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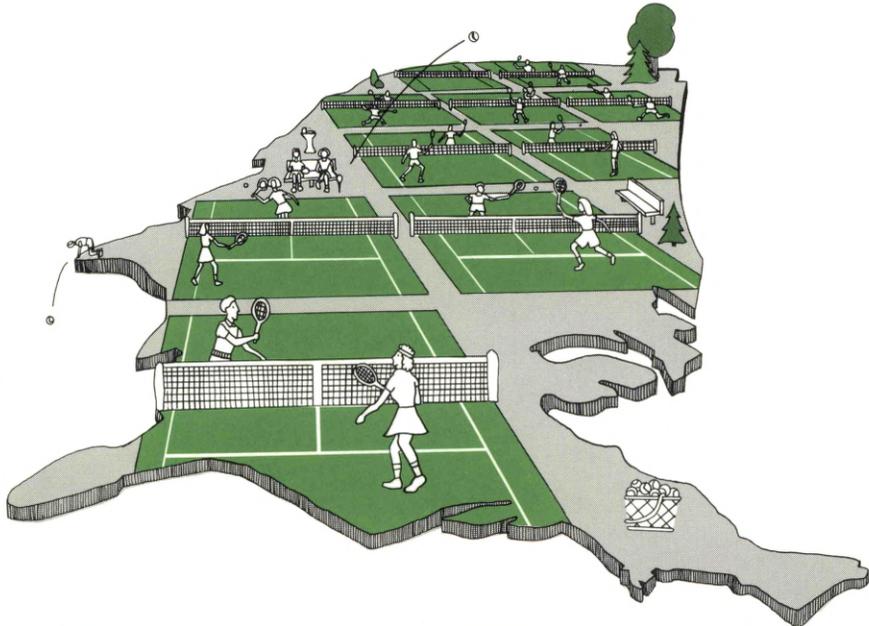
JANUARY • FEBRUARY 1987

Interstate Bank Mergers and Competition in Banking

Paul Calem

Efficient Production of Financial Services: Scale and Scope Economies

Loretta J. Mester



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BUSINESS REVIEW

Federal Reserve Bank of Philadelphia
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Over half the states of the nation, including Pennsylvania and New Jersey, have passed laws that open their doors to interstate banking. For both consumers and bankers this is a time of adjustment, excitement, and, perhaps, some concern. The concern centers on competition. Will home-state banks be gobbled up by giant banks from out-of-state? Will the interests of the communities and the small depositors and savers still be served? Each article in this issue of the *Business Review* addresses these kinds of questions, but from different viewpoints.

Paul Calem, in "Interstate Bank Mergers and Competition in Banking," describes and analyzes the elements that help regulators and others estimate how competitive a local or national banking market is. Competitiveness is no longer largely a matter of how many players are in a market and how big they may be. With interstate banking, the potential for many new competitors to get into the market serves to increase competition, as does the opportunity to merge institutions to increase efficiency.

In "Efficient Production of Financial Services: Scale and Scope Economies," Loretta Mester analyzes the latest research on the most efficient size (scale) of financial institutions, as well as the most efficient mix of products (scope) they should offer. Earlier studies found that larger firms have a substantial competitive advantage in terms of costs; but these studies treated financial services as a single product. The most recent literature accounts for the multiplicity of products these firms produce, and finds very little evidence of either a size advantage or a product mix advantage.

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twelve regional banks located around the nation as well as the Board of Governors in Washington. The Federal Reserve System was established by Congress in 1913 primarily to manage the nation's monetary affairs. Supporting functions include clearing checks, providing coin and currency to the banking system, acting as banker for the Federal government, supervising commercial banks, and enforcing consumer credit protection laws. In keeping with the Federal Reserve Act, the System is an agency of the Congress, independent administratively of the Executive Branch, and insulated from partisan political pressures. The Federal Reserve is self-supporting and regularly makes payments to the United States Treasury from its operating surpluses.

Interstate Bank Mergers and Competition in Banking

*Paul Calem**

The interstate banking era is well under way, and the days when out-of-state banking firms cannot acquire or merge with in-state firms appear to be numbered. Only a small minority of states have yet to pass interstate banking laws. In the Third Federal Reserve District, interstate banking became a reality with the passage of legislation by New Jersey and Pennsylvania in 1986. As a

consequence, numerous interstate mergers and acquisitions have already taken place, and many more transactions are currently pending.

It is safe to predict that a continuing wave of mergers and acquisitions will bring about consolidation in the banking industry, and there will be fewer and larger banks. But how will banking services ultimately be affected? Will all this activity lead to substantially reduced competition in banking? Will commercial and retail customers be left with too few alternatives at noncompetitive prices?

In fact, just the opposite is likely to happen.

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For one thing, banking regulators will continue to guard against mergers and acquisitions that would substantially reduce competition in local banking markets. And although the market for certain banking products is national, it is unlikely that increasing nationwide consolidation in banking will have significant anticompetitive effects.

At the same time, the institutions that result from interstate mergers or acquisitions may find that because they are larger, they will be able to offer more services or provide existing services more efficiently. As a result, such institutions would be more effective competitors in their markets than the original, smaller firms.

Of equal importance in promoting competition will be the increase in the number of potential entrants into local banking markets—the more competitors who enter a banking market, the greater the competition, which translates into lower charges and better services for consumers. Entry might occur in a number of ways depending, of course, on what each state allows in its law. A new competitor may enter and gain a major share of a market; an out-of-state bank holding company may set up (or acquire) a small bank with only a minor presence in a market (so-called toehold entry); or an in-state nonbanking subsidiary of a bank holding company, such as a consumer finance or trust subsidiary, may expand its operations to provide full-service banking.

These factors will contribute towards a more competitive environment in local banking markets. Thus, given the current regulatory framework, interstate banking is more likely to enhance competition than not, which means that customers will get improved banking services at competitive prices.

THE STATUS OF INTERSTATE BANKING

In the Nation. In the last few years, state after state has opened its borders to interstate banking, and in 1986 a flurry of interstate activity took place. Several types of interstate banking laws have emerged, reflecting varying entry requirements from state to state.

The most liberal interstate banking laws are the *nationwide* laws, which allow entry by banking organizations from any state in the nation. There are five states with such a law: Alaska, Arizona, Maine, Oklahoma, and Texas. Somewhat less liberal than such laws are the *nationwide reciprocal* laws. These laws allow banking organizations from any state to acquire in-state banks, contingent on reciprocity. That is, an out-of-state organization can merge with or acquire an organization in the host state only if the acquirer's home state grants similar privileges to banking organizations in the host state. Four states have nationwide reciprocal laws: Kentucky, New York, Washington, and West Virginia.¹

Another category of interstate banking laws includes the *specialized laws*. These laws authorize some specialized form of entry by out-of-state holding companies. This category includes the so-called "limited purpose laws," which generally prohibit entering out-of-state banks from competing with host-state organizations for retail customers. Such laws are usually intended to encourage out-of-state banks to establish special purpose facilities, such as credit card operations. Also included are "troubled institution laws," which authorize the acquisition of troubled or failing institutions within the state.² The last category includes the most common interstate banking laws, the *regional* laws. These laws allow only those organizations that are headquartered in a state within a specified region to acquire a

¹Under Oklahoma's nationwide law, further in-state expansion of a bank acquired by an institution from a non-reciprocating state is barred for four years subsequent to the acquisition. According to the Texas law, out-of-state organizations will not be permitted to control more than a total of 25 percent of the aggregate deposits in Texas banks.

²States having limited purpose laws include Delaware, Maryland, Nebraska, Nevada, South Dakota, Virginia, and West Virginia. States having troubled institution laws include Illinois, New Mexico, Ohio, Oklahoma, Oregon, Utah, and Washington. (Note that many of these states also have a regional or a nationwide reciprocal law.) In addition, many states have so-called "grandfather" laws, which permit out-of-state banking organizations to expand previously existing operations.

bank or bank holding company located in the host state. Of the 28 states having such a law, all but one state (Oregon) make interstate transactions contingent on reciprocity.

Some of the laws that have been passed do not become effective until 1987 or 1988. Also, some of the regional laws include a "nationwide trigger" date, at which time the regional restriction will be eliminated. The overall effect of the diversity of interstate banking laws is that the barriers to interstate expansion are being removed rather unsystematically. But because the majority of laws are regional laws, the removal of these barriers is mainly occurring at the regional level. And roughly speaking, it is possible to delineate several regions within which the barriers to interstate banking will have been largely removed by the end of 1987. (See *REGIONS WHERE INTERSTATE ACTIVITY IS LIKELY TO OCCUR*, p. 6.)

With the passage of interstate banking laws, numerous mergers and acquisitions are now occurring as bank holding companies move into new states. As of early October 1986, a total of 98 interstate transactions had been approved by the Federal Reserve Board, and at least 96 deals were pending. Especially active in 1986 was the Midwest region, where interstate banking laws were passed in late 1985.

The pace of interstate banking activity is likely to quicken still further in the near future. Oklahoma's nationwide law and Washington's nationwide reciprocal law will both take effect on July 1, 1987. Texas's nationwide law will take effect on January 1, 1987, and West Virginia's nationwide reciprocal law will take effect on January 1, 1988. In addition, various regional laws become effective in 1987 and 1988. And some states still without interstate banking laws may yet pass such legislation. Also, between 1987 and 1989, various states' nationwide triggers will become effective. This not only will increase the volume of interstate activity, but it also will permit more transactions involving widely separated states.

In the Third District. The "First State," Delaware, was in fact the first state in the District

to pass a type of interstate banking law. Known as the Financial Center Development Act, Delaware's limited purpose law permits out-of-state bank holding companies to establish "de novo," or new, subsidiaries, provided they meet certain capital and employment conditions, limit operations to a single location, and do not compete with Delaware-based banks for retail customers. Currently, at least 24 bank holding companies from other states, including many organizations based in New York City, have taken advantage of the Delaware law to set up credit card, wholesale lending, cash management, and other operations.³

In 1986, New Jersey and Pennsylvania each passed regional reciprocal laws. Pennsylvania's interstate banking bill was signed on June 25, 1986, and became effective on August 25. It grants reciprocity to New Jersey, Kentucky, Ohio, and several states in the east. New Jersey's law, passed in March, 1986, also became effective on August 25. It grants reciprocity to Pennsylvania, to the same states as does Pennsylvania's law, as well as to several states in the midwest. (For more details, see *NEW JERSEY AND PENNSYLVANIA GO INTERSTATE*, p. 14.)

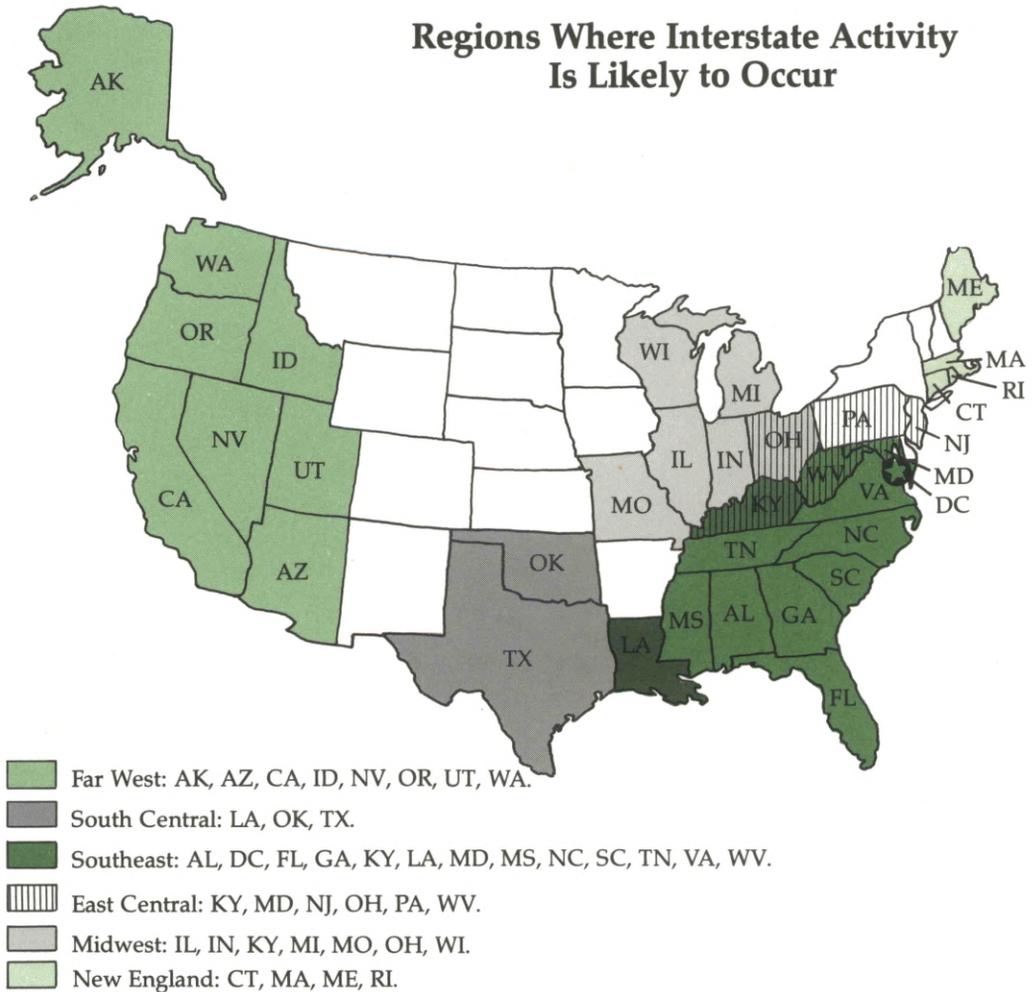
Interstate activity in New Jersey and Pennsylvania is already underway. At least three interstate transactions have been approved or are currently pending between New Jersey and Pennsylvania banking organizations. In addition, some transactions are pending between Pennsylvania banking organizations and organizations in Ohio and Kentucky.

WILL COMPETITION BE KEENER IN LOCAL BANKING MARKETS?

As interstate banking legislation is passed, the urge to merge seems to be an inevitable accompaniment. When the trigger is pulled for national

³For a more detailed discussion of Delaware's law, see Janice Moulton, "Delaware Moves Toward Interstate Banking: A Look at the FCDA," this *Business Review* (July-August 1983) pp. 17-25.

Regions Where Interstate Activity Is Likely to Occur



State with a Regional Law	Date in Effect	Specified Region ^a	Nationwide Trigger
Alabama	7/1/87	Southeast plus AR	none
California	7/1/87	Far West plus CO, TX, HI, and NM	1/1/91
Connecticut	current	New England region plus NH and VT	none
District of Columbia	current	Southeast minus KY	none
Florida	current	Southeast plus AR, minus KY	none
Georgia	current	Southeast minus WV, MD, and DC	none
Idaho	current	Contiguous states: MT, NV, OR, UT, WA, and WY	none

State with a Regional Law	Date in Effect	Specified Region ^a	Nationwide Trigger
Illinois	current	Contiguous states: IN, IA, KY, MI, MO, and WI	none
Indiana	current	Midwest minus MO and WI	none
Louisiana	7/1/87	Southeast plus AR, OK, and TX	1/1/89
Maryland ^b	7/1/87	Southeast plus AR, DE, and PA	6/30/88
Massachusetts	current	New England region plus NH and VT	none
Michigan	current	Midwest minus KY and MO, plus MN	10/10/88
Minnesota	current	Contiguous states: IA, ND, SD, and WI	none
Mississippi ^c	7/1/90	Southeast plus AR, MO, and TX, minus MD and DC	none
Missouri	current	Contiguous states: AR, IL, IA, KS, KY, NE, OK, and TN	none
Nevada ^d	current	Far West minus CA, plus CO, HI, MT, NM, and WY	1/1/89
New Jersey	current	East Central and Midwest, plus DE, VA, TN, and DC	7/1/88 (expected)
N. Carolina	current	Southeast plus AR	none
Ohio	current	East Central and Midwest, plus DE, VA, TN, and DC	10/16/88
Oregon	current	Far West plus HI	none
Pennsylvania	current	East Central plus DE, VA, and DC	3/4/90
Rhode Island	current	New England region plus NH and VT	7/1/88
S. Carolina	current	Southeast plus AR	none
Tennessee	current	Southeast plus AR, IN and MO, minus MD and DC	none
Utah ^e	current	Far West minus CA, plus CO, HI, MT, NM, and WY	12/31/87
Virginia	current	Southeast plus AR	none
Wisconsin	1/1/87	Midwest plus IA and MN	none

^aFor an explanation of the terms East Central, Midwest, Southeast, Far West, and New England region, see the accompanying map. Note that several regions overlap.

^bMaryland's reciprocity law became effective in 1985 for a subregion consisting of Delaware, Virginia, West Virginia, and the District of Columbia. Maryland's nationwide trigger in effect calls for the removal of most of the restrictions inherent in the state's limited purpose law.

^cMississippi's law extends reciprocity to contiguous states effective 7/1/88.

^dThe reciprocity requirement in Nevada's law will be dropped on 1/1/89.

^eUtah's reciprocity requirement will be dropped on 12/31/87.

reciprocity in a number of states, and when more states pass interstate banking laws, the Federal Reserve System and other federal regulators will be even busier than they are now, assessing the competitive effects of proposed mergers.⁴

Bank regulators are primarily concerned with competition in *local* banking markets. This is because the geographic markets for retail deposits and many other bank products tend to be local. Moreover, unless a specific product market is being examined, such as the market for large certificates of deposit, regulators view banks as providing a single composite product or cluster of services to its customers. A bank's total deposits (excluding the deposits of foreign institutions) is taken to be representative of the amount of services the bank provides. The locality within which banks respond to the pricing of one another's services is considered to be the banking market.⁵

Regulators will continue to guard against mergers that are likely to harm competition in local markets. As a result, local banking markets that are competitive will remain so, even though the structure of the banking industry is being transformed by interstate banking.

Measuring Concentration in Local Markets.

To assess the effects of interstate mergers on competition, the Fed first examines the effects on banking market concentration. By definition,

the greater the number of banks in a market, and the more equally divided their market shares, the less concentrated that market will be. Generally speaking, a less concentrated market is more conducive to competition. In an unconcentrated market, there will be many reliable sources of banking services, each readily available to customers. Therefore, when a market is not concentrated, banks must remain competitive in order to continue to attract customers. Only in a highly concentrated market could banks have *monopoly* power—the ability to behave noncompetitively by charging higher prices for their services. Thus, substantial increases in concentration in a banking market could signal a significant reduction in competition.

Concentration is measured by looking at each bank's market share. One measure that is often employed is the three-firm or four-firm concentration ratio. This is simply the aggregate market share of the three or four largest firms in a market. For example, if the three largest banks in a banking market control 30, 25, and 20 percent, respectively, of total market deposits, then the three-firm concentration ratio is 75 percent, indicating a concentrated market. Another concentration measure commonly used is the Herfindahl-Hirschman index (HHI). This index is simply the sum of squares of the market shares of each of the firms competing in a given market. Consider once again the preceding example. If the remaining 25 percent of the market in this example were evenly divided among five firms, then the HHI would equal $(30)^2 + (25)^2 + (20)^2 + 5(5)^2 = 2050$. Or, if the remaining 25 percent belonged to a single firm, then the HHI would equal $(30)^2 + 2(25)^2 + (20)^2 = 2550$. Generally, the fewer the number of firms in a market, and the more uneven their market shares, the higher the HHI.

The Federal Reserve Board applies Department of Justice merger guidelines in analyzing the competitive effects of a proposed merger. Specifically, if a proposed merger would increase the HHI in a market by more than 200, and lead to a post-merger HHI greater than 1800, then the

⁴The Federal Reserve regulates bank holding companies and state banks that are members of the Federal Reserve System. The Comptroller of the Currency regulates national banks, and the Federal Deposit Insurance Corporation regulates state nonmember banks. These regulatory agencies evaluate proposed mergers and acquisitions, and they have the authority to block transactions that are determined to be anticompetitive. In addition, the Department of Justice may challenge any bank merger or acquisition it determines to be anticompetitive, although that rarely occurs, because the banking agencies follow policies consistent with the Justice Department guidelines in evaluating the competitive effects of mergers.

⁵The size of a banking market depends upon several factors, such as local commuting patterns, which determine the degree to which banks interact.

Federal Reserve Board considers the possibility that the merger might be anticompetitive. In such cases, the Board decides whether other factors outweigh the anticipated increase in concentration; if they do not, the merger is not allowed to take place. Factors that may be taken into consideration can include, for example, competition from thrifts or other nonbank financial firms, or poor financial condition of the institution being acquired.⁶

Procompetitive Effects. While the regulatory process generally will prevent anticompetitive interstate mergers from taking place, interstate banking will often have procompetitive effects on local markets. In some cases, interstate mergers may result in more efficient institutions and, hence, in more effective competitors. In other cases, competition in a market may be enhanced by the entry of an out-of-state institution, or by the expansion of an existing nonbanking subsidiary of an out-of-state bank holding company.

Acquisition of a bank by an out-of-state holding company (or a merger involving the bank) may enable that bank to operate more efficiently, for a number of reasons. An acquirer may introduce new management procedures that reduce operating costs. Or it may share valuable information with the acquiree, such as expertise in certain types of lending. Merger or acquisition may also be a cost-effective way for a bank to expand into new lines of business; one merger partner might be providing products and services that the other partner wishes to make available to its customers.

Moreover, in some cases a merger may enable the combined organization to achieve scale or scope economies, although empirical economic research has not found much evidence to sup-

port the view that such economies are typical.⁷ *Scale economies* are cost savings or efficiencies that result when two merging organizations consolidate their basic operations. For example, the partners to a merger may be able to reduce their overhead costs by combining their data processing operations at a single location. Or, because a merger results in a larger management pool, each manager may be able to oversee fewer areas of operation. More effective management can result, contributing to increased operating efficiency. Similarly, *scope economies* are cost savings that result from combining different types of financial services and activities within a single organization, which allow resources to be shared and duplication of effort to be reduced. For example, a banking organization which offers discount brokerage services can advertise these services to its depositors when mailing monthly account statements. Thus, the organization can save on advertising costs. Although bank mergers will not in general result in economies of scale or scope, some mergers may indeed yield such cost savings.

Finally, an interstate bank merger may benefit the parties involved by diversifying their risk exposure. Because the combined organization will gather deposits from a wider geographic area, deposit outflows in one market are more likely to be balanced by deposit inflows in another market, thus reducing the organization's exposure to deposit fluctuations. And on the asset side, interstate expansion may enable an organization to diversify its loan portfolio further. By reducing the degree to which its loans are concentrated within a particular industry or geographic area, an organization can reduce its vulnerability to economic downturns in that particular area.

⁶For a fuller discussion of the factors the Federal Reserve Board might take into consideration, see Jan Loeys, "Bank Acquisitions: The Mitigating Factors Defense," *The Banking Law Journal* (Sept./Oct. 1986) pp. 427-449.

⁷For a more detailed discussion of scale and scope economies in banking, see the studies cited in Loretta Mester, "Efficient Production of Financial Services: Scale and Scope Economies," this *Business Review*.

Each of these efficiencies that may result from a merger or acquisition would enable a merger partner to offer improved services or lower costs to its customers, and thus to be a more competitive institution. And there are at least two more ways in which interstate banking may enhance competition in local banking markets.

First, with the advent of interstate banking, many large bank holding companies may become competitors in markets outside of their home state. In many cases, they will do so via toehold entry, establishing a small, "fringe" presence in these markets. Where permissible, toehold entry may be accomplished *de novo*, (that is, by creating a new subsidiary), or by converting an existing nonbanking subsidiary into a bank. Otherwise, it may be accomplished by purchasing an existing small bank. The fringe firm thus created can have substantial ability to expand over time, because it is backed by a large holding company. That is, because of the financial support as well as the technical assistance and expertise the parent holding company can provide, the fringe firm has the *potential* to increase its deposit share and become a major player in its market. Therefore, the new fringe competitor may exert a competitive influence greater than its market share would indicate.⁸

Second, the nonbanking interstate subsidiaries of bank holding companies could have a special kind of procompetitive effect on local banking markets. Many large bank holding companies currently operate numerous nonbanking subsidiaries in markets outside of their home state.

⁸The potential procompetitive effects of toehold entry are well recognized in the economics literature. See, for instance, F. M. Scherer, *Industrial Market Structure and Economic Performance*, Boston, Houghton Mifflin Company (1980) p. 248. Evidence indicates that toehold entry into banking markets can (but not always will) have a deconcentrating effect in the long run. That such entry can be procompetitive is supported by John T. Rose and Donald T. Savage in their study "Bank Holding Company De Novo Entry and Banking Market Deconcentration," *Journal of Bank Research* (Summer, 1982) pp. 96-100.

For example, several out-of-state holding companies operate mortgage banking, consumer lending, commercial lending, as well as leasing subsidiaries in Pennsylvania. (See "OUT-OF-STATE NONBANKING SUBSIDIARIES IN PENNSYLVANIA".) Similarly, several Pennsylvania bank holding companies have a nonbanking presence in numerous other states.⁹ When a bank holding company operates such an out-of-state subsidiary, providing a limited number of financial products and services, the holding company (unless prohibited by state law) can enter into other banking activities in the subsidiary's market by expanding the scope of the subsidiary's operations. This often may be easy to accomplish as the legal barriers to such interstate expansion are removed.¹⁰ For example, consider an out-of-state holding company that operates a commercial finance subsidiary in a local market. The removal of barriers to interstate banking may enable the finance subsidiary to gather deposits, including demand deposits, for a bank affiliate. Thus, the holding company could easily become an entrant into the deposit-taking side of the market. The threat of such entry could limit the monopoly power of banks in a

⁹For example, Corestates Financial Corporation (Philadelphia) operates Signal Financial Corporation, a consumer finance subsidiary with offices in several states on the east coast. And Mellon Bank Corporation (Pittsburgh) operates Mellon Financial Services Corporation, a factoring, commercial and consumer lending, and leasing subsidiary, with offices in major cities nationwide. Meridian Bancorp, Inc., (Reading), operates Meridian Mortgage Corporation, a mortgage and commercial lending subsidiary with offices in Pennsylvania, New Jersey, Delaware, and Florida.

¹⁰In contrast, expansion into a market by a banking organization not previously present in the market would be time-consuming and difficult, due to various regulatory, technological, and physical impediments. In the language of economics, because of the existence of such impediments, banking markets are not "contestable." (In a contestable market, entry is almost costless, and established firms are induced to keep prices as low as possible so that they will not be displaced by entrants.) For a discussion of the various impediments to entry into banking markets, see Paul Calem and Janice Moulton, "Evaluating the Competitive Effects of Mergers Under Interstate Banking," Working Paper forthcoming, Federal Reserve Bank of Philadelphia, pp. 18-20.

Out-of-State Nonbanking Subsidiaries in Pennsylvania

The following is a partial listing of the out-of-state bank holding companies having a nonbanking presence in Pennsylvania, and the types of subsidiaries they own.

Holding Company	Mortgage Banking	Consumer Lending	Commercial Lending	Leasing	Representative Offices
Fleet Financial Group - Rhode Island	✓	✓	✓	✓	
Chase Manhattan Corp. - New York	✓		✓		✓
First Maryland Bancorp. - Maryland	✓		✓		✓
Security Pacific Corp. - California	✓	✓	✓	✓	
BankAmerica Corp. - California	✓	✓	✓		
Manufacturers Hanover Corp. - New York	✓	✓	✓		
NorWest Corp. - Minnesota	✓		✓		
Beneficial Corp. - Delaware		✓			
BarclaysAmerican Corp. - North Carolina			✓		
Bank of Boston Corp. - Massachusetts			✓		
Citicorp - New York			✓	✓	
First Interstate Bancorp - California			✓	✓	
Marine Midland Banks, Inc. - New York			✓		✓
Midlantic Banks - New Jersey					✓

concentrated banking market. It might not be worthwhile for those banks to maintain monopoly prices for their services, because that could induce the potential entrant to become a more active competitor in the market.

INTERSTATE BANKING AND COMPETITION IN REGIONAL MARKETS

Whereas local banking markets typically encompass a metropolitan area or rural county, the markets for some specific bank products may comprise a region consisting of several states or even, in some cases, the entire nation. In regional markets, banks compete for large or medium-sized corporate customers, engage in syndicated lending to corporations and governments, underwrite or deal in government securities and money market instruments, act as correspondent banks, and engage in such nonbanking activities as data processing and leasing. As the barriers to interstate banking fall, and the banking industry consolidates regionally and nationally, concentration in these markets is increasing. What effect will this have on competition in these markets?

In regional banking markets, a variety of factors affecting competition come into play. On balance, it appears very unlikely that consolidation in these markets will have anticompetitive effects. First, in terms of deposit shares, the banking industry is currently quite unconcentrated nationwide. The four-firm concentration ratio for the banking industry nationally is only 5.8 percent. Moreover, the share of domestic deposits of the top ten firms is only 10.4 percent, and that of the top fifty only 37.9 percent. Although these figures cannot be equated with the level of concentration in specific bank product markets, concentration in regional product markets tends to reflect these low levels. Increases in concentration that are large enough to be a matter of concern are not likely to happen as interstate mergers occur. For instance, according to a recent survey, the top ten correspondent banks nationwide hold less than 28 percent of total domestic correspondent balances.¹¹ In a region consist-

ing of the Second and Third Federal Reserve Districts (New York, New Jersey, Delaware, eastern Pennsylvania, and southern Connecticut), the four-firm concentration ratio in correspondent banking is about 54 percent.

Second, nonbank financial firms, nonbank subsidiaries of out-of-market banks, and foreign banks provide a substantial degree of competition in many of these regional banking markets. This acts as a mitigating factor, limiting the anti-competitive effects of increasing concentration. For instance, in lending to middle market businesses (businesses that are too large to be considered small businesses, but that are not major national or multinational corporations), regional banks generally compete with the commercial loan subsidiaries of money center banks, foreign banks, and other nonbank financial institutions. And since instruments such as commercial paper and publicly issued bonds can be substitutes for commercial bank loans, banks compete with investment banking firms in the market for large corporate customers. Competition from securities firms is also significant in Treasury bill dealing and municipal bond underwriting. And banking organizations that offer data processing services must compete with many large nonbanking firms such as NCR.¹²

Third, the Federal Reserve System, in evaluating the competitive effects of proposed mergers or acquisitions, considers in particular the nonbanking subsidiaries of the merging organizations. A proposed merger that would substantially reduce competition in some nonbanking activity (an unlikely occurrence to begin with) would face a possible denial or forced divestiture.

The last kind of procompetitive factor to mention here involves customer bargaining power.

¹¹See "1984 Correspondent Banking Survey," *American Banker* (November 30, 1984) pp. 27-33, and (March 18, 1985) pp. 26-35.

¹²For a listing of the largest providers of data processing services to financial institutions, see *Savings Institutions*, Special Supplement (September 1984) pp. 43-44.

It is difficult for a bank to behave noncompetitively in dealing with high volume, sophisticated customers, even in a concentrated market. If a bank were to raise its fees too high, these customers could threaten to take their business to a major competitor or to a fringe competitor of the bank, or to withdraw from the market completely, and the loss of such a customer could have a significant impact on bank earnings. Large borrowers, whether middle market businesses or larger corporations, as well as local government bond issuers, may often have bargaining power. This factor also mitigates the effect of increasing concentration in regional markets.

CONCLUSION

Interstate bank mergers and acquisitions are already commonplace events in some parts of the country, and within a few years they are likely to become common occurrences nationwide. Although regional and nationwide concentration in banking will increase as a result, competition in banking is likely to remain vigorous. The current regulatory framework prevents mergers that would substantially reduce competition in local markets. And regional and national markets, which are generally unconcentrated to begin with, are likely to remain competitive. Various factors, such as competition from nonbank financial firms, will mitigate the effects of increasing concentration in those markets.

Of course, while competition will probably be strong, there exists some concern that interstate banking will have undesirable consequences on other fronts. For instance, it is feared that a banking industry that is highly concentrated nationwide (or within a particular state) might wield too much political clout. Also, banks will grow in size due to mergers and acquisitions. This increasing size of banks may be viewed as a threat to the safety and soundness of the banking system,

on the grounds that the failure of a very large bank could have a serious impact on the financial sector and other sectors of the economy. Further, many small community banks may be acquired by large organizations, and it is feared that these organizations will take away local control from the community banks and will be less apt to support the local economies.¹³ These are issues that legislators and regulators will address as need be.

At the same time, the need for restrictions on interstate banking should not be exaggerated, because such restrictions would place a limitation on competition in banking. In many local markets, competition is actually being enhanced as a result of interstate banking. Local markets are experiencing entry by new competitors that are subsidiaries of out-of-state holding companies, including "fringe" competitors. In addition, nonbanking interstate subsidiaries of bank holding companies are becoming potential entrants into full service banking, and as such may be exerting a greater competitive influence on local markets. Competition in a local market is also enhanced when the acquisition of a bank in the market transforms that bank into a more efficient, more dynamic institution. So on balance, bank customers will reap the benefits of more and better bank services at competitive prices as banks expand interstate.

¹³It is likely, however, that many small banks will survive, unscathed by the new interstate banking environment. In fact, a body of evidence indicates that community banks will by no means disappear. See, for instance, Dave Phillis and Christine Pavel, "Interstate Banking Game Plans: Implications for the Midwest," Federal Reserve Bank of Chicago *Economic Perspectives* (March/April 1986) pp. 23-39, or Dean F. Amel and Donald T. Savage, "The Structural Effects of Interstate Banking: Evidence from Changes in State Banking Laws," draft, (1986) Board of Governors of the Federal Reserve System.

New Jersey and Pennsylvania Go Interstate

New Jersey's interstate bill establishes an interstate banking region comprising Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, Missouri, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, Wisconsin, and the District of Columbia. To be eligible to enter New Jersey, bank holding companies must have at least 75 percent of their total domestic deposits within the region; this restriction prohibits leapfrogging, that is, entry into New Jersey by a bank holding company from outside the region that has established a small presence in some state in the region. The law originally required that New Jersey banking organizations be allowed reciprocal entry into at least three states in the region (other than West Virginia or Delaware) before New Jersey extended reciprocity to any state in the region. As Ohio, Kentucky, and Pennsylvania have offered reciprocity to New Jersey, the law is now effective.

The New Jersey law also contains a trigger to nationwide reciprocity. The law will extend nationwide when at least ten more states allow bank holding companies located in New Jersey to acquire bank holding companies or banks located in those states; four of those states must be among the ten largest, by total commercial deposits, in the country. It appears that New Jersey's trigger date for nationwide reciprocity will fall on July 1, 1988, given the current status of interstate legislation.

Pennsylvania's interstate banking bill establishes an interstate banking region consisting of Delaware, Kentucky, Maryland, New Jersey, Ohio, Virginia, West Virginia, and the District of Columbia. Like New Jersey, Pennsylvania's law contains an anti-leapfrogging provision. The law also establishes a nationwide trigger date: March 4, 1990, when reciprocity will be extended nationwide. Pennsylvania's law also requires that certain criteria be met concerning the availability of banking services to individuals and businesses. The Pennsylvania Department of Banking must certify that Pennsylvania bank holding companies and out-of-state bank holding companies involved in interstate deals offer basic account transaction services and promote investment and employment in their communities.

Efficient Production of Financial Services: Scale and Scope Economies

*Loretta J. Mester**

Banks have begun to expand into new geographic markets as a result of deregulation and the wave of interstate banking legislation that has been passed. One of the chief concerns about this geographic expansion has been that it would lead to a financial services industry that was too concentrated. It seemed possible that, once regulations limiting where financial institutions could operate were lifted, only a handful of very large,

multi-branch firms would remain; small institutions would not have a chance of surviving or starting up with these Goliaths dominating the field.

This view was based largely on evidence from the industry's cost structure, which reveals which firms are the most efficient producers. Early cost studies treated financial services as a single product, and concentrated on determining the scale of operations of efficient firms—which size firms would produce the industry's output at least cost. Many of these studies found that the average cost of production falls as more is pro-

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duced—that is, there are economies of scale—so that larger financial firms are more efficient than smaller ones. Based on this evidence, it was easy to conclude that institutions should grow much larger and the industry more concentrated as firms took advantage of interstate banking laws that allowed them to move into new markets by branching or merging with other firms. But is this happening? Although it may be too early to tell what the *ultimate* effect of interstate banking on structure will be, so far the industry has not become highly concentrated; while some institutions have grown larger, small institutions continue to thrive.

One reason the evidence from early cost studies may not be correct is that these studies concentrated on economies of scale, which are only half the story. Financial institutions are not single-product firms; they produce a variety of loans, investments, and deposit accounts, in part for customer convenience, and also to reduce risk through portfolio diversification. Furthermore, in terms of the cost structure, producing a variety of products may also allow the institution to take advantage of economies of scope—that is, when it is cheaper to produce two products together in the same firm rather than separately in two firms. If such jointness in production exists, then the results of the single-product studies are not necessarily correct—economies of scope could have been misinterpreted as economies of scale.

Recent advances in economic theory have given economists the tools to analyze the cost structures of multiproduct industries, so that the issues of size can be separated from those of product composition. In addition to determining the efficient scale of operations of financial institutions, economists can determine whether “financial supermarkets” offering all types of services to all types of customers are more efficient than “financial boutiques” specializing in particular products for particular customers. If there are economies of scope, laws that remove restrictions on the proportion or amounts in which products can be produced could lead to

greater efficiency in the industry by allowing firms to select the most efficient combination of products and services. A single-product analysis cannot be used to address these kinds of questions. When trying to determine the efficient structure of multiproduct industries like the financial services industry, it is important to consider both the scale and the scope of institutions that make up the industry.

SINGLE-PRODUCT INDUSTRIES:

A Stroll Through An Average Cost Curve

Firms that produce a single product need to decide what level of output to produce, and this depends on the costs of production.¹ These production costs are made up of variable costs that are dependent on the level of output produced and fixed costs that are not. In most industries, as a firm expands its output from low levels, the cost of producing each unit falls. At output levels where this average cost of production is declining, there are *economies of scale*, since it costs proportionately less to produce at a larger scale.

There are several reasons why the average cost of production might be less for large-scale firms. For one thing, large set-up costs may be a major factor in the technology of production. In banking, computers can be used to perform some of the servicing of deposit and loan accounts, but the fixed cost of installing the computer and writing the software is high. As the scale of operations increases, these fixed costs are spread over a larger number of accounts so that the per unit cost of production falls. Of course, the decision of whether or not to install the computer depends on whether the number of accounts the bank will service is large enough to capture the economies of scale. If the volume is too low, the bank may be better off hiring more employees to service the accounts. Automated teller machines (ATMs) present another example of the effect of technology on the cost of production.

¹The level of output defines the size of the firm in single-product industries.

The cost per transaction is lower for an ATM than a human teller, but set-up costs for the ATM are high. If the number of transactions is large enough, the bank will be able to lower its average cost by using the ATM.

Larger firms may also benefit from specialization. A larger scale of operations may allow workers to become more specialized and build up proficiency in their specific tasks. For example, if a loan officer can concentrate solely on obtaining and servicing loan accounts, he may do a better job than if he has to divide his time between loans and doing the bank's payroll.

In some industries, like electric power and gas distribution, local telephone communication, and cable TV, set-up costs are so large relative to the cost of producing another unit of output that average costs are declining at every output level consumers are ever likely to demand. These industries are called "natural monopolies" because it's efficient for a single firm to produce the entire industry supply. In most industries, however, the average cost curve has a U-shape. Firms find that at a certain output volume, average cost stops declining, and the curve flattens. At a large enough volume, set-up costs become insignificant relative to the cost of producing additional units of output, and further specialization of workers doesn't increase their productivity, so that economies of scale are exhausted. Most firms also find that their average costs begin to rise beyond some level of output—for example, the firms become too large to be efficiently managed—and they experience *diseconomies of scale* since small increases in output cost proportionately more to produce.

Average cost is lowest between the level of output where economies of scale are exhausted and the level of output where diseconomies of scale set in. It is efficient for firms to produce where average costs are minimized, and firms which do so have *constant returns to scale*. Depending on how "flat" the bottom of the U-shaped average cost curve is, firms may produce efficiently at a broad range of output levels. If all firms in an industry produce efficiently, the total

costs of the industry are minimized. In contrast to natural monopolies, in most industries each firm's efficient output level is small relative to the total industry production, so that many firms are needed in order to supply the output efficiently.

To summarize, the relationship between the amount of a good produced and the efficiency of the firm involves economies of scale. If there are *economies of scale*, the firm can become more efficient by *increasing* the quantity of its product; if there are *constant returns to scale*, the firm is producing an efficient quantity of the good; if there are *diseconomies of scale*, the firm can become more efficient by *decreasing* its production of the good.

MULTIPRODUCT FIRMS AND ECONOMIES OF SCOPE

Financial firms are multiproduct firms. That is, they produce a variety of loans, deposit accounts, and investments with different characteristics that make them different products. For example, while mortgages and credit card loans are both types of loans, they are not substitutes for one another from either the consumer's point of view or the bank's point of view. Since the financial institution requires collateral for the mortgage but not for the credit card loan, the rate of default on mortgages differs from that on credit card loans, and even if default occurs, the bank can sell off the collateral (the house) to recoup some of its loss. So different types of loans should be considered different types of products to the extent that their characteristics differ. Since financial firms can offer a range of products, they must select not only their scale of operations, but also which products they will provide. Just as firms can get cost savings depending on the volume they choose to supply, they can also get cost savings depending on the mix of outputs they supply. If it's cheaper to produce a group of outputs together in a single firm rather than separately in specialized firms, then there are economies of scope between the goods.

Sources of Economies of Scope: Shared

Inputs... Since Adam Smith's discussion of the division of labor, the advantages of specialization have received a lot of attention. Yet economies of scope point up some of the disadvantages of specialization. How do economies of scope arise? One source is the sharing of inputs. If an input is not used up to produce one product it might be used to produce a second product. The traditional example that illustrates the joint utilization of inputs is wool and mutton production. If a flock of sheep is raised to produce mutton, then it is probably less costly to use the same sheep to produce wool than to raise two different flocks of sheep, one for mutton and one for wool. The shared input in this case is sheep. Other examples along the same line are production of wheat and straw, beef and hides, and beer and vegemite.²

In financial institutions, it is generally less expensive to use the same group of tellers to handle savings and checking accounts and the same group of loan officers to handle auto and home improvement loans than it is to employ separate tellers and loan officers for each kind of deposit and loan. The shared input is the employee. Another input that can be shared is information, which is sometimes gathered at significant cost. Once credit information on an individual or business is gathered for a mortgage, it can be used costlessly for a furniture or equipment loan to the same individual or business. So it is less expensive for the same bank to provide the loans than for a different bank to provide the second loan.

...Technology and Economies of Scale. Like scale economies, the existence of scope economies depends on the technology that is available, and so can change over time. Today we think of wool and mutton as a natural example of joint production because both can be exported easily

and economically. However, in twelfth century Flanders, because of the lack of refrigeration, mutton export was impossible. Because it was much easier to export cloth, farmers found it was profitable to raise sheep to produce wool but not mutton.³ The impossibility of exporting mutton made it uneconomical to share the factor of production, sheep; no scope economies existed between wool and mutton. As technology and prices change, so do the possible economies of joint production.

Because of the technology being used, economies of scope and economies of scale often go hand in hand. For example, when a bank installs a computer, the bank can use it to process a wide variety of loan and deposit accounts. Thus, the computer can be a shared input for several types of products, leading to economies of scope among them. Furthermore, the economies of scope enable the bank to achieve the large quantities necessary to take advantage of the scale economies associated with using the computer.

A close association between economies of scope and scale also appears in activities that are organized as networks, like passenger airplane services or electronic funds transfer switching networks in banking. In both cases, economies of scale give the firms the incentive to expand the scope of their operations, that is, the pairs of cities or banks they serve. Airlines organize their activities in networks with hub cities so that they can fly larger planes which are more economical. In the financial services industry, the automated clearing house (ACH) is an example of a switching network. One use of the ACH is for payroll deposits. Instead of a business sending a check to each of its employees, it can send its own bank a magnetic tape of transactions. The bank collects all such messages from its customers and relays them to the ACH. The ACH coordinates all

²Vegemite, a concentrated yeast extract that is a by-product of beer production, can be thought of as "the peanut butter of Australia."

³For further discussion see Elizabeth Bailey and Ann Friedlaender, "Market Structure and Multiproduct Industries," *Journal of Economic Literature*, 20 (September 1982), p. 1206.

these messages from its member banks and creates outgoing tapes for all receiving banks in the network. The ACH serves as the hub of the network; the service it provides is the connection between one bank and another. That is, relaying messages between bank A and bank B is one product, and between bank A and bank C another product. Scope economies exist since once an ACH is serving one pair of banks, it can serve another pair at little additional cost, and by serving another pair it increases volume (that is, the number of messages) so that the computer input is used more economically.

As we have seen, there are many reasons why we might expect the costs of one product not to be independent of the cost of another product in multiproduct firms. In investigating the cost structure of multiproduct firms, both scale and scope of operations should be considered. (See A MULTIPRODUCT COST FUNCTION, p. 20, for an illustrative example of economies of scope between the production of commercial and consumer loans at certain levels of output.) But before the theory of multiproduct industries was developed, there were several studies of the cost structure of financial institutions which used the single-product approach.⁴ In some of these studies a composite commodity was created by aggregating all the outputs the firm provided. In others, one product was selected to represent all of the firm's outputs, or separate cost functions were estimated for each bank service. Almost all of these studies found significant economies of scale in the commercial banking industry and the savings and loan industry.⁵ This finding meant that large institutions had a significant cost advantage over small institutions.

⁴The definitive source for the theory of multiproduct industries is William Baumol, John Panzar, and Robert Willig, *Contestable Markets and the Theory of Industry Structure* (New York: Harcourt Brace Jovanovich, 1982).

⁵For a review of the single-product studies, see George Benston, Gerald Hanweck, and David Humphrey, "Operating Costs in Commercial Banking," Federal Reserve Bank of Atlanta *Economic Review* (November 1982) pp. 6-21.

MULTIPRODUCT EMPIRICAL STUDIES

The results of single-product studies may not be correct since they could not capture the effects on cost of providing different mixes of financial services. Using the multiproduct framework, economists have begun to study the efficiency of firms in the financial services industry, but the analysis is much more complex.

To get a sense of some of these complexities, consider first the problem of deciding what it is the financial firm actually produces. There are two different approaches to this problem.⁶ According to the "production" approach, the institution produces a variety of individual accounts of different sizes using labor and capital as inputs. The outputs are measured as the number of accounts of each type the firm handles. Costs include all the operating expenses. In estimating the cost structure, costs are a function not only of output levels and input prices, but also of the average account sizes of each type of output. On the other hand, according to the "intermediation" approach, the production process for a financial institution involves financial intermediation, that is, the borrowing of funds and the subsequent lending of those funds. Output is measured as the dollar value of the firm's earning assets; deposits, in addition to labor and capital, are treated as inputs in the production of the assets. Costs, therefore, include both interest and operating expenses.

The choice between the approaches depends both on the philosophy of the investigator and on the data being used. The production approach can only be used if Functional Cost Analysis (FCA) data are used, since the financial reports of institutions do not give the number of accounts while the FCA data do. The intermediation approach has an advantage over the production approach in that it includes the total

⁶The source for this distinction is David Humphrey, "Costs and Scale Economies in Bank Intermediation," in R. Aspinwall and R. Eisenbeis, eds., *Handbook for Banking Strategy* (New York: Wiley and Sons, 1985).

A Multiproduct Cost Function

Many industries, including the financial services industry, are multiproduct—that is, they provide a variety of products and services to their customers. Depending on the cost structure, it might be most efficient for each firm in the industry to specialize in providing only one of the industry’s products. If there are economies of scope, however, it will be more efficient if some firms produce several or all of the industry’s products. A simple example illustrates this. Suppose firms, in this case, banks, can produce two outputs, commercial loans and consumer loans. Now let’s look at cost data we have “collected” from banks that produce only one type of loan, that is, specialized banks.

COST DATA FOR SPECIALIZED BANKS

Commercial Loans

<u>No. of Loans</u>	<u>Total Cost</u>	<u>Average Cost</u>
0	\$ 12	
1	60	\$60
2	100	50
3	132	44
4	156	39

For these banks, average cost is always decreasing as output is expanded and there are economies of scale for all output levels. So if the public wants 4 commercial loans, it’s most efficient for one bank to supply all 4.

Consumer Loans

<u>No. of Loans</u>	<u>Total Cost</u>	<u>Average Cost</u>
0	\$ 12	
1	52	\$52
2	100	50
3	156	52
4	220	55

The average cost curve for these banks has the familiar U-shape. As output increases, the average cost decreases and then increases. If the public wants 4 consumer loans, it’s most efficient to have 2 banks produce 2 loans each.

Now let’s suppose some banks decide to provide both types of loans and look at cost data of providing the various combinations of both types.

COST DATA FOR MULTIPRODUCT BANKS

<u>No. of Commercial Loans</u>	<u>No. of Consumer Loans</u>	<u>Cost</u>
0	0	\$ 12
1	1	102
1	2	152
1	3	210
1	4	276
2	1	144
2	2	196
2	3	256
2	4	324
3	1	178
3	2	232
3	3	294
3	4	364
4	1	204
4	2	260
4	3	324
4	4	396

From these figures we can compare the costs of producing different quantities of the two types of loans when specialized banks provide them and when multiproduct banks (or a combination of specialized and multiproduct banks) provide them. At certain output quantities, it is not efficient to have only specialized banks in the industry. For example, suppose customers want the industry to provide 3 commercial loans and 1 consumer loan. A bank that produces both types of loans will be able to produce the loans cheaper than specialized banks, because there are economies of scope between commercial and consumer loans at these output levels:

IF SPECIALIZED BANKS FILL DEMAND . . .

One bank produces all 3 commercial loans (because of economies of scale) at total cost	\$132
One bank produces 1 consumer loan at total cost	\$ 52
Total cost of providing demand	\$184

IF MULTIPRODUCT BANKS FILL DEMAND . . .

One bank produces 3 commercial and 1 consumer loan at total cost	\$178
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This need not always be the case. At other levels of demand, it's cheaper if the industry is made up of a combination of specialized and multiproduct firms than if it is made up of only specialized or only multiproduct firms.

costs of banking and doesn't make a distinction between a bank's purchasing deposits from other institutions or producing its own deposits. However, the production approach allows the numbers of accounts and the average sizes of accounts to have different effects on costs, while the intermediation approach does not.⁷ Using the raw data, the approaches yield average costs

that are roughly consistent.⁸

Another somewhat more technical issue involves selecting the number of categories of outputs and inputs to use. Ideally, each distinct product should be considered as a different output, but the feasibility of doing so depends on the specification of the way costs are related to

⁷A problem with using the FCA data is that banks with deposits over \$1 billion are underrepresented and so are usually omitted from the data set before estimating the cost function. FCA data have been used extensively in both single and multiproduct commercial bank studies.

For a discussion of the production and intermediation approaches, see Allen Berger, Gerald Hanweck, and David Humphrey, "Competitive Viability in Banking: Scale, Scope, and Product Mix Economies," *Research Papers in Banking and Financial Economics* (Board of Governors of the Federal Reserve System, January 1986).

⁸See D. Humphrey, "Costs and Scale..."

A Summary of Multiproduct Cost Studies

<u>Studies (authors)^a</u>	<u>Approach</u>	<u>Outputs</u>	<u>Evidence of scale economies beyond low output levels</u>	<u>Evidence of scope economies between all outputs</u>
<u>Commercial banks</u>				
Benston, Berger Hanweck, and Humphrey (1983)	Production	<ul style="list-style-type: none"> • Demand deposits • Time deposits • Real estate loans • Commercial loans • Installment loans 	no	no
Berger, Hanweck, and Humphrey (1986)	Production	• Same as above	no	no
	Intermediation ^b	• Same as above	no	no
Gilligan and Smirlock (1984)	Production ^c	<ul style="list-style-type: none"> • Demand deposits • Time deposits 	no	yes
	Intermediation ^d	<ul style="list-style-type: none"> • Securities • Loans 	no	yes
Gilligan, Smirlock, and Marshall (1984)	Production	<ul style="list-style-type: none"> • Deposits • Loans 	no	yes
Lawrence and Shay (1986)	Intermediation ^b	<ul style="list-style-type: none"> • Deposits • Loans • Investments • Nonbalance sheet items^e 	no	no

input prices and output levels, that is, the functional form of the cost function (another thing that has to be decided!), and the data that are being used to estimate the function.⁹ Most studies use broad definitions of output; for example, all consumer loans are grouped together as one output and all real estate loans as another

output. To date, the largest number of output categories that has been used is five.

So far, eight studies of depository financial institutions have estimated multiproduct cost functions. They investigate a variety of institutions—five look at commercial banks, two look at savings and loan institutions, and one focuses on credit unions. (See A SUMMARY OF MULTI-PRODUCT COST STUDIES).

Commercial Bank Studies. In general, the five commercial bank studies come to similar conclusions about economies of scale: except at relatively low output levels there do not appear to be economies of scale. (The studies by Gilligan, Smirlock, and Marshall, and Gilligan and Smirlock

⁹As the number of categories of outputs and inputs increases, the number of parameters to be estimated in the cost function increases. For example, the translogarithmic cost function (a popular choice for multiproduct studies) has 28 parameters when three outputs and three inputs are specified, but 45 parameters when four outputs and four inputs are specified.

<u>Studies (authors)^a</u>	<u>Approach</u>	<u>Outputs</u>	<u>Evidence of scale economies beyond low output levels</u>	<u>Evidence of scope economies between all outputs</u>
<u>Savings and Loans</u>				
LeCompte and Smith (1985)	Intermediation	<ul style="list-style-type: none"> • Mortgage loans • Consumer loans • Investments 	no	no
Mester (1985)	Intermediation	<ul style="list-style-type: none"> • Mortgage loans • Other loans • Cash+securities + real estate investments 	no	no
<u>Credit unions</u>				
Murray and White (1983)	Intermediation	<ul style="list-style-type: none"> • Mortgage loans • Other loans • Investments 	yes	no
<p>^aFull citations are in the bibliography.</p> <p>^bThis is not strictly the intermediation approach since deposits are included as outputs.</p> <p>^cThis is not strictly the production approach since dollars of demand and time deposits are used instead of number of accounts.</p> <p>^dThis is not strictly the intermediation approach since deposits are not included as inputs and interest is not included in cost.</p> <p>^eIncludes safe deposit, trust, data services, and other agency expenses.</p>				

indicate there are diseconomies of scale at large output levels, so that the average cost function has the familiar U-shape.) These studies differ, however, in their conclusions about economies of scope. The two studies that specify two bank outputs find that each pair of outputs are cost complements at certain output levels, which is some indication of economies of scope. (If the cost of providing an extra unit of one output, say consumer loans, decreases when the quantity of another output, say commercial loans, increases, then the two types of loans are cost complements.¹⁰) The three other commercial bank studies each specify more than two bank outputs, and find no evidence of economies of scope. Furthermore, the study by Berger, Hanweck and Humphrey finds slight diseconomies of scope under both the production and intermediation approaches. This suggests that since we see joint production in banking, other motives, such as customer convenience or diversification to reduce risk, may outweigh the cost disincentives.

Savings and Loans. Like most of the commercial bank studies, the two savings and loan studies find no evidence in favor of economies of scale. Although both find that a proportionate increase in all outputs would lead to a proportionate increase in costs (constant returns to scale), Mester finds that there are product-specific returns to scale with respect to mortgage loans. That is, when the level of mortgage loans increases while the levels of the other two outputs are unchanged, costs increase less than proportionately. Like the commercial bank studies with three or more outputs, these studies find no evidence of economies of scope among the three outputs specified in each study.

Credit Unions. Murray and White's study is the only investigation of the cost structure of credit unions and also the only multiproduct

study of financial institutions to find significant scale economies over its data set. Of the three outputs specified, only two (mortgages and other loans) were found to be cost complementary—not enough for economies of scope.

Except for the credit union study, the overall findings of the multiproduct cost studies of depository financial institutions suggest that the previous single-product studies overstated the degree of scale economies that exist. Once scope of operations is considered along with scale, studies indicate that most firms operate at constant returns to scale. The studies have not reached a consensus regarding economies of scope. When two outputs are specified, the evidence seems to indicate that economies of scope exist. When three or more outputs are specified, the evidence turns against economies of scope.

CONCLUSIONS

Deregulation of the financial services industry is allowing financial institutions to expand into new geographic markets. As financial firms take advantage of this change, questions arise about the competitive viability of financial institutions of different sizes and product composition. Previous studies of the cost structure of the industry treated it as a single-product industry and found that there were significant economies of scale in production. This led to the conclusion that the industry would become much more concentrated and that small institutions would not be able to survive.

Recent studies have begun to model financial institutions explicitly as providers of multiple products and to investigate economies of scope as well as economies of scale of operation. The eight multiproduct studies reviewed here find little evidence of economies of scale, unlike the earlier single-product studies. So there is no evidence that larger firms have a cost advantage over smaller firms. Mergers between financial firms that increase the scale of operations should not yield cost savings. The cost studies also consider the possibility of cost savings due to joint production of different outputs (but cannot

¹⁰Cost complementarity between each pair of outputs being produced provides some evidence of economies of scope between the outputs.

consider other motives for joint production such as customer convenience and diversification to reduce risk). Although the studies reach mixed conclusions about the existence of economies of scope, there is no strong evidence to indicate that less specialized firms are more efficient than more specialized firms or vice versa. In other words, it seems that the efficient industry structure can accommodate both "financial supermarkets" and "financial boutiques."

Based on the evidence on scale and scope that has been gathered to date, it appears that many firms will be able to operate without substantially

changing their product configurations as restrictions against geographic expansion are eased further. As institutions are permitted to produce new and different products, further investigations of the cost structure of the financial services industry will indicate whether there are economies of scope between the new products and the old products already being produced. As more data become available, multiproduct cost analysis will allow us to determine the efficient structure of the industry that will emerge after product deregulation.

Bibliography and Suggested Readings

- Bailey, Elizabeth and Ann Friedlaender, "Market Structure and Multiproduct Industries," *Journal of Economic Literature*, 20 (September 1982) pp. 1024-1048.
- Baumol, William, John Panzar, and Robert Willig, *Contestable Markets and the Theory of Industry Structure* (New York: Harcourt Brace Jovanovich, 1982).
- Benston, George, Allen Berger, Gerald Hanweck, and David Humphrey, "Economies of Scale and Scope in Banking," *Proceedings of a Conference on Bank Structure and Competition* (Federal Reserve Bank of Chicago, May 1983).
- Benston, George, Gerald Hanweck and David Humphrey, "Operating Costs in Commercial Banking," *Federal Reserve Bank of Atlanta Economic Review* (November 1982) pp. 6-21.
- Berger, Allen, Gerald Hanweck and David Humphrey, "Competitive Viability in Banking: Scale, Scope, and Product Mix Economies," *Research Papers in Banking and Financial Economics* (Board of Governors of the Federal Reserve System, January 1986).
- Gilligan, Thomas and Michael Smirlock, "An Empirical Study of Joint Production and Scale Economies in Commercial Banking," *Journal of Banking and Finance*, 8 (1984) pp. 67-77.
- Gilligan, Thomas, Michael Smirlock, and William Marshall, "Scale and Scope Economies in the Multiproduct Banking Firm," *Journal of Monetary Economics*, 13 (1984) pp. 393-405.
- Humphrey, David, "Costs and Scale Economies in Bank Intermediation," in R. Aspinwall and R. Eisenbeis, eds., *Handbook for Banking Strategy* (New York: Wiley and Sons, 1985).
- Lawrence, Colin and Robert Shay, "Technology and Financial Intermediation in a Multiproduct Banking Firm: An Econometric Study of U.S. Banks, 1979-1982," in C. Lawrence and R. Shay, eds., *Technological Innovation, Regulation and the Monetary Economy* (MA: Ballinger, 1986).
- LeCompte, Richard, and Stephen Smith, "An Empirical Analysis of Scale and Scope Economies in the Savings and Loan Industry," Texas Christian University and University of Florida Working Paper (September 1985).
- Mester, Loretta, "A Multiproduct Cost Study of Savings and Loans," Federal Reserve Bank of Philadelphia Working Paper No. 85-12 (October 1985) forthcoming in the *Journal of Finance*.
- Murray, John and Robert White, "Economies of Scale and Economies of Scope in Multiproduct Financial Institutions: A Study of British Columbia Credit Unions," *Journal of Finance*, 38 (June 1983) pp. 887-902.

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