difficulty that many large banks have experienced recently.

However, what is totally inconsistent with predictions of the theory is the recent consolidation trend, which includes an increasing average firm size. There is no technical advantage in this trend, and there will be a technical disadvantage if scale diseconomies exist. In addition, theory suggests there is a strategic disadvantage to large size. Thus, it's difficult to explain consolidation as a market response to declining demand for banking services.

☐ *Summary*

Is there excess capacity to wring out of the banking industry, as proponents of consolidation claim? The answer is far from obvious. The data used by proponents of consolidation are misleading, in part because of recent changes banks have made from asset-based to off–balance sheet activities. However, even if proponents are right and banking is a declining industry, that apparently cannot explain the recent wave of mergers. For that explanation to make sense, there would have to be economies of scale for large banks, which there are not; or consolidation would have had to primarily involve small banks, which it has not. Both theory and evidence from other industries suggest that in industries with excess capacity and constant returns-to-scale, it is the larger firms which exit first.

Safety?

> To save the banking system, reform of the banking laws must provide for: diversification of risk, larger institutions and a national regulatory scheme . . . . It is instructive to note that of the 5,000 banks that failed in the 1920s . . . most were tiny and dependent on farm or real estate loans.

This is the last popular explanation for consolidation: that average-bank size increases reflect a natural attempt to "save" the banking industry (Chernow 1990, p. A14). Consolidation proponents applaud the trend they think will result in fewer bank failures, since very large banks can diversify their investments and so reduce their risk. Unfortunately, the applause is premature and, ultimately, inappropriate.

Of course, large banks are better able than small banks to diversify. Large banks can make a greater variety of different kinds of loans, each of which demands some unique expertise and specialized staff. They can lend in more geographic areas through branching networks, loan production offices, and the like. If they choose to invest in a branching network, they can obtain retail deposits from a wider geographic area. Finally, they can access liability markets unavailable to smaller banks, such as those for commercial paper, bank acceptances, Eurodollars, and Eurobonds.

All of this, however, describes what large banks *can* do, not what they necessarily *do* do. That's an important distinction because (as is well known) distortions caused by deposit insurance result in moral hazard, which reduces or eliminates banks' aversion to risk. As we have already seen, large banks use systematically more financial leverage than small banks, and (other things constant) financial leverage in-

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[6]Moreover, if scale economies were the principal explanation for the recent consolidation trend, it would have occurred mostly among the smaller banks, those with less than $100 million in total deposits, which is not where we have seen it.

creases risk of failure. Thus, it is not clear that because large banking firms are better able to diversify, they are less likely to fail.

☐ *Too Big to Fail*

In a very narrow sense, very large banking firms are unquestionably less risky than smaller firms. But this is due to special regulatory treatment.

Under normal market conditions, when a corporation fails or goes into bankruptcy, it defaults on its debt obligations. Its creditors put the firm into bankruptcy proceedings, and they cannot do that unless the firm has defaulted.

Under a unique regulatory policy, this is not allowed to happen to very large banks. If a bank is so large that its failure might have consequences for the national economy, then the government considers that bank *too big to fail*. When such a bank is in serious financial trouble, the government always pays off its creditors. The government infuses public money into the bank and either operates it under government management (as was done with Continental Illinois) or arranges for a shotgun-wedding merger with a healthier bank (as was done with First Republic of Texas).

Under these conditions, the too-big-to-fail bank has not failed in the sense that losses are realized by its debt holders. But it certainly has failed in the sense that it has experienced losses sufficient to wipe out its equity—and then some. Thus, from a creditor's perspective, too-big-to-fail banks are less risky than others. But from a public policy perspective (that of the Federal Deposit Insurance Corporation or the taxpayers who back it), that is a rather myopic point of view.

Table 4

Bigger Doesn't Mean Less Risky.

Failures Among Small and Large Banks
As % of All U.S. Banks of Each Size, 1971–88*

	Time Period		
Asset Size of Banks	1971–79	1980–88	1971–88
Small (Less Than $1 Billion)	.49	5.71	6.18
Large† ($1 Billion or More)	2.19	8.00	12.55

*For each size class, percentages are based on the cumulative number of failures and the average annual number of banks of that size over the time period specified. Over this 18-year period, the average number of small banks was 14,301; the average number of large banks, 231. Failures of small banks averaged 49 per year; large banks, 1.61 per year. Failure data reported by the FDIC include federally insured savings banks.

†For a list of all large banks that failed during 1971–88, see footnote 7.

Source: Federal Deposit Insurance Corporation

☐ *The Data*

Do big banks actually fail less often than small banks? The data say, no—not when too-big banks that required government assistance are classified as *failures*.

A simple head count may be behind the popular misconception that larger banks are less risky than smaller banks. Over the 18-year period starting in 1971, many more banks with assets less than $1 billion have failed than larger banks: 884 vs. 29.[7] Counting bank failures by size of bank, however, is not good enough. On average during this period, the United States had about 14,300 small banks and only about 230 large banks. What we need to know is not just the number of failures, but what percentage of all banks of each size failed. This failure rate, as Table 4 shows, has been twice as great for the large banks as for the small ones.

Some may think that this difference has only appeared in the last decade, as the large banks have been hard hit by unusually high losses on loans to developing nations, the energy industry, and the commercial real estate industry. Note in Table 4, however, that the large bank failure rate was greater in both the 1970s and the 1980s.

☐ *Summary*

The data do not support the notion that consolidation is occurring because larger banks are better positioned to diversify and are thus less risky. The empirical evidence shows that, contrary to popular belief, in recent years, larger banks have gotten into trouble more often than smaller banks.

If Not Market Forces, What?

The consolidation trend is real, but it is not (easily) explained by any natural market forces of which we are aware. What, then, can explain it? Why are large and medium-sized banks so eager to combine? If the explanation is not in private market forces, the natural place to look is in public policies.

Too Big to Fail, Revisited

The government's too-big-to-fail policy may produce an

[7]The 29 commercial and savings banks with assets of $1 billion or more that required FDIC assistance during this period are listed here, grouped by the year they failed: 1972, Bank of the Commonwealth; 1973, United States NB; 1974, Franklin NB; 1980, First Pennsylvania NB; 1981, Greenwich SB and Union Dime SB; 1982, Western NY SB, NY Bank for Savings, and Western SB; 1983, Dry Dock SB and FNB Midland, Texas; 1984, Continental Illinois; 1985, Bowery SB; 1986, FNB Oklahoma City and BankOklahoma; 1987, BankTEXAS, Syracuse SB, and First City Bankcorp, Texas (2 banks); 1988, First Republic, Texas (4 banks), United Bank Alaska, M Corp., Texas (3 banks), Texas American Bankshares, and National Bankshares, Inc. (NBI), Texas.

incentive for banks to increase their size. After all, if a bank gets big enough to be considered too big to fail, it gets implicit guarantees for all its liabilities, whether they are insured deposits or not. The bank does not have to pay for these guarantees, since deposit insurance premiums are only assessed against deposits. So, in essence, attaining a certain size provides a bank with some free insurance and more complete coverage than it would get otherwise.

The empirical evidence on this nonmarket incentive issue is mixed, however. Boyd, Graham, and Hewitt (1991) find no evidence that the equity shares of too-big banking firms are more highly valued than are shares of smaller banking firms. Such higher valuation might be expected if too-big firms were systematically benefiting by their status. Using modern option pricing theory, Kuester and O'Brien (1991) estimate the value of government insurance and find that it is not systematically related to size. However, O'Hara and Shaw (1990) report that equity investors did respond to an official pronouncement of the too-big-to-fail policy in 1984. Using an event testing approach, they find immediate price increases in the shares of the banks believed to be in that category.

Until more research is done, the size-incentive effects of the too-big-to-fail policy must be viewed as undetermined. Common sense suggests that this policy encourages large size, but so far the empirical results are mixed.

Too Hard to Take Over

Another government policy that might be encouraging increases in bank size is the (unintentional) regulatory protection from hostile takeovers that bank managers often enjoy. This protected position could be related to the banking consolidation trend because bank managers do seem to have an incentive to create bigger banks—an incentive that is unrelated to increased efficiency.

The data suggest that, regardless of bank profitability, the bigger the bank, the bigger the compensation package its top managers receive. We determined this by studying recent data for a sample of the 50 largest bank holding companies. Using standard statistical techniques, we investigated the relationship between managerial salaries (and bonuses) and three banking firm characteristics—total asset size, total asset growth, and profitability (measured by the ROA). The results: compensation is positively and significantly related to asset size, but not significantly related to either profitability or asset growth.[8]

Over the long haul, of course, any management will have a hard time pursuing its own objectives at the expense of shareholders. However, bank managers do have more freedom to do this than managers in other industries because one of the most effective tools for ousting bad management is essentially inoperative in banking: the hostile takeover. The regulated nature of banking makes hostile takeovers extremely difficult to execute (perhaps unintentionally). All bank mergers require time-consuming regulatory approval. In fact, hostile takeovers were unheard of in banking until a few years ago, and they still are rare.

More work needs to be done on the topic of managerial incentives in banking, and the results presented here (based on a small sample and a short time period) should be viewed as exploratory. Nevertheless, the data do suggest that, even without scale efficiencies, bank managers have a personal financial incentive to expand their firms and perhaps more latitude to do so because of the way their industry is regulated.[9]

Too Able to Increase Market Share

A final government policy that could be behind the banking consolidation trend is the policy of allowing—or even encouraging—banks in the same market to merge. These sorts of mergers often increase the market share of the merged banks and could increase their ability to earn monopoly rents.

General evidence on U.S. bank mergers supports the idea of a relationship between this bank behavior and the

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[8]We used an ordinary least-squares regression. Managerial salaries, M, are represented by the 1989 compensation (including bonuses) of corporate chief executives as reported in the October 19, 1990, *Business Week*. Bank size is represented by the log of total assets, A, at yearend 1988; bank growth, by the average annual growth in total assets, $\Delta A/A$, in 1986–88; and profitability, by the average annual ROA, π/A, in 1986–88. The data on the independent variables come from quarterly reports submitted by bank holding companies to the Federal Reserve. The time lag between the independent variables and the dependent variable reflects the assumption that managerial salaries are partly based on past performance. Our sample consisted of the 50 largest domestic bank holding companies, but incomplete data reduced the number of firms in the regression to 42.

The results of the regression (with t-values in parentheses):

$$M = 136.5 + \underset{(5.05)}{265.9}[\ln(A)] - \underset{(0.10)}{0.52}(\Delta A/A) + \underset{(0.32)}{26.3}(\pi/A).$$

$$R^2 = 0.40.$$

These results are not materially affected by different averaging periods for the explanatory variables or different specifications of the regression.

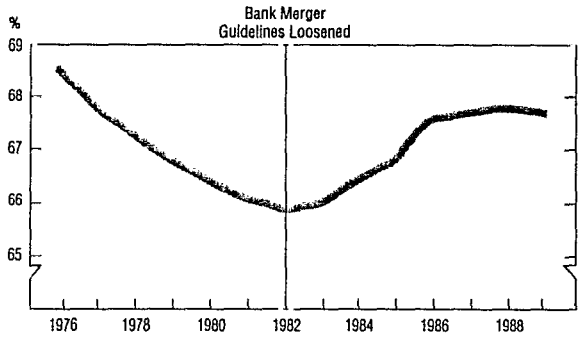
[9]Many industries besides commercial banking exhibit a positive relationship between firm size and management compensation. This does not necessarily argue against the existence of a pro-size incentive for bank managers; it may instead suggest that other industries share this incentive. See, for example, Brown and Medoff 1989.

A recent fascinating study by Allen and Cebenoyan (1991) sheds additional light on the issue of managerial incentives and acquisition strategies in commercial banking. This study finds that most acquisitions are made by banks with *entrenched managers*, banks with a high fraction of inside equity ownership by the management group and diffuse holdings otherwise (spread among outside investors). The study further finds that stock prices respond negatively (on average) to acquisition announcements by banks with entrenched managers, but positively to such announcements by other banks. Taken together, these findings suggest that when management groups have sufficient control, they may pursue acquisition strategies inconsistent with shareholder wealth maximization.

Chart 5

Bigger Does Mean More of the Market.

Average Annual % of Total Bank Deposits in U.S. Urban Markets Held by the 3 Largest Banks, 1976–89



Source. Federal Reserve Board of Governors

government's policy toward it. That many of the bank mergers of recent years have occurred among competitors in the same market is well known. However, we know of no source which categorizes bank mergers by whether or not the banks involved were in the same market. Still, the data in Chart 5 are highly suggestive. The chart shows the annual average share of total bank deposits held by the largest three banks in urban markets in the United States from 1976 to 1989. This concentration ratio declined from 68.45 percent in 1976 to a low point of 65.83 in 1982 and then climbed fairly steadily, reaching 67.65 in 1989. The general rise in this ratio since 1982 reflects a liberalized attitude toward within-market mergers adopted by the U.S. Justice Department and bank regulatory authorities. Indeed, the turnaround in the ratio dovetails with the Justice Department's loosening of its bank merger guidelines in 1982.[10]

Research on concentration in banking suggests a relationship between market structure and pricing. Higher loan rates and lower deposit rates are seen in more concentrated markets (Berger and Hannan 1989, Sharpe 1990). In other words, there is evidence of some ability for banks to earn monopoly rents, at least in some markets. If these findings are correct, they suggest an obvious incentive for banks to get bigger by merging with other banks in the same market, regardless of cost or risk efficiencies.

Concluding Remarks

Consolidation in banking is not all it seems, and those who have enthusiastically applauded it are likely to be badly disappointed by its results. Contrary to popular belief, large banks are not more profitable than middle-sized ones or less likely to impose costs on the Federal Deposit Insurance Corporation. In fact, according to the data, middle-sized banks have had the advantage on both counts for roughly the past two decades.

It's not even clear that banking is a declining industry, as many observers believe. That belief is hard to reconcile with the continued solid rate of new entries into the industry, for example. What is clear is that the nature of banking has changed so dramatically that market-share computations based on balance sheet data may be misleading. Much of the recent growth in commercial banking has been off–balance sheet and so invisible in such computations.

If competitive market forces are not behind this trend to consolidation, another likely candidate is public sector interventions. We have identified aspects of public policy which arguably do produce nonmarket incentives for consolidation, especially larger average bank size. Admittedly, our argument is not conclusive, and we may have overlooked some other significant causal factors. Nevertheless, our findings raise questions about current public policy toward banks.

Particularly serious is this one: Are competitive forces and policy forces pushing the banking industry in opposite directions? By this we mean, is the market slowly eliminating large banks, while the government systematically resuscitates some of them and encourages the formation of others? Just such a conflict has been described recently by Mayer (1991, p. 71), in a popular press article:

> These facts—the weakness of the big banks and the robustness of the smaller and regional banks—argue against the current

[10]Under the U.S. Department of Justice 1982 Merger Guidelines, as revised in 1984, a market in which the post-merger Herfindahl-Hirschman Index (HHI) is above 1800 is considered highly concentrated, and the Justice Department is likely to challenge a merger that increases the HHI by more than 50 points unless other factors indicate that the merger will not substantially lessen competition. In a subsequent change, in mergers involving commercial banking, the Justice Department has indicated that in a market where the post-merger HHI is at least 1800, the merger generally will not be challenged unless it increases the HHI by at least 200 points. The higher than normal HHI threshold for bank mergers implicitly recognizes the competitive effect of limited-purpose lenders and other nondepository financial entities.

Perhaps nowhere is this policy shift more apparent than in the Minneapolis–St. Paul area, a market dominated by two large bank holding companies. For several decades, there was essentially a regulatory moratorium on within-market acquisitions by those two large firms. Beginning in the 1980s, however, this policy changed markedly, and both firms were allowed to launch aggressive acquisition campaigns.

From the passage of the Bank Holding Company Act of 1956 until 1988, the Board of Governors of the Federal Reserve System invoked the concentration issue in denying all applications for within-market acquisitions in the Minneapolis–St. Paul banking market by First Bank System and Norwest, the two largest banking organizations. Since 1988, the Board has approved seven within-market acquisitions by these two firms. Today, they control about 65 percent of total bank deposits in the market.

> wisdom that says the salvation of the system is even bigger banks . . . . Using the taxpayers' money and credit in a futile effort to keep the whole herd alive could create another tragedy for the federal budget and for the future efficiency of financial intermediation in the U.S.

This is a stronger statement than we would make now—and an analysis of such policy issues is beyond the scope of this study. Nevertheless, our findings here are not inconsistent with Mayer's view. Like him, we see scant evidence that further banking consolidation will benefit either the U.S. banking industry or the U.S. economy.

Appendix
The Effects of Financial Leverage

In the profitability data discussed in the preceding paper, the largest banks did much worse than smaller banks when profits were measured by the return on assets (ROA), but not much worse when they were measured by the return on equity (ROE). Compared to the size groups with the greatest profits in each period, the largest banks had an average ROA 35 percent smaller, but an average ROE only 11 percent smaller.

This difference is traceable to the fact that, compared to smaller banks, larger banks operate with higher ratios of debt to assets, which is commonly known as *leverage*. Table 2 in the paper shows the equity/asset ratio, an inverse measure of leverage, for U.S. insured commercial banks between 1972 and 1990, grouped by size and by time period. In the table, leverage increases monotonically with bank size in every period.

The differing effects of leverage on the ROA and the ROE can be demonstrated with a few equations. Let π be profits; A, assets; L, liabilities (or debt); E, equity; r, the gross rate of interest on assets; and i, the rate of interest on debt. An equation for profits, then, would be

$$\text{(A1)} \qquad \pi = rA - iL.$$

With this notation, the return on assets (ROA) would be π/A, and leverage, the debt/assets ratio, would be L/A. Then, if r is constant, the effect of a change in leverage on ROA would be

$$\text{(A2)} \qquad \partial(\pi/A)/\partial(L/A) = -i.$$

Similarly, the return on equity (ROE) would be π/E, and another measure of leverage, the debt/equity ratio, would be L/E. With r constant, then, the effect of a change in leverage on ROE would be

$$\text{(A3)} \qquad \partial(\pi/E)/\partial(L/E) = (r - i) - (L/E)[\partial i/\partial(L/E)].$$

An increase in leverage results in a decrease in the ROA. This is understandable. A shift of one dollar from equity to debt financing produces an increase in interest expense and a concomitant decrease in profits. Since this shift doesn't change assets, the result will be a reduction in π/A. However, an increase in leverage increases the ROE as long as the gross rate of return on assets exceeds the interest rate on debt ($r > i$) plus the increase in debt rate due to increased leverage [$\partial i/\partial(L/E)$].

The point of all this is that large banks partially offset their lower ROAs by using systematically more financial leverage. However, if other relevant factors do not change, then increased leverage increases the risk of bankruptcy.

References

Allen, Linda, and Cebenoyan, A. Sinan. 1991. Bank acquisitions and ownership structure: Theory and evidence. *Journal of Banking and Finance* 15: 425–48.

Alpert, Mark, and Lynch, Mark. 1991a. Bank shots—Unusual perspectives on banking: Market share shifts. *Research Highlights* (June 21): 67–69. Bear, Stearns & Co. Inc.

_____. 1991b. Banking industry outlook: Will NCNB and C&S/Sovran herald a new era of mergers? *Research Monthly* (July 5): 35–37. Bear, Stearns & Co. Inc.

Berger, Allen N., and Hannan, Timothy H. 1989. Price rigidity and market structure: Theory and evidence from the banking industry. Finance and Economics Discussion Series 59. Board of Governors of the Federal Reserve System.

Berger, Allen N., and Humphrey, David B. 1990. The dominance of inefficiencies over scale and product mix economies in banking. Finance and Economics Discussion Series 107. Board of Governors of the Federal Reserve System.

Boyd, John; Graham, Stanley; and Hewitt, Shawn. 1991. Size and performance in banking firms: Testing the predictions of theory. Manuscript. Research Department, Federal Reserve Bank of Minneapolis.

Brown, Charles, and Medoff, James. 1989. The employer size–wage effect. *Journal of Political Economy* 97 (October): 1027–59.

Chernow, Ron. 1990. The menace of the small bank. *Wall Street Journal* (October 31): A14.

Clark, Jeffrey A. 1988. Economies of scale and scope at depository financial institutions: A review of the literature. *Economic Review* 73 (September/October): 16–33. Federal Reserve Bank of Kansas City.

Ghemawat, Pankaj, and Nalebuff, Barry. 1985. Exit. *Rand Journal of Economics* 16 (Summer): 184–94.

Hall, W. K. 1980. Survival strategies in a hostile environment. *Harvard Business Review* 58 (September/October): 75–85.

Humphrey, David B. 1990. Why do estimates of bank scale economies differ? *Economic Review* 76 (September/October): 38–50. Federal Reserve Bank of Richmond.

Isaac, William M. 1990. Comment: Outmoded policies thwart needed bank consolidation. *American Banker* 155 (December 6): 4.

Kuester, Kathleen A., and O'Brien, James M. 1991. Market-based deposit insurance premiums: An evaluation. Finance and Economics Discussion Series 150. Board of Governors of the Federal Reserve System.

Mayer, Martin. 1991. Too big not to fail. *Forbes* (April 15): 68–71.

McColl, Hugh L., Jr. 1991. Required reading: Updated recipe for international success. *American Banker* 156 (February 14): 4, 7.

O'Hara, Maureen, and Shaw, Wayne. 1990. Deposit insurance and wealth effects: The value of being "too big to fail." *Journal of Finance* 45 (December): 1587–1600.

Savage, Donald T. 1991. Mergers, branch closings, and cost savings. Manuscript. Board of Governors of the Federal Reserve System.

Sharpe, Steven A. 1990. Switching costs, market concentration, and prices: The theory and its empirical implications in the bank deposit market. Finance and Economics Discussion Series 138. Board of Governors of the Federal Reserve System.

U.S. Treasury Department. 1991. *Modernizing the financial system: Recommendations for safer, more competitive banks.* Washington, D.C.: U.S. Government Printing Office.

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