Working Paper 85-2

FINANCIAL INNOVATION IN THE UNITED STATES-- BACKGROUND, CURRENT STATUS AND PROSPECTS

by

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January 1985

*The views expressed in this paper are the author's and do not necessarily reflect the views of the Federal Reserve Bank of Richmond, the Federal Reserve System, or the Korea Federation of Banks.

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The purpose of this paper is to describe recent financial innovation in the United States, outline its principal implications with regard to (1) the structure and behavior of financial markets and (2) the conduct of monetary policy, and speculate on the likely character of further innovation in the near-term future. In the United States as elsewhere, financial innovation has been a continuous but uneven process, where the rate of innovation has varied substantially from one period to the next depending on a variety of circumstances. In particular, there have been a number of periods of accelerated innovation in U. S. financial history, frequently during or following periods of great social and political upheaval such as the Civil War and the Great Depression. It seems clear in retrospect that the 1970s and early 1980s have been years of relatively rapid innovation due largely to (1) higher inflation and its impact on interest rates and (2) rapid technological progress that has significantly reduced the real costs of carrying out financial transactions. This accelerated innovation has already had a profound effect on the competitive structure and risk characteristics of American banking and financial markets, on the way these markets are regulated, and on the conduct of U. S. monetary policy. Further, while there is some reason to believe that the pace of innovation may diminish in the United States in the years immediately ahead, the full impact of the innovations that have already occurred probably has not yet been felt.

The paper is organized as follows.[1] Section I provides background information on the structure and regulation of American financial markets, with special attention to the regulation of banks and other depository institutions. Section II describes the forces that appear to underlie the accelerated rate of financial innovation in recent years. Sections III and IV discuss the impact of this innovation on financial markets and the conduct of monetary policy, respectively. Finally, Section V speculates briefly on future prospects. In view of the breadth of the topic and the purpose of the symposium for which this paper was prepared, the paper will seek to synthesize available information on recent financial innovation in the United States rather than to break new analytical ground.

I.

BACKGROUND INFORMATION ON THE STRUCTURE AND REGULATION OF U. S. FINANCIAL MARKETS

This section provides background information on the general structure of U. S. financial markets and the regulation of these markets. This perspective is essential to an understanding of the nature of recent financial innovation and the forces underlying it.

A. Structure of U. S. Financial Markets

As is well known, the money and capital markets in the United States are among the largest and most highly developed in the world. Tables I and II provide a general idea of the size, scope and structure of these markets. Table I is a flow of funds table that shows total net new demands for and supplies of funds in U. S. credit markets in recent years in both dollar and percentage terms. In addition, the final column on the right side of the table shows total amounts outstanding at the end of 1983.[2] As the table indicates, total new credit flows in 1983 amounted to $515.5 billion. On the demand side,

*This paper was delivered at the First International Symposium on Financial Development sponsored by the Korea Federation of Banks in Seoul on December 4, 1984. The views expressed in the paper are the author's and do not necessarily reflect the views of the Federal Reserve Bank of Richmond, the Federal Reserve System, or the Korea Federation of Banks.

[1] The paper is organized roughly along the lines of the framework suggested by M. A. Akhtar. See Akhtar, "Financial Innovation and Monetary Policy: A Framework for Analysis," in Bank for International Settlements (1984), pp. 3-25.

[2] Table I includes only debt instruments and therefore excludes equity funds. The net issuance of corporate stock in 1983 was $46.2 billion. Total corporate stock outstanding at the end of 1983 was $2,151.4 billion. See Kaufman, McKeon and Blitz (1984), Table 3C, p. 33.

Table I

DEMAND FOR AND SUPPLY OF CREDIT IN U. S. CREDIT MARKETS

	1978	1979	1980	1981	1982	1983[e]	Amount Outstanding December 1983[e]
A. NET DEMAND							
1. Annual Net Increases in Amounts Outstanding ($ billions)							
Privately Held Mortgages	$117.7	$113.1	$ 84.2	$ 73.7	$ 12.4	$ 67.0	$1,319.5
Corporate and Foreign Bonds	34.4	31.9	39.0	33.9	38.8	35.3	617.5
Total Long-Term Private	152.1	144.9	123.2	107.6	51.1	102.3	1,937.0
Short-Term Business Borrowing	92.2	98.0	67.6	118.6	55.5	44.9	853.5
Short-Term Household Borrowing	52.4	49.3	9.8	35.1	23.9	49.9	575.4
Total Short-Term Private	144.6	147.3	77.4	153.7	79.4	94.8	1,428.9
Privately Held Federal Debt	86.5	78.6	119.5	128.9	210.9	265.9	1,504.2
Tax-Exempt Notes and Bonds	32.5	27.8	31.9	29.2	63.6	52.6	474.7
Total Government Debt	119.0	106.5	151.3	158.2	274.5	318.5	1,978.9
TOTAL	$415.7	$398.7	$351.9	$419.4	$405.0	$515.5	$5,344.8
2. Percentages[1]							
Privately Held Mortgages	28.3	28.4	23.9	17.6	3.1	13.0	24.7
Corporate and Foreign Bonds	8.3	8.0	11.1	8.1	9.6	6.8	11.6
Total Long-Term Private	36.6	36.4	35.0	25.7	12.6	19.8	36.2
Short-Term Business Borrowing	22.2	24.6	19.2	38.3	13.7	8.7	16.0
Short-Term Household Borrowing	12.6	12.4	2.8	8.4	5.9	9.7	10.8
Total Short-Term Private	34.8	36.9	22.0	36.6	19.6	18.4	26.7
Privately Held Federal Debt	20.8	19.7	34.0	30.7	52.1	51.6	28.1
Tax-Exempt Notes and Bonds	7.8	7.0	9.1	7.0	15.7	10.2	8.9
Total Government Debt	28.6	26.7	43.0	37.7	67.8	61.8	37.0
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0
B. NET SUPPLY							
1. Annual Net Increases in Amounts Outstanding ($ billions)							
Total Nonbank Finance	$174.5	$175.7	$152.0	$199.9	$178.5	$267.3	$2,423.2
Thrift Institutions	72.8	56.7	54.9	27.2	30.6	126.2	949.5
Insurance, Pensions, and Endowments	72.4	62.0	68.2	72.4	91.0	109.1	998.8
Investment Companies	6.6	29.3	15.9	72.4	52.3	8.0	213.2
Other Nonbank Finance	22.7	27.8	12.9	28.0	4.6	24.1	261.7
Commercial Banks	126.1	122.2	101.8	108.9	108.5	146.3	1,600.3
Nonfinancial Corporations	−0.9	7.5	−3.8	5.4	15.5	13.6	120.2
State and Local Governments	16.0	7.1	1.8	0.5	6.4	15.2	77.1
Foreign Investors	38.0	−4.6	23.2	16.0	17.6	12.8	238.5
Residual: Households Direct	61.8	90.6	76.9	88.7	78.5	60.3	885.1
TOTAL	$415.7	$398.7	$351.9	$419.4	$405.0	$515.5	$5,344.8
2. Percentages[1]							
Total Nonbank Finance	42.0	44.1	43.2	47.7	44.1	51.9	45.3
Thrift Institutions	17.5	14.2	15.6	6.5	7.6	24.5	17.8
Insurance, Pensions, and Endowments	17.4	15.6	19.4	17.3	22.5	21.2	18.7
Investment Companies	1.6	7.3	4.5	17.3	12.9	1.6	4.0
Other Nonbank Finance	5.5	7.0	3.7	6.7	1.1	4.7	4.9
Commercial Banks	30.3	30.6	28.9	26.0	26.8	28.4	29.9
Nonfinancial Corporations	−0.2	1.9	−1.1	1.3	3.8	2.6	2.2
State and Local Governments	3.8	1.8	0.5	0.1	1.6	2.9	1.4
Foreign Investors	9.1	−1.2	6.6	3.8	4.3	2.5	4.5
Residual: Households Direct	14.9	22.7	21.9	21.1	19.4	11.7	16.6
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[e] Estimated.

[1] Details may not add to totals due to rounding.

Source: Kaufman, Henry, James McKeon and Steven Blitz, **1984 Prospects for Financial Markets**, New York: Salomon Brothers, Inc., December 1983, p. 28.

new government debt accounted for approximately 62 percent of the total, and new private debt made up the remainder. As section A2 of the table makes clear, the principal development affecting the structure of the demand for credit in the years shown has been the disproportionate growth of government debt and especially the growth of federal debt. The net increase in privately held federal debt rose from a little over 20 percent of total net demand in 1978 to almost 52 percent in 1983. Although part of this increase reflected normal cyclical developments,[3] the substantial increase in federal expenditures over the last two decades has produced a strong secular increase in the growth of federal demands for credit. Section B2 of the table shows the breakdown of the supply of funds across various categories of lenders. In 1983, commercial banks provided slightly less than 30 percent of new funds. All depository institutions (commercial banks plus thrift institutions) provided somewhat more than half of all funds.

Table II looks more specifically at the relative size of various classes of financial institutions using data on the stocks of financial assets held in 1983. As the data indicate, depository institutions as a group accounted for over half of the total; commercial banks held approximately a third.

Tables I and II focus on the structure of U. S. financial markets in terms of dollar flows and stocks. To appreciate fully the nature of the American financial system, however, one must take account of the institutional and geographic character of these markets. In general, financial markets are less centralized in the United States than in most other industrial countries. While New York City is clearly the financial center of the country, there are important regional market centers, including regional stock exchanges, in several other major cities. Nowhere is the relative decentralization of U. S. markets more apparent, however, than in the case of commercial banks.[4] As of the end of 1983 there were 14,454 insured commercial banks in the United States of which 4,751 were national banks chartered by the federal government and the remainder were state banks chartered by the various state governments. Although several major international banking organizations are based in the United States, overall banking resources are considerably less concentrated than in most other countries. In December 1982, the 10 largest banking organizations based in the United States held only about 18 percent of total domestic deposits.

Table II

FINANCIAL ASSETS HELD BY U. S. FINANCIAL INSTITUTIONS

1983

	$ Billions	Percent of Total
Total Depository Institutions	$2,526.3	53.4
Commercial banks and affiliates	1,496.3	31.6
Foreign banking offices	67.7	1.4
Savings and loan associations	703.8	14.9
Mutual savings banks	169.4	3.6
Credit unions	89.1	1.9
Life Insurance Companies	514.4	10.9
Private Pension Funds	276.6	5.9
State and Local Government Retirement Funds	216.1	4.6
Finance Companies	254.8	5.4
Mutual Funds	54.1	1.1
Money Market Mutual Funds	102.4	2.2
Sponsored Credit Agencies	236.2	5.0
Mortgage Pools	244.9	5.2
Federal Reserve System	161.2	3.4
Other	141.2	3.0
TOTAL	$4,728.2	100.0

Source: Board of Governors of the Federal Reserve System.

B. The Regulation of U. S. Markets

A thorough review of the regulation of the U. S. financial system is beyond the scope of this paper.[5] The extent and intensity of regulation vary greatly across markets, from the minimal regulation of the market for U. S. government securities to the comprehensive regulation of commercial banks. It is the regulatory system applied to banks and other depository institutions that is most relevant to recent financial innovation in the United States. Therefore, the remainder of this section focuses primarily on banking regulation.

1. *Evolution of banking regulation in the United States* Banking has been systematically regulated in the United States throughout the nation's history. The character of this regulatory apparatus has changed significantly from one period to the next,

[3] 1978 was the fourth year of the business expansion that followed the recession that ended in the first quarter of 1975. 1983 was the first year of the recovery from the recession that ended in the fourth quarter of 1982.

[4] The historical and regulatory factors that have influenced the structure of the U. S. banking industry are discussed below.

[5] For a comprehensive recent survey see George J. Benston, "The Regulation of Financial Services," in Benston (1983B), pp. 28-63.

and it has been a major source of political controversy since the earliest days of the republic. Indeed, one of the principal political debates in the years immediately following the Revolution centered around the question of whether the federal government or the respective state governments should predominate in the regulation of banks.

This issue has never been fully resolved. The period from the Revolution until 1836 was one of constant tension. The majority of banks were chartered and supervised by the states. The federal government chartered only two banks in this period, the First Bank of the United States (1791-1811) and the Second Bank of the United States (1816-1836). These two banks, however, had branches nationwide, exercised some central banking functions, and, as a result, became principal targets for those who sought to restrict the growth of the power of the federal government.

When President Andrew Jackson vetoed the legislation that would have renewed the charter of the Second Bank, the states temporarily gained ascendancy in banking regulation. Further, between 1837 and 1860 a number of states adopted so-called "free banking" laws under which banks could be freely established as long as certain minimum, well-defined conditions regarding capital and collateralization of notes were met. This period has usually been regarded as an unsuccessful experiment with "laissez-faire" banking during which the absence of regulation led to abuses (by so-called "wildcat" banks) that demonstrated the need for greater regulation.[6] The extent of regulation began to increase gradually in the 1860s, and the federal government slowly but surely reestablished its participation with the passage of the National Banking Act in 1863 and the Federal Reserve Act in 1913.[7]

2. *Foundation of the present regulatory system*

Although the history of banking regulation prior to the early 1930s has an important bearing on the present regulatory system, especially with regard to geographic restrictions on branching, the major force that shaped the current system was the reaction to the traumatic banking crisis that accompanied the Great Depression. Some monetary historians now attribute the crisis to the failure of the Federal Reserve System to provide adequate reserves to the banking system in the face of an international financial panic and a major worldwide economic contraction.[8] At the time, however, the upheaval was blamed mainly on (1) excessive competition in the provision of banking services and (2) speculative activity and conflicts of interest that resulted from the active participation of commercial banks in investment banking activities in the 1920s. The comprehensive banking legislation of the early 1930s, which is the foundation of the present regulatory system, was designed to correct these perceived weaknesses.

The main elements of this legislation were as follows:

(a) *Separation of commercial and investment banking.* The Banking Act of 1933, known popularly as the Glass-Steagall Act, prohibited commercial banks from engaging in most underwriting and other investment banking activities. The idea was that commercial banks would invest primarily in short-term, "self-liquidating" commercial loans and other liquid assets in accordance with the real-bills doctrine that was influential at the time. This effort to keep commercial banking separate from the securities industry and other commercial activities has been extended by more recent legislation, particularly the Bank Holding Company Act of 1956 and the 1970 amendments to that Act.

(b) *Restrictions on the payment of interest on deposits.* Banks were prohibited from paying interest on demand deposits, and the Federal Reserve was given the authority to set ceiling rates on time deposits. The Fed has regulated time deposit rates over the years through its Regulation Q.

(c) *Deposit insurance and restrictions on entry.* The Banking Act of 1933 established the Federal Deposit Insurance Corporation to administer a national deposit insurance system. It set specific and generally restrictive conditions for the granting of national charters and indirectly set standards for state charters through the conditions imposed for admission to the insurance system.

(d) *Maintenance of geographic restrictions on branching.* The banking legislation of the 1930s left the restrictions on branching contained in the Mc-

[6] This view of the Free Banking Era has been challenged in an important recent article by Rolnick and Weber (1983).

[7] For more detailed discussions of banking regulation in the nineteenth and early twentieth centuries see Thomas C. Huertas, "The Regulation of Financial Institutions: A Historical Perspective on Current Issues," in Benston (1983B). See also McCarthy (1984). The standard works on the period are Friedman and Schwartz (1963) and Hammond (1957).

[8] See Friedman and Schwartz (1963), chapter 7.

Fadden Act of 1927 unchanged. Under these restrictions, interstate branching was prohibited, and nationally chartered banks had to conform to any further restrictions imposed by state law in the states in which they operated.

The general thrust of this regulatory system is clear. Commercial banking was to be insulated from other financial and commercial activities. In order to promote stability, entry into the industry, entry into particular geographic markets, and price competition were to be severely limited. In the Hegelian dialectic, thesis generates forces producing antithesis, and the tension is eventually resolved through synthesis. In U. S. financial markets, the regulatory system established in the 1930s is the thesis, and the extensive financial innovation of recent years is the antithesis. The synthesis of these opposing forces is presently being formed.

II.

FORCES UNDERLYING RECENT FINANCIAL INNOVATION IN THE UNITED STATES

As suggested at the end of the preceding section, recent financial innovation in the United States is largely a reaction to the restrictive and essentially anti-competitive regulatory system established in the 1930s. The forces motivating this innovation have existed since the system came into being, but they have been greatly strengthened over the last 25 years by two essentially external developments: (1) accelerated technological progress in the computer and communications industries and (2) a secular increase in the rate of inflation accompanied by high and volatile interest rates. This section briefly describes these developments.

A. Technological Advances

Technological progress in the computer and communications fields in recent years has led to a truly phenomenal reduction in the real cost of processing and transmitting data. It has been estimated that between the mid-1960s and 1980 computer processing costs declined at an average annual rate of 25 percent, and communications costs fell at a rate of 11 percent.[9] The impact of these developments has been especially great in banking and financial markets. In particular, the quantum reduction in real transactions costs has made it both feasible and profitable for banks to offer, and for business firms and households to use, sophisticated cash management techniques to reduce the proportion of liquid assets held in deposits or other instruments subject to interest rate ceilings. This same technology has made it feasible for nonbank financial institutions such as securities firms to offer financial products that combine their traditional investment services with transactions services that closely resemble those formerly provided exclusively by commercial banks. The Cash Management Account offered by Merrill Lynch, for example, which combines a conventional securities account with a credit line and a money market fund that has a third-party payments capability would not have been feasible in the absence of the ability to process, record and store large volumes of data relatively inexpensively. The same is true of a myriad of other cash management services now offered by both banks and other financial institutions and of the infrastructure that supports them such as electronic funds transfer systems and automated clearinghouses.

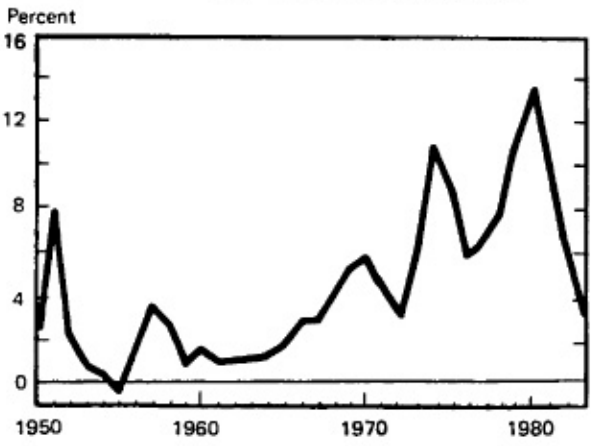
B. Inflation and Interest Rates

The technological developments described above would have had a substantial impact on cash management practices in any event, but the incentive to develop these techniques has been greatly increased by the behavior of inflation and interest rates in the United States since roughly 1965. As indicated by Chart 1, the inflation rate was below 3 percent during most of the period between the Korean War and the

Chart 1

INFLATION SINCE 1950

(Annual Changes in Consumer Price Index)



Source: U.S. Department of Labor, Bureau of Labor Statistics.

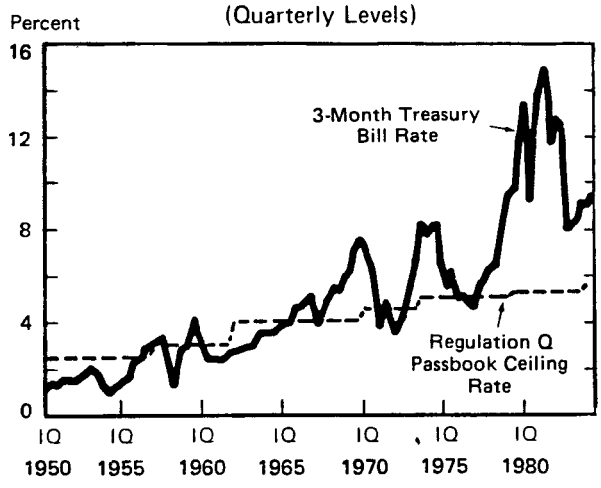
[9] See Kaufman, Mote and Rosenblum (1983), p. 9.

mid-1960s. After 1964, the expansive fiscal and monetary policies associated with enlarged domestic social programs and the financing of the war in Vietnam and subsequently the petroleum shocks of the 1970s produced a steady if irregular increase in inflation to a peak rate exceeding 13 percent in 1980. While not particularly high by world standards, this was the highest peacetime inflation in modern American history.

The rise in inflation was accompanied by corresponding increases in the level and volatility of interest rates, which can be seen in Chart 2. Through most of the 1950s and early 1960s, the opportunity cost of holding non-interest-bearing demand deposits and savings or other time deposits subject to Regulation Q ceilings was either relatively low or nonexistent. The so-called credit crunch of 1966, however, was the first of a series of tight credit episodes during which market rates rose significantly above the Regulation Q ceilings. Initially, these episodes occasioned massive but generally temporary transfers of funds from accounts subject to the ceilings to market instruments such as Treasury bills. This "disintermediation" of funds was both costly and disruptive. In particular, because the majority of mortgage credit in the 1960s and early 1970s was provided by savings and loan associations and other thrift institutions that derived most of their funds from time deposits subject to the ceilings, disintermediation led to severe periodic restrictions of the availability of credit to support residential construction. The housing and building trades lobbies are powerful political forces in the United States, and the disruption of these industries by disintermediation was an important factor leading to the reevaluation of banking regulation discussed below.

Chart 2

INTEREST RATES SINCE 1950



Source: Board of Governors of the Federal Reserve System.

As Chart 2 shows, market interest rates have exceeded the Regulation Q passbook ceiling both substantially and continuously since the end of 1976.[10] As a result, the temporary disintermediation that characterized the period between 1965 and 1977 has been supplanted by the more comprehensive and permanent innovations described in the next section.

Aside from the higher *level* of interest rates and the incentives it has created, Chart 2 shows that the *variability* of rate movements has also increased sharply over the last decade.[11] This greater variability has increased uncertainty and risk in financial markets—particularly in markets for long-term securities. This increased interest rate risk has created strong incentives for financial institutions to devise new financial instruments and develop new markets that make it possible for institutional and other investors to reduce their exposure to risk.

III.

INNOVATION IN FINANCIAL MARKETS

The combination of forces and incentives described in Section II of this paper has produced a series of financial innovations in the United States that have become increasingly visible to the general public since the late 1950s. Rather than attempting an exhaustive inventory,[12] this section will focus on the major innovations. Special attention will be given to innovations in banking and depository markets, since these particular innovations have important implications for the conduct of monetary policy as well as the provision of financial services.[13] In addition to discussing the innovations themselves, the important movement toward the deregulation of

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[10] Ceiling rates on other time deposits subject to ceilings were scaled upward from the passbook ceiling.

[11] This heightened variability may have been due in part to changes in late 1979 in the operating procedures used by the Federal Reserve to implement monetary policy. These changes shifted the short-run operational emphasis from the Federal funds rate to various reserve aggregates. See Axilrod (1982).

[12] A comprehensive listing as of the end of 1982 can be found in Silber (1983), p. 91.

[13] The monetary policy implications are discussed in Section IV below.

interest rates that is currently in progress will be summarized to date,[14] and the impact of these developments on the quantitative structure of depository markets will be detailed.

A. Innovation in Banking Markets

Innovation in banking and other depository markets has been proceeding at a rapid pace for at least a quarter of a century.[15] The initial developments primarily affected commercial banks and their corporate customers. By the end of the 1970s, however, it involved all depository institutions and a number of nondepository and even nonfinancial firms, and household as well as business customers.

1. *The 1960s and Early 1970s: The "Cat and Mouse" Game between Banks and Regulators and Initial Steps toward Deregulation* By the late 1950s it had become apparent to most money center banks in the United States that many major corporate customers had sharpened their cash management practices and found ways to lower their average holdings of non-interest-bearing deposits. Since these deposits were a major source of funds for these banks, it was essential that the banks react to this development, which they did with the introduction of large negotiable CDs in 1961. These CDs bore interest, although they were initially subject to the Regulation Q ceiling. The important thing about the negotiable CD was precisely that it was negotiable. Hence, when it neared maturity, it was essentially a marketable, interest-bearing liquid asset, in contrast to ordinary time deposits, which could not be transferred and could not bear interest at maturities under 30 days. The negotiable CD was a huge success in the early 1960s, and it allowed the money center banks to regain at least temporarily much of the ground they had lost. Beyond that, the negotiable CD introduced the concept of "liability management," which dramatically altered the character of wholesale banking in the United States. Prior to that time, banks had depended primarily on demand deposits as their major funding source. Since banks were prohibited from paying explicit interest on these deposits, they compensated their business customers—and to a lesser degree their household customers—implicitly by providing them a variety of free services, especially payments services. The negotiable CD substituted explicit interest for implicit interest. By varying the rate of interest, banks could actively influence the volume of deposit inflows rather than merely accepting deposits passively. Further, since negotiable CDs involved no payments services, their introduction moved banks in the direction of pure intermediation.[16] While these changes benefited banks in a number of ways, they also exposed them to the risk of unanticipated short-run swings in the cost of funds due to market forces beyond their control.

The volume of negotiable CDs grew steadily up to

[14] Table III lists the principal actions taken to deregulate interest rates between 1972 and 1983.

[15] Several economists have attempted to formulate theoretical models to capture the nature of the process described in this section. See in particular Ben-Horim and Silber (1977) and Kane, "Microeconomic and Macroeconomic Origins of Financial Innovation," in Federal Reserve Bank of St. Louis (1984), pp. 3-20.

[16] See Heurtes, "The Regulation of Financial Institutions," in Benston (1983B), p. 24.

Table III

MAJOR ACTIONS TO DEREGULATE INTEREST RATES ON DEPOSITS

1972-1983

Year	Action
1972	Negotiable Order of Withdrawal (NOW) accounts introduced in Massachusetts.
1973	"Wild card" experiment. Initial use of ceiling-free, small denomination time deposits. Deposits had minimum maturity of 4 years. Experiment lasted 4 months.
1978	Introduction of 6-month money market certificates with yields tied to 6-month Treasury bill rate.
1979	Introduction of small saver certificates, with yields tied to U. S. Treasury securities with comparable maturities. Minimum maturity initially 4 years, but subsequently reduced.
1980	Passage of Depository Institutions Deregulation and Monetary Control Act. 1. Set 6-year phase out of interest rate ceilings on time deposits. 2. Authorized NOW accounts nationwide, effective at the end of 1980.
1981	Introduction of nationwide NOW accounts. Introduction of ceiling-free Individual Retirement Accounts (IRAs).
1982	Introduction of several new accounts paying market rates. 1. 91-day money market certificate. 2. 3½-year ceiling-free time deposit. 3. 7-31 day time deposit. Passage of Garn-St. Germain Act, which authorized money market deposit accounts.
1983	Nearly complete deregulation of interest rates on time deposits. 1. Elimination of ceilings on all time deposits with original maturities exceeding 32 days. 2. Elimination of all ceilings on time deposits with original maturities from 7 to 31 days with minimum balance of $2,500.

1966, but the credit crunch of that year drove market rates well above the Regulation Q ceiling, and this condition persisted through most of the remainder of the decade. As a result, banks again experienced large outflows of funds and were driven to seek alternative sources not subject to the ceiling. There ensued what has been described as a "cat and mouse" game in which banks would first develop either (1) a new source, such as borrowing Eurodollars from offshore affiliates, or (2) new short-term instruments, such as commercial paper issued by holding company affiliates and various forms of RP contracts. After a brief delay, the Federal Reserve would then step in, define the instrument as a deposit and subject it to the Regulation Q ceiling and to reserve requirements. In short, the 1960s illustrated the cycle of banking innovation, regulatory reaction and further innovation in an especially dynamic form.

While this process was fascinating to witness and highly profitable to the lawyers, accountants and other specialists employed by it, it was also costly, both to individual institutions and to society as a whole in terms of its relatively inefficient use of real resources to avoid regulatory constraints. By the early 1970s it had become apparent to financial economists and many public officials that the bank regulatory system that had been built in the 1930s was not an appropriate structure for the financial environment of the 1970s. Several events occurred in this period that were the initial steps in the deregulation process that reached its full stride in the early 1980s. First, in the face of continued disintermediation, the Regulation Q ceiling was lifted in 1970 for CDs over $100,000. Second, a Presidential Commission on Financial Structure and Regulation (the Hunt Commission) issued an important report at the end of 1971 that recommended among other things that all ceilings on time deposits be phased out over a five-year period and that both thrift institutions and banks be granted somewhat broader powers. Banks, in particular, would be allowed to underwrite some municipal revenue bonds and sell mutual funds.[17] Finally, so-called NOW (for negotiable order of withdrawal) accounts were introduced in several New England states beginning in 1972. These essentially transactions accounts were functionally equivalent to demand deposits but they bore explicit interest. NOW accounts were originally devised by thrift institutions as a means of competing more effectively with commercial banks for retail customers, but their broader significance was that they were the first financial innovation to have a direct (and beneficial) effect on ordinary retail customers as opposed to corporations and wealthy individuals.

2. 1975-1983: Accelerated Innovation, Increased Competition and Deregulation As indicated in Chart 2, the sustained rise in market interest rates well above Regulation Q ceilings after 1976 greatly increased the incentive for banks to devise means to circumvent the restriction. The rise in rates also increased the opportunity cost of the non-interest-bearing reserves that banks that were members of the Federal Reserve System were required to hold, which caused many banks to drop their membership and created strong incentives to devise instruments not subject to reserve requirements. Finally, as suggested above, technological advances coupled with the relatively high profitability of banking activities created powerful incentives for nonbank institutions to enter banking markets and provide bank and quasi-bank services. These conditions ignited an explosion of financial innovation and subsequent deregulation in depository markets over the eight-year period between 1975 and 1983.

A key innovation in this period was the money market mutual fund (MMMF).[18] These funds are pools of liquid assets managed by investment companies that sell small denomination shares in the funds to the public. Although the funds are not covered by deposit insurance, they are backed fully by high quality liquid assets, are not subject to rate ceilings or reserve requirements, and in some cases allow limited third-party transactions. Aggregate MMMF assets grew rapidly after 1976, from $3.3 billion in 1977 to $76.3 billion in 1980 to $186.9 billion in 1981. (See Chart 3.)

The growth of MMMFs put enormous competitive pressure on U. S. banks. The banks, in turn, put substantial pressure on the regulatory agencies and Congress for relief. The first response to this pressure was the authorization of so-called money market certificates (MMC) by the regulatory agencies. These certificates had no third-party payment capability, but they were covered by deposit insurance, and they had a rate ceiling that floated with the 6-month Treasury bill rate.

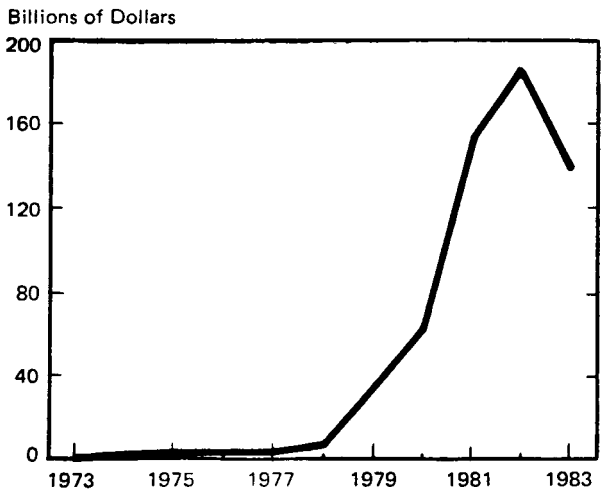
The MMCs were generally well received, but they

[17] For an interesting retrospective on the influence of the Hunt Commission's report written by the Commission's co-directors, see Almarin Phillips and Donald P. Jacobs, "Reflections on the Hunt Commission," in Benston (1983B), chapter 9.

[18] See Cook and Duffield (1979) for an extensive description and analysis of MMMFs.

Chart 3

GROWTH OF MONEY MARKET MUTUAL FUND (MMMF) BALANCES IN THE U.S., 1973–1983



Source: Board of Governors of the Federal Reserve System.

did not significantly reduce the growth of MMMFs. Intense political pressure for further deregulation developed and culminated in the passage of the Depository Institutions Deregulation and Monetary Control Act in March 1980. This watershed legislation was the most comprehensive banking law enacted by Congress since the Banking Acts of 1933 and 1935. It had a large number of diverse provisions, but the critical ones were the following:

1. All interest rate ceilings on time deposits were to be phased out over a six-year period.
2. NOW accounts were authorized for all banks and thrift institutions nationwide, effective December 31, 1980. (The accounts can be offered to individuals but not to corporations.)
3. State usury laws that put ceilings on mortgage rates were to be eliminated unless a state government specifically passed a law reinstating the ceiling.
4. The restrictions on the ability of thrift institutions such as savings and loan associations to invest in assets other than residential mortgages were eased somewhat.
5. All depository institutions were given access to the Federal Reserve discount window and to other Fed services, but they were also subjected to Federal Reserve reserve requirements.

The importance of this legislation in the context of the historical perspective developed earlier in this article should be apparent. In particular, the lifting of interest rate restrictions in items 1, 2, and 3 above reversed a fundamental element—and, implicitly, a fundamental premise—of the 1930s legislation: that price (i.e., interest rate) competition in banking markets is unhealthy.

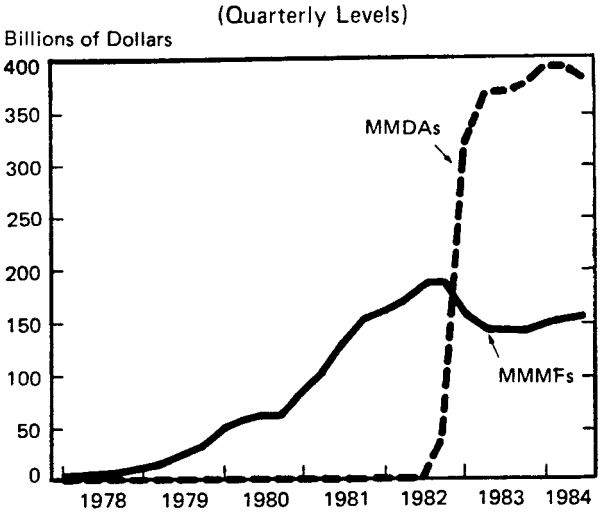
The final steps in the process of deregulation to date were taken in 1982 and 1983 following passage of the Garn-St. Germain Act in late 1982. Like the 1980 law, this Act contained numerous detailed provisions, but the most important authorized banks and other depository institutions to offer accounts with characteristics similar to those of MMMFs. In accordance with this legislation, banks and thrifts introduced money market deposit accounts (MMDAs) in December 1982. Subsequently, so-called Super NOW accounts were introduced in January 1983. Neither of these instruments is subject to a rate ceiling. The principal difference between the two accounts is that there are no limits on the number of third-party payments transactions that can be made with a Super NOW account, while there are limits in the case of MMDA accounts. Since Super NOWs have more of the characteristics of pure transactions accounts than MMDAs, they are subject to the same reserve requirements as ordinary demand deposits and other transactions accounts. MMDAs are considered savings deposits, which are not subject to reserve requirements. Further, Super NOWs, because of their greater transactions powers, typically have lower yields than MMDAs.[19] Unlike MMMFs, both MMDAs and Super NOWs are covered by federal deposit insurance. At present, however, both instruments require a $1,000 minimum balance.

The authorization of MMDAs and Super NOWs has done much to restore the competitive position of commercial banks and thrifts in depository markets. Since most MMMFs, like MMDAs, limit the number of third-party payments the holder of an account can make, these two instruments are generally similar, and it is appropriate to compare their growth since the introduction of MMDAs. As Chart 4 shows, MMDAs grew explosively immediately following their introduction to a dollar level of approximately $350 billion, well above the peak level attained by

[19] MMDAs permit up to six transfers per month other than by appearing in person, but no more than three of these can be by check. In recent months, MMDA yields have exceeded Super NOW yields by approximately 2 percentage points.

Chart 4

COMPARISON OF
THE GROWTH OF MMMFs AND MMDAs
(Quarterly Levels)



Source: Board of Governors of the Federal Reserve System.

MMMFs.[20] The level of MMMFs declined markedly in this period, and some market professionals predicted their eventual demise. The funds have made a strong effort to restore their competitive position by improving their products, however, and as the chart shows, the funds appear to be maintaining their position in 1984.

3. *The Quantitative Impact of Innovation and Deregulation on the Structure of Depository Markets* The innovations and resulting deregulation in depository markets have had a profound impact on the structure and cost of bank and thrift liabilities. Table IV shows the principal instruments as percentages of the total from 1959 through 1983. In 1959, non-interest-bearing demand deposits accounted for 41.1 percent of the liabilities shown in the table.

[20] The considerably stronger response to MMDAs is believed to be due primarily to the insurance feature and the general public's greater familiarity with the banks and thrifts issuing MMDAs than the investment companies issuing MMMFs.

Table IV

PRINCIPAL LIABILITIES OF DEPOSITORY INSTITUTIONS, YEAR-END 1959-1983

(Percentage of Total[1])

(1) Year	(2) Demand Deposits	(3) Other Checkable Deposits[2]	(4) MMDAs	(5) Savings Deposits	(6) Small Time Deposits	(7) Large Time Deposits	(8) Term RPs	(9) Term Eurodollars	(10) Total
1959	41.1	0.0	0.0	54.0	4.2	0.4	0.0	0.3	100.0
1960	39.2	0.0	0.0	55.5	4.4	0.7	0.0	0.3	100.0
1961	37.3	0.0	0.0	56.2	4.7	1.2	0.0	0.4	100.0
1962	34.6	0.0	0.0	57.0	5.9	2.0	0.0	0.5	100.0
1963	32.5	0.0	0.0	57.3	6.8	2.9	0.0	0.5	100.0
1964	31.0	0.0	0.0	57.5	7.1	3.7	0.0	0.6	100.0
1965	29.6	0.0	0.0	57.5	7.7	4.7	0.0	0.4	100.0
1966	28.8	0.0	0.0	54.1	11.8	4.9	0.0	0.4	100.0
1967	27.8	0.0	0.0	50.9	15.0	6.0	0.0	0.4	100.0
1968	27.5	0.0	0.0	47.6	17.8	6.6	0.0	0.5	100.0
1969	27.9	0.0	0.0	46.4	21.2	3.6	0.5	0.5	100.0
1970	26.5	0.0	0.0	41.5	24.2	7.2	0.3	0.3	100.0
1971	24.5	0.0	0.0	40.4	26.4	8.0	0.4	0.4	100.0
1972	23.4	0.0	0.0	38.8	28.0	8.9	0.4	0.4	100.0
1973	22.0	0.0	0.0	35.6	29.0	12.1	0.7	0.6	100.0
1974	20.9	0.0	0.0	34.0	28.9	14.5	0.8	0.8	100.0
1975	19.7	0.1	0.0	35.7	31.0	11.9	0.8	0.9	100.0
1976	18.4	0.2	0.0	37.2	32.1	9.7	1.2	1.2	100.0
1977	17.5	0.3	0.0	36.0	32.7	10.6	1.4	1.5	100.0
1978	16.7	0.6	0.0	31.7	34.4	12.9	1.8	2.1	100.0
1979	16.0	1.0	0.0	25.9	38.9	13.6	1.8	2.7	100.0
1980	15.1	1.6	0.0	22.7	41.3	14.6	2.0	2.8	100.0
1981	12.5	4.1	0.0	18.3	43.7	15.9	2.0	3.6	100.0
1982	11.7	5.0	2.1	17.6	41.7	16.0	2.0	4.0	100.0
1983	10.5	5.5	16.1	13.4	34.0	14.0	2.4	4.0	100.0

[1] Details may not add to totals due to rounding.

[2] Other Checkable Deposits includes negotiable order of withdrawal (NOW) and automatic transfer service (ATS) accounts at depository institutions, credit union share draft accounts and demand deposits at thrift institutions.

Source: Board of Governors of the Federal Reserve System.

Passbook savings deposits subject to a ceiling rate accounted for most of the remainder. By 1975, just prior to the accelerated deregulation of the late 1970s, the demand deposit share had declined to 19.7 percent. By 1983, the share had dropped further to 10.5 percent, and the Regulation Q ceilings had been lifted on all time deposits with the exception of passbook savings accounts. Of particular importance in the current situation, the category of "other checkable deposits" (column 3 in the table), which includes ordinary NOW accounts, Super NOWs and other interest-bearing transactions accounts, has been rising rapidly since 1980, while the demand deposit category has been declining. This trend will almost certainly continue in the years ahead.

The changes manifested in Table IV have obvious implications for U. S. depository institutions. First, although in the past banks and other depositories paid implicit interest in a variety of forms on demand deposits and other liabilities that did not yield explicit interest, there can be little doubt that deregulation has raised the average cost of funds for many of these institutions, especially in recent years. This increase has forced the adoption of more systematic and explicit pricing policies for loans and other services and has probably reduced cross-subsidization across various categories of customers. Second, the trend toward explicit interest has increased short-run variations in the cost of funds. This has made it necessary for depository institutions, like other financial and nonfinancial firms, to "manage" interest rate risk to a much greater extent than formerly, by either shortening loan maturities, making loan rates variable, or hedging the risk in futures markets.

4. *The Present Situation: Further Increases in Competition from Nondepository Institutions, Consolidation in the Supply of Financial Services, and the Demise of Geographic Restrictions* While changes in the level and variability of the cost of funds have had important effects on depository institutions in recent years, the increased competition from nondepository institutions has been equally significant. In addition to the competition from MMMFs, there have been several mergers involving large investment banks and insurance companies, and some of the largest nonfinancial companies in the nation have recently added an array of additional financial service activities to their existing installment credit operations. The purpose of these consolidations is the creation of financial service conglomerates capable of providing comprehensive financial services including banking services to business firms and households. As an example, Sears, Roebuck and Company, the country's largest retail chain, has recently acquired a large investment bank and a large real estate finance company and linked these operations to its existing insurance, credit card and other financial services. By offering these services through its vast chain of retail stores, Sears can reach virtually every geographic market in the United States. Merrill Lynch, American Express, and other large companies are rapidly building similar financial service conglomerates.

Although it is difficult to quantify the degree of this competition in the aggregate, some idea of the order of magnitude is conveyed by diverse statistics. At the end of 1981, the financial service subsidiaries of three large manufacturing companies (General Electric, Ford, and General Motors) held $45.8 billion of consumer installment credit compared to the $27.7 billion held worldwide by Citicorp, the Bank of America and Chase Manhattan. At the end of the same year, total business lending (commercial and industrial loans, commercial mortgage loans, and lease financing) by 32 nonbank companies was slightly over $100 billion, one-third of the total outstanding at the 15 largest bank holding companies.[21]

In their effort to compete still more directly with banks and other depositories, a number of nonbank financial service providers have acquired commercial banks in recent years. In order to avoid being classified legally as bank holding companies and therefore subjected to banking regulation, the acquiring companies have then taken advantage of a provision in the current bank holding company law that defines a bank as an institution that both (1) offers demand deposits and (2) makes commercial loans. After the elimination of one of these two activities from the acquired bank's operations, the bank is no longer a bank in the eyes of the law, and the acquiring company is not a bank holding company. These affiliates, thus transformed, have earned the awkward designation "nonbank banks." Since nonbank banks are not banks, they are not subject to the remaining restrictions on banks, notably geographic branching restrictions. Therefore, there is no legal barrier to prevent a nonbank financial service provider from establishing a national network of nonbank banks, which enormously increases the deposit base on which the company can draw. In the view of many observers, nonbank banks constitute a rather blatant circumvention of the Glass-Steagall Act, and they were the subject

[21] See Rosenblum and Siegel (1983), Chart 1B, p. 16 and Table 10, p. 26.

of much regulatory and legislative attention in the United States in 1984. Both houses of Congress passed bills that would have redefined a bank in such a way as to include most existing nonbank banks. For various reasons, no final bill was enacted, but the issue is almost certain to surface again in 1985.

The trend toward consolidation in the supply of financial services has not been restricted to nonbank and nondepository companies. Both banks and bank holding companies have sought to enter a variety of nonbanking industries throughout the postwar period, and their efforts have intensified in recent years.[22] Although Congress does not appear to be prepared to repeal the main provisions of the Glass-Steagall Act, an omnibus bill passed by the Senate in the summer of 1984 would have permitted bank holding companies to underwrite municipal revenue bonds and engage in several other previously proscribed activities. In addition, the Federal Reserve has approved the acquisition of discount brokerage companies (which trade but do not underwrite securities) by bank holding companies, and this action has been upheld in the federal courts.[23]

Apart from their efforts to expand into nonbanking activities, the larger bank holding companies are presently strengthening their effort to dismantle, de facto if not de jure, the remaining restrictions on geographic expansion. As noted earlier, banks and bank holding companies have not generally been permitted to carry on full banking operations across state lines. Many bank holding companies, however, operate numerous nonbank affiliates such as consumer finance companies in several states,[24] and in a somewhat ironic twist, several bank holding companies have recently announced their intention to establish interstate chains of retail-oriented nonbank banks known as "consumer banks." Finally, in accordance with a provision of the bank holding company law that allows bank holding companies based in one state to operate banks in another state if the government of the second state specifically permits it, a number of states in particular regions are presently establishing or attempting to establish reciprocal regional interstate banking agreements. These agreements would permit bank holding companies based in the region to operate banks in any state in the region but would preclude entry by banks based outside the region.[25] In the absence of specific legislation halting these various developments, an acceleration of the growth of interstate banking activities appears likely in the years immediately ahead.

5. *Summary* The powerful innovative forces unleashed by rising inflation and advancing technology have substantially eroded the restrictive bank regulatory structure that emerged from the Great Depression. This erosion has had three principal effects. First, the structure of bank funds, the average cost of these funds, and the stability of the cost of funds have all changed dramatically since 1960. These changes have greatly altered the character of banking operations in the United States. Second, although the legal separation of banking and other lines of commerce remains in force, the actual boundary has become increasingly blurred due to the ability of nonbank institutions to offer deposit-like products and services and the expansion of bank holding companies into nonbanking activities. Finally, geographic restrictions on banking operations have lost much of their force in recent years.

It is still too early to determine whether these developments have strengthened American banking markets or weakened them, and what the longer run effect on the welfare of the general public will be. Although the overall profitability of U. S. banks is still relatively high, the current strains in the American banking and thrift industries are well known. The number of insured banks closed due to financial difficulties in 1983 (48) was the highest in any year since the 1930s. The extent to which these strains are the result of innovation and deregulation is not clear, nor is it clear how these difficulties will affect innovation and deregulation in the future. The final section of this article will speculate briefly on the prospects.

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[22] A major reason for the emergence of the bank holding company as the dominant corporate form in U. S. banking markets has been the effort to circumvent restrictions on bank entry into nonbanking activities. Both the Bank Holding Company Act of 1956 and the Amendments to that Act in 1970 sought to close this loophole.

[23] Space does not permit a discussion of the international activities of large U. S.-based banks. These banks are engaged in a number of nonbank activities via overseas affiliates that they are not permitted to enter in the United States. They would therefore be able to establish domestic operations in many of these activities rather quickly if the restrictions were lifted.

[24] As of 1981, for example, Citicorp, which is based in New York, operated 422 nonbanking offices in 40 states and the District of Columbia.

[25] A principal objective of these regional compacts appears to be to restrict entry into regional and local markets by the large money center banks.

B. Other Innovations

The innovations in banking markets just described have been particularly visible to the average American citizen, and they have far-reaching implications. The same forces driving innovation in banking, however, have also produced important innovations in other financial markets. Developments in the securities markets and in mortgage markets have been especially dramatic, in the form of both new instruments and markets and changes in the character of existing instruments and markets. The common theme in nearly all of these innovations has been the effort to reduce the risk occasioned by the heightened volatility of interest rates. It would be difficult to list all of these developments, but some of the more important are the following.

1. *Bond markets* A sizable proportion of corporate bonds issued in domestic U. S. markets currently are floating-rate bonds, and the remaining fixed-rate issues frequently have early call or put provisions. Further, the volume of zero-coupon bonds, which pay their return in the form of price appreciation rather than coupon interest payments and therefore present no reinvestment risk, has grown significantly since 1980.

2. *Mortgage markets* A majority of the residential mortgages issued in the United States at present are adjustable rate mortgages (ARMs), which permit the lender to vary the interest rate during the term of the loan, usually on specified dates and subject to specified restrictions. Also, a large and active market for securities backed by pools of mortgages has developed, which has increased the volume of mortgage lending by insurance companies and pension funds and thus insulated the market to some extent from the difficulties currently plaguing the thrift industry as a result of the secular rise in interest rates. On balance, these innovations appear to have benefited both the residential construction industry and home buyers, since the recovery of the homebuilding sector of the economy following the 1981-1982 recession was strong. There is presently considerable concern, however, that the existence of a large stock of variable rate mortgage debt will increase the incidence of default if and when interest rates come under renewed upward pressure.

3. *Futures markets* Trading in interest rate futures in the United States has grown rapidly since the first market opened in 1975. There are currently markets for six instruments: mortgage-backed securities guaranteed by the Government National Mortgage Association (GNMA), U. S. Treasury bonds, U. S. Treasury bills, domestic bank CDs, Eurodollars, and U. S. Treasury notes. The existence of these markets and their increasing depth make it possible for both institutions and individuals to hedge their exposure to interest rate movements considerably more cheaply than is possible in cash markets.[26] Because it is possible, however, for market participants motivated by a desire to speculate rather than a desire to hedge to engage in futures transactions with relatively small cash outlays, it is not yet clear whether the existence of futures markets has reduced or increased the overall level of risk in financial markets.

This section has focused on the impact of recent financial innovation on the structure and behavior of markets. The next section examines the implications for monetary policy.

IV.

THE EFFECT OF INNOVATION ON U. S. MONETARY POLICY

In addition to their impact on markets, innovation and deregulation have led to an intensive and extensive reexamination of the conduct of monetary policy in the United States, and this reexamination in turn has clearly affected the substance of policy actions in some recent years. This section will briefly describe the present strategy of U. S. monetary policy and then indicate some of the principal questions and operational problems that innovation and deregulation have raised regarding this strategy.

A. The Current Strategy of U. S. Monetary Policy

The evolution of U. S. monetary policy in the postwar period has been a long and rather diffuse process. Although there has always been some attention to monetary conditions—as opposed to credit conditions—and the behavior of monetary aggregates, it is probably accurate to say that most of the emphasis in the actual conduct of policy in the 1950s and 1960s was on the effect of the Federal Reserve's policy actions on the availability and cost of credit in short-term credit markets.

Since about 1970, however, increased attention has been given to monetary conditions and specifically

[26] The recent development of options markets for several financial futures contracts has significantly broadened the range of hedging strategies available to investors.

to the growth rates of various measures of the money supply. This increased focus on money, which has also developed in several other industrial countries in the same period, has resulted partly from the rise of "monetarism" to prominence in the academic literature on monetary policy in the late 1960s and early 1970s and partly from dissatisfaction with the perceived failure of credit- and interest-rate oriented policies to deal effectively with the secular rise in inflation.

As a result of these developments, the present stated strategy of Federal Reserve policy centers around control of the monetary aggregates.[27] At the beginning of each year, the Fed establishes a target range for the growth rate of each monetary aggregate from the fourth quarter of the preceding year to the fourth quarter of the current year. It then monitors the actual growth of the aggregates in relation to the targets and acts to correct deviations from the targets unless it feels that unanticipated economic or financial developments warrant the deviation. The ultimate objective of this strategy is to contribute to the stabilization of both economic conditions in general and the behavior of prices in particular. For this reason, the strategy is often referred to as one of using monetary aggregates as "intermediate" targets of policy.

It is obvious that the successful implementation of this strategy requires a stable and predictable relationship between the monetary aggregates targeted and the ultimate objectives of monetary policy such as the rate of growth of nominal GNP and the behavior of the price level. It is widely asserted that recent financial innovation and deregulation have weakened this relationship in the United States and made it less predictable. Further, some monetary economists believe that innovation and deregulation have reduced the ability of the Fed to control the growth of the aggregates effectively. The remainder of this section summarizes the evidence supporting these contentions.

B. Evidence of Instability in the Relationship Between the Monetary Aggregates and Nominal GNP in the United States

1. *Possible downward shifts in money demand, 1975 and 1980-1981* The problems encountered in the conduct of U. S. monetary policy have stimulated considerable new research over the last decade on the relationship between money and GNP. Much of this research has taken the form of empirical estimation and re-estimation of conventional Goldfeld-type money demand equations or variations of these equations using the M1 aggregate, coupled with tests of the ability of the equations to predict the longer run growth of the monetary aggregates in the out-of-sample period.[28] Table V reproduces a table from a recent article by Porter and Offenbacher[29] that presents empirical evidence typical of that produced by much of this research. The table shows both the annual and cumulative errors in the predicted growth of M1[30] from a standard money demand equation over the 1967-1974 and 1974-1981 periods, respectively. The annual growth rate errors suggest that there may have been downward shifts in the demand for money in relation to income in 1975 and again in 1980 and 1981. Economists who believe that such shifts in fact occurred generally attribute them to financial innovation and deregulation. Improved cash management techniques in the corporate sector are thought to be mainly responsible for the shift in 1975. More careful management in the household sector—made possible by the introduction of MMMFs—is thought to have contributed significantly to the shift in 1980 and 1981.[31]

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[27] The Humphrey-Hawkins Act of 1978 requires the Federal Reserve to report its objectives for the growth of the monetary and credit aggregates each year. The current formal definitions of the monetary aggregates are published each month in the notes to statistical table 1.21 in the **Federal Reserve Bulletin.**

[28] Following Goldfeld (1973), these money demand functions have the following general form:

$$\ln\frac{M^D}{P_t} = a_0 + a_1\ln(r_{1t}) + a\ln(r_{2t}) + a\ln(y_t) + a_4\ln\frac{M}{P_{t-1}},$$

where M^D = money demand
P = price level
r_1 = a nominal short-term market interest rate
r_2 = a nominal short-term regulated interest rate
y = real income.

For a review of much of this research, see Judd and Scadding (1982B).

[29] See Richard D. Porter and Edward K. Offenbacher, "Financial Innovations and Measurement of Monetary Aggregates," in Federal Reserve Bank of St. Louis (1984), Table 3-1, pp. 53-54.

[30] The M1 series used in constructing the table was adjusted to eliminate the effects of institutional changes on this aggregate. See footnote 2 of the Porter-Offenbacher article.

[31] For specific evidence on the impact of MMMFs see Dotsey, Englander and Partlan (1981-82). It should be noted that although the view that a downward shift in money demand occurred in the mid-1970s is widely held, there is much less agreement regarding the possible shift in 1980-1981. For an argument that no shift occurred in the latter period, see Pierce (1982).

Table V

OUT-OF-SAMPLE ERRORS[1] FROM A GOLDFELD M1 EQUATION FOR 1967:1 TO 1974:2 AND 1974:3 TO 1981:4

Date	Cumulative Percentage Error	Annual Growth Rate Errors	Date	Cumulative Percentage Error	Annual Growth Rate Errors
1967:1	−.2		1974:3	1.2	
:2	−.3		:4	3.0	
:3	−1.0		1975:1	5.1	
:4	−1.0	−1.1	:2	5.4	
1968:1	−.8		:3	5.9	
:2	−.9		:4	7.6	4.8
:3	−1.5		1976:1	7.8	
:4	−1.9	−.9	:2	7.5	
1969:1	−2.3		:3	8.2	
:2	−1.6		:4	8.6	.9
:3	−.5		1977:1	8.3	
:4	−.3	1.7	:2	8.9	
1970:1	−.1		:3	9.2	
:2	.1		:4	8.9	.3
:3	−.2		1978:1	8.5	
:4	−.1	.2	:2	9.4	
1971:1	.9		:3	9.9	
:2	.8		:4	10.6	1.7
:3	.4		1979:1	11.9	
:4	1.2	1.4	:2	11.7	
1972:1	1.7		:3	11.5	
:2	1.7		:4	11.9	1.2
:3	1.2		1980:1	12.6	
:4	.5	−.8	:2	16.3	
1973:1	.2		:3	15.3	
:2	.7		:4	14.8	2.8
:3	.7		1981:1	18.0	
:4	.7	1.0	:2	18.1	
1974:1	1.4		:3	20.8	
:2	2.6		:4	22.1	6.4

	1967:1 to 1974:2		1974:3 to 1981:4	
	Annualized Quarterly Growth Rates	Annual Growth Rates	Annualized Quarterly Growth Rates	Annual Growth Rates
Mean Error	.4	.2	2.6	2.6
Root Mean Square Error	2.1	1.1	4.7	3.3

[1] Error is predicted value minus actual value.

Source: Porter, Richard D. and Edward K. Offenbacher, "Financial Innovation and Measurement of Monetary Aggregates," in Federal Reserve Bank of St. Louis (1984), Table 3-1, pp. 53-4.

2. The unusual behavior of M1 velocity, 1982-1983 A further instance of apparent instability in the relationship between M1 and nominal GNP occurred during the recession in 1982 and the recovery from that recession in 1983. In contrast to the possible downward shifts in money demand in 1975 and 1980-1981, M1 grew unusually rapidly in relation to nominal GNP in the 1982-1983 period. This can be depicted by charting the growth of M1 velocity, i.e., the ratio of nominal GNP to M1, as in Chart 5. As the chart makes clear, while velocity typically declines or grows more slowly in recessions than in other stages of the business cycle, the decline was much sharper in the 1981-1982 recession than in any other cycle since the 1950s. Research done by the staff of the Board of Governors of the Federal Reserve suggests that the introduction of interest-bearing NOW accounts (which are included in M1 as it is presently defined) has increased the interest elasticity of M1 demand in a manner that could not have been easily predicted in advance.[32] An implication of this view is that further deregulation may also change the parameters of the M1 money demand function in ways that cannot be anticipated. Research done at the Federal Reserve Bank of San Francisco, however, indicates that the unusual behavior of velocity in 1982 and 1983 can be explained by (1) the decline in inflation in 1982 and (2) the precipitous drop in interest rates in the third quarter of 1982 in the context of a stable money demand function.[33]

C. Effect of the Evidence of Instability on the Recent Conduct of Monetary Policy and Policy Research

As one might expect, the evidence of possible instability in the money-GNP relationship has raised doubts regarding the feasibility of continuing to use intermediate money supply targets as a central element in the strategy of U. S. policy. In this regard, it should be noted that much of this evidence pertains to M1. M1, which is the narrowest of the aggregates, is intended to be a measure of transactions balances, and it has generally received more attention than the broader monetary aggregates from the general public. One of the results of the events in 1982 and 1983 just described was a temporary change in the operational emphasis of policy away from M1 in the direction of the broader measures. In particular, the Fed announced in late 1982 that it was deemphasizing M1 and giving greater weight to M2 and M3 in its operations. Further, in 1983 the Fed established a range for the growth of a broad measure of total credit for the first time, partly in response to arguments that M1 had lost its meaning.[34] The emergence of a more normal pattern in the behavior of M1 velocity in the

[32] See Brayton, Farr and Porter (1983).

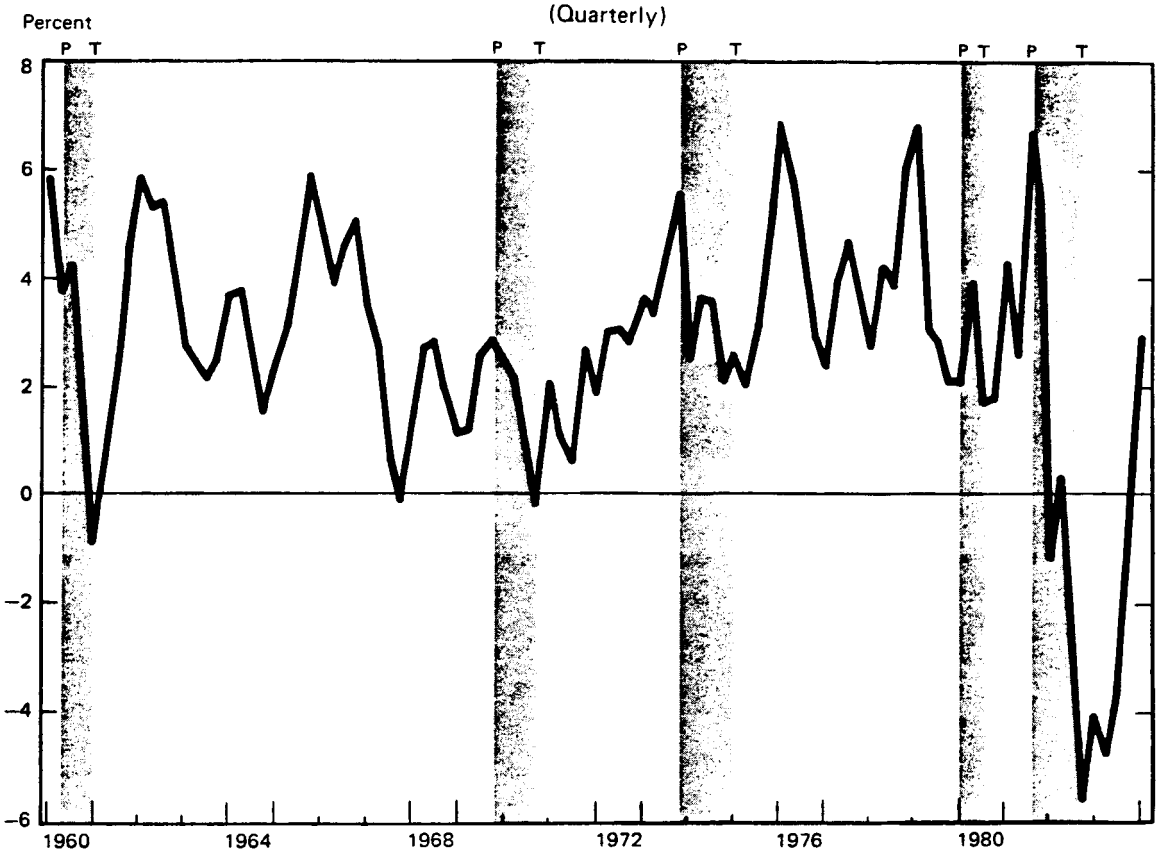
[33] See Judd (1983). See also Broaddus and Goodfriend (1984), pp, 11-14.

[34] The case for focusing on credit rather than monetary aggregates has been advanced especially strongly by Frank E. Morris, the president of the Federal Reserve Bank of Boston. See Morris (1982).

Chart 5

FOUR-QUARTER GROWTH RATES OF THE VELOCITY OF M1

(Quarterly)



Note: Shaded areas are recessions.

Source: Board of Governors of the Federal Reserve System and U.S. Department of Commerce, Bureau of Economic Analysis.

latter part of 1983 and the first half of 1984, however, led to the restoration of M1 to target status in July 1984.

As noted in the discussion of prospects for monetary policy in the next section of this article, the Fed has come under pressure from several quarters recently to drop its money supply targets in favor of one of several alternative strategies. To date, the Fed itself has given no indication that it is planning to take such a step. Indeed, much of the research done by the staff of the Board of Governors of the Fed in recent years has been aimed at improving the technical foundation for the continued use of a monetary aggregates strategy.

This research has taken two separate directions. First, an effort has been made to improve the specification of money demand equations in order to improve their performance. An example of this research is the Simpson-Porter model of money demand, which includes a so-called "ratchet" variable designed to capture the impact of cash management innovations induced by the successively higher interest rate peaks in the 1970s and early 1980s.[35] Although inclusion of this variable does not eliminate the overprediction of money demand shown in Table V, it reduces it significantly.

The second area of research has focused on the construction of alternative monetary aggregates known as Divisia aggregates using the theory of index numbers.[36] Conventional monetary aggregates such

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[35] See Simpson and Porter (1980). For a more recent example of further research on the money demand function see Brayton, Farr and Porter (1983).

[36] See Barnett and Spindt (1982).

as M1 are simple summations of their various components with no attention given in the aggregation process to differences in the monetary services provided by the components. For example, M1 as it is currently defined includes (1) currency and demand deposits, which pay no explicit interest but provide a wide range of transactions services, and (2) several interest-bearing accounts such as conventional NOW accounts and Super NOW accounts, which are also partly transactions instruments, but which provide some savings services—i.e., store of value services—as well. Divisia aggregation takes account of these differences by assigning different weights to the components of an aggregate in constructing the aggregate. To be specific, the weight attached to each component is determined by the spread between the market yield paid on a nonmonetary asset such as commercial paper and the explicit own yield paid on the component in question. This spread is the opportunity cost of holding the component (in terms of explicit interest foregone) and is assumed to be a reasonable proxy for the rental cost of the monetary services provided by the component and therefore for the flow of services themselves. In this way, the highest weights are assigned to assets like currency that have the highest spreads and therefore presumably yield the greatest flow of monetary services.

Although Divisia aggregation would appear to be superior in principle to conventional simple-sum aggregation, empirical results using these aggregates have been mixed. In recent dynamic simulations using two money demand specifications,[37] the Divisia aggregates generally outperformed their conventional counterparts in the case of the broader aggregates, but they yielded inferior results in the case of the narrower aggregates such as M1. For this reason, and in view of the obvious difficulties the Fed would encounter in communicating its objectives to the public if it were to substitute the Divisia aggregates for the standard aggregates in setting its monetary targets, it is unlikely that the Divisia measures will play a major operational role in the actual implementation of policy in the foreseeable future. Continued research with these measures, however, and informal monitoring of their behavior may help the Fed avoid being misled by temporarily aberrant behavior of the conventional aggregates due to innovation and deregulation.

[37] See Porter and Offenbacher (1984), pp. 72-6.

V.

PROSPECTS AND CONCLUSIONS[38]

To this point this article has dealt with the past and the present. This section will look to the future and speculate on how the lingering effects of the innovation that has already occurred and the effects of further innovation may influence the structure and functioning of financial markets and the conduct of monetary policy in the years ahead. Long and sometimes unhappy experience has taught the author that forecasting is the most dangerous of all the professional activities economists engage in. Accordingly, the speculative comments that follow will focus primarily on the relatively near-term future through the remainder of the 1980s.

A. Prospects for the Financial Markets and the Provision of Financial Services

As noted above, American financial institutions—especially commercial banks and thrift institutions—have come under severe pressure in recent years due to rising competition from external sources, the impact of deregulation on the cost of funding, the apparent deterioration in the quality of some bank loan portfolios, and the increased incidence of bank failures. As a result of these developments and the concern they have stimulated both in the political arena and among regulatory agencies, the pace of deregulation slowed in 1984, and it may well remain lower in the near-term future.

The forces driving the longer run process of innovation and deregulation, however, are still very much alive, and the process is therefore likely to continue in the absence of a major financial catastrophe. Several developments seem probable in the years immediately ahead. First, one of the measures available to deal with the current weakness of some thrift institutions and the associated risk is a more lenient stance by the regulators toward acquisitions of thrifts by bank holding companies. Such consolidations would further blur the distinctions between various categories of depository institutions. Second, the breakdown of the barriers to interstate banking is almost certain to continue. At the moment, it appears that the next stage of this process will take the form of regional agreements that exclude the money center banks, but the latter can be expected to press hard

[38] It should be emphasized that the somewhat speculative views presented in this section are the author's and do not necessarily reflect the views of the Federal Reserve Bank of Richmond or the Federal Reserve System.

for equitable access to these markets, and it is possible they will receive judicial relief under the antitrust laws. Finally, the line of separation between (1) banking and (2) other financial and nonfinancial activities is likely to be eroded further as banks and nonbank institutions both seek to expand further into the other group's territory. In particular, there is a fairly high probability that legislation will be passed in the relatively near future allowing banks to underwrite municipal revenue bonds and perhaps securities backed by mortgage pools, since the potential for abuse seems minimal in these areas.

The examples just given relate to near-term prospects and are relatively narrow in scope. The larger and more important issue is: What will the structure of U. S. banking and financial markets look like in 1990? Will there be significant further erosion of product-line barriers so that banks and other companies meld into "department stores" of finance? Will small banks and other small financial institutions be swallowed up by larger institutions? It is impossible to do more than guess at the answers to these questions. Some further consolidation across product lines may occur. But many of the conflicts of interest and other risks that the Glass-Steagall Act attempted to prevent are still perceived to be real dangers, so it is unlikely that the basic legal barrier between banking and commerce will be dismantled in the foreseeable future. Perhaps more fundamentally, the microeconomics of such consolidations is not well understood at present. Specifically, the extent of joint economies in the production and consumption of diverse financial services is not known. In these circumstances, it seems likely that a substantial degree of specialization in the provision of financial services will persist even if a further dismantling of the regulatory barriers occurs. In a similar way, since there is no clear evidence of significant economies of scale in banking, the specter of large bank holding companies absorbing most small, community-oriented banks seems far-fetched, although there will probably be some reduction in the number of independent banking organizations operating in the country.

Two final comments should be made regarding the prospects for change in (1) the structure of the financial regulatory agencies and (2) the system of federal deposit insurance. Suggestions have been made for many years for changes that would simplify the currently cumbersome structure of U. S. financial regulatory agencies, which involves a mixture of federal and state agencies and the existence of several agencies with somewhat overlapping responsibilities at the federal level. The most recent formal recommendations were announced in early 1984 by the Task Group on Regulation of Financial Institutions chaired by Vice President Bush.[39] Among other things, these recommendations called for simplifying the structure at the federal level by assigning the responsibility for regulating and supervising all but the largest banking organizations to a new agency built around the present Office of the Comptroller of the Currency. Responsibility for the largest organizations would be vested in the Federal Reserve. If past experience is any guide, resistance by the affected agencies and their constituencies will prevent the early adoption of these recommendations.

Regarding the deposit insurance system, the failure of the Continental Illinois Bank and the events leading up to that failure have brought earlier recommendations for reform of the system to the attention of both the Congress and the public.[40] Many of these recommendations are for changes that would reduce the danger that the existence of deposit insurance might tempt banks to take risks they would otherwise avoid. Examples of the suggested changes are reductions in the coverage of time deposits, permitting private insurance companies to compete with government agencies in providing insurance, and permitting graduated premiums that reflect the relative risk of failure of individual institutions. Despite their logical appeal, these recommendations raise a number of questions. What criteria, for example, would be used to determine relative risk in administering graduated premiums? These kinds of questions plus the broad public support for the present insurance system make it unlikely that wholesale changes will be forthcoming at an early date unless further disruptions in banking markets force them.

B. Prospects Regarding Monetary Policy

As pointed out in Section IV of this paper, the evidence of a reduction in the stability of the empirical relationship between the U. S. money supply and nominal GNP has caused some observers to question whether the Federal Reserve should continue to follow a strategy of using monetary aggregates as intermediate policy targets. The conventional theory of short-run economic stabilization[41] implies that if the monetary sector of the economy is less stable and

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[39] See Office of the Press Secretary to the Vice President of the United States (1984).

[40] See, for example, Benston (1983A).

[41] See Poole (1970).

predictable than other sectors—in terms of a conventional Hicksian model, the position of the LM curve is less stable and predictable than the position of the IS curve—targeting interest rates will yield a better policy performance than targeting the money supply. Against this background, some economists have concluded that innovation has in fact reduced the predictability of the money-GNP relationship to such an extent that targeting money supply growth is no longer appropriate, at least as long as significant innovation and deregulation are occurring. Several alternative targets have been suggested including nominal GNP and real interest rates.

Others, however, favor retention of the present strategy at least for the present. They point out that the instability that has been observed in recent years has resulted from (1) concerted efforts in the 1970s to circumvent regulations in the face of high inflation and high interest rates and (2) the disruptions caused by subsequent deregulation. With the deregulation process now well advanced, future innovation may be more gradual and more predictable. Further, while innovation and deregulation may have temporarily affected the relationship between the conventional measures of money such as M1 and the economy, they have not necessarily destabilized the monetary sector in any fundamental way. Therefore, targeting the monetary base or some other measure of high-powered money might still be feasible even if empirical problems with other monetary aggregates persisted.

A related issue that has received attention recently concerns the feasibility of monetary control if remaining interest rate ceilings are removed. A control procedure the Fed has used frequently in the past involves the direct or indirect manipulation of short-term interest rates in order to affect the opportunity cost of holding money balances and therefore the demand for money. It is sometimes argued that with interest rate ceilings removed, yields on the components of the money supply will vary with market interest rates, thereby reducing the elasticity of money demand with respect to interest rates and increasing the change in interest rates required to produce any desired change in the growth of money. Even in a completely deregulated environment, however, explicit yields on assets providing significant monetary services are likely to vary less than market yields. Therefore, the interest elasticity of money demand—especially the demand for M1, which includes currency and other transactions instruments—may remain sufficiently high for the purposes of monetary control.

This rather technical discussion regarding intermediate targets and monetary control is important, but it is only a relatively narrow aspect of the broader public debate about monetary policy that is currently going on in the United States. The experience in recent years of historically high peace-time inflation, high and extremely volatile interest rates, two severe and protracted recessions, and wide swings in the value of the dollar in foreign exchange markets has produced demands from some quarters for far-reaching changes in the strategy of monetary policy and in the responsibilities and authority of the Federal Reserve. In particular, a small but vocal group is pressing for a return to the gold standard or some alternative commodity standard.

Although another sharp rise in interest rates or inflation or another recession might motivate the Congress to require fundamental changes in the conduct of monetary policy, the more likely outcome over the remainder of the 1980s is continuation of the present monetary aggregates strategy coupled with an effort to change the institutional regime in which the strategy is pursued in ways that will make it more likely to succeed. Some of these changes are already in place. The Monetary Control Act of 1980 extended Federal Reserve reserve requirements to all depository institutions,[42] which reduces variations in the aggregate required reserve ratio due to shifts of deposits across classes of institutions. Further, a change in the reserve accounting mechanism in early 1984 from a lagged system to a (nearly) contemporaneous system has made it feasible for the Fed to change its procedure for controlling the monetary aggregates from one that operates through changes in short-term interest rates to one that operates through the supply of total reserves.[43] It should be emphasized, however, that although the current strategy of U. S. policy is formally one of controlling monetary aggregates, there is considerable room within this strategy for discretionary changes in the emphasis actually given to monetary control—especially short-run monetary control—as against other objectives such as stabilizing interest rates in particular time periods. Because it regards such flexibility as desirable, the Fed is likely to resist committing itself to a monetary control regime that

[42] The requirements had previously been applied only to the minority of commercial banks that were members of the Federal Reserve System.

[43] Many monetary economists believe that control via a reserve instrument is more efficient than control through interest rates, even though there is relatively little historical experience on which to base a test of the proposition.

significantly restricts the range of its discretionary actions in the short run.

C. Concluding Comment

This paper has presented an overview of recent financial innovation in the United States, the deregulation it has helped to force, and some of the major effects of this process on financial institutions and markets and on monetary policy. As the discussion has indicated, these developments are extremely diverse when they are considered individually. Nonetheless, there are certain unifying themes. In broadest terms, the last ten years have witnessed the collapse of an important part of the regulatory regime erected in the 1930s and the erosion of at least part of the philosophy of banking and financial regulation that sustained it. The forces that produced this change had been building since at least the 1950s, but they attained a certain critical mass in the 1970s that accelerated the process of change. It is of course possible that the process will continue at this same accelerated pace in the years immediately ahead. But it is also possible—and perhaps more likely—that the remainder of this decade will be a welcome period of consolidation characterized by a slower rate of innovation and change.

Bibliography

Akhtar, M. A. *Financial Innovations and Their Implications for Monetary Policy: An International Perspective.* Basle: Bank for International Settlements, 1983.

Axilrod, Stephen H. "Monetary Aggregates and Monetary Policy in a Deregulated Financial World." In *Interest Rate Deregulation and Monetary Policy.* (Proceedings of a conference sponsored by the Federal Reserve Bank of San Francisco.) San Francisco: Federal Reserve Bank of San Francisco, 1982, pp. 1-12.

Bank for International Settlements. *Financial Innovation and Monetary Policy.* (Proceedings of a meeting of central bank economists, November 9-10, 1984.)

Barnett, William A., and Paul A. Spindt. *Divisia Monetary Aggregates: Compilation, Data, and Historical Behavior.* Washington, D. C.: Board of Governors of the Federal Reserve System, Staff Study No. 116, May 1982.

Ben-Horim, Moshe, and William L. Silber. "Financial Innovation: A Linear Programming Approach." *Journal of Banking and Finance* 1 (1977), 277-96.

Benston, George J. "Bank Failure and Deposit Insurance." *Economic Review,* Federal Reserve Bank of Atlanta (March 1983A), pp. 4-17.

————, ed. *Financial Services: The Changing Institutions and Government Policy.* Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1983B.

Brayton, Flint, Terry Farr, and Richard Porter. "Alternative Money Demand Specifications and Recent Growth of M1." Unpublished paper. Washington, D. C.: Board of Governors of the Federal Reserve System, 1983.

Broaddus, Alfred, and Marvin Goodfriend. "Base Drift and the Longer Run Growth of M1: Experience from a Decade of Monetary Targeting." *Economic Review,* Federal Reserve Bank of Richmond 70 (November/December 1984), 3-14.

Cargill, Thomas F., and Gillian G. Garcia. *Financial Deregulation and Monetary Control: Historical Perspective and Impact of the 1980 Act.* Stanford, Calif.: Hoover Institution Press, 1982.

Cook, Timothy Q., and Jeremy G. Duffield. "Money Market Mutual Funds: A Reaction to Government Regulations or a Lasting Financial Innovation?" *Economic Review,* Federal Reserve Bank of Richmond 65 (July/August 1979), 15-31.

————. "Short-term Investment Pools." *Economic Review,* Federal Reserve Bank of Richmond 66 (September/October 1980), 3-23.

Dotsey, Michael, Steven Englander, and John C. Partlan. "Money Market Mutual Funds and Monetary Control." *Quarterly Review,* Federal Reserve Bank of New York 6 (Winter 1981-82), 9-17.

Friedman, Milton, and Anna J. Schwartz. *A Monetary History of the United States, 1867-1960.* Princeton, New Jersey: Princeton University Press, 1963.

Goldfeld, Steven. "The Case of the Missing Money." *Brookings Papers on Economic Activity.* (3:1976), pp. 683-730.

————. "The Demand for Money Revisited." *Brookings Papers on Economic Activity.* (3:1973), pp. 577-638.

Gramley, Lyle E. "Financial Innovation and Monetary Policy." *Federal Reserve Bulletin* 68 (July 1982), 393-400.

Greenbaum, S. I., and C. F. Haywood. "Secular Change in the Financial Services Industry." *Journal of Money, Credit and Banking* 3 (May 1971), 571-89.

Hammond, Bray. *Banks and Politics in America, from the Revolution to the Civil War.* Princeton, New Jersey: Princeton University Press, 1957.

Hester, Donald D. "Panel Presentation: Alternative Intermediate Instruments of Monetary Policy." In *Interest Rate Deregulation and Monetary Policy.* (Proceedings of a conference sponsored by the Federal Reserve Bank of San Francisco.) San Francisco: Federal Reserve Bank of San Francisco, 1982, pp. 240-51.

Jordan, Jerry L. "Panel Presentation: Alternative Intermediate Instruments of Monetary Policy." In *Interest Rate Deregulation and Monetary Policy.* (Proceedings of a conference sponsored by the Federal Reserve Bank of San Francisco.) San Francisco: Federal Reserve Bank of San Francisco, 1982, pp. 215-20.

Judd, John P. "The Recent Decline in Velocity: Instability in Money Demand or Inflation?" *Economic Review*, Federal Reserve Bank of San Francisco (Spring 1983), pp. 12-19.

————, and John L. Scadding. "Financial Change and Monetary Targeting in the United States." In *Interest Rate Deregulation and Monetary Policy.* (Proceedings of a conference sponsored by the Federal Reserve Bank of San Francisco.) San Francisco: Federal Reserve Bank of San Francisco, 1982A, pp. 78-106.

————. "The Search for a Stable Money Demand Function: A Survey of the Post-1973 Literature." *Journal of Economic Literature*, 20 (September 1982B), 993-1023.

Kane, Edward J. "Accelerating Inflation, Technological Innovation and the Decreasing Effectiveness of Banking Regulation." *Journal of Finance* 36 (May 1981), 355-67.

Kaufman, Henry, James McKeon, and Steven Blitz. *1984 Prospects for Financial Markets.* New York: Salomon Brothers, Inc., December 1983.

Kaufman, George, Larry Mote, and Harvey Rosenblum. "Implications of Deregulation for Product Lines and Geographical Markets of Financial Institutions." *Journal of Bank Research* 14 (Spring 1983), 8-25.

McCarthy, F. Ward, Jr. "The Evolution of the Bank Regulatory Structure: A Reappraisal." *Economic Review*, Federal Reserve Bank of Richmond 70 (March/April 1984), 3-21.

Morris, Frank E. "Do the Monetary Aggregates Have a Future as Targets of Federal Reserve Policy?" *New England Economic Review*, Federal Reserve Bank of Boston (March/April 1982), pp. 5-14.

"The Nature and Implications of Financial Innovation." (Report of a conference of central bankers in London, May 18-20, 1983.) *Quarterly Review*, Bank of England (September 1983), pp. 358-62.

Niehans, Jurg. "Innovation in Monetary Policy: Challenge and Response." *Journal of Bank Research* 6 (March 1982), 9-28.

Office of the Press Secretary to the Vice President of the United States. Press Release dated January 31, 1984.

Pierce, James L. "Did Financial Innovation Hurt the Great Monetarist Experiment?" *American Economic Review* 74 (May 1980), 392-96.

————. "Panel Presentation: Alternative Intermediate Instruments of Monetary Policy." In *Interest Rate Deregulation and Monetary Policy.* (Proceedings of a conference sponsored by the Federal Reserve Bank of San Francisco.) San Francisco: Federal Reserve Bank of San Francisco, 1982, pp. 215-20.

Poole, William. "Optimal Choice of Monetary Policy Instruments in a Simple Stochastic Macro Model." *Quarterly Journal of Economics* 84 (May 1970), 197-217.

Porter, Richard D., and Edward K. Offenbacher. "F nancial Innovations and Measurement of Monetar Aggregates." In *Financial Innovations: Thei Impact on Monetary Policy and Financial Market* (Proceedings of a conference held at the Federa Reserve Bank of St. Louis, October 1-2, 1982. Boston: Kluwer Nijhoff Publishing, 1984, pp. 49 98.

————, Thomas D. Simpson, and Eileen Mauskopf "Financial Innovation and the Monetary Aggre gates." *Brookings Papers on Economic Activity* (1:1979), pp. 213-29.

Rolnick, Arthur J., and Warren E. Weber. "The Fre Banking Era: New Evidence on Laissez-Fair Banking." *American Economic Review* 73 (De cember 1983), 1080-91.

Rosenblum, Harvey, and Christine Pavel. *Financia Services in Transition: The Effects of Nonbank Competitors.* Federal Reserve Bank of Chicago Staff Memorandum 84-1, 1984.

————, and Diane Siegel. *Competition in Financial Services: The Impact of Nonbank Entry.* Federal Reserve Bank of Chicago, Staff Study 83-1, 1983.

Roth, Howard L. "Recent Experience With M1 as a Policy Guide." *Economic Review*, Federal Reserve Bank of Kansas City 69 (March 1984), 17-29.

Silber, William L., ed. *Financial Innovation.* Lexington, Mass.: D. C. Heath and Company, 1975.

————. "The Process of Financial Innovation." *American Economic Review* 73 (May 1983), 89-95.

Simpson, Thomas D. "Changes in the Financial System: Implications for Monetary Policy." *Brookings Papers on Economic Activity.* (1:1984), pp. 249-65.

————, and Patrick M. Parkinson. "Some Implications of Financial Innovations in the United States." Washington, D. C.: Board of Governors of the Federal Reserve System. Staff Studies Series No. 139, 1984.

————, and Richard D. Porter. "Some Issues Involving the Definition and Interpretation of the Monetary Aggregates." In *Controlling Monetary Aggregates III.* Proceedings of a conference sponsored by the Federal Reserve Bank of Boston, 1980, pp. 161-234.

Vrabac, Daniel J. "Recent Developments at Banks and Nonbank Depository Institutions." *Economic Review*, Federal Reserve Bank of Kansas City 68 (July/August 1983), 33-45.

Wall, Larry, and Robert A. Eisenbeis. "Risk Considerations in Deregulating Bank Activities." *Economic Review*, Federal Reserve Bank of Atlanta 69 (May 1984), 6-19.

Wenninger, John. "Financial Innovation—A Complex Problem Even in a Simple Framework." *Quarterly Review*, Federal Reserve Bank of New York (Summer 1984), pp. 1-8.