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# Chapter 2
## FEDERAL FUNDS

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Federal funds are the heart of the money market in the sense that they are the core of the overnight market for credit in the United States. Moreover, current and expected interest rates on federal funds are the basic rates to which all other money market rates are anchored. Understanding the federal funds market requires, above all, recognizing that its general character has been shaped by Federal Reserve policy. From the beginning, Federal Reserve regulatory rulings have encouraged the market's growth. Equally important, the federal funds rate has been a key monetary policy instrument. This chapter explains federal funds as a credit instrument, the funds rate as an instrument of monetary policy, and the funds market itself as an instrument of regulatory policy.

### CHARACTERISTICS OF FEDERAL FUNDS

Three features taken together distinguish federal funds from other money market instruments. First, they are short-term borrowings of immediately available money—funds which can be transferred between depository institutions within a single business day. In 1991, nearly three-quarters of federal funds were overnight borrowings. The remainder were longer maturity borrowings known as term federal funds. Second, federal funds can be borrowed by only those depository institutions that are required by the Monetary Control Act of 1980 to hold reserves with Federal Reserve Banks. They are commercial banks, savings banks, savings and loan associations, and credit unions. Depository institutions are also the most important eligible lenders in the market. The Federal Reserve, however, also allows depository institutions to classify borrowings from U.S. government agencies and some borrowings from nonbank securities dealers as federal funds.[1]

[1] A more complete list of eligible lenders is found in Board of Governors of the Federal Reserve System, *Federal Reserve Bulletin*, vol. 74 (February 1988), pp. 122-23.

Third, federal funds borrowed have historically been distinguished from other liabilities of depository institutions because they have been exempt from both reserve requirements and interest rate ceilings.[2]

The supply of and demand for federal funds arise in large part as a means of efficiently distributing reserves throughout the banking system. On any given day, individual depository institutions may be either above or below their desired reserve positions. Reserve accounts bear no interest, so banks have an incentive to lend reserves beyond those required plus any desired excess. Banks in need of reserves borrow them. The borrowing and lending take place in the federal funds market at a competitively determined interest rate known as the federal funds rate.

The federal funds market also functions as the core of a more extensive overnight market for credit free of reserve requirements and interest rate controls. Nonbank depositors supply funds to the overnight market through repurchase agreements (RPs) with their banks. Under an overnight repurchase agreement, a depositor lends funds to a bank by purchasing a security, which the bank repurchases the next day at a price agreed to in advance. In 1991, overnight RPs accounted for about 25 percent of overnight borrowings by large commercial banks. Banks use RPs to acquire funds free of reserve requirements and interest controls from sources, such as corporations and state and local governments, not eligible to lend federal funds directly. In 1991, total daily average gross RP and federal funds borrowings by large commercial banks were roughly $200 billion, of which approximately $135-140 billion were federal funds.

Competition among banks for funds ties the RP rate closely to the federal funds rate. The RP rate has historically been below the federal funds rate because RPs are collateralized, which makes them safer than federal funds, and because arranging RPs entails additional transactions costs. Data on RP rates paid by banks to their corporate customers are not available, but from 1983 to 1990 the dealer RP rate (the rate government security dealers pay to obtain funds through RPs) was around 20 to 25 basis points below the federal funds rate. For reasons we are unable to explain, the dealer RP rate was higher than the federal funds rate during most of 1991.

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[2] This distinction has been blurred since passage of the Depository Institutions Deregulation and Monetary Control Act of 1980. Reserve requirements are now maintained only on transaction deposits, and interest rate controls have been removed on all liabilities except traditional demand deposits. Interbank demand deposits, however, are still reservable and prohibited from paying interest. In addition, our definition should be qualified because repurchase agreements (RPs) at banks have not had interest rate ceilings or reserve requirements. Strictly speaking, such RPs are not federal funds. Yet as we explain below, their growth and use have had much in common with the federal funds market. The point of view of this chapter is that they are close functional equivalents.

## METHODS OF FEDERAL FUNDS EXCHANGE

Federal funds transactions can be initiated by either the lender or the borrower. An institution wishing to sell (loan) federal funds locates a buyer (borrower) directly through an existing banking relationship or indirectly through a federal funds broker. Federal funds brokers maintain frequent telephone contact with active funds market participants and match purchase and sale orders in return for a commission. Normally, competition among participants ensures that a single funds rate prevails throughout the market. However, the rate might be tiered so that it is higher for a bank under financial stress. Moreover, banks believed to be particularly poor credit risks may be unable to borrow federal funds at all.

Two methods of federal funds transfer are commonly used. To execute the first type of transfer, the lending institution authorizes the district Reserve Bank to debit its reserve account and to credit the reserve account of the borrowing institution. Fedwire, the Federal Reserve System's wire transfer network, is employed to complete a transfer.

The second method simply involves reclassifying respondent bank demand deposits at correspondent banks as federal funds borrowed. Here, the entire transaction takes place on the books of the correspondent. To initiate a federal funds sale, the respondent bank simply notifies the correspondent of its intentions. The correspondent purchases funds from the respondent by reclassifying the respondent's demand deposits as "federal funds purchased." The respondent does not have access to its deposited money as long as it is classified as federal funds on the books of the correspondent. Upon maturity of the loan, the respondent's demand deposit account is credited for the total value of the loan plus an interest payment for use of the funds. The interest rate paid to the respondent is usually based on the nationwide average federal funds rate.

## TYPES OF FEDERAL FUNDS INSTRUMENTS

The most common type of federal funds instrument is an overnight, unsecured loan between two financial institutions. Overnight loans are, for the most part, booked without a formal, written contract. Banks exchange oral agreements based on any number of considerations, including how well the corresponding officers know each other and how long the banks have mutually done business. Brokers play an important role by evaluating the quality of a loan when no previous arrangement exists. Formal contracting would slow the process and increase transaction costs. The oral agreement as security is virtually unique to federal funds.

Federal funds loans are sometimes arranged on a longer-term basis, e.g., for a few weeks. Two types of longer-term contracts predominate—term and continuing contract federal funds. A term federal funds contract specifies a fixed

term to maturity together with a fixed daily interest rate. It runs to term unless the initial contract explicitly allows the borrower to prepay the loan or the lender to call it before maturity.

Continuing contract federal funds are overnight federal funds loans that are automatically renewed unless terminated by either the lender or the borrower. This type of arrangement is typically employed by correspondents who purchase overnight federal funds from respondent banks. Unless notified by the respondent to the contrary, the correspondent will continually roll the interbank deposit into federal funds, creating a longer-term instrument of open maturity. The interest payments on continuing contract federal funds loans are computed from a formula based on each day's average federal funds rate. When a continuing contract arrangement is made, the transactions costs (primarily brokers fees and funds transfer charges) of doing business are minimized because after the initial transaction, additional costs are incurred only when the agreement is terminated by either party.

In some cases federal funds transactions are explicitly secured. In a secured transaction the purchaser places government securities in a custody account for the seller as collateral to support the loan. The purchaser, however, retains title to the securities. Upon termination of the contract, custody of the securities is returned to the owner. Secured federal funds transactions are sometimes requested by the lending institution.

## DETERMINATION OF THE FEDERAL FUNDS RATE

To explain the determinants of the federal funds rate, we present a simple model of the market for bank reserves. In this model, which incorporates the actions of both private banks and the Federal Reserve, the funds rate is competitively determined as that value which equilibrates the aggregate supply of reserves with the aggregate demand for reserves.[3]

The aggregate demand for bank reserves arises from the public's demand for checkable deposits against which banks hold reserves. The aggregate quantity of checkable deposits demanded by the public falls as money market interest rates rise. Hence, the derived demand for bank reserves is negatively related to market interest rates. The aggregate demand schedule for bank reserves is shown in Figure 1, where $f$ is the funds rate and $R$ is aggregate bank reserves.[4]

The aggregate stock of reserves available to the banking system is determined by the Federal Reserve. In principle, the Federal Reserve could choose to provide

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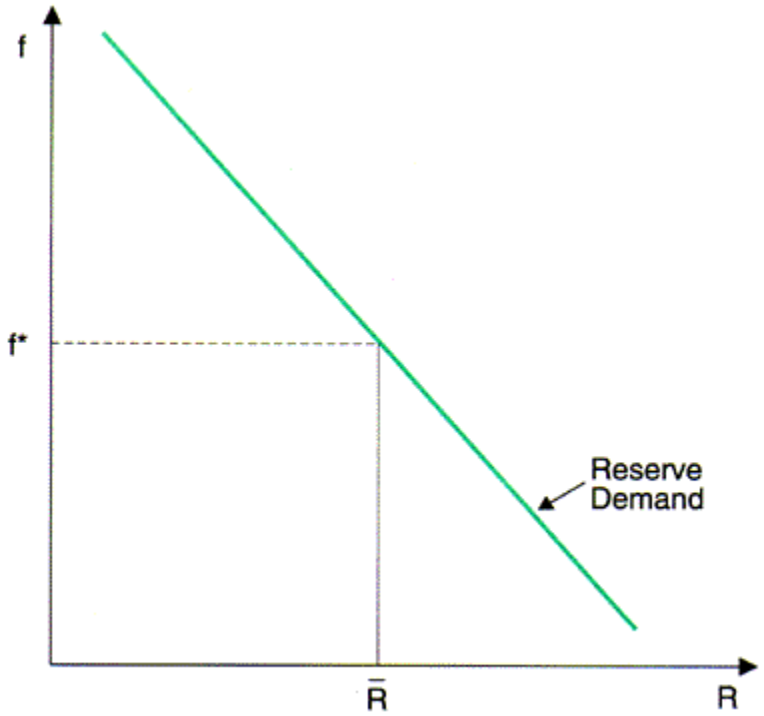
[3] Goodfriend 1982, pp. 3-16.

[4] The analysis here presumes that reserve demand is related contemporaneously to bank deposits. Required reserves were held on a lagged basis between 1968 and 1984, but they have been held contemporaneously since then. For a historical discussion of the role of reserve requirements in implementing monetary policy, see Goodfriend and Hargraves (1983).

FIGURE 1




the banking system with a fixed stock of reserves. If the Federal Reserve chose this strategy, a fixed stock of reserves, $\bar{R}$, would be provided through Federal Reserve purchases of government securities. The resulting funds rate would be $f^*$ in Figure 1, or the rate that equilibrates the aggregate supply of and the aggregate demand for bank reserves.

Such a Federal Reserve operating procedure, known as total reserve targeting, is the focus of textbook discussions of monetary policy. The hallmark of total reserve targeting is that shifts in the market's demand for reserves are allowed to directly affect the funds rate. In practice, however, the Federal Reserve has never targeted total reserves. Instead, it has adopted operating procedures designed to smooth movements in the funds rate against unexpected shifts in reserve demand.[5] The simplest smoothing procedure is federal funds rate targeting, which involves selecting a narrow band, perhaps 50 basis points or less, within which the funds rate is allowed to fluctuate. Explicit federal funds rate targeting was employed by the Federal Reserve during the 1970s.

[5] Goodfriend (1991) analyzes interest rate smoothing and the conduct of monetary policy.

The funds rate can be targeted directly by supplying, through open market purchases of U.S. Treasury securities, whatever aggregate reserves are demanded at the targeted rate. For example, if the Federal Reserve chose to peg the funds rate at $f^*$ in Figure 1, it would have to accommodate a market demand for reserves of $\bar{R}$. In principle, targeting either total reserves or the funds rate could yield the desired funds rate, $f^*$, so long as the Federal Reserve had precise knowledge of the position of the reserve demand locus.[6] There is, however, an important difference between these procedures. With a total reserve target, market forces directly influence the funds rate. They have no direct effect under a funds rate target. Instead, they affect only the volume of total reserves that the Federal Reserve must supply to support its chosen funds rate target.

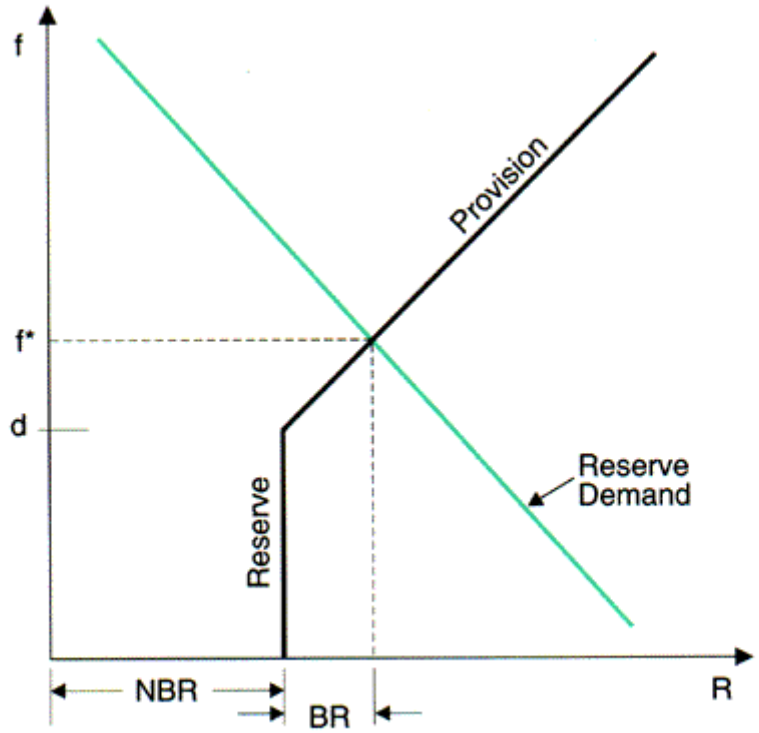
Federal Reserve operating procedures become more complicated when reserves are provided by bank borrowing at the Federal Reserve's discount window. Figure 2 shows the relationship between the provision of reserves and the federal funds rate when there is discount window borrowing. The locus has a vertical segment and a nonvertical segment because reserves are provided to the banking system in two forms, as nonborrowed and as borrowed reserves. Nonborrowed reserves (NBR) are supplied by the Federal Reserve through open market purchases, while borrowed reserves (BR) are provided by discount window lending.

The distance between the vertical segment of the reserve provision locus and the vertical axis is determined by the volume of nonborrowed reserves. The reserve provision locus is vertical up to the point where the funds rate ( $f$ ) equals the discount rate ($d$) because, when the funds rate is below the discount rate, banks have no incentive to borrow at the discount window. Conversely, when the funds rate is above the discount rate, borrowers obtain a net saving on the interest cost of reserves. This net saving consists of the differential ( $f$ -$d$ ) between the funds rate and the discount rate. In administering the discount window the Federal Reserve imposes a noninterest cost of borrowing which rises with volume: higher borrowing increases the likelihood of costly Federal Reserve consultations with bank officials. Banks tend to borrow up to the point where the expected consultation cost of additional borrowing just offsets the net interest saving on that borrowing. Consequently, borrowing tends to be greater the larger the spread between the funds rate and the discount rate. Hence, the reserve provision locus is positively sloped for funds rates above the discount rate.

Discount window borrowing plays a role in determining the funds rate whenever the Federal Reserve restricts the supply of nonborrowed reserves so that the funds rate exceeds the discount rate. In that case, the banking system's demand for reserves is partially satisfied by borrowing at the discount window. If the

[6] Of course, the Federal Reserve never knows precisely the position of the reserve demand locus. Moreover, uncertainty about currency outflows from banks and fluctuations in Treasury balances at banks precludes exact control of total bank reserves by the Federal Reserve.

FIGURE 2




Federal Reserve chooses to keep nonborrowed reserves fixed in response to an unexpected shift in either reserve demand or the demand for discount window borrowing, then the procedure is called nonborrowed reserve targeting. Nonborrowed reserve targeting is a kind of cross between funds rate targeting and total reserve targeting in the sense that the reserve provision locus is diagonal, rather than horizontal or vertical, thereby partially smoothing the funds rate against shifts in aggregate reserve demand. The Federal Reserve experimented with nonborrowed reserve targeting between October 1979 and the fall of 1982. [7]

By contrast, the Federal Reserve may choose to respond to a shift in reserve demand or the demand for discount window borrowing by adjusting the provision of nonborrowed reserves to keep aggregate discount window borrowing unchanged. The latter procedure, known as borrowed reserve targeting, is closely related to funds rate targeting in that for a given level of the discount rate, targeting borrowed reserves determines the funds rate except for unpredictable instability due to shifts in the demand for discount window borrowing. The Federal Reserve has employed borrowed reserve targeting at times since late

[7] See Cook (1989).

1982, but it has often chosen borrowing objectives flexibly in order to keep the federal funds rate trading in a narrow range around a targeted rate. It employed free reserve targeting, a procedure analytically similar to borrowed reserve targeting, throughout the 1920s and in the 1950s and 1960s.[8]

As can be seen in Figure 2, the Federal Reserve's discount rate policy plays an important role in determining the funds rate when *f* is greater than *d* under either nonborrowed or borrowed reserve targeting. As is easily verified diagrammatically, with a borrowed reserve target an adjustment in the discount rate changes the funds rate one-for-one. The effect would be smaller with nonborrowed reserve targeting. Keep in mind, however, that the discount rate would be irrelevant for the determination of the funds rate if the Federal Reserve were to supply a stock of nonborrowed reserves sufficiently large so that the funds rate fell below the discount rate and banks had no incentive to borrow at the discount window. The discount rate is also irrelevant when the Federal Reserve targets the funds rate directly. Discount rate adjustments have played an important role since October 1979 in both the nonborrowed and borrowed reserve targeting periods, as they did in the 1920s, 1950s, and 1960s under free reserve targeting. In contrast, discount rate adjustments had no direct impact on the funds rate when the funds rate itself was targeted during the 1970s. In that period, however, the announcement effect associated with discount rate changes sometimes signaled Federal Reserve intentions to change the funds rate target in the future.[9]

## THE FEDERAL RESERVE, THE FEDERAL FUNDS RATE, AND MONEY MARKET RATES

The Federal Reserve's operating procedures in the reserve market have varied greatly over the years. As we have seen, however, the Federal Reserve always has exercised a dominant influence on the determination of the federal funds rate through setting the terms upon which it makes nonborrowed and borrowed reserves available to the banking system.

The funds rate is the base rate to which other money market rates are anchored. Market participants determine money market rates according to their views of the current and future federal funds rates. As an example, consider bank certificates of deposit (CDs), which are generally arranged for a few months. A bank can raise funds by issuing a CD or by borrowing daily over the term of the CD through overnight federal funds and, therefore, chooses whichever option it expects to be cheaper. Likewise, a corporation considering the purchase of a Treasury bill has the option of lending its funds daily over the term of the bill at

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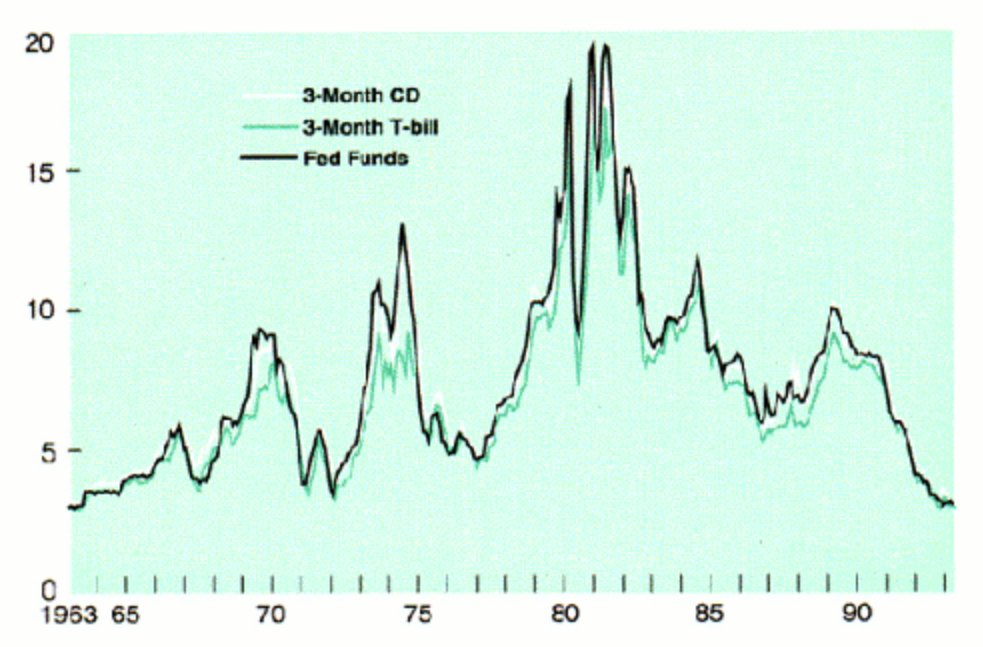
[8] Free reserves are defined as excess reserves minus borrowed reserves, or, equivalently, nonborrowed reserves minus required reserves.

[9] See Cook and Hahn (1988).

FIGURE 3

**Short-Term Interest Rates**

(Monthly Data)




the overnight repurchase rate, which is closely tied to the federal funds rate. It does whichever it expects will provide the highest return. As shown in Figure 3, such arbitrage keeps the yields of alternative money market instruments in line. Such considerations on the part of market participants make current and expected Federal Reserve policy toward the federal funds rate the key determinant of money market rates in general. Having made this point, we must realize that it provides only a partial explanation of money market rates. A full explanation requires an understanding of the Federal Reserve's monetary policy. In particular, economy-wide variables such as unemployment and inflation do ultimately play an important role in the evolution of the funds rate through their effect on the Federal Reserve's monetary policy actions over time.

## HISTORY OF THE FEDERAL FUNDS MARKET

Federal funds were traded in New York as early as the summer of 1921, though trading volume was initially small, rarely exceeding $20 million a day.[10] By 1928

[10] Eccles 1982, p. 154.

the volume of federal funds trading had risen to $100 million per day. In April of that year an article appeared in the *New York Herald Tribune* announcing the inclusion of the federal funds rate in the *Tribune's* daily table of money market conditions.[11]

As the *Tribune* described it, a federal funds transaction involved the exchange of a check drawn on the clearinghouse account of the borrowing bank for a check drawn on the reserve account of the lending bank. The reserve check cleared immediately upon presentation at the Reserve Bank, while the clearinghouse check took at least one day to clear. The practice thereby yielded a self-reversing, overnight loan of funds at a Federal Reserve Bank; hence, the name federal funds. By 1930, the means of trading federal funds had expanded to include wire transfers and other methods.[12]

The emergence of federal funds trading constituted a financial innovation allowing banks to minimize transactions costs associated with overnight loans. By their very nature, federal funds could be lent by member banks only, since only member banks held reserves at Reserve Banks. The beneficiaries on the borrowing side were also member banks, which could receive funds immediately through their Reserve Bank accounts. Federal funds offered member banks a means of avoiding reserve requirements on interbank deposits if they could be classified as "money borrowed" rather than deposits.

In September 1928 the Federal Reserve Board ruled that federal funds created by the clearing of checks as described above should be classified as nonreservable money borrowed.[13] A decision in 1930 found that federal funds created by wire transfers and other methods should also be nonreservable.[14] These decisions provided the initial regulatory underpinnings for the federal funds market of today. In both the 1928 and 1930 rulings, the Board indicated that it viewed federal funds as a substitute for member bank borrowing at the Federal Reserve discount window. It argued that because discount window borrowing was not reservable, federal funds borrowing should not be either.

The Federal Reserve Board's decision to make federal funds nonreservable is best understood as a means of encouraging the federal funds market as an alternative to the two conventional means of reserve adjustment then in use: the discount window and the call loan market. Following World War I, aggregate borrowing at the Federal Reserve's discount window generally exceeded member bank reserves. At that time, the Federal Reserve did relatively little to discourage continuous borrowing at the window, so member banks could adjust

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[11] *New York Herald Tribune*, April 5, 1928, p. 30.

[12] Board of Governors of the Federal Reserve System, *Federal Reserve Bulletin*, vol. 16 (February 1930), p. 81.

[13] Board of Governors of the Federal Reserve System, *Federal Reserve Bulletin*, vol. 14 (September 1928), p. 656.

[14] See footnote 12.

their reserve positions directly with the Federal Reserve by running discount window borrowing up or down. In addition, banks had a highly effective means of reserve adjustment in the call loan market. Since the middle of the nineteenth century, banks had made a significant fraction of their loans to stock brokers, secured by stock or bond collateral on a continuing contract, overnight basis.[15] A bank could obtain reserves on demand by calling its broker loans, and it could readily lend excess reserves by issuing more broker loans. The call loan market was thus the functional equivalent of the federal funds market for reserve adjustment purposes.

During the 1920s, however, the Federal Reserve gradually discouraged both the discount window and the call loan market as means of reserve adjustment. Beginning in 1922, open market purchases limited borrowed reserves to less than one-third of total reserves.[16] Moreover, in an apparent effort to further reduce the highly visible subsidy that member banks received at the window, the Federal Reserve began actively discouraging continuous discount window borrowing by individual banks.[17] Both policy actions tended to make discount window borrowing less effective for routine reserve adjustment. This was particularly true for banks with undesired reserves because, with borrowing usually low or zero, they could not dispose of reserves by running down borrowings from the discount window. In addition, the Federal Reserve came to see the call loan market as an inappropriate means of financing speculation during the stock market boom of the late 1920s. It went so far as to bring "direct pressure" on individual banks to restrict call loans.[18]

The more restrictive discount policy and the discouragement of call lending increased the cost to banks of membership in the Federal Reserve System by raising the cost of reserve management. Since membership always has been voluntary, the Federal Reserve had to be concerned that the increased cost might prompt members to leave the System. To retain members, the Federal Reserve had an incentive to provide a substitute means of reserve adjustment. Making federal funds nonreservable did so by allowing member banks to obtain overnight interbank deposits free of reserve requirements.

Banking legislation in the 1930s further enhanced the attractiveness of federal funds. The Banking Act of 1933 prohibited explicit interest on demand deposits, including interbank demand deposits, but allowed banks to continue paying market interest on federal funds borrowed. This benefit was to prove particularly important in the high interest rate environment of the 1960s and

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[15] See Chapters 7 and 13 in Myers (1931).

[16] Board of Governors of the Federal Reserve System, *Banking and Monetary Statistics, 1914-1941*, pp. 368-96.

[17] Board of Governors of the Federal Reserve System, *Fifteenth Annual Report of the Federal Reserve Board Covering Operations for the Year 1928*, pp. 7-10.

[18] See the discussion in Friedman and Schwartz (1963), pp. 254-66.

1970s. The Securities and Exchange Act of 1934, in order to prevent excessive use of stock market credit, authorized the Federal Reserve Board to set margin requirements for both brokers and banks, and others if necessary, on loans collateralized by listed stocks and bonds. Relatively high margin requirements, coupled with other restrictions, brought about a permanent decline in the call loan market.[19]

Extremely low interest rates in the 1930s greatly reduced the interest opportunity cost of holding excess reserves. Consequently, banks held a large volume of excess reserves during this period and federal funds trading virtually disappeared. Federal Reserve pegging of Treasury bill rates between 1942 and 1947 rendered the funds market superfluous for reserve adjustment purposes. Under this policy the Federal Reserve freely converted Treasury securities into reserves at a fixed price. Therefore, banks could use their inventories of Treasury bills for reserve adjustment just as they had used their discount window borrowings in the early 1920s. The Federal Reserve stopped pegging the price of Treasury bills in 1947 and federal funds trading gradually reemerged as the most efficient means of reserve adjustment. In the 1950s, higher market interest rates increased the opportunity cost of holding excess reserves, making more frequent reserve adjustment necessary. Consequently, the volume of trading in federal funds grew sharply, with daily average gross purchases by large reserve city banks reaching about $800 million by the end of 1959.[20]

In the 1960s, the federal funds market began to take on a broader role beyond that of reserve adjustment. Banks made more extensive use of federal funds as a means of avoiding reserve requirements and the interest prohibition on demand deposits, both of which became more burdensome as interest rates rose throughout the period. Although the Federal Reserve was responsible for enforcing both of these legislative restrictions, it had to be concerned with offsetting the increased burden of membership in the System, and its actions during the period reflected this concern.[21]

The Board's first significant ruling with regard to the federal funds market in this period was its 1964 decision that a respondent bank, whether a member or not, could request a correspondent member bank to simply reclassify a deposit as federal funds, instead of having to transfer federal funds through a Reserve Bank account.[22] This ruling probably had its major effect on smaller respondent banks,

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[19]The historical margin requirement series is reported in Board of Governors of the Federal Reserve System, *Banking and Monetary Statistics.*

[20]Board of Governors of the Federal Reserve System, *Federal Reserve Bulletin*, vol. 50 (August 1964), p. 954.

[21]Goodfriend and Hargraves (1983) document in detail how the membership problem dominated reserve requirement reform throughout this period. Required reserves have not been a disincentive for membership since the 1980 Monetary Control Act extended reserve requirements to nonmember institutions.

[22] Board of Governors of the Federal Reserve System, *Federal Reserve Bulletin*, vol. 50 (August 1964), pp. 1000-1001.

who had previously found use of federal funds too costly for their relatively small transactions. Allowing banks to simply reclassify their correspondent balances as federal funds enabled smaller institutions to benefit from federal funds as large banks had already been doing. Moreover, it allowed member correspondent banks to compete more effectively for interbank funds, thereby reducing a disincentive to membership. Today, aggregate interbank deposits at large commercial banks are less than 20 percent of aggregate federal funds borrowings.

Banks in the 1960s also had a growing incentive to give their nonbank depositors access to nonreservable overnight instruments that paid a market rate of interest. Nonbanks had always been prohibited from participating in the federal funds market. But during the 1960s, widespread use of overnight RPs by banks became popular as a means of allowing their nonbank depositors to earn an overnight rate only slightly below the federal funds rate. RPs do not allow nonbanks to lend federal funds proper. However, because they allow nonbanks to approximately earn the federal funds rate, the RP market and the federal funds market together constitute a unified overnight loan market.

No one argued that nonbank depositors needed access to a relatively unregulated overnight instrument to manage their cash positions as banks did. Yet the need to facilitate reserve adjustment had been the original rationale for waiving reserve requirements and interest rate controls on federal funds. Nevertheless, the Federal Reserve chose not to make RPs at banks subject to reserve requirements or interest rate controls, probably because doing so would have worsened the competitive position of member banks relative to nonmembers and increased membership attrition.

It was necessary, however, to face up to two consequences of allowing banks to use RPs to attract funds. First, RPs were not covered by deposit insurance. Second, shifts from deposits to RPs reduced the volume of required reserves banks had to hold. This, in turn, reduced the volume of securities that the Federal Reserve could acquire for its portfolio, and thereby reduced the interest payments that it could transfer to the U.S. Treasury. A 1969 Federal Reserve rule restricting bank RP collateral to direct obligations of the U.S. government or its agencies, e.g., Treasury bills, responded to those concerns.[23] In principle, requiring RPs to be collateralized with liabilities of the United States made them free of default risk.[24] In addition, restricting bank RP paper exclusively to U.S. liabilities enhanced the demand for U.S. debt, offsetting somewhat the revenue lost due to the reduced volume of reserves held by banks.

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[23] Board of Governors of the Federal Reserve System, *Federal Reserve Bulletin*, vol. 55 (August 1969), p. 655.

[24] Even if collateralized by U.S. government securities, as a legal matter RPs might also be subject to custodial risk due to incompletely specified contracts. See Ringsmuth (1985).

A 1970 Board ruling formally clarified eligibility for participation on the lending side of the federal funds market. Eligibility was restricted to commercial banks whether member or nonmember, savings banks, savings and loan associations, and others.[25] In effect, the ruling explicitly segmented the market for overnight credit into two classes of institutions, those that could lend federal funds and those that were required to pay somewhat more substantial transactions costs by lending through RPs. Because RPs are uneconomical for smaller transactions, smaller firms and households were unable to obtain market yields on overnight money until the emergence of money market mutual funds in the late 1970s.

## CONCLUSION

It is interesting to note how far the federal funds market has come from its beginnings in the 1920s. Initially, the regulatory rationale for making federal funds nonreservable was to provide member banks with a means of reserve adjustment that could substitute for the discount window and the call loan market. Participation in the federal funds market was limited to member banks, i.e., banks holding required reserves at Reserve Banks. By the 1970s, however, that initial participation principle was effectively overturned. Nonbanks were not allowed to participate directly in the federal funds market, but they were allowed to earn approximately the federal funds rate through RPs at banks. Reserve adjustment obviously no longer provided a rationale for sanctioning access to an overnight loan market free of reserve requirements and interest rate controls. Rather, the granting of such access is better explained as a means by which, in order to minimize membership attrition, the Federal Reserve allowed member banks and their customers to avoid reserve requirements and the interest rate prohibition on overnight loans.

The federal funds market today, together with the RP market, is in many ways a functional equivalent of the call loan market of the 1920s and earlier. The most notable differences are that the nonbank portion of the market is now a net lender rather than a net borrower, and the collateral used is exclusively debt of the U.S. government and its agencies rather than private stocks and bonds. Like the old call loan market, the federal funds market of today facilitates the distribution of reserves among banks and serves as the core of an overnight credit market unencumbered by reserve requirements and legal restrictions on interest rates.

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[25] Board of Governors of the Federal Reserve System, *Federal Reserve Bulletin*, vol. 56 (January 1970), p. 38. The current list of eligible lenders is given in the reference cited in footnote 1.

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