

RECENT FINANCIAL INNOVATIONS:

Causes, Consequences for the Payments System, and Implications for Monetary Control

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The past two decades have been characterized by a number of significant innovations in the U. S. financial system, which today differs greatly from the system existing at the beginning of the 1960's. Today's financial intermediaries, including commercial banks, handle a much larger volume of business and generally serve broader geographic markets than their counterparts of two decades ago. They are also more competitive and more inclined to offer a greater variety of services in an effort to maintain or expand market shares. Moreover, some intermediaries, such as credit unions, now play a more important role in the nation's financial system, and entirely new types of intermediaries, such as money market funds, have emerged. Generally speaking, both the variety of institutions offering financial services and the array of such services have increased significantly, especially in recent years.

The expanding variety of services offered by financial intermediaries has been paralleled by an increased diversity of the liabilities of these institutions. Twenty years ago, for example, the liabilities side of a typical commercial bank's balance sheet was heavily weighted with demand deposits and regular savings deposits. Today's typical bank balance sheet shows a sizable reduction in the relative importance of such deposits and a sharp increase in so-called "purchased funds," i.e., negotiable certificates of deposit, nonnegotiable certificates of deposit, repurchase agreements, Federal funds purchased, and in the case of very large banks, perhaps Eurodollar borrowings as well. Likewise, regular savings deposits (deposit shares) typified the liabilities of savings and loan associations in the 1950's but today have given way in large measure to time certificates of deposit. Much the same can be said for credit unions and mutual savings banks.

The liabilities of financial intermediaries represent indebtedness to their customers—to households, businesses, and governmental units for the most part. Collectively, claims on these institutions make up the predominant fraction of the public's holdings of liquid

assets. Of the several types of these liquid assets, the public's holdings of demand deposit claims at commercial banks have commanded particular attention because they have traditionally been the principal means of making payment. Until recently, demand deposits possessed an advantage in that they were immediately available for spending while other liquid claims could be spent only after being converted into coin, currency, or demand deposits. For this reason, demand deposits along with coin and currency have been traditionally defined as "money" while other liquid claims at financial intermediaries have been considered to be money substitutes or "near money."

The outstanding volume of monetary assets at a given time and its rate of growth over time are important determinants of aggregate spending and inflation. Two statistical measures of the monetary aggregates, M_1 and M_2 , have played an important role in the implementation of monetary policy since 1970. M_1 , the measure of money narrowly defined, includes coin and currency in circulation outside the banking system and private demand deposits adjusted.¹ A broader measure, M_2 , includes with M_1 time and savings deposits at commercial banks except for large denomination negotiable certificates of deposit.

I. FINANCIAL INNOVATION AND THE PAYMENTS SYSTEM

Recent innovations have had a direct impact on the payments system, i.e., on the types of assets and institutions involved in the consummation of payments between individual economic units. The payments system has historically comprised the nation's

¹ The demand deposit component of M_1 consists of (1) demand deposits at commercial banks other than domestic interbank and U. S. government demand deposits, less cash items in process of collection and Federal Reserve float and (2) foreign demand balances at Federal Reserve Banks.

14,500 commercial banks, a system of correspondent relations between individual banks, local clearing houses, and the Federal Reserve System. This network provides the machinery for transferring demand deposit claims between individual economic units. As mentioned above, until recently payments have been made almost exclusively with demand deposits or currency and coin.

As a result of recent innovations, claims on financial institutions other than commercial banks are being used to make payments. For several years it has been possible to transfer funds from savings accounts in thrifts to bank checking accounts by telephone, or to use these funds to make prearranged third-party payments. More recently in New England and New York Negotiable Order of Withdrawal (NOW) accounts have been offered by thrift institutions as well as by commercial banks. NOW accounts are a readily transferable means of payment. Share drafts at credit unions have also become a means of payment. NOW accounts and share drafts, however, differ from demand deposits at commercial banks in that they bear interest. Hence, for the first time since 1933, when interest on demand deposits was prohibited by law, what amounts to interest-bearing demand deposits comprises part of the nation's payments medium. Moreover, since November 1, 1978, commercial banks have been allowed to cover their customers' overdrafts by automatically transferring funds from savings to checking accounts. This too allows the use of interest-bearing deposits for making payments.²

The emergence of new types of assets that mediate transactions—that is, serve as money—pose special monetary control problems for the Federal Reserve System. A broadened spectrum of money and near money assets complicates the problem of determining an appropriate working statistical definition of money. Moreover, growth of monetary assets issued by institutions beyond the control of the central bank can significantly weaken the Federal Reserve's ability to control the monetary aggregates. The sections that follow contain detailed discussions of major factors promoting innovation, the innovations themselves, and their implications for monetary control.

² The U. S. Circuit Court for the District of Columbia ruled on April 20, 1979 that automatic transfer services, share drafts, and savings and loan association remote service units are not authorized under current law. However, the Court delayed the effect of its order until January 1, 1980 in order to give Congress time to consider legislation legalizing such services. Legislation passed in December 1979 allows financial institutions to continue offering these services until April 1, 1980.

II.

SOME FACTORS PROMOTING INNOVATION

The rapid pace of financial innovation of recent years is due largely to three major factors. The first of these is the serious inflation the economy has suffered since 1965 and especially since 1973. The second is the rapid development of computer and communications technology. The third is a change in the regulatory environment dating from the early 1960's.

Inflation has accelerated the pace of financial innovation through its impact on interest rates. Inflation is an important determinant of the level of interest rates because the level of interest rates reflects anticipations of future inflation and anticipations roughly follow recent experience with inflation. When inflation has been high anticipations of inflation are also high; and when inflation has been low so are inflationary anticipations. Inflation has continually risen in recent years, so inflationary anticipations have risen as well. In this environment lenders have sought higher interest rates as compensation for the depreciating purchasing power of their savings. Borrowers competing for funds have been willing to pay higher interest rates because they can expect corresponding increases in income from investments financed through borrowings. Consequently, rising rates of inflation have led to higher interest rates.

High interest rates increase the opportunity cost of holding noninterest-bearing assets and encourage the economizing of such assets. An example of how this leads to innovation is seen in the case of commercial banks, which are required by law to hold reserves in the form of noninterest-bearing assets.³ The interest foregone on these reserves, and hence the cost of holding them, rises with the level of market interest rates. In a period of high rates, banks try harder to reduce the amount of reserves required by law. Banks can do this by encouraging shifts in liabilities from categories like demand deposits, which have a relatively high reserve requirement, to categories for which lower, or even no, reserves are required. For example, they might offer to enter repurchase agreements with customers holding demand deposits. This involves selling the customer government securities under agreement to buy

³ Reserve balances of member banks held with the Federal Reserve are noninterest bearing. Nonmember banks hold reserves as specified by the individual states. A number of states allow various types of earning assets to satisfy their reserve requirements.

the securities back at a somewhat higher price (determined by prevailing market interest rates on such contracts) after a stipulated period, usually one to seven days. Such repurchase agreements (RP's) are liabilities of the bank to its customers, as are demand deposits. The difference is that, for a large bank, the reserve requirement against RP's is significantly lower than that against demand deposits.⁴ Consequently, the bank in effect pays interest to the customer and simultaneously reduces its required reserves.

Commercial banks can achieve these results in a variety of other ways as well. Their efforts to do so have resulted in a significant diversification of bank liabilities, hence in the claims on banks held by bank customers. As mentioned above, the liabilities side of bank balance sheets now include, in much larger proportion than in the 1960's, RP's, Federal funds purchases, negotiable and nonnegotiable CD's, consumer type CD's, and in the case of large banks, Eurodollar borrowings and other liabilities to foreign branches. These liabilities all involve lower legal reserve requirements than demand deposits. To the extent that banks can find ways to convert demand deposit liabilities into these other forms, required reserves are reduced, allowing a given reserve to support a higher volume of both earning assets and liabilities.

High interest rates provide incentives for individuals and businesses to shift out of demand deposits and into these new types of bank liabilities. Hence, commercial banks and other financial institutions find a ready, indeed eager, market for new interest-bearing liquid substitutes for demand deposits that their ingenuity can devise. As a matter of fact, sharp-penciled corporate treasurers have been known to insist that their bankers stand ready to enter overnight repurchase agreements with them so that they can earn interest on balances that can be used rather promptly for making payments.

Arrangements allowing banks to reduce required reserves and the public to reduce its holdings of

demand deposits are motivated simply by a desire to minimize individual costs of doing business. Unfortunately, however, the aggregate effect of these arrangements is the creation and rapid growth of highly liquid assets used by the public in place of demand deposits. As explained in Section V, this complicates monetary control.

The rapid development of computer and communications technology has given individual institutions the capacity to process massive amounts of data and to make transfers rapidly and efficiently. In many instances, sophisticated new equipment has resulted in sizable amounts of excess capacity, thereby creating incentives for expanding existing services and offering new kinds of services. In short, the revolution in computer and communications technology has played an important role in recent financial innovation.

Between the early 1930's and the 1960's, bank regulatory philosophy was dominated by a preoccupation with the soundness of individual institutions. Competition in banking was viewed as a double-edged sword, incorporating notable disadvantages as well as some generally accepted advantages in improving the quality of banking services to the public. Indeed, some bank regulations, such as the prohibition of the payment of interest on demand deposits and the limitation on interest payable on savings deposits, were designed explicitly to discourage competition.

In the early and middle 1960's major changes were made in Federal and state banking laws and regulations, most tending to encourage competition not only among banks but also between commercial banks and other financial institutions. With the introduction of the negotiable certificate of deposit in 1961, large commercial banks found a way to compete for money market funds. Shortly afterwards, both large and small banks, which up to the 1960's had shown relatively little interest in consumer type savings deposits, began moving vigorously into this market. These moves ushered in an era of ever sharpening competition within the commercial banking community and between commercial banks and other financial intermediaries. Subsequent changes in bank holding company law, liberalization of regulations for thrift institutions, and a more competitive international banking climate reinforced this move to more intensive competition. In any case, there has been in the period after 1961 a more or less steady relaxation of

⁴ The marginal reserve requirement on net demand deposit balances over \$400 million is 16¼ percent. Until the statement week of October 11, 1979 reserve requirements against RP's were zero. Since then, banks have been required to hold an 8 percent reserve against RP's and certain other categories of managed liabilities above a base amount. The base is either \$100 million or the average amount of managed liabilities held by a member bank as of the two statement weeks ending September 26, 1979, whichever is larger. Member bank reserve requirements are listed in the **Federal Reserve Bulletin**.

regulatory constraints and a significant increase in competition among all types of financial institutions.⁵

The steady relaxation of regulatory constraints, however, has not always preceded on the initiative of the regulators themselves. The NOW account case provides a simple illustration of this. The secular rise in interest rates in the late 1960's was especially troublesome for mutual savings banks. As legal ceilings on the interest they could pay became increasingly restrictive, their ability to compete for funds deteriorated and their deposit growth slowed. Federal law prohibited payment of interest on checking accounts, but the prohibition did not extend to mutual savings banks that were not insured by the FDIC. In 1970 a state-insured Massachusetts mutual savings bank, looking for a way to attract deposits, petitioned the state commissioner of banking for authority to offer NOW accounts. The petition was denied but, on appeal, the state supreme court overturned the denial on grounds that state law provided no restrictions on the form in which deposits could be withdrawn. With the public becoming increasingly aware of losses suffered by earning no interest on checking balances, Federal law authorized the issue of NOW accounts by commercial banks and thrift institutions, first in Massachusetts and New Hampshire, then in all New England states, and finally in New York and New Jersey. To preserve competitive equity nationally, commercial banks have been allowed to offer automatic transfer services beginning in November 1978.

III.

A REVIEW OF SPECIFIC DEVELOPMENTS

Table I is a roughly chronological listing of innovations that have permitted the public to reduce its reliance on demand deposits. The influence of each of these developments on the management of payments balances by businesses and households is described below.

Corporate Cash Management Like other economic units, businesses have an incentive to minimize cash held for payments purposes. Doing so is a complex task, however, especially for large corpora-

tions whose operations are widely diversified geographically and by product line. A number of specialized cash management techniques have been developed to improve the efficiency with which money positions are managed. Some of these techniques, e.g., cash flow forecasting and internal accounting control systems, are available in-house or through nonbank vendors. Because of their central role in the payments process, however, commercial banks are the most important suppliers of corporate cash management services. Bank sponsored cash management systems are designed to accelerate collections into a large firm's regional checking accounts and then to further concentrate demand deposits into one account used to pay bills and fund short-term investments. The key elements in such a system include cash concentration, disbursement, and investment management.

The first step in cash concentration is development of a collection system for funds based on a group of local and regional banking organizations selected for their proximity either to the firm's field operations or to its customers. Customers are instructed to mail their payments to a lockbox under the control of a local bank, which collects remittances and credits the firm's checking account.⁶ Information on the amount of collected balances in these local depositories is gathered by telephone, and then a depository transfer check (DTC) is written payable to an account in a regional "concentration" bank and drawn on the various local banks. The DTC, which is a nonnegotiable check that requires no signature, is commonly used to transfer funds between a corporation's accounts held in different banks. Since the DTC can be deposited in the regional concentration bank immediately after account balances are ascertained by phone, overnight credit is available as long as the regional bank and local depositories are all located in the same Federal Reserve regional check processing area. The regional bank can then wire the collected funds to the corporation's master checking account held at a bank in the home office city.

Disbursement of corporate funds can be centralized, all checks being written from the master account, or decentralized, with separate divisions of the company making payments in their respective localities. Centralized cash control can be maintained even in a decentralized check-writing environment using zero-balance accounts. Under this system, a com-

⁵ An exception to this steady relaxation of regulatory constraints is the **Interest Adjustment Act** of 1966, which extended coverage of deposit rate ceilings to the thrift industry and established a differential between maximum rates that banks and thrifts could pay on deposits. This action was a direct result of the heightened competition for consumer deposits occurring in the early- and mid-1960's, which had resulted in a decline in thrift institution deposit growth relative to bank deposit growth.

⁶ A simple rule of thumb is to choose local lockboxes so that mail from company operations in an area can be delivered overnight.

Table I
**SUMMARY OF REGULATORY, LEGISLATIVE, AND TECHNICAL DEVELOPMENTS
 ENABLING THE PUBLIC TO REDUCE ITS RELIANCE ON
 NONINTEREST-BEARING DEMAND DEPOSITS**

Development	Date or Period	Description
(1) Corporate cash management services	post-World War II	Corporate cash management services, for example, lockboxes, cash-concentration accounts, and information-retrieval systems, are technical innovations permitting more efficient management of cash balances. Their introduction by commercial banks goes back many years, although such services came to be used much more widely after World War II.
(2) Negotiable certificates of deposit (CD's)	1961	Negotiable CD's are marketable receipts for funds deposited in a bank for a specified period at a specified rate of interest. This instrument was originated in 1961 by a large money center bank.
(3) Savings accounts for state and local governments and businesses	1960's, 11/74, 11/75	Federally chartered savings and loan associations have been authorized to offer local governments and businesses savings accounts since the 1960's. Commercial banks were authorized to accept savings deposits from local governments starting November 1974 and from businesses (up to \$150,000) starting November 1975.
(4) Telephone transfers from savings accounts	1960's, 4/75	Telephone transfers allow savings account customers to transfer funds either to checking accounts or to third parties by phone. Federal savings and loan associations have had this authority since the 1960's, whereas banks were granted it in April 1975.
(5) Repurchase agreements (RP's)	1969	Repurchase agreements are primarily short-term contracts for the purchase of immediately available funds collateralized by securities. RP's grew rapidly beginning in 1969 after Regulation D was amended to explicitly exempt from reserve requirements RP's backed by the sale of U. S. Government or Federal agency securities.
(6) Preauthorized third-party transfers	9/70, 4/75, 9/75	Preauthorized transfers are payments made from savings accounts for recurring transactions. Savings and loan associations were permitted to make preauthorized nonnegotiable transfers from savings accounts to third parties for household-related expenditures in September 1970 and for any purpose beginning in April 1975. Commercial banks were permitted to make preauthorized nonnegotiable transfers from savings accounts to third parties for any purpose in September 1975.
(7) Negotiable Order of Withdrawal (NOW) accounts	5/72, 9/72, 1/74 3/76, 10/78, 12/79	NOW accounts are savings accounts from which payments can be made by draft. State-chartered mutual savings banks began offering NOW accounts in Massachusetts after a May 1972 state court ruling authorizing such deposits. NOW's were offered by state-chartered mutual savings banks in New Hampshire in September 1972 with the approval of the state bank commissioner. Beginning January 1974 Congress authorized all depository institutions in the two above mentioned states to offer NOW's. Beginning March 1976, Congress authorized NOW's at all depository institutions in Connecticut, Maine, Rhode Island, and Vermont, authority that was extended to New York in November 1978 and New Jersey in December 1979.
(8) Savings and loan remote service units (RSU's)	1/74	RSU's are machines that allow a customer to make deposits to, and withdrawals from, his savings account at stores and other places away from the institution maintaining the account. The Federal Home Loan Bank Board authorized RSU's in January 1974. Although ruled illegal in April 1979, Congress subsequently passed legislation legalizing the service until April 1, 1980.
(9) Money market funds (MMF's)	early 1974	Money market funds are mutual funds specializing in short-term investments from which shares can be redeemed by checks drawn on designated commercial banks, or by wire transfer, telephone, or mail. Use of MMF's became widespread beginning in early 1974.
(10) Credit union share drafts	10/74, 3/78	Credit union share drafts are payments made directly from share accounts. An experimental share draft program was approved for Federal credit unions in October 1974 and made permanent in March 1978. Although ruled illegal in April 1979, Congress subsequently passed legislation legalizing the service until April 1, 1980.
(11) Preauthorized savings to checking transfers	11/78	Commercial banks were allowed to offer customers automatic savings to checking transfers starting November 1978. This led to the widespread offering of automatic transfer services (ATS), which are essentially zero-balance checking accounts fed from savings accounts. Although ruled illegal in April 1979, Congress subsequently passed legislation legalizing the service until April 1, 1980.

Source: Adapted from [1].

pany's disbursing agents write checks on designated disbursing accounts maintained at regional banks and having zero balances. Debit balances accumulate in these zero-balance disbursing accounts as checks are written and are offset by charges made on the corporation's master account.

Integral to the concept of corporate cash management is a prompt reporting system that monitors, and perhaps even forecasts, cash flow. Information contained in a reporting system would consist of detailed transactions data, including transfer activity between accounts and daily bank balances. The ultimate objective of such a reporting system is to provide information on the amount of money available for short-term investment.

Negotiable CD's As corporations became more adept at cash management during the 1950's, their investable bank balances increased significantly. Rather than holding idle demand deposits, short-term investments offering high liquidity and low risk were sought. Since few banks offered corporations interest-bearing deposits as alternatives to checking balances, businesses turned to other investment sources, particularly commercial paper, Treasury bills, and repurchase agreements with securities dealers. Consequently, there was a sharp decline in the importance of corporate deposits on the banking system's balance sheet. Large money center banks especially felt this loss of funds since they relied on corporate demand deposits to a greater extent than other, smaller banks. This situation prompted First National City Bank of New York to introduce in February 1961 the large negotiable certificate of deposit (negotiable CD), a new liability specifically designed to attract corporate funds.

Regulations limit negotiable CD's to a minimum maturity of 30 days. Although relatively short, this maturity is still unattractive to businesses seeking an investment outlet that allows quick conversion back to demand deposits. When first introduced in 1961, therefore, it was also announced that a major government securities dealer had agreed to make a secondary market in negotiable CD's. This secondary market makes negotiable CD's an attractive substitute for demand deposits. Corporations holding CD's can sell these in the secondary market at any time to raise cash, while firms desiring investments with maturities shorter than 30 days can acquire CD's with remaining terms to maturity that fit their liquidity needs. The marketability of prime CD's issued by large well known banks is generally greater than that for those issued by lesser known regional institutions.

For this reason, investment in money center bank CD's is favored by corporations.

Negotiable CD's possess some characteristics that limit their attractiveness to corporate money managers. In particular, CD's are not nearly as homogeneous (in terms of rates, denominations, and other contractual features) as are, say, Treasury bills. Also, dealers mainly trade prime CD's in denominations of \$1 million and will rarely split or consolidate certificates to facilitate a secondary market transaction. For these reasons, negotiable CD's may not always exactly fit the short-term investment needs of corporations. These limitations notwithstanding, negotiable CD's have become a major source of bank funds.

Repurchase Agreements Repurchase agreements (RP's) represent a particularly useful instrument for cash management that has become widely used only in the last few years. RP's are income-generating assets having a very low credit risk that are available in maturities as short as one day. Commercial banks became active suppliers of RP's after 1969 and now offer them as part of the cash management systems marketed to corporations.

Businesses having cash concentration systems are able to determine the amount of investable balances available in their checking accounts each morning. If funds are available to invest for only a very short period, they can be placed in the overnight or one-day RP market. To facilitate placement of idle checking balances in the RP market, an investment technique known as the continuing contract has been developed. Under this type of arrangement, a corporation agrees to provide its bank with a specific volume of funds to be automatically reinvested each day for a specified period. Continuing contracts in RP's reduce transactions costs since funds are exchanged only at the beginning and end of the contract period. Liquidity is preserved, however, since either the corporation or the bank can cancel the contract before maturity. Similar to the continuing contract is the preauthorized transfer arrangement. Under the latter arrangement, banks automatically invest a corporation's master checking account funds above a specified minimum in RP's.

The RP market has grown dramatically in recent years, especially the market for very short-term RP's. A special survey of 46 money center banks conducted in December 1977 showed RP's outstanding to non-financial businesses of \$10.5 billion—31 percent under one-day contract, 11 percent under continuing contract, 22 percent under two- to seven-day con-

tract, and 28 percent under eight- to thirty-day contract. Another \$3.8 billion was outstanding to state and local governments, which, like corporations, are active cash managers. The majority of state and local government RP's are either one-day or continuing contracts. Banks indicate that activity in the RP market has increased greatly since 1977.

Savings Accounts For Business Since a fairly large minimum investment is necessary in negotiable CD's and RP's, these instruments are not generally suited to the requirements of smaller businesses. An amendment to Regulation Q, effective November 10, 1975, has permitted businesses to hold savings accounts at commercial banks, subject to a ceiling limit of \$150,000. This change was made to provide an investment outlet to small businesses holding temporarily idle funds. Such balances reached \$10.5 billion by June 1979.

Savings and loan associations have been able to offer savings accounts to businesses for many years. Although data on the size of such balances are not available, indications are that they do not make up a large share of savings and loan liabilities.

Telephone and Preauthorized Third-Party Transfers From Savings Accounts Use of bank savings accounts by individuals has had the disadvantage in the past of necessitating personal trips to the bank in order to transfer funds to and from checking accounts. This inconvenience was at least partly reduced by 1975 changes in Regulation Q, allowing banks to transfer funds from savings accounts directly to checking or to third parties on the telephone-originated order of a customer, and also to pay recurring bills directly from savings accounts on a preauthorized basis. Telephone transfers to third parties have been authorized at savings and loan associations since the 1960's, while preauthorized third-party transfers for general purposes have been allowed since 1975.

The effect of these regulatory changes has probably been to increase the substitutability between checking and savings accounts. There is no way to measure directly the impact of telephone and preauthorized transfer services on cash management policies of households or businesses. Savings deposit turnover data do show signs of increasing since 1977, the first year they were collected; and it may be that telephone and preauthorized transfer services have encouraged greater use of savings accounts as payments balances.

There are two features of savings accounts that may discourage their use as demand deposit substi-

tutes. First, in the case of direct bill paying from savings, the customer does not have a cancelled check as a record of payments. This is significant because studies of consumer attitudes toward electronic fund transfer (EFT) services have found a deep-seated reluctance to give up the record-keeping services that cancelled checks provide. Second, banks and thrift institutions typically levy charges on savings account withdrawals above some monthly or quarterly minimum. These charges can be fairly substantial, running sometimes 25 to 50 cents per transfer, thereby raising a cost barrier to heavy use of savings transfers.

NOW Accounts and Share Drafts NOW's are negotiable drafts written on savings accounts at banks, mutual savings banks, and savings and loan associations. Their use is currently confined to New England, New York, and New Jersey. Share drafts are written on accounts at credit unions and can be either negotiable or nonnegotiable. There are currently no geographic restrictions on the use of share drafts. The use of both NOW's and share drafts is limited by law to individuals only. While both are in practice honored as demand drafts, they are legally time drafts on which financial institutions have the right to delay payment for up to 30 days. NOW's offered by thrift institutions and share drafts are "payable through" instruments, i.e., they are cleared through normal check-clearing channels and are paid by a commercial bank with which the issuing thrift institution maintains a correspondent relationship. Federal law limits interest payments on NOW accounts to a maximum of 5 percent, although credit unions are permitted to pay the regular share account rate on balances subject to draft, currently 7 percent.

NOW accounts have been an important catalytic force causing changes in public attitudes toward cash management. This financial innovation, however, has by no means completely altered the public's money management habits. When it passed legislation in 1974 allowing NOW's throughout New England, Congress in a sense created a test of interest-bearing payment accounts. The results of this test show that the public is receptive to interest-bearing payments balances; and also that pricing policies as well as the degree of competition between financial institutions influence the spread of the new service. For example, in Massachusetts and New Hampshire, the first two states where NOW's were introduced, competition between banks and thrift institutions was keen and consequently low-cost pricing of NOW accounts was common. As a result, use of NOW accounts increased rapidly, with the number of ac-

counts per 100 households reaching about 70 by January 1978. In the other four New England states, where NOW's were introduced somewhat later, thrift institutions are generally less of a force than in Massachusetts and New Hampshire. The number of accounts per 100 households in these other four states was much lower, in the 10 to 20 range, by January 1978 [4]. Therefore, local market characteristics appear important in determining the extent to which NOW's are substituted for more traditional forms of payment.

Total balances in NOW accounts as of June 1979 in six New England states and New York were \$5.6 billion. Account data on share draft balances unfortunately are not available, but the National Credit Union Administration indicates that perhaps a little less than \$1.0 billion of such balances existed as of mid-1979.

Savings and Loan Remote Service Units A remote service unit (RSU) is defined by the Federal Home Loan Bank Board as an information-processing device, and an RSU account is a savings account accessible through such a device. RSU's can be located directly on sites where frequent payments occur, e.g., the supermarket. Since RSU's are not considered branches, there are few administrative barriers to their establishment by savings and loans.

Money Market Funds Money market funds (MMF's) were first offered to the public in 1972; but their importance, as measured by growth in number of shareholders and balances in shareholder accounts, increased rapidly only after 1974, and especially after 1977. It is estimated that individuals held 55 to 65 percent and businesses about 10 percent of the \$24.6 billion in MMF's as of June 1979 [3]. MMF's offer individuals and businesses having relatively small amounts of funds access to open market investments that in the past were available only to large corporations.

It is reasonable to think of MMF's as being at least partial substitutes for demand deposits. Like savings accounts, they offer high liquidity, since fund shares can be purchased or sold on any business day without a sales charge. Moreover, some MMF's offer a checking option that enables shareholders to write checks in minimum amounts of \$500. MMF's, however, appear to have more in common with savings than with demand deposit accounts. Evidence of this is the similarity of turnover rates in MMF accounts and bank savings accounts, both of which are very low compared to turnover rates for checking deposits.

Automatic Transfer Services Automatic transfer services (ATS) allow depositors to arrange with their banks the automatic transfer of funds from an interest-bearing savings account to a checking account and are the functional equivalent of NOW accounts and share drafts. ATS is a direct substitute for traditional checking balances and has been authorized on a nationwide basis for all commercial banks.

Automatic transfer services have been priced more conservatively by banks than were NOW accounts as originally offered in New England. It should also be noted that banks, but not thrift institutions, have been authorized to offer ATS. These two factors have been important in determining the growth of ATS accounts, which expanded rapidly when first introduced but which have subsequently grown much more slowly. For example, ATS balances increased from zero in November 1978 to \$6 billion in April 1979 but then rose by only another \$600 million through June 1979. Rough estimates place the proportion of funds in ATS balances coming from demand deposits at 50 percent, or about \$3.3 billion through July 1979. This figure is very small compared to the over \$90 billion individuals actually hold in checking accounts and shows that ATS has had only a marginal initial impact on traditional payments arrangements.

A Summary Overview Although the developments reviewed above take various forms, there are some general patterns underlying the changes in the payments system during the past several decades. As noted in Section II, many changes in the payments system have resulted from a combination of regulatory and legal actions, but it appears that private initiative has been the primary force leading to financial innovation. A number of these innovations, including corporate cash management services, negotiable CD's, repurchase agreements, NOW accounts, and money market funds, came into existence without any prerequisite changes in banking regulations or law. Subsequent regulatory or legal action has been important in encouraging the development of some of the newly introduced services, but it is not clear that such official action would have occurred without the impetus provided by private initiative.

Competition in the financial markets explains a large part of the private initiative in the payments system. Given a competitive environment for financial services, financial innovations that are demand deposit substitutes and pay interest, or that pay interest and can be quickly converted to cash, offer

opportunities to aggressive banks and thrifts seeking to increase their shares of the deposit market.

The earliest innovations primarily benefited businesses, since businesses generally operate on a larger scale than do individuals and consequently maintain larger average transactions balances with a significantly greater potential gain from efficient management. Also, in the period following World War II, businesses operated with much higher ratios of transactions balances to total financial assets than did individuals. In 1950, for example, the ratio of currency plus demand deposits to total financial assets was about 60 percent for nonfinancial businesses compared to about 25 percent for households.⁷ Having a relatively large share of financial assets tied up in noninterest-earning form, businesses had the greater incentive to find ways of improving cash management procedures. Threatened with the loss of corporate deposits to open market debt instruments, the banking industry responded to these improved cash management practices by providing short-term investment opportunities. Thus, the 1960's witnessed the introduction of two new bank liabilities that provide businesses a positive interest return as well as high liquidity, namely negotiable CD's and RP's.

If the 1960's was the decade of business insofar as cash management is concerned, then the 1970's may have been the decade of the consumer. A number of services designed to facilitate efficient management of liquid balances by households were introduced at banks and thrift institutions in the 1970's. First in this group were telephone and preauthorized third-party transfer services from savings accounts. These were followed by NOW accounts, share drafts, ATS, and money market funds. With the exception of money market funds, all of these services rely on the use of interest-bearing savings accounts for direct third-party payments.

On the whole, the innovations which have been described here, taken both individually and collectively, are needlessly complex. For instance, RP's used by businesses and ATS accounts used by consumers entail constant switching of funds between interest-bearing accounts and noninterest-bearing demand deposit accounts. These two services facilitate the circumvention of the prohibition of interest on demand deposits, but they require a greater investment in management time and data processing than do checking accounts. The ingenuity of the financial markets in developing alternatives to demand deposits

⁷ These estimates are derived from *Flow of Funds* data. See Chart 1 on page 23.

has resulted in a bewildering array of new monetary assets. The provision of monetary assets by the financial system could be greatly simplified if the law allowed interest to be paid on demand deposits.⁸

IV. CHANGES IN BANK LIABILITIES AND THE PUBLIC'S LIQUID ASSETS

To what degree has payments system innovation affected the balance sheets of the banking system and the nonbank public? The paragraphs below present some statistical evidence indicating the extent of change in the nonbank public's total holdings of financial assets and in the composition of bank liabilities.

Changes in the Public's Financial Assets There has been a significant reduction in the relative importance of traditional money balances in the public's holdings of liquid assets. The ratio of demand deposits plus currency and coin to this total plus time deposits and credit market instruments is shown for the household and the nonfinancial business sectors in Chart 1. The chart indicates a more or less steady decline in the relative importance of traditional money balances for both sectors since 1950. For the nonfinancial business sector the decline has been especially sharp since 1970, with traditional money balances falling from 56 percent of the total in that year to 39 percent in 1978.

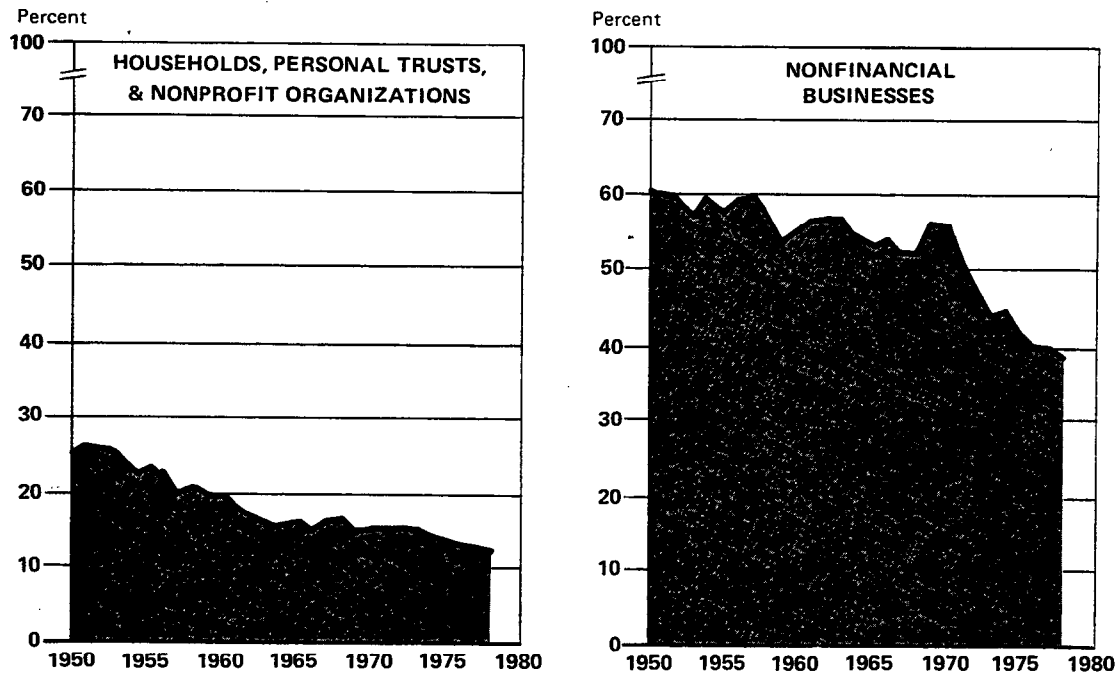
For the household sector (including personal trusts and nonprofit organizations) the decline has been considerably less sharp. As a matter of fact, the fraction of the total in traditional money declined more sharply between 1950 and 1965 than in the period since the latter year and remained fairly stable until 1974. Since that time, however, a noticeable downtrend appears to have developed. For households, the fraction of financial assets held in traditional money form fell from 25 percent in 1950 to 15 percent in 1965 and 12 percent in 1978. For the period since 1970, it appears that financial innovations have had a greater effect on the composition of the liquid holdings of businesses than on those of households.

Changes in Bank Liabilities The liabilities structure of the commercial banking system has been

⁸ The court action declaring ATS illegal has forced Congress to address the question of how far payments system changes should go. As a result, legislation that permits NOW accounts nationwide is actively being considered.

Chart 1

DEMAND DEPOSITS & CURRENCY AS A PERCENT OF TOTAL DEPOSITS, CURRENCY, & CREDIT MARKET INSTRUMENTS



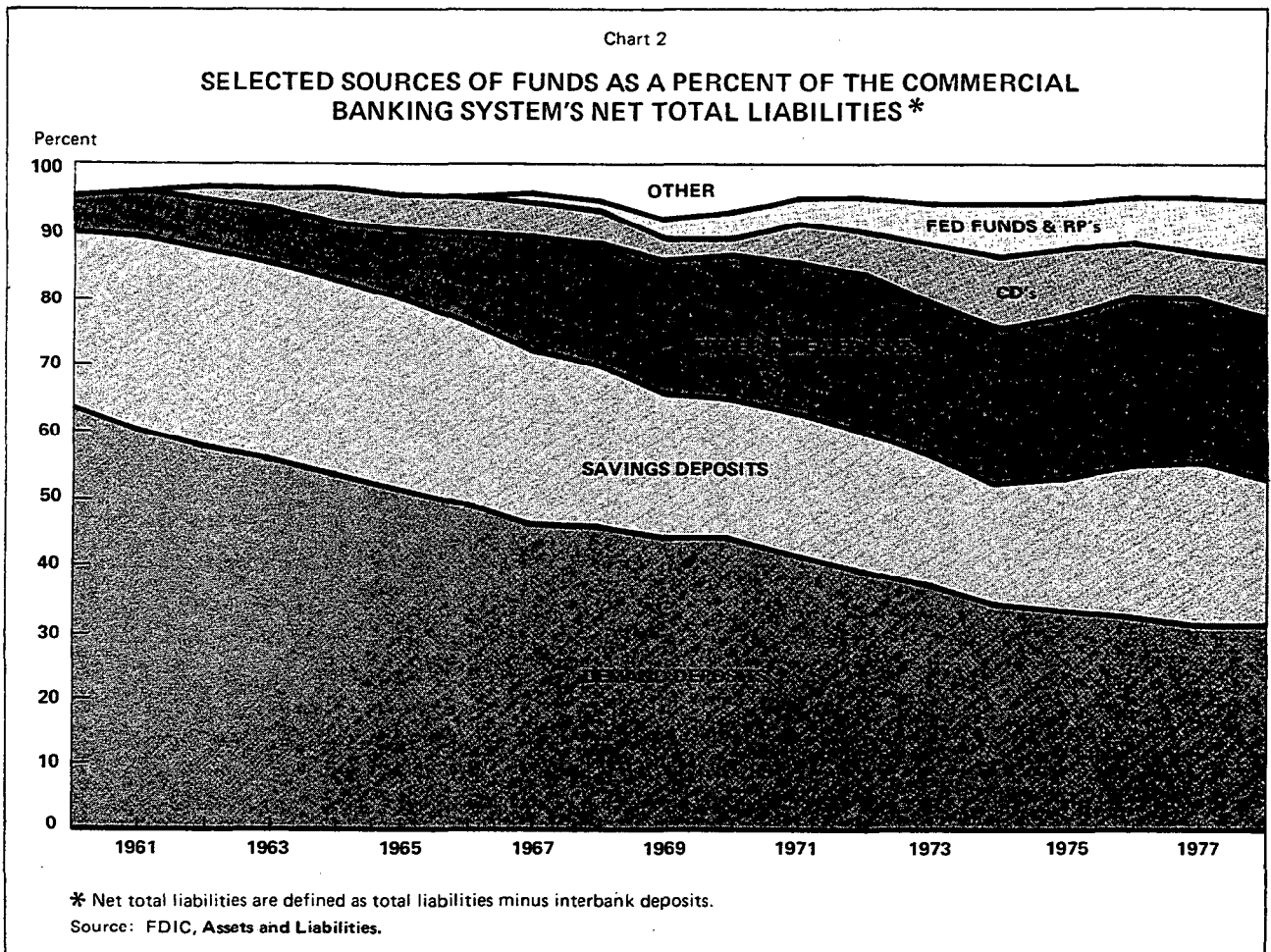
Source: Flow of Funds.

significantly altered as a result of the public's efforts to economize on noninterest-earning cash balances. The major change has been a decline in the relative importance of demand deposits compared with net total bank liabilities.⁹ For example, private demand deposits declined from 63 percent of net total liabilities in 1960 to just over 31 percent in 1978. This large drop in the ratio of private demand deposits to net total liabilities, which is shown in Chart 2, reflects a major shift in public preferences from noninterest-earning demand balances to time balances and other short-term liabilities such as CD's and RP's. Recalling Chart 1, it appears that since 1970 businesses have economized on money balances more than households. This conclusion is also supported by a comparison of the growth rates in demand deposits held by these two groups. The compound annual rate of growth of household demand deposits over the eight-year period 1970-1978 was 8.3 percent, about a third greater than the 6.2 percent rate for business deposits [5].

⁹ Net total liabilities are defined as total liabilities exclusive of deposits due to other commercial banks.

Chart 2 shows that, as the share of demand deposits to net total liabilities has declined, the shares of time deposits other than negotiable CD's, nonnegotiable CD's, and purchased funds have all increased. From their inception in 1961, negotiable CD's have grown to nearly 10 percent of net total liabilities. Purchased funds, defined to include Federal funds and repurchase agreements, have in only ten years grown to such an extent that they equaled nearly 9 percent of the commercial banking system's liabilities in 1978. Savings deposits declined in importance as a source of funds until 1974, falling from 25 to 18 percent of net total liabilities. After the 1975 regulatory change which allowed businesses to hold savings accounts, however, savings balances gained moderately in importance, reaching 22 percent of net total liabilities in 1978.

The chart shows a steadily increasing concentration of bank liabilities in those forms not subject to Regulation Q interest rate ceilings. Negotiable CD's and purchased funds are largely free of deposit rate regulation and, therefore, offer the public particularly attractive alternatives to holding sterile demand deposit or low-earning savings deposit balances. Demand and savings deposits combined, which at one



time dominated the liabilities side of bank balance sheets, have fallen in relative importance from 90 percent of total liabilities in 1960 to only 53 percent in 1978.

V. FINANCIAL INNOVATION AND MONETARY CONTROL

Roughly speaking, monetary control means management of the supply of money balances held by the public at depository institutions. The Federal Reserve is concerned with the management of aggregate money balances because these balances are a major determinant of aggregate spending. Aggregate expenditure by the public is, in turn, a key determinant of employment and the rate of inflation. The financial innovations described earlier appear to have interfered with the Federal Reserve's ability to control money growth. A simple view of monetary control is set out below to illustrate the channels through which this interference has been felt.

Control Problems Due to Financial Innovation

The Federal Reserve controls the money supply primarily by buying and selling Treasury securities. Payments made by the Federal Reserve when it purchases securities contribute to what is known as the monetary base. The monetary base consists of currency plus the reserves of the banking system. Since banks hold reserves that are only a fraction of their deposits, each dollar of reserves in the banking system supports several dollars' worth of deposits.

The stock of demand deposits in the banking system constitutes the bulk of what is called the basic money supply or M_1 . M_1 has historically served as the nation's payments medium or transactions balances, i.e., money held for the purpose of making payments. Because of its relation to expenditure, M_1 is an important monetary aggregate for the Federal Reserve to control.

To provide a framework for analysis of monetary control, M_1 may be thought of as the product of the stock of base money times a coefficient, m , called the money multiplier, i.e., $M_1 = m \cdot [\text{base money}]$.

The Federal Reserve cannot control M_1 directly. Instead, it must do so indirectly by buying or selling Treasury securities to manipulate the stock of base money. For example, if the Federal Reserve wants to raise M_1 by \$100 and the money multiplier, m , is 10, it would need to buy \$10 worth of Treasury securities to bring about the desired \$100 increase.

The Federal Reserve can exercise reasonably close control over the supply of transactions balances by operating on the stock of base money, relying on a relatively predictable money multiplier to achieve the desired results on M_1 . However, the rapid pace of financial innovation has made the task more difficult. First, growth of interest-bearing substitutes for demand deposits and currency has made M_1 a less accurate measure of total transactions balances; and second, growth of these substitutes is difficult to predict. Moreover, good data coverage is not yet available because not all financial institutions offering transactions balances are required to report to the Federal Reserve. Therefore, the Federal Reserve does not know whether to interpret a change in M_1 as a change in total transactions balances or simply a substitution by the public of some newly created short-term asset for demand deposits. This means that even if the money multiplier were to remain relatively stable, it would be difficult for the Federal Reserve to know how the stock of base money should be manipulated to affect total transactions balances because M_1 has become a less reliable measure of such balances.

Unfortunately, the money multiplier is not even invariant with respect to substitutions from demand deposits into other types of liquid assets. The reason is that current law requires banks to hold reserves against demand deposits (at graduated rates of 7 to 16¾ percent) that are higher than reserve requirements on demand deposit substitutes. Reserve requirements on NOW accounts, for example, are only 3 percent and there is currently an 8 percent marginal reserve requirement on RP's (see footnote 4). This means that if depositors shift from demand deposits to NOW accounts or RP's, excess reserves are created which enable the financial system to expand loans and increase its deposit liabilities. In other words, the money multiplier (for an appropriate measure of transactions balances) can rise with a shift from demand deposits to NOW accounts or RP's because of the different reserve requirements on these liabilities.

If current laws prohibiting the payment of interest on demand deposits are not changed, continuing financial innovation could eventually lead to the elimi-

nation of traditional noninterest-bearing demand deposits. If reserve requirements on the substituted liabilities remain low, the money multiplier will become very large. A larger multiplier is likely to have greater prediction error, and therefore is likely to make controlling money growth more difficult.

Even changes in the level of interest rates can induce changes in the money multiplier. Higher interest rates, for example, provide additional incentive for individuals and corporations to take advantage of interest-bearing substitutes for demand deposits. Compounding the problem is the fact that the short-run willingness of the public to substitute into interest-earning assets or alternative transactions balances is uncertain. The speed of substitution most likely depends, for example, on the time horizon over which individuals anticipate interest rates to remain high. Because average required reserves are decreased or increased as a result of these substitutions, the M_1 money multiplier can rise and fall with interest rates. However, because the degree of substitution is uncertain, so is the relationship between interest rates and the multiplier. Greater uncertainty about the multiplier makes it more difficult for the Federal Reserve to control M_1 through control of the monetary base.

The apparent weakening of Federal Reserve control over the volume of transactions balances has spawned a number of proposals for basic reform to improve the quality of the System's money control mechanism. A number of such proposals have been discussed at length in Congressional hearings on financial and banking reform. Some have been incorporated in legislative proposals that are in various stages of consideration by the Congress and might be acted on in 1980. A brief critique of those proposals designed to improve monetary control is presented in the sections that follow.

Extending the Coverage of Legal Reserve Requirements Shifts between deposit instruments with different reserve requirements account for much of the unpredictability in the money multiplier. Extending uniform reserve requirements to all transactions balances at commercial banks would therefore be useful in improving monetary control. However, if regulators continued to impose significantly lower reserve requirements on deposits held outside commercial banks, it would be of only limited value. Deposit institutions whose transactions-type accounts are nonreservable will be able to offer interest rates above those of institutions that must hold a larger portion of their funds in noninterest-earning required reserves. Nonreservable balances would therefore

tend to drive reservable balances out of use. The resulting money multiplier between the stock of transactions balances and the monetary base would consequently be much higher. Controlling the stock of transactions balances with the monetary base would be more difficult, because each dollar error in controlling the base would then have a greater effect on the stock of transactions balances.

Radical expansion in the usual coverage of reserve requirements would appear to be necessary to eliminate different reserve requirements among potential transactions balances while at the same time preventing the money multiplier from increasing. The problem is to devise a law that would allow only those deposits not used as transactions balances to qualify as nonreservable. For example, the law might state that customer orders to transfer funds be delayed at least a week for an account to qualify as nonreservable. But this rule might be circumvented by setting up revolving certificates maturing every eight days, so that one-eighth of the account could be transferred on any business day. This simple example illustrates the potential difficulty in enforcing a law requiring all balances used for transactions purposes to have the same reserve requirements as demand deposits.¹⁰

Removal of Regulatory Ceilings on Interest Rates If prohibitions against offering competitive rates of interest at depository institutions were eliminated, then interest rates on deposits at these institutions would tend to move more closely with the general level of interest rates. For example, interest differentials between deposits and other liquid assets such as money market mutual funds would become more stable. This would greatly reduce the incentive to switch from transactions type deposits to higher yielding liquid assets when interest rates rise.

Monetary control would be improved for two reasons as a result of this regulatory reform. First, because there would be less switching among liquid assets with changes in the level of interest rates, a given stock of bank reserves would produce a more stable basic money supply, M_1 . Second, because the incentive for use of alternative types of transactions balances would be reduced, M_1 would become a more comprehensive measure of transactions balances. The Federal Reserve's data on transactions balances would become more reliable since it would not, as it currently does, depend on an estimate of the extent

to which newly created liquid assets such as RP's or MMF's are being used as transactions balances.

Financial intermediation for banks involves longer maturities on assets than liabilities. Consequently, average returns on bank assets that provide income to pay interest on demand deposits change more slowly than short-term interest rates. Therefore, even if deposits were to pay interest, deposit rates may not move perfectly together with other short-term rates. However, the level of interest rates over longer periods of time varies largely because of changes in inflationary anticipations. The effect of anticipated inflation is reflected in all interest rates. Therefore, rates paid on demand deposits would move in line with other rates on a secular basis. As a result, paying interest on demand deposits would greatly improve the secular stability of the money multiplier and facilitate long-run monetary control.

Lowering the Long-run Rate of Money Growth

Since the rate of money growth is a major determinant of the long-run rate of inflation, the secular rate of inflation can be lowered if reasonably low secular money growth is maintained. A lower rate of inflation would reduce interest rates. As a result, incentives to substitute new forms of interest-bearing transactions balances for traditional demand deposits would be reduced, even if interest payments on the latter continue to be prohibited. The consequent reduction in financial innovation would greatly facilitate monetary control.¹¹

VI. CONCLUSION

This article has highlighted some important causes and consequences of the rapid pace of financial innovation of recent years, especially as it relates to the nation's payments system. First, high market interest rates, different reserve requirements on various types of deposits, and legal restrictions on the payment of interest on demand deposits have together provided increased incentive for the market to create

¹¹ This conclusion must be qualified by recognizing that the desire of thrift institutions to offer a greater variety of banking services may be independent of the rate of inflation and level of nominal interest rates. To the extent that this is true and to the extent that relevant prohibitions are relaxed, thrift institutions may behave more like banks in the future. This would mean that even if the rate of inflation is reduced and nominal interest rates come down, thrift institution liabilities may become more like transactions balances and their significance in money supply measurement may have to be reconsidered.

¹⁰ This illustration is taken from Cagan [2].

and use new kinds of deposit liabilities. Second, rapid development of computer and communications technology has contributed to this outcome. Third, regulators have allowed greater competition among financial institutions, thereby promoting more rapid innovation.

Because financial innovation involves creation of money substitutes, it causes problems for monetary control. In particular, difficulty in forecasting growth of demand deposit substitutes reduces the predictability of the money multiplier. In addition, since data on demand deposit substitutes are limited, it is hard to know the extent of their use, and consequently, it is hard to estimate the total stock of money.

Fortunately, reforms can ease this monetary control problem. The most important of these include extending the coverage of legal reserve requirements to all deposits used as payments balances and removing restrictions on interest payable on deposits. Adoption of these reforms should go a long way toward improving monetary control.

References

1. "A Proposal for Redefining the Monetary Aggregates." Study by the staff of the Board of Governors of the Federal Reserve System. *Federal Reserve Bulletin* (January 1979), pp. 13-42.
2. Cagan, Phillip. "Financial Developments and the Erosion of Monetary Controls." Reprint from American Enterprise Institute, *Contemporary Economic Problems*, 1979.
3. Cook, Timothy Q., and Duffield, Jeremy G. "Money Market Mutual Funds: A Reaction to Government Regulation or a Lasting Financial Innovation?" *Economic Review*, Federal Reserve Bank of Richmond (July/August 1979), pp. 15-31.
4. Kimball, Ralph C. "The Maturing of the NOW Account in New England." *New England Economic Review*, Federal Reserve Bank of Boston (July/August 1978), pp. 27-42.
5. Summers, Bruce J. "Demand Deposits: A Comparison of the Behavior of Household and Business Balances." *Economic Review*, Federal Reserve Bank of Richmond (July/August 1979), pp. 2-14.