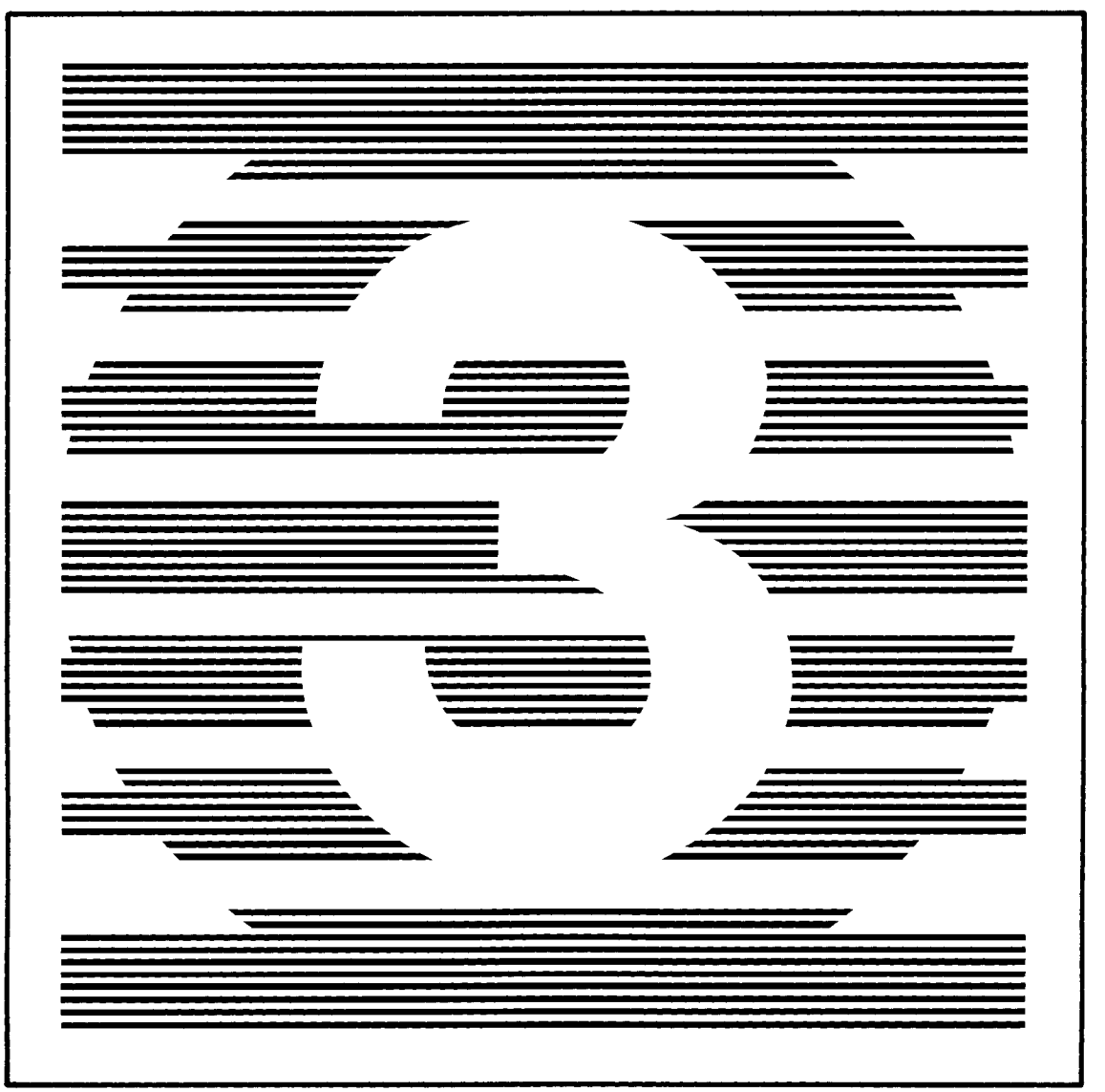
Volume 3

REAPPRAISAL OF THE FEDERAL RESERVE DISCOUNT MECHANISM



Board of Governors of the Federal Reserve System

PUBLISHED IN JUNE 1972

Library of Congress Catalogue Card Number 70-609110

Copies of this report may be obtained from Publications Services, Division of Administrative Services, Board of Governors of the Federal Reserve System, Washington, D.C., 20551. The price is $3.00 per copy; in quantities of 10 or more sent to one address, $2.50 each. Remittances should be made payable to the Board of Governors of the Federal Reserve System in a form collectible at par in U.S. currency. (Stamps and coupons are not accepted.)

Volume 3

REAPPRAISAL OF THE FEDERAL RESERVE DISCOUNT MECHANISM

CONTENTS

CONTENTS cont.

THE SECONDARY MARKET FOR STATE AND LOCAL GOVERNMENT BONDS

William F. Staats
Federal Reserve Bank of Philadelphia

Contents

THE SECONDARY MARKET FOR STATE AND LOCAL GOVERNMENT BONDS

The main focus of this study is the secondary market for State and local government securities.[1] Such securities comprise the debt instruments of many political entities that exist in this country—such as States, State agencies, cities, towns, other political subdivisions, and a large variety of special-purpose public authorities. The most significant characteristic of such bonds is that interest on them is not subject to Federal income tax. In many instances, therefore, these debt instruments are referred to as tax-exempt bonds—as well as municipal or public securities or bonds.

Because of the lack of adequate data on such crucial variables as price, volume, number of bids, spread, and types of issues, an empirical analysis of past market performance of municipal bonds has been impossible. Brokers regard such data as highly confidential. Accordingly, this study has been based upon interviews with a number of market participants and upon limited amounts of published material concerning the market for State and local government bonds.

In contrast to the primary market, in which the original sale of debt instruments of government entities to investors occurs, the secondary market refers to sales of such instruments by investors to other investors. There are several criteria for a good secondary market. First, there should be a free interplay between large numbers of buyers and sellers to whom adequate information is available on issues, issuers, economic conditions, prices, volume of activity, and other pertinent material. Second, the buyer and seller should be brought together at minimum cost through efficient institutional structures. Third, the market should be able to adjust readily to temporary disturbances in normal supply/demand relationships, thus affording price continuity for particular issues traded. These criteria provide the basis for the following evaluation of the secondary market for municipal securities.

[1] Irwin Friend *et al., The Over-the-Counter Securities Markets* (New York: McGraw-Hill Book Company, Inc., 1958), pp. 3 and 4.

MAJOR FINDINGS

According to available evidence, the existing market structure and procedures adequately provide for the orderly sale of municipal securities—even during periods of severe discontinuity in financial markets such as occurred in 1966. Communications networks enable sellers to exhibit bonds throughout the Nation in less than 3 hours. Large or small blocks of bonds of various maturities—whether issued by well-known or by quite obscure government entities—may be sold through the secondary market, even though conditions may dictate huge discounts from redemption prices. Trading

costs, however, vary widely and depend upon several factors: (1) sophistication and experience of the trader;[2] (2) size of the block of bonds traded; (3) size and credit standing of the issuer; and (4) whether trading takes place in the national or in a regional market.

State and local government obligations are clearly less liquid than U.S. Government obligations during periods of rising interest rates. Data in the Appendix suggest that rates on municipals usually rise faster than yields on U.S. Government securities. In periods of rising interest rates, therefore, banks and other holders are likely to suffer larger capital losses on sales of municipals than on sales of U.S. Government securities. While the effective cost of capital losses may be reduced because of the tax-exempt feature of municipals, such losses may be large enough to cause some banks to refrain from using municipal securities as a means of adjusting their reserve position.

Several factors seem to account for the liquidity characteristics of State and local government bonds:

1. Information that would allow optimal choice of such bonds often is not available at a reasonable cost because perhaps more than 100,000 different issues of municipal bonds are outstanding.

2. The market for these securities is a dealer market, and it suffers from the characteristics inherent in such a market, including procyclical operations, which may accentuate price swings and promote instability.[3]

3. The two most important buyers in the market—individuals and commercial banks—have different objectives and patterns of market participation.

4. Individual investors who want to avoid taxable capital gains and trustees who want to avoid difficulties with beneficiaries tend to eschew bonds selling at a discount in the secondary market. The behavior of these investors acts as a depressing influence on the market during periods of rising interest rates.

5. Large and growing participation of commercial banks as investors in the municipals market has accentuated the market's cyclical weakness because these banks tend to liquidate large amounts of such bonds during periods of tight money.

It might be desirable public policy to increase the relative liquidity of State and local government obligations and to enhance the ability of commercial banks to use them more effectively in situations requiring short-term asset adjustments. This would be a difficult task, however, because it would involve basic changes in the structure of the capital market and in the institutions that are part of that market. Whether to advocate even attempting such a task depends upon one's political philosophy—among other things. Nevertheless, for purposes of discussion and perhaps as suggestions for additional depth analysis, the following alternatives for action are presented: One would involve direct action—that is, participation in the market by some agency such as the Federal Reserve System. Another would be a "free market" approach that would build upon institutions now existing in the market.

As a first possibility in the direct action category, the Federal Reserve System might undertake to moderate sharp cyclical fluctuations in prices of municipal bonds by buying or selling such bonds in the market.

---

[2] A survey designed to shed light on the trading habits and procedures of bankers seems advisable. Lack of alertness and of market sophistication may cause a banker to incur higher trading costs than necessary.

[3] Of course, an important advantage of a dealer market is that transactions may be accomplished more quietly and with less disruptive effects than in an auction market.

This policy, however, would have a reserve effect counter to the prevailing posture of monetary policy; hence it would require offsetting operations in the market for U.S. Government securities. Depending upon the magnitude of those offsetting operations, such action might have disruptive effects on the Government securities market.

Second, some Government agency might act as a broker in the market—with the purpose of reducing trading costs and of facilitating the substitution, where appropriate, of an auction process of price determination for the negotiation process, which is the method now prevalent. This agency might also increase or improve the availability of information on current market conditions essential to investment decision-making. It should be noted, however, that private brokers are quite active and that they are increasing the scope of their activities in the secondary market for municipal bonds. Hence it might be inappropriate for any Government agency to attempt to displace existing brokers.

Third, the Federal Government might underwrite a program of guaranteeing bond issues of selected State and local governments. Such a guarantee would put all of these selected issues on the same credit-risk basis and would eliminate much of the heterogeneity that plagues the market. As a result, investors would need less information, and the costs of trading might thereby be reduced.

"Free market" alternatives do not directly affect the mechanism of the secondary market for municipal securities, but they might help reduce the price instability caused by heavy liquidation of such securities by commercial banks in periods of tight money. This might be accomplished by encouraging use of State and local government bonds as collateral for member bank borrowing from the Federal Reserve. Thus, instead of selling municipal bonds to obtain funds to protect reserve positions and sustain lending activity, commercial banks would place these bonds temporarily with the central bank. Legislation to permit implementation of this proposal has been pending in the Congress for a number of years. Also, the Federal Reserve System might accept municipals from banks under repurchase agreements. Undesirable reserve effects conceivably might result from recourse to either of these free market alternatives, but such results might not prove to be unmanageable.

For the efficient operation of the capital markets, for equitable financing of State and local governments, and for efficient portfolio management of commercial banks, it is desirable that cyclical instability in the secondary market for municipal bonds be reduced. Yet, all proposals for achieving that objective may be expected to meet with some disapproval. Perhaps the most practical (and the least objectionable) of the proposals is the one that would make tax-exempt securities eligible as collateral for member bank borrowing from the Federal Reserve.

NATURE OF THE MARKET

The secondary market for municipal bonds involves hundreds of dealers operating throughout the country and trading securities of great heterogeneity. As in the market for U.S. Government securities, no organized exchanges exist; rather, nearly all transactions involve a dealer, and most prices are negotiated by the purchaser and seller without recourse to the auction process, which is dominant in the stock market.

Size

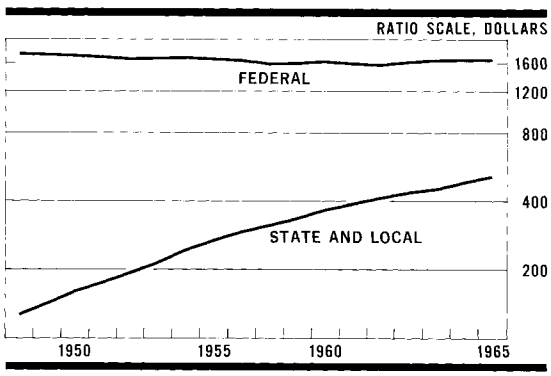
Because municipal bonds are traded over the counter, no precise data are available on the volume of activity in these bonds. Two factors determine the volume—the total amount of bonds outstanding and the rate of turnover.

The volume of municipal bonds outstanding in mid-1966 totaled $104.8 billion.[4] All of these bonds could have been sold in the secondary market one or more times. During the 1957–66 period, the amount of municipal bonds outstanding increased at a compound annual rate of 7.45 per cent. Furthermore, rapid growth is expected to continue because expenditures of the Nation's 80,000 State and local governmental entities are projected to rise sharply over the next decade. In fact, the volume of municipal securities outstanding is expected to be about $211 billion by the end of 1975.[5]

The dimensions of the recent growth in municipal debt may be assessed by comparing it with the growth of U.S. Government debt. As shown in Chart 1, per capita State and local government debt has grown at a rapid rate in the postwar period, whereas per capita Federal debt has declined. On June 30, 1966, municipal debt outstanding represented more than 24 per cent of the total public debt compared with just 15 per cent 10 years earlier, and this ratio is expected to continue to increase. In view of the large and rapidly increasing amount of municipal bonds outstanding, a larger secondary market seems inevitable.

However, as already indicated, the size of the secondary market depends not only on the volume of municipals outstanding, but also on the rate of turnover of the bonds. This rate varies from year to year, depending on monetary conditions and the distribution of issues among various types of investors. It should be noted that figures on turnover may be considerably less accurate than those for amounts of municipal securities outstanding.

1 GOVERNMENT DEBT PER CAPITA
June 30, 1948-65



Data from Tax Foundation Inc.

Using an estimate of sales in 1959,[6] Robinson[7] computed a turnover rate of 20 per cent for municipal bonds. This estimate may be a fairly reasonable approximation of the actual rate that prevails currently. Although the margin of error in this estimate may be large, the estimate is based upon a respected empirical study, and it is the best one available to date.

Applying the 20 per cent turnover rate to the amount of bonds outstanding in mid-1966 ($104.8 billion) gives $21 billion as an approximation of the volume of trading in the secondary market for municipal securities in 1966. This estimate is substantiated to some degree by independent estimates—

[4] *Annual Report of the Secretary of the Treasury on the State of the Finances for the Fiscal Year Ended June 30, 1966* (Washington: U.S. Government Printing Office, 1967), p. 777.

[5] *State and Local Public Facility Needs and Financing*, vol. 2. Public Facility Financing, Joint Economic Committee, Congress of the United States (Washington: U.S. Government Printing Office, 1966), p. 21.

[6] Irwin Friend, *Activity on Over-the-Counter Markets* (Philadelphia: University of Pennsylvania Press, 1951).

[7] Roland I. Robinson, *Postwar Market for State and Local Government Securities* (Princeton: Princeton University Press, 1960), p. 144.

ranging from $12 billion to $25 billion—obtained from authorities in the market.

Scope

Municipal bonds have been issued by thousands of governmental entities ranging from the City of New York to the Ysleta (Texas) Independent School District and from the State of Montana to the Running Springs Ranch Protection District in California. During the last 10 years, some 65,300 long-term municipal bond issues were brought to market. In early 1967 perhaps more than 100,000 different issues were outstanding.[8]

Municipal bonds generally fall into three main categories: (1) general obligation bonds, which are secured by and payable from taxes collected by the issuer; (2) revenue bonds, which are payable from earnings derived from revenue-producing facilities acquired with the proceeds of the bond sale, from certain pledged excise taxes, or from specified rents or leases; and (3) housing authority bonds, which are issued by local housing authorities but are guaranteed by the U.S. Government. Nearly three-quarters of the volume of municipal bonds outstanding are general obligation issues; however, both revenue and housing authority bonds have increased more rapidly than general obligation issues in the past decade.

The secondary market for municipal issues tends to divide into two parts—the regional market and the national market—although the division is not absolute. Most issues of small, lesser-known governmental entities are traded among investors in the area around the issuer, although some of these bonds do move through financial centers in New York City and Chicago. On the other hand, major issues—such as those of States, State agencies, and large cities—enjoy widespread interest and ownership. The market for bonds of well-known issuers is concentrated in the Nation's financial centers, but a large amount of these bonds is traded throughout the Nation.

Marketing channels and institutions

There are several ways an investor can sell municipal bonds.

1. Find an acquaintance who is willing to purchase the bonds at a mutually agreeable price.
2. Sell the bonds to a dealer at a mutually satisfactory price.
3. Order a dealer to sell the bonds through a broker at the best bid.
4. Order a dealer to sell the bonds as agent at a stated price.
5. Contract with a dealer to advertise the bonds for competitive bidding over the dealer's name.

The first two methods are suitable only when the amount of bonds to be sold is small; thus, the latter three are more significant.

Inasmuch as four of the five methods involve dealers, it may be well to call attention to the difference between dealers and brokers. Dealers buy and sell bonds for their own account, whereas brokers never take a position in bonds but buy and sell them as agents for dealers.

Because information on offerings and prices is so vital to participants in the market, elaborate communications systems have been developed to make the major marketing channels more efficient: As of early 1967, one broker had already established a large teletype network upon which offerings of bonds are displayed and bids requested. Another important market institution is the *Blue List*; published each business day, this list shows current offerings and the prices asked. And "Munifacts" is a private teletype service that keeps participants advised on current news in the municipal bond market.

[8] *The Bond Buyer's Municipal Finance Statistics*, vol. 4 (New York: *The Bond Buyer*, Mar. 1966), p. 5.

PARTICIPANTS IN THE MARKET

Dealers, brokers, individual investors, commercial banks, and other institutions are all active in the secondary market for municipal securities. This section examines the roles and activities of the various participants.

Dealers

Dealers occupy a dominant position in the secondary market for municipal bonds because they are involved in nearly every transaction. Their activities largely determine efficiency of the market. There are currently more than 800 investment banks[9] and 170 commercial banks[10] that function as dealers in municipal securities. These dealers range in size from large, nationwide investment banking firms to small, one- or two-man local operations. Most of the dealers also underwrite new municipal issues. All but five States have the main office of at least one dealer, while 35 States have main offices of seven or more dealers.[11]

In 1963 commercial banks located in 93 cities in 38 States had municipal bond departments that were engaged in underwriting new issues of State and local government securities and in maintaining markets in outstanding issues. An analysis of *Blue List* advertisers suggests that perhaps as many as 100 of the 170 banks that have municipal departments are relatively inactive traders. Most of the banks operate in regional markets, and only about five banks are numbered among the "hard core" of 15 or so dealers who bid on nearly every municipal issue sold in the secondary market.

Dealers—especially the larger ones—are not only market-makers but also institutional investors because they maintain inventories or positions of varying size. Consequently, both aspects of their operations require analysis.

Investment operations. The optimal size of a dealer's inventory varies over time. Investigation has revealed that a large dealer, for example, may maintain a municipal bond inventory of $50 million or more, even in periods of falling prices.[12] In deciding on how large an inventory to hold, a dealer considers several factors. Perhaps the most important determinant is the expectation of future market conditions. There is a direct relationship between desired size of the current position and expected prices at the planning horizon. Obviously, if a dealer expects higher prices, he will want to build up inventories now in order to realize capital gains. Another important factor that influences the size of a dealer's position is the expected volume of activity in the primary market. Most firms have some maximum amount of capital with which to finance both secondary and primary market activities. At times, dealers may need to shift resources from the secondary to the primary market, and this may make it necessary for them to reduce their holdings of outstanding bonds. Other factors of an institutional and professional nature also help to determine a desired level of inventory.

In terms of financing inventories of bonds, banks usually have an advantage over nonbank dealers. The main reason is that banks (as dealers) are not so readily forced to turn over or liquidate their inventories; con-

[9] *State and Local Public Facility Needs and Financing, op. cit.*, p. 180.

[10] U.S. Congress, House, Committee on Banking and Currency, *Increased Flexibility for Financial Institutions. Hearings* on the following H.R. bills: 5845, 7878, 8230, 8245, 8247, 8459, and 8541, 88th Cong., 1st sess., 1963, pp. 453–56.

[11] *Directory of Municipal Bond Dealers of the United States* (New York: *The Bond Buyer*, mid-1965 ed.).

[12] Calculated from the inventory list of a major dealer for May 9, 1966.

sequently, they may be better able to weather periods of price weakness.

For most firms, the planning horizon is rather short and flexible, according to dealers interviewed. There appears to be a direct relationship between the length of the planning horizon and the firm's size. However, all inventory decisions are reviewed frequently—in most cases continuously—as market conditions change.

There are two main constraints in the management of inventories—position limits, and the desire to continue making a market in bonds. For example, even though there may be a high probability of a sharp rise in prices, there is a limit as to the amount of bonds a given dealer will want to hold, or will be able to hold. Similarly, even if prices are expected to fall, a dealer who intends to continue making a market must stand ready to buy bonds at some price. The latter constraint is not very strong for the vast majority of dealers, however, when the market becomes unusually weak. For example, during the difficult days in 1966, there were instances when only a handful of dealers continued to make markets in municipal bonds. The rest were reluctant to bid for bonds in the period of rapidly falling prices.

Market-maintenance behavior. The more apparent function of dealers is to buy and sell—that is, to make a market in—municipal bonds. Dealers usually buy and sell for their own trading accounts, but they also may act as agents and buy and sell on behalf of investors. In market-maintenance activities there is a significant difference between larger dealers and smaller firms. Consequently, the two are treated separately.

Small dealers are primarily investment bankers involved in local or regional markets; that is, they tend to specialize in issues of those governments located in or near their area of operations. The operations of small regional dealers are essential to the over-all efficiency of the market for several reasons: One, most municipal bonds traded in the secondary market—even if originally sold in national markets—tend to gravitate back to the area of the issuer.

Second, some issues never reach national markets even at the time they are sold in the primary market; rather, they are sold originally to investors in the immediate region, and they tend to stay in the vicinity of the issuer. And third, the volume of these smaller, local issues is such as to require a substantial amount of market-making. Smaller regional dealers are the principal market-makers for such issues, most of which lack national interest. It appears that such dealers as a group transact a large volume of this business.[13]

These dealers seem to enjoy a high degree of customer loyalty. Often an investor transacts business with only one dealer. Thus, the dealer is frequently in a position to enlarge his own spread or gross profit. In contrast, dealers in the financial centers often do business with more sophisticated investors who shop for the best prices when buying or selling. It appears that larger dealers in the more competitive environment tend to have a smaller gross profit margin on each transaction than the smaller, regional dealers,[14] but this thinner margin is offset by the greater volume of transactions on the part of larger dealers.[15]

[13] A 1949 study indicated that registered broker-dealers having net capital of less than $500,000 accounted for 40.6 per cent of all broker-dealer resales of State and local government securities. See Friend, *Activity on Over-the-Counter Markets.*

[14] Friend *et al., The Over-the-Counter . . .*, p. 354.

[15] It has been suggested that one explanation for the smaller gross profit margin for the larger dealers is that they trade primarily in issues of well-known entities having less credit risk. Such bonds have less risk; so, a smaller gross profit margin is adequate, according to the argument. A recent major study, however, argues that "the degree of credit risk involved is not an intrinsic characteristic directly attributable to size [of the issuer] alone." *State and Local Public Facility Needs and Financing, op. cit.*, p. 248.

Many small dealers have relatively limited amounts of capital. Under such circumstances they attempt to hold little or no inventory of municipal bonds and try to equate sales and purchases over the very short run. Dealers with a larger volume of capital are able to hold larger inventories, and for them the costs of holding these securities may be negative.[16]

In addition to the hundreds of small dealers, there are more than 40 large, national dealers who operate principally in the financial centers. Approximately 10 of these are commercial banks, and the remainder are investment banks. These national dealers specialize in issues of large, well-known governments although they deal in bonds of small entities as well. For example, issues of States, large State universities, State agencies, large cities (population more than 500,000), agencies of the large cities, or major counties (which consist primarily of a large city) accounted for nearly three-quarters of the inventory of one large dealer in 1966.[17]

Although national dealers trade with individual investors through regional offices, most of their volume traditionally has come from institutional investors who are extremely knowledgeable and who usually shop among several dealers when buying or selling. Large dealers seem to operate in a better market than their smaller counterparts and as a group handle a greater volume of bonds.

Brokers

Most brokerage activity in municipal securities is based in New York and is conducted principally by a handful of firms. The function of brokers is to bring buying dealers and selling dealers together; to help accomplish this, one broker maintains an extensive teletype network connecting nearly 200 (or about one-third) of the major dealers in municipal securities throughout the Nation. Investors have access to a broker's services only through a dealer.

If an investor wants to sell a block of a given municipal issue, he may call a dealer and ask him to obtain bids. In turn, the dealer may contract with a broker who requests bids from other dealers. If, however, a dealer prefers to advertise for bids himself—perhaps in a publication such as the *Blue List,* which carries daily a list of bonds for sale—he need not secure the services of a broker. However, many dealers use a broker, especially if they want quick action. For their services, brokers receive a commission, which usually amounts to either $1.25 or $2.50 per $1,000 bond.

Because a broker's reputation depends on how many bids he can obtain for each issue, he can be expected to devote considerable resources to contacting numerous dealers—especially those who may have a particular interest in the specific type of issue offered. Therefore, brokers play a valuable role in the efficient operation of the market. Yet, they handle only about 15 per cent of the estimated total secondary market volume. One important broker has estimated that all brokers together handle from $2.5 billion to $3.0 billion of municipal bonds in the secondary market each year.

Investors

Commercial banks, individuals, and insurance companies are the principal investors

[16] The negative inventory cost results from the combination of several tax factors; for example, (1) interest on municipals is tax exempt, and (2) interest expense incurred in borrowing money with which to carry municipals is tax deductible. (Technically, tax exemption on interest received is not allowed when bonds are carried by debt, but this apparently may be circumvented.)

[17] Calculations made from the municipal bond inventory of a major dealer for May 9, 1966.

TABLE 1

ESTIMATED PERCENTAGE DISTRIBUTION OF OWNERSHIP OF STATE AND LOCAL GOVERNMENT SECURITIES, JUNE 30, 1954–66

Type of investor	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
Commercial banks	32.1	29.9	27.3	25.7	27.8	27.4	25.3	26.2	29.0	32.4	34.5	37.4	38.5
Individuals	37.0	38.8	41.0	42.3	40.2	39.7	40.9	39.5	38.3	36.9	36.9	35.8	36.5
Insurance companies	12.3	13.6	13.9	14.2	14.4	15.3	16.7	17.6	17.1	16.9	16.4	15.6	13.5
Mutual savings banks	1.4	1.6	1.5	1.4	1.2	1.2	1.1	1.0	.7	.6	.4	.4	.3
Government investment accounts	.8	.7	.4	.4	.5	.5	.4	.6	.6	.7	.7	.8	.9
Corporations	2.4	2.1	2.9	2.9	2.7	2.8	2.6	2.6	3.0	3.0	3.0	3.1	3.9
State and local governments	12.1	11.4	11.1	11.2	11.3	11.0	10.7	10.3	9.0	7.4	6.1	5.1	4.4
Miscellaneous investors	1.9	1.9	1.9	1.9	1.9	2.1	2.3	2.2	2.3	2.1	2.0	1.8	1.9
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

SOURCE.—Computed from *Annual Report of the Secretary of the Treasury on the State of the Finances for the Fiscal Year Ended June 30, 1965* (Washington: U.S. Government Printing Office, 1966), p. 685. Data for 1966 secured from the Treasury Department.

in municipal bonds (Table 1). However, the volume of activity of each investor group in the secondary market does not necessarily parallel the amount of municipals owned, because the behavior pattern of each is different.

Individuals. Individual investors generally are regarded as "strong hands"—that is, they tend to hold municipal bonds until maturity; only infrequently do they sell. Most individuals who participate in the market for these bonds are in the higher income tax brackets and they buy municipals because of the tax-exempt feature (Table 2). Since the beginning of income tax levies in the United States, Federal tax law has excluded interest on obligations of States, territories, possessions of the United States, any political subdivisions of the States or possessions, and the District of Columbia from the gross income of any holder of these obligations.[18]

Moreover, each State that imposes income taxes permits taxpayers to exclude interest on obligations issued by such State or any of its political subdivisions from taxable income. Similarly, cities that levy income taxes on residents permit them to exclude interest on debt securities of the taxing city. Thus, a resident of New York City who holds New York City bonds and whose income is taxed by both the City and the State, as well as by the Federal Government, would benefit more from the tax-exempt feature of municipal bonds than would a Texan who has the same income but who does not face city or State income taxes.

As of June 30, 1966, individuals owned an estimated 36.5 per cent of the $104 billion in municipal bonds outstanding. This proportion had declined from 40.9 per cent in mid-1960, as commercial banks moved heavily into municipals.

Commercial banks. Commercial banks have long been important investors in municipal bonds, mainly because of tax considerations. Interest earned on municipal bonds is not included in the taxable income of commercial banks. Moreover, banks may deduct from ordinary income any losses on the sale of capital assets such as State and local government obligations. Most other

TABLE 2

PERCENTAGE OF CONSUMER UNITS HOLDING STATE AND LOCAL GOVERNMENT SECURITIES, DECEMBER 31, 1962

1962 income (in dollars)	Per cent
0– 2,999	*
3,000– 4,999	*
5,000– 7,499	*
7,500– 9,999	1
10,000–14,999	*
15,000–24,999	2
25,000–49,999	7
50,000–99,999	24
100,000 and over	67

*Less than one-half of 1 per cent.

SOURCE.—Dorothy S. Projector and Gertrude S. Weiss, *Survey of Financial Characteristics of Consumers* (Washington: Board of Governors of the Federal Reserve System, 1966).

[18] *Internal Revenue Code of 1954,* Section 103.

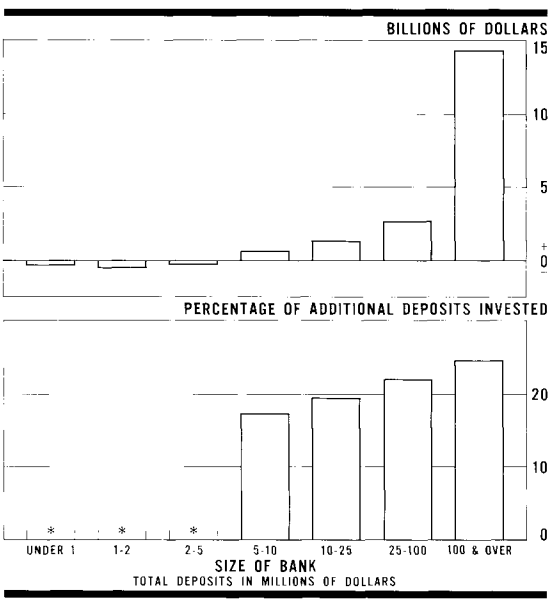
taxpayers may use losses on capital assets only to offset capital gains of the tax year or future years. In addition, while other investors are prohibited from deducting interest expense on indebtedness incurred to purchase or carry tax-exempt securities, commercial banks may deduct interest on deposits even though the deposits may be used in effect to finance the purchase of tax-exempt municipal bonds.

In recent years, banks' romance with municipals has reached a high intensity; in the period from 1961 to mid-1965, banks put more than 23 cents of each new dollar of deposits into State and local government securities—a sum large enough to purchase more than half the net annual increase in municipals outstanding. By mid-1966, banks held 38.5 per cent of outstanding State and local government bonds.

Commercial banks are likely to become even more dominant in the municipal securities market. During the next 8-year period, banks are expected to boost their holdings of State and local government obligations by 170 per cent to about $107 billion. If so, by the end of 1975 they will own about 51 per cent of the municipals outstanding.[19]

Medium-sized and large banks have been leaders in the move to municipals. Smaller banks—those with deposits of $5 million or less—actually reduced their holdings of municipals on balance in the early-to-mid-1960's (Chart 2). During the same period acquisitions of municipals by medium-sized and large banks showed a stairstep pattern; that is, as bank size increased, so did the allocation of funds to municipals. Banks with $10 million to $25 million in deposits put about 19 cents of each deposit dollar in municipals; for banks with $100 million and over in deposits, the figure was almost 25 cents of every deposit dollar.

2 STATE AND LOCAL GOVERNMENT SECURITIES: Change in bank holdings, December 1960–June 1965



* Holdings of municipals declined.

During the decade of the 1950's, the proportion of municipal securities held by the Nation's 100 largest commercial banks fluctuated between 10 and 14 per cent of the total volume of municipal bonds outstanding. In mid-1960 these banks held just under 10 per cent of all municipals. By June 30, 1966, however, they had increased their share to nearly 18 per cent of all State and local bonds outstanding and to 48 per cent of the total owned by banks.

Figures for member banks are another indication of the extent of concentration in bank ownership of municipal securities. On June 30, 1965, member banks with total deposits in excess of $100 million held more than 65 per cent of all State and local bonds owned by all member banks, but these banks represented only 2.7 per cent of all member banks (Table 3).

[19] Estimates by Wray O. Candilis, Department of Economics and Research, American Bankers Association, for the Joint Economic Committee. See *State and Local Public Facility Needs and Financing, op. cit.*, pp. 337–50.

TABLE 3

SIZE DISTRIBUTION OF MUNICIPAL SECURITY HOLDINGS OF MEMBER BANKS—JUNE 30, 1965

Size of bank (total deposits in millions of dollars)	Number of banks	Percentage of all member bank holdings of municipal securities
Under 1	788	.1
1–2	2,088	.4
2–5	4,384	3.3
5–10	2,867	6.1
10–25	2,081	10.4
25–100	953	14.4
Over 100	368	65.3
Total	13,529	100.0

Large commercial banks tend to be "weak hands" in the market. Empirical evidence indicates that their investments in municipals tend to decline absolutely around the peaks of business cycles as the demand for loans intensifies. It is probably true, as some bankers have indicated, that smaller banks usually hold their municipals to maturity, but that the larger banks are willing to sell such securities so as to be able to meet heavy loan demand. For example, from September 30, 1965, to March 31, 1966, the 100 largest banks reduced their holdings by $776 million, or about 4.3 per cent. One New York bank reduced its municipal bond investments by $217 million—or more than 21 per cent—in the first 3 months of 1966 alone.

The market impact of the behavior of large banks in 1966 was greater than indicated by net changes in their municipal holdings because of the switching they did for tax purposes. These banks seeking to establish capital losses for tax purposes dumped on the market a huge volume of short-maturity, deep-discount municipals, then immediately reinvested the proceeds of many of these sales in long-term, high-coupon tax-exempts. The effect of such switching was to bend the municipal yield curve into a practically straight line for the first time in the period for which data are available.[20]

[20] See Chart A–3 in the Appendix.

In addition to liquidating some of their holdings of State and local obligations in 1966, commercial banks sharply curtailed their purchases of new municipal issues. In contrast with 1965, when they bought about 75 per cent of all new tax-exempt securities, in 1966 they absorbed less than 33 per cent. The reduced demand for new issues helped to push municipal yields to the highest level in 30 years.

Other institutions. Various other types of financial and nonfinancial institutions own municipal bonds. Investment activity seems to vary with both the type and the size of the institution.

Unlike commercial banks, insurance companies tend to hold municipal bonds to maturity. Because their cash flows are fairly predictable, insurance companies are not likely to disrupt the market by heavy liquidation of municipals. However, they may sharply curtail their buying at the very time banks are selling large amounts of bonds. For example, purchases of municipals by life insurance companies in 1965 were nearly 26 per cent less than in 1964, and it is probable that purchases in 1966 declined by an even larger percentage.

During the first half of the 1960's, mutual savings banks became less important investors in State and local obligations. In 1960 they held 1 per cent of the outstanding bonds, but by mid-1966 the proportion had dropped to about one-third of 1 per cent. Also, savings and loan associations apparently held a smaller share of total municipal securities outstanding. For all of these thrift institutions there is little income-tax incentive to invest in municipals.

As shown in Table 1, corporations increased their share of total municipal bonds outstanding since 1954. Corporations apparently found tax-exempt yields sufficiently attractive to warrant increased investment, although some of the increase may have

been related to growth in industrial development financing via municipal debt. As is true of commercial bank holdings, however, little is known of the specific characteristics of State and local bonds owned by corporations.

EVALUATION OF THE MARKET

This section examines the factors that affect the liquidity of tax-exempt obligations. Perfect liquidity is defined as the convertibility of assets into cash immediately and with no loss. There are, then, two elements of liquidity: a price element and a time element. The time element may be called marketability—that is, convertibility of assets into cash immediately (with no regard for price). An asset may be highly marketable, however, and yet be illiquid, if it can be sold quickly only at a loss. Hence, perfect marketability is a necessary but not sufficient condition to perfect liquidity.

Because interest rates vary, it is not always possible to sell fixed-income securities without loss. If this barrier to perfect liquidity is taken into account, a perfect market may be defined as one wherein a seller can obtain the highest bid price immediately and the buyer can find the lowest asked price immediately.

Evidence gleaned from participants in the municipal bond market indicates that State and local government obligations generally are quickly convertible into cash. Marketing channels and institutions discussed earlier are sufficiently formalized and stable to accommodate sales of municipal bonds, although perhaps at deep discounts from the redemption price. Use of the teletype and telephone enables buyers and sellers to communicate easily and quickly, and a large volume of trading can be readily accommodated. Our investigation was not able to uncover any instances wherein investors were not able to sell tax-exempt bonds in the secondary market—even in the most critical days of 1966. Because every bond offer attracted at least one cash bid, we must conclude that municipal bonds are indeed marketable. But price cannot be ignored. Some would-be sellers in 1966 refused to sell at bid prices they considered so low as to be "unrealistic."

As already indicated, marketability alone does not assure that municipal bonds are liquid. Market values of all fixed-income securities change as interest rates change, and municipal bonds are no exception. Liquidity of fixed-income securities, then, is a relative thing. While it is difficult to obtain statistical evidence that is conceptually sound (see Appendix), it seems that several market obstacles cause municipal bonds to undergo relatively larger price fluctuations than other security issues—thus precluding perfection in the secondary market. These obstacles are discussed in this section.

Information gaps

In order for a market to function perfectly, all participants need to have complete knowledge of all relevant information regarding values of all investment alternatives. It is often difficult and also costly for participants in the secondary market for State and local government bonds to obtain this information.

In addition to current market information, the buyer or seller needs to have many facts about each issue. These relate to: (1) credit standing of the issuer; (2) type of bond; (3) purpose of issue; (4) coupon rate; and (5) maturity.

However, not all of this information is

readily available. For example, an issuing government's credit status is a composite of many considerations—including tax rates, population growth, and legal tax limits. One attempt to assign specific credit ratings to each issuer on the basis of relative prices of its issues outstanding in the market[21] resulted in about 30 different rankings.

Several types of institutions provide information to participants in the market. Some firms specialize in credit analysis, others provide current market news, some develop extensive reports on specific issues, and many others provide current but limited price information. But all of these services are costly; some investors, including many commercial banks, may operate on a scale that precludes them from using such services.

Because there are perhaps more than 100,000 issues of municipal bonds outstanding, the volume of information that would be required for optimum investment decision-making staggers the imagination. As a practical matter, of course, no investor makes a choice from among all 100,000 outstanding issues, but if he wants to be assured of the best possible decision, he must consider a large number of alternatives.

In that sense there is a marked contrast between the heterogeneous municipal securities market and the market for U.S. Government obligations. The latter market is characterized by minimum variation in credit risk among different issues; by availability of more complete price information, because the number of issues outstanding is small; and by the small number of dealers who are active in the market.

While it is not possible to measure the magnitude of the effect of information gaps upon the functioning of the secondary municipal market, it seems that some adverse effect in the form of excessive searching costs does exist.

Dealer practices

The secondary market for State and local government securities suffers from certain unfavorable characteristics inherent in a dealer market. For instance, dealer operations may be procyclical, accentuating price swings and promoting instability. In periods of sharply falling prices, as previously indicated, most dealers in municipals tend to abandon their market-maintenance responsibilities. The number of dealers who usually enter bids on all bonds offered in the secondary market regardless of market conditions seldom exceeds 15. And, in periods of very poor market conditions, even some of these "hardcore" dealers bid so low that there is little likelihood a trade will occur—except at bargain prices. In several instances in 1966 only one bid was made on bonds offered for sale—and this was often a joint bid by two or three dealers. In addition, dealers' position or inventory policies tend to contribute to price instability. In rising markets, dealers may acquire large amounts of bonds for their inventories, whereas in periods of price weakness, they tend to reduce inventories.

Some dealers may allocate resources and capital to the secondary market only after covering their activities in the primary market. Consequently, operations in the secondary market may be weakened somewhat by heavy activity in the new-issue market.

A dealer market does have one important advantage that counters these disadvantages: Large transactions may be accomplished rather quietly and without an excessive effect on prices. Some bankers claim that it is easier to sell substantial blocks of tax-exempt securities than to sell U.S. Gov-

[21] See *White's Tax-Exempt Bond Market Ratings* (New York: Standard Statistics Company, April 1966).

ernment securities because the number of dealers in municipal bonds is so much larger. For example, the State of New York contains the main offices of 194 municipal bond dealers, with the majority of these offices located in New York City. In contrast, there are only 16 dealers in Federal Government securities in New York City and four elsewhere in the Nation.

In terms of information availability, many investors are not in the best position to bargain knowledgeably or to choose the best bond offerings. For this reason, dealers tend to have an advantage over most investors. It is likely that investors' lack of complete information gives dealers the opportunity to boost their gross profit on many transactions —especially in regional markets.

Tax factors

Tax factors are very important features affecting the attractiveness of municipal bonds. While interest income from municipal bonds is tax-free, increases in prices of bonds bought at a discount are taxable at capital gains rates at the time of sale or maturity unless the bond was originally issued at a discount. The amount of the original discount is exempt from Federal income tax. Tax-conscious investors tend to eschew municipal bonds selling at discounts in the secondary market unless such bonds can be purchased at a price low enough to provide an acceptable yield after capital gains taxes. In fact, according to one investment counselor, some investors refuse to purchase *any* municipal bonds at a discount in the secondary market regardless of yield.

Trusts also find the tax-free interest-income feature of municipal bonds attractive, but they encounter frequent problems stemming from factors of equity between interest of the life tenant and of the remainderman. If a trustee buys a bond at a discount in the secondary market, the life tenant receives an annual income at the coupon rate but the remainderman may be subject to substantial capital gains tax when he comes into the trust. Consequently, according to several interviewees, trustees usually attempt to avoid difficulties with beneficiaries by purchasing bonds only at par in the secondary market.

Furthermore, tax laws of some States compound the difficulty of pricing specific municipal bonds. For example, some States place a tax on personal property, but they exempt bonds issued by governmental entities within that State. Therefore, a bond issued by Opa-Locka, Florida, is worth more to residents of Florida than to residents of any other State.

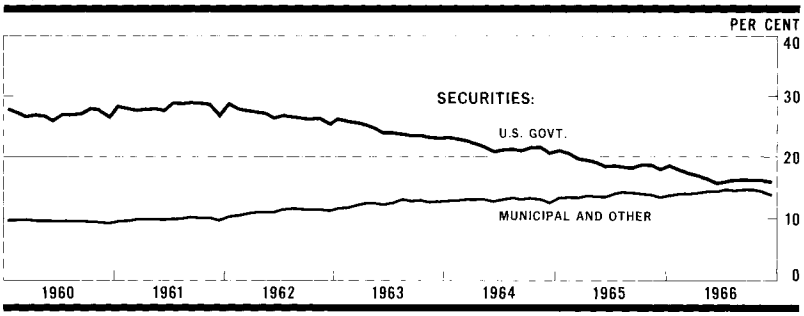
Obviously, the value of a given bond increases as the tax advantages it confers increase. Variances in tax provisions among States may be detrimental to the efficient interstate flow of funds into State and local securities.

Commercial bank operations

Experience of the 1960–66 period suggests a shift in the nature of investment by banks participating in the municipal securities market (Chart 3). Traditionally, banks have purchased State and local government bonds with the intention of holding them to maturity, and they have relied on U.S. Government securities as a temporary repository for funds not needed for loans. When demand for loans increased, banks simply stopped adding to their small inventory of municipals. Now, however, many banks are beginning to view municipals as somewhat more cyclical investments; when lending opportunities increase, they not only stop acquiring new issues of municipals but also sell some of their holdings.

The increasing importance of State and local government obligations in bank portfolios, coupled with the increased propensity

3 | PERCENTAGE OF TOTAL DEPOSITS INVESTED IN SECURITIES



of bankers to liquidate such bonds in periods of intense loan demand, points to greater fluctuations in municipal bond yields over the business cycle. Commercial bank liquidation of municipal obligations in periods of restrictive monetary policy tends to push up yields on these securities faster than they would have risen without extensive bank activity in the market. Conversely, during periods of an expansionary (or less restrictive) monetary policy, heavy purchases of municipals by banks tend to push rates down.

Market participants generally agree that heavy liquidation of State and local obligations by banks is the spark that touches off periods of instability in the secondary market. During the days and weeks of 1966 when bank liquidation of municipals was at its peak, the continuity of the municipal market was markedly disrupted. Moreover, uncertainty as to the magnitude of such liquidation tends to cause some dealers to refrain from even placing bids on bonds offered for sale. The effect, of course, is an accelerated decline in bond prices.

Evaluation of the market

When evaluated in the light of criteria set out in the introduction, the secondary market for State and local government obligations compares less favorably with the market for U.S. Government securities.

Criterion 1: *There should be a free interplay between the largest possible number of public buyers and sellers having maximum pertinent information.* Because tax-exempt securities appeal primarily to those individual and institutional investors that are able to benefit from the tax advantage of municipals, the number of possible buyers and sellers is limited compared with the number that may be active in the markets for corporate or U.S. Government bonds.

Moreover, because of the huge number of heterogeneous State and local government bonds, it is difficult and costly for market participants—especially individuals and institutions investing smaller amounts—to secure sufficient information to be assured of an optimal decision. Although market institutions gather and disseminate information, their services may be too costly or too complex for some investors, including many commercial banks.

Criterion 2: *The buyer and seller should be brought together at minimum cost.* The secondary market for municipal securities apparently consists of enough dealers and well-developed marketing channels to enable buyers and sellers to find each other quickly and at a reasonable cost. There is evidence that investors trading with smaller dealers in the regional sector of the market may pay higher costs, but additional research is needed to determine whether the regional market structure is less perfect than that of the national sector. In any case, the

institutional marketing framework appears adequate.[22]

Criterion 3: *The market should adjust readily to temporary disturbances in the supply/demand relationship so that price continuity may be maintained.* The secondary market for State and local government obligations occasionally fails to meet this criterion of a good market. The evidence is clear that discontinuity sometimes plagues this market. In periods of rapidly falling prices, there may be as much as 6 points ($60 per $1,000 bond) difference in the prices of two consecutive trades in the same bond in a single day. While an intraday difference of 6 points or more is not common, the lack of bids tends to produce excessive price movements from one trade to the next in times of market weakness.

Moreover, an analysis of fragmentary data indicates that in periods of rising prices the spread between the highest and lowest bids on a single issue usually ranges from $12.50 to $15.00 per $1,000 bond. But the spread jumps to $30 or even $40 per $1,000 bond when prices are weak.

Which of the principal market obstacles is the most important cause of the discontinuity is not clear. Some observers argue that the dominant position of commercial banks in the market makes these institutions the prime factor in the behavior of the municipal market. And it is true that, according to experience in 1966, times of peak liquidation of tax-exempt securities by banks corresponded with the periods of greatest discontinuity in the market. But another important factor should not be overlooked: It was also during these periods that all but a handful of dealers abdicated their market-maintenance responsibilities, and this added to the discontinuity in the market.

[22] The operations of the J. J. Kenny Company in New York offer an excellent example of an efficient marketing institution strengthening the secondary market for municipal securities. Kenny operates an extensive telephone and teletype network that facilitates communication and trading between buyers and sellers.

Prospects for future market developments

Further development of the municipal market may, in time, tend to moderate excessive fluctuations in prices of municipal bonds. For example, dealers increasingly may seek to expand interest in tax-exempt bonds among noninstitutional investors instead of relying primarily on institutions that (when they do buy) purchase large volumes of securities. This could result in a greater proportion of State and local obligations being placed in "strong hands" of individuals, who are not likely to dump the bonds in times of a restrictive monetary policy. Moreover, rising personal incomes may make the tax-exempt feature of municipals attractive to more individual investors. Development and promotion of municipal bond funds also may improve the "breadth" of the market.[23]

Thus, as the volume of municipal bonds outstanding continues to increase, more participants hopefully will be attracted to the market. This should moderate to some extent the perverse cyclical effects of commercial bank activity in the market for State and local government bonds.

[23] See William F. Staats, "A New Package for Municipal Bonds," Federal Reserve Bank of Philadelphia *Business Review* (Nov. 1966).

BASIS FOR FEDERAL RESERVE SYSTEM CONCERN

Because much of the instability in the secondary market for State and local government bonds seems to result from the behavior of banks during periods of restrictive monetary policy, the Federal Reserve System properly may be concerned about the

operation of this market as well as that of other financial markets. In such periods municipal bond yields tend to rise faster than rates on U.S. Government securities (see Appendix). Changes in interest rate levels and in yield spreads have several effects: (1) Commercial banks may find the municipal market a less attractive alternative to the discount window as a source of funds because of the increased costs in the form of capital losses sustained upon liquidation of municipals. (2) Capital losses suffered by banks that sell municipals may impair the efficiency of the banking system. (3) A disorderly municipal market may lead to instability in other capital markets. (4) Municipalities and other governmental entities are forced to pay higher rates or to postpone debt issues during periods of restraint. (5) Smaller municipalities may have difficulty exporting their debt obligations at the lowest realistic interest rates.

Nevertheless, a restrictive monetary policy, if it is to be effective, must curtail expenditures somewhere in the economy. The occasionally large price fluctuations in municipals tend to transfer some of the impact of restraint to banks that have large investments in State and local obligations and to State and local governments. The rapid cyclical movement in municipal yields may serve to reinforce monetary policy.

Capital losses of banks

Substantial liquidation of tax-exempt securities by commercial banks frequently occurs when interest rates are high, and it results in sizable capital losses to the banks. These losses must be considered as costs of liquidating municipals to obtain funds. Therefore, as prices of State and local government obligations decline, the secondary market becomes a less attractive alternative to the discount window or to the Federal funds market as a source of funds. Successful attempts to moderate price fluctuations in municipals may reduce the potential costs to banks of using the market instead of, or as a supplement to, the discount window or other borrowing.

Disorderly capital markets

Obstacles in the secondary market for State and local government bonds may have an adverse effect on other capital markets. While the linkage among markets is not clear, there is likely to be some "spillover" of instability. But if stability in capital markets could be maintained, it would tend to moderate the uneven impact of monetary policy.

Municipal financing

While the Federal Reserve System has no statutory concern for governmental financing, its responsibilities are such as to keep it aware of the social consequences that may stem from the failure of local governments to secure funds at reasonable rates for capital projects. Two aspects of the financing problem are caused by imperfection in the secondary market for State and local bonds: one is cyclical, the other structural.

Cyclically, rates on municipal bonds tend to move higher in relation to rates on other capital market securities during periods of tight money. This pattern of rate behavior causes governmental entities across the Nation to bear a large share of the burden of monetary restraint. In some cases, local authorities have been forced to postpone desired capital improvements during tight-money periods.

The structural problem of imperfection in the secondary market may cause smaller, lesser-known governmental entities to be placed in an inferior position in the market. Because of the heterogeneity of municipal issues, the large amount of information required for investment decisions, and the dif-

ficulty and expense of securing information on smaller entities, investors—especially the larger institutional ones—tend to concentrate on bonds issued in large volume by well-known government units. Consequently, in order to attract investors, the smaller, lesser-known governments may have to pay higher rates of interest than may be justified by risk factors alone.

The economic and social advancement of the growing areas of the Nation may be enhanced by improving their ability to export debt at the lowest reasonable rate of interest. Elimination or reduction of the obstacles in the secondary market for municipal bonds should tend to facilitate financing by the governmental entities that are lesser known.

Procyclical effect of market improvement

Any benefits to be obtained from reducing the obstacles in the secondary market for State and local government bonds should be weighed against the sole advantage resulting from these obstacles. Basically, excessive price fluctuations in the municipal market have a useful countercyclical effect of indeterminable magnitude. When monetary policy is restrictive, sharply higher interest rates on municipal securities may cause some governmental entities to postpone capital spending. Moreover, the prospect of sizable capital losses may inhibit some banks from selling State and local bonds in order to obtain funds for loans. While the "locked-in" effect probably is quite limited, the losses may help to impede, at least slightly, the growth of bank loans in periods of monetary tightness. Therefore, some of the effects of market obstacles are consistent with a restrictive monetary policy.

In an assessment of the need for, and effects of, market improvement, it is possible that the procyclical effects of such improvement could be outweighed by the resulting economic and social benefits. Be that as it may, the Federal Reserve System must consider any efforts to improve the secondary market for municipals as part of the over-all policy mix.

ALTERNATIVES FOR ACTION

If it is desirable to remove some of the imperfections in the secondary market for State and local government bonds, two broad approaches are possible. The first is a "free market" approach, which would not directly alter the basic structure or mechanism of the existing market. The second would require direct involvement in the market—and in this approach there are several potential means. These are possible methods of action; they are not necessarily recommended courses of action. Decision-makers within the Federal Reserve System must weigh the advantages and disadvantages of each alternative.

Direct involvement approach

Imperfections inherent in the secondary market for municipal bonds might be reduced in the following ways:

1. The Federal Reserve System might moderate the sharp cyclical fluctuations of prices in the municipal market by buying or selling State and local government bonds. In order to reduce such fluctuations, the Federal Reserve would be buying municipals during periods of restrictive monetary policy and selling them in times of ease. As pointed out earlier, however, such action would have a reserve effect counter to the prevailing posture of monetary policy.

Therefore, in order to achieve the desired over-all monetary effects, the System would have to offset its purchases of municipals with sales of U.S. Government securities in periods of monetary restraint. Such sales could, in turn, have a disruptive effect on the U.S. Government securities market.

Moreover, practical and operational difficulties, as well as social and political ramifications, would be involved in such a policy. (For example, would the Trading Desk follow a "best price" policy in the case of an Aaa-rated issue of a segregated school district?)

2. Another proposal for action involves the brokerage function. Municipal bond brokers apparently strengthen the market for State and local obligations by creating a stable marketing channel. Moreover, the centralization of trading through brokers facilitates gathering of current market information, which is essential to optimal investment decision-making. But only an estimated 15 per cent of all transactions in the municipal market involve brokers. Perhaps this percentage could be increased if a Government agency were to provide a brokerage function—both regionally and nationally.

This proposal would meet stiff opposition from many quarters—not the least of which would be existing brokers, who have spent many years and considerable effort and capital in establishing their services and who seem to be doing a creditable job at present. Also, it may be argued that use of the services of existing brokers will increase as the size of the market expands and as the economies of scale permit brokers to offer better services. Strong philosophical objections to this proposal also may be expected from the advocates of free and private markets.

3. Another potential area of action would involve reducing the heterogeneity among the thousands of issues of municipal bonds through some form of insurance or guarantee by a Federal agency, perhaps along the lines of that provided by the Federal Housing Administration and the Veterans Administration. Such a backing would put these issues on the same credit-risk basis and would eliminate much heterogeneity. Moreover, it probably would reduce significantly the information gap that hampers optimal decision-making because no credit-risk information would be required under a Federal Government guarantee. Furthermore, it would permit assembling obligations of several different issuers into larger, more efficient trading blocks. This proposal seems to merit careful consideration.

"Free market" approach

In contrast to the preceding alternatives for action, the free market approach would not directly affect the mechanism of the secondary market for municipal bonds, but rather would seek to reduce the instability caused by commercial banks' heavy liquidation of municipal securities in periods of tight money.

Many of the market participants interviewed suggested that the Federal Reserve System could make State and local government bonds eligible for discount under Section 13 of the Federal Reserve Act. At present, banks can borrow from the Federal Reserve under Section 10(b) by pledging municipals, but the "penalty" rate for such loans is usually ½ of 1 percentage point above the basic discount rate.

Under existing discount policies, this proposal might not prove very helpful because of the aversion of banks to supervision connected with discount operations. With the "rules of the game" of discount policy and administration currently under review, how-

ever, it might prove workable. Incidentally, legislation permitting implementation of the proposal has been under congressional consideration for a number of years.

A similar proposal is for the Federal Reserve System to enter into repurchase agreements with banks that desire to sell municipals. Such agreements might cover a period of weeks or even months, and they would give banks a large amount of flexibility in the management of their funds. However, such agreements might have an effect on bank reserves that would be counter to monetary policy objectives.

Conclusion

The proposals for possible action presented in this section serve only to indicate additional areas of research. They are not necessarily recommended courses of action. More study will be required to evaluate fully the potential effects of any action that public policy might initiate in the secondary market for municipal securities. If future development of the market should reduce or eliminate the obstacles to perfection, the need for any action by outside institutions would be obviated.

April 1967

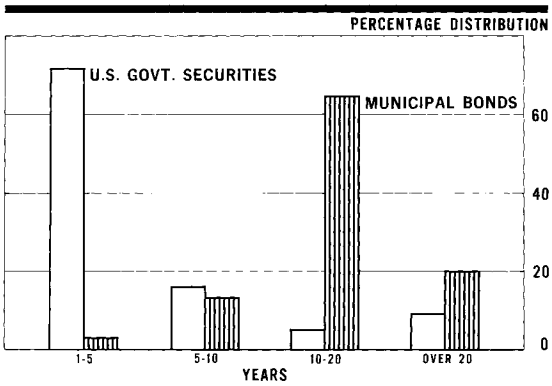
APPENDIX

A statistical comparison of markets for municipals and for U.S. Government securities entails difficulties because of (1) the dearth of available data on the municipal securities market, and (2) the difference in prevailing maturity distributions of the two types of securities.

Chart A–1 shows the approximate maturity distributions of Federal Government issues and of State and local obligations outstanding. While the data upon which the chart is based are not precise, the basic differences in maturity distributions are readily apparent. U.S. Government securities are heavily weighted with short-maturity securities, while longer-term securities make up the bulk of municipal obligations. Consequently, yield comparisons between given maturities of Governments and municipals may not be too reliable.

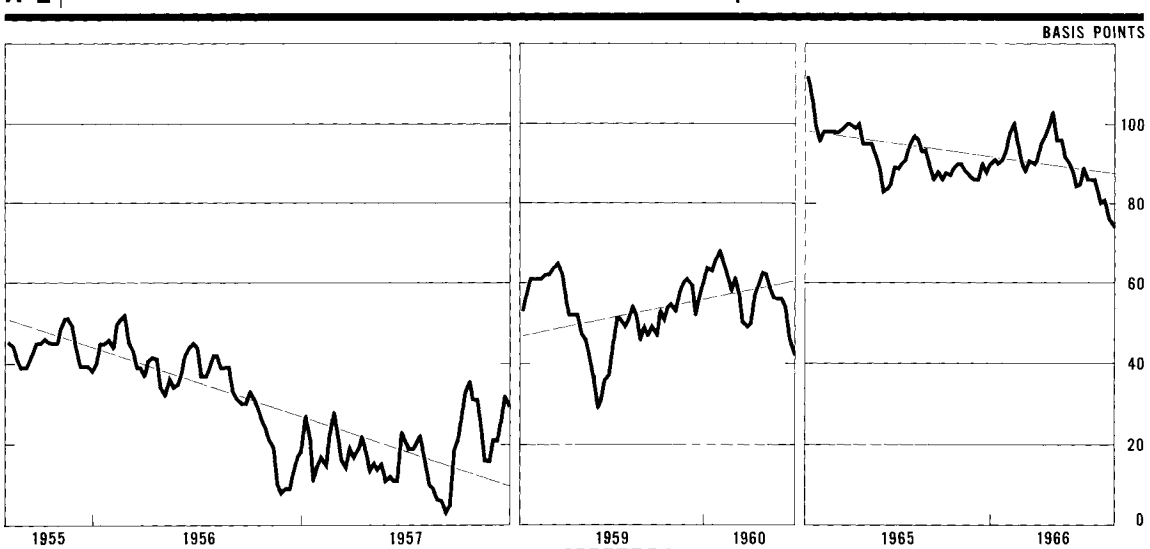
The yield differentials between long-term Federal Government securities (those having maturities of more than 10 years) and municipal securities (*The Bond Buyer's* index of 20-year bonds) are shown in Chart A–2 for three periods of restrictive monetary policy since the Treasury–Federal Reserve accord in 1951: mid-1955 to the end of 1957, early 1959 to mid-1960, and early 1965 to mid-1966. (The end of the third period was the date the analysis was made.) In the 1955–57 and the 1965–66 periods, the differentials showed a declining trend, which indicated that the yields on municipals were rising faster than those on U.S. Government issues. The opposite occurred in the period 1959–60. However, that period was characterized by unsettled conditions in the money and capital markets. During that period a mammoth steel strike and an absolute decline in the money supply severely disrupted expectations—especially in the U.S. Government securities market. There was also an unusually large increase in Federal debt, as the Government borrowed heavily

A-1 | MATURITY OF GOVERNMENT SECURITIES, June 30, 1966



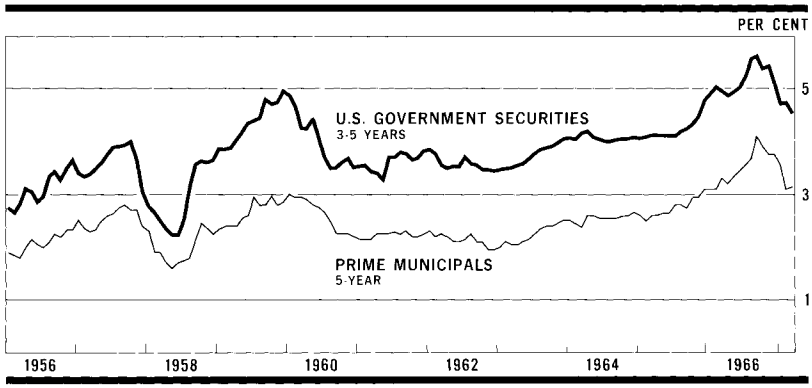
Figures are estimates.

A-2 | YIELD DIFFERENTIALS: U.S. Governments versus municipals



Differentials are for long-term securities in selected periods of restrictive monetary policy. The first panel is from the 31st week of 1955 to the 52nd week of 1957, the second panel is from the 7th week of 1959 to the 23rd week of 1960, and the third panel is from the 6th week of 1965 to the 31st week of 1966. Data from Federal Reserve and *The Weekly Bond Buyer.*

A-3 | YIELDS ON GOVERNMENT SECURITIES OF INTERMEDIATE MATURITIES



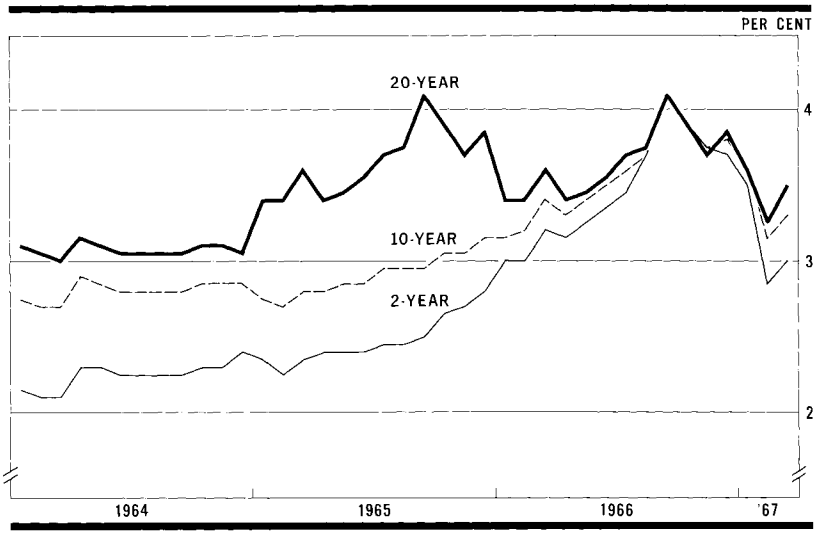
Data from Federal Reserve and Salomon Brothers and Hutzler.

to finance a large deficit. The behavior of the yield differential during this unusual period does not invalidate the conclusion that yields on municipal bonds tend to rise faster than yields on U.S. Government securities in periods of restrictive monetary policy.

Chart A–3 shows yields of intermediate-term State and local obligations (Salomon Brothers and Hutzler's series on municipals with maturities of 5 years) and Federal Government issues with 3- to 5-year maturities. Again, with the exception of the 1959–60 period, yield differentials narrowed during periods of restrictive monetary policy. The narrowing of yield differentials indicates that prices of municipals decline relatively more than prices of U.S. Government securities of comparable maturity in periods of rising interest rates.

One aspect of the effect of extensive commercial bank influence on the secondary market for municipal securities may be found in Chart A–4. In 1966 banks liquidated huge amounts of low-coupon, short-maturity State and local obligations. They used some of the proceeds to meet heavy loan demand and some to purchase long-term municipals. Because of the large sales, yields had risen to the highest levels in many years, and banks were anxious to assure themselves of such yields for a long period of time. As a result, the yield curve for municipal securities was bent into an almost straight line for the first time.

A-4 | MUNICIPAL BOND YIELDS FOR SELECTED MATURITIES



Data from Salomon Brothers and Hutzler.

THE SECONDARY MARKET FOR NEGOTIABLE CERTIFICATES OF DEPOSIT

Parker B. Willis
Federal Reserve Bank of Boston

Contents

THE SECONDARY MARKET FOR NEGOTIABLE CERTIFICATES OF DEPOSIT

This study is designed to serve several purposes: (1) to evaluate the operations of the secondary market for negotiable certificates of deposit (CD's) as a source of funds complementary to the discount window; (2) to determine whether it is feasible and desirable to promote a further development of this market so as to modify commercial bank reliance on the discount window; and (3) if such is the case, to recommend the degree, if any, to which the Federal Reserve should become involved in promoting the development of this market.

The study includes an analysis of available data on CD's to determine how the existing market functions and the extent to which banks of various types operate in it. The analysis has been supplemented by personal interviews with knowledgeable market participants. These interviews attempted to assess the current nature of the market with respect to "depth, breadth, and resiliency" and to ascertain any changes in these market qualities over time—seasonally, cyclically, or secularly. An attempt has also been made to determine the underlying causes for any deficiencies in market operations for the several classes of banks that were studied.

Some consideration has been given to procedures that could improve market operations. Also considered are the problems that the Federal Reserve would encounter if it were to act as a clearinghouse for information on the market, to function as a broker, or to deal in such liabilities as an integral part of open market operations.

MAJOR FINDINGS

The development of the secondary market for CD's accelerated the growth in amounts of certificates outstanding, increased the acceptance of certificates as a money market instrument, and enabled CD's to become competitive with Treasury bills, commercial and finance company paper, bankers' acceptances, and other short-term instruments as a medium for investment. In this connection one of the principal functions of the market has been to provide CD's with shorter maturities than those originally permitted issuers by Regulation Q; these shorter maturities have made it possible for original holders of CD's to liquidate them before maturity, if need be, and for buyers to acquire desired short-term certificates at attractive rates. The market served this purpose most fully after its initial development —that is, during the period 1962–65 when CD's that might have had shorter-term maturities were not issued because permissible ceiling rates were too low.

The increased versatility of CD's issued by leading banks in principal money centers where a secondary market for certificates

has developed has enabled issuers to tap the national pool of short-term funds without a concurrent obligation to make a loan to a customer. The mere existence of the market, however, has increased the acceptance of CD's of all issuers.

The market has been most active when profits could be obtained by "riding the yield curve." The potential for such profit was greatest during the years 1962–65 when prospects sometimes suggested that short-term interest rates would be stable or would decline. During these years Regulation Q ceilings on the shorter maturities were somewhat below market rates for long periods, and the ceiling—in effect—provided a cushion against market loss as holdings approached maturity. Because the yield curve descended as maturity shortened, it was possible for original holders to offer their CD's at lower rates (higher prices) than those available at the time the certificates were acquired—thus establishing a profit over and above the interest earned during the period held. Dealers often were able to acquire certificates on a favorable "carry"—either with repurchases or with dealer loans; to hold them for an additional period to shorten the maturity; and then to sell them or offer them for repurchase again, depending upon the money market outlook. Third-party buyers were also attracted by the possibility of profits. In general, however, there was a tendency for over-all market activity to decline after the change in Regulation Q in November 1964, which permitted issuance of certificates with maturities of less than 3 months.

The secondary market underwent radical deterioration during 1966 after the establishment of a single rate for all CD's with maturities of 30 days or more. The year is distinguished from the previous period by the extreme influence of both rate and nonrate factors. The potential for profits from "carries" largely disappeared, and original issues were available at maturities as short as 30 days at maximum ceiling rates—particularly during the latter half of the year. Dealer positions were exposed to undercutting. With the single rate of 5½ per cent on all maturities, issuers could make unexpected changes in rates on various maturities. As market rates approached and later exceeded ceiling rates during the summer, dealer positions and trading volume dropped to very low levels. Distress selling also characterized the market at times during the year. After July, if certificates were sold before their due dates, there was a constant risk of loss on the principal.

During the latter part of December 1966, dealers began to rebuild positions in anticipation of taking profits as interest rates eased. By the year-end dealers had made large additions to their inventories, as prospects seemed to indicate an abrupt and rapid movement toward lower levels of the over-all structure of rates. Positions reached a record high average in January 1967. Dealers acquired some valume of CD's with desirable maturities at 5½ per cent. Trading increased—but correspondingly less than dealer inventories. While there was some lengthening in maturities on new offerings of CD's as rates fell below the ceilings, some issues with shorter-term maturities were also available.

This episode seems to represent a complement to the one in 1966 characterized by the dramatic rise in rates. The secondary market under "normal conditions"—a period of general stability in interest rates without constraints on various maturities resulting from rate levels set by Regulation Q—is still to be tested.

Certificates of roughly 30 to 35 banks form the bulk of the market and have accounted for most of the trading. The market classifies certificates according to three cate-

gories of issuing banks—prime, lesser-prime, and off-prime. Although the designation given to any bank may vary from one buyer to another, prime generally includes from 12 to 20 banks; lesser-prime, from 35 to 45 banks; and off-prime, all other banks. In general, prime and lesser-prime names include banks with deposits of at least $500 million.

Most prime-name banks are banks of international and national prominence, and their certificates trade at the lowest yields. Certificates of lesser-prime names trade at a small spread above this level. Those of off-prime names, if traded, carry a somewhat larger spread; at times their spreads are negotiated. The common unit of trade is $1 million, but denominations of as little as $100,000—like lesser-known names—trade at slightly higher yields.

In 1966, with the change in character of activity in the market, trading of bank issues was limited to 15 to 20 of the best names. Buyers revised their authorities to purchase, and some firms even rescinded the authority to buy CD's. By February 1967 most of the previous authorities had not been fully restored.

While the secondary market for CD's performs the basic function of enhancing liquidity of certificates, it is limited in depth, breadth, and resiliency. Limitations in terms of these qualities—particularly when compared with competing markets—arise principally from the existence of Regulation Q provisions that set maximum rates on various maturities of certificates. Moreover, some of the limitations of the secondary market for CD's may reflect its relatively short period of development; during part of this time it has been exposed to an unusual conjecture of events. In contrast, markets for bankers' acceptances and for Treasury bills have developed over long periods and have received official aids. Commercial and finance company paper are not subject to rate limitation.

From the viewpoint of depth there is no substantial evidence of large orders on dealers' books at prices either above or below the market, even at its peak of activity. At times dealers find it difficult to match demand and supply, and they cannot always adjust their positions readily because of the irregularities that occur in both supply and demand. These irregularities are caused by a number of variables arising from the interrelation of market and ceiling rates, rigidity of the authorities under which many borrowers operate, and the attitudes and expectations of both issuers and buyers. Holders sometimes face delays in "pressing sales," that is, when they need to sell a large block of CD's in a short period of time. Corporations, for example, often make purchases in the market only in response to dealer offerings. On the other hand, dealer purchases at times reflect merely an accommodation of the customer—the dealer being repaid with other business.

From the viewpoint of breadth, buyers and sellers represent an increasing number of divergent investor groups, but the principal buyers and sellers have been and still are corporations. In many ways the CD market is analogous to the municipal market, in which there are many issuers but a relatively small group of large investors.

From the viewpoint of resiliency, the market is generally slow to adjust to rapid changes in rates. New orders do not flow in promptly to take advantage of sharp and unexpected fluctuations in prices, and changes in the rates cause no substantial or rapid changes in inventories. Even with a consistent increase in outstanding CD's, trading has declined. The volume outstanding rose steadily from early 1961 to a peak of about $18 billion in August 1966—displaying a tendency toward progressive short-

ening of maturities, in part in response to changes in Regulation Q. But trading on an average day in August 1966 was only $22 million, in contrast to about $80 million in January 1965. One factor causing the fall in trading activity was the fact that an increasing volume of short maturities was available from issuers.

During the last quarter of 1966 both dealer positions and trading reached historical lows. Although dealer positions rose rapidly in January 1967 in anticipation of profits as rates shifted downward, trading did not rise in proportion. Regulation Q ceilings since 1961 have made the connection between the primary and secondary markets more closely associated and have made trading activity dependent to a large extent on levels at which the ceilings were set on various maturities in relation to other market rates.

If Regulation Q continues to maintain a single ceiling rate for CD's with maturities of 30 days or more, trading in the secondary market will continue at very low levels as long as new-issue rates are at the ceiling and market rates on comparable maturities are above the ceiling rate. Under these circumstances the supply of CD's in the secondary market declines. Investors in outstanding issues sell into the market only as a last resort to avoid capital loss. Dealers face a penalty cost in carrying positions. Moreover, there is a competing supply of desirable investments with coupons or yields not subject to the restriction of regulation. Although dealers will make some bids that vary with maturity and reflect the structure of market rates, this market shows discontinuity as compared with some others when money is tight. Many trades are negotiated on an individual basis. Expectations of both investors and dealers include the possibility of a change in Regulation Q.

Trading should increase as market rates of interest fall below the Regulation Q ceiling and conditions permit issuance of new CD's. However, trading will fluctuate with the ability of banks to issue maturities in excess of the 30-day minimums, and it will be the market that will supply paper with the shorter maturities. Dealer positions will be more exposed under these conditions than they were when the regulation restricted issues of certain maturities, and the potential for profits may tend to be relatively small. Hence, dealers will run the risk of having issuers make unexpected changes in rates at various maturities, thereby undercutting their positions. They are also exposed to the risk of an unexpected change in Regulation Q.

Even with a new-issue market substantially larger than at present [mid-February 1967], secondary trading probably will not reach the levels of 1964–65. Further development of the market on comparatively smaller volume under conditions that suggest stable or declining rates, however, could lead to a narrowing of spreads such as has characterized trading in certificates of lesser-prime and off-prime banks. Assuming that the rate of growth that has characterized the new-issue market subsides, yields may also decline relative to competing investments. Yields to date [mid-February 1967] have probably been sweetened to promote the market.

The spreads in yields that both primary and secondary markets have established for CD's of some lesser-prime and off-prime names arise from several factors. When their authorizations permit discretion, buyers will refuse certificates of lesser-known names when those of better-known names are available at or near the same rate. In this sense buyers discriminate against certificates of the smaller and less well-known banks. Differentiation of names became more widespread after the failure of banks in Texas,

California, and Colorado in the years 1964 and 1965.

Premium yields arise in part as an inducement to the buyer to take lesser-known names and in part as compensation to the dealer for additional marketing effort and cost. Dealers state that they have to make more effort and have to educate customers in order to sell CD's of lesser-known names. Such certificates must be carried in position longer; they are more difficult to place on repurchase or on loan, even though CD's of some prime names may be included in their package; and they cause the dealer trouble and expense in checking the volume of outstandings and in considering other relevant information of the particular bank.

Some smaller banks with good reputations issue CD's to local customers at the same rates as prime banks issue them to national customers, or possibly at lower rates. Markets are differentiated, however, and sales of locally oriented certificates in the secondary market call for a higher yield because the bank in effect is tapping the national market at one step removed. Yield spreads thus are viewed as an impersonal market mechanism for regulating new issues. Both the rate on the new issue and the premium yield in the secondary market in this case do not reflect arbitrary actions but rather a response to influences of the national short-term money market.

Yield spreads could be eliminated if cash guarantee were made by the Federal Deposit Insurance Corporation. Or if a dealer would certify credit on a bank's certificate—charging one-eighth of 1 per cent as is the practice with acceptances—such spreads could be reduced and standardized, with improved marketability for the CD's. However, dealers believe that impersonal market evaluation of credit risk should be encouraged, and they do not want to assume the obligation of certifying credits. Participating dealers view the market as selecting, on this impersonal basis, those banks that can grow or be "tided over" on the basis of CD's, but these dealers will not give a guarantee of credit soundness.

If the Federal Reserve Banks were to act as clearinghouses for information or to function as brokers in matching the demands of smaller, expanding banks for funds with any supplies of surplus CD funds at other banks, these actions would be viewed with concern by participants in the market. Both issuers and buyers state that action would be considered as tantamount to a guarantee of soundness of the expanding bank. And if the bank should become overextended, the Federal Reserve would be blamed.

If there were no effective ceiling on rates —so participants argue—any bank could bid for funds, but the problem of rate differentials would remain. The rate paid by the individual bank would become an increasing function of the average rate prevailing in the market, the volume of CD's outstanding, and the amount of new issues proposed. This development could conceivably lead to a more even flow in the marketing of issues. Under these conditions the preliminary cost of offerings by smaller banks might be reduced but not eliminated. Such premiums would bring interest costs on offerings by these banks to the ceiling sooner where they would encounter other inelasticities in the current market, such as the inability to issue—or the increased difficulty in issuing—certificates when large banks are in the market. Improved market techniques and the increasing familiarity of buyers with good reputations will help to reduce current differential yields in trading on a number of names.

In early 1966 a large commercial paper house, commenting on the "inequity of money rates," stated that the secondary market yields on certificates of major money

market banks had been consistently higher than those on major finance company paper of similar maturities since August 1964. This was attributed to weak secondary market support of CD's. Money costs for smaller regional and money center banks reflected premiums above these rates. In an attempt to improve the liquidity of CD's and the mechanical ease of trading—looking toward reduction of the premium and a proper yield relationship to the other money market instruments—this firm suggested organization of a consortium of regional banks and recognition of the firm as the leading dealer in their secondary market certificates. The firm would then undertake to make a market that would reflect an "appropriate dealer spread" such as exists in acceptances. For instruments of members the dealer would post daily rates and would advertise a market with a spread of 10 basis points. This market would be quoted in units of 5 basis points with various maturity categories similar to those for acceptances. Adjustment to the rate scale would be made when the dealer's position reached key levels in relation to the amount of financing available to the dealer.

Participating banks could post rates for original issues of certificates at the sell side of the dealer's posted market rate, or at a lesser rate. The participating banks would provide the dealer with any financing necessary to carry reasonable positions at a rate equal to the interest earned on certificates held in loan position less any trading loss on certificates sold out of positions. In such an arrangement no profit would result to the dealer on certificates in position. This plan was expected to provide that the issue rate for members would be reduced substantially. On the assumption that the participating banks would obtain Federal funds to provide dealer financing, a profitable arbitrage was expected between the Federal funds rate and the interest earned on certificates held in loan. By establishing a known and advertised market for the certificates, it was anticipated that the issue rate for participating banks would be reduced to levels prevailing for major finance company paper and bankers' acceptances.

The consortium, however, could not be formed. One reason was that most of the prospective participants thought that they were placing CD's satisfactorily. Another was that some participants thought that customer relationships would be taken advantage of and that the benefits of the arrangement favored the dealer. Since losses would be absorbed by the lending banks and the cost of "carry" would equal the CD rate, there would be no cost of "carry" to the dealer.

Many participants continue to describe the certificate as a clumsy instrument; they state that the preference among institutional portfolio managers is for issuance of CD's on a discount basis. Issuance on a discount basis would facilitate computation of purchase and sale prices and would avoid the awkward formula now in use. Furthermore, issuance on a discount basis would make it possible for holders to avoid showing book losses unless a very sharp change in rates occurred; some large buyers will not sell into the market if a book loss would result. If these changes were made, the resulting advantages might increase the marketability of certificates substantially.

Market participants stated that they believed that the Federal Reserve would perform a disservice if it entered the market for CD's on a bid basis. Destruction of impersonal relationships was feared. Others thought that the "feel of the market," which is provided now by changes in flows and rates, would be lost.

A letter of inquiry from the Joint Economic Committee of the U.S. Congress for-

warded to monetary economists in late 1965 asked whether the Federal Reserve should "supplement its portfolio of Federal Government securities with other types of assets such as commercial loans, foreign exchange, municipal securities, corporate bonds, mortgages, and commodities."

The replies from 86 economists and others interested in monetary economics were published in January 1966. About one-third of the respondents expressed the opinion that current policy should be maintained because acquisition of private credit instruments would involve entrance into relatively narrow markets and impose burdens of credit analysis. Purchases and sales of selected issues would subject the Federal Reserve to political pressures and criticisms that should be avoided. Less than one-tenth of the respondents preferred to give the System as much flexibility as possible. They indicated, however, that the System should be free to determine its own policy.

About one-sixth favored operations in private credit and municipal markets. Advantages that were cited include increased ability to influence the cost and availability of credit and to stimulate certain sectors of the economy and certain types of spending. One economist specifically recommended dealing in certificates of deposit.

NEGOTIABLE CD'S

CD's have been used for many years by commercial banks in the United States to attract time deposits. In part these instruments represented long-term savings, but they were also used as temporary investment havens for funds of interest-sensitive business firms and large investors. As far back as 1900, certificates were popular instruments at many banks, particularly in the Midwest and in parts of the South. Even national banks—although they lacked the express authority to accept time deposits—reported the issuance of some certificates.

By 1913 when the Federal Reserve Act was passed and the powers of national banks to accept time deposits were clarified, competition for these deposits was common among national as well as State banks and trust companies. With the rapid growth of time deposits during the 1920's, observers noted that a large part of the increase represented funds that would ordinarily go into demand deposits or commercial departments of banks. They referred especially to funds that were placed in savings deposits or CD's without definite maturity. Issuers did not expect that these certificates would be traded, even if they were issued in negotiable form. In fact, there was no organized secondary market for such certificates, and their volume was limited.

But after World War II a new setting emerged—a more closely integrated banking system along with a national money market. Many commercial banks accepted time deposits as an accommodation to corporate and other organizational customers, but they did not actively solicit such deposits. Many certificates offered to corporations were tied to loan agreements and did not draw interest.

As the postwar period developed, the money market structure changed—passing from one with an overhang of surplus reserves to one of relative reserve scarcity. In addition, a new generation of financial officers emerged. These officers in charge of corporate treasuries and in responsible positions in banks and the money markets—encouraged by large cash flows, rising inter-

est rates, and other costs—established new arrangements for sources of financing as well as investment. As interest-sensitive corporate treasurers trimmed their companies' operating balances to low levels, some instability and shrinkage of deposits resulted, particularly at banks in New York City. At the same time major banks in other areas of the Nation were growing, and many concerns were turning to these banks for some of their principal banking services. Deposits of New York City banks fell from 21 per cent of the total for all banks in the United States at the close of World War II to about 15 per cent at the end of 1960.

In order to combat both instability and shrinkage of deposits, the New York City banks announced in early 1961 that they would begin to issue interest-bearing certificates. Issuance was expected to attract short-term corporate funds lodged elsewhere in the banking system and to provide an instrument that would compete for corporate balances being invested in a variety of money market instruments, principally in Treasury bills.

In late February 1961 the First National City Bank of New York began offering certificates to domestic business corporations, public bodies, and foreign sources. Two things concerning these certificates represented innovations in financial markets. One was that, according to public announcement, the certificates would be negotiable. And second, the Discount Corporation of New York, a leading dealer in U.S. Government securities, announced that it would make a market for certificates to provide liquidity, thus broadening the appeal of this type of investment.

Growth

Public awareness of the negotiability of these certificates and provision of a secondary market for them increased their appeal considerably. Other banks quickly followed the lead of First National City Bank in offering certificates, and other dealers joined in making a market for the certificates. A little more than a year later negotiable CD's outstanding at the nine largest banks in New York City were estimated to total $1.3 billion, and almost that amount was outstanding at the leading banks outside New York—in Chicago and other principal cities. This brought the countrywide total to about $2.5 billion. The great bulk of these certificates was in large denominations—units of $1 million or more—that trade easily in the secondary market.

Member banks have been the chief issuers of CD's. Most nonmember banks are small, and more than 90 per cent of them hold deposits of less than $5 million each. These banks are unable to issue certificates to any extent, and in any event, none in denominations that appeal to investment buyers. Issues of certificates in denominations of $100,000 or more by member banks accounted for 40 per cent of the increase in time and savings accounts at the weekly reporting banks from 1961 to the end of 1965.

CD's underwent very rapid expansion in 1962—reflecting (1) the increasing acceptance of the instrument and (2) the development of the secondary market, which had begun in the spring of 1961. By the end of 1962 leading commercial banks in New York City and Chicago had become by far the largest issuers. They accounted for one-third and one-sixth, respectively, of the $5.8 billion outstanding. The marked growth of the certificates at the large banks reflected a liberalization of banks' offering policies. Previous policies had, for the most part, limited issuance of certificates to occasional customers and had been in sharp contrast to the more liberal issuance policies followed by many smaller banks and by

banks located in the South and Southwest. The decision of the larger banks created a new market for certificates and accelerated the increase in volume of all issuers. At the year-end the total outstanding amounted to $5.8 billion and was in excess of, or close to, the totals for most other short-term investment instruments (Table 1).

TABLE 1

SELECTED MONEY MARKET INSTRUMENTS
December 31, 1960 and 1962
In billions of dollars

Instrument	1960	1962
Certificates of deposit	.8	5.8
Bankers' acceptances	2.0	2.6
Commercial paper	4.5	5.9
Short-term municipal securities	4.0	4.8
Treasury bills	39.4	48.3

Expansion continued at a rapid pace until December 31, 1965, with year-over-year monthly rates usually ranging from 29 per cent to 35 per cent. In 1966, however, the rate of gain slowed from 22 per cent in January to 7 per cent in September; in November the total actually declined by 6 per cent. At the end of 1963 outstanding CD's reached $10 billion; in 1964, $13 billion; in 1965, $16 billion; and in August 1966, a peak of more than $18 billion. After August the total began to decline as short-term market rates on certificates rose and remained above the 5½ per cent ceiling established by Regulation Q. By the end of November more than $3.2 billion of CD's had run off and could not be renewed because of the tight money market and the suppressing effect of the Regulation Q ceiling.

In December, however, the atmosphere changed. Largely in response to the easing of rates during the month and the subsequent rapid decline after the year-end, banks were able to resume issuance of CD's. Between mid-December and the end of January 1967, they issued about $3.1 billion of certificates, bringing the total outstanding back to $18.1 billion. By the first of February most banks with deposits of $1 billion had posted rates of 5¼ per cent for all maturities, while a few were offering rates of 5 per cent.

The growth in CD's was widespread geographically as well as by size of bank but differed somewhat among Federal Reserve districts (Table 2). In part these differences reflect changes in certificate-issuance practices before 1961 and the policies of various bank managements. Banks in the South and the Southwest, which had issued certificates before 1961, have a larger base; hence, they reported a slower rate of growth.

Issuance of CD's is concentrated in banks with deposits of $1 billion or more. This group of banks accounted for 72 per cent of the total outstanding at the August 1966 peak as compared with 54 per cent at the end of 1961. Even at that time certificates issued by the largest banks accounted for about the same percentage of outstandings as did the total deposits of these banks to total deposits of all issuers.

Issuance is further concentrated in the leading banks in New York City, and banks there have consistently maintained or increased their relative share. New York's position as a money market gives it the major share—almost 40 per cent—of issues as compared with any other financial center. The headquarters or financial offices of most of the large domestic business corporations are located within the city, and they normally would be expected to deal with local banks. Even if corporations do not have offices in New York, their financial officers often visit the city, and some take out CD's there in anticipation of future customer relationships.

Issues of smaller banks, however, have experienced sharp increases, and the participation of these banks is reflected in the size of the certificates issued relative to the

TABLE 2

NEGOTIABLE CERTIFICATES OF DEPOSIT, BY FEDERAL RESERVE DISTRICT
December 30, 1961, and May 18, 1966

Denominations of $100,000 or more

Federal Reserve district	Amounts			Issuing banks			
	Millions of dollars		Percentage increase	Number		Percentage of all banks in district	
	Dec. 30, 1961	May 18, 1966		Dec. 30, 1961	May 18, 1966	Dec. 30, 1961	May 18, 1966
Boston	82	829	911	16	59	6.0	23.0
New York	1,102	8,165	640	26	83	5.5	20.0
Philadelphia	41	525	1,181	7	19	1.0	4.5
Cleveland	233	1,363	484	16	24	3.0	5.0
Richmond	93	233	106	13	47	3.0	11.5
Atlanta	53	374	606	13	59	3.0	14.0
Chicago	351	2,166	516	32	84	3.0	8.0
St. Louis	34	288	747	12	16	2.5	3.0
Minneapolis	30	278	827	4	27	1.0	5.5
Kansas City	78	334	328	26	64	3.0	7.5
Dallas	340	1,115	225	36	86	5.5	13.0
San Francisco	456	2,053	350	31	64	19.0	29.0
Total	2,893	17,723	512	232	632		

NOTE.—Data for December 30, 1961, are based on a survey of 410 member banks (351 weekly reporting banks and selected additional banks believed to have an appreciable volume of negotiable CD's outstanding). Some adjustment in the data for several Federal Reserve districts has been made to eliminate CD's under $100,000 in denomination. Data for May 18, 1966, are based on a survey of virtually all member banks and on Federal Reserve Board Release H.4.2. Results of the surveys without adjustment appear in the Federal Reserve *Bulletin* for April 1963, pp. 458-68, and August 1966, pp. 1102-36.

size of the issuer. As early as 1961 about two-thirds of such small issuers had some certificates outstanding in denominations of $500,000 or more—a denomination ordinarily traded in the secondary market—and about 83 per cent of the issuers had some CD's at least as large as $100,000—a denomination traded on occasion in the early market and with more frequency as the market has developed.

Although the rise in volume has been rapid and continuous, some seasonal patterns in outstanding CD's are evident. The amounts decline around the quarterly tax and dividend dates and later rise in substantial amounts in preparation for the next payments.

Some bankers argue that the ability of the larger banks to increase or decrease time deposits by large amounts by making small shadings in rates or by lengthening or shortening the maturities offered has contributed to increased flexibility in the expansion and contraction of the total supply of money market instruments. In turn, this factor has tended to reduce the size of changes in money market rates associated with a change in demand.

The market from time to time over the period of development has exhibited a short-run elasticity as to the size of the market. When New York City banks withdraw certificates or issue fewer of them, banks outside of New York may increase offerings and attract more funds. Unless offerings are in local markets Regulation Q ceilings also affect small banks more severely at times than they do the large prime-name banks.

Characteristics

In view of the growth in CD's as a financial instrument, a description of their most common characteristics seems to be in order.

Denominations. Certificates are offered in a variety of denominations, ranging from about $25,000 to $10 million and higher. Denominations larger than $1 million, however, became a rarity as the secondary market developed. Limits are closely and directly related to the size of the issuing

bank. Smaller banks holding the excess balances of the generally smaller local or regional organizations that they serve cannot set limits beyond their customers' reach, and CD's of these banks account for most of the outstandings at the lower end of the denominational range. Most often, however, denominations are $100,000, $500,000, or $1,000,000. The larger banks set their lower limits in these ranges because they compete only for funds that are interest sensitive and that would otherwise enter the money market. Limits have some flexibility, and the large banks may set them aside at times to accommodate valued customers.

In August 1966 about 2,200 member banks—just over one-third of all member banks—were issuing certificates. Certificates of $100,000 or more were being issued by some 632 banks ranging in deposit size from more than $8 billion down to less than $10 million. About 75 banks were found in the latter size group, and 225 banks in the $10 million to $50 million size group. This number represented more than a fourfold increase in the number of issuers that held total deposits of less than $100 million as compared with the year-end 1961. Banks with deposits of $500 million and over, however, accounted for more than three-fourths of the total amount of certificates of $100,000 or more outstanding.

In May 1966, 1,549 member banks reported having negotiable CD's outstanding of *less than $100,000* in denomination. These banks were widely scattered across the Nation, the largest number being found in the Chicago, Kansas City, and Dallas Federal Reserve districts. These certificates are not traded.[1]

Prime, lesser-prime, and off-prime issuers. As certificate volume grew, buyers in both the primary and secondary markets developed several classifications of certificates—prime, lesser-prime, and off-prime. These designations do not represent an evaluation of the soundness of the issuer, but they are generally representative of the relative marketability of the instrument. The prime group comprises from 12 to 30 banks; the lesser-prime, about 45 banks; and the off-prime, all other issuers. Classifications of the leading banks in the principal money centers as prime or lesser-prime will differ from buyer to buyer. Differentiations reflect the buyer's estimate of the management and his opinion of whether the bank has been prudent in its issues. All of the banks classified as prime by one buyer or another generally have deposits exceeding $1 billion,[2]

[1] Federal Reserve *Bulletin*, August 1966, p. 1122.

[2] Several banks with deposits of about $500 million are considered prime by some buyers.

TABLE 3

CD'S $100,000 AND OVER, OUTSTANDING BY SIZE OF BANK

December 30, 1961, and August 31, 1966

Size (total deposits, in millions of dollars)	Dec. 31, 1961			Aug. 31, 1966		
	Amounts		Number of banks	Amounts		Number of banks
	Millions of dollars	Percentage distribution		Millions of dollars	Percentage distribution	
Under 100	82	3	72	175	1.0	382
100–500	559	19	105	2,435	13.2	172
500–1,000	689	24	35	2,470	13.4	41
1,000 and over	1,563	54	20	13,289	72.4	37
Total	**2,893**	**100**	**232**	**18,369**	**100.0**	**632**

NOTE.—Based on Federal Reserve *Bulletin*, April 1963, p. 458, and August 1966, p. 1125 and Federal Reserve Board release G.9, Oct. 6, 1966.

and as noted earlier, they have issued the bulk of the certificates.

Issuing rates. Prime banks issue certificates at the best rates when Regulation Q ceilings permit—about one-fourth of a percentage point above rates on comparable maturities of Treasury bills. Certificates of lesser-prime names carry a spread of 5 or 10 basis points above the best rates. Other issuers—generally the smaller banks—must pay one-eighth to one-fourth per cent of a percentage point more than prime banks, or they negotiate a rate with the buyers. Thus rates tend to vary with the size and reputation of the issuing bank—rising as size of bank declines. All rates may be slightly higher if CD denominations are less than $1 million. Some smaller banks, which are well known and respected in their communities and have strong customer relationships, tap regional or local markets at the same rates as prime banks, or sometimes at lower rates. Certificates are issued and traded on a yield-to-maturity basis, and a comparison with instruments issued and traded on a discount-from-par basis—such as Treasury bills—overstates the actual difference in yield.[3]

In issuing certificates it is necessary to consider returns on competing instruments other than Treasury bills—that is, on sales finance company paper, commercial paper, and bankers' acceptances. Finance company paper is the most important of these because the volume outstanding is large and denominations can be arranged to suit the buyer.

Maturities. Maturities of certificates have varied from time to time along with changes in current and prospective conditions in the money market, supplies of competing instruments, preferences of buyers and issuers, and the strength of demand for bank credit, as well as the provisions of Regulation Q in setting rate ceilings for maturity ranges. As the outstanding volume rose, average maturities of certificates tended to shorten, dropping from about 8 months in 1961 and 1962 to 2 months in November 1966.

Regulation Q ceilings restricted issuance of maturities of less than 6 months prior to July 1963 and less than 3 months prior to December 1964. Buyers who wanted such short maturities could find them only in the secondary market at the going rate. Although some certificates have been issued with maturities of 2 to 5 years, these generally represent special situations. Maturities of certificates issued by the larger banks tend to be shorter and those of smaller banks longer, reflecting in the latter case less interest rate sensitivity on the part of customers of the smaller banks. Increasingly, during the first several years certificates issued by the larger banks matured on quarterly tax and dividend dates. In an attempt to avoid concentrations and associated "binds" on these dates, maturities were later spread out when market conditions permitted.

TABLE 4

AVERAGE MATURITIES OF NEGOTIABLE CD'S OF $100,000 OR MORE

Date	Months
1961—Nov. 30	8.0
1962—Nov. 30	7.5
1963—June 30	5.3
1964—May 19	4.1
Aug. 19	3.8
Nov. 18	3.4
1965—Feb. 17	3.5
May 19	3.7
Aug. 18	3.9
Nov. 17	3.4
1966—Feb. 10	3.3
May 18	3.8
June 29	3.7
Aug. 31	3.0
Sept. 28	2.2
Oct. 26	2.5
Nov. 30	2.0

NOTE.—Data for 1961–63 are estimated. Data for other years are from Federal Reserve surveys.

[3] This difference will vary with levels of interest rates. Equivalent coupon yields on 3-month Treasury bills will be 15 basis points higher than discount at rates of 5½ per cent and 5 basis points higher at levels of 2½ per cent.

The over-all shortening of maturities that has occurred is the result of liberalization of Regulation Q ceilings and the activities of the larger banks, principally in meeting competition in the money market as Federal Reserve credit policy was gradually tightened. Variations in average maturity arise from defensive shortening to avoid paying higher rates or from defensive lengthening as the spread between market and ceiling rates widens. Buyers' preferences at times are also factors.

Buyers

The major buyers of certificates, from issuers as well as in the secondary market, are corporations. Other buyers include commercial banks;[4] foreign official institutions; institutional investors such as insurance companies, savings banks, and savings and loan associations; mutual funds; and individuals. On occasion dealers have bought certificates directly, with the intent of reselling in the secondary market. In some regional markets State and local government units are important buyers. When rising interest rates reduce new-issue volume, some banks in placing CD's resort to the use of brokers and dealers with wider business contacts. These intermediaries obtain payment for services by charging a finder's fee or by charging more than they paid.[5]

The deposit of time money at commercial banks in exchange for a certificate is governed by both rate considerations and customer relationships. Most corporate treasurers prefer to place funds only with banks at which they maintain working balances or important credit lines. Since the larger corporations generally deal with several leading banks, they place their funds with those that offer the highest rates. Corporate treasurers may place limits both on total holdings of certificates and on amounts held in individual banks. The finance committees of some leading corporations have set rigid lists of the banks with whom they will place funds, and they allow the treasurer no discretion in selection. These lists apply to original issues as well as to certificates bought in the secondary market. Other buyers generally have less specific guides, but like the larger corporations, they may recognize degrees within the prime and other categories when taking certificates.

Most banks have imposed no formal restrictions on resale of certificates by original holders. Some banks, however, caution customers to hold their certificates and to sell them into the market only as a last resort. This caution became more widespread with the disappearance of the yield curve on CD's in 1966. In general, the liquidity of the CD market has not been considered constant and completely dependable. Issuers prefer not to have buyers take losses because they fear that losses might inhibit future takings. Furthermore, the issuers want their CD's to "stand up" when they do appear in the market.

Bank uses of funds

Banks generally try to avoid issuance of certificates at the expense of a reduction in their holdings of demand deposits. The overall total of certificates a bank will issue is somewhat flexible. It may be raised as long as there are profitable uses for the funds

[4] Member banks may issue CD's to other member banks without restriction, but a member bank may issue CD's to nonmember banks only to 10 per cent of its capital and surplus.

[5] A part of the finder's fee in some instances may be passed on to the purchaser either directly or indirectly through concession pricing. If such practices raise the effective yield paid by the bank above the ceiling rate, they are considered to violate Regulation Q. When these interest payments exceed the ceiling, the Federal Deposit Insurance Corporation may consider the certificates not to be deposits and refuse insurance payments if the bank should fail. Cases involving broker CD's and FDIC insurance coverage are still in litigation.

and the outlook for certificates is favorable. Some banks may express their maximums in dollar terms; some as a percentage of total deposits.

In setting limits, smaller banks are concerned about the effects that certificates may have on the deposit totals shown in their published balance sheets. Inability to roll over certificates may result in a decline in total deposits from year to year. However, the ratios of CD's to total deposits at issuing banks have been quite stable over time, particularly at the smaller banks. The level seems to be closely related to bank size, with the smaller banks maintaining lower ratios than the larger banks.

Banks issuing certificates generally place the proceeds in a "pool of funds." The larger banks, believing that certificates afford greater stability of deposits, have used the funds to seek attractive loans and investments, with more emphasis on loans as markets tightened in 1965 and 1966. Unlike other money market instruments, CD's may influence the reserve position of banks because of the lower reserve required against time deposits. As the market evolved, a number of leading banks adopted the practice of varying the rate offered on certificates and in so doing used certificates as one means of adjusting their money position.

Smaller banks, on the other hand, feeling less sure of their ability to avoid run-offs of certificates, generally do not use the funds to support loans to the same extent as large banks. Smaller banks employ the proceeds largely for the purchase of municipal securities in the belief that such holdings can be liquidated to advantage in the market when necessary.

For years commercial banks have been important purchasers of municipal securities; in the period from 1952 to 1960 they supplied about one-fifth of all such funds. As banks began to compete for time money after 1957 because of the more liberal rates permitted by Regulation Q, they increased their taking of municipal securities. And as certificates gained in acceptance, the banks became the dominant purchasers of municipal securities, buying two-thirds of the offerings from 1960 to 1966. As of year-end 1966 they held almost 40 per cent of the total supply.

Certificates have increased the ability of the banks to attract deposits from beyond their normal service or market areas, thus enabling them to meet a broader range of demands. Some banks, however, have opposed the use of certificates and have issued none because they feared that they would be misled in determining minimum levels of funds to be held as reserves and thus the

TABLE 5

RATIO OF OUTSTANDING NEGOTIABLE CD'S TO TOTAL DEPOSITS, SELECTED DATES

In per cent

Size (total deposits, in millions of dollars)	1964	1965		1966		
	Nov. 18	May 12	Nov. 17	May 18	Aug. 31	Oct. 26
All issuers	6.1	6.4	6.7	6.8	10.1	8.9
Under 100	4.4	4.6	4.6	4.7	5.0	5.0
100–200	4.2	4.0	4.6	4.6		
200–500	7.0	7.4	7.4	7.3	7.0	6.7
500–1,000	7.5	7.8	7.8	7.8	7.7	7.5
1,000 and over						
Prime:						
N.Y.C.	12.6	15.2	17.2	17.9	15.0	13.2
Outside N.Y.C.	8.2	8.3	9.6	10.3	9.0	7.5
Nonprime	8.4	8.4	9.1	10.7	10.9	10.1

NOTE.—Figures are from surveys conducted by the System for the dates shown.

maximum amounts that could safely be used for lending and investing. Furthermore, they prefer not to incur a heavy burden of interest expense.

THE SECONDARY MARKET FOR CERTIFICATES

Since the initial stage of development in 1961, the secondary market has provided marketability—that is, has facilitated sales to third parties before maturity—for most certificates. However, not all certificates are marketable. A number are issued by banks that are not well known outside their service areas, and others are too small in denomination to attract the large investors who participate actively in the secondary market. Furthermore, many original buyers of CD's do not buy with the intention of selling, and if they need to rearrange their portfolios, they use other investments such as Treasury bills first.

The increased versatility that the market provides for CD's issued by the leading banks in principal money centers enables these banks to tap the national pool of short-term funds without a concurrent obligation for making loans to the customer. The mere existence of the market, however, has increased the acceptance of CD's of all issuers —regardless of their size or location.

In the secondary market certificates compete principally with Treasury bills, bankers' acceptances, and finance company paper. Participants rate the markets for these short-term investments as excellent for Treasury bills and good for both bankers' acceptances and certificates. Whereas finance company paper has no secondary market, issuers under certain conditions will buy back the paper prior to maturity, thus providing some flexibility to buyers.

Participants and operating methods

The primary and secondary markets for certificates are quite closely related. Both include (1) the issuers, (2) the dealers who provide an intermediary function, and (3) the buyers of certificates. The dealers buy, carry, and sell certificates at rates that reflect current market conditions. Certificates usually come into possession of dealers from original holders, but at times they come directly from issuers.[6] Certificates not acquired from these sources find their way into the market through brokers and to a more limited extent as resales to the dealer by third parties. Buyers from dealers are for the most part corporations, trustees, and institutional investors.

To a certain degree the issuers also participate in the market from the demand side as buyers of, or lenders against, certificates (other than their own).[7] A number of banks buy certificates for investment only when rates on certificates are out of line with rates on other instruments. Some banks, however, prefer not to buy certificates for investment because they must be carried in the "Cash and due from banks" account, which suggests possible inefficiencies in employment of funds. Furthermore, certificates are not thought to provide the same degree of liquidity as other instruments.

As an auxiliary to the market, some issuing banks assist customers who need to liquidate their own certificates by canvassing other customers as possible buyers, thus

[6] Some dealers criticize this practice as being one that violates the spirit of Regulation Q. In effect no deposit has been made with the bank until the dealer finds a buyer. Meanwhile, the certificate is carried with borrowed funds.

[7] A bank is permitted to make a loan secured by its own certificate only if it charges an interest rate at least 2 per cent above the rate at which the certificate was originally issued.

assuring a better price than if the CD's were sold into the market.

Development of a secondary market for CD's began early in the spring of 1961 when the Discount Corporation of New York announced it would make a market—that is, buy or sell certificates, or hold them if necessary. Salomon Brothers & Hutzler took similar action soon afterward, and as the volume of issues grew, other nonbank dealers in U.S. Government securities entered the field. The core of the market came to be centered around five leading houses: in addition to those cited, the group included First Boston Corporation, C. J. Devine and Company,[8] and New York Hanseatic Corporation. These houses generally carried large inventories of certificates —ranging from $40 million to $70 million for an individual firm.

Other nonbank dealers were also active in the market from time to time, but as a rule they held only modest positions—perhaps $15 million to $30 million. As the market developed, several bank dealers in U.S. Government securities acquired inventories of varying size. These included Bankers Trust Company, Bank of America, and the First National City Bank of New York (the last was in March 1965). Some banks are opposed to assuming a dealer function, however, on the grounds that they would help other issues at the expense of their own rather than helping the market as a whole. Others state that costs are too great in relation to potential returns.

Although smaller nonbank dealers seldom take certificates into their inventories, they act as brokers or as an auxiliary to the dealer function. Similarly, a number of large banks operate service departments for correspondents and other customers—buying or selling on orders from them. While Regulation Q does not permit a bank to purchase its own certificates for investment, it may, as an agent, acquire them for customers. Banks also purchase certificates issued by other banks for the account of a customer.

[8] Succeeded by Merrill Lynch, Pierce, Fenner & Smith, Inc., through purchase on May 13, 1964.

Dealer purchases and financing

While on occasion dealers secure a market before bidding on certificates, they do not handle certificates on a consignment basis but rather purchase the CD's outright. Dealers are generally careful not to buy too large an amount of any given issue, and they try to guard against development of too large a floating supply of certificates in general. They consider the issuer's credit standing as well as the amount of his outstanding certificates.

In their purchases, dealers emphasize profits to be gained from trading as well as from carrying an issue. They buy the longest maturities available that seem to offer profits, considering the probabilities of negative, even, or positive carries. Aside from the usual sales into the market, dealers at times prompt customers to acquire large amounts of CD's from an issuer. Later that day, or on the next, the dealer will take over the certificates at an agreed price, one that provides the original buyers with a profit of 1 or 2 basis points. These are often referred to as "take-outs." In other cases dealers' customers that have temporary surpluses of funds will take CD's from issuers with the understanding that the dealer will purchase them within a short period of time at par plus interest. These arrangements may run from several days to 2 weeks, depending on the rate outlook. Occasionally dealers acquire certificates on reverse repurchases to accommodate customers.

During 1961 through 1965 there were relatively long periods of stability in short-term interest rates and even some periods when these rates showed a tendency toward

small declines. This stability made it possible for dealers to place portfolios of certificates on profitable carries. Since Regulation Q ceilings precluded issuers from offering certain shorter maturities, dealers took issues with long maturities, placed them on repurchase or loan, and held them for a period to reduce the maturity to shorter term. The certificates could then be sold or placed on repurchase again, depending upon the money market outlook.

In the short run dealer positions vary more or less inversely with the volume of trading. Dealer inventories vary widely from week to week but much less from quarter to quarter. On a quarterly basis they average about four times the volume of trading, a ratio somewhat larger than for Treasury bills or acceptances.

The capital of the dealers is small relative to the volume of their business—particularly since CD's have been added to the line of their investments. Hence, dealers have been relying more and more on outside funds to carry inventories. The rate paid for borrowed money, as in the case of Treasury bills and acceptances, must bear a close relationship to the market rate for certificates. Higher rates on bank loans make borrowing unprofitable.

Dealer portfolios are financed in several ways: (1) on repurchase agreements with corporations, insurance companies, State funds, and other nonbank short-term lenders; (2) on repurchase agreements with agencies of foreign banks; (3) on loans from commercial banks in New York City;[9] or (4) under repurchase with out-of-town banks. Dealers prefer repurchase agreements because of lower cost, but they do use bank loans for residual needs. Repurchase agreements may be for overnight or may run for several weeks or months. Bank loans usually run for a day and must be renewed each morning if necessary. Federal Reserve facilities for repurchase agreements are not available as they are for bankers' acceptances and U.S. Government securities, including those of Federal agencies.

As a matter of practice the securities that underlie repurchase agreements or the collateral on loans consist wholly of CD's. This arrangement is preferred to mixed collateral for ease of administration if substitution of securities is necessary or if the loan is reduced in size. Mixing CD's with U.S. Government securities, or with other acceptable collateral, depends upon the relative amounts of securities in inventory. Some banks make loans at the rate charged for call loans on U.S. Government securities whereas others impose a higher rate on certificates. Rates on repurchases are almost always lower than those on loans, as is the case with repurchases on U.S. Government securities and on acceptances. Dealer loans and repurchases were generally available during the 1961–65 period at reasonable, and at times, attractive rates. In 1966, however, as rates rose, costs became virtually prohibitive, and at times some dealers could not obtain funds. Others, fearing that financing would not be available, halted their acquisitions of CD's.

Banks, as well as most of the parties to repurchase agreements, are careful about issuers and will insist that the best names underlie the transaction. A mixture of names that include lesser-prime or even some off-prime issuers is acceptable on occasion, but these arrangements become less desirable to lenders as markets tighten. Banks whose outstanding certificates are believed to be

[9] The lending bank's own certificates are generally excluded from the collateral on the grounds that if the loan is defaulted, the bank as new owner would be redeeming the certificate prior to maturity. In addition, Regulation Q provides that a borrower shall be charged 2 per cent in excess of the interest rate on the certificate for any loan collateralized by the bank's own certificates.

excessive are avoided even if the name is well known. Proceeds of the repurchases and proceeds from bank loans are available in Federal funds.

Buyers

Since inception of the market, corporations have been the principal buyers of certificates. Maturities of certificates are generally determined by negotiation between the issuing bank and the purchaser, and to an increasing degree, CD's have been written to mature on tax and dividend dates or at the end of a quarter, half-year, or year. In this way CD's are useful as an investment outlet for corporate tax and dividend accumulations and other special purposes, whether acquired from the issuer or in the secondary market.

As the secondary market broadened, however, an increasing number of divergent investor groups with temporary surpluses of funds became purchasers of CD's. These include foreign official institutions, States and municipalities, commercial banks, individuals, and the range of institutional investors including foundations. Some institutional investors such as insurance companies buy certificates only when the yields are higher than those on finance company paper. States and municipalities use certificates for temporary investment of the proceeds of bond issues, and savings banks for the accumulations of mortgagees' tax monies. Many buyers were more interested in the market when it provided an opportunity to "ride the yield curve" than when the certificate provided only investment income. Most purchasers take round lots, but on occasion investment management firms will buy odd lots at higher yields and add them to their accounts.

Investments in certificates are also made through repurchase agreements in which certificates underlie the transaction as an alternative to direct investment. The repurchase allows the lender to invest without risk of fluctuation in price and at the same time to suit the maturity to his needs.

All buyers tended to become more selective toward the end of 1965 as issues of certain banks increased substantially and several other banks failed. Buyers further restricted purchases as the market softened in 1966.[10] Some withdrew from the market completely. Dealers do not endorse the CD's that they sell to the market, and usually they make it a policy not to provide a credit opinion on the issuer.

Supply and demand variables

A number of interacting and interdependent variables or factors affect both the primary and the secondary markets for CD's. These forces affect not only the volume of issues and maturities but also the volume of trading. These factors are discussed below:

Regulation Q ceilings. As offering rates reach the ceilings set by Regulation Q, banks are forced to withdraw from the issue market because certificates become noncompetitive with other instruments. Under these conditions short-term interest rates in the market rise relative to the regulation's ceiling. The rise of open market rates above, or their fall below, the existing rate ceilings leads to retardation or acceleration, respectively, of new issues as interest-sensitive investors move to obtain the highest possible yields. Maturities are also affected under these circumstances; they tend to shorten as rates approach the ceiling and lengthen as they fall away. Similarly, as rates move above the ceiling or fall below it, sup-

[10] Restrictions involved reduction in amounts of CD's of particular banks, reduction in number of eligible bank names from the 50 largest to the 21 largest, and one large corporate buyer excluded from the authorized list of the CD's of all banks west of the Mississippi.

plies of CD's in the secondary market become less or more plentiful, respectively, and trading volume is affected accordingly. Dealers' willingness and ability to carry inventory are strongly influenced by such rate movements.

Pattern and size of corporate tax and dividend payments. The volume of funds being accumulated for corporate tax and dividend payments has a strong influence on maturities of CD's as well as on the amount of the increase in issues at various times and has led to a concentration of maturities on these dates. Tax and dividend dates significantly affect dealer positions and trading, and inventories are determined with these dates in mind. The peak of demand in the market for certificates maturing on tax and dividend dates comes about 1 or 2 months before the payment dates.

Liquidity position of corporations. When cash flows shrink, lessened liquidity leads corporations to reduce both their takings of certificates from issuers and their purchases in the secondary market. And when they make an investment, they put considerable emphasis on the ability to liquidate if necessary. Treasury bills are generally preferred. Under these conditions increasingly large premiums over other investments must be offered in order to move new issues and to induce takings in the secondary market.

Strength of loan demand at the banks. Expectations of continued or increasing loan demands suggest profitable employment of funds and encourage banks to become more aggressive bidders for CD's. If possible, banks tend to extend maturities of issues. This factor has been an alternating influence in every year and has affected issue volume, particularly at large banks, both in New York and in other areas.

Supply of attractively priced substitutes. If the supply of substitutes for CD's such as Treasury tax anticipation bills is good, it is more difficult for banks to issue certificates with comparable maturity dates. Trading volume in the secondary market also tends to be smaller than it is when there are no tax bills outstanding.

Rate relationships and money market conditions. At times banks refuse to pay the rates that are necessary to replace runoffs of certificates, and they withhold issues temporarily. If so, would-be issuers of CD's seek needed funds elsewhere.

Inflows of other time and savings deposits. If inflows of other time and savings deposits are good, banks become less willing to issue certificates—not only because of usual higher cost relative to other savings forms but also because of fear of transfer of time deposits from one form to another.

Legal list statutes. Lists of legal investments vary from State to State for savings banks and for trusteed and public funds. As of August 1966, the Massachusetts savings bank statute was changed to permit banks in that State to hold certificates of commercial banks; this broadened the issue market and moderated the rollover problem of Boston banks. Some short-term investors are legally required to invest temporary holdings of funds in U.S. Government securities. The Comptroller of New York State is authorized to buy CD's only if secured by collateral.

Corporate treasurers' authorities to hold certificates. Although some policy limits on takings of CD's may be liberalized from time to time, the existence of these limits contributes to widening spreads between yields on Treasury bills and those on other obligations—particularly as supplies increase—thus influencing trading at various times. Limits apply to new issues as well as purchases in the secondary market.

Overissuance of certificates. Overissuance of CD's by some banks, which arouses sus-

picion of the soundness or possible failure of banks with substantial amounts of certificates outstanding, induces reappraisal of policy limits of buyers, and at least temporarily affects the market as a whole or the outlook for interest rates, will induce reviews of authorities, which may lead on occasion to temporary termination of buying authorities.

Measures of trading

The general acceptance of CD's as a money market instrument is evidenced by comparing market activity in certificates with that for bankers' acceptances and Treasury bills. The volume of trading in the certificate and acceptance markets is quite similar. In 1964 and 1965, years of active markets for both instruments, the daily-average volume of trading by months ranged between $43 million and $79 million for certificates and $44 million and $49 million for acceptances. But both of these markets were dwarfed by trading in Treasury bills; such trading on a daily-average basis ranged between $1.1 billion and $1.5 billion per month. To a considerable extent the greater volume of trading in Treasury bills reflects the larger volume of these securities outstanding. Bills outstanding in 1964 and 1965 averaged from $52 billion to $55 billion per month, acceptances a little more than $3 billion, and certificates between $11 billion and $12 billion in 1964 and $13 billion to $16 billion in 1965.

Trading versus issues outstanding. Comparison of the dollar volume of trading with the volume of issues outstanding for each instrument shows that somewhat larger percentages of both acceptances and Treasury bills are traded. In 1964 and 1965 daily-average trading volume ranged from 0.31 per cent to 0.64 per cent of certificates outstanding, from 1.10 per cent to 1.78 per cent for acceptances, and from 2.05 per cent to 2.80 per cent for Treasury bills in various months. These differences reflect variations from one buyer to another in use of the various instruments to adjust portfolios, homogeneity of the instruments, and the amounts outstanding at various maturities. In contrast to both certificates and acceptances, Treasury bills are the most homogeneous of all money market paper, for they differ essentially only in maturity.

Corporate holders of certificates frequently consider them an adjunct to short-term U.S. Government securities. However, if large blocks of investments must be sold quickly to raise cash, financial officers usually use Treasury bills because of the dependable continuity of one market. At times it is difficult to liquidate large blocks of certificates in the market, although the market can usually handle transactions of $5 million to $10 million without any problem and $20 million on occasion. In other cases demands by investors cannot always be met from dealers' inventories, and in many instances switches in holdings among customers may be necessary to supply the specified issuer and maturity. To a much lesser extent the same applies to acceptances. Only prime acceptances are traded in the market, and the several maturity ranges for which quotes are posted overcome some of their diverse characteristics.

Inventories versus issues outstanding. Comparisons of the dollar volume of dealer inventories with the dollar volume of the several instruments outstanding are also significant. In 1964 and 1965 the daily-average volume of inventories as a percentage of daily-average volume of outstandings resulted in ratios for various months ranging between 1.12 per cent and 2.54 per cent for certificates, 3.20 per cent and 10.74 per cent for acceptances, and 3.84 per cent and 6.12 per cent for Treasury bills. The larger percentages of outstanding acceptances carried in inventory reflect not only the relatively

smaller amounts outstanding in contrast to Treasury bills and certificates but also the prime character of the acceptance instrument.

The high degree of quality of acceptances is based upon the combination of the name of the accepting bank, the contingent liability of other parties to the instrument, the feature of self-liquidity, and the eligibility for purchase or discount at the Federal Reserve Banks, as well as the preferred position accorded holders of acceptances of failed banks. Even the prime eligible acceptances of smaller banks with proven experience are traded at the same rates as acceptances of the leading banks. In addition, acceptances have had about 50 years of development in American practice. Like Treasury bills, acceptances may be bought under repurchase agreements with the Federal Reserve under certain conditions, and on occasion the System may buy them outright in the course of its open market operations, a policy that was developed in the 1920's and renewed in 1955 as the Federal Reserve fostered the growth of the market.

Certificates, on the other hand, do not represent a standardized form of credit risk. Thus the several rates that prevail in the market correspond to the buyer's analysis of the issuer's credit standing.[11] Dealers, by and large, trade only the better names, principally those of the 30 to 35 largest banks, most of which have deposits of $1 billion or more. The market supply of these prime CD's in relation to total CD's outstanding is not so large as it is in the case of acceptances.[12] Occasionally certificates of banks with deposits as small as $150 million to $250 million are traded. In contrast to acceptances, certificates of medium-sized and smaller banks—despite a reputation for good management—generally must carry a concession of about one-fourth of 1 percentage point to attract buyers. Treasury bills are the predominant instrument in the short-term market, and dealer inventories must be related to the large quantities outstanding of each bill maturity. As a rule this assures continuous availability of bills in the market as compared with variations in supplies of both acceptances and certificates at times.

Transactions to positions. Activity in the market may also be measured by comparing the volume of transactions to the volume of dealer positions. On this basis certificates and acceptances compare favorably. In 1964 and 1965 the ratios computed on a daily-average basis ranged from 16 per cent to 50 per cent and from 13 per cent to 38 per cent, respectively, for various months. Ratios for both instruments were somewhat smaller than those for Treasury bills, which ranged from 38 per cent to 70 per cent.

Acceptance portfolios were generally smaller in relation to turnover before 1964. The increased inventories in 1964 reflected the more continuous sales by banks to meet reserve needs and the ability of dealers to carry the larger amounts, for the most part, at favorable rates. Portfolios of certificates in relation to turnover are somewhat larger than the ratios for Treasury bills. This difference arises from the potentials for profits and reasonable "carries" in the absence of abrupt rises in interest rates. Potentials for profit on inventories of certificates are greater than for acceptances, which have a flat yield curve in each maturity range, in contrast to the descending pattern to matur-

[11] Even in the absence of an analysis, buyers know that CD's of some big-name banks trade better than others and will prefer the better names even though careful examination of the record shows there is no difference among names.

[12] This note appears in right-hand column.

[12] Acceptances are in effect a loan, and the accepting bank can sell or hold the acceptance at its option. CD's are taken out by a depositor generally to be held to maturity, and the initiative to sell rests with the holder. In part, these distinctions explain the differences in supply in relation to outstandings.

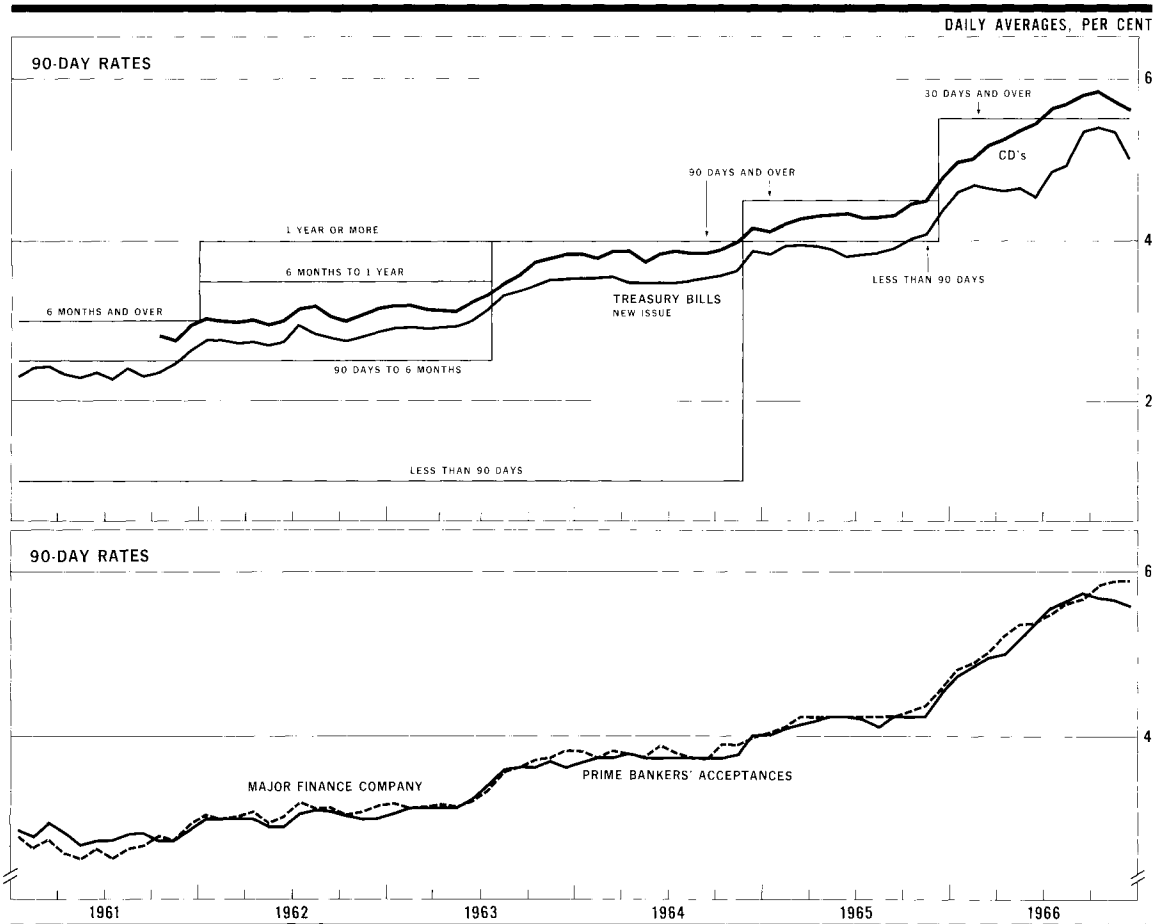
ity provided by Regulation Q prior to December 1965. Potentials for profit have also frequently been greater for CD's than for Treasury bills.

Market rates and yield spreads

In the secondary market, CD's compete with the primary paper of the issuing bank, and since the buyer of an original certificate has the advantage of selecting the date of maturity, the paper in the secondary market must trade above current primary rates. Quotations above this minimum are determined largely by the movement of money market rates as a whole, and particularly by prices of competing instruments such as Treasury bills, finance company paper, and acceptances.

Secondary market rates for CD's generally fall between those for finance company paper and acceptances on the one hand and those for Treasury bills and issues of Federal agencies on the other. Generally, rates on finance company paper and certificates are within one-eighth of a percentage point of each other. Acceptance yields are more often below certificates, by about one-eighth of a percentage point. These spreads widen in tight markets.

1 | CD's: SECONDARY MARKET RATES RELATIVE TO OTHER MARKET RATES



Levels indicate maximum interest rates payable on CD's. Secondary market CD's, Salomon Brothers & Hutzler series. All other, Federal Reserve.

Changes in relative supplies of market instruments—including bills—are an important influence on yields and on spreads among the various types. This was well illustrated in the first half of 1965 as compared with 1964 and was quite striking in 1966.

Treasury bill rates remained quite stable during the first half of 1965 and 1966, but most other short-term market yields rose some 12 to 19 basis points and 40 to 70 basis points, respectively, in these periods. These increases reflected in part the retirement of tax-anticipation bills and official purchases of U.S. Government securities. More important, however, was the fact that the outstanding volume of most other money market instruments rose substantially (Table 6).

TABLE 6

NET CHANGE IN SELECTED MONEY MARKET INVESTMENTS OUTSTANDING

First 6 months, 1964, 1965, and 1966

In billions of dollars

3-month maturities of—	1964	1965	1966
Treasury bills	—.5	—2.8	—5.3
Bankers' acceptances	.2	.....	.2
Finance paper	1.2	1.3	1.5
Certificates of deposit	2.0	2.7	1.6
Issues of Federal agencies	—.9	—.3	2.0

Changes in demand for certain types of instruments also affect yields. For example, as indicated earlier, some short-term investors may not invest temporary funds in any securities except U.S. Government securities whereas others from time to time reach policy limits on holdings of CD's and other private obligations. Although these limits are sometimes liberalized, their existence tends to contribute to a widening of spreads between bills and other obligations in the secondary market at various times.

Dealer bids must be enough above bank issuing rates on CD's—with distinctions being made for paper of prime, lesser-prime, and off-prime banks—to insure a trading profit while at the same time making a competitive offer. In the first year of market trading, spreads for certificates of prime-name banks ranged from 10 to 30 basis points above bill yields, and they have generally remained within this range since then. CD's of prime-name banks outside New York trade from 5 to 10 points higher than those of similar banks in New York, and 15 to 40 points above bills; for off-prime paper the ranges are 10 to 15 basis points and 20 to 55 basis points higher, respectively. CD's in denominations of less than $1 million generally carry higher rates. Denominations of $500,000 are traded with some frequency and denominations of $100,000 occasionally. Market rates for prime certificates at times, however, have been as much as a full percentage point higher than those on Treasury bills (Table 7).

Spreads between prime and nonprime certificates and between certificates and bills vary from time to time as the appraisal of the outlook changes for short-term rates. Spreads narrow when a trend toward lower rates (higher prices) is anticipated. Under these conditions participants feel more confident of the marketability of higher-yielding though less liquid instruments such as certificates. Accordingly, they bid strongly for higher yields to maximize income with the expectation of greater potential for future profits. When higher interest rates and lower prices are expected, the less liquid instruments become relatively less attractive, and yield spreads widen. In this context CD's maturing around certain tax-payment and dividend dates will always command higher prices (lower yields) than those maturing on other dates.

The amounts by which yields on CD's of prime-name banks exceed those of some lesser-prime and off-prime banks in the

TABLE 7

YIELD SPREADS—U.S. TREASURY BILLS AND OTHER SHORT-TERM INVESTMENT PAPER

In basis points unless indicated otherwise

3-month maturities of—	1964		1965		1966	
	Jan. 1	June 30	Jan. 1	June 30	Jan. 1	June 30
Treasury bill rate (per cent)	3.53	3.48	3.83	3.89	4.48	4.54
Spread from bill rate:						
Bankers' acceptances	10	27	17	36	27	85
Federal agencies	11	27	16	32	32	75
Finance paper	36	40	30	36	36	85
Certificates of deposit	35	39	34	41	42	101

market arise from several factors. Even when the authority to purchase permits discretion, buyers will refuse certificates of lesser-known names when those of better-known names are available at about the same yield, despite the fact that an analysis would show about the same standing. In this sense buyers discriminate against certificates of smaller, less-well-known banks. Differentiation of names became more widespread after the failure of banks in Texas, California, and Colorado in 1964 and early 1965. A part of the premium consequently represents an inducement to the buyer to take CD's of lesser-known banks.

Dealers state that it takes more effort to educate customers to the point where they will be interested in CD's of lesser-known names. Such certificates must be carried in position longer; they are more difficult to place on repurchase or loan, even though mixed with prime names; and they afford trouble and expense in checking amounts already outstanding and in obtaining other relevant information of the particular bank. In some cases data are available only quarterly or semiannually, and comparative data are lacking. For this reason a part of the premium represents compensation for additional marketing effort and cost.

A number of smaller banks that are well known in their communities issue CD's to local customers at the same rates as prime banks issue CD's to national customers, or at even lower rates. Markets are thus differentiated, and sales of locally oriented certificates in the secondary market call for added yields, since in effect the bank is tapping the national market at one step removed. In a sense, premiums are viewed as an impersonal market means of regulating new issues. They may be a warning that a particular bank is issuing a disproportionate volume of CD's. Both the rate on the new issue and the premium yield in the secondary market in this case do not reflect arbitrary actions but a marginal response to influences of the national short-term money market.

If there were no effective ceiling on rates, any bank could bid for funds, but rate differentials would remain. The rate paid by the individual bank would become an increasing function of (1) the average rate prevailing in the market, (2) the amounts of certificates outstanding, and (3) the size of the proposed new issue. Inelasticities in the current market—as exemplified by the added cost paid by smaller banks, which brings them to the ceiling sooner, or by the inability or increased difficulty in issuing certificates when the large banks are in the market—might be reduced but they would not be eliminated.

Similarly with no ceiling on rates, trading in CD's would develop by competitive forces in a fashion similar to that of comparable investments that are not regulated.

The secondary market freed from expectations about Regulation Q would fall into place as a division of the money market. Market yields would be determined by the usual forces of supply and demand and the reputation of the issuers.

Certificate characteristics

Certificates offered for sale in the early period often had terms and final payment dates that did not suit the requirements of new buyers and thus had to be carried by dealers for long periods. Many CD's were carelessly executed, and the instrument had to be standardized. Most of the early certificates were issued to a named payee or order; this contributed to some awkwardness in trading until authority was granted or the practice developed for issuance in bearer form. Similarly, banks outside New York found it necessary, in order to reduce delivery and collection expenses, to arrange for issuing agents and alternative paying agents in New York and other principal money centers. In addition, it became the general practice to pay off maturing issues in Federal funds as opposed to clearinghouse checks. Currently, unless otherwise agreed, CD's bought and sold in the secondary market are deliverable in New York the next business day following the date of transaction, and payments are in Federal funds.

The certificate market then and now is more diverse than the other short-term markets, including the acceptance market. Acceptances are analogous in many ways to certificates, but the market for them has overcome many of the problems associated with diversity through the establishment of posted rates for three maturity ranges—1 to 90, 91 to 120, and 121 to 180 days. Moreover, the distinction between prime and lesser-prime acceptances is practically eliminated by the market convention (recognized by the Federal Reserve Open Market Desk) that any acceptance in the market is a prime acceptance. Certificates can be and are written in sizes large enough to trade on an individual basis, and maturities are mutually agreed upon by the issuer and buyer. The maturity groupings used for acceptances, which were designed to overcome size and maturity differences related to the underlying goods transactions, are not appropriate for certificates.

Dealer bid and offering rates

Certificates are individual instruments, and they differ by maturity and/or by issuer. Dealers do not know of the existence of a particular CD—of any specific maturity of a particular bank—until that CD appears in the market. The possible number of maturity dates is large, and the certificate may be prime, lesser-prime, or off-prime. CD's of several hundred issuers may appear in the market, but the bulk of the trading has involved the certificates of 30 to 35 of the leading banks. Issues of another 20 to 30 banks have appeared from time to time. Only occasionally are certificates of banks with deposits of $150 million to $250 million traded. In making a market for CD's, dealers cannot be expected to be familiar with the credit standing of all issuers. Furthermore, certificates are considered easy to counterfeit, and dealers examine the issues of even the best-name banks with care.

Lack of homogeneity of certificates prevents the establishment of posted bid and offered rates and of real breadth in dealer trading. A dealer will bid only in response to a specific certificate offering; however, as the market has developed, the certificates of best names have come to trade at yields very close to each other. In the early market the dealers' spread between bid and offered quotations was generally about 5 basis

points on 90-day maturities, but this later narrowed to 2 to 3 basis points as strong competition developed. The spread widens as CD's approach maturity with the decrease in value of a basis point. If certificates are held in position for several days or longer, the rate will reflect interest accrual, financing costs, and the lesser number of days to maturity, as well as any change in short-term rates. Spreads between bid and asked prices also widen in tight markets as dealers move to protect themselves. Some inventories must be liquidated, potential sales are fewer, and purchases must be made in a market where prices are declining. Hence, dealers keep their offers down and at the same time bid less for the certificates bought. In 1966 bids declined by 5 to 10 basis points on 90-day paper of better names and 25 points for lesser-known names.

In recent years some dealers have posted offering rates for better names, but this is not a general practice. Many issuers object to the practice on the grounds that it appears to rate the credit of issuers by differentiating the prices of similar maturities even though the shadings are small. In markets where they exist, however, posted rates—bids and offers—permit dealers to lighten or increase inventories rapidly at prevailing rates. Short sales in the CD market are unknown because of the difficulty in covering such a sale—in view of the need for matching maturity, coupon, and day of offering. Thus the CD market lacks much of the continuity and closeness in pricing that characterizes other markets.

General features: 1961–66

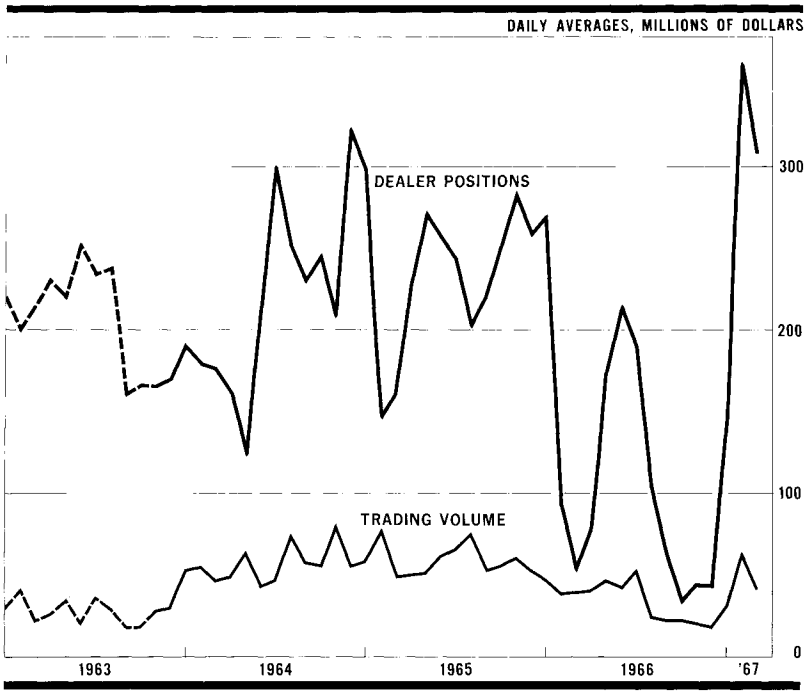
Activity in the secondary market divides itself into two periods—the first running from the establishment of the market in 1961 through 1965; and the second, the year of 1966. Until the end of 1965, Regulation Q ceilings and money market conditions in general provided a favorable atmosphere for new issues. The expanding economy stimulated an increasing variety of uses for funds and also changes in the total and in the pattern of business borrowing. Time deposits in the form of certificates became a larger share of the liquid asset holdings of corporations and to some extent displaced both money and market securities such as Treasury bills in their liquid asset portfolios.

The maximum rates permitted issuers effectively restricted offerings of short maturities—making them available only in the secondary market at attractive rates. Market rates for much of this period, it should be noted, were sufficiently above the Regulation Q ceilings on restricted maturities to permit considerable leeway in potentials for profits, and the volume of trading was large.

Inasmuch as Regulation Q ceilings on the shorter maturities with some frequency were a little below market rates, the ceilings provided a cushion against market loss as holdings approached maturity. The descending pattern of the yield curve for certificates as they approached maturity permitted dealers to offer certificates at lower rates (higher prices) than when acquired—thus establishing a profit over and above the interest earned during the period of holding. Important in this connection were the relatively long periods of rate stability, which enhanced profit possibilities and encouraged acquisition of inventories.

The upward adjustment in Regulation Q ceiling rates to 5½ per cent in December 1965, along with the shortening of the minimum maturity against which the rate applied, from 3 months to 1 month, virtually eliminated the slope in the yield curve for certificates. This development coupled with the rises in market rates in 1966—in response to System policy and very strong aggregate demand—brought to an end much

2 | DEALER ACTIVITY IN NEGOTIABLE CD's, 1963-66



Data for 1963 estimated. Daily-average figures (in millions of dollars) for the year ending June 1962 are as follows: *Dealer positions,* range $10-$100; average $20-$30; *Volume of trading,* range $0-$35; average, $10-$15.

of the potential for dealer profits. This was particularly true after rates pierced the Regulation Q ceilings in midsummer. Trading volume, which had already diminished, dropped sharply and then continued at very low levels for the balance of the year. The supply of certificates declined, and the character of trading changed.

The volume of certificates outstanding rose quite steadily from early 1961 to mid-1966 and then leveled off before declining. Over the whole period there was some tendency toward a progressive shortening of maturities. Along with the rise in CD's outstanding dealer positions and trading volume increased until the end of 1965. After that, although outstandings continued to rise, the market activity was substantially less than in previous years—in part because of risk of exposure to new issues of short maturities and the constant risk of principal if sales were made by holders before maturity. Trading dropped sharply after July 1966, as rates rose to record levels and new issues of certificates became competitive with other short-term investments of only 1 month or slightly longer maturity. Dealers' carrying costs became prohibitive, and at times there were fears that financing would not be available. Trading in the secondary market concentrated on maturities unavailable to original buyers. Dealers' bids frequently represented book losses to investors and so corporate treasurers and others held their CD's.

The course of market activity: 1961–65

1961. Banks were unable to issue certificates of less than 90-day maturity during 1961 because of the 1 per cent ceiling set by Regulation Q. Treasury bills with 1-month maturities—comparable with the

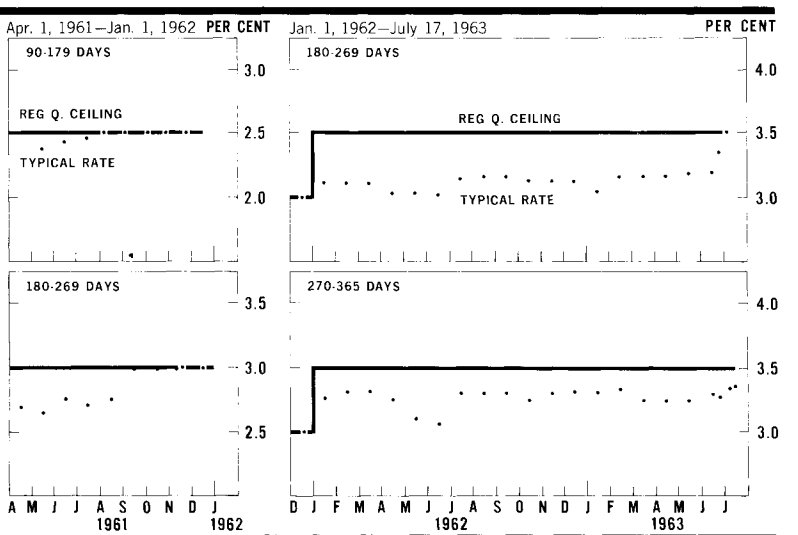
shortest certificate maturity that could be issued—traded well above this level. Similarly, issue rates on certificates with maturities from 90 days to 6 months were only briefly competitive with bills of the same maturity for several months during the spring and summer, and they were at the 2½ per cent ceiling from August to the end of the year (Chart 3). Certificates with maturity of 6 months or more afforded the most flexibility during the year because offering rates on these did not press the 3 per cent ceiling until November. The bulk of issues consequently had this maturity.

The market in 1961 was generally thin. Original buyers in many cases were content to hold their certificates, and dealers had difficulty in matching demand and supply of certificates at quoted rates. In the early part of the year dealer transactions were undertaken for the most part only on order. One or two dealers, however, began with small positions—say, $5 million to $10 million. As trading developed, however, dealers cautiously acquired inventories, and during the autumn their positions are estimated to have ranged from $10 million to $100 million and averaged from $20 million to $30 million. Individual dealer positions, however, showed wide departures from the averages, and variation has been a characteristic of positions even in years of peak activity in the market. The volume of trading correspondingly was spotty to light—ranging from nothing to $34 million—and probably averaged from $10 million to $15 million. Dealers were able to adjust their positions only with difficulty. Bid and asked prices could be moved only within fairly narrow limits because large changes would induce arbitrage with other markets. Interdealer trading was sporadic because of the small market supply of certificates.

1962. Regulation Q ceilings were raised on January 1, 1962, and banks increased rates on new CD's by about one-eighth of a percentage point on 6- to 9-month maturities and three-eighths of a percentage point on maturities of a year or more. The new ceilings were established at 3½ per cent and 4 per cent for maturities of 6 months and 1 year or longer, respectively. Rates for other maturities were unchanged. This action resulted in substantial new issues with maturities of 6 months or longer.

Largest amounts of certificates then be-

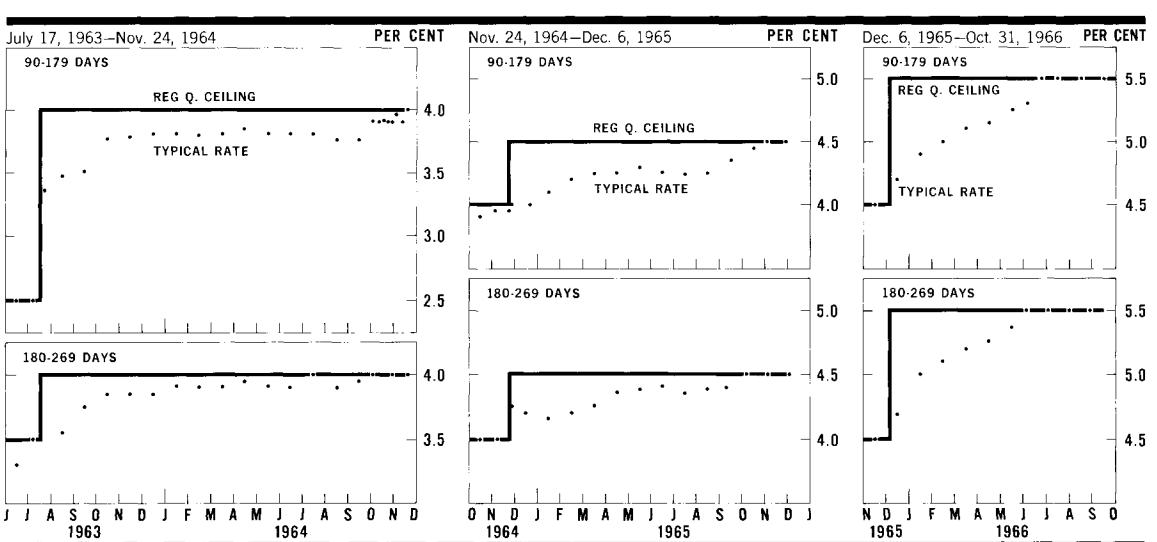
3 | CD ISSUING RATES
NEW YORK CITY BANKS



came available to dealers, and the volume of trading increased. Dealers acquired reasonable inventories of 6-month maturities from original holders and "aged" them—placing some on repurchase agreements and holding others for sale in the relatively near future. Interest rate prospects were attractive for capital gains. Expectations for generally stable interest rates encouraged dealers to build positions. Since the Regulation Q ceilings established lower rates on the shorter maturities than on the longer ones, the yield curve descended as maturity shortened. This enabled the dealers to offer CD's at lower rates (higher prices) than when acquired—thus making a profit over and above the interest earned during the period held. Dealer positions are estimated to have averaged between $125 million and $225 million and trading between $25 million to $45 million on an average day. Certificates of perhaps as many as 50 banks appeared in the secondary market at one time or another during the year.

1963. In 1963 the secondary market became stronger, attracted more participants, and served a greater variety of investor groups. Trading was more active during the first half of the year but was affected by fluctuations in interest rates during the spring as the market anticipated higher levels. Dealer positions are estimated to have ranged from $100 million to $500 million and averaged $150 million to $250 million. Trading volume ranged between $15 million and $75 million and averaged $20 million to $30 million. Both dealer positions and the transactions reached peaks for the year during the spring. Issue rates on certificates with maturities of less than 6 months had been at the ceiling all year and those for maturities of 6 to 9 months reached the ceiling in July. Only those issues having maturities of 9 months to 1 year were competitive.

The market received its first major test with the increase in the discount rate in mid-July and the accompanying sharp rise in Treasury bill rates. Regulation Q ceilings were revised, establishing a 4 per cent ceiling for certificates with maturities of 90 days to 1 year and permitting banks to offer shorter maturities than earlier. After these changes all market rates adjusted upward during the last half of July, and offering rates were raised from 3⅜ to 3½ per cent



on 3- to 6-month maturities and 3½ to 3¾ per cent on 6-month to 1-year maturities. Issue rates and market rates on certificates continued to move upward during the remainder of the year—increasing by as much as 10 to 20 basis points in 3- and 6-month maturity areas in some months (Charts 1 and 3).

The rise in market rates of interest lowered the market values of outstanding certificates, and some investors who normally would have sold before maturity chose to hold their certificates rather than accept a loss—thus contributing to a substantial decline in trading after midyear. Activity remained at low levels until fall. Trading fluctuated between a low of $15 million on the average in September and $55 million in the last month of 1963. Dealer inventories were also lightened, and, at the same time, some dealers were reported to have sustained large losses.

The adjustment of the secondary market for CD's to the abrupt rise in interest rates was more sluggish than the adjustment in Treasury bills. The spread in yields between certificates and Treasury bills narrowed sharply in July and remained narrow until October. After October the volume of trading picked up, with activity centered in maturities of less than 3 months. In contrast to the decline in dealer positions and secondary trading, the volume of CD's outstanding rose sharply after July in response to the lifting of the Regulation Q ceiling and to strong loan demand, which permitted and encouraged banks to seek funds aggressively. The new terms of Regulation Q, as noted, also made possible issuance of maturities of less than 90 days for virtually the first time. By taking advantage of this, some banks provided competition in this area with the market supply. By the end of 1963 the larger banks were quoting issuing rates close to the 4 per cent maximum. The market as a whole, however, was substantially strengthened and broadened during the year.

1964. The volume of trading in certificates reached new high levels during 1964, considerably above those in 1963. On the average there was a $10 million quarter-over-quarter increase. Broad patterns of activity associated with the four principal quarterly tax and dividend dates, as well as some trading for midyear and year-end needs, also developed. Dealer positions fluctuated, but inversely to trading; and positions averaged about four times the volume of trading. Both positions and trading reflected the relationships of both market and issuing rates to Regulation Q ceilings as well as the spread between these rates and Treasury bill yields. These factors, of course, influenced the maturities available in the market. Divergent trends in the supplies of the various money market instruments moderately influenced the yield spreads between Treasury bills and other obligations.

During the first quarter CD market rates, which generally tended to be 30 to 40 basis points above Treasury bill yields of a comparable maturity, were near the 4 per cent ceiling on maturities of 3 months or longer. At the end of March most large banks were quoting interest rates of 4 per cent on new certificates of 6 months or longer and about 3.9 per cent on 3- to 6-month maturities. Smaller banks quoted 4 per cent across the board. Since some shorter maturities were available from issuers, dealers were reluctant to increase inventories, and investors met most of their needs from the banks.

The opening of the second quarter in April brought a decline in market rates, and rates on new 9-month certificates backed away from the ceiling—thus providing banks with a chance to sell longer-term certificates. Rates changed little in May, and dealers—anticipating favorable carries

—began to increase their positions. During the first half of the year dealer inventories averaged between $120 million and $280 million and trading volume between $60 million and $70 million.

Over the early summer the bulk of outstanding certificates continued to have relatively short maturities; about half carried dates within 3 months and three-fourths, within 5 months. Some declines in rates in June and July again permitted issuance of a modest amount of longer-term certificates. Expectations for favorable carries and a strong demand for certificates maturing around the September tax and dividend date led dealers to make further increases in their inventories.

Because of high interest rates in the market in August, September, and early October, new issues maturing in 6 months or more were at the 4 per cent ceiling from the end of September until the change in the discount rate and increase in Regulation Q ceilings in late November. For some weeks prior to the change prime banks had not been able to attract any volume of certificates, and most issues were in the 4- to 5-month maturity range. Heavier dividend payments relative to tax payments in December and a step-up in estimated tax payments for 1965 also influenced the shortening of maturities and at the same time heightened interest in trading. The increase in certificates in the September–November period was only about $500 million.

Dealer positions reached new highs just before the change in the discount rate and the Regulation Q change in November, and they have never regained these levels. Active trading during the autumn, under the umbrella of the 4 per cent issue ceiling on maturities of less than 90 days, emphasized the desirability of having CD's mature on or near tax and dividend dates or around the year-end. During the last half of the year dealer positions averaged between $210 million in October and $322 million in November, with trading averaging from $70 million in July to $80 million in October. The bulk of the trading during the year was again in maturities of less than 3 months.

The new ceilings under Regulation Q permitted issue rates of 4½ per cent for maturities of 90 days or more and payment of 4 per cent on maturities of less than 90 days. This action ended the prohibitive 1 per cent ceiling on short maturities, which had been in effect since 1936. Banks used the new authority to obtain funds maturing in less than 90 days and only reluctantly paid the higher rates necessary to issue longer-term certificates.

As the year closed, dealers began to adjust inventories to the new interest rate structure through run-offs and sales. Both new-issue and secondary market rates moved higher in December (Charts 1 to 3).

1965. After a tendency to level off in January, short-term rates edged higher in February and moved upward through the remainder of the first quarter. Funds in the short maturities became generally unavailable. Banks turned from the 30- to 89-day maturities and began to seek deposits in the 4- to 6-month or longer range. Large banks in New York City and elsewhere—anticipating strong loan demands, heavy redemptions of CDs' in June, and reduced liquidity—aggressively competed for funds and extended maturities.

In contrast, the smaller banks shortened maturities. They experienced net reductions in outstanding certificates during the late winter and early spring. In part these banks were hampered by rate ceilings and the inelasticity in the market, which makes it difficult for them to issue CD's when the big money market banks are seeking funds. There was also some unwillingness to pay

the necessary higher rates. New York City banks accounted for nearly all of the increase in outstanding certificates over the quarter, and all were in the form of longer maturities (Tables 4 and 8).

In response to the changes in Regulation Q, the new rate setting, and issuance of some shorter-term CD's over the year-end, dealers cut their positions to an average of $150 million in January, an amount about half the level at the end of December. The volume of trading almost reached the October 1964 record of $80 million. Both buyers and sellers were active in rearranging their portfolios, and trading tended to center on certificates maturing on the March and April tax dates as well as certain dividend dates in the spring. After appraising the new context of market rates and possibilities for new issues of CD's, dealers began to rebuild positions. It seemed clear that upward fluctuations in rates would continue and would foreclose short-term issues. Positions were increased to about $225 million on the average in March.

Through the spring New York banks continued aggressively to seek funds with longer maturities. As a result, issuing rates were marked up, and market rates also tended to be higher. The larger banks were successful in issuing a sizable volume of longer-term certificates. However, during the spring, banks outside New York experienced net reductions in outstanding CD's in all size groups. These banks were more severely affected by rate ceilings than they had been earlier in the year (Table 8).

In response to these factors, dealers increased their positions to a peak for the second quarter of about $275 million in April. The volume of trading remained low, averaging about $45 million in February, March, and April. Trading became more active after April until it reached $75 million in July. Trading as usual centered on certificates maturing on tax and dividend dates. The $3.3 billion tax-anticipation bills maturing in June—the largest since the spring of 1962—moderated corporate buying to some extent.

Banks outside New York, faced with increasing requests for loans, stepped up their offerings of CD's during the early summer. The New York banks had temporarily withdrawn, and Treasury bill rates had moved down. With the re-entry of New York banks after midsummer, CD issues at other banks slowed.

From August through November, issuing rates of New York banks were close to or at Regulation Q ceilings about half the time, and total certificates outstanding showed only a small increase. Aside from the rise in market rates relative to the ceiling, lessened corporate liquidity and wider use of the capital market—with a consequent

TABLE 8

NET INCREASE IN NEGOTIABLE CD'S OUTSTANDING DENOMINATIONS OF $100,000 OR MORE

In millions o dollars

Size of bank (total deposits in millions of dollars)	Period								
	8–19–64 to 11–18–64	11–18–64 to 2–17–65	2–17–65 to 5–19–65	5–19–65 to 8–18–65	8–18–65 to 11–17–65	11–17–65 to 2–16–66	2–16–66 to 5–18–66	5–18–66 to 8–31–66	8–31–66 to 10–26–66
Under 100	120	16	—13	21	8	8	2	—6	—11
100–200	2	40	—42	37	24	7	—2		
200–500	—45	195	—76	90	1	—28	19	8	—76
500–1,000	25	88	—29	160	101	—38	96	193	—97
1,000 and over	574	668	1,470	644	225	40	1,259	—404	—2,094
Total	676	1,007	1,310	952	359	—11	1,374	—109	—2,778

NOTE.—Data are based on Federal Reserve surveys for dates specified. Surveys of May 18, 1966, and Aug. 31, 1966, adjusted for change in sample.

reduction in demand for bank credit—helped to check the rate of growth of CD's. Contrary to experience since 1961, when long-term rates had tended to fall and short-term rates had moved up slowly, both long- and short-term rates rose rather steadily after mid-1965. Trading in the secondary market reached a peak of about $78 million in July, with demand centered on certificates maturing on tax and dividend dates in the fall. After that, activity declined irregularly until the year-end, except for a small pick-up in trading in October for year-end maturity dates. As in the second and third quarters of 1963, some of the decline in activity was caused by the unwillingness of many holders to liquidate at a loss.

Although dealer positions reached a high for the year of $282 million in October 1965, both positions and the volume of trading failed to reach levels attained in the last half of 1964. As the fourth quarter progressed, the market became thin and uncertainty about the outlook for rates developed—culminating with the changes in the discount rate and Regulation Q early in December. In general the market lacked the breadth that had been characteristic of 1964 and early 1965 and reflected some lessened over-all interest in new issues of CD's and some slowing in the volume offered. The market also was affected sigficantly by the removal of the 1 per cent ceiling on issues maturing in less than 90 days. Dealer positions were influenced by less strong potentials for profits.

Changes in market activity: 1966

The secondary market suffered a sharp setback in 1966. The year is distinguished from the previous period in several respects, all of which significantly influenced activity in the market. Among these forces are the following: the pattern of both long- and short-term rates; the new Regulation Q ceilings, which established a single rate at 5½ per cent for all maturities of 30 days or more; the large increases in the ceilings; a record rise in amount of CD's outstanding during the spring, followed by a marked decline later in the year; the change in character of trading; and greater diversity in the supply of all short-term money market instruments (Table 6).

While the December increase in Regulation Q ceilings provided considerable flexibility for banks to raise their rates, it also made it practicable for banks to issue maturities as short as 30 days. Over the year-end, as market rates rose sharply and competition quickened, the banks—particularly those in New York—preferred to emphasize issuance of shorter maturities rather than to pay the rates necessary to attract longer-term money. Leading banks paid 4.80 per cent on 3-month certificates, and out-of-town banks were paying up to 5 per cent. At the same time there were small increases in longer-term—6 months and over—maturities, which limited further average shortening. In February the average maturity was 3.3 months. The volume of Treasury tax-anticipation bills outstanding for March and June made it more difficult to issue certificates for those dates. Between November 1965 and February 1966, there was a small net decline in certificates outstanding. This was the first quarterly decline on record since CD's were first issued (Table 8).

As the year developed, both short- and long-term rates continued the sharp rises that had begun in the summer or fall of 1965, and the advance in rates became more rapid as monetary restraint intensified and reinforced upward rate pressures stemming from heavy credit demands. New issues of certificates accelerated with these developments in March, and by mid-May the volume had increased about $1.4 billion

—one of the largest quarterly increases. Two increases in the prime rate after December—particularly the one in March to 5½ per cent—made it possible and profitable to seek certificates aggressively.

Emphasis shifted toward sales of maturities of 6 months and over, in part to avoid earlier rollover problems on tax dates and in part because loan demands were expected to continue strong. Offering rates were increased more on longer maturities than on short ones, and the average maturity in May rose to 3.8 months. Market rates rose above the CD ceiling in July, and certificates outstanding leveled off and began to decline in August. Run-offs amounted to about $3 billion at the end of November. Certificates became competitive only with 1-month maturities of market instruments. With the increase in the prime rate in early July to 5¾ per cent, leading banks began issuance of 30-day maturities at 5½ per cent. Certificates of these banks subsequently became available in the secondary market at rates above 5½ per cent. The situation became intensely competitive in the summer as rates of all short-term and long-term investments approached or reached record levels.

Dealer positions in certificates during the first quarter of 1966 averaged only about $70 million, the smallest first-quarter holdings on record. This contrasts sharply with inventories that ranged from $150 million to about $210 million in an average month in 1964 and 1965. Although dealers will purchase certificates for inventory at even or negative carries if the prospects for reselling at a small profit are good, the situation in the first quarter of 1966 exposed them to undercutting of positions. Issuers could make unexpected changes in rates at various maturities. Trading averaged only $40 million, about $10 million to $15 million below the levels of the comparable quarter in the two previous years. Trading was affected by the increased availability of shorter maturities from issuers, and the Treasury tax-anticipation bill maturing in March tended to cut market demand. One or two corporations that were pressed for cash and did not want to sell certificates at a loss arranged reverse repurchases with dealers until the March tax date. These transactions accounted for part of the increase in dealer positions in February and March.

During the second quarter of 1966, although the competition for funds intensified, the supply of certificates with emphasis on longer maturities increased substantially. Banks were willing to pay higher rates, and corporations improved their liquidity by selling new bonds. Treasury bill rates had begun to drop in March, and the yield spread between certificates and bills widened substantially. Expectations seemed favorable for carries. Dealers accordingly added to positions cautiously—buying principally certificates maturing around the September and December tax and dividend dates. Inventories rose from an average of $80 million in March to a peak of $215 million in May. This level, however, was well below that of previous years (Chart 2).

Trading volume increased with the March and April tax and dividend dates and reached a high point in June for the mid-year and early fall dates. The trading level, however, never exceeded an average monthly level of $55 million—roughly equal to the trading lows in 1964 and 1965. The money market atmosphere had changed, and concern had developed about dealers' ability to finance inventories and about the availability of supplies. As rates rose, the spread between yields on Treasury bills and CD's reached 101 basis points at the end of June, with a large part of the spread

reflecting diverse movements in the supplies of short-term investments during the half-year (Tables 6 and 7). Toward the end of June rates on loans to securities dealers approached the banks' prime rate and later exceeded it. Dealer bids for CD's in part came to be based on the cost of carrying them on loan and not on the basis of resale price. Spreads between bid and asked quotations widened.

As the secondary market weakened, some corporate treasurers had their authority to purchase certificates revoked and others were limited or further restricted as to which banks' certificates they could buy. Dependence upon the Treasury bill market for liquidity was increased.

During the summer quarter both trading and positions declined sharply to very low levels. Inventories were cut from an average level of $180 million in June to $35 million in September when they leveled off. The sharp drop reflected some "dumping" by dealers at a loss. Trading volume was cut almost two-thirds, to an average level of $20 million.

The decline occurred at a time when market rates broke through the Regulation Q ceilings and then moved substantially above them (Charts 1 to 3). Many sales by investors thus could be made only at a loss of principal funds, and there was some distress selling. During most of the time only 1-month maturities of new issues had yields that were competitive with those on other money market investments. Trading in the market continued to concentrate on maturities of less than 30 days and special situations. Market preference turned almost exclusively to certificates of the major banks, and generally there were between 20 and 25 issuers in the market. This condition characterized the market until the middle of December.

Banks had begun to have difficulties in rolling over certificates in late August. After August outstanding CD's declined steadily and by early December about $3.2 billion had run off. Both rate and nonrate factors were contributing causes. Some banks appealed to customer loyalties to lessen run-offs. Worry, apprehension, and even desperation "dogged" dealers and investors alike.

Yields on short-term money market investments reached peak levels in September and October, as shown in Table 9, and remained high throughout October. As the banks became still more restrictive in granting credit during the early fall, the increased costs and shrinkage of availability of dealer loans and repurchases compounded market problems.

Some easing in short-term market rates began in November and continued into December, supported in part by a shift toward ease in credit policy. The market atmosphere improved slightly, and dealers cautiously began to consider small increases

TABLE 9

YIELDS ON SHORT-TERM MONEY MARKET INVESTMENTS

Yields in per cent; net change in basis points

3-month maturities of—	Yields			Net change from peak to—	
	Peak (Sept.–Oct.)	Nov. 3, 1966	Dec. 22, 1966	Nov. 3, 1966	Dec. 22, 1966
Treasury bills	5.59	5.33	4.81	—26	—78
Finance paper	5.87	5.87	5.87	0	0
Federal agency issues	5.77	5.58	4.98	—19	—79
Bankers' acceptances	6.00	5.75	5.75	—25	—25
Certificates of deposit	5.90	5.70	5.65	—20	—25

in positions. There was also some revival of interest in market purchases by investors, but the market remained soft. Attraction to the market was chiefly the result of the decline in Treasury bill yields, as they fell substantially below certificate yields. Issue rates remained at 5½ per cent for 30-day or longer maturities, and banks continued to have trouble in rolling over maturing certificates.

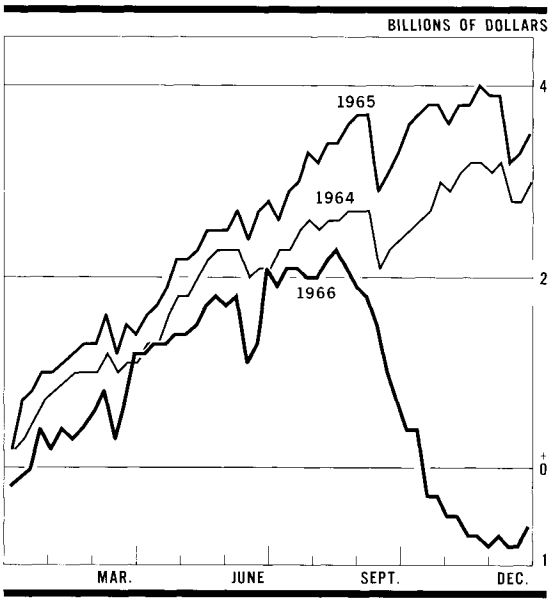
In contrast to these changes in the certificate market, activity in both the acceptance and Treasury bill markets over the year exceeded somewhat the levels of the previous period. Average daily volume of trading in acceptances in 1966 was about $63 million monthly, up noticeably from 1964 and 1965. Treasury bill trading rose to an average monthly level of $1.5 billion, up about $150 million.

Positions of acceptance dealers averaged about $280 million, some $60 million higher than the levels in 1964 and 1965. The larger inventories carried by dealers resulted from increased sales into the market by accepting banks, as banks' money positions came under pressure. Banks' holdings of their own acceptances declined to about 30 per cent of their total acceptance portfolio as compared with 49 per cent and 36 per cent in 1964 and 1965, respectively. Bypassing of the dealer market was reduced. Investors were attracted to acceptances by the high interest rates relative to those on other investments. Dealers' positions in Treasury bills were about the same as in the two previous years.

Holdings of acceptances and Treasury bills, however, were sharply reduced as the cost of carries mounted during the summer, and funds became short in supply. Acceptance inventories averaged only $181 million in contrast with an average of $350 million for the first two quarters. Repurchase agreements by the Federal Reserve had been consistently available until mid-July, but from then until the end of September there were none. Withdrawal of these agreements at 4½ per cent materially raised the cost of "carry" and forced the lessening of inventories during the third quarter. Similarly, Treasury bill positions were cut almost in half during the summer quarter, in part because of rising costs but also because of scarcity of bills and heavy demand.

The volume of acceptances outstanding remained close to the 1964 and 1965 levels as did Treasury bills. This contrasts with the pattern of outstanding CD's, which rose to a peak in August and then declined very sharply (Chart 4).

4 | NEGOTIABLE CD's
Reporting member banks



Actual cumulative change from Jan. 1 of each year.

Comparison of the dollar volume of transactions with the dollar volume of outstandings for each instrument indicates that trading in both acceptances and Treasury bills rose substantially. From January through June trading volume ranged on the average from 0.23 per cent to 0.30 per cent of CD's outstanding; from 1.22 per cent to

1.52 per cent for acceptances; and from 2.38 per cent to 2.73 per cent for bills. The percentages for certificates were less than half those reported for earlier years, whereas the ratios for acceptances and bills were more or less unchanged. As noted earlier, activity in certificates was materially affected by the establishment of a single rate for all maturities and by the increases in market rates relative to the ceiling. After June trading in certificates shrank to 0.13 per cent of the total outstanding, while trading in acceptances and bills remained the same or increased slightly—ranging between 1.6 per cent and 1.8 per cent and 2.53 per cent to 3.00 per cent, respectively.

Comparison of the dollar volume of dealer inventories to the dollar volume of outstandings also shows a marked change for certificates in 1966 as compared with the previous period. From January through June this ratio ranged on the average from 0.33 per cent in February to 1.20 per cent in May, and in September and October declined to 0.19 per cent and 0.27 per cent, respectively. All of these ratios are small fractions of those of previous periods and reflect a greater change in positions than in outstandings. The ratios for acceptances ranged from 11.3 per cent in January to 8.6 per cent in June, dropped to 4.0 per cent in August as markets tightened, and returned to earlier levels during the fall. These ratios for acceptances, except for the summer quarter, are similar to those of 1964 and 1965. Ratios for Treasury bills averaged about 3.21 per cent and showed little significant variation from earlier years. They were lower, however, during the tight market of the summer.

Perhaps the most striking contrast in activity in the secondary market is in the change in the dollar volume of transactions in relation to the dollar volume of positions. During the first half of the year these percentages for certificates ranged from 70 per cent in February to 27 per cent in May and were substantially above most months in 1964 and 1965. After June they ranged between 22 per cent and 65 per cent. Positions dropped somewhat more than transactions did. For Treasury bills too, the ratios were larger than in the earlier period and reflected higher levels of trading and some reduction in position as costs mounted. During June and July, trading in bills exceeded positions by 40 per cent and 18 per cent, respectively. Transactions in acceptances reflected the increase in investor interest. Both trading volume and positions rose, however, and the ratios were unchanged.

Market activity: mid-December 1966–January 1967

A shift from outflow to inflow of certificates began at banks in mid-December and accelerated rapidly in January as declines in market rates of interest made the instruments relatively more attractive. CD's issued by large weekly reporting banks increased by about $2 billion in January, a new monthly record. The combined increase for December and January amounted to $2.3 billion and brought certificates outstanding back to a level of about $18.1 billion. As short-term rates declined further after mid-January, many of the larger banks reduced their offering rates. At the month-end a number of banks were offering rates of 5⅛ per cent for all maturities, and some banks posted a 5 per cent rate for CD's with 3-month maturities. Even at this level yields on new 90-day certificates exceeded Treasury bill discounts by 50 basis points. Some extensions in maturity ranging up to 3 months were also made.

In the easier atmosphere in December and with prospects for further ease, dealers began to rebuild positions in anticipation of

profits. Toward the year-end they made large additions to inventories as developments seemed to suggest an abrupt and rapid movement in the over-all structure of rates to lower levels. Dealers acquired maturities that were as long as possible, most of them with June and December dates carrying coupons of 5⅜ per cent and 5½ per cent. Some dealers later cut back on their holdings of some of the longer maturities and emphasized instead certificates with early summer and early fall maturities. Dealer positions for January averaged $360 million—a record high—and although trading volume increased, it failed to rise commensurately. For the month it averaged only $60 million. Positions were six times larger than the volume of trading as compared with typical ratios of 4:1 in the active markets of 1964 and 1965.

In part, trading volume did not increase to its earlier proportions relative to positions because of competition from new issues and some lack of a balance in maturities in inventories. Dealers were also reluctant sellers. Improvements in availability of financing at lower rates provided a "running carry" or at least one that was only modestly negative. In other markets dealers' holdings of securities also increased but not to the same extent relative to trading.

This dramatic resurgence of positions accompanying the rapid drop in market rates was a complement to the equally dramatic decline in inventories in 1966 associated with the sharp upward movement in rates. It reflects largely the speculative tendencies that may accompany the unwinding of tight markets.

As shown in Table 10, downward adjustments in yields on acceptances, finance paper, and certificates were substantial in January 1967, and they accounted for all of the adjustment from the September–October peaks for finance paper and somewhat more than half for the other two investments. These drops in rates on money market paper, which had previously shown only sluggish moves, accompanied declines in rates at the bank counter and in the capital markets.

The secondary market for certificates awaits a test of what it may consider are normal conditions; that is, a period characterized by stable or declining yields and one free from the changes in Regulation Q that have been a feature of market activity to date. Patterns and levels of activity under such conditions are unknown.

Future market activity

As long as Regulation Q provides a single rate for maturities of 30 days or more—with issue rates at the ceiling and market rates on comparable maturities above the ceiling —trading in the secondary market will continue at relatively low levels. The floating supply of CD's tends to undergo a constant

TABLE 10

YIELDS ON SHORT-TERM MONEY MARKET INVESTMENTS

Yields, in per cent; net change in basis points

3-month maturities of—	Yields			Net change from	
	Peak (Sept.–Oct.)	Dec. 22, 1966	Jan. 31, 1967	Sept.–Oct. 1966 to Jan. 31, 1967	Dec. 22, 1966 to Jan. 31, 1967
Treasury bills	5.59	4.81	4.51	—108	—30
Finance paper	5.87	5.87	5.25	—62	—62
Federal agency issues	5.77	4.98	4.87	—90	—11
Bankers' acceptances	6.00	5.75	4.75	—125	—100
Certificates of deposit	5.90	5.68	5.20	—70	—48

decline. New issues are prohibited. Holders of outstanding issues are deterred from selling because of capital loss,[13] and dealers face a penalty cost in carrying inventory. Buyers show a strong reluctance to extend maturities. Participants are also concerned with the possibility of an unexpected change in Regulation Q. Moreover, there is a competing supply of desirable investments with coupons or yields not subject to the constraint of regulation. Although dealers will make some bids that vary with maturity and reflect the structure of market rates, there is evident discontinuity, and many trades are negotiated individually. This background does not produce a well-defined yield curve characteristic of some other markets, even though tight.

When market rates fall below the Regulation Q ceiling and stable or declining rates encourage issuance of new CD's, trading volume should advance moderately. The volume will fluctuate with the ability of the banks to issue longer-term maturities, and the market will supply the desired shorter maturities. Dealer positions may be somewhat smaller under these conditions, because they are exposed to greater risk than when the regulation prohibited issues of shorter maturities. The potential for profits will be relatively limited unless there is an opportunity to "age" CD's. Under the circumstances the dealer, as noted, runs the risk of having issuers make unexpected changes in rates at various maturities. The new supply comes out and competes with the old. The dealer is also exposed to the risk of a change in the Regulation Q ceiling. Even with a new-issue market substantially larger than there is at present, secondary trading probably will not reach the levels of 1964–65, which to a great extent resulted from the provisions of Regulation Q.

The secondary market for certificates has had a relatively short period of development and testing. Nevertheless, it may be said that a basic framework has emerged on which future activity can build. Whereas comparisons of the certificate market with competitors are often made, they are not altogether valid. None of the other markets have been exposed to constraint similar to that provided by Regulation Q. The acceptance market and Treasury bill markets, on the other hand, are officially recognized as markets in which the System conducts open market operations, and dealers in both markets may have repurchase facilities extended to them at times to help finance inventories. Aside from these important aids, these markets have the distinct advantage over the certificate market of a long period of development in which practices and mechanisms have evolved that contribute to their greater breadth and other qualities.

With or without official recognition or help, the certificate market of the future is likely to be somewhat different from the past. The future market—reflecting shifts and refinements based on the historical experience of the monetary authorities, issuers, buyers, and dealers—should be more continuous. Diverse characteristics of CD's should be further reduced, supplies should be less variable, and progress should be made toward a more standardized form of credit risk. It is also to be expected, if Regulation Q remains, that the spasmodic periods of illiquidity for certificates associated with changes in the regulation will be avoided or substantially moderated. Official and private action along these lines should help to encourage a widespread increase in demand, and this factor alone should help to eliminate differentials in issuing and trading rates for CD's of many banks.

[13] This is particularly true of corporations that cannot make the same flexible use of capital losses as banks do in offsets against income.

PROPOSALS TO IMPROVE MARKETABILITY OF CERTIFICATES

As the CD market expanded, various proposals designed to improve the marketability and appeal of certificates to both buyers and issuers were made by the monetary authorities and participants. Some of the proposals have the objective of providing easier access to the market by small banks. Other suggestions involve merely changes in market practices.

Issuance of certificates on a discount basis

Many observers believe that the appeal of certificates to corporate and institutional portfolio managers would be greatly increased if the certificates were issued on a 360-day discount basis instead of yield to maturity. Issuance on a discount basis would facilitate computation of purchase and sale prices and would avoid the awkward formula now used to make the conversion. In addition, issuance on a discount basis would make it possible for most holders to avoid showing book losses unless a very sharp change in rates occurred. Some large buyers are not willing to sell into the market if the sale would cause a book loss, and this factor lessens the appeal of certificates as compared with competing instruments. A change to issuance on a discount basis might result in a substantial gain in marketability.

Some banks state that placing CD's on a discount basis was considered when the market began. This method was rejected because (1) according to convention, certificates had been issued on a yield-to-maturity basis; (2) effective costs would be higher; (3) interest accrues daily, and the value of the deposit changes daily—hence there would be a mechanical problem in computing required reserves; (4) some customers insist on a yield-to-maturity basis; and (5) issuance of certificates on both bases would split the trading market into divisions and would lead to confusion. Although some banks now believe that these reasons exaggerate possible difficulties, they think that it would be almost impossible to turn the market around.

FDIC insurance coverage

Some observers suggest that complete insurance coverage be granted certificates. This proposal would obviously provide a high degree of marketability. It is not clear, however, how this proposal can be justified without applying the same coverage to other deposits. Individual unit banks are separately capitalized, differ substantially in performance, and rise and decline in profitability with their managements. Complete insurance coverage would subsidize poor management. This cost would seemingly be greater than the benefit of improved marketability and attendant improved flow of funds.

Dealer's endorsement

If a dealer would stamp or endorse bank certificates—charging a customary fee as in the case with acceptances—yield spreads of lesser known banks could be standardized and marketability improved. Dealers, however, state that they do not want to assume the obligation of certifying credits. Furthermore, they believe that impersonal market evaluation of credit risk should be encouraged. The market currently decides on an impersonal basis which banks can grow or be tided over, but it does not give a guarantee of credit soundness. Yield spreads frequently give valuable warning signs to the purchaser and perhaps to the issuer.

Provision of information by Federal Reserve Banks

If the Federal Reserve Banks were to act as a regional clearinghouse for information about banks wanting to issue certificates and about those willing to buy them, or if they were to function as brokers in matching deficit needs for funds of smaller banks with surplus funds of other banks through an exchange of certificates for deposits, the market would view these actions with concern. Participants state that such actions would be considered tantamount to guaranteeing the soundness of the bank receiving the deposit. And if the bank should become overextended, the Federal Reserve would be subject to criticism. Whereas this proposal would promote flows of funds and provide easier access to the market than exists for some banks, it is not clear that the needs of those banks are closely suited to the average certificate maturity; their needs by and large are considered to be somewhat longer term.

Group marketing of certificates of smaller banks

In early 1966 a large commercial paper house, commenting on the "inequity of money rates," stated that the secondary market for certificates of major money market banks had consistently yielded more than the market for major finance company paper of a similar range in maturity since August 1964. This was attributed to weak secondary market support of CD's. Money costs for smaller banks, whether in major centers or in outlying regions, were reflected in spreads above these rates. In an attempt to improve the liquidity of CD's and the mechanical ease of trading them—looking toward reduction of the premium and a proper yield relationship to the other money market instruments—the firm suggested that a consortium of regional banks be organized and that the firm be recognized as the leading dealer in the secondary market certificates for the consortium. Under this proposal the house would undertake to make a market reflecting a "proper dealer-spread" such as exists in acceptances. For instruments of members the dealer would post daily quotations and would advertise a market with a spread of 10 basis points. Yields in such a market would be quoted in five one-hundredths of a percentage point by various maturity categories, as in markets for acceptances and direct-issue commercial paper. Adjustment to the rate scale for CD's would be made when the dealer's position reached key levels in relation to the amount of financing available to the dealer.

Participating banks could post a rate on an original issue of certificates at the sell side of the dealer's posted market; that is to say, at a lesser rate. They could not post a rate higher than that posted by the dealer. The participating banks would provide the dealer with financing necessary to carry reasonable positions—the rates on such financing to be equal to the interest earned on certificates held in loan position less any trading loss on certificates sold out of positions. In the arrangement the dealer would not realize any profit on certificates held in position. This plan was expected to allow the issue rate for members to be reduced substantially. On the assumption that the participating banks would use the Federal funds market as a source of money to provide dealer financing, it was expected that there would be a profitable arbitrage between the Federal funds rate and the interest earned on certificates held in loan position. By establishing a known and advertised market for the certificates, it was argued that the issue rate for participating banks would be reduced to levels prevailing for major finance company paper and bankers' acceptances.

The consortium was not formed. Most of the prospective participants felt that they were placing CD's satisfactorily. Some thought that advantage would be taken of customer relationships. Others felt that the advantage rested largely with the dealer. Since losses would be absorbed by the lending banks and the cost of carries would equal the rate earned on CD's, the dealer would sustain no cost at all for the financing.

Purchase of certificates by the System Account

In the interest of increasing the marketability of certificates of smaller banks, the proposal has been made that the manager of the Federal Open Market Account make direct purchases of certificates from time to time. Participants in the market state, however, that such action would subject the System to political pressures and criticisms, which should be avoided. Beyond this it is believed that the "feel of the market" and the warning signs provided by changes in flows under current conditions would be lost. Although having little substance as to the likelihood, the eventuality of official rate pegging is also a background fear. In this general connection about one-third of the replies from monetary economists to a U.S. Congress Joint Economic Committee questionnaire in late 1965 requesting an opinion about broadening of the list of credit instruments eligible for purchase by the System Open Market Account favored the maintenance of current policy. Acquisition of private credit instruments would involve entrance into relatively narrow markets. Less than one-tenth of the replies favored giving the Federal Reserve more flexibility in this regard. One economist, however, specifically recommended dealing in CD's.

Extension of System repurchase agreements to dealers

Repurchase agreements by the System are now entered into with dealers in acceptances and in U.S. Government securities, and some market participants favor the addition of repurchase agreements on certificates. Unless the certificate were made eligible for purchase by the System Account and eligible for discount, there seems little to favor this proposal. Some have asked why this market should be distinguished from municipal bonds or mortgages of short-dated maturity. If a recent proposal to make acceptances ineligible for repurchase is acted upon, inclusion of certificates would be still harder to justify.

Greater market freedom with respect to CD rates

The secondary market for certificates for most of 1966 was a market by designation rather than transaction. Although this statement may not be an accurate characterization of the current market, it is still a matter of concern to participants in the market and it raises a question about the kind of secondary market that can be expected in the future if Regulation Q is used aggressively as one of the policy instruments to control bank credit. The administration of Regulation Q at various times in the past has maintained unrealistic maxima of rates, with the result that the CD facility as a whole—both the new-issue market and the secondary market—has not always been attractive to users. Rigid ceilings have also been responsible for development or expansion of several financial arrangements that may be considered questionable. These include use of repurchase agreements between banks and corporations, use of brokers in placing CD's, expansion of the Euro-dollar

market, issuance of short-term unsecured negotiable notes, and some loss of interest-sensitive funds by nonprime banks to large prime banks.

Market participants favor greater freedom in the establishment of certificate rates. To this end they argue that all buyers would use the facility more regularly if they had assurance that it would generally be attractive to them. Under these conditions issuers would not be forced to experience liquidation of CD's at maturity, and investors would find marketability more reliable.

In the absence of official action to permit the underwriting or subsidizing of CD's, and without radical change in the structure of the banking system, economic forces and the momentum of the national money market will continue to draw a preponderant share of CD's to the large prime banks. Corporate customer relationships and the size of these banks are interacting and interdependent factors, which explain these banks' share of market trading as well as investors' preferences for these names.

As in the acceptance market where there is a high degree of concentration—40 of the 125 accepting banks account for 80 per cent of all acceptances outstanding and the acceptances of these 40 banks comprise the bulk of the trading—the market for interest-sensitive CD funds is concentrated in the important financial centers. The banks outside these areas service local markets, and their customers by and large are less interest sensitive. CD's issued in these markets should not be considered as being the same as those issued by large banks.

February 1967

A STUDY OF THE MARKET FOR FEDERAL FUNDS

Parker B. Willis
Federal Reserve Bank of Boston

Contents

A STUDY OF THE MARKET FOR FEDERAL FUNDS

This study has several purposes: (1) to evaluate the operations of the Federal funds market, with emphasis on the participation of country banks as a source of funds complementary to those provided by the Federal Reserve discount window; (2) to determine whether it is feasible and desirable to promote a further development of this market so as to reduce commercial bank reliance on the discount window; and (3) if such is the case, to recommend the degree, if any, to which the Federal Reserve should become involved in that development. Federal funds are balances on deposit with Federal Reserve Banks that, together with vault cash, constitute the legal reserves that member banks of the Federal Reserve System must hold in a specified ratio to deposits. Federal funds transactions refer to the lending (selling) and borrowing (buying) of these balances or claims on such balances at rates of interest set by the parties to a transaction.

This study analyzes data on transactions in Federal funds to determine how the existing market functions and the extent to which banks of various types can and do operate within it. Analysis has been supplemented by interviews with "knowledgeable market participants." In these interviews probing was directed to assessing the current nature of these markets with respect to "depth, breadth, and resiliency," and to ascertaining any changes in these market qualities over time—seasonally, cyclically, or secularly. An attempt was also made to determine the underlying causes for any deficiencies in market operations for the several classes of banks studied.

Some consideration was given to procedures that might improve market operations. This related to the problem of Federal Reserve involvement if the System were to act as a clearinghouse for information about market functioning as a broker for Federal funds, or were to utilize the Federal funds market as a medium for controlling open market operations.

From time to time the performance and characteristics of the Federal funds market have been reviewed in detail by Federal Reserve System committees and by members of the staffs at the Reserve Banks. The bibliography contains a list of System publications that discuss the function of the market, variations in patterns of activity, and extent of member bank participation.

MAJOR FINDINGS

The market for Federal funds has experienced two periods of marked development —the 1920's and the 1950's. Its development during the 1950's carried into the 1960's—confirming and sharpening the structural outline of the market and increasing its dimensions. Throughout the 1920's banks used Federal funds almost

exclusively in adjusting their reserve positions. While banks continued this method of reserve adjustment in the later period, the volume of Federal funds acquired increased in importance both (1) as an outlet for short-term investment of secondary reserves and (2) directly or indirectly in connection with the financing of U.S. Government securities dealers. And in the 1960's an increasing number of banks sought Federal funds to support their expansions of loans and investments.

Through the early 1950's, the structure of the market changed somewhat—shifting from a direct exchange of Federal funds among banks to an exchange through an intermediary or a broker. The development of facilities for matching the supply of and demand for funds through a broker was accompanied by an even faster growth in market activity and in the number of accommodating banks. At the same time the market changed from one that was primarily regional and local in character to one that is strongly national, with its center in New York City. With the further growth of accommodating banks outside New York since 1960, and the matching of transactions within correspondent groups, transactions in the central market are now largely for the purpose of clearing residual needs.

Currently it is estimated that more than 2,300 country banks, or more than one out of every three, participate in the market either as buyers, as sellers, or as both. Participation rates range from about 17 per cent in the Minneapolis district to 83 per cent in the Boston district. Five districts report a range of 40 to 50 per cent. Similarly, virtually all of the reserve city and large country banks are now active in the market. The number of country banks using the market has increased more than fivefold since 1960.

As a rule, country banks are more often sellers than buyers, and they sell substantially more than they borrow. The typical movement of Federal funds is from small country banks to small city banks to major city banks.

Country banks supply net to the market about $800 million to $1 billion on a daily average, constituting a fifth to a quarter of the total volume of trading. This represents from 10 per cent to 12 per cent of required reserves of country banks. The increased participation is reflected in reductions in the ratio of their excess reserves to required reserves and in the ratios of balances due from banks to total deposits.

Relatively few country banks rely heavily on the Federal funds market as a source of funds, and the effect of their aggregate transactions on the market is negligible. Average daily purchases do not exceed $300 million, or about 3.7 per cent of their required reserves. In sharp contrast to attitudes of most of the large banks, many country banks turn exclusively to the Federal Reserve as their source of borrowed funds, although they use the Federal funds market regularly to dispose of funds.

There is still evidence that a good many small banks have no knowledge of the Federal funds market. In addition, some small banks are innately conservative, and they prefer to hold excess reserves rather than run the risk of having to borrow to offset deficits when they occur.

Transactions in Federal funds are accomplished rapidly and efficiently in increasing volume for increasing numbers of banks at nearly uniform rates. This reflects a high degree of adjustment between demand and supply and between price and quantity exchanged.

The growth in unity and breadth of the market during the 1960's and the increase in its efficiency have strengthened the "links" among the various divisions of the money

market and the links of the money market with the markets for longer-term credit. A given volume of Federal funds now moves through the market with a smaller change in rates than in earlier years. Market participants may move back and forth from one sector to another of the shorter-term money market in response to shifting rate differentials without causing unacceptable price changes.

The Federal funds market mechanism now consists of four brokers and perhaps as many as 70 accommodating banks in principal cities throughout the Nation. The number of regional accommodating bank arrangements increased in response to competition from large central money market banks. More recently competition among regional banks in soliciting business over wider areas than earlier has forced local competitors to establish facilities for their own correspondents.

The variety of facilities for trading Federal funds is a product of the last 10 years. The new facilities reflect heightened competition among banks, changes in policies, and more widely diffused knowledge of the market. It is now possible for all but the very small banks to keep most of their funds fully invested. Transaction units have been reduced from $1 million to $200,000 and even to as little as $25,000 in some instances.

There is no concrete evidence that small banks find it difficult to gain access to the market. As needs have grown, the market mechanism has been modified to facilitate their transactions.

Participants view the suggestions for a Federal funds auction with concern. Auctions would replace completely or radically alter the present range of facilities, which now satisfy efficiently both sides of the market—facilities that have evolved over time "to bridge" the unit banks. The sensitive index of pressures within the banking system provided by the Federal funds rate would then be lost.

DESCRIPTION OF THE MARKET

The money market is made up of institutions that provide a mechanism for the exchange of cash balances for short-term interest-bearing obligations or for the exchange of such obligations for cash balances. At present most of these shifts in the form of reserves are handled through a closely connected nationwide network of arrangements. Commercial banks are significant participants in the money market as either buyers or sellers of money market instruments, largely to maintain their legal reserves at required levels. Among the instruments they use are Federal funds. Purchases or sales of Federal funds permit adjustment for either a deficit or a surplus in a bank's reserve position at the Federal funds rate and thus constitute an important element in the administration of an individual bank's liquidity.

The market for Federal funds, now almost 50 years old, is a byproduct of Reserve System organization imposed on the American unit-banking structure. It emerged in the early 1920's as an offshoot of the money market. Normally, transactions in Federal funds are for overnight, and the rate of interest is negotiated or determined by the supply and demand in the market. The market cannot increase or decrease total member bank reserves but can only redistribute them and by so doing makes possible a fuller use of bank reserves and resources.

Sometimes banks will deliberately run

"short" on their reserve positions by lending reserves to other banks—thus causing or sometimes increasing a daily deficiency that they expect to cover later in the reserve period. On the other hand, some banks depend on this market as a source of funds for carrying an overinvested position in loans or securities for short periods.

Facilities for accomplishing Federal funds transactions have been developed in large part during the last 10 years. They reflect the growth of the market, heightened competition among large as well as many small banks, changes in practice and policies of participants, and more widely diffused knowledge of the market. The market now provides a way for all but the smallest banks to maintain a more fully invested position. A number of the smallest banks are unaware of the market or have no desire to participate.

Scope

Member bank reserve balances are of uniform quality and can be transferred freely throughout the United States. At present such balances are bought and sold at several locations in each Federal Reserve district, but New York City still occupies the prominent position and is the central market because half of all transactions originate in, or are handled by, that city and the brokers and principal accommodating banks are located there. Local selling points are intimately connected with the central market and with one another. They are linked in the sense that price differences can bring transactions from one market to another and that some of the competing buyers and competing sellers carry out transactions in more than one market within a district or in several districts. In a real sense the market is national.

The two periods of marked development in the Federal funds market—the 1920's and the 1950's—have confirmed and sharpened the structural outline of the market and increased its dimensions. Throughout the 1920's banks used Federal funds almost exclusively as a method of adjusting their reserve positions. While banks continued this method of reserve adjustment in the 1950's, the volume of Federal funds acquired increased in importance both as an outlet for short-term investment of secondary reserves and directly or indirectly in connection with financing of U.S. Government securities dealers. In the 1960's, an increasing number of banks sought Federal funds to support expansion loans and investments.

Through the early 1950's, the structure of the market changed somewhat—shifting from a direct exchange of Federal funds between banks to an exchange through an intermediary or a broker. The development of facilities for matching the supply of and the demand for Federal funds through a broker was accompanied by an even faster growth of activity and of number of accommodating banks. At the same time the market changed from one that was primarily regional and local in character to one that is strongly national, with its center in New York City. With the further growth of accommodating banks outside New York since 1960, and the matching of transactions within correspondent groups, transactions in the central market are now more largely for the purpose of clearing residual needs. Thus, the functions of the brokers changed from principally completing transactions for numbers of individual banks of differing size to completing transactions to a greater extent for the large money market and regional banks.

Interbank trading

Banks account for most of the activity in the Federal funds market. On the average only about 10 per cent of total activity is with nonbank groups—chiefly U.S. Government

securities dealers, savings banks, and corporations—but at times, the proportion may rise to 25 per cent. In 1966 on an average day $3.5 billion to $3.8 billion shifted from bank to bank, but at times the total came close to $5 billion. The average amount has increased significantly since the mid-1920's and had more than tripled by 1960. And the number of banks participating has risen in each year since 1950.

TABLE 1

TRADING IN FEDERAL FUNDS

Period	Number of banks	Daily-average gross purchases (millions of dollars)[1]
1925–32	30– 40	100– 250
1951–53	75–100	350– 450
1955–57	125–200	800–1,200
1960–63	175–275	1,500–2,500
1963–66	180–350	2,000–3,800

[1] Figures are partially estimated approximate amounts. Lower limits refer to earlier parts of designated periods.

Some 300 member banks are regular participants in the Federal funds market—buying and selling on from one to several occasions in every reserve period.[1] These banks hold about 60 per cent of all commercial bank deposits and include practically all banks with $100 million or more of deposits. The most active participants are found in Federal Reserve cities, but some 40 of the larger country banks have substantial regular dealings, and another 350 may trade as often as 25 times a year. Some estimates place the total number of participants as high as 3,000 banks. Many of these will have only one or two transactions during the year and include banks that have deposits of only $1 million to $2 million. Usually the transactions of the smaller banks are sales, which are made possible by excess reserves arising from seasonal or temporary forces.

[1] A number of nonmember banks and agencies of foreign banks are also traders—usually on the selling side. The nonmembers include both small and large banks and may number several hundred.

Brokers, accommodating banks, and accommodating and correspondent systems

Until December 1958, when The Irving Trust Company established its Federal funds desk,[2] Garvin Bantel Corporation, a member of the New York Stock Exchange, was the only broker in the Federal funds market, and there were as few as seven or eight accommodating banks, most of which were in New York City. Garvin Bantel Corporation had initiated its interdistrict business in 1948 and had encouraged participation by out-of-town banks. Participation by such banks became significant in the early 1950's, as increasing numbers of banks began to direct their transactions through that firm. Garvin Bantel estimates that until about 1953 it handled nearly 80 per cent of all trading in Federal funds, but as the number of accommodating banks expanded, this proportion dropped to 50 per cent in 1957 and later fell to one-third. Since the entry of Mabon, Nugent and Co., also a member of the New York Stock Exchange, in the fall of 1963 and George Palumbo & Co., Inc., a money broker, in November 1964, four firms have shared the volume of Federal funds moved through brokers. These firms are in daily telephone contact with market participants, and they act merely as agents in bringing buyers and sellers together.

Although the volume of transactions handled by brokers has increased since 1950, as the number of banks seeking funds has risen, most of the increase is the result of increased trading by the larger banks. The number of banks using brokers has failed to grow proportionately. There are eight banks in New York City and another 30 or more commercial banks in other parts of the Nation—at least two in each Federal Reserve district—

[2] The Federal funds desk is run separately from Irving Trust's transactions in Federal funds for its own account or for the accommodation of correspondents.

that perform an accommodating business for correspondents. Accommodating banks differ from brokers in that they generally deal as principals and often trade on both sides of the market. This group of roughly 40 banks constitute the major accommodators. During the last 4 years, however, perhaps another 40 have offered this service to a limited degree.

The increase in the number of accommodators in the Midwest, Southwest, and West in 1964 and 1965 was significant. With the exception of the San Francisco area,[3] however, most of the important accommodators are in New York, and with the brokers they form the focal point of the market. Accommodators outside New York and San Francisco generally service correspondents on a regional basis and may cross district lines to a limited extent.

Some accommodators—two-way trading banks—are net buyers, whereas others try to maintain balanced positions. Although all of the two-way traders are large banks, not all large banks conduct two-way trading. There are also differences in the use of the market within a given area, including New York. Many banks are referred to as adjusting banks, for they may appear as net buyers or as net sellers or they may run a balanced position. The smaller the bank the more likely it is to be exclusively a seller.

Development of regional accommodating or correspondent systems facilitated the entrance of smaller banks into the market. Such systems have been designed to meet competition offered in regional markets by the large central money market banks. More recently, competition among the regional banks, soliciting business over wider areas than earlier, has forced local competitors to establish facilities for their own correspondents.[4] Perhaps more importantly these arrangements reflect the attempt of the larger banks in interior parts of the United States to improve the flexibility of their own reserve positions and to meet marginal needs—thus helping to retain and improve their position in influence and size. The number of banks involved in these arrangements ranges from five or six to several hundred. To a considerable extent these networks are mutually exclusive.

TABLE 2

PURCHASES OF FEDERAL FUNDS THROUGH BROKERS

Year	Estimated number of banks [1]	Amounts (millions of dollars)	
		Total	Daily average
1949	15– 20	22,000	100– 150
1950	30– 40	39,000	150– 200
1951	35– 45	53,000	210– 250
1952	45– 50	68,000	260– 320
1953	50– 75	70,000	280– 340
1954	75– 85	83,000	330– 360
1955	85–100	79,000	320– 350
1956	115–130	86,000	350– 400
1957	130–145	87,000	310– 340
1958	135–155	115,000	350– 400
1959	140–160	94,000	330– 360
1960	160–175	132,000	375– 425
1961	180–210	158,000	450– 510
1962	180–220	185,000	535– 600
1963	185–225	160,000	430– 540
1964	190–230	185,000	415– 610
1965	200–240	281,000	650– 887
1966	225–250	442,000	1,050–1,330

[1] An accurate percentage of Federal funds transactions cleared through the brokers in relation to total activity cannot be computed because of double counting. Not only does the activity of the accommodating banks overstate the net movement of funds from ultimate supplier to ultimate user within a given day, but the activity of the brokers will include some of the same transactions reported by the accommodators. Hence, in a movement of Federal funds from Bank X to Bank Y, two purchases may be reported—the purchase by the accommodating bank from Bank X, and the purchase by Bank Y. They may be identical. The Federal funds may ultimately move to Y from the accommodating bank through one of the brokers.

SOURCE.—Data for 1949–62 supplied by The Garvin Bantel Corp. Volume data for 1963–66 based on reports of three brokers to the Federal Reserve Bank of New York.

Some leading correspondents have taken an aggressive approach in developing trad-

[3] Banks in the San Francisco Federal Reserve District accounted for more than one-sixth of the gross transactions in Federal funds in 1966—a larger fraction than for any other district except New York. Two-way trades amounted to two-thirds of total transactions of banks in the San Francisco District.

[4] For example, the promotion of trading in Federal funds by large Dallas banks in 1965–66 forced city banks in Oklahoma to offer trading services to country banks more willingly, and this has resulted in extensive trading by Oklahoma banks.

ing positions in Federal funds to enable them to provide a new business service—selling or buying funds to or from their correspondents—whereas others encourage only sales. A few have adopted a passive attitude—offering to buy or sell only upon specific request from the smaller banks and being reluctant to improve the familiarity of these banks with the market.

Accommodating banks usually operate on both sides of the market during the same day. In providing or absorbing funds as a service to correspondents, the accommodator generally will (1) to the extent possible, match on its own books buy and sell orders, which it receives from a correspondent or customer bank; (2) when its own reserve position is more than adequate, care for the correspondent's needs out of its own position; and (3) when it is not possible to accomplish transactions by either (1) or (2), use its best effort to cover a correspondent's needs in the national market. At times the accommodating bank may even borrow from its Federal Reserve Bank. In other cases the lead correspondent[5] acts only as agent, and it pools sales of a customer bank with its own. Funds purchased by smaller banks usually come from the lead bank's reserves.

All of the accommodating or correspondent arrangements do not provide the same degree of service, and some may limit their service at certain times during the year. In some cases they may require a collateral loan agreement of the correspondent. When the service provides for purchases of funds by the smaller banks, the lead bank usually sets up an informal line of funds. If the correspondent's needs exceed the level of its credit line, the accommodating bank will refer the request to an officer in charge of the bank's money position or the representative who regularly calls upon the particular bank. Minimum transaction units generally range from $200,000 down to $25,000 in size. Some, however, set $200,000 as the minimum and will use $100,000 or less only under pressure. Legal borrowing and lending limits are generally observed, and this requires in a number of States that sales by smaller State bank correspondents be secured by U.S. Government securities.

Some lead correspondents charge one-eighth of a percentage point on purchases of less than $1 million but will sell at the prevailing rate regardless of the amount. Others will take one-eighth of a percentage point on sales. Some lead correspondents buy and sell at the same rate. If the bank is acting as agent or if sales are usually combined with those of the lead bank, the correspondent receives the rate on the combined transaction. Few, if any, lead banks view the service of providing Federal funds as a source of profits.[6]

Probably 85 per cent of the transactions are for overnight and the rest range from 3 days to 2 weeks, with the rate being fixed from day to day. In some instances Federal funds remain at the bank's disposal until either party terminates the arrangement or until the rate changes. There has been a tendency to increase the length of transactions with smaller banks to minimize costs.

General patterns of funds activity [7]

Trading in the Federal funds market has shown a very rapid rate of growth since World War II. This factor, along with the large number of new entrants and the spreading of knowledge about the market, has tended to blur the cyclical pattern of

[5] Refers to the dominant bank in the group.

[6] One typical regional trading system with 124 members collected income and cost data for a 6-month period. Gross income amounted to $5,000 and was derived largely from rate spreads. Cost, without overhead allocation, for overhead expenses exceeded income slightly.

[7] For more detail see the bibliography.

growth in such trading. In general, transactions in Federal funds have grown at a slower rate during periods of restrictive conditions in the money market. The years 1965 and 1966 were exceptions. Those years produced record levels of transactions—reflecting increased trading by all banks as policies and practices changed, as well as a large number of new entrants. Important factors in these years were the significant shifts in relationships of interest rates in the money market, in part a result of monetary policy.

As a general rule, Federal funds activity is highest over the longer run in periods when the market is neither very firm nor very easy. This reflects chiefly rate relationships. When money is tight and demand strong, the supply tends to dry up because of greater profitability of other uses of short-term funds. Under very easy conditions demand is low, driving rates down to levels where the increased supply seeks more profitable outlets.

The major cyclical shifts in supply and demand for Federal funds may be attributed to banks that consistently borrow—sometimes in such funds and sometimes at the Reserve Banks—to maintain their loan and investment portfolios in periods of heavy credit demands and monetary restraint. Although many of these banks remain net buyers as markets ease, their net purchases are sharply reduced.

Federal funds activity also shows intramonthly variations in volume associated in part with float but more importantly with the ebb and flow of pressures on the large banks caused by the complex of "operating factors" such as the movement of correspondent balances, financing needs of U.S. Government securities dealers, Treasury calls and deposits, and corporate tax and dividend dates. The generalized pattern presents a sharp rise in activity at midmonth.

Intraweekly patterns of activity also exist, but these have changed in recent years. Trading is generally a little higher on Fridays when some banks try to obtain the cumulative effect of transactions over the weekend. And trading is often heavier toward the end of the settlement week as banks seek to bring their reserves to the required level for their reserve computation period.

Smaller country banks as a rule seem to divide their activity more or less equally among the 12 months. In contrast, larger banks may concentrate their activity during certain periods of the year or may shift from sellers to buyers or vice versa.

COUNTRY BANKS AND THE MARKET

As indicated earlier, one purpose of this study was to evaluate the use of the Federal funds market by country banks as an alternative source of funds.

Growth in participation

Participation of the smaller country banks in the Federal funds market began to accelerate early in the 1960's and became increasingly widespread after 1962. Before that, banks with less than $100 million in deposits seldom traded in that market. The standard unit of trading was $1 million, a relatively large amount for small banks. Furthermore, it was more than such banks would generally have for sale and more than they would need for reserve adjustment. The small banks usually carried excess reserves, and if these amounts were not sufficient to meet their reserve losses, they would borrow at the Federal Reserve or from correspondents with whom they lodged excess funds or they would buy Treasury bills.

TABLE 3

PARTICIPATION OF RESERVE CITY AND COUNTRY BANKS IN THE FEDERAL FUNDS MARKET, 1961 AND 1966

By district

Federal Reserve district	1961				1966			
	Reserve city banks— Total number [1]	Country banks			Reserve city banks— Total number [1]	Country banks		
		Total number	Number trading [2]	Per cent trading		Total number [3]	Number trading [2]	Per cent trading
Boston	5	256	61	23.8	4	247	204	82.6
New York	19	456	81	17.8	15	394	200	50.8
Philadelphia	6	468	40	8.5	6	402	200	49.8
Cleveland	21	530	60	11.3	16	488	225	46.1
Richmond	16	412	29	7.0	17	392	168	42.9
Atlanta	25	395	15	3.8	26	494	205	41.5
Chicago	27	976	70	7.2	26	980	450	45.9
St. Louis	18	460	14	3.0	15	468	151	32.3
Minneapolis	11	465	10	2.2	8	487	85	17.4
Kansas City	35	722	12	1.7	22	813	175	21.5
Dallas	21	609	10	1.6	17	658	175	26.6
San Francisco	24	136	40	29.4	21	204	100	49.0
Total	**228**	**5,885**	**442**	**7.5**	**193**	**6,027**	**2,338**	**38.8**

[1] Percentage of Reserve city banks trading ranged from 50 to 100 per cent in 1961 and from 95 to 100 per cent in 1966. The smaller percentages apply to Midwest and Southwest districts.

[2] Data for Boston, Philadelphia, New York, Richmond, Chicago, Minneapolis, and Kansas City Districts derived from surveys. Other data partially estimated.

[3] Data are for the beginning of 1966.

SOURCE.—Federal Reserve *Bulletin* June 1966, pp. 894–95; and May 1962, pp. 646–47.

The forces underlying increased participation by the smaller banks in the Federal funds market have been present for some time. The basic force was the combination of rising short-term interest rates and increased banking costs, which provided a strong stimulus, particularly after 1964.

In 1961 probably as many as 400 country banks traded funds at one time or another during the year (Table 3). These banks generally ranged in size from $75 million to $100 million or more in deposits. In 1966 about 2,500 country banks, or one out of every three, traded at least once during one reserve period in the year. This represents a fivefold increase in numbers since 1961 and a doubling since 1964. Included are banks with deposits of as little as $1 million, and some are found in every Federal Reserve district.[8] The greatest growth in participation, however, has been among banks in the deposit grouping from $10 million to $50 million. For banks with deposits of $10 million or less, it is estimated that between 15 per cent and 72 per cent of the number in the several districts participate (Table 4). In general, activity is related to bank size—the proportion of banks that trade increases with each size class up to the level of $50 million in deposits. Participation now includes significant percentages of banks in the third and fourth size categories, where

[8] The Minneapolis District has the lowest rate of participation of any district—probably because of the bank holding companies located there and the large number of very small banks. One large holding company arranges purchases and sales for its members through the Bank of America, with appropriate entries to reserve accounts at the Federal Reserve Bank of Minneapolis. About two-thirds of the trading banks in the Minneapolis District are members of this bank holding company.

The repeal of Section 6 of the Bank Holding Company Act in July 1966 and concurrent withdrawal of the Federal Reserve Board's ruling of 1959 prohibiting trading of Federal funds between bank subsidiaries of a holding company apparently had had little effect on trading by the end of 1966. After July 1 subsidiary banks of a holding company were in effect permitted to deal with each other at arm's length and were consequently as free to trade Federal funds as were any other banks within the limits and collateral requirements of Section 23A of the Federal Reserve Act.

banks are ranked by size of deposits into six groups of 1,000 each. The fifth and sixth groups comprise banks of less than $5 million in deposits—found in greatest numbers in the Midwest and South where activity rates are lowest.

The reduced size of the trading units in correspondent trading arrangements has not only encouraged small country banks to enter the market but has increased the frequency of their trades within reserve periods. It is no longer necessary to accumulate funds during a part of the reserve period to meet transaction sizes.

TABLE 4

PARTICIPATION OF SMALL MEMBER BANKS IN THE FEDERAL FUNDS MARKET, 1966

By district

Federal Reserve district	Total number [1]	Banks trading Federal funds		Percentage of all country banks
		Number [2]	Per cent of total	
Boston	139	100	72	56
New York	185	44	24	47
Philadelphia	237	50	21	60
Cleveland	285	63	22	58
Richmond	251	57	23	64
Atlanta	280	56	20	57
Chicago	600	150	25	61
St. Louis	346	69	20	74
Minneapolis	360	54	15	74
Kansas City	650	90	14	80
Dallas	491	98	20	75
San Francisco	117	39	33	57
Total	3,941	870	22	....

[1] Based on numbers of banks shown in annual member bank operating ratios or monthly reviews of the Federal Reserve Banks.

[2] Figures for Boston, Philadelphia, New York, Richmond, Chicago, Minneapolis, and Kansas City Districts derived from surveys. Data for other districts are partially estimated.

NOTE.—Data are for banks with deposits of $10 million or less.

Even so, most of the trading in Federal funds continues to be concentrated in a relatively small number of large banks in the money market centers. About 46 banks, a third of which have deposits of $1 billion or over, account for three-fourths of all transactions. It is the transactions of these banks that have the greatest impact on the money market. The tendency up to the mid-1960's was toward increasing concentration, but a small lessening in concentration has developed with the rise of regional correspondent systems with widespread participation on the part of country banks. Although the average dollar volume of transactions of most of the country banks is relatively small in the aggregate and does not have a substantial impact on the money market, the transactions of these banks play a continuous role that is marginally important to management of reserves of most participants.

Sales of funds

Although country banks of all sizes both buy and sell Federal funds, they are generally sellers more often than buyers, and they sell substantially more than they borrow. The typical movement of Federal funds is from small country banks and small city banks to the major city banks. On balance, country banks supply net to the market from $800 million to $1 billion daily on the average, or from one-fifth to one-quarter of the total volume of trading. This amount represents from 10 to 12 per cent of the required reserves of country banks. Most of these funds come from banks with at least $25 million of deposits.

The increased participation of country banks in the market is reflected in the reduction of the ratio of their excess reserves to required reserves and in the ratio of demand balances due from banks to total deposits. In 1961 these ratios were 8.0 per cent and 7.0 per cent, respectively. By 1966 they had declined to 3.5 per cent and 5.4 per cent, respectively—suggesting that the decline in excess reserves is real and not simply a transfer of funds from one nonearning asset to another. The growth in sales of Federal funds by country banks has been greater than the decline in their excess reserves. The fall in the ratio of demand balances due from banks occurred despite a modest increase in the level of such balances; in 1966

these balances averaged 12 per cent higher than in 1961, whereas total deposits had risen by 49 per cent. The increase in the balances for the most part reflected operating needs. Relatively few leading correspondents are reported to have insisted on larger balances in return for providing Federal funds. Some participants are reported to have made voluntary increases in deposit balances because they liked the service.

Many smaller country bankers indicate that trading in Federal funds has reduced their reliance on purchases or sales of Treasury and other money market instruments as a means of reserve adjustment. In general, these bankers continue to feel that Treasury bills and similar instruments involve inconvenience, cost, and exposure to market loss when used to adjust reserve positions within the 2-week settlement period. Some indicate that their reluctance to place liquid reserves in Treasury bills had resulted in maintenance of excess reserves at a level higher than that which they found desirable since they entered the Federal funds market.

Smaller banks thus have reduced their nonearning assets by selling Federal funds, and in some cases they have substituted these funds for other earning assets. And the larger city banks have bought Federal funds to facilitate maintenance of a position in loans and investment with relatively high yield.

Country banks can be net sellers only to the extent that city banks are buyers. The eagerness of the larger banks to buy in recent periods is reflected in the breaking down of large transaction units into units of $200,000 and less. An increasing number of larger country banks are acquiring Federal funds and are then "laying them off" or arranging arbitrage—in the form of a repurchase agreement with U.S. Government securities dealers made at a higher rate than the purchase; or some may put the funds into Treasury bills when the rate on bills is attractive relative to the Federal funds rate.

Purchases of funds

On the buying side, relatively few country banks rely heavily on the Federal funds market as a source of funds, and the effect of their aggregative transactions is negligible. Average daily purchases probably do not exceed $300 million—or not more than 3.7 per cent of required reserves. And many smaller banks have no need to borrow from any source.

A bank's appraisal of the advantages and disadvantages of using the Federal funds market or the discount window or of liquidating Treasury bills is a major factor in its decision of how to adjust its deficits. Frequently, the decision reflects practical considerations where convenience seems to be more important than cost.

In sharp contrast to attitudes of most of the larger banks, many country banks indicate that they seldom obtain funds in the Federal funds market although they use that market regularly to dispose of excess funds. These banks apparently have no hesitancy about borrowing from the Federal Reserve. In fact, they prefer to resort to the discount window rather than to attempt to obtain Federal funds or to liquidate securities, particularly in a declining market or when the outlook for rates is uncertain. In this group are banks that never buy Federal funds and some that buy them only when there is a rate advantage.

These banks cite the following advantages of using the Federal Reserve discount window:

Convenience. Notes can be prepared in advance and collateral is already in safekeeping. This avoids the necessity for trying to locate Federal funds, particularly when they might be scarce.

Timing. Funds can be obtained from the Federal Reserve later in the day. In certain cases, the time differences between New York and the West are very important.

Dependability. The Federal Reserve is a more dependable source of funds, and banks can borrow the extra amount needed; sometimes this amount may exceed the amount that can be legally borrowed in the market.

Cost. Borrowing at the Federal Reserve is slightly cheaper when rates are nominally the same because interest is figured on a 365-day basis instead of the 360 days for Federal funds. Because balances are maintained at the Federal Reserve Banks, the argument is that some use should be made of them. And if banks turn to the correspondent, it is possible that the correspondent bank would ask that the requesting bank deposit additional balances, which would tie up more funds and raise the cost to that bank.

Some district comments on funds trading

The following comments by Federal Reserve Banks in several districts reflect the practices and attitudes of smaller banks toward use of the Federal funds market.

Chicago

We are reasonably sure that the large Chicago banks do not encourage their country correspondents to purchase Fed funds, particularly in the current situation, but some individual banks can get overnight money this way largely due to competition among large banks for correspondent balances. It is our impression that the Fed funds available to small banks from their correspondents are considered part of the package of correspondent services and that a banker that keeps a good balance may be able to get Funds if he wants them. But it seems much more likely that he may prefer to draw down his balance temporarily when he needs short-term money. *We still find evidence that there are a good many small banks that do not know anything about Federal funds and some seem unaware that they can buy as well as sell.*

(Italics supplied.) Letter, FR Bank, Chicago, Sept. 19, 1966.

Richmond

Most banks meet reserve deficiencies in the short run primarily by buying Federal funds or borrowing from the Federal Reserve. Large banks tend to incur deficiencies more frequently than small banks and therefore rely more heavily on both sources of funds. Of the 120 banks in the survey with deposits of less than $5 million, 4 per cent bought Federal funds and 12 percent borrowed at the discount window in 1965 but less than 1 percent tapped both sources. In the next size classification $5-$10 million, only 2 percent of the 129 banks used both sources while 13 percent bought Federal funds and 17 percent borrowed from the Federal Reserve. The proportion using both sources rose rapidly to 8 percent in the $10-$25 million range, 29 percent of the $50-$100 million banks and 82 percent of banks with deposits over $100 million.

The proportion of banks buying Federal funds but not borrowing at the discount window also rose with bank size up to the $100 million level, then dropped strongly from 43 percent to 9 percent . . . The combination of those buying Funds and those using both sources grew steadily with bank size ranging from 5 percent to 91 percent. Thus, the larger the bank the stronger the tendency to borrow.

FR Bank, Richmond, *Monthly Review*, Sept. 1966, pp. 10 and 11.

Minneapolis

The results of the survey indicate that only a limited number of Ninth District member banks made use of the Federal funds market. Among those that did enter the market, size and frequency of transaction seemed directly related to size of bank.

The average frequency of purchase like size of transaction varied by size of bank: small banks made fewer purchases than large banks. For example, each of the seven banks with deposits of between $4 and $8 million that entered the market on the buying side made an average of 7.6 purchases. On the other hand, each of the largest-size buyers, $32 million and over averaged 48.6 purchases.

The average number of sales among banks that were active in the selling side of the market was somewhat lower, 17.4, than the number of purchases per bank. Average sales were pulled down by the behavior of the larger banks, those with $16 million and more in deposits; on the average each of the larger banks made fewer sales than purchases.

Several banks, however, returned their question-

naire with the *comment that they had never heard of Federal funds.*

The negative attitude of some city banks (in trading Funds with smaller correspondents) may be explained by their status as members of one or another of the several holding companies that exist in the district . . . Larger city banks that are members of a holding company (are) legally able to trade funds with some of the country banks they serve as correspondents but not with others. Their attitude towards trading with country banks may reflect a desire to avoid having to discriminate among customers.

(Italics supplied.) FR Bank, Minneapolis, *Monthly Review,* July 1966, pp. 6–8.

New York

Second District country member banks as a group entered the market more often as sellers than as buyers—in accord with the fact that country banks . . . hold relatively high levels of excess reserves.

. . . most of the participating banks . . . with less than $10 million in total deposits entered the market only as sellers. . . . participating banks in the intermediate size range, $10 million to $25 million in deposits was fairly evenly divided between banks that just sold funds and banks which acted as both buyers and sellers while most banks with deposits of $25 million or more traded at various times on both sides of the market. Even among banks which both sold and purchased funds, however, the frequency of transaction on the selling side was substantially greater than on the purchasing side.

FR Bank, New York, *Monthly Review,* May 1966, p. 115.

Philadelphia

Some 30 percent of the nonbuyers and 45 percent of the nonsellers suggested that they feel too small to be active in Federal funds. As would be expected, these banks are indeed almost always very small and typically are located in rural areas. It should be important, however, that there are many banks as small or even smaller that *are* active . . . The true explanation is, therefore, that management is either unaware of the opportunities offered by the market or feels that the potential profit from Federal funds transactions does not justify the "trouble" of entering the market.

. . . only 15 and 17 percent of the nonsellers and buyers respectively *noted that they were unaware of Federal funds and most of them are the smaller banks.* (Some lead correspondents) have apparently not been so active (as others) in acquainting their country correspondents with the Funds market.

Country member banks which avoided Federal funds because they preferred other methods of borrowing and lending were frequently large institutions, frequently situated in urban areas. Rather than buy they borrow directly from correspondents or at the discount window.

(Italics supplied.) FR Bank, Philadelphia, *Monthly Review,* August 1966, pp. 8–9.

Kansas City

No accurate figures on the number of member banks trading in Federal funds resulted from the survey. Some guesses are possible, however. Under 10 per cent of the member banks with deposits of less than $5 million trade Federal funds. Approximately 25 percent or less of the banks with deposits of $5–$10 million participate in the market. About 50 percent of the member banks in the $10–$50 million size range participate. Over 90 percent of the over $50 million banks participated through member correspondents.

The number of banks participating in the Federal funds market is apparently largely dependent on awareness and familiarity with the market and many smaller banks in the District are unacquainted with Federal funds and the large city banks are not encouraging familiarity. The number of participating banks is growing rapidly, however, as knowledge of the market spreads through other channels.

Most of the smaller banks that are trading Federal funds are sellers of funds. The city banks have no explanation of this except for reference to the traditional aversion of small banks to borrowing.

Letter, FR Bank, Kansas City, December 16, 1966.

San Francisco

Recent data from District Federal funds reporters indicate that both California and Pacific Northwest banks have been selling and purchasing funds from other District Banks. Some of these transactions have been in small magnitudes—indicating the probability that the transactions were with relatively small banks.

A check with our Discount Department disclosed no complaints by banks applying at the discount window about lack of access to the Federal funds market.

It would appear, therefore, that small banks in the San Francisco District do have access to the Federal funds market through their correspondent or

other banking relationships. The only bar would appear to be for the smallest banks which cannot profitably participate in the market on the sell side because of the small volume of their lendable funds.

June 30 call report data . . . indicate that even banks with less than $2 million in deposits participated in the Federal funds market on both the buy and sell side. This confirms interviews with District banks—which make a market in Federal funds—that small country banks were actively participating in the market at times in such small amounts that interest costs probably did not cover the communication cost of the transaction.

Letter, FR Bank, San Francisco, November 11, 1966.

FEDERAL FUNDS VERSUS BORROWING AT RESERVE BANKS

On an average day in the late 1920's, Federal funds traded for all member banks ranged from about 4 to 10 per cent of required reserves. In the late 1950's and early 1960's this ratio ranged from about 7 to 12 per cent of these requirements. At the time of this writing, the ratio is close to 25 per cent. By this measure, trading in Federal funds has become of substantially greater relative importance than in earlier periods. It should be noted, however, that the reserve requirement level is about 20 per cent higher than in the 1920's. Meanwhile, trading in Federal funds has shown a much greater rise; compared with the lower limit of the trading range, it has increased 15 times, and compared with the upper limit, it has risen about 10 times; compared with the 1950's, the ranges have more than tripled.

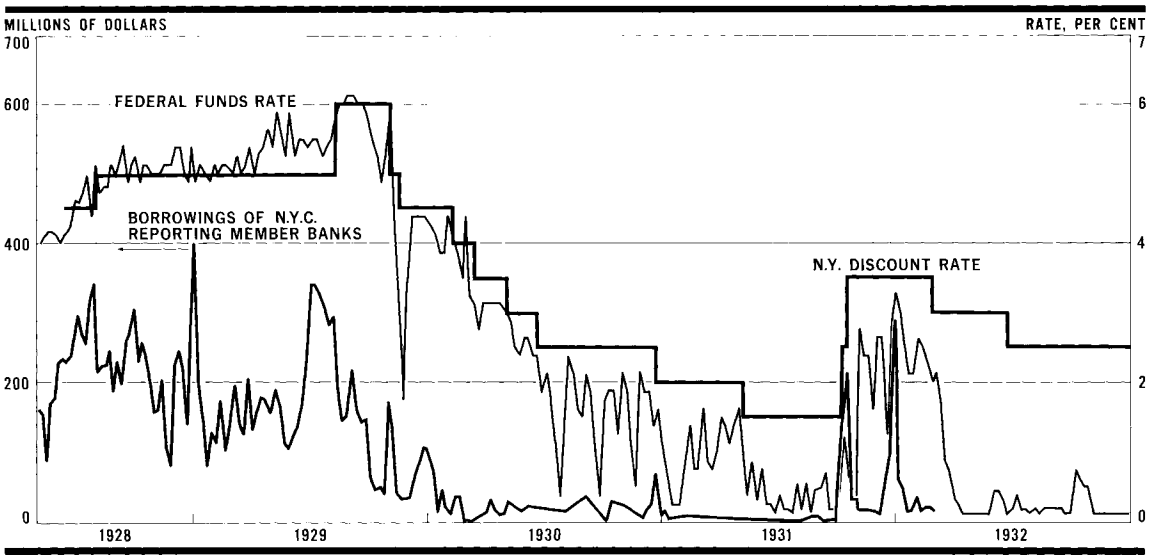
If the daily-average volumes of discounts and of trading in Federal funds are combined, the total at times in the 1920's reached about 50 per cent of required reserves in contrast to about 12 per cent in heavy trading days in the 1950's and 21 per cent in recent periods. Thus, borrowings from the Reserve Banks made up a substantially larger part of the reserve base in the credit superstructure of the 1920's than in recent decades.

It should also be noted that borrowings from the Reserve Banks during periods of expansion in the 1950's and 1960's averaged about $100 million less than in the late 1920's. However, the composition of total borrowing as suggested by these figures above was reversed; the ratio of Federal funds to borrowings in the 1920's was about one to four; now it is four or five to one. It may be said that in the 1920's Federal funds were considered a supplement to discounting but that in the 1960's discounting had become a supplement to trading in Federal funds. Although transactions in Federal funds relieve the individual bank from use of the discount window, they do not relieve the banking system as a whole from reliance on the Federal Reserve.

THE FEDERAL FUNDS RATE

Except for a period of about 2 years in the late 1920's and a similar period beginning in the midautumn of 1964, the Federal funds rate has fluctuated between the discount rate and a lower limit at one-eighth to one-half of a percentage point. Because of their access to the discount window at the Reserve Banks, member banks have not usually been willing to pay more than the discount rate. The lower limit of the Federal funds rate is set at the point where banks recover costs, even though some accommodating banks may absorb some of these costs in promoting the market.

1 | FEDERAL FUNDS RATE–NEW YORK

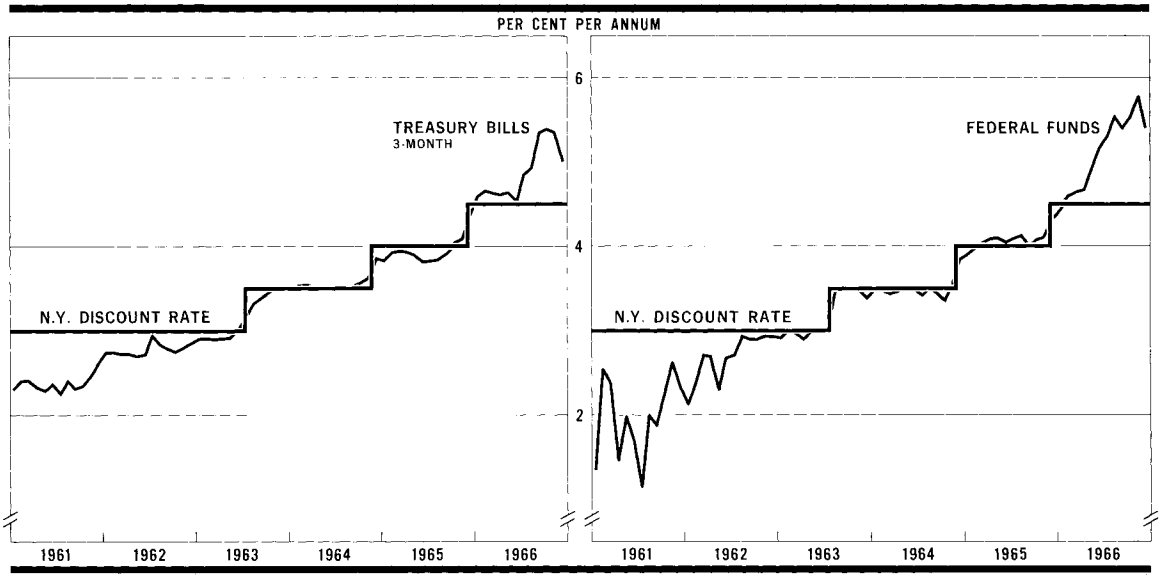


Data from *N.Y. Herald Tribune* and Federal Reserve Bank of New York. Federal funds data not available in series form prior to April 1928.

Transactions in Federal funds among banks are now quoted in terms of the effective or prevailing rate—the level at which the great bulk of transactions are accomplished. The quote is considered representative of rates for the entire market—New York City and elsewhere. Quotations above and below the effective rate, when they occur, merely indicate a range of quotations on a given day. During the postwar period the quotations have usually changed by one-fourth of a percentage point, but more recently, as in other markets, the change has frequently been one-eighth of a percentage point—reflecting the extent of competition within this market and the relation to rates in alternative markets. Differentials of one-fourth of a percentage point were also a characteristic of the 1920's.

The premiums that were bid on Federal funds during the 1920's ranged from one-eighth of a percentage point to more than a full percentage point above the discount rate when the latter was at levels of 4, 4½, 5, and 6 per cent. The willingness of banks to pay this rate was attributed to lack of eligible paper or to fear of criticism at the Reserve Bank because of their loans on stocks. The premium bid of the mid-1960's developed from the efforts of leading banks to obtain a larger volume of reserves for lending and investing and from fears that they would be criticized if borrowing from the Federal Reserve were used for extended or continuous periods. At times the premium that emerged was 1⅝ percentage points above the 4½ per cent discount rate, and on November 2, 1966, it was 1¾ percentage points higher. The discount rate was not changed after it had been raised to 4½ per cent in December 1965, and the premium on Federal funds was undoubtedly larger than it would have been if the discount rate had been raised to conform with general increases in market rates. In a sense the Federal funds rate became a discount rate. Discipline exercised at the discount window insured that Federal Reserve advances were not a steady and continuous source of supply for any given bank; hence banks had to obtain reserves from the Federal funds market, and demand forced up the rate on these

2 | SELECTED MARKET RATES OF INTEREST



Data from Federal Reserve Bank of New York.

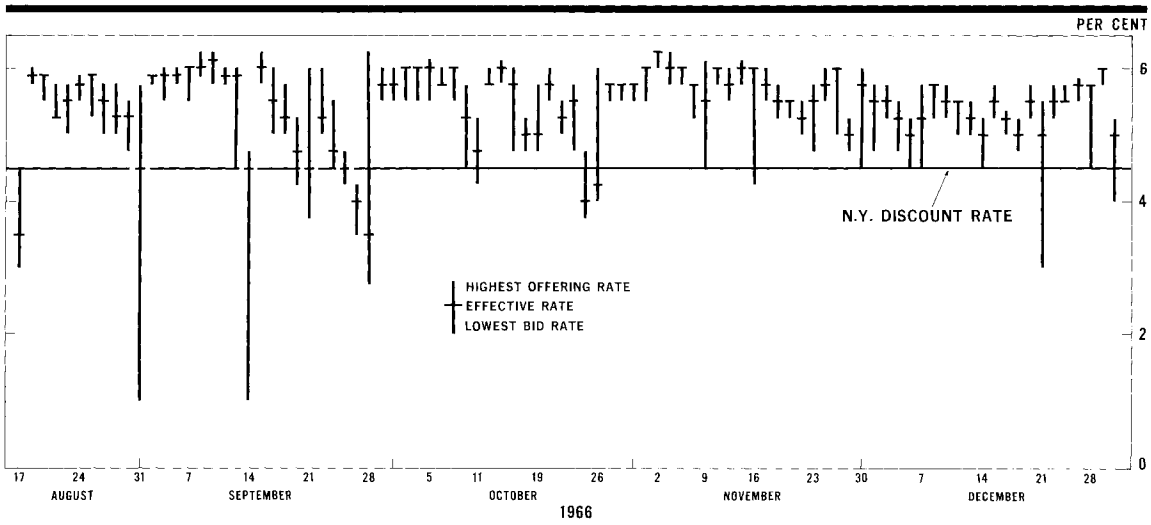
funds. Administration of the discount window in the 1950's and 1960's was more severe than in the 1920's and was substituted for the higher discount rate levels that had prevailed in the earlier period.

This was particularly true in 1966. In late summer the System released a letter dated September 1 calling for the cooperation of member banks in curtailing expansion in loans to businesses. The letter indicated that if member banks experiencing deposit losses made efforts to reduce the expansion of their loans instead of cutting further into municipal securities, credit would be extended to them for a longer period than usual. The banks, however, did not take advantage of this offer to any extent and made most of their adjustments without the System's assistance, showing a strong preference for the privacy of the Federal funds market.

Paying more than the discount rate for Federal funds reflects the elasticity of the demand for these funds. In fact, the market may be said to represent a source of marginal demand and supply, one in which increases in either demand or supply quickly result in higher or lower interest rates in contrast to some other markets where competition is less perfect. The Federal funds rate acts as a sensitive indicator of shifting pressures in the banking system—particularly when related to the supplier of the funds, to the volume of the flows, and to the depth of the demand. The huge flow of Federal funds during the past 2 years and the widespread participation of banks of all sizes in the market underscore this characterization.

Transactions are accomplished rapidly and efficiently in increasing volume for a growing number of banks at nearly uniform rates. Thus, there is a high degree of adjustment between demand and supply and price and quantity exchanged. The several markets and several market rates that may exist at any given time are the result of forces of the same general character but of different magnitudes. The rates are not unrelated to each other but reflect distinct prices, and the departures from the effective rate merely reflect a wider range of quotes on a given

3 | FEDERAL FUNDS RATE AND DISCOUNT RATE



The vertical lines represent each day's range from the low bid to the high offer. "Effective rate" is the rate at which the largest volume of business was transacted.

day.[9] Lack of perfect adjustment and of a uniform rate arises from institutional friction, the absence of knowledge of the market as a whole, and the use of Federal funds by nonbank groups and others.

[9] See Chapter 4, *Trading in Federal Funds—Findings of a Three-Year Survey*, by Dorothy M. Nichols, Board of Governors of the Federal Reserve System, Washington, D.C., September 1965, for a detailed discussion of the determination of rates and rate structure. This study provides a detailed analysis of Federal funds transactions by the 250 to 260 banks that reported to the System between September 1959 and September 1963.

The growth in unity and breadth of the Federal funds market and the increase in its efficiency during the 1960's have strengthened the links among the various divisions of the money market and the links of the money market to the longer-term credit market. A given volume of Federal funds will now move through that market with less change in rates than formerly, and the market participants may move back and forth from one sector of the money market to another in response to shifting rate differentials without causing disruptive price changes.

THE MARKET AS A SOURCE OF AND OUTLET FOR FEDERAL FUNDS

In general, the Federal funds market has permitted and encouraged banks to reduce their excess reserves and, in addition, has helped to distribute reserves supplied by the Federal Reserve through open market operations, the discount window, and reductions in the level of required reserves. For all banks the market provides an important means of adjusting their reserve positions, and the condition or atmosphere in the market is related to developments in other segments of the short-term market.

The Federal funds market also represents a source of and an outlet for these funds over periods of time. Deposit swings, however, force short-run variations in the size of purchases or sales. Transfers of reserves from selling banks to buying banks—in addition to reducing the excess reserves of the selling banks—influence the composi-

tion of assets in the banking system. Net buyers of Federal funds absorb the obligation of extending credit to a variety of users.

The small country banks use the market principally as an investment medium, and their widening use of the market in recent years has caused them to compute reserve requirements more accurately and to sell excesses to city banks. Country banks are much less active on the buying side, and as was indicated earlier, some prefer to go to the Federal Reserve when the need to borrow arises. Most of the country banks that do not participate in the Federal funds market hold deposits of $5 million or less. Some of these banks have no familiarity with the market, but others state that they expect to enter the market in the future if conditions are suitable. Banks of this size that do participate are almost exclusively sellers, but a few of them state that they would borrow if necessary.

With country member banks in the Federal funds market now numbering more than 2,500, some of which are small banks in terms of their total deposits, it is doubtful that the dimensions of this market will increase substantially in the future. There are considerable differences in management capability of very small nonparticipating banks. Furthermore, many of them would find it too costly to participate, even as sellers. This cost is measured in terms of maintaining statistics on their flows of deposits, following market developments, and communication. On the buying side, the question may be raised whether small banks should be encouraged to become borrowers for the periods of time necessary to support additions to their portfolios even if the demands by their customers could be met in this way. The same question may be raised about some of the large city banks, which may have exploited borrowing sources outside the Federal Reserve. Considerable skill is necessary to use short-term markets as a dependable source of reserves.

However, some observers feel that easier access to borrowings in the Federal funds market should be provided for small banks. Proposals to facilitate this include auctions in Federal funds and the performance of a brokerage function by the Reserve Banks; these proposals are discussed next.

Clear-cut evidence of the difficulty of access to the Federal funds market is lacking, particularly in a review of the growth and development of the market previous to this study. Additional participation or more continuous participation in the market by the small banks, if desired, can be accomplished by breaking down the innate conservatism of nonparticipants and by broadening their knowledge of the market.

ALTERNATIVE INSTRUMENTS OR SYSTEMS OF CONTROL

The Steering Committee, summarizing issues involved in reformulation of the "Discount Mechanism and Concept" has stated that over and above the considerations of control mechanisms, the efficacy of alternative instruments of systems of control must be considered from the broad viewpoint of over-all public policy and the discount mechanism as a whole.

Auctions of Federal funds

One suggested modification is to replace the present purpose constraints with a quantitative limitation on borrowed reserves through regular auctions of predetermined amounts of Federal funds (reserves). In each reserve-computation period the banks could bid for Federal funds and pay for them by tendering

their own liabilities—auctions might be used as the major source of reserve credit or for particular purposes.

The Steering Committee has also raised the following questions relating to the possible use of auctions: What becomes of open market operations—as a provider of credit for certain other purposes or as a supplemental tool to correct errors in the auction process? What policy measures other than price of Federal funds auctioned would be needed to insure a proper allocation of Reserve Bank credit? Who should determine how often and what volume of reserves to auction? How would the funds be auctioned —in the Federal funds market, or by a procedure similar to that for selling Treasury bills, or by a new method?

In an academic seminar discussing changes in the discount window[10] a suggestion was made that the auction be run on a 13-week cycle, say $500 million each week. Unsatisfied demands during a given week would be met at a penalty rate, that is, at a rate above the auction. Another suggestion was to hold the auction daily or with some other regularity—with arrangements for filling noncompetitive bids at the average rate in the auction and for providing any additional amounts needed at a penalty above the average rate.

Advantages advanced for the auction proposal were that it would: broaden the Federal funds market to the smallest bank in the smallest transaction, stabilize the total of System loans (the amount of rediscounts could be fixed forever or could be changed) provide a market-determined rate (as compared with the discount rate), and prevent the banking system from running out of liabilities as a means of payment.[11]

The disadvantages noted were that it would be difficult to determine the amount to be auctioned and that determination of the amount against projected demand would in effect set the rate—in other words, the problem of determining the quantity is similar to that of fixing the rate.

Without additional detail or assumptions a complete analysis of the effects of the auction proposal on existing institutions in the money market is not possible. Offhand, however, it seems that the proposal, in order to be successful, would have to replace completely, or at least in substantial part, the present range of facilities, which now satisfy quite efficiently the requirements of both sides of the Federal funds market—facilities that have evolved over time "to bridge" the unit banks. Such facilities include the discount window. The market would be given an official status, and such action would present new problems for the System in that more continuous and up-to-date judgments must be substituted for those now made by market participants.

On the assumption that the auctions would be limited to sales of Federal funds, formulas for awards would have to be determined in such a way as to prevent cornering of the market and disorderly trading after the funds had been sold. Otherwise rate fluctuations of large amplitude could often be expected. It is not clear how open market operations could be used to compensate for errors if too large a volume of funds were supplied in an auction. Even with present techniques—including reverse repurchase agreements—open market operations could not be used with the continuity necessary to complete the adjustments.

Trading in Federal funds continues throughout the day—reflecting the constantly shifting needs of banks. The present market mechanism centralizes buyers and sellers for all practicable purposes at a single

[10] *Academic Seminar in Changes in the Discount Window*, May 11, 1966, unpublished, Board of Governors of the Federal Reserve System, pp. 158 ff.

[11] *Ibid.*, p. 162.

point, and changes in ownership of funds are facilitated by the willingness of numbers of participants to match demand and supply—absorbing or making the residue available at a price.

If the Federal Reserve were to enter this mechanism, the mechanism would be materially altered: the Federal Reserve would become a central point for sales and would be forced to communicate, directly or through agents, with hundreds of banks—a mechanical problem of some magnitude even with the aid of computers.

It would be difficult to demonstrate that a better allocation of Federal funds would be achieved or that the efficiency of the market would be improved. Compensating for errors on the short side at a penalty rate (above the auction average) or with additional auctions suggests the necessity for precise estimates of needs, and the existing data cannot provide these estimates. Setting the penalty rate in the periods between auctions would bring about problems in determining the Systemwide penalty differential and the basis on which it would be applied. Market expectations could feed on themselves with disturbing effects on rates if the auctions were frequent and variable in amount, as would appear to be necessary.

Thus, in attempting to overcome these rate fluctuations, the System might be obliged to abandon its auction and establish an administered or pegged rate. In this event, changes in the rate would raise problems similar to those associated with decisions to change the discount rate. Sales of Federal funds in auctions might after a time lead to demands that the System also purchase Federal funds, resulting in an enormously complex operation in which the System might in fact become the whole market.

Under the proposal if some banks were able to secure more Federal funds than they could in current markets, other banks would command a smaller amount; or within the framework of the administered price they might have to pay more than they could conveniently afford. There is no means of providing an objective test as a basis of reference for administrative action, whether designed to achieve direct-use allocation of Federal funds or a new structure of prices that would encourage reallocation of funds among users.

The present market for Federal funds works efficiently, and it is relatively free from frictions that would limit free flows of funds, as evidenced in the coherent and consistent structure of rates. Rates on Federal funds are now considered an excellent measure of pressures within the banking system, and they aid in forming a range for other rates and in strengthening the short-term rate anchor in relation to rates in the capital market. The discount rate provides a reference point, as the sensitive market rates move above and below it. As noted earlier, the widespread participation in the Federal funds market and the closer links of that market to other parts of the money market have led to more rate stability and smaller fluctuations than earlier.

Unless clear-cut advantages can be shown for the proposal, it seems unwise to tamper with the current market mechanism. Changes in either the money or the capital markets that disturb confidence can have disproportionate effects elsewhere in the economy.

Federal Reserve Banks as clearinghouses for Federal funds transactions of smaller banks

The suggestion has been made from time to time that the Federal Reserve Banks establish facilities for matching the requests for sales and purchases of Federal funds of the small banks in their districts. This service would be strictly that of a broker. The Reserve Banks would match demand and supply to the extent possible and would refer

unsatisfied needs to other participants in the market. Telephone and other communication costs would be absorbed by the Reserve Banks. This proposal is less radical than the auction, but it presents many of the same problems. It involves the question of direct intervention in the market and excites expectations of further intrusions.

With the present high degree of development of the market and the lack of evidence of unsatisfied needs, there seems to be no justification for further consideration of the proposal at this time. Available information about the market shows a high degree of participation, especially by large banks. The market provides ample facilities, and it is expected that further participation by small banks will come about as the need arises.

March 1967

BIBLIOGRAPHY

Board of Governors of the Federal Reserve System. *The Federal Funds Market—A Study by a Federal Reserve System Committee.* Washington, D.C.: Board of Governors of the Federal Reserve System, May 1959.

——. "New Series on Federal Funds," Federal Reserve *Bulletin,* August 1964.

Madden, Carl H. *The Money Side of "The Street."* New York: Federal Reserve Bank of New York, 1959.

Nichols, Dorothy M. *Trading in Federal Funds—Findings of a Three-Year Survey.* Washington, D.C.: Board of Governors of the Federal Reserve System, September 1965.

Roosa, Robert V. *Federal Reserve Operations in the Money and Government Securities Markets.* New York: Federal Reserve Bank of New York, 1956.

Willis, Parker B. *The Federal Funds Market—Its Origin and Development.* Boston: Federal Reserve Bank of Boston, October 1964.

Federal Reserve Bank Monthly Review Articles

New York:

Colby, William G., Jr., and Platt, Robert B. "Second District 'Country' Member Banks in the Federal Funds Market," May 1966.

"Federal Funds," March 1950.

Philadelphia:

Baxter, Nevins D. "Country Banks and the Federal Funds Market," April 1966.

——. "Why Federal Funds?" August 1966.

Rothwell, Jack C. "Federal Funds and the Profits Squeeze —A New Awareness at Country Banks," March 1965.

Federal Reserve Bank Monthly Review Articles—Continued

Cleveland:
"Trading in Bank Reserves," December 1960 and October 1961.
Richmond:
"Federal Funds in the Fifth District," June 1961 and September 1966.
"Reserve Management at Fifth District Member Banks," September 1966.
Atlanta:
Brandt, Harry, and Wyand, Robert R., II. "Using a Sharper Pencil?" Part I, November 1965.
Crowe, Paul A., and Wyand, Robert R., II. "Using a Sharper Pencil?" Part II, December 1965.
Hirsch, Albert A. "Adjusting Reserves through the Federal Funds Market," October 1962.
Chicago:
Nichols, Dorothy M. "Marketing Money: How 'Smaller' Banks Buy and Sell Federal Funds," August 1965.
Minneapolis:
Duprey, J. N. "Country Bank Participation in the Federal Funds Market," July 1966.
Dallas:
Griggs, William N. "Federal Funds Market in the Southwest," November 1961.
San Francisco:
"The Role of Twelfth District Banks in the Federal Funds Market," June 1961.
Toby, Jacob Allan. "Fed Funds: The Western Market," September 1966.

FINANCIAL INSTABILITY REVISITED: THE ECONOMICS OF DISASTER

Hyman P. Minsky
Washington University

Contents

Preface

The original draft of this paper was written in the fall of 1966 and it was revised in January 1970. I wish to thank Maurice I. Townsend, Lawrence H. Seltzer, and Bernard Shull for their comments and encouragement. Needless to say, any errors of fact or fancy are my responsibility.

Hyman P. Minsky

FINANCIAL INSTABILITY REVISITED: THE ECONOMICS OF DISASTER

I. INTRODUCTION

A striking characteristic of economic experience in the United States is the repeated occurrence of financial crises—crises that usher in deep depressions and periods of low-level economic stagnation. More than 40 years have passed since the financial shock that initiated the Great Depression of the 1930's, a much longer period of time than between the crises and deep depressions of the previous century.[1] Is the experience since the Great Depression the result of fundamental changes in the economic system and of our knowledge so that crises and deep depressions cannot happen, or are the fundamental relations unchanged and our knowledge and power still inadequate so that crises and deep depressions are still possible?

This paper argues that the fundamentals are unchanged; sustained economic growth, business cycle booms, and the accompanying financial developments still generate conditions conducive to disaster for the entire economic system.

Every disaster, financial or otherwise, is compounded out of initial displacements or shocks, structural characteristics of the system, and human error. The theory developed here argues that the structural characteristics of the financial system change during periods of prolonged expansion and economic boom and that these changes cumulate to decrease the domain of stability of the system. Thus, after an expansion has been in progress for some time, an event that is not of unusual size or duration can trigger a sharp financial reaction.[2]

Displacements may be the result of system behavior or human error. Once the sharp financial reaction occurs, institutional deficiencies will be evident. Thus, after a crisis it will always be possible to construct plausible arguments—by emphasizing the triggering events or institutional flaws—that accidents, mistakes, or easily corrected shortcomings were responsible for the disaster.[3]

In previous work, I have used an accelerator-multiplier cum constraining ceilings and floors model to represent the real economy. Within this model the periodic falling away from the ceiling, which reflects parameter values and hence is an endogenous phenomenon, is the not unusual event that

[1] For the chronology of mild and deep depression cycles see M. Friedman and A. J. Schwartz, "Money and Business Cycles."

In that chronology all clearly deep depression cycles were associated with a financial crisis and all clearly mild depression cycles were not. Friedman and Schwartz choose to ignore this phenomenon, preferring a monolithic explanation for both 1929–33 and 1960–61. It seems better to posit that mild and deep depressions are quite different types of beasts and the differences in length and depth are due to the absence or occurrence of a financial panic. See H. P. Minsky, "Comment on Friedman and Schwartz's 'Money and Business Cycles.' "

[2] I. Fisher, "The Debt-Deflation Theory of Great Depressions."

[3] See M. Friedman and A. J. Schwartz, *A Monetary History of the United States 1867–1960*, pp. 309 and 310, footnote 9, for a rather startling example of such reasoning.

can trigger the "unstable" financial reaction —if a "proper" financial environment or structure exists. The financial reaction in turn lowers the effective floor to income. Once the gap between floor and ceiling incomes is large enough, I assumed that the accelerator coefficient falls to a value that leads to a stagnant behavior for the economy. In this way a set of parameter values that leads to an explosive income expansion is replaced by a set that leads to a stagnant economy. I assumed that the gap between floor and ceiling income is a determinant of the accelerator coefficient and that the immediate impact of financial instability is to lower the floor income, because financial variables—including the market value of common stocks—determine the position of a conventional Keynesian consumption function.[4]

This view neglects decision-making under uncertainty as a determinant of system behavior. A special type of uncertainty is inherent in an enterprise system with decentralized decisions and private ownership of productive resources due to the financial relations. The financial system of such an economy partitions and distributes uncertainty. A model that recognizes the problems involved in decision-making in the face of the intrinsically irrational fact of uncertainty is needed if financial instability is to be understood. A reinterpretation of Keynesian economics as just such a model, and an examination of how monetary constraint—whether due to policy or to behavior of the economy—works, are needed before the stability properties of the financial system and thus of the economy can be examined. It turns out that the fundamental instability of a capitalist economy is a tendency to explode—to enter into a boom or "euphoric" state.

[4] H. P. Minsky, "Financial Crisis, Financial Systems, and the Performance of the Economy," and "A Linear Model of Cyclical Growth."

This paper will not present any empirical research. There is, nevertheless, need to: (1) examine updated information of the type analyzed in earlier studies, (2) explore additional bodies of data, and (3) generate new data (see Section VII). Only with this information can the problem be made precise and the propositions tested.

There is a special facet to empirical work on the problems at issue. Financial crises, panics, and instability are rare events with short durations.[5] We have not experienced anything more than unit or minor sectoral financial distress since the early 1930's. The institutions and usages in finance, due to both legislation and the evolution of financial practices, are much different today from what they were before the Great Depression. For example, it is necessary to guess the power of deposit insurance in order to estimate the conditions under which a crisis can develop from a set of initial events.[6] The short duration of crises means that the smoothing operations that go into data generation as well as econometric analysis will tend to minimize the importance of crises.

Because of such factors it might be that the most meaningful way to test propositions as to the cause and effect of financial instability will be through simulation studies, where the simulation models are designed to reflect alternative ways that financial instability can be induced.[7]

In this paper, Section II discusses differences between an economy that is simply growing steadily and one that is booming.

[5] The large and long contraction of 1929–33 can be interpreted as a succession of crises compounding an initial disturbance.

[6] Perhaps the financial history of 1966 can be interpreted as a test of the power of deposit insurance to offset the destabilizing aspects of financial constraint.

[7] H. P. Minsky, "Financial Crisis, Financial Systems, and the Performance of the Economy," pp. 326–70, where a number of "primitive" simulations are presented.

The characteristics of a euphoric economy are identified. This section develops the proposition that, in a boom or euphoric economy, the willingness to invest and to emit liabilities is such that demand conditions will lead to tight money markets—defined in terms of the level and rate of change of interest rates and other financing terms—independently of the rate of growth of the money supply.

Section III focuses upon cash flows due to income production, balance sheet relations, and transactions in real and financial assets. The likelihood of financial instability occurring is dependent upon the relationship between cash payment commitments and the normal sources of cash, as well as upon the behavior of markets that will be affected if unusual sources of cash need to be tapped.

Section IV develops the role of uncertainty as a determinant of the demand for investment within a framework of Keynesian economics.

Section V examines alternative modes of operation of monetary constraint. In a euphoric economy, tight money, when effective, does not operate by inducing a smooth movement along a stable investment schedule; rather it operates by shifting the liquidity preference function. Such shifts are typically due to a liquidity crisis of some sort.

Section VI explores the domains of stability both of the financial system and of the economy. These domains are shown to be endogenous and to decrease during a prolonged boom. In addition, the financial changes that take place during a euphoric period tend also to decrease the domain of stability and the feedbacks from euphoria tend to induce sectoral financial difficulties that can escalate to a general financial panic. If such a panic occurs, it will usher in a deep depression; however, the central bank can abort a financial crisis. Nevertheless, the tensions and tremors that pass through the financial system during such a period of near crisis may lead to a reconsideration of desired portfolio composition by both financial institutions and other economic units. A rather severe recession may follow such a reconsideration.

Sections VII and VIII deal with two special topics, bank examinations and regional impacts. In Section VII it is argued that a bank examination procedure centering around cash flows as determined by balance sheet and contractual relations would be a valuable guide for Federal Reserve policy and an important instrument for bank management. Such an examination procedure would force financial-unit managers and economic policy-makers to consider the impact upon financial units of the characteristics of both the real economy and the financial system.

The discussion of the regional impact of Section VIII centers around the possibility that there is a concentration of financially vulnerable units within one region. In these circumstances the escalation of financial constraint to a financial crisis might occur though financially vulnerable units, on a national basis, are too few to cause difficulty.

Section IX sets forth some policy guidelines for the Federal Reserve System. It is argued that the discount window should be open to selected money market position takers (dealers) and that the Federal Reserve should move toward furnishing a larger portion of the total reserves of banks by discounting operations. This policy strategy follows from the increased awareness of the possibility of a financial crisis and of the need to have broad, deep, and resilient markets for a wide spectrum of financial instruments once a financial crisis threatens so that the effects of such a crisis can be moderated.

II. THE ECONOMICS OF EUPHORIA

In the mid-1960's the U.S. economy experienced a change of state. Political leaders and official economists announced that the economic system had entered upon a new era that was to be characterized by the end of the business cycle as it had been known.[8] Starting then, cycles, if any, were to be in the positive rate of growth of income. The doctrine of "fine tuning" went further and asserted that even recessions in the rate of growth of income could be avoided. Contemporary business comments were consistent with these official views.

The substance of the change of state was an investment boom: in each year from 1963 through 1966 the rate of increase of investment by corporate business rose.[9] By the mid-1960's business investment was guided by a belief that the future promised perpetual expansion. An economy that is ruled by such expectations and that exhibits such investment behavior can properly be labeled euphoric.

Consider the value of a going concern. Expected gross profits after taxes reflect the expected behavior of the economy, as well as expected market and management developments. Two immediate consequences follow if the expectation of a normal business cycle is replaced by the expectation of steady growth. First, those gross profits in the present-value calculations that had reflected expected recessions are replaced by those that reflect continuing expansion. Simultaneously there is less uncertainty about the future behavior of the economy. As the belief in the reality of a new era emerges, the decrease in the expected down or short time for plant and equipment raises their present values. The confident expectation of a steady stream of prosperity gross profits makes portfolio plunging more appealing to firm decision-makers.

A sharp rise in expected returns from real capital makes the economy short of capital overnight. The willingness to assume liability structures that are less defensive and to take, what would have been considered in earlier times, undesirable chances in order to finance the acquisition of additional capital goods means that this shortage of capital will be transformed into demand for financial resources.

Those that supply financial resources live in the same expectational climate as those that demand them. In the several financial markets, once a change in expectations occurs, demanders, with liability structures that previously would in the view of the suppliers have made them ineligible for accommodations, become quite acceptable. Thus, the supply conditions for financing the acquisitions of real capital improve simultaneously with an increase in the willingness to emit liabilities to finance such acquisitions.

Such an expansionary new era is destabilizing in three senses. One is that it quite rapidly raises the value of existing capital. The second is an increase in the willingness to finance the acquisition of real capital by emitting what, previously, would have been considered as high-cost liabilities, where the cost of liabilities includes risk or uncertainty

[8] J. Tobin, *The Intellectual Revolution in U.S. Economic Policy Making.*

[9] Investment by nonfarm, nonfinancial corporations, 1962–66:

Year	Purchase of physical assets	
	Billions of dollars	Growth rate (per cent)
1962	44.7	...
1963	76.7	4.5
1964	53.5	14.6
1965	64.9	21.3
1966	79.8	21.6*

*The "crunch" of 1966 occurred in late August/early September; it put a damper on investment and the purchase of physical assets declined to $74.1 billion in 1967.

SOURCE.—*Economic Report of the President*, 1969, Table B73.

borne by the liability emitter (borrower's risk). The third is the acceptance by lenders of assets that earlier would have been considered low-yield—when the yield is adjusted to allow for the risks borne by the asset acquirer (lender's risk).[10]

These concepts can be made more precise. The present value of a set of capital goods collected in a firm reflects that firm's expected gross profits after taxes. For all enterprises there is a pattern of how the business cycles of history have affected their gross profits. Initially the present value reflects this past cyclical pattern. For example, with a short horizon

$$V=\frac{Q_1}{1+r_1}+\frac{Q_2}{(1+r_2)^2}+\frac{Q_3}{(1+r_3)^3}$$

where Q_1 is a prosperity, Q_2 is a recession, and Q_3 is a recovery gross profits after taxes, $(Q_2<Q_3<Q_1)$. With the new era expectations Q_2' and Q_3', prosperity returns replace the depression and recovery returns. As a result we have: V (new era) $>$ V (traditional). This rise in the value of extant capital assets as collected in firms increases the prices that firms are willing to pay for additions to their capital assets.

Generally, the willingness to emit liabilities is constrained by the need to hedge or to protect the organization against the occurrence of unfavorable conditions. Let us call Q_2'' and Q_3'' the gross profits after taxes if a possible, but not really expected, deep and long recession occurs. As a risk averter the portfolio rule might be that the balance sheet structure must be such that even if Q_2'' and Q_3'' do occur no serious consequences will follow; Q_2'' and Q_3''—though not likely—are significant determinants of desired balance sheet structure.[11] As a result of the euphoric change in "state," the view grows that Q_2'' and Q_3'' are so unlikely that there is no need to protect the organization against them. A liability structure that was expensive in terms of risk now becomes cheap when there were significant chances of Q_2'' and Q_3'' occurring. The cost of capital or of finance by way of such liability structures decreases.

Financial institutions are simultaneously demanders in one and suppliers in another set of financial markets. Once euphoria sets in, they accept liability structures—their own and those of borrowers—that, in a more sober expectational climate, they would have rejected. Money and Treasury bills become poor assets to hold with the decline in the uncertainty discount on assets whose returns depend upon the performance of the economy. The shift to euphoria increases the willingness of financial institutions to acquire assets by engaging in liquidity-decreasing portfolio transformations.

A euphoric new era means that an investment boom is combined with pervasive liquidity-decreasing portfolio transformations. Money market interest rates rise because the demand for investment is increasing, and the elasticity of this demand decreases with respect to market interest rates and contractual terms. In a complex financial system, it is possible to finance investment by portfolio transformations. Thus when a euphoric transformation of expectations takes place, in the short run the amount of investment financed can be independent of monetary policy. The desire to expand and the willingness to finance expansion by portfolio changes can be so great that, unless there are serious side effects of feedbacks, an inflationary explosion becomes likely.

A euphoric boom economy is affected by the financial heritage of an earlier, more insecure time. The world is not born anew each moment. Past portfolio decisions and

[10] M. Kalecki, "The Principle of Increasing Risk."

[11] W. Fellner, "Average-Cost Pricing and the Theory of Uncertainty," and "Monetary Policies and Hoarding in Periods of Stagnation," and S. A. Ozga, *Expectations in Economic Theory*.

conditions in financial markets are embodied in the stock of financial instruments. In particular, a decrease in the market value of assets which embody protections against states of nature that are now considered unlikely to occur will take place, or alternatively there is a rise in the interest rate that must be paid to induce portfolios to hold newly created assets with these characteristics. To the extent that such assets are long lived and held by deposit institutions with short-term or demand liabilities, pressures upon these deposit institutions will accompany the euphoric state of the economy. In addition the same change of state that led to the investment boom and to the increased willingness to emit debt affects the portfolio preferences of the holders of the liabilities of deposit institutions. These institutions must meet interest rate competition at a time when the market value of the safety they sell has decreased; that is, their interest rates must rise by more than other rates.

The rising interest rate on safe assets during a euphoric boom puts strong pressures on financial institutions that offer protection and safety. The linkages between these deposit institutions, conventions as to financing arrangements, and particular real markets, are such that sectoral depressive pressures are fed back from a boom to particular markets; these depressive pressures are part of the mechanism by which real resources are shifted.

The rise in interest rates places serious pressures upon particular financial intermediaries. In the current (1966) era the savings and loan associations and the mutual savings banks, together with the closely related homebuilding industry, seem to take a large part of the initial feedback pressure. It may be that additional feedback pressures are on life insurance and consumer finance companies.

A little understood facet of how financial and real values are linked centers around the effect of stock market values.[12] The value of real capital rises when the expectation that a recession will occur diminishes and this rise will be reflected in equity prices. The increased ratio of debt financing can also raise expected returns on equities. Inasmuch as owners of wealth live in the same expectational climate as corporate officers, portfolio preferences shift toward equities as the belief in the possibility of a recession or depression diminishes. Thus, a stock market boom feeds upon and feeds an investment boom.

The financing needs of the investment boom raise interest rates. This rise lowers the market value of long-term debt and adversely affects some financial institutions. Higher interest rates also increase the cost of credit used to finance positions in equities. Initially, the competition for funds among various financial sectors facilitates the rapid expansion of the economy; then as interest rates rise it constrains the profits of investing units and makes the carrying of equities more expensive. This first tends to lessen the rate of increase of equity prices and then to lower equity prices.

All in all, the euphoric period has a short lifespan. Local and sectoral depressions and the fall in equity prices initiate doubts as to whether a new era really has been achieved. A hedging of portfolios and a reconsideration of investment programs takes place. However, the portfolio commitments of the short euphoric era are fixed in liability structures. The reconsideration of investment programs, the lagged effects upon other sectors from the resource-shifting pressures, and the inelasticity of aggregative supply that leads to increases in costs

[12] R. Turvey, "Does the Rate of Interest Rule the Roost?" J. M. Keynes, *The General Theory of Employment, Interest and Money*, Chapter 12.

combine to yield a shortfall of the income of investing units below the more optimistic of the euphoric expectations.

The result is a combination of cash flow commitments inherited from the burst of euphoria and of cash flow receipts based upon lower-than-expected income. Whether the now less-desirable financial positions will be unwound without generating significant shocks or whether a series of financial shocks will occur is not known. In either case, investment demand decreases from its euphoric levels. If the boom is unwound with little trouble, it becomes quite easy for the economy once again to enter a "new era"; on the other hand, if the unwinding involves financial instability, then there are prospects of deep depressions and stagnation.

The pertinent aspects of a euphoric period can be characterized as follows:

1. The tight money of the euphoric period is due more to runaway demand than to constraint upon supply. Thus, those who weigh money supply heavily in estimating money market conditions will be misled.

2. The run-up of short- and long-term interest rates places pressure on deposit savings intermediaries and disrupts industries whose financial channels run through these intermediaries. There is a feedback from euphoria to a constrained real demand in some sectors.

3. An essential aspect of a euphoric economy is the construction of liability structures which imply payments that are closely articulated directly, or indirectly via layerings, to cash flows due to income production. If the impact of the disruption of financing channels occurs after a significant build-up of tight financial positions, a further depressive factor becomes effective.

III. CASH FLOWS

Financial crises take place because units need or desire more cash than is available from their usual sources and so they resort to unusual ways to raise cash. Various types of cash flows are identified in this section, and the relations among them as well as between cash flows and other characteristics of the economy are examined.

The varying reliability of sources of cash is a well-known phenomenon in banking theory. For a unit, a source of cash may be reliable as long as there is no net market demand for cash upon it, and unreliable whenever there is such net demand upon the source. Under pressure various financial and nonfinancial units may withdraw, either by necessity or because of a defensive financial policy, from some financial markets. Such withdrawals not only affect the potential variability of prices in the market but also may disrupt business connections. Both the ordinary way of doing business and standby and defensive sources of cash can be affected.

Withdrawals on the supply side of financial markets may force demanding units that were under no special strain and were not directly affected by financial stringencies to look for new financing connections. An initial disturbance can cumulate through such third-party or innocent-bystander impacts. Financial market events that disrupt well-established financing channels affect the present value and cash flows of units not directly affected.[13]

For most consumers and nonfinancial (ordinary) business firms the largest source

[13] Thus the disruption of the southern California savings and loan mortgage markets in mid-1966 affected *all* present values and cash flow expectations in the economy.

of cash is from their current income. Wages and salaries are the major source of cash to most consumers and sales of output are the major source for business firms. For financial intermediaries other than dealers, the ordinary cash flow to the unit can be derived from its financial assets. For example, short-term business debts in a commercial bank's portfolio state the reserve money that borrowers are committed to make available to the bank at the contract dates. A mortgage in a savings and loan association's portfolio states the contractual "cash flow to" for various dates. For financial market dealers cash receipts usually result from the selling out of their position, rather than from the commitments as stated in their inventory of assets. Under ordinary circumstances dealers as going concerns do not expect to sell out their positions; as they sell one set of assets they proceed to acquire a new set.

The ordinary sources of cash for various classes of economic units will be called cash flow from operations. All three types of cash flow from the operations described —income, financial contracts, and turnover of inventory—can be considered as functions of national income. The ability to meet payment commitments depends upon the normal functioning of the income production system.

In addition to cash flow from the sale of assets, dealers—and other financial and nonfinancial units—can meet cash drains due to the need to make payments on liabilities by emitting new liabilities. This second source of cash is called the refinancing of positions.

Furthermore, liquidating, or running off, a position is the third possible way for some units to obtain cash. This is what retailers and wholesalers do when they sell inventories (seasonal retailers actually do liquidate by selling out their position).

The financial assets and liabilities of an economic unit can be transformed into time series of contractual cash receipts and payments. The various items in these contractual receipts and payments depend upon national income: the fulfillment of the terms of mortgage contracts depends upon consumer disposable income and so forth.[14] Estimates of the direct and indirect impact of variations in national income upon the ability of units in the various sectors to meet their financial commitments can be derived.[15]

Each economic unit has its reserve, or emergency, sources of cash. For many units the emergency source consists of positions in some marketable or redeemable assets. Savings bonds and time deposits are typical standby sources of cash for consumers. A corporation may keep a reserve in Treasury bills or other money market instruments to meet either unusual needs for cash or an unexpected shortfall in cash receipts. Hoards of idle cash serve this purpose for all units. Cash has the special virtue that its availability does not depend upon the normal functioning of any market.

In principle the normal and secondary sources of cash for all units can be identified and their ratio to financial commitments can be estimated. By far the largest number of units use their income receipts to meet their financial commitments. Mortgage and consumer instalment payments for consumers and interest and sinking fund payments for businesses would be financed normally by income cash flows.

The substitution of a deposit by customer B for a deposit from customer A in a bank

[14] This becomes the rationale for a cash flow bank examination. The deviation of actual from contractual cash flows depends upon the behavior of the economy.

[15] The Minsky-Bonen experiments in H. P. Minsky, "Financial Crisis, Financial Systems, and the Performance of the Economy," were primitive attempts to do this.

liability structure may be viewed as the refinancing of a position. The typical financial unit acquires cash to meet its payment commitments, as stated in its liabilities, not from any cash flow from its assets or by selling assets but rather by emitting substitute liabilities. (The only financial organizations that seem to use cash flows from assets to meet cash flow commitments are the closed-end investment trusts, both levered and unlevered.)

When a unit that normally meets its financial commitments by drawing upon an income cash flow finds it necessary, or desirable, to refinance its position, additional pressures may be placed upon financial institutions.

Some financial relations are based upon the periodic liquidation of positions—for example, the seasonal inventory in retailing. Capital market dealers or underwriters liquidate positions in one set of assets in order to acquire new assets. However, if organizations that normally finance their payments by using cash from either income or refinancing of positions should instead attempt to sell their positions, it may turn out that the market for the assets in position is thin: as a result a sharp fall in the price of the asset occurs with a small increase in supply. In the market for single-family homes a sale is usually not a forced sale, and to a large extent sellers of one house are buyers or renters of another. If homeowners as a class tried to sell out their houses, the market would not be able to handle this without significant price concessions. But significant price concessions mean a decline in net worth—not only for the selling unit but for all units holding this asset. More particularly, a fall in price may mean that the offering units may be unable to raise the required or expected cash by dealing in the affected asset.

As an empirical generalization, almost all financial commitments are met from two normal sources of cash: income flows and refinancing of positions. For most units—especially those that have real capital goods as their asset—the selling out of their position is not feasible (no market exists for a quick sale); for others, aside from marginal adjustments by way of special money markets, it is an unusual source of cash.

A further empirical generalization is that asset prices—prices of the stock—can fall much more rapidly than income prices—prices of the flow.[16] Any need or desire to acquire cash that leads to attempts to sell out positions in reproducible assets will result not only in large-scale decreases in net worth but also in market prices for reproducible assets that are far below their current cost of production.

Even in the face of a widespread need or desire to acquire cash by selling assets, not all assets are allowed to fall in price. The price of some assets will be stabilized by central bank purchases or loans (refinancing positions); such assets can be called protected assets.

Financial instability occurs whenever a large number of units resort to extraordinary sources for cash. The conditions under which extraordinary sources of cash have to be tapped—which for financial units means mainly the conditions in which positions have to be liquidated (run off or sold out)—are the conditions that can trigger financial instability. *The adequacy of cash flows from income relative to debt, the adequacy of refinancing possibilities relative to position, and the ratio of unprotected to protected financial assets are determinants of the stability of the financial system.* The trend or evolution of the likelihood of financial instability depends upon the trend or evolution of the determinants of financial stability.

[16] This is the content of the alleged wage rigidity assumption of Keynesian theory. See H. G. Johnson, "The 'General Theory' after Twenty-five Years."

IV. FINANCIAL INSTABILITY AND INCOME DETERMINATION

The essential difference between Keynesian and both classical and neoclassical economics is the importance attached to uncertainty.[17] Basic propositions in classical and neoclassical economics are derived by abstracting from uncertainty; the most that uncertainty does is to add some minor qualifications to the propositions of the theory. The special Keynesian propositions with respect to money, investment, and underemployment equilibrium, as well as the treatment of consumption, can be understood only as statements about system behavior in a world with uncertainty. One defense against some possible highly undesirable consequences of some possible states of the world is to make appropriate defensive portfolio choices.[18]

In an attempt to make precise his view of the nature of uncertainty and what his "General Theory" was all about, Keynes asserted that in a world without uncertainty, no one, outside a lunatic asylum, would use money as a store of wealth.[19] In the world as it is, money and Treasury bills are held as assets. Portfolios reflect the choices that sane men make as they attempt to behave in a rational manner in an inherently irrational (unpredictable) universe. This means that a significant proportion of wealth holders try to arrange their portfolios so that they are reasonably well protected irrespective of which one of a number of alternative possible states of the economy actually occurs.

In making portfolio choices, economic units do not accept any one thing as a proven guide to the future state of the economy. Unless there are strong reasons for doing otherwise, they often are guided by extrapolation of the current situation or trend, even though they may have doubts about its reliability.[20] Because of this underlying lack of confidence, expectations and hence present values of future incomes are inherently unstable; thus a not unusual event, such as a "salad oil scandal" or a modest decline in income, if it occurs in a

[17] I include the conventional interpretation of Keynes under the rubric of neoclassical economics. This standard interpretation, which "took off" from J. R. Hicks' famous article—"Mr. Keynes and the 'Classics,' A Suggested Interpretation," and which since has been entombed in standard works like G. Ackley, *Macroeconomic Theory*—is inconsistent with Keynes' own succinct and clear statement of the content of the general theory in his rebuttal to Viner's famous review ("Mr. Keynes on the Causes of Unemployment"). Keynes' rebuttal appeared with the title "The General Theory of Employment" and emphasized the dominance of uncertainty in the determination of portfolios, the pricing of capital, and the pace of investment.

[18] J. K. Galbraith in *The Affluent Society* and K. J. Arrow in "Uncertainty and the Welfare Economics of Medical Care" take the view that various labor and product market deviations from competitive conditions reflect the need to constrain the likelihood that undesirable "states" of the world will occur. This Galbraith-Arrow view of the optimal behavior of firms and households seems to complement the view in Keynes' rebuttal to Viner. See also K. J. Arrow, *Aspects of the Theory of Risk Bearing*, Lecture 2: "The Theory of Risk Aversion," and Lecture 3: "Insurance, Risk and Resource Allocation."

[19] J. M. Keynes, "The General Theory of Employment," pp. 209–23. The exact quotation, in full, is: "Money, it is well known, serves two principal purposes. By acting as a money of account it facilitates exchange without it being necessary that it should ever come into the picture as a substantive object. In this respect it is a convenience which is devoid of significance or real influence. In the second place it is a store of wealth. So we are told without a smile on the face. But in the world of the classical economy, what an insane use to which to put it! For it is a recognized characteristic of money as a store of wealth that it is barren; whereas practically every other form of storing wealth yields some interest or profit. Why should anyone outside a lunatic asylum wish to use money as a store of wealth?" p. 215.

[20] The doubts can take the form of uncertainty as to what "inertia" should be attached: should it be attached to the level, the rate of change (velocity), or the rate of change of the rate of change (acceleration)?

favorable environment, can lead to a sharp revaluation of expectations and thus of asset values. It may lead not only to a sharp change in what some particular rational man expects but also to a marked change in the consensus as to the future of the economy.

Conceptually the process of setting a value upon a particular long-term asset or a collection of such assets can be separated into two stages. In the first the subjective beliefs about the likelihood of alternative states of the economy in successive time periods are assumed to be held with confidence. A second stage assesses the degree of "belief" in the stated likelihoods attached to the various alternatives.

When beliefs about the actual occurrence of various alternative states of the economy are held with perfect confidence, the standard probability expected value calculation makes sense. The present value of a long-term asset reflects its (subjective) expected yield at each state-date of the economy and the assumed likelihood of these state-dates occurring. Under stable conditions, the expected gross profit after taxes (cash flow) of the i^{th} asset at the t^{th} date, Q_{it}, will equal $\Sigma\ p_{st}Q_{si}$ where Q_{si} is the gross profit after taxes of the i^{th} asset if the s^{th} state of nature occurs (assumed independent of date, could be modified to *sit*, the s^{+1} state of nature at the t^{th} date) and p_{st} is the (subjective) probability that the s^{th} state will occur at the t^{th} date. The s states are so defined that for each t, $\Sigma\ p_{st} = 1$. These Q_{it}, discounted at a rate appropriate to the assumed perfect certainty with which the expectations are held, yield the present value of the i^{th} asset, V_i.[21]

Assume that S is a set of mutually exclusive and exhaustive states of nature. At date t, one of the S, s_j will occur; the $\Sigma\ p_{sj} = 1$. However, the probabilities, p_{sj}, which must be attached to the alternative outcomes in order to compute the expected gross profit and the cash flow for date t, can be accepted with varying degrees of rational belief. The value of the i^{th} asset will vary, not only with the expected payoffs at various state-dates of nature and the probabilities attached to these payoffs, but also with the confidence placed in the probabilities attached to the occurrence of these various state-dates of nature. That is, $Q_{it} = \phi\ (\Sigma\ p_{st}Q_{si})$ where $0 \leqq \phi \leqq 1$ and ϕ reflects the confidence with which the particular weights are attached to the likelihood of various states of nature occurring.

In other words, there are at least two conjectural elements in determining the expected payoffs, Q_{it} and hence V_{it}: one is that the Q_{si} are conjectures; the other that the probability distribution of possible states of nature, as reflected in the p_s, is not known with certainty. Obviously, events that affect the confidence placed in any assumed probability distribution of the possible alternative states may also affect the confidence placed in the assumed expected payoff if state s occurs, Q_{si}. A computed present value of any asset V_i may be accepted with a wide

[21] If it is wished, to each outcome Q_{it} a utility $U(Q_{it})$ can be attached. The probability and present value computation can be undertaken with respect to utilities. The risk-aversion character of a decision unit is represented by the curvature of the utility function. A change in confidence can be depicted by a change in curvature, decreased confidence being indicated by an increase in curvature. If preference systems can be assumed to reflect experience, then a long period without a deep depression will decrease the curvature and the occurrence of a financial crisis will increase the curvature of the preference system. The psychology of uncertainty and the social psychology of waves of optimism and pessimism are two points at which economists need guidance from the relevant sister social sciences. Throughout any discussion of uncertainty and of economic policy in the framework of uncertainty psychological assumptions must be made. At times the conclusions depend in a critical manner upon the psychological assumptions.

range of confidence—from near certainty to a most tenuous conjecture. This degree of acceptance affects the market price of the asset.

The relevant portfolio decisions for consumers, firms, and financial concerns are not made with respect to individual assets; rather, they are made with respect to bundles of assets. The problem of choosing a portfolio is to combine assets whose payoffs will vary quite independently as the states of nature vary in order to achieve the unit's objective; which for a risk averter might be a minimal satisfactory state in any circumstance. This might be stated as follows: a portfolio is chosen so as to maximize V given a specified valuation procedure subject to the constraint that $V_s > V$ for every likely state of nature.[22]

The assets available are both inside and outside assets: the outside assets consist of money and Government debt.[23] The nominal value of a monetary asset (money plus Government debt) is independent of the state of the economy. Government debt can exhibit variability in its nominal value due to interest rate variations, but in conditions where business cycles occur, its nominal value is not highly correlated with the expected nominal value of inside assets.

We assume that two types of periods can be distinguished: one in which beliefs are held with confidence concerning the likelihood of alternative states of nature occurring within some horizon period and the second in which such beliefs are most insecure. In the second situation bets are placed under duress. During these second periods—when what can be called higher-order uncertainty rules—markedly lower relative values are attached to assets whose nominal value depends upon the economy's performance. Periods of higher-order uncertainty will see portfolios shift toward assets that offer protection against large declines in nominal values. Even though flexibility is almost always a virtue, the premium on assets that permit flexibility will be larger in such periods of higher-order uncertainty. For many questions a rational man has the option of saying "I don't know" and of postponing a decision. As a wealth owner he must assess the worth of various assets even when conditions are so fluid that he would rather not make a decision.

Keynesian liquidity preference encompasses both confidence conditions. Expectations as to the likelihood of different states of nature may be held with varying degrees of confidence. During periods of stable expectations, portfolios are managed so that the outcome will be tolerable regardless which state of nature rules. Most units tend to weigh heavily the avoidance of disasters, such as a liquidity crisis for the unit. Assets that offer protection against a liquidity crisis or temporarily disorganized asset markets would be part of a rational portfolio under all circumstances. In addition a preferred market may exist for assets that obviate against capital losses. Thus liquidity preference is defined as a rational person's demand for money as an asset; this leads to a determinate demand function for money for any value of higher-order uncertainty.[24]

In addition to periods when the likelihood of various states of nature appear stable, there are troubled periods when the subjective estimates as to the likelihood of various states of nature are held with much less confidence. The risk-averter reaction to a decline in confidence is to attempt to in-

[22] Alternatively, the desired portfolio objective can be stated in terms of cash flows; this less conventional view is examined in Section VI.

[23] J. G. Gurley and E. Shaw, *Money in a Theory of Finance.*

[24] See J. Tobin, "Liquidity Preference as Behavior Toward Risk," pp. 65–68.

crease the weight of assets that yield flexibility in portfolio choices, in other words, to increase the value not only of money but also of all assets that have broad, deep, and resilient markets. Any increase in uncertainty shifts the liquidity preference function, and this shift can be quite marked and sudden.

Obviously, the reverse—a decrease in uncertainty—can occur. If risk-averters are dominant, then an increase in uncertainty is likely to be a rapid phenomenon, whereas a decrease will require a slow accretion of confidence. There is no need for a loss in confidence to proceed at the same pace as a gain in confidence.

Rapid changes in desired portfolios may be confronted with short-period inelastic supplies of primary assets (real capital and government liabilities). As a result, the relative prices of different assets change. An increase in uncertainty will see the price of inside assets—real capital and equities—fall relative to the price of outside assets—government debt—and money; a decrease in uncertainty will see the price of inside assets rise relative to that of outside assets.

The nominal money supply in our fractional reserve banking system can be almost infinitely elastic. Any events that increase uncertainty on the part of owners of real wealth will also increase uncertainty of commercial bankers. Unless prices of inside assets are pegged by the central bank, a sharp increase in uncertainty will result in the price of inside assets falling relative to both money and the price of default-free or protected assets.

In a decentralized private-enterprise economy with private commercial banks, we cannot expect the money supply to increase sufficiently to offset the effects of a sharp increase in uncertainty upon inside asset prices. Conversely, we cannot expect the money supply to fall sufficiently to offset the effects of a sharp decrease in uncertainty. We should expect the private, profit-maximizing, risk-averting commercial banks to behave perversely, in that with a decrease in uncertainty they are willing and eager to increase the money supply and with an increase in uncertainty they act to contract the money supply.[25]

Portfolios must hold the existing stocks of private real assets, Treasury debt, and money. Even during an investment boom the annual increment to the stock of real capital is small relative to the total stock. However, in time the stock of reproducible capital is infinitely elastic at the price of newly produced capital goods. Thus there is a ceiling to the price of a unit of the stock of real capital in the current market. This ceiling price allows for an expected decline in the price of the stock to the price of the flow of newly produced units.

The current return on real capital collected in firms reflects the current functioning of the economy, whether prosperity or depression rules. During an investment boom current returns are high. Because a ceiling on the price of units in the stock of capital is imposed by the cost of investment, a shift in the desired composition of portfolios towards a greater proportion of real capital cannot lower very far the short-run

[25] The stagnant state that follows a deep depression has been characterized by very low yields—high prices—on default-free assets. One interpretation of the liquidity trap is that it reflects the inability to achieve a meaningful difference between the yields on real assets and on default-free assets by further lowering of the yield on default-free assets. An equivalent but more enlightening view of the liquidity trap is that circumstances occur in which it is not possible by increasing the stock of money to raise the price of the units in the stock of existing capital so as to induce investment. In these conditions expansionary fiscal policy, especially government spending, will increase the cash flows that units in the stock of real capital generate. In otherwise stagnant conditions this realized improvement in earnings will tend to increase the relative price of inside capital, and thus help induce investment.

yield on real capital valued at market price; in fact because of prosperity and greater capacity utilization this yield may increase. As the outside assets—Treasury debt and so forth—are now less desirable than in other more uncertain circumstances, their yield must rise toward equality with the yield on inside or real assets. To paraphrase Keynes ". . . in a world without uncertainty no one outside of a lunatic asylum . . ." will hold Treasury bills as a store of wealth unless their yield is the same as that on real assets.

As the implicit yield on money is primarily the value of the implied insurance policy it embodies, a decrease in uncertainty lowers this implicit yield and thus lowers the amount desired in portfolios. As all money must be held, as bankers are eager to increase its supply, and as its nominal value cannot decline, the money price of other assets, in particular real assets, must increase.

In a euphoric economy it is widely thought that past doubts about the future of the economy were based upon error. The behavior of money and capital market interest rates during such a period is consistent with a rapid convergence of the yield upon default-free and default-possible assets. This convergence takes place by a decline in the price of—the rise in the interest rate on—default-free assets relative to the price of—yield on—the economy's underlying real capital.

In addition to default-free—government debt plus gold—and default-possible—real capital, private debts, equities—assets, there are protected assets. Protected assets in varying degrees and from various sources carry some protection against consequences that would follow from unfavorable events. Typical examples of such assets are bonds and savings deposits.

The financial intermediaries—including banks as they emit money—generate assets that are at least partially protected. A rise in intermediation and particularly a rise in bank money, even if the asset acquired by the bank carries default possibilities, may unbalance portfolios in favor of default-free assets. The ability of banking, through the creation of money, to stimulate an economy rests upon the belief that banks and the monetary authorities are able to give such protection to their liabilities. The liabilities of other financial intermediaries are protected, but not so much as bank money; thus their stimulative effect, while not negligible, is smaller. In a euphoric economy the value of such protection decreases, and these instruments also fall in price relative to real assets or equities.[26]

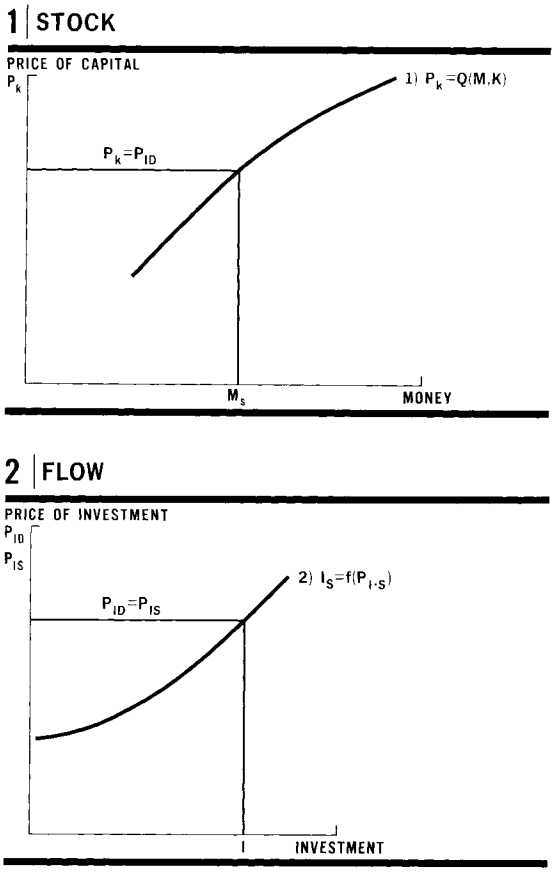
To summarize, the relative prices of assets are affected by portfolio imbalance that follows from changing views as to uncertainty concerning future states of the economy. A decrease in the uncertainty will raise the price of units in the stock of real inside assets for any given supply of money, other outside assets, and assets that are in all or in part protected against the adverse behavior of the economy; an increase in uncertainty will lower these prices. For a given state of uncertainty and stock of real capital assets, the greater the quantity of money, other outside assets, and protected assets, the greater the price of units in the stock of real capital. Investment consists of producing substitutes for items in the stock of real capital; the price of the units in the stock

[26] Incidentally, the phenomenon by which a decrease in the value of some protection affects observable market prices also exists in the labor market. Civil servants and teachers accept low money incomes relative to others with the same initial job opportunity spectrum in exchange for security; civil servants value security more than others. In a euphoric, full employment economy the value of such civil servant security diminishes. Hence in order to attract workers, their relative measured market wage will need to rise.

is the demand price for units to be produced. To the extent that the supply of investment responds positively to its demand price, the pace of investment flows from portfolio imbalance.

The investment process can be detailed as (1) the portfolio balance relation that states the market price for capital assets as a function of the money supply (Diagram 1), and (2) the investment supply function that states how much investment output will be produced at each market price for capital assets (Diagram 2). It is assumed that the market price for capital assets is the demand price for investment output. The supply curve of investment output is positively sloped. At some positive price the output of investment goods becomes zero. The market price of capital assets as determined by portfolio preferences is sensitive to the state of expectations or to the degree of uncertainty with respect to the future.[27]

In Diagram 1, I have chosen to keep the stock of capital constant. Thus $V = P_k\bar{K} + M$, where V is wealth, P_k is price level of capital, $\bar{K}$ is the fixed stock of capital, and M is outside money. As M increases, V increases because of both the rise in M and a rise in P_k. If M increases as manna from heaven, it would be appropriate for the consumption function to include a W/P_y variable (P_y is the price level of current output). This would, by today's conventions, add an



upward drifting consumption function to the mechanism by which a rise in M affects output.[28]

If $C = f(Y)$ and $Y = C + I$, then the above diagram determines income as a function of M.[29]

[27] The investment argument builds upon R. W. Clower, "An Investigation into the Dynamics of Investment," and J. G. Witte, Jr., "The Microfoundations of the Social Investment Function." Both Clower and Witte emphasize the determination of the price per unit of the stock as a function of exogenously given interest rates: they are wedded to a productivity basis for the demand for real capital assets. The argument here emphasizes the portfolio balance or speculative aspects of the demand for real capital assets. Thus, interest rates are computed from the relation between expected flows and market prices, that is, the price of capital as a function of the money supply relation *is* the liquidity preference function.

[28] Alternatively, the value of wealth can be kept constant; thus $\bar{V} = P_k K + M$. An increase in M is initially an "open market operation" $\triangle M = P_k K$. However, as portfolios now hold more money and less capital goods, the price per unit of capital goods rises. Capital is expropriated so that W remains fixed. This is a pure portfolio balance relation.

If, starting from an initial position, $V_o = P_{ko}K_o + M_o$, M is increased, then the P_k of the second variant would lie above that of the first variant. If M is decreased, the P_k of the second variant will lie below that of the first. The constant wealth variant cuts the constant private capital stock variant from below. I have assumed constant capital stock K in drawing Diagram 1.

[29] If we assume that the future expected returns

It is impossible in this view to generate an investment function $I = f(r)$ that is independent of the portfolio adjustments of the liquidity preference doctrine; investment is a speculative activity in a capitalist economy that is only peripherally related to productivity.

Two phenomena can be distinguished. If M remains fixed as capital is accumulated, a slow downward drift of the Q $(M,\bar{K})$ function (Diagram 1) will take place. A rise in M is needed to maintain real asset prices in the face of the rise in the stock of real capital.[30] Alternatively, if portfolio preferences change, perhaps because of a change in uncertainty, then, independently of the impact of real accumulation, the $Q(M,\bar{K})$ function will shift. It is the second type of shift that occupies center stage in the Keynesian view of the world. And this has been neglected in both monetary and investment analysis.

At all times investment demand has to take into account the returns received during various expected states of the economy. As the result of a shock, the weight attached to depression returns may increase. As the dust settles there is gradual easing of the views on the likelihood of unfavorable states of nature. The weight attached to liquidity is decreased and a gradual increase of investment will take place.

Hopefully we know enough to supplement investment by honorary investments (Government spending) so that the expected returns from capital will not again reflect large-scale excess capacity. Nevertheless, if a shock takes place, some time elapses before its effects wear off. In these circumstances honorary investment may have to carry the burden of maintaining full employment for an extended period.

The essence of the argument is that investment activity may be viewed as an offshoot of portfolio preferences, and that portfolio preferences reflect the attempt by rational men to do well in a world with uncertainty. Any shock to portfolio preferences that leads to a sharp drop in investment results from experiences with portfolios that have gone sour. On a large scale, portfolios go sour in the aftermath of a financial crisis.

---

from capital are known, then the equation $P_k = Q\ (M,\bar{K})$ can be transformed into $r = Q\ (M,\bar{K})$. With every quantity of M a different price will be paid for the same future income stream; a larger quantity of money will be associated with a higher market price of existing capital and thus a lower rate of return on the market value of capital. In a similar way, *the investment relation* can be turned into an $I = I\ (r)$ relationship. This requires the same information on expected returns as is used in transforming the portfolio relation. In turn the $I = I(r)$ and the $r = Q(M)$ can be transformed into $I = Q\ (M)$. Because $\bar{K}$ and not Y is an argument in the equation $P_k = Q(M, \bar{K})$, the $I-S$, $L-M$ construction is not obtained.

[30] This footnote appears in right-hand column.

[30] Underlying preferences need not be such that for P_k to remain constant $\frac{dM}{M} = \frac{dK}{K}$; it may be that $\frac{dM}{M} < \frac{dK}{K}$ or even $\frac{dM}{M} > \frac{dK}{K}$. See Arrow, "Aspects of the Theory of Risk Bearing." Friedman's well-known result is that $\frac{dM}{M} > \frac{dP_kK}{P_kK}$. See M. Friedman, "The Demand for Money: Some Theoretical and Empirical Results," pp. 327–51.

APPENDIX TO SECTION IV: A Model

The model can be written as follows:

(1) $Y=C+I$

(2) $C=C(Y)$

(3) $I=I(P_{IS}, \overline{W})$

(4) $P_K=L(M, \overline{K})$

(5) $P_{I \cdot D}=P_K$

(6) $P_{IS}=P_{I \cdot D}$

(7) $M_o=M_s$

M_s (Money), $\overline{K}$ (capital stock), and $\overline{W}$ (wages are all exogenous, $P_M=1$.

Symbols have their usual meaning: we add P_{IS} as the supply price of a unit of investment, P_K as the market price of a unit of existing real or inside capital, and $P_{I \cdot D}$ is the demand price of a unit of investment.

(3) $$\frac{dI}{dP_{IS}}>0, \lim_{I \to 0} P_{IS}>0, \frac{dP_{IS}}{dW}>0$$

(4) $$\frac{dP_K}{dM}>0, \frac{dP_K}{dK}<0$$

Equation 4 is unstable with respect to views as to uncertainty; it shifts "down" whenever uncertainty increases. This portfolio balance equation (the liquidity preference function) yields a market price for the units in the stock of real capital for each quantity of money.

Given W, I adjusts so that $P_{IS}=P_K$ (equations 3, 5, and 6). Once I is given C and Y are then determined (equations 1 and 2). Nowhere in this model does either the interest rate or the productivity of capital appear. "Liquidity preference" (equation 4) determines the market price of the stock of real assets. A shift in liquidity preference means a shift in equation 4, not a movement along the function.

In the model, the tune is called by the market price of the stock of real capital. Given a cost curve for investment that has a positive price for zero output, it is possible for the demand price to fall below the price at which there will be an appreciable production of capital goods. Thus, the complete collapse of investment is possible.

Of course, productivity in the sense of the expected quasi-rents is almost always an element in the determination of the market price of a real asset or a collection of assets. However, this formulation minimizes the impact of productivity as it emphasizes that the liquidity attribute of assets may at times be of greater significance in determining their market price than their productivity. The perspective in this formulation is that of business cycles, not of a full-employment steady state.

Productivity of capital takes the form of expected future earnings (gross profits after taxes) of a collection of capital goods within a producing unit. In any real world decision, the earnings on specific items or collections of capital must be estimated, and the heterogeneity of the capital stock must be taken into account.

Once earnings are estimated, then given the current market price, a discount rate can be computed. That is, we have

(7) $$P_k \cdot \overline{K}=\sum_{i=1}^{n} \sum_{t=1} Q_i/(1+r_i)^t$$

which states the arithmetic relation that the value of the capital stock is of necessity equal to the discounted value of some known stream of returns, Q_i. If the current market determines $P_k \cdot K$ and if a set of Q_i is estimated, an interest rate can be computed. If it is wished, equation 4 can be suppressed by using equation 7, that is,

(4′) $$\frac{1}{K} \sum_{i,t=1}^{n} \frac{Q_i}{(1+r_i)t}=L(M, K)$$

If a transaction demand for money is added, if the Q_i are interpreted as a function of Y, if all r_i are assumed equal, and if K is suppressed as being fixed in the short run then

(4″) $$M_0=L(r, Y)$$

may be derived.

For the investment decision, we may assume that the future return of the increment to capital is the same as to the stock of capital. With the Q_i known and assumed independent of the short-run pace of investment, then

(3′) $$P_{IS}=\frac{1}{K} \sum_{i,t=1}^{n} \frac{Q}{(1+r_i)t}$$

Thus given the fact that the supply price of investment rises with investment (constant W), greater investment is associated with a lower interest rate. That is,

(3″) $$I=I(r, Y) \text{ and } \frac{dI}{dr}<0$$

Both equations 4″ and 3″ are arithmetic transformations of 4 and 3. Equations 4 and 3 represent market phenomena, whereas 4″ and 3″ are

computed transformations of market conditions.

For financial contracts such as bonds the Q_i are stated in the contract. Even so the yield to maturity is a computed number—the market number is the price of the bond.

When the interest rate is not computed, the investment decision and its relation to liquidity preference are viewed in a more natural way. Of course, for real capital the Q_i reflects the productivity in the form of cash flows, current and expected. But the productivity of capital and investment affect present performance only after they are filtered through an evaluation of the state of the irrational, uncertain world that is the positioning variable in the liquidity preference function. Productivity and thrift exist, but in a capitalist economy their impact is always filtered by uncertainty.

V. HOW DOES TIGHT MONEY WORK?

Tight money, defined as rising nominal interest rates associated with stricter other terms on contracts, may work to restrain demand in two ways.[31] In the conventional view tight money operates through rationing demand by means of rising interest rates. Typically this has been represented by movements along a stable negatively sloped demand curve for investment (and some forms of consumption) that is drawn as a function of the interest rate. An alternative view that follows from the argument in Section IV envisages tight money as inducing a change in expectations in the perceived uncertainty, due to an episode such as a financial crisis or a period of financial stringency. This within Diagrams 1 and 2 can be represented by a downward shift in the infinitely elastic demand curve for investment.

The way in which tight money operates depends upon the state of the economy. In a non-euphoric expanding economy, where liability structures are considered satisfactory, monetary restraint will likely operate by way of rationing along a stable investment demand curve. In a booming euphoric economy, where high and rising prices of capital are associated with a willingness on the part of firms to "extend" their liability structures and of financial intermediaries to experiment with both their assets and their liabilities, tight money will be effective only if it brings such portfolio, or financial structure, experimentation to a halt. A reconsideration of the desirability of financial experimentation will not take place without a triggering event, and the reaction can be both quick and disastrous. A euphoric boom is characterized by a stretching, or thinning out, of liquidity; the end of a boom occurs when desired liquidity quickly becomes significantly greater than actual liquidity.

In a euphoric economy, with ever-increasing confidence, there is an increase in the weights attached to the occurrence of states of nature favorable to the owning of larger stocks of real capital. Thus, an upward drift in the price of the real capital–money supply function occurs (Diagram 1, p. 111).

This shift means that for all units both the expected flows of cash from operations and the confidence in these expectations are rising. Given these expectations, an enterprise assumes that with safety it can undertake (1) to emit liabilities whose cash needs

[31] "Tightness" of money refers to costs (including contract terms) for financing activity by way of debt. High and rising interest rates plus more restrictive other terms on contracts are evidence of tight money. Tightness has nothing directly to do with the rate of change of the money supply or the money base or what you will. Only as these money supply phenomena affect contract terms do they affect tightness.

Nonprice rationing by suppliers of finance means that the other terms in financing contracts for some demanders increase markedly. The tightness of money is not measured correctly when only one term in a contract, the interest rate, is considered.

will be met by these now-confidently-expected cash flows and (2) to undertake projects with the expectation that the cash flows from operations will be one of the sources of finance. In a euphoric economy the weight attached to the necessity for cash reserves to ease strains due to unexpected shortfalls in cash flows is ever decreasing.

In a lagless world—where all investment decisions are taken with a clean slate, so to speak—current investment spending is related to current expectations and financial or money market conditions. In a world when today's investment spending reflects past decisions, the needs for financing today can often be quite inelastic with respect to today's financing conditions: and today's financing conditions may have their major effect upon investment spending in the future. Thus, there exists a pattern of lags between money and capital market conditions and investment spending conditions. This lag pattern is not independent of economic events. A dramatic financial market event, in particular a financial crisis or widespread distress, can have a quick effect.

For units with outstanding debts, tight money means that cash payment commitments rise as positions are refinanced. This is true not only because interest rates are higher but also because other terms of the units' borrowing contracts are affected. In addition, if projects are undertaken with the expectation that they would be financed in part by cash generated by ongoing operations, and if the available cash flows fall short of expectations—due perhaps to the increased cost of the refinanced inherited debt—then a larger amount will need to be financed by debt or by the sale of financial assets. This means that the resultant balance sheet can be inferior to and the cash flow commitments larger than the target envisaged when the project was undertaken. Conversely, if gross profits rise faster than costs, so that a smaller-than-expected portion of investment is financed by debt, the resultant balance sheet will be superior to that expected when projections were made. In this way, investment may be retarded or accelerated by cash flow and balance sheet considerations.[32]

Deposit financial institutions are especially vulnerable to tight money if their assets are of significantly longer term than their debts; they are virtually refinancing their position daily by offering terms that are attractive to their depositors. A rapid rise in their required cash flows due to interest costs may take place, which can lead to a sharp reduction in their net income.

Thus, during a euphoric expansion the effects of tight money are more than offset for units holding real capital, whereas for other units, such as savings banks, tight money means a significant deterioration in their financial position whether measured by liquidity or net worth.

In a euphoric economy the willingness to hold money or near money decreases. The observed tightness of money—the rise in interest rates on near monies and other debts—is not necessarily caused by any undue constraint upon the rate of increase of the money supply; rather it reflects the rapid increase in the demand for financing. An attempt by the authorities to sate the demand for finance by creating bank credit will lead to rapidly rising prices: inflationary expectations will add to the euphoria. Euphoric expectations will not be ended by a fall in income, as the strong investment demand that is calling the tune is insensitive to the rise in financing terms.

[32] For a more detailed analysis of how financial actualities may relate to project decisions, see H. P. Minsky, "Financial Intermediation in the Money and Capital Markets." See also E. Greenberg, "A Stock-Adjustment Investment Model."

In a euphoric economy characterized by an investment boom, cash payments become ever more closely articulated to cash receipts; the speculative stock of money and near monies is depleted. Two phenomena follow from this closer articulation. The size decreases, both of the shortfall in cash receipts and of the overrun in cash payments due to normal operations, that will result in insufficient cash on hand to meet payments. The frequency with which refinancing or asset sales are necessary to meet payment commitments increases. Units become more dependent upon the normal functioning of various financial markets.

Under these emerging circumstances there is a decrease in the size of the dislocation that can cause serious financial difficulties to a unit, and an increase in the likelihood that a unit in difficulty will set other units in difficulty. Also, even local or sectoral financial distress or market disruptions may induce widespread attempts to gain liquidity by running off or selling out positions in real or financial assets (inventory liquidation). This action in turn may depress incomes and market prices of real and financial assets. We may expect financial institutions to react to such developments by trying to clean up their balance sheets and to reverse the portfolio changes entered into during the recent euphoric period. The simultaneous attempt by financial institutions, consumers, and firms to improve their balance sheets may lead to a rupture of what had been normal as well as standby financing relations. As a result losses occur, and these, combined with the market disruptions, induce a more conservative view as to the desired liability structure.

The view that, in conditions of euphoria, tight money operates by causing a re-evaluation of the uncertainties carried by economic units is in marked contrast to the textbook analysis of tight money seen as operating by constraining expenditures along a stable investment function. If an expansion is taking place in the absence of a transformation —by way of euphoric expectations—of preferred portfolios and liability structures then the system can operate by rationing along a stable investment relation. Then tight money may lead to a decline in investment and a relaxation of monetary constraint may reverse this decline: conventional monetary policy can serve as an economic steering wheel.

But once the expansion is associated with the transformation of asset and liability structures that have been identified as characteristic of a euphoric economy, tight money will constrain demand only if it induces a shift either in the demand function for money or in the price function for capital goods. For this to happen the expansion must continue long enough for balance sheets to be substantially changed. Then some triggering event that induces a reconsideration of desired balance sheets must occur. A financial crisis or at least some significant amount of financial distress is needed to dampen the euphoria. The fear of financial failure must be credible in order to overcome expectations built on a long record of success.

During an emerging euphoric boom, the improvement in expectations may overwhelm rising interest rates. As a result of the revision of portfolio standards, the supply of finance seems to be almost infinitely elastic at stepwise rising rates. Typically, this "infinitely" elastic supply is associated with the emergence of new financial instruments and institutions,[33] such as the use of Federal funds to make position, the explosive growth of negotiable CD's, and the

[33] H. P. Minsky, "Central Banking and Money Market Changes."

development of a second banking system. Under these circumstances, a central bank will see its restriction of the rate of growth of the money supply or the reserve base overwhelmed by the willingness of consumers, business firms, and financial institutions to decrease cash balances: increases in velocity overcome restrictions in quantity. The frustrated central bank can try to compensate for its lack of success in constraining expansion by further decreasing the rate of growth of the money supply, thus forcing a more rapid development of a tightly articulated cash position. Such a further tightening will occur within a financial environment that is increasingly vulnerable to disruption. The transition will not be from too-rapid economic expansion to stability by way of a slow deceleration, but a rapid decline will follow a sharp braking of the expansion.

With some form of a financial crisis likely to occur after a euphoric boom, it becomes difficult to prescribe the correct policy for a central bank. However, the central bank must be aware of this possibility and it must stand ready to act as a lender of last resort to the financial system as a whole if and when a break takes place. With the path of the economy independent in its gross terms of the rate of increase of the money supply and of the relative importance of bank financing, the central bank might as well resist the temptation to further tighten its constraints if the initial extent of constraint does not work quickly. The central bank should sustain the rate of growth of the reserve base and the money supply at a rate consistent with the long-term growth of the economy. This course should be adopted in the hope, however slight, that the rise in velocity—deterioration of balance sheet phenomena described earlier—will converge, by a slow deceleration of the euphoric expectations, to a sustainable steady state.

In particular during a euphoric expansion the central bank should resist the temptation to introduce constraining direct controls on that part of the financial system most completely under its control—the commercial banks. The central bank should recognize that a euphoric expansion will be a period of innovation and experimentation by both bank and nonbank financial institutions. From the perspective of picking up the pieces, restoring confidence, and sustaining the economy, the portion of the financial system that the central bank most clearly protects should be as large as possible. Instead of constraining commercial banks by direct controls, the central bank should aim at sustaining the relative importance of commercial banks even during a period of euphoric expansion; in particular, the commercial banks should not be unduly constrained from engaging in rate competition for resources.

VI. THE THEORY OF FINANCIAL STABILITY

In Section IV it was concluded that normal functioning requires that the price level, perhaps implicit, of the stock of real capital assets be consistent with the supply price of investment goods at the going-wage level. The euphoric boom occurs when portfolio preferences change so that the price level of the stock rises relative to the wage level, causing an increase in the output of investment goods. A sharp fall in the price level of the stock of real assets will lead to a marked decline in investment and thus in income: a deep depression can occur only if such a change in relative prices takes place.

Attributes of stability

In the discussion of uncertainty, we identified one element that could lead to a sharp lowering of the price level of the existing stock of capital. A sharp change in the desired composition of assets in portfolios—due to an evaporation of confidence in views held previously as to the likelihood of various alternative possible state-dates of the economy—will lower the value of real assets relative to both the price level of current output and money. Such a revaluation of the confidence with which a set of expectations is held does not just happen.

The event that marks the change in portfolio preferences is a period of financial crisis, distress, or stringency (used as descriptive terms for different degrees of financial difficulty). However, a financial crisis—used as a generic term—is not an accidental event, and not all financial structures are equally prone to financial instability. Our interest now is in these attributes of the financial system that determine its stability.

We are discussing a system that is not globally stable. The economy is best analyzed by assuming that there exist more than one stable equilibrium for the system. We are interested in the determinants of the domain of stability around the various stable equilibria. Our questions are of the form: "What is the maximum displacement that can take place and still have the system return to a particular initial equilibrium point?" and "Upon what does this 'maximum displacement' depend?"

The maximum shock that the financial system may absorb and still have the economy return to its initial equilibrium depends upon the financial structure and the linkages between the financial structure and real income. Two types of shocks that can trigger large depressive movements of financial variables can be identified: one is a shortfall of cash flows due to an over-all drop in income, and the second is the distress of a unit due to "error" of management. But not all recessions trigger financial instability and not every financial failure, even of large financial units, triggers a financial panic or crisis. For not unusual events to trigger the unusual, the financial environment within which the potential triggering event occurs must have a sufficiently small domain of stability.

The contention in this paper is that the domain of stability of the financial system is mainly an endogenous phenomenon that depends upon liability structures and institutional arrangements. The exogenous elements in determining the domain of financial stability are the government and central banking arrangements: after mid-1966 it is clear that the exogenous policy instrument of deposit insurance is a powerful offset to events with the potential for setting off a financial crisis.

There are two basic attributes of the financial system that determine the domain of stability of the financial system: (1) the extent to which a close articulation exists between the contractual and customary cash flows from a unit and its various cash receipts and (2) the weight in portfolios of those assets that in almost all circumstances can be sold or pledged at well nigh their book or face value. A third element, not quite so basic, that determines vulnerability to a financial crisis is the extent to which expectations of growth and of rising asset prices have affected current asset prices and the values at which such assets enter the financial systems.[34] The domain of stability of

[34]Assets enter the financial system when they are used as collateral for borrowing. A newly built house enters the financial system through its mortgage, which is based upon its current production costs. If the expectation takes over that house prices will rise henceforth at say 10 per cent a year, the market value of existing houses will rise to reflect the expected capital gains. If mortgages are based upon purchase prices, once such a house turns over, the values in the

the financial system is smaller the closer the articulation of payments, the smaller the weight of protected assets, and the larger the extent to which asset prices reflect both growth expectations and realized past appreciations. The evolution of these attributes of the financial structure over time will affect the size of the domain of stability of the financial system. An hypothesis of this, as well as the earlier presentations of these ideas, is that when full employment is being sustained by private demand, the domain of stability of the financial system decreases.

In addition to the impact of such full employment a euphoric economy with its demand–pull tight money will be accompanied by a rapid increase in the layering of financial obligations, which also tends to decrease the domain of stability. For as layering increases, the closeness with which payments are articulated to receipts increases and layering increases the ratio of inside assets to those assets whose nominal or book value will not be affected by system behavior.[35] A euphoric economy will typically be associated with a stock market boom and an increase in the proportion of the value of financial assets that is sensitive to a sharp revaluation of expectations.

Even though a prolonged expansion, dominated by private demand, will bring about a transformation of portfolios and changes in asset structures conducive to financial crises, the transformations in portfolios that take place under euphoric conditions sharply accentuate such trends. It may be conjectured that euphoria is a necessary prelude to a financial crisis and that euphoria is almost an inevitable result of the successful functioning of an enterprise economy.

Thus, the theory of financial stability takes into account two aspects of the behavior of a capitalist economy. The first is the evolution of the financial structure over a prolonged expansion, which affects the nature of the primary assets, the extent of financial layering, and the evolution of financial institutions and usages. The second consists of the financial impacts over a short period due to the existence of a highly optimistic, euphoric economy; the euphoric economy is a natural consequence of the economy doing well over a prolonged period. Over both the prolonged boom and the euphoric period portfolio transformations occur that decrease the domain of stability of the financial system.

Financial instability as a system characteristic is compounded of two elements. How are units placed in financial distress and how does unit distress escalate into a systemwide crisis?

The "banking theory" for all units

It is desirable to analyze all economic units as if they were a bank—or at least a financial intermediary. The essential characteristic of such a financial unit is that it finances a position by emitting liabilities. A financial institution does not expect to meet the commitments stated in its liabilities by selling out its position, or allowing its portfolio to run off. Rather, it expects to refinance its position by emitting new debt. On the other hand every unit, including banks and other financial units, has a normal functioning cash flow from operations. The relation between the normal functioning cash flow to and the refinancing opportunities on the one hand and the commitments embodied in the liabilities on the other determine the conditions under which the organization can be placed in financial distress.

---

portfolios of financial institutions reflect growth expectations. This happens with takeovers, mergers, conglomerates, and so on. It is no accident that such corporate developments are most frequent during euphoric periods.

[35] The relevant assets structure concept is outside assets as a ratio to the combined assets (or liabilities) of all private units, not the consolidated assets.

It is important for our purpose to look at all organizations from the *defensive* viewpoint: "What would it take to put the organization in financial distress?" This aspect will be made clearer when we discuss bank and other examination procedures.

Solvency and liquidity constraints. All economic units have a balance sheet. Given the valuation of assets and liabilities one may derive a net worth or owner's equity for the unit. The conditional maximization of owner's equity may be the proximate goal of business management—the condition reflecting the need to protect some minimum owner's equity under the most adverse contingency as to the state of the economy.

A unit is solvent—given a set of valuation procedures—when its net worth is positive.[36] A unit is liquid when it can meet its payment commitments. Solvency and liquidity are two conditions that all private economic organizations must always satisfy. Failure to satisfy either condition, or even coming close to failing, can lead to actions by others that affect profoundly the status of the organization.

Even though textbooks may consider solvency and liquidity as independent attributes, the two are interrelated. First of all, the willingness to hold the debt of any organization depends in part upon the protection to the debt holder embodied in the unit's net worth. A decline in net worth—perhaps the result of revaluation of assets—can lead to a decreased willingness to hold debts of a unit and hence to difficulties when it needs to refinance a position. A lack of liquidity may result from what was initially a solvency problem.

[36] The common valuation procedures take book or market value. For purposes of both management and central bank decisions it would be better if valuation procedures were conditional, that is, of the form: if the economy behaves as follows, then these assets would be worth as follows.

Similarly, a net drain or outflow of cash from an organization may lead to a need to do the unusual—to acquire cash by selling assets. If, because of the thinness of the market, a sharp fall in the asset price occurs when such sales are essayed, then a sharp drop in net worth takes place, especially if the organization is highly levered.

We can identify, therefore, three sources of a decline in the price level of the stock (capital), relative, of course, to the flow (income and investment). One is a rise in the weight attached to those possible states of the society that make it disadvantageous to hold real assets, and financial assets whose value is closely tied to that of real assets. The second is the fall in asset values due to a rise in the discount caused by uncertainty. The third is a decline in asset values as the conditions change under which a position in these assets may be financed. In particular, whenever the need to meet the cash payment commitments stated by liabilities requires the selling out of a position, there is the possibility of a sharp fall in the price of the positioned asset. Such a fall in asset prices triggers a serious impact of financial markets upon demand for current output.

The need for cash for payments. Cash is needed for payments, which are related to financial as well as income transactions. The layering of financial interrelations affects the total payments that must be made. To the extent that layering increases at a faster rate than income, over a prolonged boom, or in response to rising interest rates, or during a euphoric period, the payments/income ratio will rise. The closer the articulation by consumers and business firms of income receipts with payments due to financial contracts, the greater the potential for financial crisis.

Each money payment is a money receipt. As layering increases, the importance of the

uninterrupted flow of receipts increases. The inability of one unit to meet its payment commitments affects the ability of the would-be recipient unit to meet its payment commitments.

Three payment types can be distinguished: income, balance sheet, and portfolio, each of which can in turn be broken down into subclasses.[37] These payment types reflect the fact that economic units have incomes and manage portfolios.

The liabilities in a portfolio state the payment commitments. These contractual payment commitments can be separated into dated, demand, and contingent commitments. To each liability some penalty is attached for not meeting the commitment: and the payment commitments quite naturally fall into classes according to the seriousness of the default penalty. In particular, the payment commitments that involve the pledging of collateral are important—for they provide a direct and quick link between a decline in market value of assets and the need to make cash payments. That is, they are a type of contingent payment commitment that involves the supply of additional collateral or cash whenever a market price falls below some threshhold. This margin or collateral maintenance payment commitment can be a source of considerable disorganization and can lead to sharp declines in asset prices.

Another aspect of balance sheet payment commitments is the source of the cash that will be used to make the payments. Three sources can be distinguished: the flow due to the generation of income; the flow due to the assets held in a portfolio; and the flow due to transactions in assets, either the emission of new liabilities or the sale of assets.

For each unit, or class of units, the trend in payment commitments relative to actual or potential sources of cash generates the changing structure of financial interrelations. The basic empirical hypothesis is that over a prolonged expansion—and in particular during a euphoric period—the balance sheet commitments to make payments increases faster than income receipts for private units (layering increases faster than income) and so total financial commitments rise relative to income. In addition, during euphoric periods, portfolio payments (transactions in assets) increase relative to both income and financial transactions. The measured rise in income velocity during an expansion underestimates the increase in the payment load being carried by the money supply.[38]

---

[37] *Income payments* are those payments directly related to the production of current income. Even though some labor costs are independent of current output, the data are such that all wage payments are in the income payments class. All of the "Leontief" payments for purchased inputs are such income payments.

Balance sheet payments during a period are those payments that reflect past financial commitments. Lease, interest, and repayment of principal are among balance sheet payments. For a financial intermediary either withdrawals by depositors or loans to policyholders are balance sheet payments.

Portfolio payments are due to transactions in real and financial assets.

Any payment may be of a different class when viewed by the payor or the payee. To the producer of investment goods the receipts from the sale of the good is an income receipt; to the purchaser it is a portfolio payment.

In addition to types, payments may be classified by "from whom" and "to whom."

If money consisted solely of depositors subject to check, then total payments would be the total debits to accounts and total receipts would be credits to accounts. Hence, it is the implication for system stability of total clearings, where the financial footings are integrated with the income footings, that is being examined.

[38] In various places, I have tried to estimate by proxies some of these relations. Empirical investigation of stability could begin with a more thorough and also an up-to-date examination of these payment relations. The relations mentioned in this section are discussed in detail in my paper, "Financial Crisis, Financial Systems, and the Performance of the Economy."

Modes of system behavior

Three modes of system behavior can be distinguished depending upon how *ex post* savings are in fact offset by *ex post* investment. The offsets to saving that we will consider are investment in real private capital and Government deficits. For convenience, we will call real private capital inside assets and the accumulated total of Government deficits, outside assets. Thus, the consolidated change in net worth in an economy over a time period equals the change in the value of inside assets plus the change in the value of outside assets.

At any moment in time the total private net worth of the system equals the consolidated value of outside plus inside assets. Assuming the value of outside assets is almost independent of system behavior, the ratio of the value of outside to the value of total or inside assets in the consolidated accounts is one gross measure of the financial structure.

The savings of any period are offset by outside and inside assets. The ratio of outside to inside assets in the current offset to savings as compared to the initial ratio of outside to inside assets will determine the financial bias of current income. If the Government deficit is a larger portion of the current offset to savings than it is of the initial wealth structure, then the period is biased toward outside assets; if it is smaller, the period is biased toward inside assets; if it is the same, then the period is neutral.

Over a protracted expansion the bias in financial development is toward inside assets. This bias is compounded out of three elements: (1) Current savings are allocated to private investment rather than to Government deficits; (2) capital gains raise the market price of the stock of inside assets; and (3) increases in interest rates lower the nominal value of outside, income–earnings assets. Thus, the vulnerability of portfolios to declines in the market price of the constituent assets increases.[39]

In the long run, portfolio balance has been maintained by cycles in the relative weights of primary assets accumulated: historically the portfolio cycle centered around business cycles of deep depressions. However, to judge what is happening over time it is necessary to evaluate the significance of changes in financial usages. The existence of effective deposit insurance makes the inside assets owned by the banking system at least a bit outside. The same is true for all other Government underwritings and endorsements of private debt. Thus, with the growth of Government and Government agency contingent liabilities even growth that is apparently biased toward the emission of private liabilities may in fact be biased toward outside assets. An attempt to enumerate—and then evaluate—the various Government endorsements and underwritings of various asset and financial markets in these terms is necessary when estimating the potential of an economy for financial instability.

Secondary markets

The domain of stability of the system depends upon the ratio of the value of those assets whose market value is independent of system behavior to the value of those assets whose market value reflects expected system behavior. The value of a particular asset can be independent of system behavior either because its market is pegged or because the flow of payments that will be made does not depend upon system performance and its capital value is largely independent of financial market conditions.

[39] This is, of course, an assertion as to the facts, and the truth of these statements can be tested. Perhaps with a government sector that is 10 per cent of GNP, such statements are less true than with one that is 1 per cent of GNP.

For secondary markets to be an effective determinant of system stability, they must transform an asset into a reliable source of cash for a unit whenever needed. This means that the secondary market must be a dealer market; in other words, there needs to be a set of position takers who will buy significant amounts for their own account and who sell out of their own stock of assets. Such position takers must be financed. Presumably under normal functioning the position taker is financed by borrowing from banks, financial intermediaries, and other private cash sources. However, a venturesome, reliable position taker must have adequate standby or emergency financing sources. The earlier argument about refinancing a position applies with special force to any money market or financial market dealer.

The only source of refinancing that can be truly independent of any epidemics of confidence or lack of confidence in financial markets is the central bank. Thus if the set of protected assets is to be extended by the organization of secondary markets, the stability of the financial system will be best increased if the dealers in these secondary markets have guaranteed access to the central bank.

It might be highly desirable to have the normal functioning of the system encompass dealer intermediaries who finance a portion of their position directly at the Federal Reserve discount window.

If a Federal Reserve peg existed in the market for some class of private liabilities, these liabilities would become guaranteed sources of cash at guaranteed prices. Such assets are at least in part outside, and they would increase the domain of stability of the system for any structure of other liabilities.

The extension of secondary markets to new classes of assets and the associated opening of the discount window to new financial intermediaries may compensate at least in part—or may even more than compensate—for the changes in financial structure due to the dominance of private investment in the offsets to saving during a prolonged boom.

Unit and system instability

Financial vulnerability exists when the tolerance of the financial system to shocks has been decreased due to three phenomena that cumulate over a prolonged boom: (1) the growth of financial—balance sheet and portfolio—payments relative to income payments; (2) the decrease in the relative weight of outside and guaranteed assets in the totality of financial asset values; and (3) the building into the financial structure of asset prices that reflect boom or euphoric expectations. The triggering device in financial instability may be the financial distress of a particular unit.

In such a case, the initiating unit, after the event, will be adjudged guilty of poor management. However, the poor management of this unit, or even of many units, may not be the cause of system instability. System instability occurs when the financial structure is such that the impact of the initiating units upon other units will lead to other units being placed in difficulty or becoming tightly pressed.

One general systemwide contributing factor to the development of a crisis will be a decline in income. A high financial commitment–income ratio seems to be a necessary condition for financial instability; a decline in national income would raise this ratio and would tend to put units in difficulty. Attempts by units with shrunken income to meet their commitments by selling assets adversely affects other initially quite liquid or solvent organizations and has a destabilizing impact upon financial markets. Thus, an

explosive process that involves declining asset prices and income flows may be set in motion.

The liabilities of banks and nonbank financial intermediaries are considered by other units (1) as their reservoirs of cash for possible delays in income and financial receipts and (2) as an asset that will never depreciate in nominal value. Bank and financial intermediary failure has an impact upon many units—more units hold liabilities of these institutions than hold liabilities of other private-sector organizations. In addition such failures, by calling into question the soundness of the asset structure of all units, tend to modify all desired portfolios. A key element in the escalation of financial distress to systemwide instability and crisis is the appearance of financial distress among financial institutions. Without the widespread losses and changes in desired portfolios that follow a disruption of the financial system, it is difficult for a financial crisis to occur. The development of effective central banking, which makes less likely a pass-through to other units of losses due to the failure of financial institutions, should decrease the likelihood of the occurrence of sweeping financial instability that has characterized history.

From this analysis of uncertainty it appears that, even if effective action by the central bank aborts a full-scale financial crisis by sustaining otherwise insolvent or illiquid organizations, the situation that made such abortive activity necessary will cause private liability emitters, financial intermediaries, and the ultimate holders of assets now to desire more conservative balance sheet structures. The movement toward more conservative balance sheets will lead to a period of relative stagnation.

The following propositions seem to follow from the preceding analysis:

1. The domain of stability of the financial system is endogenous and decreases during a prolonged boom.

2. A necessary condition for a deep depression is a prior financial crisis.

3. The central bank does have the power to abort a financial crisis.

4. Even if a financial crisis is aborted by central bank action, the tremor that goes through the system during the abortion can lead to a recession that, while more severe than the mild recessions that occur with financial stability, can be expected nevertheless to be milder and significantly shorter than the great depressions that have been experienced in the past.[40]

[40] The above was written in the fall of 1966. If the crunch of 1966 is identified as an aborted financial crisis, then the events of 1966–67 can be interpreted as a particularly apt use of central bank and fiscal policy to first abort a financial crisis and then offset the subsequent decline in income. It is also evident from the experience since 1966 that if a crisis and serious recession are aborted, the euphoria, now combined with inflationary expectations, may quickly take over again. It may be that, for the boom and inflationary expectations evident in 1969 to be broken, the possibility of a serious depression taking place again must become a credible threat. Given the experience of the 1960's, it may also be true that the only way such a threat may be made credible is to have a serious depression.

VII. AN ASIDE ON BANK EXAMINATION

Commercial banks and other deposit institutions are periodically examined. I do not intend to offer a critique of current bank examination objectives and techniques or to inquire into whether such examination is useful or necessary. I assume that bank examination will continue and that the only negotiable issue is its nature.

As now carried out, bank examinations enable the examining authority to determine

the creditworthiness of the institution and fraud are not obvious. The determination of creditworthiness is an extension of the lender–borrower relationship, and the examination for fraud and mismanagement is a consumer protection function. It is argued here that a bank examination procedure that focuses on cash flow relationships can be a useful source of information for Federal Reserve policy-making.

Typically, the end result of a bank examination is a balance sheet, which places prices on assets. Many assets of financial institutions—such as bank loans—do not have an active market. Such assets are priced at their face value, especially if they are current, even though they would sell at a discount if a market existed.[41] Items that are not current—what some call scheduled items—are valued at some arbitrary ratio to face value in arriving at the balance sheet. An excess proportion of scheduled items is taken as indicating a need for corrective action by the institution. It is obvious that the examiners' balance sheet reflects many arbitrary rules, especially to the extent that valuation is divorced from current market prices. An arbitrary element enters into every placing of a price on assets for which no broad, deep, and resilient market exists.

In addition, measures of the adequacy of capital and liquidity are derived. These measures reflect examiners' experience. It may be that an examination procedure that focuses on cash flows will lead to a more precise evaluation of capital adequacy and liquidity.

Even though the value placed upon a financial asset may be the result of an arbitrary valuation procedure, the commitments of the emitter of the instrument are precise. The commitments are to make payments—either at specified dates, on demand, or upon the occurrence of some stated contingency. Both assets and liabilities of a financial institution are such contracts. The examiner, by reading the outstanding contracts, can make a time profile of contractually dated cash flows to and cash flows from the unit. Each profile of dated payments and receipts needs to be supplemented by behavioral relations detailing the conditions under which demand and contingent clauses of contracts will be exercised. Thus, a time series of the needs and sources of cash, under alternative contingencies, can be estimated.[42]

Cash flow analysis enables the authorities to receive information about the expected impact of various economic policy operations upon the cash flow to and the cash flow from various units and classes of units. Whereas balance sheet analysis is essentially static, a cash flow analysis of any financial organization that forecasts cash flows at some future date must be based of necessity upon clearly stated assumptions as to (1) the values that certain systemwide variables will take, and (2) the functional relationships between these variables and the elements of the unit's cash flows. The conditional nature of any single statement makes it necessary to vary the assumptions—to map out how changes in parameters of the assumed functions and in systemwide variables affect cash flows.

An evaluation of the expected cash status of any institution, or class of institutions, will depend upon assumptions as to how

[41] Of course, with a decline in market interest rates, the assets would sell at a premium. The bias in writing this report has been to examine the effect of monetary constraint and rising interest rates. This essay is a creature of its time—midyear to fall 1966.

[42] Computer technology makes more feasible such a transformation of the examination procedure from an analysis of values to an analysis of cash flows. The emphasis upon capital values in bank and similar examination procedure, as well as in economic analysis, may well reflect what were at one time insurmountable computational difficulties.

the different market-determined variables will behave. Thus, the examination procedure will have to embody the results of serious economic analysis. Bank and other examination procedures should be forward looking. That is, instead of asking questions about the present status and the past history of an organization, the questions should be of the following form: "Given the present status as an initial condition, what would be the dated impacts upon the organization of various economic system, financial market, and management developments?" The vulnerability of say the New York mutual savings banks to rapidly rising interest rates on time deposits and the sensitivity of the income and liquidity of West Coast savings institutions to a decrease in the rate of growth of the local economy would have been obvious with such an analysis.

The proposed examination procedure becomes an analysis of the unit that is conditional upon the behavior of the economy. Economic policy decisions cannot be made on an adequate factual basis without some knowledge of their impact upon various classes of financial institutions. Much of what happens seems to surprise the authorities: an adequate examination procedure would minimize such surprise.

Cash flow analysis transforms every asset into a generator of a cash flow to the organization. Financial assets may be subdivided into three classes depending on how they generate cash: cash itself, loans, and investments. There is no need to discuss cash itself. Loans are those assets that generate a contractual cash flow. The ability of the owning organization to accelerate this cash flow by sale is very restricted. We may as well assume that it does not exist. However, such assets may serve as collateral for loans, for example at the discount window. Investments, while they do embody contractual cash flows, may also be salable in a market. Their current market price more or less states the cash flow that the managers can generate if they choose to sell out their position. True investments would have broad, deep, and resilient markets. Those of many banks and other financial institutions have thin markets, and the relevant cash flow to the organization from such investments follows from the contractual, rather than the marketable, properties of the asset.

Whereas current assets yield a cash flow to an organization, the process of asset acquisition results in a cash flow from the organization. As a continuing organization at each point in time a bank will have dated, demand, and contingent commitments to acquire assets. The commitments will be both explicit—lines of credit or letters—or implicit—the result of a long-term financial relation between the bank and the potential borrower. Banks may similarly have an implicit commitment to bid for local municipal issues.[43]

The cash flow to an organization due to financial asset holdings reflects both the flow of income and the repayment of principal. However, this division is not really relevant—what is relevant is the amount that is available from any cash flow for the acquisition of new assets. That is, the cash

[43] For all economic units, such continuing financial contacts and relations are valuable assets. True, implicit agreements may be not honored if a liquidity squeeze occurs, but this imposes capital losses upon the surprised and disappointed potential borrower. One way in which widespread bank failures affected the economy was by rupturing normal financial channels. When the Bank of the United States in New York failed in 1930, not only were there losses by depositors but a fairly large portion of the New York garment trade was cast adrift without a continuing bank relationship. Thus in principle we can be cavalier with respect to financial constraint resulting in loan contraction, but in fact we must recognize that extreme constraint may cause losses to innocent bystanders. See footnote 9, pp. 309 and 310, in M. Friedman and A. J. Schwartz, "Money and Business Cycles."

flow to must be related to the cash flow from.

The debt liabilities of deposit and other financial intermediaries are commitments to pay cash—at some specified date, on demand, or upon the occurrence of some contingency. These commitments include both the repayment of principal and interest payments; although for many deposit institutions interest payments are credited to the depositors' account and do not generate an automatic cash drain.

The debt liabilities of deposit institutions can be separated into service and purchased liabilities. Local demand deposits and passbook savings are almost all service deposits. The volume of such deposits will depend upon the state of the local economy and the action of local competitors. Purchased liabilities include Federal funds and large certificates of deposit for commercial banks as well as out-of-state deposits for savings and loan associations. Market demand may be volatile with respect to system performance for purchased liabilities, but be stable for service liabilities. A bank's potential ability to finance a position in assets without recourse to extraordinary techniques in times of monetary constraint may depend upon the extent to which its resources are derived from service rather than from purchased liabilities. The potential for recourse either to the discount window or to the sale of assets in some secondary market is related directly to the extent to which purchased liabilities are a source of funds. Thus the cash flow examination will have to consider the likelihood that the behavior of the market for such bank liabilities will lead to large cash flows out of the bank and thus force it to resort to discounting or asset sales.

Any cash flow analysis would need to relate each earning asset—both loans and investments—to the market in which it may be sold or pledged. For each asset the terms upon which financing is available to the position takers or lenders in its market need to be examined. In particular, the breadth, depth, and resiliency of a market can be guaranteed only if the central bank or perhaps its chosen instruments stand ready to finance position takers. Thus, if new asset classes become important, the examinations procedure might feed back to the central bank the need for the development of new or strengthened secondary markets or additional discount facilities.

For the demand and contingent liabilities of deposit institutions the interesting economic question is the conditions under which the demand or contingent claims will be exercised.

The cash flow to and from an organization because of demand liabilities is a function of at least the terms offered by the institution, the terms available elsewhere, and for certain institutions, national income. Many special variables that reflect the specific contractual terms enter into determining the impact upon cash flows of market-determined and policy variables.[44]

The content of cash flow analysis of a financial intermediary can be made more precise by illustrating how the technique would be applied to a specific institution. Let us take, for the sake of simplicity, and also perhaps because of its recent relevance, a savings and loan association. The assets of such an institution will consist almost

[44] In the Minsky-Bonem simulation experiments—reported in my paper "Financial Crisis, Financial Systems, and the Performance of the Economy," pp. 365 and 366—least-square regression lines were fitted for new deposits and withdrawals at savings and loan organizations as functions of disposable income. For particular savings and loan organizations similar functions would need to be estimated and such functions would include local economic conditions as well as interest rate variables, rather than just aggregate income data as was true in our rather primitive analysis.

entirely of long-term fully amortized mortgages. Because of the rapid growth of these institutions the representative portfolio is rather young. This means that the cash flow to the organization on account of its assets is a relatively small percentage of the total liabilities. In addition to such mortgages there will be some cash and Treasury bills—but at most these will be a small percentage of total assets. Thus even allowing for the cash flow that the management can generate by selling assets, the cash flow to the organization during one short period (say 90 days) cannot be more than 5 to 10 per cent of total liabilities.

Ignoring stand-by and lender-of-last-resort refinancing as a potential supplier of cash, these organizations must at all times offer interest rates attractive enough so that no appreciable flight of deposits will occur. However, as they cannot discriminate readily among depositors, they must pay all depositors whatever is needed to keep the marginal depositor.

In the summer of 1966, the need arose to raise interest rates on all deposits to prevent large-scale withdrawals of some deposits. This resulted in a sharp rise in the total cost of deposit funds. At the same time savings banks were locked into young portfolios whose contracts reflected the lower interest rates of the past. The cost of money in many cases may be penal, but unlike the classical penal rate case, the penal rate will rule not for a short time but may stretch over many years.

The penal rate of classical banking theory was an expensive way of refinancing a position that ran off in a relatively short span of time: 90 to 180 days. As a result of the short original dating of the contracts—within 6 months almost all of the initial assets of a commercial bank will be repaid—the turnover time for assets is short. New assets will be acquired as old ones are repaid, but only at interest rates that are consistent with the higher cost of money. Thus, when the cost of money rises, the relevant question is not just "How long will the interest rates be at this higher level?" but also "How long will it take for almost all assets in the portfolio to carry rates consistent with the new rate on liabilities?" If portfolios are heavily weighted with young, fully amortized, long-term contracts, this turnaround time can be many years. A cash flow examination procedure would state how long it would take for say 25 per cent, 50 per cent, and 75 per cent of assets to adjust to new higher —or lower—costs of money.

If interest on liabilities is a cash flow from the organization, a period in which a net cash flow out is financed by selling assets can occur when interest rates rise. If interest on liabilities is credited to the accounts of the depositors, deposit liabilities will rise relative to assets, and net worth will decrease. In both cases demand commitments to pay will increase relative to both the contractual cash flow to the unit due to assets and the ability of management to generate a cash flow by selling marketable assets.

There is no necessity to enlarge upon the relevant conditional relations. For example, one possible reaction by a deposit institution to prospective pressures for cash payments is to increase the ratio of cash and marketable securities to other assets. This means that instead of feeding cash flows generated by its mortgage portfolios to the now high-yielding mortgages, a hard-pressed savings and loan association will withdraw from the mortgage market and use cash flows to acquire low-yielding but marketable assets: it prepares its cash and near-cash position to withstand a deposit drain.

For each of various assumptions as to how units react to a cumulative cash flow

to or cash flow from, a time series of asset and liability positions can be derived. Presumably in the example given, the cash flow from, because of withdrawals, can actually be greater than the cash flow to for some periods. Even if such withdrawals do not occur, and even if we do not value assets at the current—estimated—market price, the growth of demand liabilities that results from the crediting of the high interest rate income to deposit accounts will lead to an increase in the ratio of deposit liabilities to cash flow to the organization. Thus, it may become an ever more difficult problem to retain deposits.

A conditional cash flow examination of individual and of classes of financial institutions would determine the impact upon the institution or class of institution of various policy-determined conditions.

One proposition favored by nonacademics is that the high cost of funds forces financial intermediaries into making risky loans that carry a high contractual interest rate. From the preceding cash flow example the cost of funds can rise so rapidly, relative to the fixed returns on the assets, that the organization will foresee that a liquidity crisis at some stated date is certain if it follows a conservative policy in the placement of accruing cash. If it sells its low-yield, fixed-market-price investments, reduces its cash position, and uses the cash flow on principal, income, and new deposit accounts to purchase high-yield, high-risk assets, then, if all turns out well, it avoids a liquidity crisis. That is, whereas the conservative portfolio policy yields a financial crisis with a probability of almost one, the more radical portfolio policy yields a finite probability greater than zero of avoiding the liquidity crisis. In these conditions the chancy portfolio policy is safer than the risk-free policy.

A conditional cash flow analysis of individual, and classes of, financial institutions will estimate the impact of various alternative policy and market-determined conditions upon the individual institutions and the set of institutions. For example, there may be a limit to tight money—due to the running losses, as illustrated earlier—that a nonbank financial intermediary, such as the savings and loan associations, can stand. The Federal Reserve must look beyond the commercial banking system to determine whether, or in what circumstances, its actions are destabilizing.

A unified procedure for examining all financial institutions that focuses on their cash flows will be of help not only to unit managements but also to regulatory authorities. One advantage of this approach is that through the information obtained the distribution of impacts can be estimated. Such an examination procedure should enable us to determine how many units are pushed over or pushed too close to some threshold by some constraining event that, for example, lowers the average return to a financial intermediary.

The development of an examination procedure for cash-flow-oriented banks and other financial institutions would involve a great deal of experimentation not only with observations of individual banks—the data gathered in examinations—but also with the system attributes that are relevant to determining individual bank behavior. Fortunately, the recent interest in banking and bank markets has generated a body of studies that can be used as a starting point for the analysis of the behavior of financial institutions under alternative conditions.

VIII. REGIONAL ASPECTS OF GROWTH AND FINANCIAL INSTABILITY

The reserve base of the banks in a region must be earned, and to keep such reserves, the return offered must be competitive. The global reserve base is the result of Federal Reserve policies.[45] Every change in reserves appears initially as a change in reserves in some particular set of banks. However, even if the Federal Reserve has a policy or program that directs the initial change in reserves toward some region, the ultimate regional distribution depends upon market forces. Any change in the reserve base of the banks within any region will be the result of either an income or an asset transaction with the rest of the country. The monetary system of every region is equivalent to a very strict gold standard, where reserves for a region are the equivalent of gold for a country.

National economic growth is the result of the growth of the various regions. Some regions grow more rapidly—and some less rapidly—than the economy. The available evidence indicates that the reserve base of the various regions grows at a pace that is consistent with the growth of the region. That is, even if there is a trend in velocity in both the country and the regions, the relative velocity will change but slightly. If there is a rapidly growing region embedded in a slowly growing country—as was true of California during the 1950's—the money supply and the reserve base of the rapidly growing region will also grow rapidly. Thus, in the 1950's while demand deposits in the United States were growing slowly, demand deposits in California were growing rapidly.[46]

In the case of California, two identifiable, large, and rapidly growing sources of bank reserves were (1) the excess of Federal Government payments over receipts in the State and (2) the flow of funds to the State to finance home construction. Other sources of reserves undoubtedly exist, but they were not identifiable at the time of the research underlying this section.

During the decade of the 1950's, the financing of housing generated a large flow of funds toward California. It has been estimated that as much as 40 per cent of the total financing for house-building in California came from out of the State. This flow of funds into California reflected both the export of mortgages and a rise in out-of-state deposits in California savings and loan associations. About 20 per cent of the deposits in California savings and loan associations were from out-of-state depositors.

A build-up in the stock of mortgages and deposits owned by out-of-state investors means that an increasing reserve drain takes place to meet the commitments as stated in this growing stock of liabilities. That is, without an appropriate offsetting growth in the cash flow from new mortgages, deposits, or other items, the growing stock of outstanding liabilities will tend to generate payments that lower the region's reserve base. Any slowdown in the influx of funds to the region on account of the housing market can lower the growth prospects for commercial banks and for the State's money supply.

Mortgages, especially the standard fully amortized contract, generate a known, dated series of payments; the only variation in the cash drain from the region due to the stock of mortgages will be due to an inability to make payments, prepayments, or the sale of mortgages. Given that there is some experience on prepayments and sales,

[45] Even if there are changes in the reserve base that are not due to Federal Reserve policy, the total reserve change is the result of Federal Reserve action—or inaction.

[46] See Minsky (ed.), *California Banking in a Growing Economy: 1946–1975*.

it seems clear that the outstanding foreign-owned (out-of-state) mortgages yield a known cash drain from the region's banks.

The cash flow due to all depositors but especially those from out of state, at California savings and loan associations will depend upon safety and profitability. Deposit insurance eliminates concern or doubt about the safety; thus, the cash flow to California because savings and loan deposits depend upon relative interest rates. A variety of rate-sensitive "hot monies" exist as deposits in these institutions; some of these would be sensitive to small differentials in interest rates. We would expect these potentially hot-money deposits to be the large out-of-state accounts.

Even though all deposits—local and out of state—should be equally sensitive to rate differentials, the convenience factor may dominate in the case of local, mostly passbook deposits. A rapidly growing region must maintain a rate structure that attracts funds and that retains previously acquired out-of-state deposit funds. Thus, California savings and loan associations must keep a favorable interest rate premium, even if the demand for financing of housing is slack. Defensive rate competition is based upon the unit's liability structure. Note that if the national cost of money is high, the supply price of finance from these institutions will remain consistent with this cost of money, even though local demands for financing may be slack.

One impact of monetary constraint in a euphoric economy is that a rise has taken place in other market interest rates relative to the rate on savings and loan shares (deposits) in California. The observation that the California mortgage market exhibited signs of disorderly conditions in mid-1966 needs no documentation. Due to rate competition, these deposits have stopped increasing Even if there is a net increase in deposits (at a slower rate) the net increase may be compounded of a decrease in foreign (out-of-state) deposits and an offsetting rise in domestic (in-state) deposits.

During recent periods of monetary constraint, the housing-related financial markets have tended to generate a decrease in California's reserve base. If all else remains the same, this means that either monetary velocity in California must increase relative to that of other geographical sectors, or the rate of growth of income must decrease.

There is nothing sacred about the favored growth experience of California, nor is there any reason why the national authorities should operate to keep California growing more rapidly than the country as a whole. However, tight money will be particularly hard on California homebuilding, mortgage financing institutions, and commercial banks. This will be compounded if a rate ceiling is adopted to prevent competition for deposits. Nonconstrained market instruments are substitutes for savings and loan liabilities, and a potential expansion of the retailing of such market instruments is a threat to deposit institutions.

A decline, or a slowdown, in the growth of commercial bank reserves in a rapidly growing region will lead to a decline in locally available credit through commercial banks. California banks are traditionally light on secondary reserve assets. The opportunity to sustain loan growth by decreasing investments is minimal.

Monetary constraint, after a period of rapid growth—especially if it is a reaction to a spread of euphoria from a previously rapidly growing region to the country as a whole—will put serious pressures upon the banks and other financial institutions of the previously rapidly growing region. The regional concentration of financial duress may trigger a more general spread of distress than if the same total financial

tightness were more evenly distributed geographically.

The practitioner of monetary policy must be aware that there are different regional pressures due to monetary constraint and that contagion phenomena within a region may be one way in which financial instability may be initiated.

IX. CENTRAL BANKING

The modern central bank has at least two facets: a part of the stabilization and growth-inducing apparatus of Government and the lender of last resort to all or part of the financial system. These two functions can conflict.

For the United States, central bank functions are decentralized among the Federal Reserve System, the various deposit insurance and savings intermediary regulatory bodies, and the Treasury. The decentralization of central banking functions and responsibilities makes it possible for "buck passing" to occur. One result of this decentralization, along with the fact of usage and market evolution, is that there exists a perennial problem of defining the scope and functions of the various arms of the central bank. The behavior of the various agencies in mid-1966 indicates that *ad hoc* arrangements among the various agencies can serve as the *de facto* central bank. However, even though central banking functions are distributed among a number of organizations, the fact that the Federal Reserve System appears first among them should not be obscured. The Federal Reserve may have to make markets in the assets or liabilities of the other institutions if they are to be able to carry out their assigned subroutines.

The Federal Reserve System undertook, when the peg was removed from the Government bond market, to maintain orderly conditions in this market. Maintaining orderly conditions in a key asset market is an extension of the lender-of-last-resort functions in that it is a preventive lender of last resort. "If we allow the now disorderly conditions to persist, we will in fact have to be a lender of last resort" is the underlying rationalization behind such action. Maintaining orderly conditions in some markets serves to protect position takers in the instrument traded in these markets. This protection of position takers may be a necessary ingredient for the development of efficient financial markets.

The stabilizer and lender-of-last-resort functions are most directly in conflict as a result of such efforts to maintain orderly conditions. If constraining action, undertaken to stabilize income, threatens the solvency of financial institutions, the central bank will be forced to back away from the policy of constraint.

If a financial crisis occurs, the central bank must abandon any policy of constraint. Presumably the central bank should intervene before a collapse of market asset values that will lead to a serious depression. However, if it acts too soon and is too effective, there will be no appreciable pause in the expansion that made the policy of constraint necessary.

I have already discussed one way in which tight money can cause financial instability; that is, asset holders that are locked into assets bearing terms born in times of greater ease are forced into risky portfolio decisions. In addition the very rise in interest rates, which measures tight money, induces substitutions in portfolios that makes financial instability more likely. Thus, intervention on grounds of lender of last resort and re-

sponsibilities for maintenance of orderly conditions become more likely during such periods.

In exuberant economic conditions central banking has to determine, once distress appears, just how disorderly markets can become before the lender-of-last-resort functions take over and dominate its actions. Perhaps the optimal way to handle a euphoric economy is to allow a crisis to develop—so that the portfolios acceptable under euphoric conditions are found to be dangerous—but to act before any severe losses in market values, such as are associated with an actual crisis, take place. If monetary conditions are eased too soon, then no substantial unlayering of balance sheets will be induced, and the total effect of monetary actions might very well be to reinforce the euphoric expansion. If conditions are eased after a crisis actually occurs —so that desired portfolios have been revised to allow for more protection—but the effective exercise of the lender-of-last-resort function prevents too great a fall in asset prices, then the euphoria will be terminated and a more sustainable relation, in terms of investment demand, between the capital stock and desired capital will be established.

If the lender-of-last-resort functions are exercised too late and too little, then the decline in asset prices will lead to a stagnation of investment and a deeper and more protracted recession. Given that the error of easing too soon only delays the problem of constraining a euphoric situation, it may be that the best choice for monetary policy really involves preventing those more severe losses in asset prices that lead to deep depressions, rather than preventing any disorderly or near-crisis conditions. If capitalism reacts to past success by trying to explode, it may be that the only effective way to stabilize the system, short of direct investment controls, is to allow minor financial crises to occur from time to time.

Note that the preceding is independent of the policies mix. If, as seems evident, the tight money of 1965–66 was due more to a rapid rise in the demand for money than to a decline in the rate of growth of the supply of money, a greater monetary ease combined with fiscal constraint would not have done the job. If we accept that a major expansionary element over this period was the investment boom and that the expenditures attributable to Vietnam only affected the degree, not the kind, of development, then an increased availability of finance would have resulted in increased investment and nominal income. A changed policy mix would have constituted further evidence of a new era. Of course, the fiscal constraint could have been severe enough to cause such a large decline in private incomes that existing commitments to make payments could not be met. A financial crisis or a close equivalent may be induced by too severe an application of fiscal constraint as well as by undue monetary constraint.

Within the Federal Reserve System, from the perspective of the maintenance of financial stability or at least the minimization of the impact upon income and employment of instability, a reversal may be in order of the trend that has led to the attenuation of the discount window. If secondary markets are to grow as a way of generating both liquidity while the system is functioning normally and protection while the system is in difficulty, then the dealers in these markets will need access to guaranteed refinancing. The only truly believable guaranty is that of the central bank.

However, a central bank's promise to intervene to maintain orderly conditions in some market will be credible only if the central bank is already operating in that market. If the central bank is not operating

in the market, then it will not have working relations with market participants and it will not be receiving first-hand and continuous information as to conditions in the market; no regular channels that feed information about market conditions will exist as now exist for the Government bond market. Thus, the Federal Reserve will need to be a normal functioning supplier of funds to the secondary markets it desires to promote.

At present, only a small portion of the total reserve base of banks is due to discounting at the Federal Reserve System. Discounting can serve three functions—a temporary offset to money market pressures, a steady source of reserves, and the route for emergency stabilization of prices. In order to set the ground for the Federal Reserve System to function effectively in the event of a crisis that requires a lender of last resort, the Federal Reserve normally should be "dealing" or "discounting" in a wide variety of asset markets. One way to do this is to encourage the emergence of dealer secondary markets in various assets and to have the Federal Reserve supply some of the regular financing of the dealers. It might be that a much higher percentage of the bank's cash assets than at present should result from discounting, but the discounting should be by market organizations rather than by banks.

Monetary and fiscal constraint may not be enough once the Keynesian lessons have been learned. The monetary–fiscal steering wheel had assumed a mechanistic determination of decisions that center around uncertainty; the system's doing well may so affect uncertainty that an arsenal of stabilization weapons including larger rationing elements may be necessary.

Let us assume the present arsenal of policy weapons and objectives. The policy objectives will be taken to mean that the high-level stagnation of the 1952–60 period does not constitute an acceptable performance. Under these conditions, the lender-of-last-resort obligations of the Federal Reserve, redefined as allowing local or minor financial crises to occur while sustaining over-all asset prices against large declines, become the most important dimension of Federal Reserve policy. The lender-of-last-resort responsibilities become also the arena where human error may play a significant role in determining the actual outcome of economic situations.

It is only in a taut, euphoric, and potentially explosive economy that there is much scope for error by the central bank. The importance attached to human error under these circumstances is due to a system characteristic—the tendency to explode—rather than to the failings of the Board of Governors.

Fall 1966 (revised January 1970)

BIBLIOGRAPHY

Ackley, G. *Macroeconomic Theory*. New York: Macmillan, 1961.

Arrow, K. J. "Aspects of the Theory of Risk Bearing." Yrjo Jahnsson lectures. Helsinki: Yrjo Jahnssonin Säätio, 1965.

———. "Uncertainty and the Welfare Economics of Medical Care," *American Economic Review,* December 1963.

Clower, R. W. "An Investigation into the Dynamics of Investment," *American Economic Review,* March 1954.

Economic Report of the President. Washington, D.C.: U.S. Government Printing Office, 1969.

Fellner, W. "Average-Cost Pricing and the Theory of Uncertainty," *Journal of Political Economy,* June 1948.

———. "Monetary Policies and Hoarding in Periods of Stagnation," *Journal of Political Economy,* June 1943.

Fisher, I. "The Debt-Deflation Theory of Great Depressions," *Econometrica,* October 1933.

Friedman, M. "The Demand for Money: Some Theoretical and Empirical Results," *Journal of Political Economy,* August 1959.

Friedman, M., and Schwartz, A. J. *A Monetary History of the United States, 1867–1960*. Study by the National Bureau of Economic Research, N.Y. New Jersey: Princeton University Press, 1963.

———. "Money and Business Cycles," *Review of Economics and Statistics,* Supplement, February 1963.

Galbraith, J. K. *The Affluent Society*. Boston: Houghton Mifflin, 1958.

Greenberg, E. "A Stock-Adjustment Investment Model," *Econometrica,* July 1964.

Gurley, J. G., and Shaw, E. *Money in a Theory of Finance*. Washington, D.C.: Brookings Institution, 1960.

Hicks, J. R. "Mr. Keynes and the 'Classics,' A Suggested Interpretation," *Econometrica,* April 1937.

Johnson, H. G. "The 'General Theory' after Twenty-five Years," *American Economic Review,* papers and proceedings, May 1961.

Kalecki, M. "The Principle of Increasing Risk," *Economica,* November 1937.

Keynes, J. M. "The General Theory of Employment," *Quarterly Journal of Economics,* February 1937.

———. *The General Theory of Employment, Interest and Money*. New York: Harcourt, Brace, and Company, 1936.

Minsky, H. P. "A Linear Model of Cyclical Growth," *Review of Economics and Statistics,* May 1959; also in Gordon, R. A., and Klein, L. R., A.E.A. Readings in Business Cycles, vol. 10. Homewood, Ill.: Richard D. Irwin, Inc., 1965.

——— (ed.). *California Banking in a Growing Economy: 1946–1975*. Berkeley, California: University of California, Institute of Business and Economic Research, 1965.

———. "Central Banking and Money Market Changes," *Quarterly Journal of Economics,* May 1957.

———. "Comment on Friedman and Schwartz's Money and Business Cycles," *Review of Economics and Statistics*. Supplement, February 1963.

———. "Financial Crisis, Financial Systems, and the Performance of the Economy," in *Private Capital Markets*. Prepared for the Commission on Money and Credit, N.Y. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1964.

———. "Financial Intermediation in the Money and Capital Markets," in Pontecorvo, G., Shay, R. P., and Hart, A. G. *Issues in Banking and Monetary Analysis*. New York: Holt, Rinehart and Winston, Inc., 1967.

Ozga, S. A. *Expectations in Economic Theory*. Chicago: Aldine Publishing Co., 1965.

Tobin, J. *The Intellectual Revolution in U.S. Economic Policy Making*. Noel Buxton lecture. Essex, England: The University of Essex, 1966.

———. "Liquidity Preference as Behavior Towards Risk," *Review of Economic Studies*, February 1958.

Turvey, R. "Does the Rate of Interest Rule the Roost?" in Hahn, F. H., and Brechling, F. P. R. (eds.). *The Theory of Interest Rates*. New York: St. Martin's Press, 1965.

Viner, J. "Mr. Keynes on the Causes of Unemployment," *Quarterly Journal of Economics,* November 1936.

Witte, J. G., Jr. "The Microfoundations of the Social Investment Function," *Journal of Political Economy,* October 1963.

DISCOUNT POLICY AND BANK SUPERVISION

Benjamin Stackhouse
Federal Reserve Bank of New York

Contents

DISCOUNT POLICY AND BANK SUPERVISION

INTRODUCTION

The purpose of this study is to examine the relationship between Federal Reserve discount policy and bank supervision. Bank supervision, being concerned with the condition of individual components of the commercial banking system, is affected primarily by discount policy as that policy, in turn, affects the supply of funds available to individual member banks to meet anticipated demands.

Any change in discount policy that increases or decreases the supply of funds will necessarily lead to some adjustment in liquidity management for individual banks. It is one of the responsibilities of bank supervision to identify possibly needed adjustments and, where appropriate, to counsel banks how best to make them.

This study considers the present approach to liquidity used by examiners for the New York Federal Reserve Bank and compares this approach with some other liquidity standards; it concludes with some comments on the consequences for the bank examiner's approach to commercial bank liquidity of proposed changes in discount policy.

Summary and conclusions

The changing asset structure of banks, the development of new money market instruments, and the decline during the postwar period in commercial bank liquidity as measured by traditional indices have focused attention on the problem of bank liquidity. The primary responsibility for maintaining adequate liquidity rests with the individual bank; this is particularly true under the present Regulation A, which provides that the Federal Reserve Banks may extend credit only to banks on a short-term basis except in emergency or other unusual situations. Under these circumstances supervisors place great emphasis on liquidity in their examinations of banks. A number of formulas have been developed to assist both bank management and the examiners by providing useful reference standards for assessing and evaluating bank liquidity.

Various proposals made in connection with the over-all study of the discount mechanism would liberalize the administration of the System's facilities so as to provide greater assistance to the banks in supplying funds either on a short-term basis or perhaps for longer periods of time. Any liberalization of Regulation A to permit readier access to the discount window would, of course, tend to reduce the need for member banks to make provision for their own liquidity because they could rely to a greater extent on their Reserve Bank.

Under a more liberal discount policy the examiner's emphasis would be shifted to some degree from the volume of securities in the bank's short-term liquidity position, and additional emphasis would be placed on the quality and soundness of longer-term assets, on the adequacy of capital, and on the adequacy of earnings to cover the costs of borrowing. Examiners would con-

tinue to criticize any bank that used the discount facilities for purposes inconsistent with statutory and regulatory requirements or with sound banking principles.

Definition of liquidity

Bank liquidity may be defined as the ability of a bank to meet its known and foreseeable demands for money. These demands may come from the bank's depositors or they may come from customers seeking credit. A bank is considered to have an adequate liquidity position when it can meet normal cash withdrawals and requests for loans without having to sell or liquidate medium- or long-term assets. Adequate liquidity can be achieved by holding, in addition to cash or its equivalent, a sufficient quantity of other assets readily convertible into cash—secondary reserves—and by spacing maturities of its loans and investments to assure the necessary inflow of cash.

Aside from the requirements that banks must maintain certain amounts of reserves against their demand and time deposits, there are no uniform supervisory standards governing the liquidity of U.S. banks. The responsibility for maintaining adequate liquidity is left to the individual bank, which must exercise this responsibility in the light of the ever-changing conditions under which it operates.

Our definition of liquidity is asset oriented and suggests that banks provide for their normal liquidity needs out of their own resources. It is recognized, however, that many banks rely in some instances on borrowing as a source of funds for meeting deposit withdrawals and credit demands. In descending order of importance, these borrowings—all of a short-term nature—are purchases of Federal funds, loans from correspondents, sale of securities under repurchase agreements, and direct borrowings from the Reserve Banks. In recent years negotiable time certificates of deposit and Euro-dollar deposits have been developed, and they in turn have provided still other sources of funds.

While these various types of essentially short-term funds provide a cash flow, each such short-term borrowing represents an additional requirement for liquid funds to be repaid at some near-term date. From time to time the inability to borrow may create problems for some or all banks, because funds are not always readily available from outside sources at reasonable cost in time of need.

Borrowings from the Reserve Banks or from other sources, such as those mentioned earlier, do provide funds to meet short-term demands. However, borrowings from the Reserve Banks differ in character from other short-term borrowings. Under Regulation A as revised in 1955, control of the discount window rests with the Reserve Banks. In practice banks traditionally have been reluctant to borrow from the Reserve Banks; that is, they have preferred to obtain needed funds from other sources. Several of the proposals to liberalize the use of the window might alter or at least modify banks' attitudes regarding borrowings from the Reserve Banks and the use of the discount window as a "lender of last resort," and they call for reconsideration of the general concept of bank liquidity.

Secular trend in commercial bank liquidity

Although the need for individual institutions to maintain adequate liquidity has always been a well-recognized tenet of the American banking system, it has become increasingly important since World War II. Between 1934 and 1944 liquidity problems were generally of minor concern in the affairs of commercial banks. In the early part of this period the Federal Reserve System, for the most part, maintained a

stimulative monetary policy and inflows of gold were large. Credit demands expanded little, however, and excess reserves of member banks ranged between $1 billion and $5 billion. Moreover, since the loan demands of business were at a low ebb, commercial banks invested heavily in U.S. Government securities. By 1940 they held a volume of Government securities that was nearly equal to the volume of loans in their portfolios.

The financing of the war effort during the early 1940's greatly intensified this trend and caused the growth in the volume of Government securities held by commercial banks to outstrip the growth in loans by large amounts. By the end of 1945 the volume of Government securities held by commercial banks was more than 3½ times the aggregate of their loan portfolios. Not all of these securities were of short term, but since the Federal Reserve System was supporting the Government securities market in this period—and continued to do so until early 1951—all such securities were fully liquid regardless of maturity; that is, they could be readily converted into cash without loss.

The post-World-War-II period has seen an expanding economy, one that has sought more and more bank credit. While deposits have increased during this period, their growth has not been sufficient to meet in full the expanding demand for credit. As this demand increased, commercial banks reduced their holdings of Government securities in order to enlarge their lending activities, and thus their liquidity positions underwent a somewhat steady deterioration.

This changing asset structure of the commercial banks and the revision in 1955 of Regulation A, which emphasized the responsibility of the individual banks for maintaining adequate liquidity, created an interest in the development of a more sophisticated approach to the measurement of liquidity needs. Improved measures would enable both the managers and the supervisors of commercial banks to make more accurate evaluations of the liquidity position of a bank.

In 1961 commercial banks began to use negotiable CD's on a large scale. The extensive use of this additional source of funds changed somewhat the structure of banks' liability accounts. While this new money market instrument was designed to protect banks from the drainage of deposits to other short-term markets, it soon came to be used in an aggressive manner. Through the use of CD's, many banks were able to attract a large volume of deposits within a relatively short period of time and to expand their loans far more than would have been possible by the liquidation of securities. More recently, the large commercial banks have looked to the Euro-dollar market as an additional source of funds.

Recourse to these new types of time deposits and other liabilities as sources of funds has made more complex the banks' problems of maintaining adequate liquidity, and has altered to some extent the traditional methods of assessing liquidity positions. In turn, use of CD's has increased the pressure for the development of a more sophisticated approach to the measurement of liquidity needs.

SUPERVISORY APPROACHES TO LIQUIDITY

One approach to liquidity

Revision of Regulation A in 1955 led the Federal Reserve Bank of New York to develop a new approach to the problem of commercial bank liquidity in the examination of State member banks in the Second District. This included a means of measuring bank liquidity that was designed not only to provide non-money-market banks with a convenient method of analyzing their own situations but also to assist examiners and supervisors in evaluating liquidity positions of banks.

The liquidity formula adopted by the Federal Reserve Bank of New York in 1955 was introduced to its bank examiners by a bulletin noting that under the revision of Regulation A, "The responsibility of providing for normal seasonal swings of funds, or for finding funds to expand the loan portfolio, is placed squarely on the individual member bank." The bulletin describes the liquidity formula as a means of assisting examiners in appraising the degree to which a bank has provided itself with adequate liquidity, and as a possible guide to member banks themselves. It emphasizes that the formula does not provide a hard-and-fast rule, that it has no substitute for logical reasoning or more extensive analysis, and that it is primarily designed as a starting place or rough screening device to focus proper attention on liquidity problems that may exist in individual commercial banks. In the following discussion, this emphasis on the limitations of the Federal Reserve Bank of New York's liquidity formula in the total evaluation of a commercial bank's liquidity is important to keep in mind. In the final evaluation of liquidity that accompanies every report of examination of a State member bank in the Second District, the New York Reserve Bank examiner brings to bear not only the results of the application of the liquidity formula, but also his knowledge of the bank's history and of the financial markets in which it operates, his understanding of the broader financial and economic developments affecting the bank's operations, the pattern of the bank's borrowings at the discount window and elsewhere, and his discussions with the management of the bank and with his colleagues in the Examinations and Discount Departments of the New York Bank.

This liquidity formula has been refined and expanded since 1955. The instruction memorandum currently used by the Examinations Department of the New York Federal Reserve Bank, dated February 15, 1965, may be found in Appendix A. The basic principles of the formula are summarized below:

Rationale of the New York Reserve Bank formula. The New York Reserve Bank's liquidity formula endeavors to evaluate a bank's liquidity requirements and position as follows: (1) projects a bank's liquidity position over and above its day-to-day required reserves and the minimum cash balances it must maintain with correspondents,[1] and (2) projects a bank's liquidity needs on the basis of a loss of deposits concurrent with an expansion of loans. These projections make possible a fairly comprehensive and effective appraisal of a bank's loan and investment policies.

---

[1] The formula and the other analyses described later in this paper generally do not take into consideration the cash flow from term and other amortizing loans that would be available for liquidity purposes. In practice, the cash flow from loans is generally rolled over into new loans to maintain the loan portfolio. Nevertheless, the cash flow does provide a bank some freedom of action with respect to liquidity; for example, in extreme emergencies, a bank could curtail its lending activities and use the cash flow from loans to meet deposit withdrawals.

Since banks need liquidity not only for the everyday operations but also to meet future demands for funds, the formula classifies the liquidity needs of banks and the instruments held into three time categories:

Short term	Under 1 year
Medium term	1 up to 2 years
Longer term	2 up to 5 years

These liquidity needs and instruments are described as follows.

Liquidity requirements for deposits. The New York Reserve Bank's formula distributes deposits into three classes—volatile, vulnerable, and residual—based upon the degree of stability. So that each deposit class will have adequate liquidity coverage, the formula requires that a bank maintain specified percentages of such deposits in short-, medium-, and long-term liquid assets. Demand and time deposits are considered separately, but the liquidity requirements for each type depend on how the deposits are classified—that is, in which of the three categories they fall.

Volatile deposits are those most likely to be withdrawn, including seasonal deposits. They should be covered in full by liquid assets of the shortest maturities.

Vulnerable deposits are those the sudden or unexpected withdrawal of which would place heavy pressure on the bank's liquidity position. These are usually the larger deposits—that is, deposits including volatile deposits that are in excess of ½ of 1 per cent of total deposits. Deposits classified as "volatile" are deducted from the sum of the larger deposits to arrive at the total of vulnerable deposits. The formula requires a liquidity provision of 20 per cent against such deposits in the form of so-called medium-term instruments.

Deposits classified as *residual* are "hard-core" deposits. They may be fully invested in earning assets. However, the formula prescribes that banks, as a precaution, should hold liquid assets to cover 10 per cent of all residual demand deposits and 5 per cent of all such time deposits. In addition, the formula specifies higher liquidity requirements for certain types of deposits deemed to be subject to unusual liquidity pressures.

Liquidity requirements for portfolio. Banks also need to hold certain amounts of liquid funds so as to be able to make additional loans or investments. Such holdings protect a bank from having to borrow unduly or to dispose of securities, possibly at a loss, to meet the credit needs of its customers. Loan demand is divided into three categories: seasonal, unexpected, and projected. Patterns in seasonal lending tend to be similar year after year and can be estimated in large part from past experience. Unexpected demand is estimated in an arbitrary way as a figure equal to twice the bank's legal lending limit for unsecured loans. Seasonal and unexpected loan demands require full coverage in short-term liquid instruments. Projected demand requires 100 per cent coverage, but the coverage may be divided equally between short-term instruments and those maturing in 1 to 2 years.

The anticipated liquidity needs for deposits and portfolio are totaled for each time category to show the aggregate needs for liquid assets.

Liquidity instruments held. The liquidity instruments held are generally considered to consist of cash or bank balances (primary reserves) and investments in assets readily marketable with minimal risk of loss (secondary reserves). For purposes of liquidity analysis such liquid assets are classified according to their remaining maturity—short-term, medium-term, and long-term.

Not all primary reserves are available

for liquidity because some of the balances are required for everyday operations. Thus, only those primary reserves that are in excess of established working needs are considered as qualifying for liquidity purposes. Likewise, some of the secondary reserves, covering such items as brokers' loans and loans to correspondent banks, involve normal customer relationships, and it is unlikely that a bank would permit these reserves to fall below certain specified levels, except in cases of extreme contingency. Thus, only the amounts of secondary reserves in excess of the average amounts of such loans over the previous 12 months or in excess of the minimum amounts specified by the management may be considered liquid assets.

The liquidity instruments in the three categories are totaled, and any borrowings are deducted from the short-term category. Net liquidity in the three time categories is determined by deducting liquidity requirements from total holdings of liquid assets.

A composite liquidity index is computed by weighting the dollar amounts of the liquidity requirements and net volume of instruments held in each of the three time categories and by comparing total dollar amounts of the instruments held to the dollar requirements. A composite index of 100 or more is normally considered to denote adequate liquidity.

Other analyses made by examiners in appraising a bank's liquidity. Since, as stated earlier, the New York Reserve Bank's liquidity formula serves merely as a starting point or a rule-of-thumb in evaluating liquidity, the Bank's examiners make other analyses that are equally important in the over-all evaluation of a bank's liquidity position and its loan and investment policies. Such analyses include the following:

1. A review of the bank's procedures in computing the daily record of required and maintained reserves to determine whether or not the bank is handling its money position properly. If the review shows periodic closing of reserve periods with either deficiencies or large amounts of excess reserves, the examiners discuss the situation with the management and make recommendations for correcting it.

2. A complete analysis of the bank's borrowing activities for the period between examinations, based in part on the record of the bank's borrowings from the Federal Reserve Bank, the reasons advanced for such borrowings and when appropriate, discussions with members of the Reserve Bank's Credit and Discount Department; and also a determination of the principal sources of borrowings, with particular emphasis on the volume and steadiness of the bank's use of the discount window as compared with purchases of Federal funds and the use of other sources of borrowings; and how the borrowings were used and why they were needed—for example, to cover seasonal deposit fluctuations or inaccurate projections of deposit and loan growth, or because the bank had overextended its loans and investments.

3. A general review of the bank's loan and investment policies to determine the extent to which they have affected the liquidity position. Such an analysis would include a review of outstanding loan commitments and of the distribution of loans by type and a projection of the cash flow from the loan and investment portfolios.

4. Consideration of general trends in national and local economic and financial conditions, including such factors as interest rates, loan demand, and the state of capital markets that may affect liquidity.

Evaluation of the New York Reserve Bank's examining approach to liquidity. While the liquidity formula and other analyses discussed earlier constitute the general ap-

proach used by the New York Reserve Bank's examiners in appraising the liquidity position of a bank, the manner in which the examiner uses these analytical tools depends entirely upon the judgment of the individual examiner. He will use the ones best geared to the specific circumstances of a particular bank. The examiner's conclusions are predicated on a careful consideration of the following basic concepts with regard to appropriate utilization of borrowed funds—regardless of source—to support a bank's operations:

1. That borrowings at the Reserve Bank, regardless of size, are objectionable if they do not conform to the 1955 revision of Regulation A.

2. That steady and somewhat heavy borrowings from sources other than the Reserve Bank may be considered normal at New York City banks because these banks are involved in the money market. The extent to which such borrowings are used to support non-money-market operations is an important factor in determining whether the borrowing activities of these banks might be subject to criticism.

3. That steady and somewhat heavy borrowings from sources other than the Reserve Bank are objectionable if used to support an unsound expansion of loan portfolios or other practices inconsistent with prudent banking.

In view of the differences in the appropriateness of borrowings, and since there are wide differences in the operations of non-money-market banks compared with the operations of banks connected with the money market, the approach to liquidity and borrowings in these two broad classifications of banks differs considerably, and the evaluation of the approach should be reviewed accordingly.

Non-money-market banks. Traditionally, non-money-market banks have been reluctant to borrow from any source; instead they have preferred to obtain needed liquidity by making adjustments in their own loan and investment portfolios. In many cases, particularly among the smaller banks, there has been a lack of understanding of liquidity. Where this has occurred, banks either have had too little liquidity to cover their needs or more often, at the other extreme, have had too much liquidity, with a resultant loss of income.

The New York Reserve Bank's liquidity formula has proven to be a valuable instrument to the examiners in evaluating liquidity of non-money-market banks in this District. More important, because of its relative simplicity, the formula has been useful in assisting the management of these banks to better understand how much liquidity the banks should have and how such needs can be met without resorting to excessive use of the Reserve Bank's discount facilities or without selling assets at a loss. In other instances it has helped management to recognize an excessive liquid position and to make the necessary adjustments to improve earnings. We believe that the formula has made it possible for examiners and bank management to develop a mutual understanding of liquidity and of the appropriate utilization of borrowings.

In recent years the Federal funds market has provided the country banks with a convenient and flexible means of adjusting their excess reserve positions. Previously, country banks had been largely excluded from the use of this market because the unit traded was too large. However, with the increased demand by large city banks for borrowed funds to maintain positions in relatively high-yielding assets, these large banks, at least in the Second Federal Reserve District, have been willing to trade in much smaller units to tap the excess reserves of even the smallest institutions. Access to the Federal

funds market has enabled the country banks to put otherwise idle funds to profitable use. While these banks generally enter the market on the "selling" side, the increase in their knowledge of this market permits them on occasion to purchase Federal funds—thus reducing their dependency on the discount window.

Examples of the types of comments made by the New York Reserve Bank examiners in connection with non-money-market banks that have been found to have excessive liquidity positions and marginal liquidity positions may be found in Appendixes B and C, respectively.

Money market banks. The application of the New York Reserve Bank's liquidity formula to money market banks poses somewhat different problems. For one, the formula was not designed primarily for application to these large banks; for another, these banks maintain a close and continuing watch over their liquidity positions and attempt to provide the necessary liquidity through a wide variety of transactions that have not been fully recognized in the formula.

Whereas these large banks have their normal levels of deposits of individuals, partnerships and corporations, the examiner's analysis of the liquidity position and the application of the formula are governed largely by the extent to which these banks are financing money market transactions, such as loans to U.S. Government securities dealers, operation of U.S. and municipal bond trading accounts, and so forth. It is generally recognized that these banks support such money market transactions by borrowing. In addition, these banks as a general rule are actively engaged in providing correspondent services to banks located throughout the United States. For example, they are a major source through which country banks can adjust their reserve positions by selling Federal funds. Many of the large banks have been relying to an increasing extent on the availability of such funds when projecting their own liquidity requirements.

Moreover, in recent years these large banks probably have encountered greater changes in their deposit structure than have the country banks. In this period their demand deposits have shown little growth, and in order to obtain funds for lending, the large banks have relied to an increasing extent on expansion of time deposits. The time deposits generated have been largely in the form of negotiable CD's. In common with most banks, the short-term liquid asset portfolios of money market banks have also shown a steady decline, as these banks have converted such assets into longer-term, higher-yielding loans to offset the increased costs of the growing volume of their time and savings deposits. The tight money conditions that existed in 1966 and the unstable short-term money rate structure placed severe strains on the liquidity positions of most of the money market banks. As a result, a number of these banks increased their borrowing from various sources to support their heavily invested positions in loans and securities as well as their money market activities.

Because of these conditions, the examiners have had to analyze each situation carefully and to modify the liquidity formula, as needed, in order to arrive at satisfactory conclusions with respect to the actual liquidity position of a money market bank. For example, the liquidity requirements against certain types of deposits, such as the negotiable CD's, did not appear realistic in the light of present conditions and were increased. In addition, the examiners have given consideration to the relationship between a bank's activities in the money market and the volume of borrowings from all sources to support these activities.

Examples of the type of comments made

by the New York Reserve Bank's examiners in connection with money market banks with adequate liquidity positions and those with tight liquidity positions may be found in Appendixes D and E, respectively.

Summary. The New York Bank's liquidity formula has been a useful tool for both examiners and bank management in evaluating and discussing liquidity and borrowings of banks—particularly of non-money-market banks. The present liquidity formula is somewhat inadequate when applied to the money market banks in part because of their increased reliance on liability management. Modifications of the formula, based in part on experience during the period of tight money in 1966, are needed to make the formula more effective for that purpose.

Other liquidity standards

A variety of ratios and other formulas are used to measure bank liquidity. Probably the two ratios most widely used are the liquid assets/liabilities ratio and the loan/deposit ratio. The liquid assets/liabilities ratio shows the relationship of the means of cash payment to the possible demands for payment. It is expressed as a percentage and is usually computed by relating the sum of cash and balances due from banks, loans to brokers and dealers, and short-term Government securities less any borrowings to total deposits less cash items in process of collection and reserves on deposit at the Federal Reserve Bank. The loan/deposit ratio, as the name implies, relates the volume of loans outstanding to the volume of deposits; it indicates the extent to which deposits are tied up in relatively illiquid assets.

These ratios, used either in combination or separately, are at best only rough measures of a bank's liquidity position. They are not considered adequate for supervisory purposes because they omit any consideration of such important items as the flow of funds from loan repayments, the amount of funds that a bank may be called upon to supply, and the varying stability of different types of deposits.

The examining staff of the Board of Governors of the Federal Reserve System includes a liquidity calculation section in its Form for Analyzing Bank Capital (Appendix F). Among the formulas for measuring the liquidity position are those used by the examiners for the Comptroller of the Currency and the examiners for the New York State Banking Department. Each of these measurements is described here briefly.

Board of Governors. As noted, the examining staff of the Board of Governors of the Federal Reserve System includes a liquidity calculation in its Form for Analyzing Bank Capital.[2] In the strictest sense, the liquidity calculation is not a measurement of a bank's liquidity position but merely indicates the extra capital that would be needed to cover possible losses in the event that a forced liquidation of portfolio assets was required to supplement liquidity provided by primary and secondary assets. The calculation is based on certain assumptions as to deposit shrinkage, made on the basis of a review of historical data by the Board's staff.

Comptroller of the Currency. The formula currently used by the examiners of national banks is explained briefly in the "Regional Newsletter, Second National Bank Region, July 1966," a copy of which is included as Appendix H. It is a much simpler formula than that used by the New York Reserve Bank and relates liquidity only to deposit liability. Liquid assets are considered to be cash and balances due from banks, the market value of the bank's unpledged security

[2] See Appendix F. This form (FR 363) is completed by the New York Reserve Bank examiners during their examinations of all Second District State member banks.

portfolio (including bonds pledged in excess of legal requirements), and Federal funds sold. From the total of such assets are deducted borrowings, Federal funds purchased, and required reserves. The resulting figure is considered to be the net liquid asset position of the bank. A net deposit figure is obtained by deducting secured deposits from total deposits. The liquidity ratio (expressed as a percentage) is computed by dividing net liquid assets by net deposits.[3] It is understood that the Comptroller's office would consider a percentage of 35 per cent or more as reflecting a reasonably adequate liquidity position.

The value of this formula in the analyses of the liquidity positions of national banks cannot be readily determined because discussions of liquidity and borrowings in reports of examination of these banks are generally not extensive. This liquidity formula appears to serve as a rough rule-of-thumb for calculating deposit liquidity as on the examination date. It does not include any consideration of the liquidity needs for the portfolio; nor does it include any projection of liquidity needs for deposits and loans.

New York State Banking Department. At each examination bank examiners for the State of New York compute a "quick-asset ratio" that is similar to the liquid-assets/liabilities ratio described earlier. The quick assets consist of cash and balances due from banks; the market value of readily marketable stocks and bonds (excluding securities deposited for purposes other than as security for deposits or borrowings, as for example, securities deposited to secure trust activities); loans secured by readily marketable collateral; and other quick assets. Secured deposits and borrowings are deducted from total quick assets to arrive at net quick assets, the sum of which is related to net liabilities, which consist of total liabilities less the secured deposits and borrowings.

The New York State Banking Department considers this ratio to be a useful measurement of the proportion of a bank's assets that are intrinsically liquid in character. However, such a measure of the bank's liquidity position contemplates the liquidation of secured loans, thus implying an unusual and severe contingency. To supplement the quick-asset ratio and to measure the extent to which immediate conversion of assets into cash is possible without interfering with the normal activities of the institution, the department has developed a "primary liquidity" formula. This formula is explained in Supervisory Circular Letter CB–14 (Appendix G).

The primary liquidity formula is similar to the New York Reserve Bank's liquidity formula, except that it does not distribute the liquidity requirements and the instruments held into different time periods. In addition, the use of liquidity instruments as primary reserves in the formula is limited, for the sake of uniformity, to the five types listed in Circular Letter CB–14. Moreover, the formula does not include a reduction in primary reserves due to outstanding borrowings; such borrowings are treated rather as a deduction from the total of quick assets in the quick-asset ratio.

Comparison of various approaches to liquidity. The New York Reserve Bank liquidity formula differs in concept from those developed by the staffs of the Comptroller and the Board of Governors. The New York approach attempts to gauge the relationship between those assets that may be liquidated readily with little, if any, loss in order to meet the foreseeable needs of a bank with respect to changes in loan volume or deposit losses during the normal course of

[3] At the year-end call for statements of condition for 1966, the three Federal supervisory agencies requested banks under their supervision to complete liquidity forms patterned after this formula.

its business. Such an approach is also used to some extent by examiners of the New York State Banking Department.

Formulas of the examining staffs of both the Comptroller and the Board of Governors, on the other hand, seek essentially to determine a bank's ability to meet any deposit loss short of going into liquidation; neither formula recognizes the liquidity needs for the portfolio. The formula of the Board's staff is the more sophisticated, however, since it places a ceiling on any possible deposit losses and recognizes that under certain circumstances a bank may have to rely for liquidity on assets other than those considered to be primary or secondary reserves.

Comparison of these various measures of liquidity for a typical country bank, including the different types of ratios and the formulas used by the examining staffs of the New York Reserve Bank, the Board of Governors, and the Comptroller, is shown in Appendix I. A computation of primary liquidity according to the formula used by examiners for the New York State Banking Department has not been made because that formula is similar to one used by the New York Reserve Bank.

These ratios and formulas indicate the following regarding the sample bank's liquidity position:

1. Loan/deposit ratio, at 68.6 per cent, indicates a fairly heavy loan position. Member banks in New York State outside of New York City had an average ratio of about 61 per cent at year-end 1966.

2. Liquid-assets/liabilities ratio, at 11.8 per cent, seems to reflect an adequate position when compared with the December 21, 1966, average ratio of 8.2 per cent for all weekly reporting member banks in the Second Federal Reserve District outside of New York City.

3. On the other hand, New York State's quick-asset ratio, at 41.4 per cent, indicates a tight liquidity position. The average ratio for all banks in New York State outside of New York City was 55 per cent in 1966. It should be noted, however, that the State Banking Department also reviews the bank's liquidity position on the basis of the State's primary liquidity formula discussed previously.

4. The New York Reserve Bank's liquidity formula reflects an adequate liquidity position on the basis of the consolidated index of 113. Net liquidity is adequate for the short- and long-term categories, but there is a deficit for the medium-term category. Moreover, the examiner's comments regarding this bank (see Appendix C) indicate that if certain large public demand deposits were reclassified as volatile, the bank's short-term position might not appear so favorable.

5. The Board of Governors' Form for Analyzing Bank Capital shows that the ratio of actual capital to required capital for this bank was too low and that the bank needed additional capital of $206,000 against assets, other than primary and secondary reserves used for liquidity. This amount would represent 25 per cent of the total capital required.

6. The Comptroller of the Currency's liquidity formula, at 30.3 per cent, also reflects a tight liquidity position.

LIQUIDITY STANDARDS AND CHANGES IN DISCOUNT POLICY

Changes in discount policy including such concepts as a basic borrowing privilege and a seasonal borrowing privilege, all of which involve freer and perhaps more frequent access to the discount window, would of course require some modification of the

examiner's approach to liquidity and overall evaluation of bank management and loan and investment policies. Under such a liberalized discount policy, the bank examiner may have the additional responsibility of counseling the management of some banks as to how to operate effectively in a new environment. Bank supervision would have the responsibility of reminding management of the possible dangers of relying too heavily on the window and of assuring that the banks retain the skills needed to manage their liquidity positions in times when exclusive reliance on borrowings may be unprofitable.

The studies made in connection with the reappraisal of the Federal Reserve discount mechanism have served to re-emphasize the desirability of establishing uniform standards of capital and liquidity and the need to take changes in discount policy into account in developing such standards. One result has been the establishment within the Federal Reserve System of a study group to consider the various approaches to capital adequacy and liquidity and the possibility of introducing such techniques and cash flow analysis in the evaluation of liquidity, with a view toward developing standards that may meet with general acceptance among bankers and bank supervisors.

November 1968

APPENDIX A: ESTIMATING LIQUIDITY REQUIREMENTS

An explanatory memorandum of the Bank Examinations Department, Federal Reserve Bank of New York, February 15, 1965

FUNCTION OF LIQUIDITY

The problem of bank liquidity is essentially that of having available sufficient funds—or marketable assets readily convertible into funds—to meet at all times the demands for money that may be made on a bank. Adequate liquidity is the basic protection afforded against losses that could develop should the bank have to sell or be forced to liquidate creditworthy assets in an adverse market. Maintaining adequate liquidity, therefore, means having enough funds on hand or readily available with which to meet the actual or potential demands for funds by the bank's depositors or borrowing customers.

The liquidity requirements of an individual bank will vary from day to day as funds flow into and out of the bank. Management's responsibility is to measure these requirements and to anticipate them on a current and continuing basis. Our objective, therefore, has been to develop a yardstick capable of systemizing the variables involved and producing as accurate and simple a measure as possible.

BACKGROUND

The Bank Examinations Department of the Federal Reserve Bank of New York has for some time been using a measure of bank liquidity as an adjunct to its regular bank examinations. Several years' development of bank liquidity standards and their application in the field has seen widening interest on the part of bankers and supervisory authorities in the objectives of such measurements. The first of these is to provide bankers with a convenient means of analyzing their own situations, thereby encouraging closer attention to their liquidity positions. The second is to aid bank examiners and supervisors in evaluating management's performance in maintaining sound liquidity positions. A third objective might be to create a measure of relative liquidity that could be used to evaluate the impact of credit policy changes on groups of banks.

Banks, themselves, for the most part have not developed any systematic procedures for estimating liquidity needs. Rough measures generally used, such as loan/deposit ratios or ratios of liquid assets

to total loans and investments, do not adequately reflect prospective *demands* for funds. Most often liquidity needs have been estimated by intuition born of experience or calculated so as not to be "out-of-line" with other banks whose needs may be entirely different. A need for guiding principles and uniformity of approach seemed clear. For these reasons, the Liquidity Position Form described in detail later was developed as a basis for management's necessary exercise of judgment.

LIQUIDITY POSITION FORM

A form for estimating the liquidity position is shown in Table 1. The liquidity requirements are first computed, as will be described. The holdings of liquid assets are then listed and compared with needs to arrive at a net liquidity (excess or deficit) in the individual banks' positions. Both requirements and holdings of liquidity instruments are shown separately for short-term needs (under 1 year), medium-term needs (1 to 2 years), and longer-term needs (2 to 5 years). Excesses of liquid assets in the shorter maturities may of course be used to satisfy the longer-term requirements.

These time periods play a key part in deciding upon how to assign and apportion liquid assets. Liquidity requirements have been established primarily to provide for normal or seasonal changes

TABLE 1

LIQUIDITY POSITION
Amounts in thousands of dollars

Item	Amount	Per cent	Maturity in years		
			Under 1	1–2	2–5
	REQUIREMENTS				
Deposit liquidity					
Demand deposits					
*Volatile	1,150	88	1,012	...	...
Vulnerable	...	...	...	...	...
Large	1,233	...	...	...	...
Less: Volatile	*1,150*	...	...	...	...
	83	20	...	17	...
Residual					
Total	9,520	...	...	...	...
Less: Large	*1,233*	10	...		829
	8,287	...	...	...	...
Time deposits					
*Volatile	*440*	96	422	...	...
Large	*270*	20	...	54	...
Negotiable CD's	*200*	20	40	...	...
*Special	*30*	96	29	...	...
Residual					
Total	11,125	...	...	...	509
Less: Above	*940*	5	...	...	...
	10,185	...	...	...	...
Deposit requirements	...	...	*1,503*	*71*	*1,338*
Portfolio liquidity					
Seasonal loan demand	*40*	100	40	...	...
Unexpected demand	*300*	100	300	...	...
Projected (special loan increase)	*20*	100	*10*	*10*	...
Portfolio requirements	...	...	*350*	*10*	...
Aggregate requirement	...	...	1,853	81	1,338
	HOLDINGS				
Liquidity instruments held					
Excess reserves and correspondent bank balances	...	...	278	...	...
Acceptances, brokers' loans, commercial paper, and loan participations	...	...	400	...	...
High-grade securities					
Under 1 year	...	...	1,175	...	...
1–2 years	...	...	...	117	...
2–5 years	...	...	...	...	1,378
Firm commitments from others to purchase assets	...	...	100	...	...
	NET LIQUIDITY				
Aggregate holdings	...	...	1,953	117	1,378
Less: Borrowings	...	...	*100*	...	...
Net holdings	...	...	*1,853*	*117*	*1,378*
Aggregate requirement	...	...	1,853	81	1,338
Excess, or deficit (—), dollars	...	...	...	36	40
Liquidity index	...	...	100	144	103

* Adjust percentage in accordance with legal reserve requirement.

in deposits and loan demand plus a margin of safety for cyclical variations or unforeseeable events. Liquidity instruments that mature within 1 year are considered the first line of protection, and the only holdings sufficiently fluid to meet correspondingly short-term liquidity needs. But defense in depth is also advisable to allow for maneuverability in less predictable circumstances. Liquid assets with maturities of 1 to 2 and 2 to 5 years are more realistically termed shiftable reserves. Segregating these from liquidity holdings emphasizes the essential difference, even though borderline distinctions are often difficult to apply.[1]

[1] This note appears in right-hand column.

Note from preceding column.

[1] Depending upon market conditions, shiftable reserves may sometimes prove highly liquid. However, these cannot always be relied upon to meet short-term liquidity needs. Instead they are relied upon to meet the longer-term demands anticipated on the form. These reserves can, however, serve as reinforcements for converting during emergencies when there are liquidity deficits and no alternatives available. But they do not fully pass the major test of "liquidity"—the ability to convert to cash with no risk of sizable loss *whenever* sold. Of course, the passage of time, as well as shifts in response to changing money market conditions, may see securities of over-1-year maturity flowing into the under-1-year liquidity classification with appropriate changes in entries on the form.

LIQUIDITY REQUIREMENTS

Demands for funds on a bank may be made by its depositors or by its customers seeking credit.

DEPOSITS

Bankers know from experience that the major portion of liquidity need is related directly to the volume and stability of their demand and time deposits. Obviously, not all deposits are equally active and do not require the same degree of liquidity. The actual requirement is related to the *likelihood* that any specific deposit or group of deposits will be withdrawn. Forecasts cannot be made with certainty, but it is feasible to rank potential demands for funds by degrees of intensity: those that will surely occur; those that are likely, but not certain to occur; and finally, those that are less likely but, under certain circumstances, could possibly occur. These groupings are more precisely shown on the liquidity position form as volatile, vulnerable, and residual deposits. Time deposits are considered separately because of their somewhat greater stability under normal circumstances.

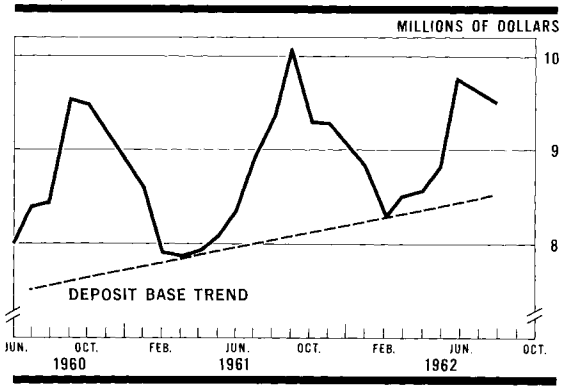
Volatile deposits. The greater the likelihood of withdrawal, the larger the percentage of liquidity required and the shorter the maturities of the liquid assets that should be held. Deposits with the greatest likelihood of being withdrawn are termed volatile and should be covered fully by liquid assets with the shortest maturities, ranging from cash to high-grade securities, and other instruments maturing within 1 year. Prescribing 88 per cent as the liquidity need directly reflects the current member bank legal reserve requirements set at 12 per cent for demand deposits at country member banks.[2] This amounts to saying that the total of the two types of reserves covers the volatile withdrawals in full. The dollar entry of volatile demand deposits ($1,150,000 in Table 1) is not the product of guesswork but reflects the bank's accumulated experience. Typical of volatile deposits are the local payroll accounts that are built up weekly or biweekly and immediately checked against; the municipal deposits of tax monies that will be drawn down over a specified period of time to meet municipal expenses; and seasonal deposit fluctuations that are also of the same character.

The extent of such short-term deposit swings can be shown most simply by a chart of month-end deposit totals. Chart A–1 shows the bank's recent experience in clear visual form. Chart A–2 similarly depicts the volatility of time deposits. The trend line connecting the low points determines the base line.[3] At any particular point on the chart the amount of deposits above the base line is

[2] For banks in reserve cities the comparable percentage would be 83.5 per cent.

[3] In charting deposits, or the loan figures mentioned later, there will sometimes be unusually sharp increases or decreases. These may not represent a change in *trend* but rather a change in *level*. For example, if a new large deposit account is obtained—or if one is lost—it will raise or lower the level of total deposits without affecting the trend. The base lines may therefore have to be adjusted upward or downward without changing their directions. This further underscores the continuing need for management to exercise judgment in the individual situations confronting its bank.

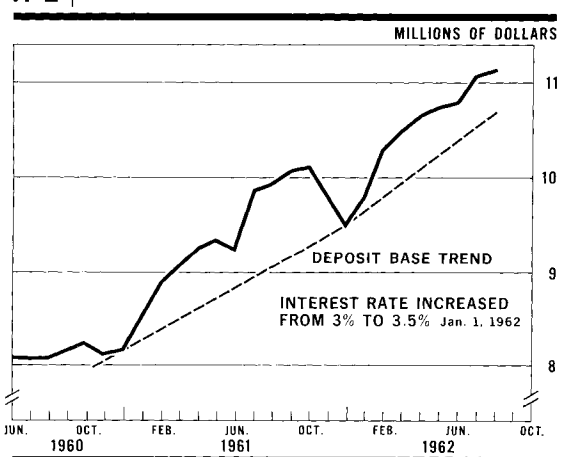
A-1 | DEMAND DEPOSITS



considered volatile and required to be covered in full by liquid assets plus the automatic release of required reserves.

By the same token, the aggregate amount below the line indicates the nonvolatile deposits. This status does not, however, exempt such deposits from the need for some liquidity. Should unusual withdrawals carry deposits below the base line, the need for a second, or even a third, line of liquidity defense will come into play. These liquid assets, however, may be comprised of securities of somewhat longer-term maturities if interest considerations justify it from an investment viewpoint. As shown in Table 1, these longer-term assets are assigned against the vulnerable and residual deposits.

A-2 | TIME DEPOSITS



Vulnerable deposits are those whose sudden or unexpected withdrawal would place heavy pressure on the bank's liquidity position. They are likely to be the bank's larger deposit accounts.[4] These accounts, in any event, should be identified and more closely followed by the officer responsible for the liquidity position. Experience will generally show that most of the volatility of demand deposits will be in these large and therefore vulnerable accounts. (A time deposit, of course, can be large and vulnerable even though it does not fluctuate at all.)

Volatile deposits, having already been determined and provided for, are therefore deducted from the total of large demand deposits to determine the *vulnerable* deposits in Table 1 and a 20 per cent requirement of 1- to 2-year maturities is set up for them. The choice of intermediate rather than shortest-term maturities would seem to provide reasonable protection against possible but unanticipated withdrawals of substantial magnitude.

Residual deposits are those remaining deposits that are neither volatile nor vulnerable. They represent what is often referred to as the "hard core" of stable deposits that can be fully invested in earnings assets. A more conservative view, however, calls for a precautionary margin of liquidity even for such stable deposits. A 10 per cent requirement in liquid assets with maturities ranging up to 5 years, when market conditions justify,[5] is suggested. To the ultraconservative this requirement may seem low. But it should be remembered that this requirement, as well as that against vulnerable deposits, is supplemented to the extent of 12 per cent of the demand deposit loss (4 per cent for time deposits) by the release of required reserves.

TIME DEPOSITS

Although under normal circumstances there may be less immediacy with respect to liquidity needs for time deposits, banking practice and experience have shown that time deposits share several characteristics normally attributed to demand deposits. For this reason much that has been said about demand deposits applies to time deposits as well. For example, time deposits also often exhibit seasonal fluctuations: Christmas club accounts are almost entirely seasonal and such seasonality, readily

[4] For purposes of uniform practice "large deposits" have been defined as those exceeding, in round figures, half of a per cent of total deposits.

[5] Investment specialists counsel lengthening maturities when interest rates are relatively high and shortening maturities when interest rates are low.

discernible from Chart A–2, represents a volatile portion of time deposits requiring full liquidity reserves. This protection is afforded by a 96 per cent reserve of liquid assets in conjunction with the 4 per cent release of required reserves brought about by a time deposit decline.

Large savings deposits, as noted earlier, can be vulnerable without being volatile. Against such deposits, together with large time deposits held indefinitely (such as State time deposits in many localities), a 20 per cent liquidity reserve in medium-term liquidity assets is recommended.

Negotiable time certificates of deposit are also considered vulnerable and a liquidity requirement of 20 per cent is prescribed. These certificates are usually short term and, therefore, the liquidity reserve generally should be in short-term liquidity assets.

Special time deposits refers to some large time deposits that management may know will be withdrawn at maturity or even after a relatively short period of time. An example of such deposits would be the proceeds of a school bond issue scheduled for disbursement as the school construction progresses. Such accounts are considered special deposits and require specific liquidity provision in the light of their prospective withdrawal.

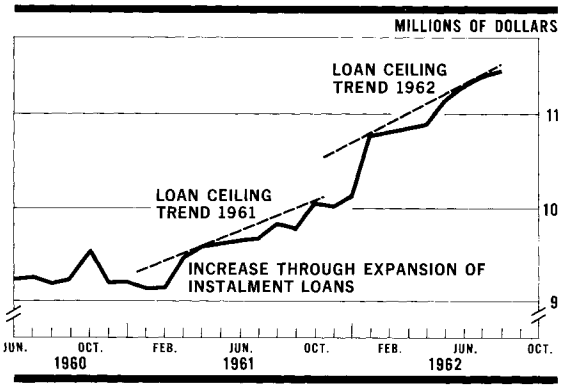
Residual liquidity reserves of 5 per cent for remaining time deposits are prescribed for the same reasons set forth earlier in connection with demand deposits. Maturities may be of somewhat longer term and, in times of high interest rates, might be concentrated toward the longer end of the 2- to 5-year range.

PORTFOLIO LIQUIDITY

Portfolio liquidity, as the term is used here, consists of liquid funds for the purpose of making additional loans or investments. These holdings safeguard the bank against the need of having to borrow unduly or sell securities at a loss in order to meet the foreseeable credit needs of its customer. Three categories of loan demand are identified: seasonal, unexpected, and projected.

Seasonal loan demand is one of the surer fluctuations bankers can anticipate. Chart A–3 shows month-end loan figures similar in principle to Chart A–1. The trend line, this time connecting high (instead of low) points, is the loan ceiling—the amount to which loans may be expected to rise seasonally or periodically based on recent experience. The amounts by which loans at any time drop below this ceiling measure the bank's liquidity needs to meet normal or seasonal loan variations. These seasonal needs should be provided for in full.

A-3 | LOANS



Unexpected and unusual loan demand, by definition, cannot be foreseen. A minimum provision would seem to be an additional fund of liquid assets equal to at least 20 per cent of capital and surplus (twice the 10 per cent legal loan limit on unsecured borrowings). The bank is then reasonably prepared to accommodate some loan requests from good customers who may not have borrowed in recent years and whose need for credit is not reflected in the chart.

Projected loan increase superimposes on the preceding categories any definite loan expansion plans that management may have in mind and provides for any expected net increase in the community's demand for credit in the foreseeable future, at least to the extent that such demand may exceed accompanying deposit increases. Additional liquidity provision should be made and closely related to the size of demands and to the time when such demands are expected. No specific requirement can be allocated other than by management with its detailed knowledge of the local community and its needs.

In addition to the foregoing, there may exist a need for further modification of this formula approach. Management may know of some change in policy to become effective in the near future that would affect the bank's liquidity requirements. For instance, a change in the rate of interest paid on savings accounts or time accounts might be expected to change the deposit level materially. If such a situation exists, an adjustment of the liquidity requirements should be made.

LIQUIDITY INSTRUMENTS HELD

Adequate liquidity means the bank's ability to meet the immediate and potential demands for funds as outlined earlier. Liquid assets are generally thought to consist of cash or bank balances (primary reserves), and investments in short-term assets readily marketable with minimal risk of loss (secondary reserves). Such liquid assets are subdivided on the liquidity position form into maturity categories having varying degrees of ready convertibility into money.

EXCESS RESERVES AND CORRESPONDENT BALANCES

A bank requires some working balances at all times to carry on its daily business. For this reason, a portion of bank balances, over and above the required legal reserves, is not truly liquid; and, for purposes of this analysis, the liquidity holdings should include only that part of primary reserves that is *freely available*. Only excess reserves, therefore, and correspondent balances exceeding essential working balances are countable as liquidity instruments held.

NET LIQUIDITY

The aggregated figures on either side of the liquidity scale provide useful information. However, better perspective for bank appraisal is obtained by netting the two categories and showing the bank's excess or deficit liquidity balance in each category. The illustration given on the liquidity position table shows, for example, that the bank is in balance regarding its shortest-term liquidity requirements and holdings and is in a surplus position relative to its longer-term needs.

In the process of comparing requirements with holdings, banks' responses to cyclical changes should come to light in the aggregated statistics over a period of time.[7] It is well, however, to emphasize here that the Bank Examinations Department regards its immediate function more narrowly, and gives primary attention to the condition of individual banks on a case-by-case basis.

[7]A distinction must be drawn, however, between the banking system and the single bank. While liquidity of the entire system is the concern of the monetary authorities, the liquidity position of the individual bank is local management's responsibility and may either directly reflect or run counter to general trends

OTHER LIQUIDITY INSTRUMENTS—SECONDARY RESERVES

The remaining stocks of liquid assets include money market loans such as brokers' loans and commercial paper, and investment-grade securities maturing within 1 year.[6]

The distribution of longer-term high-grade securities enumerated on the form is directly related to the nature of the individual bank's deposits and its potential loan demands spelled out earlier. (It is worth repeating that the legal reserves freed by withdrawals of demand and time deposits are among the liquidity sources. Although not enumerated as a liquidity instrument they have been implicitly recognized in the setting of 88 and 96 per cent in liquid reserves against volatile demand and time deposits.)

[6]There are instances, however, where short-term securities are pledged to secure specific deposits and certain banking functions. In such cases, pledged short-term securities should not be considered available for meeting liquidity requirements—unless available nonliquid securities holdings may be substituted in their place.

LIQUIDITY INDEX

Because of wide differences in size of banks, it would be helpful to convert the individual net *dollar* liquidity positions to a liquidity index that would lend itself to drawing interbank comparisons on a comparable base. This is illustrated on the last line of Table 1. Such indicators lend themselves to a study of relationships between banks' liquidity indexes grouped by bank size, unit or branch structure, geographic location, and, going further, with other statistics of local or nationwide economic and business data.

Comments up to now have been mainly restricted to short-term liquidity positions of banks. The longer-term securities, however, account for an important share of holdings and the bank's ability to meet its projected longer-term deposit and loan responsibilities. Although a distinction has been drawn between short-term and longer-range liquidity needs, it may prove useful to combine the short- and longer-term categories into a composite index that gives recognition to the total liquidity distribution over time.

Table 2 illustrates the method followed in computing the consolidated index of liquidity. The Bank Examinations Department has assigned weights to the dollar amounts of liquidity requirements and net liquidity holdings. The weights are tailored to the relative importance of short-, medium-, and longer-term liquidity needs. The dollar amounts, rather than the liquidity indexes shown in Table 1, are used in arriving at the consolidated index, in order to avoid any distortion.

TABLE 2

CONSOLIDATED INDEX

Maturity	Weight	Liquidity requirements	Net holdings
Under 1 year	2×	3,706	3,706
1–2 years	1×	81	117
2–5 years	.5×	669	689
Total		4,456	4,512

Consolidated index: 101

CONCLUSION

The major purpose of the liquidity position form is to lend assistance in measuring liquidity rather than to establish a grading system. Nor is there any intention of imposing a formal liquidity ratio upon banks to which they must adhere in a way comparable, say, to legal reserve requirements. It should also seem clear that ways toward improvement in banks' practice and the methods of accounting therefor are, as yet, far from closed.

The most likely way toward improvement in both directions lies in objective appraisal by the bank examiner followed by frank discussion with management. But the examiner's "still photograph" taken at the time he is on the premises will require continuing follow-ups by the banker since liquidity needs will obviously vary as funds flow into and out of the bank. For this reason no formula can be so perfect as to displace the continuing need for management's educated judgment in the local and special circumstances confronting its bank. It *is* important, however, to reinforce judgment with some formal guides. Wider use of the method described here should contribute toward achievement of that goal.

APPENDIX B: EXAMINER'S COMMENTS CONCERNING EXCESSIVE LIQUIDITY POSITION OF A NON-MONEY-MARKET BANK

The bank, not having borrowed for several years, maintains at all times an apparently excessive amount of liquid assets. This excessively liquid position is not the result of board policy, but stems rather from an apparent total absence of effort on the part of management to employ profitably all available funds. In 1965, the reserve account balance was in excess of that required by a daily average of approximately $125,000. Because of the pressing demands of daily activities, management admittedly maintains "a safe cushion" in the reserve account so that it will not be forced to make a daily calculation of the requirement. The regular offers of a correspondent bank to purchase excess Federal funds are always refused because the reserve position is unknown. In addition, the bank sold to a correspondent bank mortgage participations aggregating about $300,000 on June 1, 1965. As of examination date, about $100,000 of the proceeds of this transaction had not been reinvested and remained with the correspondent bank. The elimination of these excess balances would leave the bank still in a highly liquid position, with about 20 per cent of the investment account in Treasury bills. As standby liquidity protection, management has an open commitment from the correspondent bank to purchase an unlimited amount of this bank's mortgage portfolio. The loss of potential earnings inherent in a situation such as this was discussed with management.

APPENDIX C: EXAMINER'S COMMENTS CONCERNING MARGINAL LIQUIDITY POSITION OF A NON-MONEY-MARKET BANK

Our formula indicates that the bank's liquidity position has improved between examinations, primarily due to a shortening of maturities of high-grade securities. Total liquidity holdings under 2 years now aggregate only about $45,000 less than requirements over the same period. However, if

in computing this formula, a few large public demand deposits were considered as volatile (as indeed they appear to be) rather than vulnerable, liquidity requirements for "under 1 year" would be increased by as much as $150,000. The basic liquidity problem appears to stem from the bank's failure to properly invest short-term public deposits. Cyclical increases of public funds in the spring and fall of each year usually run off rapidly at precisely the same time that loan demands and other deposit withdrawals reach their cyclical peaks. Without the additional public money, the bank's liquidity holdings during these periods are hardly sufficient to cover the seasonal demands.

This bank has been forced to borrow regularly from the Federal Reserve Bank over the past few years. Since last examination, there were eight borrowing periods which totaled 46 days. Average borrowings were $66,000 per day, and the bank's reserve balance was deficient during three reporting periods. Almost all borrowing occurred during periods of heavy public deposit withdrawals with inadequate short-term asset protection, except for Government securities which the bank was reluctant to sell. Holdings of Treasury bills will now be increased in an attempt to alleviate this problem in the future. Management was receptive to the suggestion that future short-term borrowing requirements might be better satisfied by means of the Federal funds market or from correspondents rather than at the discount window.

APPENDIX D: EXAMINER'S COMMENTS CONCERNING ADEQUATE LIQUIDITY POSITION OF A MONEY MARKET BANK

This bank continues a policy of maintaining a fully invested position and, in so doing, operates close to the minimum of liquidity requirements. For the most part, management has been able to operate satisfactorily because it has various means of supporting its heavily invested position. These means include the bank's correspondent relationship with about 1,500 banks throughout the United States, and various corporate, institutional, and municipal entities that look to this bank for the investment of their excess funds. An important service offered correspondent banks is the management of their reserve positions, which results in this bank's heavy activity as a purchaser of Federal funds. The bank also occasionally borrows heavily at the discount window of the Federal Reserve Bank. As a result, the bank's money position desk maintains a close daily watch over the flow of funds placed at its disposal. It builds up heavy reserve deficits at some time during each reserve period that are later offset by borrowed funds. As a consequence, the bank generally maintains its daily reserve position with a minimum average excess of $1 million or less over its required reserves.

Current projections of the bank's liquidity requirements, over the second quarter of 1965, have set a loan growth of about $300 million. The funds to support these projections are expected to be generated primarily by increasing negotiable CD's by a like amount. It would appear, however, that if the bank for some reason were unable to hold and/or attract additional CD growth, heavy pressures may develop on the bank's money position such as those that have sometimes existed in prior years. If such a situation should arise, it may be necessary for the bank to liquidate a portion of its municipal bond holdings and place additional reliance upon borrowings to support its heavily invested position.

APPENDIX E: EXAMINER'S COMMENTS CONCERNING TIGHT LIQUIDITY POSITION OF A MONEY MARKET BANK

Comparing daily averages for 1964 with those of September 1966, deposits increased $146 million, borrowings increased $278 million, and securities decreased $29 million, for a total of $453 million which is the amount of loan increase during the same period. Therefore, an obvious conclusion would be that the major portion of the loan expansion has been supported by borrowings, mostly Federal funds. Management has always contended that borrowed funds were used primarily to sup-

port loans to non-money-market borrowers. For this reason alone, the bank's borrowing activities can only be described as excessive, particularly since a review of the bank's liquidity position shows that there has been no reduction in lending activities and an appreciable decrease in liquid assets to cover short-term needs.

Time CD's totaled $452 million ($402 million negotiable), a decrease of about $150 million since last examination. The heavy run-off is attributed primarily to a tight-money position of corporate depositors and the more attractive yields in other short-term investment instruments. The bank's ability to borrow Federal funds at more attractive rates has apparently detracted from the desirability of generating additional CD's or even of maintaining outstandings at the 1965 examination level. It is difficult to obtain any reliable estimate of how long the negotiable CD's will be carried and apparently no provisions have been made for meeting a further run-off of these volatile-type deposits.

Average loans outstanding show a continual increase since 1964, with the major increases occurring in term loans and mortgages. While management estimates term-loan and mortgage repayments of $212 million and $330 million, respectively, over the next 2 years, unused commitments in both of these loan categories aggregate about $433 million. All of these commitments will not be drawn down, but it is quite probable that the total drawdowns will exceed repayments in the next year. Every effort is reportedly being made by management to curtail the loan expansion, with all new loan applications carefully screened to determine how they can turn down requests without impairing customer relationships. Loans reached their highest level in the past year.

Investment securities have been maintained at about $600 million with $233 million in U.S. securities and the balance primarily in tax-exempt securities. While the maturity distribution is considerably less long term than in other banks, liquidation of securities to meet liquidity needs would result in sizable losses.

In connection with the above, attention is directed to the fact that, while this bank was an infrequent borrower at the discount window, the examiner was very much concerned over the large volume of borrowings from other sources.

APPENDIX F: FORM FOR ANALYZING BANK CAPITAL

FR 363
April 1956

BANK: _____

LOCATION: _____

BASED ON REPORT OF EXAMINATION AS OF _____ DISTRICT NO. _____

(Dollar Amounts in Thousands)

	AMOUNT OUTSTANDING	CAPITAL REQUIREMENT Per Cent	CAPITAL REQUIREMENT Amount
(1) PRIMARY AND SECONDARY RESERVE			
Cash Assets	$	0%	
Guar. Portion of CCC or V-loans			
Comm. Paper, Bnk Accept. & Brks' Lns			
U.S. Govt. Secs: Bills		0.5%	$
Certificates, etc. (to 1 yr.)			
Other (1-5 yrs.) (Incl. Treas. Inv. Series A & B)		4.0%	
Other Secs. Inv. Rtngs 1 & 2 or Equiv. (to 3 yrs.)			
TOTAL	$		
(2) MINIMUM RISK ASSETS			
U.S. Govt. Secs. (5-10 yrs.)			
Ins. Portion FHA Rep. & Modr'n Loans			
Loans on Passb'ks, U.S. Secs. or CSV Life Ins.			
Short-term Municipal Loans			
TOTAL	$	4%	
(3) INTERMEDIATE ASSETS			
U.S. Govt. Secs. (Over 10 yrs.)			
FHA and VA Loans			
TOTAL	$	6%	
(4) PORTFOLIO ASSETS (Gross of Res.)			
Investments (not listed elsewhere)			
Loans (not listed elsewhere)			
TOTAL	$	10%*	
* Plus 15% of 1st $100,000 of portfolio, 10% of next $100,000 and 5% of next $300,000.			
(5) FIXED, CLASSIFIED & OTHER ASSETS			
Bk Prem., Furn. & Fixt., Other Real Est.			
Stocks & Defaulted Secs.		100%	
Assets Classified as "Loss"			
Assets Classified as "Doubtful"		50%	
Assets Classified as "Substandard"		20%	
Accruals, Fed. Res. Bk. Stock, Prep. Expen.		0%	
TOTAL ASSETS	$		
(6) ALLOWANCE FOR TRUST DEPT. (Amt. equal to 300% of annual gross earnings of Department)			
(7) EXTRA CAP. REQD. IF ANY ASSETS IN GROUPS 2-4 USED FOR LIQUIDITY (zero if line C in Liquidity Calculation is zero, otherwise Total in line H)			
(8) ALLOW. FOR SPEC. OR ADDIT. FACTORS, IF INFO. AVAILABLE (+ or —) (see notes on reverse side)			
(9) TOTAL CAPITAL REQUIREMENT (1 thru 8)			$

LIQUIDITY CALCULATION

47% of Demand Deposits i.p.c.	$
36% of Time Deposits i.p.c.	
100% of Deposits of Banks	
100% of Other Deposits	
100% of Borrowings	
Allow. for spec. factors, if info. available (+ or —)	
A. Total Provision for Liquidity	
B. Liquidity available from Prim. and Secondary Res. ("amt. outstanding" less cap. required thereon)	
C. Liquidity to be provided from assets in Groups 2, 3 or 4 (zero if B equals or exceeds A, otherwise A less B)	
D. Liquidity available from Min. Risk Assets (90% of "amt. outstanding" in line 2)	
E. Liquidity to be provided from assets in Groups 3 or 4 (zero if D equals or exceeds C, otherwise C less D)	
F. Liquidity available from Intermediate Assets (85% of "amt. outstanding" in line 3)	
G. Liquidity to be provided from Portfolio Assets (zero if F equals or exceeds E, otherwise E less F)	

* * * * * *

Extra Capital Required on Any Assets in Groups 2-4 Used for Liquidity

6.5% of line C	
4.0% of line E	
9.5% of line G	
← H. Total Extra Cap. Req.	$

(10) ACTUAL CAP., ETC. (Sum of Cap. Stock, Surplus, Undiv. Profits, Res. for Conting., Loan Valuation Res., Net unapplied Sec. Valuation Res., Unallocated Charge-offs, and any comparable items) (Exclude Depreciation and Amortization Reserves) $

(11) AMOUNT BY WHICH ACTUAL IS: { MORE than requirement (10 minus 9) ..... +$ / or / LESS than requirement (9 minus 10) ..... —$

(12) RATIO OF ACTUAL CAPITAL, ETC. TO REQUIREMENT (10 divided by 9) ..... %

NOTES:

A thorough appraisal of the capital needs of a particular bank must take due account of all relevant factors affecting the bank. These include the characteristics of its assets, its liabilities, its trust or other corporate responsibilities, and its management—as well as the history and prospects of the bank, its customers and its community. The complexity of the problem requires a considerable exercise of judgment. The groupings and percentages suggested in the Form for Analyzing Bank Capital can necessarily be no more than aids to the exercise of judgment.

The requirements indicated by the various items on the form are essentially "norms" and can provide no more than an initial presumption as to the actual capital required by a particular bank. These "norms" are entitled to considerable weight, but various upward or downward adjustments in requirements may be appropriate for a particular bank if special or unusual circumstances are in fact present in the specific situation. Such adjustments could be made individually as the requirements are entered for each group of assets; but it usually is preferable, particularly for future reference, to combine them and enter them as a single adjustment under Item 8, indicating on the Analysis Form or an attached page the specific basis for each adjustment.

The requirements suggested in the Analysis Form assume that the bank has adequate safeguards and insurance coverage against fire, defalcation, burglary, etc. Lack of such safeguards or coverage would place upon the bank's capital risks which it should not be called upon to bear.

ITEM (4)—PORTFOLIO ASSETS

Concentration or Diversification.—The extra requirement of 15% of the first $100,000 of portfolio, 10% of the next $100,000, and 5% of the next $300,000, as specified in Item 4, is a rough approximation of the concentration of risk (lack of diversification) which is likely in a smaller portfolio, and which is usually reflected in the somewhat larger proportion of capital shown by most banks with smaller portfolios. This requirement is applied to all banks, but is naturally a larger portion of the total capital requirements of banks with smaller portfolios. However, a particular portfolio, whatever its size, may in fact have either more or less concentration of risk than other portfolios of similar size. If there is in fact substantially greater or lesser concentration of risk in the portfolio assets of the particular bank—as for example dependence upon a smaller or larger number of economic activities—it would be appropriate to increase or decrease requirements correspondingly.

Drafts Accepted by Bank.—When drafts have been accepted by the bank, ordinarily the customers' liability to the bank should be treated as Portfolio Assets if the acceptances are outstanding, or the acceptances themselves should be so treated if held by the bank.

ITEM (5)—FIXED, CLASSIFIED, AND OTHER ASSETS

Rental Properties.—Bank premises, furniture and fixtures, and other real estate are assigned a 100% requirement as a first approximation, since these assets usually are not available to pay depositors unless the bank goes into liquidation, and even then they usually can be turned into cash only at substantial sacrifice. However, some properties which bring in independent income, such as bank premises largely rented to others, may be more readily convertible into cash by selling or borrowing on them, and in such situations it may be appropriate to reduce the 100% requirement by an amount equal to an assumed "sacrifice" value, such as, say, two or three times the gross annual independent income.

Stocks.—In the case of stocks, their wide fluctuations in price suggest a 100% requirement as a first approximation. However, in some cases it may be appropriate to reduce the 100% requirement against a stock by an amount equal to an assumed "sacrifice" value, such as the lowest market value reached by the stock in, say, the preceding 36 or 48 months.

Hidden Assets.—In some cases assets may be carried at book values which appear to be below their actual value, and may thus appear to provide hidden strength. However, any allowance for such a situation should be made with great caution, and only after taking full account of possible declines in values and the great difficulty of liquidating assets in distress circumstances.

ITEM (6)—ALLOWANCE FOR TRUST DEPARTMENT

Deposited Securities.—The requirement for the trust department should in no event be less than the amount of any securities deposited with the State authorities for the protection of private or court trusts, since such securities are not available in ordinary circumstances to protect the bank's depositors.

LIQUIDITY CALCULATION

Percentages of Deposits.—The provision for 47% liquidity for demand deposits of individuals, partnerships, and corporations actually represents 33⅓% possible shrinkage in deposits, plus 20% of the remaining 66⅔%. 36% of time deposits i.p.c. represents 20% shrinkage, plus 20% of the remaining 80%. In both instances, the provision for 20% liquidity for remaining deposits is to help the bank continue as a going concern even after suffering substantial deposit shrinkage.

Among possible special factors to be considered in connection with the liquidity calculation would be concentration or diversification of risk among deposits. This might be due to such things as dependence upon a smaller or larger number of economic activities, or preponderance of large or small deposits—large deposits usually being more volatile.

Liquidity Available from Assets.—Liquidity available from primary and secondary reserves is assumed to equal the amount of those assets less only the regular capital required thereon, since the regular capital specified for these assets assumes forced liquidation. However, the regular capital specified for other assets (i.e., those in Groups 2-4) is only a portion (approximately 40%) of that required for forced liquidation. Therefore, in determining the liquidity available from such other assets, the amount of such other assets must be reduced by more than the regular specified capital.

Extra Capital Required.—This extra capital is to cover possible losses in forced liquidation of assets other than primary and secondary reserves in case they had to be used to provide liquidity. The 4% indicated for Line E amounts to an automatic addition to the 6.5% that has already been applied to Line C, and results in a total extra requirement of 10.5% of the liquidity to be provided from Intermediate Assets. Similarly, the total extra requirement on the liquidity to be provided from Portfolio Assets is 20%. If the same amounts of extra capital were stated as percentages of the assets to be liquidated rather than of the liquidity to be provided, the percentages would be smaller, namely, 6% of Minimum Risk Assets, 9% of Intermediate Assets, and 15% of Portfolio Assets.

APPENDIX G: STATE OF NEW YORK, BANKING DEPARTMENT, SUPERVISORY CIRCULAR LETTER CB-14, MAY 6, 1959

PRIMARY LIQUIDITY

This Department has been studying a new approach to the problem of primary liquidity of the state banks and trust companies and similar types of institutions under its supervision. The basic premise is that each bank should maintain an adequate amount of cash and other assets which can be quickly converted into cash with a minimum risk of loss to meet any foreseeable or potential deposit decline or other cash needs without resort to borrowing except for temporary purposes such as adjustment of reserve balances. Provision should be made for the fluctuation of deposits, with appropriate consideration to concentrations in large balances and those of a temporary nature.

To assist the Department in preparing statistics on this subject, each institution is requested to analyze its deposits as of the last business day of each month. If, however, your experience shows that total deposits are usually at the lowest point during some other part of the month, we recommend that a focal date within that period be selected instead of the last business day.

A deposit segregation should be made each month, as at the last business day or the focal date, as follows:

1. Date
2. Deposits of U.S. Government, states, and political subdivisions (including time)
3. Deposits of other domestic and foreign banks (including time)
4. Other demand deposits
5. Savings deposits
6. Other time deposits
7. Total deposits

The figures may be adjusted to the nearest thousand dollars. A record should be retained by the bank covering at least the period between examinations by this Department, and is to be made available to the examiner. The executive officers will probably find it helpful to retain this record for a more extended period to enable them to study seasonal trends and other pertinent factors affecting the liquidity position.

If each institution will compute the aggregate difference between the current total in each type of deposit with the *lowest* monthly figure for the preceding twelve months, it should have a fair estimate of the minimum amount of "primary reserves" which it should have available to meet its ordinary requirements. It is unlikely that the "low" point in each of the deposit segregations will occur in the same month of a yearly

period, but any over-estimate due to such circumstances will provide a margin to cover unexpected developments. If, however, the deposit level is lower than in the preceding year, further study should be made of the causes, and a projection made of potential future trends and liquidity requirements with special consideration to deposits of a temporary nature, and to heavy concentrations of deposits in a small number of accounts.

In addition to being prepared to meet potential deposit losses, the institution should also make adequate provision to cover its outstanding loan commitments, the ordinary seasonal credit requirements of its customers, projected new loan demands, and other factors which may deplete its liquid assets.

The term "primary reserves" as used in the preceding paragraph will consist of the following assets:

1. Cash, demand cash items, and balances due on demand from banks *in excess of the reserves required to be maintained* against deposits,
2. Readily marketable securities maturing within two years (at market values),
3. Loans to brokers and dealers in securities,
4. Bankers acceptances and prime commercial paper which are readily marketable through brokers and dealers in such paper, and
5. Federal funds sold.

Since reserves against deposits required by the Banking Law or Federal Reserve regulations may not be drawn down without penalty for deficiencies, only the excess reserves maintained, demand balances due from nonreserve depositaries, and demand cash items are allowed in this formula. Securities maturing within two years are allowed at market value. They can usually be disposed of with relatively moderate, if any, loss. The other assets which are classified as "primary reserves" can also, as a rule, be quickly disposed of with minimum loss. While some institutions may hold other assets of similar marketability and quality to meet the qualifications of "primary reserves," for the sake of uniformity only those listed above will be used for this purpose.

The Department intends to use the primary reserve formula as a supervisory guide to supplement the quick asset ratio shown on Schedule 2A of the examination report. Although the latter is useful in revealing the proportion of assets intrinsically liquid in character, the former will indicate to what extent immediate conversion to cash is possible without interfering with the normal activities of the institution.

Your cooperation is requested in facilitating the work of our examiners in compiling these data.

Very truly yours,

E. H. Leete
Deputy Superintendent
of Banks

APPENDIX H: REGIONAL NEWSLETTER, SECOND NATIONAL BANK REGION, JULY 1966

HOW'S YOUR LIQUIDITY?

The present "tight-money" market in which our banks are operating has led to increasing loan-to-deposit ratios and narrowing liquidity positions. While most bankers are conversant with the rule-of-thumb standards relating to deposit ratios, we find that many National bankers are unfamiliar with the method of computation and standards utilized by this Office in analyzing their liquidity position.

Since this is a topic of mutual interest, a copy of our form is shown below. Based on our experience with the formula over the past two years, this Office makes a detailed analysis of the asset structure when Net Liquid Assets to Net Deposits is 30 per cent or less.

It will be noted that the formula eliminates the market value of pledged bonds but does include municipal and corporate securities as a source of liquidity.

We would appreciate receiving the views and comments of bankers with respect to the merit of the guidelines.

LIQUIDITY ANALYSIS FORM

Cash and due from banks			
Market value—unpledged bonds			
Market value of excess pledged bonds			
Federal funds sold			
Subtotal			
Less: Borrowings			
Federal funds purchased			
Required reserves			
Net liquid assets			(A)
Total deposits			
Less: Secured deposits			
Net deposits			(B)
Net liquid assets/net deposits (A÷B) (per cent)			

APPENDIX I: APPLICATION OF FORMULAS

BALANCE SHEET

SAMPLE BANK

In thousands of dollars unless otherwise indicated

Assets		Liabilities	
Cash and due from banks	291	Deposits	
Reserves with FRB and cash items in process	241	Demand	
	532	IPC	774
Investment account*		U.S. Govt	57
U.S. Govt	967	States and municipals	568
Municipals	766	Other	59
Other securities	26		1,458
	1,759	Time	
		IPC	3,892
Loans and discounts	3,947	CD's (nonnegotiable)	19
Less: Valuation reserves	63	States and municipals	237
	3,884	Other	52
			4,200
Fixed assets	63	(Total deposits)	(5,658)
Other assets	14	Other liabilities	53
		Book capital funds	541
Tota' assets	6,252	**Total liabilities**	6,252

*Maturity distribution (par value):		Securities pledged to secure deposits, total (par value)	405
Under 1 year	229		
1–2 years	192		
2–5 years	491		
Over 5 years	860		
Total	1,772		

Ratios:

Loan/deposit (per cent)	68.6			
Liquid assets/liability (per cent)	11.8			
Cash and due from banks	291	Total deposits		5,658
Brokers and dealers loans	0	*Less:* Cash items	9	
U.S. Govt. securities (up to 2-yr. maturities)	350	Reserves at FRB	232	241
	641			
Less: Borrowings	0			
Total	641			5,417
New York State's quick-asset ratio (per cent)	41.4			
Cash, due from banks, exchanges and demand items	532	Total liabilities		5,711
Unpledged securities (market value)	1,756	*Less:* Deposits and borrowings secured by pledge of assets		357
Loans secured by readily marketable collateral	286			
Total quick assets	2,574			
Less: Secured deposits and borrowings	357			
Net quick assets	2,217	**Net liabilities**		5,354

NEW YORK LIQUIDITY FORMULA

SAMPLE BANK

Amounts in thousands of dollars

Requirements	Amount	Per cent	Under 1 year	1–2 years	2–5 years
Deposit liquidity					
Demand deposits:					
Volatile	60	88	53		
Vulnerable					
Large	698	...	...	...	
Less: Volatile	60	...	...	...	
	638	20	...	128	...
Residual					
Total	1,458	...	...	...	...
Less: Large	698	...	...	...	...
	760	10	...	...	76
Time deposits:					
Volatile	55	96	53	...	...
Large	654	20	...	131	...
Residual					
Total	4,200	...	...	...	...
Less: Volatile and vulnerable	709	...	...	...	...
	3,491	5			175
Deposit requirements	...	...	*106*	*259*	*251*
Portfolio liquidity					
Seasonal loan demand	70	100	70	...	...
Unexpected demand	90	100	90	...	...
Projected loan increase	68	100	34	34	...
Portfolio requirements	...	...	*194*	*34*	*0*
Aggregate requirements	...	...	**300**	**293**	**251**

Holdings	Under 1 year	1–2 years	2–5 years
Liquidity instruments held			
Excess reserves and correspondent balances	127	...	...
High-grade securities maturing in—			
Under 1 year	229	...	...
1–2 years	...	192	...
2–5 years	...	...	491

Net liquidity	Under 1 year	1–2 years	2–5 years
Aggregate holdings	**356**	**192**	**491**
Less: Borrowings	...	...	...
Net holdings	356	192	491
Aggregate requirements	300	293	251
Excess, or deficit (—)	56	—101	240
Liquidity index, (net holdings)/(aggregate requirements)	119	66	196

Consolidated index	Weight	Liquidity requirements	Net holdings
Maturity			
Under 1 year	2×	600	712
1–2 years	1×	293	192
2–5 years	.5×	126	246
Total		**1,019**	**1,150**
Consolidated index, (liquidity requirements)/(net holdings)		113	

NOTE.—For examiner's comments relating to this bank's liquidity position and borrowings, see Appendix D.

FR 363
April 1956

FORM FOR ANALYZING BANK CAPITAL

BANK: SAMPLE BANK

LOCATION: _____

BASED ON REPORT OF EXAMINATION AS OF _____ DISTRICT NO. _____

(Dollar Amounts in Thousands)

	Amount Outstanding	Capital Requirement: Per Cent	Capital Requirement: Amount
(1) PRIMARY AND SECONDARY RESERVE			
Cash Assets	$ 532	0%	
Guar. Portion of CCC or V-loans			
Comm. Paper, Bnk Accept. & Brks' Lns			
U.S. Govt. Secs:		0.5%	$ 1
Bills	200		
Certificates, etc. (to 1 yr.)			
Other (1-5 yrs.) (Incl. Treas Inv. Series A & B)	535		
Other Secs. Inv. Rtngs 1 & 2 or Equiv. (to 3 yrs.)	177	4.0%	28
TOTAL	$ 1,444		29
(2) MINIMUM RISK ASSETS			
U.S. Govt. Secs. (5-10 yrs.)	235		
Ins. Portion FHA Rep. & Modr'n Loans			
Loans on Passb'ks, U.S. Secs. or CSV Life ins.	85		
Short-term Municipal Loans			
TOTAL	$ 320	4%	13
(3) INTERMEDIATE ASSETS			
U.S. Govt. Secs. (Over 10 yrs.)			
FHA and VA Loans	174		
TOTAL	$ 174	6%	10
(4) PORTFOLIO ASSETS (Gross of Res.)			
Investments (not listed elsewhere)	612		
Loans (not listed elsewhere)	3,353		
TOTAL	$ 3,965	10%*	431
(5) FIXED, CLASSIFIED & OTHER ASSETS			
Bk Prem., Furn. & Fixt., Other Real Est.	64		
Stocks & Defaulted Secs.		100%	64
Assets Classified as "Loss"			
Assets Classified as "Doubtful"	59	50%	29
Assets Classified as "Substandard"	213	20%	43
Accruals, Fed. Res. Bk. Stock, Prep. Expen.	14	0%	
TOTAL ASSETS	$ 6,252		
(6) ALLOWANCE FOR TRUST DEPT. (Amt. equal to 300% of annual gross earnings of Department)			
(7) EXTRA CAP. REQD. IF ANY ASSETS IN GROUPS 2-4 USED FOR LIQUIDITY (zero if line C in Liquidity Calculation is zero, otherwise Total in line H)			206
(8) ALLOW. FOR SPEC. OR ADDIT. FACTORS, IF INFO. AVAILABLE (+ or −) (see notes on reverse side)			
(9) TOTAL CAPITAL REQUIREMENT (1 thru 8)			$ 825

* Plus 15% of 1st $100,000 of portfolio, 10% of next $100,000 and 5% of next $300,000.

LIQUIDITY CALCULATION	
47% of Demand Deposits i.p.c.	$ 364
39% of Time Deposits i.p.c.	1,427
100% of Deposits of Banks	
100% of Other Deposits	921
100% of Borrowings	
Allow. for spec. factors, if info. available (+ or −)	
A. Total Provision for Liquidity	2,712
B. Liquidity available from Prim. and Secondary Res. ("amt. outstanding" less cap. required thereon)	1,415
C. Liquidity to be provided from assets in Groups 2, 3 or 4 (zero if B equals or exceeds A, otherwise A less B)	1,297
D. Liquidity available from Min. Risk Assets (90% of "amt. outstanding" in line 2)	288
E. Liquidity to be provided from assets in Groups 3 or 4 (zero if D equals or exceeds C, otherwise C less D)	1,009
F. Liquidity available from Intermediate Assets (85% of "amt. outstanding" in line 3)	148
G. Liquidity to be provided from Portfolio Assets (zero if F equals or exceeds E, otherwise E less F)	861

Extra Capital Required on Any Assets in Groups 2-4 Used for Liquidity

6.5% of line C	84
4.0% of line E	40
9.5% of line G	82
← H. Total Extra Cap. Req.	$ 206

(10) ACTUAL CAP., ETC. (Sum of Cap. Stock, Surplus, Undiv. Profits, Res. for Contng., Loan Valuation Res., Net unapplied Sec. Valuation Res., Unallocated Charge-offs, and any comparable items) (Exclude Depreciation and Amortization Reserves) $ 604

(11) AMOUNT BY WHICH ACTUAL IS: MORE than requirement (10 minus 9) +$ _____ or LESS than requirement (9 minus 10) -$ 221

(12) RATIO OF ACTUAL CAPITAL, ETC. TO REQUIREMENT (10 divided by 9) 73 %

NATIONAL BANK'S LIQUIDITY FORMULA

SAMPLE BANK

In thousands of dollars unless otherwise indicated

Cash and due from banks	532
Market value, unpledged bonds Market value, excess pledged bonds	1,396
Federal funds sold	0
Subtotal	1,928
Less: Borrowings	(0)
Federal funds purchased	(0)
Required reserves	(319)
	319
Net liquid assets	1,609
Total deposits	5,658
Less: Secured deposits	360
Net deposits	5,298
(Net liquid assets)/(net deposits) (per cent)	30.3

DISCOUNT POLICY AND OPEN MARKET OPERATIONS

Paul Meek
Federal Reserve Bank of New York

Contents

DISCOUNT POLICY AND OPEN MARKET OPERATIONS

The basic responsibility of any central bank is monetary management—managing the liquidity and credit conditions of the entire economy, primarily through its influence on the commercial banking sector. In the United States, open market operations are the principal instrument for exercising the Federal Reserve System's initiative in affecting the full range of credit and monetary conditions. As the ultimate source of liquidity to the economy, the System cannot control total bank reserves precisely in the very short run because the monetary system of a modern economy must be able to respond flexibly to wide week-to-week changes in the demand for currency, bank deposits, and credit. But the System can and does exert a strong influence over the growth path of total bank reserves, deposits, and credit by varying over time the division between reserves provided without strings through open market operations and those provided with strings through the discount window. Within the framework provided by Regulation A governing individual bank access to reserves borrowed from the Reserve Banks, the Federal Open Market Committee acts in this way to influence bank behavior in the interest of achieving national economic objectives.

This paper sketches the process whereby the decisions of the FOMC are brought to bear on the liquidity of commercial banks through open market operations and the discount window. It describes broadly how the Manager of the System Open Market Account relies on patterns of bank behavior and the Federal funds market to aid in the day-to-day decisions that carry out the FOMC's instructions. The paper also ventures some observations on the implications for discount policy of the need for integrating open market and discount policies, and on the constraints that these implications impose on changes in the administration of the discount window.

SUMMARY OF FINDINGS

The nationwide level of member bank borrowing from the Federal Reserve Banks is an important element in the money market conditions that the FOMC instructs the Manager of the System Open Market Account to achieve, particularly in periods of monetary restraint. In specifying the money market conditions to be achieved, the FOMC, in effect, determines that such member bank borrowing will stay within a certain range—that is, that member banks somewhere in the banking system will be forced to borrow at the discount window in an aggregate that corresponds on average to the Committee's desires regarding money market conditions. The Committee increases

monetary restraint and affects commercial bank behavior by having the Manager, through the Trading Desk of the Federal Reserve Bank of New York, reduce the provision of reserves by open market operations in relation to the demand for them so that member banks come into the window in larger numbers and/or more often. Banks appear individually at the discount window and are exposed to its discipline, but it is the FOMC that regulates the discipline imposed on the banking system as a whole.

From the Trading Desk's standpoint the daily-average level of member bank borrowing at the discount window over the 7 days of the statement week is an important and workable operational guide—one that interrelates with a number of other money market indicators. Armed with statistical forecasts of member bank reserves and a knowledge of bank patterns of reserve management, the Desk can make reasonably good judgments of the level of unsatisfied demand for reserves that is likely to appear at the discount window after the operation of the Federal funds market. The Manager can ordinarily detect when actual reserve availability is appreciably larger or smaller than expected—without knowing at the moment the cause of the deviation—and he can adjust his actions accordingly.

The FOMC is not concerned with member bank borrowing or any other money market indicator for its own sake, but as an operational means of providing for the economy's short-run cash needs and of influencing the growth of bank credit and the behavior of interest rates over the long run. Member bank borrowing provides only a first—and imperfect—approximation to the money market conditions that are consistent with achieving the Committee's longer-run financial objectives. The relation between the Federal funds rate and the discount rate at a given level of such borrowing is probably a somewhat better short-run indicator than borrowing alone of the effectiveness of open market operations in influencing the banking system in the desired direction. The behavior of such monetary aggregates as bank credit and the money supply—in conjunction with interest rates—provides even better evidence on this point, although the monetary aggregates are not themselves targets that the Manager can hit directly in the short run. In an effort to improve the responsiveness of open market operations to changing external circumstances, the FOMC introduced in 1966 a new form of the directive that has provided for varying its short-run operational targets in accordance with the unfolding behavior of bank credit. Thus far, this approach seems to be a promising one for improving the implementation of the System's monetary policies.

Changes to be made in the operation of the discount mechanism should maintain the responsiveness of the banking system to the policy moves of the FOMC. Discount policy will necessarily remain a principal cutting edge of a policy of monetary restraint, imposing on a succession of individual banks —beginning with the larger money market banks—the need to adjust assets and/or liabilities within a reasonably short time period in order to repay borrowing from the Federal Reserve. Such a requirement need not interfere with liberalizing the access of small banks to the discount window for seasonal liquidity needs. Under any set of rules of discount administration, however, the FOMC will need to be able to direct open market operations to increase or to reduce the pressure on a major segment of member banks —certainly the larger ones. Discount policy will need to provide incentives for banks to pay off their borrowing at the discount window in fairly short order. For operational purposes, changes in the discount rules should probably be timed to coincide with

a period of monetary ease. Such timing would enable both the Federal Reserve System and the financial community to grow accustomed gradually to the new framework within which open market policy would be conducted.

A VIEW OF THE POLICY PROCESS

As noted, any central bank has primary responsibility for managing liquidity and credit conditions in the economy through its influence on the banking sector with a view to promoting national economic objectives. To exert this influence, a central bank develops policy instruments that enable it to initiate policy changes and to give centralized direction to the implementation of its policy.

Central banking in the United States has developed, and has come to rely on, open market operations as the most efficient means for influencing national liquidity and credit conditions. This development flows naturally from the growth of the specialized and interdependent financial markets and institutions that serve a highly developed economy. The System bases its policy judgments on its reading of the full range of financial flows and interest rates in relation to economic developments and objectives, rather than narrowly on the behavior of the banking system alone. Moreover, the Federal Reserve is the ultimate source of liquidity to the entire financial system and thereby to the economy. It must make its operational decisions about liquidity needs on the basis of centralized information about the banking sector and the evidence provided by the financial markets themselves about those needs. From a policy standpoint, open market operations provide a logical and natural point of contact between the Federal Reserve and the financial system.

In managing the reserves of the banking system, the monetary authorities have two interlocking responsibilities. Routinely, they enable the banking system to provide in the short run for the highly variable needs of the economy for cash—both currency and bank deposits. Over the longer run, they seek to influence the liquidity of the economy, financial flows, and interest rates with a view to fostering national economic objectives. A central problem of monetary management is to keep short-run flexibility from impairing long-run policy objectives.

The Federal Reserve System depends on an integration of open market policy and discount policy to carry out these dual responsibilities. In the very short run, open market operations flexibly provide reserves in accordance with the shifting cash needs of the over-all economy. Discount policy, on the other hand, provides a limited adjustment mechanism for both the individual bank and the banking system when reserves fall short of reserve requirements—assuring short-run accommodation at the discount rate. Over the long run, however, individual banks cannot rely on continuous borrowing from the Federal Reserve, and therefore such borrowing generates a need for adjustment of assets or liabilities that is missing as long as reserves are being provided without stint by open market operations.

Open market operations and the discount window, as operated under the current Regulation A, enable the banking system to meet the economy's short-run cash needs without undue strain. These needs fluctuate from day to day and from week to week in relation to the increase in money supply that takes place over the course of a full year. Member banks as a group will have to borrow from their Reserve Banks to cover

their reserve deficiencies in a given week to the extent that open market operations in that week fail to compensate for changes in currency outstanding, bank deposits, other factors affecting reserves, or unused reserves that accumulate within the banking system. Such borrowing will be necessary whatever the reason for the deficiency—whether it is deliberate System policy, an unexpectedly large bulge in deposits at tax payment time, or a much sharper decline in float than had been anticipated. The geographic pattern of such borrowing depends to a large degree on the movement of deposits and reserves, including the important redistribution of reserves among individual banks that is effected through the Federal funds market and the correspondent banking system. As a result of providing "an elastic currency" and of acting as lender of last resort, the System must give up precise control over total deposits and currency outstanding in the very short run.

The System, nonetheless, exerts leverage on the process of credit creation through open market policy applied against the fulcrum of the discount policy as embodied in Regulation A. The essence of Regulation A has been that an individual member bank's borrowing from its Reserve Bank is to be temporary. The discount window is not to provide a continuing supplement to a bank's resources. Hence, member banks have been expected to adjust their assets or liabilities over a period of weeks so that borrowing from their Reserve Bank will no longer be necessary. Given this fulcrum, the FOMC can consciously direct open market operations to change the amount of borrowing that member banks in the aggregate must undertake, and thus to influence directly bank lending and investment decisions. In this context, it can be seen that the discount rate has little effect on the aggregate level of member bank borrowing. (The influence of the discount rate—by its relation to other interest rates—instead comes through its effect on the calculus of commercial bank policies and actions, and thereby on the rate of bank credit growth.)

The interaction of open market policy and discount policy over the cycle is familiar. If the economy requires stimulation, the System uses open market operations to flood the banks with reserves that can be employed in loans and investments. The discount rate is also lowered, although member bank borrowing will naturally fall to a frictional minimum as open market operations supply reserves in abundance. As the economy expands and less stimulation is required, the System typically supplies reserves through open market operations somewhat less freely in relation to expanding credit demands. This policy change forces member banks to come to the discount window in increasing numbers and/or with increasing frequency. As the FOMC steps up the degree of restraint, open market operations insure that more and more banks are gradually affected by the necessity of not abusing their privilege of borrowing at the discount window, but of reserving it for the increasingly frequent occasions on which they have exhausted alternative means of balancing out their reserve positions.

DIRECTION OF OPEN MARKET POLICY

The System has used open market policy as its primary continuing instrument, both for providing liquidity to the economy in the short run and for influencing liquidity, credit conditions, and spending over the longer run. In making policy, the FOMC must embody

its policy prescription in instructions to the Manager of the System Open Market Account that are operationally feasible. Essentially, the Committee does this by: (1) specifying the terms on which the reserve needs of the banking system are to be accommodated by the Manager on a week-to-week basis, and (2) varying the terms from time to time to influence bank liquidity and the financial variables in the direction desired. In recent years, the FOMC has specified the terms of accommodation—that is, money market conditions—in terms of a number of indicators. These indicators include free reserves, member bank borrowing from the Reserve Banks, the Federal funds rate in relation to the discount rate, and Treasury bill rates.[1] The FOMC has sometimes given particular weight to one of these. For example, shoring up Treasury bill rates for balance of payments reasons was an active concern in the early stages of the economic expansion that began in 1961. In the main, however, the Committee has come to rely less than in the 1950's on any single measure, such as free reserves. It tries instead with the aid of its staff to specify for a constellation of variables the ranges of short-term variation that are believed to be consistent with a projected rate of growth in total bank deposits over the next month or so.

As noted earlier, the System wants to exert a degree of influence on the lending and investment decisions of banks—and an important means of exerting this influence is by governing aggregate recourse to the discount window. It is the essence of a short-run accommodative posture, when policy is not changing, for open market operations to seek to maintain daily-average member bank borrowing at a reasonably stable level on a week-to-week basis. Then, the pressure exerted by discount officers on borrowing banks to adjust assets and to repay the Reserve Banks will be reasonably steady. Discrete changes in the levels of average member bank borrowing, and the pressures exerted by the System on bank management, flow from the FOMC's decisions rather than emerging haphazardly as a byproduct of other factors affecting reserves.

A problem remains. The Manager may successfully maintain member bank borrowing from the Reserve Banks and the other elements of money market conditions within the prescribed ranges, but bank credit and a variety of interest rates may behave differently than the FOMC expected. Such discrepancies are likely to be particularly large —and significant—when the economy's demand curve for credit is shifting rapidly in either direction. The FOMC may then find that interest rates and the rate of bank credit growth turn out to be higher than it intended at times when credit demands are burgeoning, and lower than it intended at times when credit demands are falling sharply. The reasonably short interval of 3 to 4 weeks between FOMC meetings provides considerable assurance that large shifts in credit demands will be detected rather promptly. The Committee has sought in recent years, however, to increase the rapidity of its response to changing conditions.

To this end the FOMC began experimenting in 1966 with a new form of its directive governing the conduct of open market operations. It included a proviso clause that instructed the Manager to change conditions in the money market in a prescribed direction if the rate of bank credit growth differed significantly from what was expected. (Other conditioning elements—such as the timing of Treasury financing and pressures on

[1] Free reserves are defined as the excess reserves of member banks less their borrowings from the Federal Reserve Banks. This formulation is equivalent to the difference between the nonborrowed reserves and required reserves of member banks.

liquidity—continued to be employed as well.) For example, the operational paragraph of the directive adopted by the FOMC on September 13, 1966, is as follows:[2]

> To implement this policy, System open market operations until the next meeting of the Committee shall be conducted with a view to maintaining firm but orderly conditions in the money market; provided, however, that operations shall be modified in the light of unusual liquidity pressures or of any apparently significant deviation of bank credit from current expectations.

In the process of implementing this and succeeding directives, the Manager of the System Open Market Account gradually leaned toward a little less firmness in the money market as bank credit persistently fell somewhat short of projected levels.[3] By the time the Committee voted on November 22, 1966, to promote "somewhat easier conditions in the money market," the proviso clause had already led to a clearly discernible shift in money market conditions away from the degree of restraint prevailing in August and September.

The inclusion of the bank credit proviso clause in the Committee's directive did not represent any downgrading of member bank borrowing from the Reserve Banks as an important policy variable. The new directive merely provided a procedure for increasing or reducing the degree of restraint —and the level of such borrowing—under specified conditions in the interval between meetings of the FOMC. The direction of open market operations in periods of monetary restraint necessarily must include some implicit specification of the range of member bank borrowing from the Reserve Banks that the Manager is to foster in the banking system as a whole.

[2] Board of Governors of the Federal Reserve System, *Annual Report, 1966* (Washington: 1967), p. 179.

[3] *Ibid.*, pp. 248–56.

IMPLEMENTATION OF THE FOMC'S POLICY

The Manager of the System Open Market Account and his colleagues at the Trading Desk operate in, and operate on, a financial environment whose dominant short-run characteristic is variability.[4] To be sure, factors affecting reserves such as Federal Reserve float, currency in circulation, and member bank deposits—through their effect on required reserves—behave in roughly similar patterns at corresponding times from year to year. But the day-to-day behavior of these factors in a particular year differs, almost routinely, from an average of the behavior of past periods. Changes in the timing of Treasury financings and tax collections have been especially noteworthy in the past few years. The distribution of reserves among different groups of banks and the marginal use made of reserves by these banks change frequently also. Interest rates, too, can vary considerably over the interval between FOMC meetings in response to a multiplicity of real and expectational forces. The conduct of open market operations involves a continuing strategy of successive approximation to the FOMC's specification of money market conditions.

Operationally, the Manager focuses in the first instance on the behavior of bank reserves during the statement week and money market clues to that behavior. Affecting his strategy for each week is the knowledge that the excess reserves held by the banking system change from week to week as a result

[4] See Paul Meek and Jack W. Cox, "The Banking System—its Behavior in the Short Run," *Monthly Review of the Federal Reserve Bank of New York*, April 1966, pp. 84–91.

of changing conditions of reserve distribution and use. Country banks, for example, usually build up excess reserves in the first week of their reserve settlement period and then run them down by $150 million to $200 million in the second week of this period. Unusual churning in the money or Government securities markets—as on a quarterly corporate tax date—will increase the volume of unused reserves that are likely to pile up somewhere in the banking system. The Manager can maintain the steady degree of pressure on the banks desired by the FOMC—to keep member bank borrowing from the Reserve Banks reasonably stable—only by allowing the daily average of free reserves to vary with the distribution and utilization of reserves from statement week to statement week.

The Manager depends importantly in his daily judgments on the close connection between member bank borrowing from the Reserve Banks and other indicators of money market conditions—in particular, the information on reserve availability and/or use provided by the Federal funds market. Each morning, the Manager receives information on borrowing from the Reserve Banks by all member banks on the previous day and estimates of total and required reserves for major groups of banks for the previous day. (Estimates of total reserves are usually accurate within $50 million, although occasionally errors exceed $100 million.) The Manager also receives reports on the previous day's activity of 46 major reserve city banks in trading Federal funds and in lending to Government securities dealers. The Manager has estimates of daily levels of free reserves stretching 3 to 4 weeks ahead—projections that rely on the patterns of factors affecting reserves observed in similar periods of past years. On the basis of this information, experience with the shifting strategies that banks pursue in managing their reserve positions, and knowledge of any large special strains such as occur at times of a Treasury financing, the Manager and his associates will formulate their expectations of how the Federal funds market should behave that day.

The Trading Desk matches these expectations against the developing situation revealed by its continuing contact with the Federal funds brokers, the money desks of the major New York City banks, and the closely related efforts of the nonbank dealers in Government securities to finance their positions. The Federal funds market reflects with considerable accuracy the marginal availability of bank reserves and the demand for them on each day. If the Federal funds market is much tighter than the reserve data suggest should be the case, the Trading Desk will not usually know whether it is because Federal Reserve float is $300 million lower than expected, or because country banks are holding on to more excess reserves than usual. But the Desk will get a fairly clear indication that member bank borrowing from the Reserve Banks is likely to bulge unless reserves are provided through open market operations. Therefore, in such circumstances, the Desk is likely to supply reserves in a volume intended to moderate the mounting tightness. Its intervention may tend to affect the willingness of a few banks to wait another day or two before resorting to the discount window. Conversely, the Desk may respond to easier-than-expected conditions in the Federal funds market by deferring action to supply reserves or by actually mopping up reserve excesses.

A major strength of the System's conduct of open market operations in recent years has been the extent to which this day-to-day decision-making meshes with the FOMC's policy objectives of maintaining a fairly even degree of restraint on the banks in the short run. As described earlier, the Manager

is essentially making daily judgments about the marginal demand for reserves that will go unsatisfied in the Federal funds market and will be likely to appear at the discount window. The Manager is able to detect changes in the degree of pressure on bank reserve positions and to cast the System's weight on the other side of the scales. He cannot control member bank borrowing at the Reserve Banks with much precision on a daily basis, but he can adapt his weekly strategy to resist large deviations in average borrowing from the range embodied in the money market conditions specified by the Committee. Such borrowing and the degree of firmness in the Federal funds market are opposite sides of the same coin. The Committee's objective of influencing bank behavior has a practical day-to-day focus.

Member bank borrowing from the Reserve Banks is really only an approximation to the degree of monetary pressure or ease that the Manager is instructed to foster in order to further the System's longer-term goals. The Federal funds rate itself, in relation to the Federal Reserve discount rate, has become increasingly a sort of fine-tuning device in daily reserve management. The FOMC's increased attention to this rate as a supplemental indicator of the interaction between bank policies and the credit demands falling on the banks reflects expanded member bank activity in the Federal funds market.[5] The Federal funds rate has proved increasingly sensitive as an indicator of the banking system's need for reserves, trading at rates above and below the discount rate.

Use of the Federal funds rate as a conditioning element in the Committee's instructions to the Desk has been clearly evident in periods of monetary ease. At such times open market operations provide reserves in such volume that member bank borrowing at the discount window falls to a frictional minimum. In seeking to promote rapid growth in bank credit, the System not only lowers the discount rate but also keeps the cost of reserves in the Federal funds market below the discount rate. It thereby seeks to insure that open market operations are supplying reserves more rapidly than the banks are using them to expand loans and investments—in effect, maintaining pressure on the banks to expand credit.

The appearance of Federal funds trading at a rate well above the discount rate in 1966 brought a new dimension to bank behavior and probably to monetary policy as well. The increase in the size of the premium from one-eighth of a percentage point in early March to 1½ to 1¾ percentage points in early September 1966 was associated with a marked increase in the degree of effective restraint on bank lending and investment. The increase in restraint was probably considerably greater than that which in earlier years would have been associated with the rise of average member bank borrowing from the Reserve Banks from $551 million in March 1966 to $776 million in September 1966. The behavior of bank credit, the money supply, and interest rates in 1966 was consistent with such an interpretation. By October 1966 a number of Committee members were specifying among the money market conditions to be achieved an upper range of the premium on Federal funds to 1 to 1½ percentage points—presumably, with a view to easing the pressure on the banking system.

Both member bank borrowing from the Reserve Banks and the Federal funds rate

[5] Treasury bill rates were useful as such an indicator at one stage. In the 1960's, however, Treasury bill rates have become much less meaningful because alternative means of bank reserve adjustment have multiplied and bank holdings of Treasury bills have declined in relation to the total volume of bills outstanding. The Committee's concern with Treasury bill rates in the 1960's was more the product of balance of payments than of domestic considerations.

provide objectives that the Manager can achieve reasonably well within his operational horizon of the statement weeks between FOMC meetings. Open market operations bear directly on both of them. The Manager's influence over other interest rates —for example, the Treasury bill rate or the yield on long-term Government securities— is much more indirect and uncertain. Changes in the expectations of market participants can easily outweigh any marginal influence the Manager may exert in the course of pursuing the FOMC's marginal reserve objectives. For balance of payments reasons a few years ago, a sustained System effort coordinated with the Treasury's issuance of Treasury bills was necessary to shore up bill rates.

The implementation of the directive's bank credit proxy involves a shading of money market conditions over the interval between FOMC meetings. In determining its application, the Manager is guided by the relation between the FOMC's desired range of growth for total bank deposits for a month or so ahead and updated projections of those deposits prepared weekly by the staffs of the Board of Governors and of the Federal Reserve Bank of New York. Should bank credit appear to be expanding more rapidly than the FOMC indicated was acceptable, the Manager would consider a shift in the direction of greater restraint if permitted by other conditioning elements in the Committee's instructions—for example Treasury financing. Such a move would involve promoting a higher level of member bank borrowing from the Reserve Banks, and possibly also a somewhat higher Federal funds rate, than had prevailed on average before implementation of the proviso clause. Since the interval between meetings is only 3 or 4 weeks, the Federal Open Market Committee itself determines whether such a shading is to be held, carried further, or reversed.

OPEN MARKET OPERATIONS AND CHANGES IN DISCOUNT ADMINISTRATION

As noted earlier, monetary policy is an integration of open market policy and discount policy. The Open Market Committee basically determines the desired aggregative level of member bank borrowing from the Reserve Banks by its specification of the money market conditions that the Manager is to achieve. Discount officers encourage the individual borrowing banks to pay off their borrowing after a time—by asset adjustments if necessary. Monetary policy exerts restraint on the banks because the discount window is not continuously open to individual banks. Open market operations are used quite consciously to vary the pressure on the banks to adjust their lending and investment policies.

Monetary management in a modern economy is so closely related to the performance of the money and credit markets that there is no desirable alternative to open market operations as a policy instrument. There is general agreement that discounting cannot provide efficiently a centralized management of reserves that is integrated with national liquidity needs. Fortunately, there do not appear to be any major obstacles ahead in the future use and development of open market operations as a policy tool. In the unlikely event that the supply of U.S. Government and Federal agency securities in the hands of the public should become so limited as to impair open market operations, such operations could be conducted in the debt obligations of other issuers.

A great virtue of the present arrangements

is that policy-making is centralized in the Federal Open Market Committee. The Committee exerts its leverage on the monetary process against the fulcrum of a reasonably uniform policy of discount administration. The linkage between money market conditions and bank credit may change, but the Committee now can be reasonably sure that such changes do not reflect an independent monetary policy being pursued by discount officers. At first glance it might appear desirable to vary discount administration over the cycle to reinforce the effects of the Committee's open market policy—either in the direction of ease or of restraint. But changing institutional arrangements repeatedly would unpredictably shake up the banking system's behavior, increase the already considerable difficulty of deciphering its response to open market policy changes, and impair the Committee's growing ability to give instructions to the Manager of the System Account that relate meaningfully to the Committee's own bank credit and interest rate objectives. The Trading Desk would probably find its task complicated considerably if the behavior of the money market and the banking system were being affected by changes in discount administration. There would not appear to be any substitute in monetary management for the centralized policy direction and centralized execution that open market operations make possible.

The discount window will continue to play a key role in enforcing a policy of monetary restraint. It is axiomatic to such a policy that the banking system cannot be permitted to borrow from the central bank without restraint those reserves that are absorbed, or are not supplied, by open market operations. Any revision of the System's approach to discounting must provide a mechanism for limiting the access that the individual banks in the banking system have to reserves via their own initiative. Since borrowing at the window must remain a principal cutting edge of monetary restraint, one cannot allow the total to rise and fall except as a reflection of monetary policy. To allow banks to borrow without restraint—for example, to meet long-term growth needs or to deal with aggregative intramonthly and seasonal reserve needs—would involve loss of control over the reserve base.

The present system of administrative rationing on the basis of the current Regulation A meets the test of providing an adequate fulcrum for the FOMC's exercise of monetary restraint. But the rules of discount administration could be modified or changed without impairing this function. Under a different set of rules, administrative rationing could permit all banks more frequent or longer access to the window than at present before administrative counseling began. Under such rules it would probably take considerably longer to achieve a given degree of monetary restraint, but the System could undoubtedly achieve its objectives in time.

The lag between a policy move toward restraint and its effect on bank behavior would probably be less under a hybrid system in which small banks were allowed to borrow for seasonal needs in amounts specified in advance while large institutions remained on a short tether as at present. Small banks with marked seasonal patterns could negotiate with the discount officer of their Reserve Bank in advance a credit line for continuous borrowing for the period in question—perhaps as much as 2 or 3 months—thereby enabling them to reduce their own provision for seasonal liquidity needs. Such a borrowing facility would recognize the limited time that bankers in such institutions can give to daily liquidity management, and would be an added attraction of

System membership. Only borrowing above a seasonal amount would be subject to administrative scrutiny for disciplinary purposes. The frequency of such borrowing permitted before administrative counseling was called into play might also be increased somewhat. Aggregative member bank borrowing at the discount window would presumably be higher under such a hybrid system than under the present system for a given degree of monetary restraint. In periods of easy money some seasonal borrowing might be added to the frictional borrowing already experienced. As the Committee moved toward restraint, one would expect borrowing to rise to higher levels than at present, without necessarily involving any very sizable swings in total borrowing around the policy-determined level.

Access to reserves borrowed from the Reserve Banks could also be limited through a structure of quantitative limits and discount rates. There has always been a considerable body of academic opinion that has felt that the discount rate should be a penalty rate. The 1966 experience, of course, showed that policy could be quite restrictive with a discount rate well below outstanding market rates. Such a discrepancy, however, does raise some questions of the desirability of providing reserves to the banking system at an unrealistic rate and of equity between borrowing and nonborrowing banks. These questions are of limited significance as long as borrowing at the discount window is a small part of total reserves, but they would become more important if revisions in discount policy increased substantially the proportion of total reserves represented by such borrowing.

A structure of quantitative borrowing limits and discount rates could supplement or substitute for administrative counseling as a means of affecting bank behavior. Such a system might involve, for example, an automatic boost in the effective cost of borrowing from the System once borrowing exceeded a certain proportion of required reserves, a certain frequency, or some combination of the two. Conceivably, it could alleviate some of the problems of equity that emerge between borrowing and nonborrowing banks, although there are manifold problems in designing an equitable system because the sizes of the reserve swings experienced by banks vary so widely. One might also expect that such a system would reflect to some extent the degree of restraint being achieved by the Committee—that is, borrowing at penalty rates would increase with the degree of restraint.

Whereas a structure of rates or quantitative borrowing limits may be a suitable means of trying to influence the reserve base and credit conditions in countries without well-developed money and credit markets, it is hardly an acceptable substitute for open market operations as the primary instrument of general control in this country. One may question whether the complexities of even a supplemental system might not render the conduct of monetary policy and its impact on economic activity even more mysterious and subject to misunderstanding than at present.

Both policy and operational factors suggest a number of considerations to be observed in any process of modifying the present rules of discount administration. The importance of fostering uniform administration is self-evident. A corollary of this is that changes in discount administration should be of the once-over variety. The policy decisions of the Committee and the operations of the Desk could adjust to modified rules without major difficulty, provided there were no continuing change of the rules nor any effort to substitute discount policy for

open market policy. In making discount rule changes that may seem desirable for purposes of dealing with individual banks, it would also seem advisable to time the changes to coincide with a period in which monetary policy was expansive, and borrowing by member banks was near a frictional minimum. Then, discount officers, the commercial banks, the Federal Open Market Committee, and the Trading Desk could all adapt gradually over the expansionary period to the effect of the changed regulations on bank behavior and monetary developments.

February 1968

THE REDESIGNED DISCOUNT MECHANISM AND THE MONEY MARKET

Robert C. Holland, Board of Governors of the Federal Reserve System

George Garvy, Federal Reserve Bank of New York

Contents

THE REDESIGNED DISCOUNT MECHANISM AND THE MONEY MARKET

The purpose of this paper is to explore, insofar as *a priori* knowledge permits, the kind of interaction that might be expected between the national money market and a redesigned discount mechanism as proposed in the Final Report of the Steering Committee (vol. 1 of this series) and to outline the kinds of adaptations that the Federal Reserve would probably be required to make in the conduct of its open market operations.

This paper thus differs in concept and orientation from other studies that have been prepared in connection with the reappraisal of the Federal Reserve discount mechanism. Generally speaking, the other papers endeavored to analyze past, present, or prospective conditions and to draw from such analyses inferences as to the circumstances in which the current discount mechanism proved to be inadequate and in what respects it might be improved. This paper takes the proposed new discount mechanism as given, and tries to evaluate how such a mechanism might interact, in practice, with likely money market conditions and open market policy.

The purpose of the proposed redesign of the discount window is to make better use of monetary tools to achieve System objectives and to improve the functioning of the banking system in general. More liberal access to Federal Reserve credit at the discount window does not imply easier monetary policy. Rather, such access would redistribute responsibilities for facilitating adjustments to the posture of credit policy. The proposed design of the window should enhance the ability of member banks to meet the needs of their customers, without reducing the effectiveness and precision of open market operations.

Our growing economy has required a continuous broadening over the years of the banking system's reserve base. And over the long run, the Federal Reserve System will still have to provide substantial amounts of bank reserves, even if its efforts to achieve greater price stability are successful and its additions to reserves are held to a rate commensurate with noninflationary growth of the economy. Thus, the impact of the shift to the proposed new system on the money market and on open market operations must be viewed against the background of a long-run process of net reserve injection, the precise time profile of which is subject to seasonal factors as well as to changes in System policy objectives related to cyclical developments.

Under the present Regulation A, the discount mechanism contributes little to an appropriate growth in aggregate reserves of banks or to accommodating recurrent seasonal swings in the reserve base. Because of the reluctance-to-borrow convention, a large part of the needs of member banks for adjusting reserves from one reserve period to another are accommodated through System open market operations. Thus, over the year, open market transactions show a

large volume of purchases followed by sales —and vice versa—to accommodate the fluctuating reserve needs of the banking system. As a result, in any given year open market transactions (disregarding exchanges) are several times as large as the net addition to the reserve base.

Restoration of the discount mechanism to the role of a buffer willingly used by member banks to make initial adjustments to fluctuations in their loans and deposits and to meet part of regular seasonal bulges in demand for loans will result in a change in the composition of reserve injection. Such injection will be more immediately guided by the needs of individual banks. A somewhat larger proportion of the provision of reserves will occur at the window rather than at the initiative of the Trading Desk. But since the Desk will continue to be in charge of implementing the over-all objectives of credit policy, as defined periodically by the Federal Open Market Committee, it will need to adjust the actual conduct of its operations to the new role that the Report of the Steering Committee assigns to discounting. If the amount of reserves created at the initiative of member banks is at times excessive in the light of current targets of Federal Reserve policy, the Trading Desk will need to offset such excesses by appropriate operations. Normally, part of the reserves that banks lose and seek to replenish by borrowing at the window will find their way to banks that are anxious to reduce their borrowings from the Federal Reserve, and the net injection through the window will tend to be smaller—and at times considerably smaller—than the gross flow. This should be kept in mind in interpreting the rough estimates of gross potential borrowing cited in the Report.

The greater initiative that member banks will be able to exercise in the initial distribution of reserves to support long-term growth and to accommodate seasonal and cyclical swings in bank credit, as well as in the levels and composition of deposits, will have significant effects on the money market. The Trading Desk will need to make certain corresponding adjustments in its operating procedures and projection techniques. The redistribution of the responsibility for flexibility in the provision of reserves to member banks will, on balance, reduce the volume of open market transactions without diminishing the Desk's central role in implementing Federal Reserve policy.

The primary purpose of this paper is to explore the probable impact of the proposed changes on money market processes. There is no intention to minimize either the challenge to the Trading Desk or the magnitude of its task. Yet, the proposed changes in discount philosophy and procedures affect the Trading Desk in a quantitative rather than in a qualitative way. The required adjustments involve, in the main, a restructuring of the patterns of reserve flows with which the Desk is confronted in its day-to-day operations; it is believed that these problems can be solved by gradual adjustment, as the impact of the new policies progressively affects credit conditions.

In the next section, attention will be directed toward the likely operation of short-term adjustment credit at the discount window in conjunction with ordinary money market conditions as they may be moderated by the recent adoption of changes in reserve regulations. Succeeding sections will describe how such short-term adjustment credit might interact with money market developments as credit demands change cyclically, and as the general Federal Reserve instruments—open market operations, reserve requirements, and changes in the discount rate—are employed to implement changes in monetary policy. Another sec-

tion will discuss how these relationships might be affected by the operation of seasonal credit assistance and emergency credit assistance. The last section explores some implications of the redesigned discount window for open market operations.

THE MONEY MARKET ENVIRONMENT

The national money market is the arena in which excesses and deficiencies in supplies of, or demands for, liquid funds by a variety of participants are balanced out, insofar as those participants have the means, directly or indirectly, for reaching this market. Some of these excesses and deficiencies are highly transitory—that is, of a few days' duration; others are expected to continue for longer periods—that is, several weeks, a season, a cycle, or indefinitely. In some instances those that supply funds and those seeking funds, as well as market intermediaries, are likely to be uncertain as to the duration or prospective dimension of the excesses or deficiencies accruing to them.

The response to such liquidity surpluses or deficits is conditioned largely by expectations as to their size and duration. In addition, responses of those participants with surpluses and those with deficits are affected by their basic portfolio positions, by their view of the current and prospective conditions in the money market, and anticipated future trends in basic economic and financial conditions. Guided by these considerations, including estimates of the alternative costs involved, participants in the money market choose among the alternatives open to them for adjusting excess or deficient liquidity. For member banks—the only category to be discussed in this paper—the Federal Reserve discount window is one of the alternatives, albeit one with unique terms and conditions.[1]

Member banks vary widely—in liquidity needs, in swings in cash positions, in demands made on them, and in their ability to make short-run adjustments in their assets and liabilities.

[1] For a fuller discussion of present money market performance, bank adjustments through the money market, and the market interaction of existing monetary instruments, see "Discount Policy and Open Market Operations," pp. 169–82.

MODIFIED MARKET PERFORMANCE AS A RESULT OF AMENDMENTS TO REGULATION D

A special influence on the responses of member banks to variations in liquidity is their need to satisfy specified reserve requirements, on the average, within each designated reserve period, in accordance with the existing provisions of Regulation D. The Board of Governors adopted certain changes in Regulation D; the revisions, which became effective in September 1968, were expected to alter bank use of the discount window somewhat and therefore are taken into account here.

Briefly, the new reserve regulations (1) shorten the reserve periods for country banks to the same 1-week duration already applicable to reserve city banks; (2) base requirements on deposits 2 weeks earlier; (3) allow holdings of vault cash 2 weeks earlier to be used (along with the current week's reserve balance at the Reserve Bank) to satisfy reserve requirements; and (4) provide for the carryover of either deficiencies or excesses in average reserves of up to 2 per cent of requirements from one

reserve period into the next period (but no further).

Banks thus are able to operate with certain knowledge of their reserve requirements and of their vault cash credit with respect thereto at the beginning of each reserve period. On the other hand, banks remain as uncertain as ever about the flow of their deposits during the current week and about the effect of this flow upon their reserve and "due from" balances. The cost of this uncertainty in terms of actual reserves is fractionally larger because the fractional offsetting effect of any deposit movement on current required reserves under the previous regulation has been eliminated.

The provision for an automatic 2 per cent carry-forward should moderate bank efforts to dispose of any end-of-period reserve excesses or to meet moderate deficiencies, because it provides a limited alternative to forcing such adjustment through the market near the end of reserve periods when supply and demand schedules have been most inelastic.

Shortening of the reserve period for country banks to 1 week increases reserve adjustment activities for those country banks that tend to experience offsetting deposit or loan movements in successive weeks, but that choose not to carry enough excess reserves to meet peak needs. On the other hand, numerous country banks for precautionary reasons up to this time have tended to accumulate excess reserves throughout most of their 2-week reserve periods and then near the end of those periods have dumped such accumulated credit into the Federal funds market or into their balances with correspondent banks; with only 1 week in which to cumulate reserves, the absorptive capacity of the rest of the money market would not be swamped so often by such dumping.

It is believed that these changes in reserve regulations will tend, on balance, to moderate the reserve adjustment activities of most of the banks, and hence to reduce somewhat their demand for end-of-period accommodation at the discount window. However, for a minority of country banks that are subject to swings in deposits or loans that are largely reversed from one week to the next, requests for intermittent assistance at the discount window may expand considerably. But on balance, the method of reserve computation introduced in 1968 is likely to reduce both the recourse of country banks to the discount window for adjustment purposes and the periodic bulge in excess reserves supplied by these banks to the Federal funds market.

MARKET INFLUENCE OF SHORT-TERM ADJUSTMENT CREDIT UNDER GENERALLY STABLE MONEY MARKET CONDITIONS

For purposes of this discussion, generally stable market conditions are taken to include (and in part depend upon) a stable pattern of use of the discount window for obtaining short-term adjustment credit. This implies that, as a rule, member banks are making only moderate use of System discount facilities but are willing to increase their use of the window should their flows of funds turn adverse.[2] A minority of banks are assumed to be using only a small frac-

[2] In most instances, bank use of the discount window in response to changing circumstances is expected to be substantially symmetrical; that is, what a bank would be inclined to do if an influence changed in one direction would be about the inverse of what that bank would do if the same influence changed in the opposite direction. For purposes of simplicity and clarity, influences and responses are described in a consistent direction in the text, however.

tion of their basic borrowing privilege, another minority are assumed to be using most of their basic borrowing privilege, and only a few banks are assumed to be borrowing in excess of their basic borrowing privilege in either amount or duration and thus to be subject to administrative review.

Under the circumstances indicated, it is believed that interest rates on most of the alternative types of instruments readily available for adjusting liquidity—the markets for which are dominated by banks—would be separated from the discount rate by margins no more than equal to the costs of the attendant transactions, credit risk, market or liquidity risk, customer-relations effects, and the like.

In this environment banks experiencing what they think will be quickly reversible drains of funds should be inclined to offset such drains by borrowing at the discount window. Their ability to do so will depend to a large extent upon whether they had previously used little or most of their borrowing leeway under the basic borrowing privilege. The longer-lived these drains of funds are expected to be, the more inclined banks would be, at the outset, to initiate correspondingly long-term adjustments in their portfolios, except insofar as they would need some transitional time to become reasonably certain of trends or to arrange orderly adjustments.

If a drain of funds should hit a sizable proportion of banks simultaneously, there could be a considerable rise in the nationwide total of borrowing. If this occurred, and if the cause of the drain was of a reserve-absorbing nature (for example, an outflow of currency), the aggregate reserve base of the banking system would remain little changed. If, on the other hand, the drain consisted of a deposit shift from one group of banks to another, the step-up in borrowing by the deposit-losing group would enlarge the national total of reserves. The deposit-receiving banks could be expected to dispose of some of their resultant reserve surpluses through the money market, and to that degree the supply of Federal funds (and similar money market instruments such as dealer loans) would be expanded. In most circumstances the interest rates on Federal funds and money market instruments would tend to decline, and banks in debt to the Federal Reserve could be expected to try to refinance such debt by borrowing in the now-cheaper funds market, absorbing redundant reserves in the process. However, if the outstanding amount of adjustment borrowing at the discount window were too small or if the time remaining in the reserve period were too short to permit full absorption of the redundant reserves, day-to-day rates in the money market would drop still lower—unless some buying to build up carryovers developed or banks receiving part of the newly created funds used them to repay their debts at the window. If the decline in such rates seemed too great to be compatible with the currently desired money market atmosphere, the Trading Desk would need to sell securities (outright or through reverse repurchase agreements) to absorb the redundant reserves.

Substantially, the reverse of the process outlined here should take place if the initiating factor were an inflow rather than a drain of funds at the banks in question.

As a result of greater reserve-adjustment activity stemming from more general use of the discount window, the national total of adjustment borrowing (within and outside the basic borrowing privilege) would probably fluctuate over a wider range from day to day and from week to week than occurs under the present system, but it would still oscillate around a longer-run trend that is generally level. Open market operations

would probably undergo smaller, and perhaps also less frequent, day-to-day and week-to-week fluctuations; it is difficult to document this probability, however, because such operations are undertaken in relation to the total of all influences affecting member bank reserves and not borrowing alone. Open market operations to supplement rather than to offset swings in borrowing would be called for whenever data on the composition of borrowing suggested a cumulative build-up of adjustment pressure at the discount window. Such situations would notably arise when a greater share of adjustment borrowing was tending to take place outside the basic borrowing privilege and was therefore under administrative review, and/or when the preponderance of banks was moving toward the upper threshold of use of the basic borrowing privilege.

Interest rates on those instruments of liquidity adjustment for which banks are by far the main suppliers and purchasers would tend to fluctuate less widely than under the present system so long as underlying conditions remained stable. On the other hand, interest rates on instruments ordinarily utilized by the System in its open market operations would tend to be influenced less by System operations undertaken to even out reserve positions in the short run and more by the ebb and flow of private investor interest. This would mean that at times such rates might be subject to wider swings than under the present system and at other times to smaller swings, depending upon the extent to which changes in investor interest and in the volume of operations undertaken by the Trading Desk to meet banks' adjustment needs would have been mutually offsetting or reinforcing.

INTERACTION OF SHORT-TERM ADJUSTMENT CREDIT WITH CHANGING MONEY MARKET CONDITIONS

When underlying money market conditions begin to undergo a basic change—either because of shifts in credit demands or because of a change in Federal Reserve policy —the proposed short-term adjustment credit facilities should work to spread the influence of such a change somewhat more gradually, but also more broadly, throughout the banking system. Recourse to the discount window may be expected to make reserves available sooner at the point of need than they would be if they were redistributed through bank portfolio adjustments, after having been injected through open market operations.

A cyclical expansion in demands for bank credit could be expected in the first instance to elicit an accommodative response from the bank subject to such demands. As the consequent rise in deposits, and perhaps also an expansion in currency, effectively absorbed reserves, member banks would be inclined to undertake sufficient borrowing to offset such absorption at least temporarily.

Thus, as the credit expansion and resultant reserve absorption spread and cumulated, progressively more and larger borrowing by banks would be induced. The borrowing banks, in turn, would gradually reach thresholds at which they were moved to rely more heavily on alternative methods of adjustment. For some banks, this might happen as they drew close to their own desired maximum use of the basic borrowing privilege; for others, it might occur only after they had exhausted their basic borrowing privilege, had moved on into other adjustment borrowing, and had finally en-

countered Reserve Bank pressure to repay. The speed with which the banks reached these stages would depend, of course, on the combined effects of the reserve absorption and of bank willingness to use the discount window up to the limits outlined here. It would also depend on the degree to which reserves originally lost by the borrowing banks would be used by the receiving banks to reduce their indebtedness rather than to expand credit. There would undoubtedly be differences in behavior between specific periods of expansion and among different economic areas and groups of banks.

As borrowing banks shifted to adjustment outside the discount window, interest rates on the alternative adjustment instruments utilized would rise, both absolutely and relative to the discount rate. Most directly affected would probably be the Federal funds rate, since it is dominated by bank reserve adjustment actions. The results—higher money market rates, a tighter borrowing posture at the discount window, and the contracted supply of total reserves—if unalleviated, would presumably tighten the availability of credit on a broader scale, thus deterring some borrowers. This shift, by itself, would operate in the direction of general monetary restraint. Monetary policymakers would then have to decide whether the tauter trends emerging in reserves, credit, and interest rates were desirable in the changing economic environment, or whether they wished to moderate such trends by buying enough securities in the open market to offset at least in part the curtailed availability of reserves at the discount window.

Conceivably, of course, the requirements of policy might lead the Federal Open Market Committee to accelerate rather than to moderate the financial system's adjustment to the changing supply of reserves. In those instances, even though borrowing at the discount window was becoming larger and more widespread, parallel sales for the Open Market Account might be desirable. As an alternative an increase in reserve requirements might be used to speed the adjustment and to elicit greater attention to it.

INTERACTION OF SHORT-TERM ADJUSTMENT CREDIT WITH CHANGES IN DISCOUNT RATES

The influence of a change in the discount rate on the money market and on borrowings of short-term adjustment credit sought at the discount window will differ considerably, depending upon whether the change in the discount rate is leading market rates or is simply following a change in general money market rates and conditions.

Let us consider first a situation in which a combination of expanding demands for credit and of less-expansive System open market operations has increased the reserve pressures on banks. As pointed out in the preceding section, this process, if carried on long enough, will impel more and more banks to undertake their reserve adjustments outside the discount window, and the pressure of such added demand for available reserves will tend to raise interest rates on Federal funds and various money market instruments correspondingly. By the same token, reserves borrowed at the discount window at the existing discount rate will appear relatively cheaper.

This relative cheapness of discounting might entice some additional borrowing by

banks that still had not used all of their basic borrowing privileges to make their first adjustments in reserves in this way. On the other hand, a sizable and growing proportion of banks would have used all of their basic borrowing privileges and have come under administrative review; the banks in this second group would seek to effect their reserve adjustments outside the discount window—not for reasons of comparative cost but in order to comply with the standards for repayment of adjustment credit, and to be able to proceed to orderly portfolio adjustments when and as needed.

In these circumstances an increase in the discount rate following recent increases in other money market rates would not appreciably alter the pattern of adjustment of the second group of banks. Such an increase would therefore not engender through these banks any significant additional upward pressure on market rates and would not reduce the incentive for them to delay the required adjustments. However, the increase in the discount rate would narrow the rate incentive for the first group of banks to borrow at the discount window. To the extent that the first group rechanneled its reserve adjustment activities away from the discount window and into the market, upward pressures on market rates would increase. Generally speaking, the more the discount rate lags behind market rate increases, the larger the second group of banks should be relative to the first, and the less likely it would be for the eventual "following" increase in the discount rate to trigger much additional upward pressure on market rates.

A somewhat different pattern would tend to emerge, however, if the discount rate were to be leapfrogged ahead of the rates on the most closely related instrument of reserve adjustment. First, such a "leading" increase in the discount rate would increase the relative cost of borrowing compared with alternative reserve adjustment instruments. All member banks that had been borrowing, but not in a large enough amount or for a long enough duration to bring them under pressure to repay, would then find it advantageous to seek less-expensive means of financing their reserve deficits. Their added financing efforts in the money market should quickly bring upward rate pressures to bear on other money market instruments. To the extent that these banks were successful in this endeavor, and thus were enabled to retire debt at the Federal Reserve, the aggregate supply of reserves would be curtailed. In consequence of all these actions, a correspondingly tauter atmosphere should soon prevail in the central money market.

The effects of decreases in discount rates, under the redesigned discount mechanism, are likely to be generally the reverse of those outlined for increases but not precisely symmetrical. So long as the borrowing pressure on the banking system is sufficient to keep a large number of banks borrowing over and above their basic borrowing privilege, reductions in the discount rate should have only modest, easing effects on other money market rates. The fact that the bulk of the banks were still under pressure to repay their indebtedness to the Reserve Banks should tend to keep the rates on Federal funds and similar private instruments of reserve adjustment relatively high.

However, once credit contraction or expansive open market operations have made enough nonborrowed reserves available for such "over-privilege" borrowing to be substantially repaid, most banks should again be importantly influenced in their choice of reserve adjustment media by the relative costs thereof. Thereafter, reductions in the discount rate should be followed promptly by enough rechanneling of reserve adjustment pressures to the discount window and

away from other avenues to cause sympathetic rate declines on other such media.

If monetary policy should ease sufficiently, however, to encourage the retirement of virtually all adjustment borrowing from the Federal Reserve, then money market rates would tend to become unhinged from the discount rate and to drop to levels that would equilibrate the demand for and supply of nonborrowed reserves.

Consideration of typical interactions and sequences suggests a very close association between the discount rate and rates on alternative instruments of reserve adjustment so long as member bank adjustment borrowing is large enough to affect market rates but not large enough to bring a significant proportion of the banking system under pressure to repay. As credit demands and monetary policy shift over the cycle, discount rates would presumably be raised or lowered more or less commensurately in order to achieve the System's objectives. However, there would be a tendency for rates on alternative instruments of reserve adjustment to rise even higher relative to the increased discount rate near peaks of strong cyclical borrowing pressure and to drop even lower relative to the lowered discount rate during cyclical troughs when borrowing was slack.

All of this discussion has abstracted from the "announcement effect" of any changes in the discount rate on interest rates and availability of funds in the money market. Such effects are conditioned so much by the attitudes prevailing at the time of a given rate change that any generalization is very risky. Nonetheless, it appears that such effects would be most marked when no action on the discount rate was expected. This would probably occur when the discount rate was used to lead rather than to follow movements in market rates.

ADDITIONAL EFFECTS OF SEASONAL CREDIT ON THE MONEY MARKET

The seasonal borrowing privilege provided in the proposed redesign of the discount mechanism should work to moderate the effect on the money market of the reserves supplied or absorbed in response to changing seasonal demands. But since banks would be required to meet the first portion of their seasonal drains of funds (up to an amount equal to 5 to 10 per cent of their average deposits) out of their own resources, it is likely—judging from inadequate empirical evidence—that the great bulk of seasonal oscillations in fund flows within the banking system would continue to be met by resorting to the usual reserve adjustment techniques. However, to the extent that seasonal adjustments are met at the window—either through the seasonal borrowing privilege or under the basic borrowing privilege—the need for seasonal open market operations of the conventional sort would be reduced.

The typical user of the seasonal borrowing privilege is expected to be a relatively small bank experiencing a large seasonal swing in relation to its available funds. Given the diversity of seasonal needs and their patterns, it is likely that the total amount of reserves advanced to such banks would rise and fall more or less gradually. Since the banks will be expected to negotiate their seasonal borrowing needs with their Reserve Banks over their full seasonal period insofar as is feasible, the general timing and amount of reserve injections from this source should be fairly well defined in advance. In addition, the discouragement of temporary repayment of such credits with funds

obtained from the money market when it turns easy for a day or two will tend to minimize abrupt changes in the level of borrowing under the seasonal arrangement.

Inasmuch as the volume of seasonal borrowing should change gradually and more or less predictably, it should be possible to insulate most of this borrowing from day-to-day changes in money market atmosphere. Seasonal borrowing, therefore, would have little more significance on policy than on float. This means that it should be possible to project the aggregate flow of reserves from use of the seasonal borrowing privilege with about the same degree of accuracy as for other market factors affecting reserves—including the component of seasonal credit that will remain hidden in borrowing under the short-term adjustment provisions. If the total of seasonal borrowing and other factors appeared to supply too many reserves in any period, open market sales would be employed in the usual way to maintain the desired conditions in the money market.

Undoubtedly there will be a tendency for use of the seasonal borrowing privilege to rise as banks and their customers become familiar with this special facility. And it is probable that requests for seasonal credit assistance will tend to grow in periods of tight money or relatively low discount rates, and contrariwise to shrink when credit conditions are easy or when the discount rate is unusually high compared with rates on alternative instruments. But so long as the business of the Nation's largest banks is such that these banks are unlikely to meet the terms of the regulation and therefore are prevented from suddenly becoming seasonal borrowers, the total dimensions and variability of seasonal credit assistance at the discount window should be well within a scope that can be handled by present methods of open market operations.

EFFECTS ON THE MONEY MARKET OF EXTENSION OF EMERGENCY CREDIT

The very nature of emergencies makes it hard to predict the consequences of any efforts to deal with them.

For the most part, it can be assumed that the occasional needs of individual member banks for emergency credit assistance at the discount window will be small and infrequent enough to have no significant effect (in quantitative terms) on the over-all flows of reserves through the money market.

When the emergency assumes the aspect of a large-scale regional, sectoral, or even national liquidity squeeze, however, the probable effects of discount window assistance on the money market cannot be disregarded. In any crisis of such proportions, System open market operations would have been undertaken to bring about approximately the desired degree of over-all credit availability. Undesirably tight conditions in any specific group of institutions, therefore, would be related to the inability of such institutions to command a suitable redistribution of the national total of liquidity, unless the emergency were of national scope. Extension of emergency credit to such groups of institutions by the Reserve Banks would thus be not so much a substitute for money market activities that they might otherwise undertake as it would be an independent and complementary source of funds for the alleviation of undue pressures.

If the funds drained from the institutions experiencing the emergency accrued to others in the financial system, and if this

development led to an undue easing of reserve availability in the money market, the System would need to undertake open market sales of short-term securities to absorb such reserve excesses. In such an environment, investor demands would be shifted toward liquid assets in general, and Treasury bills in particular—creating a ready market for such sales by the Trading Desk.

Provision is made in the final report of the Steering Committee for another kind of emergency credit assistance. This assistance would apply not to institutions in trouble, but rather to markets for the most important types of securities, should such markets become so disorderly that open market operations in the kinds of assets purchasable by the Trading Desk would not calm them. In such circumstances it is possible that the Reserve Banks could extend emergency credit to institutions as at least a partial substitute for further substantial efforts on their part to dump securities into disrupted markets.

The reserve effects of such lending could be sizable, and loans could bulk so large as to tax the ability of the Trading Desk to offset quickly any undue creation of reserves. Here again, market demand for Treasury bills would probably become strong, thus facilitating the offsetting open market operations. But in certain circumstances, emergency assistance through the window might be the only feasible means of averting dangerous or even disastrous developments and such assistance would be justified even if the simultaneous or subsequent absorption of excess liquidity should prove to pose difficult problems for the Trading Desk.

Indeed, it is quite conceivable that as much as or more importance would attach to the psychological effects of emergency credit actions at the window as to their reserve effects. Markets plagued by fears of a liquidity crisis seek reassurance more than anything else. The knowledge that the Reserve Banks were lending to alleviate a widespread emergency—or were prepared to do so—might well do more to promote an orderly functioning of the market than the actual reserve funds so injected.

CONCLUSION

Each of the major types of credit assistance envisioned under the redesigned discount mechanism is likely to have a different effect on the money market and on the kind of complementary open market operations needed. However, these influences are not expected to exceed the ability of the market and the Trading Desk to deal with them. Many of the major categories of credit should serve to reduce on balance over the year demands on the money market and the Desk by providing an alternative for adjustments that in the past have required alternating purchases and sales of securities, at times in quite unreceptive markets.

The estimates of the potential *maximum* extension of credit for reserve period adjustment (under the basic borrowing privilege) and for seasonal needs that are given in the Steering Committee Report are large in comparison with the net amounts added to bank reserves in recent years—including those required to offset gold losses and currency outflows. However, it is unrealistic to assume that such totals will ever be reached, even for short periods, because the conditions laid down for borrowing under the basic borrowing privilege would require all banks to be out of debt simultaneously during a fairly protracted period prior to any

rapid build-up of indebtedness to the System. Furthermore, the estimated upper limit would be reached only if all member banks borrowed maximum amounts, irrespective of their actual needs and in spite of the rule against reselling borrowed funds. It is much more likely that in a period of growing restraint some banks will enlarge their borrowings fairly early and thus will be subject to strong administrative pressure to adjust their assets by the time aggregative borrowings rise toward a statistical maximum as monetary conditions tighten further. One cannot guess how far below the potential maximum total bank borrowing will tend to remain in a time of extreme restraint. Only experience will show what typical profile short-term adjustment borrowing will assume in response to extreme tightening, but it is unlikely that the estimates in the report will even be approached. And in any case the shift to the new policy could be made gradually.

On the other hand, provision of a sizable part of the seasonal needs of the banking system through the proposed seasonal credit accommodation is expected to result fairly soon in the emergence of a different pattern of residual seasonal demands for reserves to be met through open market operations. Given the fact that few money market banks, if any, are likely to become eligible for the proposed accommodation, it is improbable that the shift envisaged will require more than routine adjustments in projections and operations. Indeed, because the new types of assistance available at the Federal Reserve discount window will interact with existing processes and institutions in new ways, adjustments to the new types will take some time, and they may not progress smoothly. Some transitional uncertainties are inevitable.

Interpretation of money market conditions by analysts—and more importantly, by the Trading Desk—leans heavily on magnitudes that have come to be regarded as having special relevance in reflecting current and prospective conditions. It is obvious that any change in procedures, including those flowing from the quite far-reaching recommendations of the Steering Committee, will result in changes in the level and pattern of several such variables, particularly member bank borrowing. It may be some time before representative or stable patterns emerge and before analysts acquire sufficient confidence in interpreting and projecting changes in the magnitudes of these variables that are essential for evaluating money market conditions and the posture of System policy. But all of these magnitudes are affected from time to time by innovations, modifications in procedures, shifts in preferred adjustment processes, and bankers' changing attitudes, and other reasons, as well as by changes that reflect the more fundamental structural shifts that are continuously taking place in our economy and in the financial system.

A specific level of borrowing—and of net borrowed reserves—acquires its meaning from the cumulative experience of market participants who come to associate it with a certain average bank attitude and a certain market atmosphere. The relationship between given conditions is not fixed and mechanical, but is subject to change as a function of variations in market pressures, in bankers' attitudes and policies, and in other factors (as the experience of recent years amply demonstrates). A range of net borrowed reserves of $200 million to $300 million has a specific meaning when related to levels in recent periods, but may have been associated with significantly different credit conditions 10 years earlier.

Given the fact that specific levels (or ranges) of net borrowed (or free) reserves acquire their analytical and policy signifi-

cance as a result of collective rationalization of the way in which they are associated with specific kinds of market and credit conditions, it is reasonable to assume that similar associations will become just as firmly established once Federal Reserve standards and their administration, as well as bank attitudes, have been modified by the adoption of the window design proposed by the Steering Committee. A degree of tightness that recently has come to be associated with, say, borrowings of $600 million and net borrowed reserves of $300 million may then be identified with, say, borrowings of $1 billion and net borrowed reserves of $900 million. Both the new and the old levels will synthesize essentially the same combination of conditions and attitudes and will convey substantially the same message to market participants.

It should become clear to the market fairly soon that temporary bulges in borrowing around holidays are merely a technical alternative to providing and then absorbing equivalent amounts of reserves through open market operations, and that such temporary borrowing under the basic borrowing privilege affects over-all credit conditions no more than corresponding "defensive" operations by the Desk.

It is expected that market participants and analysts, as well as all those within the System who are connected with formation and execution of policy, will learn—as they have in the past—to live with the new levels and relationships and to interpret these levels and relationships with no less insight and imagination than they have in the past.

Uncertainties and frictions might be reduced by a campaign to acquaint all participants with the objectives and expected *modus operandi* of the new system, or by introducing the new system in tranches over time. The amount and frequency targets recommended in the Steering Committee report could be announced as ultimate goals, but initial levels could be set lower and raised gradually in the light of cumulative experience.

Finally, both during the transition and thereafter, a much more sophisticated monitoring system may be required to keep the policy-makers and the operational staffs who are concerned with discounting and open market operations fully aware of the changing interaction between member bank borrowing and the money market and the importance of this interaction for monetary policy.

July 1968

RESERVE ADJUSTMENTS OF THE EIGHT MAJOR NEW YORK CITY BANKS DURING 1966

Dolores P. Lynn
Federal Reserve Bank of New York

Contents

RESERVE ADJUSTMENTS OF THE EIGHT MAJOR NEW YORK CITY BANKS DURING 1966

By the end of 1965 the U.S. economy had already been expanding for some time with a vigor and endurance unmatched by any other business upswing of the post-World-War-II period. The margin of unused productive capacity and manpower resources had narrowed considerably, and inflationary tendencies were on the rise.

During the first 9 months of 1966 demand pressures in the economy continued. Business expenditures on new plant and equipment accelerated further, spending on services by States and municipalities rose, and outlays by the Federal Government increased sharply as a result of an escalation of the conflict in Vietnam and of an expansion of domestic social programs. Pressures in the credit markets intensified as the corporate and government sectors competed for funds in an atmosphere of increasing monetary restraint. Yields on capital market instruments soared to their highest levels in more than three decades, and demands on the commercial banking system induced near-crisis conditions. These pressures focused on the eight large New York City money market banks (hereinafter referred to as the "eight City banks," or sometimes as "City banks") because these eight banks have traditionally been the major source of business credit for the Nation.[1]

[1] The group comprises Chase Manhattan Bank, First National City Bank, Manufacturers Hanover Trust Company, Chemical Bank New York Trust Company, Morgan Guaranty Trust Company, Bankers Trust Company, Irving Trust Company, and Marine Midland Grace Trust Company.

SOURCES OF PRESSURE ON THE EIGHT CITY BANKS

The heavy corporate demand for bank credit during 1966 reflected in large part an acceleration in the payment schedules for both Federal income taxes of corporations and the income and social security taxes that corporations had withheld for their employees; payments of these taxes increased corporate working capital requirements in 1966 by an estimated total of $4.1 billion. These sharply expanded needs for funds occurred at a time when corporate liquidity was at low ebb and internally generated cash flows had begun to shrink.

During the economic expansion that began in 1961, corporations had allowed their holdings of cash and liquid assets to decline to minimum levels as they expanded productive capacity, built up inventories, and acquired a large volume of trade receivables. Moreover, after the first quarter of 1966 the rapid growth of corporate profits came

to a halt. As the year progressed, it became apparent that corporations' projections of their cash inflows had been overly optimistic, and the need for additional borrowing from banks rose accordingly.

Several other factors, in addition to the increase in needs of corporations for working capital, exerted pressure on the eight City banks during 1966: First, a portion of the growing number of requests for business loans represented a spillover of demand from the capital markets. With yields on new bond flotations moving rapidly to three-decade highs, many corporations sought to avoid expensive long-term borrowing by financing investment outlays temporarily at relatively favorable bank lending rates. Second, cash inflows at life insurance companies and savings banks were seriously reduced by the process of disintermediation that had been set in motion by the sharp increase in market yields on securities relative to those available on institutional savings. Moreover, life insurance companies were subjected to heavy cash withdrawals as a result of borrowings by policyholders at low contractual rates of interest, and for related reasons, while savings banks experienced some loss of savings to the commercial banks, which were permitted to pay higher rates of interest on certain types of accounts. Therefore, in order to meet prior investment commitments, these two types of financial intermediaries sought loans under commercial bank lines of credit that had seldom before been used.

Finally, requests for bank credit by businesses anticipating further increases in interest rates were a constant and significant source of pressure on the banks. Throughout the first three quarters of 1966 banks were deluged with requests for business loans that were generated by specific investment projects or working capital needs and/or by a strong desire to obtain an adequate liquidity margin for possible future needs. To obtain these funds, many businesses activated lines of credit that had been dormant for long periods. Equally symptomatic of the spreading uncertainties regarding the future cost and availability of credit were the large-scale attempts by corporations to obtain additional lines of bank credit or increases in existing lines and to convert existing lines into legally binding commitments for revolving credits or term loans in exchange for the payment of a customary commitment fee.

During this period the prevailing belief that interest rates must continue to rise was caused by the increasing congestion in the capital markets, by mounting demands for credit at commercial banks, and by a step-up in military activity in Vietnam. The mood of pessimism was reinforced by the absence of fiscal measures to restrain inflation and by the increased burden that this absence placed on monetary policy.

MONETARY POLICY ACTIONS DURING THE 1966 BOOM

From late 1965 to September 1966, the Federal Reserve System used all of its instruments of general monetary control, and applied selective monetary pressures where possible, in its efforts to brake the boom. In December 1965 the discount rate was raised from 4 to 4½ per cent—signaling a shift from the mild restraint that had prevailed during most of 1965 to a more aggressively restrictive policy. This increase brought the discount rate at least temporarily into line with money market rates, which had been moving up rapidly. In the strong upward surge of interest rates that followed, however, the discount rate was left far behind market rates. In an effort

to avoid a further escalation in interest rates, the System refrained from raising the discount rate in 1966, but it continued to carefully scrutinize member bank borrowings as requests at the discount window mounted.

After the change in the discount rate in December 1965, the System gradually increased pressures on member bank reserve positions through open market operations. Demand for bank credit continued to expand, however, and the banking system increased its aggregate net borrowed reserves from about $100 million in the final week of 1965 to nearly $600 million in the last week of September 1966. The Board of Governors raised reserve requirements against time deposits other than savings accounts to the statutory ceiling of 6 per cent in September 1966;[2] such rates had been raised from 4 to 5 per cent in July of that year.

Throughout the period of rising credit demands, officials of the System expressed increasing concern over the inflationary threat in the economy and the urgent need for credit restraint. Moral suasion took the form of periodic informal counseling of member banks by officers of the individual Reserve Banks as well as public speeches and statements by System officials. Member banks were urged to curtail their lending and to become more selective in granting loans so as to avoid extending credit for speculative ventures, for corporate acquisitions, or for other purposes that were nonproductive.

An important way in which the System attempted to restrain the growth of bank credit during 1966 [3] was by maintaining the interest rate ceiling on large-denomination negotiable certificates of deposit at 5½ per cent in the face of sharp increases in yields on competing types of money market instruments. By holding the rate ceiling on CD's, the System sought not only to curtail the availability of bank credit but also to discourage further upward interest rate adjustments in the credit markets and thereby alleviate some of the pressure on savings and loan associations and mutual savings banks caused by disintermediation. Ever since 1961, when corporations and other large investors had begun to use CD's as an important outlet for surplus funds, the CD had been a major source of new funds for commercial banks, particularly the eight City banks. Although rates on most money market instruments by July 1966 had risen considerably above the 5½ per cent maximum permissible rate on CD's, the Federal Reserve did not respond by raising the CD ceiling, as it typically had in the past. As a result this maximum rate limitation was posing a serious threat to the ability of the eight City banks to attract new funds.

The accelerating demand by business for credit in the summer of 1966 was regarded by the System as the most threatening single element in the bank credit picture, and the growing apprehension over the strength of bank lending to business was eventually made public in a letter issued by the System to member banks on Septem-

[2] These higher percentages applied only to "other time deposits" in excess of $5 million at each member bank. Reserve requirements against time deposits below this limit and those against savings deposits remained unchanged at 4 per cent. Subsequent to these increases, the statutory maximum reserve requirement against time deposits was increased to 10 per cent.

[3] However, the maximum interest rate payable on multiple-maturity time deposits was reduced to 5 per cent for maturities of 90 days or more and to 4½ per cent for 30- to 89-day deposits, effective July 20. The maximum rate payable on single-maturity time deposits of less than $100,000 was reduced to 5 per cent, effective September 26. Previously, no distinction had been made between the single- and multiple-maturity categories of other time deposits. The reductions in the ceiling rate on multiple-maturity and on smaller-denomination single-maturity deposits affected those deposits most directly competitive with deposits or shares in savings institutions.

ber 1, 1966, near the peak of the pressures on the financial markets. This letter, which called attention to the 20 per cent annual growth rate in business loans by banks during the first 8 months of 1966, stated that "Federal Reserve credit assistance to member banks to meet appropriate seasonal or emergency needs . . . will continue to be available as in the past . . ." and that ". . . a greater share of member bank adjustments should take the form of moderation in the rate of expansion of loans, and particularly business loans." The letter warned that this goal would be kept in mind by the individual Reserve Banks in granting credit at the discount window; at the same time it offered the privilege of discount accommodation for extended periods of time to those banks that cooperated in achieving this goal. Meanwhile, officers of the individual Reserve Banks continued to examine carefully trends in loans, investments, deposits, and borrowings of banks that were, or might become, problem borrowers.

LIQUIDITY OF THE EIGHT CITY BANKS AT BEGINNING OF 1966

A lion's share of the pressure on the banking system that resulted from the combination of excessive credit demands and monetary restraint during 1966 fell on the eight City banks. Although the industrial Northeast and the mid-Atlantic States had shown less-rapid economic growth than many other regions of the country from World War II to 1966, the role of the eight City banks as a major supplier of business credit had declined very little. At the beginning of 1966 these eight City banks held about 29 per cent of total business loans outstanding at all member banks compared with 31 per cent in 1946.[4] A partial explanation for this continued prominence may lie in the widespread trend toward the integration of industry during the postwar period through mergers and consolidations. With the substantial increase in the relative size of individual business units, the eight City banks—the legal lending limits of which are unusually large—have continued to be almost the only banks capable of accommodating the Nation's prime borrowers. Also, corporate businesses may have continued to regard these banks as an unfailing source of funds, even in periods of credit stringency.

Even though the eight City banks lost funds to other regions of the country from World War II to 1966, their total deposits showed a sharp growth for the period as a whole. At the same time, moreover, their required reserves increased little in absolute terms because reserve requirement percentages were reduced. Over the period the effective ratio of required reserves to total deposits declined from a peak of 22 per cent in 1948 to approximately 9 per cent in 1966.[5]

In relative terms, however, resources of the eight City banks showed a distinct tendency to decline after World War II. Between 1946 and 1959, the eight City banks' share of total deposits of all member banks declined from 22 per cent to less than 17 per

[4] This and similar ratios quoted later are computed on the basis of data for New York City member banks classified as reserve city banks (or central reserve city banks prior to July 1962). The eight City banks account for 92 per cent of the total assets of this group.

[5] This decline occurred under the combined influence of successive reductions since the Korean war in reserve requirements against demand deposits under Regulation D (partly through the elimination of the central reserve city classification in July 1962) and a shift in the composition of deposits in favor of time and savings accounts. See also footnote 4.

cent. Although these banks succeeded in raising their share to 20 per cent during the years 1960–65 through the aggressive promotion of negotiable CD's, by the end of 1966 their share had again fallen to less than 18 per cent as a result of a sharp decline in CD liabilities.

The decline in the ability of the eight City banks to attract funds by means other than the issuance of negotiable CD's appears to be directly related to the revolution in the management of corporate funds that has taken place over the postwar period. During this era of generally restrictive monetary policy and rising interest rates, corporate financial managers have become increasingly aware not only of the cost of holding uninvested cash but also of the possibility of simultaneously pursuing the goals of adequate liquidity, safety, and income. Consequently, many corporations now keep demand balances with commercial banks at minimum working levels and invest their surplus cash in a widened array of high-quality money market instruments. In order to obtain bank loans during 1966, however, corporations were required to maintain larger compensating balances on deposit with lending banks.

Although corporate programs to invest cash have had an impact throughout the banking system, the effect has been more severe at the eight City banks, which have traditionally relied on corporate demand deposits as a major source of loanable funds. While the use of negotiable CD's has enabled the eight City banks, in effect, to recoup a portion of the corporate funds previously lost to the money market, this repatriation has represented an extremely volatile and expensive source of funds for these institutions. On balance, it appears that the volume of funds available for lending at the eight banks has tended to increase less rapidly than the demands for credit.

To summarize, by the end of 1965 the eight City banks were not so well-equipped to handle a barrage of credit requests as they had been at any previous time during the postwar period. Over the course of the cyclical expansion in the economy that had begun early in 1961, these banks had allowed their liquidity to fall to a historically low level. By the end of 1965 their holdings of U.S. Government securities were small, and the loan-to-deposit ratio of the eight as a group had risen to 73 per cent, compared with 63 per cent for all commercial banks. Thus the eight banks entered 1966 with their liquidity at unprecedentedly low levels and with a very large proportion of their deposits in the form of highly volatile, negotiable CD's; such deposits accounted for nearly one-sixth of the total.

SOURCES OF NEW LOANABLE FUNDS

In view of this low level of liquidity and of the strength of the demand for credit, banks generally—and the eight City banks in particular—were faced with the need to expand both their sources of loanable funds and the volume of such funds in 1966. As already noted, CD's had become an important source of funds to many banks, but the volume of CD's declined sharply after mid-1966 as interest rates on competing instruments rose to unusually high levels. To replace funds no longer obtainable from this source or from reductions in their Government securities portfolios, the eight City banks turned in large measure to the Euro-dollar market. They borrowed little from their Federal Reserve Bank.

Certificates of deposit

The eight City banks responded to the acceleration of credit demands in 1966 primarily through intensive efforts to maximize their ability to meet these demands, and secondarily through adoption of programs to ration demands and to scale down lending operations.

At the beginning of 1966 negotiable CD's promised to be the major source of loanable funds for these institutions—as they had been in 1965. The maximum interest rate payable on time deposits under Regulation Q had just been raised (in December 1965, simultaneously with the discount rate increase) to a flat 5½ per cent for all maturities of 30 days or more from rates of 4 per cent on 30- to 89-day maturities and 4½ per cent on maturities of 90 days or more. This increase in the rate ceiling had restored banks to a favorable competitive position relative to other issuers of money market instruments and appeared to allow banks ample maneuvering room in their efforts to attract funds.

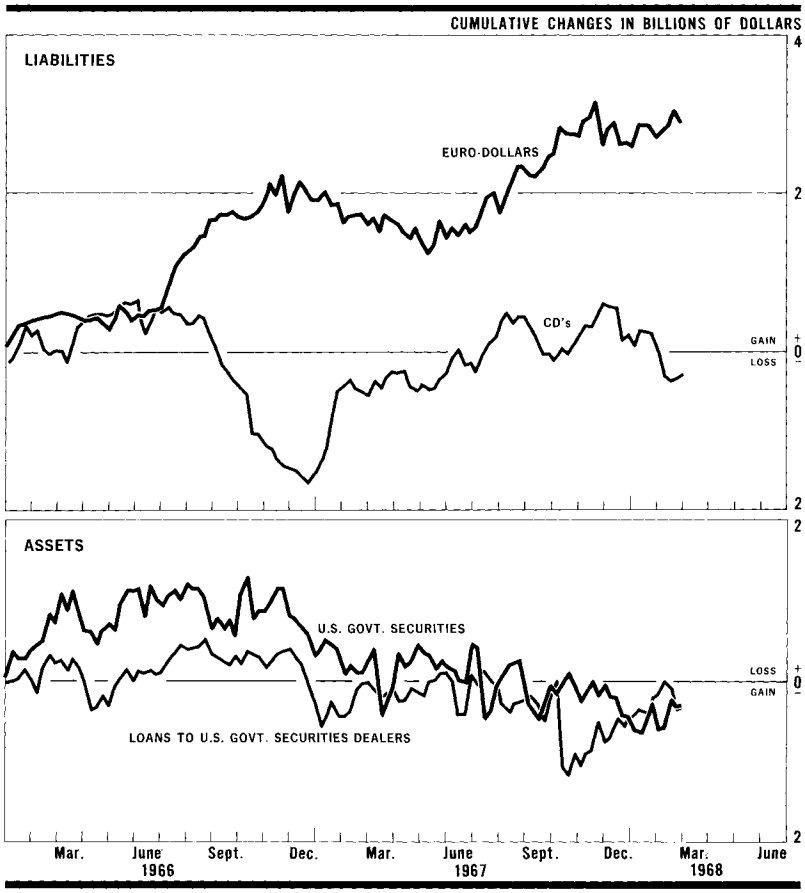
As a result of the rapid upward movement in money market rates beginning early in 1966, however, the eight City banks raised offering rates on CD's frequently and hence soon reached the new ceiling rate. As early as March one City bank posted the ceiling rate of 5½ per cent on CD's in the 9- to 12-month maturity category. Other City banks soon joined the move toward higher rates—raising rates first on instruments with the longest maturity and then later on those with progressively shorter maturities. By the beginning of August an offering rate of 5½ per cent was in effect "across the board" at most of the eight City banks.

By late August, however, negotiable CD's —except in the shortest maturity category— had little appeal for investors. Money market rates (discount basis) had risen to 5⅞ per cent on 4- to 6-month prime commercial paper; to 5¾ per cent on 90-day bankers' acceptances; to 5⅝ per cent on 3- and 6-month finance company paper, directly placed; and to about 5 per cent and 5.40 per cent, respectively, on 3- and 6-month Treasury bills. These rates were equivalent to investment yields ranging from about 5.14 per cent and 5.63 per cent, respectively, on 3- and 6-month Treasury bills to 6.10 per cent on prime commercial paper, compared with the 5½ per cent yield on CD's.

Subsequently, yields increased further— through mid-September for Treasury bills and through mid-October for commercial paper. For a brief period during the fall both 3-month and longer-term Treasury bills enjoyed a yield advantage over CD's. Yields on commercial and finance company paper remained stable at their peak levels through the end of the year, while market yields on Treasury bills and on bankers' acceptances declined after reaching their respective peaks in mid-September and late November. Nevertheless, the longer-term Treasury bills maintained their yield advantage relative to CD's until the latter part of November; through the year-end, yields on bankers' acceptances and on commercial paper were higher than the yields on CD's. Thus, despite a general easing of market tensions in the early fall, it was not until just before the turn of the year that negotiable CD's again became competitive with money market instruments.

Because of the changing structure of money market rates—and contrary to indications at the end of 1965—the negotiable CD performed very poorly during 1966 as a magnet for new loanable funds. As the top panel of Chart 1 shows, this instrument drew a negligible sum into the eight City banks during the first 8 months of the year in spite of the frequent and substantial

1 | SOURCES OF LOANABLE FUNDS OF EIGHT CITY BANKS, 1966-68



Gains stem from increases in liabilities or decreases in assets. Data are based on Wednesday figures, except loans to U.S. Govt. securities dealers, which are based on the daily-average volume of Federal funds and New York Clearing House funds loaned to dealers during weeks ended on Wednesday. The latter include funds supplied to dealers under repurchase agreements.

F. R. Bank of New York data.

upward adjustments in rates. Increases in offering rates during January and February did attract some new money, but further rate increases were necessary in March to stem the tide of net CD redemptions that developed in that month and to prepare these banks for heavy seasonal credit demands during the tax-payment period.

The March increases in rates led to an expansion of $0.6 billion in the volume of outstanding CD liabilities by mid-April. This inflow of deposits enabled the eight City banks to accommodate the unusually large corporate demands for credit that developed as a result of the Treasury's accelerated schedule for tax payments. Banks were also able to meet the borrowing needs of U.S. Government securities dealers who were replacing funds lost through the expiration of repurchase agreements made with nonfinancial corporations around the tax date.

During May the eight City banks raised offering rates on CD's again—leaving little room for further adjustments under the legal maximum—and by early August the 5½ per cent ceiling rate was quoted on all maturities by most of the eight banks. The

rate increases during the summer permitted the City banks to hold their CD liabilities fairly constant, but they failed to generate enough additional funds to enable the banks to handle renewed seasonal tax-related pressures, loan requests from nonbank financial institutions, and a more-than-seasonal demand for business loans.

The larger-than-seasonal demand for business loans that appeared early in May and persisted into the fall of 1966 reflected to a considerable extent a substantial increase in the volume of anticipatory borrowing by corporations. During the summer, as previously noted, expectations of increases in interest rates and concern over the future availability of credit became widespread. These apprehensions were bolstered by evidence of increasing monetary restraint and by an awareness that the eight City banks—then offering the maximum permissible rate on CD's—would be severely limited in their ability to expand loans further. While precautionary borrowing was thus generated by the actual and prospective situation in the money and credit markets, such borrowing contributed to existing pressures. As credit demands became increasingly urgent, the eight City banks were subjected to rapid withdrawals of CD funds beginning in the latter part of the summer. During the brief span between mid-August and mid-December, CD liabilities of these banks fell by $2.1 billion to about $4.3 billion. Thus the availability of loanable funds declined at the very time that demand for such funds was increasing.

Euro-dollars

In the early summer of 1966 the eight City banks began to anticipate the large losses of funds that eventually occurred as a result of CD redemptions. Those banks that had foreign branches were prepared to counter these redemptions by borrowing Euro-dollars through such branches. Although the Euro-dollar market is generally an expensive source of funds, the relatively strong surge of money market rates in the United States toward the end of 1965 had narrowed considerably the differentials between domestic money market rates and the rates on Euro-dollars. During the first half of 1966 rates on 1-month Euro-dollars were only about ⅜ of a percentage point higher than rates on short-term negotiable CD's sold in New York City (Chart 2). This interest rate differential widened over the balance of 1966 as interest rates abroad moved upward. However, the cost disadvantage to the eight City banks of acquiring Euro-dollars was partly compensated for, throughout 1966, by the fact that these liabilities were not subject to reserve requirements or to assessments by the Federal Deposit Insurance Corporation.

Borrowings in the Euro-dollar market constituted the major source of new funds for the eight City banks during 1966. In fact, they were the principal means by which the City banks survived the severe drains resulting from net run-offs of CD's during the last 4 months of the year. As Chart 1 shows, for the eight City banks, liabilities to their own foreign branches climbed sharply between June and December from a plateau reached near the end of the first quarter of 1966. For the year as a whole, net borrowings of Euro-dollars by the eight City banks rose by $1.8 billion, an amount roughly equivalent to the decline in CD liabilities. As a group these banks stepped up their Euro-dollar borrowing fully 2 months before the heavy redemptions of CD's began. Consequently, the basic reserve position of these institutions improved sharply, though temporarily, in August and early September.

Although virtually all of the eight City banks used Euro-dollar borrowings to offset CD losses (Chart 3), the timing differed

2 | SELECTED SHORT-TERM INTEREST RATES, 1966-68

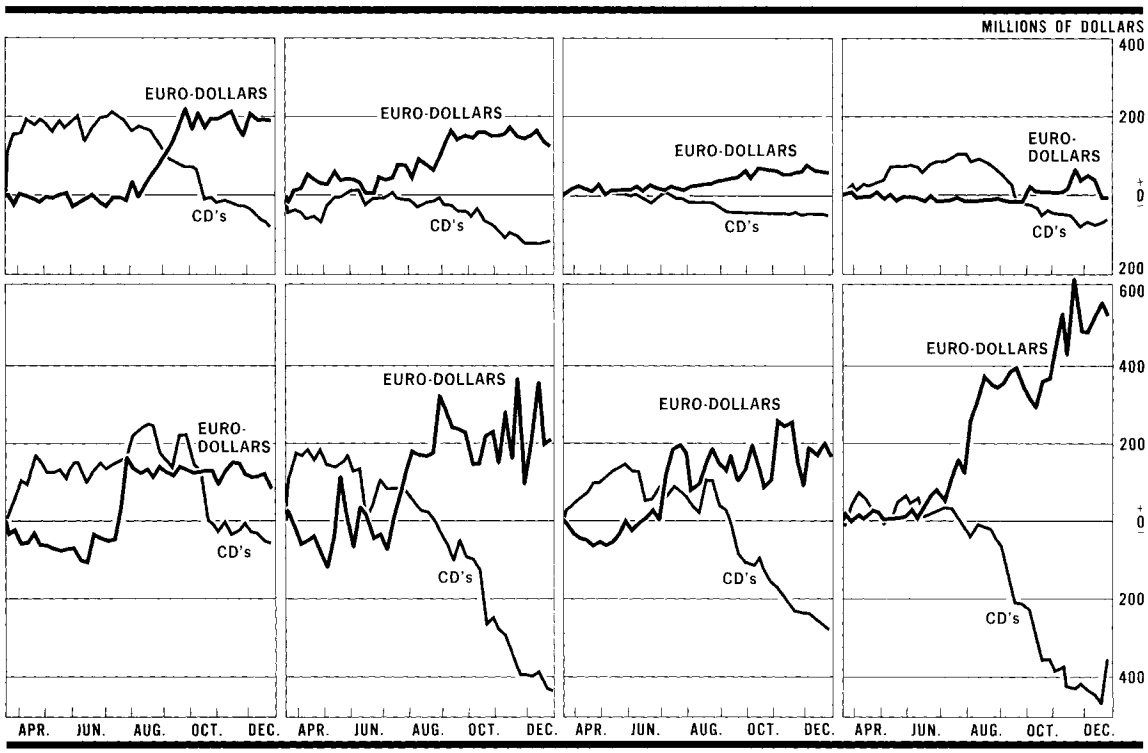
Data for Federal funds are the 7-day average rate for week ended Wednesday; for new negotiable CD's, the rate most often quoted on Wednesday by nine large New York City banks; and for Euro-dollar deposits, the Wednesday rate.
F. R. Bank of New York data.

from one bank to another: Some borrowed Euro-dollars considerably in advance of CD run-offs. Some built up liabilities to foreign branches gradually over the period of CD outflows, compensating for losses of funds as they occurred. Others did not begin to seek such funds until a downward trend in their CD liabilities had become clearly visible. And still others borrowed heavily at first, then allowed these foreign liabilities to remain on a plateau until the latter part of the year when the greater portion of interest-sensitive CD funds had been withdrawn. Most of the cumulative borrowings of Euro-dollars by the eight City banks corresponded roughly to their cumulative CD losses. At two institutions, however, borrowings of Euro-dollars were quite heavy relative to CD run-offs.

Although little is known about the maturities of Euro-dollars borrowed by the eight banks, it seems reasonable to assume that some of the aggregate represented overnight or call money, while a relatively larger amount represented funds that had been acquired by the foreign branches on longer-term contracts. Maturities may have varied widely from bank to bank, however, since some overseas branches characteristically seek short-term Euro-dollar deposits whereas others seek somewhat longer maturities.

3 NEGOTIABLE CD's AND EURO-DOLLAR BORROWINGS

Cumulative change at eight City banks, Mar. 16 to Dec. 28, 1966



F. R. Bank of New York data.

In order to increase the availability of Euro-dollars for its domestic lending operations, one of the eight City banks began in April 1966 to sell negotiable CD's denominated in Euro-dollars at its London office at yields slightly lower than those available for comparable maturities of regular Euro-dollars. At the same time it organized a secondary market for these Euro-dollar CD's. Within a short time the majority of other money market banks with branches in London had begun to sell these instruments.

By offering CD's in relatively small denominations—a minimum of $25,000 compared with a regular Euro-dollar deposit minimum of $250,000 and a minimum of $100,000 for a domestic negotiable CD—the banks set their sights on the funds of small investors, who had not previously participated in the Euro-dollar market. In addition, however, the City banks hoped to acquire Euro-dollars at a reduced cost and to improve their ability to retain funds that might otherwise be lost through the redemption of domestic CD's by foreign holders in the event of increases in interest rates here or abroad. One advantage of selling Euro-dollar CD's in London is that these CD's are not subject to any rate limitation such as that imposed on domestic CD's by Regulation Q. As it turned out, the creation of the Euro-dollar CD market did not add significantly to the supply of Euro-dollar deposits in foreign branches of the major money market banks, but it illustrates the resourcefulness of these institutions in attempting to locate new sources of funds for lending.

Other sources

Although needs for new loanable funds were intense during 1966, the eight City banks did not rely on sales of U.S. Government securities as a source for new loanable funds after the first quarter. In periods of seasonal increases in loan demand the banks did reduce their Government securities portfolios; but then later, as the acute pressures eased, they made net purchases. The use of the U.S. Government securities portfolio as a temporary adjustment mechanism contrasted sharply with its use as a more or less permanent source of funds earlier in the business expansion. During 1965, for example, net sales of U.S. Government securities had been a major source of new loanable funds for the eight City banks, second only to the issuance of negotiable CD's. In the first quarter of 1966 further liquidation of such investments had provided another $1.1 billion of loanable funds (as can be seen in the lower panel of Chart 1 on page 207).

The reduced reliance on the U.S. Government securities portfolio as a source of funds with which to meet accelerating loan demands was primarily a reflection of the low level of such holdings. By March 1966 the combined U.S. Government securities portfolio of the eight City banks had been reduced to its lowest level of the postwar period as a result of the sustained liquidation that had begun late in 1961. At this level the bulk of the securities remaining in portfolio may have been pledged against public deposits and hence, were not salable. Another factor tending to discourage sales of securities by the eight City banks in the summer of 1966 was the sharp increases in market yields, which raised the cost, in terms of capital losses, of liquidating coupon issues.

In view of the sharply lower level of their U.S. Government securities portfolios, these banks—like most others—added to their loanable funds in 1966 by selling State and local government securities from their holdings. But such sales were not enough to meet the rising demands for funds, and pressures in financial markets continued to rise.

Liquidation of these and other investments by banks after September 1 ran counter to the expressed wishes of Federal Reserve System policy-makers. Through public statements, periodic counseling of individual member banks, and the administration of the discount window, System officials left no doubt after that that they looked with disfavor upon further reductions in bank investments—and of holdings of tax-exempt securities in particular—especially when accompanied by a sustained rate of expansion in business loans. Member banks that engaged in large-scale liquidation of such securities thus tended to invite closer scrutiny if they should request discount accommodation at the Reserve Banks.

However, because of their relatively limited use of discount facilities during 1966, for the eight City banks the possibility of increased surveillance at the discount window was not a significant restraint on liquidation. In fact, these institutions sold off tax-exempt securities at a steady pace throughout 1966 —gaining about $0.5 billion from this source through June and a like amount over the second half of the year. These sales, occurring during a period of heavy net new borrowing by State and local governments, were a significant factor in the sharp rise in yields on tax-exempt bonds to a 34-year high by August 1966.

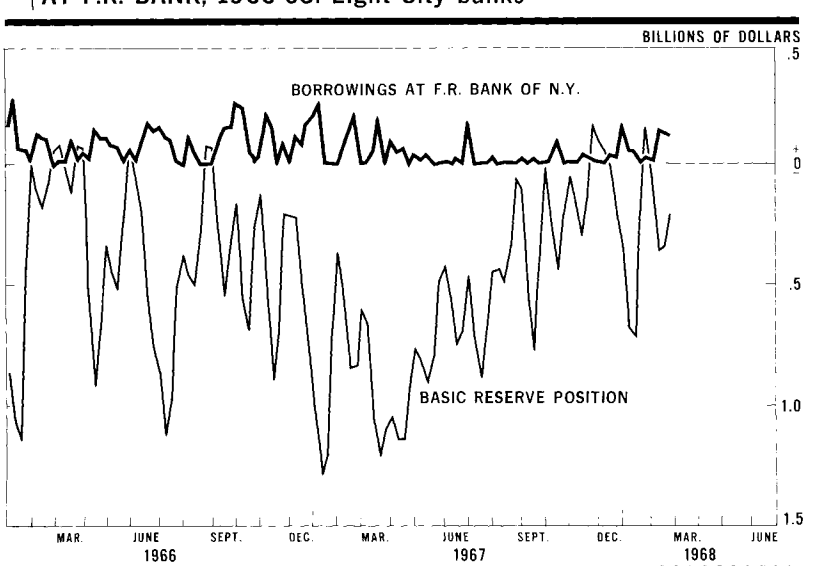
USE OF THE DISCOUNT WINDOW

The eight City banks generally operated with substantial basic reserve deficits during 1966 (Chart 4). On occasion during the first 8 months of the year, their combined reserve positions underwent sharp, temporary improvement as a result of inflows of CD funds and liquidations of securities, and as a result of substantial Euro-dollar borrowings during the summer months before the heavy run-offs of CD's began. During the latter part of the year, however, the basic reserve deficit worsened as a result of the drastic decline in CD liabilities after mid-August. Consequently, the daily-average basic reserve deficiency of the eight City banks rose to nearly $500 million in the fourth quarter of 1966 from roughly $350 million during the first three quarters of the year.

While their needs for funds to cover reserve requirements were consistently large during 1966, the eight City banks made relatively little use of borrowing facilities at the Federal Reserve Bank. As shown in Chart 4, substantial increases in the basic reserve deficiency prompted only moderately increased use of the discount window. Moreover, whatever borrowing these institutions did at the Federal Reserve Bank was invariably the traditional overnight or short-term type of accommodation. None of the eight City banks took advantage of the privilege of extended discounting offered in the System's September 1 letter to member banks, despite the increase in basic reserve deficits during the fall of the year.

The hesitancy of the City banks to approach the Federal Reserve Bank for assistance, except at times of extreme emergency, reflected in part the unwillingness of these institutions to have their lending and portfolio adjustment practices subjected to official scrutiny. Moreover, they could now meet a larger part of their needs for funds by borrowing in the Federal funds market than they could have in other recent

4 | BASIC RESERVE POSITION AND BORROWINGS AT F.R. BANK, 1966-68: Eight City banks



Data are daily-average levels for weeks ended on Wednesday. Basic reserve position is 2-week moving averages.
F. R. Bank of New York data.

years. In the early 1960's the City banks had begun to borrow Federal funds from other banks for the purpose of relending, particularly to Government securities dealers, as well as for the purpose of making day-to-day adjustments in their reserve positions. As a rule, rates on such funds were below the discount rate in that period. But as the Federal funds market broadened, the rate for Federal funds rose relative to the discount rate and generally exceeded the latter after 1964. Throughout 1965 the spread was about 10 basis points.

During 1966, however, the margin by which the effective rate for Federal funds exceeded the discount rate began to widen and by mid-June it was almost a full percentage point (Chart 2). The sharp increase in the differential reflected the City banks' efforts to operate without assistance from the Federal Reserve Bank as well as their continued use of Federal funds to meet credit demands of Government securities dealers and others. In 1966, to an even greater extent than before, the eight City banks were permanent debtors in the Federal funds market—automatically renewing overnight loans and borrowing for periods of more than 1 day.

ATTEMPTS BY THE EIGHT CITY BANKS TO CURTAIL LENDING

Between December 1965—the time of the increase in the discount rate—and August 1966, the eight City banks raised their prime lending rate to business borrowers in four steps from 4½ to 6 per cent. These increases were dictated in large part by the need to maintain profitable operations in the face of the rapid rise in the cost of loanable funds to the banks. Although the increases in the prime rate—particularly those that occurred in June and August—were also intended to discourage loan applications from business borrowers, they seem to have had little effect on total loan demand.

Early in 1966 many of the eight City banks adopted programs amounting, in effect, to voluntary credit restraint. These programs, aimed generally at moderating the pace of business loan expansion through the exercise of greater selectivity in reviewing loan requests, were not implemented with any great vigor until the summer, when the gap between credit demands and the supply of bank funds for new lending widened significantly. Under these programs the City banks denied requests for loans that were clearly for speculative or hoarding purposes, turned down requests for term loans or formal loan commitments, and discouraged applications for loans from new customers. They also attempted to reduce the size of loans and lines of credit. Moreover, the banks reported that they made fewer loans at the prime rate and that they also raised compensating balance requirements.

At the same time, however, the eight City banks were hesitant to turn down loan requests from old customers, or from new customers whose business they had long solicited. For competitive reasons, as well, some banks apparently reversed their original position not to issue, for a fee, formal commitments for revolving credits or term loans even though they realized that a large volume of outstanding commitments would seriously limit their flexibility in time of emergency.

Despite the banks' efforts and procedures to restrain expansion in credit, and despite their successive increases in the prime rate, net increases in business loans of the eight City banks in the second and third quarters of 1966 exceeded the amount of the increases in the corresponding quarters of 1965 by roughly two-fifths. Not until the fourth quarter of the year did business lend-

ing fall off. In that period the net increase declined sharply to a less-than-seasonal $0.4 billion from $1.1 billion in the fourth quarter of 1965.

This rather drastic change in the pattern of business lending, however, probably reflected a slowdown in corporate demands as much as efforts by the City banks to curtail lending. Two factors that had contributed significantly to the vigorous demand for loans earlier in 1966 were no longer present during the fourth quarter. Expectations of further increases in interest rates had disappeared for the most part, and corporations, whose liquidity needs were still large, had shifted part of their credit demands back to the capital markets in response to a reversal of the upward trend in bond yields.

These favorable developments, in turn, had been prompted by a number of factors tending to stabilize the credit markets in the fall of 1966. Early in September, President Johnson had announced a fiscal program to combat inflation, and the U.S. Treasury had indicated that it would curtail certain types of Government agency financing over the balance of the year. Prospects for peace in Vietnam seemed to be improving, moreover, and many expected that an increase in income taxes would be approved after the November elections. By the end of November the markets began to detect signs of a relaxation of credit restraint and, indeed, the record of policy directives issued by the Federal Open Market Committee shows that the New York Reserve Bank had been instructed on November 22 to conduct open market operations ". . . with a view to attaining somewhat easier conditions in the money market. . . ."

August 1967 (revised July 1968)