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# *U.S. Monetary Policy and Financial Markets*

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*By Ann-Marie Meulendyke  
Federal Reserve Bank of New York*

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33 Liberty Street  
New York, N.Y. 10045*

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## *Forward*

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From time to time officials at the Federal Reserve Bank of New York have prepared special works sharing with economists, market participants, and others their own personal perspective on the monetary policy process. Of particular note in this regard was Robert Roosa's 1956 essay entitled *Federal Reserve Operations in the Money and Government Securities Markets*. In 1982, Paul Meek, in *U.S. Monetary Policy and Financial Markets*, described a policy setting process that had changed considerably from that described by Bob Roosa. The nature and functioning of financial markets continued to change in subsequent years, and the conduct of monetary policy has evolved as well. Since Paul Meek's book was published, the procedures of policy implementation that he described as "new" have been transformed again.

In this volume, Ann-Marie Meulendyke, a manager and senior economist assigned to the Bank's domestic trading desk, has offered her personal perspective on the monetary policy process and financial markets of the 1980s. The new essay describes the recent evolution of Federal Reserve procedures and places them in the context of the longer historical sweep of Federal Reserve policy. This new essay should benefit students of the subject well into the 1990s.

E. Gerald Corrigan  
President  
Federal Reserve Bank of New York

New York City  
December 1989

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## Acknowledgements

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Paul Meek wrote the first edition of *U.S. Monetary Policy and Financial Markets*, published in 1982. With its detailed descriptions of the policy process at the Federal Reserve, it proved to be a valuable and widely used resource for students and financial market participants in the United States and abroad. To date, the Federal Reserve Bank of New York has distributed around 55,000 copies. The book has also been translated into Japanese, Korean, and Portuguese.

During the years since the book was published, Federal Reserve policy procedures and U.S. financial markets and institutions have undergone substantial change. In order to maintain the usefulness of Paul Meek's volume, it seemed appropriate to offer a new version of the work. What has emerged is essentially a new book on similar themes rather than simply an update of the earlier book. Nonetheless, in doing the writing, I have been guided where possible by the structure of Paul Meek's book and have made significant use of material from it. I am deeply indebted to Paul not only for paving the way with his book but also for encouraging me in my work during the years that we both worked in the Open Market area at the New York Fed.

Special mention must go to Donald Vangel of the Open Market Function and to Christine Cumming of the International Capital Markets Group, who were primarily responsible for the preparation of Chapters 3 and 9, respectively. Don brought to the topic his knowledge of bank management and regulation and described some of the many changes that have been taking place in the banking industry in recent years. Chris drew upon her knowledge of international economic relationships to write about the international transmission of monetary policy, expanding on a topic that received only brief attention in 1982.

This book also owes a great deal to many other colleagues in the Federal Reserve System. Members of the Open Market Function patiently read drafts, and offered valuable suggestions. In addition, they graciously took over some of my normal responsibilities to give me extra time to work on the book. Many thanks to Peter Sternlight, Joan Lovett, Robert Dabbs, Kenneth Guentner, Sandra Krieger, Cheryl Edwards, and Jeremy Gluck, as well as Don Vangel. Jeremy, along with Lawrence Aiken, Deborah Perelmuter, and Mary Vitiello, deserves thanks for assisting in the preparation of the material on financial markets in Chapter 4.

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and John Wenninger. John Partlan and Judy Cohen of the monetary and reserve projections unit helped with Chapter 6. Margaret Greene and Willene Johnson of the Foreign Exchange Department reviewed sections in Chapters 5, 6, and 9 on foreign exchange intervention.

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Several people outside the Federal Reserve deserve special thanks for their careful reading of the manuscript: Dana Johnson of the First National Bank of Chicago, David Jones of Aubrey G. Lanston, and Jeffrey Leeds of Chemical Bank. Lawrence DiTore of Fulton Prebon provided insights into the functioning of the Federal funds market. Several people who once worked in the Open Market area of the Federal Reserve contributed oral history. They included Edward Geng, John Larkin, Paul Meek, Robert Roosa, and Robert Stone.

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Ann-Marie Meulendyke  
New York  
December, 1989

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## *Monetary Policy and the U.S. Economy*

Few components of economic policymaking are as important to the nation's economic well-being as monetary policy. This book offers the reader information on monetary policy from the vantage point of the Federal Reserve's domestic trading desk, the area responsible for carrying out most monetary policy actions. It emphasizes the process of formulating and implementing policy.

As the central bank for the United States, the Federal Reserve has been entrusted by the Congress with the responsibility for conducting monetary policy. Monetary policy is concerned with the terms and conditions under which money and credit are provided to the economy. Money comprises currency and coin issued by the Federal Reserve or the U.S. Treasury and various kinds of deposits at commercial banks and other depository institutions. Credit encompasses loans made by depository institutions and by other types of financial or nonfinancial entities and includes loans evidenced by debt instruments such as notes or bonds.

Under the Full Employment and Balanced Growth Act of 1978, usually referred to as the Humphrey-Hawkins Act for its primary sponsors, the Federal Reserve must establish annual growth targets for the monetary aggregates and explain how these targets relate to goals for economic activity, employment, and prices. Monetary policy is carried out by the Federal Reserve through its regulations and techniques for the issuance of currency and its provision of reserve balances. The behavior of reserves can in turn influence deposit behavior since some classes of deposits are partially backed by them.<sup>1</sup> The Federal Reserve can influence the rates and other conditions of credit extension by its monetary policy actions, although it cannot directly control the quantity of credit or its price.<sup>2</sup>

In addition to having a mandate to carry out monetary policy in a way that promotes sustainable economic expansion and reasonable price stability, the Federal Reserve also has responsibilities for promoting the smooth functioning of the nation's financial system. It tries to accommodate the substantial short-run variations in the

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*1 Currency outside the Federal Reserve, including cash in bank vaults, and total reserve holdings at the Federal Reserve constitute the monetary base, sometimes called "high-powered money" or "outside money." The monetary base is often singled out as a potential target variable. At least conceptually, the central bank has the power to control the issue of both components of the monetary base. Traditionally, the monetary base served as backing for other forms of money, although currently some of the items contained in the broader forms of money have little or no such direct backing.*

*2 The Federal Reserve does not set targets for credit growth, although it does announce annual monitoring ranges for a particular indicator of total credit behavior called nonfinancial debt, defined in Box A.*

demand for money and credit that inevitably arise in a complex market economy. The Federal Reserve monitors a wide variety of financial variables and responds when they seem to indicate that credit conditions are out of step with System policy goals. Determining the appropriate policy stance and balancing long- and short-run objectives in the execution of policy have proved to be very challenging. Decisions must be made as events are unfolding on the basis of data whose full significance is not yet clear. The policy actions themselves become part of the dynamic economic processes and may have effects that extend over considerable periods of time.

The next three sections of this chapter provide information on the role of money in the economy and examine the tools of policy. These sections serve as background for the discussion of the financial system and policy process in later chapters.

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### *Money and the Economy*

Since money represents generalized purchasing power, it ought to be reasonably well linked over time with the nominal value of the total spending and output of goods and services in the nation's economic system. Individuals and companies choose to hold money because its use greatly simplifies a wide range of economic transactions. On the other hand, they limit their money balances because holding money has costs in the form of forgone opportunities for alternative investments in goods, services, or financial instruments. The amount of money that is consistent with the goals for prices and output depends upon the customs, practices, regulations, and political environment of the economy. If these are stable, the relationship between money and economic activity will tend to be stable as well. Monetary growth in excess of that needed to support sustainable growth in economic activity will be associated with generalized price increases.

The amount of money that people wish to hold will not, however, always bear a constant relationship to the level of economic activity. The demand for money will also depend upon expectations of future price changes. For instance, if rapid inflation is expected, people will seek to minimize holdings of those forms of money that do not provide a return sufficient to offset the expected loss of purchasing power caused by rising prices. On the other hand, if prices are expected to be steady, people will hold more money because of its convenience in conducting transactions. Another factor influencing the demand for money is the ease of

conversion between money and those nonmoney instruments that provide a greater return than money.

As underlying economic conditions or expectations shift, the behavior of money will also change. Usually these changes will be so gradual that they will not seriously interfere with short-term policymaking, but on occasion they may be rapid enough to complicate policy choices. Even when the underlying conditions are stable, demands for money will vary considerably from day to day and week to week in response to seasonal and institutional payment conventions. The Federal Reserve attempts to sort out these effects and to accommodate the short-run changes in money demand without compromising its ability to influence money over time to achieve long-term goals.

One factor complicating the process of determining the appropriate behavior of money is the absence of a good match between the conceptual definition of money—given in textbooks as a medium of exchange, a standard of value, a standard of deferred payments, and a store of wealth—and the actual financial instruments that exist in the United States.<sup>3</sup> Because financial instruments have varying degrees of “moneyness,” the Federal Reserve has set forth several definitions of money, listed in Box A. The narrow measure of money, M1, comes closest to conforming to all the criteria of the textbook definition, but it omits items that have most of the characteristics of money and are often better stores of value than M1. The broader measures, M2 and M3, capture some of these close substitutes for M1.

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### ***Money and the Policy Process***

In the policy process, “money” has traditionally served as an intermediate target or indicator, standing between the Federal Reserve’s ultimate goals of sustainable economic growth with price stability and the operating targets used for day-to-day policy implementation. Money occupies this position because its behavior is related both to the ultimate policy goals of the Federal Reserve, which cannot be controlled directly, and to the potential policy tools over which “the Fed” has direct control. Until the 1980s, empirical data supported the view that M1 growth was a reasonably predictable leading determinant of nominal economic activity. The Federal Reserve had only an imprecise ability to control M1, but over several quarters, it could come close to achieving

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<sup>3</sup> See, for instance, Thomas Mayer, James S. Duesenberry, and Robert Z. Aliber, *Money, Banking, and the Economy*, 3d ed. (New York: W.W. Norton and Company, 1987), p. 5.

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*Box: Money and Credit Definitions*

M1 consists of currency in circulation outside of the Treasury, Federal Reserve Banks, and depository institutions; travelers checks; demand deposits at all commercial banks other than those due to depository institutions, the U.S. government, and foreign banks and official institutions, less cash items in the process of collection and Federal Reserve float; other checkable deposits (OCD), including 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.

M2 consists of M1 plus overnight and continuing contract repurchase agreements (RPs) issued by all commercial banks; overnight Eurodollars issued to U.S. residents by foreign branches of U.S. banks worldwide; money market deposit accounts (MMDAs); savings and time deposits (including retail RPs) in amounts of less than \$100,000; and all balances in general purpose and broker-dealer money market mutual funds. M2 excludes individual retirement accounts (IRAs) and Keogh (self-employed retirement) balances at depository institutions and in money market funds. Also excluded are all balances held by U.S. commercial banks, money market funds (general purpose and broker-dealer), foreign governments, foreign commercial banks, and the U.S. government.

M3 consists of M2 plus time deposits and term RP liabilities in amounts of \$100,000 or more issued by commercial banks and thrift institutions; term Eurodollars held by U.S. residents at foreign branches of U.S. banks worldwide and at all banking offices in the United Kingdom and Canada; and all balances in institution-only money market mutual funds. M3 excludes amounts held by depository institutions, the U.S. government, money market funds, and foreign banks and official institutions. Also excluded is the estimated amount of overnight RPs and Eurodollars held by institution-only money market mutual funds.

Total nonfinancial debt is defined as outstanding credit market debt of the U.S. government, state and local governments, and private domestic nonfinancial sectors. Private debt includes corporate bonds, mortgages, consumer credit (including bank loans), other bank loans, commercial paper, bankers' acceptances, and other debt instruments. The Federal Reserve Board's flow of funds accounts are the source of domestic nonfinancial debt data expressed as monthly averages.

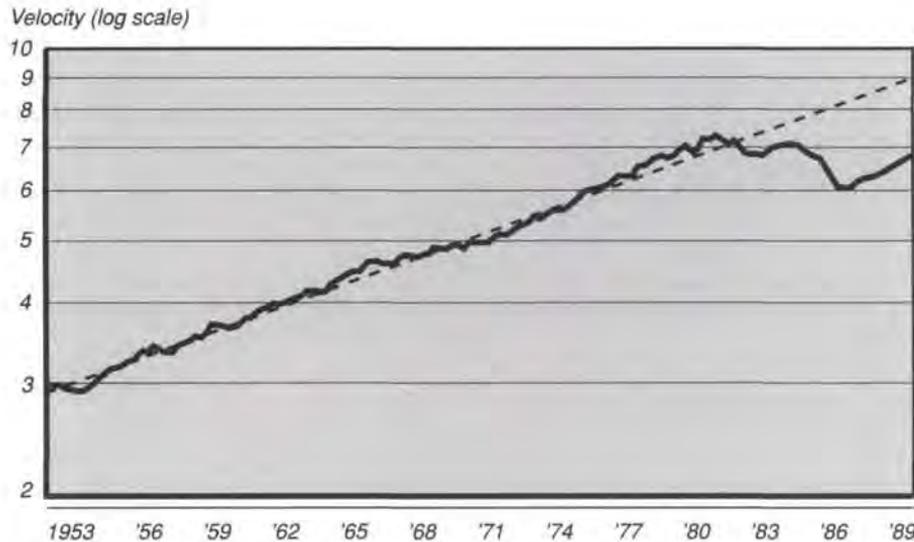
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a desired rate of money growth by adjusting either the levels of the banks' reserve balances or short-term interest rates. Similarly, the response of nominal gross national product (GNP) to changes in M1 showed seasonal and cyclical variation, but it was also reasonably predictable over the long run.

In the 1970s, the Federal Reserve sought to take advantage of the empirical regularities and to control money growth in order to reduce inflation. For most of the decade, it adjusted reserves to influence the interest rate on interbank transfers of reserves—the Federal funds rate—as a means of changing money growth. However, persistent overshooting of the money targets and other forces had pushed prices upward until, by 1979, inflation had reached wholly unacceptable levels. Eager to halt and wind down the inflationary process of the 1970s, the Federal Reserve adopted a reserve targeting approach to money control in October of that year. The technique met with considerable success if judged by its effect on average money growth and its impact on inflation. By 1982, the economy was in a deep recession and considerable progress had been made in overcoming inflation. Nonetheless, M1 was growing rapidly by recent standards. It appeared that the previous relationships between M1 growth and nominal economic activity were not standing up well. Consequently, the techniques of policy implementation were modified late in 1982 in a way that deemphasized the money growth targets, especially those for M1.

The causes of the shifts in money demand have gradually become better understood, although even at this writing many questions remain. For about three decades, the relationship between money and income had been reasonably stable and predictable. Nominal GNP had grown faster than M1, so the income velocity of M1, or its rate of turnover per income-generating transaction, had risen an average of 3 percent a year. But a series of factors combined to make people less reluctant to hold M1 balances, and income velocity declined during the first half of the 1980s (see Chart 1, page 7). The spread of interest-bearing NOW accounts made individuals more inclined to hold some of their savings in transactions form. Lower inflation made the loss in purchasing power from holding money balances smaller, an outcome which made holding money a more attractive option. When interest rates began falling, forgone interest from holding money balances also declined. Although the demand for money rose on average, it also became more sensitive to short-run interest rate movements. With components of M1 paying rates that were above zero but slow to

**Chart 1** Trend of M1 Velocity



Velocity trend from 1953.1 to 1979.4 was 3.2 percent per year

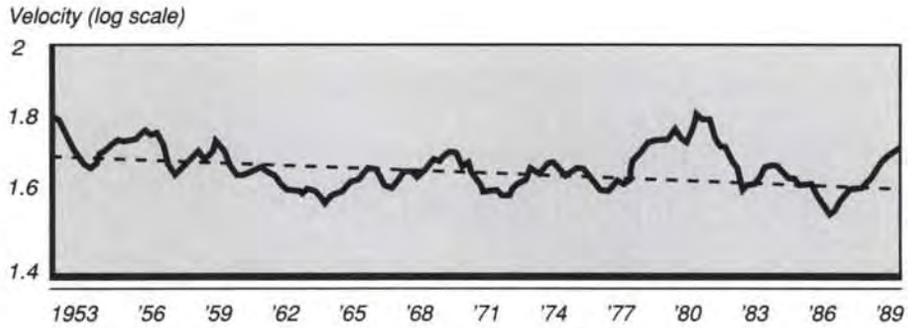
change, there were large swings in the relative relationship between market rates and rates on money balances. The trend velocities of M2 and M3 did not shift as much, but for M2, the variability of velocity increased (see Charts 2 and 3, page 8).

While reducing their reliance on the behavior of the monetary aggregates as policy indicators, policymakers placed greater emphasis on measures that might be termed intermediate indicators. These included commodity prices and monthly statistics on employment, production, and trade. Such measures are not directly controllable but, taken together, they ought to suggest at least the direction in which policy instruments should be adjusted to achieve the ultimate policy goals.

### *The Tools of Policy*

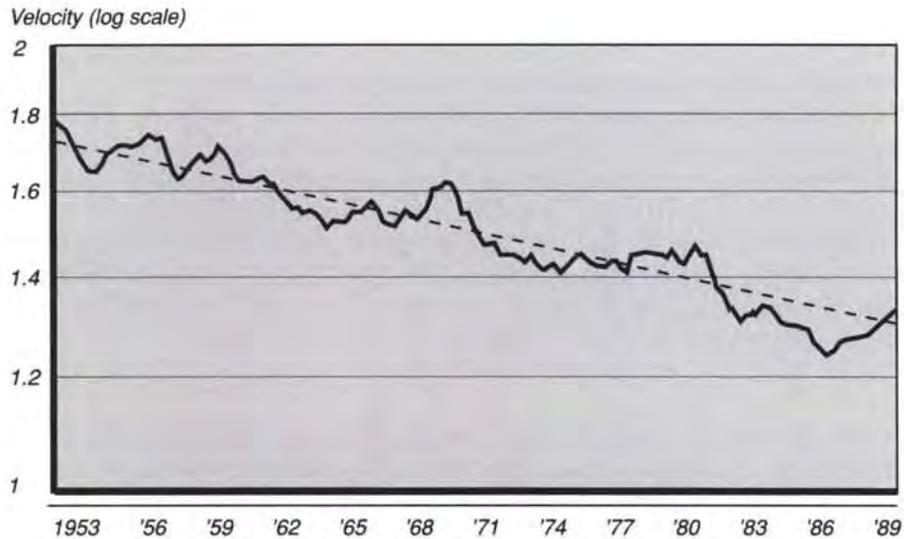
The Federal Reserve traditionally had three primary instruments of monetary policy: reserve requirements, the discount rate, and direct open market purchases and sales of U.S. government securities. Using these tools, the Federal Reserve could affect the cost and availability of reserves to commercial banks and other depository institutions.

**Chart 2** Trend of M2 Velocity



Velocity trend from 1953.1 to 1979.4 was -0.03 percent per year

**Chart 3** Trend of M3 Velocity



Velocity trend from 1953.1 to 1979.4 was -0.07 percent per year

Reserve requirements play a role in establishing the banks' demand for reserves and help determine the effects of the other monetary tools on bank behavior. Commercial banks and other financial institutions accepting deposits against which payments can be made must maintain reserves in the form of cash held in their vaults or deposits at Federal Reserve Banks. The existence of reserve requirements underlies the relationship between the volume of reserves and the transaction deposit component of money.

The Depository Institutions Deregulation and Monetary Control Act of 1980 (MCA) imposed uniform reserve requirements across all depository institutions holding transactions deposits. It also specified a schedule for implementing the new reserve requirements. Although the MCA gave the Board of Governors of the Federal Reserve System authority to alter reserve requirements without regard to the designated phase-in schedule if necessary for monetary policy, the provision was not used during the phase-in period. Indeed, changes in reserve requirements for the express purpose of influencing the behavior of money or credit have not been made since 1979.

The discount window provides depository institutions with the means to borrow reserves from the Federal Reserve at a specified rate. The Federal Reserve, relying on administrative procedures, limits access to the facility by restricting frequency and amount of use. Although the volume of borrowing is usually modest, the terms for gaining access to the discount window are an important part of the policy implementation process. The limitations on borrowing contribute to the seemingly contradictory result that increases in the amount of reserves in the banking system, when provided by the discount window, act to restrict reserve availability by putting banks under pressure to find other sources of reserves to repay the loans.

Changes in either the discount rate or the rules and guidelines for access to the facility can affect the costs to depository institutions of obtaining reserves to support deposit and credit growth. Discount rate changes are initiated by the regional Reserve Banks' boards of directors and are subject to final review and determination by the Board of Governors in Washington. The response of depository institutions to the settings of the discount rate affects short-term interest rates. Banks respond both to the rate itself and to the implicit or explicit message about policy contained in the announcement. These relationships make discount policy an integral part of monetary policy. Changes in Federal Reserve policies

toward use of the window have been rare. Normally they have consisted of temporary reductions on restrictions because of an unusual strain on the banking system.

Open market operations are the primary tool used for regulating the pace at which reserves are supplied to the banking system. Open market operations consist of purchases and sales by the Federal Reserve of financial instruments, usually securities issued by the U.S. Treasury. Open market operations are carried out by the domestic trading desk of the Federal Reserve Bank of New York under directions from the Federal Reserve's principal monetary policymaking unit, the Federal Open Market Committee (FOMC). The transactions are arranged through firms that act as dealers, routinely buying and selling Treasury debt. Purchases by the desk add reserves while sales drain reserves from the banking system. Such purchases and sales may be made outright or they may be made under a temporary arrangement in which the transaction is reversed after a specified number of days.

Reserve requirements, discount policy, and open market operations can be used separately or in combination. Even though they are under different jurisdictions within the Federal Reserve System, their use can be coordinated to meet the needs of a particular situation. Of the three tools, open market operations provide the greatest flexibility and are the most actively employed tool. Nevertheless, the FOMC must take account of the settings of the other instruments in making its choices for open market policy. The FOMC meets regularly and monitors a variety of monetary and economic indicators in order to choose an appropriate policy mix.

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### *Plan of the Book*

The structure of the book largely follows that of its predecessor, Paul Meek's 1982 volume on U.S. monetary policy. This section previews the principal topics in the sequence in which they are treated in the book. Although a more detailed picture will emerge in the following pages, it may be helpful to note here certain broad divisions in the subject matter. Chapters 2-4 cover various aspects of the institutional setting for U.S. monetary policy. They are followed by three chapters describing the policy process itself, then two exploring the ways that policy affects the domestic and international economy. Chapter 10 assesses the record of monetary policy in the 1980s and the economic and financial conditions that accompanied it.

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## 1. Evolution of Federal Reserve Procedures

The history of the policy process, the subject of Chapter 2, reveals how the Federal Reserve has responded to new problems and changing conditions by significantly modifying its primary goals and the techniques for achieving them. Indeed, since the Federal Reserve's beginnings in 1914, both Congress and the Federal Reserve have substantially revised their views of the Federal Reserve's mandate. In the early days, the gold standard was expected to take care of stabilizing the price level. The Federal Reserve saw its role as providing reserves to accommodate routine variations in the needs for credit to finance trade and as providing currency to avoid financial panics. But the experience of the Great Depression altered priorities, and in the years following the Second World War, the policymakers considered economic stabilization a primary goal. Then, during the 1970s, the goal of price stability acquired increased importance as inflation worsened.

The tools of policy evolved over time as well. In the System's early years, discount window loans were the predominant means of short-term adjustments to reserves while secular changes in money and credit stemmed primarily from changes in monetary gold. In more recent times, both secular growth in money and accommodation of short-term variation in money and credit demands have been provided through open market transactions, primarily in U.S. Treasury securities.

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## 2. The Depository Institutions

Monetary policy reflects continuing interactions among the Federal Reserve, financial institutions, the financial markets, and members of the nonbank public who deposit and borrow funds. The functioning of the depository institutions, described in Chapter 3, plays a role in transmitting the Federal Reserve's policy impulses to the economy.

Each depository institution considers many factors in managing its balance sheet. The balance sheet compares assets, which encompass loans and investments, with capital and liabilities, the latter consisting of deposits and other types of debt. When a depository institution makes loans or investments, it must weigh the interest to be earned against risks incurred, and it must take account of the cost of capital requirements on the asset acquired and the return on the capital that the assets should generate. In attracting deposit liabilities, it needs to take account of the direct

and indirect costs involved, including paying interest and account management expenditures as well as any reserve requirements on those deposits. If the maturities of the assets and liabilities differ, it must consider the implications of changes in interest rates over their lives. In recent years, the introduction of new regulations and the greatly increased degree of interest rate volatility have complicated the tasks of asset and liability management.

While depository institutions set conditions for accepting deposits and making loans, their customers choose how to respond to the rates and terms established by the institutions. Customer behavior in turn affects the mix of deposits and the amount of lending that takes place. Customers choose among deposit categories on the basis of interest rates and other features, but they also act according to their incomes and assets, the timing of their payments and receipts, and the ease of conversion between money and near-money instruments. The amount of credit actually extended depends on the level of economic activity and perceived gains from investments, in addition to the interest rates charged by depository institutions on their loans compared with the cost of alternative sources of credit.

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### *3. The Role of the Financial Markets*

The effects of monetary policy actions are not limited to the depository institutions. Indeed, as described in Chapter 4, governments at various levels, quasi-governmental agencies, private corporations, and individuals engage in extensive direct financial market borrowing and lending. The United States has vast financial markets where debt and equity are created and redistributed. These markets are competitive and serve to direct capital to the users with the most urgent demands.

Depository institutions, other financial firms, nonfinancial businesses, and governments all place funds in, or borrow from, the money market—the term used for financial markets specializing in instruments maturing in a year or less—to bridge differences in timing between receipts and payments. They also use the market to defer long-term borrowing or lending to a more propitious time. They use the longer term capital markets to borrow for investment purposes. Lenders may place funds for a long period, or they may purchase a security with the intention of selling it when cash is needed in what is called the secondary market.

The existence of active secondary markets facilitates transfers of existing debt instruments before maturity and enables the New

York Fed's domestic trading desk to conduct open market operations efficiently. Open market operations take place in two segments of the markets: that for U.S. Treasury securities and that for temporary purchases and sales of government securities, referred to as repurchase agreements (RPs) and matched sale-purchase agreements (MSPs). The Federal funds market allows depository institutions to exchange reserve balances at the Federal Reserve among themselves, an arrangement which promotes the efficient use of reserves and the building of a large volume of deposits and credit on a relatively small reserve base. The Federal funds rate, the rate for overnight exchanges of Federal funds, responds to reserve availability and is regarded by money market participants and observers as a useful, although not always reliable, indicator of the stance of Federal Reserve policy.

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#### *4. The Policy Process*

The formulation and execution of monetary policy, reviewed in Chapters 5-7, occur in several stages. The process originates with the actions of the FOMC, which typically meets eight times a year in Washington, D.C. At these meetings, the 7 governors and the 12 presidents of the regional Reserve Banks evaluate the economic outlook and develop monetary policy. The Chairman of the Board of Governors presides over the meetings; the permanent voting members of the Committee include the governors and the president of the New York Federal Reserve Bank. Four other Reserve Bank presidents serve as voting members on a rotating basis for one-year terms. At every FOMC meeting, instructions are adopted and sent to the domestic trading desk at the New York Federal Reserve. This "directive" indicates whether the Committee desires to increase, maintain, or decrease the degree of reserve pressure. Reserve pressure is produced by forcing depository institutions to borrow rationed credit from the discount window. The directive may also indicate that potential developments—for example, in the monetary aggregates, economic activity, or prices—could call for adjustments to the degree of reserve pressure during the period between meetings.

The objectives set by the FOMC for the growth of various monetary and credit measures during the current calendar year are reported by the Chairman every February to the banking committees of the Congress as required by the Humphrey-Hawkins Act. In July, the Chairman reports any revisions in that year's objectives, along with preliminary goals for the subsequent year.

The trading desk at the New York Fed provides reserves to the banking system in a manner designed to be consistent with the FOMC's desired level of discount window borrowing and sensitive to the implications for short-term rates. In implementing the Committee's directive, the desk purchases or sells U.S. Treasury debt instruments to bring reserves into line with established objectives.

Changes in the policy stance of the FOMC usually are quickly detected by banks and other financial market participants. When the degree of pressure on bank reserve positions is increased, banks will have to satisfy a larger share of their reserve needs at the discount window. Since their access to the discount window is limited, they will bid up the Federal funds rate. Over time, depository institutions will respond to the reserve restrictions by shifting the rate structure of their assets and liabilities. Their actions help to lower financial asset prices, raising market rates and providing incentives for other economic participants to reduce their holdings of money and their use of credit. Gradually, growth of money balances and credit should slow. At some point, the pace of real economic activity and of inflation will abate. Conversely, when pressure on bank reserves is eased, the Federal funds rate falls, and over time banks will be encouraged to acquire more assets. The resultant portfolio adjustments will eventually work to spur monetary growth, increase credit availability, and quicken economic activity.

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## 5. *The Economic Impact*

What, then, are the channels through which monetary policy impulses are transmitted to the economy? This question, addressed in Chapter 8, is difficult to answer because lags and feedback effects hamper efforts to trace all connections. Furthermore, a complex economy operating in a wider world context will not always react in a predictable way to a particular policy initiative. Nonetheless, much has been learned over the years. Individuals and businesses make decisions to buy or sell goods and services and to borrow or lend on the basis of current and expected values of income, interest rates, and prices. In addition, they respond to the ease or difficulty of obtaining credit. It is the job of the Federal Reserve to analyze these influences and to formulate a monetary policy that appropriately responds to them.

Analysts of the monetary transmission process differ in the importance they attach to the various channels. Some economists, often referred to as Keynesians, emphasize the influence of interest rates on economic decisions. They contend that a stimulative mon-

etary policy arises when sufficient reserves are provided to reduce interest rates. Lower rates are viewed as stimulating borrowing for investment and consumption expenditures. These expenditures in turn will encourage an increase in output. If output rises to the point where it is straining the productive capacity of the economy, then competition for scarce resources will result in higher prices.

Other economists, often called quantity theorists or monetarists, have emphasized the importance of adjustments in money supply and demand in determining the state of the economy and the behavior of the price level. They expect that money demand will be reasonably stable over meaningful periods of time while recognizing that demand can be subject to short-run variations and that shifts can arise out of institutional change. The quantity theorists include interest rates, income, and prices in the list of factors determining the demand for money. They maintain that money demand is fairly predictable over time, but they acknowledge that economic activity and prices may be slow to respond to monetary growth impulses since people do not fully adjust their spending patterns as soon as their money balances change.

The impact of expectations on economic decisions has received increased attention in the models of both groups of economists in recent years. Expectations formulation has become an important component of the analysis of the monetary transmission mechanism. In particular, much interest has centered on expectations about inflation and their effect on the interpretation of interest rates. Judging whether interest rates are high or low requires knowing people's expectations about the degree to which inflation will erode the purchasing power of money during the term the funds are borrowed or lent.

Many analysts examine monetary policy transmission in the context of the business cycle. In recent decades, the Federal Reserve has attempted to take account of lags in the policy process and to anticipate economic responses in its use of policy to counter cyclical developments. The idea is to take restrictive policy steps before the economy overheats and inflation follows, and to initiate easing steps before a recession occurs. In practice, however, imperfect forecasts have meant that the Fed cannot always correctly anticipate the best time for a shift in policy. Still, once an economic turn has been recognized, prompt responses can mitigate extremes of business fluctuations.

Various sectors of the economy will respond differently over the business cycle to monetary policy influences, in part because

interest rate changes have different implications for them. For instance, consumers as a group are net creditors, while the federal government is generally a net debtor. Moreover, within each sector and income group, debt or credit positions will vary considerably.

Finally, the communication of economic and financial developments can be a factor in policy transmission. The speed with which information is disseminated has increased markedly in recent years. As prices and interest rates have become volatile over the last two decades, firms that have particular needs to predict and understand interest rate developments expanded the resources they devote to monitoring the economy and Federal Reserve policy in order to avoid adverse surprises.

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## *6. International Dimensions of Monetary Policy*

In the United States, monetary policy is still largely conducted with an eye toward domestic economic conditions and still based on domestic monetary and financial aggregates. Nevertheless, it has become increasingly apparent that the United States is far from being a closed economy. As Chapter 9 shows, U.S. monetary policy can have a significant impact on other countries' economies, and developments abroad can affect the U.S. economy to a substantial degree. Moreover, foreigners use U.S. dollars as a transactions medium, a store of value, and to establish value in long-term contracts. In many dollar transactions, U.S. residents are not participants, and the transactions do not enter into any U.S. economic or financial statistics.

The increased awareness that the United States is an open economy that cannot operate in isolation from the rest of the world reflects the rapid expansion of international trade and financial transactions in the postwar period. As foreign trade has grown, both absolutely and as a share of GNP, exchange rates have come to have substantial bearing on U.S. income and production levels and on the rate of inflation in the United States. Increased trade has been accompanied by enlarged international capital flows, which were facilitated by the dismantling of capital controls by many nations in the 1970s. Looked at in isolation, the floating exchange rates that replaced pegged rates in the early 1970s increased the opportunities for each country to pursue its own monetary policy goals independent of the actions of other nations. Nevertheless, increased trade and financial flows worked to make exchange rate changes—including those that stem from monetary policy actions—important policy considerations. They also elevated the impor-

tance of coordinated policy procedures among major countries in the world economy.

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### *7. Reflections on the 1980s*

In the 1980s, monetary policy contributed importantly to promoting economic expansion and reducing inflation. But the decade also witnessed a mounting debt burden and many unsettling financial developments, including the apparent breakdown of traditional policy relationships. Chapter 10 briefly reviews some of the developments that shaped monetary policy in the decade.

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## 2

# *The Federal Reserve and U.S. Monetary Policy: A Short History*<sup>1</sup>

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The tools that the Federal Reserve uses today and its approach to formulating and implementing monetary policy have evolved considerably from what the framers of the Federal Reserve Act had in mind in 1913. The economic consequences of two world wars, the Great Depression, and the inflation of the 1970s have contributed to significant changes in Federal Reserve policy priorities and in the techniques and tools used to pursue them. A System that was decentralized at the outset has become much less so; the goal of economic stabilization now figures importantly in the Federal Reserve's objectives for policy; and open market operations, a procedure not even mentioned in 1913, has become the primary tool of policy. This account focuses on the changing views of the Federal Reserve's primary monetary policy responsibilities and on the discovery and development of policy guidelines and tools. It should provide some understanding of the roots of the current policy process that is the focus of much of the book.

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### *The Beginning of the Federal Reserve and World War I: 1914 to 1919*

The U.S. Congress passed the Federal Reserve Act in December 1913, creating a system consisting of the Federal Reserve Board in Washington and 12 regional Federal Reserve Banks with main offices and branches to serve the entire country. Congress acted because the decentralized banking system of that time could not respond adequately to variations in the cash and credit requirements of the economy. The Federal Reserve System was directed, in the words of the preamble to the Federal Reserve Act, "to furnish an elastic currency, to afford the means of rediscounting commercial paper, to establish a more effective supervision of banking in the United States, and for other purposes." It was anticipated that credit extended by the Federal Reserve Banks to commercial banks would rise and fall with seasonal and longer term variations in business activity, thus providing a self-adjusting mechanism that would prevent shortages of currency or runs on banks from leading to financial panic and a breakdown in the economy. The framers did not worry about the inflationary potential of such accommodative

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<sup>1</sup> This chapter draws heavily from policy records of the various Open Market committees, annual reports prepared by the Open Market Function of the New York Federal Reserve; and Milton Friedman and Anna Jacobson Schwartz, *A Monetary History of the United States 1867-1960* (Princeton: Princeton University Press, 1963).

The first three sections make extensive use of W. Randolph Burgess, *The Reserve Banks and the Money Market* (New York: Harper and Brothers, 1936); and House Committee on Banking and Currency, Subcommittee on Domestic Finance, *Federal Reserve Structure and the Development of Monetary Policy: 1915-1935, 92nd Cong., 1st sess., December 1971*.

credit provision, perhaps because long experience with the gold standard had led them to expect that gold flows would limit tendencies to inflation or deflation.

From the beginning, the Federal Reserve was reasonably successful in accommodating the seasonal swings in the demand for currency—in the terminology of the act, providing for “an elastic currency.” It thereby alleviated some of the troublesome strains on the commercial banks that arose from the cyclical pattern of credit demands in agriculture and from the year-end rise in currency demand. Interest rates no longer exhibited seasonal fluctuations to the degree that they had earlier.<sup>2</sup> Other aspects of the System’s mandate developed more slowly and were subject to experimentation and controversy.

The act established a decentralized system. The regional Reserve Banks were to have considerable authority to set the terms for credit provision and regulate member banks in their districts. The Board in Washington was assigned responsibility to oversee the activities of the Reserve Banks. The Board consisted of a governor and four other regular members; with the Secretary of the Treasury and the Comptroller of the Currency designated as *ex officio* members. The 12 regional banks had considerable autonomy and power to respond to financial conditions in their districts. They were headed by governors, most of whom had been commercial bankers.

Between the outbreak of World War I in 1914 and the United States entry into the war in 1917, gold flowed into the country from Europe to purchase goods needed for the war effort. The Federal Reserve found that it did not have the tools to offset the inflationary impact of the inflows. It did not have the power to raise reserve requirements; indeed, the Federal Reserve Act mandated reductions in reserve requirements for several years while reserve balances were being consolidated at the Federal Reserve rather than scattered among the large commercial banks. The Reserve Banks did not yet have securities they could sell to absorb liquidity. Indeed, there were only minimal amounts of Treasury debt outstanding, most of it backing national bank notes. During those years, the only tool potentially available to offset the reserves provided by gold inflows was the discount window. Discount rates (or rediscount rates as they were then called)—the rates at which the Reserve Banks made loans to the member banks by discounting eligible paper—could have been

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<sup>2</sup> Jeffrey A. Miron, “Financial Panics, the Seasonality of the Nominal Interest Rate, and the Founding of the Fed,” *The American Economic Review*, vol. 76, no. 1 (March 1986), pp. 125-40.

raised sufficiently to discourage banks from using the facility. While the rates varied considerably, the governors left them low enough to encourage banks to use the facility to obtain needed reserves. They did discuss boosting the rates to discourage banks from borrowing, but did not take that step. The rates differed among Reserve Banks and according to the type of paper being discounted.

Once the United States entered the war, gold flows almost disappeared. The United States extended massive loans to its allies, eliminating their need to make gold payments to the United States, and it restricted exports of gold. The Federal Reserve also had to cope with the large issuance of Treasury debt needed to finance the war effort. The Secretary of the Treasury insisted that the Federal Reserve hold down interest rates while the Treasury's Liberty Loan issues were being sold. The Fed made it easy for member banks to buy the issues by allowing them preferential rates for the discounting of Treasury securities. Expansion of Federal Reserve credit took the place of gold inflows as a major source of inflationary growth in money and credit.

After the war, the Federal Reserve struggled to sort out how to operate in a climate that had changed greatly. The Treasury had become an important participant in the credit markets. The discount rate was held down to support Treasury finance; deposits expanded and inflation accelerated, prompting an outflow of gold. Federal Reserve officials debated whether penalty discount rates should be established or moral suasion used to discourage banks from extending credit for speculation in commodities. Decisions were deferred, however, until 1920, when the outflow of gold had reached critical proportions, and the combination of currency expansion and gold outflows had reduced the ratio of gold to Federal Reserve notes to a level approaching the 40 percent legal minimum then in effect. In that year, the Treasury dropped its opposition to higher rates. Higher discount rates reversed the gold outflows but contributed to dramatic declines in money and prices and a short but severe economic contraction.<sup>3</sup>

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### *Adapting to a Changed Environment in the 1920s*

The 1920s were marked by ongoing discoveries about the effects of the various monetary policy tools and considerable debate about the role of the Federal Reserve. For much of the decade, the banks

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<sup>3</sup> Leland Crabbe, "The International Gold Standard and U.S. Monetary Policy from World War I to the New Deal," *Federal Reserve Bulletin*, vol. 75, no.6 (June 1989), pp. 423-40.

made heavy use of the discount window. There was an understanding that individual banks should not be continuously in debt to the Federal Reserve, but on any given day, about one-third to one-half of the member banks were likely to be borrowing. Large banks were expected to repay their loans within a few days while smaller banks could borrow for a couple of weeks at a time. Borrowed reserves often met a significant portion of the banks' total reserve requirement.

The discount rates were usually kept modestly above the rate on 90-day bankers' acceptances and modestly below the rate on four- to six-month commercial paper. Occasionally the Fed made attempts to discourage use of the discount facility for speculative purposes. Multiple rates for discounting different types of paper prevailed through 1921. Rates often differed among the regional Reserve Banks until World War II. Discount rate changes had to be approved by the Board, a requirement which sometimes precipitated disputes between the Board and the Reserve Banks. On average, the discount rate was changed about twice a year.

Federal Reserve thinking was influenced by the so-called real bills doctrine, particularly in Washington, where Board member Adolph Miller was its strongest advocate. This doctrine held that credit used to finance commercial activity should expand and contract in line with the needs of trade. Accordingly, because short-term commercial bills were issued to finance commercial transactions, it was believed they could not be issued in excessive amounts and could not be inflationary. In contrast, other loans might encourage speculation and thus could be excessive. This reasoning led some to conclude that the Federal Reserve should encourage financing conducted through commercial bills and discourage speculation.<sup>4</sup> Other hypotheses were being developed at the New York Federal Reserve and in academic circles. Inflation, according to these alternative views, arose from excessive credit expansion. Any provisions of Federal Reserve credit, regardless of the original reason for the extension, would stimulate economic activity and could potentially lead to inflation.<sup>5</sup>

From its founding, the Federal Reserve had promoted the creation and development of bankers' acceptances (BAs), a form of

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<sup>4</sup> *The Tenth Annual Report of the Federal Reserve Board, released in February 1924, sets out the Board's view of policy.*

<sup>5</sup> Benjamin Strong, "Federal Reserve Control of Credit," address delivered before students of the graduate college, Harvard University, Cambridge, Massachusetts, November 28, 1922, reprinted in *Federal Reserve Bank of New York Quarterly Review, Special 75th Anniversary Issue, May 1989, pp. 6-14.*

commercial bill (described in Chapter 4). BAs were believed to be a desirable means of promoting domestic and international trading of goods. Federal Reserve Banks had purchased BAs before 1917 in order to provide earning assets to meet expenses and to encourage the growth of the instrument. The volume of purchases had fallen off after the United States entered the war, when earnings from discount window loans covered expenses. Purchases of BAs were resumed in the 1920s, initially to build up earnings of the Reserve Banks and to help develop a secondary market for these instruments. To this end, Federal Reserve Banks also arranged repurchase agreements against BAs. In accord with the real bills doctrine, many officials initially did not believe that Federal Reserve purchases of BAs could be inflationary. Purchases of Treasury certificates of indebtedness evoked more concern. By removing Treasury securities from bank portfolios, they freed funds that could be used for speculative purposes.<sup>6</sup>

Early in the 1920s, most Federal Reserve officials still regarded open market purchases primarily as a source of revenue rather than as a tool for regulating reserves in order to control money and credit. Each regional Bank made its own purchases of both Treasury securities and BAs. It soon became apparent that these purchases had an impact on short-term market interest rates. Benjamin Strong, the influential Governor of the New York Reserve Bank, was one of the first officials to recognize the power of open market operations to affect reserve and credit conditions and, through them, economic activity and prices. He argued that under a system with fractional reserve requirements, increases in bank reserves, whether they came from an inflow of currency to the banks or from Federal Reserve provision, would support a multiple expansion of deposits and credit. He wanted to use open market operations to offset undesired changes in gold holdings and to stabilize economic activity.

Beginning in 1920, Governor Strong sought to achieve better coordination of open market operations. He preferred to have all operations on behalf of the System conducted by the New York Federal Reserve, but initially his goal was to coordinate open market operations among the regional banks. A series of committees were formed to explore ways to achieve coordination and prevent the Reserve Banks from bidding for securities against each other or the Treasury. Gradually the policy implications of the operations

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<sup>6</sup> *At the time, certificates of indebtedness were the primary short-term Treasury instrument. Treasury bills were not introduced until 1929.*

came to be considered. The efforts to study and coordinate Reserve Bank operations led to the creation of the Open Market Investment Committee (OMIC) in 1923, consisting of the Governors of the Federal Reserve Banks in New York, Boston, Philadelphia, Cleveland, and Chicago. None of the various open market committees during the 1920s had the exclusive power to approve the open market operations of all regional banks either in BAs or in government securities. But they did receive reports on purchases and on redemptions of maturing issues to guide the choices for System operations. A trading desk at the New York Fed carried out operations for the System as well as for the New York Bank.

During the 1920s, the U.S. Treasury Department believed it had some authority over Federal Reserve operations involving Treasury debt issues. Indeed, in 1922, the Treasury expressed distress at the amount of its securities that had been purchased and asked the Federal Reserve Banks to liquidate their holdings of its debt to avoid inflation. Governor Strong acquiesced to the request for portfolio liquidation because gold inflows to the United States were financing credit expansion. Other governors, concerned that sales of Treasury securities would reduce earnings, agreed only reluctantly. Because of the gold inflows, discount window use (another source of earnings) did not rise as the portfolio declined, and Federal Reserve earnings reached critically low levels. The Treasury then agreed that the Federal Reserve Banks could hold sufficient securities to cover expenses.

The view that open market operations could serve as a countercyclical tool to influence reserve and credit conditions became better understood and gained adherents as the 1920s progressed.<sup>7</sup> Nonetheless, there were ongoing disputes between those wanting a procyclical policy based on the demand for credit for commercial transactions (real bills) and those who wanted to make credit readily available when the economy was in a recession and make it stringent when the economy was growing rapidly. The OMIC, with Treasury approval, began to use open market operations as a countercyclical policy tool during the 1924 recession.

The OMIC gauged whether credit was tight or easy by watching short-term market interest rates and the amount of borrowing from

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<sup>7</sup> From 1926 to 1928, the Congress contemplated legislation that would direct the Federal Reserve to keep prices steady, legislation which the Federal Reserve spokesmen generally opposed. The testimony by various Federal Reserve officials and academic economists revealed the range of thinking at the time. For more information see Robert L. Hetzel, "The Rules versus Discretion Debate over Monetary Policy in the 1920s," *Federal Reserve Bank of Richmond Economic Review*, vol. 71, no. 6 (November-December, 1985), pp. 3-14.

the discount window. A number of analysts observed that open market purchases that did not offset gold outflows encouraged banks to repay discount window credits. Similarly, open market sales encouraged increased borrowing. Some people interpreted this pattern to mean that open market operations had no effect on reserve availability or on a bank's ability to lend. But others, including analysts at the New York Reserve Bank, argued that limitations on prolonged discount window borrowing might make those banks reducing borrowing feel more comfortable in extending additional loans. Thus, open market purchases would have an expansionary effect. Nonetheless, some analysts who conceded that open market operations and discount rate changes could moderate business cycles questioned the wisdom of countercyclical monetary policy because they feared it might impart an inflationary bias to policy.

During much of the 1920s and 1930s, outright purchases and sales of Treasury securities in the market were the only type of open market operation regularly undertaken at the Federal Reserve's initiative. The OMIC at its regular meetings generally authorized the New York Federal Reserve to undertake outright purchases or sales of Treasury debt instruments for the consolidated System Account in amounts up to a specified level.<sup>8</sup> This "leeway" for portfolio changes was available if needed to achieve the desired credit conditions. Decisions would be made by observing the behavior of borrowed reserves, especially borrowings by the money center banks, and money market conditions, exemplified by the behavior of short-term interest rates and the ease or difficulty encountered by securities dealers in obtaining financing. Operations were conducted with recognized dealers and were negotiated on a case-by-case basis.

Other types of open market operations were generally carried out at the initiative of the banks or dealers and were sometimes referred to as passive open market operations. The Federal Reserve Banks established rates at which they would buy BAs. Through most of the 1920s, the rates were set close to market rates and slightly below the discount rate. If the Federal Reserve Banks were routinely buying more or fewer BAs than the OMIC wanted, the offering rate would be adjusted. Repurchase agreements (RPs) against both Treasury securities and BAs were arranged on behalf

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<sup>8</sup> *The Committee members were kept informed of developments affecting the System Account through written reports prepared in the open market operations area of the New York Fed. These reports described reserve and money market conditions, trading desk operations, and weekly lending patterns of large banks, and they also provided background information on other securities markets. They were prepared at the end of each statement period and before each Committee meeting. The reports, with modifications, have continued to the present.*

of nonbank dealers at the dealers' initiative for periods of up to 15 days, with early withdrawals permitted. The Federal Reserve recognized that these passive operations affected bank reserves. But because of their temporary nature (the average maturity of BAs purchased was only about 15 days, and the BAs were redeemed at maturity), passive operations were generally not seen as having policy significance. Instead, they were believed to ease temporary credit stringencies faced by dealers when reserves were drained by Treasury cash management operations or some other noncontrolled factor. The Federal Reserve did, on occasion, deliberately absorb reserves through what today would be called matched sale-purchase transactions. When reserves were abundant because Treasury cash positions were abnormally low before tax dates, the Fed sometimes made temporary sales of short-term Treasury certificates of indebtedness bought directly from the Treasury.<sup>9</sup>

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### *Major Contraction: 1929 to 1933*

The absence of consensus concerning either the role or the power of the Federal Reserve to respond to cyclical forces proved to be a severe handicap during the 1929-33 contraction phase of the Great Depression. Economic activity had already begun to weaken at the time of the stock market crash in October 1929, but the Federal Reserve had felt helpless to provide stimulus without also feeding the speculative boom in stock prices. Governor George Harrison, who had assumed leadership of the New York Fed after Governor Strong's death in October 1928, had argued in 1928 for a sharp but short-lived increase in the discount rate, tempered by open market purchases. The Board turned down his requests until August 1929, by which time Governor Harrison felt that it was probably too late. Initially, the Fed tried, with limited success, to use moral suasion to discourage banks from borrowing funds from the discount window to invest in financial instruments. Once it did raise the discount rate, it made only limited use of open market operations to soften the pressure of high rates.

On the day the stock market crashed, the New York Fed bought about \$125 million of Treasury securities, five times the maximum weekly purchase amount permitted by the OMIC authorization. The purchases almost doubled total holdings of government securities by all Federal Reserve Banks, which stood at \$260 million on

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<sup>9</sup> *Once the Banking Act of 1935 proscribed such direct Federal Reserve loans to the Treasury, the Federal Reserve regarded temporary sales as having been ruled out as well. Burgess, op. cit., p. 117.*

October 30, 1929.<sup>10</sup> The New York Fed also indicated that its discount facility would be available to help the New York City banks that were providing assistance to other banks facing cash needs.

However, the OMIC did not approve further purchases of securities until its next meeting, worrying that such an action would be inflationary. It then approved only enough leeway to provide for the normal seasonal increase in currency.

In 1930, the OMIC was replaced by the Open Market Policy Conference (OMPC), composed of all 12 Federal Reserve Bank governors and the members of the Federal Reserve Board. Power to call and lead the meetings was transferred from the New York Fed governor to the governor of the Board. The reorganization, which had been in the works since 1928, had the effect of shifting power from the New York Fed to the Board. An executive committee, consisting of a subset of the OMPC members, met more frequently than the whole Conference and worked closely with the trading desk at the New York Fed on the specifics of operations. The use of an executive committee was continued until 1955, when improved transportation made frequent meetings of the full open market committee relatively easy to arrange.

During 1930, the OMPC resisted using a countercyclical approach to policy to offset the weakness of economic activity. Although Governor Harrison several times asked the OMPC for authorization to buy more Treasury securities to promote business recovery, he was permitted to purchase only small amounts of securities. The predominant sentiment was that with the economy weakening, the needs of trade were declining. Thus, the contraction in money and credit was appropriate. At least one governor viewed the economic weakness as the inevitable consequence of the earlier "economic debauch" of the speculative boom.<sup>11</sup>

The Federal Reserve did lower discount rates in several steps until 1931 but at a pace that lagged behind the effects of the contraction in money, credit, and prices. Board member Adolph Miller argued that further cuts in interest rates were desirable to counter the depressed business conditions. To support his view that the discount rate cuts to date might not have been sufficient, Miller con-

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<sup>10</sup> The New York Federal Reserve did not violate the leeway provision because it booked only \$25 million of the securities purchased to the System special investment account. It booked the rest of the securities to the Bank's own account, a practice that was permitted until 1935. During the week ended October 30, discount window borrowing rose by \$195 million to \$991 million.

<sup>11</sup> Statement by Governor Norris, minutes of the OMPC meeting of September 1930.

tended at the September 1930 meeting that in times of depression, a money rate is "a particularly imperfect indicator of the true state of credit." Nonetheless, the OMPC remained cautious, hoping that economic conditions would improve.

The OMPC was disturbed by the banking crises that took place from October to December of 1930 and in March 1931. During these periods, bank failures and runs on banks caused the demand for currency to rise dramatically. The Federal Reserve provided the currency demanded but did not fully offset the reduction in member bank reserves that the banks suffered as the currency was paid out. Available records do not indicate that the OMPC members discussed the severe contractions of member bank reserves, money, and credit resulting from the currency drains. The OMPC made no adjustments to its routine instructions for open market operations, which generally authorized net purchases (and in some instances sales) of up to \$100 million of Treasury securities between meetings if needed to stabilize money market rates. Much of the Conference's discussion following the first banking crisis was about supervisory issues, particularly as they applied to the Bank of the United States, by far the largest failure.<sup>12</sup>

In contrast, the Federal Reserve raised rates promptly in October 1931 to stem gold outflows that occurred after Great Britain went off the gold standard.<sup>13</sup> The New York Fed raised its basic discount rate from 1 1/2 to 3 1/2 percent. The action severely strained an already weakened financial system. The higher rates did stem the gold outflow, but they also led to a renewed increase in the rate of bank failures and another depositor rush to currency. Although banks used the discount window because they needed the reserves, they were uncomfortable doing so, and some banks feared that using the window would be viewed as a sign of weakness.

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<sup>12</sup> Most OMPC members were bankers who subscribed to the real bills view. They apparently did not understand the contractionary mechanism at work during the banking crises, even though the linkages had been understood at the New York Fed for some time. Governor Strong had testified before a congressional committee in 1926 on the power of open market operations (Hetzl, *op. cit.*). Strong had described the expansion side of the mechanism in detail, explaining how an increase in reserves leads over time to a multiple increase in deposits. He noted that a drain of currency would reduce the expansionary potential of an increase in reserves. This was the same mechanism through which the stepped-up currency withdrawals were depriving the bank of needed reserves and causing a serious contraction of deposits during the banking crises.

<sup>13</sup> The literature analyzing this period debates whether the requirement for gold collateral against currency forced the Federal Reserve's hand. Most writers have argued that it was not really a binding constraint. See David C. Wheelock, "The Fed's Failure to Act as Lender of Last Resort during the Great Depression, 1929-1933," Proceedings of a Conference on Bank Structure and Competition, Federal Reserve Bank of Chicago, May 1989.

In April 1932, the OMPC picked up another proponent of a more active countercyclical policy, the new Treasury Secretary, Ogden Mills. He found the Federal Reserve's failure to act "almost inconceivable and almost unforgivable. . . . the resources of the System should be put to work on a scale commensurate with the existing emergency."<sup>14</sup> In the face of strong pressure from Congress and the Administration, the OMPC did authorize \$500 million of purchases of Treasury securities. (The leeway had been increased gradually from \$120 million to \$250 million between August 1931 and February 1932.) The reserve impact of the initial purchases was partially offset by gold outflows, but after a couple of months, gold flowed back. Bank failures subsided, and people began to return currency to the banks. The banks used some of the additional reserves to reduce their use of the discount window and to build up their holdings of excess reserves. But money and credit also grew, and the economy showed some meager signs of recovery.

The OMPC members, however, believed that excess reserves were rising because banks were not finding attractive lending opportunities. More likely, banks simply wanted more excess reserves in the wake of the banking crises. Burgess notes that during the depression, banks became increasingly strict in their lending practices and were not taking care of their regular customers.<sup>15</sup> But in the face of the excess reserves, the Fed gave up on adding reserves and did not make any more substantial open market purchases after August 1932. Indeed, in November the OMPC contemplated selling securities to eliminate the excess reserves, but the Administration discouraged that policy course. Early in 1933, the Fed again rejected suggestions to do something stimulative, even though a third severe banking crisis began in January and lasted into March.

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### ***Active Policymaking by the Administration: 1933 to 1939***

When the Roosevelt Administration was installed in March 1933, it very quickly instituted a universal bank holiday in the hope of resolving the crisis atmosphere and ending the series of runs and bank failures. Banking legislation in 1933 gave legal status to the bank holiday and authorized orderly reopenings. It allowed for issuance of Federal Reserve notes against government collateral and emergency issuance against other collateral. The Board was given power to alter

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<sup>14</sup> *Minutes of the joint meeting of the Federal Reserve Board and the OMPC, April 1932.*

<sup>15</sup> *Op. cit.*, p. 65.

member bank reserve requirements within a fairly wide range that included the existing ratios as lower bounds, and the OMPC, as then constituted, was formally recognized. Finally, the legislation introduced federal deposit insurance and created the Federal Deposit Insurance Corporation (FDIC). Temporary insurance began in January 1934 while a more permanent plan was worked out.

The Banking Act of 1935 went further. It restructured the Federal Reserve System, introducing the basic structure that exists today. The Board became the Board of Governors of the Federal Reserve System, with seven Governors, one of whom was designated Chairman. The Treasury Secretary and the Comptroller of the Currency no longer sat on the Board. The act formally charged the Board with responsibility for exercising such powers as it possessed to promote conditions consistent with business stability. The Reserve Bank governors were redesignated as presidents, and membership of the renamed Federal Open Market Committee (FOMC) was limited to five presidents at any one time. The act also took away the power of individual Reserve Banks to buy or sell government debt without permission of the FOMC, thereby formally ending one of the major controversies of the 1920s. Finally, it made permanent the provision of deposit insurance.

The Roosevelt Administration generally supported activist government economic policies, and it took the lead in ending the pattern of money contraction. In 1934, Marriner Eccles was appointed Governor of the Board (and later Chairman as the restructuring took effect). He was a strong believer in an active Federal Reserve policy to combat deflation and unemployment. Nevertheless, the Federal Reserve actually made little use of either open market operations or rediscounting, its traditional policy tools, between 1934 and 1939.

Instead, gold returned to center stage as the primary source of money expansion. The Administration took the country off the gold standard in April 1933. It allowed the price of gold to rise in the market until it established a new parity of \$35 a troy ounce in January 1934, up from \$20.67. The price was high enough to attract a large gold inflow from abroad, which the Treasury monetized by issuing gold certificates to the Federal Reserve. The Federal Reserve did not offset the resulting rise in reserve balances. Furthermore, because deposit insurance was increasing public confidence in the banks and ending the runs, currency flowed back to the banks and increased their reserves. Hence, even though the Federal Reserve took no action, reserves and money grew rapidly between 1934 and 1937, and economic activity expanded.

The gold and currency flows did stimulate money growth, but reserves grew even faster and the banks built up unprecedented holdings of excess reserves. At the time, Fed officials were puzzled by the buildup, and many of them interpreted it as a sign that there was no loan demand from creditworthy customers. They worried that the excess reserves could set off inflation at some point in the future and consequently sought a way to eliminate them. Open market sales of securities were contemplated, but the excesses were so large that such sales would have reduced Federal Reserve earnings to the point where covering expenses might have been difficult. Discount window borrowing already was negligible, so there was no scope for further reductions.

Instead, the Federal Reserve turned to its new tool, reserve requirement ratios, and raised the ratios dramatically in several steps in late 1936 and early 1937. To the frustration of Fed officials, the banks built up their excess reserves again and, in the process, contracted the money stock. At the same time, the Treasury stopped issuing gold certificates to the Federal Reserve against the gold inflows, thus halting the reserve injections from that source. Economic activity contracted until 1938 when the Fed reduced reserve requirements modestly and the Treasury resumed monetizing gold inflows.

The Federal Reserve made almost no use of open market operations to change the size of its portfolio, not even to offset seasonal movements in currency and the Treasury balance. Variations in excess reserves were permitted to absorb the seasonal swings in those factors. The Fed merely replaced maturing issues and, to achieve "orderly markets," made swaps that changed the composition of its holdings. Furthermore, even though the Fed cut the discount rate to 1 1/2 percent and then to 1 percent, the facility fell into disuse after the banking crisis of 1933. Throughout the late 1930s, the discount rate almost always exceeded market rates on short-term instruments. The combination of high excess reserves and a slight penalty rate took away the incentive to use the window. Outstanding discount window credit rarely exceeded \$10 million in the latter half of the 1930s.

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### *Accommodating War Finance in the 1940s*

Before the United States entered the Second World War, the Federal Reserve made only very limited use of open market operations—most notably, some purchases of Treasury securities after war was declared in Europe in 1939. Gold inflows continued to play

the major role in supporting reserve expansion through 1941. As deficit financing of the war expanded, the Federal Reserve became a more active purchaser of Treasury debt. The Treasury wanted to keep its borrowing costs low and encouraged the Fed to hold down interest rates. In April 1942, the Fed formally pegged the rate at which it would buy 90-day Treasury bills at  $\frac{3}{8}$  of one percent, a level held until 1947. It pegged rates for making purchases (or sales) on longer term Treasury debt as well, although less formally. Sales of Treasury bills and certificates of indebtedness to the Federal Reserve were often substantial. Because the discount rate was always at least  $\frac{1}{2}$  percent, banks that held Treasury bills found it advantageous to sell them to the Federal Reserve when they needed funding rather than to use the discount window. Hence discount window borrowing was not important during the war.

With confidence in the banks rising and prosperous economic times making banks more willing to expand loans and investments, excess reserves fell. The drop in excess reserves was assisted in November 1941 by an increase in reserve requirements. Measured inflation picked up initially, but once the United States entered the war late in 1941, it was very modest. Some inflation was disguised by price controls, but the public also chose to hold more money balances and save more in a wartime economy with few consumer goods available.

After the war, the nation's resolve to avoid another depression was embodied in the Employment Act of 1946. The Federal government, including the Federal Reserve System, actively sought to achieve reasonably full employment of resources. The economy quickly shifted resources to civilian production. In attempting to restrain money and credit growth, the Federal Reserve was handicapped by its commitment to stabilize interest rates on government securities.

By the late 1940s, inflationary pressures emerged as people spent some of their accumulated wealth and reduced their money balances from the unusually high wartime levels. The government ran large budget surpluses, but the debt outstanding was still substantial. Accordingly, the Treasury resisted Federal Reserve requests to raise interest rates to contain the inflationary pressures. In 1947, the Treasury finally did agree to an upward adjustment of the rates on the shorter maturities, creating a considerably flatter yield curve. Federal Reserve purchases of securities were rather variable. Despite the inflation, the  $2\frac{1}{2}$  percent rate on long-term bonds was above the market clearing rate, and the Federal Reserve actually sold bonds. Money fell, and there was a mild recession in 1949.

Unlike most of its trading partners, the United States continued to maintain a fixed price for gold, \$35 an ounce, during and after the war (although during the war gold exports were restricted). Following the war, the United States ran large trade surpluses as other countries began to rebuild. Gold flowed into the country and thus did not constrain domestic policy. During the late 1940s, a series of international negotiations resulted in the establishment of a modified gold exchange standard. In addition, a new organization, the International Monetary Fund, was created to help countries reestablish pegged exchange rates and to ease the transition to new exchange rates when currency imbalances created unacceptably large reserve flows at the existing rates. The founders of the new system believed that it would be flexible enough to prevent a recurrence of the international stresses of the 1930s. (In practice, adjustments proved more difficult than had been anticipated and were not often made.) The procedures took on the name of the resort in New Hampshire where negotiators met, and came to be known as the Bretton Woods System.

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### ***Resumption of an Active Monetary Policy in the 1950s and 1960s<sup>16</sup>***

In 1950, inflation related to the Korean War convinced the FOMC that the rates being pegged on Treasury securities were too low. The trading desk attempted to discourage securities dealers from offering it Treasury issues. The desk often delayed processing offers for several hours to induce dealers to find another purchaser. In the end, however, if the dealers could not obtain reasonable bids from other sources, the Fed generally bought the securities at the pegged rates.

The Treasury was reluctant to give up the ability to finance the debt cheaply, and the Federal Reserve negotiated with the Treasury for an extended period to gain the right to make its own monetary policy decisions. By March 1951, an "Accord" was reached that allowed the Federal Reserve to resume an active and independent monetary policy. William McChesney Martin, who was soon to become Chairman of the Board of Governors of the Federal Reserve, handled the final stages of the negotiation for the Treasury.<sup>17</sup>

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<sup>16</sup> This section and those that follow draw heavily from Ann-Marie Meulendyke, "A Review of Federal Reserve Policy Targets and Operating Guides in Recent Decades," *Federal Reserve Bank of New York Quarterly Review*, vol. 13, no. 3 (Autumn 1988), pp. 6-17.

<sup>17</sup> Allan Sproul, who participated in the negotiations as President of the Federal Reserve Bank of New York, offered an interesting commentary on the process in "The 'Accord'—A Landmark in the First Fifty Years of the Federal Reserve System," *Federal Reserve Bank of New York Monthly Review*, November 1964, reprinted in Lawrence S. Ritter, ed., *Selected Papers of Allan Sproul*, Federal Reserve Bank of New York, December 1980.

After the Accord, the FOMC created a subcommittee, headed by Chairman Martin, to investigate how best to carry out an active monetary policy and to encourage the return of an efficiently functioning government securities market.<sup>18</sup> The FOMC adopted most of the key recommendations of the subcommittee. It gradually withdrew its support of interest rates.<sup>19</sup> Between 1953 and 1960, it emphasized that it was no longer pegging interest rates by pursuing what came to be known as a “bills only” policy. Open market operations were confined to the short maturity Treasury bill sector, leaving the longer maturity coupon securities to trade without Federal Reserve interference. On only two occasions—when the coupon market was widely perceived to be “disorderly”—were coupon securities purchased. To create a climate in which the dealers could make markets on an equal footing, the trading desk developed the competitive “go around” technique, still in use today, in which all of the dealers are contacted simultaneously and given the opportunity to make bids or offers. The desk also increased the number of dealers with which it would trade and specified criteria that dealers had to meet to qualify for a trading relationship.<sup>20</sup>

During the 1950s, the Federal Reserve developed open market operations into the primary tool for carrying out monetary policy, with discount rate and reserve requirement changes used as occasional supplements. Margin requirements on stock purchases were adjusted occasionally to encourage or discourage credit use. In establishing open market policy, the FOMC took into account that the level of the discount rate would influence interest rates and the banks’ perception

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18 “Federal Open Market Committee Report of Ad Hoc Subcommittee on the Government Securities Market,” 1952, reprinted in *House Committee on Banking and Currency, The Federal Reserve System after Fifty Years: Hearings before the Subcommittee on Domestic Finance, 88th Cong., 2nd sess. (Washington, D.C.: GPO, 1964), vol. 3, pp. 2005-55.*

19 Although it ended its routine support of interest rates in 1952, the Federal Reserve followed a so-called even keel policy during Treasury financing periods until the early 1970s. In the 1950s and 1960s, most Treasury coupon securities were sold as fixed-price offerings. Around the financing periods, the Fed avoided changes in policy stance and tried to prevent changes in money market conditions. Major financing operations occurred four times a year, around the middle of each quarter, but extra unscheduled financing operations occurred when the Treasury found itself short of money. In the 1970s, debt issuance was put on a regular cycle on the recommendation of Treasury Secretary William Simon, and coupon issues were generally sold at auction.

20 During the subcommittee hearings, several dealers had objected to the technique used by the Trading desk to arrange an open market operation at its own initiative. The desk, on a rotating basis, had chosen 1 of a group of 10 recognized dealers as a broker or agent to handle its orders in the market. The dealers that were not part of that group complained that they were unfairly excluded from dealings with the Federal Reserve. The dealers that were part of the group were dissatisfied because they could not transact business with the Fed for their own portfolios at times when they served as agent.

of reserve availability. It did not (and does not), however, have the authority to change the discount rate, and it considered the rate to be given within the context of short-term policymaking. The Board of Governors approved periodic adjustments to the discount rate when the rate got out of line with market rates. On other occasions, changes were made in conjunction with adjustments in other tools when the Board wished to emphasize a shift in policy stance. The window was administered to reinforce the banks' reluctance to borrow from the Federal Reserve. The Board changed reserve requirements occasionally to signal a policy shift. The changes were far smaller in magnitude than those of the 1930s, and the impact on reserves was generally cushioned with open market operations that partially offset the reserve impact.

While FOMC members believed that interest rates played an important role in the economy, they felt it would be unwise to establish interest rate targets. The use of such targets, they reasoned, would increase the difficulty of making a break with the strict rate pegging of the 1940s. In developing policy guidelines at its meetings, the FOMC considered a number of indicators. It gave special emphasis to the behavior of bank credit (commercial bank loans and investments) as an intermediate policy guide. It sought to speed up bank credit growth in periods when economic activity showed weakness and slow it down in periods of rapid growth. It did not have direct control over bank credit, however, or even timely information on recent performance, so bank credit was not suitable for day-to-day operating guidance.

At the conclusion of each meeting the FOMC created a written directive for the trading desk at the New York Fed. It was deliberately nonspecific, avoiding even a hint of targeting interest rates. The Manager of the System Open Market Account surmised from listening to the discussion at the FOMC meeting what policy steps the Committee wanted.<sup>21</sup>

The desk's day-to-day operations focused on free reserves and money market conditions. Free reserves are defined as excess reserves less reserves borrowed from the discount window.<sup>22</sup> Free reserves were targeted in order to provide some anchor to the policy guidelines. A relatively high level of free reserves was regarded as

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<sup>21</sup> *At that time, the Trading desk was not authorized to modify its policy stance between meetings without receiving additional instructions from the Committee. The executive committee of the FOMC met frequently—generally every two weeks through the middle of 1955. Subsequently, the full Committee met every three weeks. The Committee sometimes had telephone meetings between regular meetings.*

<sup>22</sup> *Free reserves are referred to as net borrowed reserves when borrowed reserves are greater than excess reserves. (Descriptions of the various measures of reserves appear in Chapter 6, Box A.)*

representing an easy policy: the excess reserves available to the banks were expected to facilitate more loans and investments. Net borrowed reserves left the banks without unpledged funds with which to expand lending and were consequently viewed as fostering a restrictive policy environment. High rather than rising free reserve levels were thought to foster expanding bank credit since banks would perpetually have more excess reserves than they wanted and would keep increasing their lending. High net borrowed reserve levels would, in a parallel manner, encourage persistent loan contraction.<sup>23</sup>

Research staff members developed and refined techniques during the 1950s and 1960s for estimating each day what free reserves would be for the reserve maintenance period by forecasting both nonborrowed and required reserves.<sup>24</sup> The reserve factor estimates, which affected nonborrowed reserves, were subject to sizable errors, even though considerable resources were devoted to obtaining timely information about past and likely future behavior of the more volatile factors. The reserve estimates and market conditions were reviewed at a daily 11:00 a.m. conference call held with senior Board staff officials and a president who was a voting FOMC member.<sup>25</sup>

The desk generally bought or sold Treasury bills when forecasts suggested that free reserves were significantly below or above the objective, especially if the free reserve estimates were confirmed by money market conditions. RP operations were resumed in 1951. By this stage, RPs in both government securities and BAs were generally being undertaken at Federal Reserve initiative “to provide temporary, but immediate, reserve assistance to the central money market at times of unusual strain on that market.”<sup>26</sup> Until the 1970s, RPs were only done with nonbank dealers at preannounced rates

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23 See (Peter D. Sternlight), “The Significance and Limitations of Free Reserves,” *Federal Reserve Bank of New York Monthly Review*, November 1958, pp. 162-67; and “Free Reserves and Bank Reserve Management,” *Federal Reserve Bank of Kansas City Monthly Review*, November 1961, pp. 10-16. A critique of free reserves and a survey of the literature is provided by A. James Meigs in *Free Reserves and the Money Supply* (Chicago: University of Chicago Press, 1962).

24 Until 1968, maintenance periods were one week long for reserve city banks (member banks with offices located in cities with Federal Reserve banks or branches) and two weeks long for country banks (all other member banks). Computation and maintenance periods were essentially contemporaneous. In 1968, the Board of Governors adopted a system of lagged reserve accounting, under which reserve requirements were based on average deposit levels from two weeks earlier, with all member banks settling weekly. The change made it easier to hit free reserve targets—ironically, shortly before free reserve targeting ended.

25 The daily conference call was introduced in 1954. Currently, it begins around 11:15 a.m.

26 *Open Market Operations and Changes in Operating Procedures During 1954*, “Annual Report of the Open Market Function, p. 18. The report went on to say that the introduction of outright operations for same day “cash” settlement reduced the need for RPs.

—usually at or slightly below the discount rate—although beginning in 1968, the RP rate was occasionally set slightly above the discount rate. The practice of arranging RPs only with nonbank dealers was a holdover from the earlier view that RPs served primarily to finance dealer positions in securities. On occasion during the 1950s and 1960s, an RP would still be arranged at the request of dealers facing difficulties in financing their positions in the markets. After the introduction of matched sale-purchase transactions (MSPs) in 1966, the desk was also able to drain reserves temporarily.

Because the FOMC was also interested in money market conditions, the desk continued to watch the “tone and feel of the markets” each day in deciding whether to respond to the signals given by the free reserve estimates. The tone of the markets might suggest whether the reserve estimates were accurate. If the banks were short of reserves, they would sell Treasury bills, a secondary reserve, and put upward pressure on bill rates. The banks would also cut back on loans to dealers, thus making dealer financing more difficult. Reading the tone of the markets was considered something of an art. Desk officials monitored Treasury bill rates, dealer financing costs, and comments from securities dealers concerning difficulties in financing their inventories of securities.

The rate on Federal funds played only a limited role as an indicator of reserve availability during these years although it gained attention during the 1960s.<sup>27</sup> The interbank market was not very broad as the 1960s began, but activity was expanding. Until the mid-1960s, the Federal funds rate never traded above the discount rate. During “tight money periods,” when the desk was fostering significant net borrowed reserve positions, funds generally traded at the discount rate, and the funds rate was not considered a useful indicator of money market conditions. When free reserves were high, funds often traded below the discount rate and showed noticeable day-to-day variation. At such times, the funds rate received greater attention as an indicator of reserve availability.

There was considerable surprise when the funds rate first rose above the discount rate, briefly in October 1964 and more persistently in 1965. As large banks became more active managers of

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<sup>27</sup> *There had been interbank exchanges of Federal Reserve funds (or Federal funds, as they came to be called) as early as the 1920s; at that time, trades were mostly negotiated directly between two banks rather than through brokers. Burgess, op. cit., p. 152. For further discussion of the expansion of the market in the 1960s, see Mark H. Willes, “Federal Funds during Tight Money,” Federal Reserve Bank of Philadelphia Business Review, November 1967, pp. 3-11, and “Federal Funds and Country Bank Reserve Management,” Federal Reserve Bank of Philadelphia Business Review, September 1968, pp. 3-8.*

the liability side of their balance sheets, they borrowed funds in the market in a sustained way. Banks had introduced large negotiable certificates of deposit (CDs) in 1961. But CD borrowings were subject to reserve requirements and (until 1970) to interest rate ceilings under Regulation Q. Borrowings from other banks through the Federal funds market were free of reserve requirements and interest rate ceilings. Furthermore, they were not subject to the restrictions on prolonged use that were applied to the Federal Reserve's discount window. The changes in liability management techniques meant that individual banks could expand credit even when they did not have free reserves if they were willing to bid aggressively for wholesale funding from other banks. Their actions were making free reserves a less reliable predictor of bank credit growth.

In 1961, several developments led the FOMC to abandon its "bills only" restrictions. The new Kennedy Administration was concerned about gold outflows and balance of payments deficits and, at the same time, wanted to encourage a rapid recovery from the recent recession. Higher rates seemed desirable to limit the gold outflows and help the balance of payments, while lower rates were wanted to speed up economic growth. To deal with these problems simultaneously, the Treasury and the FOMC attempted to encourage lower long-term rates without pushing down short-term rates. The policy was referred to in internal Federal Reserve documents as "operation nudge" and elsewhere as "operation twist." The Treasury engaged in maturity exchanges with trust accounts and concentrated its cash offerings in shorter maturities. The Federal Reserve attempted to flatten the yield curve by purchasing Treasury notes and bonds while simultaneously selling Treasury bills. The extent to which these actions changed the yield curve or modified investment decisions is a source of dispute. The Federal Reserve continued the procedure for another year and then allowed it to lapse after short-term rates rose in 1963.

Through the middle of the 1960s, policymakers generally viewed the basic policy process with some satisfaction. Reasonable price stability had been reestablished, and recessions had been mild, short-lived interruptions in a period of prolonged prosperity. In the latter half of the 1960s, however, rising inflation began to accompany the prosperity. Primary blame was placed on the budget deficits generated to finance U.S. involvement in the Vietnam War and "Great Society" social programs. But some people at the Federal Reserve and in the academic community expressed the view that expansionary monetary policy was also contributing to inflation.

Economists, both within and outside the Federal Reserve, questioned the assumptions underlying the existing monetary policy procedures, including the connections of free reserves and bank credit to the ultimate policy goals of economic expansion and price stability. Quantitative methods were increasingly applied to test the hypothesized relationships among operational, intermediate, and ultimate policy objectives. Some studies suggested that more attention should be paid to money growth and to the behavior of total reserves or the monetary base.<sup>28</sup> In response, the FOMC expanded the list of intermediate guides to policy. The directives continued to focus on bank credit but added money growth, business conditions, and the reserve base. Free reserves continued to be the primary gauge for operations, although the Federal funds rate gained more prominence as an indicator of money market conditions.

Although the FOMC met every three to four weeks, it was concerned that developments between meetings might alter appropriate reserve provision. Consequently, in 1966 it introduced a “proviso clause” that set conditions under which the desk might modify the approach adopted at the preceding meeting. Bank credit data still were available only with a lag. After some experimentation, the FOMC adopted what it called the bank credit proxy, consisting of daily average member bank deposits subject to reserve requirements. If the bank credit proxy moved outside the growth rate range discussed at the FOMC meeting, the desk would generally adjust the target level of free or net borrowed reserves modestly.<sup>29</sup> Sometimes the proviso clause permitted either increases or decreases in the objective for free reserves. Frequently it allowed adjustments only in one direction.

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### **Targeting Money Growth and the Federal Funds Rate: 1970 to 1979**

The inflationary pressures that began in the late 1960s led to a number of policy initiatives in the early part of the 1970s. Inflation in the United States encouraged outflows of official gold holdings and made the Bretton Woods system of pegged exchange rates pro-

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<sup>28</sup> Chapter 8 discusses the various hypotheses being developed to explain how monetary policy works.

<sup>29</sup> Logically, the bank credit proxy, which represented most of the liability side of the banks' balance sheets, should have moved in a similar fashion to bank credit, which was a large share of the asset side of their balance sheets. But they often differed, primarily because of the growing use of nondeposit liabilities to finance credit extension. In 1969, the bank credit proxy was expanded to include liabilities to foreign branches, the largest nondeposit liability. Nonetheless, the proxy continued to deviate from bank credit when reserve ratio changes made bank assets and liabilities diverge.

gressively less viable. In 1970, the Federal Reserve formally adopted monetary targets with the intention of using them to reduce inflation gradually over time. In August 1971, the Nixon Administration froze prices and wages and suspended gold payments.<sup>30</sup> The Administration's actions on gold effectively brought the Bretton Woods exchange rate system and the last remnant of the gold standard to an end. Over the next two years, the industrialized countries moved toward floating exchange rates. The official price of gold was raised in two steps to \$42.22 a troy ounce by 1973, but because the Treasury did not make purchases or sales, the price ceased to have any role in constraining growth in money or inflation.

The techniques for setting and pursuing money targets developed gradually, with frequent experimentation and modification of procedures taking place in the first few years of the 1970s. Nonetheless, until October 1979 the framework generally included setting a monetary objective and encouraging the Federal funds rate to move gradually up or down if money was exceeding or falling short of the objective. The Federal funds rate, as an indicator of money market conditions, became the primary guide to day-to-day open market operations, and free reserves took on a secondary role. An increasingly active market for Federal funds made the funds rate a feasible target, and the passage of time reduced the association of interest rate targeting with the rate pegging episode of the 1940s.

Bank credit and its proxy remained for a while in the list of subsidiary intermediate targets, but they received decreasing attention. Free reserves served as an indicator of the volume of reserves needed to keep the Federal funds rate at the desired level. The desk used the forecasts of reserve factors to gauge the appropriate direction and magnitude for open market operations.

The FOMC selected growth targets for M1—and to a lesser extent for M2—that evolved into two-month growth rate ranges that used the month before the FOMC meeting as a base.<sup>31</sup> The FOMC directed the staff to develop estimates of monetary aggregate growth aimed at gradually reducing inflation. In 1972, it introduced six-month

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<sup>30</sup> During the next few years, the government imposed a variety of wage-price controls, which had the effect of creating shortages and distorting various price indices. It also created a Committee on Interest and Dividends that restricted interest rate increases and thus distorted financial market activities.

<sup>31</sup> At the time, M1 consisted of currency and privately held demand deposits at commercial banks. Other checkable deposits at commercial banks and transactions deposits at thrift institutions were added to the definition in 1980. M2 consisted of M1 plus time and savings deposits at commercial banks other than large CDs. Thrift institution deposits, overnight RPs, Eurodollars, and money market funds were not included until 1980.

growth targets designed to achieve that goal. Econometric models, supplemented by the judgments of the staff, were used to develop the six-month and one-year estimates. The estimates assumed that the demand for money depended on economic activity and interest rate behavior. The weekly and two-month estimates were derived judgmentally, allowing for a range of technical factors.

The FOMC instructed the desk to raise the Federal funds rate within a limited band if the monetary aggregates were significantly above the desired growth rates or to lower the funds rate within that band if the aggregates were below them. The procedure required the staff to estimate what funds rate would achieve desired money growth. The funds rate worked by affecting the interest rates banks both paid and charged customers and hence the demand for money. The Board staff built models of money demand, as did other Federal Reserve research departments.

In 1972, the FOMC addressed criticisms of its efforts to control money from the demand side. It introduced a supplemental reserve operating mechanism to influence money from the supply side. The development of a reserve guideline was based on the reserve-money multiplier model. The model implied that controlling total or required reserves would constrain money growth through the operation of the reserve requirement ratio. The FOMC was concerned, however, that a pure reserve provision strategy would cause undesired short-run volatility of interest rates.

The FOMC briefly tried reserve targeting in 1972. Because it feared that reserve targeting would raise the volatility of interest rates to unacceptable levels, it also constrained the funds rate. The reserve measure targeted was called reserves on private deposits, or RPD. It excluded reserve requirements on government and inter-bank deposits that were not in the money definitions.<sup>32</sup> The linkage between RPD and M1 was not very close because bank reserve requirement ratios differed widely according to size and membership status. Using staff estimates of the various ratios, the FOMC set two-month growth target ranges for RPD designed to be consistent with the desired growth in M1; it then instructed the desk to alter reserve provision in a way that was intended to achieve them. As it turned out, relatively narrow funds rate constraints often dominated, and the desk frequently missed the RPD target. RPD targets

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<sup>32</sup> *Government deposits at the time varied far more than they have in recent years. All tax and loan account monies kept in commercial banks were subject to reserve requirements until 1977, when a legal change introduced note option accounts that pay interest and are not subject to reserve requirements.*

were considered to be unachievable, although the funds rate constraint precluded a true test. In 1973, RPD changed from an operational target to an intermediate target, taking its place with M1 and M2. Since information on the behavior of M1 was about as good as information on RPD, RPD gradually fell into disuse. It was dropped as an indicator in 1976.

The monetary targets were modified further in 1975 in response to a congressional resolution. The Federal Reserve adopted annual target ranges and announced them publicly. A growth cone was drawn from the base period, which was the calendar quarter most recently concluded. Every three months, the target range was moved forward one quarter. The procedure meant that by the time a given annual target period was completed, the original target had long since been superseded. Frequently, the targets were overshot, and complaints about upward "base drift" were legion. The Full Employment and Balanced Growth Act of 1978, known as the Humphrey-Hawkins Act, established the current procedure requiring the Federal Reserve to set monetary targets for calendar years and to explain any deviations.

During most of the 1970s, the FOMC was reluctant to change the funds rate by large amounts at any one time, even when staff estimates suggested that sizable modification was necessary to achieve the two-month or annual monetary goals. Part of that reluctance reflected a wish to avoid short-term reversals of the rate. Keeping each rate adjustment small minimized the risk of overdoing the rate changes and then having to reverse course. These priorities meant that the FOMC was handicapped at times when it sensed a large rate move might be needed but was uncertain about its size. The adjustments in the funds rate often lagged behind market forces, allowing trends in money, the economy, and prices to get ahead of policy.

At the FOMC meetings, the Committee frequently voted for a funds rate range that surrounded the most recent rate target. The Committee also put relatively narrow limits on the range of potential adjustments that could be made between meetings if money growth went off course. In the early 1970s, the width of the intermeeting funds rate range was generally  $\frac{5}{8}$  to  $1\frac{1}{2}$  of a percentage point. By the latter part of the decade, the width narrowed to about  $\frac{1}{2}$  to  $\frac{3}{4}$  of a percentage point, and on a couple of occasions to only  $\frac{1}{4}$  of a percentage point. In addition, the specifications for the monetary aggregates were often set in a way that made it likely that the funds rate would be adjusted in one direction only, effectively cutting the range in half.

In implementing the funds rate targeting procedure, the desk became increasingly sensitive to preventing even minor short-term deviations of the funds rate from target. It generally added reserves by purchasing securities or arranging RPs in the market in a visible way when the funds rate exceeded the objective even slightly, and it absorbed reserves through sales or matched sale-purchase agreements when the funds rate fell short of the objective. It felt some constraint not to make reserve adjustments in an overt way when the funds rate was on target. At times when reserve estimates suggested that a large adjustment was needed but the funds rate did not confirm it early in a statement week, the desk would worry about delaying the reserve adjustment and having to make an unmanageably large open market transaction late in the week. When the funds rate failed to confirm an estimated reserve excess or shortage, the desk often made the reserve adjustments by arranging internal purchases or sales with foreign accounts that could not be observed by market participants. The introduction in 1974 of customer-related RPs—agreements on behalf of official foreign accounts—gave the desk a tool for adding reserves when the funds rate was on target but a reserve need was projected.<sup>33</sup> (Market participants routinely assumed that outright transactions in the market for customers did not signal dissatisfaction with the funds rate, and they initially regarded customer-related RPs the same way.)

If the estimated need to add or drain reserves was too large for these techniques, the desk often pounced on very small funds rate moves off target to justify an open market operation. For instance, when estimates suggested that additional reserves were needed, the desk would often enter the market to arrange an RP when the funds rate rose  $1/16$  of a percentage point above the preferred level. But if the funds rate fell despite the estimated need to add reserves, the desk typically would allow a  $1/8$  percentage point deviation to develop before it would arrange a small market operation to drain reserves. If the funds rate continued to trade off target after the desk's first entry of the day, the desk often arranged a second open market operation. There were operational limits to how late in the day transactions could be made to achieve a reserve effect on the same day. The cutoff was around noon for outright bill operations. It was supposed to be 1:30 p.m. for temporary transactions, but if the desired funds rate move occurred just after that time, the desk often responded if it was anxious to conduct an operation. The end of its operating time was close to 2:00 p.m. by 1979.

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<sup>33</sup> Chapters 6 and 7 describe the various policy tools and how they affect reserves.

The desk's prompt responses to even small wiggles in the Federal funds rate led banks to trade funds in a way that tended to keep the rate on target. Except near day's end on the weekly settlement day, a bank short of funds would not feel the need to pay significantly more than the perceived target rate for funds. Likewise, a bank with excess funds would not accept a lower rate. Rate moves during the week were so limited that they provided little or no information about reserve availability or market forces. Probably few, if any, in the Federal Reserve really believed that brief, small moves in the funds rate were harmful to the economy. The tightened control developed bit by bit without an active decision to impose it.

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### *Targeting Money and Nonborrowed Reserves from 1979 to 1982*

In October 1979, Paul Volcker, who had recently become Chairman of the Board of Governors, announced far-reaching changes in the FOMC's operating techniques for targeting the monetary aggregates. The acceleration of inflation to unacceptable rates over the preceding decade inspired a change in priorities. Chairman Volcker and other FOMC members realized that turning around these inflationary pressures, which had come to permeate economic relations, would involve costs. Interest rates would have to rise significantly beyond recent levels, although the extent of the increase could not be determined in advance. Increased rate volatility was also likely to accompany the efforts to halt inflation. The Federal Reserve's credibility with the public was low after previous efforts to slow inflation had been followed by further price acceleration. Chairman Volcker felt that only strong measures could rebuild public confidence.

Many analysts, both inside and outside the Fed, argued that using the funds rate as the operational target had encouraged repeated overshooting of the monetary objectives. They contended that whatever measure was targeted was likely to be changed too slowly. Partly in response to such arguments, the FOMC began to target reserve measures derived to be consistent with desired three-month growth rates of M1. Reserve controls were expected to keep money growth from persistently exceeding (or falling short of) the target growth rate, although they would not prevent short-term deviations. The limits on the Federal funds rate were applied only to weekly averages, rather than to brief periods during the week as had been common in the 1970s. A band 4 to 5 percentage points wide allowed room for adjustments to achieve the monetary target.

Operationally, the FOMC chose desired growth rates for M1 (and M2) covering a calendar quarter and instructed the staff to estimate

consistent levels of total reserves. The process resembled that used to estimate RPDs. The staff estimated deposit and currency mixes to derive average reserve ratios and currency-deposit ratios. The estimation technique employed a mix of judgment and analysis of historical patterns. It was complicated by the wide range of reserve ratios applied to Federal Reserve member bank deposits and by the absence of reserve ratios, or even timely deposit data, from nonmember banks. From the total reserve target, the desk derived the nonborrowed reserve target by subtracting the initial level of borrowed reserves that had been indicated by the FOMC.<sup>34</sup> If money exceeded (or fell short of) its path, total reserves would also exceed (or fall short of) their path. Because the required reserves were predetermined, the desk had limited means to change total reserves within the reserve period. If the desk only provided enough reserves to meet the nonborrowed reserve objective, banks would have to increase (decrease) their borrowing when money growth and total reserve demands were excessive (deficient).<sup>35</sup> Because banks were still discouraged from making frequent use of the discount window, the change in aggregate borrowing would affect the ease of obtaining reserves and interest rates. It would encourage the banks and the public to take actions that would accomplish the desired slowing or speeding up of money growth. If the pace of adjustment implied by the mechanism did not seem appropriate, instructions were occasionally given to accelerate or delay the adjustment to the borrowing objective. The FOMC could make alterations to the basic mechanism at a meeting or direct the desk to make adjustments between meetings under specified conditions.

To reduce overweighting of weekly movements in money, the total and nonborrowed reserve paths were computed for intermeeting average periods or, if the intermeeting period was longer than five weeks, for two subperiods. (In 1979 and 1980 the FOMC met 9 and 11 times, respectively; in 1981 it moved to the schedule of 8 meetings a year in use today.) A consequence of this averaging technique was that reserve target misses in the early part of the intermeeting period had to be offset by large swings in borrowing in the final week. Informal adjustments were sometimes made to smooth out these temporary spikes or drops in borrowing that were deemed inconsis-

<sup>34</sup> *The Board staff made estimates of consistent combinations of borrowed reserves and money growth for the given discount rate. The estimates were derived from modified versions of money demand models and borrowed reserve equations.*

<sup>35</sup> *The scope for adjusting excess reserves was very limited since banks at the time held only minimal levels of excess reserves. The relationships among reserve measures and the effects of these measures on bank behavior and monetary growth are discussed more extensively in Chapter 6.*

tent with the longer term pattern. Although the adjustments were considered necessary to avoid severe short-term swings in reserve availability and interest rates, they gave the appearance of “fiddling” and have caused considerable confusion for outside observers. Each week the total reserve path and actual levels were reestimated using new information on deposit-reserve and deposit-currency ratios.

In implementing the policy, the desk emphasized that it was targeting reserves and not the Federal funds rate by entering the market at about the same time each day—usually between 11:30 and 11:45 a.m.—to perform its temporary operations. It confined outright purchases or sales to estimated reserve needs or excesses extending several weeks into the future. It arranged outright operations early in the afternoon for delivery next day or two days forward. The Federal funds rate was not ignored; it was used as an indicator of the accuracy of reserve estimates, although it was not always very reliable. On the margin, it could accelerate or delay by a day or so an operation to accomplish a needed reserve adjustment, but its role was much diminished.

It had been anticipated that the new procedures would lead to considerably wider short-term swings in the Federal funds rate, although the actual changes exceeded most expectations and were accompanied by greater variation in money growth rates as well. In part, the sharp movements in both interest rates and money may have reflected the difficulties in reversing strongly held beliefs that inflation had become a permanent phenomenon. Expectations about inflation and economic activity were in the process of being reshaped, with many people uncertain whether a new lower inflation pattern would emerge or whether the inflation slowdown would be a temporary pause on the way to even higher rates. In this environment, people evaluated new information and judged whether the anti-inflation policies were likely to succeed. Some of the interest rate moves came in response to changes in expectations.

The control mechanism itself also appeared to play a role in the variation of money growth. It forced borrowing to rise whenever money was above the desired level. Consequently, following the procedure caused borrowing to rise until money was back on target. Since there were lags in the adjustment of money to borrowing pressures, money continued to weaken even after borrowing stopped rising. The result appeared to be a “damped cycling process.”

These years also saw major regulatory and legislative changes that affected the climate for Federal Reserve policy. In 1980, the Congress passed the Depository Institutions Deregulation and Monetary Control

Act (MCA), which simplified the structure of reserve requirements and extended the requirements to nonmember commercial banks and thrift institutions with transactions deposits.<sup>36</sup> The MCA provided for gradual elimination of interest rate ceilings on all but demand deposits. (It permitted interest-bearing consumer transactions deposits, called NOW accounts, to be extended to the states outside the Northeast.) In 1982, the Garn-St Germain Act modified the MCA reserve requirements and established money market deposit accounts (MMDAs), which were free of interest rate and maturity restrictions. That same year, the Federal Reserve Board announced plans to introduce contemporaneous reserve requirements on transactions deposits in 1984. (These requirements are described in Chapter 6, Box A.)

Several motives underlay these changes. Deposit interest rate restrictions and reserve requirements were particularly burdensome when inflation and market rates were high. Numerous state-chartered banks had dropped their Federal Reserve membership, and largely unregulated nonbank institutions were competing for consumer funds. Shifts in bank and customer behavior caused the meaning and behavior of money to change. The Federal Reserve attempted to deal with the behavioral and regulatory changes by redefining the monetary aggregates in 1980 to include instruments and depository institutions that were growing in importance. It also used "shift adjusted" aggregates in setting M1 targets in 1981 in an attempt to allow for effects on money demand from the introduction of nationwide NOW accounts. These adjustments, however, did not fully offset the money demand shifts.

As evidence mounted that the relatively close linkage between M1 and economic activity had broken down, the FOMC suspended its M1 target in late 1982. It had become apparent that the demand for M1 had strengthened relative to income, so that growth within the target range would have been more restrictive than seemed desirable. Some of the increase in the demand for money was attributed to the popularity of NOW accounts included in M1. In addition, the maturing of a large volume of special tax-favored "all savers" deposits that October was expected to add substantially to M1 holdings. The FOMC hoped that M2 would continue to be a reliable indicator, and for a few months at the end of 1982 it attempted to use it as a guide to building total and nonborrowed reserve targets. But MMDAs, first offered in December, proved very attractive, and the demand for M2 rose sharply.

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<sup>36</sup> As Chapter 1 indicated, the structure of reserve requirements and a schedule for the transition were specified in the act.

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***Monetary and Economic Objectives with Borrowed Reserve Targets:  
1983 to the Present***

In the absence of a stable relationship between money and economic activity, the FOMC modified its procedures for guiding reserve provision. The FOMC focused on measures of inflation and economic activity and placed less weight on the monetary aggregates. Instead of computing total and nonborrowed reserve levels linked to one of the monetary aggregates and deriving a level of borrowing that moved with the deviations of the aggregate from target, it targeted the borrowed reserve level directly. It intended to adjust it up or down whenever money seemed to be deviating from the desired growth path in a meaningful way. In deciding whether an adjustment was appropriate, the FOMC would allow for any known distortions to the aggregates and would consider supplemental indicators.

The monetary aggregates did not quickly resume their prior relationship with economic activity. Declining inflation made holding money more attractive. Because rates on some components of M1 were close to market rates but slow to change, interest rate sensitivity increased. Policy decisions continued to be guided by information on economic activity, inflation, foreign exchange developments, and financial market conditions. In time, money growth was moved from a predominant position in the directive to join the list of factors shaping adjustments to the borrowing level.

The temporary policy procedures introduced in 1983 have persisted, with modifications, through most of the 1980s. The FOMC has continued to set policy that is designed to be countercyclical, but at the same time anti-inflationary. It has used a discretionary approach that draws from some of the techniques developed in earlier decades. Particular tools of policy may have gained or lost prominence, but all the tools now in use were developed and refined over the years. The element of continuity in Federal Reserve policy makes this brief history a fitting prelude to the extensive discussion of current policy in Chapters 5 through 7. First, however, let us turn our attention to two other subjects that bear on monetary policy at the end of the decade—the structure of the U.S. banking system and the financial markets.

## *The Role of Depository Institutions*

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Depository institutions play a key role in the transmission of monetary policy to the financial markets, to borrowers and depositors, and ultimately to the real economy. They hold a large share of the nation's money stock in the form of various types of deposits and provide for the transfer of those funds to effect the payments that keep the economy functioning. Depository institutions also lend these funds directly to consumers and businesses for a wide variety of purposes and lend them indirectly by investing in securities.

The United States has a wide variety of depository institutions — commercial banks, savings banks, savings and loan associations, and credit unions. Originally only commercial banks accepted deposits upon which checks could be drawn, but during the late 1970s and early 1980s, checkable deposits developed at the other institutions as well. The Depository Institutions Deregulation and Monetary Control Act of 1980 (MCA) treated all depository institutions that accept checkable deposits similarly. Among depository institutions, commercial banks are still a major force in commercial deposit-taking and lending activities although their share of the business has dropped considerably.

The structure of the U.S. banking system, with many institutions in a range of sizes, reflects U.S. banking traditions. Until recently, depository institutions were permitted to have offices only in one state. During the last few years, however, a majority of the states have relaxed restrictions on interstate operations, prompting many depository institutions to expand operations outside of their home state. At the same time, institutions have merged, particularly thrift institutions in areas of the country where regional problems or overexpansion have created financial difficulties. In addition, multistate or regional bank holding companies that are nearly as large as the major money center banking organizations have been formed. Despite these changes, the United States continues to have many more depository institutions than other countries. At the end of 1988 there were about 33,600 depository institutions, of which 13,400 were commercial banks. Some of them are large multifaceted organizations that attract deposits from and make loans to a wide range of customers, while others specialize in corporate or retail activities.

For many years, commercial banks were unique in conducting all types of banking. Thrift institutions — savings banks and savings and loan associations — provided selected banking services for individuals, primarily savings accounts and mortgage

loans.<sup>1</sup> Over time, the powers of thrift institutions have been expanded to overlap those of commercial banks. Nonetheless, although thrifts have aggressively accepted checkable deposits from individuals, to date most of them have entered the business of commercial lending and deposit taking only in a very limited way.

Commercial banks still handle the bulk of the myriad commercial transactions that take place each day. They also hold most of the reserve balances at the Federal Reserve Banks and play a major role in intermediation. In addition, they are responsible for the lion's share of large dollar payments over Fedwire, the Federal Reserve's electronic transfer network.<sup>2</sup> Thus, as the Federal Reserve fashions and implements policy, it must stay closely attuned to commercial bank behavior. Those involved in the policy process must understand the dynamics of the financial system generally, the activities of the major institutions involved, and the manner in which these institutions respond to the day-to-day demands made on them by the other participants in the economy. Such an understanding of the role of banks prepares policymakers to assess the linkages between monetary policy and growth in money and credit. More specifically, a knowledge of the circumstances and behavior of individual institutions enables the open market desk to evaluate the reserve situation knowledgeably as it devises its operating strategy.

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### *The Business of Banking*

While the essence of banking—borrowing and lending money—remains essentially what it was in ancient times, the nature of the business in the United States has undergone dramatic change in recent years. Deregulation is sometimes cited as the principal catalyst of the changes. Deregulation may be more appropriately regarded, however, as an outgrowth of the competitive pressures that have increasingly impinged on the banking franchise. Broader access to the money and capital markets, information, and technology has irrevocably altered the competitive landscape.

Banks historically have had a comparative advantage in acquiring the information crucial to credit analysis and thus in making informed credit judgments. This advantage has diminished in

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<sup>1</sup> Credit unions provide services similar to those offered by thrift institutions; their clientele typically consists of members of affinity groups, such as people employed by a particular corporation or members of a union.

<sup>2</sup> "Large-Dollar Payment Flows from New York," *Federal Reserve Bank of New York Quarterly Review*, vol. 12, no. 4 (Winter 1987-88), pp. 6-13.

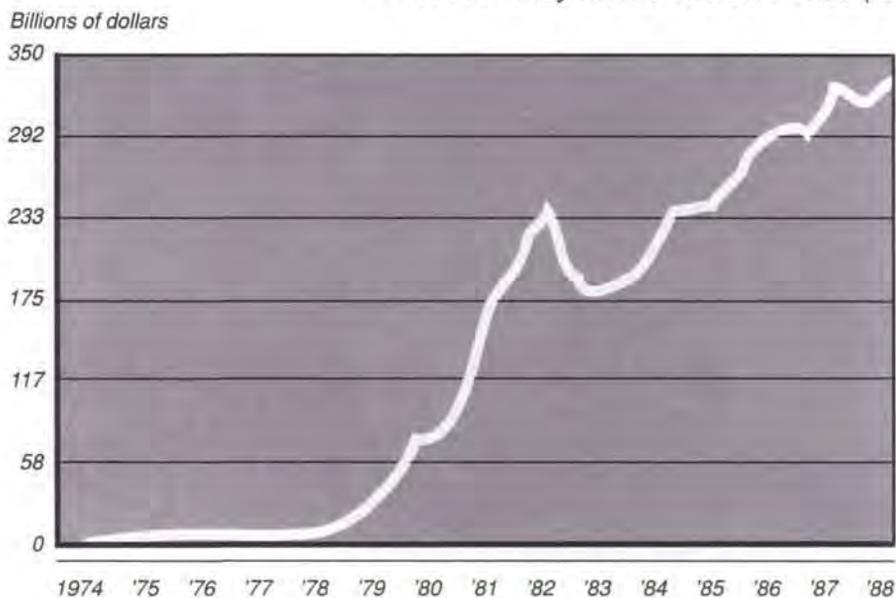
recent years with increasingly broad dissemination of information. Computer-aided analytical techniques for investors borrowing directly in the money and capital markets have become accessible to more and more businesses. Moreover, technological developments have greatly enhanced the cash management and funding sophistication of the banks' traditional client base. So the enduring relationships between banks and their customers that of necessity used to form the basis for profitable banking have yielded to price-sensitive competition and a more fickle clientele.

Growing numbers of large corporations have turned to the commercial paper market for working capital financing. In response, the banks have developed a role for themselves in that market by providing backup credit lines to commercial paper issuers and placing the paper as agent for the issuer. More recently, nonbank affiliates of banks have begun underwriting commercial paper and other corporate debt in competition with securities firms as a result of expanded authority granted by the Federal Reserve, the agency responsible for the supervision and regulation of bank holding companies.

On the liability side of the bank's ledger has come competition for both commercial and retail deposits. In the high interest rate environment of the 1970s, competitors of commercial banks, including investment banks and brokerage firms that managed stock and bond mutual funds, began to offer savers an alternative to time and savings deposits in the form of money market mutual funds (MMMFs). The fund managers pooled small sums gathered from many customers and placed them in short-term market instruments—primarily commercial paper and Treasury securities—and in large CDs that were exempt from interest rate ceilings. Consequently, the MMMFs were able to offer market-based rates along with easy access through limited check writing privileges. The volume of MMMFs expanded rapidly whenever interest rate ceilings restricted the rates banks and thrifts could pay.

In response to this development, bank laws and regulations were changed. Restrictions on interest rates that could be paid by depository institutions on most types of deposits were removed gradually, enabling the institutions to offer a directly comparable product. In December 1982, banks and thrifts were allowed to offer money market deposit accounts (MMDAs) paying competitive interest rates on small sums that were immediately withdrawable and federally insured. Depository institutions were thus able to attract the funds that they needed by paying attractive rates. Many

**Chart 1 Money Market Mutual Funds (Quarterly Average Assets)**



large banks were able to reduce their issuance of wholesale deposits as they acquired more consumer deposits; at the same time, the volume of MMMFs fell sharply (Chart 1), reducing the demand for such deposits. Once MMDAs grew to the volume the banks desired, banks retreated from offering high promotional rates, often dropping their rates well below those on MMMFs. MMMFs then resumed their growth because they were able to attract rate-sensitive liquid funds. Banks had the flexibility to compete when they desired to do so, but had to pay for the privilege. Often they competed aggressively in their offerings of specific maturities of consumer time deposits while holding down rates on the more widely held MMDAs.

The one remaining area where the rates payable by banks and thrifts are restricted is demand deposits, the only type of checkable deposit that may be offered to commercial customers. By law, explicit interest may not be paid on demand deposits. Even these funds involve costs to the banks, however, because banks must compete for them by offering other services to corporate customers. At the same time, demand deposits are a shrinking share of bank balance sheets, because of the many substitutes available and the development of techniques for closely managing demand deposits.

Deregulation has not been the only response to changing conditions. Regulatory capital requirements have been strengthened in recognition of the risks inherent in innovation and deregulation. At least initially, the requirements may have increased the costs associated with banking for some institutions. Beginning in 1981, the federal bank supervisory agencies (the Federal Reserve, the Federal Deposit Insurance Corporation, and the Office of the Comptroller of the Currency) have systematically raised the minimum requirements for bank capital-to-asset ratios. This development, in turn, encouraged banks to move business off their balance sheets. The banks increased fee-generating activities and contingent exposures (for example, standby letters of credit) rather than balance sheet assets against which capital had to be held. In response, regulators have further modified capital requirements to include some contingent liabilities. Banks have also begun to package and sell loans in the form of securities. This “securitization” of assets — mortgages, auto loans, credit-card loans, and so forth — shifts bank loans to permanent investors, leaving the banks to service the loans for a fee. Thus, origination, distribution, and servicing capabilities have become increasingly significant elements of banking, while building up the balance sheet—once perceived as a measure of a bank’s eminence—has diminished in importance.

In 1988, U.S. bank regulators moved to risk-based capital requirements as part of an international agreement among the Group of Ten (G-10) countries. The risk-based capital standards differentiate among risk categories of assets, establish capital requirements for each category, and require capital to be held against off-balance sheet exposures. The new measures of capital adequacy demand higher levels of capital, particularly for the large banking organizations heavily involved in off-balance sheet business. Thus the shift to risk-based requirements is likely to alter further the nature of the business.

The upshot of these developments has been a greater premium on flexibility and innovation. Banks have lost their essentially captive markets for “rate-controlled” deposits and for loans. Now they must compete for market-priced liabilities and a wider variety of lending and investment products and services. These changes call for a more dynamic view of the balance sheet, increased levels of capital, and the expansion of fee-based operations.

In response, the banking industry has become more diverse. The cost of being all things to all people has grown more difficult to finance with thinning profit margins, and most institutions have

looked to specialize or to diversify into potential growth areas. The broad traditional distinction between “wholesale” and “retail” banks has been further refined. Some banks have withdrawn entirely from retail or branch banking to concentrate on serving corporate clients. Others have seen their advantage in the consumer sector and have expanded that part of their business. Some have pulled back from international operations while others have expanded abroad, and several larger organizations have taken to arranging and financing mergers and acquisitions in direct competition with investment banks. Many smaller institutions, on the other hand, have managed to retain some of the traditional character of full-service banks by serving a geographically limited clientele. In these cases, the banks’ knowledge of their local communities and their relationships with depositors and borrowers are what distinguish them from the competition.

The U.S. activities of foreign bank branches and agencies have remained largely wholesale oriented, focusing for the most part on the money markets, foreign exchange, and trade finance. But over the past decade foreign banks have also tried to establish a more broadly competitive presence in the U.S. corporate banking business. They have expanded their U.S. operations by establishing new banks or by acquiring existing U.S. banks. Since 1980, the number of foreign-owned U.S. banks has approximately doubled. In addition, foreign banks have increased their securities-related activities in the United States alongside their American counterparts.

While the distinctions among banking firms have grown, banking more generally has increasingly overlapped other financial industries such as the securities and insurance businesses in the services it offers. Banking organizations in recent years have established and marketed mutual funds (albeit technically limited by existing law to trust customers), packaged their loans and sold them in the form of securities to investors, entered the bond guaranty insurance and securities brokerage businesses, and begun to underwrite and trade corporate debt through their nonbank affiliates. Currently, the Federal Reserve is reviewing whether to permit banks to underwrite corporate stock as well.

Securities firms and insurance companies, conversely, have successfully offered deposit-like products to consumers and businesses and provided financing for corporate expansion. Like the banks, they are testing the bounds of current law and regulation that generally prohibit affiliation between commercial banks and full-service securities firms. Security firms have established or acquired spe-

cial-purpose banks such as Edge Act corporations (limited to an internationally oriented business) and nondepository trust companies in order to obtain access to Federal Reserve services. These developments represent significant inroads into banking's province—the ability to maintain accounts at the Federal Reserve Banks and to have direct access to the electronic payments system.

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## **Banking Risks**

Because of the crucial importance of depository institutions to the economy, they are supported by a Federal “safety net,” composed of the discount window, federal deposit insurance, and an extensive framework of supervision and regulation. Other types of financial firms, such as securities houses and insurance companies, are also heavily regulated and supervised, and their investors and beneficiaries too are protected by pooled guaranty funds against a company's failure. But only depository institutions have access to central bank liquidity to guard against the risk that the failure of one institution to settle its obligations on a given day will cause other institutions to default in turn. The potential social costs of a crisis of confidence in the banking system and the likely related money and credit dislocations are certainly large enough to warrant such safeguards. In the extreme, a banking crisis could bring the economy to a halt.

This framework of support does not imply, however, that the business of banking is without risk. Indeed, as we have observed, growing competitive pressures and deregulation have introduced new types of risk and made the business much more complicated in recent years. The safety net is intended to protect the system as a whole, not individual banks. Still, these protections against systemic risk to some extent protect the participating institutions as well, creating the “moral hazard” that banks will take excessive risk in reliance on federal support. Bank supervision and regulation, therefore, look to minimize these moral hazards while maximizing systemic protection by letting the discipline of the marketplace work as much as possible. Investors in bank or thrift stocks are certainly at risk, as are other creditors including uninsured depositors. Banks perceived to be risky may find it difficult to raise capital. But regardless of who in the end bears the cost — bank investors, the federal support system or depositors — the basic risks to bank solvency remain.

These basic risks assume a variety of forms.<sup>3</sup> Credit risk, per-

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*3 The rest of this section focuses on the diversified business of commercial banking, although (continued on page 55)*

haps the most notable form, centers on the possibility that a bank's customer will be unable to meet the interest and principal payments on a loan. One of the principal functions of bank credit officers is to assess the borrower's financial condition and evaluate the risk and return characteristics of the loan. To an extent, loan losses are unavoidable. Among U.S. investments, only U.S. Treasury securities are truly free from credit risk on the part of the issuer since they are backed by the full faith and credit (that is, the taxing power) of the federal government. However, since banks must pay more than the U.S. government for a large portion of their liabilities, an investment strategy free of credit risk would not be very profitable. Rather, bankers generally look for the higher yields that can be obtained from relatively riskier loans and investments.

In managing credit risk, banks attempt to maintain a diversified portfolio priced both to absorb expected losses and to earn a satisfactory return on capital. The portion of a bank's capital that can be lent to a single borrower is limited by law, and bank credit departments typically establish even more restrictive internal limits for specific borrowers. Moreover, the financial condition of the borrower is monitored on an ongoing basis as long as the loan or commitment is outstanding.

Collateral also plays a role in the management of credit risk. Important considerations are the liquidity of the collateral and the coverage (margin) of collateral value in excess of the amount outstanding on the loan. Clearly, the ability to foreclose on a property or a piece of machinery can be cold comfort to a bank if it cannot readily sell the collateral in the market at a price that will cover the balance due on the loan and the bank's related costs. In most cases, the cost of managing, insuring, and maintaining the collateral pending its sale must also be considered, as must the risk that a borrower will seek protection of the courts under the bankruptcy laws. In the latter instance, the bank may not be allowed to liquidate the collateral at all.

A second form of risk facing banks is interest rate risk. Over the past decade, this risk has grown in importance as interest rates have become less regulated and more volatile. A bank's profitability can be heavily dependent on the direction of interest rate movements. In fact, because basic lending spreads have narrowed substantially in recent years, a bank might find it difficult to cover

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*some of the discussion could be applied to thrift institutions. Because the thrifts specialize in consumer deposit taking and real estate loans, their risk exposures and strategies for managing risk differ from those of commercial banks.*

its overhead by running a “matched book” of assets and liabilities with the same repricing dates or duration.<sup>4</sup> In such cases, movements in interest rates will not affect the bank’s profitability because the rates paid on liabilities will change in lockstep with those earned on the loans and investments they support. But the earnings from such a strategy may not be sufficient both to cover operating expenses and to make a profit for the shareholders.

Consequently, most banks mismatch or “gap” the repricing of their assets and liabilities to some degree with a view toward profiting from changes in the level of rates or in the shape of the yield curve. For instance, borrowing short and lending long may be profitable in an environment of falling interest rates because liabilities can be repriced at lower rates while assets lock in relatively high yields. Such a strategy may also be profitable if rates are stable and the yield curve has a “normal” upward slope. Banks generally vary their interest rate risk gaps in different maturity sectors if they expect changes in rates over time, but “bets” on interest rates are typically kept relatively small given the inherent difficulties of forecasting rates and the high cost of being wrong.

Liquidity risk, a third type of banking risk, turns on the bank’s ability to meet unexpected demands for cash in the form of withdrawals, funds transfers, or drawdowns of credit lines. In managing its liquidity, a bank must balance the cost of holding cash and money market instruments against its ability to obtain funding in the market, or if necessary, from the discount window. Sales of longer term assets are another possible source of liquidity. Historically, banks have been reluctant to incur the capital losses that at times may accompany such sales, while the realization of capital gains has not always impressed regulators or bank analysts. In recent years, however, banks have turned increasingly to the asset side of their balance sheets for liquidity, making growing use of securitized assets and loan sales.

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<sup>4</sup> Duration is a more sophisticated measure than simple repricing gap measures for assessing interest rate mismatches in that it takes into account the timing of the cash flows involved. Duration weights the present value of annual cash flows by their term to maturity so that near-term payments get proportionally greater weight and work to shorten the duration of an instrument compared to its nominal maturity. Thus, a loan that pays interest and principal monthly always has a shorter duration than its maturity, while duration and maturity are identical for loans that pay both interest and principal only at maturity. The duration concept is discussed extensively in Gerald O. Bierwag, *Duration Analysis* (Cambridge, Mass.: Ballinger Publishing Company, 1987). It is also examined in a series of *American Banker* articles by Sanford Rose. Key articles include those dated March 22, 1983; January 25, 1984; May 22, 1984; June 1, 1984; July 3, 1984; December 4, 1984; December 11, 1984; February 5, 1985; and August 27, 1985.

Financial innovation has significantly affected the way in which banks manage liquidity and interest rate exposures. Increasingly banks can address liquidity and interest rate issues separately because they can avail themselves of derivative instruments — futures contracts, interest rate swaps, or options on U.S. Treasury securities, Eurodollars, and other primary instruments — and dynamic hedging techniques that use these tools to alter hedges as the rate relationships change. Through the use of such instruments as futures and options contracts as well as interest rate swaps (described in Chapter 4), banks can synthetically alter their interest rate exposures within a given funding profile, although they may incur new risks in the process.

On the international side, banks face foreign exchange risk and country risk (or sovereign risk). The first type of risk has long been a major concern in international banking. Banks make markets in foreign exchange and hold assets and liabilities denominated in various currencies. Thus, they are exposed to gains or losses from relative movements in exchange rates.

Country risk (or transfer risk) relates to the possible difficulties in collecting from borrowers in another country as a result of some development in that country. For example, a revolution or coup in a foreign country may overthrow the government that took out a U.S. bank loan and bring in a successor government that repudiates the loan. Recently, the more common form of country risk has arisen when public and private sector borrowers in less developed countries (LDCs) borrowed heavily in dollars from the international banking community and found it difficult to generate sufficient dollars to service their loans. In the mid to late 1970s the burgeoning revenues of oil-exporting countries were recycled by banks in industrialized nations in the form of loans to LDCs. Conventional banking wisdom had been that countries do not default on their obligations. Default would cut them off from future access to international credit and seriously hinder further development. But that assumption did not recognize that the size of the country's debt could overwhelm its ability to accumulate the dollars necessary to service that debt. As foreign governments found it necessary to defer loan payments, declare moratoria on debt service, and negotiate reschedulings that extended repayment terms, U.S. banks' cross-border exposures became a focus of attention for management, regulators, analysts, and investors.

Inherent in the management of country risk are assessments of the local political situation, local economic conditions, and balance-

of-payments prospects. Beginning in the early 1980s, the Federal Financial Institutions Examination Council, a joint body of the three federal bank supervisory agencies, began to evaluate and monitor the cross-border risk of public and private sector debt in particular countries to permit consistent treatment of such debt in banks' loan portfolios. The International Lending Supervision Act of 1983 also provided a statutory basis for the Federal bank supervisors to direct their information gathering and supervisory responses directly at transfer risks. The supervisory agencies established criteria, comparable to those applied to domestic loans, classifying loans to foreign private or public sector borrowers according to their degree of transfer risk. The agencies also stipulated that if a loan was particularly questionable, it might have to be accounted for on a cash basis, meaning that interest would not accrue to the bank's income statement as it was earned but would only be recorded when paid. At some stage, the bank might also have to put aside reserves against possible losses, in effect recognizing the lessened value of the loan because of repayment risk.

Prompted by these concerns, the international banking community has sought to reduce its exposures to country risk while recognizing its interest in providing sufficient dollar funding to LDCs to give the countries' internal economic adjustments an opportunity to work. Some of the smaller banking organizations have sold off their entire LDC loan portfolios and exited the business, but the largest international lenders have sold off only portions of their loans. To protect against the risk inherent in the remaining loan, the large lenders have raised additional capital and renegotiated terms on existing debt while providing additional funding to the LDCs in cooperation with multinational organizations such as the International Monetary Fund and the World Bank.

Finally, with the increasing globalization of financial markets and the rapid movements of huge volumes of funds and securities, payment and settlement risks have also emerged as key concerns. For instance, an institution that fails to receive a wire transfer of funds it had been expecting could be forced to acquire the funds in the market or at the discount window. Alternatively, it might itself fail to make a payment for which it had relied on the receipt of the funds. Securities, too, may not be delivered to a buyer when expected. The buyer, in turn, might not be able then to deliver them to someone else. The implications of such problems for the liquidity of particular institutions or even of the system as a whole are significant. Moreover, the fact that the underlying transactions

often occur across international boundaries raises the prospects of dislocations in one market being transmitted globally.

Accordingly, there has been a concerted effort to manage such risks more explicitly by monitoring exposures to particular counterparties and clearing systems and an increased interest in the netting of transactions and in other mechanisms to reduce the implications of a given problem.

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### *Strategic Considerations*

In most banks, the overall management of these various risks is highly centralized. Central control is necessary to prevent fundamentally different strategies from offsetting one another to the detriment of a bank's overall profitability. Typically, the central body that sets the bank's strategic direction is the Asset and Liability Committee or the Sources and Uses Committee. Senior officers on this committee represent areas responsible for the major elements of the bank's business—loans, investments, and funding. In addition, the bank's chief economist normally plays an important staff role on the committee, providing forecasts of the real economy, interest rates, and monetary policy that are crucial to the institution's strategic planning.

The committee meets periodically to review the bank's financial position against the backdrop of the economic and market outlooks. Committee members give particular attention to recent material changes in the consolidated global balance sheet and expected future projects. The outlook for loan demand is reviewed, both as it would flow from the firm's economic forecast and as it would reflect particular business considered likely to develop over the planning horizon. Upcoming maturities of assets and liabilities are also reviewed, since they will generate funding needs and liquidity. Then committee members take up questions of pricing and funding, considering in particular the implications for liquidity, interest rate exposure, capital adequacy, and ultimately, expected profitability. The members might, for example, decide whether the bank should alter its asset allocation, enhance or reduce liquidity, mismatch its book in particular maturity sectors, reduce its asset size and hence its required capital, or raise equity or debt capital.

As noted earlier, banks generally take some position on the direction of interest rates over periods of a few months or so. If, for example, rates are expected to rise over three months and then begin to fall, the bank might plan to be somewhat long funded up to three months, so that its assets will reprice at increasing interest

rates while its fixed-term funding protects it against increasing costs over the period. At the same time, it would try to be short funded beyond three months to take advantage of expected declines in financing rates while seeking to lock in higher returns on its assets. Although some “gapping” of this sort is common at most banks, such exposures are generally kept relatively modest given the perils of interest rate forecasting and the attendant downside risk of “betting the store” on a particular outlook. On the other hand, the relatively narrow profit margins inherent in simply matching the maturities of assets and liabilities generally provide an incentive to mismatch the book to some extent.

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### ***Tactical Considerations***

Although the Asset and Liability Committee sets the bank’s overall strategy for managing assets and liabilities, the money desk plays an important role in implementing the strategy in the market day to day through their taking and selling of funds. In addition, the money desk manages the bank’s reserve position, making certain that the bank’s daily average reserve requirements are met on settlement day (every other Wednesday) with as little uninvested or “wasted” excess reserves as possible. This task necessarily includes monitoring the flow of customer activity that affects the bank’s reserves. For instance, a wire transfer of funds for a customer or a deposit withdrawal that was not anticipated by the desk could force the bank to replace those reserves in the Federal funds market to avoid being overdrawn in its reserve account at day’s end. Or an unexpected inflow of reserves could provide the bank with unwanted (and costly) excess reserves.

The money desk can vary the terms it sets on repurchase agreements (RPs) with dealers in government, municipal, and corporate securities.<sup>5</sup> Changing the posted dealer loan rate has long been used by banks to adjust their asset positions. The money desk typically uses the bank’s portfolio of U.S. government securities to offer corporate and other customers overnight or term RPs. Moreover, it sells certificates of deposit (CDs) for the bank and keeps track of commercial paper sales by the parent bank holding company. Other responsibilities include directing the acquisition of Eurodollar funds for the head office through foreign branches and carrying out the funding operations booked at branches in Nassau and the Cayman Islands for tax or other reasons. In addition, the

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<sup>5</sup> *The various financial market instruments mentioned are described in more detail in Chapter 4.*

money desk handles the funding of the bank's U.S.-based international banking facilities. Through these facilities, the bank can conduct offshore business without incurring the cost of reserve requirements or U.S. taxes.

In recent years, the funding process has witnessed tremendous innovation. For instance, options, futures, and forward contracts have become widely used to hedge exposures in the cash market, and interest rate and currency swaps have emerged as vehicles for synthesizing a particular profile. "Caps," "collars," and "floors" have evolved in the derivative product markets. They allow interest rate exposures to be shaped as desired. In all, the funding operation has become more complex; the depository institutions have faced variable interest rates on an increased share of their balance sheets and have had to manage the risks.

The officer supervising the money desk directs daily tactics within a biweekly reserve strategy. Under the contemporaneous reserve accounting regime in place since 1984, reserve requirements for transactions deposits over the two-week statement period ending on Wednesday are based on daily average deposits held for the two weeks ending two days earlier.<sup>6</sup> For time and savings accounts, requirements are lagged, based on deposits held a month earlier. Vault cash held a month earlier is counted toward meeting requirements. Modest reserve excesses from the previous period can be carried over into the current period, while modest deficiencies from the previous period must be covered.

As a general matter, the bank's objective is to end each day with roughly enough reserves to keep pace with requirements to that point. To do this, it needs to make short-run interest rate forecasts. The expected trend in rate movements is one element examined. Technical factors affecting reserves of the banking system and the money desk's assessment of how the Federal Reserve will respond to those factors must also be considered. Short-run interest rate expectations may suggest to the money desk that it might be profitable to run the reserve position somewhat long or short of requirements for a given day or maintenance period. Both strategies involve risks. If the bank holds more excess reserves early in the period than it can eliminate before the period ends, it suffers an opportunity cost for holding non-interest-bearing reserves. On the other hand, if it has a deficiency, it risks running an overdraft at the Fed or having to borrow at the discount window.

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<sup>6</sup> Chapter 6, Box A offers a detailed description of reserve measures and accounting techniques.

Even when the intention is to run the position short of required levels, the money desk typically targets a sufficiently large positive reserve balance at the end of the day to guard against a last-minute, unexpected outflow that could leave the account overdrawn. If a bank realized at day's end that it was overdrawn, it would have to cover the overdraft with a visit to the discount window. If the bank did not discover the overdraft until the next day, it would face a penalty, and it would have to make up the reserve deficiency.

The officers or committee in charge of the money desk will make use of projections of asset and liability maturities and estimates of additional sources and uses of funding in the coming weeks. They will try to anticipate unusual loans or deposit buildups. A large bank will also predict patterns of activity by small banks that place excess funds with it and rely on it for other services. The big bank will use this information to devise an approach to be used in rolling over wholesale deposits and RPs and in making loans to securities dealers. Out of this plan will emerge estimates of the bank's net overnight funding needs. The bank will plan either to borrow or lend in the interbank Federal funds market. The outlook for the Federal funds rate over the current maintenance period and the ensuing one is considered, and the officer in charge of the money desk directs the Federal funds trader whether to err on the long or short side in managing the bank's reserve position.

The Federal funds trader of a major bank usually starts each day with an estimate of the bank's closing position at its Federal Reserve Bank the night before. The trader may not be confident of that position until noon, but active trading in the Federal funds market begins by around 8:30 a.m. For a large bank that is a net borrower in the Federal funds market, funds borrowed the previous day are typically returned early the following morning, a practice which lowers the bank's reserve balance significantly and puts the bank temporarily into an overdraft position in its reserve account that will have to be covered over the day. A bank that had loaned overnight Federal funds will see a rise in its reserve balance that morning when the loans are repaid. The bank has at hand estimates of the major transactions that will go for or against it that day from newly issued and maturing RPs, CDs, and Eurodollars, as well as from customer and other transactions. It has some control of these items, but unexpected transactions do occur. The net inflow from direct transactions in Federal funds from smaller client banks is reasonably predictable; hence the funds trader has a fairly good estimate of the remaining net amount of Federal funds that must be bought or sold in the brokers' market.

Federal Reserve open market operations may affect the bank's reserve calculations. For example, if the Fed's trading desk executes an RP, the volume of reserves for the banking system will rise. The individual bank can choose whether to participate directly in the operation; if it does so successfully, it will increase its reserve balances. Even if it does not execute an RP transaction directly, its customers may participate. In that case, it will receive some of the reserves added in the operation. Otherwise, it will be affected only indirectly—reserves will be more plentiful in the banking system, making additional reserves less costly to obtain or making surplus reserves less profitable to sell.

In planning the day, the trader tries to gauge from broker comments, the bank's own direct Federal funds trades, and projections of aggregate reserve supplies made by money market economists whether the Federal funds rate is firm and likely to rise, or whether it may ease, allowing the bank to cover its reserve shortage 1/16 or 1/8 of a percentage point less expensively. The money desk manager will generally prefer not to be both a borrower and a lender of wholesale funds in the brokers' markets, even though there may be profit in undertaking both transactions when rates change through the day. Capital requirements on gross asset positions discourage extensive use of two-way operations. As the day goes on and the trader's own picture becomes clearer, the object is to buy enough funds to come out about on target.

On settlement Wednesday, the trader has to bring the Fed balance to the level needed to meet the average level required for the two-week maintenance period, after allowance for any excesses or deficiencies carried in from the previous period. It is an especially tricky and often volatile day. Reserves in the system are likely to be either overly abundant, encouraging the Federal funds rate to fall, or in short supply or maldistributed, producing upward rate pressure. The trader's success in contributing to bank profits depends importantly on winding up on settlement Wednesdays in need of reserves when the funds rate is low and with adequate reserves when the funds rate is high. On those occasions when the bank finds itself suddenly short because of unexpected transactions, or the trader cannot find funds in sufficient volume late in the day before Fedwire closes, the remaining option is to turn to the Federal Reserve discount window. In some instances, the bank's officers may have concluded that they can risk borrowing at the discount window because of their limited recourse to it in the recent past. In other cases, they may go to extraordinary lengths to avoid

borrowing at the window if they have used it often and are likely to be counseled against further borrowing.

In addition to managing the day's flows with a view toward producing a desired end-of-day position, the money desk must also monitor its intraday position in accordance with Federal Reserve policies regarding payment system risk. The roughly \$1 trillion of daily payments over Fedwire and private payment systems such as the Clearing House Interbank Payments System (CHIPS) and the payments arising out of the Federal Reserve's Book Entry Securities System currently produce about \$40 billion daily on average of free intraday credit (that is, "daylight overdrafts"), with peak amounts well in excess of \$100 billion. These overdrafts reflect transfers made with the expectation that sufficient inflows of funds will cover them before the day is over. The risks in this process have received a great deal of attention from the Federal Reserve and the financial community as a whole in recent years: the Federal Reserve has established policies to limit daylight overdrafts and the banks have put procedures in place to monitor and manage their exposures. A systemic risk is inherent in this extension of daylight credit—the risk that one institution's inability to settle its net debit position on a private large dollar settlement system will in turn force other participants to default. Moreover, the failure of a bank to settle Fedwire overdrafts poses the risk of direct loss to the Federal Reserve. Consequently, depository institutions are expected to limit their daylight overdrafts to specified multiples of their capital on each separate payment system, such as Fedwire, and across all payment systems. They are also expected to monitor those positions in real time. Federal Reserve proposals to price Fedwire daylight overdrafts and require collateralization of certain overdrafts are currently pending; if adopted, they would further add to the money desk's intraday funds management responsibilities. (Overdrafts, of course, could occur on the books of private institutions as well as on the Federal Reserve's books.)

In addition to adjusting positions minute by minute, the money desk must also take account of the longer term perspective contained in the Asset and Liability Committee's strategy. A significant change in the economic outlook and expectations for monetary policy may, for example, suggest lower rates over the relatively near term. This development could prompt the Asset and Liability Committee to decide to shift out of a long-funded position to minimize potential losses. In such circumstances, the money desk might seek to unwind some long liability positions, presumably at a cost, and put some liquid funds to work in longer maturity assets.

Flexibility is a key element in the development and implementation of asset and liability strategies. The inability to react quickly and effectively to changing circumstances can eat into hard-earned profits. As the competitive landscape grows more difficult to negotiate and the financial marketplace becomes increasingly complex, the one constant for banks is that nothing is really likely to stay as it is for very long. And it is within this continually changing framework that monetary policy must do its work.

The Federal Reserve's trading desk routinely observes how the large money center banks and various groupings of smaller banks and thrifts are managing their reserve positions. Members of the desk staff speak with money desk managers of large banks and monitor daily statistics on reserve positions of groups of other institutions by size and type. What they learn can clarify the behavior of aggregate excess reserves and of the Federal funds rate. More specifically, it may help desk officials understand instances when reserve and Federal funds rate behavior do not seem consistent. This knowledge often proves helpful to desk officials in planning a strategy for reserve management.

## *The Financial Markets*<sup>1</sup>

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The existence of broad-based, active financial markets in the United States is very important to Federal Reserve policy implementation. The markets provide a place where the Federal Reserve can buy and sell Treasury debt instruments in carrying out open market operations. The Federal Reserve uses such transactions to make large-sized reserve adjustments quickly. If active markets in financial instruments did not exist, the Federal Reserve would not be able to make open market operations its primary policy instrument, and a very different, less efficient set of monetary policy procedures would have developed. Moreover, without large-scale financial markets, the economic conditions addressed by Federal Reserve policy would barely resemble the complex system that has evolved in the United States, since the variety and efficiency of means of borrowing and lending have affected the course of economic development.

The financial markets encompass a vast array of techniques and instruments for borrowing and lending that facilitate investment, consumption, saving, and the convenient timing of purchases and sales of goods and services. The borrowers are mostly businesses, individuals, and governmental units with a variety of needs for funding. Lenders are businesses and individuals with savings to invest. Many entities fall into both categories. Financial institutions, including commercial banks, investment banks, insurance companies, and others, intermediate between borrowers and lenders. In addition, a wide variety of financial instruments have been developed that permit borrowers to sell their own securities, usually with the assistance of investment banks, without relying on the intermediary services of commercial banks.

Active financial markets help potential borrowers and lenders find the most advantageous terms and interest rates. The market-making processes allocate savings to the uses offering the highest return and search out the interest rates that bring supplies and demands into balance. The determination of the overall level and the structure of interest rates according to the maturity of the instrument is a complex process (see the discussion in Chapter 8). For any maturity, rates will differ among instruments if they are perceived to have different risk, tax, or marketability characteristics, or

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<sup>1</sup> This chapter draws on the following sources: Marcia Stigum, *The Money Market*, rev. ed. (Homewood, Illinois: Dow Jones-Irwin, 1983); Timothy Q. Cook and Timothy D. Rowe, eds., *Instruments of the Money Market*, 6th ed., Federal Reserve Bank of Richmond, 1986; and First Boston Corporation, *Handbook of Securities of the United States Government and Federal Agencies, and Related Money Market Instruments*, July 1988. It also draws heavily from the 1982 version of this book that was written by Paul Meek.

are available to different classes of purchasers (lenders). The spread between interest rates of two financial instruments of the same maturity may change if perceptions about such characteristics change.<sup>2</sup>

The highly developed nature of financial markets in the United States and the wide range of choices for borrowing and lending have facilitated a massive expansion of outstanding debt. The large volume of debt can be seen as a sign of economic and financial vigor, but at times it can also be worrisome. Servicing the debt could be a problem in a period of economic retrenchment when corporate profits and personal income tend to weaken. In addition, with market development has come increased integration among the various financial instruments, an outcome that may speed the transfer of credit problems from one part of the financial markets to another.

Market participants often make a distinction between financial instruments with maturities of a year or less and those with longer initial maturities. The market in which the shorter instruments are issued and traded is referred to as "the money market." The money market is really a market for short-term credit, or the option to use someone else's money for a period of time in return for the payment of interest. The money market helps the participants in the economic process cope with the financial uncertainties they face in daily life. It assists in bridging the differences in the timing of payments and receipts that arise in a market economy. Borrowers rely on it for seasonal or short-term cash requirements; lenders use it to offset uneven flows of funds. By providing a place for funds to be placed temporarily, the money market also permits borrowers to time their issuance and lenders to time their purchases of bonds and equities in accordance with their forecasts of stock prices and long-term interest rates. (Table 1, page 68, lists characteristics of several money market instruments.)

Markets dealing in instruments with maturities that exceed one year are often referred to as capital markets, since credit to finance investments in new capital would generally be needed for more than one year. The time division is somewhat arbitrary. A long-term project can be started with short-term credit, with additional financing arranged at a later date. Furthermore, two- or three-year credit instruments may need to be renewed before a project is completed. Debt instruments that differ in maturity share other

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<sup>2</sup> Ray C. Fair and Burton Malkiel, "The Determination of Yield Differentials between Debt Instruments of the Same Maturity," *Journal of Money, Credit, and Banking*, vol. 3, no. 4 (November 1971), pp. 733-49.

**Table 1 The Money Market**

<b>Instruments</b>	<b>Typical Maturities</b>	<b>Principal Borrowers</b>	<b>Secondary Market</b>
<b>Federal funds</b>	<i>Chiefly 1 business day</i>	<i>Depository institutions</i>	<i>None</i>
<b>Negotiable certificates of deposit (CDs)</b>	<i>1 to 6 months and longer</i>	<i>Depository institutions</i>	<i>Modest activity</i>
<b>Bankers acceptances</b>	<i>90 days</i>	<i>Financial and business enterprises</i>	<i>Active</i>
<b>Eurodollars:</b>			
<b>Time deposits (nonnegotiable)</b>	<i>Overnight, 1 week, 1 to 6 months and longer</i>	<i>Banks</i>	<i>None</i>
<b>CD (negotiable)</b>	<i>1 to 6 months and longer</i>	<i>Banks</i>	<i>Moderately active</i>
<b>Treasury bills</b>	<i>3 to 12 months</i>	<i>U.S. government</i>	<i>Very active</i>
<b>Repurchase agreements</b>	<i>1 day, 1 week, 3 to 6 months</i>	<i>Banks, securities dealers, other owners of securities</i>	<i>None, but very active primary market for short maturities</i>
<b>Federal agencies</b>			
<b>Discount notes</b>	<i>30 to 360 days</i>	<i>Federally sponsored agencies:            Farm Credit System            Federal Home Loan Banks            Federal National Mortgage Association</i>	<i>Limited</i>
<b>Coupon securities</b>	<i>6 to 9 months</i>		<i>Active</i>
<b>Commercial paper</b>	<i>1 to 270 days</i>	<i>Financial and business enterprises</i>	<i>Very limited</i>
<b>Municipal notes</b>	<i>30 days to 1 year</i>	<i>State and Local governments</i>	<i>Moderately active for large issuers</i>

characteristics. Hence, the term “capital market” could be—and occasionally is—applied to some shorter maturity transactions. (Table 2, page 69, gives examples of capital market instruments.)

A distinction is also made between primary and secondary markets. The term “primary market” applies to the original issuance of

**Table 2 The Capital Market**

<b>Instruments</b>	<b>Typical Maturities</b>	<b>Principal Borrowers</b>	<b>Secondary Market</b>
<b>Treasury notes</b>	2 to 10 years	U.S. government	Active
<b>Treasury bonds</b>	Recently, 10 to 30 years	U.S. government	Active
<b>Federal agencies: Bonds</b>	3 months to 10 years	{ Farm Credit System, Federal Home Loan Bank, and related institutions	Moderately active for recent issues, less active for older issues
<b>Debentures</b>	2 to 30 years	{ Federal National Mortgage Assn; Federal Home Loan Mortgage Assn.	Moderately active depending on maturity
<b>Master notes</b>	Up to 10 years – negotiable	{ Federal National Mortgage Assn; Student Loan Marketing Assn.	Active
<b>Zero coupon</b>	Long-term	{ Federal National Mortgage Assn; Student Loan Marketing Assn.	Limited
<b>Fixed/floating rate Swaps</b>	2 to 10 years	{ Student Loan Marketing Assn.	Active [see swaps below]
<b>Corporate bonds</b>	2 to 30 years	{ Financial and business enterprises	Active (OTC market)
<b>Municipal bonds</b>	2 to 30 years	State governments	Active (OTC market)
<b>Derivative products: Futures contracts</b>	Contracts mature every 3 months out to 2 years	Dealers, banks (users)	Active arbitrage with cash market
<b>Options</b>	Exercise at strike price on or before prearranged expiration date	Dealers, banks, nonbanks	Very active
<b>Swaps</b>	Exchange of interest streams over the lives of underlying debt issues	Dealers, banks, nonbanks	Active (sales termination, reverse swaps)
<b>Strips</b>	Semiannually on each coupon date and bond maturity date out to 30 years	U.S. government (indirectly – stripping done by dealers)	Active

a credit market instrument. There are a variety of techniques for such sales, including auctions, posting of rates, direct placement, and active customer contacts by a salesperson specializing in the instrument. Once a debt instrument has been issued, the purchaser may be able to resell it before maturity in a "secondary market." Again, a variety of techniques are available for bringing together potential buyers and sellers of existing debt instruments. In many cases, the same firms that provide primary marketing services help to create or "make" secondary markets. Sometimes, brokers play a key role in the market process. The development of active secondary markets has increased the attractiveness of debt instruments to potential purchasers. Firms can keep some of their liquid working balances in short-term instruments, which they can then sell before maturity if they need cash. This source of liquidity has affected money and bank credit because it has reduced firms' needs to keep funds on deposit and to obtain short-term loans from the banks.

In addition to making outright purchases and sales in the secondary market, entities with money to invest for a brief period can buy a security temporarily, and holders of debt instruments can borrow short term by selling securities temporarily. The two types of transactions are repurchase agreements (RPs) and reverse RPs. In the wholesale market, banks and government securities dealers offer RPs at competitive rates of return by selling securities under contracts providing for their repurchase from one day to several months later. Finally, a variety of derivative instruments such as futures and options contracts on various financial instruments can be used for hedging interest rate risk or for speculating.

Increasingly, the financial markets have become international in scope. Banks of many nations bid for deposits and make loans throughout the world. Foreign borrowers may raise funds in the U.S. credit markets and U.S. borrowers can raise money abroad by issuing securities denominated in U.S. dollars or in other currencies. Foreign central banks and others hold U.S. dollar securities in large volume as part of their reserves. U.S. Treasury securities trade virtually around the clock in major financial centers in Europe and Asia as well as in the United States. The U.S. dollar is the main international currency, but some financial instruments are denominated in currencies other than the local currency or occasionally in a basket of currencies. The international markets provide facilities for managing currency risk by allowing investments in many currencies and by providing hedging facilities for managing exchange risk.

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### *Financial Intermediaries and the Financial Markets*

The development of financial markets has allowed large credit-worthy commercial entities to avoid traditional intermediaries and borrow directly from investors, either through dealer departments of investment banking firms or by direct placement. Business and financial corporations and municipalities often borrow by issuing unsecured commercial paper. A corporation with a strong credit rating can capitalize on the rating and obtain short-term loans from investors at a rate lower than that charged by a bank.

Commercial banks, nonetheless, play several important roles in the financial markets. In addition to providing traditional deposit transfers and loans, they create and deal in financial market instruments. The 15 to 20 largest U.S. banks are particularly active in the money market. The banks figure importantly in the markets for Federal funds, bankers' acceptances (BAs), certificates of deposit (CDs), Eurodollars, and RPs. Their holding companies issue commercial paper. Money center banks are typically the principal domestic traders in the worldwide foreign exchange market. They also furnish the transfer, record keeping, and credit facilities needed by nonbank participants. Many banks act as dealers in money market securities, while others service customer investment needs through a short-term investment desk. A few banks in New York City serve as clearing agents for dealers in money market instruments, receiving and delivering securities for them and insuring that payments are made. A number of large banks meet residual financing needs of nonbank money market dealers.

Some of the larger domestic regional banks and affiliates of foreign banks are active, too, in trading Federal funds and issuing CDs and BAs. They serve both area businesses and nationally based firms, providing their customers with access to the international money market. American affiliates of foreign banks provide access to the U.S. money market for their head offices abroad, for their global branch networks, and for the U.S. operations of their overseas clients. The affiliates also are active participants in the foreign exchange markets.

For most depository institutions, participation in the capital markets consists of purchases and sales of government securities for their investment portfolios. A few serve as dealers in U.S. government securities and underwriters of state and local government securities. Their authority to engage in other types of underwriting and market-making activities is limited by statute, but as noted in

Chapter 3, the regulatory agencies have recently been expanding the limits administratively.

Thrift institutions—savings and loan associations, savings banks and credit unions—have participated in a wider range of financial activities in recent years and have made use of market instruments to manage cash and risk positions. They have also sold mortgage loans and purchased mortgage-backed securities to manage risk. Most of them, however, have a smaller role in the financial markets than the commercial banks have.

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## **Bank-related Financial Markets**

### **1. The Federal Funds Market<sup>3</sup>**

The Federal funds market is the market for immediately available reserve balances at the Federal Reserve.<sup>4</sup> Depository institutions that maintain accounts at the Federal Reserve, either directly or through a correspondent, can borrow (buy) or lend (sell) a portion of those reserve balances.<sup>5</sup> Depository institutions hold reserve balances at the Federal Reserve to meet their reserve requirements — on average over a two-week maintenance period — and to handle clearings of transactions among banks while avoiding overnight overdrafts that may arise from those transactions. Because the Federal Reserve does not pay interest on reserve accounts, depository institutions have an incentive to hold their reserve balances to the minimum levels consistent with meeting their various needs.

Regular flows of business to a bank are unlikely to leave it with the desired level of reserves. A bank that is short of reserves has a number of adjustment options, including the purchase of enough Federal funds to offset the shortage. Such borrowings are not classified as deposits, so they are subject neither to reserve requirements nor to the statutory prohibition against paying interest on

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<sup>3</sup> Lawrence DiTore of Fulton Prebon and Jamie Paterson of Chemical Bank provided helpful information for this section.

<sup>4</sup> The various reserve concepts are described in more detail in Chapter 6, Box A.

<sup>5</sup> The other eligible participants in the Federal funds market are federally sponsored agencies that provide banking services such as the Federal Home Loan Banks, and certain official international banking organizations, such as the International Bank for Reconstruction and Development.

The term “Federal funds transaction” is sometimes applied to payment in immediately available funds. Such payments would normally use the Federal Reserve’s funds transfer facilities. Any nonfinancial entity can arrange with its bank to have such a payment made on its behalf. But this type of payment is not a Federal funds transaction in the sense that the term is used above because it does not involve the borrowing and lending of reserve balances at the Federal Reserve.

demand deposits. A bank with reserve balances in excess of its needs may lend them in the Federal funds market.

Most banks tend to be routinely either net buyers or net sellers of funds although some shift back and forth. The large banks are more often buyers than sellers while the smaller institutions tend to be net sellers, but in both cases there are exceptions. Typical sellers include small domestic commercial banks, thrift institutions, and credit unions.<sup>6</sup> The institutions that are routine sellers often view the monies sold in the Federal funds market as part of their liquidity. Data collected by the Federal Deposit Insurance Corporation (FDIC) on its call report of all the institutions it insures indicated that the institutions' daily purchases of Federal funds were around \$145 billion at the end of 1988. Sales were \$100 billion. (Data on transactions by institutions that were not insured by FDIC are not included in these figures.)

There are two methods for buying and selling Federal funds. First, depository institutions can deal directly with each other. Second, brokers can bring together financial institutions with shortages and those with excesses of reserves. Direct transactions most commonly consist of sales by small- to medium-sized institutions to larger correspondent banks. Small institutions rarely generate reserve excesses large enough to allow them to participate in the brokers' market. Instead, they arrange to have a correspondent bank buy from them directly. Often these transactions take place on a regular basis: if the respondent institution routinely generates more reserve balances in its business than it needs, it may make daily sales to its correspondents. Usually, the transaction takes place either at the opening rate or the average effective rate set in the brokers' market less a fraction. Some direct transactions also occur between two large institutions and may, at times, be of substantial size.

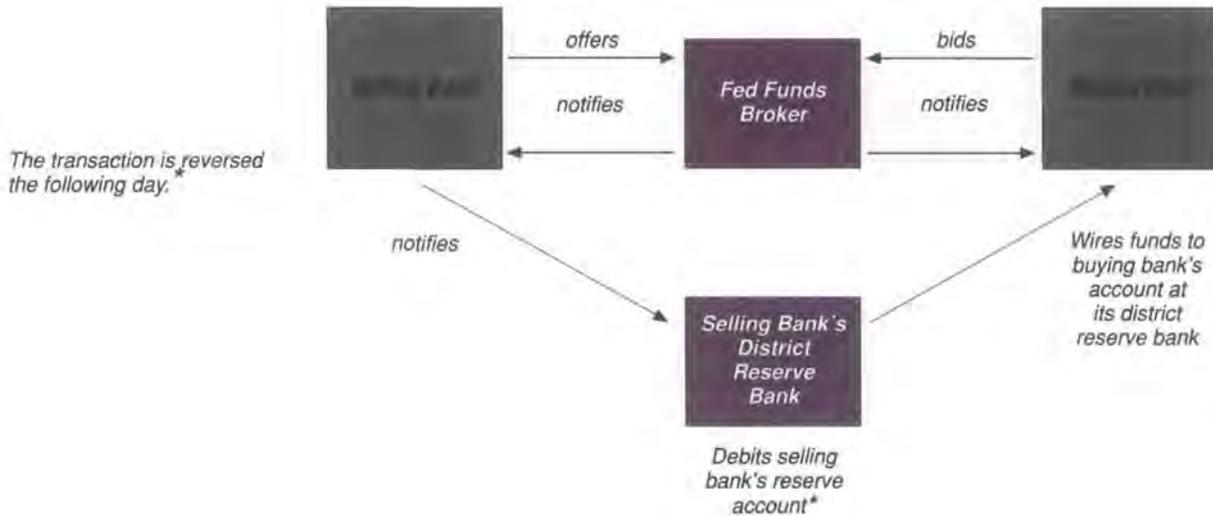
A substantial share of large transactions are arranged in the brokers' market. Trades through the brokers are typically for \$25 million or more, although trades of around \$10 million are arranged routinely.<sup>7</sup> Brokers provide an essential service to the one thousand or so financial institutions that are regular participants. The major Federal funds brokers do not take positions themselves but bring together potential buyers and sellers. They take bids and offers

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<sup>6</sup> *The Federal Home Loan Banks sell reserve balances in the funds market on behalf of the member savings and loan associations. The U.S. Central Credit Union sells funds on behalf of member credit unions.*

<sup>7</sup> *Trades as small as \$1 million are occasionally arranged as odd lots.*

**Diagram 1 Fed Funds Transaction (with Broker)**



from banks by phone, charging each party to the trade a commission of 50 cents per \$1 million. Generally either 1/16 or 1/8 percentage point separates the bid from the offer. If the market is very one-sided or rates are changing rapidly, the spread may be greater. Since most loans are unsecured, depository institutions establish credit limits for each potential buyer. Once the terms of the exchange are agreed upon, the selling institution notifies its District Reserve Bank to debit its account and wire the funds to the buying bank. The banks entering into the contract, rather than the broker, are responsible for making sure the transactions are completed. Typically, the transaction is reversed and the interest is paid the next day (Diagram 1).

Participants in the Federal funds market can get an idea of the rates at which funds are trading by looking at on-line information screens provided for a fee by various financial service firms. Several brokers report the current rates bid and offered for Federal funds and the rate at which the most recent transactions took place. Participants phone the brokers to get their views on the market and to place bids or offers. Brokers will indicate whether the market is "better bid" or "better offered." They will try to get bidders to step

up their rate or sellers to accept a lower rate when they observe a concentration of bids or offers. Staff members at the trading desk of the New York Reserve Bank also watch the news screens and telephone the brokers from time to time during the day to keep abreast of the rates, the volume of activity, and the balance between supply and demand. In the latter part of 1988, the daily volume of Federal funds trades arranged through the brokers reporting to the Federal Reserve Bank of New York averaged around \$50 billion.

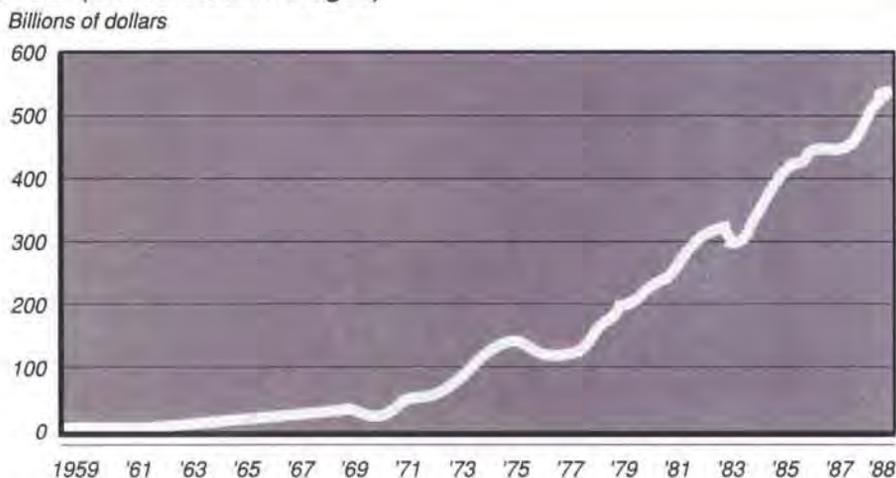
Most activity in the market involves purchases and sales for one business day, but trading for future delivery and for an extended term also takes place. Trading for future delivery is most common ahead of quarter ends when heavy flows of funds through the banking system may inflate cash needs. The market for "term" Federal funds is a wholesale market in unsecured interbank lending. Maturities range from a few days to more than a year, although most transactions mature in six months or less. The term funds market is considerably smaller than the overnight market; the volume of activity varies but the amount of term Federal funds outstanding is likely to be on the order of one-tenth of the amount of overnight funds arranged on a given day. The term market is less liquid than the overnight market. On occasion the broker may need hours or even days to find a counterparty willing to meet the rate bid or offered. For a bank with an extended need for funding, buying funds for a specified term is equivalent to issuing a CD, except that such borrowing does not carry reserve requirement and deposit insurance costs. Banks can thus afford to pay a higher rate than they would be willing to pay if they were issuing CDs. The sellers in the term market are members of the same group that participates in the overnight Federal funds market. Resident foreign banks often place funds raised abroad in this way when the rate spread is favorable. Some banks situated abroad lend Federal funds whenever the rate is sufficiently above that available on RPs to compensate them for the lack of collateral against the loan. Savings and loan associations and the supervising Federal Home Loan Banks also use the term funds market to invest liquid reserves. Term Federal funds transactions are not subject to early termination except in unusual circumstances when both parties agree.

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## *2. The Market for Certificates of Deposit*

After its introduction in 1961, the large negotiable bank CD grew rapidly in importance and often served domestic banks as a major source of funds. Banks borrow by issuing CDs, principally to non-

**Chart 1 Large Time Deposits (Semiannual Averages)**



banks. The CD, like a U.S. Treasury bill, can be sold before maturity. Its secondary market, however, is not nearly as liquid as the bill market, and a CD carries some credit risk. Consequently, CDs must offer investors a rate of interest that exceeds that on a Treasury bill of the same maturity. The success of the domestic CD was followed by the growth of an active market for Eurodollar CDs, or dollar-denominated CDs issued by banks or branches located outside the United States, primarily in London. Secondary markets developed first in London and later in New York. Dollar-denominated CDs are also issued by foreign banks located in the United States and are known as Yankee CDs. Large domestic savings and loan associations are also issuers.

The domestic CD market grew rapidly from its inception, with only a few notable interruptions (Chart 1). During the 1960s, CD rates were subject to interest rate ceilings specified under Federal Reserve Regulation Q. When market rates rose above the ceiling rates in 1966 and again in 1969, demand for domestic CDs dropped. In both instances, the Eurodollar market, which was exempt from the ceilings, got a boost. Then in 1970, the collapse of the Penn Central Transportation Company caused a crisis in the commercial paper market. To ease the resultant liquidity problems, the Federal Reserve took the first in a series of steps to remove interest rate ceilings: it immediately eliminated ceilings on short-term time deposits of \$100,000 or more in value. Growth in large

CDs resumed; the volume of large domestic time deposits, the bulk of which were negotiable CDs, rose from \$21 billion at the end of 1969 to \$334 billion in November 1982. In December 1982 depository institutions were able to begin issuing money market deposit accounts (MMDAs), which paid unrestricted interest rates on consumer deposits with no minimum maturity. MMDAs and other deregulated consumer deposits were very popular. Banks—particularly the large money center banks that had been heavily dependent on wholesale funding—reduced CDs outstanding for a number of months. Expansion resumed in the second half of 1983, partly because brokers sold \$100,000 CDs for regional financial institutions, thus offsetting the decline in money center bank wholesale CDs. In recent years, with the reduction in wholesale CD issuance, the secondary CD market became much less active.

Most primary market sales of large CDs are negotiated between banks and their customers. Most banks still post the rates at which they are prepared to accept deposits for the most popular maturities—one, two, three, and six months—although they will only post attractive rates when they are anxious to issue CDs. Major banks usually have salespeople who keep up with customer needs and call around if the bank decides to make more sales than are achieved through routine contacts. A bank also may place CDs with a dealer who will market them at a concession, although the decline in volume in 1983 reduced the importance of this method of issue. In many cases, dealers will act as brokers, finding customers for a bank's CDs but not taking them into their own positions. Sales handled through dealers tend to be in round lots of \$5 million or more, although \$1 million pieces are placed.

In addition to issuing short-term CDs, primarily with fixed interest rates, banks offer a considerable volume of longer term variable-rate CDs. CDs with an initial maturity of 18 months or more are popular with banks because they are exempt from the 3 percent reserve requirement imposed on shorter term "nonpersonal" CDs. They are priced off a variety of short-term interest rate indexes such as the London interbank offer rate (LIBOR) and the Federal funds rate.

Banks also issue what are known as deposit notes or CD notes, a hybrid between ordinary CDs and corporate bonds. Most of these notes mature in 18 months to about 10 years. Like deposits, they are free of the Securities and Exchange Commission (SEC) registration requirements that apply to bonds. Banks must pay insurance premiums on deposit notes, although some of the notes do

not use the term “deposit” and thus avoid the insurance premium. The FDIC, however, is seeking to collect insurance on all such notes. The notes would also be subject to reserve requirements except that their initial maturities exceed 18 months. Banks must report their deposit note volume to the Federal Reserve as part of their total large time deposits. Like bonds, deposit notes pay interest semiannually, and they are often purchased by traditional bond buyers. Sizable issuance began in 1985, the year CD notes were first rated by major bond rating services.

The secondary CD market became less active as the primary dealer market contracted. In the 1970s and early 1980s, CDs often traded through a brokers’ market in which bids and offers were listed on a “run” of about 10 to 12 banks, with the individual bank names not reported. Beginning in 1982, credit concerns about certain banks “on the run” complicated such trading. As credit problems increased, tiered CD rates for different banks developed and issuance of wholesale CDs diminished. Consequently, trading through brokers disappeared. Currently 10 dealers participate in the secondary market in CDs, although only about 6 are active.<sup>8</sup> Because regional and foreign banks (especially Japanese banks) have become more important as issuers in recent years, they have taken on an expanding role in making markets. With the markets becoming so thin, a dealer that buys a CD from a customer cannot count on reselling it quickly. The dealer therefore will demand a price concession or liquidity premium to protect it in case it has to hold the CD to maturity. It faces financing rates that are generally higher than those on Treasury securities in recognition of the CDs’ lesser marketability and somewhat greater credit risk. The CD futures market, which once provided a means of hedging position risk, has become moribund.

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### 3. Bankers’ Acceptances

The Federal Reserve Act authorized U.S. banks to engage in acceptance financing of the domestic and foreign trade of their customers. Nurtured by the Federal Reserve, the market in BAs burgeoned to the point where it now finances a significant share of trade denominated in dollars in the United States and foreign countries (see Box A, pages 80-81). Federal Reserve regulations continue to govern the issuance of most acceptances, limiting their use to short-term, self-liquidating commercial transactions. Acceptances

<sup>8</sup> A dealer that is owned by a bank is forbidden by Federal Reserve regulations to buy back CDs issued by that bank.

are subject to reserve requirements if they exceed 200 percent of the bank's capital and surplus. Since 1982, when the limit was liberalized, no bank has come close to its limit.

The BA available from banks or in the dealer market is a prime short-term investment because both the bank and its customer are legally obligated to pay it at maturity. Acceptances are written in varying amounts based on the underlying transaction, but they are put together for sale in round lots of \$1 million to \$5 million. The odd lots remaining, in pieces down to about \$25,000, are sometimes sold to individual investors and sometimes held by the accepting bank. About 15 to 20 firms make active markets in these instruments, buying acceptances from the accepting banks and retailing them to corporations, government agencies, foreign investors, banks, and other financial institutions.

Secondary market trading of the larger pieces has grown significantly; dealers typically quote a bid-offer spread of 2 to 4 basis points. Dealers also use brokers to facilitate trading with other dealers while preserving their own anonymity; the cost is one basis point to the originator of the trade. Two "runs" of acceptances trade on brokers' screens, and within each, acceptances trade interchangeably. The domestic run consists of BAs of about 9 to 10 large domestic banks, while the Japanese run consists of BAs of about a dozen Japanese financial institutions. Dealers finance their positions with bank loans or RPs arranged with a wide variety of investors.

BAs trade in a tiered market at rates reflecting the size of the accepting banks, market perceptions of the banks' creditworthiness, and the perceived liquidity of the paper in the market. Membership in the tiers changes from time to time as market conditions and perceptions of credit risk and liquidity are altered. The first tier generally consists of some of the large U.S. banks that constitute the domestic run. The next group comprises 10 to 12 large regional banks and the other names on the domestic run. After that are the Japanese banks. The final tier, a group of perhaps 20 to 25 banks, includes non-Japanese foreign branches and agencies of foreign banks. This tier also includes Edge Act subsidiaries of U.S. banks, institutions established to transact foreign-related business outside of a bank's home state. The spread between the top names and the final group is 10 basis points or more and depends on market conditions. (A basis point is 1/100 of a percentage point.)

The trading desk in New York was an active buyer of BAs for the System's own account from the beginning of the Federal Reserve

**Box: Financing through Bankers' Acceptances**

If an importer and an exporter arrange a delayed payment transaction, the seller must assume the risk that the buyer may be unable to pay....



But if the same basic transaction is arranged with a bank guaranteeing payment, the risk is transferred to the bank.

- Substantial credit risk
- Minor credit risk
- \* Typically an acceptance is purchased (discounted) first by the accepting bank and then resold (rediscounted) to another investor

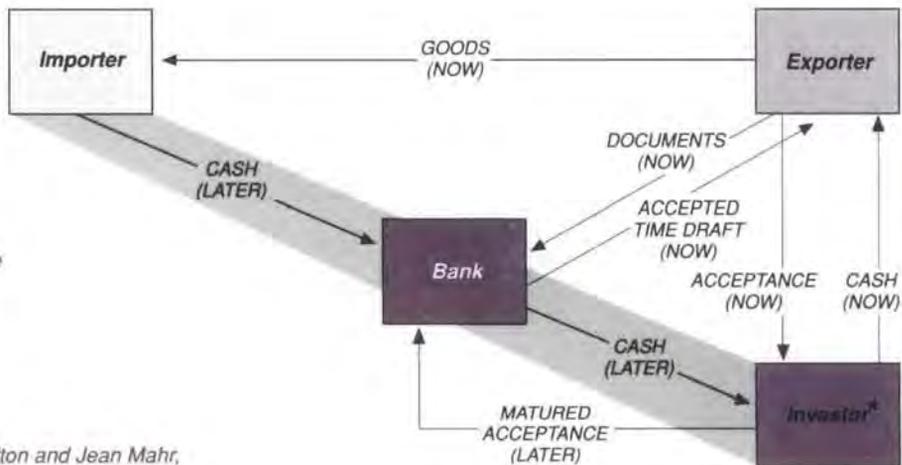


Chart adapted from William Melton and Jean Mahr, "Bankers' Acceptances," Quarterly Review Federal Reserve Bank of New York, Summer 1981, p. 40.

System through the early 1930s and again after World War II until the mid-1970s (although in the postwar years BAs met only a small proportion of reserve needs since Treasury issues had taken over the dominant role). In 1977, the FOMC decided that its active support of the market was no longer necessary and it discontinued its purchases. In 1984, the Fed discontinued its purchases of acceptances under RPs because the volume of government securities available was sufficient to meet its reserve management objectives.

Although the Federal Reserve no longer participates in the acceptance market for its own account, it does purchase and sell

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In the course of international trade, importers and exporters find it advantageous to organize transactions in such a way that the importer does not pay until a specified date in the future. However, in the absence of information on the creditworthiness of the importer, the exporter may be reluctant to extend the credit. Bankers' acceptances are financial instruments that bridge this difficulty; they substitute the bank's creditworthiness for that of the importer. The bank acts as intermediary by guaranteeing to make the payment for the goods on the specified date. The bank guarantees payment by "accepting" a time draft (or order to pay) drawn on it by the exporter. The bank charges the importer a fee, which is usually about 50 basis points but may be larger or smaller, depending on competitive conditions and the creditworthiness of the importer. The accepting bank either sells the acceptance at a discount to a dealer in the secondary market or holds it in its portfolio as an investment. In either case the exporter receives immediate payment for the shipment. At maturity the bank receives payment from the importer and pays the holder of the acceptances. Dollar acceptances are also used to finance trade and other transactions between two foreign countries even though the United States is not a party to the transactions.

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acceptances in the secondary markets on behalf of its foreign official customers. It also retains a direct regulatory role, determining the eligibility of acceptances as collateral at the discount windows of the Reserve Banks. Eligibility at the window is limited to transactions involving original maturities of six months or less for foreign and domestic trade or for storage of goods in transit. Also eligible are dollar-exchange acceptances drawn by approved countries for three months or less to finance seasonal needs. Reserve requirements apply to bills originally written to mature in more than six months and to finance bills issued to raise working capital. These requirements have made such acceptances rare.

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#### 4. The Eurodollar Market<sup>9</sup>

Eurodollars are U.S. dollar deposits at banking offices in a country other than the United States. Eurodollars came into existence in the 1950s when Soviet bloc governments placed dollar deposits in London in order to conduct transactions in Europe and avoid the potential risk that the U.S. government might, for political purposes, freeze deposits held in the United States. Eurodollar deposits proved attractive to a wide range of depositors because, unlike U.S. deposits, they were not subject to interest rate ceilings, reserve requirements, or FDIC insurance premiums. The Eurodollar market—the process through which banks solicit these deposits and place the proceeds—grew spectacularly in the 1960s. Although the interest rate restrictions were gradually removed from domestic deposits beginning in 1970, reserve requirements and insurance premiums have remained in effect. Furthermore, because the dollar finances international trade and investment, investors have found it convenient to hold deposits in the time zones where trade-related dollar transactions are taking place. For these reasons, Eurodollars have continued to be popular.

Eurobanks—which include foreign branches and international banking facilities of U.S. banks—now operate not only in London but also in Tokyo, Hong Kong, Singapore, Bahrain, Western European financial centers, several Caribbean islands, and other parts of the world. Eurodollar deposits may be either nonnegotiable time deposits or negotiable CDs. In contrast to the large time deposits in the United States, nonnegotiable deposits predominate in the Eurodollar market.<sup>10</sup> Both types come in a wide range of maturities, from the next day to five years or more in the future. There are no Eurodollar transactions deposits. The bulk of deposits mature within one year, but multiple-year maturities are considerably more common than in the domestic market. The banks bid for the deposits of international corporations, investors, and governmental units to fund the loans being made to businesses and governments. They also bid for the deposits of other banks or place funds with them, using the huge interbank market to manage the balance between the maturities of their assets and their liabilities.

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<sup>9</sup> *The role of the Eurodollar market in the international transmission of policy impulses is discussed in Chapter 9.*

<sup>10</sup> *In some countries, there are legal obstacles to issuance and clearance of negotiable instruments. Most Eurodollar deposits are arranged through brokers. Rates are quoted relative to LIBOR.*

U.S. banks and resident foreign banks help keep Eurodollar rates closely parallel to rates in the domestic money market. Changes in Federal funds and other short-term U.S. rates rapidly affect Eurodollar rates. Interest rate differentials between Eurodollar and domestic funds that are not based on regulatory differences are quickly eliminated through arbitrage. Same-day settlement of Eurodollar transactions, introduced in the 1980s through the clearing house interbank payments system (CHIPS), reduced arbitrage costs.

U.S. banks may place domestically generated funds in the Eurodollar market for varying terms when interest rate relationships favor such actions. They may also borrow Eurodollars to use in their domestic banking operations. The borrowing of repatriated Eurodollars in excess of the volume that the bank has placed abroad subjects the institution to a 3 percent reserve requirement. The banks closely monitor their net positions and will only take Eurodollars in excess of their placements if the interest rate is sufficiently below the Fed funds rate to compensate for the reserve requirement.

U.S. banks are among the major participants in the Eurodollar market, both through their overseas branches and through their head offices, which in most cases control the global "dollar book." The head office generally conducts the funding side of offshore operations booked in the Nassau, Cayman Islands, and Panama branches — branches which do business on New York time. Since 1981, U.S. and foreign banks have been able to conduct international operations in U.S.-based international banking facilities, free from U.S. reserve requirements, taxation, and FDIC insurance premiums.

Negotiable Eurodollar CDs grew in popularity from their introduction in 1966 until the early 1980s among U.S. and, to a lesser extent, continental investors. U.S. money market mutual funds (MMMFs) were major purchasers of Eurodollar CDs during their period of greatest expansion in the late 1970s and early 1980s but cut back on their takings when the funds shrank in 1983. Patterned after the domestic instrument, Eurodollar CDs are usually issued for maturities of one year or less in minimum pieces of \$1 million. They are delivered and held in London, and paid at maturity in the United States by telegraphic transfer from the London issuers. The negotiability feature enables most banks to offer Eurodollar CDs at rates below those prevailing on Eurodollar time deposits of similar maturity. Rates on Eurodollar CDs are generally slightly higher than those on CDs issued domestically by the same bank. The differential exists because physical delivery of Eurodollar CDs is

more complex, the roles of both the home and host countries' central banks as lenders of last resort are uncertain, and the host government could conceivably restrict withdrawals. Banks are willing to pay the spread because they do not face the costs of reserve requirements and deposit insurance.

London branches of U.S. investment firms and British merchant banks and discount houses provide the main secondary market. U.S. banks and corporations purchase a large share of Eurodollar CDs—reportedly above three-quarters of the total. The quoted bid-ask spread in the secondary market has recently been about 5 basis points, with \$1 million as the basic trading unit. Settlement is made in New York in clearing house funds two days after the trade, but delivery and custody of the CDs are in London. U.S. dealers also make an active market in New York for these Eurodollar CDs.

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### *5. The Interest Rate Swap*

The interest rate swap was developed in the early part of the 1980s. Swaps permit two bond issuers to exchange commitments to make interest payments over the lives of the debt instruments that they issue, although each retains the obligation to pay off its own principal borrowing at maturity. One borrower issues fixed-rate debt while the other issues floating-rate debt with similar maturities. Under the swap, the borrower that issued the fixed-rate debt will pay the floating-rate interest over the life of the instrument, while the party that sold the floating-rate debt will pay the fixed-rate interest.

Swaps can be profitable because of anomalies between fixed- and floating-rate debt markets. Potential lenders at floating rates may differ from potential lenders at fixed rates in their credit evaluation of potential borrowers. Sometimes borrowers find it cheaper to borrow in the fixed-rate market while the revenue streams they will use to service the debt are more closely related to a floating rate; in other instances, the reverse may be the case. Swaps bring together borrowers with opposite revenue patterns. They allow each to borrow in the sector permitting the lower rate option and to hedge the interest rate exposure.

A commercial bank is often the intermediary in a swap, acting as counterparty to two borrowers with opposite mismatches in their borrowing and cash flow structures. In this role, the bank assumes potential credit risks, which become actual risks if interest rate changes unmatch the payment commitments in the offsetting deals. Banks can avoid this interest rate risk by astute offsetting of swap agreements, but sometimes they do not achieve precise matches and therefore assume some residual rate risk.

According to call report data, commercial banks had \$857 billion of swaps on their books as of December 1988.

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## ***Nonbank Financial Instruments***

### ***1. The U.S. Treasury Debt Market***

#### ***a. The primary market***

The U.S. Treasury is the dominant issuer of debt instruments in the financial markets. It sells both marketable and nonmarketable debt, the former representing the larger share of its issuance. It sells bills that mature within a year, notes that mature in 2 to 10 years, and bonds with maturities out to 30 years. The Treasury's regular issuance of securities is an important part of its program for managing the U.S. public debt, which was about \$2.7 trillion at the end of 1988. Of this amount, just over \$1.8 trillion was in the hands of the public, while a little over \$0.2 trillion was held by the Federal Reserve and about \$0.6 trillion was held in Treasury trust accounts. Treasury debt issues are purchased by a wide range of investors who are attracted by the securities' freedom from credit risk, ready marketability, exemption from state and local taxes, and wide range of maturities. Banks, thrift institutions, foreign central banks, and a range of other financial and nonfinancial businesses in the United States and abroad buy marketable Treasury securities. As of December 1988, the Treasury estimated that of the \$1.8 trillion of Treasury debt held by the public, 43 percent was held by banks and other financial institutions, 22 percent by private nonfinancial businesses and individuals, 19 percent by foreigners, and 17 percent by state and local governments.

The Treasury has sold bills at competitive auctions since bills were introduced in 1929. Beginning in the early 1970s, auctions became the predominant sales technique for notes and bonds as well. Nonmarketable debt is sold to specific purchasers on prearranged terms.<sup>11</sup> The Treasury auctions bills most frequently, offering 91- and 182-day bills (generally referred to as 3- and 6-month bills) each Monday (Tuesday, if Monday is a holiday). It sells 52-week bills (referred to as year bills) every fourth week. Bills are dis-

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<sup>11</sup> *Nonmarketable debt includes savings bonds, which are sold to the public as requested. They are sold at a discount and pay the face value at maturity. Special securities are sold to state and local governments when they want to invest the proceeds of a tax-exempt security sale. To keep the local governments from making arbitrage profits from their tax-exempt status by selling low-cost debt and purchasing Treasury debt paying higher rates, the Treasury sells these governments special issues (often referred to as SLGs, or "slugs") that pay rates equal to the municipalities' cost of funds. Some special issues are also sold to Treasury trust funds.*

count instruments, for which the purchaser pays an amount below the face, or par, value. The Treasury repays the face value at maturity. The interest earned, referred to as the rate of discount, is computed approximately as the amount below the face value divided by the fraction of the year that the bill is outstanding.<sup>12</sup>

To obtain bills at an auction, bidders must submit tenders on a timely basis to the Treasury Department or to any Federal Reserve Bank or branch serving as fiscal agent for the Treasury. Currently, tenders are due before 1:00 p.m. eastern time on the day of the auction. The minimum tender size is \$10,000, with additional amounts permitted in \$5,000 increments. Tenders can be either competitive or noncompetitive. Competitive tenders must show both the amount being tendered for and the rate of discount that the bidder is willing to accept. There is no maximum bid size, but the Treasury limits its issuance to any one bidder to 35 percent of the amount of the auction available to the public (exclusive of awards to the Federal Reserve and foreign official institutions). This restriction is designed to prevent one or two parties from taking so much of an issue as to create a situation where the price could be manipulated artificially.

Once the tenders are received, each Federal Reserve office arranges them in ascending rate order. The offices report the amounts at each rate to the Treasury, which then combines the figures. The Treasury will accept all tenders at the rates that were bid, starting with the lowest rate, until it covers the preannounced amount of the auction. If there are more tenders at the highest acceptable rate than needed, the Treasury will make partial awards, proportionate to the sizes of the bids. Bidders seeking only limited amounts, currently \$1 million or less, are permitted to bid noncompetitively. They receive the full amount of their tender at the average rate that emerges in the competitive bidding.

Treasury notes and bonds pay interest in the form of a semiannual coupon. They are auctioned in the same way as bills, except the bidder indicates a yield to maturity rather than a rate of discount on the tender. The minimum tender size is \$5,000 for maturities of three years and less and \$1,000 for longer maturities. The Treasury generally sets the coupon rate at the nearest 1/8 percentage point that produces an average auction price slightly below par.

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<sup>12</sup> The formula for the rate of discount on a bill is:  $d = ((F - P) / F) \times (360 / t)$ , where  $d$  is the rate of discount,  $F$  the face value,  $P$  the price paid, and  $t$  is the number of days to maturity. For bills maturing in six months or less, bond equivalent yields, which are higher, are computed as follows:  $y = ((F - P) / P) \times (365 / t)$ , where  $y$  is the bond equivalent yield. Calculations are more complex for longer time periods since they must account for the semiannual coupon payments made on coupon securities.

The Treasury announces the results of the auction as soon as they are computed, generally about two to three hours after the bidding deadline. Depository institutions and primary dealers must pay the full amount on the delivery date, usually a few days later. Others must either have a bank or dealer guarantee their payment, or they must submit full payment with the tender.

Dealers can judge what rates to bid for a new issue by talking to customers and by trading in the secondary market. Trading begins in new Treasury securities as soon as the Treasury announces an upcoming auction. Dealers trade the securities prior to the issue date in what is called the “when-issued” market. Instead of the usual settlement in a day or two, settlement of such trades will take place on the day that the Treasury delivers the security. The when-issued market allows dealers to sell “short” to customers ahead of the auction date and to cover the sale in the auction.<sup>13</sup>

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*b. The secondary market*

The secondary market is an over-the-telephone dealer market with a large number of participants. Until recently, the secondary market for Treasury securities was essentially unregulated. The Government Securities Act of 1986 introduced regulation setting financial responsibility and custody rules for brokers and dealers in government securities. The rules were designed to preserve the efficiency of the market and to encourage wide participation. As Chapter 7 explains in more detail, the Federal Reserve maintains a list of “primary dealers” from which it selects its trading counterparties, but other firms also trade, subject to rules specified in the act.

In the most actively traded Treasury bills, competition is keen. Bills are quoted in terms of discount rates. The spread between the bid and asked rates quoted to customers is often only 1 to 2 basis points—\$25 to \$50 per million dollars on a three-month maturity. Coupon issues trade on a price basis (except for pre-auction when-issued trading, which is on a yield basis). Prices are quoted relative to the par value of 100, and in increments of 1/32 of a point. Thus a price of 99 31/32 means the issue is 1/32 point below par. As the price falls, the yield rises; the amount of yield increase associated with a 1/32 drop in price is largest for short maturities. It is close to 2 basis points for a note maturing in two years. A 1/32 drop in price lifts the yield on a 30-year bond by only 1/3 of a basis point.

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<sup>13</sup> When dealers sell short, they sell securities that they do not own on the assumption that they can acquire them, either through purchase or loan, in time for delivery.

Bid-ask spreads on coupon issues depend on how actively the issue trades and when it matures. Market spreads tend to widen with maturity because the risk of price fluctuation increases. Spreads generally range from 1/32 to 1/2 point or so, with small, older issues at wider spreads. The spreads also depend somewhat on recent market volatility. Trades can be for any size, although transactions smaller than \$1 million face value are considered to be odd lots and are subject to an extra charge. Most dealers are prepared to "make markets" to customers on the telephone for amounts that are routine in size at that time. Generally, large orders will be accommodated, but occasionally the dealer may need time to assess the market before quoting a price.

The dealers trade actively with each other as a means of achieving inventories consistent with customer demands and with interest rate expectations. Most interdealer trading is arranged through half a dozen brokers specifically serving the dealer community. Dealers post anonymous bids and offers through the brokers on issues they wish to trade. Even after the trade is completed, the dealers do not know their counterparties; they know only that they must be members of the group that has access to the broker. The broker is compensated by the dealer who hits a bid or takes an offering.

Trades are normally for the next day (regular delivery) or two days forward (skip-day delivery), although same-day transactions (cash delivery) can be arranged for bills in the morning. All bills and most coupon issues are held in computerized "book entry" accounts. The transfer of ownership is effected by depository institutions through the Federal Reserve's Fedwire transfer network. Other owners must arrange to have a depository institution, generally a large money center bank, make transfers for them. Securities are transferred in one direction and reserve balances are transferred in the other direction simultaneously so that the party selling the securities does not give up possession until payment is assured and the party buying the securities does not give up the money until the securities are transferred.

In the last few years, participation by foreigners in the U.S. Treasury debt market has mushroomed. Interest by Europeans in owning and trading securities encouraged the expansion of trading in London. Japanese participation fostered a market in Tokyo. Trading also occurs to a lesser extent in Australia, Singapore, and many western European centers. The increased international trading in U.S. Treasury issues has led to expanded participation by foreign-based dealers and lengthened trading hours. Even before the

extensive foreign involvement, trading hours were never strictly controlled because trading took place over the telephone rather than on an organized exchange. Convention held that normal trading in the United States would take place between 9 a.m. and 4 p.m. eastern time, but it was common for trading to range outside those hours when there was significant news. In recent years, however, trading hours have expanded to the point where securities are traded almost around the clock. Brokers operate during the Asian and European trading days to serve those markets. U.S. firms can make trades through the brokers by way of their Tokyo or London operations and will often trade through the London market when important U.S. economic data are released at 8:30 a.m. eastern time.

Government securities dealers perform a variety of tasks. In addition to buying or selling securities at the request of customers, they provide information, analysis, and advice to stimulate trading activity and customer loyalty. To meet customer needs, they maintain inventories of government and other securities, financing them through RPs arranged with corporations or other lenders or, if necessary, with relatively expensive bank loans. They manage their securities positions with a view to profiting from both short- and long-term swings in interest rates. They also engage in "arbitrage" transactions by making offsetting purchases and sales to take advantage of price disparities. For example, dealers can capitalize on the price differences between securities of varying maturities, or on price differentials between cash markets and futures and options markets (discussed below).

Profitability for a dealer firm potentially arises from several sources. A firm can realize a financing or "carry" profit when it earns a return on securities owned that exceeds its costs to finance the securities. A firm may make a position profit from having sold short (sold securities they did not own and borrowed securities to make delivery) in falling markets and having gone long (held inventories of securities) in rising markets. A firm may, in principle, make a trading profit from the spread between bid and offer prices in trading with customers and other dealers, although the business is sufficiently competitive that bid-ask spreads are generally too narrow to serve as a significant source of profit. Arbitrage transactions can be in a source of profit or a protection against losses. Such transactions are often quite complicated, involving offsetting transactions in the cash, futures, and options markets. Dealers generally have in-house traders who specialize in arbitrage. Such transactions are often kept separate from the trading positions of those making markets to customers.

Achievement of substantial profits involves taking risks, since competition limits the returns from risk-free operations. Hedging strategies can be used to manage that risk, but implementing those strategies can be costly. Consequently, dealer operations inevitably show sharp fluctuations in returns that require a firm to be well capitalized if it is to succeed through a range of market conditions.

For most dealers, maintaining a sizable customer base is essential to success in the business. Knowing what customers prefer, what securities they hold, and what they are doing, or thinking of doing, enables the dealer to make markets intelligently, to judge the likely market impact of prospective news developments, and to manage the firm's own positions profitably. The key people in the effort are the traders, who bid and offer close enough to the competition to do business; the sales staff, who keep the customers in touch with the market and the firm in touch with its customer base; and the money market economist, who keeps the traders informed of recent and prospective economic developments and the likely implications for the market.

Many dealer firms have branches in important domestic and international centers to maintain close personal contact with both large and small customers; some of the major stock brokerage firms also draw in retail customers through registered representatives in their large network of stock-oriented branches. Other nonbank dealers and most of the banks rely principally on direct telephone or telex contacts, followed up with periodic personal visits. Leased wire information systems, which keep the customer abreast of the latest market and news developments, have greatly reduced the need for routine informational calls by sales staff. The sales effort has shifted toward providing computerized information on trading spreads and arbitrage possibilities, as well as up-to-the-minute analyses of economic developments and the Federal Reserve's policy posture. The rapid availability of information and analysis has eroded the dealers' comparative advantage in day-to-day trading.

The financing of dealer positions has developed a life of its own. Years ago, the dealers searched out the cheapest source of financing to increase the positive interest rate carry earned on their positions. (The carry is the difference between the interest earned on the security held and the cost of borrowing the money used to purchase the security.) The dealers would try to minimize the negative carry in periods when short-term financing rates were higher than the longer term rates being earned on the security. To improve their returns, both bank and nonbank dealers developed the sale of gov-

ernment and federal agency securities to corporations and other lenders under agreements to repurchase the securities a day, a week, or several months later at the same price plus an agreed rate of interest for the period. Such RPs allowed investors to earn a return on very short-term lending. (Until 1980, banks were not allowed to pay interest on deposits of less than 30 days maturity.) The financing cost to the dealer was typically below the Federal funds rate or the dealer loan rates posted by the major banks—usually by an appreciable amount. Most lenders allowed the dealers the right of substitution of collateral, so that the dealer could sell securities on demand, replacing them with others.

Over the last 15 years, bank and nonbank dealers have run matched books as well. They buy government securities for an extended period under a reverse RP from a holder who needs funds. Then they lend the securities on RP for an equivalent period at an interest rate lower than the one they charge the seller. The matching of maturities minimizes risks from price fluctuations. In effect, dealers have gone into the banking business, taking care that the credit standing of both customers assures the reversal of the transaction. Dealers also protect themselves by taking a greater margin of collateral on the securities acquired than they give when lending the securities. Recent changes, some of them prompted by the failures of a few dealers that had too little collateral and some introduced by the Government Securities Act, increased protection of customers against inadequate collateral in RP transactions. Dealers may also run an “unmatched book”—for example, financing securities acquired under 60- or 90-day reverse RPs with shorter term RPs to increase the interest rate spread earned. Such activity runs the risk, of course, that financing costs may rise in the interim and result in a loss rather than a profit.

Just as dealer position-taking is basically a bet on the future course of interest rates, the unmatched book is a bet on future financing costs. The resale value of the securities is fixed in the original contract, the reverse RP. In a straightforward position play, a dealer may purchase six-month Treasury bills at auction, expecting to finance at a positive carry for three months and then sell the bills at three months to maturity for a gain that, over time, should equal the average difference between three- and six-month bill rates over the cycle. If interest rates were to fall over the interval, both the carry earned and the yield-curve-based sales gain would be larger. But if interest rates were to rise sharply, the carry could become negative at the same time the price of the bill was declining. All

straight position decisions involve weighing the expected behavior of both dealer financing costs and government securities prices.

Government securities dealers are extremely sensitive to the interest rate outlook because their positions at risk can be very large relative to their equity. A multiple of securities held to capital as large as 50, aside from the matched book, is not uncommon for a non-bank dealer expecting a decline in interest rates. A 1 percent rise in the price of securities held in such a situation would increase the dealer's capital by 50 percent; a similar drop would wipe out half of present capital. In practice, dealers tend to make substantial gains by acquiring and financing an outright position during recessions, when rates decline. When interest rates are choppy or rise persistently, however, dealers often encounter moderate-to-large losses, in part because it is difficult to maintain effective markets for customers while holding a sizable net short position. Moreover, borrowing securities to sell short requires using scarce capital to execute reverse RPs or pledging other securities and paying a borrowing fee of 1/2 of a percentage point or more. This strategy requires securities prices to fall sharply for the dealer just to break even.

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### *c. Derivative products*

A number of innovations during the past 15 years have provided new means for hedging interest rate risk or speculating on the future course of interest rates. The new instruments have helped dealers to manage their positions and have enabled a wide variety of businesses to lock in costs or returns consistent with expected cash flows.

Financial futures markets began to develop in the mid-1970s and expanded in the early 1980s as interest rate volatility rose. The growth of futures market activity has spawned so much arbitrage and trading between the cash and futures market that they function as a single market most of the time. Futures markets provide a means of hedging against the effects of volatility, but by making speculative bets easier, they may contribute to volatility at times. Treasury bill and Eurodollar futures trade on the International Monetary Market in Chicago. Futures on Treasury notes and bonds and government-backed mortgage securities trade on the Chicago Board of Trade. These contracts help increase liquidity and flexibility. They allow dealers to offset the positions they must maintain to service customers—or to establish short positions—by entering futures contracts to deliver the specified securities at a limited number of specified dates over two years. The commission cost is

very small—around five dollars per contract on a “half turn” or a single side of the futures transaction. The futures exchanges, which are private corporations of exchange members, issue contracts to buyers and sellers, each of whom must meet the low initial margins set by the exchange. Initial margins are in a range of 1 to 5 percent of the value of the instrument to be delivered. A clearing corporation marks each contract to market daily and requires additional margin when a margin drops below the required maintenance level, which is somewhat lower than the initial margin.

Options on Treasury securities and options on Treasury futures contracts have been available since the latter part of 1982. They expand the range of possible hedging strategies that can be used to manage interest rate risk. Call options give the purchaser the right but not the obligation to purchase from the seller the indicated security or futures contract at a specified (strike) price at any time before the maturity of the contract (a process known as exercising the option). The purchaser benefits if the security or contract price rises above the contract strike price, while the risk from price declines is limited to the price of the option contract itself. Put options give the purchaser the right to sell the security or the futures contract at a set price within the period of the contract; thus they benefit the purchaser in a falling market. Put options are like a short sale but with limited downside risk for the purchaser. Options on futures contracts are much more actively traded than the straight options on securities. The writers of options contracts take open-ended risks from a price rise in the case of a call or a price fall in the case of a put. Writers may hedge this risk through diversification or other techniques, but of course these techniques may have costs that offset the gains from writing options.

Another form of derivative product based upon Treasury debt instruments is the stripped security. Stripped notes and bonds are zero-coupon instruments created by separating the coupons from the “corpus,” or principal, of a security and trading them separately. Like Treasury bills, zero coupon debt instruments are sold at a discount. The return to the investor comes from increases in price until maturity, when they pay the face amount. (As interest rates rise and fall, their actual price will fluctuate around a rising trend line.) With no periodic interest payments to reinvest, these securities have an assured yield to maturity that is not dependent upon a reinvestment return on intervening interest payments. They can be attractive to pension funds and other entities with known future payment commitments. On the other hand, because all the return is deferred to

the maturity date, larger price changes will result from a given change in the general level of interest rates than would occur if the security returned its interest periodically. Consequently, stripped securities may be attractive as a vehicle for speculation.<sup>14</sup>

Stripping of Treasury notes and bonds began during the 1970s. Initially, dealers physically removed the coupons from the corpus, since at the time coupon issues could be bought in definitive (paper) form. Because stripping reduced tax revenues, the Treasury discouraged the practice until 1982, when the tax laws were changed. The new tax laws forced holders of zero coupon and stripped Treasury securities to pay taxes each year on the portion of the accrual representing the movement toward the par value to be paid at maturity. The changes also required new coupon debt to be sold only in book entry and not definitive form. Physical stripping of older issues expanded once the practice was no longer discouraged. Holding of stripped issues mostly attracted entities that were not heavily taxed because the revised laws made the tax burdensome.

Since the new book entry securities could not be stripped, a number of government securities dealers created derivative instruments; they purchased Treasury issues, then placed them with a custodian and sold separate rights to the various coupons and the corpus. These receipts, called by a variety of proprietary names, were popular for a time. In 1985, the Treasury began what is known as the STRIPS program (Separate Trading of Registered Interest and Principal of Securities). It permitted separate registration of the coupons and corpus of the book entry securities and thus allowed dealers to sell them to different purchasers. Later, the Treasury provided the means to reconstitute a complete security if a party had accumulated all the needed pieces. The STRIPS form soon came to dominate the zero coupon market. Its popularity has reflected the interest in zero-coupon products generally, which has varied with perceptions of the future course of interest rates.

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## 2. The Market for Federally Sponsored Agency Securities

A number of special purpose agencies with varying degrees of federal government sponsorship sell debt to finance their support of designated sectors of the economy, primarily agriculture and housing. As of December 1988, regular debt outstanding (excluding pass-through securities, described below) totaled about \$350

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<sup>14</sup> Sean Beckett, "The Role of Stripped Securities in Portfolio Management," *Federal Reserve Bank of Kansas City Economic Review*, May 1988, pp. 20-31.

billion. The principal agencies are the Farm Credit System (FCS), the Federal Home Loan Bank System (FHLB), the Federal Home Loan Mortgage Corporation (FHLMC, also called "Freddie Mac"), the Federal National Mortgage Association (FNMA, also called "Fannie Mae"), the Government National Mortgage Association (GNMA, also called "Ginnie Mae"), and the Student Loan Marketing Association (SLMA, also called "Sallie Mae"). Except for securities of GNMA and some other mortgage-backed securities as well as some special issues noted below, agency debt obligations are not explicitly backed by the full faith and credit of the U.S. government, even though the agencies are federally sponsored. There are other government agencies that have access to the Federal Financing Bank (FFB), which is funded by direct Treasury borrowing. Though these agencies have raised funds through the FFB since 1974, some of them, such as the Postal Service, still have securities outstanding that were sold in earlier years.

The FCS consists of a number of different regionally based institutions that provide credit to farmers. The system has undergone restructuring in recent years as a result of financial difficulties in the agricultural sector that left individual member institutions financially weakened or even insolvent. What had previously been a group of largely independent regional institutions was combined into a more centralized organization in January 1989 when the National Bank for Cooperatives was formed. The problems that led to the restructuring arose when the farm economy deteriorated in the 1980s. Institutions that were members of the FCS suffered dramatic losses. To provide financial assistance to the system, Congress passed the Agricultural Credit Act of 1987. The act, which went into effect early in 1988, authorized the FCS to issue up to \$4.0 billion of 15-year bonds through the Financial Assistance Corporation (FAC), with interest to be partially paid by the Treasury, and provided a \$1.5 billion line of credit with the Treasury. The obligations issued under the plan are fully guaranteed by the Treasury. In 1988, the FAC sold two issues totaling \$690 million. Yield spreads on other FCS debt over comparable-maturity Treasury debt which had risen dramatically relative to those of debt issued by other Federally sponsored agencies when the financial problem developed, gradually declined during the year following the assistance package.

The FHLB, supervised by the Federal Housing Finance Board, provides loans to member savings and loan associations and other thrift institutions as a means of fostering the flow of funds into home mortgages; the Federal Home Loan Banks are owned by the

member associations. The FHLB Board used to oversee the Federal Savings and Loan Insurance Corporation (FSLIC), which insured deposits of up to \$100,000 at thrift institutions, but FSLIC was abolished in 1989 and the thrift insurance fund transferred to the FDIC. As the thrift industry weakened in the early to mid-1980s and FSLIC's resources dwindled to the point where it was technically insolvent by the end of 1986, Congress and the Administration approved a plan under which the newly created Financing Corporation (FICO) could issue up to \$10.8 billion of debt to recapitalize FSLIC. Principal payments on FICO issues are backed by zero-coupon Treasury bonds, while interest payments are secured by a first lien on insurance premia paid to FSLIC. In 1989, the Financial Institutions Reform, Recovery, and Enforcement Act (FIRREA) was passed to resolve the thrift situation. It created the Resolution Trust Company (RTC) and the Resolution Funding Corporation (REFCORP). The RTC manages the liquidation of assets of failed thrift institutions. REFCORP issues debt obligations to fund the rescue operations. The first REFCORP sale was a 30-year bond offering auctioned in October 1989.

FNMA, whose stock is traded on the New York Stock Exchange, operates with guidance from the Secretary of Housing and Urban Development. It buys government-insured and government-guaranteed mortgages and conventional private mortgages in the secondary market. FNMA issues its own debentures and notes and guaranteed pass-through securities backed by pools of mortgages.

GNMA and the FHLMC also operate in the long-term credit market to help finance housing. GNMA is a government corporation that functions principally by guaranteeing pass-through securities. These securities pass through to the purchaser the interest and dividends earned on pools of government-guaranteed mortgages. The holder of the securities receives a pro rata share of the principal and interest payments earned on the mortgages. The FHLMC buys conventional residential mortgages to foster a secondary market for them; it sells pass-through securities and other bonds to finance its activities. The FHLMC's voting capital stock was held solely by the FHLB, but under the terms of the FIRREA, its voting stock will be publicly issued.

SLMA provides a variety of support services to institutions making loans to students. Before 1982, it borrowed directly from the FFB, but since then it has borrowed in the market under its own name. It issues primarily floating-rate debt. Occasionally it sells fixed-rate debt, then converts its payment stream to a floating-rate obligation through the use of swaps.

Federal agencies generally use a designated fiscal agent to manage sales to investors, although FICO, FAC, and REFCORP debt has been sold in auctions. The fiscal agents sell their coupon securities to the public through separate selling groups composed of about 25 to 120 banks and securities firms. Members of each group are allocated securities on the basis of their past performance as distributors; fees paid to each member range from \$0.30 to \$3.00 per \$1,000, and are scaled according to the maturity of the security being sold.

The fiscal agents rely on major members of their selling group for advice in choosing the maturities to be offered and the interest coupons necessary to sell the securities. Because of the long-term profitability of this relationship, members of the group characteristically take up the securities even when they think the pricing is aggressive. The farm credit agencies sell 3-, 6-, and 12-month paper monthly, while intermediate-maturity issues are sold at longer and less regular intervals. The FHLB system sells short- and intermediate-term issues each month. FNMA offers intermediate-term debt approximately monthly and occasionally sells long-term issues. The fiscal agents also sell discount notes maturing in a range of 5 to 360 days through designated dealers, who receive a commission of 5 basis points (0.05 percent) on notes they distribute. Such notes are increased or reduced to reflect cash needs between regular financings; rates are adjusted flexibly to attract funds as needed. Most of the paper sold is in the 30- to 60-day area.

During periods when their credit quality has not been a particular source of concern, agency issues have attracted wide investor participation. Because of their government sponsorship and supervision, the securities of the sponsored agencies generally trade at yields only modestly above those on comparable maturity Treasury issues. Although the yield differentials have usually been small—occasionally as low as 5 basis points in the shorter maturities—they have risen to 100 basis points or more during periods in which financial difficulties of the issuing agencies have raised questions about liquidity and creditworthiness. The yield differentials also reflect the tax treatment. The FCS, FHLB, SLMA, FICO, and FAC issues enjoy exemption of their income from state and local taxation, while those of FNMA, GNMA, and the FHLMC do not.

Most dealers in government securities make secondary markets in these issues, although trading in many outstanding issues is inactive. The size of some issues is small—as little as \$200 million. Perhaps only a dozen dealers are willing to make bids and offers in

most of the over 200 outstanding issues. Bid-ask spreads are related to the amount of activity in the secondary market. They are generally wider than those on Treasury securities of corresponding maturity. Federal agency discount notes, like commercial paper, do not enjoy much of a secondary market. A dealer who distributes the notes is usually prepared to make a bid to a customer who has a pressing need to sell notes, but customers are generally expected to hold the notes to maturity.

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### 3. Corporate Debt Instruments

#### a. Commercial paper

One of the most rapidly growing sectors of the money market in the last 15 years has been the market for the short-term promissory notes of creditworthy financial and other business enterprises.<sup>15</sup> Corporate issuers are attracted by borrowing costs below those available from banks; investors, by the yield premium offered over Treasury issues. To be exempt from registration with the SEC, such notes must mature in 270 days or less and be issued for working capital purposes, such as financing inventories and accounts receivable. The most popular maturities depend somewhat on the rate structure at the time of issuance, with 15- to 60-day paper generally the most common.

Commercial paper is sold to money market investors either directly by a firm's own sales force or through a dealer that makes sales on behalf of many borrowers. Direct placement is characteristic of large finance and credit companies, which are often affiliates of automobile and other manufacturers, and of bank holding companies. Around 40 to 45 percent of the approximately \$450 billion in commercial paper outstanding in the latter part of 1988 was placed directly by such firms with customers. The remainder was placed by a small number of major dealers that have specialized sales forces. Among the approximately 1,000 companies issuing through dealers are several hundred industrial companies and public utilities, and more than 100 each of bank holding companies and smaller finance companies. Foreign banks and a few foreign government agencies also borrow in the market.

Most commercial paper is sold by companies that have good credit ratings. Some small- to medium-sized firms may obtain a letter of credit from a bank—in most instances a foreign bank—that will allow the firm to obtain a strong credit rating. The credit rating

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<sup>15</sup> Municipalities may occasionally issue commercial paper.

companies—Standard & Poor's (S&P), Moody's, and Fitch's—assign numerical ratings to a company's debt after a careful review of the company's balance sheet and operations. S&P and Fitch use ratings of A-1, A-2, or A-3 and Moody's uses ratings of P-1, P-2, or P-3. Perhaps three-quarters of all paper sold is in the top A-1/P-1 grade. Most of the remainder is graded A-2/P-2. Investors have generally shied away from lower graded paper, although some issues of speculative paper have been purchased by investors willing to take a risk in return for a high yield.

Paper issuers generally establish bank credit lines to provide a liquidity backup that will cover the amount of paper they expect to have outstanding. In contrast to the irrevocable letters mentioned above, these more standard lines do not provide a guarantee of the outstanding paper. The rating agencies do not deem full coverage necessary for financial institutions with liquid portfolios or ready access to a central lending agency. In theory, bank credit lines require maintenance of deposits with the bank equal to 10 percent of the credit line, with an additional compensating balance equal to 10 percent when the line is drawn on; in practice, issuers rarely maintain a balance at such a level. Some issuers pay a fee rather than maintain compensating balances.

Allowing for the cost of the liquidity backup, issuers of commercial paper can usually save between 1 and 2 percentage points over the cost of borrowing from a bank at a rate tied to the prime. Recently, domestic and foreign banks have recaptured some of this business by making loans for 30 days or less at a markup over the cost of funds to the bank.

Commercial paper, which continues to be in definitive (paper) form, is sold at a discount and is redeemed at par at maturity. The smallest denomination for dealer-placed paper is \$100,000; blocks of \$5 million or \$10 million are more common, especially on directly placed paper. Paper is lodged by the company with a New York bank, which countersigns and delivers the notes to the commercial paper dealer for payment that same day.

Dealers usually take down paper as it is sold at quoted rates, but they also are prepared to buy paper at a concession for inventory when an issuing company's needs are pressing. Dealers are usually prepared to buy back paper they have sold to an investor, but in fact only a small percentage comes back. Some dealers carry very little inventory for their own account; inventories of others may run around \$400 million and on occasion have reached \$1.5 billion, typically financed at rates above those prevailing for Treasury

issues. Inventories tend to be largest when financing rates are below the return on paper. When financing rates exceed the return, dealers attempt to minimize inventories. Spreads between the rates at which paper is bought and sold are around 10 basis points.

Holdings of commercial paper by MMMFs grew very rapidly in the late 1970s and early 1980s; however, the pace of accumulation slowed after 1984, and the MMMF share of total commercial paper outstanding declined from a peak of around one-third in that year to about one-fourth by the end of 1988. Some of the slack has been taken up by households and pension funds. Other important investors are insurance companies, business corporations, and commercial bank trust departments that manage investments for the account of corporate customers.

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#### *b. Corporate bonds*

While commercial paper helps satisfy the short-term borrowing needs of many firms, corporate bonds are issued to provide longer term financing. They are often classified by the type of issuing firm: public utility, transportation, industrial, financial, or real estate. Because the volume of corporate equities, an alternative source of long-term financing, actually fell in the 1980s, net new issuance of corporate bonds grew very rapidly. Nonfinancial firms accounted for around one-half to three-quarters of net new corporate debt.

Unlike Treasury securities, corporate bonds may carry a significant risk of default. The risk for a particular issue depends in part on how it is secured; mortgage bonds are secured by a first lien on property or equipment, collateral bonds by the holding of securities, and debentures by whatever unpledged assets remain at the time of liquidation.<sup>16</sup> But regardless of the type of security, investors rely on the credit ratings assigned by the major ratings agencies such as Moody's and S&P. These ratings range from Moody's Aaa (or S&P's AAA) for prime-grade issues down to C for the poorest prospects (or S&P's D for issues actually in default). More highly rated issues are naturally offered at lower yields.

Federal Reserve data show that typical corporate bond maturities have fallen in recent years; the proportion of new domestically offered issues in the under-10-year range rose from around 35 percent in 1983 to 55 percent in 1988 as the share of new offerings in the 20-or-more-year range fell from about 35 to 15 percent. The longer maturity issues can normally be called by the issuer at a

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<sup>16</sup> The term "bond" is often used generically to refer to debentures and notes, which have no specific pledged collateral.

prearranged price after an initial period of 5 to 10 years. The issuer will usually call a bond if interest rates have fallen far enough to allow refinancing at lower yields. Even if an issue has no call feature, some of it may be retired before the bond reaches its nominal maturity by means of a "sinking fund" provision. The provision requires the issuer to retire gradually a specified portion of the issue each year; in some cases, the fund requires retiring all of the issue by maturity, but in other cases, a single "balloon" payment at the end may be necessary to retire the remaining debt. Sinking fund provisions are characteristic of industrial bonds but are almost never attached to financial issues. Most corporate bonds pay interest semiannually, though a relatively small volume of zero-coupon corporates has been issued as well.

Corporate bonds are usually sold to the public through underwriting syndicates formed by investment banking institutions that have corporate bond divisions. In 1989, a Federal Reserve Board ruling gave commercial banks limited authority to underwrite corporate debt through their securities subsidiaries. The firm acting as lead manager recommends the maturities and types of issues believed to be consistent with the issuer's financial needs and tests market appetite through conversations with potential large buyers. Each member of the syndicate will be allocated securities to place with its customers. In some cases, a whole issue may be placed privately with a large investor, generally an insurance company, and never be sold publicly.

Public offerings must be registered with the SEC, which requires the corporation to report actual and potential obligations that might affect the ability of the corporation to repay the debt. Since 1982 the commission has permitted "shelf registration," allowing corporate issuers to register their intent to issue debt without specifying issuing dates or amounts (Rule 415). Consequently, issuers can bring the debt to market relatively quickly once the decision is made to offer it. Valid for a period of three years, shelf registration reduces the average cost per offering and allows greater flexibility than issue-by-issue registration. The provision has given rise to a market for medium-term notes, issues with maturities of 5 to 10 years that can be offered whenever market conditions are favorable, much like commercial paper. Insurance and pension funds dominated net purchases of corporate bonds in the early 1980s; life insurance firms were particularly active. Households began to step up net purchases significantly in 1984 and were joined by commercial banks and foreign investors a couple of years later.

Nearly all secondary market trading of corporate bonds takes place in the over-the-counter market, with the residual occurring on organized exchanges such as the New York Stock Exchange. The over-the-counter market is made by securities dealers who trade directly with other dealers and with large institutional investors. Given the vast number of outstanding corporate issues, the market for most individual issues is illiquid, although the market for particular types of bonds may be fairly broad. Since corporate bonds are less liquid than Treasury securities, the bid-ask spreads quoted by dealers normally exceed those on Treasuries; investment-grade corporate spreads typically range from 1/8 to 3/8 percent, while spreads for lower rated issues are larger. Issues listed on an exchange are more liquid than otherwise similar unlisted issues.

An important development in the corporate bond market in the 1980s has been the explosive growth of relatively risky bonds, generally referred to as "high-yield" or "junk" bonds. These issues offer nominal returns which have generally been about 2 to 7 percentage points above those on Treasury issues of comparable maturity (higher if the issue is considered to be in imminent danger of default). They carry Moody's ratings of Ba1 or less and S&P ratings of BB+ or less. Some investors, such as commercial banks, cannot hold high-yield bonds but are limited to investment-grade issues carrying ratings of Baa (Moody's) and BBB (S&P), or higher. FIR-REA stipulates that thrift institutions will have to divest their holdings of lower rated bonds over five years.

Junk bonds appealed to many investors who were attracted by their high yields. From the issuer's point of view, high-yield debt was an attractive means of financing risky corporate acquisitions; the intent was to sell newly acquired assets to provide funds to pay interest and principal on the debt. To some extent, the expansion of junk bond issuance represented a substitute for private placements of unrated bonds primarily with insurance companies. (Unrated private placements remain a popular means of finance.) To a greater extent, it represented conversions, from equity finance to debt finance, undertaken at least partly for the tax benefit. In some cases, the company's management bought outstanding common stock, financing the purchase through sales of bonds. In other cases the conversions were accomplished in a takeover by an outside interest. From 1982 to 1986, new issuance of junk bonds expanded at about an 85 percent annual rate,<sup>17</sup> reaching a

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<sup>17</sup> From data reported by Morgan Stanley.

point where the bonds accounted for about a quarter of new corporate debt issuance. New issuance leveled off after 1986.

The market for junk bonds has received a number of setbacks, each of which led to widened spreads and a reduction of issuance. In 1986, it faced a default by LTV, a big steel producer, and a protracted insider-trading scandal; in October 1987, the stock market crash reduced the attractiveness of issues to finance takeovers and leveraged buyouts; and in 1989 Campeau Corporation, a real estate and large retail firm with an extremely heavy volume of debt outstanding, struggled to raise cash to meet debt service payments and avoid bankruptcy. Its troubles made investors more sensitive to the relationship between debt service costs and revenues, and more selective in their purchases.

The higher yields offered by junk bonds relative to investment-grade issues should compensate for the higher risk of default. It is an open question whether the spreads between the two types of bonds are appropriate. Some studies have concluded that a diversified junk bond portfolio will earn enough over time to more than compensate for the higher level of defaults. Other studies, using different methodology, have reached the opposite conclusion.<sup>18</sup> In any case, the substantial increase in volume of junk bonds in the 1980s means that studies drawn from an era when the market was smaller may not be totally applicable to the future.

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#### 4. Municipal Securities

Municipal securities are issued by state and local governments and by special authorities providing services such as housing, education, transportation facilities, and industrial development. Issues maturing in one year or less are generally referred to as "notes," while longer term obligations are known as "bonds"; the great bulk of funds raised in the municipal market take the form of bond offerings.<sup>19</sup>

Until recently, the distinctive feature of municipal bonds had been their exemption from federal income taxes as well as from state and local taxes for investors residing in the state in which the

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<sup>18</sup> *The classic study supporting the first view is Walter Braddock Hickman, Corporate Bond Quality and Investor Experience (Princeton: Princeton University Press, 1958). For a more recent analysis, see Jerome S. Fons, "The Default Premium and Corporate Bond Experience," The Journal of Finance, vol. 42 no. 1 (March 1987), pp. 81-97. For a contrary view, see Paul Asquith, David W. Mullins, Jr., and Eric D. Wolff, "Original Issue High Yield Bonds: Aging Analysis of Defaults, Exchanges, and Calls," The Journal of Finance, vol. 44, no. 4 (September 1989), pp. 923-52.*

<sup>19</sup> See Public Securities Association, *Fundamentals of Municipal Bonds*, 3rd ed., 1987.

securities were issued. Because of the bonds' unique status, municipalities could issue high-grade debt at yields that were usually below those on taxable bonds of comparable maturity. But changes in the Federal tax code, particularly the Tax Reform Act of 1986, have eroded the tax-exempt status of municipal bonds.<sup>20</sup> Among the more important changes are: 1) treatment of private purpose (industrial development) bonds issued after August 7, 1986 as a "preference item" under the alternative minimum tax, so that the tax-exempt status of municipal issues now varies from investor to investor, 2) limitations on the volume of partially taxed private purpose issues that can be offered annually in each state, 3) elimination of the deductibility of the interest cost incurred by financial institutions in borrowing to buy municipal bonds, and 4) a prohibition against the practice of issuing low-yielding municipal bonds to invest in higher yielding debt. After the reforms restricted the ability of municipalities to issue tax-exempt debt, a few municipalities began to offer fully taxable issues.

Like corporate debt, municipal bonds carry some risk of default. Investors were reminded of that risk in 1975, when New York City temporarily defaulted on a note issue, and again in 1983, when Washington Public Power Supply System defaulted on \$2.25 billion of bonds. Substantial help in assessing the likelihood of default is offered by Moody's and S&P.<sup>21</sup> Before assigning ratings, the firms must consider the security for each issue. Generally, municipal bonds can be secured in one of two ways: "revenue" bonds are issued to finance specific projects, and the proceeds of those projects, normally in the form of user fees, are used to service and retire the debt; "general obligation" bonds are backed by the full faith and credit of the issuer, which can use its taxing authority to raise funds to pay interest and principal on the bonds. Some issues are hybrids of the two types, and a sizable proportion of new debt is independently guaranteed by firms that specialize in municipal bond insurance.

Investors in municipal bonds were traditionally drawn by the tax-exempt feature. The three major groups of investors have been households (including mutual funds), commercial banks, and property and casualty insurance firms. The tax reforms encouraged households, the group of investors with the largest holdings,

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<sup>20</sup> The word "bond" should be understood to mean both notes and bonds throughout this section, unless otherwise indicated.

<sup>21</sup> The ratings schemes for municipal bonds are similar to those for corporate bonds. For municipal notes, Moody's uses the symbols MIG 1 to MIG 4, while S&P uses SP-1 to SP-3.

to expand that share to around 50 percent by the end of 1988, according to Federal Reserve statistics. Although lower marginal tax rates and the alternative minimum tax have reduced the attractiveness of municipal bonds, other tax shelters available to households have been curtailed as well. By contrast, the elimination of the deductibility of carrying costs has greatly diminished the after-tax yields on municipal bonds for commercial banks; their share of holdings, which was already falling in the 1980s, declined further to about 25 percent by the end of 1988. Property and casualty insurers have generally invested in municipal securities when they have profits to shelter. These firms reduced their holdings of municipal debt during several unprofitable years through the mid-1980s. But as tax reform increased accounting profits by reducing the extent to which insurers could carry losses forward, some firms again found "munis" a profitable investment.

New public offerings of municipal bonds may be marketed either by competitive bidding among underwriters or through directly negotiated underwritings. Underwriting is done by investment and commercial banks. Most general obligation issues are competitively offered, while revenue issues may be underwritten through either method. Once distributed, issues trade in a fairly active secondary market. Though municipal issues are not listed on formal exchanges, the secondary market is maintained by hundreds of dealers nationwide. Transactions may be carried out by phone, and issues are advertised both through the *Bond Buyer's* "munifacts" teletype system and through S&P's *Blue List* publication. Typical bid-ask spreads quoted by dealers for retail investors are about 2 points, while spreads for institutional investors tend to run around 1/2 point or less.

This review does not cover some other major components of the U.S. financial markets, such as the mortgage market (although touching on some of the Federally sponsored agency issues that are backed by mortgages), and the market in equities.

## *The FOMC Meeting: Developing a Policy Directive*

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At each of its eight scheduled meetings a year, the Federal Open Market Committee (FOMC) develops its policy priorities and prepares instructions for carrying them out. At the February and July meetings, the FOMC focuses explicitly on annual growth ranges for specified monetary and credit aggregates and sets forth the range of expectations among FOMC members and other Reserve Bank presidents for real GNP, inflation, and employment. This review provides the Chairman with information for the semiannual testimony before the House and Senate Banking Committees required by the Humphrey-Hawkins Act.<sup>1</sup> At the other six meetings each year, the longer run money and credit targets may be reviewed if special conditions so require. But any such discussion is likely to be shorter and less formal.

At all of its meetings, the FOMC develops policy specifications to guide the domestic trading desk at the Federal Reserve Bank of New York. The FOMC discusses the outlook for economic activity, the monetary aggregates, inflation, and financial market conditions. It weighs information from a variety of sources and considers the likely consequences of alternative policy prescriptions. Table 1-5, page 107, presents a typical FOMC meeting agenda.

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### *Preparation*

In advance of each FOMC meeting, documents are prepared and circulated to those who will attend and to other staff members at the Reserve Banks who brief their presidents. Three of these documents are described by the colors of their covers as the green book, the blue book, and the beige book.

The green book presents the Board staff's detailed appraisal of the forces currently at work in the major economic sectors and in the financial markets and summaries of the outlook for domestic economic activity, prices, and the international sector. Tables present quantitative forecasts of a number of key economic and financial variables for the current and upcoming calendar years. Generally, the forecasts take into account the longer run monetary growth rate ranges most recently adopted. While the forecasts make use of structural econometric models, the end product relies heavily on the judgment of the senior staff members.

The blue book provides the Board staff's view of recent and prospective developments related to the behavior of money, bank reserves, and interest rates. In the blue book prepared for the

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<sup>1</sup> Formally titled the "Full Employment and Balanced Growth Act of 1978."

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**Table 1-5 Federal Open Market Committee Meeting****Sample Agenda**

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**1. Approval of minutes of actions taken at the last meeting of the Federal Open Market Committee.**

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**2.\* Foreign currency operations.**

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- A. Report on operations since the last meeting.
  - B. Action to ratify transactions since that meeting.
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**3.\* Domestic open market operations.**

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- A. Report on operations since the last meeting.
  - B. Action to ratify transactions since that meeting.
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**4. Economic situation.**

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- A. Staff report on economic situation.
  - B. Committee discussion.
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**5. Longer run ranges for monetary policy (February and July meetings).**

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- A. Staff comments.
  - B. Committee discussion and actions on longer run ranges.
    - 1. Review of ranges for year in progress.
    - 2. Establishment of tentative ranges for following year (July meeting).
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**6. Current monetary policy and domestic policy directive.**

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- A. Staff comments.
  - B. Committee discussions.
  - C. Action to adopt directive.
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**7. Confirmation of date for next meeting.**

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*\* At the February and July meetings, reports on operations in foreign currencies and the domestic securities market and their discussion are sometimes deferred until after the longer run ranges are developed.*

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February meeting, the staff presents monetary growth scenarios for the year just beginning. In July, the blue book offers a review and outlook for the year in progress and a preliminary look at the following year. Both the February and July blue books set out alternative annual ranges for growth of the monetary aggregates to be presented in the Humphrey-Hawkins testimony later in the month. Also noted are developments that might lead the Committee to reconsider its earlier target ranges for the aggregates for the current year.

All eight blue books provide the Board staff's view of monetary and financial developments for the few months surrounding the meeting in question. The staff typically offers three alternative combinations of reserve pressures and three-month growth rates for those monetary aggregates being targeted, along with amounts of discount window borrowing and short-term interest rates expected to be associated with each alternative. It identifies the likely effects of the suggested combinations on future economic activity. The Committee traditionally targeted M1, M2, and M3, but the demand for M1 shifted so much in the 1980s that the FOMC stopped setting targets for that aggregate. To aid its judgment, the staff draws on simulations of money demand in monthly and quarterly econometric models. In addition, recent special studies of factors affecting the demand for money may be employed, particularly at times when changing institutions or changing perceptions of inflation seem to be altering the previous relationships.

The beige book, made available to the public shortly before each FOMC meeting, presents reports on regional economic conditions in each of the 12 Federal Reserve Districts. The reports are compiled from conversations with local business leaders and analyses of statistical reports for the area. A summary of the conditions described by the 12 Banks leads off the report.

Before every FOMC meeting, a series of briefings and discussions are held. Members of the Board staff review their economic forecasts with the governors. Each Reserve Bank president discusses with staff members policy options that will be addressed at the FOMC meeting. Reserve Bank research officers may also present their own review of economic and financial developments, delineating any differences they have with the Board staff's monetary or economic outlook.

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## *The Meeting*

The FOMC meetings take place in the boardroom of the Board of Governors in Washington. The seven governors and 12 Reserve

Bank presidents gather around a long conference table, along with the Secretary of the FOMC, Board staff members serving as advisers to the FOMC, and two officers of the New York Reserve Bank—the Manager of Foreign Operations and the Manager of Domestic Operations. Senior research officers of the Reserve Banks, other senior Board officials, and an officer from the New York Reserve Bank’s domestic trading desk sit around the sides of the room.

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### *1. Reports of the Managers*

#### *a. The report on international developments*

The Chairman generally opens the meeting by seeking approval of the minutes of the previous meeting. The next order of business usually involves reports by the Managers for foreign operations and for domestic open market operations. At the February and July meetings, however, these reports are occasionally deferred until after the discussion of the longer term policy specifications. The Manager for foreign exchange operations reviews developments in the exchange markets during the period and describes any intervention by the foreign trading desk to buy or sell dollars against foreign currencies. The Manager gives reasons for such intervention, highlighting information contained in a more detailed written report submitted previously. Following questions and discussion of international developments, including the response of the exchange markets to U.S. economic statistics, the actions of foreign trading desk generally are ratified by the Committee.

The FOMC and the Foreign Exchange Department of the New York Bank are important players in the conduct of foreign exchange policy, but responsibilities in this area are shared by the Federal Reserve and the U.S. Treasury. The Treasury has broad responsibilities for the country’s international financial policy while the Fed plays a key policy and technical role in matters touching the foreign exchange markets. Exchange rate policies and operations are the subject of continuing conversation between the Treasury and the Federal Reserve, and the actual operations are carried out on behalf of the Federal Reserve System and for the Treasury by the Federal Reserve Bank of New York. The Chairman, other FOMC members, the Manager for foreign operations, and the Board staff periodically exchange views with senior Treasury officials on U.S. policy in the foreign exchange markets.

The FOMC adopts general guidelines and monitors activity with respect to foreign exchange operations by the Federal Reserve System. The Federal Reserve operates for its own account in the

foreign exchange markets through the foreign trading desk at the New York Federal Reserve, which also serves as agent for the Treasury in the Treasury's foreign exchange operations.<sup>2</sup> As the nation's central bank, the Federal Reserve has close working relationships with foreign central banks, and the New York Reserve Bank may execute foreign exchange transactions on their behalf in the U.S. market.

During the meeting, the Manager for foreign operations may comment on the views expressed by the central bank governors of major industrial countries at their monthly meeting at the Bank for International Settlements in Basle, Switzerland. At times, the Chairman or one of the Committee members reports on discussions of current issues with foreign officials or with the Treasury. Committee members routinely question the Manager about foreign central bank policies and developments in the exchange market. They may ask the Manager to predict how the exchange market would react to a change in the Federal Reserve discount rate or in the approach to supplying nonborrowed reserves. Members often ask the Board staff about the U.S. balance of payments and other international economic developments.

The Committee is also responsible for monitoring operations executed under the Federal Reserve swap network—reciprocal credit lines established between the Federal Reserve and other central banks. From modest beginnings in 1962, the network grew to \$30.1 billion of standby credit in October 1989, negotiated between the Federal Reserve and 14 foreign central banks plus the Bank for International Settlements.<sup>3</sup> The swap network is occasionally used by the Federal Reserve or one of its partners to supplement its holdings of foreign currency for intervention in the foreign exchange markets (although the frequency of use has diminished in recent years because the Federal Reserve and other central banks hold foreign exchange balances outright). From time to time, swaps have also been used temporarily by countries in the process of negotiating major borrowings to refinance outstanding loans. Swap drawings can be arranged quickly by telephone or other means,

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<sup>2</sup> *The effects of intervention on bank reserves are discussed in Chapter 6, Box B. On occasion, the United States has expanded its foreign currency resources by drawing down its reserve position at the International Monetary Fund through sales of Special Drawing Rights, and it has issued securities denominated in foreign currencies in the capital markets of other countries. These operations are conducted by the U.S. Treasury. Intervention has occasionally been financed with swap lines, described below.*

<sup>3</sup> See Sam Y. Cross, "Treasury and Federal Reserve Foreign Exchange Operations," *Federal Reserve Bank of New York Quarterly Review*, Autumn 1989.

with the central bank supplying the currency needed. Such drawings, which pay interest, are typically arranged for three-month periods and can be renewed for additional three-month terms by mutual consent. Over the years the FOMC has maintained the principle that swap drawings are to be fully repaid within a year.

The Manager for foreign operations reports to the Committee on any outstanding swap drawings that are approaching maturity and outlines current plans for the drawing party to repay. The Committee, aided by its staff, also reviews and approves any additions to individual country swap lines and any changes in the instructions under which the Manager conducts foreign exchange operations.

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*b. The report on domestic operations*

Once the Committee has considered the foreign exchange issues before it, the Manager for domestic operations reports on the implementation of the Committee's directive since the last meeting. The Manager typically reports whether the policy instruments have been held as initially specified by the FOMC at its last meeting. If they have been changed, the Manager relates the reasons for the adjustment, commenting on the monetary and economic conditions that precipitated the change. The Manager then describes the behavior of nonborrowed and borrowed reserves relative to the objectives set for them and explains any special factors that might have led to either deliberate or unintentional misses. Such misses may occur when the behavior of excess reserves deviates from normal assumptions or when banks modify their willingness or reluctance to borrow at the discount window. Large errors in projecting the behavior of technical factors affecting reserves can also cause deviations. If in the period since the last meeting, the normal relationships between nonborrowed and borrowed reserves and reserve pressures had seemed to shift, the Manager, in consultation with senior Board staff and the Chairman, would have had to make choices as to what, if any, modifications were appropriate in the desk's immediate objectives. The oral comments at the FOMC meeting would indicate how such situations had been handled. These comments supplement material in a written report submitted in advance that covers daily domestic operations and changes in the System portfolio over the intermeeting period.

In the presentation, the Manager discusses financial market developments in the intermeeting period, with special emphasis on the Treasury market and the Federal funds market—the overnight market in bank reserves. The Manager reports any changes in

market sentiment about the interest rate outlook, shifting perceptions of the pace of economic activity and inflation, and market views of the likely course of Federal Reserve policy. Attention may be given to legislative initiatives, budgetary developments, or changes in the market response to developments in the foreign exchange markets.

If unusually large needs to add or drain reserves are expected to develop in the upcoming intermeeting period, the Manager may ask the Committee to amend the authorization for domestic operations to permit a larger than normal net change, or "leeway," in the System portfolio over the period. As of 1989, the normal intermeeting leeway was \$6 billion.<sup>4</sup> (Chapter 7 gives a more detailed description of the authorization for domestic operations.)

Following the Manager's report, FOMC members may comment or raise questions about operations or market developments. They may ask about market expectations concerning future policy. Finally, the Committee is asked to ratify the operations conducted over the interval.

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## 2. Sizing Up the Economic Situation

### a. The Board staff presentation

Members of the Board staff then review current and prospective economic and financial developments, summarizing the material presented in the green book. Typically, the forecast horizon includes both the current year and the following year. At the February and July meetings, the presentation is more extensive than at other meetings and includes numerous charts and reports from specialists in several fields. The staff presentations explain the green book's forecasts and comment on its estimates of a number of measures, including prospective output, employment, and prices. The staff members examine factors underlying the forecasts such as expected personal consumption expenditures, business fixed investment, home sales, government spending, trends in labor productivity, wage settlements, and unit labor costs. The analysis may touch on the extent to which tax policy or inflationary expectations are influencing consumer spending and home construction. Business capital spending plans may be evaluated.

The international staff presents its views of the output, growth, and price performances expected abroad in relation to U.S. performance

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<sup>4</sup> On occasion, the need for greater leeway is not foreseen at the time of a meeting, but shifting conditions introduce a need between meetings. The Committee members are advised by the Chairman of the need during the intermeeting period and are canvassed for their votes.

and the implications for trade and current account balances and the dollar's exchange rate. The staff goes on to outline expected credit flows and interest rates associated with established policy priorities.

Following the staff presentation on the economy, Committee members generally ask a number of specific questions about the assumptions underlying the forecasts. They may inquire how economic forecasts would change if certain factors behaved differently. They often ask senior staff members whether a forecast is more likely to err on the high or the low side.

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#### *b. Discussion of the economy*

The Committee members (and the nonvoting Reserve Bank presidents) then present their views on the economy, including the outlook. At the February and July meetings, they will have submitted in advance their individual estimates of economic growth, inflation, and unemployment. They may defend or modify those forecasts as a result of the discussion. The ranges and central tendencies of these forecasts are included in the Humphrey-Hawkins report.

In the commentary, the Board staff's latest forecasts for the economy are used as a benchmark. In giving their assessments of the economy, the governors and presidents typically note the areas of agreement or disagreement with the staff. The speakers employ a range of analytical approaches to the topic when they comment. Some build their conclusions about the total economy from the spending dynamics they observe in the consumer, business, and government sectors. Others may focus on particular factors that they believe play a key role in indicating the direction in which the economy is headed. A policymaker may cite developments in one or a few key industries or single out recent interest rate movements, commodity prices, or the exchange value of the dollar as a key indicator of future economic activity and inflation. Others put a heavier emphasis on past monetary or credit expansion. Some Reserve Bank presidents may remark on regional developments, but typically they stress that their view of appropriate monetary policy is not based on merely local factors.

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### *3. The Longer Run Monetary Targets*

#### *a. Presentation*

Generally at this stage of the February and July meetings, the Committee turns its attention to the longer run ranges for money and credit growth. At the start of the discussion of the annual rates for money growth, a senior Board staff member, usually the Director

of the Division of Monetary Affairs (the key staff member responsible for policy implementation), highlights the significance of the material covered in the blue book. This speaker describes the alternative annual growth rate ranges and the reasoning behind them.

The Director may offer comments on income velocity—the rate of turnover of money relative to GNP. As noted in Chapter 1, until the early 1980s, M1 velocity had followed a reasonably predictable trend, growing at an average annual rate of about 3 percent between 1960 and 1980. Velocity generally accelerated during expansions, especially when inflationary pressures built up and interest rates on alternative liquid assets rose. It increased more slowly or declined during recessions, when interest rates fell and inflationary pressures subsided. Accordingly, descriptions of velocity during those years had focused mostly on the stage of the business cycle.

The tenor of the presentation on longer run monetary targets gradually changed after it began to appear in 1982 that the traditional velocity relationships were breaking down. As Chapter 1 indicated, a combination of interest rate deregulation, the creation of new types of deposits, and sharp shifts in actual and perceived inflation was changing both the demand for money and its interest elasticity and thus the relationship between money and GNP. The staff presentations during the 1980s often included comments on demand shifts observed to date and cited recent research results in an attempt to shed light on the changes. For instance, the presentation might have focused on how money demand was adjusting to the removal of an interest rate ceiling from a particular type of deposit. Alternatively, it might have examined how banks were changing their methods of establishing compensating balance requirements in the face of declining or rising interest rates.

While cognizant of sharp variability in velocity, the staff and the FOMC have retained the belief that the behavior of money over time has an important influence on inflationary pressures. Accordingly, they have increased the attention given to the broader aggregates, M2 and M3, in the wake of the distortions to M1 behavior. M2 and M3 have not been immune to the changes in financial practices taking place, but generally they have seemed less severely distorted.

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#### *b. Developing annual ranges*

Following the staff presentation, the Chairman calls for a general discussion of the ranges of money and credit growth to be adopted for the current calendar year and, at the July meeting, tentative growth

ranges for the next year. As the governors and presidents speak, they may spell out the growth objectives they consider appropriate.

A starting point for the Committee's deliberations is the blue book formulation of two or three families of annual growth rates for the monetary and credit aggregates being targeted or monitored, and the economic, price, and interest rate patterns expected to be associated with each option. Recently the aggregates have been M2, M3, and nonfinancial debt. Each participant either signifies agreement with one of these options or proposes different ranges. A speaker may expect that the relationships among the growth rates of the monetary aggregates will differ from the staff's estimates. Therefore, he or she may want to change the range for one of the aggregates while concurring in the staff's suggestions for the others. Some Committee members may express a preference for widening the growth ranges to encompass the staff forecast for nominal GNP while allowing for a wide range of behaviors of velocity. Others may suggest narrower ranges as a means of imposing a tighter discipline on the policy process. All are concerned about the message that will be conveyed if the new annual objectives do not seem consistent with the past performance or the desired future performance of the economy.

In making policy choices, Committee members interpret the staff's recommendations in light of their own views. For example, while acknowledging that the staff's projection of the economy's performance is both reasonable and desirable, a member may still conclude that money will have to grow more rapidly than the staff judges necessary in order to accommodate a larger-than-predicted shift in the money demand function. Another member may believe that the rise in interest rates that the staff associates with achieving the money growth objective will in fact keep the economy from attaining its projected level of performance. At times, members may essentially agree with the staff's formulation of interest rate, monetary, and GNP relationships but wish to see faster monetary growth. They may reason that excess capacity is sufficient to permit more rapid economic expansion than the staff believes feasible without creating undue inflationary pressures. At other times, individual members may desire slower growth of the monetary aggregates. Rapid money growth is most likely to be troubling when other precursors of inflation such as speculative increases in precious metal or other commodity prices have been observed. At other times, members may fear that allowing shortfalls in money growth to persist will lead to a recession, which in turn may encourage an overly stimulative fiscal policy.

The Committee's wide-ranging discussion underscores the complexities and uncertainties affecting decentralized decision making in a flexible and efficient market economy. Still, the Committee must set monetary and credit objectives in this uncertain environment, recognizing that it may neither achieve them nor the economic performance its members wish. When the voting members give the actual growth ranges they favor for the calendar year, their views are often closer than one might expect from the diversity of their analyses. After the discussion, the Chairman can usually present ranges for the monetary and credit aggregates that will command majority support. Further discussion indicates whether a modification of the Chairman's proposal will pick up additional support. Prompted by a strong desire to be as united as possible in setting the year's objectives, the Committee members reach their decisions with considerable give and take along the way. Even after the agreement on the growth rate ranges is achieved, however, members of the voting majority may well entertain different expectations of what the fulfillment of those objectives will mean to the economy's performance. (Members are free to modify their estimates of GNP growth and price performance following Committee discussion.) If a consensus is emerging, a vote on the longer run specifications may be taken at this time. Sometimes the vote may be postponed in the hope that subsequent discussion of the short-run parameters will clarify the options.

Once a set of long-run specifications has been approved, the Committee considers how to express its choices in the policy directive. The blue book contains suggested wording for the paragraph on the longer run aggregates. Usually, the Committee uses that wording, but occasionally it may make some modifications to highlight a particular concern.

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#### *4. Short-Run Policy Alternatives*

##### *a. Presentation*

The Monetary Affairs Division Director then discusses alternatives for the short-run growth paths for the monetary aggregates, along with associated amounts of discount window borrowing and ranges for the Federal funds rate. The presentation draws upon and amplifies the material presented in the blue book. At the February and July meetings, the Director gets right to the specific policy alternatives, since the presentation on long-run ranges will have included general comments about factors affecting the behavior of the monetary aggregates. At other times, this portion of the meet-

ing starts with a review of the recent behavior of the aggregates, with attention to any special factors that have been upsetting the normal relationships.

At all meetings, the Director refers to alternative specifications (typically three are provided, labeled A, B, and C) for three-month growth rates of the monetary aggregates spanning a calendar quarter. The central alternative, labeled B, normally contains the monetary growth rates estimated by the staff to be consistent with the prevailing degree of reserve pressure and amount of discount window borrowing. If financial market participants expect reserve pressures and the discount rate to remain unchanged, then the Director will probably suggest that money and bond market rates would hold steady if the Alternative B specifications were adopted. But if holding pressures steady would surprise market participants or if special seasonal factors were expected to distort rate relationships, the Director could indicate that some other rate behavior was likely.

Alternative A usually encompasses reduced reserve pressures and higher monetary growth rates relative to the Alternative B assumptions. Normally, a decrease in reserve pressures would be achieved by lowering the assumed level of discount window borrowing incorporated in the reserve paths. As a rule, the blue book does not discuss possible discount rate changes as an alternative approach to reducing pressure because the FOMC does not have the power to change the discount rate and consequently no definitive decision could be reached on that score. If borrowing were already about as low as it was likely to go, however, a discount rate cut might be suggested as an alternative. (The presidents and governors at the meeting would know if there had been initiatives for cuts made by any of the Reserve Banks. The governors would also know if they were inclined to approve them.) The Director is likely to suggest that adopting the Alternative A specifications will lead to lower short-term interest rates, while the behavior of long-term rates will depend upon how market participants regard such a move. If participants see the policy as a desirable stimulus to financing investment, they may help to bring down rates. But if they believe such a policy to be inflationary, they might react by pushing up rates on long-term financial instruments.

Alternative C usually encompasses an increase in reserve pressures relative to the B alternative. Its adoption would be expected to slow money growth relative to its current course. The Director will note that market participants would probably respond to the adoption of this alternative by pushing up short-term rates and that

long-term rates might also rise if the action were seen as restricting credit flows. On the other hand, if the move were seen as a welcome attack against rising inflationary forces, long-term rates would be expected to remain steady or even decline.

Once the Director's presentation is completed, Committee members may ask technical questions about the behavior of the aggregates or other specifications. Members may also ask the Director about the likely market reaction to a particular policy course.

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## *5. Preparing the Directive*

### *a. Discussion of the specifications*

Next, the Chairman turns to the specifications to be used in writing the section of the policy directive that will guide the New York domestic trading desk in its execution of policy until the next FOMC meeting. Opening remarks are designed to give some focus to what follows. The Chairman may express particular concerns about policy or comment that Committee members appear to be in general agreement about the appropriate direction of policy.

The Chairman then asks the other 11 voting members of the FOMC and the 7 nonvoting presidents to offer their policy preferences. The discussion is generally couched in terms of the blue book alternatives for the short-run aggregates and the initial borrowing assumption. The speakers use a shorthand, saying, for instance, that they favor "B" to indicate that they favor the set of specifications contained in Alternative B. Some people may agree with only part of an alternative. For instance, a speaker may favor the slower growth rates for the monetary aggregates contained in Alternative C but prefer initially to specify a level of discount window borrowing associated with Alternative B. Often, speakers suggest specifications that fall somewhere between two of the blue book alternatives. For instance, they may want to see a more subtle degree of easing in reserve pressures than contemplated in Alternative A, because they are only slightly worried about signs of slack in the economy. Such a preference might be expressed as support for an "A-" or "B+" option. Or, individual members may prefer a policy stance outside the range presented in the blue book—either to the easier or to the more restrictive side.

Once the round of policy comments has been completed, the Chairman summarizes the results of an informal tally of voting members. If there is a clear preponderance of support for a particular approach, it is noted, and the Committee proceeds directly to the language of the directive. However, if a range of views is

expressed, with members pushing for different policy prescriptions, the Chairman may have to explore several alternatives to see if any intermediate positions can command broad support.

Most policymakers view the monetary policy process as one of evolutionary adjustments and therefore are willing to accept a prescription that moves in the direction they favor even if at a modestly faster or slower pace than they would prefer. Consequently, it is usually possible to come up with some shading that captures the support of most members. On rare occasions, however, the divisions may be deep and the views strongly held. In such cases, a number of combinations must be tried before a majority of members give their support to a particular policy prescription.

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*b. Writing the directive*

Once the general outlines of the specifications for money growth and reserve conditions for the near term have been established, the Committee addresses the wording of the directive that will guide the Open Market Function of the Federal Reserve Bank of New York. The blue book presents suggested language that normally follows the pattern of the previous directive unless there is a special reason to make some modification.<sup>5</sup>

The conversation focuses on the final, operational paragraph of the directive. The Box contains two samples. The first sentence indicates the degree of pressure on reserve positions desired in the immediate future. The usual phrasing is “maintain the existing degree of reserve pressure” or “increase” or “decrease reserve pressure.” A preference for Alternative B with no change in discount window borrowing is conveyed by the first expression. The alternative phrasings are associated with the selection of Alternative C or A, respectively. The degree of change in pressure desired can be indicated with the modifier “slightly” or “somewhat.” The directive goes on to indicate the three-month growth rates for the aggregates that are expected to be consistent with the specified degree of reserve pressure, either immediately following the introductory sentences or in a later part of the paragraph.

The Committee also writes a passage explaining the adjustments it might wish to see made to the degree of reserve pressure before

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<sup>5</sup> The early paragraphs of the directive review recent developments in the economy, the exchange markets, and the monetary aggregates. They state the Committee's fundamental goals of price stability and sustainable economic expansion and report the long-run money and credit growth ranges. Except for the paragraphs on the long-run objectives constructed at the February and July meetings, these paragraphs are rarely discussed at meetings, although they can be discussed if any member wants to suggest a change.

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*Box: Operating Paragraphs from FOMC Domestic Policy Directives  
Meeting Held July 5-6, 1989*

In the implementation of policy for the immediate future, the Committee seeks to decrease slightly the existing degree of pressure on reserve positions. Taking account of indications of inflationary pressures, the strength of the business expansion, the behavior of the monetary aggregates, and developments in foreign exchange and domestic financial markets, somewhat greater reserve restraint or somewhat lesser reserve restraint would be acceptable in the intermeeting period. The contemplated reserve conditions are expected to be consistent with growth of M2 and M3 over the period from June through September at annual rates of about 7 percent. The Chairman may call for Committee consultation if it appears to the Manager for Domestic Operations that reserve conditions during the period before the next meeting are likely to be associated with a federal funds rate persistently outside a range of 7 to 11 percent.

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*Meeting Held August 22, 1989*

In the implementation of policy for the immediate future, the Committee seeks to maintain the existing degree of pressure on reserve positions. Taking account of progress toward price stability, the strength of the business expansion, the behavior of the monetary aggregates, and developments in foreign exchange and domestic financial markets, slightly greater reserve restraint might or slightly lesser reserve restraint would be acceptable in the intermeeting period. The contemplated reserve conditions are expected to be consistent with growth of M2 and M3 over the period from June through September at annual rates of about 9 and 7 percent, respectively. The Chairman may call for Committee consultation if it appears to the Manager for Domestic Operations that reserve conditions during the period before the next meeting are likely to be associated with a federal funds rate persistently outside a range of 7 to 11 percent.

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the next meeting if certain factors behave significantly differently than expected. For a number of years, this passage gave prominence to deviations in the behavior of the monetary aggregates. But as the demand for money became more variable in the 1980s, the Committee instructed the Open Market officials to respond to a range of factors in addition to the monetary aggregates. The factors to be considered for a potential change in reserve pressures generally include the pace of business expansion, the extent of inflationary pressures, developments in the foreign exchange markets, and conditions in the domestic and international credit markets.

The Committee identifies those factors that should be given the most weight when the Open Market officials evaluate whether to make modifications to reserve pressures before the next meeting. For instance, if there is particular concern about inflationary forces and signs of acceleration in economic activity attributed to recent rapid money expansion, the Committee may be especially sensitive to the pace of money growth. It can indicate that it wants to be particularly responsive to overshoots of the monetary goals, while only responding to monetary shortfalls if the economy appears to be weakening significantly. In composing the directive, the Committee will make money growth prominent in the list of factors to consider in deciding whether to change reserve pressures. In this case, it will probably say that "somewhat" greater reserve restraint "would" be acceptable while "slightly" lesser reserve restraint "might" be acceptable. If, on the contrary, the concerns are focused on weakness in the economy and imminent inflationary pressures appear unlikely, the Committee can reverse the use of "somewhat" and "slightly" and of "would" and "might." It can also rearrange the list of considerations affecting reserve pressure changes to give more weight to economic activity. In the extreme, it may allow scope for adjustments to be made only in one direction. When the risks are deemed essentially balanced, the Committee typically chooses symmetrical phrasing.

The final topic addressed in writing the directive is the Federal funds rate range. If a borrowing adjustment causes funds to trade persistently outside the specified range, the Committee will want to be consulted. Since the 1982 modifications to procedures, the amount of adjustment in reserve pressures between meetings has tended to be smaller than before, and the band on the Federal funds rate has rarely served as a constraint. The band has been adjusted occasionally when the central tendency of Federal funds trading has shifted toward one end of the band.

Once the directive's wording has been completed, the Chairman calls for a vote. All voting members will indicate their approval or disapproval. By that point, majority support is virtually assured, as the directive has been constructed to encompass most views that have been expressed. The Secretary of the FOMC records the votes and reports the results. The Secretary then confirms the next regular meeting date, and the meeting is adjourned.

Following the meeting, copies of the directive are sent to the participants. Later, the Secretary's office prepares a more extensive policy record that reports the highlights of the meeting. This record is sent to Committee members for review and possible revision and then is published, along with the directive, a few days after the following meeting. Any member who voted against the directive includes with the policy record an account of his or her reasons for dissenting.



## *The Trading Desk: Formulating Policy Guidelines*

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### *Formulation and Operation of the Reserve Objective*

Upon returning from an FOMC meeting, the Manager of the System Open Market Account confers with the other officers and senior staff members of the Open Market area charged with actually implementing the policy directive. The Manager describes the principal topics of discussion at the meeting and reports on the actions taken by the Committee regarding the degree of reserve pressure to be used initially for building reserve paths, the monetary targets, and the likely trading range for Federal funds. The conditions under which the Committee would want the degree of reserve pressure modified during the period before the next meeting are also reported. A written text of the directive, prepared by the secretary of the FOMC, will arrive during the day. Implementation of the directive will require translating the general reserve specifications established at the meeting into operating parameters.

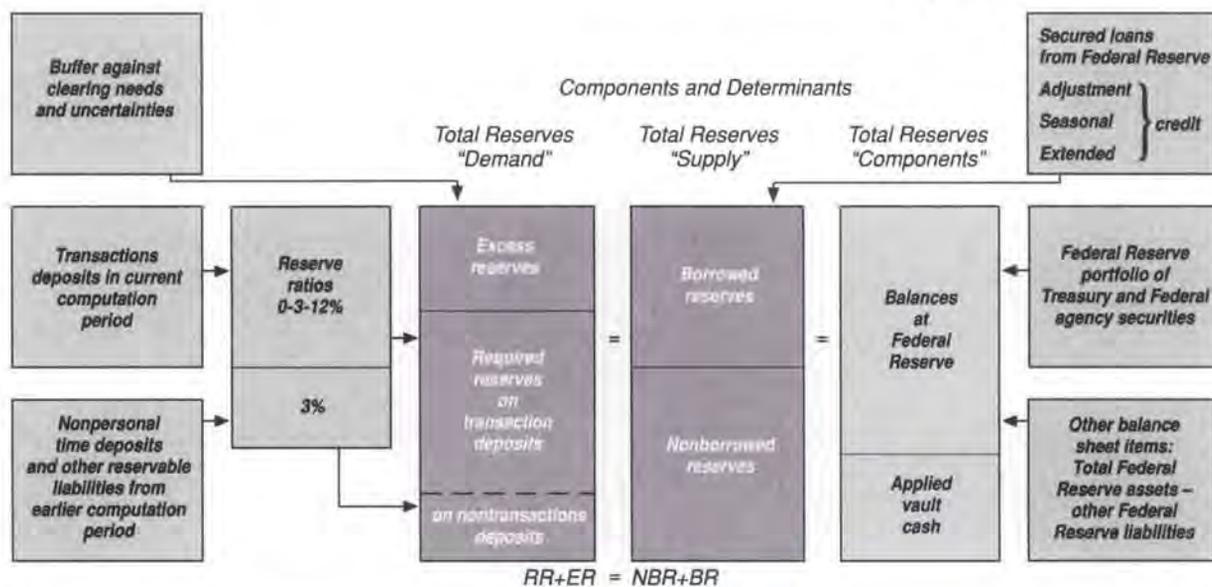
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#### *1. Creating the Nonborrowed Reserve Objective*

The policy procedures focus on establishing targets for reserve measures consistent with the directive's instructions concerning reserve pressure. Reserve pressure is interpreted in the context of a series of interrelated reserve concepts. Reserve paths are developed based upon these concepts and the FOMC's specifications. The paths exploit relationships between the supply of and demand for total reserves (TR) and the forces that bring them into equilibrium (see Diagram 1, page 125). Box A describes the reserve components and their determinants in some detail. The *demand* for total reserves can be viewed as a demand for required reserves (RR) plus a demand for excess reserves (ER). Depository institutions are required to hold reserves against certain deposit liabilities, as specified in Federal Reserve Regulation D. They hold excess reserves for precautionary reasons because it is not always possible to achieve a level of total reserves precisely equal to required reserves. Excess reserves provide a cushion so that a reserve shortfall will not leave depository institutions with an unwanted reserve deficiency for the maintenance period or an overnight overdraft in their reserve account, either of which could be subject to penalties.

The *supply* of total reserves essentially comes from two different sources, nonborrowed reserves (NBR) and borrowed reserves (BR). Nonborrowed reserves are supplied from additions to Federal Reserve assets (other than loans at the discount window) and from reductions in liabilities. The Federal Reserve can change

Diagram 1 Total Reserves



the level of nonborrowed reserves through purchases, sales, and redemptions of government securities. Also affecting nonborrowed reserves are changes in so-called market factors, which are not under the direct control of the desk. These factors include currency in circulation, float, and the Treasury's cash balance at the Fed. Discount window borrowing, the alternative source of total reserves, is initiated by the depository institutions but is subject to the rules and guidelines set by the Federal Reserve for discount window use. Since the banks face restrictions on borrowing, reductions in nonborrowed reserves relative to demand will increase reserve pressures. The relationship between the demand for and the supply of reserves can be represented in equation form as:  $RR + ER = TR = NBR + BR$ .

To construct the nonborrowed reserve objective at the start of a two-week reserve maintenance period, staff members at the Board of Governors in Washington, D.C. and the New York Federal Reserve develop estimates of the demand for total reserves. They make estimates of required reserves by using forecasts of deposit behavior and reserve requirement ratios. Average excess reserve levels change slowly, so a "normal" allowance is generally used.

Variations from the norm are forecast through the use of econometric models and staff judgment. At times when excess reserves are expected to be substantially different from the norm—for example, in a reserve period that includes a quarter end or when unusually large excesses or deficits have been carried into the period—a different allowance might be used. Otherwise, informal adjustments are made to the nonborrowed reserve path when a deviation in excess reserves appears likely.

The projection staff adds together the estimated demands for required reserves and excess reserves to obtain an estimated demand for total reserves. From that, it subtracts the FOMC's preferred level for borrowed reserves to form tentative nonborrowed reserve objectives for the current and two succeeding maintenance periods. Staff members at the Board and New York Fed will make revisions to the nonborrowed reserve objective during a maintenance period as incoming data call for modifications to estimates of required reserves or excess reserves, in order to keep the likely amount of borrowed reserves in line with the FOMC's intentions. On occasion, the desk may make a technical adjustment to the borrowing allowance—for instance, if a computer problem or other operational difficulty during the period has resulted in a large amount of borrowing. At other times it may choose not to achieve the borrowing allowance if doing so would cause misleading movements of the Federal funds rate away from the expected trading range.

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## *2. Adjustment by the Banking System to Policy Actions*

The demand for, and supply of, total reserves must come into balance over the maintenance period. The full response of the banks and the public to the provision or withdrawal of nonborrowed reserves will depend upon many factors, including the underlying institutional and regulatory structure. Because of the large number and variety of financial institutions in the United States that participate in the creation of reservable deposit liabilities, the adjustment process is inevitably complex. How a particular action will affect money, credit, and interest rates can be described in a general way, but the magnitude and timing of the responses to a monetary policy action can at best be roughly estimated.

Suppose the FOMC had voted for increased reserve pressures. The desk, under the new specifications, would meet a smaller share of the estimated demand for total reserves through injections

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*Continued on page 137*

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*Box A:  
Description of Reserve Measures  
Total Reserves:*

Total reserves consist of depository institutions' reserve balances held at day's end at the Federal Reserve and applied vault cash (defined below). Depository institutions must hold total reserves to meet reserve requirements, specified as averages over two-week reserve maintenance periods that end every other Wednesday.<sup>1</sup>

Applied vault cash is defined as that portion of total currency held by depository institutions that is used to meet reserve requirements. The vault cash that is applied during a two-week reserve maintenance period was held during a two-week computation period that ended on a Monday almost two and one-half weeks before the reserve maintenance period began. Large banks apply all of their vault cash toward meeting their requirements since their required reserves exceed their vault cash. However, many small banks and thrift institutions hold more vault cash than they need to meet their reserve requirements. Hence, applied vault cash for those institutions is equal to their required reserves. Their total vault cash is known at the beginning of the reserve maintenance period, but the portion applied to meeting reserve requirements cannot be computed until after the reserve maintenance period ends and their required reserves are known. This excess vault cash arises because depository institutions base the amount of vault cash they will hold on expectations of customer demands rather than on reserve requirements. Many smaller institutions need more cash for conducting business than they need to meet requirements. On average over 1988, applied vault cash amounted to \$24.9 billion while excess vault cash, not needed to meet reserve requirements, was \$1.7 billion.

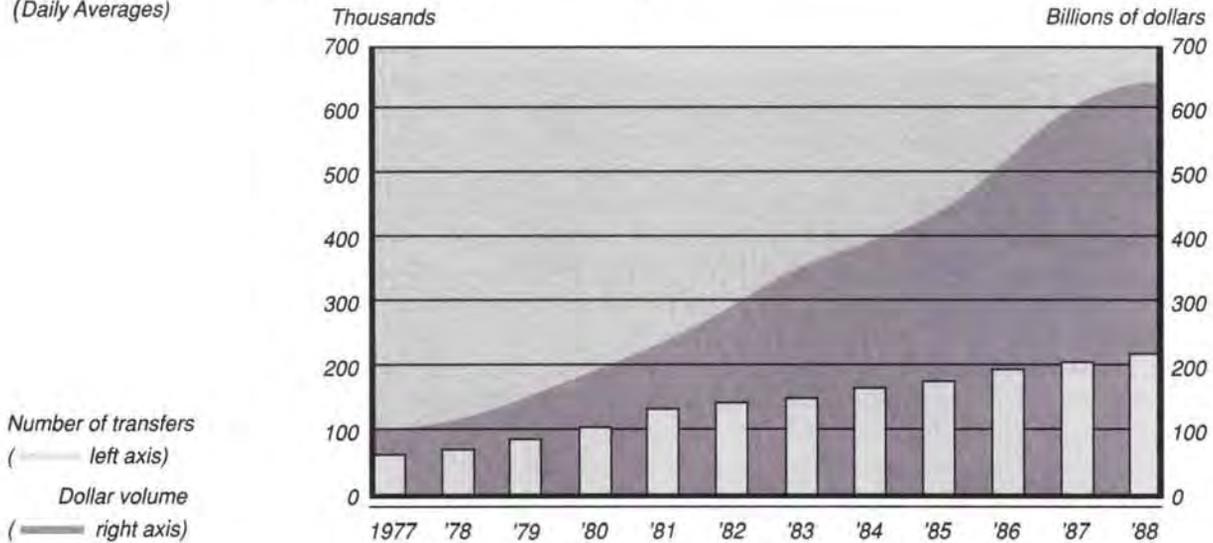
Reserve balances at the Federal Reserve are also held for purposes beyond meeting requirements. They provide the means for transferring funds among banks by check and by wire. As checks clear through the Federal Reserve, reserves are transferred from the paying bank to the receiving bank. Private clearing services also clear checks and arrange for the net transfers among reserve accounts arising from the settlement of the checks. Many transfers are made when a depository institution directs the Federal Reserve to make a wire transfer for

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<sup>1</sup> For days on which depository institutions are closed, all deposit, reserve, and vault cash levels are counted as equal to the previous day's levels.

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**Chart 1 Measures of Systemwide Fedwire Activity**  
(Daily Averages)



itself or a customer over what is called Fedwire. Treasury and some Federal agency securities that are held in book entry form at the Federal Reserve are also transferred through the Fedwire system. The volume of reserve transfers over Fedwire is very high. In 1988, for example, it averaged \$640 billion a day (Chart 1).

In 1988, reserve balance accounts, which averaged \$37 billion, turned over around 25 to 30 times a day, more often at large banks. Balances in the reserve accounts facilitate such transfers. The high turnover rates often leave some banks' reserve accounts overdrawn at some point during the day. Such daylight overdrafts are permitted, but their size is restricted according to the capital of the bank and the bank's own assessment of its creditworthiness. The Federal Reserve is currently exploring ways to limit daylight overdrafts such as introducing specific charges for them. By day's end, a bank must cover all overdrafts or be subject to a significant penalty, even if it has already met its requirements for the period.<sup>2</sup>

<sup>2</sup> The penalty for an overnight overdraft is at a rate of 10 percent or 2 percentage points above the effective Federal funds rate that day, whichever is higher. In addition, the banks have to make up the overdraft by holding the same amount of extra reserves on other days in that maintenance period.

Reserve requirements can be satisfied by holding either or both of the two forms of total reserves—vault cash from an earlier computation period and end-of-day reserve balances at the Federal Reserve. Depository institutions must come close to meeting their requirements on average over a maintenance period; they are allowed to carry forward for one maintenance period an excess or deficiency of up to 2 percent of their requirements or \$25,000, whichever is greater.<sup>3</sup> Once these carryovers are taken into account, a depository institution that fails to meet its requirement will be assessed a penalty on the deficiency at a rate that is 2 percentage points above the discount rate (although the penalty may be waived if there are extenuating circumstances). If a depository institution frequently fails to meet requirements, its senior management will be contacted to discuss the problem and reminded that repeated failure to comply with this important obligation would put the institution under scrutiny.

Reserve requirements are computed as various fractions of deposit levels. Requirements are specified in Federal Reserve Regulation D according to rules and guidelines established in the Depository Institutions Deregulation and Monetary Control Act of 1980 (MCA) and the Garn-St Germain Depository Institutions Act of 1982.<sup>4</sup> The guidelines distinguish between nontransaction deposits and transaction deposits. Of the nontransaction deposits, primarily time and savings deposits, only those that are classified as “nonpersonal” and carry initial maturities of less than 18 months are subject to reserve

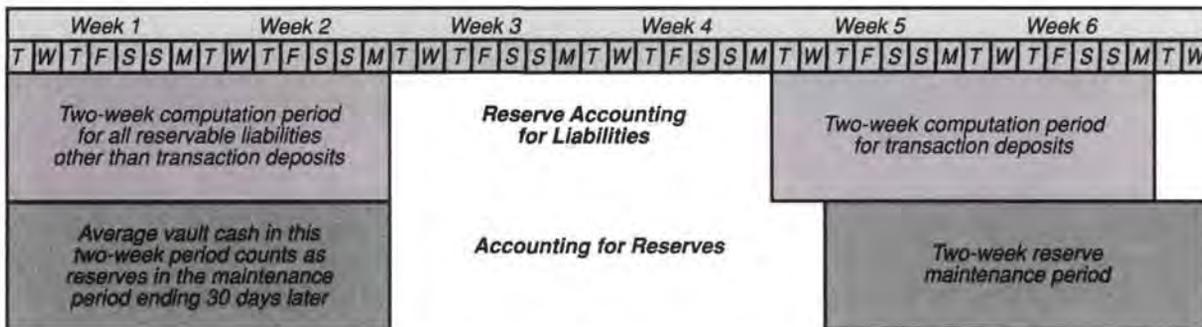
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<sup>3</sup> A bank can use excess reserves carried forward in the next period by running a deficiency equal to the excess carried forward. If it does not use the excess in that period, the carry-over is lost. A bank must cover in the next period a deficiency carried forward by holding excess reserves in a volume at least equal to the deficiency or the bank will be judged to have failed to satisfy its requirement.

<sup>4</sup> Schedules of reserve requirements were contained in the MCA. At the completion of the phase-in period, institutions had to hold reserves on transactions deposits equal to 3 percent up to an indexed amount and reserves equal to 12 percent for additional amounts. The Garn-St Germain Act of 1982 exempted the first \$2 million of transactions deposits from reserve requirements and indexed the exempted amount. Member commercial bank reserve requirements were gradually reduced between 1980 and 1984. Nonmember institutions, on the other hand, had not been subject to the Federal Reserve's reserve requirements before passage of the MCA. They became bound by requirements phased in between 1980 and 1987. By the latter date, the same reserve requirements applied to member and nonmember institutions. At the same time, the MCA eliminated reserve requirements on “personal” time and savings deposits and all deposits with original maturities of 18 months or more. It cut reserve requirements on shorter term “nonpersonal” time deposits to a flat 3 percent.

**Diagram 2** Timing of Contemporaneous Reserve Accounting System

Contemporaneous Reserve Accounting System



**Note:** A "reserve maintenance period" is a period over which the daily average reserves of a depository institution must equal or exceed its required reserves. Required reserves are based on daily average deposit liabilities in "reserve computation periods."

requirements. In most cases, the reserve requirement on these deposits is 3 percent. Under the reserve accounting structure introduced in February 1984, it is calculated on a lagged basis, using the same computation period as vault cash (Diagram 2). Thus, when constructing the objective for nonborrowed reserves, staff members do not need to estimate required reserves for nontransaction deposits for the maintenance period in progress, since these requirements are known before the period starts.

For required reserves against transaction deposits, the computation period is the two weeks ending on the Monday two days before the maintenance period ends.<sup>5</sup> Thus, required reserves are not known during the period and must be estimated. The projection staffs at the New York Fed and the Board make estimates of both the underlying deposit trends and of special seasonal or technical factors. The staffs estimate the underlying behavior by looking at recent trends in the monetary aggregates (primarily M1) and considering how interest rate movements and economic developments are likely to affect them. For instance, deposits may be growing rapidly because interest

<sup>5</sup> Very small depository institutions are exempt from reserve requirements and only report their deposits annually. Institutions of the next larger size only report quarterly. For that group, required reserves on transaction deposits are lagged. Most of these institutions meet their entire requirement with vault cash.

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rates on market instruments are falling faster than the rates on deposits. A prominent seasonal factor affecting deposits is the payment of social security benefits on the third of every month. Most recipients allow their cash balances to rise initially, then gradually work down the deposits as they pay their bills. Before seasonal adjustment, total deposits in the various money measures move in a pattern that reflects the swings in social security recipients' balances. The Treasury's cash balance might show offsetting movements, but Treasury cash is not counted in the monetary aggregates.

Once the projection staffs have developed forecasts of total transaction deposits, they must estimate the appropriate average required reserve ratios to use in deriving required reserves. Transaction deposits are divided into three tranches, with indexed cutoffs that change slightly each year. In 1989, the first \$3.4 million of transaction deposits are exempt from reserve requirements. Then deposits up to \$41.5 million are subject to a 3 percent reserve ratio. All deposits in excess of that amount are subject to a 12 percent reserve ratio. Between the enactment of the MCA in 1980 and February 1984, new and generally lower reserve requirements were phased in for member banks of the Federal Reserve System. Between 1980 and September 1987, higher requirements were phased in for nonmember institutions. During those periods, the staffs had to take account of differing required reserve ratios between member and nonmember institutions. In September 1987, the distinction ceased to exist. Nonetheless, the staffs still have to estimate changes in average reserve ratios as deposits move between large and small institutions.<sup>6</sup>

During the maintenance period, the Board and New York staffs make frequent updates of their forecasts of required reserves as information on actual deposit levels becomes available. Usually, they modify their forecasts during the middle part of the period — on Tuesday, Wednesday, and Thursday—in response to incoming data on deposit levels for the first week of the period. They make further adjustments on the following Tuesday and Wednesday as they receive deposit data for the second week of the period. They will continue to revise required reserves after the period is over, taking into account the more complete information received, but these

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<sup>6</sup> The staffs also have to estimate reserve requirements on interbank and Treasury demand deposits, which are not part of the monetary aggregates. Interbank deposits have no pronounced trend, although they show both a seasonal pattern and residual volatility. Treasury demand deposits are small and reasonably predictable.

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changes will not, of course, affect the desk's reserve provision for the period that has concluded.

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### *Excess Reserves:*

Excess reserves consist of total reserves that are not needed to meet reserve requirements. All excess reserves take the form of reserve balances at the Fed rather than applied vault cash, since the vault cash included in total reserves is defined to exclude that portion of vault cash that does not satisfy reserve requirements. Excess reserves arise because depository institutions do not have perfect control over the level of their reserve balances. They hold excess reserves when the cost of eliminating them is estimated to exceed the interest lost by investing the reserves.

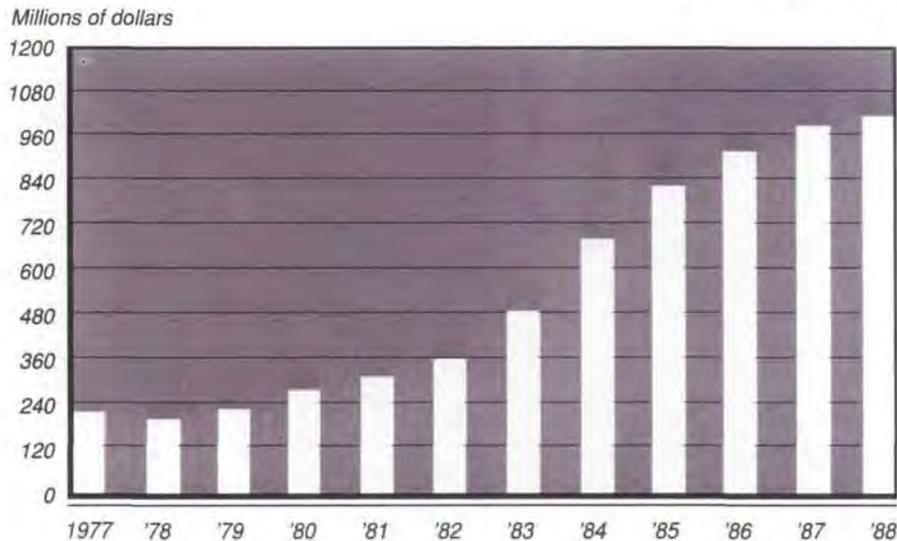
Federal Reserve strictures have given depository institutions a strong sense of obligation both to meet their requirements and to avoid end-of-day overdrafts. Large banks devote considerable resources to monitoring reserve and deposit flows so as to achieve these ends without having to hold excess reserves. These banks usually are able to keep excess reserve levels within the relatively narrow band established by their carryover allowance. Occasionally, around quarter ends or at other extraordinary times, they are left with excess reserves that exceed their carryover limits, but large overshoots happen infrequently.

For many small and medium-sized commercial banks and thrift institutions, the flows through their reserve accounts each day are large compared with the relatively small amount of reserve balances needed to meet requirements. For some of these institutions, it costs less to hold reserve balances in excess of requirements than to engage in the close management of reserve positions necessary to eliminate excess reserves.

Excess reserves grew during the 1980s (see Chart 2, page 133) after the MCA and the International Banking Act of 1978 mandated that reserve requirements be extended to more institutions. The MCA made nonmember commercial banks and thrift institutions subject to Federal Reserve rather than state requirements; the International Banking Act applied to branches and agencies of foreign banks operating in the United States. Many of these institutions previously had met their state's reserve requirements by holding vault cash and deposits at correspondent banks, neither of which were counted by the Federal Reserve in any of its reserve measures.

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**Chart 2 Average Excess Reserve Levels**



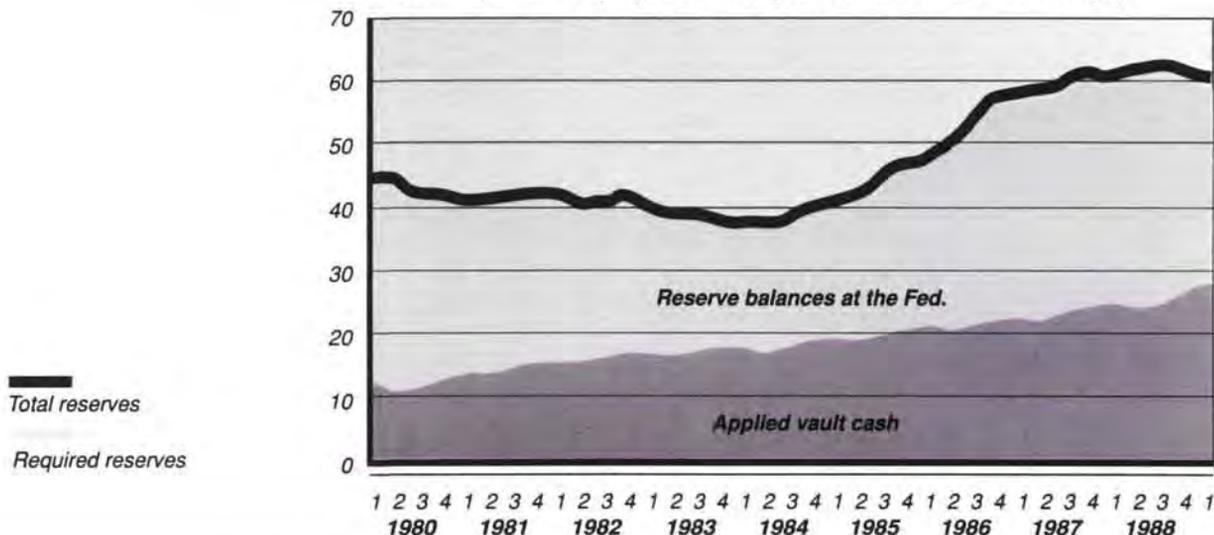
When reserve requirements were phased in, some of these institutions became subject to reserve requirements in excess of vault cash. As they opened reserve accounts to meet requirements and to provide funds for wire transfers and check clearing through the Federal Reserve, they often found that the reserve balances needed for clearing were greater than the reserve balances needed to meet requirements.<sup>7</sup>

Excess reserves also rose between 1980 and 1984 because banks' needs for reserves for clearing purposes were rising but required reserve balances were falling (see Chart 3, page 134). During those years, MCA-mandated cuts in reserve requirement ratios were being

<sup>7</sup> Depository institutions that routinely need excess reserves for clearing purposes either because their required reserve balances at the Federal Reserve are low or because vault cash fully meets requirements may establish "required clearing balances." An institution may choose the amount of reserve balances it expects it will need for clearing and make a commitment to hold that amount on average. The Federal Reserve then compensates the institutions for those balances by extending credits to cover fees for priced services. An institution's maximum required clearing balance level is determined by the amount of priced Federal Reserve services it uses. Often that level is below the reserve balance needed to avoid overdrafts. In many cases depository institutions have chosen not to establish required clearing balances since that would entail paying increased attention to reserve management. Required clearing balances are not treated as part of total reserves (or excess reserves).

**Chart 3** Composition of Total Reserves (Quarterly Averages)

Billions of dollars (not seasonally adjusted — not adjusted for reserve requirement changes)



phased in for Federal Reserve member banks; the reduction in member bank requirements exceeded the increase in reserve requirements for nonmember institutions. At the same time, the demand for vault cash was rising because of the spread of automated teller machines and because deregulation of interest rates was encouraging many banks to expand their consumer business. Even some fairly large banks found themselves in a position where vault cash was meeting a substantial share of their reserve requirements. Some increase in excess reserves at those institutions accompanied the need for larger balances to cover clearings. Required reserve balances began to rise again after 1984, but excess reserves continued to increase as the ongoing phase-in of requirements for nonmember institutions resulted in increasing numbers of institutions maintaining reserve accounts at the Federal Reserve. Furthermore, the volume of reserve balances needed to avoid overdrafts continued to grow, since the number of transactions clearing through the Federal Reserve was continuing to rise. These factors combined to raise the routine excess reserves of all but the largest member banks.

Three basic types of collateralized credit may be made available to banks and other depository institutions at the discount window: adjustment credit, seasonal credit, and extended credit borrowing. A bank can use adjustment credit when it comes up short in its efforts to meet its reserve requirement or when it would otherwise run an overnight overdraft. Banks are instructed to make a good faith effort to obtain the reserves from other sources before borrowing from the discount window; they could, for example, purchase Federal funds from another bank. The Federal Reserve extends adjustment credit for one or at most a few business days at the basic discount rate and discourages prolonged or frequent use. Banks also must demonstrate that they are not relending the borrowed funds to other banks. Thrift institutions eligible to borrow from a Federal Home Loan Bank may also use adjustment credit, but normally they would meet anticipated needs through Home Loan Bank advances.

Under the seasonal borrowing program, small banks that have a significant seasonal pattern to their lending can borrow modest amounts for a more lengthy period during that portion of the year when their lending is regularly high. Because these banks are small, the Federal Reserve assumes that they have limited ability to obtain funds from the national money markets. The discount window officers will not require the same justifications that apply to requests for adjustment borrowing. Seasonal borrowing has a true seasonal pattern because many of the users are agricultural area banks that face their strongest credit demands over the spring and summer. Nevertheless, seasonal borrowing shows a sensitivity to reserve and interest rate pressures that is similar to that of adjustment borrowing although smaller in magnitude.

For reserve path purposes, adjustment and seasonal credit together constitute borrowed reserves. Adjustment credit borrowing is included because the limitations on banks' use of this type of credit will force them to bid up the Federal funds rate before they turn to the discount window and will consequently encourage them to restrict the extension of credit. Seasonal borrowing is treated as part of borrowed reserves because of its tendency to respond to changes in reserve pressures in a fashion similar to adjustment credit. For a number of years no clear seasonal pattern to the sum of adjustment and seasonal borrowing was evident, despite the

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strong pattern to seasonal borrowing, apparently because adjustment borrowing was dominant. But in recent years, when seasonal borrowing has often constituted a significant share of the sum, the FOMC has sometimes had to adjust the borrowing objective to allow for a seasonal pattern. Otherwise, borrowing relative to the spread between the Federal funds rate and the discount rate would go off track as the seasons progressed.

Extended credit borrowing represents loans to depository institutions that are having unusual difficulties. An institution in this program does not generally have the means to borrow additional funds from normal market sources. Hence, its dependence on Federal Reserve credit is likely to last until its basic problems are resolved either through an acquisition, an infusion of additional capital, or some other action by its insurer. While in the program, banks are permitted to borrow without the normal pressures to repay promptly. Soon after their borrowing begins, the interest rate they pay is set above the basic discount rate so as to make the cost to the troubled institution commensurate with market rates. In formulating reserve paths, the desk treats extended credit borrowing as if it were nonborrowed reserves because of its special characteristics.

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*Nonborrowed Reserves:*

Nonborrowed reserves can most easily be described as the portion of total reserves provided to depository institutions through any means other than the discount window. The primary source of nonborrowed reserves is the purchase of Treasury securities by the desk. Nonborrowed reserves can also be provided or withdrawn when other Federal Reserve balance sheet items change. Box B reviews the major factors affecting reserves. The formal definition of nonborrowed reserves does not include extended credit borrowing, although the definition used for reserve path construction includes it.

of nonborrowed reserves or, if reserves were above desired levels, it would drain more reserves than otherwise.<sup>8</sup> If the desk sells Treasury securities, the purchasers' banks will initially lose reserves. But the resultant reserve shortages will quickly shift from the banks of firms participating in the open market operations to other depository institutions as the institutions encountering the shortages take steps to cover them. A similar quick redistribution of the additional reserves would follow an open market purchase.

Within a single two-week reserve maintenance period, the banks' adjustment options to a reserve excess or shortage are in actuality quite limited. Banks confronting a shortage would have several possible options, but most of the options would be impractical to carry out in such a short time period. In principle, banks could take actions to reduce their demand for reserves by trying to lower their required reserves within the period. Such a strategy would require reducing transaction deposits (a decrease in time deposits would not lower required reserves until a future maintenance period). To this end, banks could increase lending rates and lower transactions deposit rates, thereby encouraging customers to reduce loans and deposits.<sup>9</sup> Such prompt adjustments by many banks and by their customers, however, are unlikely. They would require very quick recognition that a change in policy toward reserve provision had occurred and very fast responses to the change. In practice, the depository institutions and their customers have less disruptive ways to respond to a reserve shortage, so most of the initial adjustment to reduced provision of nonborrowed reserves will take place in categories other than required reserves.

Another adjustment option available in theory to the banks is to cut back on excess reserve holdings. But as indicated in Box A, the banks' holdings of excess reserves are effectively already low. Large banks generally manage to keep their excess reserves close to zero on average, so they cannot economize on excess reserves more than they already do. Some small banks may be able to economize slightly on excess reserves, but the scope for further reductions is small.

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<sup>8</sup> Raising the discount rate instead of reducing the amount of nonborrowed reserves supplied would also increase reserve pressures. The discount rate is not a tool of the FOMC, although the Board of Governors, in approving a discount rate change, takes account of its effect on reserve pressures. Discount rate changes have a strong announcement effect, which may or may not be desired.

<sup>9</sup> Banks are prohibited by law from paying explicit interest on demand deposits. However, they can adjust the implicit return by changing fees charged and services provided. They are free to adjust rates on consumer NOW accounts, although NOW account rates have changed very little since the rate ceilings were removed in 1986.

Thus, when nonborrowed reserves within a reserve maintenance period are insufficient to meet the demand, the banking system as a whole has no practical alternative to borrowing more reserves at the discount window. Because of the limitations on frequent borrowing, however, each individual bank will explore other ways to adjust its reserve position before it turns to the discount window. A bank can sell assets such as short-term securities or loans, it can bid for wholesale deposits such as large CDs or Eurodollars, or it can purchase reserves from other banks directly or through a Federal funds broker. None of these actions increases the total reserves of the banking system but all do redistribute the shortages. When banks attempt to acquire an increased share of the pool of nonborrowed reserves, they will bid up the Federal funds rate. As the funds rate rises, more banks will be induced to borrow at the discount window until total reserves available are brought into line with the demand.

Although these actions do not slow the growth in the monetary aggregates within the maintenance period, they will begin a process that will lead to a slowdown in both money and credit growth over time. How much the funds rate will increase as a result of the induced increase in discount window borrowing and how quickly the other responses will occur depend upon a number of factors. Bank perceptions of likely and appropriate Federal Reserve policy actions are important. If banks initially see the increased reserve pressures as an anomaly—as, for example, the result of some seasonal or other transitory development—they will be unlikely to make any basic adjustments to their approach to lending and deposit taking. Likewise, participants in the securities markets initially may not adjust market rates if a change in the funds rate appears to be an aberration. But once participants perceive that the higher funds rate is part of a deliberate policy action, they will take steps that will lift other short-term rates as well.

As the banks come to believe that the reduced reserve availability is a deliberate policy move, they will begin to make basic adjustments to the pricing of loans and deposits. They may also act to save their access to the discount window for future times when reserve conditions may be even firmer than currently. These adjustments will gradually work to alter money and credit growth. Banks may reevaluate the structure of their lending rates and make upward adjustments. They may also find that they will have to pay higher rates on some types of deposits to discourage depositors from shifting their funds to market instruments. It is likely that both

transaction deposits and time and savings deposits will shrink initially as market rates adjust upward more rapidly. In the current environment, with unrestricted interest rates on all but demand deposits, there will be recovery in those classes of deposits on which the banks raise their rates enough to bring them into line with the higher market rates. Thus, M2 and M3 will weaken more in the months right after a restrictive policy action is recognized than they will once the rate adjustments are complete. By contrast, M1 growth, affected by continued rate restrictions on some types of deposits and slow adjustment of NOW account rates by banks, will likely be held down for a more extended period.

The details of the adjustment to a change in reserve provision will vary according to initial conditions and expectations. Banks' degree of reluctance to borrow will not always be the same. For instance, when confronted with reserve shortages, banks that have borrowed recently will be particularly reluctant to borrow and are likely to bid more aggressively in the Federal funds market to cover the shortages than would banks that had not borrowed recently. Although the Federal funds market functions well, there is enough friction that the initial distribution of the shortages may also influence how much the rate rises before borrowing occurs. Banks may become more reluctant to borrow when financial difficulties at other institutions with similar characteristics have received some publicity. Even though the Federal Reserve does not release the names of the banks that borrow, there is a risk that the borrowing might be discovered through some other channel and interpreted by depositors as a sign of weakness. Furthermore, although the Federal Reserve tries to keep the standards for use of the discount window constant over time and across Federal Reserve districts, an institution may interpret a question or comment from an official at the discount window as implying a change in the willingness of the Federal Reserve to lend.

The public's response to the firmer policy will arise from whatever steps the banks take to change their pricing of deposits and loans and from the public's perception of future interest rate developments. If banks raise their rates on loans, customers may cut back on their use of bank credit, either by substituting other, less costly types of credit or by reducing their overall dependence on credit. If customers expect this rise to be the first of many increases in interest rates, however, borrowers may rush to get fixed-rate loans before they become even more expensive, thus initially accelerating rather than reducing loan demand and related deposit expansion.

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## *Estimating Reserve Availability*

Once the desk has an objective for nonborrowed reserves for the two-week reserve maintenance period, it must develop a strategy for bringing actual nonborrowed reserves into line with the objective. The first stage of the process is getting estimates of nonborrowed reserves for the period in progress and for future periods. Past open market operations, which will have established the size of the System's portfolio of Treasury and Federal agency securities, will be the primary determinant of nonborrowed reserves. But nonborrowed reserves can also be provided or absorbed by a number of factors besides changes in the portfolio. Most of these consist of balance sheet items not under direct Federal Reserve control. Several are subject to considerable period-to-period or even day-to-day variation. For some factors, the variability is reasonably predictable. Others may have a predictable component, but they may also change in a way that is hard to forecast. The desk undertakes a substantial share of open market operations to offset the unwanted reserve impact of swings in these factors.

Each morning, members of the New York Fed's monetary projection staff make estimates of the likely behavior of all of the factors affecting reserves and then present their estimates to the desk. Their counterparts at the Board perform a similar exercise to provide the desk with a second set of estimates. As information flows in, projection staff members learn how the factors turned out the day before and what developments may affect these factors in the future. They interpret any deviations from the expected behavior of the factors and decide how to modify their forecasts. The major factors that they examine are described in Box B, page 141.<sup>10</sup> These forecasts form the basis of the estimate of reserve supplies. They will be compared with the reserve paths in developing a plan for carrying out policy operations.

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<sup>10</sup> An extensive discussion of these reserve factors and the techniques for forecasting them can be found in John C. Partlan, Kausar Hamdani, and Kathleen M. Camilli, "Reserve Forecasting for Open Market Operations," *Federal Reserve Bank of New York Quarterly Review*, Spring 1986, pp. 19-33.

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*Box B:*  
*Forecasting Factors Affecting Reserves*  
*Currency:*

Over time, providing for currency demands requires the largest net reserve injections of any of the factors because currency has a strong growth trend. Every time a bank needs to replenish its currency holdings following cash withdrawals by the public, it obtains currency from the Federal Reserve, which debits the bank's reserve account. Most short-term movements in currency follow recurring seasonal patterns and are therefore predictable (see Chart 4, page 142). There is residual variation, however, which is not always forecast accurately.

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*Treasury Cash Balances:*

Although the Treasury's balance at the Federal Reserve changes little over the year as a whole, it is the reserve factor that shows the most variation from one reserve maintenance period to another. Increases in Treasury cash balances at the Federal Reserve absorb reserves since they involve a transfer of funds from the banking system to the Federal Reserve, while declines in the Treasury's Federal Reserve balances supply reserves to the banks. The Treasury attempts to keep a steady working balance at the Federal Reserve for making its payments,<sup>11</sup> and it places additional cash in so-called Treasury tax and loan note option, or TT&L, accounts at depository institutions that have agreed to accept them.<sup>12</sup> Each morning, the Treasury evaluates the estimated flows. It may decide to transfer funds to the Fed by making a "call" on the TT&L accounts if its balance would otherwise be below the target balance or to transfer funds to the TT&L accounts by making a "direct investment" to the TT&L accounts if the balance would otherwise be higher than desired.<sup>13</sup>

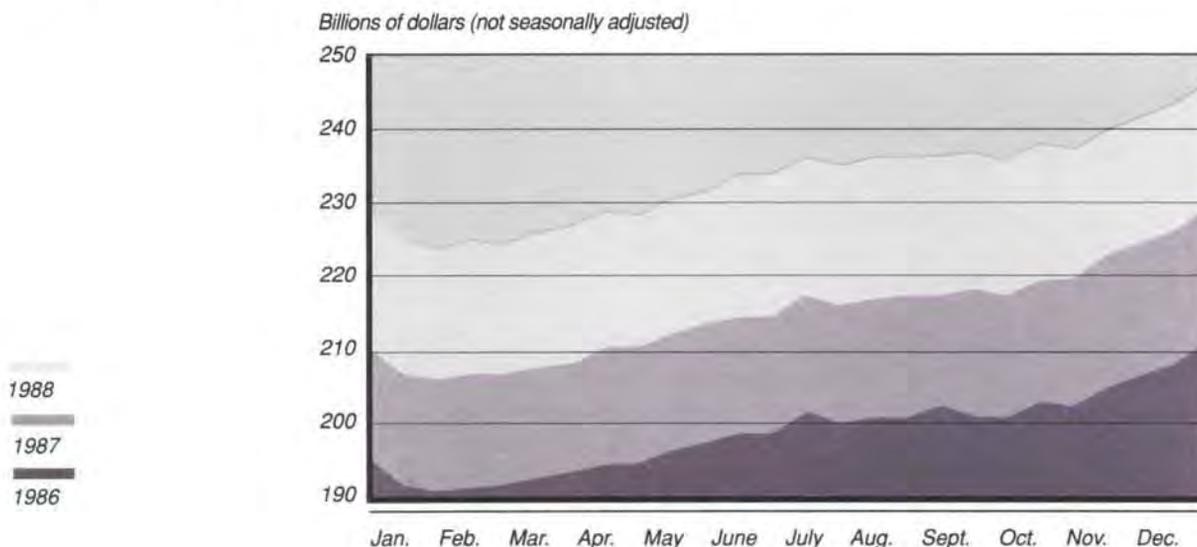
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11 The standard working balance target was raised from \$3 billion to \$5 billion in October 1988.

12 Depository institutions receive Treasury funds when their customers make payments to the Treasury. Those that do not wish to participate in the TT&L program remit all such funds to the Federal Reserve the next day. All institutions hold the funds for one day as non-interest-bearing but reservable government demand deposits.

13 Same-day or next-day calls generally are only made on large banks (referred to as C banks). Calls also are made on smaller institutions (A and B banks), but they are usually made with longer lead times and are not used for marginal adjustments to the balance. Calls are calculated as fractions of the book balance in each TT&L account on the previous day. Direct investments will be sent to all depository institutions that have chosen to participate. They are computed as a share of the available capacity of each institution.

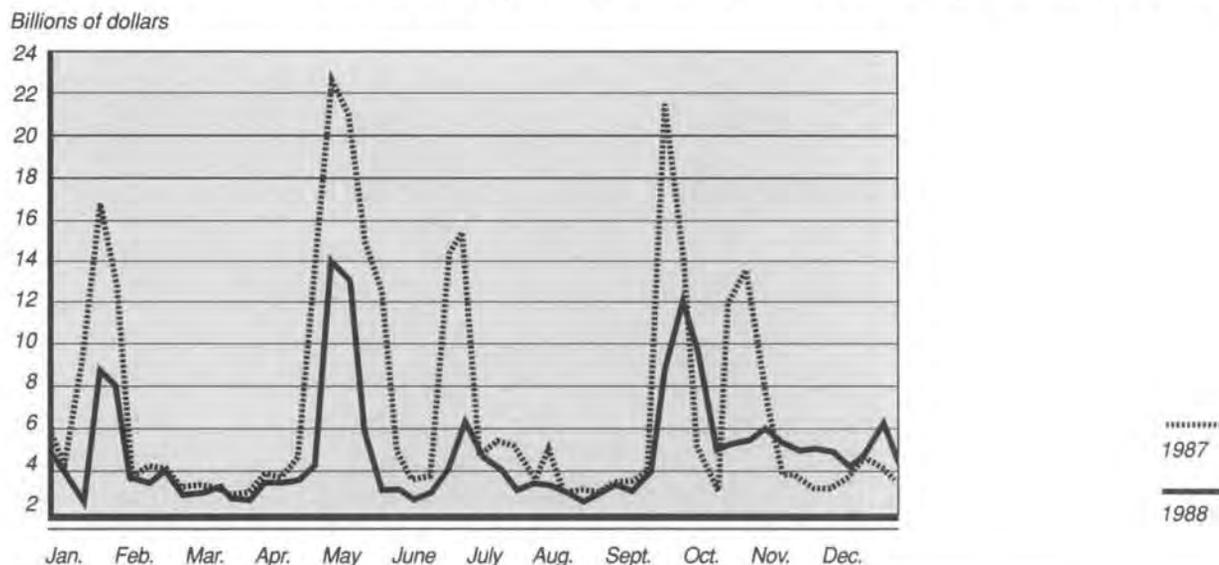
**Chart 4** *Currency in Circulation (Maintenance Period Averages)*



The banks must pay interest on the TT&L accounts at a rate 1/4 of a percentage point below the weekly average Federal funds rate and must hold collateral against them. Because of these requirements, the participating banks place caps on the amount of Treasury balances that they will accept. At times when the Treasury is particularly flush with cash, such as after some of the major tax dates—those in the middle of January, April, June, and September—its cash balances may exceed the capacity of the TT&L accounts to a considerable degree. The excess cash will lift the balance at the Federal Reserve (see Chart 5, page 143). As the funds flow from the commercial banks to the Fed, they drain reserves. Once the Treasury spends the money, the Treasury's balance at the Fed falls back to normal levels, adding to reserves.

Errors occur in the day-to-day forecasts of the Treasury balance because it is not possible to estimate precisely the level or timing of the myriad receipts and expenditures of the federal government. Most of the time the errors have only a modest effect on the average level of nonborrowed reserves over the two-week reserve maintenance period because the Treasury will adjust the size of the

**Chart 5 Weekly Average Treasury Balances at Federal Reserve Banks**



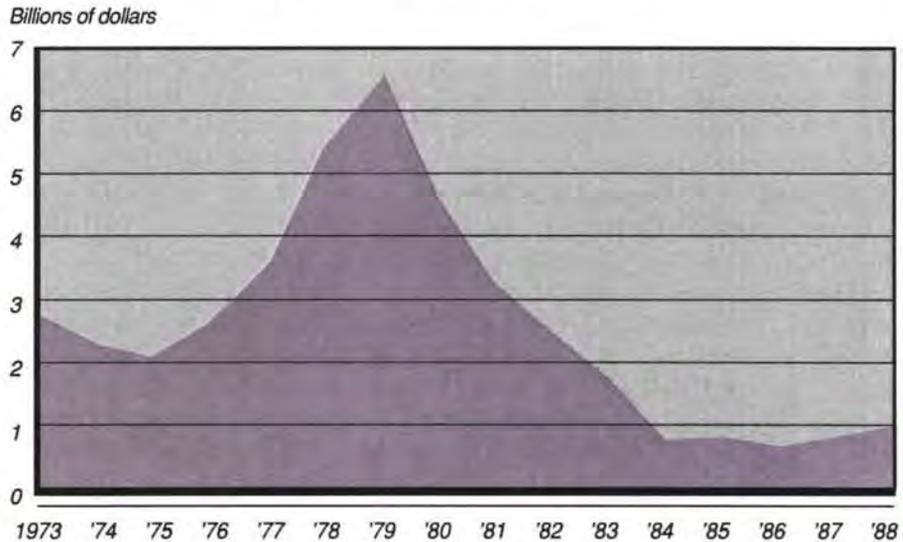
next day's calls or direct investments in order to bring the balance back to the normal target level. When total Treasury cash exceeds the capacity of the TT&L accounts, however, changes in flows, such as higher or lower receipts than expected, will affect the level of the Treasury's balance at the Federal Reserve not just for a day or two but until the balance drops below the TT&L capacity again, a development which may take a couple of weeks. The resulting reserve effect will be magnified.

**Federal Reserve Float:**

Federal Reserve float is generated when checks are processed more slowly than specified in a preset schedule for crediting the banks presenting the checks. When the presenting bank's reserve account is credited before a corresponding debit is made to the account of the bank on which the check is drawn, two banks will simultaneously have the same reserves credited to their respective accounts. Thus, float is a source of reserves. Float has declined dramatically in recent years as the Fed has worked to discourage it under the terms of the MCA (see Chart 6, page 144). In 1983, the Federal Reserve started charging the banks explicitly for the

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**Chart 6 Annual Average Federal Reserve Float (Including As-of Adjustments)**



float they generate. Float has also become more predictable as forecasters have been able to gather more information about delivery and processing of checks. Float occasionally jumps unexpectedly, however, most commonly when bad weather interrupts normal check delivery. Interruptions to the Fed's wire transfer systems can also create or reduce float. Errors introduced by incomplete or misdirected wire transfers are corrected after the fact with so-called as-of adjustments. If the problem is not completely resolved before the end of the maintenance period, the adjustment may be made in a later period, thus affecting each period's reserve availability; efforts have been made to minimize the unpredictable component of as-of adjustments.

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**Foreign Exchange Intervention:**

In the United States, foreign exchange transactions are not undertaken for the purpose of affecting reserves. Nonetheless, the reserve impacts of various foreign exchange developments have to be taken into account along with other market factors. When the Federal Reserve intervenes in the foreign exchange markets, it

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either buys dollars—draining reserves—or sells dollars—adding reserves. The reserve absorption or provision from the purchase or sale of dollars usually occurs two business days after the intervention takes place. Generally, intervention is split between the Federal Reserve and the Treasury. The Federal Reserve's portion of the intervention will add or drain reserves when the payments are made.<sup>14</sup> The reserve impact of the Treasury portion will depend upon how the Treasury pays for it. If the Treasury pays out either dollars or foreign currencies from the Exchange Stabilization Fund, the intervention will generally have no reserve impact. The potential injection or withdrawal of dollars will be offset by adjustments to the size of the call or direct investment made by the Treasury. (When the TT&L accounts are at capacity, however, the intervention will change the Treasury's Federal Reserve balance and therefore will affect reserves until the balances fall back below the TT&L capacity.) If the Treasury finances its portion of intervention to sell dollars with dollars acquired from a sale to the Federal Reserve of Special Drawing Rights (SDRs) obtained from the International Monetary Fund, this "monetization" of SDRs adds reserves. If the Treasury acquires dollars to sell from the Federal Reserve by placing foreign currencies with the Fed (with an agreement to buy them back at the same exchange rate) in what is known as a warehousing technique, the warehousing will add reserves as the the Treasury invests the funds.<sup>15</sup> The Treasury will reduce its TT&L calls when it receives funds from SDR monetization or warehousing that exceed its immediate intervention needs.

Reserve levels are also affected by monthly revaluation of Federal Reserve holdings of foreign currencies to incorporate changes in exchange rates. The Federal Reserve's profits from this source rise when its foreign currency balances appreciate. The Fed turns over its profits to the Treasury each week, allowing the

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*14 The reserve effect occurs if the Federal Reserve finances the dollar purchases by drawing down its foreign currency balances or if it adds to its foreign exchange holdings when it makes a dollar sale. If it finances a purchase by drawing on a swap line that it has arranged with another central bank, however, it will credit dollars to the central bank that provided the currency. When that bank invests the proceeds, the investment will offset the reserve drain. If the Fed uses foreign exchange acquired from a dollar sale to pay down a swap drawing, the reserve impact of the intervention will again be offset when the central bank pays back the dollars it acquired in the swap. Intervention has generally not been financed with swaps in recent years.*

*15 If the Treasury intervenes to buy dollars and uses the dollars acquired to retire SDRs or reverse a warehousing transaction, reserves will be drained.*

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Treasury to call in less cash from the banks. Losses from depreciation of foreign currency balances reduce its payments to the Treasury and increase the need for TT&L calls.

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### *Foreign Central Bank Transactions:*

Many foreign central banks hold transactions balances at the Federal Reserve for use in executing a variety of dollar-denominated transactions. Transfers of funds into their accounts at the Federal Reserve from commercial banks drain reserves. Because the central banks cannot earn interest on these accounts, however, they hold essentially steady working balances. The ultimate reserve effect of an inflow of dollars to a central bank account depends on how the central bank invests the receipts. If the funds stay within the Federal Reserve, then the inflow drains reserves. The most common way for the funds to stay within the Fed is for the foreign account to arrange a repurchase agreement (RP) with the Fed acting as counterparty. From the Federal Reserve's perspective, this transaction is a matched sale-purchase agreement (MSP). The Fed arranges MSPs with the foreign accounts when their cash buildup is expected to be temporary. The reserve forecasts routinely allow for the drain from the inflow of funds to the Federal Reserve and their arrangement as MSPs, since they occur every business day. If the desk instead passes part of the orders through to the market as customer-related RPs, the RPs add reserves since the drain has already been factored into the assumptions about reserve levels. The desk must estimate how large the foreign RP orders will be in coming days. While the central banks attempt to predict any large flows into or out of their accounts, their estimates are sometimes wide of the mark. Unexpected variations in the flow of central bank RP orders cause errors in the reserve forecasts.

If a central bank expects a rise or fall in its cash holdings to persist, it may ask the Federal Reserve to make an outright purchase or sale of Treasury securities on its behalf. In contrast to the RP orders, these operations are routinely arranged in the market, so the Federal Reserve does not serve as counterparty. As long as the funds come into the Federal Reserve and get paid out on the same day, there is no reserve impact. Therefore, the projection staffs do not need to forecast the outright transactions. There are times when the desk will be the counterparty if it serves the desk's reserve management purposes. In these situations, the transactions will have the same reserve impact as an outright purchase or sale in the market, discussed in Chapter 7.

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*Other Factors:*

Also affecting reserves are a number of other balance sheet items such as interest accruals and remittances of profits to the Treasury. For the most part, however, forecasting these factors is reasonably straightforward. Gold holdings of the Federal Reserve affect reserves, but the volume of reserves would change only if the Treasury changed the amount of U.S. gold for which certificates have been issued to the Federal Reserve or if the official price of gold were changed. (The official price has been \$42.22 per troy ounce since 1973.)

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## *The Conduct of Open Market Operations*

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### *The Strategy of Reserve Management*

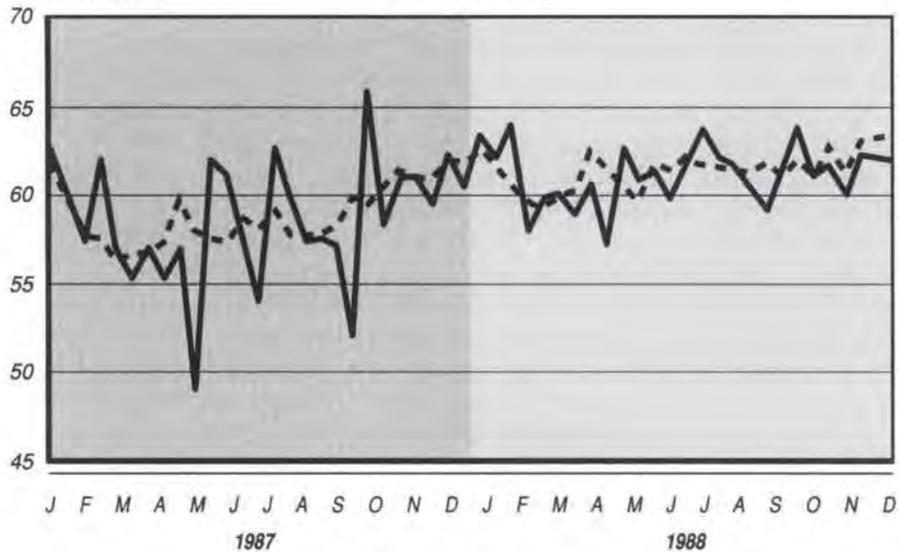
The Manager of the System Open Market Account and other trading desk personnel use the estimates of both the objective for and the forecasts of nonborrowed reserves to develop a strategy for bringing actual nonborrowed reserves into line with the objective over the two-week reserve maintenance period. Working out plans for adding or draining reserves to achieve the nonborrowed reserve objective is partly an “art” that requires skill and experience in taking into account the many diverse factors affecting reserves. In working out a plan, desk personnel assess the prospective as well as the current estimated reserve situation. They also attempt to make needed reserve adjustments in a way that does not conflict with the thrust of policy. In seeking to maintain the desired degree of pressure on bank reserves, desk personnel concentrate on achieving the nonborrowed reserve objective on average over the reserve maintenance period. But they also are sensitive to the day-to-day distribution of reserve shortages or excesses.

The Manager’s task is to generate the desired degree of pressure on bank reserve positions despite uncertainty about how bank reserves are behaving. The short-term variability in reserve supplies and demands arising from factors other than open market operations is substantial and far outstrips the longer term needs for reserves (see Chart 1, page 149). In 1987 and 1988, for example, the System’s securities portfolio rose an average of about \$700 million per two-week reserve maintenance period. The bulk of the increases supported currency, which expanded an average of \$680 million per period. Nonborrowed reserves rose about \$65 million per period. These moderate net changes in reserves and the portfolio mask the rather substantial changes from one maintenance period to the next. During those same two years, the average absolute change in reserve availability attributable to operating factors (including currency) from one reserve maintenance period to the next was \$2.7 billion. A large portion of open market operations served to offset this variability. The operations reduced average period-to-period changes in nonborrowed reserves to about \$900 million. Much of the residual change in nonborrowed reserves accommodated seasonal variation in required reserves (see Chart 2, page 149).

Further complicating open market strategy are the difficulties in estimating reserve factors and the inevitable forecast errors that result. (Box B in the preceding chapter described the major reserve factors.) Average absolute errors—the averages of forecast misses without regard to sign—of operating factor estimates made at the

**Chart 1 Nonborrowed Reserves (Plus Extended Credit Borrowing)**  
(Biweekly Averages)

Billions of dollars



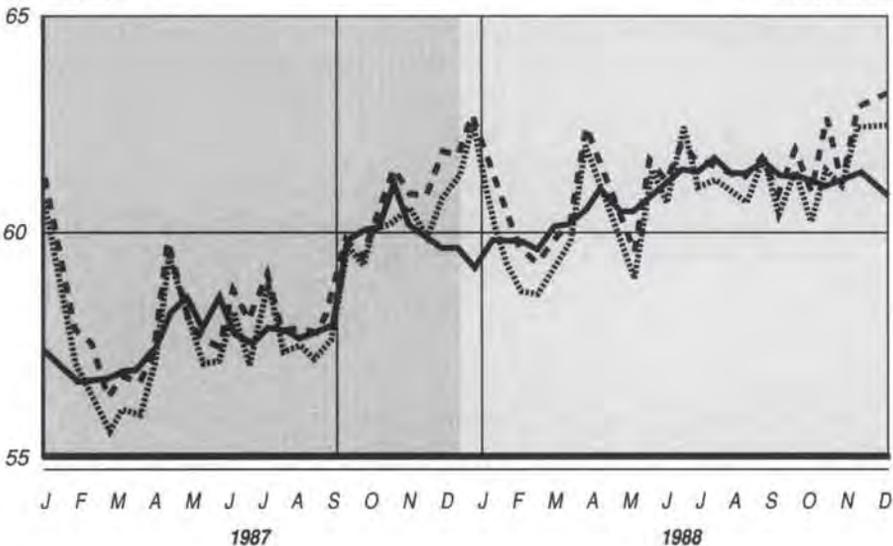
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Including open market operations

—  
Excluding open market operations

Note: Data are not seasonally adjusted.

**Chart 2 Selected Reserve Measures**  
(Biweekly Averages)

Billions of dollars



—  
Required reserves – seasonally adjusted

.....  
Required reserves – not seasonally adjusted

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Nonborrowed reserves and extended credit borrowing – not seasonally adjusted

Note: Required reserve data are not adjusted for changes in reserve requirements.

Vertical lines indicate dates when reserve requirements were changed.

start of each maintenance period were about \$1.2 billion for 1987 and 1988. Comparable errors for required reserve estimates averaged about \$200 million.

Each day the Manager of the System Open Market Account studies the various reserve estimates, allowing for possible revisions. The Manager must decide whether to buy or sell securities outright or to provide or drain reserves on a temporary basis, reversing the impact on reserves sometime in the next few days. To achieve the reserve objectives smoothly without generating undue confusion in the market, the reserve management strategies of depository institutions are also taken into consideration. Depository institutions may be more or less inclined to use borrowed reserves and may occasionally show a preference for excess reserves that are higher or lower than usual. These preferences will affect the relationship between the demand for reserves and the behavior of the Federal funds rate. The Manager weighs the various factors affecting reserve supplies and demands and tries to cope with the large swings in reserves in a manner that will be readily understood by the depository institutions and others trying to duplicate the Federal Reserve's projections of factors affecting reserves. Each day the desk weighs both the action indicated by the reserve projections and the wide margins of error in the projections. The desk's main concern is to maintain a degree of reserve pressure on banks consistent with the nonborrowed reserve objective for the period.

The lengthening of the reserve maintenance period from one to two weeks, a change that accompanied the switch to quasi-contemporaneous reserve requirements in February 1984, has had the effect of giving the desk greater choice in timing the reserve adjustments within a maintenance period. The desk must plan its operations with sensitivity to both the overall reserve picture and the day-to-day pattern of reserve availability. To continue targeting borrowed reserves, it became necessary to forecast required reserves within maintenance periods and allow for significant revisions to those forecasts.

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### ***Tools of Open Market Operations***

The desk uses the System's portfolio to achieve its reserve objectives. The FOMC spells out the Manager's authority in a special directive, which is reviewed at the February FOMC meeting (previously March) and may be amended as necessary. (It is published in the *Federal Reserve Bulletin* with the Record of Policy Actions for that meeting.) It authorizes outright transactions at mar-

ket prices in Treasury and federal agency securities with securities dealers and with official foreign and international accounts maintained at the Federal Reserve Bank of New York. The FOMC also authorizes the desk to make repurchase agreements (RPs) involving the same types of securities for periods of up to 15 days for the New York Reserve Bank's account. When conducting RPs in the market on behalf of official foreign and international accounts, the desk interposes the New York Reserve Bank's account between the foreign accounts and the market. Finally, as Chapters 2 and 5 explained, the FOMC sets a limit on the net change permitted in the System's outright portfolio in the interval between meetings—routinely \$6 billion during 1989.<sup>1</sup> This leeway for portfolio changes between meetings has long since ceased to be the key indicator of Committee policy preferences that it was in the 1920s and early 1930s. If the portfolio leeway appears to be insufficient to counter seasonal swings in reserve factors, the Manager seeks an increase, and the FOMC generally approves it with at most a discussion of the technical factors behind the request.

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### 1. Outright Operations

In buying and selling securities, the Manager of the System Open Market Account functions within a framework of Federal Reserve-Treasury relations that has evolved to keep monetary policy and debt management separate. Currently, the degree of separation between Treasury operations and the Federal Reserve far exceeds that of the early years of the System. As indicated in Chapter 2, until the Treasury-Federal Reserve Accord of 1951, the Federal Reserve felt obliged to provide stable market rates for U.S. Treasury securities when the Treasury asked it to do so. During and immediately after both world wars, the Fed was unable to use open market operations for policy purposes because the Treasury wanted rates held steady to support its heavy debt issuance.

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*1 The authorization continues to permit aggregate holdings of prime bankers' acceptances up to \$100 million should circumstances call for it. In 1977, however, the Federal Reserve discontinued operations in bankers' acceptances for its own account when the FOMC concluded that the market was sufficiently developed to make Federal Reserve participation unnecessary. The desk bought acceptances under RP until 1984, when it discontinued the practice, although the authorization still permits such operations. By that time, the massive volume of government debt outstanding usually provided sufficient collateral to achieve the needed reserve injections without using bankers' acceptances.*

*The authorization also permits the desk to lend securities from the System portfolio against collateral to dealers to smooth the clearing operations in the securities markets and ensure effective conduct of open market operations. The loans have no direct reserve impact, although the interest paid by the dealers results in a small reserve drain.*

The Accord freed the Federal Reserve from the obligation to support prices in the secondary market, but for many years thereafter the Fed continued to follow an “even-keel” policy. This meant that the Fed operated in a way designed to hold rates steady in the period immediately surrounding major Treasury coupon financings. In the 1970s, however, Treasury financings increased in frequency, and interest rates became more volatile as inflation became a much more serious problem. The Treasury gradually shifted its financing techniques away from presetting interest rates to holding auctions to determine rates. That change made it possible for the Federal Reserve to move away from the even-keel restrictions and for the Treasury to sell mounting quantities of debt efficiently.

The Federal Reserve makes all additions to its portfolio through purchases of securities that are already outstanding. The Federal Reserve Act does not give the System authority to tender for new Treasury issues that are sold for cash.<sup>2</sup> Moreover, in a refunding, the System cannot subscribe for a larger amount of the issues offered than it holds of the maturing securities. Normally the Manager will decide to roll over the System’s maturing securities by submitting a noncompetitive tender at the auction and receiving the average auction rate. The Manager can, however, reduce the System’s portfolio by redeeming a part of the maturing holdings—bidding at a higher rate than the Treasury is likely to accept for the amount it wants to redeem. The desk occasionally redeems maturing three- and six-month Treasury bills as a means of absorbing reserves. In 1989, when it had already reduced bill holdings substantially to offset increases in the foreign exchange portfolio, it ran off some maturing coupon securities. It has also redeemed securities when no replacement issue was being delivered when the old issue matured. That has occurred occasionally when the Treasury has temporarily run out of legislative authority to issue new debt and has paid down maturing issues.

In the secondary market, the Manager’s key choices involve the timing and type of security and the counterparties of the securities transaction. The timing of outright activity depends principally on the outlook for nonborrowed reserves. When the forecasts show large reserve needs stretching several weeks ahead, the Manager may decide to buy a sizable volume of Treasury securities in the

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<sup>2</sup> Over the years, a variety of provisions had permitted the Treasury to borrow limited amounts directly from the Federal Reserve. Beginning in 1979, the length of the loan and other conditions for use of the facility were also restricted. Authority for any kind of direct loans to the Treasury lapsed in 1981 and has not been renewed.

market.<sup>3</sup> Since the operations are geared to addressing extended needs, they normally will be undertaken to coincide with the projected rise in the reserve need. Typically, they are arranged early in the afternoon for delivery of the securities within the next day or two. Desk officers also take market conditions into account in choosing the day to arrange an outright operation. They try to avoid conducting operations in rapidly rising or falling markets, not wishing either to add to market volatility or to impede price adjustments.

Another choice the desk makes in arranging outright transactions is between operating in Treasury bills and operating in Treasury coupon securities (notes and bonds). In general, both markets are sufficiently broad to accommodate the desk's purchase or sale of several billion dollars of securities at a time with no undesirable effects.<sup>4</sup> The desk has not tested the capacity of the coupon market to handle sales for the System Account. (It does make periodic sales on behalf of official foreign accounts, usually for modest quantities of relatively short maturity issues.) In most years, the need to sell securities arises only occasionally, and can be accomplished through sales and redemptions of bills. As indicated above, the need to reduce the portfolio expanded in 1989 because of large scale purchases of foreign currencies, leading the desk to redeem some maturing coupon securities.

The Federal Reserve prefers to have a portfolio that contains the full range of maturities of securities that the Treasury has issued. In recent years, the Treasury has auctioned on a weekly basis bills that mature in 3 and 6 months; every four weeks, it has auctioned bills that mature in a year. It sells coupon issues that mature at various intervals ranging from 2 to 30 years. Most coupon securities are sold quarterly, although 2-year notes are sold monthly. To some extent, the decision to buy bills or coupon issues will be affected by market availabilities of different types of issues. For example, in 1987 and to a lesser extent in 1988, outright desk purchases were weighted toward coupon issues when the Treasury was reducing supplies of bills and adding to outstanding coupon issues. The desk is, nonetheless, conscious of the greater liquidity normally present in the bill market and seeks to make sure that it

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<sup>3</sup> The Federal Reserve also has authority to purchase securities of federally sponsored agencies. Typically, if the agency is offering a new issue, the Fed will acquire it in exchange for its maturing issues. Market purchases have been infrequent; the desk last bought such securities in the market in 1981 and last sold them in 1979.

<sup>4</sup> Through October 1989, the largest single bill purchase (in 1986) and coupon purchase (in 1987) were both around \$4 billion. The largest bill sale (in 1989) was about \$4 1/2 billion.

holds a sufficient volume of bills to meet any plausible contingency requiring substantial sales within a short time period.

When the desk executes outright purchases or sales, it selects from among the dealers' offers or bids in order to achieve the highest or lowest yields to maturity in relation to the prevailing yield curve. When buying Treasury coupon issues, the desk purchases offerings throughout the maturity spectrum, planning in advance the approximate amounts it will take from each maturity area. Purchases reflect market availability rather than any desk view of the interest rate outlook. At the margin, the System tends to buy issues within each maturity area that are in excess market supply, since those are likely to be offered at the highest relative yields.

As long as the operations are considered to be a routine part of seasonal or secular reserve adjustments, the dealers will normally have anticipated and prepared for the operation in their positioning of securities. A desk purchase on a particular day may run around 10 percent of that day's market volume of bill or coupon trades between customers and dealers, although a large bill transaction may be above 20 percent. If the operation does not suggest a change in policy has occurred, only minimal rate moves are likely to result from the supply changes generated by the operation.

In addition to its transactions in the market, the trading desk has the option to buy Treasury securities from foreign official accounts on any day the accounts are selling or to sell issues from its own portfolio to meet the buy orders of such accounts. These trades give the desk a means of adding or draining relatively modest amounts of reserves in a way that is quick, operationally simple, and unobtrusive. A market operation, in contrast, is rather cumbersome. While a market go-around is in progress, it may be difficult for dealers to trade since they do not know the results of their bids or offers with the Fed. Consequently, the desk prefers to limit such operations to times when the prospective reserve excess or shortage is relatively large. On occasion, it may be an advantage to the desk that purchases from or sales to foreign accounts do not have the announcement effects that accompany a market entry for the System Account.

During periods when persistent increases or decreases in reserve needs are projected, the desk may be buying securities from, or selling them to foreign accounts rather consistently, if orders permit. Because the foreign orders are generally modest in size—from a few million dollars to several hundred million dollars—the desk will usually buy all the bills being sold by the foreign accounts or sell all the bills being bought. Transactions with foreign accounts are put

through at the middle of the latest bid and asked rates in the market. Occasionally, if the order size is large relative to the needed reserve adjustment, the desk will buy or sell only a portion of the foreign orders. Foreign buy and sell orders that do not match the desk's reserve needs may be arranged between two foreign accounts that have purchase and sale orders of matching maturities. The desk will execute the balance of the orders in the market.

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## 2. Temporary Transactions

In managing bank reserves, the Manager finds it very helpful to put reserves in or take them out in large volume for one day to a few days at a time. Suppose the forecast suggests nonborrowed reserves will be in short supply for the remainder of the current maintenance period but will be about as desired for the next period. One possibility would be to provide the needed reserves by buying Treasury bills outright. The bills could then be sold from the portfolio in the next period when the additional reserves were no longer needed. But such a course would involve substantial transactions costs. The System could instead buy securities under RP, which obligates dealers to return the cash plus interest and reacquire the securities on the desired date. Eligible collateral includes not just bills but also Treasury coupons and federal agency securities held by both dealers and their customers.<sup>5</sup>

The enlarged collateral and reduced market risk mean that the desk can conveniently undertake a larger operation through an RP than through an outright purchase.<sup>6</sup> To some extent, collateral offered to the desk reflects the availability of securities being financed from day to day. This factor in turn depends partly on floating supplies from recent Treasury sales and on positioning strategies of dealers and others active in the RP markets. If market participants anticipate that interest rates will soon decline, they tend to add to their positions. Accessible collateral becomes plentiful and the RP rate rises toward the Federal funds rate. When higher rates are anticipated, dealer positions are cut back sharply and the RP rate may fall well below the Federal funds rate.

When the Manager wants to absorb reserves for one or a few days, matched sale-purchase transactions (MSPs) with dealers

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<sup>5</sup> Those federal agency securities that are eligible for outright purchase are also eligible for purchase under RP.

<sup>6</sup> Through October 1989, the largest volume of RPs arranged on a single day was almost \$16 billion (May 1989), and the largest volume of contracts outstanding was about \$22 billion (May 1987).

provide a convenient mechanism.<sup>7</sup> In an MSP, the desk sells Treasury bills from the System's Account for immediate delivery and simultaneously buys them back for delivery on the date desired. This procedure provides securities to be financed for one or a few days, making it unnecessary to add to dealer positions at risk of loss from a price drop. While MSPs are just the reverse of an RP in their effect on reserves, their form is different. Technically they encompass two separate outright transactions.

The desk relies heavily on temporary reserve operations in dealing with the uncertainties that affect bank reserves. Even when the reserve forecasts on the first day of the maintenance period indicate no need for System action, reserves may actually turn out substantially higher or lower than projected. RPs or MSPs enable the desk to respond quickly when reserves fall short of desired levels or prove excessive. Furthermore, a need or an excess may be concentrated on certain days within the period, and temporary transactions can help to smooth the daily pattern of reserve positions.

As Chapter 6 indicated, many foreign official and international accounts place a portion of their dollar holdings in a daily RP investment facility provided by the Federal Reserve Bank of New York. How the desk handles these orders will determine their reserve effect. It can arrange the RP orders internally, executing an overnight MSP using its portfolio, or it can pass them through to the market as a customer-related RP. Reserves are drained under the first option because the funds received by the foreign account from a commercial bank remain with the Fed. The reserve projections allow for this drain on the assumption that the investment orders will be arranged internally. Consequently, if some of the orders are instead passed through to the market as customer-related RPs, they add reserves relative to the projected level.<sup>8</sup>

The choice between a System RP and a customer-related RP depends largely on the magnitude and duration of the reserve injection that the desk wants to accomplish. Customer RPs are normally arranged to mature on the next business day, since participation in the foreign RP pool changes each day. Customer RPs are limited in volume, since they must not exceed the total funds available to for-

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<sup>7</sup> Through October 1989, the largest MSP operation made in the market amounted to \$7 3/4 billion (March 1979). The largest balance of such contracts outstanding was about \$10 1/2 billion (February 1989).

<sup>8</sup> In a technical sense, customer-related RPs merely offset the drain of reserves that results when the foreign central banks receive money into their Federal Reserve accounts. Since foreign investments occur every day, the Federal Reserve builds an estimate of the reserve drain into its reserve forecasts.

eign accounts for investment. The choice of customer-related RPs may be interpreted as indicating that the estimated reserve need is modest or uncertain in size. When the reserve need is large and expected to persist for a number of days, the Manager is likely to choose System RPs in the market. Sometimes the choice between System and customer RPs may be influenced by concerns about how the operation will be interpreted by market participants.

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### *A Day at the Trading Desk*

The working day at the trading desk has a regular rhythm, which flows from the task at hand. The morning is filled with a number of information-gathering activities and meetings that prepare the Manager to make the day's policy decisions. Using direct telephone lines, traders at the desk talk to dealers selected by the Federal Reserve for a trading relationship.<sup>9</sup> The dealers are asked how they expect the day's activities to unfold in the securities markets and how the task of financing their securities positions is progressing. Traders talk to the large money center banks about their reserve needs and their plans for meeting them. Meanwhile, the reserve forecasters in the New York Bank's Research Department and at the Board of Governors in Washington will begin gathering data on bank reserves for the previous day and on factors that could change their projections for future days. By midmorning, the information is used in determining what, if any, open market operations to arrange that day. The plan will be reviewed at a conference call and then carried out.

The officers and senior staff that participate in the policy process begin their day by gathering information about various financial and economic developments and how they are being interpreted by analysts and market participants. U.S. government securities trade in Tokyo and other Asian centers and in Europe while it is nighttime in the United States. Thus, part of the preparation involves reading headlines from various news services concerning developments abroad. U.S. economic data are often released at 8:30 a.m. If any such economic reports are made that day, the officers and staff will read them on the news screens along with any descriptive information concerning special factors that may clarify the data. A number of financial services whose findings are available on information screens provide analyses of recent economic and monetary releases

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<sup>9</sup> The desk chooses its trading partners from the list of primary government securities dealers that report daily data to the New York Federal Reserve. Criteria for inclusion on that list are described in the final section of this chapter.

and offer their forecasts of coming data. This background information helps the officers and staff to understand what the representatives of the government securities dealers have in mind when they arrive beginning at 9 a.m. for a series of meetings.

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### *1. Daily Dealer Meetings*

Each day, one or two members of the Open Market Function, usually including the junior officer or senior staff member who will be speaking on the conference call later that morning, will hold a series of 15 minute meetings with representatives of government securities dealers. Normally, three or four such meetings are scheduled each morning. The meetings with dealers that are located near the Federal Reserve in the New York City financial district are held in person at the Reserve Bank. For the dealers located in midtown Manhattan and in other cities, the meetings are conducted over the telephone. Over a three-week period, each of the dealers with which the Federal Reserve has a trading relationship will have the opportunity to talk with the representatives from the desk.

These discussions with leading members of the dealer community help the people from the desk keep abreast of the forces at work in financial markets. The conversations are free flowing, covering a wide range of subjects. They are full of market jargon and shorthand references, puzzling to outsiders but well suited to conveying information efficiently to the Federal Reserve. The desk participants do not comment on current policy although they may answer questions on technical matters.

A dealer representative may open the meeting by giving the firm's operating assumptions about the desk's current policy objectives. The dealer usually describes how rates are expected to change in coming weeks. The firm's money market economist often outlines the economic analysis and interest rate outlook the firm is presenting to clients. Particularly useful are dealer comments on what their customers actually are doing in the market—sitting on the sidelines or clearly favoring a particular type of security. The dealers will often give their own estimate of the technical position of "the Street" by identifying shortages in particular maturity areas or excess supplies. This information helps to explain the way the market has been behaving in recent days. The succession of meetings each day, day after day, keeps the desk in close touch with the changing analyses, moods, and concerns of the market makers themselves.

Treasury financings provide a recurring theme for the dealer meetings. The Manager or an associate may ask how much debt

the market expects the Treasury to sell in the current or following quarter. They get running reports on the progress in distributing recently sold issues, and news of potential customer interest in coming offerings. To dealers, bidding in Treasury auctions of bills and coupon securities is an extension of the daily task of making markets in outstanding issues.

Dealers associated with banks may comment on bank trading activity, the strength of business loan demand, and any issuance of wholesale market instruments to fund lending. Some dealers will offer information on mortgage-market developments and the liquidity and earning pressures experienced by thrift institutions. Desk participants also gain insights into prospective corporate and municipal bond flotations by quizzing the dealers with large investment banking operations.

After concluding the dealer meetings around 10 a.m., the people from the desk return to the trading room. They will check the information screens for the latest quotes on the most actively traded government securities, for news headlines, and for updated commentary from money market analysts. They will peruse any important news developments that traders will have clipped from several news tickers.

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## *2. The Treasury Call*

A daily conversation with the Treasury takes place around 10:30 a.m. In preparation for this call, the Manager and other officers and staff of the Open Market Function gather in an office near the trading room and review data on the previous day's member bank reserves and borrowing. Soon the New York staff reserve forecasters arrive and present a preliminary estimate of what nonborrowed reserves will be on average over the reserve maintenance period in the absence of any further open market operations. Their estimate gives desk personnel an idea of the operations that will be needed to achieve the nonborrowed reserve objective.

The first step in refining this estimate is to examine the assumptions about the Treasury balance at the Fed on that day and the next two days. As noted in Box B of Chapter 6, the Treasury balance is often the biggest source of uncertainty about reserve levels. After a review of the figures, a desk official will place a call to Treasury Department personnel who make their own estimates of Treasury cash flows. The Treasury attempts to keep its balance at the Fed relatively steady so as to minimize its impact on bank reserves. When the Treasury and New York staffs suggest that the

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# *A Day at the Trading Desk*

**8:30 am**

**9:00 am**

**10:30 am**

**10:45 am**

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*Watching the market react to data*



*Consulting the Treasury by phone about its balances at the Federal Reserve Banks*



*Discussing market developments with securities dealers*



*Developing a plan of action for the day*

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**11:15 am**

**11:40 am**

**5:00 pm**

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*The daily conference call with FOMC representatives*



*Reviewing how the day turned out*



*Contacting the dealers to announce an open market operation*

balance is likely to move away from desired levels, the Treasury will, if possible, take action to bring the balance back into line by transferring funds to or from depository institutions in the form of direct investments or calls.

On occasion, the Manager may ask that the balance be shaded somewhat to the high or low side to assist in the management of reserves. Such requests are most common when the Treasury balance is expected to rise or fall sharply, perhaps in conjunction with tax flows. If the Treasury adjusts its actions to achieve a more gradual rise or fall over several days, it can make managing the reserve adjustments less difficult.

Other topics come up at the Treasury conference call as well. Desk officers may pass along information about foreign central bank subscriptions to forthcoming Treasury issues, subscriptions which often affect the projected cash position. The timing of future Treasury offerings and the associated payment dates also may be discussed, since these affect reserves.

After the Treasury call, the forecasters will, if necessary, revise their reserve estimates in light of the actual Treasury actions. About that time, one of the traders will phone to report the preliminary estimates of outright orders and the size of the foreign RP pool for the day that are prepared from information provided by the New York Reserve Bank's Foreign Exchange Function. The reserve forecasters will incorporate the RP pool into their estimates. They will then depart for their offices to make final refinements to their forecasts.

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### *3. Formulating the Day's Program*

The Manager and other members of the open market area will then begin a preliminary discussion of the appropriate plan of action for the day. Some of the subjects discussed will be the same each day, while others will depend upon whether the two-week maintenance period is just beginning, partially completed, or drawing to a close. Early in the period, the options for making any estimated reserve adjustments will be greatest. But the chances of substantial revisions either to the objective for nonborrowed reserves or to reserves provided by market factors are also greater than they will be later in the period.

Throughout the maintenance period, the starting point of the discussion will be the estimates of the need to add or drain reserves for the period in progress and coming periods. A telephone call to the Board will provide a preliminary reading on the Board staff's reserve estimates as well as an opportunity to provide senior Board

**Table 1 Sample Reserve Data (in millions of dollars)**

<b>Reserve Period Ending</b>	<b>RR Estimate</b>	<b>ER Assumption</b>	<b>BR Assumption</b>	<b>NBR Objective</b>	<b>Projected Supply NBR</b>	<b>Open Mkt. Oper. needed</b>	<b>Aver. ER to Date</b>	<b>Aver. BR to Date</b>
2/28	60,250	1,000	500	60,750	NY 60,150 Bd 59,850	+600 +900	900	400
3/14	60,850	1,000	500	61,350	NY 61,450 Bd 61,400	-100 - 50	—	—
3/28	60,400	1,000	500	60,900	NY 60,600 Bd 60,200	+300 +700	—	—

If these were the figures presented to the desk on February 22, midway through a maintenance period that would end on February 28, it would need to add \$600 to \$900 million of reserves on average for the period to reach the NBR objective. Since half of the period has been completed, it would need to add \$1.2 to \$1.8 billion of reserves on average over the remaining days to reach the NBR objective. The ER and BR to date are close enough to the path assumptions to suggest the NBR objective can be obtained without causing an unduly high or low Federal funds rate. (Abbreviations are defined on page 124.)

The desk knows that the forecasts are uncertain. NBR could end up being higher than \$60,150 million or lower than \$59,850 million by several hundred million dollars.

The desk would probably not choose to make an outright purchase of securities since the estimates suggest that there will not be a need to add reserves in the following period.

Given the forecast uncertainty, the desk would probably arrange an overnight customer-related RP for about \$1 1/2 billion, which would keep pace with the remaining daily average need (midway between The Board and New York staff estimates).

staff with preliminary indications of what sort of action the Manager may be contemplating. (Table 1 illustrates one possible situation the desk might face.) Generally New York and Board staff forecasts will be given similar weight in the deliberations. If the forecasts suggest that nonborrowed reserves are not close to the objective, the participants will discuss ways to bring them into line. They will consider whether the expected reserve adjustments are going to be persistently in one direction. If so, they would discuss whether to undertake an outright operation in the market. As an alternative, they may be able to accomplish the reserve adjustment using modest outright operations with foreign accounts, supplemented at times with temporary operations. If an extended need to drain reserves is expected, the Manager also has the option of allowing securities to mature without replacing them.

Another factor considered each day is the expected reserve excess or deficiency on that day. If reserves are especially short, some banks may face overdrafts if additional reserves are not provided through an open market operation. To avoid ending the day overdrawn, those banks short of reserves are likely to borrow at the discount window. Before they borrow, however, they will probably bid up the Federal funds rate. Just how short reserves have to be before borrowing will rise above amounts that the desk desires will depend upon how much routine borrowing the desk is seeking. It will also depend on the volume and pattern of flows through the financial system expected that day. For example, the high volume of transactions through the Federal Reserve's "Fedwire" funds transfer system that accompanies deliveries of new Treasury issues or social security payments will increase the need for reserve balances. The desk could probably arrange overnight RPs to ease a shortage on the day without much risk of making reserves overly abundant for the period as a whole, even if the overall need were modest. An overnight RP would add to the average reserve level for the two-week maintenance period only one-fourteenth of the dollars paid out.

The desk will watch the Federal funds rate each day. The Manager estimates the range of rates at which funds will most likely trade given the discount rate and the amount of borrowing being sought. The funds rate may move outside the anticipated range for a number of reasons. There may be a reserve need or excess, which may or may not be captured in the projections. The funds rate may also reflect expectations of a policy change or a poor distribution of reserves among banks. The desk officials will try to read the rate's significance. If the level of the funds rate is inconsistent with the reserve estimates, the desk officials must decide how much weight to give to the reserve estimates as compared with the funds rate. A number of factors influence that decision. Sometimes the desk may fear that the funds rate could mislead the banks about the Fed's policy intentions, particularly if a shift in policy stance is widely expected. Moreover, the desk may on occasion wish to give more weight to the signal from the funds rate because its confidence in the reserve forecasts is low. For example, there are times, such as around tax dates, that reserve estimates may be especially uncertain. At other times, however, the desk may feel more comfortable in taking guidance from the reserve estimates, possibly when a reserve distribution pattern suggests an explanation for the level of the funds rate. Moreover, there is a desire to avoid such close atten-

tion to the funds rate as to suggest that even minor variations from some expected central tendency should be resisted.

On occasion, the FOMC may have indicated that it wants to be especially sensitive to conditions in the foreign exchange markets. At such times, reports from the foreign trading desk suggesting disturbing movements in exchange rates may temper the Manager's response to reserve projections and funds rate signals. The main effect of exchange rate developments would tend to be on timing of open market operations within the maintenance period, rather than on the reserve objective itself or the decision to meet it.

Early in the maintenance period, the discussion will give particular attention to the expected daily pattern of reserve excesses and deficits for the period. Other things equal, the Manager prefers to add reserves, if that is the action needed, on days when the reserve deficiencies are expected to be particularly large. Sometimes the pattern of reserves may be so skewed that the Manager will plan to both add and drain reserves within the maintenance period. The estimates at the start of the period only rarely show the extremely uneven pattern of reserves that would warrant such an approach, although subsequent revisions to market factors or the nonborrowed reserve objective may lead to that result.

On the first day of the period, the reserve forecasters will have presented formal estimates of the demand for excess reserves based on econometric models and some individual judgment. The initial estimates are computed without any figures on the reserve excesses or deficiencies carried into the period, although estimates of the previous period's excess reserves may suggest whether reserves carried in will be positive or negative. More complete information will be available on the second Thursday, at which time the forecasters will revise their estimates.

After the first day, the discussions will include a review of the planned approach to see if it needs to be modified. Small changes are the norm, since reserve factors rarely behave exactly as expected. Major shifts in the outlook for reserves within a maintenance period generally occur a few times a year. As a reserve period progresses, the Manager will consider the distribution of reserves so far. For instance, have the small banks been holding unusually large amounts of excess reserves that might mean actual excess reserves will run higher than forecast or have the large money center banks accumulated abnormally large reserve deficiencies that will have to be covered, possibly creating extra money market pressures? The traders at the desk have daily conversations with the large banks

during which they may obtain useful clues about the bank's reserve management strategies. Finally, are banks borrowing actively relative to the planned average? Usually, the money center banks borrow only on the last day of the period unless unusual reserve distributions or wire or computer transmission problems leave them facing an overdraft at day's end when routine means of covering it are no longer available. If the large banks have not borrowed, then the day-to-day borrowing tends to run a bit below the planned average until the final day of the period.

Near the end of the maintenance period, the desk will have to take a very close look at borrowed reserves and excess reserve behavior to date, to see if it is still appropriate to achieve the nonborrowed objective. For instance, banks may have borrowed so much at the discount window early in the period that it becomes mathematically impossible to achieve the planned borrowing level, since borrowing can never be less than zero. In practice, there is always some borrowing since many small institutions use the seasonal program for extended periods and often use the adjustment program for several days at a time. If large amounts of borrowing have occurred and the Manager still decides to meet the nonborrowed reserve objective, total reserves would be high and consequently excess reserves would be large relative to probable bank demands. The excesses would most likely foster easy money market conditions near the close, which could convey a misleading impression as to policy intentions. Alternatively, the Manager could opt to allow nonborrowed reserves to fall short of the path, accepting the inevitable overshoot of borrowing in order to prevent an overabundance of excess reserves. If low borrowing had occurred through most of the period such that borrowing would have to rise sharply on the last day, the funds rate would be subject to upward pressure. Again, the Manager will have to weigh the consequences of meeting or of deliberately overshooting the nonborrowed reserve objective. Either course of action could leave the financial markets with mixed signals about policy intentions.<sup>10</sup> Relative sensitivities to the reserve measures as against the funds rate tend to shift as policy priorities change.

The amount of excess reserves finally reported for the period will largely be determined by what has already happened. If small institutions have built up a large reserve excess, they will only work off a limited portion of it. Many never run reserve deficiencies and oth-

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<sup>10</sup> Federal Reserve actions are studied carefully by banks, dealers, and other market participants. "Fed watching" is described in Chapter 8.

ers only run small ones because the reserve balances that they are required to hold at the Federal Reserve are modest. Large banks usually meet their reserve goals, although occasionally a large reserve miss during the period may have locked one or two of them into excess reserves positions that they cannot eliminate without ending one of the remaining days with their accounts overdrawn. Since excess reserves are not a target in themselves, the Manager is likely to make an allowance for expected deviations from the assumption used in the objective.

Not all of these issues must be readdressed at each day's morning strategy session, however. The actual conversation among open market officials will usually last only 10 to 15 minutes, depending on the number of issues present. Around 11 a.m. the reserve forecasters will deliver computer spread sheets containing their final reserve estimates as well as those of the Board staff. If the estimates differ significantly from those made earlier, some modification of the plan of action may be needed. Usually, however, the forecasters have made at most minor adjustments to the earlier estimates.

As the discussion progresses toward a conclusion, one of the junior officers will write a program of action for the day. The program will review the reserve situation and any other considerations that have influenced the approach taken. On Thursdays, the program will also summarize the forecasts of the monetary aggregates, which will have been revised the night before on the basis of an additional week's data and reviewed earlier that morning. The Thursday program will describe the degree of reserve pressure being sought. If the approach to reserve provision is being changed, the reasons will be indicated. Once the program is drafted, the Manager and other officers will review it.

Toward the end of the strategy session, the person who will be speaking on the conference call will go to the nearby trading room, to be briefed by the traders who follow developments in the various financial markets. This person will first be given a run-down on developments in the Treasury market. One trader summarizes price moves since the previous close, beginning with developments in Asia and Europe. The trader then reports on market reactions to indexes of economic data and describes other factors that the dealers have mentioned. Another trader will report on the corporate and municipal markets, noting new issues that have been priced that day and highlighting other topics that dealers have mentioned. Even though the desk does not deal in these

issues, it likes to have a sense of what is happening, because developments in other markets and the economy often impinge on the Treasury market.

Someone else will report on short-term financing in the Federal funds and RP markets and will note conditions relating to the new issuance of bank paper. The trader who has been talking with the money center banks will offer updates on how the banks see their own reserve needs and will report their perceptions of overall reserve availability. In the few remaining minutes before the conference call begins, the person who will do the call consults the information screen to see where the dollar is trading relative to several key currencies and then telephones the foreign trading desk. The foreign desk will provide a review of foreign exchange trading abroad and locally, a report on intervention by the Federal Reserve or foreign central banks, and an enumeration of factors behind movements in the exchange rates.

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#### *4. The Conference Call*

Around 11:15 a.m., a secretary will report "the call is in." The person who will be talking will gather up his or her notes, along with sheets of paper with information about reserves and the securities markets, and head for the office near the trading room where the call will take place. The Manager, other officers, and senior staff members will already have gathered. The conference call links the desk with the office of the Director of the Division of Monetary Affairs at the Board where several Board staff members will have assembled, and with one of the four Reserve Bank presidents outside of New York serving on the FOMC. The call provides the Board staff with the desk's review of market and reserve developments and the Manager's plan for open market operations. The Board staff condenses this into a brief report, given to each governor by early afternoon and wired to each Reserve Bank president. The call also enables the Manager to consult daily with one of the Committee members concerning the desk's execution of FOMC instructions. The Reserve Bank president on the call not only has an opportunity to comment daily on the desk's approach, but also gets a sense of the circumstances, including uncertainties and difficulties faced by the desk between meetings.

The call itself usually runs 15 to 20 minutes. The person speaking for the desk draws upon the findings of the morning's information-gathering sessions to give a review of price and rate movements in the principal securities markets and to explain the influences mar-

ket participants see at work. Mention is made of current developments in the gold and foreign exchange markets. The speaker will describe the state of the Federal funds market, giving the latest information on rates and on the progress made by the major banks in covering their reserve needs. The speaker then discusses the reserve outlook and explains revisions to the figures. If the reserve forecasts of the Board and New York staffs differ significantly, the call provides a convenient opportunity for discussing the reasons for the discrepancy. During the course of the maintenance period, the estimates usually come closer together, but they may still be one or two hundred million dollars apart on the Wednesday settlement date. Finally, the speaker reads the proposed program of action and asks the Reserve Bank president for comments. (Occasionally, a governor will sit in at the Board and will also be asked to comment.)

Usually the president will concur in the Manager's approach. Occasionally, the president may ask the Manager whether an alternative approach has been considered. Such a question will elicit further elaboration of the reasoning behind the proposed program. If more discussion of recent developments seems needed, the Manager usually calls the president after the day's operations are launched.

The Director of the Monetary Affairs Division at the Board uses the call to give the other participants the latest information on the monetary aggregates. Usually by Tuesday morning the Director's staff has a fairly good fix on bank deposits for the week ended on Monday, eight days earlier. These figures will be incorporated into the weekly levels of M1, M2, and M3 to be published on Thursday. Often the Director will discuss M1 for that week and give a first estimate of the M1 data for the week that ended the previous day, drawing on reports for part of the week by the large institutions and a sample of other institutions. Deposit data are subject to further refinement on Wednesday; by Thursday morning the Director will report the final monetary data for the week ended 10 days earlier to be published that afternoon and will review the revised projections of the aggregates for the current month.

The Chairman of the Board of Governors does not generally sit in on the call but is kept fully informed of all significant matters relating to open market operations. The Manager and Director make sure the Chairman knows in advance about large outright or other significant open market operations. If necessary, the Manager, the Director, and the Chairman will discuss unfolding economic and monetary data that may bear on how the Committee's

directive is to be carried out—particularly whether a change in the desired degree of reserve pressure may be appropriate. The Chairman may decide that a consultation of the full Committee, or perhaps a formal telephone meeting, is in order.

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### 5. Executing the Daily Program

The call typically ends shortly after 11:30 a.m.; the officers usually carry out any temporary transactions authorized in the program fairly soon afterwards.<sup>11</sup> In the go-around, traders contact the dealers quickly so that the announcement time is kept short. At the same time, an officer will inform the public information area of the Federal Reserve Bank of New York of the action to enable its press officers to respond to inquiries from the news media.

When arranging RPs, either for the System or for foreign official customers, the desk notifies each of the dealers that it wants to do RPs for a specified period, most commonly ranging from overnight to one week. Within about ten minutes, dealers will begin to call in offerings of the par amount that they and their customers want to arrange and the interest rate they are willing to pay on each lot. Typically, traders on the desk will have to round up the stragglers to complete the array of competitive propositions over the next 10 minutes. The traders consolidate the offering amounts by rate and then inform the Manager of the totals at each rate. The Manager has in mind an approximate volume of RPs to be arranged, but there is some flexibility, especially early in the period when further reserve adjustments can be made on subsequent days. A somewhat greater volume may be arranged if large offerings or a stringent Federal funds market suggests a larger-than-forecast need for reserves. If offerings are skimpy or unattractively priced, a smaller volume than was contemplated initially may be executed. Once the Manager decides how low a rate to accept, the traders quickly notify all dealers of the propositions accepted and rejected. Each accepted proposition will be arranged at the rate the dealer offered. The whole operation is over in about a half hour.

After an RP operation is completed, those dealers whose propositions were accepted notify the traders on the desk of the specific securities that they or their customers are selling to the Federal Reserve under RP. Since the specific issues identified may trade

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<sup>11</sup> On rare occasions, such as in the tumultuous market conditions that accompanied the stock market crash in October 1987, the desk may operate before the normal time. Expectations of collateral shortages or an early closing of the markets ahead of a major holiday have also led to early entries.

significantly above or below par depending on whether their coupon interest rates are higher or lower than current rates, the collateral value of each security must be assessed. A price is set somewhat below the bid price currently being quoted in the market plus any accrued interest on the issue. The dealer receives that price in return for the securities. This pricing procedure affords the Federal Reserve protection against declines in market price during the term of the contract and potential losses should the dealer not return the money when the contract matures. The task of valuing the securities is in the process of being automated. Computers will soon be used to do the necessary calculations. The accounting division of the Open Market Function puts the needed information into the computer to start the delivery process through the Securities Clearance Department. Procedures allow payment to be made only when the securities are received.

RPs are of short duration and dealers generally may withdraw from multiday transactions before maturity, a possibility which complicates the accounting. Hence, RPs are made for the account of the Federal Reserve Bank of New York rather than for the System Open Market Account because the System Account must be divided each business day among the 12 Federal Reserve Banks. RPs are subject to the terms of a comprehensive collateral agreement, which affirms the right of the Reserve Bank to sell the securities in the event the dealer fails to repurchase them.

Both the desk and the dealer retain the option to terminate routine multiday RP contracts before maturity. In practice, the desk has not exercised its option. Dealers often do, repurchasing their securities because they wish to sell them to another party or because they have arranged an RP from another source at a lower rate. The right of withdrawal means that the desk is uncertain at the time it makes multiday RPs what the effect will be on average reserve levels for the period. The early withdrawal option can sometimes work to the desk's advantage. If nonborrowed reserves are too high, the funds rate is likely to slip, encouraging dealers to repurchase their securities early and absorb reserves in the process.

Nevertheless, the withdrawal feature also can lead to difficulty in maintaining desired reserve levels—for example, when a strong demand for securities rather than an abundance of reserves causes the withdrawals from RPs. Furthermore, although withdrawals are permitted until 1:00 p.m., the desk enters the market earlier than that. If the desk wishes to replace the RPs withdrawn, it must do so without knowing total withdrawals. When the desk wants to be sure

that its reserve injection sticks, usually when the need for reserves is especially large, it may offer nonwithdrawable RPs. Of course, the absence of an option to terminate the contract early can lead the dealers to offer less or offer lower rates than might have been the case otherwise.

If the day's action is a matched sale-purchase agreement (MSP), the entry time is the same but the operational procedures are slightly different. The sale side is an outright sale of a specific Treasury bill (or specific bills) from the System's portfolio. The purchase side is a contract to buy back the bill for delivery at a particular future date. In executing MSPs in the market, desk traders notify dealers of the market rate at which the System will sell the particular bill. Dealers then indicate the amount they are willing to buy and the rate at which they will reoffer. The rate of discount set by the desk determines the price realized by the System on its sale, while the competitively set reoffering rate determines the prices at which the System reacquires the same bill one or more days later. MSPs are not subject to withdrawal since they are literally matched outright transactions with specified delivery dates.

When the desk executes an outright transaction in bills or coupon securities it usually enters the market in the early afternoon. The transactions are for delivery the next day or two days forward. Outright operations are more time-consuming than temporary transactions, both because dealers contact a larger number of customers and because a larger number of bids or offers have to be recorded and reviewed. Choosing among the propositions is also more complicated because a yield curve involves more choices than the single interest rate comparison typical of RPs and MSPs. Generally, an hour or more is required for a go-around in Treasury bills. A similar operation in Treasury coupon securities can require two hours or more, largely because of the increased number of issues and the operational time required by desk personnel to convert prices to yields and to compare offering yields relative to the yield curve. (Plans to automate these operations are in the development stage.)

As dealers call back, traders record dealer bids or offerings on strips preprinted with two dealer names at the top of each strip. The issues involved have been posted on each strip so that the rates for bills, or prices for coupons, and the amounts can be listed quickly. Desk traders read back each dealer's propositions to guard against communication errors. The officers assemble the go-around strips used by the traders on one or more boards. The rates or prices being quoted by different dealers for each issue line up horizontally. The

different maturities run vertically. The officers then choose the better propositions (based on maximizing yield to maturity) from the array before them, bearing in mind predetermined parameters for the size and distribution of purchases desired. Subsequently, they return the strips to the individual traders so that they may let the dealers know which propositions were accepted and which rejected.

Next, the traders must record the trades on tickets that will, in turn, be entered onto the computer for subsequent processing. When a dealer has served as an intermediary for a customer, the dealer or its clearing bank tells the Federal Reserve Bank the name of the institution that will deliver the securities and receive payment over Fedwire. Purchases of the dealer's own securities generate credits to the dealer, if a bank, or to the dealer's clearing bank.

Regardless of which bank receives the initial reserve credit, banks across the country will soon benefit from the infusion of reserves, although they may not distinguish it from all the other bank and customer transactions that are flowing through their reserve accounts. In a similar fashion, sales of securities reduce the reserves of individual banks and the effects quickly spread through the banking system.

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### *Communications Within the System*

One of the desk's functions is to keep others in the System informed, not only about how operations are carrying the Committee's thrust forward into the financial arena but also about the kind of feedback that its policy is receiving. Regular desk reports to the Committee and visits by System personnel to the desk are important means of maintaining a clear understanding of these key aspects of the monetary policy process.

The desk's main channels for communicating with the rest of the System are the daily wires to the Reserve Banks and the written reports sent to the Board and the Reserve Banks. Wires sent from the trading desk describe each day's developments in the financial markets. As noted earlier, the Board staff's wire describing the 11:15 a.m. call gives a full view of reserve data, the markets, and the desk's program for the day.

Every other Friday the analysis division of the Open Market Function mails a comprehensive report on operations for the maintenance period ended on the preceding Wednesday. This report describes the daily conduct of operations and tracks the behavior of the reserve measures in relation to the objectives. It also conveys the latest data and projections of the monetary aggregates.

Separate sections examine bank reserve management, money market developments, and developments in government, corporate, and municipal securities markets. Statistical appendixes summarize all transactions in the System Account and contain an array of information on the financial markets.

Before each FOMC meeting, the analysis division prepares a summary report of operations and financial market developments since the last Committee meeting. The officers and staff most closely involved with the reports also prepare a comprehensive annual report analyzing policy implementation and financial market developments for the year. A modified version of this report is published, generally in the spring issue of the New York Federal Reserve Bank's *Quarterly Review*.

The Trading desk also has a regular flow of visitors from the staffs of the Board and other Reserve Banks. They observe operations so that they can brief their principals and do monetary research. Usually visitors participate in the desk's daily routines for a week and spend time with government securities dealers, a bank money desk, and a Federal funds broker. Desk officers and staff lead the visitors through the morning dealer visits, the Treasury call, and the 11:15 a.m. conference call, explaining the array of data that influence daily decision making. Interviews with research personnel who project both reserves and money supply acquaint visitors with the current state of the projector's art, while the observation of daily meetings at which revisions to the reserve outlook are presented drives home the uncertainties attending the conduct of open market operations.

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### ***Adjunct Desk Responsibilities***

Trading desk officers and staff members perform a number of other duties. As mentioned above, they carry out securities transactions for customers, mostly for central banks but occasionally for Treasury trust funds. Desk officers are in daily contact with senior Treasury officials responsible for Treasury cash and debt management. They also play a role in official surveillance of the primary dealers in government securities. Finally, officers and staff undertake studies relating to monetary policy and to a broad range of other financial developments.

Purchase or sale orders are executed for foreign customers at the customers' initiative. The Bank's Foreign Relations Department keeps in contact with the more than 150 official foreign institutions maintaining accounts with the Fed and compiles their requests for

transactions. Any orders that the desk does not choose to meet using the System Account as counterparty must be either crossed between foreign accounts, if buy and sell orders coincide, or arranged in the market on a competitive basis. When the customer orders are small relative to ordinary market transactions, the desk will seek bids or offers from a handful of dealers. For large orders, the desk will arrange a go-around of all dealers to get competitive bids or offerings. Market entries to make purchases or sales for customer accounts may either precede or follow the operations in RPs or MSPs for reserve management purposes. (Since customer RPs are used for reserve management, the desk does not arrange them on the same day it does a System RP or MSP.) While the desk does not publicly announce the magnitude of its own operations, it does announce the approximate size of customer transactions (including RPs) at the time of market entry. The bulk of customer operations are in Treasury bills and short-dated coupon issues. The desk will also purchase or sell non-Treasury instruments such as bankers' acceptances and large certificates of deposit when asked to do so. Most of the excess foreign cash is placed in the foreign RP pool, but at day's end, a limited amount of uninvested funds that arrived too late to be arranged as RPs may be placed overnight in the Federal funds market.

The Trading desk's relationship with the Treasury has many facets. The traders on the desk provide information several times each day on secondary market activity in government securities—both through oral reports and market quotations. Desk personnel also convey to the Treasury the dealers' comments on new offerings that investors might find attractive. Once the offerings have been announced, the desk reports on the apparent extent of investor interest. Traders monitor the market's estimates of rates to be established at each auction of Treasury issues. Officers supervise the opening of competitive tenders submitted in New York, which usually account for 80 percent or more of the national awards of new issues.

The desk's advisory role stems naturally from its daily involvement in the U.S. government securities market. The Manager is in frequent contact with the Deputy Assistant Secretary of the Treasury for Debt Management and the Fiscal Assistant Secretary to discuss the Treasury's cash needs and its plans for meeting them. Desk staff regularly inform the Treasury about foreign official interest in new issues. Once each quarter, Treasury officials come to New York to obtain the suggestions from primary dealers

on structuring the midquarter financing and on meeting remaining cash needs in the months ahead. In the following week, the Manager and an associate typically attend the briefing sessions held by the Treasury in Washington. There, the Treasury obtains financing recommendations from a special advisory committee of the Public Securities Association that includes representatives of government securities dealers and other market participants. Trading desk representatives participate in the Treasury's debt management group discussions, which lead to the Treasury's final decisions on what to offer.

Open market personnel have a special responsibility for relations with the primary dealers by virtue of the desk's role in the market. Members of the Open Market and Dealer Surveillance Departments of the New York Federal Reserve Bank work closely together on matters relating to primary dealers. Surveillance procedures have been somewhat modified as a result of the Government Securities Act of 1986, which provided for regulation of what had previously been an essentially unregulated market. Nonetheless, the desk still wants to be assured that the parties with which it does business are financially sound and have the ability to carry through on a commitment.

The Federal Reserve publishes a list of reporting primary dealers. The number of primary dealers grew from 38 in 1985 to 46 in late 1988. Subsequently, however, some firms that did not find participation profitable withdrew. At the end of July 1989, the primary dealer list included 42 dealers. Firms are usually added to the list when they have satisfactorily demonstrated the adequacy of their capital, the experience of their management and trading personnel, and the capability to remain market makers. They must also show that they have achieved a significant volume of trading activity in government and federal agency securities with a broad range of customers and other dealers.

A surveillance team conducts an on-site review of each firm's policies, management controls, and reporting procedures before the firm is accepted. The primary dealers and the aspiring dealers report daily on their trading activities, their cash and futures positions in Treasury and other securities, and their means of financing positions. Such reports supply open market and dealer surveillance personnel with up-to-date information on the functioning of each dealer and the market as a whole. In addition, the firms provide monthly and annual profit reports, which enable the Federal Reserve to keep close watch on their financial soundness. The

surveillance team schedules periodic visits to the primary dealers to strengthen the New York Fed's understanding of a dealer's business approach, review management controls, and test adherence to reporting procedures. Occasionally, senior officials from the Open Market and Dealer Surveillance Departments meet with the principal officers of a dealer firm to discuss the dealer's recent performance and review any outstanding issues. The Federal Reserve admits a firm on the primary dealer list to a trading relationship after determining that it has a good track record and would help the desk perform its own functions. Generally most of the primary dealers have a trading relationship with the desk.

Finally, open market personnel engage in a wide variety of reporting and analytical assignments. Reporting to the FOMC itself is one important task. Beyond the routine reports, described above, special studies are undertaken. They may involve proposed modifications in the Committee's approach to reserve management or to the choice of intermediate targets. Technical matters involving reserve management, such as the behavior of excess reserves or the relationship between discount window borrowing and interest rates, may be analyzed. Open market staff may also examine issues of Treasury financing and the Treasury's tax and loan accounts to find ways to reduce their disruptive effects of Treasury cash flows on reserves. Market developments, such as the emergence of markets for derivative financial instruments, are of particular interest as well.

## *Responses to Federal Reserve Policy*

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Monetary policy has a wide range of direct and indirect effects on economic activity, prices, and interest rates. Although there is considerable agreement among economists about the channels through which monetary policy impulses are transmitted to the economy, the relative importance of each of these channels remains controversial. Most economists believe that monetary policy influences economic activity and prices by affecting the availability and cost of money and credit to producers and consumers. People make spending and investment decisions based upon current and expected wealth, income, and prices, all of which are influenced by past, current, and expected future monetary policy actions. Interest rates respond to the current and prospective economic climate and to monetary policy. Monetary policy actions in turn enter into decisions about consumption, savings, and investment. The effects of policy will both influence and depend upon the underlying economic environment, including perceptions about federal government expenditures and receipts, the strength of credit demands and supplies in the United States and abroad, and the outlook for the exchange rate of the dollar.

The four major sections of this chapter explore some of the ways in which domestic monetary policy can affect the U.S. economy. The first section examines how economists over the last 50 years have interpreted the transmission of monetary policy. Considerable understanding has been gained from the experience and analysis of recent decades; most analysts currently believe that monetary policy influences prices and incomes by affecting both interest rates and wealth. Nonetheless, the significance of particular channels of transmission is still debated, and questions persist about the way people respond to new information. No single, comprehensive, widely accepted view has emerged of the role of monetary policy in determining economic activity and price behavior.<sup>1</sup>

The second section considers the impact of policy on the cyclical behavior of the interest rate maturity structure, commonly called the yield curve. The third section examines how the desk's procedures may influence interpretations of policy and interest rate determination. The potential effect of policy on the individual sectors of the economy is the subject of the fourth section; the discussion demonstrates that the sectors' different compositions and constraints shape their responses to interest rates and income. The final section discusses the communication of policy through the activi-

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<sup>1</sup> Stanley Fischer, "Recent Developments in Macroeconomics," *The Economic Journal*, vol. 98, no. 391 (June 1988), pp. 294-339, provides an overview of the literature on a number of policy issues.

ties of “Fed watchers”—economists who forecast and interpret economic behavior, interest rates, and Federal Reserve actions.

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### *Evolving Views of Policy Transmission*

Economists’ understanding of the transmission of monetary policy to the financial markets and to the economy has been modified extensively during the past several decades. One school of thought begins with J. M. Keynes’ *General Theory*, written in 1935. Influenced by the Great Depression, Keynes had argued that monetary policy had limited power to promote economic expansion; once interest rates fell close to zero, as they did during the depression, no further declines to stimulate investment would be possible. Wages were believed to be sticky and particularly resistant to falling, even in the face of high unemployment. Although A. C. Pigou, a member of the earlier classical school, objected that Keynes’ arguments depended upon an implausible failure of workers to respond to changes in their purchasing power, the predominant belief in academic and policymaking circles during the 1940s was that monetary policy, in practice, had little power to promote economic expansion. In the postwar period, however, economic expansion and inflation were the dominant conditions. Interest rates were no longer close to zero and “Keynesian” economists modified Keynes’ models. They came to expect that monetary policy would work primarily by affecting interest rates, which in turn would affect investment.<sup>2</sup> Economists who continued to follow the prewar classical tradition were more likely to focus on long-run equilibrium conditions and generally believed that over time money would determine the price level.

Monetary policy was frequently analyzed in the context of business cycles, both by Keynesians and by economists who were extending and modifying the classical analysis. Some economists suggested that business cycles resulted, at least in part, from the policy process itself.<sup>3</sup> Their arguments ran as follows: Monetary authorities would respond to weakness in the economy with an easier monetary policy that would lower interest rates by making loanable funds more plentiful. (Deliberate fiscal stimulus might make a difference in long con-

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<sup>2</sup> For a further description of the evolution of Keynesian thought in the 1950s and 1960s, see Paul A. Samuelson, “Money, Interest Rates, and Economic Activity: Their Interrelationship in a Market Economy,” Proceedings of a Symposium on Money, Interest Rates, and Economic Activity, American Bankers Association, New York, 1967. Reprinted in Robert C. Merton, ed., *The Collected Scientific Papers of Paul A. Samuelson*, vol. 3 (Cambridge: MIT Press, 1972), pp. 550-70.

<sup>3</sup> Gottfried Haberler, *Prosperity and Depression* (London: George Allen and Unwin, 1964).

tractions, but lags in recognizing the recession and in changing policy would preclude its use in countering short recessions.) Lower rates and increased credit availability would encourage more expenditures on investment and consumption, which in turn would support economic expansion as long as there was excess capacity to absorb the increased demand. When capacity constraints were felt, increased demand would merely lift prices, producing “demand pull” inflation. Interest rates would begin to rise, and investment would be choked off as credit became more expensive. If ceilings were then placed on the interest rates that banks could pay or charge, or if banks became reluctant to make loans that they perceived to be risky, credit availability would be reduced. The “credit crunch” would constrain economic activity, bringing the business expansion to its close.

During the 1950s and 1960s, economists struggled to explain inflation that arose when the economy seemingly was not at full employment. It was generally described as a “cost push” phenomenon and was attributed to structural distortions in the labor markets rather than to aggregate monetary or fiscal policies. A related hypothesis was developed by A. W. Phillips.<sup>4</sup> He observed that increasing levels of employment seemed to be associated with rising nominal wage rates. Graphical relationships between the unemployment rate and changes in wages or prices came to be referred to as Phillips curves.

These economic models relied on nominal wage rigidities, which meant that the prevailing descriptions of the policy transmission process could at best hold only in the short run. At some stage, people would change their behavior as prices and wages were observed to rise (or fall) persistently. In economic parlance, people would not suffer permanent money illusion but would, in time, recognize the decline in their wages defined in “real” terms—adjusted to take account of price changes. In particular, as prices rose, workers would demand higher wages for a given amount of work to offset the loss of purchasing power, or alternatively would work less for the same wages. The Phillips curve would not represent a long-run equilibrium. Once inflation expectations rose, the curve would shift outward.<sup>5</sup>

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4 “The Relation Between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861-1957,” *Economica*, vol. 25, no. 100 (November 1958), pp. 283-99.

5 Milton Friedman, “The Role of Monetary Policy,” *Presidential Address at the 80th Annual Meeting of the American Economic Association, December 1967*, reprinted in *American Economic Review*, vol. 58, no. 1 (March 1968), pp. 1-17; and Edmund S. Phelps, “Money Wage Dynamics and Labor Market Equilibrium,” *Journal of Political Economy*, vol. 76, no. 4 (July-August 1968), pp. 687-711.

During these years, Milton Friedman and several other economists argued that the standard view of the monetary transmission process gave too little emphasis to the role of money balances. Consumers who found themselves with larger amounts of money when an increase in the aggregate quantity worked its way through the economy would feel wealthier and increase their spending. Sellers would respond to the increased purchases by ordering more goods and by raising prices; the increased total quantity of money available for purchases would sustain the higher prices.

The theory did not define how the increase in aggregate demand stimulated by the higher money balances would be divided between output and prices. Drawing on the classical model, the economists who emphasized the role of the quantity of money argued that increasing money balances would not affect output indefinitely but in the end would only lift prices. The short-run dynamics of a response to a series of increases in money balances, however, would affect both economic activity and prices. The pattern followed would depend upon how the increases affected expectations and how quickly people adjusted their behavior when their expectations changed.

When inflation was expected to pick up, nominal interest rates—those observed directly—would increase. If the change were merely offsetting the expected decline in purchasing power over the term of the loan, the increase in nominal rates would not raise the inflation-adjusted or real cost of borrowing or the return to lending. Consequently, using nominal rates as a gauge of the tightening or easing of policy could prove misleading and could induce perverse results. For instance, the monetary authorities might think they were providing for a steady cost of credit by holding interest rates constant, but if the rate of inflation was expected to accelerate, they would really be fostering easier money and credit conditions.<sup>6</sup>

It became increasingly important to deal with distortions in nominal interest rates as inflation gained force in the late 1960s and 1970s. Economists made use of the concept, introduced years earlier by Irving Fisher,<sup>7</sup> of real interest rates—approximated as the nominal rate less the expected rate of inflation. This concept held that borrowers and lenders made their decisions based on expected real rates. These rates, however, could not be observed but had to be derived from expectations of inflation. Fisher suggested that the real rate was

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<sup>6</sup> Friedman, *op. cit.*

<sup>7</sup> *The Theory of Interest* (New York: MacMillan, 1930).

related to underlying economic conditions as they affected investment and savings opportunities and therefore might be reasonably constant. If that were the case, changes in nominal interest rates could be used as an indication of changes in inflationary expectations. Using that hypothesis, Fisher and subsequent observers found that interest rates appeared to adjust to changes in inflation with long lags, possibly because it took time for borrowers and lenders to realize that a change in the rate of inflation would be sustained.

Fisher's hypothesis is difficult to test because *ex ante* real rates cannot be measured directly. *Ex post* rates may or may not be a good proxy. If real rates are computed *ex post* by subtracting actual inflation from nominal rates—even averaged over fairly long periods—we find that real rates have been far from constant (see Chart 1, page 183). *Ex post* real returns have often been low and occasionally negative during periods of accelerating inflation such as the 1970s; they were well above levels of the previous decades in the early part of the 1980s when inflation was slowing.<sup>8</sup> The apparent variability in real rates may mean either that expectations of inflation are subject to substantial errors or that *ex ante*, real rates are not constant.<sup>9</sup> Real rates may well change as part of the price adjustment process.

With the distinction between real and nominal measures attracting increased attention, analysts considered how to measure inflationary expectations. Most work done in the 1960s estimated expectations of future inflation by extrapolating from past inflation. During the 1970s economists argued that this “adaptive” expectations approach was incomplete. They suggested that borrowers and lenders would make use of all of the relevant information available, not just that on past inflation. In particular, they would consider current monetary and fiscal policies and likely future actions by the policymakers. The approach has been termed rational expectations.<sup>10</sup>

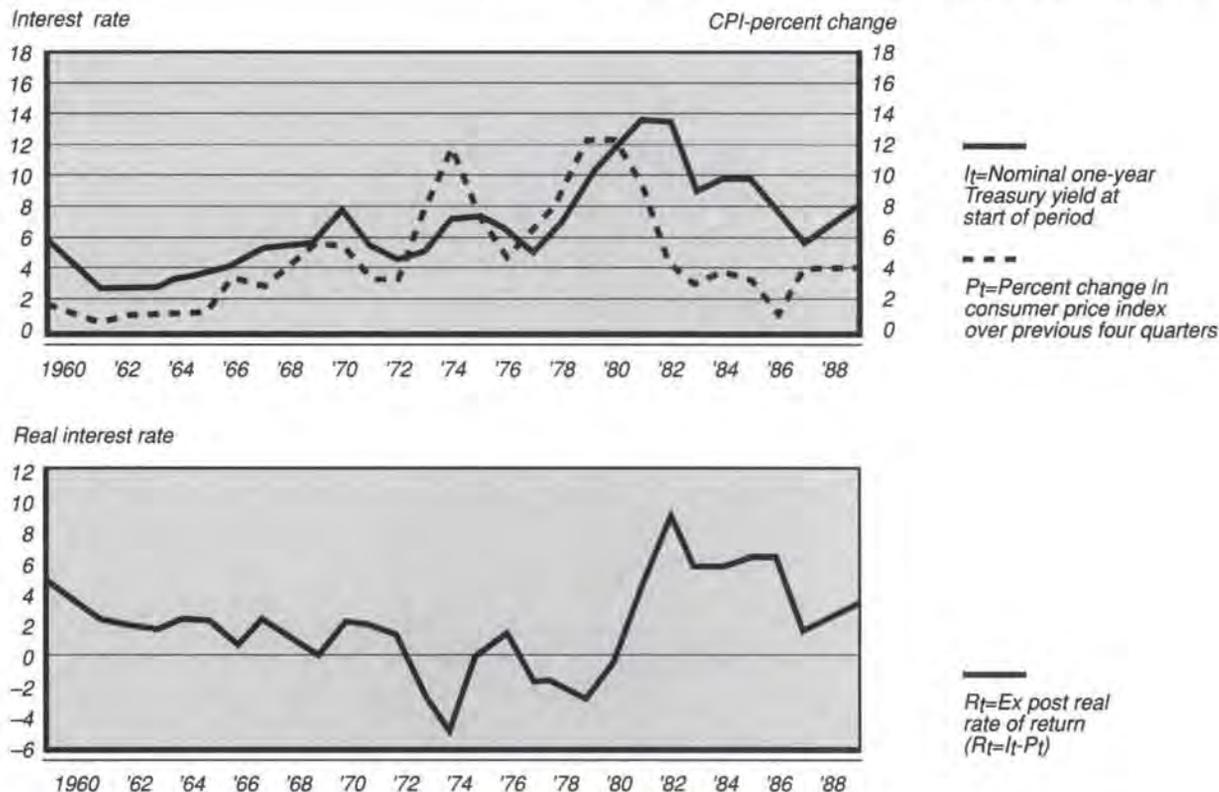
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8 A. Steven Holland, “Real Interest Rates: What Accounts for Their Recent Rise?” *Federal Reserve Bank of St. Louis Review*, December 1984, pp. 18-29.

9 A number of different techniques have been used to estimate the *ex ante* real rate of interest. For instance, see Frederick Mishkin, “The Real Interest Rate: An Empirical Investigation,” *The Cost and Consequences of Inflation, Carnegie-Rochester Conference Series on Public Policy*, vol. 15 (Autumn 1981), pp. 151-200; and Charles R. Nelson and William G. Schwert, “Short-Term Interest Rates as Predictors of Inflation: On Testing the Hypothesis That the Real Rate of Interest is Constant,” *American Economic Review*, vol. 67, no. 3 (June 1977), pp. 478-86.

10 The concept was introduced in John F. Muth, “Rational Expectations and the Theory of Price Movements,” *Econometrica*, vol. 29, no. 3 (July 1961), pp. 315-35. Rational expectations analysis was applied to monetary questions by Robert E. Lucas Jr. in “Expectations and the Neutrality of Money,” *Journal of Economic Theory*, vol. 4, no. 2 (April 1972), pp. 103-24; and by Thomas J. Sargent and Neil Wallace in “‘Rational’ Expectations, the Optimal Monetary Instrument, and the Optimal Money Supply Rule,” *Journal of Political Economy*, vol. 83, no. 2 (April 1975), pp. 241-54.

**Chart 1 Ex Post Real Rate of Return: One-Year Horizon**



The basic rational expectations concept has attracted a wide audience. Its proponents have argued that people will incorporate all of the predictable consequences of available information about monetary policy into their decision making, including the future effects of changes in policy priorities. Hence, if the Federal Reserve enacted a change in policy procedures<sup>11</sup>, people would alter the way they

<sup>11</sup> The observation that a change in policy procedures will change the structure of the transmission mechanism was made in Robert E. Lucas Jr., "Econometric Policy Evaluation: A Critique," in Karl Brunner and Allan H. Meltzer, eds., *The Phillips Curve and Labor Markets*, Carnegie-Rochester Conference Series on Public Policy, vol. 1 (Amsterdam: North-Holland, 1976), pp. 19-46.

Carl Walsh applied the hypothesis of the "Lucas critique" to the monetary policy transmission mechanism in "The Effects of Alternative Operating Procedures on Economic and Financial Relationships," *Monetary Policy Issues in the 1980s*, a symposium sponsored by the Federal Reserve Bank of Kansas City, August 1982, pp. 133-63.

responded to observed monetary variables in keeping with their understanding of the revised operating guidelines.

Some writers, particularly in the academic community, have followed this line of analysis to the conclusion that people will adjust their behavior to prevent any *anticipated* monetary policy actions from having an effect on the real economy. Thus, it is argued, only when a policy action is a surprise can it affect real interest rates and economic activity. This version of rational expectations theory figures importantly in real business cycle theory, which holds that business cycles can be caused by exogenous shocks to the economy or by unexpected monetary policy developments but not by predictable monetary policy actions.<sup>12</sup>

Many economists, however, have rejected the notion that anticipated monetary policy does not affect real economic activity in the short run, partly because the argument does not seem to be supported by empirical work. Even within the rational expectations framework, a case can be made that predictable monetary policy can affect real activity because of the substantial costs of acquiring and interpreting all of the potentially available information about past, current, and future monetary policy. In addition, although money data are available with short lags, their significance will not always be clear, particularly when the demand for money seems to be shifting. Furthermore, there may be institutional rigidities, such as long-term contracts, that are not indexed for inflation. Rigidities will slow down the responses to a policy impulse, permitting a more conventional adjustment process to occur. Hence, most economists, while recognizing some difficulties with the standard models, still view business cycles in more or less traditional terms as arising from a combination of real and monetary forces.<sup>13</sup>

As a group, Federal Reserve policymakers continue to regard monetary policy as a powerful tool, although different individuals will place different emphases on the various transmission routes

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<sup>12</sup> Michael Dotsey and Robert G. King, "Rational Expectations Business Cycle Models: A Survey," *Federal Reserve Bank of Richmond Economic Review*, vol. 74, no. 2 (March-April 1988), pp. 3-15.

<sup>13</sup> For more detailed discussions of the business cycle, see the essays in Robert J. Gordon, ed., *The American Business Cycle* (Chicago: University of Chicago Press, 1986). In "The Mechanisms of the Business Cycle in the Postwar Era," pp. 39-122, Otto Eckstein and Allen Sinai identify five stages to the business cycle: "(1) recovery/expansion; (2) boom; (3) precrunch period/credit crunch; (4) recession/decline; and (5) reliquefaction."

In the same volume, Olivier J. Blanchard and Mark W. Watson question whether business fluctuations are sufficiently similar to give analytical value to the concept of a business cycle ("Are Business Cycles All Alike?" pp. 123-79).

and on the appropriate role of monetary policy in the short-run stabilization of economic activity. Some policymakers believe response lags are sufficiently short to allow policy actions to be used for short-run stabilization. Others are concerned that long lags that are not very predictable will keep monetary policy from being a good tool for short-run stabilization. Policymakers generally agree, however, that long-term relationships exist between price and money behavior and that these relationships must be kept in mind if price stability is to be achieved.

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### *Monetary Policy and Yield Curves*

Monetary policy works most directly by changing reserve availability. Such changes affect the overnight Federal funds rate and other short-term rates which in turn affect the monetary aggregates.<sup>14</sup> How short-term rates affect longer term rates has long been a source of controversy among both academic and market analysts. Perhaps the most commonly accepted view is that the pattern of a default-free yield curve (such as for Treasury debt) reflects both expectations of future short-term rates and preferences for liquidity that lead investors to favor shorter term maturities to varying degrees. (Liquidity in this context means the ability to turn an asset quickly into cash without significant loss of nominal value. Hence, short-term instruments with their smaller price fluctuations have greater liquidity even though there is an active market for long-term instruments.) This view of yield curve determination is described in the literature as the liquidity-augmented expectations hypothesis.<sup>15</sup>

Expectations of future interest rates influence the shape of the yield curve as long as potential investors and borrowers have choices about the maturity of the instruments they purchase or

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<sup>14</sup> Because the Federal Reserve alters reserves through purchases and sales of Treasury securities, it changes the amount of securities held by the public, a development which also affects rates. However, Federal Reserve purchases or sales usually represent such a small part of the total Treasury market that the rate impact, separate from the effect on reserves, is very small.

<sup>15</sup> Edwin J. Elton and Martin J. Gruber, in *Modern Portfolio Theory and Investment Analysis* (New York: John Wiley and Sons, 1987), pp. 458-67, offer a helpful review of common hypotheses of the yield curve. For a review of the theoretical and empirical literature on the yield curve, see Robert J. Shiller and J. Houston McCulloch, "The Term Structure of Interest Rates," National Bureau of Economic Research, Working Paper no. 2341, August 1987.

The major alternative hypothesis of yield curve determination is that markets for securities of different maturities are segmented. Parties that normally borrow or lend in a particular maturity range are assumed to be very reluctant to alter their actions in response to changes in the shape of the yield curve. Therefore, there need be no relationship between yields on different maturity instruments. While such segmentation may apply in limited circumstances, it breaks down if parties on the margin are willing and able to change the maturities at which they borrow or lend in response to changes in actual or expected rate relationships.

issue. For instance, potential investors can compare their expected returns from buying either a long-term security or a succession of short-term securities. They will buy the longer term security if their expectations about the course of interest rates over the security's lifetime support their view that the longer term instrument is more attractive. Investors will continue to switch to longer term issues until those rates fall relative to shorter rates by enough to remove the expected rate advantage of the longer term issues. Investors form their expectations on the basis of the outlook for inflation and for real interest rates, which will, in turn, be influenced by expectations about economic activity, monetary policy, and fiscal policy.<sup>16</sup>

If preferences for liquidity are imposed on the expectations model, interest rates will rise as the term to maturity lengthens when expectations of steady rates would otherwise call for a flat yield curve. The "normal" upward slope provides investors with a higher expected yield on longer term obligations in return for giving up the greater liquidity of shorter term instruments. The longer the time before maturity, the greater will be the change in price that will accompany a given change in interest rates and the greater the likelihood that rates will change substantially during the security's remaining life. The degree of liquidity preference may shift with changing perceptions of the potential for rate variability.<sup>17</sup>

The yield curve for Treasury securities serves as the reference standard. Such securities are free of the credit risk attached to other securities, generally are not subject to early redemption, and enjoy a broad and active secondary market. Debt instruments issued by the federally sponsored credit agencies and by private business typically have higher yields for corresponding maturities. The sizes of the rate differentials between Treasury securities and

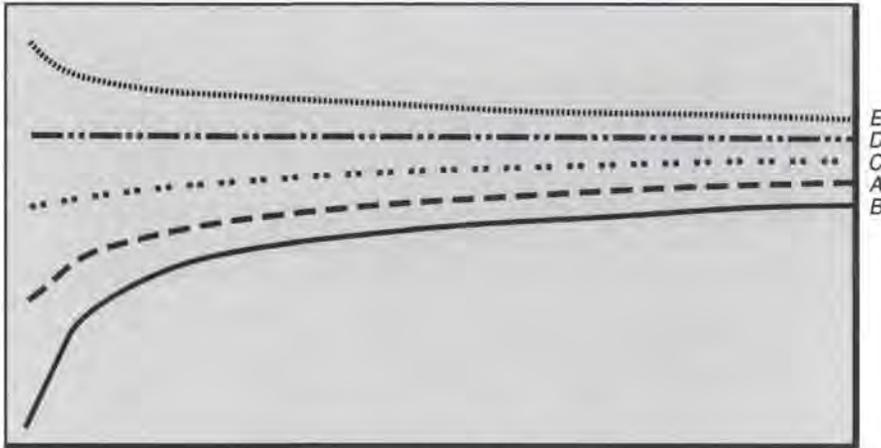
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<sup>16</sup> Since the slope of the yield curve embodies the market expectations of future interest rates, it can be used as a summary statistic of the market participants' predictions of future interest rate changes. Examination of interest rates out to six months has suggested that, historically, the predictive power of the slope of the yield curve appears to have varied inversely with the degree to which the Federal Reserve smoothes interest rate fluctuations. See Gregory N. Mankiw and Jeffrey A. Miron, "The Changing Behavior of the Term Structure of Interest Rates," *Quarterly Journal of Economics*, May 1986, pp. 211-28, for an analysis of the period 1890-1979. See Gikas A. Hardouvelis, "The Predictive Power of the Term Structure during Recent Monetary Regimes," *Journal of Finance*, June 1988, pp. 339-56, for an analysis of the 1970s and 1980s.

<sup>17</sup> For a different perspective on the slope of the yield curve, see John H. Wood, "Do Yield Curves Normally Slope Up? The Term Structure of Interest Rates, 1862-1982," *Federal Reserve Bank of Chicago Economic Perspectives*, July-August 1983, pp. 17-23. Wood's examination of 19th-century data leads him to question the widely held view that an upward slope to the yield curve is normal. He suggests that it arose in the 20th century because the change in monetary standard introduced an inflationary bias.

**Chart 2** Yield Curves over a "Normal" Business Cycle

Interest rate



Time to maturity

other debt instruments of comparable maturity reflect the market's allowance for lesser marketability and the risk that the borrower may default, as well as differences in tax treatment and in other characteristics such as the potential for early redemption.

When business cycles follow what is considered the traditional pattern, the shape of the yield curve may do so as well, because the traditional business cycle is accompanied by cycles in inflation and credit demands. A "normal" upward-sloping yield curve would emerge when a major acceleration or deceleration in inflation was not expected (Chart 2, Figure A). Toward the latter part of a recession, the yield curve would be expected to slope upward more sharply than "normal" (Chart 2, Figure B); short-term rates would fall more than long-term rates, since the recession would not be expected to persist throughout the life of the long-term debt instruments.

As a recovery got underway, the yield curve would initially remain steep. At some stage it would be likely to flatten somewhat as short-term rates rose, but it would generally remain upward sloping (Chart 2, Figure C). If significant inflationary pressures became evident, however, the Federal funds rate and other short-term rates would be likely to rise substantially, prompted by tighter monetary policy and changes in the market's expectations about inflation. The yield curve would then tend to shift upward and flatten (Chart 2, Figure D). An inverted or downward-sloping yield curve (Chart 2, Figure E) would reflect

market views that short-term interest rates were already high enough to reduce real GNP growth and inflation and that a slowing in economic activity and inflation should lead to a decline in interest rates.

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### *Responses to Operating Procedures*

Federal Reserve actions generally have had a strong direct impact on short-term rates. When the Federal funds rate was the primary target of desk operations during the 1970s, the Federal Reserve controlled that rate within a narrow range. Other short-term interest rates were influenced by the current and expected behavior of the funds rate. Decisions about the management of money and credit were influenced by estimates of how rapidly the monetary authorities would raise or lower the funds rate; the judgment often depended as much on assessing policymakers' willingness to allow interest rates to change as on observing the behavior of money growth and the economy. Most forecasting focused on the factors believed to affect the timing and magnitude of funds rate changes. Changes in the direction of the funds rate were relatively infrequent and generally only occurred after considerable evidence of a turnaround in economic activity had accumulated. Since the funds rate was targeted directly, changes in the desired rate were easy to recognize once they had taken place.

The switch to nonborrowed reserve targeting in 1979 changed the ways that the banks and the financial markets interpreted Federal Reserve actions. Observers gradually incorporated expectations that significant deviations of money from its target would bring immediate countervailing pressures on reserves and hence on interest rates. Market participants had to shift their emphasis when making interest rate forecasts. The Federal funds rate was less reliable as a day-to-day or week-to-week guide to the thrust of policy.<sup>18</sup> Analysts had to forecast near-term money behavior in order to project the timing of interest rate changes, since money growth significantly affected the degree of pressure put on reserve positions and hence on short-term interest rates. Interest rates became very sensitive to current policy and to the perceived chances of subduing inflation.<sup>19</sup> Analysts looked at the economy's performance to assess likely money demand as well as credit

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<sup>18</sup> Dana Johnson, "Interest Rate Variability under the New Operating Procedures and the Initial Response in Financial Markets," *New Monetary Control Procedures*, vol. 1, Board of Governors of the Federal Reserve System, February 1981.

<sup>19</sup> Financial innovation, encouraged by rapid inflation and efforts to avoid restrictive interest rate ceilings, also affected the demand for money.

requirements, resource deployment, and inflationary pressures. Economists devoted considerable effort to predicting weekly movements in M1; they made surveys of large depository institutions, gathering information on M1 deposits, and became experts in anomalies in the seasonal factors.

The procedures adopted early in 1983 focused most directly on borrowed reserves. Consequently, the relationships between policy actions and market response shifted once more. The amount of discount window borrowing being sought by the Federal Reserve became less variable; the objective no longer depended primarily on movements in M1 but was changed only when a group of indicators suggested that a change was needed. For a given discount rate and set of rules of access to the discount window, the amount of borrowing served as a key determinant of the Federal funds rate. Other factors influencing the funds rate included seasonal pressures, concerns about the banking system, and expectations about Federal Reserve policy and its likely effects on future rates.<sup>20</sup>

The relatively limited moves in the objective for borrowed reserves made the Federal funds rate considerably less likely to change significantly from week to week than during the 1979-82 period. Short-term fluctuations in the funds rate, nonetheless, were somewhat greater than in the 1970s when the rate had been targeted directly. In observing the behavior of the funds rate, market participants had to decide whether a move in the rate occurred for policy or for other reasons. Since the Federal Reserve was basing its borrowed reserve objectives on a variety of indicators, including the outlook for economic activity and inflation as well as the behavior of the monetary aggregates, participants forecast those variables in order to estimate the next move in the policy stance.

Under any of the mechanisms used to determine short-term rates, Federal Reserve policy actions affected longer term rates through their impact on expectations of money growth, the outlook for economic activity, inflation, and at times, the exchange value of the dollar. In making decisions affecting longer term interest rates, market participants weighed the appropriateness of policy actions in relation to their own forecasts of inflation and economic activity. If policymakers seemed reluctant to allow short-term rates to rise

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<sup>20</sup> For a review of the borrowed reserves operating procedures and a comparison with the earlier nonborrowed reserves procedures, see Henry C. Wallich, "Recent Techniques of Monetary Policy," *Federal Reserve Bank of Kansas City Economic Review*, May 1984, pp. 21-30; and Brian F. Madigan and Warren T. Trepeta, "Implementation of U.S. Monetary Policy," in *Changes in Money Market Instruments and Procedures: Objectives and Implications*, *Bank for International Settlements*, March 1986.

sufficiently in periods of economic growth to restrain money and credit growth, at some stage longer term rates would increase to allow for the possibility of higher inflation. During the 1979-82 period, longer term rates showed much more short-run volatility than they had previously, although the Fed's policy procedures were only one source of this volatility. Participants were not sure whether the Federal Reserve would ultimately succeed in halting inflation or whether its efforts would be overwhelmed, allowing another burst of price acceleration. Much depended upon how the economy adapted to the adjustment pressures. The uncertainty made long-term rates unusually sensitive to short-run developments.<sup>21</sup>

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### *Policy's Effect on the Economic Sectors*

Monetary policy influences spending and investing decisions in all sectors of the economy. The various economic sectors will respond in different ways to changes in income and interest rates depending on the extent to which they are borrowers or lenders.<sup>22</sup>

Over the 1982-88 period, the Federal Reserve's flow of funds statistics show that the net funds raised annually by the nonfinancial sectors were equivalent to about one-sixth of GNP. Households took up about one-third of that flow and business another third. The U.S. government has accounted for nearly one-quarter of the total. State and local governments accounted for the remainder. Of the funds advanced, the household sector supplied a little less than half and the business sector around 10 percent. Close to three-quarters of household funds were placed with depository institutions or money market funds, while the remainder was invested directly in credit market instruments.

Because of the large current account deficits that the United States amassed in recent years, foreigners have also lent large sums to U.S. residents—almost 5 percent of total funds advanced over the 1982-88 period. When real interest rates in the United States were perceived to be relatively high through the middle of the decade, private foreigners were willing to provide the financing. When real rates did not seem attractive, particularly when the dollar was falling, foreign central banks often intervened in the ex-

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<sup>21</sup> For a discussion of the relation of long-term rates to policy, see Gikas A. Hardouvelis, "Market Perceptions of Federal Reserve Policy and the Weekly Monetary Announcements," *Journal of Monetary Economics*, September 1984, pp. 225-40.

<sup>22</sup> For more discussion of the interest sensitivity of household and business spending, see M. A. Akhtar and Ethan S. Harris, "Monetary Policy Influence on the Economy—An Empirical Analysis," *Federal Reserve Bank of New York Quarterly Review*, vol. 11, no. 4 (Winter 1986-87), pp. 19-34.

change markets. They purchased dollars, which they then invested in the United States, largely in Treasury securities.

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### 1. *The Household Sector*

Monetary policy's cumulative impact on the household sector can be substantial. Policy can influence household spending through numerous channels:

- income and employment
- wealth
- division of income between saving and consumption
- expectations of inflation
- cost and availability of credit.

To the extent that monetary policy affects the level of overall business activity, it affects households' incomes and employment. These factors, in turn, have strong effects on consumer spending. Changes in interest rates are likely to influence household spending by affecting wealth and income and by shifting the relative returns to future savings and investment. The impact of interest rate changes on different households has been altered by the expanded use of variable rate loans and deposits.<sup>23</sup> Households will respond to changes in interest rates according to the forms of wealth they hold, the types of debt they have incurred, and their propensities to save the changes in income brought about by changes in rates. Households as a group are net savers, so their incomes should be increased by a rise in rates. The net stimulus to spending from higher rates will be partially offset, however, by declines in existing wealth held in the form of fixed-rate investments, since their prices fall when rates rise. Furthermore, if rates rise, those households with variable rate loans will have to make higher payments on existing loans; these obligations will take away resources that might otherwise be directed to consumption.

Household responses to interest rate changes will also depend upon how those changes are interpreted. For instance, if consumers regard a sharp rise in nominal interest rates as a sign that greater economic uncertainty and rising unemployment lie ahead, they will tend to save more and borrow less. If at the same time, however,

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<sup>23</sup> For more detail, see *Changes in Money-Market Instruments and Procedures: Objectives and Implications*, *Bank for International Settlements*, March 1986; *Financial Innovation and Monetary Policy*, *Bank for International Settlements*, March 1984; Thomas D. Simpson, "Developments in the U.S. Financial System since the Mid-1970s," *Federal Reserve Bulletin*, vol. 74, no. 1 (January 1988), pp. 1-13; and John Wenninger, "Financial Innovation—A Complex Problem Even in a Simple Framework," *Quarterly Review*, *Federal Reserve Bank of New York*, vol. 9, no. 2 (Summer 1984), pp. 1-8.

inflationary expectations shift upward such that real interest rates fall, consumers may reduce saving and increase their borrowing in order to step up current spending before prices increase further. In recessions, a sharp fall in interest rates could lower borrowing costs, a development that might temper the decline in consumer spending that results from the reductions in income.

Household investment in housing can be sensitive to the cost and availability of credit. However, the removal of ceiling rates on loans and consumer deposits over the last decade has made the adjustments less sudden than they were in the past when interest rate ceilings on loans and deposits became binding. Currently, if rising interest rates outstrip the effects of rising incomes from an expanding economy, some prospective home buyers may not make purchases either because they are unwilling to take on such a large debt burden or because lenders are reluctant to extend the needed credit. Unless consumers are convinced that future home prices will provide a good hedge against inflation, they will curtail their purchases as mortgage rates rise. Rising mortgage interest rates also reduce the attractiveness of refinancing existing homes to provide additional resources for spending. In addition, the higher rates should discourage the use of home equity loans, which are often on a floating-rate basis. Households may feel less wealthy when homes become harder to sell or the prices of existing houses actually decline. When interest rates fall as a recession progresses, the activation of deferred housing demand can contribute to economic recovery.

Monetary policy also affects the use of consumer credit such as installment and credit card loans. Consumers are heavy users of such credit, especially for purchases of automobiles and other durable consumer goods. Historically, use of such credit has not been very sensitive to the level of interest rates charged. And during the 1980s, the automobile manufacturers, by providing direct financing to consumers at attractive below-market rates, may have lessened the impact of high market rates. Changes made to the tax law in 1986 are gradually eliminating the deductibility of interest on all personal loans, other than those secured by owner-occupied housing, on a five-year timetable. Consequently, consumers are likely to rely increasingly on home equity loans and mortgage refinancings as sources of credit.<sup>24</sup> Because most home equity loans and many mortgages are made at variable rates, consumers feel

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<sup>24</sup> Glenn B. Canner, James T. Fergus, and Charles A. Luckett, "Home Equity Lines of Credit," *Federal Reserve Bulletin*, vol. 74, no. 6 (June 1988), pp. 361-73.

the effects of higher interest rates not only on the debt incurred for new purchases but also on their stock of existing debt.

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## 2. The Business Sector

Monetary policy affects business decisions concerning production levels, inventories, and new investments. Businesses produce most of the goods and services consumed by the other sectors. To be successful, they must anticipate and respond to the demands of consumers, other businesses, governmental units, and foreign buyers. These demands will be influenced by monetary policy as it responds to changes in general business conditions.

Businesses depend heavily on the credit markets to finance the inventories and productive capacity needed to meet customer demands.<sup>25</sup> The Federal Reserve's flow of funds statistics show that during the 1980s, corporate cash flow from retained earnings and depreciation allowances provided about three-fourths of the funds used for capital spending, the extension of trade credit, and the acquisition of other financial assets. The remainder came chiefly from borrowing in the credit markets. Moreover, business credit demand typically grows more rapidly than the economy once the expansion phase of the business cycle is well under way. If business managers expect strong sales, they try to keep inventories growing ahead of demand so that sales are not lost because of shortages. Similarly, expectations of strong demand lend greater urgency to plans for increasing capacity that may require several years to accomplish.

When the economy approaches capacity, short-term interest rates rise and business managers have to weigh the increasing cost of financing inventories against the possible sales gain from having ample supplies. Price expectations also enter their calculations. If inflation is widely expected to accelerate, managers are likely to increase purchases of raw material and other inputs to raise planned levels of finished inventories. Expectations can then become self-fulfilling. If monetary policy allows short-term interest rates to rise rapidly during expansions, making inventory building a costly strategy, managers will respond by keeping inventories under tight control. Otherwise, there could be speculative inventory building. At the same time, rising rates reduce the buoyancy of household demand for business output through the channels already noted. As a result, business profitability begins to suffer

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<sup>25</sup> In "Relative Prices and Inventory Investment," *Journal of Monetary Economics*, vol. 4, no. 1 (January 1978), pp. 85-102, John Bryant discusses the effects of financing costs on inventories and investment.

both from high borrowing costs and a softening of demand. At some point, inventories become heavy in relation to sales, requiring a reduction in current production to bring them back in line.<sup>26</sup>

Managers, encountering sustained pressure on profit margins, step up their efforts to cut costs. If their businesses are heavy credit users, a review of capital spending may prompt them to trim present plans or to defer completion of particular projects—especially when lenders are reluctant to provide additional financing. The rise in long-term rates may itself reduce the attractiveness of projects under consideration by increasing the rate at which projected income streams are discounted. Often the spreads widen between yields on bonds of well-capitalized firms that are given investment-grade ratings and yields on lower rated bonds. The increased spreads may force potential borrowers contemplating risky uses of the funds to turn to less conventional financing; higher financing costs may also crowd some borrowers out of the credit markets altogether.<sup>27</sup> Aggregate capital spending tends to be sustained well into a recession, diminishing only as the rising margin of available capacity reduces the desirability of further additions.

During the 1980s, a number of techniques were developed to allow corporations to hedge some of the interest rate risk involved in their operations. Corporations employing these techniques can reduce their sensitivity to changes in market rates. For example, they can make use of financial futures and other derivative products, described in Chapter 4, to lock in a specified interest rate cost or to cap future increases. They can use swaps to change a variable-rate commitment into a fixed-rate one or to do the reverse, depending upon their expected pattern of revenue streams. Although these devices cannot be used without cost and cannot be expected to insulate a firm from all effects of interest rate changes, they can reduce costs of rate changes for those who use them.

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### 3. State and Local Governments

Most units of government below the federal level operate essentially by balancing current spending with receipts from taxes and grants-in-aid from a higher level of government. Since persistent deficits are

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<sup>26</sup> The relationships among monetary policy actions, interest rates, and inventories are discussed in Alan S. Blinder and Stanley Fischer, "Inventories, Rational Expectations and the Business Cycle," *Journal of Monetary Economics*, vol. 8, no. 3 (November 1981), pp. 277-304; and M.A. Akhtar, "Effects of Interest Rates and Inventory Investment in the United States," *American Economic Review*, vol. 73, no. 3 (June 1983), pp. 319-28.

<sup>27</sup> The volume of "junk" bonds, or bonds below investment grade, has risen dramatically since the 1982 recession. The response of those new bonds to a recession is untested.

not permitted, state and local spending is heavily dependent on the current condition of the economy. As the economy expands, revenues increase, encouraging new spending initiatives. Conversely, disappointing revenues in times of recession often lead state and local governments to scale down their capital expenditures fairly quickly because of the need for balancing income and expenditures.<sup>28</sup> The credit market effects of monetary policy on governmental units work chiefly through capital spending, but total capital outlays have recently been around 13 to 14 percent of state and local government expenditures, so that reducing these outlays when rates rise will affect only a modest portion of total spending. Major capital projects that depend heavily on bond financing include building and repairs of schools, roads, water systems, sewers, and transportation systems. A general rise in interest rates increases the rates that governmental units have to pay on their bonds. At the margin, rate increases may lead to some reduction in, or postponement of, capital spending programs. Some issuers may be unable to borrow because rates rise above ceilings established by state law on what they can pay.

General obligation debt of governmental issuers is secured by the taxes that can be levied. For most purchasers, their interest is exempt from federal income taxation. The current expense budget of the issuing body usually provides for interest and authorization charges on such debt. The states have also established separate corporations to run enterprises, which charge for the services they render. Their services include financing mortgage lending and building and maintaining bridges, turnpikes, utilities, and hospitals. The capital spending of such corporations is usually financed by revenue bonds, that is, bonds secured by the stream of revenues expected from the facilities they finance. These bonds will be tax-exempt if the proceeds are used for public purposes. Private purpose financing is, with a few limited exceptions, no longer exempt from federal taxes.<sup>29</sup>

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#### 4. The U.S. Government

Monetary policy's direct impact on federal spending and revenue decisions generally is limited. The changes in interest rates that accompany economic expansion and recession do affect the interest

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<sup>28</sup> Donald Phares, "The Fiscal Status of the State-Local Sector: A Look to the 1980's," in Norman Walzer and David L. Chicoine, eds., *Financing State and Local Governments in the 1980's* (Cambridge, Mass.: Oelgeschlager, Gunn, and Hain, 1981).

<sup>29</sup> John King, "State and Local Debt," in J. Richards Aronson and John L. Hilley, eds., *Financing State and Local Governments, 4th ed.* (Washington, D.C.: Brookings Institution, 1986) pp. 160-92.

cost of refinancing outstanding debt and issuing new debt. The budgetary impact can be sizable, since a significant portion of the outstanding debt must be refinanced annually.<sup>30</sup> In the 1980s, however, the Treasury's heavy reliance on financing with intermediate and long-term issues has reduced the share of the marketable Treasury debt that was refinanced each year from around 50 percent at the beginning of the decade to around 35 percent more recently. Changes in Treasury interest costs over the business cycle affect the size of the budget deficit and hence the degree of concern about it. However, they do not appear to have influenced federal fiscal policy very much. Furthermore, the Treasury chooses the maturity structure of its debt on the basis of longer term objectives and does not alter its debt management strategy in response to changes in the shape of the yield curve.

The Treasury is a major force in financial markets, competing with other borrowers for funds and for command over real resources. Real federal credit demands have tended to rise relatively more in recessions than in expansions. Thus, over the cycle, they have generally run counter to demands of other borrowers. Spending on unemployment compensation and other income-sustaining programs generally falls during expansions and rises during contractions. The 1980s have seen considerable modifications to that pattern as deficits remained high during the long period of expansion. In the early stages of the expansion, changes in the cyclical elements of government spending were more than offset by a buildup in defense spending.

The pattern of Treasury revenues has also been modified in the 1980s. Revenues generally rise faster than GNP during expansions because tax receipts rise more than proportionately as incomes increase. The procyclical pattern to revenues has been reduced during the 1980s through changes in the tax code. The 1981 tax law introduced indexing of tax brackets; receipts have ceased to be accelerated by bracket creep during periods of inflation. Nevertheless, under the 1981 law the progressivity of tax rates, particularly for individuals, still provided for an increased rate of tax collection as real incomes rose. In the 1986 tax reform, the progressivity of the tax rates was reduced considerably, and some of the tax burden was shifted from the consumer to the corporate sector. The new tax structure will likely cut back somewhat on the cyclical variation in

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<sup>30</sup> *The impact of interest rates on the deficit is discussed in T.M. Holloway, "Measuring the Sensitivity of Net Interest Paid to the Business Cycle and to Inflation," Public Finance Quarterly, vol. 15, no. 3 (July 1987), pp. 235-58.*

the ratio of taxes to income, although it will still provide for rising tax collections as incomes increase. In any case, it will require some experience with tax revenues over a range of business conditions to obtain a complete picture of the cyclical effects of the changes in the tax laws.

Since the Treasury can always satisfy its credit needs, some observers have questioned whether its heavy borrowing during the long expansion of the 1980s might have adversely affected the flow of funds to other potential borrowers. Despite the high deficits, however, nominal rates fell during much of the decade's expansion because of the sharp decline in inflation and inflationary expectations from the unusually high levels reached previously. Real interest rates, nonetheless, remained quite high from 1982 to 1985 even as nominal rates fell. While the high interest rates may have crowded out some borrowers, most firms that were willing to pay for credit seemed to be able to get it. Over this period, high real interest rates and a growing economy attracted large capital inflows to the United States. For a few years, these factors also promoted a stronger dollar. The strong dollar in turn constrained growth in the U.S. export sector, a development which offset some of the stimulus coming from the budget deficit. Beginning in 1985, the dollar declined substantially because of investor concern about the longer run implications of the large U.S. budget and trade deficits and as a result of a change in foreign exchange market intervention policies. At the same time, slower growth in the U.S. economy and a narrowing of the spreads between interest rates in the United States and abroad also contributed to a weaker dollar, which encouraged a pickup in exports.<sup>31</sup>

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### *The Role of the Fed Watchers*

The participants in the money and capital markets watch the actions of the Federal Reserve. They try to understand the basic thrust of policy and to detect any signs that objectives are changing by predicting the variables that the Federal Reserve follows and anticipating future policy developments.<sup>32</sup> Their activities may help speed changes in expectations about policy and hence the rate at which economic activity adjusts to new information. The increased sensitiv-

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31 Gerald P. Dwyer, Jr., "Federal Deficits, Interest Rates, and Monetary Policy," *Journal of Money, Credit and Banking*, vol. 17, no. 4, pt. 2 (November 1985), pp. 655-81.

32 David M. Jones, *Fed Watching and Interest Rate Projections: A Practical Guide*, New York Institute of Finance (New York: Simon and Schuster, 1989); and William W. Melton, *Inside the Fed: Making Monetary Policy*, (Homewood, Ill.: Dow Jones-Irwin, 1985).

ity of markets to information may add to interest rate volatility. The financial firms employ economists to help them anticipate the effects of policy moves on interest rates and on the demand for credit because such information is important to the firms' trading and positioning strategies. In addition, The economists track the activities of the trading desk, the FOMC and the economy.

Analysts who work for banks or dealer firms provide regular briefings to their own managers and are close at hand to analyze current developments during the day. Sales personnel at most firms circulate rapidly the current views of their in-house experts. The economists also meet with clients and are available to customers for telephone consultation. Their expertise, or boldness, in making interest rate forecasts helps them achieve high visibility through the financial press. The independent entrepreneurs often present their basic analyses to clients through a market letter, usually a weekly report on recent and prospective developments. Many of the analysts provide daily commentary on prospective and actual Federal Reserve operations through computer information systems, which can be accessed by paying customers. The popularity of these services has led to their introduction in Europe and the Far East through news wire and computer screen systems. Some of the services report on surveys made of their fellow forecasters so that subscribers can learn the range of the estimates of various monetary and economic variables.

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### *1. Projecting and Interpreting the Behavior of Reserves and Desk Activity*

In tracking and anticipating the desk's actions, financial market economists begin with a close reading of the most recently released FOMC directive and policy record; these documents are made available a few days after the subsequent FOMC meeting. The economists try to understand the Committee's concerns and the balance of opinion among its members. They will identify those factors that the FOMC chose to emphasize in its guidelines to the desk in order to predict a change in reserve pressures that might be made between meetings. Before the policy record is released, the economists must interpret developments in light of their understanding of the Committee's primary emphasis—be it the monetary aggregates, economic activity, inflation, financial market conditions, or the exchange rate. Then they must gauge the likely behavior of those variables that the Fed appears to be following most closely.<sup>33</sup>

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<sup>33</sup> See H. Robert Heller, "Implementing Monetary Policy," *Federal Reserve Bulletin*, July 1988, pp. 419-29, especially pp. 428-29.

When money is thought to be the focus, then developing a view of money market conditions over the coming month or two requires estimating how the aggregates are likely to behave compared to the growth assumed acceptable to the FOMC. For instance, if money growth thus far in the year has been below targeted growth, the economists will consider whether there are good reasons for the shortfall that might prompt the Committee to accept the slow growth. Should they not find such reasons, they may expect the Committee to encourage faster growth until money gets back on path. When the economists believe that the Fed is giving primary weight to the economy, inflation, or the exchange value of the dollar, they will put particular effort into forecasting these elements.

In tracking desk operations and evaluating whether reserve pressures have been modified, analysts try to distinguish between the defensive and dynamic aspects of open market operations. An open market operation may represent a change in stance toward the policy objective or it may merely be designed to offset the movement in some other balance sheet item or address normal seasonal movement in required reserves. To interpret open market actions properly, Fed watchers must analyze a variety of statistics. They essentially duplicate the Fed's daily estimation of reserve supplies and demands. (For a description of this process, see Chapter 6.) The outside forecasters operate under a handicap during the period since they do not have the daily flow of reserve information available to their Federal Reserve counterparts. While they can estimate the scale of daily desk operations in the open market and learn what the Treasury's cash balances were with a one-day lag, they can only speculate on the behavior of Federal Reserve float or the size of the desk's transactions with foreign accounts.

Each Thursday afternoon, after the Federal Reserve's 4:30 release of a variety of statistics including weekly data on the Federal Reserve balance sheet, the Fed watchers analyze the borrowing at the discount window, excess reserves, and other factors to try to assess the Fed's policy stance. They will question whether the borrowing level achieved was the one that was intended, or whether some unexpected movement in the demand for excess reserves or some balance sheet item pushed borrowed reserves off track. Under most circumstances, the analysts will expect borrowing and reserve pressures to continue near the level recently prevailing. They will also estimate what range for the Federal funds rate appears to be consistent with such borrowing. Sometimes, however, the behavior of recent economic or monetary data and

their reading of desk behavior will lead them to believe that a change in reserve pressures has occurred.

The analysts are keen observers of the trading desk's actual operations and the Federal funds rate. They use their expectations about policy and their knowledge of seasonal pressures on the funds rate to sort out whether a change in the funds rate results from a change in reserve pressure engineered by the desk or from skewed distribution of reserves or a seasonal development. Fed watchers have to be on guard against overestimating the accuracy of the desk's own information on demands and supplies of reserves. Given the uncertainties with which they contend, these economists usually perform well in providing relevant counsel to their clients or their own firm's trading operations.

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## *2. Budgetary and Economic Forecasting*

The financial economists also project and interpret developments other than Federal Reserve policy that are likely to affect future economic conditions and interest rates. Recognizing the federal budget's economic significance, its importance in determining the volume of marketable securities sold to the public, and its impact on Treasury cash positions and on reserve flows, the analysts are often skillful interpreters of the continuing adjustments to the budget data. They pore over the fine print in the budget documents and then estimate what new spending commitments and tax actions are likely to emerge from the congressional mill. Since the Treasury and off-budget agencies are by far the largest borrowers in the financial markets, their future activities influence the outlook for interest rates.

The hunger of market participants for information on the variables tracked by the Federal Reserve has placed new demands on these economists. They produce advance estimates of key economic statistics to give market traders a benchmark for evaluating the statistics when they are released. Statistics published monthly on the economy—retail sales, production, employment, and prices—are all forecast. There are fashions in what data receive the most attention. Whenever the Federal Reserve is perceived to be shifting its focus, market attention and forecasting efforts shift as well.

To forecast economic behavior, financial economists examine recent trends and consider components that might be changing. Some analysts make comprehensive forecasts of the supply and demand for funds associated with different sectors of the economy—consumer, business, government, and foreign. The modeling

involved relies heavily on both individual judgment and econometric techniques.<sup>34</sup>

As this chapter has conveyed, the economy responds to Federal Reserve policy in a variety of ways. It reacts to interest rates, to monetary impulses, and to expectations of future developments in these measures. Because of the important role of expectations, almost any factor that affects the formation of expectations can enter into the transmission process. This chapter has concentrated on the domestic side of policy transmission. The next chapter looks at the international dimensions.

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*34 Short-term economic forecasting is difficult and even the most skilled practitioners' forecasts are often wide of the mark. Furthermore, preliminary published figures may be substantially different from the final figures. Accuracy of private forecasts is discussed by Steven Strongin and Paula S. Binkley in "A Policymakers' Guide to Economic Forecasts," Federal Reserve Bank of Chicago Economic Perspectives, May-June 1988, pp. 3-10.*

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## *International Aspects of Monetary Policy and Financial Markets.*

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The increasing interdependence of U.S. economic activity and developments abroad has made the U.S. economy more open today than it was in the 1950s. The United States has become increasingly subject to direct influences from abroad in the form of substantial cross-border flows of goods, services, and capital. In addition, foreign exchange rates, foreign interest rates and prices figure in the economy's response to developments in other countries. These changes reflect a worldwide increase in the freedom of goods and capital to move across borders. As a result, developments in the United States, including policy moves, can have part of their effect on international flows and foreign developments, with subsequent effects back on the domestic economy.

Barriers to trade and capital flows have fallen substantially and world trade volumes have grown twice as fast as real GNP in the industrial countries over the last four decades. The sum of U.S. imports and exports, one measure of openness, has expanded from less than 8 percent of GNP in the 1950s to 16 percent in 1988 (see Chart 1, page 203). In the 1980s, cross-border capital flows have become a complex web of banking, securities, and direct investment transactions. They are denominated not only in the traditional currencies, U.S. dollars and U.K. pounds, but also in German marks, Japanese yen, and other currencies. The United States was the recipient of net foreign capital inflows averaging more than \$125 billion a year from 1985 to 1988, the result of its large current account deficit.

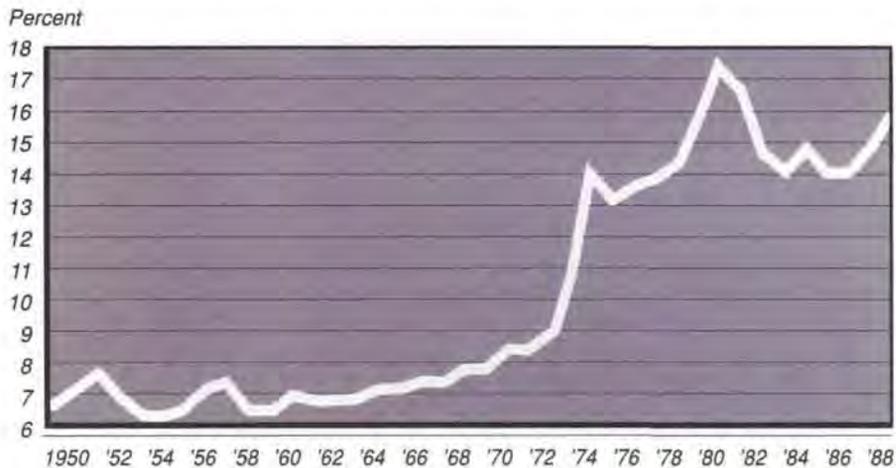
Because of the U.S. economy's size and the dollar's roles as major reserve currency and medium for trade and financial transactions, U.S. monetary policy has long had an important influence on interest rates, inflation, and economic growth in much of the world. While U.S. monetary policy has primarily been determined by domestic economic and financial developments, the greater openness of world trade and finance has also meant that events abroad can at times influence the formulation of U.S. monetary policy and the effects of policy actions on the U.S. economy.

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### *Key Changes in the International Financial System*

The current degree of economic interdependence was fostered by two sets of developments in the 1970s and 1980s. The first was the abandonment in the early 1970s of the Bretton Woods system of pegged exchange rates and the move to floating exchange rates. The change occurred in an environment in which there was both a growing belief in allowing markets to adjust and a series of strains in the old system arising from persistent U.S. balance of payments

**Chart 1** U.S. Nominal Merchandise Trade Flows as a Proportion of Nominal GNP



deficits, worsened by the emergence of inflation in the United States. The floating-rate system that supplanted the Bretton Woods regime relied on a highly visible price adjustment mechanism, the dollar's exchange rate against other major currencies, to eliminate imbalances in international payments. Under floating rates, the world economy was expected to escape from persistent payments problems. At the same time, central banks were expected to have greater independence in choosing their domestic policy course, since they would be freed of the obligation to intervene to support fixed exchange rates.

The second set of changes was the progressive dismantling of restrictions on international capital flows. Foreign exchange and capital flow controls had restrained—with ever less effectiveness—the potential flow of capital. The United States removed most capital controls with the advent of floating exchange rates. Other countries reduced capital controls gradually under the combined influences of free-market philosophies and pressures from shifting payments imbalances that proved wider than those under Bretton Woods.<sup>1</sup>

The two sets of changes have had differing implications for the effectiveness of monetary policy. Domestic monetary policy actions

<sup>1</sup> For a fuller treatment of these issues, see Federal Reserve Bank of New York, Research Papers on International Integration of Financial Markets and U.S. Monetary Policy, December 1987, a compendium of papers on increased capital mobility and its effects.

can be more effective under flexible exchange rates than they were under relatively fixed exchange rates in part because policy is less constrained by official balance of payments settlements. In addition, policy-induced exchange rate changes reinforce the effects of monetary policy on the domestic economy. A tightening of monetary policy, for example, tends to restrain U.S. economic growth and inflation and also tends to drive up the dollar's exchange rate. A higher exchange rate in turn shifts production from the United States to other countries and contributes to slowing U.S. economic growth. Yet at the same time that flexible exchange rates seem to have made monetary policy potentially more effective, freer capital movements have made the policy transmission mechanism more complex than it was in the 1950s and 1960s. Freer capital movements promote a wave of rapid and widespread financial adjustments to a U.S. monetary policy action in advance of the slower and more complicated real and price adjustments.<sup>2</sup>

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### ***International Channels of Transmission of U.S. Monetary Policy***

Domestic open market operations, as well as other monetary policy measures, have international effects that feed back to the U.S. economy through their influence on financial and economic conditions in other countries. The following sections describe the series of changes that might be set in motion by a Federal Reserve decision to ease monetary policy.

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#### ***1. The Impact of Expectations and Financial Asset Prices***

The international money and capital markets and the foreign exchange markets represent the most immediate channel of transmission of U.S. monetary policy to other countries. The financial market response to a U.S. monetary policy action depends on an interplay of domestic and foreign influences.

A U.S. monetary easing that produces a reduction in nominal and real interest rates on short-term dollar investments relative to

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<sup>2</sup> *Open economy macroeconomics under varying assumptions about capital mobility and exchange rate flexibility is covered in Rudiger Dornbusch and Stanley Fischer, Macroeconomics, 4th ed. (New York: McGraw-Hill Book Company, 1987). Under fixed exchange rates and moderate to low capital mobility, monetary policy has relatively more effect on the external balance while fiscal policy has relatively more effect on output and employment. Under floating rates and high capital mobility, the effects of both policies are more pervasive. Current models of an open economy under floating rates and high capital mobility are descendants of the Mundell-Fleming model. See Jacob Frenkel and Michael Mussa, "Asset Markets, Exchange Rates and the Balance of Payments," in R.W. Jones and P. Kenen, eds., Handbook of International Economics, vol. 2 (Amsterdam: North-Holland Books, 1985).*

those abroad should cause investors to shift from dollar to foreign currency assets, thereby placing downward pressure on the exchange value of the dollar and on foreign interest rates. Investor and borrower decisions take into account the broad range of factors discussed in Chapter 8, but they also reflect the exchange rate risk involved in cross-border transactions.<sup>3</sup>

This last consideration comes into play as investors and borrowers compare expected rates of return across currencies expressed in the home currency. A U.S. investor would compare expected nominal returns from making a U.S. dollar-denominated investment to the return denominated in dollars of making a foreign currency investment.<sup>4</sup> The nominal dollar return on the foreign currency investment consists of its nominal interest rate plus the expected change in the exchange value of foreign currency, less an adjustment for risk. For two instruments of comparable credit risk and maturity, the main additional risk of a foreign currency instrument is uncertainty about the future exchange rate.<sup>5</sup> In some circumstances there may also be uncertainty about possible changes in exchange and capital controls either by the United States or a foreign country. A U.S. borrower would compare the nominal interest cost of borrowing in U.S. dollars to the cost of borrowing in a foreign currency, expressed in dollars.<sup>6</sup> A foreign investor would compare the nominal return in the currency of the home country with the return on U.S. dollar investments expressed in the home currency. The foreign investor would add the expected change in the exchange value of the dollar to the nominal dollar interest rate and subtract

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<sup>3</sup> Other factors play an important role in investor decisions about cross-border transactions, but they tend to change less frequently than interest rates and market expectations and thus are reflected in persistent interest rate differentials. These factors include the investment and tax climates, perceptions of economic risk (that is, the extent to which economic performance is perceived to be variable or unsatisfactory) and political risk. Another factor is the perceived riskiness of expected real rates, which depends on the expected volatility of interest rates and, for a foreign asset, the expected volatility of the exchange rate.

<sup>4</sup> The return calculations would allow for taxes, default risk, and any other factors that would be considered in choosing among dollar-denominated investments. Expected returns on long-term assets include expected capital gains and losses at the end of the investment horizon; these can be quite important. At times in the 1980s, foreign investors have purchased U.S. bonds while long-term rates were falling because expected capital gains exceeded expected exchange losses. The purchases in fact helped to bid up the dollar temporarily.

<sup>5</sup> For short-term investments it is possible to avoid this risk by engaging in a forward purchase of dollars for the maturity date.

<sup>6</sup> For a further explanation of the reasons that interest rates differ across currencies and a look at the evidence in the postwar period, see Bruce Kasman and Charles Pigott, "Interest Rate Divergences among the Major Industrial Nations," *Federal Reserve Bank of New York Quarterly Review*, Autumn 1988, pp. 28-44.

an adjustment for risk. A foreign borrower would make a similar comparison of borrowing costs in the home currency and in U.S. dollars expressed in the home currency.

These straightforward comparisons by investors and borrowers contribute to a more fundamental economic process. Because investors and borrowers ultimately make decisions to save and borrow based on the ex ante real interest rate level in their home country, their comparisons of international returns adjusted for exchange rates lead to an economic mechanism that compares *real* interest rates across countries adjusted for the expected change in the *real* exchange rate over the holding period. A change in the U.S. real exchange rate is the change in the nominal exchange rate of the U.S. dollar in units of foreign currency plus an adjustment for changes in the dollar's purchasing power relative to foreign currency, represented by the difference between foreign inflation and U.S. inflation. In effect, the real exchange rate expresses the relative value of U.S. goods in terms of foreign goods. Changes in the ex ante real rate cannot be measured directly and are commonly measured by changes in the ex post real exchange rate, a rather imperfect proxy. The ex post real rate has shown large swings in recent years. The dollar appreciated 40 percent in real trade-weighted terms from late 1980 to its peak in early 1985, then depreciated dramatically through mid-1988 (see Chart 2, page 207).<sup>7</sup>

A decrease in U.S. ex ante real interest rates relative to those abroad tends to lower the foreign exchange value of the U.S. dollar. A decrease in U.S. real interest rates encourages domestic and foreign investors to purchase foreign currency financial assets. Borrowers turn to the U.S. dollar markets from markets with higher real interest rates. The incipient flows bid down the U.S. dollar exchange rate and thereby alter supply and demand across national

<sup>7</sup> In the international economics literature, the Fisher parity condition states that the nominal interest rate on a U.S. financial asset is equal to the foreign nominal interest rate plus the expected appreciation of the foreign currency exchange rate (an expected depreciation would be subtracted). This condition can be written:

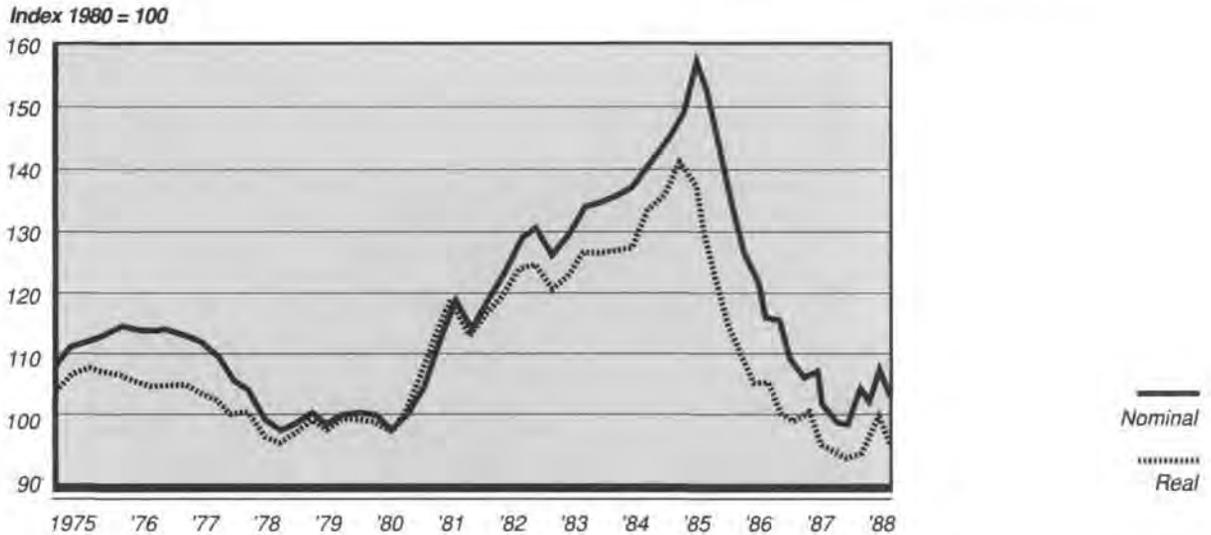
$$R_{US} = R_F + E,$$

where  $R_{US}$  is the nominal U.S. interest rate,  $R_F$  is the nominal foreign currency interest rate, and  $E$  is the expected rate of foreign currency exchange rate appreciations. After adjusting for expected price inflation in the United States and in the foreign country,  $P_{US}$  and  $P_F$ , respectively, we obtain the Fisher condition expressed in terms of real interest rates:

$$R_{US} - P_{US} = [R_F - P_F] + [E + (P_F - P_{US})].$$

The second term on the right hand side is the expected appreciation in the real exchange rate of the foreign currency (the nominal exchange rate plus the difference between foreign inflation and U.S. inflation).

**Chart 2 U.S. Dollar Effective Exchange Rates**  
Weighted against Sixteen Industrial Countries



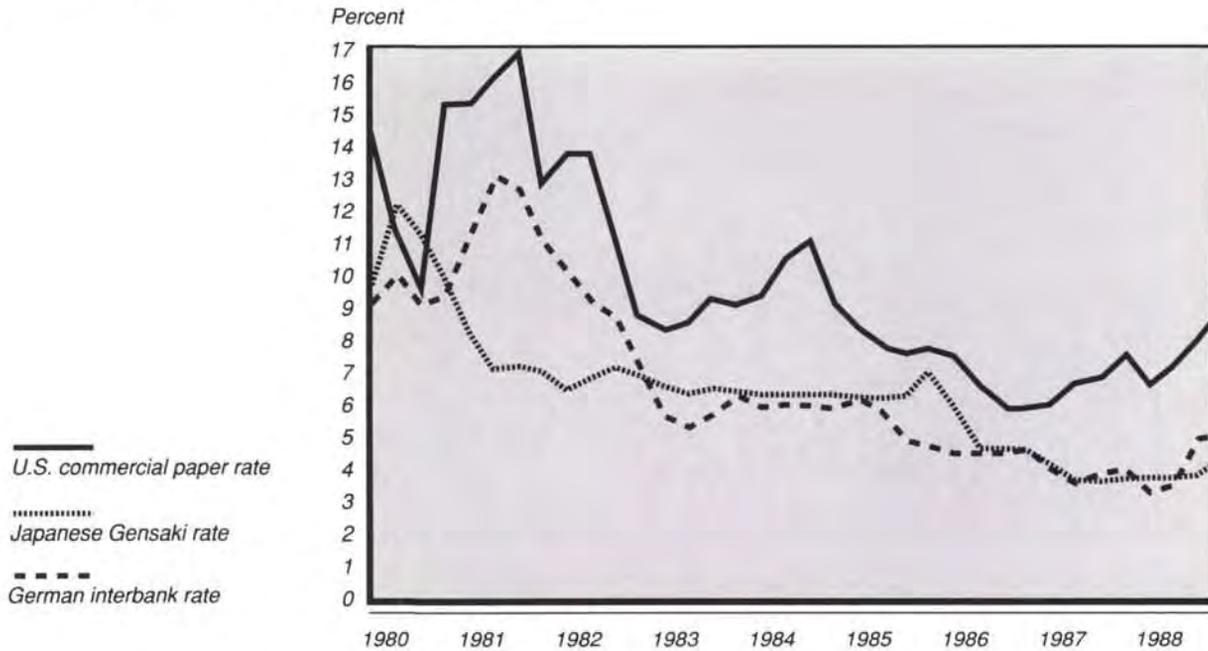
Source: International Financial Statistics

capital markets to bring real interest rates into closer alignment (see Charts 3 and 4, page 208).<sup>8</sup>

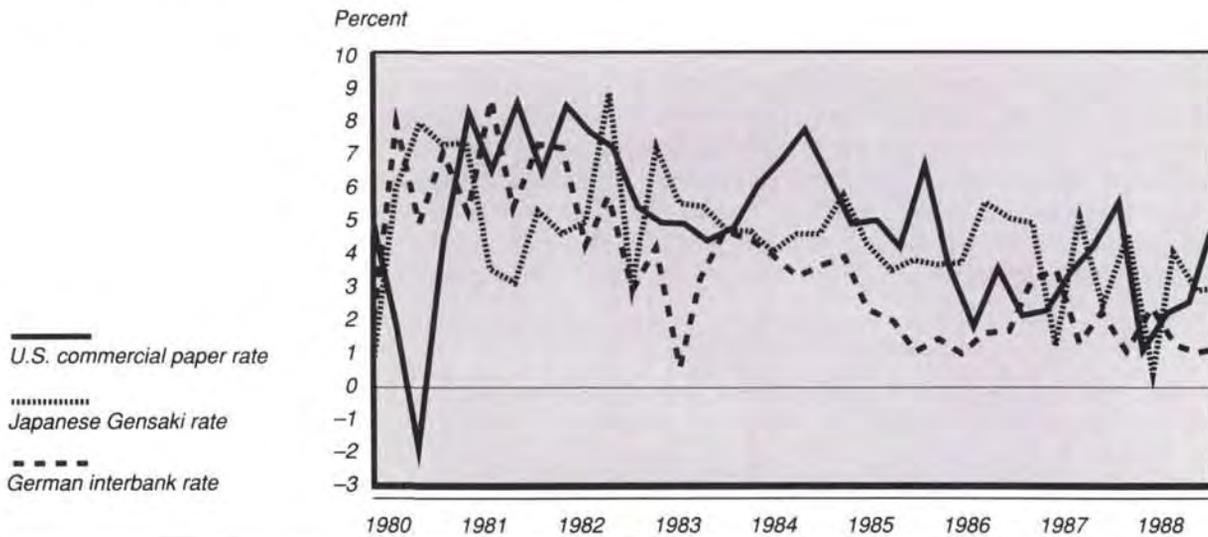
The importance of real interest rates points to one situation in which a fall in nominal interest rates will have little effect: when the fall in U.S. rates just matches a drop in U.S. inflationary expectations. A drop in inflationary expectations leads U.S. and foreign investors to raise their expectations of the future path of the U.S. dollar exchange rate, so that the path reflects the dollar's expected gain in relative purchasing power. The lower nominal return on dollar assets largely compensates investors for higher expected dollar appreciation (or less expected depreciation). In this case, lower

<sup>8</sup> This tendency holds even if *ex ante* real interest rates adjusted for expected real exchange movements are not equalized, that is, even if foreign and domestic assets are not perfect substitutes. The *ex post* real interest rates in Chart 4 can also diverge because the expected inflation and exchange rate movements can differ substantially from the actual movements. Some economists believe that real interest rates are equalized across countries. This real interest rate parity hypothesis, a fairly strong condition, is usually rejected by empirical evidence. A weakness of such tests is that direct measures of *ex ante* real rates cannot be made. The concept and measurement of real interest rates are discussed in Chapter 8 of this volume.

**Chart 3** Nominal Three-Month Interest Rates



**Chart 4** Ex Post "Real" Three-Month Interest Rates



nominal interest rates do not induce investors to switch their assets to other currencies from U.S. dollars.

While the U.S. easing sets in motion a process that tends to lower the dollar, the extent of the dollar's fall depends in part on the monetary policies pursued by foreign central banks. If economic and inflationary pressures abroad are weak or the foreign central bank is stabilizing the foreign exchange value of its currency, the foreign central bank may also ease its short-term interest rates. In this case, the dollar's exchange rate may undergo little or no change. However, if a foreign central bank takes steps to maintain its interest rate levels for domestic policy reasons while U.S. rates are lower, the dollar may fall.

The effects depend further on market perceptions of the appropriateness of the U.S. and foreign monetary policy stances. Central banks, if they choose to, can have considerable influence over short-term interest rates. Hence, market perceptions may be reflected primarily in changes in the spot exchange rate and in relative long-term interest rates, changes which themselves reflect reactions to the policy moves and expected longer term relative price performance. If the U.S. monetary easing is viewed as inflationary but the foreign central bank's stance is not, U.S. long-term interest rates may rise while foreign rates remain unchanged. The relatively higher U.S. long-term rate compensates investors for lower expected future U.S. dollar purchasing power and thus for likely expected future exchange losses.

In practice, since interest rates and exchange rates are simultaneously determined, predicting with precision how they will change after a monetary policy action is impossible. The broad tendency, however, is for a reduction in U.S. nominal and real interest rates eventually to lower the exchange value of the dollar unless other central banks are reducing interest rates at the same time.<sup>9</sup>

In some countries, intervention in the foreign exchange markets may be used for domestic monetary policy purposes (see Box, page 222). In the United States, intervention is not used to adjust reserves or interest rates and is generally not permitted to do so; any reserve

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<sup>9</sup> This discussion has assumed a fairly close relationship between inflation, interest rate, and exchange rate expectations, on the one hand, and on the other, the term structure of domestic interest rates, foreign interest rates and forward foreign exchange rates. The purchasing power parity hypothesis posits a very close relationship between inflation differentials and exchange rate movements. That is, at any time, a dollar will buy the same amount of goods in the United States as it does in Germany after conversion to marks; the real exchange rate is constant. Rational investors would therefore expect future exchange rate changes to mirror expected inflation differentials exactly. Purchasing power parity is nearly always violated in the short run, but some economists believe it may hold in the long run. The analysis here assumes that inflationary expectations play a straightforward role in determining the term structure of interest rates. The actual interrelationships are more complex.

impact is offset with other policy tools. U.S. foreign exchange intervention is designed specifically to modify foreign exchange market conditions. On occasion, the economic forces prompting the intervention will encourage an adjustment in the stance of domestic policy that works in the same direction, but two separate decisions would be made.

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## 2. International Effects of Changes in U.S. Real Activity and Prices

The reduction in U.S. interest rates under a monetary easing triggers responses in the real economy and in the prices of goods and services in the United States that ultimately affect the U.S. trade account. If the easing stimulates U.S. domestic demand, it also increases U.S. demand for imported goods and services over the next few quarters. If the easing at the same time raises U.S. prices of goods and services, both foreign and domestic customers have an incentive to shift from U.S.-produced goods to foreign goods. Together, these factors increase U.S. import demand and may reduce foreign demand for U.S. exports somewhat. Thus, the trade surplus will decline or the deficit widen.<sup>10</sup>

If the monetary easing also produces a fall in the foreign exchange rate, the stimulative effects of the easing on the U.S. economy are reinforced. A lower dollar exchange rate makes foreign goods more expensive relative to domestic goods and U.S. goods more attractive in overseas markets. Both U.S. and foreign customers have an incentive to shift to relatively less expensive U.S.-produced goods and services from those produced abroad, offsetting part of the impact on trade of higher U.S. growth.<sup>11</sup>

While higher U.S. demand and a lower U.S. dollar are both stimulative to the U.S. economy, they have offsetting long-run effects on foreign economies. The expansionary effects initially predominate. From the foreign country's perspective, the increased U.S. demand for its goods resulting from higher U.S. growth and prices provides a stimulus to production, while the lower dollar channels demand

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<sup>10</sup> See the analysis of trade balance determinants in Robert A. Feldman, "Dollar Appreciation, Foreign Trade, and the U.S. Economy," *Federal Reserve Bank of New York Quarterly Review*, Summer 1982, pp. 1-9.

<sup>11</sup> If the easier U.S. monetary policy is accompanied by a decline in the dollar, changes in price competitiveness and the terms of trade may, in part, offset the effects of stronger U.S. growth on the trade balance. "Terms of trade" describes the price of imports relative to the price of export goods. When the dollar falls, U.S. consumers lose some purchasing power through the terms of trade effect because imported goods are now relatively more expensive. The larger the trade flows are relative to domestic economic activity, the larger the potential effect. The lower dollar can also contribute to a higher price level in the United States since foreign goods are more expensive.

back to the United States by making U.S. goods and services relatively less expensive. Changes in U.S. real income fairly quickly affect the U.S. trade flows, while several quarters can pass before the major effects of changes in prices and the exchange rate become apparent.<sup>12</sup> Hence, a U.S. monetary policy easing is usually initially stimulative to foreign countries. Policymakers in those countries can try to offset the stimulative effects, but they may dislike some of the implications of doing so. A move to tighten monetary policy tends to drive up the country's interest rates and its exchange rate, reducing its trade competitiveness. Since international trade is a large part of GNP in many countries, choosing an appropriate level of policy response to offset a stimulus from the United States is difficult.

The initial stimulus to foreign economies from a U.S. monetary policy easing eventually feeds back—albeit weakly—to the United States through higher demand for U.S. exports and through changes in the price competitiveness of U.S. goods and services. When combined with the rapid and continuous adjustments in the financial markets and with changes in real activity and prices in foreign countries, the U.S. economy's response to a change in monetary policy can quickly develop a complex and sustained dynamic.

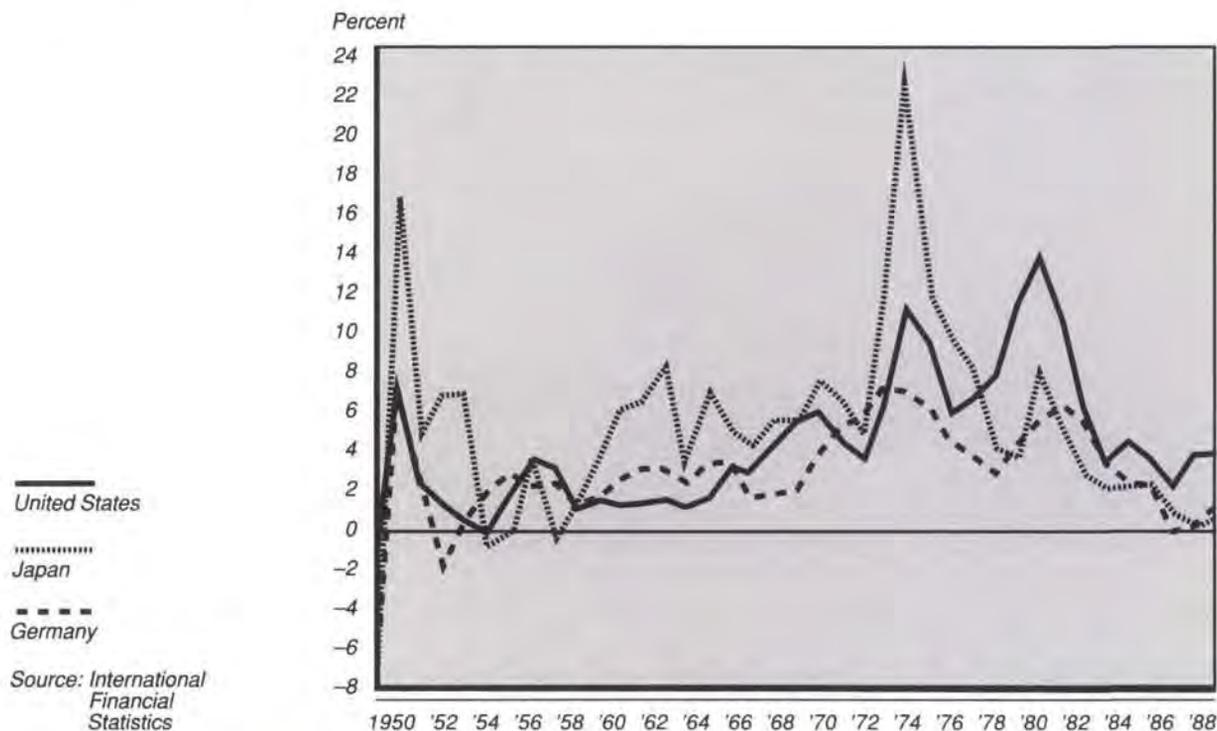
The type of cross-border interaction between policy moves and economic performance just described strengthens the role of medium-term interdependence between the United States and the rest of the world, while still leaving a substantial role for purely domestic factors. The mix of interdependent and independent factors can be seen in the inflation process in three representative industrial countries—the United States, Germany and Japan—during the 1970s and 1980s (see Chart 5, page 212). Rapid growth in the early 1970s, fueled in many industrial countries by monetary expansion, put strong upward pressure on commodity prices and set the stage for OPEC's first round of oil price increases. These developments contributed to inflation rates in 1974 that were high relative to those in the preceding 20 years in most industrial countries.

The magnitude of the acceleration varied considerably among countries, however, because of differences in domestic policy and structural features of the economy. Monetary tightening to resist inflation in all three industrial countries helped produce a sharp

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<sup>12</sup> See Ellen E. Meade, "Exchange Rates, Adjustment, and the J-Curve," *Federal Reserve Bulletin*, vol. 74 (October 1988), pp. 633-44; Catherine L. Mann, "Prices, Profit Margins, and Exchange Rates," *Federal Reserve Bulletin*, vol. 72 (June 1986), pp. 366-79; and Paul R. Krugman and Richard E. Baldwin, "The Persistence of the U.S. Trade Deficit," *Brookings Papers on Economic Activity*, 1987: 1, pp. 1-43.

**Chart 5 Consumer Price Inflation**



recession in 1974-75 and a general slowdown in inflation in 1975 and 1976. Subsequently, the inflation trend in the United States diverged from that in Germany and Japan because U.S. monetary and fiscal policies remained relatively more expansive. The reemergence of strong growth and inflationary pressures in the United States and some other industrial countries in the late 1970s contributed to a second sharp runup in commodity prices, a second round of oil price increases, and rising inflation—although from differing levels—in all three countries by 1980. The simultaneous efforts of the industrial countries to combat inflation brought about an extended period of disinflation in the first half of the 1980s.

### **International Influences on U.S. Monetary Policy**

International developments have often had an impact on the ultimate goals of U.S. monetary policy in the form of sustainable U.S.

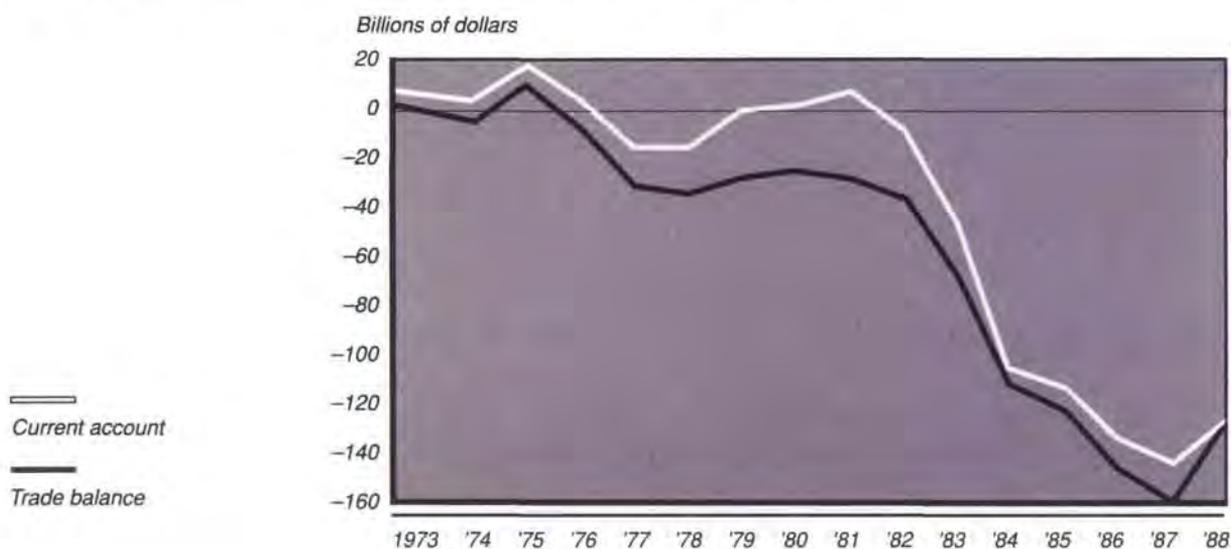
economic growth and price stability. For example, they have contributed to large swings in the value of the dollar, the prices of oil and other commodities, and the state of the U.S. trade and current accounts. The Federal Reserve generally does not directly adjust its policy in response to international developments, but it may do so indirectly when the developments affect the intermediate and ultimate goals of policy. For example, a political development that reduces the value of the dollar or a supply restriction that raises internationally traded commodity prices tends to raise import prices and can create domestic inflationary pressures. In formulating domestic policy, the FOMC monitors changes in the dollar and commodity prices; it will respond to them only if the movements appear to signal changes in U.S. inflationary pressures or U.S. real growth.

International developments can on occasion move countries substantially away from both full employment and price stability, producing a policy dilemma. The oil shocks of the 1970s are good examples: they raised inflationary pressures and weakened domestic demand (by reducing consumer purchasing power), outcomes which called for opposite monetary responses. International developments can also move countries away from both domestic goals and external goals. The oil shocks of the 1970s illustrate this potential as well: the policy stimulus to offset the contractionary effects of the oil price increases would worsen the already large current account deficits arising from the higher cost of oil imports. Indeed, past experience has shown that countries with large current account deficits cannot long escape assigning considerable weight to the external goal—even though it conflicts with domestic objectives.

Because of the size of the U.S. economy and the dollar's role as a reserve currency and medium for international transactions, the United States has perhaps more latitude than most countries to place domestic above external policy considerations. In the postwar period, clear-cut instances in which domestic goals had to be sacrificed to external concerns have been rare. Such conflicts are possible, however. In the mid-1980s, many economists worried that such high dollar interest rates would be required to attract private financing for the large U.S. current account deficit that domestic growth would slow sharply.

As a reflection of growing interdependence, international monetary and fiscal policy coordination has often had an important place in the formulation of U.S. monetary policy. The extent of policy coordination has been greater at some times than others; disagreements sometimes arise about the distribution of the costs and the

**Chart 6** U.S. Current Account and Merchandise Trade Balance



risks involved in any coordination effort. The emergence of large U.S. current account deficits in 1977-78 and in the 1980s (Chart 6) prompted intense debate among the major industrial countries about the relative magnitude of adjustment to be undertaken by each as they shaped a collaborative approach to reducing the international imbalances.

The difficulty of coordinating macroeconomic policies in the 1960s was a major reason fixed exchange rates were abandoned. The experience with large capital flows and wide and often persistent payments imbalances in the 1970s and 1980s suggests that policy coordination is still desirable under the floating exchange rate regime. While floating exchange rates have increased the potential independence of monetary policy, the growing openness of world trade and finance has increased interdependence among countries' economies. Floating exchange rates allow the central bank to set its nominal interest rates (or reserve base) independently of other countries, but capital mobility means that a change in the real interest rate relative to other countries is offset by a change in real exchange rate expectations. Thus, central bank freedom to set interest rates is only as great as its tolerance of the foreign exchange rate movements associated with a change in interest rates.

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### *The Impact of Changes in International Financial Markets*

The initial financial adjustments triggered by a U.S. monetary policy action involve the huge dollar and nondollar financial markets outside the United States. The rapid growth and changing character of these financial markets do not so much alter the qualitative effects of a U.S. monetary policy action on U.S. inflation or output as add to the complexity of tracing the timing and ultimate magnitude of those effects.

Reductions in the cost of information and of transactions and improvements in trading system technology have accelerated the interaction between U.S. and overseas financial markets. International trades can be executed quickly. For a few instruments, trading can occur at nearly any time of the day or night. Foreign investors are able to react almost immediately to news in the United States; U.S. investors can respond quickly to developments abroad. Furthermore, market participants seek out and exploit arbitrage opportunities across an increasing number of markets, reducing market segmentation.

The underlying character of many national financial markets has changed over the last two decades as well. Changes in regulatory philosophy and economic forces lay behind the extensive deregulation of domestic financial markets in the United States and abroad. The experience of rapid and persistent inflation undermined regulated or administered interest rate systems. In many industrial countries, the emergence of large government budget deficits opened up alternatives to bank deposits for domestic investors and prompted government debt market reform.<sup>13</sup>

Competitive forces and the price mechanism gained a much larger role in foreign financial markets, particularly in the 1980s. Access to foreign and offshore markets, falling information costs, and increased investor sophistication reduced the effectiveness of regulating deposit and lending rates and imposing quantitative credit controls. Many countries liberalized and developed their money markets and stock and futures exchanges. They substantially modified the separation of powers of financial institutions and eased the entry of foreign financial firms.

These changes in turn induced foreign central banks to change their approaches to conducting monetary policy. In the late 1970s, very few foreign monetary authorities conducted open market operations in domestic securities as the principal instrument of monetary policy. Most relied primarily on administered interest rates, discount window quotas, and credit and capital controls. Freer financial mar-

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<sup>13</sup> *The forces behind innovation and their impact on the financial markets are discussed in Bank for International Settlements, Financial Innovation and Monetary Policy, Basle, 1984.*

kets required more flexible monetary policy tools, however. Now monetary authorities in most larger countries carry out some form of open market operations in domestic securities, operations which not only affect domestic money market conditions but also are closely watched in the exchange markets. The shift in operations led to more professional analysis of foreign monetary policy along the lines of "Fedwatching."

The internationalization of markets was further assisted by the development of markets for off-balance sheet instruments such as interest rate and currency swaps, financial futures and options, and forward rate agreements.<sup>14</sup> These instruments allow financial market participants to hedge interest rate and exchange rate risks, to adjust market risk positions quickly, and to separate to a considerable extent the management of price risks from the management of credit and liquidity. Markets for instruments that transfer credit and liquidity risks, such as letters of credit, sureties, and committed lines of credit, also grew substantially in the 1980s.

Changes in the ability of financial market participants to manage exposures to foreign currency and interest rate risk and to tap foreign credit sources have raised concern that the influence of monetary policy on macroeconomic performance has waned. Analysts have shown, however, that the evidence for an erosion is not compelling.<sup>15</sup> Still, the growth of the U.S. economy after 1982 despite unusually high nominal and real interest rates raises questions, even when the strong fiscal stimulus is taken into account. While it was widely appreciated that the repeal of usury laws and the phaseout of Federal Reserve Regulation Q restrictions on interest rates would alter one of the channels of transmission of a monetary policy tightening—that from credit rationing to higher credit cost—few observers probably anticipated the large potential supply of credit from overseas investors at high interest rates.

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## ***The Principal International Short-Term Markets***

### ***1. The Eurodollar Deposit Market***

The large Eurodollar deposit market provides convenient access to dollars for non-U.S. residents who use them for commercial and

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<sup>14</sup> These instruments are described in *Bank for International Settlements, Recent Innovations in International Banking, Basle, 1986.*

<sup>15</sup> See M.A. Akhtar and Ethan S. Harris, "Monetary Policy Influence on the Economy—An Empirical Analysis," *Federal Reserve Bank of New York Quarterly Review, Winter 1987.* Further evidence is contained in Lawrence Radecki and Vincent Reinhart, "The Globalization of Financial Markets and the Effectiveness of Monetary Policy Instruments," *Federal Reserve Bank of New York Quarterly Review, Autumn 1988, pp. 18-27.*

investment activities. The gross volume of Eurodollar deposits amounted to \$4.6 trillion at the end of 1988. Interbank deposits make up about two-thirds of the total.

As noted in Chapter 4, the term Eurodollar is applied to dollar deposits of all maturities booked at offices of financial institutions outside the United States. Eurocurrency deposits, more generally, are deposits in currencies other than the domestic currency of the country in which the deposit is booked. The Euromarket is predominantly a wholesale market based in London, although significant Euromarket activity occurs in Luxembourg, Hong Kong, Singapore, and other financial centers. The core of the Euromarket is the short-term deposit market. Although deposits exist in all major currencies, the dollar component of the market, at about 50 percent, continues to be the largest. The interbank component plays a part in directing credit to areas of greatest demand, even though it does not add to total money or credit available.

Just as the Eurodollar deposit market has become closely integrated with the U.S. domestic markets, the Eurodeposit markets are closely tied to the foreign exchange markets. Spot and forward foreign exchange rates for most currencies against the dollar are determined jointly with Eurodeposit rates; the percentage gap between the spot and forward exchange rates is very close to the interest rate differential prevailing in the respective deposit markets. Transactions costs almost fully explain any remaining difference.<sup>16</sup>

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## 2. Nondeposit Money Markets

New markets in Eurocommercial paper and Euronotes developed in the 1980s. The largely dollar-denominated Eurocommercial paper market, like the U.S. commercial paper market, competes for the funds of institutional investors, but Eurocommercial paper is generally offered in longer maturities (three or six months) and has a liquid secondary market. The major issuers are foreign governments and their agencies and nonfinancial corporations based in the United States and abroad. Euronotes are short-term promissory notes issued under arrangements that allow the borrower to obtain credit from banks if the notes' spread over a reference rate exceeds a specified level. With around \$70 billion in issues outstanding at year-end 1988, the Europaper market is still relatively small.

Until recently, few national markets in money-market securities existed overseas. Active Treasury bill markets are still limited to a

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<sup>16</sup> See Lawrence Kreicher, "Eurodollar Arbitrage," *Federal Reserve Bank of New York Quarterly Review*, Summer 1982, pp. 10-22.

handful of countries, among them France, Italy, and Canada. Activity in the large commercial bill market overshadows the Treasury bill market in the United Kingdom. Commercial paper was introduced during the 1980s in Japan, France, and a number of smaller countries. International participation in these markets so far appears small.

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### *International Money Markets and U.S. Monetary Aggregates*

Short-term instruments in the international markets can substitute for domestic deposits and thus have the potential to change the behavior of U.S. monetary aggregates. The relationship between nominal income, interest rates, and the monetary aggregates in the United States will remain stable only if other financial assets cannot easily be substituted for components of the U.S. money supply.

For U.S. wholesale depositors, Eurodollar deposits have proved to be nearly perfect substitutes for domestic time deposits. As the Euromarkets grew, the broader monetary aggregates became less representative of the purchasing power available in liquid form to the U.S. economy. In 1980, the definitions of the monetary aggregates were revised to include U.S. resident deposits in overnight Eurodollars in M2 and both overnight and term Eurodollars in M3.<sup>17</sup>

Foreign currency Eurodeposits and other nondollar short-term instruments represent potential substitutes for U.S. domestic deposits in two respects. They can be paired with an off-balance sheet instrument such as a short-dated swap or a foreign currency future or forward to create a synthetic dollar instrument. Or dollar deposit holders may prefer the yield and appreciation potential of a short-term foreign currency instrument to dollar deposits. Economists are in substantial disagreement about the extent and the effects of such substitution.<sup>18</sup>

As foreign investors have made more adjustments to their cross-border asset holdings by buying and selling medium- and long-term foreign securities rather than by shifting their Eurodeposit holdings, international substitutes for domestic deposits should have receded as a source of instability in the monetary aggregates. Nevertheless, analysts have recently inferred from changes in the money-income

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17 Thomas Simpson, "The Redefinition of Monetary Aggregates," Federal Reserve Bulletin, February 1980, pp. 97-114.

18 See M.A. Akhtar and Kenneth J. Weiller, "Developments in International Capital Mobility: A Perspective on the Underlying Forces and the Empirical Literature," in Research Papers on International Integration of Financial Markets and U.S. Monetary Policy.

relationship that changes in international capital flows may have affected the behavior of M1 in the 1980s.<sup>19</sup>

Others have argued that distortions in the monetary aggregates appear to be partly related to currency expectations. When the domestic currency is expected to appreciate, foreign demand for domestic money increases, so that at any interest rate, money demand is higher than before and money growth faster.<sup>20</sup> This may be one reason that money demand appears unstable in many countries.<sup>21</sup> Potentially at least as important for the aggregates are money demand shifts stemming from political instability and high inflation.

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## *The Principal International Long-Term Markets*

### *1. The Eurobond Market*

The Eurobond market, centered in London, is the principal long-term offshore dollar market, a source of capital for multinational corporations and for foreign governments. It developed after the United States instituted the Interest Equalization Tax in 1963 to stem capital outflows that were inspired by relatively low U.S. interest rates.<sup>22</sup> The tax gave European corporations an incentive to issue bonds in Europe rather than in New York and to draw on the dollar funds that had accumulated in Europe in the postwar years. Efforts in the 1960s to limit U.S. direct overseas investment prompted U.S.

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19 See John Wenninger and Thomas Klitgaard, "Exploring the Effects of Capital Movements on M1 and the Economy," *Federal Reserve Bank of New York Quarterly Review*, Summer 1987, pp. 21-31.

20 A compelling quantitative case for the United States has not been made. Some cases that seem to support this line of analysis involve market expectations of a European Monetary System (EMS) realignment. See, for example, *Deutsche Bundesbank, Annual Report 1986*, for a description of the large capital flows surrounding the January 1987 EMS realignment and their impact on German monetary aggregates. When foreign investors hold securities rather than deposits, deposit rates may still be bid up to provide clearing balances and finance dealer inventories. See *Bank for International Settlements, "International Banking and Financial Market Developments,"* July 1987.

21 Ronald McKinnon has advocated targeting a world M1 money aggregate made up of industrial country money supplies to get around shifts in currency preferences. See *An International Standard for Monetary Stabilization*, vol. 8, *Institute for International Economics, Policy Analysis in International Economics* (Cambridge: MIT Press, 1984). Although the concept of currency substitution has attracted attention, most economists reject a world M1 target. Some economists are skeptical because they oppose money targets generally, others because they see targeting a world monetary aggregate as stabilizing only if the relative changes in national money demands reflect pure financial shocks, not real side shocks such as those experienced in the early 1980s. Finally, the very low share of cross-border M1 deposits in international assets raises questions about the practicality of such targets.

22 A brief history of the early years of the Eurobond market can be found in Frederick G. Fisher III, *The Eurodollar Bond Market* (London: Euromoney Publications, 1979). The Interest Equalization Tax was especially burdensome to the bond markets since it took the form of an up-front fee based on the principal amount and the maturity.

corporations to raise capital for overseas operations in the Euromarkets as well. Moreover, bonds issued by subsidiaries of U.S. corporations chartered outside the United States were exempt from the U.S. withholding tax on interest paid to foreigners. The Eurobond market was not limited to dollars: the first Eurobond issues in foreign currencies occurred in the mid-1960s.<sup>23</sup>

The Eurobond market was well established when the Interest Equalization Tax was removed in 1974 and faltered only briefly before resuming its growth. From 1985 to 1988, an average of \$175 billion a year was issued in the Eurobond market, much of it in non-dollar currencies. While issuance of foreign currency Eurobonds picked up at times in the 1970s, it soared after the dollar's exchange value began to decline in 1985. The liberalization of national markets and the growth of currency swaps added momentum to the surge of foreign currency Eurobond issuance. A currency swap allows a U.S. borrower, for example, to issue an Australian dollar bond in the Euromarket and transform the exposure to U.S. dollars. The major foreign currencies, especially the yen, accounted for most of the growth in nondollar Eurobonds, but currency swaps have promoted issuance in several other currencies.

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## 2. U.S. Treasuries and Other Government Bonds

In the 1980s, government securities became prominent long-term international investments. The large stock of public debt that accumulated in major currency countries since 1975 and the reform of government bond markets abroad contributed to more liquid markets. Around 1984, withholding taxes on interest income earned by foreigners were repealed in many countries, effectively raising returns to foreign investors. Institutional investors who prefer liquid instruments with low credit risk also favored bonds issued by governments over the less liquid corporate Eurobonds.

As Chapter 4 revealed, a secondary market in U.S. Treasury debt issues functioning outside the United States has grown rapidly in the 1980s. U.S.- and foreign-based dealers and U.S.-based brokers operate actively in London and Tokyo, with more limited activities in other financial centers. The internationalization of the market for U.S. Treasuries has set a pattern for other government bond markets.

International trading in the major government bonds has supplemented and to some extent replaced the international flows between

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<sup>23</sup> Although most of the Eurobond market is based in London, an agreement with the domestic authorities requires DM and Swiss franc Eurobonds to be issued in the foreign bond markets in Germany and Switzerland, respectively.

deposits in different currencies that were the chief source of exchange rate pressures in the 1970s. These flows involve the bond markets of the major currency countries and of a number of smaller industrial countries as well.

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## *Conclusion*

The shift to floating exchange rates and international capital mobility in the 1970s changed the framework of monetary policy analysis for the United States and its trading partners. The greater openness of trade and finance has increased the international influences on the U.S. economy, heightened the sensitivity of U.S. financial markets to foreign developments, and altered the timing and path of the transmission of policy.

These changes have affected both the transmission and formulation of U.S. monetary policy. While the basic concerns of U.S. monetary policy—sustainable economic growth and price stability—are unaltered, greater openness has changed the interpretation of domestic indicators, introduced new risks in monetary strategy, and underscored the importance of international considerations in the creation of policy. The techniques of monetary policy implementation, however, have been little affected by international flows.

Theoretical and empirical insights into the international aspects of U.S. monetary policy need to be developed more fully. Economists are still assessing the impact of changing foreign financial markets and foreign monetary policy techniques on domestic financial indicators and still exploring the real and financial linkages between the domestic economy and the rest of the world. Thinking on such central issues as the determination of exchange rates has yet to crystallize into a consensus or a clear rivalry among competing theories. As these issues are clarified, they should help us to understand how U.S. policies affect conditions outside the United States and in turn are affected by them—in the commodity markets, in other industrial countries, and in the less developed countries—and how current economic problems are likely to evolve in the future.

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### **Box: Foreign Exchange Market Intervention**

Intervention in the foreign exchange markets by the U.S. Treasury and the Federal Reserve is undertaken to restore orderly conditions in the exchange markets and at times to influence exchange rates. As explained in Chapter 5, the U.S. Treasury is primarily responsible for foreign exchange policy, but developments in the foreign exchange markets have important ramifications for U.S. financial and economic conditions and therefore for monetary policy and the Federal Reserve. Decisions to intervene in the foreign exchange market are made jointly by the U.S. Treasury and the Federal Reserve, and the Foreign Exchange Desk at the Federal Reserve Bank of New York conducts the operation.<sup>24</sup> Intervention policy in the second half of the 1980s has been influenced significantly by coordination efforts of the governments and central banks of the Group of Seven countries.<sup>25</sup>

Foreign exchange intervention by a central bank primarily affects exchange rates by affecting the psychology of the foreign exchange market. It may lead participants to reassess their assumptions about the relative risks of short or long positions in foreign currency. It may also have a direct effect on supplies and demands in the short run, but to do so the volume of the intervention would generally have to be relatively large. The enormous expansion of transactions volume in the foreign exchange market (upward of \$500 billion a day in 1989) has greatly enhanced the importance of tactics and timing in achieving a desired impact. In some cases, intervention may also signal a willingness to alter monetary policy to achieve an exchange market objective, and in some countries, it can serve as a policy tool for altering short-term interest rates.

As Chapter 6 explained, purchases and sales of foreign currencies by the central bank generally involve an exchange of domestic currency reserves with the banking system and thus add or drain reserves. If the central bank (or treasury) offsets the full change in the monetary base produced by foreign exchange market intervention, then the intervention is sterilized. Sterilized intervention is a tac-

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<sup>24</sup> A good discussion of foreign exchange intervention practices is contained in Roger M. Kubarych, *Foreign Exchange Markets in the United States*, Federal Reserve Bank of New York, 1983. Since substantial exchange reserves accumulated in the early 1980s, most exchange intervention has been financed by drawing down or building up reserves rather than by activating the swap network.

<sup>25</sup> The Group of Seven countries are the United States, Canada, France, Germany, Italy, Japan, and the United Kingdom.

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tic used to influence market psychology and to signal central bank concerns. Its success depends on the readiness of market participants to interpret it as an indication of central bank policy resolve.

If the central bank (or treasury) offsets only part of the change in the monetary base, then the remainder is unsterilized intervention. Unsterilized intervention is a joint policy action involving both foreign exchange intervention and a monetary policy change. Since unsterilized intervention induces changes in the money supply and short-term interest rates of the intervening country, private residents and nonresidents have additional incentives to alter their investment and borrowing decisions.

The monetary effects of foreign exchange intervention by the United States are routinely offset under Federal Reserve operating procedures (see Box B of Chapter 6). The FOMC can and occasionally does change its monetary policy stance in response to the same factors that inspired the exchange market intervention, but two separate decisions are involved. The intervention is never passively permitted to change reserves. Nor is intervention undertaken as a way of changing reserves, since domestic open market operations can be arranged when needed.

In many other countries, however, the central bank does not automatically offset intervention in the exchange markets. On a technical level, open market operations in domestic securities are often limited by thin domestic financial markets. Hence, the operations cannot be as large or as frequent as they are in the United States. Some central banks may not have the domestic tools to achieve domestic goals and must operate in the exchange markets. Indeed, many foreign central banks use foreign exchange operations as an alternative to domestic operations for monetary policy purposes, although they generally only do so when the likely foreign exchange effects are consistent with their policy objectives. They may choose to operate in the exchange markets under some circumstances because larger, more flexible operations may be feasible or because the sectoral and inflation consequences of intervention may be preferred to a domestic money market operation.<sup>26</sup>

Because foreign exchange intervention can be an important signal of central bank intentions, market participants try to detect and interpret intervention when it occurs. While the United States reports peri-

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<sup>26</sup> See *Bank for International Settlements, Exchange Market Intervention and Monetary Policy, Basle, 1988.*

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odically on its foreign exchange intervention, few other countries release much information. As a result, market participants estimate dollar-related intervention from the growth of foreign exchange reserves abroad or the size of investments by foreign monetary authorities in the United States. These indicators can be misleading.

Increases in official reserves include nondollar reserves. For example, central banks participating in the exchange rate mechanism of the European Monetary System (EMS) have at times intervened substantially in EMS currencies to maintain agreed-upon exchange rate relationships. Most countries do not disclose the currency breakdown of their reserves, although the International Monetary Fund publishes periodic estimates in its *Annual Report*.

The proportion of official financing of the U.S. current account deficit changes not only as foreign central banks accumulate dollar reserves, but also as foreign central banks shift the composition of investments of existing reserves among instruments. Official financing is the increase in the dollar reserves invested in the United States plus reductions in the reserves of the United States. Central bank investment of dollars tends to be confined to a relatively narrow but expanding spectrum of high-quality, highly liquid instruments. These instruments have traditionally consisted of Treasury securities, deposits or custody accounts at commercial banks in the United States, and usually a minimum working balance at the Federal Reserve, but increasingly they include Eurodeposits and other eligible Eurodollar instruments such as Eurocommercial paper or Eurobonds issued by governments or supranational agencies. Foreign central banks may shift their reserves between investments in the United States and those in the Eurodollar markets for pure portfolio considerations even in periods of little intervention.



## *Experiences of the 1980s*

United States monetary policy during the 1980s was by some measures extraordinarily successful. Inflation was brought down from the frightening levels that had developed at the end of the previous decade to more manageable, though still disquieting, levels. After a major recession early in the decade, the economy grew without significant interruption for a number of years, achieving the longest recorded peacetime expansion.<sup>1</sup>

Although gratified by the slowdown in the rate of inflation, monetary policymakers were troubled by the breakdown of the traditional relationships among money, economic activity, and prices during the 1980s. Money growth had served as a policy guide and as an advance indicator of inflation during the 1970s and the early part of the 1980s. When it became apparent during the 1980s that the demand for money was shifting, the Federal Reserve began to look for alternative measures to help direct its policy actions. The search, still going forward, has yielded many possible guides, including specific economic, employment, and price reports, movements of M2 around trend, and the shape of the yield curve. These indicators may sometimes help policymakers forecast turns in economic activity or increases in inflation, but none of the indicators has proved to be completely reliable.

In retrospect, the breakdown of the reasonably reliable relationship between M1 and economic activity in the 1980s is in some ways understandable. At the beginning of the decade, many observers had predicted reductions in the demand for money as sophisticated electronics made close monitoring of money balances easier and encouraged daily investment of excess cash. Instead, money demand increased. Indeed, M1 growth rates between 1982 and 1986 were similar to those that had produced accelerating inflation in the 1970s, but they were accompanied by dramatic slowing of the rate of inflation. A portion of the rapid growth of money in those years stemmed from the greater willingness of people to hold wealth in forms included in the money measures. Because both actual and prospective inflation had been reduced by the tight monetary policy pursued between 1979 and 1982, money was not losing value so quickly. At the same time, interest rate deregulation made it possible to earn reasonably attractive returns on some types of liquid money balances, increasing the inducement to hold savings in the form of money and reducing the incentives to manage cash balances intensively.

<sup>1</sup> *The dating of business cycles by the National Bureau of Economic Research begins in 1854.*

After 1986, money growth slowed even as inflation accelerated moderately. The increase in money demand resulting from the earlier disinflation had about run its course. Market interest rates once again began to rise. Depository institutions often delayed increasing their offering rates on some types of deposits, thus reintroducing incentives to economize on cash balances. Meanwhile, corporations still had the means to monitor and adjust cash positions carefully, by using the techniques that had been developed a decade earlier when inflation and market interest rates were high. Recent experience suggests that money demand will continue to be sensitive to interest rates and expected inflation.

At this stage, it is an open question whether the increased understanding of the factors affecting the demand for money will allow any of the monetary aggregates to become more reliable guides to appropriate policy once again. M2 appears at this writing to have the most stable track record over time. Short-run sensitivities to changes in market interest rates are substantial, however, even though M2 displays little sensitivity to rate levels over extended time periods. Furthermore, M2 is more difficult than M1 for the Federal Reserve to control.

The absence of a clear and widely recognized advance indicator of inflation in the wake of the shifting relationships among money, economic activity, and prices has challenged Federal Reserve monetary policymaking. The Federal Reserve has to maintain its vigilance against frequent pressures to produce a more inflationary policy than is desirable over the long run. In an era when the public wants more from the government than it is willing to pay for through taxes, there may be considerable clamor for policies that seem to promote expansion and thus reconcile diverse and possibly inconsistent demands placed on the political system. In the end, however, such policies are only likely to achieve higher rates of inflation.

As long as memories of the costs of the rapid inflation of the 1970s are relatively fresh, the Federal Reserve should receive substantial support for holding to a course aimed at promoting price stability. But the risk will grow that the Federal Reserve will be pressured to follow more inflationary policies as memories of the 1970s experience fade. A clear and widely recognized leading indicator of inflation in the form of a definition of money or some other variable could help to anchor the process of controlling inflation and make it easier for the Federal Reserve to resist pressures for inflationary actions. Nonetheless, even in the absence of a good leading indi-

cator of price developments, the Federal Reserve so far has met with reasonable success in feeling its way toward price stability.

The Federal Reserve was able to achieve reduced inflation in the 1980s and to help promote a long period of economic expansion despite a number of adverse financial developments that sometimes complicated its task. The total amount of public and private sector debt outstanding grew during the decade to levels beyond what many observers believed to be wise or sustainable. The rising debt of the U.S. federal government led the increase, and a number of other forms of debt also grew rapidly. Many observers have been especially troubled by growth in areas that may be hard hit by defaults in an economic downturn. Corporations with credit ratings low enough to have limited their access to the debt markets in earlier times issued substantial amounts of debt in the 1980s.

Another source of concern has been persistent U.S. trade deficits. To date, political stability in the United States and the perception that the country offers many good investment opportunities have eased the financing of those deficits. But many observers believe that the cumulative buildup of foreign ownership of U.S. debt could mean that even a modest reduction in confidence in the U.S. economy could lead to disruptive capital flows.

A number of banking and financial crises developed during the decade, requiring prompt Federal Reserve action to contain them and restrict their impact to the immediate area of difficulty. The breadth of the financial markets, both within the United States and across international borders, has had the positive effect of encouraging the efficient use of resources. At the same time, however, it has meant that a disturbance in one financial market can be quickly transmitted to others both nationally and internationally.

Policymakers also had to cope with the repercussions of the debt crises in developing countries. Excessive debt burdens taken on by a number of countries in the 1970s when credit was easily obtained and inflation was believed to be headed ever higher proved unmanageable when dollar prices slowed their climb and prices of oil and some other commodities fell. By the middle of 1982, many of these countries were suffering serious difficulties in meeting their financial obligations, putting pressure on large banks in the United States and other industrialized countries and jeopardizing prospects for growth of the world economy. The unfolding Mexican debt crisis in 1982, which was followed by similar crises in other developing countries, was a factor contributing to the Federal Reserve's decision to move to a more accommoda-

tive monetary policy stance at that time—although domestic economic developments remained the chief factors determining the monetary policy actions. While the crises have abated, the problems remain, requiring ongoing broad-based international cooperation throughout the decade.

Further, a number of banks and thrift institutions in the United States suffered serious losses from their domestic operations during the 1980s. The collapse of Penn Square Bank of Oklahoma in 1982 had a wider impact than would normally follow the failure of a modest-sized bank because Penn Square had arranged loan participations with several large banks; Continental Illinois National Bank, one of the largest banks in the country, was seriously weakened. In 1984 it faced runs in the form of withdrawals of large uninsured deposits, a development which set in motion the biggest rescue ever by the Federal Deposit Insurance Corporation. Further oil price declines in 1986 and a related collapse in real estate prices in some of the oil-producing areas in the United States weakened a number of the regions' banks to the point where assisted mergers and takeovers had to be arranged.

In 1985, fraudulent practices by a securities firm brought down an Ohio thrift institution that was insured by a state-sponsored fund. The fund could not handle the claim, an event which set off runs on privately-insured thrift institutions in Ohio and in Maryland. The Ohio insurance fund collapse proved to be a prelude to the troubles of the Federal Savings and Loan Insurance Corporation (FSLIC). The real estate loan crisis in the Southwest that followed the second set of declines in oil prices in 1986, together with mismanagement and alleged fraud at some institutions, created insolvencies at many thrifts. Forced mergers, restructurings, and closings weakened FSLIC, bringing its own solvency into question, and it had to be restructured by the federal government.

In 1987 the crash in stock prices brought back fears of a global economic and financial collapse. The Fed, however, took forceful actions in response, temporarily making more credit available to the banking system until the crisis had clearly passed. Hence, both the policy actions and the outcome stood in sharp contrast to the unfortunate events that followed the 1929 stock market crash.

The banking and financial problems that developed in the 1980s underscore the need for steady vigilance on the part of the Federal Reserve. Like all central banks, the Federal Reserve must promote stability in the financial markets in order to limit the possibility of financial crisis and must discourage excessive risk taking by those

responsible for making credit judgments. It must also take seriously its role as lender of last resort when crises do develop.

If the decade has presented the Federal Reserve with a number of difficult problems, it has also demonstrated the effectiveness of the System's primary monetary policy tool. Open market operations have repeatedly proved to be an extraordinarily useful and flexible device. As long as there are active markets in high-quality financial instruments, the Federal Reserve should have the means to make purchases and sales to achieve desired reserve adjustments.

A second tool, required reserve changes specifically designed to make policy "tight" or "easy," has been absent from the Federal Reserve's repertoire in the 1980s. Its absence has gone virtually unnoticed, suggesting it was not much missed.

The System's third tool, discount window borrowing, has been a source of controversy for many years. The current system of management holds the discount rate below market rates while strongly discouraging banks from borrowing. One advantage of present procedures is that imposing administrative guidelines enables the Federal Reserve to indicate to banks that have borrowed that it is attentive to their reserve management practices. Moreover, the procedures have usually functioned reasonably well as part of the mechanism for imposing varying degrees of monetary restraint.

Many economists, however, have questioned features of the current discount window procedures. They have criticized the implicit subsidy in a rate that is generally below short-term market rates—even though the amounts borrowed under the seasonal and adjustment credit programs typically have been quite modest in recent years—and the consequent need to limit access to the window through nonprice rationing. They have been concerned because the administrative guidelines may at times be more or less restrictive than intended. Observers within the Federal Reserve have recently noted apparent shifts in the demand for borrowing that have not been entirely understood, as well as the short-run variability in the relationship of borrowing to the spread between the Federal funds rate and the discount rate. It would be helpful to the policy process if borrowing were more predictable in that key relationship. Nonetheless, changing the guidelines for discount window borrowing to address one set of problems could create new problems for other aspects of the policy process. Any such changes should not be considered without careful study.

Of course, taking a long view, further changes in many aspects of policy will inevitably occur, for the U.S. financial system is

dynamic and the Federal Reserve must adapt to a changing world. Some of the information in this book will no doubt become obsolete before long; a few points may even be outdated before the book rolls off the presses. Nonetheless, much of the information should remain relevant for several years. The book has been designed to highlight the full range of factors that enter into the task of making and executing monetary policy. It is hoped that the reader will have gained some sense of how the policy process operates and how it has evolved in the United States during the Federal Reserve System's first 75 years.

# *Notes*

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