Technological Innovation: Implications for Regulation of Financial Institutions

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Finance theory deals primarily with perfect markets--competitive markets in which there are no transaction costs and all participants in the market have perfect information. In such a world--the world of the Capital Asset Pricing Model (CAPM)--there is no way for financial institutions to earn a profit, and hence there are no financial institutions. In the absence of financial institutions, there is no need for regulation of financial institutions.

In the real world, of course, there are financial institutions, transactions costs, information deficiencies, and regulation. The existence of financial institutions is attributed to one type of imperfection or another, though it is not necessary for our purposes here to determine the true cause of the existence of financial institutions.[1] Once we have financial institutions of the type that seem to develop in the real world--that is, operating on a fractional reserve basis, providing transaction services for the economy, and holding risky assets--there is a need for some type of regulation to assure stability of the financial system.

What does all this have to do with the theme of this ~~conference~~ book? Changes in technology can be viewed as bridging the gap between financial theory and real financial markets. Historically, financial institutions have not been in the forefront of the adopters and adapters of new technology. In recent years, however, changes have been great. The new technology--specifically computer hardware, software, and communications--have significantly reduced

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[1] Goldfeld has said that an economist is someone who, observing the successful operation of banks in practice, questions whether they would work in theory (Journal of Money, Credit and Banking, November 1984, p. 611. For a good discusison of the relationship between market imperfections and the existence of financial institutions, see Santomero, Journal of Money, Credit and Banking, November 1984.

transaction costs and promise further great cost reductions. Access to information has increased and the cost of acquiring and using information has come down. Information asymetries become less significant, as all parties to a transaction can obtain relevant information.

There has been much discussion in recent years of deregulation in financial services, but there has not been sufficient appreciation, in my view, of the interrelationship between deregulation and technology. In fact, "deregulation" as we normally understand the term--a decision by the legislature or regulator to eliminate some type of regulation--has been rather limited in banking. There has been little comparable to a Congressional decision to eliminate the CAB and most of its regulatory functions. The only significant deregulation of that type in banking has been the elimination of interest rate ceilings on deposits. We should not lose sight of how that came about.

Interest rate ceilings and the prohibition of interest on demand deposits were imposed by the Banking Act of 1933 with the support of the banking industry. While economists consistently attacked the ceilings as being inefficient, unnecessary, immoral, and fattening, for at least 30 years bankers strongly supported this restriction on their pricing perogatives. Some bankers began to oppose ceilings in the late 1950s/early 1960s, not on grounds of economic principle, but because their ~~savings and loan~~ thrift industry competitors (savings and loan associations, savings banks and credit unions) were not subject to such restrictions. That inequity was repaired in 1966, and the vast majority of bankers were satisfied with a system in which all depository institutions were subject to rigid rate ceilings on deposits. Bankers' complaints about the system after 1966 were aimed much more at the 1/4% rate differential allowed to ~~savings and loans~~ thrifts than at the system as a whole. And as long as the bankers and the savings institutions were happy with

the system, neither Congress nor the regulators were going to make any change on the basis of criticism from a few academics or gray-haired consumers.[2]

What happened in the late 1970s to change the views of the bankers? They were not suddenly converted to free market principles, nor were there pangs on conscience over inequitable treatment of depositors. What did happen was the growth of money market mutual funds that offered going market rates to small depositors. Small banks faced a loss of deposits to the money market funds, and the larger banks, that ended up selling large CDs to the money market funds, found an increase in interest costs as compared with the previous cost of maintaining their retail deposits.

It is not surprising that this type of innovation--development of the money market fund--took place. What is interesting is the question of why it occurred in the 1970s and not in the 1960s. The answer turns at least partly on transaction costs, ~~and technology~~ the effect of improved technology. Pooling the funds of thousands of investors, representing individually rather small amounts, investing those funds, accounting for earnings, crediting accounts daily, and allowing checks to be written on those accounts, represents an enormous data processing burden. Communication capability is also extremely important to customers of money market funds. An 800 telephone number may not represent terribly sophisticated communications technology, but it was essential to the success of the money market funds.

I have reviewed this history in some detail because I think the point is an important one--the important deregulation that has taken place in the financial services business has taken place because of changes in technology.

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[2]It may be interesting to note that when change did come, the latter--specifically, the "gray panthers"--were more influential than the former. (a senior citizens organization)

In the absence of improvements in that technology, I suspect that we would still have Regulation Q ceilings.

I do not mean to suggest that the causal relationship always runs from technology to regulation. Regulation can affect the extent or rapidity with which improvements in technology are accepted and adopted. The prohibition of interest on demand deposits has delayed acceptance of improvements in the payments system. The prohibition of price competition forced banks to compete for demand deposits by providing payments services below cost. The consumer had to forego interest on his checking account, but enjoyed free checking services and float. As Humphrey and Berger have pointed out, he or she had little incentive to accept a change in the payment system, say, truncation or POS systems, the principal benefit of which would be reduced cost to the bank. Payment of interest on demand deposits, or NOW accounts, allows an unbundling whereby the depositor earns interest and is charged on the basis of his use of services. In that situation the customer has an incentive to use the lowest cost system. Banks have been slow to totally unbundle the pricing of checking account services, but they are moving in that direction. The changes in regulation will spur the acceptance and application of new technology.

Changes in technology are also affecting geographical deregulation in financial services. There has been no change in federal law regarding interstate banking, but there has been an expansion of interstate activity as a result of changes at the state level. This reflects, in my view, a growing recognition that the changes in technology are weakening the effectiveness of the barriers to interstate banking, and local bankers are seeking to make the best legislative deals they can while they still have some bargaining power.

To see this we must examine the relationship between changes in the payments system and the local structure of banking in the U.S. If the public

depends on paper checks to make payments, a local banking connection is a virtual necessity. Because a physical piece of paper is involved, deposits can most conveniently be made locally. It is possible to deal by mail with a distant bank, but that clearly involves additional time for checks to move through the mail. Given the state of the postal system, that involves risk as well as lost interest. Further, making payments and obtaining cash are facilitated by having a local bank account. Some merchants will accept only local checks.

Large firms have less need to be concerned with a local banking connection for their major payments activity, since they are not as dependent on the paper check system. Small business, however, still relies heavily or totally on the paper check and needs a local supplier of payments services. Even the large firm that has its major banking connections with money center banks will need a local connection for payroll accounts and other payments made locally. Employees want to be paid in cash or in checks on local banks that they can cash easily. In view of these consideration, it is not surprising that the payments system based on the paper check has been associated with a localized banking system.

It is clear that the paper check system is being replaced by other payments system. I am impressed by the work done at the Atlanta Fed that indicates the volume of paper checks may be close to its ultimate peak.[3] What is relevant to my topic is that all the alternative payment methods that the Atlanta Fed study finds are replacing checks involve less need for a local banking connection. Let us examine a few of these.

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[3]See "Displacing the Check," Economic Review, August 1983, pp. 4-19.

Bank credit cards can be used anywhere and are equally acceptable regardless of the location of the issuing bank. The consumer who maintains a local checking account because local merchants would not accept out-of-town checks no longer is constrained by that consideration. This means that banks can solicit credit card business on a national basis, as Citicorp is doing from South Dakota. The customer has no reason to prefer a card issued by a local bank. Local banks in this business are in direct competition with the out-of-state banks.

One reason for having a local bank account is to obtain cash. National ATM networks allow a consumer to maintain a deposit account with a nonlocal institution and to rely on the ATM for cash withdrawals. The reluctance of local merchants to cash checks on nonlocal banks no longer is a restraining factor. Another reason for a local bank account is to be able to make deposits conveniently without relying on the mails. The ATM is such a means. Further, banks generally begin paying interest promptly on deposits made at an ATM, without the delays associated with deposits made by mail. In addition to the ATM, the automated clearinghouse also reduces the need for a local bank, since the consumer's paycheck can be credited to his or her account wherever that may be.

Point-of-sale systems, as they develop, will also reduce the need for a local banking connection. When such systems exist, neither the customer nor the merchant need to be concerned about the location of the customer's bank. POS systems can provide cash and accept deposits, fully replacing the payment services now handled by a bank office. Home banking is a payments technique somewhat farther off in the future (though pay-by-phone now exists, and the technology exists for the origination of payments through home computers or interactive cable TV systems). When such systems are widely used, the

consumer will have little concern with the physical location of the bank with which he or she deals. The choice of banks will be based on the quality and convenience of the programs offered and the prices charged. Now pay-by-phone systems are locally limited because of the cost of telephone service, but communication costs are coming down. There are ways of dealing with that problem without the need for a manned local office.

While various justifications can be given for enacting regulations that restrict interstate banking, it is clear that the principal reason such restrictions exist is the desire to protect local banks from out-of-state competition. This analysis of payments-system developments argues strongly that such developments will soon make it impossible to protect local banks from interstate competition. Regardless of a state's desire to preserve a structure of local depository institutions, and the desire of local banks to keep out competitors, these payments developments will enable out-of-state banks to compete for local business, even without any change in state or federal law concerning branching or holding company operations.

An additional implication of these changes in payments system technology is that it is no longer clear that commercial banks will have an exclusive franchise (or even an advantage) in providing the payments services of the future. It may be that AT&T or IBM or ADP or Sears or a cable TV company can do it better or cheaper. One path to product deregulation may come not from banks seeking broader operating powers, but from payments systems developments that attract other potential providers of such services into the business.

Similar considerations affect the credit function as well as payments services. Banks are allowed to operate loan production offices across state lines. LPO's cannot make loans in a technical, legal sense--approval must come from the head office. If documents had to be transported for signature

from, say, Houston to New York by stage coach or the U.S. Postal Service, the ability of an LPO to provide competitive service would be greatly inhibited. Now telecommunication of documents is virtually instantaneous and is transparent to the customer. That is, the customer does not know or care where the documents are signed, since his local representative of a distant bank can provide service just as if he was legally authorized to do so.

The recent efforts of the banking industry to broaden the scope of its financial activities and products are related to changes in regulation and technology. Perhaps the best example is the banks' interest in performing insurance agency functions. There have long been logical ties between some insurance products and bank lending. The borrower seeking a mortgage loan to finance a home purchase is simultaneously in the market for homeowner's insurance. Automobile loans and auto insurance go hand-in-hand. In many cases, business loans are connected with an opportunity to sell commercial insurance.

In general, federal law has prohibited banks from performing general insurance agency functions, but there are many exceptions. The economic logic of bank sale of insurance products has become more compelling as a result of changes in technology and deregulation. Many banks have a large investment in branch networks. These facilities were a reasonable means of competing for customers on a convenience basis when Regulation Q ceilings restricted competition on the basis of rate. But now costly manned brick-and-mortar facilities represent an expensive burden when competing on rates. One way in which branch facilities could become cost-effective again is by broadening the range of products handled by the branch. Insurance products are perhaps the best example.

The economics of the insurance business is also changing. Traditionally, most insurance in this country has been distributed through the so-called "American agency system," whereby independent agents sell insurance products to their customers. It is now clear that this involves substantially higher distribution costs than "direct writing," whereby an insurance underwriter sells insurance through its own employees or exclusive agents. It is not feasible, however, for an insurance company to switch from the American agency system to direct writing, because the law holds that the insurance customer "belongs" to the agent, and the underwriter cannot eliminate the agent and keep the customer. A new, small insurance company cannot, as a practical matter, start out in business as a direct writer.

Large banks or bank holding companies, however, do have the financial strength and name recognition to enter the insurance underwriting business on a direct writing basis. Insurance companies, similarly, see the banks as a more efficient distribution system for their insurance products. Price competition has become more intense in the insurance business as well as the banking business. Obtaining price information is easier because of computer systems and communications. The potential exists to greatly reduce transaction costs through a combination of insurance and banking. Pressures to move in that direction come from both commercial banks and insurance companies.

All these interrelated technological and regulatory developments have the result of making the financial services business more efficient and more competitive. This brings us back to my original discussion of the basis for the existence and profitability of financial institutions. Many banks, particularly smaller ones, have earned healthy profits because they have operated in relatively isolated uncompetitive markets. Many large banks have

earned profits because of their greater efficiency in handling certain types of transactions (when transaction costs are high, healthy profits accrue to the firm that is more efficient than the average). If transaction costs decline towards zero for all firms, and competitive pressures extend even into smaller markets, how will banks continue to earn profits? Are we getting closer to the world of finance theory where there is little need for financial institutions?

In my view, the long run answer is a pessimistic one for financial institutions operating in the traditional fashion. It will become increasingly difficult for financial institutions to earn a respectable spread between their cost of funds and their earnings on assets as competition increases, transaction costs decline, and information becomes cheaper. If individuals and corpratıons can come to participate in the market for financial instruments on a direct basis with low transaction costs, they will not allow financial institutions to earn high profits for performing an intermediary function. Financial institutions will continue to exist, but in smaller numbers, because there will be no need for local institutions, and their services may become largely a brokerage one (with earnings that reflect a broker's role rather than a risk-bearing investor's role).

Transition to a changing role is never easy, and the economic situation of recent years has made transition particularly difficult. Many institutions have been faced with narrowing spreads due to increased competition and falling transaction costs. Many have responded by taking on increasing risks in their portfolio or by increasing leverage. Banks have traditionally earned profits by performing credit intermediary functions, i.e., bearing credit risk. Large firms have been a major source of these profits. Banks have raised funds and made loans to large firms at a healthy spread. In recent

years, however, the commercial paper market has expanded greatly (at least partly in response to reductions in transaction and information costs). Large firms are no longer required to provide substantial spreads to banks for providing credit and bearing credit risk. Banks have responded, as we have noted, by increasing the credit risk in their portfolio. Middle-market firms now seem to be the most prized customers of larger banks, and the regional banks as well as the money center banks have pursued international lending beyond what has turned out to be wise.

Improved communication technology has brought increased risks with it, or at least has made increased risk-taking feasible. In the 1950s it would have been impossible for a large bank to raise huge sums abroad on a daily basis, as Continental Illinois was doing. Similarly, it would have been impossible for a major bank to face a liquidity crisis from the drying-up of such sources of funds.

Banks have also sought to maintain profitability by taking interest rate risk. Banks have always tended to borrow short and lend long. As long as interest rates moved moderately, and yield curves tended to be upward-sloping, borrowing short and lending long resulted in profits (on average). But interest rate volatility has been greater in the last twenty years or so than it used to be, and has been even greater in the last ten years. Speculating on interest rate movements has resulted in huge losses for some banks. Many authorities believe that banks must avoid all interest rate risk. Many bankers, however, argue that they will be unable to earn a sufficient return on their capital if they do not perform a maturity intermediation function (with the attendant risks). Some analysts argue, in fact, that recent efforts by the regulatory authorities to increase bank capital may force institutions to take greater risk. The evidence of the fourth quarter of 1984 indicates

that many large banks are making substantial interest rate bets. Over 40% of Morgan Guaranty's assets were funded by overnight Fed funds, generating large profits as rates moved down during the quarter. Obviously a sharp increase in rates would have had the opposite effect.

It has always been possible for the regulatory system to deal with excessive risk-taking by individual banks. Failures of even fairly large banks have been taken in stride. But there is a clear need to maintain stability of the financial system. We must prevent individual failures from leading to a loss of confidence in the banking system or in the deposit insurance system that backs it. In the face of a general increase in risk-taking, the problem for the regulators increases. One result of techonological change has been an increase in the speed of funds flows, with the potential for the failure of one bank to involve others. More banks are now tied into wire transfer systems, dollar flows are greatly increased, and, more important, the ratio of dollar flows to bank capital has increased enormously.

In 1970 the turnover of demand deposits of New York City banks (i.e., the ratio of debits to deposits) was 155 times. By 1980 that increased to 814 times, and in 1984 exceeded 1800 times. When funds were moved slowly in response to the flow of paperwork, it was easier for a bank to control its exposure.[4] At the time of the study of the payments system by A.D. Little for the Reserve City Bankers Association,[5] decisions on wire transfers involving

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[4]Professor Almarin Phillips has stressed the increasing vulnerability of the system to failures of individual banks when electronic transfers are as large as they have become. See, "Implications of the New Payments Technology for Monetary Policy," Issues in Financial Regulation, F. Edwards and J. Scott, eds., 1980.

[5]Report on the Payments System, Association of Reserve City Bankers, 1982.

the equivalent of millions of dollars of overdrafts were being made at the clerical level. No failure in the payments system has yet caused the failure of a bank, but we did come close to such a situation when the Herstatt Bank failed in 1974.

The implications of these payments systems developments have been well-summarized in a recent study by David Humphrey:

> Risks exist in any payments system. There are risks due to fraud, operational breakdowns, accounting mistakes, and the unexpected failure of a payments mechanism participant to settle for funds transferred during the day. Of these four risks, the last one--settlement risk--has the greatest potential for precipitating a sequence of failures that, if it occurs, would severely disrupt the operation of financial and product markets....
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> Settlement risk is more manageable when small dollar payment methods are used, such as cash, checks, ACH transfers, and credit cards. This is a direct result of the fact that small dollar losses are easier to absorb out of earnings flows or equity capital writedowns than are exceptionally large dollar losses. An important additional element, however, has to do with the certainty with which liability for losses are apportioned among interested parties for large dollar electronic payments. In both areas--the size of the potential losses and the ex ante assignment of liabilities--the wire transfer payment method contains the greatest risk.[6]

Humphrey points out the huge amounts of "daylight overdrafts" that are now a standard part of the electronic payments system. An examination of data for three large banks in January 1983 found an average daily overdraft on their Federal Reserve account of $4.2 billion. The extreme one-day figure for the month was $6.1 billion.[7]

The new technology does expose the system to greater risks, but part of the solution may be found in a greater use of improved technology by the regulators. That is, the tools of improved communications and computer power may make banks riskier, but those tools also have applications that may allow

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[6] The U.S. Payments System: Costs, Pricing, Competition and Risk, Monograph 1984-1/2, Graduate School of Business Administration, New York University, 1984).

[7] Ibid, p. 85

the supervisors to handle the increased risks. Changes in the process of bank examination may be one example.

I have argued that the important task of bank examination is determination of the solvency of an institution so that insolvent banks can be closed promptly. If net worth changes gradually rather than discontinuously, closing the bank when net worth becomes zero, but before it becomes significantly negative, prevents any loss to the deposit insurance system. The key is accurate monitoring of bank financial condition.[8]

Modern computer and communication capability enhances the ability of the FDIC to monitor bank net worth. Present computer hardware and software makes it feasible to measure the duration of bank assets and liabilities and to calculate the change in market values of assets and liabilities in response to interest rate changes. It may always be necessary to send teams of bank examiners into the field to evaluate the quality of bank loans, but much information can be communicated directly from bank to regulator. Bankers have always complained about the burden of reporting to the regulators. In the future, the volume of reporting will probably have to be significantly increased, but the cost of such reporting may decline.

Insert → of enhanced supervisory capability

An additional example may be the feasibility of risk-related deposit insurance premiums. This has long been a favorite proposal of academic economists that I have always been skeptical of--at least partly because of doubts as to the feasibility of measuring bank risk. Again, improved

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[8]There is now a significant body of literature that supports the view that monitoring bank capital rather than controlling bank risk-taking is the key to minimizing deposit insurance costs. See, for example, R. Merton, "On the Cost of Deposit Insurance When There Are Surveillance Costs," Journal of Business, 1978; D. Pyle, "Deregulation and Deposit Insurance Reform, Economic Review, Federal Reserve Bank of San Francisco, Spring 1984.

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A recent study by the FDIC finds significant ability to predict future bank failures by using data now available on non-performining loans.[9] This still requires bank examination but with a different responsibility--confirming that the data reported by banks is accurate. This is an easier task for the examiner than evaluation of loan quality.

[9]FDIC, Economic Outlook, November 1984.

communication and computing power may put this into the realm of the possible. The system developed by George Kaufman that is described in the Federal Home Loan Bank Board's Report to Congress on Deposit Insurance does seem a workable means of measuring interest rate risk.[8] It is a duration-based system that requires calculation of market values for all assets and liabilities in a savings and loan portfolio. At one time that would have seemed an impossible task, but now it may be doable.

Improvements in technology and deregulation are clearly desirable in that they improve the efficiency and competitiveness of the financial system. But it has always been recognized that a competitive industry, with firms operating on narrow profit margins, will experience more failures than a less competitive one. Since the financial services business will never become totally unregulated, the greater incidence of failure will put increased pressure on the regulators. Their task must be to maintain stability of the system, and not to become overly concerned about failures of individual firms. In particular, such failures must not become a basis for seeking reregulation.

Assuring a stable system does not require a massive structure of regulation. It is clear that deposit insurance is an efficient means of assuring that individual bank failures do not lead to a collapse of the system through runs on healthy banks. The only regulation we need is that which is necessary to protect the deposit insurance system. I have argued elsewhere that all that is required for that is a good monitoring system, the power to close banks when they become insolvent, and a capital requirement. That view may be too sanguine. The nature of risk in the system now may be such that more substantial change in deposit insurance is necessary to preserve it.

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[8] See Agenda for Reform, Federal Home Loan Bank Board, 1983.

Kane argues that the incentives for excessive risk-taking must be curbed, either by a pricing scheme that removes the subsidy represented by deposit insurance, or by some form of market discipline. While I am skeptical of the risk-related premium approach, market discipline, emanating from a capital requirement in the form of subordinated debt, may be a workable solution.

In any case, improvements in our means of monitoring banks are necessary, and the new technology makes that opportunity available. If properly harnessed, the technology can facilitate maintenance of a stable system, even if the outlook, in an increasingly competitive world, is for a continued high number of individual bank failures.