[SUBCOMMITTEE PRINT]

AN ALTERNATIVE APPROACH TO THE MONETARY MECHANISM

SUBCOMMITTEE ON DOMESTIC FINANCE

COMMITTEE ON BANKING AND CURRENCY

HOUSE OF REPRESENTATIVES

88th Congress, 2d Session

AUGUST 17, 1964

Printed for use of the Committee on Banking and Currency

U.S. GOVERNMENT PRINTING OFFICE

34-474 WASHINGTON : 1964

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LETTER OF TRANSMITTAL

AUGUST 17, 1964.

To the Members of the Subcommittee on Domestic Finance:

Transmitted herewith for the use of the subcommittee is the third and final part of a staff analysis of the Federal Reserve System's policy action pertaining to the System's determination of the volume of money and credit.

This part III contains an appendix which relates to parts I and II as well as to this part. It is contemplated that at a future date this study may be published in its entirety in one volume.

Sincerely yours,

WRIGHT PATMAN, *Chairman.*

LETTER OF TRANSMITTAL

AUGUST 14, 1964.

Hon. WRIGHT PATMAN,
Chairman, House Banking and Currency Committee,
House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: Transmitted herewith is the last portion of a three-part study on "An Analysis of Federal Reserve Monetary Policy Making," that has been prepared for the committee. The first part, chapter II of the completed study, was published on February 10 and described "Some General Features of the Federal Reserve's Approach to Policy." It discussed the generally inchoate nature of the Federal Reserve's conception of monetary processes. Some major consequences of this situation, revealed by systematic misinterpretations of policy actions, were presented. The evident disregard of rational methods of policymaking was partially explained in terms of the Federal Reserve's inherited procedures.

Among the many disconnected strands that apparently constitute the Federal Reserve's conception of monetary mechanisms, we found a frequently recurring notion that occupies a dominant position. This notion emphasizes the central role of free reserves in the causal process shaping the behavior of the monetary system. The Federal Reserve's choice of free reserves as an indicator of monetary situations and of their prevalent policies has been greatly influenced by this notion. The occasional choice of free reserves as a target of policy actions was similarly affected by the Federal Reserve's "free reserve doctrine."

The pervasive occurrence of this doctrine among the Federal Reserve's policy statements suggested a more detailed investigation of the particular notion. The second part of our study containing chapters III, IV and V, published on May 7, was therefore devoted to the "The Federal Reserve's Attachment to the Free Reserve Concept." The discussion traced some of the prevailing confusion to an inadequate distinction between three logically independent ingredients, viz, free reserves as a centerpiece of the causal process transmitting policy actions to the monetary system, free reserves as an indicator of situations and policy positions, and free reserves as a target of policy actions. Evidence from published statements and overt actions was presented in support of our contention about the central role of the "free reserve doctrine." Moreover the doctrine was tested in order to appraise its relevance. We found that, for the data available, it had almost no explanatory value. More specifically, our appraisal revealed almost no connection between "credit" or money supply on the one side and free reserves on the other. If this doctrine were held to be a true description of the monetary process, one would therefore be forced to admit that monetary policy is indeed a futile exercise. Since the doctrine is not the only conception of the monetary mecha-

nism, there is an alternative interpretation of the results: viz, the free reserve doctrine seriously misconstrues the true nature of the money supply process. But this can only be judged appropriately by formulating an alternative conception of this process and exposing it to observations in competition with the Federal Reserve's doctrine.

The present and last part of our study (secs. I–III of the present report), containing chapters VI, VII, and VIII of the full study, pursues this theme. In chapter VI we describe in some detail an alternative conception that we label the "modified base doctrine." Under this conception the money supply (and the banks' portfolio of earning assets) is determined by the monetary base (i.e. the volume of high-powered money issued by the government sector of the economy), the legal requirement ratios, the public's behavior revealed by its division of money balances between currency and checking deposits and total deposits between checking and time accounts, and the banks' desired reserve positions. The characteristics of these determinants are explained and their interaction in the process described. A number of implications for monetary policy and the behavior of the money supply process are presented. Among the major implications may be mentioned:

(1) The monetary multiplier, which measures the System's magnifying power in response to injection of additional reserves, is substantially below the reciprocal of the average reserve requirement ratio, the measure of the monetary multiplier usually used by spokesmen for the System.

(2) The major reason for the comparatively low multiplying power exhibited by the System is the systematic occurrence of currency drains from banks to the public, typically associated with the banks' portfolio responses to changes in their reserve position.

(3) In addition to these systematic currency drains other features of the public's demand for currency also have an important position in the monetary process.

(4) The single most important determinant of the money supply is the extended base. This magnitude summarizes the actual policy of the Federal Reserve authorities. The monthly averages of the extended base can be adjusted to any desired level by suitable Federal Reserve actions.

(5) The analysis developed also implies the existence of a continued effective connection between policy actions and the money supply throughout the depression of the 1930's.

The development of an alternative conception of the money supply process is not sufficient to indicate its relevance. The exposure of the Federal Reserve's conception to observation should be matched by similar exposure of the alternative presented. Chapter VII, therefore, summarizes some results of a detailed appraisal of the "modified base doctrine." A few of these results are briefly indicated:

(1) The variations in the annual growth rate of the extended base account for approximately two-thirds of the variations in the growth rate of the money supply during the 1950's.

(2) The completely specified base doctrine accounted for 95 percent of the variations in the growth rate of the money supply observed during the 1950's.

(3) The orders of magnitude implied by the modified base conception for the response in the money supply's growth rate to accelerations in the base, the accumulated sum of "liberated reserves," the public's currency and time deposit behavior and the banks' reserve adjustment are confirmed by observations. In particular a dollar's worth of open-market purchases induces on the average the same response as a dollar's worth of reserves liberated by lower requirement ratios.

(4) The monetary multiplier is substantially below the reciprocal of an average of the requirement ratios. Our estimates indicate that per dollar change in the extended base, or per dollar of open market operations, the money supply changes by $2.50 to $2.70, on the average.

(5) The banks' reserve adjustment is found to be sensitive to variations in open market rates and the discount rate. But this sensitivity does not prevent an effective connection of monetary policy, summarized by the extended base, and the money supply. Observations for the 1930's yield quite negative results for the notion that large excess reserves broke the link between the money supply and policy actions. Variations in the base continued to be transmitted effectively to the money supply.

(6) The modified base conception was used to predict the money supply for 16 quarters beyond the period used to obtain estimates. The average predictive error for the money stock was one-half of 1 percent and for the changes in the money supply 10 percent. Moreover, the association of predicted and actual changes and predicted and actual accelerations was evaluated. The results show a strongly marked association between predicted and observed values.

Finally the chapter covers some additional material bearing on the public's currency behavior and a further discussion of selected policy problems in the context of the modified base doctrine. It is found that the results of a number of policy actions, that are inexplicable in terms of the ruling Federal Reserve notion, can be interpreted usefully in terms of the conception presented.

We wish to emphasize that the material in chapters VI and VII is not presented with any sese of finality or conclusiveness. We are convinced that diligent research will yield substantial improvement in our future knowledge. Rational policymaking will undoubtedly benefit from such procedures. The purpose of these chapters is not to close a discussion, but on the contrary, to open a discussion by posing a challenge to the Federal Reserve authorities. We have criticized their policy procedures and their disregard for substantiated analysis. Our investigation of their conceptions and tests of their leading notions have found them seriously inadequate. We have submitted an alternative frame of analysis that is both more explicitly formulated and better substantiated than the Federal Reserve's ruling conception. We hope the Federal Reserve will respond to the challenge and carry the analysis and evidence further.

Our recommendations in chapter VIII must be viewed in the context of the above remarks. We present 8 general recommendations and 10 specific proposals. Among the major recommendations we emphasize the importance of deliberate efforts to apply systematic

analysis to improve the policymaker's understanding of monetary processes. In particular, the policymaking bodies should learn to exploit their research facilities more effectively. Moreover, the Federal Reserve authorities should once acknowledge fully and without reservation that they have a responsibility to control the growth rate of the money supply and that they possess the technical means to avoid its past gyrations.

Monetary policy is not a panacea. But appropriate monetary policy can contribute substantially to avoid both mass unemployment and substantial inflation. There is no reason or excuse for permitting inappropriate monetary arrangements or policies to aggravate economic fluctuations as they have in the past. Neither is there reason to permit inadequate analysis and unverified assertion to continue to furnish the basis for policy decisions.

KARL BRUNNER.
ALLAN H. MELTZER.

CONTENTS

APPENDIX III

APPENDIX IV

Charts:

Section I—An Alternative Approach to the Monetary Mechanism

Two possible interpretations of the observations presented in our earlier chapters [1] may be suggested. First, we might conclude that Federal Reserve policies, particularly open-market operations, have very little effect on the level or rate of change of the stocks of money and credit. Even if changes in money have a decisive influence on the pace of economic activity, the practical usefulness of discretionary monetary policy is severely reduced if this conclusion is correct. We have seen that the FOMC and the manager correctly evaluated future or current changes in the pace of economic activity in the postwar years. And they generally changed the level of free reserves in the direction that was appropriate in terms of their understanding of the monetary mechanism. But the evidence suggests that there is very little relation between the elements incorporated in the modified free reserve doctrine and monthly or annual changes in the supply of money. The relation of free reserves to changes in member bank credit is weaker still. Since there is little assurance that Federal Reserve operations designed to induce changes in the supply of money will have much effect on the money stock, or on "credit," there must be doubt about the effect of their policy on income, whatever the response of income to variations in the stocks of money or "credit."

A second interpretation of the observations is that the Federal Reserve's approach is based on an incorrect conception of the process by which monetary policy alters the stock of money. In this view, the evidence presented in the last chapter tells us little about the effectiveness of discretionary monetary policy. It suggests only that the Federal Reserve has not developed a valid understanding of the monetary mechanism. To appraise the relation of monetary policy to changes in the stock of money, an alternative view is required.

The choice that is made between these two interpretations has important consequences. Monetary policy has been relied upon in the postaccord period to reduce unemployment and to prevent inflation. At times, reliance on effective monetary policy has included the apparent belief that restriction of the growth of the stock of money could maintain price stability during periods of economic expansion in the face of deficits in the Government budget. If monetary policy operations have only an uncertain effect on the stock of money, this confidence seems to be misplaced.

In this chapter, an alternate view of the monetary mechanism is discussed. Selected policy actions will be analyzed in terms of the alternative conception. Evidence supporting the approach and the power of monetary policy will be presented below as a means of judging the usefulness of the suggested approach.

[1] "The Federal Reserve's Attachment to the Free Reserve Concept," a subcommittee print, by Karl Brunner and Allan H. Meltzer.

The mechanisms to be outlined here connect Federal Reserve policy, the behavior of the banks, and the public with the stock of money. The theory presented is a theory of the money supply, reflecting an approach that emphasizes the importance of the stock of money as a determinant of the pace of economic activity and the importance of Federal Reserve policy as a determinant of the stock of money. Because of the persistent confusion between money and "bank credit," we note, first, that we do not regard these terms as synonyms. Statements that apply to the stock of money do not necessarily apply to the stock of "credit." Second, it is not a valid procedure to dismiss analysis and evidence with the statement often made by spokesmen for the Federal Reserve system, "we prefer to view the process in terms of 'credit'." Without analysis and evidence relating Federal Reserve policy to "credit" and "credit" to the pace of economic activity, there is no reason to regard these statements as more than an announcement of the speaker's preference that is without bearing on any substantive issue. Third, we do not present very much detailed analysis or evidence supporting the statement that the money supply is an important determinant of the pace of economic activity. Such analysis goes well beyond the scope of this report, concerned primarily with the relation of policy action to the money supply. But we wish to point out that the use of monetary policy as a means of promoting employment of resources and preventing inflation presupposes a connection between the supply of money and the pace of economic activity. If the two are unrelated, there would be much less reason to be concerned with Federal Reserve actions.

AN OUTLINE OF THE MONEY SUPPLY PROCESS

The behavior of the money stock emerges from the interaction of the public and the banks, responding to the conditions of the Government sector's monetary accounts. These accounts are a consolidation of the Federal Reserve banks' balance sheet and a statement summarizing the Treasury's position and activities in currency issues and in gold. The monetary base emerges from the consolidated statement. The base is the volume of high-powered money directly issued and controlled by the monetary division of the economy's Government sector. Base money consists of (1) currency issued by the Treasury (coin, silver certificates, and other Treasury currency issues); (2) notes issued by Federal Reserve banks; and (3) those deposits at Federal Reserve banks that are assets of member banks.

If all the base money were held by the public and if liabilities of private economic units were rarely used to settle obligations, the Nation's money stock would coincide with the monetary base. But such identity between monetary base and money stock is observed only in countries with exceedingly primitive economic organization. At some stage of economic development, liabilities of private economic units become generally accepted as a means of payment and form part of the money stock. In any country with sufficiently complex economic organization, the money stock is a multiple of the monetary base. The existence and peculiar functioning of banks is the sine qua non for such multiplying power; part of the monetary base is held as currency by the public, the remainder is held by banks as a reserve against demand and time liabilities of banks. Both currency and deposits at a central bank may be used as a part of bank reserves.

The basic ingredients of the process

Under our present arrangements the Board of Governors can effectively control the monetary base with the aid of open market operations and suitable adjustments of the discount rate. Given the magnitude of the base, the behavior patterns of the public and banks determine the division of the base into reserves at banks and currency balances in possession of the public. These crucial behavior patterns are summarized by the public's demand for currency and time deposits and the banks' demand for reserve balances.

The public's desired portfolio of time deposits depends foremost on the interest rate offered on time accounts, the interest rate available on savings accounts with mutual savings banks, the interest rate on the share accounts at savings and loans associations, and the bill rate. The service charges on checking deposits quite likely affect the public's desired allocation of wealth to time deposits also. In addition, this allocation depends on the public's wealth in the form of money balances and nonmoney assets.

The behavior of the public's currency balances is somewhat more difficult to explain. But the costs and yields associated with specific financial assets, especially the service charges on checking deposits, and wealth—held in the form of money balance and nonmoney assets—appear to shape the public's currency demand. Both demand for currency and time deposits may be usefully partitioned into two components. One component depends on monetary wealth (i.e., money stock plus time deposits), the other is dependent on nonmoney wealth and a spectrum of costs and yields associated with the range of financial assets under consideration.

The banks' demand for reserves can be similarly partitioned into a component depending on deposit liabilities and a component depending on prevailing market interest rates and the discount rate. The first component covers the volume of required reserves that banks must hold under the reserve requirements imposed by the Federal Reserve authorities. Given these requirement ratios, a bank's required reserves depend completely on its time and net demand deposits. But a bank will usually hold reserves beyond the volume of required reserves. Excess reserves are "excess" only in a strictly legal sense. It is dangerously misleading to use this legal notion to interpret the actual behavior of banks. Although large banks may at times hold few reserves in excess of requirements, the mass of member banks generally hold assets in the form of excess reserves. In the thirties and forties banks held more than $1 billion in this form for many years.

Analysis of the banks' reserve adjustment process reveals both a systematic demand for excess reserves resulting from the adjustment process outlined in a previous chapter, and the influences shaping the banks' desired excess reserve balances. These desired reserve balances depend partly on the banks' deposit liabilities. But foremost they seem to depend on short-term open market rates, the discount rate, and some other factors to be specified shortly.

During any particular settlement period, a bank continuously adjusts its portfolio under conditions of uncertainty with respect to the net balance of currency flows to the public, the net balance of claims against other banks arising from checks drawn by its depositors, and the net balance of time deposit inflows. The daily fluctuation

in the bank's reserve position can be very large relative to the average reserve balance held during the settlement period. But pervasive uncertainty surrounding a bank's flow of reserve funds does not mean that the bank is without relevant information. Bankers acquire "experience" which permits them to judge the nature of the observed variations in their reserve positions and to attempt to separate systematic from random events.

The concept of a probability distribution may be used to approximate the judgments and "experience" on which bankers rely. The spread of the distribution indicates the variability of the reserve position to be expected on the basis of the banker's past experience. Relatively large positive or negative changes are most unlikely, i.e., have relatively small probabilities in the absence of a systematic change in underlying market conditions or the bank's portfolio. The center of the probability distribution indicates the amount of reserves that the banker may expect to hold. This is the average reserve position around which deviations in reserves will occur. The anticipated average reserve position and the anticipated variability are determined primarily by past observations about the credit market, the behavior of the Federal Reserve authorities, and a bank's reserve flows. The average and the variability around the average frequently provide an adequate description of the uncertain environment in which the banker operates.

The wide spread of the probability distribution reflected by the substantial variability of reserve positions, reflects the peculiar uncertainty facing a bank's decision makers. There is always some likelihood that any particular portfolio decision will be accompanied by a loss of reserves. Of course, the probability with which losses of different size occur depends on the portfolio decisions made. At any particular reserve position, there will be portfolio decisions that would render reserve losses very likely, while other decisions could lower the probability of reserve losses to negligible proportions.

Within the context of uncertain prospects, characterized by a given probability distribution, expressed by a specific anticipated average and expected variability, a definite association emerges between a bank's portfolio adjustments and the likelihood of a reserve deficiency: that is, a volume of reserves on the settlement day below the required level. Reserve deficiencies involve specific costs to a bank. These costs are both of a pecuniary and nonpecuniary nature. In order to understand the banks' behavior with respect to their reserve positions, the costs of reserve deficiencies require some further attention. These conditions may be usefully traced by considering the courses available to a bank with a reserve deficiency at the end of a settlement period.

If the reserve deficiency does not exceed 2 percent of required reserves, a bank may carry over the deficiency to the next settlement period. This carryover imposes additional constraints on the bank's portfolio adjustments in the following period. Such constraints involve costs of both a subjective and a pecuniary type. A bank may instead decide to cover the deficiency by borrowing Federal funds from other commercial banks or from its Federal Reserve bank. If the deficiency exceeds the critical 2-percent limit and is judged to be only temporary, the bank will usually borrow from one of these sources.

The interest on borrowing and the constraint on subsequent portfolio decisions do not form the only costs associated with potential reserve deficiencies. Such deficiencies give rise to additional costs to a bank, particularly the allocation of valuable resources, the time of skilled and expensive labor, to the arrangement and implementation of the technicalities involved in the borrowing transaction and the subsequent readjustment of the short end of portfolios to repay the borrowed funds and to assure an adequate volume of reserves.

Costs also arise if a bank obtains Federal funds, i.e., reserves, by withdrawing correspondent balances at other commercial banks. The costs incurred in this manner very likely depend on the relative frequency with which a bank pursues this course and the relative size of its correspondent balances. Reserve deficiencies thus generate specific costs which depend on size, frequency, and duration of the deficiencies.

The previous discussion indicated that a bank can control the expected costs generated by potential reserve losses through the choice of its portfolio. Arranging portfolios to hold excess reserves is one means of lowering these costs. The larger the volume of excess reserves held by a bank, the smaller the probability of reserve deficiencies and thus the smaller the costs (on the average) associated with such deficiencies. But excess reserves, while lowering one type of cost to banks, increase another type of cost. Allocation of assets to excess reserves involves a loss of revenues in proportion to the interest rate on earning assets that would have been acquired. If assets have been allocated to Treasury bills, for example, the bank would have obtained revenues equal to the amount of reserves multiplied by the prevailing bill rate. Revenues on excess reserves are zero; an allocation to excess reserves is a sacrifice of potential income. If no cost were associated with holding excess reserves, all banks would find it most profitable to hold excess reserves at a level sufficiently large to render the occurrence of a reserve deficiency totally improbable. But we frequently observe reserve deficiencies on settlement days, thus confirming the assertion that holding excess reserves is not without very specific costs to a bank.

The optimal volume of excess reserves emerges from the cost conditions associated with the holding of excess reserves and the cost conditions characteristic of reserve deficiencies. The two types of cost operate to influence a bank's optimal excess reserve balance in opposite directions. The marginal cost of excess reserve holding is closely dependent on short-term rates on the open market. The marginal cost of reserve deficiencies depends on size, frequency, and duration of such deficiencies and the nature of a bank's "production function," that is, the technology associated with the production of banking services. These technological aspects very probably explain major differences in the marginal cost of reserve deficiencies between different types of banks. A large Reserve city bank most likely has much lower marginal costs of reserve deficiencies than medium or small banks, particularly country banks. No matching differential seems to occur in the marginal costs of excess reserve holding. It follows from optimizing behavior that country banks and smaller banks will desire to hold a larger volume of excess reserves per dollar of deposit liabilities.

The optimal excess reserves that a bank desires to hold on the average thus emerges from the interaction of the two types of cost, the

costs of holding excess reserves and the costs generated by reserve deficiencies. If a bank attempts to minimize cost, its desired excess reserve balance depends on the volume and structure of its deposit liabilities, interest rates on the open market, technological characteristics shaping the operational costs of its reserve adjustment processes, and some characteristics (anticipated average and variability) expressing the nature of the uncertain prospects bearing on the flow of currency and the net withdrawal or accrual of deposits. A bank's total demand for reserves thus depends on the factors just listed and on the requirement ratios imposed by the Federal Reserve.

Apart from mergers and substantial changes in institutional arrangements prohibiting or limiting branches, we deem it unlikely that technological aspects significantly modify the marginal costs of reserve deficiencies in the shorter term. We expect such modifications to work their mass effects quite slowly and gradually. The other factors listed exert, on the other hand, a decisive short-run effect on the banks' desired volume of excess reserves. In particular, variations in short-term rates and the discount rate substantially alter the banks' desired volume of excess reserves. Banks tend to hold considerably larger excess reserves in periods with low open market rates than in periods of comparatively high rates.

A major portion of the difference observed between excess reserves in the 1930's and 1950's can be attributed to the difference between open market rates prevailing in the two periods. Still, the large difference in market rates does not completely explain the difference in the behavior of excess reserves in the two periods. The probability distribution summarizing a bank's uncertain prospects with respect to the flow of reserve funds seems to be of importance in explaining the difference also. The shocks exerted by the accumulating bank failures, and the accelerated conversions of deposits into currency experienced after the late fall of 1930, raised both the expected average and variability of reserve flows.

The failure of the Federal Reserve to offset the currency drain or to stem the rise in bank failures substantially raised the probability of given reserve losses and thus contributed to raise the marginal costs expected from potential reserve deficiencies. This change in costs alone, independent of accompanying movements of market rates, would have induced banks to hold substantially larger excess reserves.

The experiences of the early thirties, combined with the events observed at financial crises occurring before the operation of the Federal Reserve System, strongly suggest that the anticipated average and variability of reserve flows immediately respond to accelerating bank failures and unexpected large deposit withdrawals. The same observations also suggest that, once the initial shock has passed, its effects wear off only gradually and are distributed over a considerable period. The anticipated average and variability of reserve flows appear to adjust only slowly to a new set of comparatively stable circumstances. The residual effects of the terrible shocks, shattering the U.S. banking system from late 1930 to early 1933, seem to have persisted well into the subsequent war period. The relatively low volume of excess reserves observed during the 1950's is thus the result of comparatively higher interest rates and the elimi-

nation of the shock effect on the anticipated average and variability of reserve flows.[2]

THE TWO MAJOR MECHANISMS CONSTITUTING THE MONEY SUPPLY PROCESS

The basic behavior elements required to understand the operation of the money supply process have been introduced in the last section. We presented for this purpose the public's demand for currency and the public's demand for time deposits. We also emphasized the dependence of the public's wealth allocation to currency and time deposits on a spectrum of costs, yields, money and nonmoney wealth. Furthermore, the banks' behavior with respect to excess reserves was summarized by the concept of demand for excess reserves or "desired" excess reserves. A detailed analysis of the banks' reserve adjustment process was outlined. This analysis demonstrated the emergence of a demand for excess reserves dependent on interest rates, deposit liabilities, and some other entities considered in the previous section.

With the basic behavior elements at our disposal we can proceed with the description of the money supply process. This process may be usefully visualized in terms of two interrelated mechanisms. One mechanism describes the response of the banking system to surplus reserves by suitable portfolio adjustments; the other describes the process injecting surplus reserves into the system. The generation of surplus reserves and their absorption by the banks' portfolio adjustments thus form the focal point of our description of the money supply process.

The multiplier mechanism

Surplus reserves are the difference between measured excess reserves and desired excess reserves. While the volume of measured excess reserves is a result of legal or administrative requirements, the volume of surplus reserves is a behavioral construct reflecting the bankers' demand for reserves. Our previous discussion and the assumption that banks seek to maximize wealth imply that bankers adjust their portfolios to eliminate surplus reserves. By suitable acquisition of earning assets, positive surplus reserves are exhausted, and by appropriate unloading, or running off, of earning assets negative surplus reserves are removed. A bank unavoidably loses surplus reserves by acquiring earning assets. Such acquisition is necessarily accompanied by at least one of the following events: (1) deposits newly created by the acquisition of earning assets are converted into currency; (2) newly created deposits are checked away to other banks; (3) newly created deposits stay with the bank as demand or time deposits. In the first two cases surplus reserves are lost because of a loss in reserves to the public and other banks. In the last two cases surplus reserves are lost because of an increase in required reserves necessitated by larger deposit liabilities. Appropriate port-

[2] Useful material pertaining to the banks demand for excess reserves can be found in an unpublished doctoral thesis by George Morrison, "Liquidity Preferences of Commercial Banks," June 1962, University of Chicago. Morrison investigated the dependence of excess reserves on interest rates and the shock of spreading bank failures and accelerated deposit withdrawals. The previously discussed results of Meigs also support the assertion that excess reserves depend on interest rates. Additional material coupled with a detailed analysis will be contained in our forthcoming book on money supply and money demand.

folio adjustments thus always enable a bank to remove surplus reserves.

Emerging surplus reserves induce banks to respond with suitable portfolio adjustments. Such portfolio adjustments eliminate the surplus reserves initially experienced by the adjusting banks but do not eliminate, immediately, the surplus reserves for the system as a whole. Surplus reserves are distributed to other banks. This redistribution is caused by the relative frequency with which the deposits of a bank, and particularly the newly created deposits, are checked away to other banks. This "spillover" to other banks is the major limitation imposed on a single bank's portfolio adjustment in response to available surplus reserves.

The redistribution of surplus reserves over the system, accompanying the portfolio adjustments induced by the initial surplus reserves, lowers the volume of surplus reserves available to the system. The portfolio adjustments generated in the first round are typically associated with outflows of currency to the public. The loss in surplus reserves through the currency drain is reinforced by increases in required reserves attributable to the portion of the newly created deposits not converted into currency. The surplus reserves available after the first round of portfolio adjustments is thus necessarily smaller than the initial volume that triggered the sequence of portfolio adjustments. In every round banks respond to accruing surplus reserves by appropriate portfolio adjustments. These adjustments partly absorb some of the remaining surplus reserves into currency held by the public or into required reserves, and redistribute the remaining surplus reserves over the system. The redistributed volume triggers a further round of portfolio adjustments with the train of consequences already described. The chain reaction to initially emerging surplus reserves proceeds until the initial volume of surplus reserves has been absorbed through a series of portfolio adjustments generating spillovers into currency or increases in required reserves. Our tentative investigations into this process suggests that it works quite rapidly and that most of the surplus reserves that triggered the process are absorbed within a month.

The sequence of portfolio adjustments, associated with the continuous redistribution and absorption of the surplus reserves initially injected into the system, yields an increase in total bank earning assets and the money supply that is a multiple of the original volume of surplus reserves. The money stock rises in every round of the process by (1) the amount of the currency spillovers to the public, and (2) the concomitant increase in checking deposits. Both magnitudes mirror the public's demand for currency and time deposits. The banks' portfolio adjustments generate a matching amount of new deposits that are distributed by the public between currency, time, and demand deposits according to the public's marginal propensity to hold currency and time deposits with respect to money wealth. The response of the public's demand for currency and time deposits to variations in money wealth (i.e., the money stock plus time deposits) thus forms a crucial element in the multiplier mechanism.

The currency spillovers caused by the public's systematic reaction to larger money wealth, decisively share the magnitude of the system's multiplier response. In the absence of such spillovers the multi-

plier effect of surplus reserves on the money stock would be inversely proportional to a weighted average of reserve requirements against demand and time deposits. Reserve requirements on time deposits have been 0.05 until recently and the average requirement ratio against demand deposits has been in the neighborhood of 0.15 for a lengthy period in the fifties. Without the occurrence of systematic spillovers of currency, as an element of the portfolio adjustment sequence, the monetary multiplier would have been at least 6⅔ and would not have exceeded 20. A multiplier substantially below six could only occur if currency drains, reflecting the public's currency demand behavior, are typically associated with the series of portfolio adjustments constituting the multiplier mechanism of the monetary system.

The processes injecting surplus reserves

We discussed the system's multiplier mechanism; i.e., its response to an initial volume of surplus reserves, without questioning how surplus reserves emerge. Our description of the money supply process must be extended at this point to describe the way in which surplus reserves are injected into the system. The eventual combination of the multiplier mechanism with the injection mechanism yields a complete description of the money supply process.

The joint operation of the two mechanisms provides information about the response of the money stock to open-market operations, to variations in reserve requirements and the discount rate. The injection mechanism consists of six distinct processes which operate more or less independently to create or absorb surplus reserves. These processes are independent of the portfolio adjustments that constitute the multiplier mechanism. They center on (1) variations in the monetary base, (2) variations in requirement ratios and the redistribution of already existing deposits among banks with different requirement ratios, (3 and 4) changes in the public's demand for currency and time deposits that are independent of modifications in money wealth and consequently independent of the bank's portfolio adjustments, (5) variations in the system's interbank deposit structure, and (6) changes in the banks' desired excess reserve position attributable to variations in interest rates. The subsequent sections develop the characteristic nature of these processes.

The monetary base

It is most useful to visualize new injections of base money as operating initially through bank reserves. Given the volume of required reserves and the existing demand for excess reserves, injections of base money increase the amount of available surplus reserves. Variations in the base thus constitute a channel through which surplus reserves are injected into the system with the consequences traced in our description of the multiplier mechanism. The latter mechanism distributes the new base money between cash assets held by banks and currency held by the public. Cash assets of banks, in particular bank reserves, thus emerge jointly with the money supply from the operation of the multiplier and injection mechanisms. The base is thus allocated by these processes between the banks and the public. It follows that the base can be measured as the sum of currency held by the public, bank reserves and vault cash. But this summation does not

reveal the mechanism generating the monetary base. To investigate the latter channel in more detail, we focus on the sources of the monetary base, the magnitudes and processes that determine the volume of base money issued.

Every issue of the Federal Reserve Bulletin carries a table with the title "Member Bank Reserves, Federal Reserve Bank Credit, and Related Items" at the beginning of the statistical section of the Bulletin. The table includes all the principal asset and liability accounts from the consolidated balance sheets of the 12 Federal Reserve banks. In addition, liabilities of the Treasury that are money—currency and coin issued by the Treasury—are included with the Federal Reserve accounts. The table, as presented in the Bulletin, is divided into "Factors Supplying Reserve Funds" and "Factors Absorbing Reserve Funds." By a simple rearrangement of the items that appear in the table, we can construct a statement of sources and uses of reserves plus currency from the statement of sources and uses of reserves that appears in the table. The sources and uses of reserves plus currency will be referred to as the monetary base, or more simply the base.

To obtain the uses of the base, we add the principal liability accounts on the Federal Reserve balance sheet—member bank reserves plus note issue—to the principal monetary liability of the Treasury, Treasury currency outstanding. The sum of these three items is equal to Federal Reserve and Treasury coin and currency held by the public, currency and coin held by member banks, plus member bank deposits at Federal Reserve banks. These three items are the total uses of the base. Any increase or decrease in the base must affect one of these items. Actually, our procedure is more restrictive, as we noted above. Injections of base money initially modify available reserves and generate surplus reserves. The process set in motion distributes the new injections between bank reserves and currency held by the public.

The sources of the base, that is its determinants, combine the remaining factors supplying and absorbing reserves that appear in the table in the Bulletin to which reference was made above. The first source of the base, reserve bank credit outstanding, is divided into three component parts: (1) U.S. Government securities held by the Reserve banks, (2) discounts and advances, and (3) float.

(1) U.S. Government securities held by the Reserve banks: Increases or decreases in this account reflect open market operations, repurchase agreements, and Federal Reserve decisions to replace maturing securities retired by the Treasury. This item can be completely controlled by the Federal Reserve authorities through their open market operations. By purchasing or selling securities in the market, the Federal Reserve can reinforce or counteract any other change that affects the monetary base.

(2) Discounts and advances show changes in borrowing by member banks. An increase in member bank borrowing increases the base and a decrease contracts the base. Unlike the Federal Reserve's Government security portfolio, this item is not completely controlled by the Reserve banks. Indirect control is exercised through changes in the discount rate, but the banks' demand for borrowed reserves depends on market rates as well as the discount rate. Moreover, borrowing is a privilege and not a right under present arrangements. Although the

Federal Reserve banks rarely refuse to grant the privilege, they may put pressure on individual banks to retire indebtedness, thereby inducing other banks to borrow as noted earlier. Hence the total volume of borrowing is not completely determined by the Reserve banks. But reserves supplied by borrowing can be offset by compensating sales in the open market that reduce the Government security account.

(3) Float is an interest-free loan from the Reserve banks to the member banks. It is neither a necessary consequence of monetary policy nor an unavoidable feature of monetary arrangements. It occurs because of the fixed time schedule that the Federal Reserve has adopted for payment of checks cleared through the Reserve banks. When a check is presented for payment, the Federal Reserve gives "deferred availability credit" to the collecting bank. The deferred credit is later replaced by a credit to the bank's reserve account. If the check is not completely processed within the fixed time schedule, the bank presenting the check for collection receives an increase in reserves at a Federal Reserve bank before the reserve position of the paying bank has been charged with the check. The difference between these "uncollected items" and "deferred availability credit" is float. If the Federal Reserve should decide to reduce the time schedule underlying deferred availability credit without any compensating change in the technical means of collecting checks, float would increase. For example, if all checks were credited immediately, deferred availability credit would be abolished and float would equal the volume of checks in process of collection. In effect, the Federal Reserve would be making interest-free loans to banks up to the amount of checks not yet collected. Conversely, float could be abolished by making the credit and debit to reserve accounts coincide with the actual collection period. If this were done, the uncertainty underlying the process generating float would not be reflected in the shortrun variations of the base.

To the sum of these three items that compose reserve bank credit we add the gold stock. The next item in the table, "Treasury currency outstanding," is the value of the currency and coin issued by the Treasury. It measures the Treasury's direct contribution to the money supply. This item appears in the table as a factor absorbing reserves. Our analysis in terms of the base includes total currency held by banks and the public as a part of the base rather than as a "factor absorbing reserves." An increase in the outstanding volume of Treasury currency, whether used by banks for till money (now counted as part of the reserves of member banks) or held by the public, expands the base. Treasury currency is therefore a positive source of the base.

Total currency in circulation is the next column heading. Included in the value of this item are all the currency holdings of the banks and the public whether issued by the Treasury of the Federal Reserve banks. We pass over this item since it has been incorporated as a use of the base above. It is a part of the magnitude to be explained by the sources or determinants considered in this section.

The remaining column heads designate additional factors absorbing reserves. In the statement describing the sources of the monetary base, these items are treated as negative sources, that is, as a reduction in the amount of the base supplied by total reserve bank credit, gold stock, and Treasury currency outstanding. We consider each briefly. The

first, Treasury cash holdings, is of minor importance (except for the period following the devaluation in 1934), both because of its small size and its small monthly and annual variation. It is a technical item that arises because of accounting procedures related principally to gold and need not concern us here. The second item, deposits other than member bank reserves with Federal Reserve banks, includes three liabilities from the consolidated Federal Reserve balance sheet. One of these is the highly volatile Treasury cash balance at the Reserve banks. To reduce the impact of its operations on the banking system, the Treasury adheres to the practice of depositing at commercial banks the checks that it receives and writing checks against balances at the Reserve banks. Balances are periodically transferred from the commercial banks to the Reserve banks to increase the relatively small Treasury balance prior to drawing checks. This process withdraws reserves from member banks temporarily. When checks are written against and collected from the Treasury balance at the Federal Reserve, the reserves are restored to the banking system. The generation and absorption of reserves caused by movement of the Treasury balance from commercial banks to the Reserve banks had a large and important influence on the monetary base in the early postwar years.

The second and third components of the item "Deposits other than member bank reserves with Federal Reserve banks" are principally the deposits of foreign central banks and the deposits of commercial, nonmember banks. Each of these is treated in a manner analogous to the Treasury balance; i.e., as a negative source of reserves. Reductions in these Federal Reserves liabilities expand the monetary base; increases in these items reduce the base. Thus a transfer of deposits from member banks to nonmember banks, accompanied by a shift from member bank reserves to deposits of nonmember banks at the Federal Reserve, reduces both the sources and uses and hence reduces the monetary base. The exchange of foreign central bank deposits at the Federal Reserve banks for gold and the withdrawal of gold from the United States has no direct effect on the monetary base. But an exchange of foreign deposits at commercial banks for gold and a withdrawal of gold reduces both the sources and uses sides and hence reduces the monetary base.

The final item in the table, "Other Federal Reserve accounts," is the sum of all other Federal Reserve liabilities plus net worth minus all other Federal Reserve assets. This small magnitude is a balancing item that assures that assets equal liabilities plus net worth or, in the case at hand, that total sources equal total uses of the base.

TABLE VI–1.—*Sources and uses of the monetary base*

Sources	Uses
Total Reserve bank credit, including Government securities, discounts and advances, plus float.	Member bank reserves with Federal Reserve banks.
Plus gold stock	
Plus Treasury currency outstanding	
Minus Treasury cash holdings	Plus member bank reserves in currency and coin.
Minus deposits, other than member bank reserves, at Federal Reserve banks.	Plus currency held by the public.
Minus other Federal Reserve accounts	
Equals total sources	Equals total uses.

We can recapitulate the above discussion by presenting a table summarizing the sources and uses of the base. Table VI–1 shows the rearrangement of the Federal Reserve's table "Member Bank Reserves * * *" into the monetary base.

Relative size and variation of the sources of the base

The source components of the base exhibit neither a uniform relative size nor a variability of similar order. From the beginning of the Federal Reserve System both gold stock and Reserve bank credit have dominated the base. But changes occurred over the decades in the composition of Reserve bank credit. Until the early thirties, discounts and advances were a significant proportion of Reserve bank credit. Thereafter, Reserve bank credit almost coincided with the portfolio of securities until the early fifties. Around the start of the first postwar decade requests for discounts and advances at Federal Reserve banks accelerated and this particular source contributed once again to the base. The volume of Reserve bank credit remains, however, completely dominated by the portfolio of Government securities.

Some information about the comparative variability of the major source components is collected in table VI–2. To construct this table the percentage change of the base for each month relative to the corresponding month in the preceding year was computed beginning with January 1919 and terminating with December 1962. The total sample was subdivided into four periods, distinguished according to the rows in the table. The annual percentage change of the base recorded for each month was partitioned into the portions contributed by (1) the Federal Reserve's portfolio of Government securities, (2) the Federal Reserve's portfolio of discounts and advances, (3) the gold stock, (4) Treasury currency issued, and (5) the sum of the remaining items listed on the sources side of table VI–1. Maximal and minimal values were then selected from each period for the percentage change in the base and, similarly, extreme values were selected from the contributions made by the five major source components to the percentage change in the base.

The columns in table VI–2 exhibit the extreme values defining the range of variation in the growth rate of the base and the extreme values of the contributions made by the various sources. An inspection of the table indicates that the range of variation of the base, measured by the distance between maximal and minimal percentage change per annum was almost the same for the first three periods distinguished. We note that the growth rate of the base was as high as 16 percent per annum and fell as low as minus 15 percent between 1919 and 1929, a range of 32 percent. During the thirties and forties this range was maintained. The size of the variations is remarkable indeed.

Even more remarkable is the occurrence of negative growth rates. Such growth rates reflect a deflationary posture of the Federal Reserve authorities. We contend that there is little reason to lower the money supply, even in the aftermath of an inflationary episode; e.g., the period 1941–46. Once the inflationary injections have been made, nothing is gained by the subsequent imposition of a deflationary monetary policy. Termination of the inflationary process can be assured by retrenching the growth rate of the money supply and can be achieved by suitable adjustments in the growth rate of the base. Such adjustments rarely require a negative growth rate in the base.

The deflationary posture assumed by the Federal Reserve authorities in the thirties and revealed by the minimal growth rate of the base (minus 5.7 percent) was even less appropriate, in the light of prevailing circumstances, than the deflationary policies pursued after 1918 and again after 1945. Negative growth rates of the base occurred again in the past decade. A later section will indicate, however, that these reductions in the base were typically the result of "compensatory open-market operations" designed, in principle, to modify the sudden impact of changes in reserve requirements and to redistribute their effect over time. More important is the compression of the range of variation, recently exhibited by the growth rate of the base, relative to the range observed in all the previous decades. The exaggerated variability has been conspicuously lessened, and fluctuations in the growth rate of the base have been reduced by more than 50 percent.

An inspection of the remaining columns in table VI–2 yields information concerning the major sources of the variability of the base. It is quite apparent that from 1919 to 1929 the variations of discounts and advances dominated the variability of the base. At their maximal rate, discounts and advances contributed to an increase of 23.9 percent in the base and at their minimal rate they generated, by themselves, a decline of 25.1 percent in the base per annum. The close association between the money supply and the base determines a similar variability in the money supply attributable to the gyrations in discounts and advances. It follows that the Federal Reserve's mode of operating the discount window essentially introduced a systematically destabilizing feature into our monetary framework. The variability of the gold stock was substantially smaller during the 1920's than the large swings in the base attributable to discounts and advances. The variations in the portfolio of securities appear to be even more moderate in comparison, and Treasury currency and other items had only minor significance.

TABLE VI–2.—*Range of variation of annual percent change of base and of the contributions made by major source components*

[In percent]

Period	Base (B)	Portfolio of Government securities (including float) (F^1)	Discounts and advances (F^2)	Gold (A)	Treasury currency (C)	Other items (W)
January 1919 to December 1929:						
Maximum	+16.6	+7.7	+23.9	+10.9	+2.4	+3.1
Minimum	−15.5	−7.7	−25.1	−7.1	−3.7	−4.6
January 1930 to December 1940:						
Maximum	+26.6	+18.2	+9.5	+52.1	+3.4	+5.8
Minimum	−5.7	−2.0	−12.7	−14.6	−.5	−39.8
January 1941 to December 1950:						
Maximum	+23.1	+28.1	+1.4	+21.9	+3.1	+6.3
Minimum	−9.3	−11.6	−1.0	−4.5	−.002	−7.6
January 1951 to December 1962:						
Maximum	+9.8	+13.6	+2.4	+3.4	+.4	−1.5
Minimum	−3.2	−2.6	−2.5	−5.8	−.06	+2.0

Remarks: The table is based on the following formula:

$$\frac{\Delta B}{B}\cdot 100=\frac{\Delta F^1}{F^1}\cdot\frac{F^1}{B}\cdot 100+\frac{\Delta F^2}{F^2}\cdot\frac{F^2}{B}\cdot 100+\frac{\Delta A}{A}\cdot\frac{A}{B}\cdot 100+\frac{\Delta C}{C}\cdot\frac{C}{B}\cdot 100-\frac{\Delta W}{W}\cdot\frac{W}{B}\cdot 100$$

Where B=base; F^1=portfolio of Government securities (including float); F^2=discounts and advances; A=gold; C=Treasury currency; W=foreign and "other" deposits at Federal Reserve banks plus Treasury deposits plus Treasury cash plus "other accounts" at Federal Reserve banks. This formula was computed for monthly data for the period January 1918 to December 1962. The changes are measured between corresponding months of adjacent years. The left side shows the percent change per annum in the base for each month, and each term on the right shows the contributions made by major source component to this percent change. In each one of the periods specified, the maximal and minimal contribution of each component was selected.

In the second period, the thirties, gold moved to the center of the stage. Variability of both gold stock and "other items" dominated the base; and the changes of "other items" were due principally to the behavior of the portion of gold included as part of Treasury cash. Still, the dominant role assumed by the behavior of gold should not veil the fact that the Federal Reserve's portfolio of securities and discounts exhibited variations of a similar order. The movements in the base attributable to Treasury currency were again comparatively insubstantial.

The next period, 1941–50, saw another shift in the role of particular sources in the movement of the base. The Federal Reserve's portfolio of Government securities became the central actor, closely followed by the gold stock. The contribution of discounts and advance almost vanished. Even the "other items" showed a larger range of variations.

The Federal Reserve's portfolio of securities and gold also dominated the variations of the base in the last decade. Discounts again varied over a smaller range. Treasury currency and other items again exhibited the least variation.

The four decades of Federal Reserve operation can be summarized in three points: (1) In most of the periods, the variations in the base assume proportions difficult to justify in terms of a rational monetary policy; (2) the minimal growth rates exhibited by the base mirror a deflationary posture not necessitated by the circumstances prevailing in the periods; and (3) the gyrations of gold and the variability of Reserve bank credit dominated the variations in the annual growth rate of the base in all periods.

Table VI–2 supplies information concerning the range of variability associated with the major source components of the base. Table VI–3 supplements this information for the postwar period. The interval from October 1949, the first lower turning point of the postwar period, to December 1963 is divided into seven half cycles. Each half cycle, other than the last, represents either a complete expansion phase or a complete recession phase. The average change between adjacent months of all the major source components of the base was computed for each period indicated in the table. The table thus reveals both the average relative importance of the various source components and the variability of this relative importance for different half cycles. A cursory glance at the table suffices to establish the comparatively small significance of the last two components specified: namely Treasury currency outstanding C, and the residual agglomeration W (Treasury deposits plus foreign deposits, plus Treasury cash, plus other deposits, plus other Federal Reserve accounts). The major contribution to the changes in the base emanate from the Federal Reserve's portfolio of securities, F^1, discounts and advances F^2, or the gold stock A. But the table also reveals the shifting importance of these source components. Variations in F^1 dominated the changes in the base during the first two half cycles, with gold clearly assuming a position of secondary importance.

The next two half cycles exhibit a radically different pattern. Variations of the Federal Reserve's discounts and advances and changes in the gold stock dominated the changes in the base. The negligible changes in F^1 reveal that open-market operations contributed almost nothing to the longer run changes in the base over the interval from August 1954 to April 1958. The pattern was once more reversed in

the last two half cycles and the recent, incomplete upswing phase. Changes in the gold stock and the Federal Reserve's portfolio of securities emerged again with decisive importance, while the discounts and advances slipped into a range of minor significance. The reader should also note the remarkable cyclic behavior of the Federal Reserve's discounts and advances. They grow during expansionary phases and decline in recession phases.

The information presented in table VI–3 may be further summarized. Table VI–4 specifies the maximal and minimal average growth rate per month of the five source components considered.

Table VI–4 clearly reveals the relative order of variability—the Federal Reserve's portfolio of securities shows the largest range of variation. The changes in the gold stock show the next largest range of variation, and the Federal Reserve's discounts and advances the smallest range of the three. The remaining two components; i.e., Treasury currency and the host summarized by W, generate comparatively minor perturbations.

TABLE VI–3.—*Average monthly changes of source components of the monetary base between adjacent months during half cycles*

[In millions of dollars]

Half cycle	F^1	F^2	A	C	W
October 1949 to July 1953	171.0	6.5	−49.6	5.8	5.2
July 1953 to August 1954	−80.8	−16.8	−38.1	8.2	−16.2
August 1954 to July 1957	−2.7	20.2	21.5	4.2	−10.2
July 1957 to April 1958	.3	−87.4	−51.0	9.2	−3.6
April 1958 to May 1960	92.9	14.8	−112.4	6.3	−20.6
May 1960 to February 1961	124.7	−39.5	−217.1	6.1	19.2
February 1961 to December 1963	242.6	6.2	−54.1	5.2	7.9

TABLE VI–4.—*Extreme values of overage monthly changes in postwar half cycles*

[In millions of dollars]

	F^1	F^2	A	C	W
Maximal value	242.6	20.2	21.5	9.2	19.2
Minimal value	−80.8	−87.4	−217.1	4.2	−20.6

Reserve requirements

The institution of reserve requirements for member banks (extended by State regulation to nonmember banks) contributes in two distinct ways to generate or absorb surplus reserves. Until the middle thirties the Federal Reserve authorities had no power to change the prevailing requirement ratios. These ratios were fixed at a specific level for each class of member banks. The volume of required reserves for member banks could be computed as an average of the unchanging reserve requirement ratios weighted by the volume of deposits to which the particular requirement ratio was applicable. A shift in the distribution of deposits among banks in different classifications modified the volume of required reserves. A redistribution of deposits from banks with higher requirements to banks with lower requirements created surplus reserves for the system similar to the injections accom-

plished by variations in the base. On the other hand, a redistribution of already existing deposits from banks with lower to banks with higher requirements, absorbed surplus reserves from the system and induced a contraction of bank portfolios. Variations in the distribution of deposits among classes of banks thus altered the volume of surplus reserves because of the differences in the applicable requirement ratio. As we have indicated, changes in the volume of surplus reserves alter the current response of the monetary system, mirrored in the behavior of money stock and the system's portfolio of earning assets. Uniform reserve requirements would, of course, completely remove any connection between the redistribution of deposits and the money supply.

When the Federal Reserve authorities acquired the power to change the level of reserve requirements against both demand and time deposits, an additional source of variation in surplus reserves was introduced. Fiat changes of the legal requirement ratios announced by the Board of Governors immediately subtract or inject surplus reserves for the system. The banks respond in the manner described in our discussion of the multiplier mechanism. Changes in requirement ratios do not modify the volume of total reserves, but they do modify the volume of excess reserves supplied to the system relative to the desired excess reserve position. A change in the requirement ratios, per se, exerts at most only a marginal effect on desired positions. However, excess reserves are immediately released or absorbed. Consequently the supply of excess reserves shifts relative to the banks' demand for excess reserves; surplus reserves are created or destroyed.

The effect on surplus reserves of both the redistribution of deposits among classes of banks and fiat changes in legal ratios can be summarized in terms of variations of the average requirement ratios on demand and time deposits. A weighted average has been constructed for this purpose. The legal ratios applicable to a class of deposits are weighted by the volume of deposits in that classification. Because the ratio on all member banks' time deposits has rarely differed between classes of member banks, we obtain an average time deposit ratio dependent on the uniform requirement ratio imposed on member banks and the ratios assigned to nonmember banks. These ratios are weighted by the relative magnitude of total time deposits held by member and nonmember banks. The average requirement ratio on demand deposits depends essentially on the legal ratios characterizing member bank classifications and the requirements imposed on nonmember banks. The relative magnitude of demand deposits is used as the weight for each classification.

To summarize, changes in the average requirement ratios may occur because of changes in the values of one or more of the requirement ratios or because of shifts in deposits from one class of banks (or deposits) to another. The first cause of changes in the average reflects policy action by the Federal Reserve authorities (or the State banking agencies); the second mirrors a multitude of underlying factors shaping the distribution of existing deposits between banks subject to different requirement ratios. Both causes have been generally acknowledged as influences on the average requirement ratios.

Some writers, including spokesmen for the Reserve System, assign a level of importance to the redistribution of deposits that cannot be substantiated. There is little doubt that volatile redistribution of deposits among classes of banks could seriously impair the degree of control exercised by the monetary authorities over the money supply. Of course, such impairment could be removed even in the face of severe instability of distributional pattern, for example, by imposing uniform requirement ratios on all commercial banks.

Investigation of the variations generated in the average requirement ratio on demand deposits attributable to a shifting distribution of existing deposits, however, yields no support for the contention that volatile shifts in deposit distribution actually impairs the degree of control over the money stock. Some results of this investigation are collected in table VI–5 for periods during which the requirement ratios for each classification remained unchanged. For each month in the period we computed the change in required reserves, relative to the same month in the preceding year, that was strictly attributable to the redistribution of already existing deposits. The table presents averages and extreme values of these changes for every period selected.

We note that the average value of required reserves released via deposit redistribution has been declining over the postwar period. With a monetary multiplier of approximately 2.5 the average increment in the money stock per annum, induced solely by deposit redistribution in the context of differential requirement ratios, reached 175 million in the early postwar period and fell to 87 million in the early sixties. Deposit redistribution thus contributed approximately 0.16 percent to the growth in the money stock immediately after the war and only about 0.06 percent in the early sixties. These percentages are of a magnitude that does not exceed the effect of random influences operating on the money supply process. Moreover, a careful inspection of the sequences of monthly values reveals the occurrence of a clearly marked cycle in the operation of the deposit redistribution process. The values of required reserves released do not oscillate at random between the extreme values recorded in the table. They move in a regular pattern exhibiting sharply separated upswings and downswings. The random component of the process is thus only a fraction of the magnitudes in the table, and the increment in the money stock attributable to this random component in the deposit redistribution process can reasonably be expected to be a fraction of the 0.16 and 0.06 percent mentioned previously. Only a comparatively large random component could potentially impair the degree of control over the money stock. Since our investigation indicates that the operation of the random component has no relevant effect on the money supply process, it follows that the removal of differential requirement ratios cannot be justified in terms of the degree of control over the money supply. But elimination of this argument offers no justification to continue differential requirements. The discussion will be resumed in the final section.

TABLE VI–5.—*Release of required reserves occurring between corresponding months of adjacent years, attributable to the redistribution of demand deposits between different classifications of member banks*

Period	Average of monthly values (in millions of dollars)	Range of monthly values (in millions of dollars)
June 1945 to January 1948	69	[1] 141 [2] 12
February 1952 to May 1953	68	[1] 123 [2] 6
August 1955 to February 1958	50	[1] 104 [2] 14
May 1959 to September 1962	35	[1] 141 [2] −111
Average of absolute values	43	

[1] Maximum.
[2] Minimum.

Remarks: The underlying data were obtained from the computation of the L-magnitude described in K. Brunner, "A Schema for the Supply Theory of Money," *International Economic Review*, January 1961.

Changes in the requirement ratios not only release—or absorb—surplus reserves, they also modify the magnitude of the multiplier response expressed by the size of the monetary multiplier. This multiplier, revealing the banking system's power to magnify injections of surplus reserves, depends partly on the level of the requirement ratios. An increase in requirement ratios tends to compress, and a reduction to raise, the magnitude of the monetary multiplier.

Changes in legal requirement ratios are traditionally acknowledged to exert an effect on the money stock via two essentially distinct channels. One channel transmits the impact of surplus reserves released; the second channel modifies the magnitude of the multiplier response. Our preliminary studies of the money supply process indicate the dominant operation of the first channel—the change in surplus reserves. The effect on the current response in the money stock transmitted via the second channel is of comparatively small order and may be neglected without serious error. For example, a reduction in reserve requirements by 1 percentage point can be expected to raise the multiplier by approximately 2.5 percent of its existing magnitude, i.e., from 2.50 to 2.56. Exaggerated views concerning the impact of requirement changes on the system's magnifying power appear to have resulted from a prevalent Federal Reserve attitude that equates the money multiplier with the reciprocal of the System's average requirement ratios. According to the latter notion the given percentage change in the average requirement ratio modifies the multiplier by an equal percentage change in the opposite direction. Our investigation indicates that the presumed equality of the two changes overstates the effect on the multiplier of a change in the requirement ratios.

A crucial and frequently overlooked fact explains the comparatively attenuated sensitivity of the multiplier to requirement changes, viz, the multiplier depends only partly on the legal requirement ratios. It also depends on the public's marginal propensity to hold currency

relative to monetary wealth, the public's marginal propensity to hold time deposits relative to monetary wealth, the banks' marginal propensity to hold excess reserves relative to their deposit liabilities, and some institutional features expressing the system's degree of centralization and the interbank deposit structure. The first factor assumes a particular significance in this context. Its operation generates the currency drains typically associated with the System's portfolio adjustments. According to our analysis such currency drains form the single most important reason why the change in the multiplier resulting from changes in the requirement ratios is much smaller than is typically asserted in Federal Reserve publications or the standard textbooks on money and banking. Moreover, the currency drain and the other factors listed explain why the value of the multiplier is substantially below the reciprocal of the average requirement ratio. This point will be further pursued in a subsequent section.

Our detailed analysis of the money supply mechanism also yields information about the comparative response of the money stock to variations in the base and the legal reserve ratios. It appears that, on the average, the same volume of surplus reserves is generated by a dollar injection of base money and a dollar reduction of required reserves achieved by means of fiat changes in reserves requirements or the deposit redistribution process. It follows that, per dollar of operation, open market operations and changes in legal reserve ratios induce, on the average, the same response in the money supply.

A policy change of minor importance can be effectively incorporated in the monetary mechanism through changes in the accumulated sum of "liberated" reserves. At times, the Board of Governors changes the classification of banks within cities. For example, small banks in Reserve cities may be designated as "country" banks. Such changes in classification are identical in their effects to other changes in reserve requirements. The weighted average of reserve requirements is raised or lowered by the reclassifications. Reserves are absorbed or liberated and the rate of monetary expansion is consequently increased or decreased In all respects, this minor policy change is equivalent to a redistribution of deposits.

Currency drains that are independent of banks' portfolio adjustments

In a previous section, the public's demand for currency was partitioned into two components. One component, the public's marginal propensity to hold currency relative to money wealth, was shown to play a significant role in the System's multiplier response to emerging surplus reserves. This role is reflected in the spillovers of currency to the public associated with the banks' portfolio adjustments. The systematic prevalence of such induced currency drains, occurring as part of the multiplier process, is revealed by a value for the money multiplier that is substantially below the reciprocal of the average reserve requirement ratios.

This section turns our attention to the role of the other component in the public's demand for currency. This second component describes the response of the public's currency demand to nonmoney wealth and a spectrum of costs and yields associated with currency and related financial assets. This demand component does not change in response to the new deposits created or destroyed by the adjustment of bank portfolios. The currency drains reflecting variations in this demand

component are not induced as an integral part of the response to surplus reserves expressed by the multiplier mechanism. These currency drains result from changes in nonmoney wealth and modifications in the above-mentioned costs and yields. They are imposed on the multiplier mechanism and, along with variations in the base and changes in the average requirement ratios, help to determine the volume of surplus reserves available at the banks.

To clarify the effect of this component, consider the following sequence. Reserve positions are in equilibrium—desired reserves equal actual reserves. The public converts a dollar of existing demand deposits into currency, draining a dollar of reserves from the banks. The supply of excess reserves is lowered by less than $1, to be precise by (1–r) where "r" designates the average requirement ratio on demand deposits. The lowered volume of deposit liabilities also reduces the banks' desired excess reserves. The banks' demand to hold excess reserves per dollar of deposit liabilities, however, is substantially smaller than the amount (1–r). It follows that a dollar's worth of currency drain, generated by an increase in the second demand component for currency, lowers the supply of excess reserves decisively more than it lowers desired excess reserves. Consequently, surplus reserves have been siphoned off, a deficiency has been created; the multiplier mechanism is thus set in motion since desired reserves are now greater than actual reserves.

The opposite process occurs if the second demand component for currency declines. A dollar's worth of currency converted into checking deposits increases the supply of excess reserves by the fraction (1–r), whereas the desired excess reserves increase by a smaller fraction. The volume of surplus reserves generated are slightly less than (1–r). We note that a smaller volume of surplus reserves is created (or destroyed) by a dollar change in the public's second demand component for currency—that is, by an imposed currency accrual (or drain)—than by a dollar injection of base money, or by a dollar of reserves liberated through changes in average requirement ratios. Currency drains of the second kind thus induce a smaller response in the money stock than open market operations and liberations in required reserves through changes in legal ratios. The difference in the order of the responses is approximately equal to the fraction (1–r). It is reasonable to expect, therefore, that the response to a currency flow of the second type, per dollar, is less than (1–r) times the response to a dollar change in the base, or a dollar of required reserves liberated.

The significant role played by the currency flows described in this section can be explored further. As we have emphasized, these flows are imposed on the multiplier mechanism, through variations in the public's second demand component for currency. Several patterns can be usefully distinguished among these variations. One such pattern, generally referred to as seasonal variation, was acknowledged by students of monetary affairs long before the Federal Reserve System was established. Many complaints were heard in the period before the Federal Reserve System existed about the serious inconveniences created by the juxtaposition of an "inelastic currency" and the seasonal pattern in currency demand. The problem has traditionally been formulated in terms of an insufficiently elastic currency supply. This formulation is both uninformative and misleading.

34-474—64——3

The problem faced at the time by the financial community was the result of a seasonal change in currency demand in the context of a base, determined by processes unrelated to this seasonal pattern, and not accessible to immediate policy actions. Before the Federal Reserve System began to operate, the base consisted only of currency issued directly by the Government sector and currency issued by banks. The latter type of currency was covered by collateral, Government securities, deposited by the issuing bank with the Treasury. The seasonal variations in currency demand thus unavoidably generated a seasonal pressure on bank reserve positions that was reflected in banks' supply behavior on credit markets and consequently in the behavior of interest rates. The seasonal element in currency demand forced a seasonal readjustment of financial portfolios in major parts of the economy. The seasonal readjustments of financial portfolios, forced by the seasonal pattern of currency demand (in the context of a base unrelated to these processes) was reflected in the seasonal variation of interest rates.

The organization of the Federal Reserve System in 1914 introduced an institutional framework that permitted a lessening of the consequences induced by the seasonal fluctuations of currency demand. Under the Federal Reserve System, both the sources and uses of the base were restructured. The asset portfolio of Federal Reserve banks, especially Reserve bank credit, became an important source of the monetary base. And this source, controlled by the Federal Reserve authorities, can be easily modified at almost zero social cost. Thus variations in the base, initiated by appropriate Federal Reserve action, could be used to offset the seasonal fluctuations in currency demand at much lower social costs after 1914 than before. The seasonal increase in currency demand can be met by an increased supply of base money. Neither the reserve positions of banks nor their desired portfolio of earning assets need be affected. The necessity for widespread readjustment of financial portfolios that had been a feature of the prevailing system was eliminated. Resources originally allocated to the seasonal readjustment of portfolios were thus freed for other opportunities.

It should be noted, however, that we remain uncertain about both the exact shape of the seasonal movement in currency demand and the precise response in the money stock to variations in the base and to currency drains of the second kind. It is therefore unreasonable to expect a perfectly matching adjustment of the base to the seasonal gyrations in currency demand. We contend that in the absence of any endeavor by the Board to penetrate the structure of the monetary mechanism, it has almost no systematic and validated knowledge at its disposal concerning the relative effect of variations in the base or currency drains of the second kind. Considerably more effort has been applied to measurement of the seasonal pattern in currency demand. But such information, even when quite reliable, is not sufficient to guide policy designed to minimize the impact of seasonal variations.

Seasonal demands are the source of variations in the second component of the public's demand for currency that has dominated the Federal Reserve's attention. But the history of monetary events in this country provides some dramatic evidence of the relevant opera-

tion of cost and yield factors operating in the public's allocation of wealth to currency, expressed by nonseasonal elements in the public's second demand component for currency. A few of these events are outlined briefly to indicate the serious consequences of ignoring all but the seasonal element.

After the peak of 1929 the public's currency demand behaved according to the characteristic pattern for most comparatively mild downswings. Currency, released from the public's holdings, flowed into the banks until late in the year 1930. This reduction in the second component of the public's demand for currency, frequently encountered in a downswing, generated surplus reserves and thus partly compensated the decline in surplus reserves resulting from reductions in the base. The public's behavior thus attenuated the first phase of the downswing, partly offsetting the Federal Reserve's deflationary posture.

By November 1930 a radically new element had emerged. The eruption of serious bank failures suddenly shifted the balance of relative advantages in the direction of increased currency and smaller demand deposit holdings. The risk attached to demand deposits increased substantially, lowering the relative inconvenience of holding and using currency. The currency drain generated by this jump in the public's demand for currency created negative surplus reserves. The decline in surplus reserves set off the multiplier mechanism in a deflationary direction, compressing the banks' portfolios and the money supply. The first of a series of currency drains abated in the winter of 1931. A second series, with increased intensity, began in the spring, further reducing the volume of surplus reserves. Each increase in the public's demand for currency pushed available excess reserves below the desired level, thus forcing adjustments that lowered the money supply. Increases in the base, reflecting some expansion of Reserve bank credit, modified the deflationary impulses emanating from the public's fearful response to bank failures to some extent. But the actions taken were too small to offset fully the decline in surplus reserves.

From January 1932 to the following April the currency drains abated. Unfortunately, the Federal Reserve authorities permitted a reduction in the monetary base during this period. Thus the surplus reserves injected into the system by the public's declining currency demand were destroyed. When the currency drains resumed again in April 1932, new deflationary pressures were imposed on the system. Once more the base expanded and attenuated, somewhat, the deflationary shock emanating from the public's demand for currency. But again, the expansion was insufficient to offset the public's increased demand for currency and thus break the deflationary impact on the monetary system. This third series of currency drains tapered off in July. The public's currency demand at first declined slowly but accelerated later in the year. The flow of currency into the banks, accompanied by a maintained base, sharply curtailed the deflationary momentum and even induced a hesitant increase in the money supply, during the fall of 1932. But currency drains emerged again in December, accelerating to catastrophic proportions by March 1933. The monetary base was expanded during this period by an increase of Reserve bank credit, but this increase was quite inadequate to stem the deflationary impact of the public's currency behavior.

The monetary events from October 1930 to March 1933 form a terrifying sequence of missed opportunities to break the deflationary process by means of an effective monetary policy. During this period the behavior of the monetary system and the money supply was dominated by the public's (second) demand component for currency, responding to the public's repeated reappraisals of the risk attached to checking deposits relative to currency holdings. The crisis was met by the Federal Reserve authorities with a singularly pallid attitude. Every new spurt of the public's currency demand, mirrored in accelerating currency drains, was accompanied by inadequate expansions of the base. The subsequent return flows of currency to the banks were either offset by a compression of the base or by the banks' increased desire to hold excess reserves in response to a greater anticipated variability of reserve flows induced by the public's currency behavior. A number of ingredients in the Federal Reserve's conception most likely shaped their attitude during this dramatic period. But we submit that the prevailing inchoate view of the monetary process, the absence of any clear and tested understanding concerning the interaction of base and currency demand in the monetary mechanisms, contributed to the repeated sequence of inadequate or omitted expansions in the base. Contrary to the assertion made by spokesmen for the System, the Federal Reserve authorities had the technical capabilities to engage in such expansion.

The upswing, initiated in the spring of 1933, was accompanied by a persistent decline in the second component of the public's currency demand that lasted until the spring of 1936. The return flow of currency to banks generated by this process worked jointly with the expansions of the base, resulting from the gold inflow, to raise the money supply by substantial proportions. This behavior of the money supply contributed, we contend, quite decisively to the duration and magnitude of the recovery. It is revealing that this monetary expansion was not the result of any actions taken by the Federal Reserve authorities. It occurred entirely as a result of the decline in the public's currency demand and international capital transfers. The net effect of Federal Reserve actions, subsequent to the spring of 1933, remained deflationary. The recovery was not aided by Federal Reserve policy. In the face of large-scale unemployment and output levels substantially below any reasonable measure of "full utilization," the Federal Reserve's major concern was focused on "inflation."

We skip some interesting features of currency behavior in the later thirties and turn our attention to the war and the early postwar period. The use of checks or currency involves costs. One cost, associated with the use of checking deposits, is the cost of obtaining information about the issuer. In periods of limited social dislocation, this cost remains relatively constant. The major dislocations, associated with the wartime mobility of the population, raised this cost by disrupting the regular sources of information applicable to a more stationary population. The cost of accepting payments by check increased markedly. Some of these costs were shifted to the issuers. The public responded by increasing its demand for currency. This increase in the public's currency demand was reflected by a currency drain that reduced the size of the continuous injections of surplus

reserves resulting from the explosion in Reserve bank credit and the monetary base.

The demand for currency did not abate immediately after the war. It rapidly decelerated, however, during the year 1946, and declined from the start of 1947, until the end of 1950. The return flow of currency to the banks injected surplus reserves into the monetary system. This action by the public was of particular importance in 1949 when the Federal Reserve authorities compressed the extended base (i.e., base plus cumulated sum of liberated reserves). A major portion of the decline in the public's demand for currency was very likely attributable to the operation of the factors previously considered, now working their effects in the opposite direction. Adjustment to peacetime conditions was accompanied by lower mobility and more stable sources of information. The frequency of exposure to unfamiliar surroundings declined, and potential check users were less frequently forced into a choice of higher transaction costs associated with check payments or holding a larger currency inventory. The cost of check payments thus declined in the postwar period, lowering the public's demand for currency and leading to a return flow of currency. This backflow and the motion of the base dominated the behavior of the money supply during most of the period prior to the accord between the Treasury and Federal Reserve authorities in March 1951.

If we look at the broad contours of the money supply process during the war and preaccord years, we detect a peculiar pattern. The inflationary increase of the money supply during the war was essentially due to the expansion of the base induced by the continued expansion of Reserve bank credit. The public's behavior on the other hand, expressed by its currency behavior, attenuated the Federal Reserve's inflationary policy. After the war, most specifically in 1948 and 1949, Federal Reserve policy turned in a deflationary direction. The growth rate of the money stock slowed (in 1948) and declined (in 1949). The public once again attenuated the Federal Reserve's policy by substantial return flows of currency. Thus, Federal Reserve policies during and after the war were mitigated by the public's behavior with respect to its desired currency inventories. In the decade from 1940 to 1950 the public reduced the destabilizing impulses emanating from the Federal Reserve's policy operations.

The relevant operation of the currency drains in the money supply process has not disappeared with the accord. Additional material clarifying this long neglected aspect of our monetary mechanism will be presented in a later section, where evidence is presented in support of the conception described in the present chapter.

Variations in the public's demand for time deposits independent of the bank's portfolio adjustment

The public's demand for time deposits is partitioned into two components in a manner similar to our treatment of the demand for currency. The component involving the marginal propensity to hold time deposits with respect to money wealth is related to specific features of the monetary system's multiplier process, viz, the spillover of newly created deposits into time deposits. The other component contributes to the current flow of surplus reserves. The latter demand operates independently of the multiplier mechanism. By generating or absorbing surplus reserves, it contributes to the impulses maintain-

ing the mechanism in motion and thus plays a role in current variations of the money supply and bank portfolios.

The second component of the public's demand for time deposits depends primarily on interest rates and nonmoney wealth. An increase in the rate offered on time deposits relative to other interest rates raises the public's desired portfolio of time deposits. The public responds by shifting funds from checking accounts to time accounts at a rate determined by the increase in the demand for time deposits. This shift releases reserves and increases the supply of excess reserves. At the present time, the shift of a dollar from checking account to time account raises excess reserves by more than 10 cents. We surmise that the banks' demand for excess reserves is more sensitive to variations in the volume of checking deposits than to changes in the volume of time deposits. Thus the shift of deposits toward time accounts, induced by higher rates offered on time accounts, lowers the banks' desired level of excess reserves. This decline is probably quite small, at most a few cents per dollar of funds shifted. Still, the reallocation of deposits between demand and time account lowers, comparatively slightly, the banks' desired excess reserves and simultaneously raises the supply of excess reserves. Surplus reserves are generated, and the multiplier mechanism is set in motion. Bank portfolios and the money stock are modified as a result of the process.

We noted that per dollar of deposits reallocated, at least 10 cents of surplus reserves would be created. Suppose we fix the amount at 15 cents. This specification will enable us to determine in more detail the effect of the deposit reallocation on the banks' portfolios and the money supply. The evidence summarized in a later section indicates that, on the average, the response in bank portfolios measures approximately $2.80 per dollar of surplus reserves, while the money supply changes on the average by about $2.50. (The difference of 30 cents is due to the spillover into time deposits with respect to money wealth.) The deposit reallocation would thus expand bank portfolios by approximately 42 cents (15 cents of surplus reserves times a multiplier of 2.8) per dollar shifted. The net effect on the money supply, on the other hand, emerges from the joint operation of two distinct components working in opposite directions. First, there is the conversion of checking deposits into time deposits, initiating the process. For every dollar transferred, the money supply immediately falls by $1. But the multiplier process triggered by the 15 cents of surplus reserves generated per dollar transferred adds approximately 38 cents to the money stock (15 times 2.5). The deposit reallocation thus lowers the money supply by approximately 62 cents per dollar transferred.

A similar analysis holds for events that lower the public's demand for time deposits and induce a reallocation of deposits toward checking accounts. Such reallocation will lower the banks' portfolio by 36 cents and raise the money supply by 62 cents per dollar transferred. Variations in the public's demand for time deposits thus contribute to explain the phenomenon noted in chapter II, viz, the differential behavior of "bank credit" and money supply. Once again, we note that under an appropriate conception of the money supply, money and "credit" are not "two sides of the same coin."

The events observed in the recent past dramatically reveal the significant role played in the money supply process by reallocations between demand and time deposits. The relaxation of regulation Q

in January 1962 enabled banks to raise the rates offered customers on time accounts. An extensive reallocation of deposits toward time accounts, induced by the change in regulations, prevailed throughout the subsequent year. This reallocation reflected the increase in the public's demand for time deposits attributable to the higher yields obtainable on time deposits. Surplus reserves were generated by the switch from demand to time deposits and absorbed by the portfolio expansion of the banking system. The reallocation of deposits also explains the difference in the behavior of the money supply and the sum of the money supply plus time deposits. The growth rate of the money supply declined from December 1961 to October 1962, whereas the larger sum, including time deposits, grew at an accelerating rate until April 1962. The declining growth rate of both money supply and the extended sum in the late spring and summer of 1962 was attributable to a spurt in currency drains and the deceleration in the growth rate of the extended base.

The role of interbank deposits

The money supply is a measure of the amount of money balances on the public's balance sheets. Interbank deposits are therefore excluded from the money supply. Nevertheless, these intrasystem claims, that cancel in a consolidated statement of the banking system, play a role in the money supply process. This role has been largely neglected in dicussions of the monetary system. Analysis of this role, however, involves unavoidable technical complexities that render it inadvisable to push our discussion beyond a summary of the analytical results developed. Moreover it can be demonstrated that changes in the interbank deposit structure, even if large relative to those observed, exert a comparatively small effect on the monetary system.

Our previous discussion of the bank's desired portfolio of excess reserves can be usefully extended to cover all cash assets of banks. Such extension requires some adjustments that will be glossed over at this point. The incorporation of interbank deposits into a detailed analysis of the money supply process yields three principal conclusions: (1) The banks' marginal propensity to cover net checking balances by debiting or crediting interbank deposits or to transfer Federal funds affects the structure and magnitude of the multiplier response to emerging surplus reserves. (2) Variations in the banks' desired holdings of deposits at other commercial banks (induced by changing interest rates or modifications in the anticipated average or variability of cash asset flows) generate surplus reserves setting off the multiplier mechanism. Changes in the desired level of interbank deposit assets thus exert the same effect as changes in the desired level of excess reserves. (3) Shifts in the distribution of interbank deposits over the system release or absorb surplus reserves.

The first proposition refers to the multiplier mechanism and the others to the mechanism injecting surplus reserves. Our third proposition acknowledges that variations of the interbank deposit structure influence the supply of cash assets relative to the desired portfolio. But omission of this process from further consideration imparts no serious error into our analysis. The second proposition, however, assigns a substantial role to the scale effect of interbank deposits. This scale effect is similar to the effect of variations in desired excess reserves. Our next section terminates the discussion

of the injection mechanism and considers this source of surplus reserves as a part of the banks' demand for reserves.

Variations in banks' desired excess reserves independent of their portfolio adjustments

The banks' second demand component for excess reserves was introduced into our discussion above. It was argued that this demand component depends on interest rates, particularly on open market rates, the rediscount rate and the anticipated average and variability of reserve flows. Variations in open market rates, the rediscount rate and changing anticipations about the behavior of reserve flows modify the banks' desired excess reserve position. This modification changes the desired position relative to the actual position and creates surplus reserves. An increase in open market interest rates induces banks to compress their desired excess reserve position. The release of surplus reserve sets off the sequence of portfolio adjustments that we have called the multiplier process. A reduction in interest rates induces the opposite response, a reduction in surplus reserves, bank portfolios, and the money supply. Raising the rediscount rate induces banks to hold a larger volume of excess reserves, on the average, by increasing the marginal cost of potential reserve deficiencies without affecting the marginal cost of holding excess reserves. The optimal portfolio of excess reserves rises. If this rise is not matched by an increased supply of excess reserves, the discrepancy between actual and desired position pushes the multiplier process in a deflationary direction. A similar argument applies to variations in the anticipated average or variability of reserve flows.

The dependence of the banks' desired reserve position on interest rates connects the money supply with the credit markets and thus with the public's asset supply behavior on these markets. Such asset supply has at times been introduced as the centerpiece of the money supply process, particularly by spokesmen for the Federal Reserve System. Our investigations confirm the dependence of the money supply on interest rates via the banks' desired reserve position, but they also indicate the comparatively small order of this influence. The behavior of the money supply has been dominated by the base, the requirement ratios and the currency patterns. Variations in interest rates do, however, modify the basic contours. They inject an element into the money supply process that creates a minor dependence of the money supply on the behavior of national income under existing institutional arrangements.

The role of interest rates in the money supply process also prevails in deep depressions. It has often been asserted that in periods of large deflation a "liquidity trap" opens. The "trap" is said to appear in the form of a demand for cash assets by banks that is so sensitive to interest rates that rates cannot decline. The rationale for the floor has rarely been developed explicitly. Presumably it is determined by the marginal costs associated with credit market transactions. In any case when interest rates have reached this floor, the banks' desired portfolio of excess reserves is said to become indefinitely large. Any operation that injects surplus reserves into the System—open market operations, gold inflows, return flows of currency to banks, etc.—is supposed to be offset by an increase in the banks' desired excess reserves. With interest rates at the lower floor, variations in the base,

the second components of the public's currency and time deposit demand, and changes in the requirement ratios would exert no effect on the money supply. The modifications in the supply of excess reserves engineered by these policy actions or induced by the public's behavior, would be immediately matched by a change in the banks' desired reserve position.

With interest rates at the level of the "floor" or "trap," discrepancies between actual and desired positions become impossible. The crucial link between monetary policy and the money supply is broken. The behavior of the money supply would have to be explained in terms entirely different from those that have been presented. At the floor level of interest rates the banks' portfolio of earning assets would only mirror the public's asset supply decisions. Banks would be passive agents without independent response to inflows or outflows of reserves. Their portfolio changes would depend solely on the public's demand for loans. Under these conditions, the money supply is completely determined by the public's asset supply to banks.

Considerable attention has been given in the literature to the conjecture that a liquidity trap operated in the thirties and rendered monetary policy futile and useless. The large volume and persistent accumulation of excess reserves seemed to strengthen such notions. On occasion, the behavior of excess reserves was accepted as prima facie evidence for the operation of a liquidity trap. Unfortunately, vague, impressionistic evidence of this kind was accepted by the Federal Reserve authorities and given added weight by their references to monetary policy as a matter of "pushing on strings."

The observed behavior of excess reserves is quite compatible with a persistently effective monetary policy and can be adequately explained in terms of the banks' demand for excess reserves developed in an earlier section. The persistent decline of interest rates accompanied by the substantial rise of anticipated average and variability of reserve flows (induced by the shocks experienced between October 1930 and March 1933) raised the banks' desired level of excess reserves. The decline of interest rates lowered the marginal cost of holding excess reserves, and the induced increase of anticipated average and variability of reserve flows raised the expected marginal cost of reserve deficiencies. Both types of cost thus moved in a direction that contributed to the expansion of the banks' desired excess reserves.

Our discussion of an alternative explanation of the events that have been widely interpreted as evidence for the "trap" or "string pushing" does not dispose of the alternative notions. Neither does the assertion that the "trap" rendered monetary policy futile dispose of our explanation of the events. Evidence is required to discriminate between the rival explanations. Such evidence is of importance for deciding whether the Federal Reserve and others erred when they accepted the view that monetary policy was inoperative and ineffective in the depression of the thirties.

Three pieces of evidence will be discussed here. The first is an appraisal of the effects of doubling reserve requirements in a series of steps. Under the "liquidity trap" notion, this action would have no effect on the money supply. The volume of excess reserves would be lowered, and the volume of required reserves raised, by this action. Under the liquidity trap notion, banks are assumed to

accept passively such changes in reserve position. The alternative explanation that we have presented implies that an increase in the requirement ratios absorbs surplus reserves, sets off the multiplier process and leads to a reduction in the money supply and the banks' earning assets. The changes in reserve requirements became effective on August 16, 1936, March 1 and May 1, 1937. The money supply had been growing at the annual rate of 18 percent during most of the months of 1935. The rates of growth in the money supply for May 1936 to December 1937 are shown in table VI–6. The rates shown are annual rates measured from the same month in the previous year.

TABLE VI–6.—*Annual rate of growth of the money supply before and after changes in reserve requirements, monthly 1936 and 1937*

Month	Growth rate (percent)	Month	Growth rate (percent)
May 1936	16.8	March 1937	12.6
June	17.6	April	10.1
July	17.1	May	5.7
August	10.8	June	3.3
September	14.5	July	2.4
October	12.9	August	2.1
November	11.6	September	— .1
December	14.1	October	—2.0
January 1937	13.1	November	—3.5
February	12.1	December	—5.7

The National Bureau of Economic Research records a peak in economic activity in May 1937. The Federal Reserve's index of industrial production also peaked in that month, although the annual rate of growth of output remained positive throughout the summer. Thus the growth rate of the money supply and the stock of money began to decline before the peak in economic activity. Since output was rising, the decline in the money supply cannot be attributed to a reduction in the public's supply of assets to banks, as would be expected from the liquidity trap notion. The evidence is inconsistent with the "trap."

A second source of evidence is the behavior of interest rates during the period. Under the "trap" notion, interest rates reach a "floor" below which they will not decline. Bond yields on U.S. Government securities declined from approximately 3.31 percent in the second quarter of 1933 to 1.9 percent at the time of the U.S. entry into the war. This decline proceeded during most of the 8-year period, interrupted on occasion by increases in interest rates. An even more persistent decline can be observed in the rates charged by banks on commercial loans. The average rate on commercial loans charged by banks in "principal cities" fell from approximately 4.53 percent in the second quarter of 1933 to 2.41 percent in December 1941. Yields on short-term paper declined sharply in the early phases of the recovery and oscillated considerably around a very low average in later years. For example, in 1939 3-month Treasury bills were quoted at yields of from .02 to .05.

Inspection of the behavior of interest rates during the period reveals either a persistent downward trend for the longer maturities or a sharp decline followed by substantial monthly variation for the shorter maturities. Only stock exchange loans and banker's acceptances show constant yields that remained at a low level for extended periods. But these securities were, at the time, quite unimportant.

According to the liquidity trap conception, interest rates reach a floor at which banks passively accepted the variations imposed on their excess reserves. The behavior of interest rates during the period is inconsistent with the explanation offered by proponents of the "trap." Again, the evidence casts doubt on the relevance of the asserted "trap" as an explanation of the events in the thirties.

This doubt is reinforced by examination of the data on bank portfolios, a third source of evidence. The liquidity trap notion suggests that portfolios reflect only the actions taken by the public. The banks' response is said to be passive. It is difficult to conceive of the mechanism underlying this passive adjustment. Banks caught in the liquidity trap would have a loan portfolio dependent only on the public's demand for loans. But banks also have portfolios of Government securities that are bought and sold on an organized market. An expansion of the security portfolio cannot be interpreted as an event occurring because the public dumped packets of securities on the banking system. Under prevailing institutional arrangements, securities purchased by banks necessarily involved a choice by bankers confronted with costs and yields on alternative assets.

It is noteworthy that in the first year of recovery from the depression, the expansion of "bank credit" took the form of an increase in the securities portfolio that more than offset the decline in loans. This portfolio expansion resulted primarily from an inflow of gold that generated surplus reserves. The accelerated demand for securities by banks contributed to the persistent decline in yields on securities. Under the base conception of the money supply process, the decline in yields helps to explain the increased holding of excess reserves by the banks and the attenuation—but not the elimination—of the magntitude of the monetary multiplier. Thus, according to the base conception, the explosion of the monetary base in the middle thirties occurred in the presence of a smaller monetary multiplier.

One should also note that, during the recovery from 1933 to 1937, the portion of the increase in the base that flowed into excess reserves declined persistently. This observation is consistent with the attenuation of the anticipated mean and variance of reserve flows as the catastrophic events of the early thirties faded into the background.

Detailed inspection of the events of the thirties casts serious doubt on the relevance of the liquidity trap notion. These doubts are reinforced by our results bearing on the interaction of the demand for and supply of money. Moreover, almost no evidence beyond casual references and impressionistic appeals has ever been advanced in support of the "trap" conjecture.[3] We thus dismiss this conjecture as poorly substantiated and conclude that variations in the banks' desired portfolio of cash assets, in response to interest rates and anticipated average or variability of reserve flows, do inject surplus reserves into the multiplier mechanism. But these flows do not systematically offset the surplus reserves cast up by the other processes previously discussed. The existence of a demand for excess reserves, dependent on prevailing credit market conditions, thus modifies the size

[3] A recent attempt claiming to provide evidence supporting the "trap" came to our attention after this section was written. Cf. G. Horwich, "Effective Reserves, Credit, and Casualty in the Banking System of the Thirties," in D. Carson, ed., Banking and Monetary Studies. However, Horwich's tests are inconsistent with the hypothesis he formulates in the appendix.

of the response in money supply to policy actions during periods of comparatively low interest rates. But the response is not obliterated. Policy actions were connected to the money supply even during the phases of collapse and insufficient recovery of the 1930's. It follows that monetary policy cannot be absolved from responsibility for both events. Inappropriate policies, guided by fundamental misconceptions about the structure of the monetary process, accelerated the deflationary process in 1929–33, and subsequently prevented the large monetary expansion required to absorb all idle resources.

A SUMMARY OF THE MONEY SUPPLY PROCESS AND AN INDICATION OF SOME EVIDENCE

According to the conception outlined above, variations in the money supply are explained in terms of the extended monetary base (i.e., the base plus the cumulated sum of reserves "liberated" from or "impounded" into required reserves by fiat changes in requirement ratios or due to the redistribution of existing deposits between different classifications), the public's desired wealth allocation to currency and time deposits, and the banks' desired portfolio of excess reserves. The major implications of this conception can be summarized in the following propositions:

(1) Variations in the base, requirement ratios and the public's currency behavior dominate the behavior of the money supply.

(2) The public's asset supply to banks, especially the public's loan demand, affects the money supply to the extent that the banks' desired volume of excess reserves is sensitive to interest rates. There is little doubt that excess reserves depend on interest rates and are highly sensitive to interest rates in a low interest rate regime. Nevertheless, the base and the public's currency behavior dominated the money supply process during the middle and late thirties as in other periods.

(3) A dollar change in the base induces, on the average, a multiple change of the money supply in the same direction. The multiplier is substantially below the reciprocal of a weighted average of requirement ratios. Depending on the marginal allocation of newly created deposits to demand or time accounts, this reciprocal would be at least 7 and at most 25 (at present). If 20 percent of the newly created deposits were allocated to time accounts, the reciprocal would be 10.6. On the other hand, if 80 percent of the newly created deposits were allocated to time accounts, the reciprocal of the suitably weighted average requirement ratios would be 21.4. According to the base conception, the multiplier effect of the base is much smaller than the lower boundary of the reciprocal mentioned. The single most important reason for this comparatively reduced magnitude of the monetary multiplier is the spillover into currency. This spillover is typically associated with the banks' series of portfolio adjustments triggered by surplus reserves. These spillovers mirror the public's positive marginal propensity to hold currency relative to money wealth.

(4) Changes in reserve requirement ratios induce changes of the money supply in the opposite direction. A dollar change in required reserves, attributable to changes in the average requirement ratios induces, on the average, a response in the money supply that is similar

in magnitude to a dollar change in the base. The accumulated sum of all reserves liberated from or absorbed into required reserves by changes in the average requirement ratio has been computed for our analysis. This sum is added to the monetary base to form the "extended monetary base," the single most important determinant of the money supply. The extended base is completely controlled by the Federal Reserve authorities via open market policy, reserve requirement policy, and discount policy.

(5) The extended monetary base, currency drains and reallocations of deposits between demand and time accounts affect the money supply, per dollar of operation involved, in a descending order of magnitude. A dollar change in the base has a larger effect than a dollar's worth of currency drain, and the latter has a larger effect than a dollar's worth of deposit reallocation. The difference in the magnitude of the responses is determined by the size of the prevailing requirement ratios and the banks' marginal propensities to hold excess reserves with respect to demand and time deposits.

(6) The size of the monetary multiplier depends on the reserve requirement ratios, the public's marginal propensity to hold currency and time deposits with respect to money wealth, the banks' marginal propensity to hold excess reserves with respect to deposit liabilities, and the pattern of interbank payments through the correspondent banking system. While the magnitude of the multiplier is responsive to variations in requirement ratios, it is much less sensitive to the level of the legal ratios than is usually suggested. The elasticity of the multiplier with respect to the reserve ratios is substantially below unity (in magnitude) and is approximately minus one-third. A 20-percent increase in requirement ratios from 15 to 18 percent would lower the multiplier by about 7 percent; i.e., from 3 to 2.8.

(7) The conception describing the money supply process clearly reveals that "monetary expansion" and "credit expansion" are not "two sides of the same coin." Instead the conception implies that the joint operation of the base, the requirement ratios (via the cumulated sum of liberated reserves), the public's allocation of payment money between currency and checking deposits, and its allocation of deposits between checking and time accounts yields substantially different patterns for money supply, total deposits and the banks' portfolio of earning assets (i.e., one sense of bank credit). A dollar of liberated reserves induces the same response in the banks' portfolio as in the money supply plus time deposits and a smaller change in the money supply. On the other hand, a dollar change in the base exerts, on the average, a smaller effect on the banks' portfolio of earning assets than on the money supply. An important result that we asserted above to hold for the money supply (with or without time deposits) does not hold for the banks' earning assets. The response of earning assets to variations in the base is smaller on the average than the response to liberated reserves.

(8) Variations of the interbank deposit structure within the observable range exert only a negligible effect on the money supply. Moreover, if required reserves were assessed against total demand deposits (unadjusted for claims against other banks), the connecting link between the interbank deposit structure and the money supply would be broken.

Some comments on policy action

Monetary policy centers on open-market operations, reserve requirement ratios and the discount rate. But other courses of action remain available to both Federal Reserve authorities and the Treasury. Among such courses of action affecting the money supply should be mentioned: (1) the reclassification of member banks, (2) the Federal Reserve's check collection arrangements and the behavior of float, (3) the administration of the discount window revealed by the cyclical behavior of discounts and advances among the source components of the base, (4) the Treasury's administration of its money balances, particularly the division of the total balance between Federal Reserve accounts and tax and loan accounts at commercial banks and the relative variability of these two components, (5) the division of the total gold stock between reserve account and the general fund, and (6) the extent to which the Treasury uses a surplus to retire Government debt held by the Federal Reserve banks or finances a deficit (directly or indirectly as in 1917–18) by borrowing from Federal Reserve banks.

The effect of both open market operations and changes in reserve requirement ratios have been discussed sufficiently in previous sections. Open market operations immediately modify the base and thus set off the multiplier mechanism; changes in the legal ratios also inject surplus reserves in the manner described above. But the operation of the rediscount rate and the effect of other policy actions requires further discussion.

Discount policy

Variations in the discount rate work their effects on the money supply through two different channels, the banks' desired volume of excess reserves and the base. (1) An increase in the discount rate raises the banks' expected marginal cost of potential reserve deficiencies and induces a rise in the desired volume of excess reserves. This response in bank behavior is comparatively small. But, surplus reserves are reduced, since desired excess reserves are pushed above the supply of excess reserves. To the extent this occurs, the multiplier mechanism works to lower both the money supply and bank portolios until desired and actual excess reserves are equated. (2) The effect on the base results from the occurrence of discounts and advances among the sources of the base. The borrowing of commercial banks (mostly member banks, but occasionally foreign central banks) usually dominates the behavior of this source component. Banks respond to the discount rate announced by the Federal Reserve authorities according to a demand pattern that is partly influenced by the Federal Reserve System's administrative pressures, expressed by the "tradition against borrowing" so persistently advocated by spokesmen for the System. Under this demand pattern, banks' indebtedness to Federal Reserve banks is essentially determined by the discount rate, the Federal funds rates and other rates of interest. The available evidence strongly supports the contention that an increase in market rates relative to the discount rate raises the banks' volume of indebtedness and thus raises the Federal Reserve banks' discounts and advances. Conversely, an increase in the discount rate, relative to prevailing market rates, reduces the incentive to borrow, lowering the Federal Reserve's portfolio of discounts and advances and the base. An increase in the discount rate thus

induces a negative response in the money supply via the banks' desired volume of excess reserves and the volume of discounts and advances. A reduction in the discount rate would similarly operate to raise the base and compress (slightly) the banks' desired volume of excess reserves.

The administration of the discount window contributed both in the twenties and the fifties to the cyclical variability of the money supply. The discount rate typically lags behind the movements of the market rates. A cyclical upswing, generated or reinforced by nonmonetary factors, pushes market rates ahead of the discount rate, and induces banks to expand their borrowing. The rising volume of discounts and advances increases the base and consequently increases the money supply. A reverse operation occurs in a downswing. The cyclical variability of the money supply is thus amplified by the operation of the discount window. A feedback mechanism is introduced into the monetary system that amplifies economic fluctuations.[4]

Neither the amplifying feedback nor the administrative pressures applied to borrowing banks are necessary features of the discounting mechanism. Administrative pressure could be replaced by a discount rate that is always higher than open market rates and loan rates. The discount rate has traditionally been low in the United States relative to short-term asset yields. This alone would have induced, on the average, large scale borrowing by banks. Thus a "tradition against borrowing" had to be fostered by administrative procedures that complicate a bank's "life with the Federal Reserve." If a penalty rate replaces the traditional "inducement rate," administrative pressures to bottle up commercial banks' borrowing requests become unnecessary. Furthermore, rapid adjustments of this penalty rate to evolving market situation would eliminate the amplifying feedback traditionally associated with the Federal Reserve's discount operations.

The Federal Reserve's check collection facilities

The portfolio of securities and discounts dominates the longrun movements of Reserve bank credit. But variations in Federal Reserve float frequently exert a decisive effect on Reserve bank credit and the base in the very short run, e.g., from week to week. Float arises as part of the Federal Reserve's check collection process that was described in the section devoted to the base. It consists of checks drawn on commercial banks, collected via the Federal Reserve System, for which collection time has exceeded the fixed time schedule. Every dollar of additional float adds a dollar to the base.

Federal Reserve float is determined by the volume of checks presented to Federal Reserve banks for collection, the time period fixed for deferred availability credit and the probability distribution governing the time required by Federal Reserve banks for processing and collecting these checks. Both the volume of checks and the actual collection time are subject to substantial shortrun vagaries that create the erratic shortrun behavior of float. These erratic movements, difficult to foresee from day to day or week to week, are a major source of shortrun variation in the base. The fluctuations attributable to float,

[4] The result of discount policy that has just been described reinforces the operation of monetary policy that was described in an earlier chapter. We noted in the earlier chapter that postwar monetary policy has been procyclical rather than countercyclical on the average.

however, tend to average out and in the longer run are submerged by the changes in the base due to gold or other components of Reserve bank credit.

The operation of the check collection facilities thus contributes substantially to the feeling that "defensive" action is required. Float enhances the uncertainties confronting the account manager and the pressures on him to concentrate on the shortest run horizon that we discussed in chapter II. The erratic shocks in the base emanating from the check collection process could be attenuated by lengthening the period governing deferred availability credit. Moreover, if the reserve accounts of banks presenting checks for collection were credited at the time the reserve accounts of the drawers' banks were debited, float would disappear and with it the erratic shortrun element in the base.

The administration of Treasury deposits

The Treasury holds tax and loan accounts with thousands of commercial banks. It also maintains deposits at Federal Reserve banks. The Treasury has to decide how to partition its total balances between the two types of accounts. Variations in this division, and particularly variations in the Treasury deposits at Federal Reserve banks, have monetary consequences.

A transfer of Treasury funds from tax and loan accounts to Federal Reserve deposits raises a component of the base that is included as a negative source. The base declines and deflationary impulses are sent through the multiplier mechanism when such transfers occur. The base rises when the Treasury disburses funds from its Federal Reserve account. The administration of the Treasury's money balances can exert a substantial effect on the monetary system. The Treasury's receipts from taxes and borrowing do not have a timing pattern matching the expenditures made by drawing on its Federal Reserve deposits. At times in the past, considerable shortrun variation in Treasury deposits at Federal Reserve banks have occurred as a result. These variations either induced a corresponding shortrun instability in the base or added to the uncertainties facing the account manager. A readjustment in the Treasury's procedures and improve coordination between the account manager and the Treasury now minimize the destabilizing impact of variations in Treasury balances. Most of the Treasury's receipts accrue on tax and loan accounts at commerical banks and are transferred to Federal Reserve deposits under a formula arrangement. Treasury deposits at the Federal Reserve banks are kept at a comparatively very low level. Moreover, transfers are geared sufficiently close to disbursements to contain fluctuations in Treasury deposits at the Reserve banks within relatively narrow limits. The effects on the base and the money supply have thus been similarly confined.

Treasury deficit and surplus

Numerous discussions during and after the war about the interrelation of fiscal and monetary policy attached great importance to the monetization of debt by the monetary system. The inflationary effect of a deficit seemed to depend on the distribution between public and banks of the securities issued to finance the deficit. Monetization of debt by commercial banks was alleged to raise the money

supply and contribute to inflationary pressures. Application of a surplus, on the other hand, to retire debt from banks was often characterized as a deflationary policy action designed to lower the money supply.

Our analysis of the money supply process clearly implies that a coordination of Federal Reserve expansion of the base with Treasury deficits exerts a substantial effect on money supply and bank portfolios. We contend, however, that the concept of debt monetization by banks involves serious misconceptions. Such misconceptions may have been fostered by the unfortunate terminology used in Federal Reserve publications. The analytical frame outlined in previous sections permits us to clarify the issues involved.

The crucial distinction in the case of financing a deficit is not between securities acquired by banks and securities acquired by the public but between securities acquired by Federal Reserve banks and securities acquired by the banks or the public. The first method of classification has no relevance for money supply behavior. The second classification permits consideration of the significant difference in the response of the money supply and bank portfolios to the Treasury's fiscal procedures. If the Treasury's issue of new securities is matched by an equal purchase of marketable securities by Federal Reserve banks, then Reserve bank credit expands and the base rises immediately by a matching amount. Money supply and bank portfolios respond correspondingly. On the other hand, if the Treasury's new issues are offered on the market for placement in the public's and the banks' portfolios, neither the base nor any other major determinant of the money supply or total bank earning assets is affected directly. However, prevailing interest rates are altered. The Treasury's new offering to the public or the banks raises the (stock) supply of Treasury securities confronting the public's and banks' demand. Interest rates, therefore, rise. This rise in interest rates lowers the banks' desired excess reserves, raises their desired borrowing from Federal Reserve banks, and compresses the public's relative demand for time deposits. The induced increase in the commercial banks' borrowing from Federal Reserve banks expands the base and consequently expands the money supply.

The induced reallocation of the banks' assets between cash assets and earning assets, or the public's deposits between time and checking accounts, also contributes to the increase in the money supply. The response of the money supply to new Treasury issues sold to the banks or the public thus depends on the operation of the interest mechanism. The magnitude of this response is determined by the sensitivity to interest rates (i.e., the interest elasticity) of the banks' desired excess reserves, the banks' indebtedness to Federal Reserve banks, and the public's demand for time deposits. A pronounced sensitivity of both banks and public to interest changes (expressed by large interest elasticities) generates comparatively large responses of the money supply to new Treasury issues sold to the public and the banks. An interest insensitive behavior of the public and the banks, on the other hand, renders the money supply quite insensitive to variations in the Treasury's debt operations.

The effects of interest rates on the banks demand for excess reserves and borrowing and the public's demand for time deposits influence the money supply in the same direction. This is not the case for the com-

mercial banks' portfolio of earning assets. The banks' and the public's response to interest rates work in opposite directions on this magnitude. It follows that the working of the interest mechanism, set in motion by the market's absorption of new Treasury issues or the Treasury's net retirement of outstanding debt, generates a larger response in the money supply than in the banks' portfolio of earning assets.

The base conception of the money supply process thus implies that the Treasury's debt management operations affect the money supply. But this conception also implies the need for a careful distinction between variations in the distribution of outstanding debt that raise or lower the Federal Reserve's holding and those that alter only the distribution between commercial banks and the public. Reshuffling the ownership of the public debt between commercial banks and the public has no significant effect on the money supply.

When the Treasury's debt operations are matched by a corresponding increase in the base, the stock supply of securities on the market is unchanged and the money supply expands. If the Treasury's operations only shift the stock supply of securities on the market, the response of the money supply is comparatively small. This should not suggest that the redistribution of securities between the banks and the public has no economic effect. The redistribution affects the structure of bank assets—the composition of portfolios between loans and securities—in a manner determined by the public's and the bank's demand for financial assets. But this redistribution does not affect the money supply. The monetary effect of the shift in securities between the public and the banks depends, in a first approximation, on the change in the size of the outstanding debt. In short, monetization or demonetization of Government debt by commercial banks has no relevent connection with the behavior of the money supply and the total volume of banks' earning assets, in the conception presented.

Some conflicting implications of the base and free reserve doctrines

The free reserve conception has been discussed in some detail in earlier chapters.[5] We contend that this conception has held the dominant position among the Federal Reserve's notions. The radical difference between the base conception, outlined in this paper, and the Federal Reserve's view is explored in this section.

In the Federal Reserve's view emphasizing the central role played by free reserves, increased borrowing by banks is relatively deflationary, and a larger supply of excess reserves is relatively inflationary. A completely different interpretation of borrowing and excess reserves emerges under the conception that assigns a central position to the extended base and the public's currency behavior. An increase of member bank borrowing from Federal Reserve banks raises the monetary base. This holds equally for funds obtained by banks through discounting eligible paper or through loans based on collateral deposited at Federal Reserve banks. The legal and administrative technicalities have no relevant effect on the base. In either case, the base increases and so does the money supply. Similarly, a contraction in the Federal Reserve's discounts and advances lowers the base and compresses the money supply.

[5] Published separately as "The Federal Reserve's Attachment to the Free Reserve Concept," a subcommittee print.

The conception outlined in the present study thus reverses the Federal Reserve's traditional interpretation of member bank borrowing. The Federal Reserve's expanding portfolio of discounts and advances, typically observed during an upswing, does not, according to the conception centered on the base, gradually decelerate the money supply and inject "less ease" or "more tightness" into the monetary system. On the contrary, member bank borrowing contributes to the persistent growth in the money supply observed during periods of economic expansion. Similarly, the reduction of member bank borrowing during a recession is not an event that "eases" the monetary system by accelerating the money supply or slowing its deceleration. A decline in discounts and advances lowers the base and retards the growth rate of the money supply. Under the base conception, reductions of member bank borrowing are a deflationary and not an inflationary move.

The same argument applies of course to any component of Reserve bank credit. An increase in Reserve bank credit, whatever the precise form and technicality involved, raises the base and consequently expands the money supply. In particular, securities purchased by Federal Reserve banks from security dealers under repurchase agreements also affect the base and thus the money supply. Under the modified base doctrine presented in this chapter, member bank borrowing and repurchase agreements have exactly the same effects on the money supply.

According to the free reserve doctrine essentially trivial differences in technicalities lead to opposite evaluations of member bank borrowings and repurchase agreements. Both events involve loans made by Federal Reserve banks on the basis of collateral left with the Federal Reserve banks. When a member bank borrows by obtaining a loan from a Federal Reserve bank, collateral is pledged to the Reserve bank as a guarantee of repayment. Many banks maintain collateral in the form of short-term Government securities at the Federal Reserve to simplify the mechanical side of this transaction. If the bank has not pledged the securities to the Reserve bank as collateral for a loan, they can be used for transfers from bank to bank over the private wires of the Federal Reserve System. But if they have been pledged as collateral for a loan from the Reserve bank, they are no longer available for this purpose. Thus the effect of the most commonly used form of borrowing from a Reserve bank is a temporary reduction in the amount of short-term securities available in the market, although technically the title to the securities remains with the member bank.

A loan to Government security dealers is technically treated as a dealer repurchase agreement. The dealer sells short-term Government securities to the Reserve bank and agrees to repurchase the same securities at the end of a specified number of days. The effect on the monetary base of the dealer repurchase agreement is identical in every way with the effect of a collateral loan. The dealer receives bank reserves (Federal funds), and the Federal Reserve makes a loan to the dealer that is in effect collateralized by Government securities. A liability item, reserves of member banks, increases on the consolidated balance sheet of the 12 Federal Reserve banks. The asset item Federal Reserve bank credit rises. The monetary base increases temporarily, i.e., until the transaction is reversed.

The Federal Reserve recognizes that dealer repurchase agreements are a means of supplying reserves and easing the prevailing pressure

on the monetary system. Indeed, the rationale for the use of repurchase agreements is that it is a means of easing a money market situation that has become temporarily more restrictive than is deemed desirable. We must ask, therefore, how two transactions that have an identical effect on the consolidated balance sheet of the Reserve banks can have a different effect on the market. The answer in terms of the monetary base is, of course, that they do not have different effects. Collateral loans to member banks and dealer repurchase agreements have an identical effect on the monetary base. But an increase in borrowed reserves has no effect on free reserves because total reserves and borrowed reserves both rise, while a dealer repurchase agreement raises total reserves and is not counted as an increase in borrowed reserves. Judged in terms of the concept of free reserves, borrowed reserves and dealer repurchase agreements are different. Only the latter expands free reserves and accelerates "credit expansion." It is not unlikely that the incorrect appraisal of the role of borrowing by the Federal Reserve has been an important contributing factor to the procyclical movement of the money supply in the postwar years.

An arbitrary technical distinction thus yields a strange result under the free reserve doctrine. An increase in member bank borrowing decelerates the money supply, whereas an expansion of repurchase agreements with security dealers accelerates the money supply. Loans made on collateral are deflationary and loans made by simultaneously purchasing spot and selling long are inflationary. Of course, the Federal Reserve might concede this point and adjust the notion of free reserves by lumping repurchase agreements with member bank borrowings. Expansion of either repurchase agreements or bank borrowings, excess reserves unchanged, would lower "free reserves" and decelerate the money supply. But, the puzzle has only been shifted. Loans made under the form of a repurchase agreement, combining a spot purchase with a long sale at a specified future date, would be deflationary under the adjusted free reserve conception at the time of purchase. On the other hand, spot purchases of securities by Federal Reserve banks combined with a definite decision to unload the securities at an uncertain future date, would be expansive at the time of purchase and contractive at the time of sale.

The base conception of the money supply also yields an interpretation of the role and position of excess reserves that differs sharply from the view presented by the free reserve doctrine. The latter interprets expanding excess reserves to mean accelerated movements in money supply and "bank credit." Falling excess reserves are assigned a deflationary interpretation. Once more, the modified base doctrine reverses this interpretation. Expanding excess reserves, typically associated with falling interest rates, actually slow the growth rate of the money supply and bank portfolios. And declining excess reserves, usually accompanied by rising interest rates, accelerate the growth in money supply and bank portfolios.

It should be noted, however, that all Federal Reserve statements do not conflict with the implications of the base doctrine. Moreover, at times it is possible to interpret some of the statements made by the Federal Reserve in terms of the base conception. But such interpretations yield no support for the more frequently occurring statements that justify policy operations in terms of the free reserves conception.

CONCLUSION

In section I of this study, we have developed an alternative conception of the money supply process that we have called the modified base doctrine.[6] This conception emphasizes the role of the extended monetary base and the public's currency behavior as the principal elements that must be incorporated in an analysis of money supply behavior. We have also pointed to some other elements that must be incorporated as part of a more complete explanation. Specifically, the public's demand for time deposits, the banks' demand for excess and borrowed reserves, and the role of interbank deposits, and the check collection process have been indicated as ingredients in the process.

Specific policy actions and the events recorded in monetary history have been discussed using the framework centered on the base. We have noted that the conception developed is an extremely useful tool for separating the policy actions taken by the Federal Reserve to influence the money stock from the other factors affecting the money supply. The analysis reveals that the failure of the Reserve authorities to appreciate the importance of the public's demand for currency and the demand by banks for excess reserves contributed in major ways to the serious policy errors of the thirties.[7]

The base conception established a connection between the comparative size of the excess reserves in the banking system and the strength of the feedback from nonmonetary processes to the money supply. Under some conceptions, this feedback from economic activity, via the demand for loans, is the principal determinant of the money supply. The base doctrine acknowledges the feedback but denies that it is the centerpiece of the money supply process. Instead, the feedback is viewed as operating principally through the effects of variations in interest rates on the banks' demand for excess reserves. In periods of low interest rates and large excess reserves, an increase in the pace of economic activity that stimulates the demand for loans and raises interest rates compresses the demand for excess reserves by banks and increases the money supply. Our investigation suggests that this effect is stronger in periods of low interest rates.

The effectiveness of monetary policy, operating through the extended base, is not impaired by the existence of the feedback. Operations on the base or on the reserve requirement ratios could offset the induced expansion. And policies to expand the money supply need not patiently wait for the operation of the feedback. Moreover, the importance of the feedback could be further reduced by institutional rearrangements that reduce the cost of holding excess reserves or the cost of potential reserve deficiencies.

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[6] The money supply theory outlined has been developed in more detail in a paper published by one of the authors in "A Schema for the Supply Theory of Money," International Economic Review, January 1961. More material bearing particularly on the public's demand for currency and time deposits was contained in "The Structure of the Monetary System and the Aggregate Money Supply Function," which was presented at a session of the Econometric Society in December 1960. The reader may also consult our paper "Some Further Investigation of Demand and Supply Functions for Money," Journal of Finance, May 1964. Our forthcoming book will contain several chapters dealing with money supply theories.

[7] A more detailed analysis of the Federal Reserve's policy during the recovery phase of the great depression can be found in Karl Brunner's "A Case Study of U.S. Monetary Policy: Reserve Requirements and the Inflationary Gold Flows of the Middle Thirties," Schweizerische Zeitschrift fur Volkswirtschaft und Statistik, 1958.

Section II—Some Evidence on the Relation of the Base Mechanism to the Supply of Money

A major contention in our criticism of the Federal Reserve System is that they have failed to develop an adequate analysis of the money supply process and have failed to support their conjectures with evidence. The evidence presented in chapter V [1] provides ample reason for doubting the relevance of the modified free reserves doctrine. But neither our doubts nor the existence of an alternative conception are sufficient to reject the Federal Reserve's view centered on free reserves. The alternative conception must be appraised in competition with the free reserves doctrine. In this chapter, some evidence had been gathered to indicate the comparative relevance of the modified base conception.[2]

The Relation of the Modified Base Conception to the Money Supply

The discussion in the previous chapter assigned a dominant role in the monetary process to the effect of the extended base on the money supply. We noted there that the extended base is the single most important determinant of the stock of money. However, our analysis implies that other factors must be included along with the base for a more complete explanation of monetary behavior. When these elements are incorporated with the extended base, we obtain the relation that we call the modified base conception. To recapitulate the earlier discussion, the modified base conception incorporates: (1) the monetary base plus the accumulated sum of reserves liberated or impounded by changes in reserve requirements; (2) the public's second demand component for currency; (3) the public's second demand component for time deposits; (4) interest rates; and (5) the rediscount rate. The two last elements reflect the operation of the interest mechanism on the banks' desired reserve position and provide a link between the money supply and the credit markets.

The coefficient of determination is used to measure the relation of changes in the base or in the elements of the modified base conception to changes in the money supply. This measure was introduced in chapter V [3] when we appraised the evidence for the modified free reserve conception. As we noted there, the coefficient of determination must be between zero and 1. The closer the computed coefficient of variation comes to 1, the larger the percentage of variation in one entity that is explained by concomitant variations in the others.

Table VII–1 presents the coefficients of determination for the extended base and the modified base conception. The underlying data

[1] Published separately as sec. III of "The Federal Reserve's Attachment to the Free Reserve Concept," a subcommittee print, by Karl Brunner and Allan H. Meltzer.

[2] Other evidence is provided in our paper "Some Further Investigation of the Demand and Supply Functions for Money," Journal of Finance, May 1964. Additional findings will be reported in our forthcoming book.

[3] Published separately as sec. III of "The Federal Reserve's Attachment * * *," op. cit.

are the changes in each of the variables from a given quarter to the corresponding quarter in the following year. This is similar to the procedure that we used in some tests of the free reserve conception. Two principal advantages of measuring changes from year to year recommended the use of annual changes between corresponding quarters of adjacent years rather than changes between adjacent quarters. First, there is seasonal variation in the data for the change in the money supply and the other entities. The use of annual changes avoids the problem of choosing some alternative procedure for eliminating seasonal variations. Second, and most important, we have indicated repeatedly that the so-called defensive operations, practiced by the Federal Reserve, impart substantial variation to the changes in the money supply. The use of changes between corresponding quarters in adjacent years dwarfs the importance of these haphazard variations.

The computations were made for two overlapping periods. Both begin with the first quarter of 1949. One ends in the fourth quarter of 1958, the other in the fourth quarter of 1962. The separation into two periods permits an evaluation of the effect of an institutional change that occurred during 1959–60. Congress granted to the Federal Reserve the power to vary the proportion of member banks' vault cash that was counted as reserves. Shortly after this power was granted in 1959, the Federal Reserve, in a series of steps, permitted all vault cash to be counted as part of reserves. The modified base doctrine indicates that this institutional change should be incorporated by adding the volume of vault cash released to the extended base. When vault cash is incorporated in this way, the effect on the money supply of each of the elements in the modified base conception should be unchanged. The division into two periods permits a check on the specific interpretation of the change in institutional arrangements and the implied statements about the response of the money supply to the change.

Columns 1 and 4 in table VII–1 indicate the gross association between changes in the extended base and changes in the money supply or the money supply plus time deposits. It is apparent that the gross association between the changes in these magnitudes is substantially larger than any of those observed when we considered the modified free reserves doctrine. Thus the data suggest the comparative relevance of the base doctrine and the comparative irrelevance of the modified free reserve conception.

The coefficients of determination in columns 2 and 5 go beyond the simple association between changes in the money supply and changes in the extended base. The extended base is now augmented by all of the determinants of the money supply that are a part of the modified base conception. At least 95 percent of the variations in changes of the money supply are explained by the changes in the variables included in the modified base conception. Substantially superior results are thus obtained when changes in the elements representing the behavoir of the banks and the public are incorporated in the mechanism. By far the larger part of the changes in the money supply appear to be responses to movements in the proximate determinants that have been specified.

Additional information on the operation of the extended base in the money supply process is given in columns 3 and 6. The indicator

used is the partial coefficient of determination. This measure shows the association between changes in the extended base and changes in the money supply, after removing the effect of other money supply determinants included in the modified base doctrine. We usually find that the extended base and the currency factor are the two most important elements in the process. In the samples used here, this result is obtained again. Changes in the extended base account for 91 percent of the changes in the money supply afer removing the effect of other variables operating on the money supply.

Moreover, we note that the coefficients in columns 2 and 3 are quite similar to those in columns 5 and 6. This suggests that the institutional change in 1959–60—the release of vault cash—has not altered the explanatory power of the doctrine considered here.

TABLE VII–1.—*Measures of association between changes in the money supply and changes in the extended base*

	Period: 1st quarter of 1949 to 4th quarter of 1958			Period: 1st quarter of 1958 to 4th quarter of 1962		
	Coefficient of determination using—		Partial coefficient of determination for modified base doctrine	Coefficient of determination using—		Partial coefficient of determination for modified base doctrine
	The extended base only	The modified base doctrine		The extended base only	The modified base doctrine	
	(1)	(2)	(3)	(4)	(5)	(6)
Changes in the money supply	0.663	0.956	0.914	0.602	0.957	0.908
Changes in money supply plus time deposits	.607	.964	.914	.50	.985	.908

THE EFFECTS OF THE PRINCIPAL DETERMINANTS ON THE MONEY SUPPLY

The treatment of the public's demand for currency is one of the principal differences between the modified base conception and the views expressed by spokesmen for the Federal Reserve. Their discussion of currency movements is usually restricted to seasonal variation in currency flows. At times, references are made to secular changes in currency demand. But the Federal Reserve apparently has never noted either the cyclical component in currency movements or the spillover into currency that is a part of the multiplier mechanism.

Statements by Federal Reserve officials clearly deny the relevant operation of the currency drain as a part of the multiplier process. Their statements assert that the monetary multiplier for the banking system is the reciprocal of the average reserve requirement ratios. This implies that the monetary multiplier has been at least 6 and no more than 24 during most of the postwar period, the precise value depending on the marginal allocation of newly created deposits between demand time accounts as we have previously indicated.

The results in tables VII–2 and VII–3 present information on the size of the monetary multiplier and hence on the operation of currency spillovers. In all cases, we find a multiplier value substantially

less than the minimum value of six, implied or stated in Federal Reserve publications. The values thus support our contention that portfolio adjustments by the banks, induced by changes in surplus reserves, are typically associated with a partial conversion of the newly created deposits into currency. A billion dollars of open market purchases, or the release of a billion dollars from required reserves by reduction in the requirement ratios, cannot be expected to raise the money supply by more than $6 billion as the Federal Reserve has contended.

The computed values of the multiplier are smaller for the money supply than for the money supply plus time deposits. This, again, is in accord with the underlying modified base conception. The multiplier mechanism incorporates a spillover into time deposits as well as a spillover into currency. The effect of this spillover is to lower the expansion of the money supply, and to raise the expansion of the money supply plus time deposits, per dollar of surplus reserves.

The computed multipliers show the effect of a dollar of base money (table VII–3) or a dollar change in base money (table VII–2) on the two measures of the money supply or changes in the supply. The extended base incorporates the open market portfolio of the Federal Reserve banks, the volume of member bank borrowing, float, and the cumulated sum of liberated reserves. In the past few years, the amount of vault cash liberated under the new institutional arrangements is included in the extended base. Table VII–2 provides estimates for the two overlapping periods described earlier. The values of the multipliers computed from the simple base conception are relatively close for the two periods. This suggests that the change has had little or no effect on the magnitude of the monetary multiplier, as the base conception implies.

TABLE VII–2.—*The response of the change in the money supply to changes in the extended base*

	Values of the monetary multipliers	
	Period: 1st quarter 1949 to 4th quarter 1958	Period: 1st quarter 1949 to 4th quarter 1962
Change in the money supply	2.536	2.479
Change in the money supply plus time deposits	2.818	2.939

The estimates in tables VII–2 and VII–3 permit a comparison of the value of the multipliers computed from the relation of the base to the money supply with those obtained from computations of the effect of changes in the extended base on changes in the money supply. For the money supply, the two sets of estimates provide almost identical values; for the money supply plus time deposits, the estimates differ slightly but suggest that the multiplier is larger when time deposits are added to the money supply. This comparison again indicates the relevance of the modified base doctrine. Moreover, we note that the partial coefficients of determination in table VII–3 reveal the important influence of the base on the stock of money.

TABLE VII–3.—*The response of the money supply to the separate components of the extended base, 1st quarter 1948 to 4th quarter 1959*

	Multiplier—	
	For the base	For the sum of liberated reserves
For the money supply:		
Multiplier response	2.50	2.53
Partial coefficient of determination	.884	.823
For the money supply plus time deposits:		
Multiplier response	2.64	2.67
Partial coefficient of determination	.884	.823

An important feature of the modified base doctrine is the response of the money supply to the base and the accumulated sum of reserves liberated or impounded by changes in reserve requirements or redistributions of deposits between classes of banks. In most of our tests these two components are combined to form the extended base. Table VII–3 provides estimates of the multipliers applicable to each component, a test of the procedure that we have used. The results support our assertion that the effect on the money supply of a dollar of base money or of a dollar of liberated reserves are the same. A similar result is found when time deposits are added to the money supply. Moreover, the partial coefficients of determination suggest that variations in the money supply explained by synchronous variations in each of the separate components of the extended base, other elements in the modified base conception unchanged, are of approximately the same order of magnitude. Again, the evidence supports the procedures used in the development of the modified base doctrine.

We noted in chapter II that a leading spokesman for the Federal Reserve has indicated that changes in reserve requirement ratios have only seven-eighths of the effect of open market operations that supply the same volume of excess reserves.[4] They have presented no evidence in support of this assertion. Our evidence denies their contention and suggests that the effects of the two are the same, as the base conception implies.

Some additional implications of the modified base conception can be evaluated. Our discussion indicated that the public's currency and time deposit behavior influenced the money supply in two separable ways. One component has been incorporated in the multiplier mechanism; the second set of demand components for currency and time deposits occur independently of the banks' portfolio adjustment and the multiplier. Six statements, or propositions, summarize some of the main implications of the modified base conception with respect to the second demand components for currency and time deposits.

(1) The reallocation of $1 from demand deposits to currency lowers both the money supply and the money supply plus time deposits.

(2) The negative effect of the increased demand for currency is smaller for the money supply than for the money supply plus time deposits.

[4] W. W. Riefler, "Open Market Operations in Long-Term Securities," Federal Reserve Bulletin, vol. 44, No. 11.

(3) A dollar shifted from currency to demand deposits has a smaller effect on both measures of the money supply than a billion dollar change in the extended base.

(4) A dollar of deposits shifted from demand to time deposits has a negative effect on the money supply and a positive effect on the money supply plus time deposits. The effects of the shift on the two measures, though in opposite directions, will be of approximately equal size.

(5) The reallocation of a billion dollars from demand to time deposits has a smaller effect on either measure of the money supply than a billion dollar shift from demand deposits to currency.

(6) If a billion dollars of demand deposits is reallocated to the time deposit account, the sum of the decrease in the money supply (ignoring signs) and the increase in the money supply plus time deposits will be slightly greater than $1 billion. According to the base conception, the sum of the two responses will be approximately $1,050 million under prevailing institutional and behavioral arrangements.

These six propositions implied by the modified base conception can be compared to the results shown in table VII–4. To test the propositions, we have used annual changes in the relevant magnitudes from a given quarter to the corresponding quarter in the following year. The evidence supports the six propositions quite well. We will discuss the evidence for each of the six propositions in the sequence in which the propositions were presented.

(1) An increase in the public's demand for currency lowers both the money supply and the money supply plus time deposits. This confirms proposition 1.

(2) A $1 billion increase in the demand for currency lowers the money supply plus time deposits by approximately $2.7 billion on the average. This is almost $300 million larger than the average effect on the money supply as indicated by proposition 2.

(3) Only a $1 billion change in currency demand has a smaller effect on each measure of the money supply than a $1 billion change in base money, as stated in proposition 3.

(4) A $1 billion shift of deposits from demand to time account lowers the money supply $590 million and raises the money supply plus time deposits by $450 million on the average. The effects are in opposite direction for the two measures and are of approximately equal size. This result clearly reveals that when a dollar is reallocated from demand deposits to time deposits, the money supply (exclusive of time deposits) contracts by less than $1. The reallocation releases surplus reserves that stimulate the expansion of additional money by the banking system, as the base conception implies. This expansion partially restores the money supply (or the change in money supply) to its previous position.

(5) The descending order of the responses to changes in the extended base, changes in the demand for currency and changes in the demand for time deposits are supported by the evidence for both measures of the money supply. This is a major implication of the modified base conception and reveals the power of the base doctrine to indicate the approximate quantitative effects of various monetary operations on the money supply.

(6) Ignoring signs, the sum of the effect of a $1 billion change in the demand for time deposits on the two measures of the change in

the money supply is $1,043 million on the average. Again, the approximate value is extremely close to the magnitude implied by the theory.

Thus the evidence supports some of the major qualitative and quantitative implications of the base conception. Where the elements of the modified free reserves conception have at best a tenuous link with the change in the money supply, the results in this section reveal that the major changes in the money supply in the postwar period conform to the patterns implied by the modified base doctrine.

TABLE VII–4.—*The magnitude of the change of the money supply in response to changes in each of the elements of the modified base conception—Period, 1st quarter 1949–4th quarter 1952*

[Billions of dollars]

	Money supply	Money supply plus time deposits
Response to a billion dollar change in the extended base	$2.478	$2.755
Response to a billion dollar shift from demand deposits to currency	−2.423	−2.692
Response to a billion dollar reallocation of deposits to time account	−.592	+.451
Response to a change in the Treasury bill rate by 1 percentage point	+.656	+.728
Response to a change in the discount rate by 1 percentage point	−2.9	−.243

The theory of the money supply that we have presented incorporates interest rates in the monetary mechanism along with the factors that have been considered in this section; the extended base, the demand for currency, and time deposits. Variations in interest rates operate on the money supply through three distinct channels: (1) via the reallocation of deposits between demand and time accounts; (2) via the banks' desired excess reserve position; (3) via the banks' desired borrowing from the Federal Reserve banks. The operation of the first and third channels has been implicitly incorporated in the monetary process by procedures that were discussed earlier. The operation of interest rates on the allocation of deposits between demand and time account is implicitly recognized through the second demand component for time deposits. The working of interest rates on the demand for borrowed reserves has been incorporated through the volume of member bank borrowing that is treated as a source of the monetary base. Under an alternative procedure, the base is adjusted by the removal of member bank borrowing as a source and borrowed reserves as a use. The demand for borrowed reserves is then incorporated through the interest mechanism.

In the present case, interest rates operate through the second channel only—the demand by banks for excess reserves. The results are shown in lines 4 and 5 of table VII–4 above where the computations are based on changes in interest rates. We find that an increase in the Treasury bill rate lowers the banks' demand for excess reserves and adds to both the money supply and the money supply plus time deposits. A rise in the rediscount rate lowers both measures of the money supply. However, the results suggest that an equal increase in the Treasury bill rate and the rediscount rate leads banks to reduce excess reserves and increase the money supply.

The response of the change in the money supply to changes in interest rates permits a comparison between policy operations designed to raise interest rates with changes in the monetary base. For

example, an increase of Treasury bill rates by 1 percent, for example from 3 to 4 percent, has an effect on the money supply that is approximately equivalent to a $250 million increase in the base. A rise in the rediscount rate by 1 percent is approximately equivalent to a reduction in the monetary base of $80 million.

These numerical examples bring out some essential points. The Federal Reserve opposes flexible discounting arrangements and favors infrequent flat changes in the discount rate. At times their spokesmen have suggested that variations in the discount rate have important effects, particularly announcement effects, and that a floating discount rate would lessen their degree of control. Yet they do not hesitate to increase and decrease the monetary base by several hundred million dollars through their defensive operations. These defensive operations have a much larger effect on the money supply than the conceivable effect imposed by the likely variation in the discount rate.

Moreover, our results suggest that the net effect of an increase in Treasury bill rates and the rediscount rate by 1 percent raises the money supply by less than $450 million. If the Federal Reserve is concerned with the behavior of the money supply, the effect of these interest rate changes on the money supply can be offset by a small reduction in the monetary base, one that is well within the typical daily or weekly variation in their open market operations.

Viewing the same example in another way makes clear that the Federal Reserve's attempt to reduce the seasonal variation in interest rates by relatively large variations in the base has consequences for the behavior of the money stock. This should not suggest that the allocative effects of seasonal changes in interest rates should be permitted. But it does suggest that analysis and evidence is required to appraise the effects of the operations that are undertaken.

The estimates of the response of the money supply to variations in Treasury bill and rediscount rates can be used to derive estimates of the response of excess reserves to changes in the two rates. The sensitivity of changes in excess reserve to interest rate changes can be expressed in term of a concept called elasticity. The elasticity of the banks' desired excess reserves with respect to Treasury bill or discount rates describes the percentage change in desired excess reserves induced by a given percentage change in either rate. The estimated value of the elasticity of desired excess reserves with respect to Treasury bill rates is approximately minus nine-tenths and with respect to the discount rate plus three-tenths percent. This means that a 10-percent rise in the bill rate (from 3.3 to 3.63 percent) lowers desired excess reserves by 9 percent on the average. A similar increase in the discount rate raises desired excess reserves by 3 percent. Thus, a 10-percent change in both rates changes desired excess reserves by approximately 6 percent on the average. The resulting accrual of surplus reserves at commercial banks induces changes in the money supply as we have noted.

The banks' liquidity trap

The operation of the interest mechanism introduces a dependence of the money supply on the pace of economic activity. This dependence modifies the influence of the policy magnitude, expressed by the extended base, in the money supply process. But it neither removes the dominant role of the extended base nor breaks the effective connection between the money supply and its principal determinant. As we have just seen, the dominant role of the extended base remains

when the effect of interest rates is incorporated in the monetary mechanism.

It has been asserted at times that the effective connection between Federal Reserve policy and the money supply is broken during periods of comparatively low interest rates. This is the contention of those who suggest that monetary policy can be a matter of pushing on strings. In this view, the attempt to expand the base by increasing the supply of reserves is matched by an insatiable willingness by banks to acquire and hold reserves. Each addition to the supply of reserves is matched by an identical increase in quantity demanded. Increases in reserves do not set off the multiplier mechanism leading to portfolio expansion and an increased money supply. Reductions in available reserves do not lead to contractions in the stock of money. The banking system passively holds any additional reserves generated by an expanding base or an outflow of currency to the banks, and passively surrenders reserves absorbed by a contracting base or a currency outflow to the public. Monetary policy becomes entirely ineffective; the money supply is determined by the public's asset supply to banks; the monetary system is caught in the liquidity trap.

The public's supply of assets to banks depends on the pace of economic activity. If the liquidity trap is operating, the money supply becomes dependent on the public's desired supply of assets to banks; hence it too depends on the pace of activity. The onset of a liquidity trap thus implies that the "push" exerted by monetary policy operating through the base is replaced by the "pull" of national income as the principal determinant of the money supply. Indeed, as we have noted, the liquidity trap implies that the Federal Reserve authorities have no control over the money supply. Under these circumstances, the Federal Reserve must be absolved from responsibility for the growth rate of the money supply.

The liquidity trap or "pushing on strings" notion is frequently invoked to describe or explain the monetary events of the thirties. In the previous chapter, we produced some evidence relevant to the question and showed that the events of the period are incompatible with the asserted break in the link connecting Federal Reserve policy with the money supply. Our evidence suggested that the doubling of reserve requirements in 1936–37 was responsible for the reduction in the extended base and the consequent reduction in the money supply. Additional evidence in this chapter reinforces that conclusion.

Table VII–5 summarizes some of the evidence from detailed tests of the liquidity trap notion. By incorporating the effect of the public's asset supply to banks—assumed to depend on national income—as a part of the money supply process, we obtain a relation indicating the dependence of the money supply on national income and the extended base. If the liquidity trap notion is well-founded, the money supply depended exclusively on national income during the thirties. The extended base had no role in the money supply mechanism. However, if the modified base doctrine is the more appropriate theory, the extended base exerted a dominant influence on the money supply; the influence of national income reflected only the feedback from income to the money supply and was of little consequence in the monetary mechanism.

It should be noted, however, that the modified base doctrine implies that the response of the money supply to policy action will depend on the prevailing level of market interest rates. The monetary multiplier

for the extended base is smaller in periods of low interest rates than in periods when interest rates are higher. A given decline in interest rates will induce banks to add a larger amount to desired excess reserves when interest rates are low than when rates are at higher levels. The response of desired excess reserves to variations in deposits is dependent on the level of interest rates also. Additions to excess reserves per dollar of additional deposits are smaller in periods of comparatively high interest rates, larger in periods of relatively low rates. Both implications operate to reduce the expected change in the money supply per dollar of surplus reserves in a period of low interest rates.

TABLE VII–5.—*The comparative magnitude of the push of the extended base and the pull of income on the money supply*

[In billions]

	Deflationary environment 1st quarter 1929 to 4th quarter 1940—Response of money supply to a billion dollar change in—		Nondeflationary environment 1st quarter 1951 to 4th quarter 1959—Response of money supply to a billion dollar change in—	
	Extended base	National income	Extended base	National income
Money supply	$1.25	$0.06	$2.74	$0.03
Money supply plus time deposits	1.32	.07	2.89	.03

The data in table VII–5 permit a comparison of the policy multipliers computed for the thirties and the fifties and of the comparative effects on the money supply of the extended base and national income. Note that the "push" of the extended base dominated the "pull" of national income in both periods. An increase in the extended base of $1 billion raised the money supply by $1.25 billion during the thirties. The pull of income was much smaller. A $1 billion increase in national income called forth only $60 million of money supply on the average. In the high-interest-rate regime of the fifties, the push of the extended base is much larger, and the pull of income much smaller, as the base conception implies.

The evidence is incompatible with the "liquidity trap" notion. The money supply in the thirties does not appear to have been dominated by national income operating on the public's asset supply to banks. The influence of Federal Reserve policy was not eliminated. Although the Treasury bill rate remained at a level only slightly above zero for long periods of time, the Federal Reserve remained capable of inducing a multiple expansion of the money supply by increasing the monetary base. Thus the evidence denies the relevance of the liquidity trap notion and suggests that monetary policy remained effective despite persistently low interest rates in the thirties.

Some predictions of the money supply

The results presented earlier in this chapter reveal that the modified base conception is an approximative theory of the money supply that is capable of explaining the major changes that have taken place. Such evidence is an important means of distinguishing between valid and invalid theories, but it is not the only type of evidence that can be adduced. This section presents some additional data to suggest the usefulness of the modified base conception as a tool for predicting values of the money supply or the change in the money supply.

Observations for the change in the money supply and its approximate determinants for corresponding quarters in adjacent years were used to infer the relation between the change in the determinants and the change in the money supply. Data for the period beginning in the first quarter 1949 and ending in the last quarter 1958 were used for this purpose. Predictions of the change in the money supply and the value of the stock of money were then made.

Two measures summarize the results of the predictions. The average percentage error indicates the magnitude of the error expressed as a percentage of the change in the money supply or its level. The standard deviation measures the extent to which the percentage errors cluster around the average. The larger the standard deviation, the looser the cluster. A large standard deviation and a small average percentage error indicate that on the average the percentage error is not large but that in any particular quarter one might expect to find an error substantially larger than the average. For example, a sequence of estimates that first overestimate and then underestimate the change in the money supply by approximately equal percentages would produce a small average percentage error and large standard deviation.

Table VII–6 is divided into two parts. The first section shows the average percentage error and the standard deviation for the predictions of the money supply, the money supply plus time deposits, and the changes in the two measures of the stock of money. The second part of the table presents the percentage errors for each of the 16 quarters following the period used to infer the estimates.

TABLE VII–6.—*The predictive performance of the modified base doctrine*

A. AVERAGE AND STANDARD DEVIATION OF PERCENTAGE ERRORS FOR PREDICTION BEGINNING 1ST QUARTER OF 1959 AND ENDING LAST QUARTER OF 1962. THE ESTIMATES USED FOR THE PREDICTION WERE DRAWN FROM THE PERIOD 1ST QUARTER 1949 TO 4TH QUARTER 1958

	Average percentage error, error of predictions		Standard deviation of percentage error	
	Without proper inclusion of vault cash release	With proper inclusion of vault cash release	Without proper inclusion of vault cash release	With proper inclusion of vault cash release
Money supply	−0.5	0.5	1.7	0.6
Money supply plus time deposits	−.3	.4	1.1	.4
Change in money supply	−25.1	10.4	231.0	65.9
Change in money supply plus time deposits	−21.3	.3	48.1	29.4

B. SEQUENCE OF PERCENTAGE ERRORS IN PREDICTION FOR 16 QUARTERS FOLLOWING THE PERIOD USED TO INFER THE ESTIMATES

Period	Money supply	Money supply plus time deposits	Period	Money supply	Money supply plus time deposits
1st quarter, 1959	0.4	−0.1	1st quarter, 1961	−0.1	0.4
2d quarter 1959	.5	.2	2d quarter, 1961	−.2	.7
3d quarter 1959	.1	.1	3d quarter, 1961	.6	.4
4th quarter, 1959	.6	.5	4th quarter, 1961	−1.0	.3
1st quarter, 1960	.4	.3	1st quarter, 1962	.6	.5
2d quarter, 1960	.5	.3	2d quarter, 1962	1.4	.6
3d quarter, 1960	−.1	.3	3d quarter, 1962	1.6	1.3
4th quarter, 1960	1.2	.1	4th quarter, 1962	1.4	1.3

The period for which the predictions were made contained an important change in institutional arrangements. In a series of steps in 1959–60, the Federal Reserve permitted banks to count some, and later all, vault cash as a part of reserves. These changes in arrangements occurred after the period used to infer magnitudes for the monetary multiplier and other values (parameters) that link the behavior of the public and the banks to the money supply. An additional test of the modified base doctrine can, therefore, be made since the base doctrine indicates the manner in which the release of vault cash should be incorporated. Two sets of estimates are provided. One set includes the released vault cash as a part of the extended base as is required by our theory; the other ignores the influence on the stock of money of the release of vault cash. In effect, the second procedure assumes that the Federal Reserve's action had no influence on the money stock while the first implies that the volume of reserves released through the institutional change is equivalent to a reduction in reserve requirements or an open market purchase that supplied the same amount of surplus reserves.

Inspection of table VII–6 shows that the average predictive error for the money supply did not exceed one-half of 1 percent. The proper inclusion of vault cash did not affect the size of the average error, but it substantially lowered the variability of the errors in predicting the money supply measured by the standard deviation. The standard deviations are three times smaller when the released vault cash is included as a part of the extended base after the institutional change.

The substantial improvement achieved by incorporating the vault cash release as a part of the extended base is most clearly revealed by the percentage errors applicable to predictions of the change in the two money supply measures. The average error falls from 25.1 to 10.4 percent for the change in the money supply and from 21.3 percent to a negligible three-tenths of 1 percent for the money supply plus time deposits. The standard deviations of the percentage errors also fall markedly.

The complete sequence of errors for the 16 quarterly predictions is shown in the second part of table VII–6. We note that the errors tend to be somewhat smaller for the money supply plus time deposits. There also appears to be a tendency for larger than average errors to occur near the end of the period. Nevertheless, the results indicate that the modified base conception supplies a substantially more reliable conception of the money supply process than has been suggested by the Federal Reserve authorities.

Two additional sets of computations have been used to evaluate the predictive accuracy of the modified base doctrine. Table VII–7 compares the direction of predicted and actual changes in the money supply. Table VII–8 compares the acceleration and deceleration of predicted and actual money supply. The latter results pertain to the changes in the quarterly changes in the money supply. That is, we attempt to predict the rate of change of the change in the money supply. If the money supply rises by $500 million in one period and by $300 million in the next, the change is positive in both periods,

but the change has decelerated since the money supply is rising at a slower rate.

The rank correlation coefficient has been used to express the degree of association between predictions and observations. This measure of association is based on the orders of magnitude rather than the numerical values. If the extended base conception predicts a large positive change in the money supply or its rate of change and such a change occurs, the rank correlation is increased. Conversely, if large positive predictions occur when there are small positive or large negative changes, the rank correlation is reduced. A rank correlation of 1 indicates a perfect association; i.e., the largest predicted change occurred in the quarter experiencing the largest observed change; the second largest prediction is made in the quarter with the second largest change, etc. A value of -1 indicates perfect inverse association. The largest predicted change is made in the quarter experiencing the smallest actual change. If the rank correlation is zero, there is no association between predicted and actual changes or predicted and actual acceleration and deceleration.

Once more the predictions were made with and without proper incorporation of the vault cash release. The incorporation of vault cash as a part of the extended base substantially raises the rank correlation. This is particularly true for the predictions of the money supply that is defined exclusive of time deposits. But for both measures, the association is considerably closer when the implication of the base conception with respect to vault cash is followed.

Table VII–7 indicates the presence of a strong positive association between predicted and actual changes in the money supply, when vault cash is properly incorporated. This association is somewhat stronger when time deposits are included as a part of the money supply, but in both cases, the data suggest that predictions of large positive and negative changes occur in periods experiencing such changes. Moreover, we note that the association between predicted and actual changes is approximately twice as large as the association between the changes in the two measures of the money supply. This suggests that the relatively high rank correlation for the two measures of the money supply is not the result of a common movement in the money supply and the money supply plus time deposits. That the modified base conception is able to predict the changes more accurately than the simple explanation that the two move together, adds to our confidence in the underlying conception.

TABLE VII–7.—*A measure of the closeness of association between predicted changes and observed changes in the money supply*

KENDALL'S RANK CORRELATION IS USED AS OUR MEASURE OF ASSOCIATION

	Without proper inclusion of vault cash release	With proper inclusion of vault cash release
Association between predicted change and actual change of money supply	0.56	0.81
Association between predicted and actual change of money supply plus time deposits	.76	.89

NOTE.—Association between change in the money supply and changes in the money supply plus time deposits is 0.43.

The values in table VII–6 were computed to predict the annual change from a particular quarter to the corresponding quarter of the following year. These predictions were based on estimates of the structure of the money supply relation computed from quarterly data for the period 1949 to 1958. The change in the predicted change between adjacent quarters was then computed and compared to the change in the actual change (acceleration or deceleration). These data were then ranked, and the rank correlations was used to measure the association. The results are presented in table VII–8.

TABLE VII–8.—*Measure of the association of the changes between adjacent quarters of changes in the predicted and observed values of the money supply between corresponding quarters, acceleration and deceleration*

	Without proper inclusion of vault cash release	With proper inclusion of vault cash release
For the money supply	0.58	0.79
For the money supply plus time deposits	.70	.83

NOTE.—Association between the acceleration of the money supply and the money supply plus time deposits is 0.68.

Again we find a relatively close association between predicted and actual observations. The clear, positive association between changes of changes reveals the strong relation between the money supply and the elements of the modified base conception. As before, the degree of association is markedly larger when the vault cash release is incorporated in the extended base.

Currency behavior and money supply

The description of the injection mechanism and multiplier process emphasized the importance of currency flows between the public and the banks. The multiplier process was seen to generate a spillover of newly created deposits into currency. This spillover helps to explain why the observed magnitude of the monetary multiplier is substantially below the reciprocal of a weighted average of reserve requirement ratios. Currency flows also result from variations in the public's demand for currency that occur independently of changes in monetary wealth. These flows generate or absorb surplus reserves and trigger the multiplier mechanism. The evidence adduced in previous sections confirmed the operation of currency patterns in both the multiplier and injection mechanisms. Our observations thus support the contentions implicit in the modified base doctrine that ascribe a substantial role to currency behavior in the money supply process. This role has not been fully appreciated by the Federal Reserve. It appears useful, therefore, to investigate more fully some major behavior features of the public's demand for currency.

Under the prevailing institutional arrangements the volume of currency outstanding, the amount issued by the Treasury and the Federal Reserve, is determined by the public's demand. The supply quantity is thus identical with the demand quantity, which is shaped by the public's monetary and nonmonetary wealth, and the costs and yields associated with currency holding or currency using. These arrange-

ments have not always prevailed. At times, the supply of currency has had an important influence on the monetary mechanism. But under our contemporary institutions, the observed changes in "currency outside banks" can be safely attributed to the operation of the public's demand for currency.

Three aspects of the public's demand for currency can be usefully separated—a seasonal movement, a cyclical pattern, and a secular drift. The seasonal movements have attracted substantial attention from the Federal Reserve. Passing references are made to secular drift in the public's currency demand, but a clear description of the nature of the movement has not been provided. The cyclical pattern has been disregarded. We found no references or descriptions of the cyclical demand for currency in Federal Reserve discussions.[5] Nevertheless, the cyclical pattern is an important feature of the public's demand for currency and has been incorporated in both the multiplier and the injection mechanisms. The observation of a cyclical component in the movement of "currency outside banks" thus provides important evidence on the operation of currency flows in the monetary process through the two mechanisms.

In the absence of both cyclical and secular behavior components the public's demand for currency would remain constant, except for seasonal variations. Under these conditions, changes in the volume of currency between corresponding months of successive years would tend to vanish, unless there is a change in the seasonal pattern. But we observe the regular occurrence of significant changes between corresponding months. This indicates that either secular or cyclical forces (or both) operate on the public's demand for currency.

Changes in wealth, costs, and yields associated with currency holding or currency use modify the public's demand for currency. For example, we notice a sweeping secular drift before World War I expressed by a persistent decline in the demand for currency relative to the demand for total deposits. This decline can very likely be attributed to a reduction in the cost of banking, particularly the cost of access to and information about banks. The reduction in the "cost of banking" lowered the yield associated with currency holding or currency using and led to a relative decline in the public's currency demand. These longrun influences on the public's currency demand worked their effects through the injection mechanism of the money supply process and contributed to an acceleration of the longrun growth in the money supply.

Scrutiny of the data for more recent years provides no evidence of the continuation of the relative decline in the relative demand for currency. Both World Wars raised the yield associated with the holding of currency and thus unleashed a remarkable increase in the public's relative (and absolute) demand for currency. The high yield on currency subsided rapidly with the termination of the two wars, and both wars were followed by a speedy decline in the relative (and even

[5] Members of the Board of Governors and the 12 presidents of the Reserve banks were asked about the currency problem as a part of the questionnaire reproduced in the appendix. Their answers to question 1, pt. 5, suggest that they regard the problem as a mixture of seasonal and secular changes. They make no mention of any cyclical changes in the demand for currency. Moreover, the Board's reply is quite explicit about the action taken to offset "wide but fairly predictable seasonal variations." Member bank reserve positions are increased by the amount of increased demand for currency minus the reduction in required reserves. This is additional evidence of the reliance that is placed on the free reserves doctrine in determining policy actions.

absolute) demand. But this relative decline was quickly attenuated and eventually disappeared. In recent years the public's relative demand for currency was more than 60 percent above the corresponding demand in 1929. Thus there exists no evidence for the persistence of the secular decline of the public's relative demand for currency in this century. The disappearance of the secular drift implies that the changes in the public's currency holdings between corresponding months of successive years must be attributed to the operation of cyclical forces.

To pursue our investigation of the role of currency patterns in the money supply process, we obtained annual changes of currency outside banks and of the extended base for each month of the year. The change in currency for any month was computed as the difference between the amount outstanding in that month and the amount outstanding in the corresponding (same) month of the previous year. Identical methods were used to compute the annual change in the base from month to corresponding month. The ratio of the change in currency to the change in the base was then obtained, and this ratio was used to observe the prevailing patterns. Data for each postwar year and for each postaccord half-cycle are presented in table VII–9. These figures are averages of the ratios obtained for each month.

A negative ratio for any month can only occur when the change in currency and the change in the base are in opposite directions. Occurrences of negative ratios are, however, more usefully described for our purposes in terms of "overcompensation of currency changes by changes in the base." Such overcompensation is characterized by two conditions: (1) changes in currency and bank reserves exhibit opposite signs, and (2) the magnitude of the change in bank reserves exceeds the magnitude of the change in currency. This specification implies that overcompensation of currency changes is a necessary and sufficient condition for the occurrence of a negative value for the ratio. It follows that annual averages or half-cycle averages of the ratios are negative only if overcompensation dominates the changes in the base. Moreover, it can be shown that overcompensation is typically associated with a reallocation between currency and demand deposits that reinforces the effect on the money supply of the simultaneous change in the base.

Some examples may clarify the foregoing discussion. October, November, and December 1953 show increases in currency holdings of the public from the corresponding months of 1952. The ratio of the change in currency to the change in the base is negative for these 3 months. This means that the decline in member bank reserves from 1952 to 1953 in each month during the autumn of the year was larger than the rise in currency. The base contracted while its currency component expanded. The fall in the base occurred despite the fact that a recession had started in the summer of 1953. The reduction in reserve requirements in July 1953 explains some of the observed change in member bank reserves. But the change in reserve requirements does not justify the negative change in total reserves if the Federal Reserve is trying to offset the effect of seasonal changes in the supply of money. Neither does the onset of recession explain the reduction in reserves of member banks. Indeed, one would expect that the change in reserves would be positive for that reason alone, if the Federal Reserve pursues a countercyclical policy.

The year 1954 provides a somewhat different example. The annual change in currency from month to corresponding month was negative between autumn 1953 and autumn 1954. Currency held by the public declined from October, November, and December 1953 to the same months in 1954. But the ratio of the change in currency to the change in the base was positive during this period indicating a decline in bank reserves. In fact, the Federal Reserve reduced bank reserves from each month of 1953 to the corresponding month of 1954. This added further to the annual reduction in the monetary base between corresponding months of the 2 years. Again, there were reductions in reserve requirements; in this case reserve requirements were reduced for both time and demand deposits.

The increase in the demand for currency in autumn 1953 and the decline in 1954 is surprising, if the demand for currency is constant except for seasonal variations. Although there has been little or no recognition of cyclical changes in the demand for currency by the Federal Reserve, the data for the autumn of 1953 or 1954 suggest that such cyclical changes do occur.

TABLE VII-9.—*Currency patterns in the postwar period*

PART A. ANNUAL AVERAGES

Year or period	The ratio of changes in currency to changes in the base	Direction of change in the monetary base through most of the year	Remarks
1946	+0.443	Rising	
1947	−.519	do	
1948	−.599	do	
1949	−.117	Falling	
1950	−.103	do	
1951	+.138	Rising	
1952	+.514	do	
1953	+.864	do	11 months only. For 12 months ratio is 8.200.
1954	+.303	Falling	
1955	+.742	No change	11 months only. For 12 months ratio is −0.987.
1956	+.548	Rising	
1957	+.329	do	11 months only. For 12 months ratio is −6.365.
1958	+.187	Falling	
1959	+.860	Rising	11 months only. For 12 months ratio is 1.370.
1960	+.045	Falling	
1961	+.044	do	11 months only. For 12 months ratio is −0.574.
1962	+.586	Rising	

PART B. CYCLICAL AVERAGES

November 1948 to October 1949	−0.183		Peak to trough.
October 1949 to July 1953	+.340		Trough to peak.
July 1953 to August 1954	+.049		Peak to trough.
August 1954 to July 1957	+.564		Trough to peak.
July 1957 to April 1958	+.394		Peak to trough.
April 1958 to May 1960	+.369		Trough to peak.
May 1960 to February 1961	+.077		Peak to trough.

The modified base conception implies that the ratios in the table would be approximately one-half if the spillover into currency through the multiplier process dominates the currency movements. A positive ratio of less than one-half indicates that the reallocation between currency and demand deposits creates or destroys surplus

reserves in a direction opposite to the concurrent change in the base. The public's demand for currency partially offsets Federal Reserve policy operations summarized by the movement of the base. But in the table we find that a ratio of approximately one-half for 1946 is followed by a series of negative ratios in the next 4 years. In 2 of these years the base rose, and in 2 years the base fell. Since 1950, overcompensation has not occurred to an extend sufficient to be apparent in the average ratio for the year as a whole. This observation suggests that after the postwar readjustment, currency flows were dominated, on the average, by the spillovers associated with the multiplier mechanism. However, the reallocation between currency and demand deposits appears to explain the variations in the ratio and its deviation from the neighborhood of one-half.

An examination of the ratios in table VII–9B yields additional information about the cyclical role of currency in the money supply process. If currency grows at a steady rate, without any cyclical variation, the ratio would exhibit an inverse relation with the growth rate in the base. The observed procyclical movement of the base would imply that the ratio is lower in upswings than in downswings. This implication of a steady growth rate in the public's currency demand is quite inconsistent with the data in part B of table VII–9. The average ratio for each upswing exceeds the average ratio for the subsequent downswing.

Inspection of the ratios in part B of the table thus reveals some disturbing indications of Federal Reserve policy. The ratio of changes in currency to changes in the base is generally larger in periods of expansion than in adjacent periods of recession. The change in currency is often negative in recession, but the ratios in part B are generally positive. This again suggests that the Federal Reserve permits total member bank reserves to decline in periods of recession. The fact that the ratio shown in the table is small and positive further suggests that the decline in reserves is much larger than the decline in the demand for currency by the public. Examination of the data for reserves and currency confirms that during recession both components of the base often decline. For example, during the recession of 1960–61, member bank reserves and the monetary base were permitted to decline in every month from the level maintained in the corresponding month of the previous year. This behavior of the base is difficult to reconcile with an active, countercyclical monetary policy.

The cyclical pattern in currency flows resulting from both the spillover and reallocation effects is revealed again in the chart appended to this study. In general, the movements observed during the postwar years have reduced the cyclical variation in the money supply generated by the procyclical policy pursued by the Federal Reserve. Increased demand for currency puts increased pressure on member bank reserve positions during expansions, since a rise in the public's demand for currency reduces the expansion of the money supply permitted by a given value of the monetary base. In view of the cyclical variations in currency shown in the table and in the appended chart, it is surprising to find no mention of cyclical changes in the demand for currency in the Federal Reserve reply to question 1, part 5.

A DISCUSSION OF SELECTED POLICY ACTIONS IN 1946–51

Two striking features of the actions taken by the Board of Governors and the Open Market Committee in the postwar period prior to the accord can be analyzed in terms of the modified base doctrine. These are the so-called pegging of Treasury bond prices and the use of the power to change reserve requirements. Discussion of these topics furnishes additional support for the view taken here that the Federal Reserve has failed to analyze adequately the mechanism connecting their actions with the supply of money or to consider seriously the influence of the stock of money on prices and employment. The Federal Reserve's usual appraisal of the two policies is found to be seriously deficient.

The two policies are closely associated. During much of the preaccord period, the Federal Reserve complained about the effect of pegged interest rates and the reduction in (or elimination of) its power to reduce inflationary pressures. Other devices such as the reduction of Treasury balances at the member banks, retirement of securities from the Reserve banks, and increases in required reserves were relied upon to control the inflationary pressures. Yet during much of the preaccord period, the rate of change of the money supply was not large. Indeed, examination of the data for the period reveals that the annual percentage change in the money supply declined almost continuously from the middle of 1946 through the end of 1948, remained negative for the five quarters starting in the fall of 1948, and did not exceed a 3-percent rate of increase from the beginning of 1947 to the start of the Korean war. Far from suggesting that the Federal Reserve was converted into an engine of inflation, the data suggest that during much of the period, and particularly before and during the recession of 1949, the Federal Reserve was pursuing a policy of contraction.

Lest our discussion be misunderstood, we are not advocating inflation. The indexes of recorded prices did rise during the period. But much of the price rise was a readjustment of recorded prices to the inflationary policy of war finance that had produced increases in the money supply of as much as $5 billion per annum during the war. These exceedingly large increases in the supply of money put upward pressure on prices. With the removal of price controls, recorded prices began to increase at a faster rate. Most of this rise occurred between the date the removal of price controls and the middle of 1948. In 1949, the wholesale price index (base 1926) fell by 10 points. A renewed increase in prices began with the advent of the Korean war. But a strong statement of intention by the Federal Reserve in the fall of 1950, culminating in the famous accord and the removal of the peg from bond prices in early 1951, did not prevent a much more rapid expansion in the money supply than had occurred during the period of pegged bond prices.

We do not wish to suggest that the policy of pegged bond prices was either appropriate or desirable. Quite the contrary. Pegging bond prices created a serious distortion in the allocative mechanism. But our intention in this report is to focus primarily on the larger questions raised by the failure of the Federal Reserve to analyze, understand, or examine the mechanism connecting their actions with the stock of money and the economy. These failures are the major

reasons for the inappropriate policies that they pursued during the preaccord period and afterward. Unless the Federal Reserve is equipped to more adequately appraise their actions, critical comments based on hindsight do little to improve future policy. In short, we do not wish to concentrate on the specific features of the inappropriate policy of pegging yields or the reasoning that was used to support that policy. Rather, we wish to examine briefly their statements and the evidence during the period to appraise the repeated assertion that the policy of "pegging" was a major source of inflation and to evaluate the use that was made of the power to change reserve requirements.

Pegged bond yields and inflationary pressures

During much of the preaccord period, yields on Government bonds with 15 years to maturity remained below 2½ percent. Indeed bond yields declined slowly during 1948 and quite steadily in 1949 and early 1950. At the time of the accord, intermediate and long-term Government bond yields were below the average level that had prevailed in 1948. We have already indicated that the annual percentage change in the money supply was below the percentage change in population during most of the period and that the return to "flexibility" in monetary policy in March 1951 was not accompanied by an abatement of inflationary pressures emanating from an increased stock of money. On the contrary, the annual percentage change in the money supply from month to corresponding month was always above 4 percent, and often above 5 percent, in the 18 months from January 1951 through June 1952. Thus there does not appear to be a prima facie case that the pegging of bond yields converted the Federal Reserve into an engine of inflation or that the removal of the peg eliminated the danger.

Turning to the specific details of Federal Reserve operations during the period, we find very little evidence that open market purchases were feeding the inflationary forces. Table VII–10 shows total Federal Reserve holdings of Government securities during the period. These data do not suggest that open market operations contributed substantially to the inflationary pressures. Indeed, the System reduced its holdings annually from month to corresponding month during most of the period. The most notable exception occurs after the meeting of August 1950 when the problem of inflation was described as a matter of "critical importance and urgency," in the Record of Policy Action.

TABLE VII–10.—*Reserve bank credit outstanding, Federal Reserve holdings of Government securities and gold in the preaccord period*

[In millions]

Date	Total Reserve bank credit outstanding	Free reserves	Total System holdings of Government securities	Gold stock
December 1945	$25,091		$24,262	$20,065
December 1946	24,093	$743	23,350	20,529
June 1947	22,170	650	21,872	21,366
December 1947	23,181	763	22,559	22,754
June 1948	21,900	752	21,366	23,532
December 1948	24,097	663	23,333	24,244
June 1949	19,696	658	19,343	24,466
December 1949	19,499	685	18,885	24,427
June 1950	18,703	699	18,331	24,231
December 1950	22,216	885	20,778	22,706
February 1951	23,188	297	21,881	22,066

Interest rates on long-term Government securities declined slightly during 1948, as we noted earlier. The Federal Reserve greatly increased its bondholdings during the year and more than offset the decline in its holding of bills, certificates, and notes. The Board's annual report for the year refers to the abatement of inflationary pressures. Credit is given to the Treasury surplus as the principal limiting element. In the opinion of the Board, the budget surplus was reinforced by the monetary policies pursued.[6] This is in fact a correct statement in terms of the modified base mechanism. The small positive change in the base, reflecting primarily the inflow of gold, was more than offset by increases in reserve requirements. The net effect was a decline in the monetary base plus the accumulated sum of liberated reserves. This decline occurred, however, after the middle of the year and continued throughout 1949 when the Federal Reserve described its policy as one of "ease."

Some of the confusion generated within the System during this period is reflected in the remarks made in the annual reports for 1948 and 1949. Read in tandem these statements strongly suggest the unwillingness of the Federal Reserve to seek foundation for its statements. The 1948 report notes:[7]

> The Federal Reserve System is also much better equipped than ever before to meet the credit needs of the economy in a period of downward readjustment. Through open market operations, the System has virtually unlimited means of supplying the money market with additional reserves, if the situation should call for such action.

After the recession of 1949 had started, the annual report noted:[8]

> Because the System had not been in a position to exert greater monetary restraints, it had less scope for the reversal of policy when the time came to relax credit restraints. Notwithstanding these limitations, the System acted promptly to adjust monetary and credit policy to the changed conditions of early 1949.

In fact the System did not pursue a countercyclical policy. The annual percentage change in the money supply was negative throughout the year. The same conclusion holds even if time deposits are included in the money supply. Moreover, had it not been for the continued reduction in the demand to hold currency by the public, the decline in the money supply would have been greater. The monetary base and the accumulated sum of liberated reserves declined throughout the year, and on balance the System sold or retired $4.5 billon of Government securities.

At the meeting of the FOMC on May 3, 1949, the recession was described as desirable. Policies were to be directed not toward reversing the direction of the economy but at "keeping the movement from going too far." This perhaps explains the reference in the 1948 report[9] to the need for offsetting a reduction in reserve requirements by sales of securities in the open market. The FOMC policy of supporting Government security rates was cited as the reason for

[6] Annual Report of the Board of Governors for 1948, p. 2.
[7] Ibid., p. 7.
[8] Annual Report of the Board of Governors for 1949, p. 4.
[9] Op. cit., p. 2. The 1948 annual report included a discussion of the developments in early 1949.

tightening the monetary system in the midst of recession. This policy was continued until the announcement of June 28 recognized that "the maintenance of a fixed pattern of rates has the undesirable effect of absorbing reserves from the market at a time when the availability of credit should be increased." Despite this acknowledgment there is no perceptible change during the last half of 1949 in the rate of decrease in the monetary base plus the accumulated sum of liberated reserves. However, when we look at the volume of free reserves, we find a sudden jump from the level $650 million to the level $850 million that was maintained from July through October.

With the benefit of hindsight, the Board summed up the postwar period 1946–49 in the following terms:[10]

> In the transition period from a war to a peacetime economy the inflationary problem become more acute, notwithstanding the termination of heavy Government deficits. The development of inflation was made possible by the large volume of liquid assets built up during the period of war finance, * * * but it was augmented by postwar expansion of credit to private borrowers. Liquidation of Government securities was an important source of funds for current spending and for credit expansion, and the Federal Reserve found it necessary to purchase securities in order to maintain a stable and orderly market for Government securities. These purchases supplied additional bank reserves. Under the circumstances action for counteracting inflationary developments had to be limited to relatively moderate measures.

There is little evidence that recognition was given to the principal features of their policy. Much more attention was spent throughout the period on the need for more controls and more powers. In the section that follows, we will discuss the use that was made of the additional powers to raise reserve requirements that the Congress granted in 1948.

Early in 1950 the annual change in the extended monetary base and the annual percentage change in the money supply became positive. The rise in the base and the money supply accelerated through 1950 and continued into 1951. The annual report recognized the rising money supply and discussed the factors contributing to the increase. The Board noted that "Reserve positions of commercial banks were under greater pressure in 1951 than in any other postwar years." In fact, the monetary base increased by approximately $2 billion, the largest annual increase in the postwar period between 1947 and 1963. But the monthly average of free reserves declined in the course of the year to the lowest levels that had been achieved in the postwar period up to that time. It seems likely that this reduction in free reserves from $885 million in December 1950 to $169 million in December 1951 encouraged the Board to believe that an anti-inflationary program was in effect when in fact their policy was expansive.

It is particularly important to note the very different movements in the monetary base and the level of free reserves. The base and the money supply were rising, while the level of free reserves was rising

[10] "Monetary Policy and the Management of the Public Debt," Joint Committee on the Economic Report, pt. 1, p. 357.

and falling during the year but declining on balance. This is not the only time that the level of free reserves and the base moved in opposite directions. But a critical judgment about the monetary system appears to have been based on the movement of free reserves. The Federal Reserve interpreted the data as showing that the banks were under greater pressure. Had they looked at the monetary base as an indicator of the position of the monetary system, it is unlikely that they would have reached the conclusion that they did.

Prices soared during the year 1950 and remained high in 1951. The BLS Wholesale Price Index (1947–49 base 100) rose from an average 103.1 in 1950 to 114.8, a rise that was surpassed in the postwar only in 1947. Most of the increase occurred during late 1950. Very similar evidence is obtained if the Consumer Price Index is used as a guide.

If the pegging of bond prices was a serious handicap to an effective anti-inflationary program, one would expect that the removal of the peg would eliminate the root of the difficulty. In our interpretation of the postwar events, the principal inflation that is attributed to Federal Reserve postwar policy occurred after the start of the Korean war. True, prices rose in 1946 and 1947 following the removal of commodity price controls. But it is likely that much of the rise during this period was an adjustment of quoted prices to increases in the money supply that occurred during the war. Federal Reserve policy during 1947–49 was not actively expansionist. Indeed, monetary policy exercised a deflationary influence on the economy in late 1948 and throughout 1949 despite the presence of recession in the latter year. The Federal Reserve made no attempt to "roll back" prices in 1951 after the peg was removed from bond prices. Instead they permitted a more rapid expansion of the money supply than they had permitted during the previous 4 years. There is, therefore, little reason to conclude that monetary policy would have been used to reverse the direction of price changes in 1946 and 1947 had the support policy been repealed.[11]

Federal Reserve policy in the postwar, preaccord years made substantial use of the power to vary member bank reserve requirements. On 18 separate dates reserve requirements were altered for one or more classes of banks or types of deposits. Reliance was placed on these changes both as a device for controlling inflationary pressures in 1948 and early 1951 and as a means of easing the reserve position of the banking system in 1949. Within the modified base conception, fiat changes in reserve requirements operate principally by altering the accumulated sum of liberated reserves. A multiple expansion or contraction of the money supply should follow the liberation or absorption of reserves brought about by fiat changes in reserve requirements. But we have already noted that the money supply moved in the opposite direction to the one suggested by the changes in reserve requirements. In 1949, the money supply contracted, despite the liberation of reserves through reductions in reserve requirements; the money supply expanded in 1951 despite the increases in reserve requirements during January and early February. The following section discusses in more detail the Federal Reserve policy of changing reserve requirements and evaluates the use that was made of existing and augmented power to control inflationary developments.

[11] This should not be taken as a suggestion that a "roll back" of prices would have been a desirable policy.

Changes in reserve requirements

The modified base doctrine indicates that changes in the sum of liberated reserves and changes in the monetary base are of approximately equal significance as determinants of a change in the money supply. If the Federal Reserve does not offset the change in reserve requirements by moving the monetary base in the opposite direction, such changes are capable of providing a multiple expansion or contraction in the supply of money. But Federal Reserve policy can offset the changes in reserve requirements by altering the monetary base.

Before presenting the evidence on compensation of particular changes in reserve requirements, it should be noted that the Federal Reserve recognizes that compensation occurs. Generally, they have regarded postwar changes in reserve requirements as events of major significance in their effect on available bank reserves. To reduce the impact of the change, open market operations in the opposite direction have withdrawn or furnished some of the reserves released or absorbed by the change in reserve requirements. But it has not been made clear that, on many occasions, compensation completely offsets the effect on reserve positions of the fiat change in required reserves. (See response to question VI in the appendix.)

One measure of compensation is the monthly change in the reserves of banks divided by the amount of reserves absorbed or liberated through the fiat change in reserve requirements. In table VII–11 these changes have been expressed as percentages. The larger the percentage, the greater the amount of compensation. A change of more than 100 percent indicates that the reduction or increase in reserve requirements was overcompensated, i.e., more than completely offset.

TABLE VII–11.—*Compensation of changes in reserve requirements, by date and compensation percentage*

1. Increase in reserve requirements, Feb. 27, 1948:	
March 1948	53.8
April	18.2
May	19.6
2. Increase in reserve requirements, June 11, 1948:	
June 1948	120.9
August	154.4
3. Increase in reserve requirements, Sept. 16–24, 1948:	
October 1948	106.6
November	107.4
December	115.2
January 1949	115.2
February	94.1
4. Decrease in reserve requirements, May 1–5, June 30–July 1, 1949:	
May 1949	90.6
June	71.1
July	82.6
August	65.4
September	81.8
5. Decrease in reserve requirements, Aug. 1–Sept. 1, 1949:	
September 1949	81.8
October	81.0
November	80.9
6. Increase in reserve requirements, Jan. 1–Feb. 1, 1951:	
January 1951	34.5
February	75.0
March	89.9
April	95.7
May	74.3
June	94.9

The table makes clear that, with the exception of the first increase in reserve requirements in 1948, all of the fiat changes is reserves during the preaccord years were compensated by a change in bank reserves in the opposite direction. In some cases, the change in reserves overcompensated the effect of a change in reserve requirements. Moreover the policy of compensation did not stop at the time of the accord. During 1951, 90 percent of the increase in required reserves was offset within 2 months. Very similar findings pertain to changes in reserve requirements in later years. The reduction in reserve requirements in July 1953 was more than 60 percent compensated by mid-August. A further reduction in reserve requirements in mid-June 1954 was 80 percent compensated within 1 month and greatly overcompensated at the end of 2 months. Nevertheless, another reduction in reserve requirements followed at the end of July. In that case, compensation never exceeded 72 percent so that a substantial amount of additional reserves was liberated.

Compensation of the reserve requirement changes in 1948 may be defended by reference to the pegging policy. But that defense cannot explain the Federal Reserve's willingness to void more than 80 percent of each set of reductions in reserve requirements in 1949. Nor does the compensation in 1951 and 1954 follow from the inability of the Federal Reserve to pursue a more "flexible" monetary policy. One wonders at the rationale for a policy that introduces a change of major importance to the monetary system and then almost completely reverses the policy within a few short weeks.

To pursue the matter one step further, a correlation was computed between the annual change in the base and the annual change in the accumulated sum of reserves liberated or impounded. The annual changes were computed for corresponding months starting with each change in reserve requirements and terminating 1 year after the change. For example, to investigate the relation between the change in the base and the change in the accumulated sum of liberated reserves associated with the increase in reserve requirements in January 1948, we computed the change in both policy variables starting with the change from January 1947 to January 1948. Because of the frequent changes in the requirement ratios during the preaccord years, the annual changes between corresponding months terminate with September 1950, 1 year after the reduction in reserve requirements in September 1949.

Two measures are used to indicate the Federal Reserve's compensatory policy. Both are shown in table VII–12. Column 1 indicates the average amount by which the monetary base changed per dollar of reserves liberated or impounded by reserve requirement changes. A negative number in this column indicates compensation of reserve requirement changes. Values close to minus 1 reveal that compensation was almost perfect on the average—each dollar of reserves liberated or impounded was accompanied by a change in the base in the opposite direction. A positive value in this column indicates a policy of reinforcement. Each dollar of reserves liberated or impounded is accompanied by a movement in the base that effects the money supply in the same direction as the change in the requirement ratios. The numbers in parentheses are measures of the variation around the average, technically known as "t statistics." The larger

the values shown, the smaller the variability in the Federal Reserve's compensatory policy. Column 2 is the computed coefficient of determination that we have used several times as a measure of association.

TABLE VII–12.—*The association between changes in the base and changes in the accumulated sum of liberated reserves during periods surrounding changes in reserve requirements*

Period	The amount of compensation per dollar of reserves liberated or impounded (1)	Coefficient of determination (2)
February 1948 to September 1950	−0.96 (32.55)	0.97
January 1951 to January 1952 plus July 1953 to July 1955 plus February 1958 to April 1959	−1.26 (26.63)	.941
September 1960 to December 1961 plus October 1962 to October 1963	2.22 (6.76)	.629
All above periods combined	−.992 (16.41)	.706

The first period in the table is the preaccord period. Changes in reserve requirements were almost completely compensated by movements of the monetary base in the opposite direction. On the average, the changes in the base offset the changes in reserve requirements so that the latter had little effect on the money supply. The Federal Reserve's open market policy operated against the policy of raising reserve requirements in 1948 and against lowering them in 1949. As we noted previously, the compensation in 1949 was not forced on the Federal Reserve by the "pegging" operation then in effect.

The data for the second period reveal that the compensatory policy continued throughout the fifties, long after the accord. Reserve requirement changes in these years were more than offset by open market operations, on the average. The evidence from the fifties strongly reinforces our interpretation of Federal Reserve policy. Compensation appears to be a relatively persistent feature when reserve requirements are raised or lowered.

Between 1958 and 1960, the policy appears to have changed. The reductions in reserve requirements in 1960 and 1962 were not offset by reductions in the base. Judged by the coefficient of determination, the changes in the base were less closely associated with the change in liberated reserves. Nevertheless, open market policy must be interpreted as reinforcing rather than compensating reserve requirement policy, on the average, during the early sixties.

In the postwar years, there have been increases and decreases in reserve requirements. On balance, however, the requirements have been reduced. This is particularly true for the period since the accord. All changes after 1951 have been reductions in the requirement ratios. In addition, the admission of vault cash as a part of the measured reserves of the banking system was the equivalent of a further liberation of reserves.

There is no important difference between a reduction in reserve requirements compensated by a sale of securities to the banking system and a subsidy to the earnings of the commercial banks. The earning assets of the banking system are increased relative to the cash assets when reserves are first liberated by changes in reserve requirements

and then absorbed by open market operations. The expansion of banks' earning assets is no greater than would be permitted by an appropriate increase in the monetary base with no change in the accumulated sum of liberated reserves.

Has the Federal Reserve had a countercyclical policy in recessions?

On numerous occasions, Federal Reserve spokesmen have described their policy during recessions as one designed to stimulate the economy. Our discussion in earlier chapters has shown that they quite generally use the level of free reserves as the principal indicator of their policies. But we have found almost no relation between the level of free reserves and changes in money and credit. Moreover, our analysis clearly reveals that the stock of money grew more slowly during postwar months of contraction than during months of expansion in the economy. It is difficult, therefore, to reconcile their statements [12] with the available evidence.

We contend that Federal Reserve spokesmen and policymakers seriously misinterpret their policy actions. There is little evidence that they pursued a stimulative policy in periods of recession. In this section we present a brief discussion of Federal Reserve policy during recessions in terms of the movements of the extended monetary base. This magnitude is the single most important determinant of the money supply and is controlled to a close approximation by Federal Reserve policy. The extended base is, therefore, an excellent indicator of the actual policy pursued by the Federal Reserve.

A chart in the appendix shows the change in the extended base between corresponding months of successive years from June 1945 through December 1962. Our discussion of the four postwar recessions and the upswing that started in February 1961 will refer to the chart. To date the cyclical peaks and troughs, we will use the dates provided by the National Bureau of Economic Research. We are aware of the uncertainty that surrounds the dating of turning points. However, the National Bureau dates are quite likely to be within a few months of the true peaks and troughs and are sufficiently accurate for the discussion. A change of a few months in the dating of the peaks and troughs would not affect the main conclusions.

(*1*) *The recession from November 1948 to October 1949*

The annual growth rate of the extended base was about $800 million at the start of 1948. It rapidly fell, became negative in July, and reached a postwar low of −$800 million in January 1949. Thereafter, the extended base rose slightly, but it remained below −$500 million throughout the remainder of 1949. The growth rate of the base did not become positive until March 1950. Throughout the recession, the extended base was declining and exerting a contractive effect on the money supply. In fact, the growth rate during the first postwar recession was smaller than in any period since the recession of 1936–37. Thus there is no indication that Federal Reserve policy became more expansive relative to the policies pursued before the recession. On the contrary, the behavior of the extended base reveals that policy became more deflationary than it had been in the downswing.

[12] For an example, see pt. 2 of the answer to question V in the appendix where the 12 Presidents indicate that during recession "System policy is more likely to be positively stimulative rather than to remain the same" and that "at such times the System shifts to an active antirecessionary policy."

(2) *The recession from July 1953 to August 1954*

During the year 1952, the growth rate of the extended base reached levels not achieved since 1946. In the second half of 1952, the annual growth rate never dropped below $2 million. From January 1953 to the peak of economic activity in July, the base decelerated and the annual growth rate fell to $1.2 billion. After a brief pause, the deceleration resumed until the low point of $119 million was reached in September 1954, after the trough of the recession. The chart clearly indicates that the growth rate in 1953 was below the growth rate in 1952 and above the growth rate in 1954. The recession was thus accompanied by a declining growth rate in the extended base—a growth rate that was substantially smaller than the rate maintained before the recession. Once more we conclude that there is no evidence of a switch in policy in a more stimulative direction. Policy shifted in a less stimulative direction.

(3) *The recession from July 1957 to April 1958*

With the exception of March 1957, all months between January 1956 and the peak in July 1957 showed annual growth rates between $400 and $800 million. The growth rate declined rapidly after July and became almost zero at the end of the year. In February 1958 the extended base accelerated with impressive rapidity. An inspection of the chart clearly demonstrates that the growth rate of the extended base fell during the recession until February, i.e., 2 months before the trough of economic activity was reached. During the period from August 1957 to February-March 1958 the growth rate not only declined but was lower in every month than it had been since the recession period of 1954 (with one exception). Again, the pattern observed indicates no shift in Federal Reserve policy toward expansion until 2 months before the trough was reached. Monetary policy was comparatively deflationary even after the System recognized the onset of the downswing. The System effectively reversed its comparatively deflationary policy in February 1958, and its decisive reversal very likely contributed to the rapid termination of the downswing.

(4) *The recession from May 1960 to February 1961*

The same patterns occurred in the most recent recession. For most of the downswing the growth rate of the extended base was lower than in the previous 18 months. Relative to the policy pursued in 1959 most of the downswing exhibited a lower growth rate of the extended base. The Federal Reserve thus followed a comparatively more deflationary policy during the recession. However, it should be acknowledged that the System reversed the direction of policy in the fall of 1960. This shift in direction, mirrored by the increase in the growth rate charted in the appendix, occurred much earlier, relative to the previous peak, than in any other postwar recession. The extended base, including the released vault cash, had an annual growth rate of —$125 million from April through August 1960. As a result of the increasing importance of the released vault cash, the growth rate of the extended base began to rise in September. By the trough of the recession, the annual growth rate had reached $800 million.

(5) *The Federal Reserve's evaluation of calendar year 1963*

While our analysis in this section is concerned with policy action during recessions, a similar comparison of Federal Reserve statements

and events during periods of expansion would reveal a divergence between the facts expressed by the extended base and the statements of the policymakers. Some of these periods have been discussed elsewhere in this study. However, as our report was about to go to press, the Federal Reserve released its annual report for 1963. We comment briefly on some statements made in that report to indicate that the problem to which we have repeatedly referred, remains. The absence of a validated conception as a basis for policy actions or statements is readily apparent in the most recent annual report.

The report notes:

> At its last meeting in 1962 the Federal Open Market Committee had concluded that it was appropriate to reduce a little the degree of ease existing at that time. Accordingly, it redirected its actions toward accommodating moderate further increases in bank credit and the money supply. * * * The Committee made no further change in policy until mid-May, when it moved to reduce reserve availability slightly further.[13]

Elsewhere the report notes that in the second half of 1963 reserves became "less readily available" and comments on three distinct shifts toward "less ease." [14]

The growth rate of the extended base yields no support for the System's appraisal of its policy. The growth rate expanded markedly throughout the year and reached a level in the second half of 1963 that had not been observed since 1952. We find no evidence of the shift toward less ease in the extended base. On the contrary, the Federal Reserve pursued a substantially more expansionary policy in 1963 than in 1962.

Once again, the extended base clearly indicated the expansionist monetary policy. The level of free reserves gave the wrong indication. In chapter IV of this study, written before the appearance of the annual report, we noted the decline in the level of free reserves in February and May and predicted that the annual report would record a movement toward less ease in these months. The confirmation of these predictions (see footnote 14 of this chapter) reveals quite clearly that free reserves remain the principal indicator of Federal Reserve policy action.

The systematic difference between the Federal Reserve's description of its policies and the actual policies requires an explanation. The basic ingredients for the explanation have been discussed elsewhere in this study. Their misconceptions result from the continued reliance on free reserves as an indicator of policy. Our analysis of this doctrine indicates that even if one accepts the central role assigned to free reserves in the causal process, it does not follow that free reserves are a useful indicator of policy or prevailing monetary situations.[15] As a result of the indicator function mistakenly

[13] Annual report for 1963, p. 10.

[14] Op. cit., p. 12. See also the "Review of Open Market Operations" on pp. 129 to 170. On p. 129, January and February are listed as showing a slight shift toward less ease. May through July are again listed as showing a shift toward less ease. The same shift is indicated again for August and September.

[15] This analysis has been developed in our underlying paper "Evolving Federal Reserve Conceptions of the Money Supply Process," that will be published elsewhere. It is shown that a completely specified free reserves doctrine, acknowledging the full interaction of the behavior relations constituting the monetary process, again yields the extended base as the major determinant of the money supply. When a proper analysis is carried out, the base—not the free reserves—emerges as the policy indicator even if free reserves are given the central position in the causal relation.

assigned to free reserves, increasing free reserves are interpreted as a reflection of a policy of more "ease" or less "restraint."

PRELIMINARY CONCLUSION

We do not regard the above analysis of the monetary mechanism as complete. The results reported are but the bare beginnings of an adequate appraisal of the role of particular factors and their influence on the money supply. Yet these results go far beyond those that have been obtained for the modified free reserves doctrine in providing an understanding of the monetary process. And they strongly suggest that control of the change in the money supply rests largely in the hands of the Federal Reserve if they pursue appropriate policies and attempt to understand the mechanism connecting their policy operations with changes in the supply of money.

Our study indicates that the most important single factor operating to change the money supply is the change in the monetary base. Through open market operations the change in the monetary base can be brought under the control of the Federal Reserve authorities. Such control is a precondition for appropriate policy actions to offset changes in the public's demand for currency and time deposits or changes in the banks' demand for cash assets. But control cannot be achieved as long as the Federal Reserve allows day-to-day money market events to obscure its view of the money supply mechanism.

This study began by pointing out some of the errors that prevent a useful approach to the understanding of the monetary mechanism by the Federal Reserve. We have tried to show that many of these errors are embodied in the concept of free reserves and the modified free reserves doctrine. Most of all this study has been directed toward presenting evidence to support the statement that in 50 years the Federal Reserve has not obtained an understanding of the basic factors that must be incorporated in an analysis of the money supply process.

Before turning to some suggestions designed to improve Federal Reserve monetary operations, it is useful to consider one last set of questions. An effective monetary policy must do more than control the stock of money. It must also operate on the level of income with sufficient force to change the direction of income or at least mitigate recession and inhibit inflation. It is appropriate therefore to conclude this chapter by considering the question: Has the stock of money exercised an important influence on the postaccord economy?

THE STOCK OF MONEY, VELOCITY, AND NATIONAL INCOME

The discussion in this section shifts attention from the supply of money to the demand for money by the public. In several recent studies we have attempted to formulate and test a relation between the demand for money and its determinants. Closely related to the concept of a demand for money is the measure known as the income velocity of money. Once we know the factors affecting the demand for money, we know the determinants of income velocity. Knowledge

of either one of these is tantamount to knowledge of the other. If we can forecast the velocity of money and control the supply of money, we can have substantial impact on the level of national income through monetary policy.

To obtain the predicted level of income from the prediction of velocity, all that is required is that the predicted velocity be multiplied by the money supply made available through Federal Reserve operations. We hasten to add that controlling income is not a simple, mechanical operation. Nor is monetary policy a panacea that guarantees that we can make the level of national income whatever amount we desire. First, the analysis does not separate changes in real income from changes in prices. Second, increases or decreases in the quantity of money alter interest rates, one of the major factors determining the movement of income velocity.

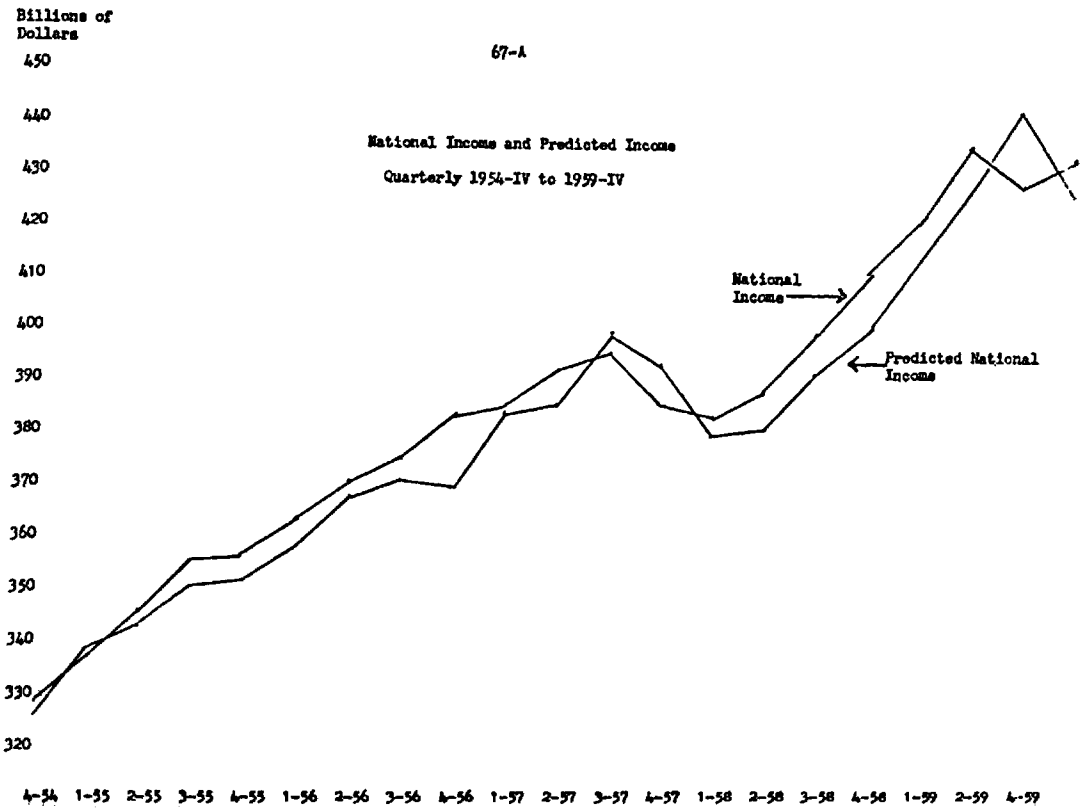
Nevertheless, the analysis and the forecast are useful. Evidence that we have gathered clearly indicates that prediction of virtually all of the major turning points in the level of national income since 1910 can be made by this means.[16] In recent work, we have begun to explore the possibility that forecasts of national income made by this procedure would be an aid to policymakers and would add to our understanding of the economy. We have, therefore, included here some very preliminary results based on our attempt to forecast the quarterly value of national income during part of the postaccord period.

The results, though preliminary, are encouraging. They suggest that the average error in forecasting quarterly velocity is approximately 1½ percent. These forecasts of velocity have been converted into forecasts of national income by multiplying the forecast by the actual supply of money. In this way, the forecast of national income is obtained that has the same error of forecast, 1½ percent, as the velocity forecast. Ultimately, we will wish to modify this procedure by using a forecast of the quantity of money in place of the actual money supply. Our predictions of the money supply earlier in this chapter clearly indicates that the error will not be enlarged substantially. But, the use of a forecast of the money supply is of little relevance until the Federal Reserve concentrates attention on control of the quantity of money and its rate of change rather than on the day-to-day details of the money market or the stock of bank credit.

The quarterly forecasts of national income at annual rates and the actual level of national income are shown in chart VI–1. We observe that in addition to the reasonably close agreement between the forecast values and the actual values, there is reasonable agreement in the two series at turning points in economic activity. It should be noted that the forecasts of velocity were made using only information that would have been available at the time that the forecasts were made. In the case at hand, each forecast used information for a date no later than the quarter preceding the forecast value. These values were then converted into forecasts of income by using the actual values of money supply, as noted above.

[16] See "Predicting Velocity: Implications for Theory and Policy," Journal of Finance, May 1963.

CHART VI-1



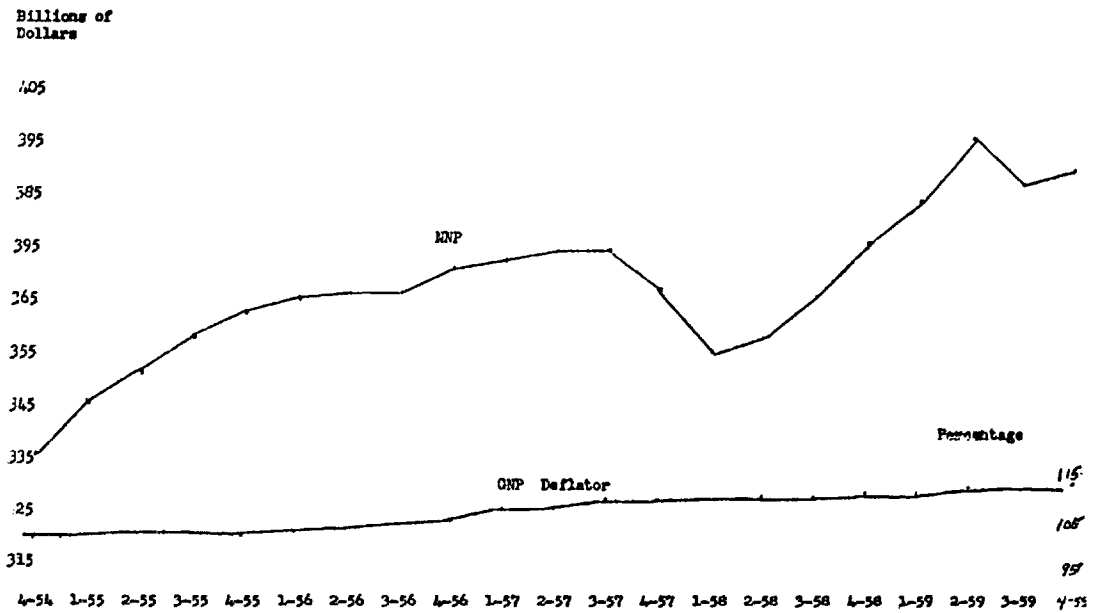
The dominant factor is the quantity of money and not velocity. That is, an increase in the quantity of money adds to the level of national income; it is not completely offset or reversed by changes in velocity. These findings strongly suggest that if monetary policy can control the stock of money more closely than it has, the degree of control over cyclical variations in the pace of economic activity can be improved greatly. But all changes have not been forecast completely; control of the stock of money is an aid in promoting a full employment economy with stable prices. It is not a guarantee of perpetual "full employment."

One major lacuna in the forecast is the omission of a mechanism capable of predicting separately the change in prices and the change in real income. Our confidence in the forecasts of economic activity would be much greater if these two components of money income had been separated. For it is clearly important in policy formation to predict the extent to which an attempt to increase the pace of economic activity will produce inflation. The studies that we have underway have not reached the point at which this can be done. But we can survey a part of the postaccord record to see the way in which changes in national income were divided between changes in the price level and changes in real income during the period for which our forecasts have been made. These data are shown in chart VI–2.

CHART VI-2

69-A

Deflated Net National Product
and Price Deflator
1954-IV to 1959-IV



CONCLUSION

This chapter has presented some of the accumulated evidence on the ability of the Federal Reserve to effect desired changes in the stock of money and in the economy through monetary policy operations. We have found that the degree of control over the money supply can be greatly improved if analysis is focused on what we have called the modified base doctrine. And we have seen that the preliminary evidence seems to indicate that changes in the stock of money affect the level of income in a predictable way. Thus it would appear that additional analysis of monetary factors, and a reorientation of Federal Reserve thinking, would have desirable consequences for economic stability.

Moreover, we have found that many of the implications of the modified base doctrine have been confirmed by our tests. These findings suggest that to obtain more useful knowledge about the monetary process, analysis should focus on the monetary base, the demand for currency and time deposits by the public, the demand for reserves by banks and other components discussed in the text. Our work is a small step in the direction of improving understanding of the process. Much remains to be done. But the results are sufficiently encouraging to suggest that further work along these lines would be useful.

The central concept presented here, the monetary base, is obtained from a regularly published table in the Federal Reserve Bulletin. Most of the other data used in the analysis are regularly provided in other published tables. Yet there is little or no indication that the appropriate steps have ever been taken within the Federal Reserve to link the base to the money supply. In an earlier chapter, we commented on some of the reasons for this failure. Organizational factors, particularly Greshman's law of planning and the banker's orientation, seem to be responsible for the attachment of the Federal Reserve to an inadequate conception of the monetary process. In addition, what is sometimes referred to as "selective perception" seems to be an important element.

Observations that confirm the prevailing view are accepted as evidence that the prevailing view is correct, while observations that contradict the prevailing view are neglected or made to fit into some specially contrived framework. These special categories are never integrated with one another to obtain a unified view of the monetary mechanism. Thus erroneous views are perpetuated.

Analysis and theory are required to fit the parts into a coherent framework capable of explaining the details of monetary life. Tests of the conception are required to assure that the framework is adequate and that the specific factors fit together in the manner envisaged by the theory. This is a task for a research staff, not for policymakers. But the judgment of policymakers who are not gifted with clairvoyance cannot be much better than the analysis on which their conclusions rest. It is therefore of the utmost importance to make the analysis explicit, to fit the pieces together, to test the framework against the facts.

The major failure of the Federal Reserve System has been the unwillingness to take these steps. If our analysis leads to any conclusion, it is the conclusion that changes in the method of making monetary policy are required if Federal Reserve monetary operations are to achieve their potential usefulness in the economy.

Section III—Some Suggested Changes in Policymaking Procedures

What is the primary purpose of Federal Reserve policy? Is it designed to smooth the adjustment of banks to the inevitable random changes in the money market? Or is it primarily a means of controlling, as best we can, the movements of the stock of money? The operations designed to smooth the reserve adjustments for bankers, the day-to-day operations that often dominate System policy, introduce a large amount of variation in the monetary base. As a result, such operations add to the variation of the money stock, weaken or reduce the "degree of control" over the money supply, and introduce substantial changes in the monthly rate of change of the money stock.[1] Even if the modified free reserve doctrine is replaced by the more appropriate base theory of the determination of the supply of money, daily and weekly changes in the base for "defensive" reasons would continue to hamper the effective transmission of Federal Reserve policy. Whatever the lags in the relation of money to income, whatever the factors affecting the speed of transmission, continuous defensive operations cause the signals emitted by Federal Reserve policy to be extremely variable. The variability of the monetary signal will remain as long as defensive operations and random changes create the pattern in the extended monetary base that is observed in chart VIII–1.

If the analysis presented in the two preceding chapters has validity, as the evidence presented there and elsewhere suggests, it follows that Federal Reserve policy is summarized by the movements of the extended base shown in the chart. It is extremely difficult to rationalize the observed movements of the base as part of a coherently formulated, systematic policy for controlling the supply of money. Even if Federal Reserve operations affected the money supply instantaneously, it would be difficult to defend the repeated changes in the direction of policy operations. One would still wish to know about the effect on economic activity of expectations engendered by the variations in the money supply.

Of course, it may be suggested that some of the movement in the extended base is introduced as the result of a conscious policy of removing seasonal changes in interest rates. The Federal Reserve is charged with the problem of removing interest changes of a seasonal nature to avoid the effects of such changes on the allocation of resources. We noted earlier that, consistent with their recognition of this responsibility, the "a" section of the directive has been interpreted as an instruction to the Manager to remove seasonal disturbances affecting interest rates. But, before we accept this explanation, two

[1] We have previously noted that the correlation between changes in the money supply, currency plus demand deposits, in adjacent months is negative. A rise in the money supply in a particular month is no indication that it will be followed by a further rise in the succeeding month.

points must be noted: (1) The monthly variability of the extended base is the result of more than seasonal operations. Removing seasonal variations in interest rates would introduce such changes into the extended base. No consistent seasonal pattern remains in the changes of the extended base plotted in chart VIII–1. This suggests that other short-term operations explain the exhibited monthly variability. (2) Attenuation of seasonal variations is not a purely mechanical affair. As we noted previously, a validated conception is required. The amount by which the base is changed to offset a given seasonal change depends upon the theory that we use and the goal that we pursue.

This becomes clearer if we suppose that we desire to offset the seasonal increase in the demand for currency. We choose as a goal the elimination of seasonal influence on Treasury bill rates. Our theory must tell us the amount of reserves to supply to accomplish that end. A theory based on free reserves will not yield the same answer as a theory based on total reserves. Nor can we solve the problem by deciding to keep the interest rate unchanged for the particular season, for in doing so we remove more or less than the seasonal influence. Clearly, a theory is required and all theories do not provide equivalent answers. Hence it becomes important to choose among competing theories or conceptions before we can decide on the meaning of "appropriate" in the expression "appropriate policy action" to remove seasonal influences.

A very similar issue has been raised quite recently by two members of the banking community.[2] They argue that, contrary to the Federal Reserve view that "defensive" open market operations are a major force stabilizing the economy or the money market, such operations interfere "unnecessarily with private security markets." Moreover, they suggest that prevailing methods of settling reserve balances "magnify the impact of random deposit fluctuations" and, in periods of monetary ease, "destabilize trading in Federal funds particularly to the disadvantage of country banks."[3]

An unofficial reply by a staff member of the Federal Reserve Bank of New York makes light of these objections.[4] This reply, though unofficial, is of interest since it reveals some basic features of the Federal Reserve conception to which we have referred at several places in this report. For example, Sternlight argues that if banks were allowed longer settlement periods, some banks might "expand credit more rapidly then was justified by the degree of reserve availability sought by the authorities, * * * transferring the burden of adjustment to others." This would "significantly delay and, in effect, blunt the impact of Federal Reserve influence on bank credit."[5] Moreover, the prospect that the Federal Reserve would no longer have weekly averages of reserves for Reserve city banks is viewed with alarm. The "System would not have nearly as good an idea as it does now of where the banking system stood at any particular time with respect to reserve availability in relation to requirements."[6]

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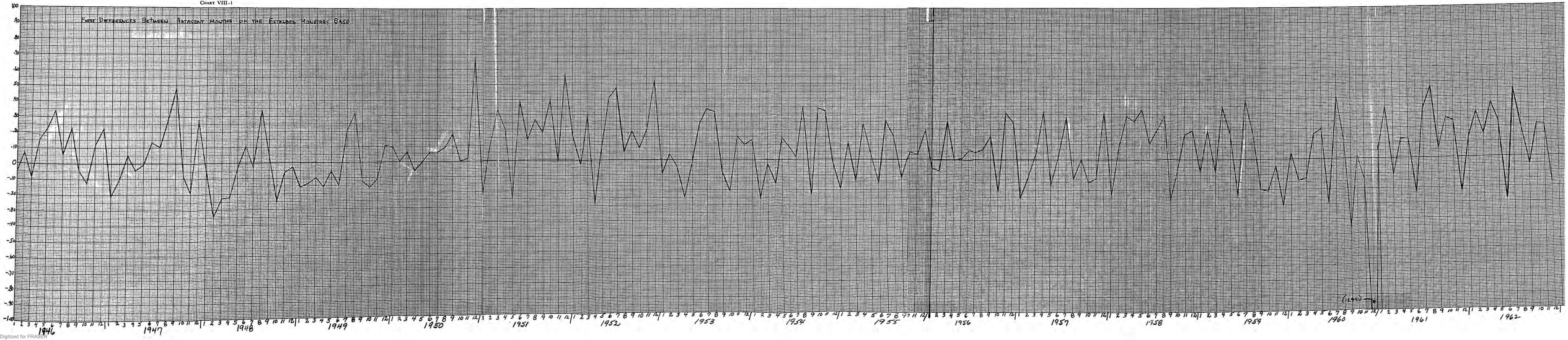
[2] Albert H. Cox, Jr., and Ralph F. Leach, "Defensive Open Market Operations and the Reserve Settlement Periods of Member Banks," Journal of Finance, March 1964.
[3] Ibid., p. 93.
[4] Peter D. Sternlight, "Reserve Settlement Periods of Member Banks: Comment." Ibid.
[5] Ibid., p. 95.
[6] Ibid., p. 96.

CHART VIII-1

FIRST DIFFERENCES BETWEEN INTEGRATE MOMENTS ON THE EXTENDED MONETARY BASE



The first quotation from Sternlight once again suggests the single bank frame of reference that dominates Federal Reserve thinking; the second amply demonstrates that extremely short-term daily or weekly events, are the events that the Federal Reserve watches and to which they respond. Let us consider these statements in a bit more detail.

Sternlight's argument that longer settlement periods would "blunt the impact of Federal Reserve influence" is not supported by any analysis or evidence. It is a pure assertion that shows little understanding of the operation of the monetary mechanism. If the Federal Reserve controls the size of the monetary base, why should it matter that a particular bank might be able to borrow Federal funds to meet the reserve settlement and thereby transfer the pressure to another bank? How does this differ from the prevailing arrangements under which individual banks buy and sell reserves in the Federal funds market?

The answer is that longer settlement periods would make for a more efficient use of existing reserves. When the Federal funds rate is comparatively high, a bank might be more inclined to sell Federal funds (reserves) with the expectation of reacquiring the reserves later in the month at a lower rate. The longer settlement period would encourage such operations. In this way, the volume of reserves would be able to support a larger volume of aggregate deposits. In short, the costs to the banking system of reaching a settlement would be reduced because a given volume of total reserves would support a larger volume of deposits for the banking system as a whole.

The Federal Reserve can control the supply of reserves. The increased efficiency in the banking system's use of the supply of reserves can be easily offset by a reduction in the volume of reserves. While the "degree of ease or restraint" associated with a particular volume of reserves would change, the change need not produce one additional dollar of monetary expansion if the Federal Reserve reduces the supply of reserves by an appropriate amount. In principle, the proposal for monthly reserve settlement periods is akin to the revival of the Federal funds market in the past decade. The introduction of the Federal funds market reduced the cost of bank operations by permitting an individual banker (1) to reduce the amount of reserves held as a contingency for sudden deposit withdrawals and (2) to earn a return on surplus reserves that are expected to remain available for only a short period.

Contrary to the view taken by Sternlight, the existing Federal funds market already performs the function of spreading the impact of Federal Reserve policy from a single bank with a reserve deficiency to other banks. Federal Reserve policy is not, or should not be, aimed at maintaining the pressure on a single bank or group of banks. As long as the Federal Reserve has control of the supply of reserves, the desired "degree of restraint" can be maintained. The spread of pressure to other banks is the first step in the mechanism transmitting monetary policy from a localized influence on banks in money market centers to banks in other locations.

The principal problem that arises in the operation of the Federal funds market as a part of the reserve adjustment mechanism is quite different from the one suggested by Sternlight. Because bankers will

not pay more than the rediscount rate to buy Federal funds, the Federal funds rate does not rise above the discount rate. Federal Reserve discount rate policy thus imposes a restriction on the price that prevails in the Federal funds market. This restriction prevents the market from allocating reserves efficiently in some of the periods when the Federal funds rate and the discount rate are equal. This problem is discussed in more detail below.

Here, it should be noted that Sternlight uses a single-bank approach to policy operations. What we would regard as the mechanism transmitting monetary policy through the banking system, he refers to as a means of blunting the impact of policy. His argument may be true—for the single bank. But if the Federal Reserve attempts to control the rate of monetary expansion by operating on the monetary base, it will not be true for the banking system.

The second quotation from Sternlight provides additional evidence for our view that the Federal Reserve is concerned with daily or weekly occurrences at the expense of longer term influences. Commenting on the present system, he notes that "there is often some uncertainty as to how the country banks stand in the first week of their 2-week reserve periods, and as to how this position might affect their willingness and ability to supply reserves to the central money market in the latter part of the 2-week period" (i.e., in the following week).[7] We readily acknowledge that such weekly movements may have a decisive importance for the Federal Reserve in carrying out the mandate given by the Congress. But we insist that neither analysis nor evidence has been presented to show that this is the case. Our own attempts to find supporting evidence for this conception have produced none. Instead, the evidence seems to support the view that concern with transitory intramonth variations in reserve positions produce the pattern of monthly changes in the monetary base that is exhibited in the chart VIII–1. Such changes are partly reflected in the money supply and produce a pattern that increases uncertainty.[8]

Again, the important point to be emphasized is the need for a validated theory or conception that serves as a basis for Federal Reserve action. Continuous repetition of existing dogma, unsupported by analysis or evidence, is not a substitute. It may turn out that there is an underlying rationale and substantial evidence for many of the positions taken by the Federal Reserve spokesmen and officials. But this can only be ascertained by analysis and evidence that has, as yet, not been provided.

This study is concerned with methods for improving policy operations and arriving at "appropriate policy actions." To that end, we suggest a number of general and specific recommendations. The list presented is by no means exhaustive, and no attempt is made to suggest an ideal set of administrative arrangements. Rather our interest is concentrated on some general features of an improved set of policy arrangements that would be consistent with any one of a number of alternative administrative structures. A few specific changes in policy procedures are then discussed briefly. No attempt is made to present a detailed analysis supporting each proposal.

[7] Ibid., p. 96.

[8] We emphasize the qualifying word "partly" in the sentence in the text. As we noted earlier in the report, the changes in reserves may be interpreted as systematic or random (transitory) by bankers. Their response to each would be different.

SOME GENERAL SUGGESTIONS FOR POLICYMAKING

Our principal recommendation follows directly from our analysis:

I. *The Federal Reserve should develop and test a theory incorporating the essential elements of the money supply process*—policy operations, currency, and time deposit behavior of the public and the demand for reserves by banks. While we regard our own efforts in this direction as a useful beginning, we do not claim to have developed a definitive theory of the supply of money. But we insist that the evidence strongly supports our contention that the theory that we have presented performs substantially better than the alternative conception that is the dominant Federal Reserve view.

It must be emphasized that until the Federal Reserve improves its understanding of the money supply mechanism, policy operations are more akin to an attempt to "steer a ship without a rudder" than the "rudder that causes the monetary ship to lean against the wind." Without a validated conception of the monetary process connecting policy operations with the money supply, there is no basis for the belief that the Federal Reserve operates to carry out the congressional mandate.

II. *The immediate aim of monetary policy should be control of the stock of money.*—Our analysis and the evidence in chapters II and V strongly support our contention that money and credit are not "two sides of the same coin," as the Federal Reserve has maintained. In the past, policies focused on bank credit have produced larger increases in the money supply during months of economic expansion than during recession periods. The analysis and the evidence that we have presented supports the view that there is a close and predictable link between Federal Reserve policy and the stock of money in terms of the conception centered on the monetary base; evidence from validated economic theory supports the view that there is a relation between the stock of money and the pace of economic activity measured by national income. To our knowledge, there is no substantial body of evidence supporting the contention that total "bank credit" is closely related to the pace of economic activity. However appealing the latter association may be at the level of intuition, neither analysis nor evidence has been presented to support this association.

It must be noted, therefore, that the argument that our approach is based on money, while the Federal Reserve prefers to view the process in terms of "bank credit" is irrelevant. In the present state of knowledge, such statements indicate only that the speaker prefers to disregard the accumulated evidence and substitute his own unsupported views.

III. *The free reserves or "modified free reserves" doctrine should be abandoned.*—We find little evidential support for the asserted relation between the conception centered on free reserves and changes in the stock of money. We find even less evidence for the view that free reserves are related to changes in bank credit as specified in the modified free reserves conception. Indeed, the free reserves conception does little better in explaining the behavior of the stock of money than the simple statement: If the money supply fell last month, it will rise next month and fall in the following month.

IV. *The free reserves conception should be replaced by the conception centered on the monetary base.*—Again, we emphasize that this

conclusion is based on a comparative appraisal of existing theories of the money supply. We do not wish the base theory, as we have presented it here and elsewhere, to become a rigid dogma. Continuous appraisal, reappraisal, and comparisons with alternative conceptions should be a part of the work of the Research Division at the Board and at the Reserve banks. These efforts will lead to improved understanding of the money supply process that the Board once acknowledged as its primary concern. However, in the present state of knowledge, the conception centered on the monetary base, while far from perfect, is the most highly validated conception of the money supply process. Moreover, this conception incorporates the essential elements of the process—Federal Reserve policy actions, the behavior of the banks and the public. Until modifications or tests against alternative theories show that another conception performs better, the theory centered on the monetary base should serve (1) as a guide for policy action and (2) as the conception used by the Federal Reserve to analyze the money supply process.

V. *The Federal Reserve should be required to report periodically on the progress that it is making toward the development of improved understanding of the monetary process.*—The reader of this report is well aware that after careful reading of published statements and many pages of discussion, we cannot be certain about the Federal Reserve's views on many fundamental issues. The reason is that their views are rarely articulated clearly or fully developed. They are more in the nature of impressions obtained by selective perception of events.

The requirement to report periodically on the work that is being done to develop a validated conception of the monetary process will lead to a better utilization of the Research Division. More important, it will lead to a better understanding of the monetary process, and the relation of policy actions to the money supply and the relation of the money supply to the pace of economic activity. Such knowledge is the basic foundation for effective policy action and for the avoidance of errors and the inappropriate actions that have so frequently occurred in the past.

The report that is envisaged would be one that meets high professional standards. The conceptions should be clearly stated and evidential support, including tests against alternative conceptions, should be provided. Such reports would provide a greatly improved understanding and increased discussion of the monetary process by the staffs of the executive departments, including the President's Council of Economic Advisers, the Congress, the interested members of the academic community, and the public. Discussion and critical examination by outsiders would be of substantial assistance in suggesting modifications and additional tests.

Moreover, the requirement to provide such detailed reports will focus attention on the development and testing of alternative conceptions within the Federal Reserve. To those who would question the need to force attention to this issue with the Federal Reserve, we ask only: Why has the Federal Reserve failed to develop a validated conception after 50 years? Why has it retreated from the useful beginning made by Riefler more than 30 years ago?

VI. *The desired growth rate of the money supply should be explicitly chosen for a 6-month or longer period and policy operations should be*

directed toward achieving that growth rate by explicit choice of a growth rate for the monetary base.—We have found that the Federal Reserve has demonstrated in the postwar years that it is capable of judging turning points in economic activity quite accurately. The major problem in policy operations has been the failure to take appropriate action. This failure is closely related to the invalid conception of the monetary process and the concern with extremely shortrun operations. There is no clear reason why shortrun technical problems of the money market should dominate Federal Reserve policy discussions. The proposal made here would require discussion of the appropriate growth rate of the monetary base and the money supply over a longer period of time. This would focus the attention of policymaking officials on the problems that have been entrusted to their control, rather than on the technical position of the financial markets.

We do not suggest that the decision taken should be made once and for all. The demonstrated ability of the Federal Reserve in the postwar years to judge turning points in economic activity suggests that discretionary monetary policy can make an important contribution to achieving the goals that Congress has established for the economy. The choice of a desired growth rate for the base and the money supply is a means of (1) providing a clear statement on the part of the policymakers of the short-term objective of policy; (2) freeing the Federal Reserve from the dominant influence of the Manager of the System Open Market Account, who, as we have seen in chapter IV, has played a major role in making policy decisions; (3) furnishing a criterion by which policymakers can judge the action of the Manager that is related to the aims of monetary policy decided by the Congress in the Employment Act of 1946 and elsewhere; (4) providing more consistent, less variable, policy operations and less interference in market processes and operations.

Needless to say, if events occuring in the economy indicate that a slower or faster growth rate in the monetary base is required to increase employment or forestall inflation, the desired growth rate should be altered. But such decisions should be made by specifying an alternative monetary growth rate to be achieved at a relatively steady rate over a period of months rather than in terms of a vague statement about desired "ease or restraint" for a 3-week period.

This report has been dominantly concerned with problems of domestic monetary policy. We have not specifically discussed the international balance of payments. At this point, however, some comments on the relation between the international balance of payments and monetary policy are unavoidable. In particular, the connection between the optimal growth rate of the money stock and the choice between two alternative arrangements governing international transactions requires some comment.

Adjustments of international transactions operate through changes in relative prices (including interest rates) and income. Changes in relative prices are induced either by modifications of exchange rates or by suitable changes in domestic price levels under fixed exchange rates. A fixed exchange rate requires, for successful operation, that the growth rate of the money supply be adjusted to the evolving balance of payments. A persistent deficit would have to be properly reflected in a relatively decelerated growth rate in the base and a correspond-

ing relative deceleration of the money stock. This retardation must be sufficiently large to generate the relative fall in domestic prices and income required to restore equilibrium. Similarly, in case of a persistent surplus, the base should accelerate and the money supply should expand more rapidly. The induced rise in domestic prices and income would eventually remove the surplus.

Under a fixed exchange rate serious constraints are thus imposed on the growth rate of the monetary base. On the other hand, these constraints are relaxed under a regime of flexible exchange rates. Such a regime absorbs the transmission of deflationary or inflationary impulses from one country to another through variations in the exchange rate. This permits the choice of a monetary policy designed to stabilize prices and dampen fluctuations in output.

The choice between a flexible and a fixed exchange rate thus affects the selection of policy patterns guiding the growth rate of the base. It is important to acknowledge this dependence of a rational monetary policy on the type of international exchange system. Disregard of this dependence creates persistent difficulties and eventually forces difficult decisions.

We submit that the Federal Reserve authorities should face the choice between fixed and flexible exchange rates. The choice is sufficiently important to justify a careful analysis and an assessment of the two exchange systems with more than the slogans usually supplied. Moreover, in case the balance of rationally founded judgment should tip in favor of a fixed exchange rate system, the Federal Reserve authorities would have to acknowledge that their policies contribute to variations in price levels, output and employment. However, even with the growth rate of the base properly adjusted to the evolving balance of payments under fixed exchange rates, there would be no reason for the shortrun gyrations observed in the past. The gyrations were not induced by the balance of payments. They emanated from the misconceptions of the Federal Reserve about the structure of the monetary process.

VII. *Delegate to the Manager the responsibility for a limited amount of technical operations provided that these operations do not alter the steady growth rate of the monetary base.*—We have stressed that there is little need for the continuous buying and selling operations carried on by the Federal Reserve under the guise of "defensive operations." This view has been supported by members of the banking community, as we noted earlier in this chapter. But technical market considerations may at times require limited "defensive" operations to improve the technical position of the market. For example, payment for a Treasury issue may fall on a "double settlement" day. However, we believe that arrangements, such as those suggested in the following section, will eliminate the need for many "defensive" operations.

VIII. *Separate the problems of bank regulation from the problems of monetary control.*—The skills and knowledge required to determine the desirability of mergers, branching, supervision, and other questions of bank regulation are not the same as those required for making appropriate judgments about monetary policy. There is little relation between the duties or the information acquired in the two types of activity. Questions of supervision, merger, and branching presently

occupy a substantial portion of the time of Board members. Such operations should be separated from monetary policymaking and should become the responsibility of some other group.[9]

The above recommendations are of a general nature. They reflect the view that the principal problems in Federal Reserve policymaking are those that have been emphasized in this report: (1) The absence of a coherent, validated conception of the money supply process and (2) the (related) failure to carry out the congressional mandate through countercylical policy operations. These failures of the Federal Reserve could be eliminated without any change in the prevailing administrative arrangements. Administrative rearrangement, by itself, will neither provide an appropriate conception nor lead to better policy decisions in the absence of a validated conception, although it may increase the probability of obtaining both.

Our primary interest is in improving discretionary monetary policy. We regard the general recommendations—particularly the development of a validated theory and the elimination of concern with extremely shortrun phenomena—as the most important means of achieving that end. Nevertheless, some specific changes in legal and administrative arrangements contribute to improved policymaking procedures provided that a coherent, validated conception of the monetary process replaces the prevailing collection of largely unsubstantiated views. The following section, therefore, suggests some specific legal and administrative changes that may be useful.

SOME SPECIFIC SUGGESTIONS

IX. *The Federal Reserve's power to alter reserve requirement ratios should be abolished.*—Discretionary power to alter the requirement ratios was given to the Board of Governors in the middle thirties as a means of increasing the power of the Federal Reserve to control the monetary system. This increased power was given despite the failure of the Federal Reserve to use its existing power to prevent the destruction of a large part of the banking system and the stock of money in the early thirties. We have found little evidence that suggests that the Federal Reserve has used this power wisely or well. Furthermore, our analysis in this study suggests that most of the changes in reserve requirements in the postwar period have been largely or fully compensated by offsetting open market operations.

The analysis in chapters VI and VII also suggests that there is little difference for the money supply between an open market operation of given magnitude and the liberation or absorption of the same volume of reserves through changes in reserve requirements. This in turn suggests that the power to alter reserve requirements is largely redundant—whatever is accomplished by reserve requirement changes could be achieved by open market operations. Unless a valid, alternative conception of the money supply process is developed that furnishes a rationale for such discretionary power, we urge that the power be abolished. The principal advantage of doing so is that abolition of the power reduces the Federal Reserve's ability to make large errors such as those that were made in 1936–37 when reserve requirements were doubled.

[9] The proper resting place for responsibility over mergers, etc., is beyond the scope of this report since it raises questions quite unrelated to monetary policymaking.

X. *The power to alter vault cash requirements should be abolished.*—At present, the Board of Governors is able to vary the percentage of vault cash that is counted as a part of reserves within the range zero to 100 percent. Variations in the proportion of vault cash that is included as a part of reserves is equivalent to a change in reserve requirements. Liberation or absorption of reserves by this means is an alternative to open market operations.

The Federal Reserve has presented no analysis or evidence that the power to alter this requirement adds to the "degree of control." Our analysis indicates that the power is largely redundant in terms of the "degree of control." Moreover, member banks now hold more than $3 billion in vault cash that is counted as a part of reserves. A sudden reversal of position by the Federal Reserve, one that eliminated vault cash as a part of reserves, would have a sizable impact on the money supply. Such action would produce a decline in the money stock of approximately $8 billion if not offset by open market operations.

XI. *The discount rate should be a penalty rate.*—Many of the short-term problems in the money market that are used to justify "defensive" operations result from deficiencies in the existing arrangements for reserve adjustment by individual banks. One such problem is created by the failure of the Federal funds rate to rise above the discount rate. If the Treasury bill rate is above the discount rate, many banks are induced to hold Treasury bills rather than sell Federal funds. The efficiency of the Federal funds market as a place for adjusting reserve positions is seriously diminished.

The failure of the Federal funds rate to rise above the discount rate leads to a rapid increase in borrowing at the Reserve banks, generally followed by a fiat change in the rediscount rate to a level above the Treasury bill rate. Sudden changes of this kind in the rediscount rate produce "unsettled conditions" in the financial markets since they alter the cost and yield relations on those assets that banks use for short-term adjustment. A penalty rate that removed this source of difficulty would permit a smoother adjustment to prevailing conditions.

Our analysis suggests that the demand by banks for excess reserves is dependent on prevailing market rates and the rediscount rate. When market rates are comparatively high, banks reduce the amount of reserves that they desire to hold. It is precisely during such periods that the Federal funds market could play a particularly useful role in redistributing reserves among bankers and in assisting in the weekly or biweekly settlement. All bankers do not experience the identical rate of expansion (or contraction) in deposits. Some have reserves that can be profitably lent in the market. However, the rediscount rate operates as a ceiling above which banks will not buy Federal funds. Moreover, when the Treasury bill rate is sufficiently above the Federal funds rate, it is profitable for banks with surplus reserves to pay the higher transaction costs and acquire bills even if the transaction must be reversed in a few days. The quantity of Federal funds offered on the Federal funds market is reduced.

These considerations affecting both the quantity supplied and the quantity demanded, at times, restrict the role of the Federal funds

market as a mechanism for adjusting reserve positions. As a result banks borrow more heavily from the Reserve banks. The Federal Reserve thus supplies through the discount window some of the reserves that it has attempted to absorb through the open market account.

If one adopts the Federal Reserve view that increased borrowing by bankers restricts the expansion of the banking system, there is no conflict between supplying reserves through the window and removing them through open market operations. But our analysis and evidence strongly suggest that this interpretation is incorrect and that it confuses the effect on an individual bank with the effect on the monetary system.

Under our proposal the rediscount rate would always be above the Treasury bill rate. Although the two need not be tied together, we envision a rather close relationship between the two in the direction and timing of movements. As the Treasury bill rate rose, the rediscount rate would rise also. This would remove the ceiling presently imposed on the Federal funds rate by the "sticky" rediscount rate. The rediscount rate would become more of a market determined rate.

Removing the ceiling imposed on the Federal funds rate by the rediscount rate would increase the information content of the latter rate. Bankers in various parts of the country would have better information on the daily reserve position summarized by the price that is being paid for reserves, or Federal funds, in the market.

Further, the removal of a restriction on the Federal funds market as an allocative device would reduce the problems of short-term maldistribution of reserves. At present, total reserves (or total free reserves) may be sufficient, on a given day, from the Federal Reserve's view, but the distribution may be poor. "Defensive" open market operations are conducted to supply reserves and avoid the distribution problem. A part of the distribution problem occurs because of the implicit upper boundary imposed on the Federal funds rate. By removing the restriction on the Federal funds rate, the solution to the problem of reserve distribution could be given to the individual bankers. By paying a sufficiently high rate, bankers could attract surplus reserves through the Federal funds market.

We strongly believe that such technical problems should be resolved by individual bankers insofar as possible. By removing restrictions imposed on the market for Federal funds, the Federal Reserve could facilitate solution of the distribution problem through the market mechanism.

XII. *The discount window should be "open" at a penalty rate.*— The spirit of the original Federal Reserve Act envisioned that bankers would adjust actual to desired reserves by borrowing from the Reserve banks. Since the twenties, the Federal Reserve has attempted to impose administrative restrictions on the use of the discount window, particularly in periods when banks desired to borrow. The rationale for these administrative restrictions is open to question. If banks do not borrow for profit but only for "need," and repay borrowing as promptly as possible as the Federal Reserve has maintained, why should the Federal Reserve impose administrative restrictions designed to reduce the volume of borrowing to meet these "needs"? If banks borrow for profit, the profitability of borrowing can and would be eliminated by the use of a penalty rate.

Our proposal to keep the discount window "open" would mean that borrowing at a penalty rate would be a "right" and not a "privilege" of membership in the System. A major reason for advocating this step stems from the recognition of the desirable role that member bank borrowing can play in the individual bank's reserve adjustment. Many smaller banks cannot participate in the Federal funds market regularly, if at all, because the minimum size of transactions in that market is too large relative to the size of their excess reserves. Generally such banks hold excess reserves and do not borrow or lend. However, even the smallest member banks may at times have reserve deficiencies. The discount window permits them to adjust their position. The proposal would not change this adjustment procedure other than granting the member bank the right to expect accommodation.

A second reason for advocating the "open window policy" stems from our concern with so-called defensive operations. Many of these operations are designed to smooth the adjustment of individual banks or sectors of the banking system to the inevitable random movements that affect their reserve position for short periods. We propose to make the adjustment to such movements a matter to be resolved by the individual banker. If there is a maldistribution of reserves or some other random event, the banker may, if he wishes to pay the rate, avoid this problem by borrowing. Such borrowing would solve his temporary problem and would not involve any substitution of judgment by the Federal Reserve for judgment by the individual banker.

It may be suggested that under prevailing arrangements, bankers are rarely refused the discount privilege. This might lead many to believe that this proposal would not provide any new mechanism other than the penalty rate. Our response to that potential comment is contained in the next recommendation.

XIII. *The discount window should replace open-market operations as the principal means by which the Federal Reserve handles "defensive" operations.*—This proposal would transfer the judgment about "defensive" operations to the individual bankers. Under present arrangements, when the Treasury withdraws balances from an individual bank, the bank may have a reserve deficiency. Why should the Federal Reserve correct this temporary deficiency by a "defensive" open-market purchase? If collection schedules are disrupted so that Federal Reserve float rises, why should open-market operations at the initiative of the Federal Reserve be used to adjust reserve positions?

We recommend that, by paying a penalty rate, the individual bank be allowed to adjust reserve deficiencies at its own descretion. Our proposal (XI) envisions that many of the deficiencies and surpluses in reserve positions would be resolved through the Federal funds market. Those that were not resolved in that way could be handled through the discount window, if the individual banker is willing to pay the price. If the individual bankers prefer to take the risk of acquiring reserves later in the settlement period, we see no reason for the Federal Reserve to substitute its collective judgment for the decisions of the bankers.

XIV. *The effect of member bank borrowing on the growth rate of the monetary base should be offset.*—Our proposal VI calls for the choice of a growth rate for the monetary base to be achieved over a period of time at a steady rate. Proposal VII is designed to prevent

the Manager from altering the growth rate by large temporary injections of reserves for defensive reasons. The present proposal makes more explicit the procedure that we have in mind. The Manager should observe the increase in member bank borrowing and offset the borrowing by open-market operations. Thus defensive operations would be designed to maintain the growth rate of the base that was decided upon by policymaking officials. As above, banks would be permitted to borrow at a penalty rate to ease the problems associated with the distribution of reserves. But such private decisions should not interfere with the decision of the body that Congress has entrusted to control the money supply.

Among the advantages of the proposed system, we single out three for comment: (1) The policymaking officials would have a clear set of criteria by which to judge the actions of their Manager. (2) The economy would experience much smaller fluctuations in the money supply over short periods of time with attendant reduction in the uncertainty presently engendered by Federal Reserve procedures. (3) The information content of market indicators would be substantially increased. In particular, the movement of the Federal funds rate and the size and location of member bank borrowing would convey quite useful information about the state of the financial markets. Such information is presently obscured by the ceiling imposed on the Federal funds rate by the rediscount rate and by the variety of administrative restrictions imposed on member bank borrowing.

XV. *Float should be abolished.*—A major source of short-term variation in member bank reserve balances and a major reason used to justify defensive open-market operations is the existence of float. This is purely a manmade, or more correctly a Federal Reserve made, problem. We suggest that float should be abolished by making credits and debits to reserve balances simultaneous.

Under present arrangements the Federal Reserve determines a fixed schedule governing deferred availability credit, i.e., the schedule of dates on which the reserve balances will be made available to the banks whether or not the checks have been collected. The difference between the amount of uncollected items (or cash items in process of collection) and deferred availability credit is "float." Float is subject to large intramonth and seasonal variation owing to the variability of the volume of checks that must be processed, the failure to meet collection schedules due to weather and other, often random, events.

Float is an interest-free loan that the Reserve banks make to the member banks. It arises solely because the payment schedule determining the conversion of deferred availability credit to actual credit, that the Federal Reserve imposes on itself, does not match the actual collection schedule.

We see no clear reason why this problem should be used to justify a large volume of defensive open-market operations and interference in the market by the Federal Reserve. If banks are temporarily under pressure because mail schedules or collection schedules are not met, does it follow that the Federal Reserve should make an interest-free loan to the banks? The alternative proposed here would abolish the interest-free loan by replacing the predetermined guaranteed collection schedule with the actual collection schedule. This would eliminate the rationale for many of the defensive open-market operations required to adjust for changes in float.

Sizable intramonthly variation in reserves would occur because of the intramonth variation in the volume of checks drawn. We suggest that bankers be permitted to solve this problem on their own, without Federal Reserve interference, by anticipating reserve drains in advance, by purchasing or selling Federal funds, or by borrowing at a penalty rate from the Reserve banks. We are pleased to note that some bankers partially share our view that bankers would be able to solve some of these problems, without Federal Reserve assistance, under alternative institutional arrangements.

XVI. *Remove restrictions on the payment of interest on demand deposits and regulation of interest rates paid on time deposits.*—These restrictions interfere with the allocative efficiency of the financial markets. They have an important effect on the rate at which demand deposits are converted into time deposits. The zero nominal rate of interest on demand deposits is particularly important in this regard. Permitting banks to pay interest on demand deposits would reduce this source of instability in the growth rate of the money supply, currency and demand deposits.

Ceiling rates of interest on demand and time deposits encourage the growth of nonbank financial intermediaries when interest rates are comparatively high. More important, little analysis and evidence has been presented to support this form of price control. The only detailed study of the effect of payment of interest on demand deposits that we know [10] suggests that many of the asserted dangers arising from the payment of interest on demand deposits are without evidential support.

XVII. *We suggest that the Federal Open Market Committee be abolished.*—The committee system as a means of regulating the volume of open-market operations developed from an attempt to coordinate the semi-independent operations of a number of Reserve banks. This form was retained in the modifications introduced into the Federal Reserve Act during the middle thirties.

The committee system is somewhat unwieldy. While there are officially only 12 members of the committee at any one time, the seven members of the Board and the 12 Reserve bank presidents participate in most of the meetings. In addition, there are a number of vice presidents, advisers, and staff present and participating in the meeting. While such large meetings may contribute to the development of an active and at times heated discussion, it is not clear that such discussion contributes to the formation of rational monetary policy. Indeed, the evidence that we have surveyed suggests the opposite. A variety of unsubstantiated judgments and unsupported opinions replaces analysis and evidence as the basis for policy operations.

We don't wish to infer that the Reserve bank presidents are more responsible than the members of the Board for the absence of analysis and evidence as a basis for policy decisions. We suggest, instead, that the committee system and the discussion procedure is itself a major contributing factor to the present state of affairs.

Further, we are convinced that much of the information that the regional officials bring to the meetings can be obtained in alternative ways. Under the proposed arrangements that we have suggested, the

[10] George Benston, "Interest Payments on Demand Deposits" (multilithed), University of Chicago, 1963.

volume of member bank borrowing in the various regions and the Federal funds rate would be a more useful indicator of regional banking situations than they are at present. Moreover, we have indicated that the primary policy matter to be decided is the rate of growth of the monetary base. This is a national, not a regional, matter that should be decided on the basis of analysis and evidence—not as a matter of unsubstantiated judgment.

XVIII. *Serious consideration should be given to the replacement of the Board of Governors with a single administrative official.*—Our reasons for suggesting this change are much the same as those discussed briefly in connection with recommendation XVII. We note, in addition, that the Commission on Money and Credit and the author of the Hoover Commission Report on the Federal Reserve both suggested a smaller Board.[11]

Our own suggestion assumes that many of our other suggestions will be adopted. There will no longer be a problem of deciding on branches, bank mergers, etc. There will be no problem of deciding on reserve requirements or interest rates on time deposits. Problems connected with the supervision of banks and the inspection of assets will have been moved elsewhere. The principal problem that will remain is that of deciding on the appropriate growth rate of the monetary base after interpretation of the events occurring in the economy. We know of no compelling reason why this decision requires a Board. Our reading of past history suggests that at crucial points in our monetary history, the committee system has prevented appropriate action from being taken because of indecision within the Board.

CONCLUSION

The principal conclusion of this study has been stated many times in the present and preceding chapters. To repeat once more, we find that the Federal Reserve has failed to develop an understanding of monetary processes that is adequate for carrying out the mandate given to it by the Congress. The recommendations in this chapter are largely designed to correct that deficiency and other failures of the present system that prevent or hamper discretionary monetary policy from having maximum effectiveness in promoting employment and forestalling inflation.

Our "general" recommendations are our principal suggestions. Among these, we suggest most strongly the urgent need for development of a coherent, validated framework connecting Federal Reserve operations with the monetary process. Without a validated analytical foundation, the errors that have reduced the usefulness of discretionary monetary policy are likely to occur and reoccur with tragic consequences similar to those that have been experienced on occasion in the past.

We have not attempted to investigate the complete range of monetary phenomena and have not analyzed some features of policymaking. Consequently, we have not recommended changes in some existing procedures that are a part of the prevailing system. This failure

[11] "Money and Credit," the report of the Commission on Money and Credit (Englewood Cliffs: Prentice-Hall, 1961, pp. 87, 90). G. L. Bach, "Federal Reserve Policymaking" (New York: Alfred Knopf, 1950).

should not be construed as an acceptance of these procedures. Many present restrictions—e.g., the 25-percent gold reserve requirement—might be usefully abolished. But our discussion and analysis have not taken us in that direction, and we have refrained from making recommendations where we have not supplied analysis.

Finally, we wish to note that we do not regard the type of "monetary rule" that has been suggested by a number of economists as a viable alternative to discretionary monetary policy and the development of a coherent framework for policymaking. The Federal Reserve does not directly control the money stock but must operate through the banking system and the public. Without a valid understanding of the monetary process, the Federal Reserve is unlikely to be able to deliver a constant rate of growth in the money supply. Without prior analysis of the effect of their policy operations on the money supply, attempts to control the monetary growth rate seem fruitless. Once the Federal Reserve has attained a validated understanding of the monetary process, their power to control the rate of monetary growth and their demonstrated ability to judge turning points seem to argue in favor of discretionary procedures.

APPENDIX I

Questions and Responses to Questionnaires Mailed to Each Member of the Board of Governors and Each President of a Reserve Bank Who Held the Position on August 21, 1963

Board of Governors of the
Federal Reserve System,
Office of the Chairman,
Washington, September 12, 1963.

Hon. Wright Patman,
Chairman, Committee on Banking and Currency,
House of Representatives, Washington, D.C.

Dear Mr. Chairman: On August 21, 1963, you addressed letters to each of the members of the Board enclosing questions that had been prepared by Drs. Brunner and Meltzer relating to a study of several aspects of the effectiveness of monetary policy.

The members of the Board have considered these questions and have indicated their substantial agreement on the answers they would supply. Accordingly, the members of the Board join in submitting the enclosed set of answers to the eight questions you presented.

Sincerely yours,

Wm. McC. Martin, Jr.

Enclosures.

Conference of Presidents of the
Federal Reserve Banks,
September 10, 1963.

Hon. Wright Patman,
Chairman, Committee on Banking and Currency,
House of Representatives, Washington, D.C.

Dear Mr. Chairman: I am writing to you with reference to your recent letter addressed to each of the Federal Reserve bank presidents and enclosing seven questions prepared by Drs. Brunner and Meltzer in connection with a study of several aspects of the effectiveness of monetary policy.

The Federal Reserve bank presidents have had an opportunity to discuss these questions, and they have concluded that they are in substantial agreement with respect to the answers to these questions. They have, therefore, concluded that it would be expeditious to respond to your request by submitting a single set of answers which they have worked out among themselves.

Accordingly, I am transmitting herewith the joint answers on behalf of the presidents of all 12 Federal Reserve banks.

Yours sincerely,

WATROUS H. IRONS, *Chairman.*

Enclosures.

Question

I. The annual reports of the Board of Governors frequently refer to the desire to accommodate the credit needs of commerce and industry.

1. Are certain classes of assets or liabilities used to measure the credit needs of commerce and industry? If so, which are they?

2. Are other specific measures used? If so, which are they?

3. What specific criteria do you use to judge whether these needs are adequately met? Cite the relevant data for a period when inadequate accommodations obtained?

4. Does the requirement under the Federal Reserve Act to accommodate the needs of commerce and industry involve more than a seasonal adjustment of the items in question 1? If it does, what other adjustments are involved? A concrete example covering a given time period will be helpful.

5. Does the requirement under the Federal Reserve Act to furnish an elastic currency involve more than a seasonal adjustment of the amount of currency outstanding? If it does, what other adjustments are involved? Do you understand currency in this context to be only Federal Reserve notes? If not, how do you define currency?

6. During 1949 and 1961 (as well as at other times) the sum of currency held by the public plus demand deposits adjusted grew at a lower rate than its longrun average growth rate. Is this behavior of the money supply appropriate under the Employment Act of 1946? (If your answer suggests that time deposits of commercial banks should be included in the money supply, kindly indicate the principal reasons for this choice of definition as part of your answer.)

Answer Supplied by the Board of Governors

Parts 1–4

Credit needs of commerce and industry cannot be measured solely by any specific classes of assets or liabilities. In addition to the direct credit needs of manufacturers and merchants to finance outlays for inventories and equipment, credit is needed to finance consumer purchases of the products of commerce and industry, credit is needed by agricultural and other suppliers of raw materials and services used in commerce and industry, and credit is needed by governments to provide the community services essential to the proper functioning of the production and distribution processes.

The Federal Reserve is not empowered to and does not attempt to allocate credit to any of these specific uses; in our free enterprise economy such allocation is a function of the marketplace. Nor is the Federal Reserve the principal source from which these credit needs are met; the bulk of all credit arises from the flow of consumer and business financial saving. It is the responsibility of the Federal Reserve to insure that the marginal element in the total credit supply—

bank credit—when combined with the flow of financial saving, is adequate to meet the aggregate credit needs of an expanding economy.

Adequacy in this context is not a matter of satisfying all credit demands at all times nor, on the other hand, is it a matter of meeting only seasonal fluctuations in business credit demands. Judgments as to the adequacy of credit availability must balance the overall credit needs for longer term economic growth against the current availability of productive resources to accommodate additional credit-financed expenditures without upward pressure on prices. The impact on credit supply and demand of other governmental policies must also be assessed. All of these factors are weighed in arriving at judgments as to whether the credit needs of commerce and industry are being met adequately, and the record of policy actions taken by the Board of Governors and the Federal Open Market Committee (published in detail in the annual reports of the Board of Governors) indicates the wide range of economic data reviewed in arriving at such judgments.

Part 5

In the context of the question, currency is understood to mean currency in circulation outside of the Treasury and the Federal Reserve banks. Of the total of such currency in circulation ($35.5 billion at midyear 1963), $30.3 billion is in Federal Reserve notes, and the remaining $5 billion is principally in the form of silver certificates and subsidiary silver coin.

The public obtains additional currency through the commercial banking system by exchanging demand deposits for currency. It is free to do so at will. Technological and social changes, such as those that have made checkbook banking so popular in this country, have limited the secular growth in demand for currency, but there are still sharp seasonal fluctuations in the public's currency needs.

Commercial banks meet these fluctuations by adjusting their own holdings of currency or by obtaining additional currency in exchange for their reserve balances at Federal Reserve banks. An increase in the public's preference for currency as against deposits increase these reserve needs of the banking system, for each dollar of increase in currency demanded by the public represents an equivalent drain on member bank reserve positions offset only in part by the reduction in the fractional reserves required to be held against deposits. Along with other factors affecting reserves which also may have wide but fairly predictable seasonal variations, seasonal changes in currency demands are anticipated and provided for in the implementation of monetary policy. Secular growth in currency needs is accommodated within the framework of providing an adequate reserve base to meet the credit and liquidity needs of an expanding economy growing at a sustainable rate.

Part 6

Changes in the money supply result from the prevailing posture of monetary policy as well as many other factors. Among the most important of these other factors are the economy's demands for bank credit, public preferences for holding liquid assets in particular forms, and the incentives for banks to make loans and purchase investment.

In recession periods, credit demands and bank incentives to acquire loans and investments tend to decline, while public preference for liquid assets tends to rise. In 1949 and 1961, for example, evidences

of recession were apparent in the course of the money supply and other financial magnitudes as well as in real economic activity. The Federal Reserve was following an active countercyclical monetary policy in both years, as would be appropriate under the Employment Act of 1946.

Resulting stimulation to economic activity was not such as immediately to create vigorous expansion. That takes time and monetary policy cannot do the job by itself. In any case, the average longrun rate of growth in the money supply is not a measure of the desirable addition to the supply in each individual year, for conditions influencing the supply of and demand for money vary greatly from time to time and affect the rapidity with which the economy responds to shifts in policy.

Answer Supplied by the Presidents

1. In the current context, the language of the Federal Reserve Act [1] must be interpreted in a broad sense and the goals of monetary policy defined in terms transcending purely monetary and credit variables. The credit needs of commerce and industry cannot be isolated and considered apart from the credit needs of the economy as a whole, and these, in turn, are related to the performance of the economy. Credit needs cannot be related to specific classes of assets or liabilities. Nor are all credit needs of any segment of the economy met by the commercial banking system alone, and, indeed, bank credit plays a marginal role in our credit structure.

Monetary policy is concerned with the overall availability of credit, but the allocation of credit among competing needs occurs in the marketplace. The process of credit allocation is studied closely by System officials in order to ascertain the uses made of credit resources and in particular of the marginal amounts made available as a result of System policy actions. At times, the monetary authorities may want to influence credit flows, but their policy actions do not aim at identifying or meeting specific credit needs of individual segments of the economy.

Data relative to the assets and liabilities of the banking system contribute importantly to an understanding of the credit needs of the economy, but by themselves they are not sufficient. Moreover, they cannot be interpreted mechanically; they must be interpreted in the light of the lessons of the past and the anticipated problems of the future; this requires both skilled analysis and judgments based on detailed knowledge of the economy as a whole (with due regard to regional differences and needs).

Within this framework, changes in bank assets and liabilities must be examined closely. Changes in member bank reserves and in borrowings from Federal Reserve banks provide a measure of the capacity of the banking system to expand credit. Similarly, changes in bank loans, by category, provide some measure of the strength of demands for the various types of credit, nationally and by region, and of the willingness or ability of the banking system to accommodate them. Changes in bank holdings of Treasury obligations, and especially changes in the maturity distribution of these holdings, when viewed against movements in deposit liabilities, shed some light on whether increases in the loan totals of the banks are being limited by

[1] The act, of course, speaks of "accommodating commerce and business." See, e.g., secs. 12A (3)(c) and 14 (5)(d).

liquidity and portfolio considerations or by lack of strong demand from borrowers. Similarly, changes in savings and time deposits, when compared with changes in mortgage loans and other long-term assets, help to provide a clearer picture of the bank activity in these sectors of the capital market. Relative rates of growth of demand deposits and time deposits help to provide some measure of shifts in the public's preferences for various types of liquid assets, which in turn is relevant to the economy's need for expansion in the money supply, as defined conventionally. Loan-deposit ratios are examined, because these help in the assessment of the liquidity position of banks.

Changes in credit extended by other financial intermediaries and in interbusiness credit are other important considerations. Developments in the banking area are viewed against the broader context of a flow-of-funds analysis encompassing the entire network of financial relationships.

2. Statistical measures which help to gage the rate of actual and potential growth of the economy, the availability and degree of utilization of labor and other physical resources, the various sources of savings and of credit, the sources and nature of pressure on prices, and forces shaping the balance of payments are examined in the process of determining the credit needs of the economy.

It should be stressed, however, that no statistical data, however complete and up to date, can provide a precise determination of the economy's credit needs. Statistics never tell what the situation will be in the period immediately ahead; they merely provide the underpinnings for interpretation and assessment.

3. Monetary policy is concerned with the national economy as a whole and with its relation to the outside world. The national economy, of course, is made of many parts and sections and overall policy can be determined intelligently only with an understanding of developments in these sectors. Nevertheless, the overall objectives of policy have to do with the economy as a whole rather than the problems of specific areas or groups.

The principal criteria employed in judging whether the credit needs of the economy are being adequately met are aggregative and national. By concerning itself with the overall supply of money and credit, monetary policy relies on the marketplace for distributing this supply. Needs are never absolute, and therefore cannot be "measured" except through the process of market allocation using the price mechanism. In an economic system which aims at preserving monetary stability, credit is among those resources the supply of which is limited. Our economy is much too complex for its credit and liquidity needs to be gaged solely by statistical criteria, including norms and patterns derived from past performance.

4. Only an unrealistically narrow interpretation of the Federal Reserve Act would confine System actions to meeting the seasonal demands for credit. The broad goals of national economic policy require an active and imaginative policy to make a maximum contribution toward achieving high levels of employment of the Nation's resources, stable prices, a balanced and sustainable rate of growth, and equilibrium in our international payments. Meeting recurrent and largely predictable seasonal needs does not normally represent a significant challenge to monetary policy. Major policy problems usually arise in connection with the System's endeavors to attenuate

cyclical movements and to accommodate long-term growth needs of the economy. In general, these other adjustments require supplying reserves in amounts either greater than or less than seasonal needs alone would appear to require. For example, in the fourth quarter of 1960 monetary policy was one of expansion, and reserves were supplied in amounts exceeding normal seasonal needs.

5. In our type of monetary system, the public makes the ultimate decision as to the distribution of its cash holdings as between currency and demand deposits, and as between money holdings and holdings of other types of liquid assets.

The Federal Reserve System makes no distinction between Federal Reserve notes and Treasury notes and subsidiary coin, supplying the public with the amounts and denominations of currency desired. Obligations of the Reserve banks, which constitute by far the largest segment of currency, and that of the Treasury, are all legal tender. The System supplies currency to the member banks to meet the wants and needs of the public and accepts currency from the banks when the seasonal demand has passed. In addition to seasonal needs, the System must take into consideration the need for additional currency to support the growth of the economy.

6. The public's demand for money is not a stable function of time. It is subject to many forces (such as the intensity with which nonbank financial intermediaries seek to increase their liabilities) and to many sets of expectations, especially regarding prices and interest rates. The System constantly endeavors to assess these forces and expectations, including the use made by the banking system of reserves recently supplied, and through such a process of analysis and judgment reaches its policy decisions, including those regarding the appropriate increase in the money supply.

We, therefore, do not regard a fixed rate of growth in the money supply, defined as currency outside banks plus demand deposits adjusted, as necessarily an appropriate objective in all circumstances. Circumstances may at times require money supply to exceed and sometimes to fall below the long-term trend line. The demand for means of payment will depend, among other things, on relative preferences for other types of financial assets, of which time deposits (e.g., 1961) and Treasury bills are among the most important. If the Federal Reserve were to attempt to force an increase in the money supply at a faster rate than the public was willing to add to its cash balances at prevailing price levels, the result would be rising prices and aggravation of the balance-of-payments situation, rather than a promotion of sustainable economic growth.

Question

II. The Annual Report of the Board of Governors for 1961 contains the following statements in a discussion of the FOMC meeting on July 11, 1961. (Similar statements are found elsewhere; e.g., March 25, 1959.)

> "It was the consensus that open-market operations should be designed to maintain approximately the same degree of ease that has recently prevailed, associated with a free reserve level of around $500 to $600 million."

1. Are the level of free reserves and the distribution of free reserves significant factors in judging ease and restraint? If so, how is each related to the degree of ease?

2. Are the level and distribution of free reserves the *principal* factors shaping the degree of ease or restraint? If not, what are the principal factors?

3. Under the conditions prevailing on July 11, 1961, were there any factors that would have made the existing situation tighter than indicated by the prevailing level of free reserves? If the answer is "yes," indicate the factors.

4. Has the level of free reserves of $500 to $600 million always been considered easy? If not, what specific factors have modified your interpretation of the prevailing level of free reserves? When did this occur?

Answer Supplied by Board of Governors

Part 1

Ease and restraint are relative terms. Taken by itself, without reference to existing economic and financial conditions, the absolute level of free reserves; that is, the excess reserves of member banks less their borrowings from the Federal Reserve banks is not a reliable or significant factor in judging the relative degree of ease or restraint. If, however, it is related to existing conditions—and in particular to what may be called "the desired level of free reserves" by member banks—the level of free reserves provides a useful indication of the degree of ease or restraint. By the desired level of free reserves of member banks, is meant essentially the desired level of their borrowings from the Reserve banks, for the desired level of their excess reserves changes only infrequently.

At a time when customer loan demands are slack and short-term market rates of interest are below the discount rate, the desired level of free reserves tends to be high; that is, member banks have little incentive to borrow from Reserve banks and they prefer a relatively high level of excess reserves. At such a time, an effort by the Federal Reserve to maintain a low level of free reserves would lead to actions by the banks, as they attempted to restore the desired level, which would tend to reduce the availability of bank credit and raise interest rates.

On the other hand, if loan demands were strong and short-term market rates were near or above the discount rate, banks in the aggregate would be willing to maintain a higher level of borrowing and a somewhat lower level of excess reserves. In such circumstances, maintenance of the same level of free reserves specified in the previous example would probably involve a condition of relative ease. A given level of free reserves can therefore be associated with either a rising or declining volume of total reserves, bank credit, and bank deposits, depending upon economic and financial conditions as they are reflected in demands for bank credit.

Thus the level of free reserves is related to the degree of ease in the same sense that supply of a commodity is related to price pressures on that commodity: the effect of supply on price depends also on the state of demand. Interaction between supply of and demand for free reserves gets reflected in the rate of expansion in total and required reserves. For instance, as the supply of free reserves is maintained large relative to demand, total and required reserves will expand as banks put newly available reserves to work. Thus, the actual level of free reserves may be unchanged for a period, or may even be declining some, while total reserves and bank credit are expanding,

because banks are utilizing the flow of new reserves to add to their loans and investments, and thereby to their deposits.

The distribution of free reserves is at times significant in interpreting very short-term developments. Excess reserves are ordinarily concentrated largely at country banks; Reserve city banks maintain very low levels of excess reserves. Occasionally, however, excess reserves may shift between country and Reserve city banks, depressing or elevating the level at one group and causing the opposite temporary movement at the other group of banks. Because country banks react less quickly than city banks to changes in their reserve positions, a given level of free reserves may temporarily have different implications for the degree of ease or tightness in the money market, depending on distribution.

Part 2

The level of free reserves is, as noted above, an *indicator* of the degree of ease or restraint if interpreted in the light of prevailing demand conditions. The principal factor shaping the degree of ease or restraint is the total supply of loanable funds in relation to the demand for such funds. Federal Reserve policies are directed at influencing one element in the supply of credit and money through the bank reserve mechanism. Federal Reserve policy, as a result of its significant influence over one blade of the demand-supply scissors, is a principal factor in shaping the degree of ease or restraint. Federal Reserve policy with respect to the supply of bank reserves will be reflected in the level of free reserves; furthermore, the Account management may at times receive instructions from the FOMC in terms of a level of free reserves, as in July 1961. Whatever the technical means of implementing FOMC policy decisions, the principal factor on the supply side subject to Federal Reserve policy is the flow of reserves to member banks.

Part 3

No. There is no evidence of a change in the factors that might have influenced banks' preferences regarding excess reserves or borrowings at that time.

Part 4

In recent years, a level of free reserves of $500 to $600 million has been considered relatively easy. This is so because the desired level of excess reserves by member banks as a group has seldom risen above this range. Since borrowings seldom decline much below $100 million, a level of free reserves of $500 to $600 million implies that Federal Reserve policy is providing a level of excess reserves significantly above the level that banks desire to hold in that idle form. The result is that banks normally put these additional reserves to work by acquiring earning assets. As the Federal Reserve continues to maintain free reserves at this level, total reserves will rise and banks will continue rapidly to increase their loans and investments. Periods in which free reserves have been at the level of $500 to $600 million have usually been periods of rapid credit expansion.

Answer Supplied by the Presidents

1. Free reserves are one of a number of indicators used by the Open Market Committee and the Manager of the System Open Market

Account to determine the impact of market forces and of monetary policy on credit conditions during the relatively short time intervals between Open Market Committee meetings. The weekly figures on free reserves are also followed by the informed public as an early indicator of possible shifts in Federal Reserve credit policy. Almost never can they be used as the single, and usually they are not even the most important indicator of credit conditions, even in the short run, as no given level can be interpreted out of context. Free reserves (or their negative counterpart, net borrowed reserves) are most useful if analyzed as part of a complex of factors which includes bank credit, short-term interest rates and the other indicators of money market conditions (the "feel" of the market). Free reserves have their greatest usefulness in appraising conditions over relatively short periods; over longer periods the significance of marginal reserve availability is superseded by other indicators that throw more light on the behavior of bank credit and related variables in response to past levels of marginal reserve availability.

Different patterns of distribution of free reserves tend to have different credit and money market effects. It is helpful in understanding reactions to credit policy actions on a day-to-day basis to analyze the distribution of free reserves and the factors which account for it, such as an unexpected bulge in float due to weather conditions. Knowledge of the distribution is also helpful in projecting near-term developments when marked changes occur in the level of free reserves owing to changes in required reserves (for example, as a result of changes in applicable percentages or bulges in Treasury financing), or to recurring factors such as the completion of reserve settlement periods.

A given level of free reserves, such as the range given in this question, may at one time be associated with a faster or slower rate of growth in total bank reserves and bank credit than the same level at a different time.

The directive to the Manager of the Account is generally not written in terms of free or net borrowed reserves. At the FOMC meeting of July 11, 1961, after a broad review of the business and credit situation including developments in demand deposits and total money supply and related monetary data and an extended discussion of these factors, the Committee members concluded that the directive could be carried out over the subsequent 3 weeks by attempting "* * * to maintain approximately the same degree of ease that had recently prevailed, associated with a free reserve level of around $500 to $600 million." [1] This analysis was summarized in the statement from which the passage quoted in this question was taken. The formal directive given to the Manager, however, was stated in broader terms.

It is not unusual for individual members of the Committee in discussions held in the presence of the Manager (which helps him to understand the full range of considerations which have led to the adoption of the necessarily short formal directive) to mention a level of free reserves or other short-run guidelines such as market "tone" or "feel," Federal funds rates, or Treasury bill rates. But when it

[1] Annual Report of the Board of Governors, 1961, p. 69.

has been judged desirable to mention specifically bank reserve positions in the formal directive, the reference has been usually to total reserves, which, indeed are also the magnitude more relevant from a longer term point of view.

2. The level and distribution of free reserves are merely one of the indicators of current money market conditions. They have to be interpreted in the light of what is happening generally to the total credit extension by member banks. The degree of ease or restraint in the credit markets is a product of the interaction of the supply of, and demand for, reserves. The effects of changing degrees of ease or restraint are discussed in answers to another question.

3. Money market conditions prevailing at the time of the July 11, 1961, FOMC meeting were easy and there were no factors that would have made the existing situation tighter than indicated by the prevailing level of free reserves. Compared with the then discount rate of 3 percent, the effective rate on Federal funds that week averaged 1.36 percent (the month of July as a whole averaged 1.16 percent, against 1.73 percent for June). On July 10 the 3-month Treasury bill sold at an average rate of 2.322 percent, only slightly above the average for the previous week, while the average for July as a whole was 2.268 percent. Total commercial bank credit expanded 0.8 percent during June and 0.7 percent during July to levels 7.6 and 7.8 percent, respectively, above those prevailing a year earlier. Other measures also indicated a general condition of ease.

4. As noted earlier, it is not possible to associate a particular level of free reserves uniquely with a particular credit condition. The credit situation may at times be easier at a lower level and less easy at a higher level.

However, since the "Accord," whenever free reserves have been for some time in the area of $500 to $600 million, the money market and bank reserve positions have been easy and credit policy expansive. The months from the beginning of 1954 to date in which the monthly average level (based on daily figures) of free reserves fell in this range are shown in the accompanying table. The table also suggests a few of the problems associated with the use of free reserves as an indicator of the monetary situation.

Some of these months were periods of active, possibly even "aggressive" ease (for example, 1954); others represent periods when policy was beginning to become less easy (for example, mid-1958). The average level of free reserves for individual weeks within these months fluctuated from a level of less than $300 million to more than a billion. The difference between monthly average Federal funds rates and the discount rate ranged from less than one-half of 1 percent to almost 2 percent. Changes in bank credit on a month-to-month (seasonally adjusted) basis ranged from a decline of 1.0 percent to an increase of 2.3 percent and on a year-to-year basis from +2.5 to +8.4 percent. The outstanding average level of borrowing was in the range of $37 to $189 million. Conceivably, higher levels of borrowing (and correspondingly higher levels of excess reserves) could be associated with free reserves of between $500 and $600 million.

Months when free reserves have averaged $500,000,000 to $600,000,000, and other credit market indicators, 1954–63

Month and year	Free reserves		Borrowing (daily average)	Change in total bank credit [1]		Average auction 3-month Treasury bills	Average effective Federal funds rate	Discount rate
	Weekly average range	Monthly daily average		Year to year	Month to month			
	Millions	*Millions*	*Millions*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
1954—March	$286–$557	$503	$189	+2.5	−0.4	1.053	1.26	1¾
April	460–837	626	139	+4.1	+.9	1.011	.85	1½–1¾
May	535–625	561	155	+5.3	+.7	.782	.86	1½
1958—March	470–524	495	138	+5.2	+1.8	1.354	1.20	2¼–3
April	416–552	492	130	+6.2	+1.5	1.126	1.26	1¾–2¼
May	511–599	547	119	+6.1	+.4	1.046	.63	1¾–2¼
June	404–569	484	142	+8.4	+2.3	.881	.93	1¾
July	455–704	547	109	+7.3	−1.0	.962	.68	1¾
1960—October	287–802	489	149	+3.8	+.9	2.426	2.47	3
November	375–1,084	614	142	+4.2	+.3	2.334	2.44	3
1961—February	389–618	517	137	+6.9	+1.6	2.408	2.54	3
March	333–629	476	70	+6.7	−.2	2.420	2.02	3
April	428–694	551	56	+6.0	−.4	2.327	1.50	3
May	406–523	453	96	+7.2	+1.4	2.288	1.98	3
June	504–558	549	63	+7.6	+.8	2.359	1.73	3
July	499–634	530	51	+7.8	+.7	2.268	1.16	3
August	402–560	537	67	+7.6	+.3	2.402	2.00	3
September	484–630	547	37	+8.3	+1.3	2.304	1.88	3
October	429–492	442	65	+7.5	+.2	2.350	2.26	3
November	382–620	517	105	+7.9	+.6	2.458	2.62	3
December	344–527	419	149	+7.8	+.6	2.617	2.33	3
1962—January	385–657	546	70	+7.8	+.5	2.746	2.14	3

[1] Seasonally adjusted.

Question

III. The April 1963 Federal Reserve Bulletin contains an article by Mr. Robert Stone, surveying Federal Reserve open market operations in 1962. The article states that money was easy in the first 5½ months of 1962, slightly tighter for the next 5 to 6 months, and still tighter at the end of the year.

During 1962, long-term interest rates fell, short-term interest rates were relatively stable, and the money supply increased. At the end of the year member bank borrowings rose and free reserves declined.

1. Was the increase in member bank borrowings and the associated decline in free reserves the sole indication of the relatively greater tightness?

2. If not, what other specific indications of relative tightness are applicable?

3. Did the increase in relative tightness retard the asset expansion of member banks under the conditions of 1962? If not, what did the relative increase in tightness achieve?

Answer supplied by the Board of Governors

Federal Reserve open market operations contributed to expansion throughout 1962, but at times the contribution was lessened slightly because of concern about the persistence and severity of the balance-of-payments problem. Nevertheless, money and bank credit was at no time during the year "tight."

The change in monetary policy that developed over 1962 was reflected mainly, if not entirely, in money market conditions, particularly short-term interest rates. There was some increase in member

bank borrowings from the Federal Reserve banks and some reduction in free reserves—excess reserves less borrowings—particularly late in the year. There was also some increase in the Federal funds rate—the interest rate on excess reserve balances lent among banks—as well as in most other short-term rates of interest. The movements of short-term rates also reflected continued Federal Reserve efforts to supply reserves to member banks in ways that minimized downward pressures on such rates.

The aggregate volume of reserves supplied to the banking system increased significantly throughout 1962, with the pace of increase slightly slower in the second half of the year than in the first half. Similarly, the bank credit increases that accompanied such reserve expansion tended to be larger prior to mid-1962 than thereafter. Over the year as a whole, with reserve funds continuing to be readily available and with very large inflows of time and savings deposits, loans and investments outstanding at banks rose $19 billion, a record annual amount for the postwar period.

Whether the second half growth in bank credit was retarded in any meaningful way by the lessening of monetary ease is a question that cannot be answered conclusively. Some individuals felt that there was such an effect; others did not. In any case, many felt there was a need for raising short-term interest rates to aid in reducing incentives to outflows of short-term capital abroad and that this warranted a moderation of the prevailing degree of monetary ease.

Answer Supplied by the Presidents

Mr. Stone's April Bulletin article did not refer to System policy as being "slightly tighter" after the first 5½ months of 1962 and "still tighter" at the end of the year. Rather, the characterization was that policy shifted toward "slightly less ease" after mid-June while a similar shift occurred in December. (See pp. 429 and 431 of the April 1963 Federal Reserve Bulletin.) The difference in wording is small but still significant in that the policy changes that occurred during 1963 were minor shifts within the context of a broadly easy and stimulative policy.

The modest shifts toward lesser ease (subquestions 1 and 2) were reflected, as the article notes, in a slightly lower range of free reserves resulting from a lower level of excess reserves and a slightly higher average level of member bank borrowings. In addition, the modest firming was reflected in higher Federal fund rates. The lessened availability of reserves relative to the demand for them meant that banks in need of additional reserves had to pay slightly more to acquire the less freely available supplies from banks with excess reserves, and there were more frequent occasions when demand for reserves could not be satisfied in the Federal funds market and were met instead through member bank borrowing at the discount window.

The modest reduction in monetary ease was also reflected in Treasury bill rates. Similarly, rates on other very short-term money market instruments, such as rates on directly placed finance company paper and rates charged on loans to Government securities dealers by New York City banks also moved up slightly during the year.

As suggested by the modest change in the indicators cited above, there was only a slight reduction of ease in the money market during 1962, and accordingly it is not surprising that no significant retardation of bank credit growth showed up (subquestion 3).

The slight shift in the posture of monetary policy in the course of 1962 was not intended to retard the asset expansion of member banks in a business climate overshadowed by an unemployment rate stubbornly hovering around 5½ percent of the labor force. What the modest firming of System policy during 1962 was intended to accomplish was a slightly higher level of short-term interest rates to help reduce the balance-of-payments deficit and to signal our determination to use monetary policy tools to defend the international position of the dollar. The outflow of short-term capital to foreign financial centers, where higher rates of return may be earned, has been an important contributing factor in our balance-of-payments problem. While higher short-term rates in the United States did not cure the problem in 1962, and still have not done so, they have made a useful contribution without which the present problem would probably have been worse.

Question

IV. During periods of Treasury refunding or other Treasury debt operations, the Federal Reserve has often been described as attempting to operate on "an even keel."

1. What specific factors constitute "an even keel"?
2. Does the "even keel" mean that interest rates are kept constant?
3. Does the "even keel" mean that free reserves are kept constant?
4. Does the "even keel" mean that reserves are supplied in sufficient quantity to absorb the debt into nondealer positions?
5. Has the "even keel" policy introduced conflict with seasonal or long-run objectives of monetary policy? If "yes," indicate some specific examples.

Answer supplied by the Board of Governors

Stated in general terms, the Federal Reserve practice of operating "on an even keel" during periods of Treasury financings implies that the System avoids any actions which might be interpreted by participants in the Treasury securities market as a major change in monetary policy. Specifically, this practice means that during periods of Treasury financings no changes are made in Federal Reserve discount rates or in member bank reserve requirements and that changes in bank reserve availability and in money market conditions are not large enough to induce expectations of a possible shift in money and credit policy.

An "even keel" policy, however, involves no commitment to stabilize prices and yields on Treasury securities. Accordingly, such prices and yields may fluctuate as a result of market influences other than monetary policy shifts, such as changes in demand and supply of funds in the capital markets or developments affecting the outlook for interest rates. In this way the Treasury is better able to price and offer its new issues on the basis of yields determined by market forces of supply and demand rather than by official intervention. To this end the System also ordinarily avoids operations in "rights" to Treasury refundings, in "when issued" securities, or in other issues with maturities adjacent to those involved in Treasury financings.

While the "even keel" policy does not involve any commitment to stabilize interest rates, the System would intervene to correct a

"disorderly" market situation involving cumulative and disruptive movements in prices and yields of U.S. Government securities.

The "even keel" policy does not mean that "free reserves are kept constant." Although large changes in free reserves may be precluded by the need to maintain a stable tone in the money market and by the desirability of not giving apparent signals of a monetary policy shift to the market, the maintenance of an unchanged monetary position can be associated with fluctuations in free reserves, as is indicated in the answer to question II.

The "even keel" practice does not mean that reserves are supplied in sufficient quantities to absorb the debt into nondealer positions. Rather, it means that the System provides reserves on a temporary basis to assure the successful distribution of new Treasury issues by private underwriters, including banks. Thus, increases in required reserves needed to cover expanded tax and loan accounts at banks are usually supplied by the System in order to keep money conditions from tightening on the payment date for the new Treasury issue. In addition, money market pressures resulting from the need of nonbank Government securities dealers to finance holdings of new Treasury securities may also require some action by the System in providing repurchase agreements.

In recent years the "even keel" policy has not conflicted seriously with seasonal or longrun objectives of monetary policy. On occasion, particularly in the 1950's, "even keel" considerations have affected the timing of Federal Reserve policy shifts, but they have not imposed a severe limitation on monetary policy execution in the longer run.

Answer Supplied by the Presidents

1. Essentially, the maintenance of an "even keel" at times of Treasury financing means that the System normally seeks to avoid taking action that would tend to alter basic financial market conditions for a period of time shortly before, during, and shortly after Treasury financing operations. Treasury financings, which are typically large in size, fully engage the capacity of the Nation's financial markets. Any major change in background conditions during a period of financing could cause serious disruption in the Nation's financial mechanism. In exercising its monetary powers, the Federal Reserve System strives not to complicate the debt management operations of the Treasury.

The Treasury, on its part, is aware of the need to minimize difficulties for monetary policy which may arise from "even keel" considerations and it has been making a significant effort to arrange its financing schedules in such a way as to leave the System's freedom of action as little impaired as possible.

At the same time, the maintenance of "even keel" conditions does not mean that the System would so conduct open market operations as to insure the success of any and every Treasury financing operation. Rather, the System's role is one of eschewing new actions on its own part that might interfere with Treasury financing. This means that Treasury financings must "meet the test of the market", with the System maintaining as neutral a stance as possible.

Specific "even keel" criteria are not readily defined, since every market situation is unique, but a few illustrative references may help to clarify the point. Almost certainly, it would be contrary to "even keel" criteria to change the discount rate or undertake a major

shift in reserve availability during a period of major Treasury financing. On the other hand, a modest shift in policy emphasis during a period of minor Treasury financing would not necessarily be ruled out.

2. As already indicated, the System would avoid taking any action in an "even keel" period that would tend to change the existing atmosphere, but the System would not ordinarily resist any upward or downward rate tendency that emerged as a result of market flows and expectations or represented the continuation of trends that had been at work in recent months. Only if rate changes threatened to become very abrupt, and beyond the market's absorptive capacity, might the System intervene to cushion the adjustment.

3. An "even keel" period would not necessarily mean that free reserves were "kept constant," but the System would usually try to avoid significant changes in net reserve availability in such periods. In practice, if in the period before a Treasury financing free reserves had been fluctuating, say, in a range of $200 to $400 million, there would be some effort to remain within that range through the financing period, unless some unusual developments in terms of reserve distribution called for a different reserve level in order to maintain reasonable continuity in the money market atmosphere. However, rather than seeking constancy of some specific indicator such as free reserves, the System would usually be aiming at avoiding sharp changes in the general money market atmosphere. To the extent that the free reserve level is an indication of that atmosphere—and it is a highly imperfect one—then the System would be aiming for continuing approximately the same range of free reserves.

4. Basically, it is the terms of the Treasury financing, set in the light of current market conditions, that bring about the absorption of the new securities. The Federal Reserve supplies whatever volume of reserves is required to achieve the overall objectives of monetary policy. Hence, in the broad sense, as already stated above, an "even keel" policy does not contemplate providing a volume of reserves necessary to accomplish complete digestion in the market of issues included in Treasury financing. However, in the narrower sense, the initial increase in required reserves that may occur as issues move out into the hands of dealers, banks, and nonbank investors, is one of the many influences on reserves taken into account in determining the proximate reserve objectives and the day-to-day conduct of open market operations.

5. Implementation of longrun objectives of monetary policy and offsetting seasonal fluctuations in the availability of reserves will meet with difficulties only if "even keel" periods follow each other in rapid succession. At times, the maintenance of "even keel" has tended to delay the implementation of changes in System policy, and on a few rare occasions the System has had to step in more positively, cast aside immediate reserve objectives, and temporarily give overriding attention to the state of the market. Yet, the "even keel" constraint has not seriously interfered with the implementation of general policy objectives as a long-term matter.

To cite, however, specific examples of temporary interferences: In mid-1958, severely adverse developments in the bond market meant that System reserve objectives temporarily gave way to correcting disorderly market conditions and helping to restore confidence in the functioning of the market. As System policy again moved from ease

toward restraint against the background of the 1958–59 recovery and expansion, there were additional instances when System action was delayed because of major Treasury financing operations—for example, in early 1959 and again in the spring of that year.

Question

V. When an increase in the degree of ease occurs, in your judgment, does the increased degree of ease—

1. Cause a change in interest rates?
2. Cause a change in the composition of bank portfolios?
3. Cause a change in the total of bank earning assets?
4. Cause a change in the volume of demand deposits and currency outstanding?
5. Cause a change in commercial banks' time deposits outstanding?
6. Cause a change in the position of dealers in the government securities market?

Answer supplied by the Board of Governors

The effect of an increase in the degree of credit ease depends in part on the surrounding economic and financial circumstances. Moreover, the effects of the easing itself may either intensify or offset the effects of other developments simultaneously taking place in the economy.

A shift of policy from restraint toward ease may be expected to take place when business activity is showing less strength and loan demand is slackening. Such developments are likely to follow a period in which banks have drawn down their liquid assets and increased their loan-deposit ratios. Under such circumstances, an increase in the degree of credit ease is likely to be reflected in an increase in bank credit and deposits, or at least a moderation of the decline that would otherwise have taken place; an increase in the proportion of assets held in the form of short-term open market paper and a subsequent increase in holdings of longer term securities; and a general reduction in interest rates. The easing of credit conditions at a time of rapidly increasing loan demand, or a prolonged period of very great ease, on the other hand, might lead to excessive credit expansion in unsound directions.

In a period of slackening loan demand following a period of credit restraint, commercial banks are likely to use reserves becoming available in roughly the following order: first, to repay indebtedness to the Federal Reserve banks and, to some extent, to build up cash assets; second, to replenish depleted portfolios of Treasury bills and other liquid assets; and third, to increase holdings of longer term U.S. Government securities and State and local government securities. Banks will also show increased willingness to make loans, except in so far as deterred by rising delinquency rates. Because of the reduced loan demand, however, most types of loans, with the possible exception of real estate loans, are likely to decline or show little change pending an improvement in the business outlook.

The demand for loans and investments on the part of banks, coupled with the reduction in supply of some types of assets, is likely to be reflected in a reduction in interest rates and security yields. In the absence of sharp changes in supply conditions, the reduction in rates tends to be earliest and most marked for short-term open

market paper but spreads also to longer term securities and to many types of loans.

The expansion of banks' earning assets tends to be reflected directly in an expansion of demand deposits as banks make payments to sellers of securities or to borrowers. The extent to which recipients of such deposits, or holders of existing deposits, choose to convert them into time and savings deposits with commercial banks depends on a variety of circumstances. The reduction in market rates of interest makes consumers and businesses more willing to hold demand deposits than formerly. Interest and dividend rates on savings deposits and shares, however, have typically responded only slowly, if at all, to an easing of credit conditions, and the reduction in market rates of interest together with reduced expenditures by consumers and businesses may cause a shift to time and savings deposits at commercial and mutual savings banks and to shares of savings and loan associations and credit unions. Commercial banks would probably receive a particularly large share of any temporary increase in time deposits on the part of businesses, governments, or wealthy individuals.

Reduced rates of interest accompanying easier credit conditions affect both the yields on securities held by Government security dealers and the cost of funds borrowed to carry such securities. The assurance of a ready supply of borrowed funds, however, might encourage some expansion of dealers' trading positions. In addition, if dealers expect a further reduction in interest rates and an increase in security prices, they may temporarily expand their demand for securities, thus tending to accelerate the reduction in interest rates.

Answer Supplied by the Presidents

An increase in the degree of ease may be reflected in any or all of the processes enumerated in the question. Basically, an increase in the degree of ease represents an increased availability of reserves relative to the economy's demand for credit. Such a change in the degree of ease will be reflected immediately in money market conditions.

Obviously, an increase in the degree of ease—and the resulting effects on interest rates, commercial bank earning assets, deposits and other financial variables—can come about either through an increased availability of reserves to the banking system or through a decline in the intensity of credit demands.

1. If an increase in ease took place solely as a consequence of an increased willingness on the part of the System to supply reserves, the probable effects are as follows. With more reserves available, banks would tend to add to their earning assets at a more rapid pace (subquestion 3). Increasing the degree of ease from a basically easy position is unlikely, however, to uncover much unsatisfied loan demand, so that the bulk of the increased advance in earning assets is likely to be diverted to securities and possibly mortgages (subquestion 2). In the process of acquiring such securities the demands exerted by the banks would tend to put downward pressure on interest rates (subquestion 1). A stepped-up acquisition of earning assets by the banking system implies, of course, a more rapid increase in deposit liabilities (subquestions 4 and 5). In general, both the money supply (as usually defined to include demand deposits adjusted and currency outside banks) as well as commercial bank time deposits, would tend to rise. However, the response of the money supply is strongly

influenced by other factors. Thus, for example, if the increase in the degree of ease leads to a considerable expansion of economic activity, then the rise in the money supply may be relatively rapid. On the other hand, if economic activity responds only sluggishly, then the public's need for more money to finance activity may be relatively slight.

2. The second possible cause of an increase in the degree of ease would involve a reduced need for reserves on the part of banks. This could occur, for example, if the pace of an advance in economic activity slowed (or if the economy moved into recession) with a consequent weakening in loan demands. If the availability of reserves remained unchanged, banks would tend to divert at least part of their funds into securities and mortgages. At the same time, a slower advance in economic activity would probably reduce the public's demand for money, while the growth of time deposits may continue or even accelerate. If the System continued to supply reserves at the same rate (and given the lower reserve requirements against time deposits) the banking system would be in a position to increase total bank earning assets more rapidly. As in the first case, interest rates would be under downward pressure.

An increase in the degree of ease will also have an effect on dealers in Government securities (subquestion 6). First, with credit conditions somewhat easier, the availability of borrowed funds to such dealers will increase. In itself this would tend toward an increase in dealer positions. A more important consideration, however, is the possible effect of the increase in ease on market expectations. If the change in credit conditions gives rise to expectations of declining rates, dealers may be induced to add to their positions; however, expectations are influenced by many other developments so that there is no certain relationship between an increase in the degree of ease and an increase in dealer positions.

The causal interconnections outlined above appear most clearly during business recessions. At such times System policy is more likely to become positively stimulative rather than to remain the same. At such times, the effect of business recession in easing credit conditions is reinforced by the System's shift to an active anti-recessionary policy.

The effects of an increase in the degree of tightness need not be the exact opposite of the effects of an increase in ease. For example, under boom conditions marked by inflationary pressures, the degree of tightness typically increases, both because of an increase in commercial bank demand for reserves, reflecting strongly rising loan demands, and a reduced willingness of the System to supply reserves. Under such conditions banks would tend to sell off Governments in order to finance a part of the additional loan demands, and interest rates would tend to rise. However, the strength of loan demands might be such as to result in some further growth of earning assets and of the money supply. In effect, then, credit conditions might appear more restrictive if attention were focused on interest rates alone, and less restrictive if stress were placed on the behavior of bank credit and the money supply. It is worth noting, however, that interest rates probably would have been lower, and the pace of the advance in bank credit and the money supply more rapid, in the absence of the reduced willingness of the System to supply reserves.

The behavior of earning assets and the money supply just described may, of course, be entirely appropriate to the situation; the immediate goal of policy under such conditions may be to slow the growth of bank credit and the money supply below what it would otherwise have been and thus prevent an excess of expansion. If a rate of advance in bank credit and the money supply were already excessive, additional tightening could bring about an even slower advance.

Question

VI. In the postwar period, changes in member bank reserve requirements have generally been largely offset by compensating open market operations.

1. What is the rationale for coupling the change in reserve requirements with an open market operation instead of effecting the desired increase or decrease in member bank reserves through open market operations alone?

Answer Supplied by the Board of Governors

Changes in reserve requirements have generally been made at times when the changing need for bank reserves has been more than temporary or of large magnitude, or when it has been desirable to provide reserves at once on a countrywide basis. However, open market operations are the more usual method of supplying and absorbing reserve funds because they are more flexible, can be applied more gradually, and are more easily reversed. Thus, reserve requirement changes are not made very frequently because open market operations are better adapted to the continuous adjustments required of monetary policy as it responds to the economy.

Because the impact on reserves of a change in reserve requirements occurs all at once rather than over a period of weeks or months, partially offsetting open market operations are sometimes undertaken when the new requirement first becomes effective. These operations are temporary, however, and are designed in part to cushion the market impact of sudden large changes in bank reserve positions.

Answer Supplied by the Presidents

Changes in reserve requirements are ordinarily made in steps of not less than one-half of 1 percent. But even a reduction as small as this produces an immediate change in reserve availability of sizable proportions (under current conditions, a reduction of one-half of 1 percent in the requirements against demand deposits would be, about $550 million) and the resulting change in reserve availability can, therefore, readily be greater than required by basic economic and credit conditions at that exact point of time, or greater than the money market can absorb quickly without undue disturbance. Thus, it is often desirable to cushion the initial impact of a reserve requirement reduction by partially (usually temporarily) offsetting it by open market action.

It is only in this limited sense that one can speak of "coupling the change in reserve requirements with an open market operation." The two operations should not rightly be thought of as substitutes to each other but as complementary. Each method of putting reserves into the market has special advantages at times. For example, in a recessionary period, a reduction in reserve requirements has the advantage of putting reserves immediately into the hands of all classes of

banks whose reserves are lowered. The impact of open market operations, while immediate on banks in the financial centers, takes more time to be transmitted throughout the country. Reserve requirement changes also seem to have a more immediate psychological impact, which may be important under certain conditions.

In a broad sense, changes in member bank reserve requirements during the postwar period as a whole must be viewed as a reduction from unprecedentedly high levels established during the 1930's to absorb the excess reserves flowing into the country from abroad and subsequently to counteract excessive bank liquidity generated by World War II financing. The postwar reductions (except for the Korean period and disregarding the November 1960 increases for country banks to compensate for the inclusion of vault cash in required reserves) have served to move toward a level and structure of reserve requirements that would be more appropriate in the long run, provide part of the increase in the money supply which the expansion of the economy has necessitated, and place the banks in a better competitive position vis-a-vis other similar financial institutions.

The successive postwar reductions were in general undertaken in an amount and at a time when they could be expected to support the broad aims of monetary policy. Primary reliance, in most cases, for the achievement of policy objectives was placed on open market operations and the discount rate.

From the end of World War II to the time of the Accord, open market operations on balance withdrew reserves (in several steps in 1949) from the banking system in an attempt to reduce excessive liquidity. After the outbreak of the Korean war, open market operations provided reserves to support war financing, and the increase in reserve requirements in January 1951 was designed to offset some of the effects of war finance on bank liquidity. While total Reserve bank credit remained about level for 5 years from the beginning of 1951, another opportunity for a constructive reduction in reserve requirements occurred as the economy moved into a recession in 1954.

Since the emergence of balance-of-payments considerations as a major element in the formulation of monetary policy, further reductions in reserve requirements for demand and time deposits were made, together with the reduction of requirements for the banks previously classified as central Reserve city banks. The reserve requirement tool is particularly well suited to a situation in which it seems desirable both to add to reserve availability and to minimize downward pressure on short-term rates. Indeed, because of the relative thinness of the market for long-term U.S. Government securities, the provision of heavy reserve needs solely through open market operations would have to be accomplished primarily by purchases of Treasury bills and other short-term investments. This method of supplying reserves would have the presently undesirable effect of putting downward pressure on short-term rates. Accordingly, in a period when policy is directed simultaneously toward discouraging short-term capital outflows and stimulating the economy, a reduction in reserve requirements, may offer an important advantage over providing an equal amount of reserves through open market operations because of their different effect on short-term rates.

Thus, over the postwar period as a whole, changes in reserve requirements as well as open market policy have been used to broaden signifi-

cantly the credit base of the economy in a way consistent with the overall objectives of sustained growth and international stability.

Question

VII. The four most likely causes of higher free reserves are:

1. A desire on the part of business and individuals to decrease their borrowing at commercial banks.

2. A desire on the part of individuals to hold a larger proportion of their money balances in the form of checking deposits.

3. A desire on the part of banks to hold a larger proportion of their assets in reserves.

4. An increase in excess reserves brought about by open market operations.

(*a*) Are there significantly different effects on economic conditions if the change in free reserves originates in one source rather than another? Do you attempt to deal differently with each of them?

(*b*) Do you attempt to distinguish among these sources of change in evaluating the change in free reserves? If so, are there explicit measures you employ to distinguish among these sources of changes in free reserves? If so, which measures do you use?

Answer Supplied by the Board of Governors

As is suggested in the answer to Question II, it is useful to appraise the significance of free reserves in terms of the supply of reserves made available by Federal Reserve actions and the demands for reserves by the banks, which are affected by prospects for bank profits. Such prospects are, in turn, affected by the first two factors noted in this question, as well as the cost of alternative methods of reserve adjustment. In response to the question under (*a*), it does make a difference whether a change in free reserves originates, on the one hand, in a desire by the banks to reduce or increase their borrowings or, on the other, in action by the Federal Reserve to change monetary policy.

In response to the question under (*b*), the Federal Reserve does attempt to distinguish between sources of change. It recognizes, for example, that in a period of recession when loan demands are weak and interest rates relatively low, member banks will wish to reduce sharply their borrowings at Federal Reserve banks. In other words, banks will desire a higher level of free reserves. The movement toward larger actual free reserves in such a period ordinarily reflects two factors: (1) adaptation by the Federal Reserve to this change in bank preferences and (2) adjustment in Federal Reserve policy to a more stimulative posture. Although factors influencing the banks' demand for free reserves cannot be measured with precision, indications of this demand are provided, for example, by changes in bank loans, especially business loans, and by the level of interest rates on short-term securities and the Federal funds rate and their relationship to the discount rate.

Answer supplied by the presidents

Different monetary factors which affect, among other things, free reserves may of course have different implications for general monetary and economic conditions. The factors listed are not always the "most

likely causes of higher free reserves." Free reserves are affected by a variety of factors including those stated in the question. The relevance of these influences to monetary policy lies in what they indicate with respect to economic and credit conditions. There may be significantly different effects on economic conditions if the changes originate in certain sources rather than others. But, more importantly, the changes originating in certain sources mirror effects that are more significant to monetary policy formulation than those originating in other sources. Thus, in this sense, we do attempt to distinguish among these sources of change.

The factors of change listed (and others) are reflected first in total reserves and excess reserves and then in borrowings and free reserves. Depending upon the current posture of policy, actions may be taken to offset or not to offset changes in reserves stemming from the so-called money market factors such as Treasury operations, gold and foreign account operations, float, currency, etc. Thus, with specific reference to factor 2 (a desire on the part of individuals to hold a larger proportion of their money balances in the form of checking deposits) we would read normally no deep economic significance into this. Like movements of other market factors affecting reserves, the impact of these flows on free reserves is at times substantial. These movements, however, are generally a reflection of purely seasonal and random factors, rather than of any significant change in the economic atmosphere. For this reason, we normally seek to offset changes in the banks' reserve position stemming from such sources—subject to the needs of policy goals—through open market operations.

Factor 3, a desire on the part of banks to hold a larger proportion of their assets in reserves (an increase in the demand for free reserves) might reflect a number of influences. In a broad sense, it would be interpreted as a reduction in the willingness of banks to expand credit and deposits on the same basis, relative to reserves, as had prevailed. Again, given a particular policy goal this might be allowed to hold or it might be offset by injecting more reserves so that the new demand schedule for free reserves might be met without contraction of bank credit. Incidentally, this is one reason why a given dollar amount of free reserves cannot be assumed to have an identical meaning over time in terms of the pressure on banks to expand or contract credit.

The immediate impact of purchases of securities through open market operations (factor 4) is, of course, also to raise excess reserves, unless such purchases are undertaken to offset market factors. A reserve injection due to open market purchases will result in a more "permanent" increase in the level of free reserves if the banks wish to use the new reserves to repay borrowings from the Federal Reserve banks or to maintain excess reserves at a higher level. It is likely, however, that at least a part of the reserve gain stemming from open market purchases (or from any other source of nonborrowed reserves) will be used to advance credit, thereby increasing required reserves and tending to use up free reserves.

In any case, the injection of reserves through open market operations is a step in the direction of credit and deposit expansion, although the quantitative magnitudes do depend upon the banks' demand for excess reserves. While it is difficult to estimate this demand directly, as indicated below, the pattern of the response of credit and deposit expansion is usually discernible—except over very short periods—and

if further adjustments in reserve availability appear to be appropriate, they can subsequently be made. Of course the appropriateness of any monetary variable or group of variables must, in turn, be determined in the context of the larger aims of policy.

The immediate impact of a decline in individual and business loan demand (factor 1) is a fall in required reserves and a rise in excess and free reserves. The longer term impact on free reserves is less certain. The banks are likely to respond by attempting to offset the loan decline through purchases of securities from the public—including newly issued securities—as indicated in our answer to question V. Required reserves will thus tend to rise again and there would be a tendency for free reserves to revert to their original level. On the other hand, this tendency could be partly offset, should open market interest rates decline and if banks were stimulated merely to hold higher levels of excess reserves. Whatever the ultimate impact on free reserves, a decline in loan demand of any substantial size is most likely to occur during periods of weakness in economic activity when policy is actively seeking to counter recessionary forces through generous injections of reserves.

It is, to be sure, very difficult, if not impossible, to isolate with any degree of confidence the influence of changes in the banking system's demand for free reserves from the other factors that may be operating on actual changes in free reserves at any moment. This is particularly true in view of the occasionally erratic movements of certain supply factors such as float. At times it may be possible to get some understanding of the reasons for shifts in the demand for free reserves, however, by examining the tone of the money market (as evidenced, for example, by the rate on Federal funds) in relation to the estimated level of free reserves in the banking system. Abnormalities in the relationship between money market tone and the nationwide level of free reserves are more likely to be indicative of temporary shifts in the distribution of reserves than of any fundamental shift in bank demands.

Question

VIII. Identify some specific occasions during your membership on the Board of Governors when the Federal Reserve and Treasury positions on a particular issue were not the same. State the issue and the nature of the conflicting views.

1. In which cases did the Treasury view prevail?
2. In which cases did the Federal Reserve view prevail?

Answer Supplied by the Board of Governors

The nature of the arrangements for cooperation and coordination between the Treasury and the Federal Reserve in monetary and debt management policies and operations does not generally produce conflicts of the sort implied by this question. Typically prospective actions are discussed freely and frankly and there is an interchange of judgments as to the desirable and undesirable effects that might be expected to flow from them. In the course of these discussions, differences in emphasis and judgment will emerge among the individuals concerned, but after further discussion a consensus is reached that is understood and acceptable to both agencies.

These interagency discussions form part of the background against which decisions are made by the appropriate authority—that is, the

Treasury on questions of debt management and the Federal Reserve on questions of monetary policy. Since the discussions are basically an exchange of views and information, there is usually no sense in which the agency not responsible for the action can be said to have had a "position" that had "prevailed" or been overruled.

The only specific instance which might fall within the scope of this question occurred in the spring of 1956, when the then Secretary of the Treasury felt that a discount rate increase proposed by several Federal Reserve banks was premature. This increase was approved by the Board, and Secretary Humphrey subsequently indicated publicly his feelings in the matter. This "incident" was subsequently explored in some detail at hearings before the Subcommittee on Economic Stabilization of the Joint Committee on the Economic Report, held June 12, 1956.

(The presidents were not asked to respond to this question.)

APPENDIX II

Scaling of the Federal Reserve's Policy Decisions

The scaling represents the authors' consensus about Federal Reserve decisions to change policy. The procedure is described more fully in the text of chapter IV. A positive value indicates a move toward "greater ease" or "less restraint"; a negative value indicates a move toward "less ease" or "greater restraint." Large values, whether positive or negative, are used to indicate more decisive changes in desired policy. Note, however, that the values in the table relate to a particular decision made for the period between two meetings. Scaling is not cumulative.

Scaling of the Federal Reserve's policy decisions

1. 1946—Mar. 1	0	"* * * The Committee should continue the existing open market policy * * *."
June 10	−½	Before this date "action had been taken * * * to discontinue the preferential discount rate. * * *"
Oct. 3	0	"* * * there had been no new development which presented reasons for a change in the policies adopted * * *."
		Comment: No emphasis on restraint to be found. Policy directives refer to stabilization of security prices only.
2. 1947—Mar. 1	0	"* * * the Committee continued to be of the opinion that monetary * * * policy should be directed * * * toward restraining the further expansion of bank credit.* * *"
June 5	0	The "Committee therefore decided that * * * no change should be made in existing open market policies.* * *"
Aug. 8	−½	"* * * to provide for supporting the present issuing rate on Treasury certificates instead of the ⅞ rate previously prevailing."
Oct. 6, 7	−½	"* * * directed the Federal Reserve banks to terminate the policy of buying and to terminate the repurchase option privilege on Treasury bills."
		"It was the view of the Committee that * * * the situation was such as to justify the Treasury and the Federal Reserve System taking such actions as were available to them to eliminate * * * excessive credit expansion."
Dec. 9	0	"* * * it was felt that the existing open market policy should be continued.* * *"
		Comment: The Committee mentions in March its opinion to restrain credit expansion. In October a detailed anti-inflationary program is formulated.
Dec. 1947?	−½	"* * * the policy of combating inflation has been further implemented by additional retirement of maturing government debt, a downward revision * * * of the prices at which the system would purchase Treasury bonds * * *, an increase in the issuing rate of 1-year Treasury certificates * * *"
3. 1948—January	−½	Increase in discount rate.
February		Increase in reserve requirements at CRCB.
Mar. 1	−½	"The existence of a large Treasury surplus during the first quarter of the year would be the principal weapon available in the credit field for combating inflation."
May 20	0	"* * * its existing anti-inflationary policy of keeping pressure on the money market for the purpose of restraining the expansion of bank reserves should be continued."
July–August	−1	Raise in reserve requirements effective Sept. 1.
Aug. 9	−½	Raise of discount rate and increase of short-rate.
Oct. 4	−¼	"* * * the Treasury continued to manage its balances * * * to further the policy of keeping pressure on bank reserves. * * * The effect on bank reserves of securities purchased * * * had been offset by the sale of Treasury bills. * * *"
Nov. 30	0	"* * * to continue to cope with conditions as they develop."
		Comment: The report states that "monetary expansion was more effectively restrained in 1948 than in any other year since before the war."

Scaling of the Federal Reserve's policy decisions—Continued

4. 1940—Mar. 1	+½	"It would replace the existing policy of exercising restraint on credit expansion with a policy which would relax such restraint without following an aggressive easy money policy."
April	+⅛	Reduction in reserve requirements "offset * * * because * * * policy of maintaining * * * short-term rates required sales of securities."
May 3	+½	"* * * that the policies of the system should be directed toward somewhat easier credit conditions.* * *"
June 28	+1	Reductions in reserve requirements were made. Sales of bonds were discontinued. Only partial offsetting of reduction in requirement ratio by sales of bills.
Aug. 5	0	"* * * to reduce the system's holdings of securities to offset the released reserves * * * so that the reduction would not result in a general further lowering of short-term rates."
Nov. 22 to Dec. 1	−½	"* * * in order to indicate a change from a policy of monetary ease to a policy of mild restriction.* * *" Bill rates were allowed to rise and 1⅛ established for 1-year paper.
5. 1950—Mar. 1	−¼	"* * * mildly restricting the availability of bank reserves." "* * * some rise in those (long-term rates) * * * sales of bonds by the System. * * *"
Early June	+½	"* * * Treasury refunding required substantial Federal Reserve purchases."
June 13, 14	−½	"* * * the System's policies should be directed towards restricting increases in bank reserves."
Aug. 18	−1½	"It was felt by the Committee that immediate action to restrain credit expansion should be taken as an essential part of the broad anti-inflationary program of the Government." "* * * the prevention of inflation was a matter of critical importance and urgency. * * *" "Treasury borrowing * * * should be as much as possible from savings and as little as possible from banks." "* * * use all the means at their command to restrain * * *."
Sept. 28	0	"* * * the System should endeavour to hold down purchases of securities to the minimum consistent with maintenance of an orderly market.
Oct. 11	0	"* * * proceed with policies decided upon. * * *"
Oct. 30	0	"* * * continued flexibility in the short-term money market was essential * * *."
Nov. 27	0	"Continuation of the policies of credit restraint through open market operations * * * was decided upon. * * *"
		Comment: The policy of tight restraint was not put into effect. Purchases exceeded sales. See annual report.
6. 1951—January–February	−½	Increase in reserve requirements. The increase absorbs some additional reserves. Incomplete compensation by open market purchases.
Jan. 31	0	"* * * continuing in effect * * * the existing policy of restraint on further expansion of bank credit. * * *"
Feb. 6–8	0	"* * * no change should be made in the existing general direction of the Committee of restraint of further expansion of bank credit. * * *"
Mar. 1, 2	−1	"The *change* in policy (i.e., accord with Treasury) did not require any change in direction for the reason that the direction issued at the meeting of Aug. 18, 1950, was changed in the light of the policy adopted at that time. * * *" "First * * * bonds could be taken off the market by Treasury offer * * * nonmarketable * * * to minimize the monetization of public debt * * * a limited volume of open market purchases would be made * * * and open market purchases, if any, would be made on a scaledown of prices." "Third * * * immediately reduce or discontinue purchases of short-term securities * * * banks would depend upon borrowing at the Federal Reserve. * * *"
Mar. 8	0	"* * * continue to carry out the policy approved at the meeting on Mar. 1 and 2. * * *"
April–May	−1	"Reserve positions of commercial banks were under greater pressure in 1951 than in other postwar years."
May 7	0	"Reduced Federal Reserve buying of Government securities after April was an important factor limiting bank reserves expansion. As bank reserves became less readily available than they had been previously * * *."
Oct. 4	0	"* * * a more restrictive policy seemed unnecessary."
Nov. 14	0	"* * * no change in existing objectives of credit policy was needed."
7. 1952—Mar. 1	0	"* * * to continue the policy which had been pursued for several months."
June 19	0	"* * * the general policy of limiting the availability of bank reserves that had been pursued by the System since October of 1951 was still appropriate."
Sept. 25	+¼	"* * * additional reserves should be supplied through open market purchases in order to avoid undue restraint."
Dec. 8	0	"* * * did not call for action to change the existing policy * * *."
8. 1953—January	−¼	Increase in discount rate.
Mar. 4, 5	0	"The Committee agreed * * * that it would pursue a policy which would maintain about the same degree of restraint on credit expansion that had been followed in recent preceding months. * * *"

Scaling of the Federal Reserve's policy decisions—Continued

8. 1953—Continued		
June 11	+1	"* * * the change in policy at this meeting reflected recent developments * * *." "It was the view of the Committee * * * that policy should be one of aggressively supplying reserves to the market. * * *"
Sept. 24	+½	"* * * that further easing would be needed to assure ready availability of credit. * * *"
Dec. 15	+½	"* * * in carrying out operations for the System account there would be more emphasis on a program of actively maintaining a condition of ease in the money market."
9. 1954—February	+¼	Reductions in discount rate.
Mar. 3	0	"* * * the policy of actively providing reserves to the money market to facilitate credit expansion should be continued during the spring of 1954."
June 23	+¼	Reductions in reserve requirement and only partial compensation by open market sales.
Sept. 22	+⅛	"* * * resolve doubt on the side of ease. * * *"
Dec. 7	−½	"A reexamination of the policy of 'active ease' * * * led the Committee to the conclusion that the developing economic situation did not warrant continuing as active a program of supplying reserves to the market as had been followed during the preceding year. * * *"
10. 1955—Jan. 11	−½	"* * * easy credit was no longer needed. * * *" "* * * a *further* step away from the policy of 'active ease' * * *."
Mar. 2	0	"* * * it agreed that, although increased ease should be avoided, further measures toward restraint should be deferred. * * *"
May 10	−½	"* * * a further shift in emphasis toward a policy that would discourage undue credit expansion."
June 22	0	"* * * the Committee concluded that for the immediate future it should not alter the course it had been following recently which had had a restraining influence on credit expansions. * * *"
July 12	0	"* * * the Committee agreed that it should maintain substantially the degree of restraint that had existed. * * *"
Aug. 2	−1	"* * * shift to a policy of restraining inflationary development * * *." "* * * It agreed that the wording of its directive should be changed * * * to show that increased monetary restraint on credit expansion was now clearly appropriate."
Aug. 23	−½	"* * * the Committee's policy should be one of gradually *increasing pressure.* * * *"
Sept. 14	−¼	"It was the judgment of the Committee that this situation called at least for the maintenance of, and preferably *for some* slight increase, in the restraining pressure it had been exerting * * *."
Sept. 26	+⅛	"* * * it should aim at maintaining about the same degree of credit pressure that had existed, with the understanding however, that doubts need not be resolved on the side of greater restraint."
Oct. 4	−⅛	"* * * restraint on credit expansion, with the understanding that doubts should be resolved on the side of increased restraint."
Oct. 25	−⅛	"Continuation of the policy * * * seemed to be called for with the understanding that doubts should be resolved on the side of dispelling any idea of an easing."
Nov. 16	+⅛	"* * * while it was trying to move in the direction of maintaining tightness, it would not be concerned if operations in the open market during the immediate future did not achieve as great a degree of tightness as had existed recently." *This statement is balanced partly by an increase in the discount rate.*
Nov. 30	+½	No change in policy, but emergency action to support Treasury refinancing: "The volume of cash redemption would be considerably larger than had been anticipated." Purchases up to $100,000,000.
Dec. 13	−½	"With the passage of that difficult period, it seemed desirable to attempt to regain as far as possible the level of pressure that had existed * * * just prior to the announcement of the Treasury's refunding." "* * * the general policy of restraint followed in the recent months should be reaffirmed. * * *"
11. 1956—Jan. 16	0	"* * * that a *continuation of restraint on credit expansion* was required." "* * * the Committee did not feel that the general level of restraint should be increased beyond that which existed in the autumn of 1955."
Jan. 24	+½	"* * * a shift in emphasis seemed desirable." "* * * some relaxation of restraint appropriate in the near future."
Feb. 15	0	"* * * a relaxation of pressures * * * was not indicated, although no increase in restraint appeared to be called for * * *."
Mar. 6	0	"* * * to continue the existing policy without overt action toward increasing or lessening the degree of restraint * * *."
Mar. 27	−½	"The supplementary clause which was introduced in Jan. 24, was eliminated * * *. The Committee concluded that its instructions to take into account deflationary tendencies * * * was not consistent with the existing situation * * *."

Scaling of the Federal Reserve's policy decisions—Continued

11. 1956—Continued		
Apr. 17	+¼	"* * * no relaxation of pressures. However, the restrictive policies should not be pressed too strongly."
May 9	0	"* * * to make no change in the existing policy."
May 23	+½	The qualifying phrase deleted from the instructions in Mar. 27 was reintroduced "* * * the Committee agreed that during the immediate future additional reserves should be supplied to take care * * * of growth needs."
June 5	0	"The Committee did not wish policy to become more restrictive."
June 28	+¼	"The committee agreed that, within the framework of the restrictive policy it had been following, doubts should be resolved on the side of ease during the next few weeks."
July 17	0	"* * * no significant change in credit policy should be made. * * *."
Aug. 7	−½	The qualifying phrase re-introduced in May 23 was deleted. Instructions required attention be given only to inflationary developments.
Aug. 21	−¼	"* * * should be somewhat more restrictive but Federal Reserve banks * * * considering discount rate increases. * * *"
Sept. 11	−⅛	"* * * to maintain substantially the existing degree of stability in the market, with doubts resolved on the side of tightness rather than ease. * * *"
Sept. 25	+⅛	"* * * to maintain pressures of about the same degree that had existed recently, but that in the case of doubt operations should be resolved on the side of ease. * * *"
Oct. 16	0	"* * * to maintain substantially the present degree of restraint."
Nov. 13	0	"* * * the degree of pressure in the money market should be substantially unchanged. * * *"
Nov. 27	0 to +⅛	In spite of the modification in the directive, "the committee did not intend an overt change away from a policy of restraint; * * *."
		"A qualifying phrase was added (to the directive) requiring 'recognition' of additional pressures. * * *"
Dec. 10	0	"* * * the existing policy should not be changed."
12. 1957—Jan. 8	−⅛	"* * * the directive issued at its first meeting of 1957 maintained the policy of restraint upon credit expansion that had been in effect for approximately 2 years, but it represented an adjustment from the program followed in the last few weeks of 1956."
Jan. 28	−⅛	"* * * restoring approximately the degree of restraint of the late November-December period * * *."
Feb. 18	0	"The current relative ease was unintended."
Mar. 5	0 to +⅛	"* * * continuation of the status quo. * * *"
		"The committee sought to continue about the same pressure on credit expansion that had been intended by the action taken at the last several meetings * * *" The directive was changed to acknowledge emerging uncertainties.
Mar. 26	−⅛	"* * * doubts should be resolved on the side of greater rather than less restraint that had existed in recent months."
Apr. 16	0	"* * * a stable situation should be maintained for the next few weeks."
May 7	0	"* * * current events made continuation of substantially the existing degree of restraint appropriate. * * *"
May 28	0	"* * * the Committee sought to have the same situation continue for future weeks. * * *"
June 18	0	"* * * the Committee's conclusion was that a firm policy of restraint should be continued for the present."
July 9	0	"* * * to maintain but not to increase the existing degree of pressure."
July 30	0	"* * * to keep the banking system under substantial pressure."
Aug. 20	+⅛	The directive was renewed and "* * * the System account would have flexibility in providing reserves. * * *"
Sept. 10	+⅛	"* * * that in carrying out the policy of restraint * * * doubts would be resolved on the side of less rather than greater restraint."
Oct. 1	0	"* * * to continue the same degree of pressure that had been sought during the previous 3 weeks."
Oct. 22	+¼	"* * * although general policy was not to be changed appreciably, it should tend on the easier side from where it had been in recent weeks."
Nov. 12	+½	"* * * there should be a moderate relaxation of the degree of restrictive pressure."
Dec. 3	+½	"* * * there should be further moderation of restrictive pressures * * *."
Dec. 17	+¼	The directive was modified "to contribute further by monetary ease to resumption of stable growth * * *."
13. 1958—Jan. 7	+¼	"* * * a more positive approach to recovery. * * *"
Jan. 28	0	"* * * a slight easing in the reserve position of banks would be desirable. * * *"
		"* * * there should be no change * * * in the policy of supplying reserve funds. * * *"
		"* * * maintaining approximately the same condition in the money market that had existed immediately prior to this meeting."

Scaling of the Federal Reserve's policy decisions—Continued

13. 1958—Continued		
Feb. 11	+⅛	"* * * continue to follow an 'even keel' policy stopped on the side of ease. * * *"
Mar. 4	+¼	The directive was modified "to contribute further by monetary ease to resumption of stable growth. * * *"
Mar 25	+¼	"* * * a more positive approach to recovery. * * *"
Apr 15	+¼	"* * * operations in the System account should be directed toward maintaining a slightly larger volume of free reserves and money market conditions slightly easier. * * *"
May 6	0	"Easing" was "contemplated" in form of lower discount rates and reserve requirements.
May 27	−⅛	"* * * the prevailing policy of ease should be continued. * * *"
June 17	0	"* * * maintain the current posture of monetary ease without further depressing Treasury bill rates. * * *"
July 8	0	"* * * no change in Federal Reserve credit policy * * * no action should be taken to cause the tone of the market to get materially easier or tighter."
July 18	+¼	"* * * there should be no change in policy."
July 24	−¼	"Disorderly conditions" developed on the securities market and the System account was authorized to engage in purchases.
July 29	−¼	Termination of authorization passed on July 18.
Aug. 4	0	The Committee felt that the reserves generated by recent emergency purchases of securities were now redundant and should be absorbed.
Aug. 19	−¼	"* * * the policy to be followed * * * should be one of keeping from having redundant reserves."
Sept. 9	0	"* * * that the rate of expansion in the money supply * * * should be tempered and that operations for the System Open Market Account should move in the direction of lower free reserves.* * *"
Sept. 30	0	"* * * maintaining substantially the same tone in the money market.* * *"
Oct. 21	0	"* * * to maintain an 'even keel' in the market.* * *"
Nov. 10	0	"* * * it would be undesirable to aim toward a greater degree of restraint on reserve availability.* * *"
Dec. 2	−¼	"* * * to maintain conditions in the market about as they were at present."
Dec. 16	−¼	"* * * the Committee's conclusion contemplated letting market developments tend to increase restraint.* * *"
14. 1959—Jan. 8	−⅛	"* * * it was believed that a move toward somewhat greater restraint on the availability of reserves would be appropriate."
Jan. 27	0	"* * * that the degree of restraint on credit expansion * * * should be about the same as in the immediate past, but that any deviation should be on the side of restraint. * * *"
Feb. 10	0	"* * * the current degree of restraint on bank reserves * * * should be continued. * * *"
Mar. 3	−⅛	"* * * to maintain the same degree of pressure on bank reserves position that had been exerted recently. * * *"
Mar. 24	0	"* * * about the same level of restraint should be maintained on bank reserves. * * *"
Apr. 14	0	"* * * that any doubt * * * should be resolved on the side of restraint."
May 5	0	"* * * maintenance of about the degree of restraint that had prevailed. * * *"
May 26	−½	"* * * maintenance of about the same degree of restraint as had existed. * * *"
June 16	0	"* * * it would be desirable to move toward greater restraint on credit expansion * * * after the current Treasury financing was complete. * * *"
July 7	+⅛	"* * * the first paragraph of the Committee's policy directive was revised * * * to provide for increased restraint on credit expansion."
July 28	0	"* * * that an intensification of restraint was required. * * *"
Aug. 18	0	"* * * continuance of the present * * * policy of restraint. * * *"
Sept. 1	0	"* * * doubts should be resolved on the side of the ease during the period of Treasury financing."
Sept. 22	+⅛	"* * * aiming as far as practicable at the same degree of restraint on credit expansion as currently prevailed."
Oct. 13	0	"The consensus * * * favored continuing the present degree of restrictiveness. * * *"
Nov. 4	+⅛	"* * * maintenance of the existing degree of pressure on reserve positions of banks. * * *"
Nov. 24	0	"* * * any deviations preferably should be on the side of less restraint. * * * *"
Dec. 15	0	"* * * to continue the existing directive. * * *"
		"* * * operations * * * should aim at maintaining a feeling of stability in monetary and credit conditions and assuring the availability of funds for seasonal credit needs."
		"* * * the current open market position * * * should be continued. * * *"
		"* * * a consensus favoring maintenance of the degree of restraint on credit expansion. * * *"

Scaling of the Federal Reserve's policy decisions—Continued

15.	1960—Jan. 12	0	"* * * the consensus favored no change in credit and monetary policy. * * *"
	Jan. 26	0	"* * * continue substantially the same degree of restraint. * * *"
	Feb. 9	+⅛	"* * * any tightening in the degree of restraint should be avoided. * * *"
	Mar. 1	+¼	"The Committee concluded that it would be appropriate to supply reserves to the banking system somewhat more readily."
			"* * * a policy of moderately less restraint. * * *"
	Mar. 22	0	"* * * maintaining about the existing situation. * * *"
	Apr. 12	+½	"* * * the consensus favored easing further the reserve position of member banks. * * *"
	May 3	+¼	"* * * moving moderately in the direction of increasing the supply of reserves available to the banking system."
	May 24	+½	"The consensus * * * favored a further supplying of reserves. * * *"
	June 14	+⅛	"* * * any deviation should be on the side of ease. * * *"
	July 6	0	"* * * to continue to provide reserves at approximately the present rate. * * *"
	July 26	0	"* * * continue to make reserves * * * readily available. * * *"
	Aug. 16	+¼	"For several months Committee policy had been directed toward providing reserves needed for moderate bank credit expansion, and the consensus of the meeting was that this objective should be emphasized."
	Sept. 13	+⅛	"* * * doubts should be resolved on the side of ease. * * *"
	Oct. 4	+⅛	"* * * doubts resolved on the side of ease."
	Oct. 25	0	"* * * a conflict should arise between providing additional reserves and further decline in the bill rate * * * the first of these considerations should take precedence. * * *"
	Nov. 22	0	"The directive * * * was renewed. * * *"
	Dec. 13	0	"* * * a continuation of the current degree of ease would be the preferable objective. * * *"
16.	1961—Jan. 10	0	"* * * to maintain approximately the same amount of ease in the market. * * *"
	Jan. 24	−⅛	"* * * there should be no change in the existing degree of monetary ease. * * *" Close attention urged to the bill rate because of balance of payments.
	Feb. 7	0	"The consensus of the Committee favored no change in open market policy. * * *"
	Mar. 7	0	"The consensus of the Committee was that the existing monetary policy of ease should be followed. * * *"
	Mar. 28	0	"* * * seeking to maintain about the existing degree of ease. * * *"
	Apr. 18	0	"* * * revision of the directive carried with it no intent to modify open market policy in any significant extent at this stage."
			"* * * aimed at maintaining approximately the same degree of ease that had prevailed. * * *"
	May 9	0	"* * * maintaining the same degree of ease that had prevailed in recent weeks. * * *"
	June 6	+⅛	"* * * it would be desirable to maintain approximately the same degree of ease as had prevailed recently, resolving any doubts on the side of ease. * * *"
	June 20	0	"* * * maintaining substantially the same degree of reserve availability as had prevailed recently. * * *"
	July 11	0	"* * * to maintain approximately the same degree of ease that had recently prevailed. * * *"
	Aug. 1	0	"The consensus favored continuation of approximately the same degree of ease that had been maintained recently."
	Aug. 22	−⅛	"* * * the consensus favored continuing the period in early August when a confluence of market factors contrived to produce more firmness than had otherwise been the case."
	Sept. 12	0	"* * * continuation of the same degree of ease that had prevailed. * * *"
	Oct. 3	0	"* * * continuation of approximately the same degree of ease. * * *"
	Oct. 24	−⅛	"* * * to resolve any doubts * * * on the side of less ease. * * *"
	Nov. 14	0	"* * * to produce approximately the same degree of ease that had prevailed. * * *"
	Dec. 5	0	"* * * maintaining * * * approximately the same policy in respect to the supplying of reserves that the Committee had been pursuing. * * *"
	Dec. 19	−¼	"* * * not substantial change from recent policies was called for."
			"* * * a somewhat slower rate of increase in total reserves than during recent months. * * *"
17.	1962—Jan. 9	0	Maintain even keel. No change in basic policy.
	Jan. 23	0	On balance no change. Emphasis in steady money market.
	Feb. 13	0	Domestic developments did not * * * require shift toward ease. Hold the posture. * * *
	Mar. 6	+⅛	The majority favored no change. (But) "Promote further expansion of bank credit. * * *"

Scaling of the Federal Reserve's policy decisions—Continued

17. 1962—Continued		
Mar. 27	+¼	Slightly more expansion in reserve availability than had developed.
Apr. 17	0	No change indicated.
May 8	0	Current posture appropriate; reissued directive.
May 29	0	No change in policy despite stock market decline.
June 19	−¼	"Slightly less easy policy indicated."
June 21		"Avoid redundant reserves."
July 10	0	Foreign currency purchases only.
		Consensus for continuing degree of ease of June 19. No further reduction in degree of ease.
July 31	0	A majority favored greater ease. However * * * concluded even keel.
Aug. 21	0	No change from previous directive.
September	0	Evidence of adequate liquidity; policy should remain unchanged.
Oct. 2	0	Supply reserves for seasonal purposes; continue current policy.
Oct. 23	0	No change in policy seemed called for re Cuba. Reduced requirements on time deposits. Maintain status quo in monetary policy.
Nov. 13	0	Free reserves at level of $400,000,000. A majority felt no change called for.
Dec. 4	0	Majority valid; no change.
Dec. 18	−¼	Somewhat less easy policy favored by majority to firm Treasury bill rates.

APPENDIX III

The Relation of Changes in Money to Changes in Bank Portfolios ("Credit")

At several points in the text of the study, we have stated that changes in money and "bank credit" have not been the same for the monetary system as a whole. This appendix provides a more technical treatment of the problem than the one presented in the text and indicates the sources of the discrepancy between the two rates.

We start from the balance sheet of the commercial banks

$$R+E=D^p+T+D^t+D^f+A+N$$

where R denotes the banks' cash assets in the form of base money (i.e., currency and Federal Reserve deposits), E designates total earning assets, D^p indicates demand deposits adjusted, T refers to total time deposits, D^t denotes the Treasury's tax and loan accounts at commercial banks, and D^f measures *net* foreign deposits at U.S. commercial banks. A designates the indebtedness incurred to Federal Reserve banks and N refers to the banks' net worth. The statement describes the consolidated position of commercial banks; all interbank items have been suitably canceled.

Total earning assets E are subdivided into two components E^1 and E^2 such that

$$E=E^1+E^2$$

and defined by the relations

$$R+E^1=D^p+T+A \text{ and } E^2=D^t+D^f+N$$

The relative change in total earning assets is thus the weighted sum of the components E^1 and E^2:

$$\frac{\Delta E}{E}=\frac{\Delta E^1}{E^1}\cdot\frac{E^1}{E}+\frac{\Delta E^2}{E^2}\cdot\frac{E^2}{E}$$

The relative change of E^1 can be usefully transformed into an expression consisting of the currency ratio k, the time deposit ratio t, the average requirement ratio r, and the free reserve ratio f. It is easily demonstrated that

$$E^1=\frac{(1-r-f)(1+t)}{(r+f)(1+t)+k}\cdot B^a$$

where B^a is the base adjusted for "discounts and advances." The relative change in E^1 can thus be approximated by a linear combination of relative changes in the adjusted base B^a, the average require-

ment ratio r, the free reserve ratio f, the currency ratio k, and the time deposit ratio t, i.e.—

$$\frac{\Delta E^1}{E^1}=\frac{\Delta B^a}{B^a}+\epsilon(e, r+f)\,\frac{\Delta r}{r+f}+\epsilon(e, r+f)\,\frac{\Delta f}{r+f}+\epsilon(e,k)\,\frac{\Delta k}{k}+\epsilon(e, t)\,\frac{\Delta t}{t}$$

The coefficients ϵ of the linear combination designate the elasticities of the asset multiplier e with respect to $r+f$, k, and t. The asset multiplier e is defined by

$$e=\frac{(1-r-f)(1+t)}{(r+f)(1+t)+k}.$$

The elasticities are thus exhibited as rational functions of the parameters indicated.

A similar approximation can be derived for the money supply $M=C^p+D^p$ where C^p denotes the volume of currency held by the public:

$$\frac{\Delta M}{M}=\frac{\Delta B^a}{B^a}+\epsilon(m,r+f)\,\frac{\Delta r}{r+f}+\epsilon(m,r+f)\,\frac{\Delta f}{r+f}+\epsilon(m,k)\,\frac{\Delta k}{k}+\epsilon(m,t)\,\frac{\Delta t}{t}$$

The coefficients ϵ are now the elasticities of the monetary multiplier

$$m=\frac{1+k}{(r+f)(1+t)+k}$$

with respect to the behavior parameters indicated as second arguments of the expressions. These elasticities are also rational functions of the parameters. Detailed investigations covering the postwar period indicate that the variability of the elasticities over half-cycles, expressed by the coefficient of variation, is quite small when compared to the corresponding variability of the relative changes of B, k, r, f, and t. The coefficient of variation of $\epsilon(m, k)$, for example, is always less than 0.03.

The linear approximation to E^1 is used to replace the relative change in E^1 in the formula for E, and then we subtract the relative change in the money supply. We obtain in this manner the difference between the relative change in the banks' total earning assets and the money supply:

$$\begin{aligned}\frac{\Delta E}{E}-\frac{\Delta M}{M}=&\frac{\Delta D^t}{D^t}\cdot\frac{D^t}{E}+\frac{\Delta D^r}{D^r}\cdot\frac{D^r}{E}+\frac{\Delta N}{N}\cdot\frac{N}{E}+\frac{\Delta r}{r+f}\,[\epsilon(e,r+f)-\epsilon(m,r+f)]\\&+\frac{\Delta f}{r+f}\,[\epsilon(e,r+f)-\epsilon(m,r+f)]+\frac{\Delta k}{k}\,[\epsilon(e,k)-\epsilon(m,k)]\\&+\frac{\Delta t}{t}\,[\epsilon(e,t)-\epsilon(m,t)]\end{aligned}$$

The differences between the elasticities occurring in the four bracketed expressions can be converted into rational functions of the underlying behavior parameters. These functions were evaluated at the values

prevailing in the recent past. The difference between the relative change in E and M can thus be written

$$\frac{\Delta E}{E}-\frac{\Delta M_1}{M}=\frac{\Delta D^t}{D^t}\cdot\frac{D^t}{E}+\frac{\Delta D^r}{D^r}\cdot\frac{D^r}{E}+\frac{\Delta N}{N}\cdot\frac{N}{E}$$

$$-.12\cdot\frac{\Delta r}{r+f}-.12\cdot\frac{\Delta f}{r+f}$$

$$-.20\cdot\frac{\Delta k}{k}+.37\cdot\frac{\Delta t}{t}$$

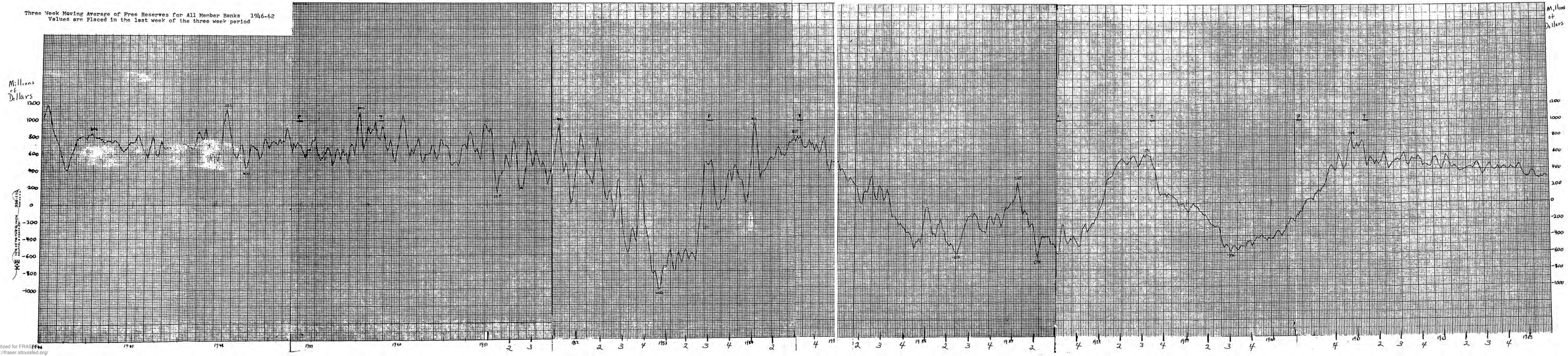
This formula supplies the frame for an explanation for the differential patterns observed for earning asset and money supply.

The formula reveals that "credit-expansion" and "monetary expansion" are not "two sides of a coin." "Credit" and money supply would exhibit identical relative changes if and only if the relative changes in r, f, k, t, D^t, D^r, and N were restricted in such manner that any one of these relative changes were perfectly explainable in terms of the remaining relative changes with the aid of predetermined coefficients. But our observations indicate that this special restriction does not hold. Therefore, earning assets and money supply respond, in general, with substantially different patterns to changes in the public's allocation of "payment-money" or total deposits, variations in reserve requirements and changes in the banks' desired reserve position.

APPENDIX IV

Charts

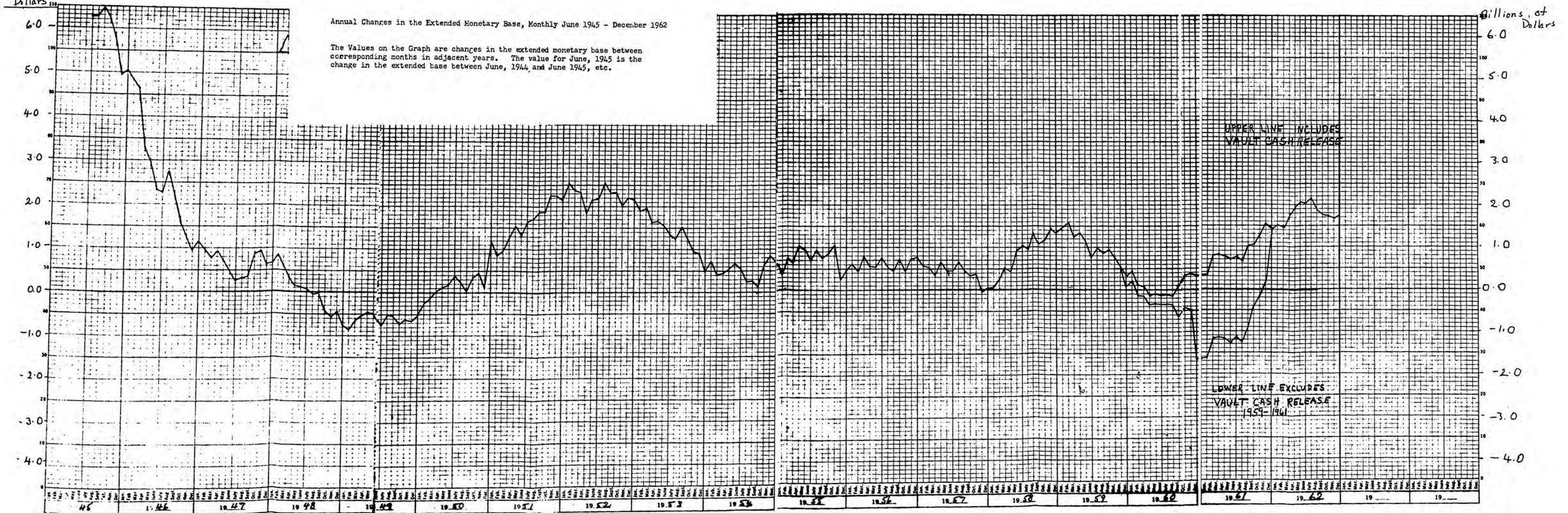
Three Week Moving Average of Free Reserves for All Member Banks 1946-62
Values are Placed in the last week of the three week period



Billions of Dollars

Annual Changes in the Extended Monetary Base, Monthly June 1945 - December 1962

The Values on the Graph are changes in the extended monetary base between corresponding months in adjacent years. The value for June, 1945 is the change in the extended base between June, 1944 and June 1945, etc.



Billions of Dollars

SCALE

Annual Changes in Currency between Corresponding Months in Adjacent Years 1946-62

(The value shown on the chart for any month is the change in currency from the same month in the previous year to the month indicated.)

$\Delta C_t^t = C_t^t - C_{t-12}^t$

$\Delta C_t^t - C_t^t - C_{t-12}^t$

$\Delta C_t^t - C_t^t C$

2.0

1.0

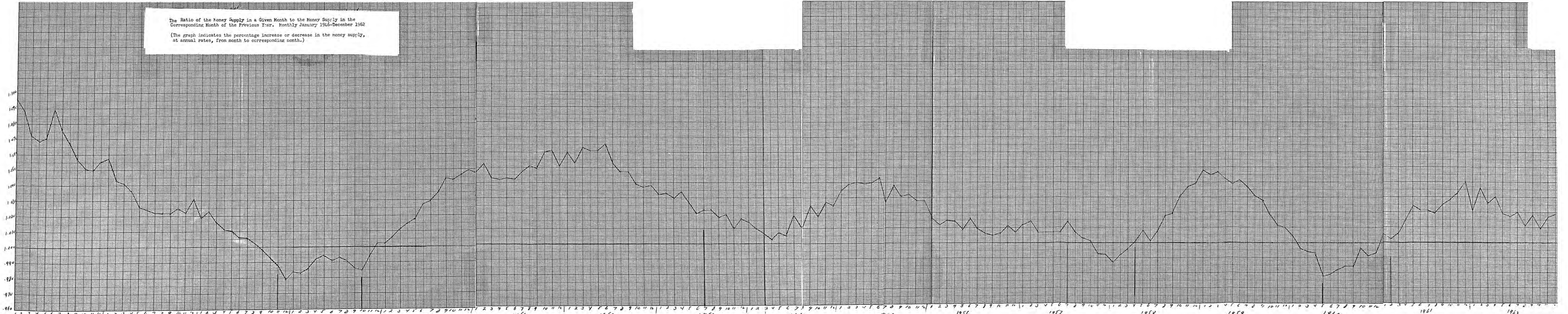
.05

-.10

1946 1947 1948 1949 1950 1951 1952 1953 1954 1955 1956 1957 1958 1959 1960 1961 1962

The Ratio of the Money Supply in a Given Month to the Money Supply in the Corresponding Month of the Previous Year. Monthly January 1946-December 1962

(The graph indicates the percentage increase or decrease in the money supply, at annual rates, from month to corresponding month.)



The ratio of the Money Supply plus Time Deposits in a Given Month to the Money Supply plus Time Deposits in the Corresponding Month of the Previous Year. Monthly January 1946-December 1962.

(The graph indicates the percentage increase or decrease in the money supply plus time deposits, on annual rates, from month to corresponding month.)