ISSUES IN
FEDERAL
DEBT MANAGEMENT

ADAMS   KAUFMAN   SHAPIRO

BOSWORTH-DUESENBERRY   MACLAURY   STRUBLE-AXILROD

CULBERTSON   NORDHAUS-WALLICH   WHITE

GOODHART   RICKS   WILLETT

JAFFEE   ROOB   YOUNGDAHL

PROCEEDINGS OF A
CONFERENCE
HELD IN
JUNE 1973

FEDERAL RESERVE BANK OF BOSTON

ISSUES IN
FEDERAL
DEBT MANAGEMENT

Proceedings of a Conference

Held at

Melvin Village, New Hampshire

June, 1973

Sponsored by

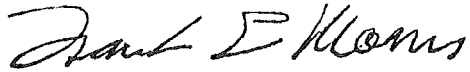THE FEDERAL RESERVE BANK OF BOSTON

THE FEDERAL RESERVE BANK OF BOSTON
CONFERENCE SERIES

FOREWORD

Issues related to public debt management
have changed considerably in recent years. The changed
relative size of the Federal Government debt, the
increased importance of agency issues — these and
other factors make a fresh look at debt management issues
appropriate at this time.

All of the papers and comments of discussants included in this
volume were presented at a conference sponsored by the Federal
Reserve Bank of Boston in June 1973. That meeting was the tenth
in a series dealing with current financial issues; the printed
proceedings of those conferences have received a wide distribution
and have been useful to many persons concerned with policy issues.
We hope this collection will make a similar contribution.

Frank E. Morris
President

CONTENTS

Alternatives for Debt Management

WILLIAM D. NORDHAUS and HENRY C. WALLICH*

Public debt management, in the sense of manipulation of a given stock, has been a policy problem at least since World War II. During this time, dissatisfaction with the handling of the debt has surfaced sporadically. A feeling that the average maturity of the debt should be longer than it was has been pervasive. But no generally accepted philosophy of the public debt management has emerged.

Various objectives have been urged for debt management. An anti-cyclical impact seems an obvious possibility. A balance of payments-oriented debt policy, seeking to lower long- and raise short-term rates, was tried in the form of Operation Twist. Cost minimization regardless of anticyclical considerations has been proposed. Most of the time a policy of tailoring to the needs of the market ("sell what they will buy," a not too distant relative of cost minimization) has been followed.

A variety of theoretical approaches has been given a workout on debt-management problems. The effect of wealth on consumption — contrasting the economist's belief that the public debt is private wealth with the banker's view that the debt is a burden — has been one of them. The theory of portfolio choice has been another. Alternative views concerning the relative weight of money and of liquid assets in the determination of aggregate demand have found application. The theory of the term structure of interest rates has attracted possibly the largest amount of theoretical attention.

*Associate Professor and Professor of Economics, respectively, Yale University.

While uncertainty about the proper objectives of debt management has been constant, other aspects of the situation have changed. Table 1 shows alternate measures of the impact of the debt. The volume of the debt, in relation to both GNP and the total volume of public and private debt, has contracted drastically since 1950. Public debt instruments became a relative rarity in many institutional and personal portfolios. In this sense, one might say that, while the problem was not solved, in good part it went away. Interest rates rose, however, so that without accounting for inflation the net interest burden remained almost constant as a fraction of GNP. We have also shown the "real" interest burden in column 5 of Table 1, a measure accounting for the presence of inflation. By this measure, real interest payments were negative in early years, and have remained quite low except for the early 1960s.

A final shift in emphasis has occurred as the Federal Reserve moved toward a new theory of monetary policy, in which the monetary aggregates play a relatively smaller role. Monetary policy aimed at a money supply target was seen to be more vulnerable to the consequences of even keeling during financing periods. On the other hand, failure to even keel poses a greater threat to the success of financings under a money-supply than under an interest-rate target.

Debt management has traditionally focused on the role of the Treasury in determining the structure of the Federal Debt. There is an implicit separation of functions between the Treasury and the Federal Reserve under which the Treasury determines the gross distribution of government liabilities of different maturities while the Fed determines the net distribution. No matter what securities the Treasury chooses to issue, the Fed could, through its open-market operations and regulatory policies, ensure private investors would hold a portfolio of government securities of the Fed's choosing. The responsibility of the Treasury then would be limited to two objectives: to keep the Fed supplied with a sufficient bundle of maturities with which to operate, and in its financing operations to keep out of the way of the Fed. This separation of functions has never been explicitly followed in the United States. The Fed does not, by maturity-switching open-market operations, sterilize the impact of Treasury actions, or even the consequences of the passage of time, upon the maturity structure of publicly held securities. Its preference for dealing in bills and for thus limiting monetary policy to changes in the monetary base, instead of changes in monetary base and asset structure, favors this policy of self-limitation. Close cooperation between Treasury and the Fed, and some regard by the

TABLE 1

ALTERNATIVE MEASURES OF IMPACT OF FEDERAL DEBT HELD BY PUBLIC

			Net Federal Debt as Percent of:	Net Federal Interest Payments as Percent of GNP	
	Net Federal Debt (1)	GNP (2)	Total Public and Private Debt (3)	Not Accounting for Inflation (4)	Accounting for Inflation (5)
1946	$229.5	110.1%	57.9%	2.0%	
1950	218.1	76.8	44.9	1.6	—3.1%
1955	232.5	58.4	34.9	1.2	—0.3
1960	243.3	48.3	27.8	1.4	0.1
1965	275.3	40.2	22.1	1.3	0.7
1971	365.7	34.8	18.3	1.3	—0.2

Sources: Column (1) Total Federal Government and agency debt, end of year (*Economic Report of the President, (ERP)* 1973, Table C-62), billions of dollars.

Column (2) Equals Col. (1) divided by Gross National Product (*ERP*, 1973, Table C-1).

Column (3) Equals Col. (1) divided by total public and private debt (*ERP*, Table C-62).

Column (4) Net interest payments (*ERP*, 1973, Table C-66 and 1968, Table B-62) divided by Gross National Product.

Column (5) Accounting for inflation involves multiplying an estimate of the "real" interest rate times column (2). The real interest rate is derived as the difference between the actual rate (derived from columns (2) and (4)) and the average rate of change of the GNP deflator over the past 5 years for first four rates and 6 years for 1971 (*ERP*, 1973, Table C-4).

11

Treasury for the cyclical implications of its debt actions, can serve as a substitute for an explicit "separation of functions" under which the Treasury would determine only the gross and the Fed the net (publicly held) maturity structure of the debt.

We shall shortly ask whether the maturity structure of the Federal debt makes any difference. If it does, there are almost certainly advantages in centralizing monetary policy in a single authority. The obvious place is the Fed. In case of inadequate coordination, or of conflict of views, as has occurred, decentralization of policy can be costly or even destabilizing.[1] The British system of debt management features some of the techniques here described. Its concomitant in the British framework — far-reaching control by the Treasury over central bank policies — is a possible but certainly not necessary consequence of the technical "separation of functions."

We do not, however, propose any change in existing Treasury-Federal Reserve procedures. We proceed instead on the assumption that the Treasury does determine not only the maturity structure of the gross debt, but in large measure also that of the net debt. If maturity structure matters, then debt management is interwoven with monetary policy and the Treasury has a responsibility in the areas both of anticyclical and structural (long-term) monetary policy.

On the question whether maturity structure matters, the theory of debt management is today confronted with relatively recent empirical findings concerning the effect of that structure, as it relates to government securities, upon the term structure of interest rates. There is considerable evidence that it is very difficult to change the term structure of rates. As Modigliani and Sutch conclude:[2]

> Our findings. . .suggest that the responsiveness of the rate structure to variations in the age composition of the national debt outstanding was at best weak, even in a period in which the national debt was large, both in absolute and relative size. . .On the basis of a rather extensive battery of tests based on a variety of measures of age composition, we have been able to uncover persistent and fairly convincing evidence that

[1] For a formal analysis of the effects of centralization or decentralization of policy on the outcomes, see R. N. Cooper, "Macroeconomic Policy Adjustments in Interdependent Economies," *Quarterly Journal of Economics*, February 1969. For an analysis of the benefits of risk diversification by employing simultaneously several policy instruments the effects of which are not known with certainty, see William Brainard, "Uncertainty and the Effectiveness of Policy," *American Economic Review, Papers and Proceedings*, May 1967.

[2] Modigliani and Sutch, "Debt Management and the Term Structure of Interest Rates: An Empirical Analysis of Recent Experience," *Journal of Political Economy*, 1967, pp. 587-589.

at least variations in the supply of debt in the intermediate range, especially in the one-to-five-year range, tended to produce moderate variations in the spread for intermediate maturities, that is, maturities in the corresponding age class. On the other hand, we have been unable to uncover solid or even suggestive evidence that the age composition of the supply affects significantly longer rates as measured by the average long-term rate or the twelve-year rate.

The rationale for the ineffectiveness of debt structure in affecting rate structure usually is stated in terms of the "expectations hypothesis." The pure expectations hypothesis about riskless rates can be formulated as follows:

A. The term structure of interest rates is determined solely by expectations of future rates.

There is considerable evidence that the pure expectations hypothesis is not correct, but that a weaker hypothesis — which we shall call "approximate term structure invariance" — is valid:

B. There are systematic deviations of the term structure from that predicted by the pure expectations hypothesis, with long rates generally above short rates. The rate structure, however, is almost invariant with respect to changes in the composition of government debt.

A number of studies of the effect of the composition of government debt on the term structure of interest rates point to these conclusions and are summarized in Table 2. The most impressive point about these results is that there is very little effect of change in the maturity structure on interest rates. The studies are not unanimous in their estimate of the impact of changes on the *direction* of effect. The *size* of the effect varies by a factor of almost three between the findings of Okun and those of Scott. The one fairly consistent finding is that the effect is very limited, as indicated by the hypothesis of approximate term structure invariance. A subjectively weighted average estimate from Table 2 might be that a 1 percent shift from shorts to longs would change the rate differential by 5 basis points. This means that to twist the rate structure by 1 full percentage point would currently require a maturity switching operation of $50 billion.

Findings of a failure of the term structure of interest rates to react to the maturity structure of the public debt have been puzzling to

TABLE 2

ESTIMATES OF MOVING 1 PERCENT OF FEDERAL DEBT FROM 1-YEAR TO 20-YEAR BONDS[a]

	Change in Short-Term Interest Rate (Basis Points)	Change in Long-Term Interest Rate (Basis Points)	Change in Spread between Long-and Short-Term Interest Rates (Basis Points)
Okun[1]	−2.20	0.83	3.03
Scott[2]	−12.77	−4.79	7.98
	(2.81)[b]	(1.44)	(2.07)
Modigliani and Sutch[3]	---		−.912
			(.798)
Hamburger and Silber[4]	0.0		

[a]Let D be total interest-bearing Federal debt. The table shows the estimated effect of an open market operation which simultaneously sells D/100 in bonds with maturity greater than 20 years and buys D/100 in bonds with maturity less than 1 year. The effect of a 1 percent increase in 20-year bonds and a 1 percent decrease in 1-year bonds will be to raise the average maturity of the total debt by .19 years. Scott and Modigliani and Sutch estimate the effects on interest rates of a 1 year increase in the average maturity of the debt. Their estimates have been multiplied by .19 in order to obtain the figures in this table.

[b]The standard errors are given in parentheses when the sources present them.

[1]Arthur M. Okun, "Monetary Policy, Debt Management and Interest Rates: A Quantitative Proposal," pp. 142-188 in *Financial Markets and Economic Activity*. Edited by Donald Hester and James Tobin, New Haven, Yale University Press, 1967. Okun's sample period was 1946-I to 1959-III. The value of net interest-bearing debt for 1953-I was $119 billion. A 1 percent shift on average represents a a switch of $1.2 billion. We have used Okun's equation (8) presented in Tables 1 and 4.

[2]Robert Haney Scott, "Liquidity and the Term Structure of Interest Rates," *Quarterly Journal of Economics*, 79 (February 1965), pp. 135-145.

[3]Modigliani and Sutch, "Debt Management and the Term Structure of Interest Rates: An Empirical Analysis of Recent Experience," *Journal of Political Economy*, 1967, pp. 569-589.

[4]Michael J. Hamburger and William L. Silber, "Debt Management and Interest Rates: A Re-examination of the Evidence," *The Manchester School*, December 1971, pp. 261-66. The sample period is 1961-I to 1966-II, during which the average debt was $202 billion. A 1 percent shift from bills to 20-year bonds therefore represents a switch of $2 billion. We have presented their preferred equation, equation (2).

14

market practitioners because they so often observe the rate impact of large issues. The difference in observations between practitioners and econometricians seems to be that between a very short-run impact effect and a permanent stock effect. Even though a large issue may depress the market for comparable maturities temporarily, the effect may disappear within a few days or weeks, so that little trace is left on the quarterly or even monthly data usually employed in econometric studies.[3] In the short run the impact effect may be largely obliterated by portfolio adjustments of lenders. In the long run, any remaining effects may be removed by adjustments of borrowers in the maturity of their liabilities.

In addition to changes in the term structure of rates, i.e. principally the short-long spread, manipulation of the maturity structure of the public debt may affect the level of rates, quite possibly without altering the structure. Again, the empirical results cited in Table 2 cast doubt on whether there is any durable effect of composition of the debt on the *level* of rates. In principle, a reduction in maturity increases liquidity. An increase in the liquidity of assets reduces the demand for money, causing the existing money supply to become excessive at the existing level of interest rates. A shortening of the public debt therefore might have the same effect on interest rates as an increase in the money supply.

This effect, too, could be neutralized by countervailing shifts in the maturity structure of private debt. Some lenders, as well as borrowers, prefer long-term to short-term debt, and may move into maturity areas vacated by the Treasury. It should be pointed out that the effect of changes in the maturity of private claims and liabilities on the liquidity of lenders and borrowers, respectively, is very unlikely to be symmetrical, i.e., unlikely to be mutually neutralizing. Treasury action could be neutralized likewise, of course, by action of the central bank, especially if the latter uses interest rates rather than the money supply as its principal policy guide.

---

[3]Okun reports no flow effect for periods of one quarter, Okun, *op. cit.,* p. 161. Hamburger and Silber, *op. cit.,* present a regression showing a distributed lag on the Treasury bill rate for monthly data, but the effect does not show any rate of change (or flow) effect (p. 263). In fact, their monthly equation shows a distributed lag with all coefficients having the same sign; a rate of change effect implies that current and lagged coefficients have opposite signs. Perhaps there is a flow effect for a week, a day, a second, a nanosecond . . .

Objectives of Debt Management

The major issues of debt management revolve around whether debt management should be oriented primarily toward cyclical or structural objectives and, to the extent that structural objectives predominate, what these should be. Historically, anticyclical debt management has received a fair amount of academic support, pointing to an anticyclical lengthening and shortening of the debt. Experience has demonstrated that such a policy is not easy to carry out: the policy involves selling large amounts of long-term debt during periods of expansion and rising rates, a period when such sales are difficult by the Treasury's traditional techniques of selling bonds. As noted above, the Fed does not automatically sterilize Treasury operations. This indicates that the Treasury should continue to have cyclical objectives in mind. Nor should the anticyclical objective be abandoned to the extent where the Treasury, having financed short during a long expansion, would feel free to engage in massive refunding during an ensuing recession. Avoidance of debt operations that gratuitously conflict with monetary policy objectives could be viewed as in line with the principle of "keeping out of the way of the Fed." We shall examine this as one of the possible "structural" objectives, to which we now turn.

1. Adequate Money Supply

In the early postwar days, when the public debt was large relative to private debt and when private short-term instruments were not plentiful, a debt structure conducive to providing and maintaining an adequate money supply and adequate liquidity had attraction. This would have meant: (a) enough medium-term securities which banks could hold without undue risk but also without experiencing excessive liquidity, to make the money supply adequate; (b) enough short-term debt to meet bank and nonbank demand for highly liquid instruments; and (c) all the rest of the debt in savings bonds or long-term marketable bonds. This criterion has little meaning at a time when the money supply is overwhelmingly based on private debt and when the investments that banks buy typically are tax-exempt.

2. *Maximum Protection Against the Political Risks of Short-Term Debt*

The traditional central bank view is that short-term public debt is dangerous. Political pressure can compel central banks to monetize such debt in order to forestall a rise in interest costs on an important part of total debt. American experience shows that political pressures to monetize long-term debt can be even stronger — see the rate-structure pegging episode of the late 1940s.

3. *Minimum Cost to the Treasury*

This would probably mean a debt in all short-term securities, unless the consequent increase in this type of paper should cause short-term rates to rise above long-term rates. It would not mean a debt all in interest-free currency, since the Federal Reserve would have to compensate such excess creation of bank reserves and thereby give up assets whose income otherwise would go to the Treasury. An "all shorts" public debt posture has many uncomfortable aspects and risks beyond the traditional danger of excessive monetization by the central bank.

At a more theoretical level, the concept of "debt monetization" carries a somewhat different, although currently not operational, connotation. In line with the view that payment of interest on demand deposits would lead to larger holdings of money and hence to greater liquidity and greater welfare without an increase in inflationary pressure, it should be noted that such a policy would move toward "monetization" of the debt by narrowing the rate spread between bonds and money and so making money more like bonds. Likewise, it has been argued that under certain conditions the true cost of public expenditures can be measured better by the interest cost of borrowing they require than by their capital cost, while for certain redistributive measures more "bang for a buck" can be attained if the buck is borrowed at a low interest rate.

4. *Optimal Public Debt from the Viewpoint of the Private Sector: Public Debt as Financial Intermediation*

The negative implications of concentration on short-term debt lose some of their sting when it is remembered that the choice is not simply whether the Treasury should finance short or long. To a certain extent the choice is whether the Treasury (i.e., the public

sector) should finance long and the private sector short, or vice versa. If it is granted that the supply of long-term funds is not infinitely elastic, then long-term government financing either cuts off some private financing or drives it into the short-term area. Quite aside from the Treasury's possible desire to keep down interest costs by financing short, the private sector has an interest in keeping the public debt relatively short-term. We shall give a few instances of this interest of the private sector in a short-term public debt, and then present a more formal argument to make the same basic point and arrive at a more general statement about optimal debt management in terms of public debt as financial intermediation.

In an economy in which the long-term rate normally is above the short, long-term money is the scarcer and more valuable article. Debtors, on balance, regard the disadvantages of short-term debt as weighty enough to justify paying a premium for long-term money. If the government can make do equally well with either kind of debt, it obviously ought to avoid borrowing the premium type and so contributing to its scarcity.

Private borrowers, furthermore, confront both market and credit risk. Market risk relates to the possibility that the market may be unfavorable at the time of borrowing or refunding, credit risk to the possibility that the borrower's credit standing may deteriorate. The Federal Government confronts only market risk. Both borrowers can spread their risks if they have a choice of borrowing both long and short. The Federal Government can broaden this option for the private borrower if it stays out of the long-term market and allows the private borrower a better chance to select the kind of maturity that his risk situation makes preferable.

For lenders, finally, short-term assets are advantageous as indicated by their normal willingness to accept a lower interest rate on liquid instruments. If the government, without incurring compensating costs, can create liquidity, it should do so.

One approach to the optimal debt structure is to consider the government debt as a form of changing the structure of total private holdings. Consider an economy where liquid wealth is held by households and capital is held by firms. An analysis of portfolios would indicate that households prefer short assets, while firms prefer long liabilities. We assume for simplicity that for a flat-term structure individuals keep all assets in short securities and firms issue all liabilities long. Figure 1 shows the ratio of long assets to total assets of households as HH as a function of the rate differential; similarly the (negative) liabilities of firms are shown as FF. In terms of theory, we

can say that short securities are the "preferred habitat" of house-holds while long securities are the "preferred habitat" of firms. They must compromise, of course, and the outcome comes at λ^* with the long rate at a premium δ^* above the short rate.
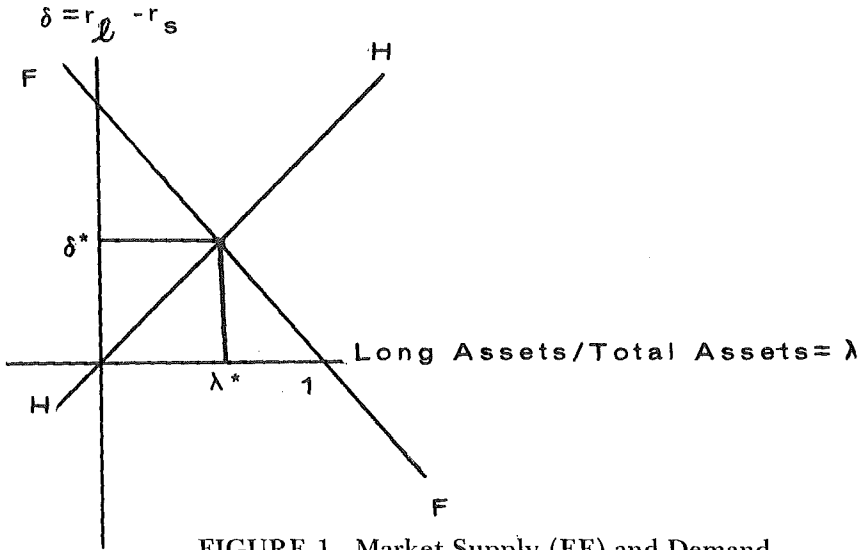
FIGURE 1. Market Supply (FF) and Demand
              (HH) Functions for Long Term Assets

We assume that risk differentials are sufficiently great so that speculators do not close the rate differential δ^*, but that these risks are not social risks. If this is the case the government can make both households and firms better off by engaging in "intermediation," e.g., issuing short debt and buying an equal amount of long debt. This process should proceed until the term structure is flat. If the government is a debtor, this argues for issuing only short debt until the term structure is flat. Assuming HH and FF are homogeneous in total wealth, issuance of short debt amounts to changing the supply function from FF to F′F′ in Figure 2.[4]

---

[4] At a point δ in Figure 2 the FF curve shifts to the left by the fraction $\mu = D^f / (D^f + D^g)$, where D^f and D^g are total liabilities of firms and government, respectively.
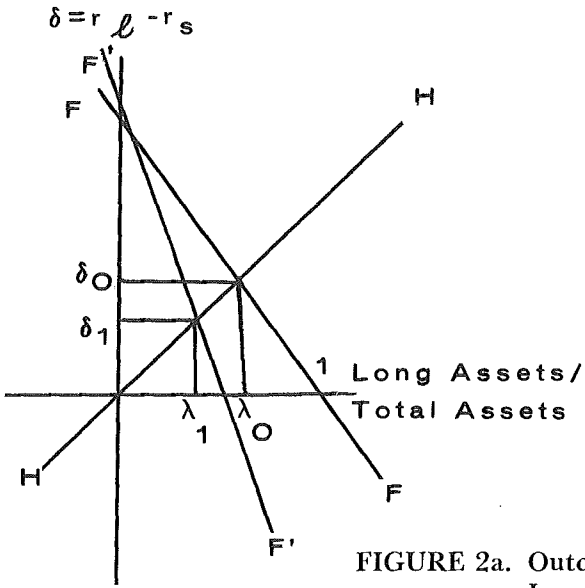
FIGURE 2a. Outcome when Government
           Issues Short Debt Only
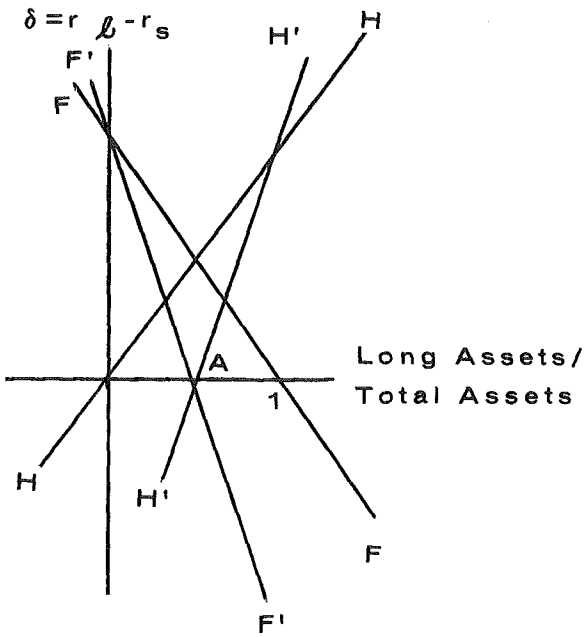
FIGURE 2b. Outcome when Government Issues
           Short Debt and Buys Private Long
           Debt

20

This policy lowers interest-rate differentials from δ_0 to δ_1 and lowers the fraction of debt in long securities from λ_0 to λ_1. Why is it that in this scheme there might be a small effect of debt composition on the rate differential? Either the HH line, or else the FF line, is very flat. In the former case, the government succeeds in changing the composition of private debt, but the rate effect is small; in the second case, firms undo public debt management with their own debt policy.

It is easily seen that simply issuing short securities will not erase the yield differential if the HH line goes through the origin. To erase the differential the government can buy long debt, say in secondary mortgage markets. In this case, the HH curve moves to the right as to H'H' in Figure 2b. The policy shown in Figure 2b actually performs a sufficient amount of buying long and selling short so that the term structure is completely flat. There will be a unique combination of such short sales and long purchases which will (a) provide a flat yield curve and (b) assure that the entire net debt is held. We will call this policy the *debt management technique which flattens the term structure of interest rates*, or the flattening policy.

It is easy to see that the monetary authorities have enough instruments to flatten the term structure. In the general case there are n demand and supply functions for the n assets, each function being homogeneous in the n rates of interest. There are n instruments since government debt has n maturities. Under normal conditions the targets can all be met, subject to the proviso that full achievement of such an objective may involve the Treasury in substantial short-term borrowing and long-term lending.

What is the rationale for a policy of flattening the rate structure? The basic reason is that over the long run a rate structure which is anything but flat reflects the presence of inefficiencies. Just as money will not be held as an asset without transactions costs, so the observed stable ascending rate structure seems to us to be consistent with a pattern of preferred habitats and risk aversion as shown in Figure 1. By flattening the rate structure the government finances the debt in such a way as to remove the inefficiencies associated with risks.

It should be noted that the flattening of the rate structure does not necessarily increase the welfare of all participants. The short-term borrower and the long-term lender who have below average aversion to risk or who were operating in their preferred maturity range lose the risk premium from which they were benefiting in their respective ways. But on balance the reduction of a private risk that is

not also a social one is bound to raise aggregate welfare. It is true also that there are private intermediaries, one of whose functions it is to convert short-term into long-term money, making a profit by "riding the yield curve." This activity is itself not a riskless one, however, as the recent experience of the thrift institutions has shown, and in any event has on average not been carried to the point of producing a flat-term structure. There is room, therefore, for some structural influence emanating from the public debt in the direction of a flatter yield structure. Financial intermediation, involving lending as well as borrowing, is part of the current activities of the public sector, but our analysis is concerned not with Federal lending agency operations and their possible expansion, but with the principles underlying the influence of debt management upon the term structure of interest rates.

How does a policy of debt management aiming to flatten out the yield structure relate to other policy objectives of debt management? It should be seen only as an absolute goal when no other goals are in competition with optimal debt management. It appears to us to be very similar to the objective of minimizing the cost of debt. On the other hand, it should be viewed as a *very long-run policy* and one around which stabilization objectives can move. Thus we would not view a policy of Twist such as that used in 1962 as inconsistent with this objective as long as Twist was clearly seen to be a cyclical policy and not as a substitute for expansionary domestic policies and a higher foreign exchange rate. Moreover, a policy of faster (or slower) growth could be achieved by a greater (or lesser) monetization of debt.

5. *Providing Adequate Gross Debt for Cyclical Debt Management*

We have presented a set of reasons, based on structural grounds, that favor a Federal debt financed largely with short-term interest bearing securities. Two major reservations need to be stated concerning such a policy. One is the familiar set of objections to governmental short-term financing: given that the Federal debt is almost certainly permanent, a heavy concentration on short-term issues appears "unsound" in the light of the canons of traditional private finance; it carries a heavier market risk than long-term debt because the stream of interest payments is more variable; it is vulnerable to political and other pressures that could lead to inflationary debt financing. We have stated earlier some considerations that reduce the weight of these objections.

The second reservation relates to the fact that a predominately short-term debt precludes the possibility of twisting the term structure of rates. The Fed cannot substitute short for long debt in the market if there is no public long debt in the market. We assume here that the present institutional framework will be preserved, which prevents the Fed from dealing in private securities in the open market. Many economists have argued that in certain conditions the yield curve should be twisted; in 1962, for example, a quarter-hearted attempt was made to lengthen the debt in order to promote investment while attracting short-term capital from abroad. Especially in a world without perfect markets, such situations (or even in mid-1974 the reverse!) may well arise again. A case can therefore be made for either: (i) having a sufficient quantity of gross long debt so that the monetary authorities can buy and sell long debt; or (ii) changing the existing framework to allow the monetary authorities to operate in securities other than those of the Treasury.

One question involves the magnitudes of debt of different maturities necessary for the Fed to engage in meaningful monetary policy of this kind. The studies summarized in Table 2 place the change in the ratio of short debt to total debt required to twist the term structure by 100 basis points around 20 percent of marketable interest-bearing Federal debt, i.e. about $50 billion. This is roughly equal to the total of marketable Treasury securities outstanding with maturities exceeding five years.

Given the realities of the market, anticyclical operations in long-term securities of such orders of magnitude are not promising. Over the years, as total wealth rises, the Federal debt is likely to constitute a continuously diminishing proportion of it. The chances of a meaningful impact on the rate structure via open-market operations in long-term debt will further diminish. It might be asked, therefore, whether the hope of achieving such effects should be allowed to dominate debt structure policy.

6. *Minimum Interference with the Fed*

"Keeping out of the way of the Fed" is another of the possible objectives of debt management. In other words, instead of seeking to achieve positive effects, the goal would be to avoid negative effects resulting from interference with monetary policy. This goal at one time would have loomed so large as to be impossible to achieve. Shortly after World War II, all thinking about monetary policy was dominated by concern over its effect on the debt. During the pegging period, cooperation between the Treasury and the Fed paralyzed monetary policy.

Today, three forms of interference are readily apparent. One is the constraint that at times has resulted from the need to finance large budget deficits in a rapidly expanding economy, when capital markets were already strained by private demands. This is basically a fiscal policy problem — the budget probably should not be in such heavy deficit at these times. When it is, the result almost certainly will be a heavy concentration on short-term debt. Large-scale long-term financing would drive up long-term rates excessively. Even a strict interpretation of the expectations theory would not deny this — heavy long-term financing would probably change expectations. Only short-term debt can be sold in sufficient volume without great rate increases — provided the Federal Reserve gives the banks the reserves with which to buy these issues, thereby improperly accelerating the growth of the money supply.

A second form of interference with monetary policy can result from a heavy volume of short-term debt outstanding from an earlier period. An effort to keep the monetary aggregates growing stably under conditions of expansion will raise short-term interest rates and make the interest cost of the debt very burdensome. It will also put upward pressure on rates charged by banks for short- and medium-term credit. The answer to this problem is that of orthodox debt management: avoid short-term debt by keeping the debt funded. The pros and cons of this advice are familiar. It does not appear that this form of interference with monetary policy should be decisive for the choice of debt management policies.

The practice of even-keeling the market during Treasury financings is a third form of interference. A variety of views seems to exist among market technicians about the variables and techniques involved in even-keeling, about the duration and rigor of individual episodes, and even about the need to protect Treasury financings by this form of market stabilization. We conclude that there is a significant possibility, which frequently materializes, that even-keeling may interfere with monetary policy particularly under a policy regime aiming at stable growth of the monetary aggregates.

Fortunately, techniques are available to offset the adverse effects of even-keeling upon monetary policy, assuming the practice cannot be dispensed with altogether. The orthodox counsel again would be to reduce the number of financings by lengthening the debt. But even-keeling could be eliminated altogether if 1) the debt were all in bills, assuming auctions to require no even-keel, or 2) all short and long financings were shifted to an auction basis, or 3) all issues were made sufficiently small, perhaps by reopening of old issues, to make

their pricing and sale no more difficult than that of corporate issues. The Treasury already has experimented with 2), through a "Dutch Auction" of a bond, which will be reported on in another paper at this conference. Of these techniques, the Dutch Auction may well be the best, since it does not prejudice the form of Treasury issues as would the other two. It is evident, then, that the conclusions of this paper pointing in the direction of a predominately short-term debt can be made consistent with a debt policy whose principal objective is to keep out of the way of the Fed.

7. *Purchasing-Power Bond*

No discussion of debt management is complete that does not pay its respects to the merits of a purchasing-power bond. This time honored subject has been endowed with powerful actuality by our high rate of inflation. We shall ignore the familiar pros and cons debated in the past — the need to give the small saver a positive real interest rate, the danger of seeming to "throw in the towel" in the fight against inflation, and so forth, and only note briefly two points that appear to have been neglected in the debate.

In a risk-averse market, investors will be prepared to pay a premium for the elimination of the inflation risk. Thus, the rate at which such a bond could be sold might turn out to be lower than the real rate. The latter has been variously computed as falling in the range of 3-4 percent. It might be worthwhile finding out whether this is so, perhaps by having a government agency, rather than the Treasury, put out such an experimental issue.

Second, the Treasury would be deceiving itself if it were to ignore the fact that it is already putting out securities that are near substitutes for purchasing-power securities. The coupons of all issues currently sold obviously contain an inflation premium. This however, is an inefficient and costly method of inflation-proofing a security. The premium contained in the coupon is taxable. Hence it must be high enough to attract, as marginal investors, taxable buyers for whom the post-tax premium still constitutes adequate protection. For tax-exempt buyers, that premium is excessive. The situation is the reverse of that prevailing in the market for tax-exempts, where middle-bracket buyers have to be attracted to sell enough bonds, giving high-bracket buyers an unnecessarily high return. A purchasing-power bond, providing for a tax-exempt inflation adjustment, would avoid this extra cost.

We have no expectation that the Treasury will issue a purchasing-power bond, any more than that it will hereafter voluntarily finance all of its debt short-term. But it may be useful to the Treasury to have to rethink from time to time the reasons why it will not.

DISCUSSION

CHARLES A.E. GOODHART*

If the function of an opening paper at a Conference is to raise more questions than it attempts to answer, in order to give a wide scope for subsequent discussion, then this paper fills that role admirably. I have rarely read a paper that managed to start up so many interesting hares, such as the Fed-Treasury relationship, the "real" burden of the debt, purchasing-power bonds, even though many were hardly pursued after the first sighting. In particular, the fact that I shall pass in pained silence by one of these hares, the authors' reference to 'far-reaching' Treasury control over Bank of England policies, should not be taken to represent agreement with that comment.

The authors do, however, expand and develop their analysis of two main issues, the first on the question whether changes in the maturity composition of the debt affect the rate structure and the second on whether there is some long-term optimal structure for the debt. In addition, there is a secondary theme, which surfaces at various points, which considers the rationale and arguments for the traditional Central Bank desire to fund — that is, to establish and maintain a long average maturity in its outstanding debt.

It is, indeed, proper to begin, as the authors do, with the question whether the composition of the debt affects the rate structure. For if it does not do so, the implication would seem to be that shifts in the composition of the debt, at least over the range that has been observed, do not matter; in particular that they do *not* affect the welfare of the private sector, which forms the authors' second main topic.

*Adviser, Bank of England.

26

The standard theoretical conditions in which the rate structure will be insensitive to the composition of the debt are well known in the literature. These are that there shall be enough, adequately financed, market operators to control the determination of market prices,[1] who are both risk neutral and have uniform expectations. Frankly, I find these conditions totally unrealistic. Moreover it should be noted that, if risk neutrality was prevalent, there could be no basis for the existence of a liquidity premium. But if behavioural conditions are such as to lead to the establishment of liquidity premia, because essentially of risk aversion, then it must follow that these premia will be a function of shifts in the composition of the debt, since it will take rising premia to shift additional risk-averse investors out of their preferred habitats. I noted with some interest that the authors were careful not to equate the observed systematic deviations from the predictions of the pure expectations hypothesis (in their hypothesis B) with liquidity premia. For it would be illogical for such liquidity premia *not* to be a function of the debt composition. But if they are not liquidity premia, could the authors tell us what causes these systematic deviations?

Then having shown that the econometric evidence clearly suggests that the composition of the debt hardly seems to matter at all, and indeed having been rather snooty about the misguided and myopic market operators, who thought it did, the authors in the second half of their paper ignore their own conclusions with a magnificent insouciance to develop a theory of the welfare implications of debt composition, whose significance depends entirely on that risk aversion, those preferred habitats, which they had virtually dismissed earlier. Would the authors like to reveal which half of their paper they actually believe?

But I am being unfair. There is a real problem. Most of us believe that market operators are characterized by risk aversion, in which case theory suggests that debt composition should influence the rate structure. Yet econometric tests do not show much evidence of this. One possible reason that has been suggested for these findings is that adequate data of substitute private debt are not available in the United States.[2] If, of course, private sector borrowers are prepared

[1]See, for example, R. S. Masera, *The Term Structure of Interest Rates*, Chapter 1, "A Brief Survey of the Literature on the Term Structure," (Oxford University Press: Oxford, 1972).

[2]B. G. Malkiel, *The Term Structure of Interest Rates*, (Princeton University Press: Princeton, New Jersey, 1966), pp. 221-3.

to shift the maturity of their new issues very flexibly in response to very small opportunities to lower the mean yield on their debt, then they are acting as the adequately financed risk-neutral speculators. I think that the argument is instead that inability to observe accurately the maturity shifts, determined by other unstated reasons, in the proportionately very large totals of private debt may have biased downward the econometric estimates of response to public sector debt shifts. I doubt, however, whether this will be found to be an important explanation of this puzzle: for in the United Kingdom, where the issue and stock of Central Government debt far outweighs that of private sector debt[3] and where the market for the latter is institutionally limited to new issues of a restricted maturity range,[4] my own statistical research[5] has equally failed to turn up any evidence of the effect of composition on the term structure.

The Optimal Debt Structure

Having looked this conflict, between the belief that most of us share that the composition of the debt should matter and the econometric evidence that it hardly does, squarely in the face, let us pass on to the authors' second main theme, the optimal structure of the debt, accepting the postulate that risk aversion can lead to the emergence of rate differentials in the term structure. The key sentence in this section to my mind is as follows, "We assume that risk differentials are sufficiently great so that speculators do not close the rate differential, but that these risks are not social risks". Now what exactly is a "social risk"? My own view is that it is not the nature of the risks themselves, but of the behavioural response to risky circum-

---

[3]Nominal value, £ mn. U.K. Debt quoted on London Stock Exchanges.

Outstanding Stock			New Issues (gross cash raised)		
Central Government		**Company Sector**	**Central Government**		**Company Sector**
March 1965	16,648	2,500*	1968	681	304
March 1970	21,569	5,502	1969	766	425
			1970	11,635	

*Estimated

[4]The great majority of company-sector quoted debt is issued with an initial maturity of between 25 and 30 years.

[5]Still in preparation.

stances, that differentiates public and private sector intermediation. Why do not private intermediaries borrow short and lend long, until rate differentials are closed?

One answer is that, with a given subjective probability distribution of returns, the dangers of insolvency and illiquidity make the intermediary unprepared to accept the required risk-return trade-off, especially with declining marginal utilities of income and/or penalties arising from bankruptcy. But the public sector is never illiquid; it can always print more money. It may be technically insolvent — and from the experience of the British nationalised industries usually is — but it can not be bankrupt. It is not affected by risk, in the sense of the variance of expected returns, in the same way as the private sector. In this respect it has a comparative advantage in risk bearing. What interests me is just how far do you want to follow the ramifications of this argument? For surely the logical conclusion of the authors' theme here should not be limited to the composition of their own debt. As is mooted by the authors, when they advocate the authorities buying long *private sector* debt in exchange for short *public sector* debt, this train of thought leads on to the argument that the public sector is better placed in this request than the private sector to undertake most intermediation services, and, perhaps, a whole range of other activities involving risk bearing.

Let me repeat this interesting argument; the comparative advantage of the public sector in risk bearing gives theoretical grounds for a massive extension of nationalization into the provision of financial services. I suppose that in some ways the growth of Federal credit assistance and insurance serves to offset risk without entailing an even larger extension of direct public ownership.

Finally I would like to suggest that the authors have largely failed to capture the motivation leading central banks, certainly my own, to want to fund the debt. The authors twice suggest that this is because market risk may raise the interest costs of the debt. But as they show in their opening table, the interest payments on the debt are too small, as a proportion of GDP, to make even relatively large fluctuations in it of serious consequence.[6] Political constraints on interest-rate movements, which certainly occur, do not now arise from fiscal cost considerations but when rate movements, anywhere in the spectrum, appear to threaten the flow of funds into some

---

[6]This is also true in the United Kingdom; net Central Government interest payments, (after taking account of interest received from loans made to local government bodies, etc.), fell from 2.9 percent of GDP in 1960/61 to 0.7 percent in 1970/71.

sensitive area or cause a publicly visible jump in rates in such sensi-
tive areas. The recent rumpus in the United Kingdom over the
possibility of Building Society mortgage rates going to 10 percent is
an excellent example of this syndrome.

If the desire to fund is not based, at least in the United Kingdom,
on cost considerations, what is its rationale? It is instead, in my view,
based on the desire to be in control of liquidity, in the driver's seat.
For example, in the bill market in the United Kingdom the authori-
ties always issue a few more bills than they predict that the market
will have the money to take up in the coming week. The short-term
market is thus normally held taut, allowing the authorities to relieve
that tension at their own discretion. Now if we move on to the
gilt-edged market, the present flow of maturities onto the market, in
conditions where the present average maturity of debt stands at 13½
years, is now on average running at around £1,700 million per
annum. The present volume of currency outstanding, plus bankers'
balances at the Bank of England, amounts to some £5,000 million
(end-December 1972). Thus the present flow of maturities each year
would, by itself, raise the monetary base by 33 percent unless
refinanced. If you halved the average maturity, you would in turn,
by and large, double the flow of maturities to be financed each year.
Far from holding the market taut, it gives a central banker a feeling
of rushing around with a mop trying to sop up floods of liquidity.
This is not a comfortable posture. Instead of us feeling that we are in
charge, able to relieve the market on our own terms, we are left with
the feeling that our ability to control either monetary aggregates, or
interest rates, or a preferred trade-off between these objectives is
weakened and made far less predictable by an overhang of short-term
debt. Now I do not want to press this argument too hard; for my
own part I find it debatable to say the least. Nevertheless I think it
true that Bank of England preferences for funding are based on
arguments of this ilk, and not on concern with variations in the
interest cost of the debt.

DISCUSSION

JOHN M. CULBERTSON*

Those who work closely with the economy have long viewed academic economics with some suspicion, if not disdain. Recently, a number of eminent economists have lent support to the qualms of these realists by arguing that in its pursuit of formal elegance and methodological refinement economics has lost touch with the realities of the economy it nominally seeks to explain.[1] If this view is merited, Nordhaus and Wallich are placed in a somewhat awkward position when they undertake to provide for our discussion here some fruits of economic theory applied to debt management. They provide, as I see it, two such pieces of fruit. One is the proposition that it is socially inefficient for short-term interest rates to be lower than long-term rates, and debt management ought to be used to level out the yield curve. The second is a set of estimates of the effects of debt management in shifting the yield curve, which are interpreted as relevant to the question, "Does debt management matter?"

I should like to suggest that these pieces of fruit ought to bear a label, indicating that they may be injurious to our health. The

---

*Professor of Economics, University of Wisconsin.

[1]In his presidential address to the Econometric Society, Frank Hahn uttered the unthinkable: "To discuss and analyze how the economy works it may be necessary to go and look." "Some Adjustment Problems," *Econometrica*, 38 (January 1970), 1-17. Other important statements of basic dissatisfaction with the methodology of recent economics are these: Nicholas Georgescu-Roegen, *The Entropy Law and the Economic Process* (Cambridge, Mass.: Harvard University Press, 1971). Kenneth E. Boulding, "Economics as a Moral Science," *American Economic Review*, 59 (March 1969), 1-12. Wassily Leontief, "Theoretical Assumptions and Nonobserved Facts," *American Economic Review*, 61 (March 1971), 1-7. G. L. S. Chackle, *Epistemics and Economics* (Cambridge, England: Cambridge University Press, 1972).

reasons for this are not the fault of Nordhaus and Wallich, but derive from those very methodological shortcomings of present-day economics about which we have recently received so many warnings.

Let us then take a look at our first piece of fruit. In recent years, a large literature in economics journals has arisen from the argument advanced by Friedman and Samuelson[2] that it is inefficient for people not to be satiated with money to hold, since additional money can be created by the government at zero social cost. Therefore, the argument runs, it would increase human happiness if interest were permitted to be paid on demand deposits, and perhaps also if stronger measures were taken to assure that the yield from holding money is no lower than that from holding investment assets. The Nordhaus-Wallich argument that short-term rates should not be lower than long-term rates involves the same line of argument.

There are, to my mind, a great many things wrong with the optimum-quantity-of-money doctrine. The one most central to our discussion is this: For people to be holding money beyond what they need for current transactions *does involve a social cost*. Under this condition, a piece of inflationary news could lead to a rapid and large increase in spending, as people used their redundant cash to finance additional expenditures, and velocity of circulation rose abruptly. Had people been holding only minimal cash balances, they would have had to finance additional spending by liquidating debt or by borrowing, and the general effort to do so would increase interest rates, reduce asset prices, and limit the inflationary upsurge.

Similarly, in the absence of an incentive to economize cash balances, those with income beyond their current spending plans would simply let cash pile up rather than putting the funds into the credit markets. When the nonspenders put unneeded funds into the credit markets, these tend to reduce interest rates and to finance someone else's spending. The financial system thus plays the role of integrating spending and saving decisions. This has the effect of dampening variation in velocity and limiting economic instability. The differential between the yield from holding debt and the zero yield from holding money provides the inducement that is required if the financial system is to perform this integrative function.

I suspect that this is the way many of you here see the role of credit markets and the financial system. When, for example, Henry Kaufman in his paper raises the question: "Who will be rationed out"

_____

[2]Milton Friedman, "The Optimum Quantity of Money," in his *The Optimum Quantity of Money and Other Essays* (Chicago: Aldine, 1969), 1-50.

of the credit market, he suggests the view that the financial system *does* ration out the ability of people to spend at any particular time, and that the volume of financing that emerges from the credit markets is defined by the volume of funds flowing into it.

But this, incidentally, is not the conception of the economy that is embodied in the prevailing economic theory or economic models. A basic point of the Keynesian revolution was that the market economy included no mechanism to integrate the decisions of savers and investors. If one person spends more, this has no tendency to cause anyone else to spend less. This is not true if the financial system functions in the way just described. Moreover, macro-economic models have not closed the financing loop and represented spending as constrained by a limited total flow of sources of financing. However, in this respect the model by Bosworth and Duesenberry seems to me an important breakthrough, indeed, an innovation of greater theoretical importance than its authors indicate. But if you take the view that the financial system works in a coherent way, and that people get rationed out of the credit markets, you are at odds with the economic theory that has prevailed, and you must not expect it to bear your kind of fruit.

So in the interpretation I am suggesting, satiating people with money to hold does involve a social cost. It basically undercuts the operation of the financial system, and makes the economy more unstable. Why is this point not noticed in the literature on the optimum quantity of money? Because this literature is formulated with reference to a hypothetical situation of equilibrium. It does not deal with the processes by which short-run variation in total spending is limited by restrictions on the availability of finance.

Let us extend this interpretation to the authors' argument that people should not economize the liquidity of their asset holdings, because the government could create additional liquidity at zero social cost. There is, we see, a social cost of additional public holdings of liquid assets, which precisely parallels the social cost of redundant cash balances and zero incentive to economize cash. It undercuts the complex logic of the financial system, and makes the economy more unstable and less controllable. This is not taken into account in the authors' interpretation because, like the optimum-quantity-of-money argument, it is posed only in terms of equilibrium analysis.

Because of the proposal's being made in an equilibrium framework, it is not clear to me what it really would involve in practice. Is the yield curve to be kept flat *all the time*? This surely would be a radical program. It is well known that interest rates generally rise

during periods of bullishness and decline during periods of economic slack, and that in these adjustments short-term rates swing over a wider range than long-term rates, rising above long-term rates during boom periods and falling below them during periods of slack. To try through debt management actions to override this characteristic behavior of credit markets would be a drastic action, the full implications of which could hardly be foreseen. What would be involved is debt management actions responding to short-run changes in economic conditions — but actions proposed not on the basis of an analysis of their effects on economic stability, but in terms of an argument relating to utility analysis within an equilibrium framework. This does not seem at all a satisfactory way of approaching the matter.

Or is the proposal that the rate structure should be flat not in each period, but *on the average over some interval of time*? If so, over what interval of time? If for a period of years short rates averaged below longs because of prevalence of economic slack and generally low rates, should they then be raised above them in order to make the average come out right? Once again, this would not be consistent with the use of debt management to avoid economic instability.

My own reaction is that this line of argument is unacceptable from its very foundations, and that the criterion of a flat-rate structure as a goal for debt management should be rejected.

The other piece of fruit I see Nordhaus and Wallich as picking for us from the tree of economics is the finding that debt management has "very little effect" on the structure of interest rates, "findings of a failure of the term structure of interest rates to react to the maturity of the public debt."

If taken literally, this finding would seem to imply that we can stop worrying about debt management, just tell the Treasury to do what it likes — so long as it goes easy on our tax dollars. But many of you may find it hard to believe that this finding can be taken seriously. It seems to imply, for one thing, that the government can take as much money as it wants out of the long-term market without even raising the long-term rate — not to mention causing a bond-market panic. Does anyone believe that?

But can such elaborate statistical studies come up with findings that are not true? There is no longer any doubt as to that. So many econometric studies have come up with so many inconsistent findings that, as a matter of logical necessity, most of them must not be true. Just why it is that the findings of regression analysis are so sensitive to details of the way the study is set up, and why it is that the relations measured by such studies are generally not causal

relations — this makes a long story that I would not try to tell here. But on the point that matters to us here, do these regression analyses provide a valid measure of the effects on economic conditions of a debt-management operation of such scale as we might want to consider under the conditions under which we might want to conduct it? My own view is that these coefficients throw no light at all on the matter. When the rationale and methodology of such studies is considered closely, it becomes clear that they should not be represented as offering a valid answer to such a question.

How then can we get some feel for what kind of debt management program we need in order to avoid economic instability? Perhaps we must fall back on trying informally to draw some lessons from past experience with the kinds of actions and events we have in mind, under the kinds of circumstances that are relevant. What actual cases can we point to in which the economy might have done much better with a different debt-management policy?

I should be very happy to benefit from the expertise of the members of this group by having their answers to this question. From what I know of the matter, two cases of unfortunate debt-management actions seem to stand out. One is the overly enthusiastic debt lengthening of the spring of 1953 — along with the overly enthusiastic talk about the overly enthusiastic debt lengthening. This caused a minor panic in the bond market and seems to have been a major cause of the recession of 1953-54.

A less obvious but more instructive and more important case is that of the early 1930s. Debt management did not cause this debacle, but a factor contributing to it was perverse liquidity developments, which a suitable debt-management policy might have prevented. After 1929 there was an unusual extinction of liquid assets because of the drying up of call loans and commercial paper, and because of the loss of time deposits and savings accounts from failures of banks and other financial institutions. The scarcity of liquid assets sent yields on them close to zero. Long-term interest rates showed no corresponding decline. It was 1934 before they finally edged below their levels of 1927-1928, when short-term rates had been up at a more normal level.

Debt management contributed to this situation. The Treasury was financing its large deficits mainly in the intermediate and long markets, and was refunding with new long-term issues a large volume of maturing World War I bonds.[3]

[3]For a more detailed expression of this interpretation, see Culbertson, "The Term Structure of Interest Rates," *Quarterly Journal of Economics*, 71 (November 1957), 485-517.

These conditions contributed to the self-feeding economic contraction of 1929-1933 in several ways:

1. The high long-term rates (and remarkably high *real* interest rates, given the rate of price-level decline) discouraged marginal investment expenditures.

2. The rise in long-term rates during the liquidity panics, and declines in bond prices, contributed to insolvency and failures of banks, which reduced the money supply and led to other bank failures.

3. The drop in short-term rates reduced incentives to the economization of money holdings, and contributed to the decline in velocity of circulation.

4. The unavailability of secondary-reserve assets led banks to hold excess reserves in their place.

5. This state of affairs was not interpreted by the Federal Reserve as reflecting a shortage of liquid assets. Rather, the excess reserves were interpreted to indicate that reserves were already redundant, or "excessive" in a literal sense, and that to provide more reserves would be harmful. Similarly, the low short-term rates were interpreted as indicating that bank credit was already redundant. Thus the conditions that actually reflected a shortage of liquid assets were interpreted rather as reflecting an excessive volume of bank reserves. This interpretation was one of the factors that underlay Federal Reserve inaction as banking panic followed banking panic and the money supply declined by one-fourth.[4]

How much better might this story have come out with a suitable debt-management program, which would have shifted government debt from the long-term to the short-term market, in this case in large volumes? That is very difficult to say, for debt management did not operate in isolation — as it never does — but in interaction with other factors. In this case, a crucial consideration is that a different debt management and structure of interest rates might have led to different Federal Reserve actions, and a much more favorable interaction process conceivably could have developed.

This episode illustrates two points that are important for our consideration of future debt management:

First, what is important is not only — perhaps not mainly — the contribution of debt management during ordinary times when rather

---

[4]The significance of this interpretation is brought out in Lester V. Chandler, "Impacts of Theory on Policy: The Early Years of the Federal Reserve," in David P. Eastburn, ed., *Men, Money, and Policy: Essays in Honor of Karl R. Bopp* (Philadelphia: Federal Reserve Bank of Philadelphia, 1970), 41-53. See also Clay J. Anderson, *A Half-Century of Federal Reserve Policymaking, 1914-1964* (Philadelphia: Federal Reserve Bank of Philadelphia, 1965).

ordinary debt management actions are being followed, but its role in unusual situations. Perhaps special attention should be given to the conduct of debt management in the face of seriously aberrant liquidity conditions.

Second, debt management is not to be interpreted in isolation, but rather as an element in the economy's liquidity system — the only element that is subject to quantitative control. Reasonable guides for debt management policy would assign it responsibility to offset untoward developments in other aspects of the economy's liquidity system.

Before we leave the topic of "lessons from experience," let me briefly make one other point. "Operation Twist" of 1961-62, so far as I can figure out, is rather like the emperor's clothes that everyone saw, even though they were not there. The Federal Reserve bought some intermediate governments, but the Treasury at that time was lengthening the debt, while the usual situation in the postwar period was one of debt shortening. The debt held by the public thus, in my understanding, was on balance being lengthened somewhat, in contrast to the pronounced shortening that had occurred in 1955-60. Nothing really happened, thus, that could have been *expected* to push short rates up and long rates down. Operation twist was an operation in rhetoric, not in actual debt management.[5] But of course government policy actions aimed largely at their public-relations effects were not a new invention of this time, and I believe there may even have been some of them recently.

To what proposal for debt management does this interpretation bring us? I would treat debt management as an aspect of a broader government liquidity policy, and would characterize my program in these five points:[6]

1. The behavior of liquid assets created by others is as important as debt management itself. Laws and regulations should be designed to guard against erratic or procyclical variation in the supply of/or demand for liquid assets. In this connection, the uncontrolled creation of debt by Federal agencies and the erratic behavior of time deposits because of government regulations are objectionable.

---

[5]On this, see Culbertson, *Macroeconomic Theory and Stabilization Policy* (New York: McGraw-Hill, 1968), 520-522.

[6]For a more detailed discussion involving most of these points, see Culbertson, "A Positive Debt Management Program," *Review of Economics and Statistics*, 61 (May 1959), 89-98.

2. In relation to the structure of government debt held by the public on the average over a period of time, it is useful to preserve an active market in government bonds as well as intermediate and short maturities in order to retain for debt management the capacity to shift in either direction should this be called for by circumstances. This consideration severely limits the government's ability to use debt management to bring about any particular average rate structure, and I should not in any case recommend such an effort.

3. In its relation to short-run variations in total demand, I should like to see debt management regularized, with modest continuous offerings of long-term securities. I think that large offerings of long-terms bunched during economic contractions or periods of economic slack are not worth the risk they involve of damaging the overall performance with anticyclical variation in debt management, particularly in a case in which, say, long-term interest rates fail to show their usual rise during an economic expansion or their usual decline during a period of deficient total demand.

4. Perhaps most important, I think we need to have, at least in our minds, a standby program for potentially vigorous action against aberrant liquidity conditions in the event — which is perhaps unlikely — that they do arise. I think this responsibility should be imposed on the administration and the Treasury Department. In any period of economic contraction or economic slack in which short-term rates drop unusually low while long-term rates remain high, the possibility should be considered that this reflects aberrant changes in the supply of or demand for liquid assets. Corrective action could involve also changes in laws and regulations, but the standby resort would be variation in the maturity structure of government securities to offset other factors and correct the damaging imbalance in the structure of financial assets.

5. Finally, since only the Treasury has the power to take actions that might need to be taken with debt management, it seems to me that the whole responsibility should be placed on the Treasury and the administration. Thus the Federal Reserve should not muddy the waters by token interventions into the debt structure.

A Flow of Funds Model

and Its Implications

BARRY BOSWORTH and JAMES S. DUESENBERRY*

I. INTRODUCTION

The events of the past few years have placed severe strains on our financial system. In 1966 and again in 1969 the stability of important types of financial institutions was called into question. The volume of net residential mortgage lending was sharply curtailed. Corporate liquidity was drawn down to dangerously low levels and commercial banks were able to accommodate their customers only by resorting to novel expedients which strained their own liquidity positions.

The cause of those strains on the system is well known. A rapid expansion of government expenditures, only partially offset by tax increases which were too little and too late, set off a boom in private investment and a demand inflation followed by a wage-price spiral. The vacillations of fiscal and monetary policy created uncertainty as to the government's ability or willingness to control inflation, and the resulting inflationary psychology fed the investment boom. This exacerbated the difficulties of controlling inflation by monetary measures.

There is little doubt that fiscal policy was the real villain of the piece. But the trials of 1966 to 1970 revealed some serious difficulties in the use of monetary policy as a stabilization instrument.

The monetary policy of 1966 played a major role in checking the boom which began in late 1965. But one of the major components of that achievement was a 50 percent decline in housing starts. There are those who would argue that such an outcome was all to the good, since housing is, after all, a durable good whose construction can be postponed with a very small percentage decline in the output of our total housing services. But few of those who make that argument would be prepared to argue for, say, an excise tax on building or any other industry which would deliberately bring about the same result.

In 1969 the Fed again pursued a severely restrictive monetary policy. The rapid expansion of mortgage financing through Federal agencies as well as the rate ceilings on time deposits reduced — though they certainly did not eliminate — the impact of monetary restraint on the housing industry. But the resulting all-out competition for funds created liquidity problems of dangerous proportions in many sectors of the market. Fortunately, the boom was over before the Penn Central crisis, but the episode again demonstrated the importance of the side effects of over-reliance on monetary policy as a stabilization instrument.

As this is written, monetary policy has again turned toward restraint; and, once again, security market participants are fearful of another crunch, while thrift institutions and home builders interpret the statistical auguries for signs of a new wave of disintermediation.

The Quest for Reform

The events of 1966 sensitized the government, the Federal Reserve System, and the financial community to the allocational side effects of monetary policy. The government responded first by establishing "temporary" ceiling rates on saving deposits, then by restructuring the Federal National Mortgage Association (FNMA) as a quasi-private institution and greatly expanding its role in the secondary mortgage market. The Housing Act of 1968 provided for a GNMA guarantee of mortgage-backed security issues. Under its new administration, the Federal Home Loan Bank Board expanded its support of the mortgage lending operations of Savings and Loan Associations. Meanwhile, in the private sector, Real Estate Investment Trusts (REITs) began to play a role in the mortgage market while thrift institutions experimented with a variety of new forms of deposit liabilities. All these changes have reduced the instability of the mortgage market, as was shown in 1969-70. Nonetheless, everyone agrees on the need for a thorough review of our financial system.

Demand for reform almost always creates its own supply of reform proposals, and the present case is no exception. Presidential commissions, congressional committees, and private parties have brought forward proposals for changes in the structure and regulations of almost every financial institution and market.[1] Some propose more severe and detailed regulation of financial institutions and markets while others would move toward decontrol and greater reliance on market competition. Some are concerned with the stability and viability of particular financial institutions, while others are concerned with the availability and cost of funds for particular purposes. Obviously, many of the reforms under consideration are mutually contradictory. One cannot have more control and less control at the same time. Proposals aimed at improving the competitive position of mortgage borrowers may be in conflict with those aimed at improving the competitive position of state and local governments.

In view of the conflicting objectives of the various reform proposals and because of the complex interactions within the financial markets, proposals for changes in financial structure and regulation cannot be evaluated one at a time or in terms of the effects of a single change in a single market. There is, of course, sufficient controversy over the direct effects of changes in the structure and regulation of individual markets. For example, how much change in the demand for savings and loan shares would result from the extension of third party transfer powers to savings and loan associations? But even when some measure of agreement on such issues is achieved it is necessary to evaluate the probable effects of a set of reform proposals in terms of interactions in a complete financial system.

The need for analysis in terms of a complete system is apparent when one considers some of the reform proposals under consideration. One of the Hunt Commission proposals would give savings and loan associations power to extend consumer credit. Extension of consumer credit by savings and loan associations could increase their average rate of return. More important, their earnings would rise more rapidly in response to increased market rates. At the same time, the change would draw some funds from the mortgage market (except to the extent that better earnings increase deposits). But the effects do not stop there. If savings and loan associations are able to

---

[1] For recent examples see *The Report of the President's Commission on Financial Structure and Regulation* (Hunt Commission), 1971; *The Report of the Commission on Mortgage Interest Rates*, 1969; and *Ways to Moderate Fluctuations in Housing Construction*, Federal Reserve Staff Study, 1972.

pay higher rates and therefore obtain more deposits, the fund flows
to other institutions will be affected. If S&Ls make consumer loans,
will the result be to increase total consumer loans or to draw business
from finance companies or commercial banks? If the latter, will
banks increase their mortgage acquisitions, bid for municipal
securities, or compete less aggressively for deposits? Whatever action
banks take will be felt in other markets. No analysis of the effects of
changed S&L powers will be complete unless it deals with the whole
system. Piecemeal analysis will only kick the problem around until it
gets lost.

A similar argument applies to proposals to give state and local
governments the option to issue taxable bonds with a federal subsidy
covering part of the interest payment. Such a proposal, if adopted,
will widen the market for municipal securities, reducing its depen-
dency on commercial banks and high income individuals. But if
insurance companies and pension funds were to buy substantial
amounts of taxable municipal securities they would presumably buy
less corporate securities. At the same time, bank funds and those of
wealthy individuals would go somewhere. The side effects of the
proposed change can only be analyzed by considering the reactions
in a whole set of closely related markets.

The same considerations apply to the composition of the Federal
debt — among maturities and between agency and Treasury
securities. Different varieties of Federal securities appeal in the first
instance to different segments of the market. Any change in the
composition of the Federal debt will have some initial effects on the
level and structure of yields. But, as the market adjusts to those
initial impacts, secondary responses may cancel out the initial impact
or shift it to still other parts of the market. Again, the net impact
requires an analysis of interactions throughout the security markets.

The Role of Financial Models

It is implicit in all of these reform proposals that financial struc-
ture makes a difference — that the effect of any action by the mone-
tary authority depends on the interaction between the central bank's
action and the complex financial structure which links the central
bank to the expenditure decisions of households, businesses, and
government. That view of things seems obvious to market partici-
pants who firmly believe that changes in the powers of financial
institutions, in their competitive relationships, or in the types of
financial instruments in use, will surely influence the cost and avail-
ability of credit to different types of borrowers.

The importance of the financial structure has been far less obvious to economists who can readily note the ways in which a structural change appearing to favor one type of borrower by its direct effects may be cancelled by its secondary effects in closely related markets. Indeed, there are many cases in which the effects of institutional gadgetry all "come out in the wash." Nonetheless, economists have been giving increasing recognition to the importance of structural arrangements which transfer risk from risk-averse wealth holders to those who are less risk averse or to those who eliminate risk through pooling. At the same time, economic theorists have been giving increasing recognition to the role of transactions costs and the cost of obtaining information, factors which can be significantly affected by the institutional structure. Thus theorists and practitioners agree that monetary policy does not work directly but has its influence through its effects on the financial system on which central bank actions first impinge.

As we have already noted, our understanding of the underlying nature of financial processes has been greatly enriched by the development of portfolio theory by Markowitz, Tobin, Lintner, and others. At the same time, Shaw and Gurley and numerous others have shown how change in the process of intermediation can influence the level and structure of interest rates. These theoretical analyses have stimulated a great deal of empirical work on the portfolio behavior of various types of financial institutions, businesses, and households.

Many of these strands of theoretical and empirical work can be brought together in an econometric model of the financial system. Theoretical work on the behavior of individual households, firms, and financial institutions guides the empirical analysis of the behavior of individual units. The results of that research in turn guide the formation of empirical hypotheses about the aggregate behavior of sectors of the financial system. At the same time, the theoretical models of the whole system control the structure of a model which will reflect the interactions among the sectors.

A great deal of progress in building up the various strands of theoretical and empirical work has been made by the builders of financial models — particularly the Fed-MIT-Penn consortium. Starting with an empirical version of the Keynesian theory of interest rates in which a single interest rate is determined by the supply and demand for money the financial models have been gradually expanded. The supply of money has been made endogenous and in the process a more realistic and complete treatment of the commercial banking system has been introduced into the models. In recognition

of the special characteristics of the mortgage markets, the more recent versions of the Fed-MIT-Penn model include a very elaborate treatment of the mortgage market and the thrift institutions.

Yet much remains to be done. The models presently in use still begin with a Keynesian supply and demand for money approach to interest-rate determination. The multiplicity of existing interest rates then is dealt with by subsidiary equations of the term-structure type — homogenizing the security markets into a single bond market. For Keynes that was a very ingenious simplification and it is useful in empirical models which are meant to be simple and compact. But once we embark on the task of giving a detailed treatment of the structure of the financial system, there is a strong case for building a model which starts from the beginning with a clearing of markets of particular types of securities. The model presented here follows that approach.

The need for a model which deals directly and explicitly with the supply and demand for specific types of securities is also emphasized by the problems which arise in the evaluation of the variety of reform proposals now under discussion. The model presented here has been developed to facilitate the analysis of the effects of a variety of proposed changes similar to the ones sketched out in the previous section. The model deals explicitly with the market-clearing process for a number of different types of financial assets. It is based on the flow-of-funds data and uses a "flow-of-funds" approach but with a considerable consolidation. Of course, flows of funds include not only the disposition of the current surpluses and deficits of spending units but also the shifts of assets and liabilities among sectors arising out of the reallocation of existing portfolios. But to provide meaningful control totals and to emphasize the link between the "real sector" and the financial sector, the model is linked to the national income accounts framework by incorporating NIA surpluses and deficits of the sectors as the basic measure of net claims on the capital market. Finally, the model provides a simplified analytical framework for examining the allocation of credit among potential users.

The reader who is familar with other financial models will note a number of points at which our model differs from the ones now in use. First, the model is organized in terms of the supply and demand balance for particular types of securities. If financial structure makes a difference, it must do so, we believe, either by affecting interest rates in particular markets or by affecting the extent of credit ration-ing in those markets. In either case, structural changes will exert their

influence through their effects on the supply or demand for different types of securities. The alternative approach used in some other models is to organize the model in terms of the supply and demand for money and a term and risk structure approach to interest-rate differentials. Other factors can be grafted onto the framework of the term-structure equations where necessary. That approach avoids some of the problems posed by weaknesses in the data base and for certain purposes can be very useful. But for our purposes, it is not satisfactory because it does not show explicitly how structural changes such as those outlined above affect particular markets.

Second, our special interest in short-run cyclical changes has led us to give considerable empahsis to the dynamic effects of short-run changes in the flows of funds arising from the sector surpluses and deficits. In the longer run, the relative stocks of different kinds of assets and liabilities play a dominant role in determining interest rates. But the flows assume relatively greater importance in short-run cyclical changes.

In the following sections of this paper some of the implications which follow from a flow-of-funds analysis of the financial system are examined in greater detail. The distinction between a money-market model and a bond-market model is the topic of the following section. The choice between these two approaches does not involve differences in interpretation of the basic monetary theory. Rather they are different views of the same financial mechanism. The primary issue in choosing between the two approaches hinges upon the extent to which financial assets other than money can be homogenized into one asset, "bonds."

The importance of the distinction between the stocks of financial assets outstanding and their rate of flow through the markets is examined in section three. The general model of portfolio balance is modified in order to include elements which reflect current flows of savings and investment behavioral response lags, and the use of liquid asset stocks as a buffer against unanticipated changes in income and expenditures.

A summary outline of our model of the credit markets is given in section four. The model is based on a consolidation of the Flow-of-Funds as currently published by the Board of Governors of the Federal Reserve System. This section includes a brief description of the major market participants and financial instruments which are treated explicitly in the model. The following section five outlines the general considerations which guided the specification of the individual equations. In section six, several individual sectors which are of special interest are discussed in greater detail. A complete list of all the equations of the model is provided in Appendix B.

The concluding section discusses some illustrative simulation results from the model. Multiplier responses to changes in government expenditures and unborrowed reserves are presented as simplified measures of the implied effectiveness of monetary and fiscal policy. A FNMA purchase of residential mortgages in exchange for increased issues of government securities is examined as illustrative of a policy change which is contained completely within the market for "bonds."

II. MONEY-MARKET MODELS AND BOND-MARKET MODELS

In spite of the great progress in monetary theory made in the past 35 years, financial models are still based on an admittedly simplified theoretical approach developed by Keynes in the *General Theory*. The basic theme of the monetary argument in the *General Theory* is the proposition that — at least in the short run — interest rates are determined by financial factors, not by the underlying forces of productivity and thrift.[2] To support that point, he developed a simplified and rather ad hoc type of portfolio theory to show that there is a demand for money to hold as a more permanent asset in addition to the traditionally recognized inventory or transactions demand. Further, the amount of money demanded for this "speculative" purpose would, Keynes argued, vary with the level of interest rates, with expectations of future changes in rates, and with the certainty with which they are held. The special form of the argument used by Keynes has long been discarded but in the more general form developed by Tobin, the same conclusions hold. The upshot was to cast money in the role of a diluter of risk — not only the risk of change in bond prices but of any type of risk associated with asset holdings.

In presenting his theory, Keynes emphasized his departure from prior approaches by arguing that the interest rate is determined in such a way as to equate supply and demand for money rather than, as in traditional theory, the level required to equate savings with investment. Keynes' money argument was based on the assumption that only two assets are to be considered — money and bonds. In that case it is equally true that the equilibrium interest rate can be said to clear the market for money and that the same equilibrium

[2]In the long run, of course, the forces of productivity and thrift emphasized in neoclassical literature must significantly influence, if not uniquely determine, the movement of the real rate of interest while the nominal rate of interest will be moved by expectations of inflation as well as by the forces determining the real rate.

rate clears the market for bonds. Keynes could have expressed his theory in terms of the supply and demand for bonds just as well as in terms of the supply and demand for money. He chose the other route in order to emphasize the difference between his theory and its predecessors.

Since the appearance of the *General Theory* there has been a rapid development of monetary theory which has served to enrich and generalize the Keynesian approach while still leaving its fundamental ideas intact. The theory of liquidity preference has been through the work of Markowitz, Tobin, Lintner, and others — made part of a more general portfolio theory grounded on the general theory of household and firm behavior. The economics of the transaction component has been extensively developed from the inventory theory based provided by Tobin and Baumol. The endogenous elements of money supply have been recognized. Finally, it has been recognized that the "risk dilution" function of money can also be performed by other liquid assets including all kinds of time and savings deposits. The demand for money depends on time deposit rates as well as on the yields of marketable securities. None of these developments pose any real difficulty for the original Keynesian theory. It is more complicated but still usable.

But the original theory can only be used if we are content to combine all the securities into one aggregate called bonds. Then a set of equations for the supply and demand of money will determine "the interest rate" on those bonds. But which interest rate? With some violence to the facts all long securities may be combined and the rate spreads between them explained by risk differentials. Similarly, all short securities can be combined. But the long and short securities cannot be readily combined and rate spreads between them vary greatly. A solution commonly used has been to introduce a theory of term structure in which current long rates are determined by moving averages of past rates. The Keynesian theory can then be applied to determine the current short rate. In effect, term and risk differentials are used to homogenize all the different securities so that they can be treated like Keynes' "bonds." This is a formally acceptable solution.

But whether it is an empirically acceptable solution depends upon the empirical acceptability of the hypothesis underlying the "homogenization" of the many different types of marketable securities. If it is not valid then it is necessary to use models which clear the markets for different types of securities explicitly. The formal relations between the two approaches can be clarified by considering a simple model.

This illustration limits the number of financial assets to four: money (M), deposits (D), short-term marketable securities (S), and long-term securities (L). There are three actors: households as net savers (H), a financial intermediary (I), and a security-issuing business sector (B). Net household financial wealth (W_H) and net business debt (W_B) are predetermined by the savings and investment flows of the real sector.[3] The three balance sheets can be expressed in equation form as:

(1) $W_H = M_H + D_H + S_H + L_H$ (4) $S_B = S_I + S_H$

(2) $M + D_H = R + S_I + L_I$ (5) $L_B = L_I + L_H$

(3) $W_B + M_B = S_B + L_B$ (6) $M = M_H + M_B$

The exogenous variables of the system are W_B and bank reserves, R. Household wealth (W_H) is, of course, identically equal to the sum of those two items. The system contains four supply and demand markets but only three rates, deposits, short-term securities and long-term securities since the yield on money is zero. Because of the balance sheet constraint each sector can have at most three independent demand (or supply) equations — the sector's fourth demand (or supply) equation being deducible from the other three and the balance sheet constraint. That consideration makes it possible to analyze a set of equations containing a given set of propositions about sector portfolio behavior in a number of different ways. In the present case the straightforward approach would be to start with explicit equations for the demand and supply of long and short securities. Thus we could write:

(1) $S_H = F_{SH}(r_S, r_L, r_D) (W_B + R)$

(2) $L_H = F_{LH}(r_S, r_L, r_D) (W_B + R)$

(3) $D_H = F_{DH}(r_S, r_L, r_D) (W_B + R)$

(4) $S_B = F_{SB}(r_S, r_L) W_B$

(5) $L_B = F_{LB}(r_S, r_L) W_B$

(6) $L_I = F_{LI}(r_S, r_L, r_H, R)$

(7) $L_I = F_{LI}(r_S, r_L, r_H, R)$

(8) $r_D = F (r_S, r_L)$

---

[3]This illustration ignores the redistributive effect of capital gains and losses on outstanding securities.

Substituting equation 8 into equations 1 through 3 and substituting the resulting 3A into 6 and 7, we obtain a set of equations for household and bank demand for long and short securities. Adding these and equating to the corresponding business supply equations, we obtain the equilibrium long and short rates. Substitution back into the quantity equation yields the equilibrium quantities of securities, deposits, and money. In this approach no use is made of the demand for money equations; and the supply of money is obtained by determination of bank assets, time deposit liabilities, and use of the bank balance sheet identity.

Without changing the substance of the solution in any way, it would also be possible to eliminate the equations for short securities and replace them by introducing the money demand (supply) equations. Such a substitution would have no substantive significance since the new equations would contain exactly the same information as the other set. However, the possibility of suppressing some security market equations and replacing them with money market equations leads directly to the further consolidation of the whole system into a one-bond market model.

Suppose we accept a strong term structure hypothesis of the form $r_L = \sum_{i=0}^{\infty} a_i r_{t-i}$. The hypothesis implies that for some substantial number of market participansts long and short securities are perfect substitutes. The net demand curve for long-term bonds will have a flat range at $r_L = \sum a_i r_{st-i}$. The number (weighted by wealth) of participants who regard long and short securities as perfect substitutes must be large enough to insure that the net demand curve will cross zero in the flat range.

In that case, since long and short securities are effectively perfect substitutes, they may be aggregated. After appropriate substitutions to eliminate deposits from the sytem we are left with a model in which we have a supply equation and a demand equation for bonds. On equating these, we obtain the equilibrium short rate. We can then substitute back to determine the long rate, the deposit rate, and the other quantities in the system. In this procedure, of course, the money supply and demand functions are reduced out.

Alternatively we can drop the bond equation and obtain the short rate directly from the money demand equation (after making the term structure substitutions to eliminate the long rate). These substitutions will, of course, make the money demand (supply) functions reflect the perfect substitutability of the long and short bonds. The latter procedure is the one implicitly used in models which use a supply and demand for money plus term-structure approach.

In summary three types of models can be distinguished: (1) a pure securities market model in which the demand and supply for money equations are dropped; (2) an intermediate model which uses a supply and demand for money equation in place of the corresponding equation for short securities but retains explicit treatment of other security markets; and (3) a money-market model which closes the market for money explicitly but homogenizes all securities by term- and risk-structure equations.[4]

The choice between the first two does not depend on issues concerning substantive hypotheses. An explicit short securities market approach enables the model builder to use more information and to determine in more detail the interaction between markets — particularly short security markets and time and savings deposit markets — but uses a data base which is somewhat weaker in the aggregate than the money market alternative. Accordingly to the purpose for which the model is to be used, a case can be made for either alternative.

More fundamental issues are at stake in the choice between either of the first two alternatives and the third. As noted earlier, the validity of the pure money-market model depends upon the validity of the homogenization process which permits the use of Keynes' money versus bonds approach. In effect, the homogenization process assumes that relative yields on different types of securities are independent of the relative quantities of those securities outstanding. That proposition has been debated intermittently for many years in connection with debates over the term structure of interest rates; but the same considerations which enter into the term structure argument apply in the case of different types of securities of the same maturity — corporate bonds versus tax — exempt securities and mortgages, or different grades of bonds.

It is not necessary to repeat here all the argumentation of the term-structure dispute, but it is worth noting that the "expectation" approach to the theory of term structure appears to be inconsistent with the implications of the portfolio-balance theory. In principle at least the relative quantitites of the different types of securities which have to be absorbed by the market participants should make a difference. At the same time, it is also true that expectations of future rates should exert an important influence on current rates. It is an empirical question therefore whether one or the other of these forces plays a dominant role or whether both play a significant role in the

---

[4]In principle one can also construct a model using the money demand equation and the short security equation. But since in practice there are several distinct long markets, the implicit treatment of these would have little analytical value or convenience.

rate determination. But the models which implicitly homogenized all marketable securities in order to determine the "interest rate" by equating the supply and demand for money are valid if and only if the expectations factor dominates all other factors in the term structure, and if and only if an analogous treatment of risk differentials applies to different securities of the same maturity.

Beyond those general considerations a number of specific institutional considerations suggests the importance of designing financial models which treat explicitly the market clearing processes for a number of different types of securities. The notion that all securities can be homogenized so that it makes no difference whether a given wealth total consists of long or short government debt, equities, corporate bonds, business or consumer bank debt, or municipal bonds seems inconsistent with the well-known specialization of institutional demand. Thrift institutions specialize in mortgages, insurance companies in corporate bonds, banks in business loans and municipal bonds. Competition between institutions as well as marginal shifts in the composition of their portfolios do serve to link up the different markets. But to say that the markets for different types of securities are not water-tight compartments is not to say that securities can be treated as completely homogenous or that factors making for portfolio specialization can be ignored.

Our model, therefore, is one which includes a number of separate but closely related markets. In each case we have tried to identify supply and demand factors separately. To the extent that two types of securities are very close substitutes in some portfolios, this should show up in the coefficients on the rate differential in the demand functions. Similarly, expectational variables are included; and, if they play a dominant role, they will be reflected in the equations. Thus, the homogeneity of different types of securities can assert itself if it is there, but it is not assumed in advance. On the other hand, if institutional factors are relevant, it will be possible to see what role they play and to make a reasonable assessment of the effects of institutional change.

III. STOCKS AND FLOWS

The foundation of modern financial analysis is the theory of portfolio balance. Most portfolio theorists agree that the households and firms (financial and nonfinancial) with whom we are concerned are ultimately interested in the composition of their total portfolio of assets and liabilities. The purchases and sales of assets which generate

"flows of funds" are only means to the end of achieving optimal portfolios. The flows of asset transactions are not (except to brokers) ends in themselves. Any model of financial behavior must be based upon the theory, or a theory, of portfolio optimization for the actors in the system. Our model is no exception to that rule. All of our sector demand equations contain terms which are intended to reflect long-run shifts in the allocation of wealth in response to changes in relative yields of assets.

However, we have found it necessary to include elements reflecting the current flows of savings and investments to a greater extent than one might expect from the overwhelming emphasis on the relative stocks of assets and liabilities in the theoretical literature. Indeed, we have arranged the model so as to use the sector savings and investment balances as control totals. Since saving necessarily equals investment ex post, the total volume of savings and investment is not of great significance but for reasons given below, short-run shifts in the sectoral balances of savings and investment can cause significant disturbances in financial markets and relative interest rates. The current flow elements in the system become significant because of the presence of what used to be called frictions in the system, i.e., from transactions costs, and information collection and processing costs not recognized in the pure static theory of portfolio balance.

In a frictionless world in which all portfolios are kept continuously in equilibrium, flows of savings and investment appear in the determination of interest rates only in very indirect ways. The interest rates and asset prices are determined at every moment by the relative stocks of assets, the risk return preferences of households and firms (financial and nonfinancial), and the institutional factors which influence the operations of intermediaries. Of course, the relative stock of money or bank reserves is one of the important determinants of the outcome. In addition, savings and investment flows can be regarded as instantaneous rates of growth of asset stocks and thus their cumulative values influence the movement of asset prices and yields over time. But given the stocks of assets at time T, the rates of savings and investments at that moment do not influence directly the asset prices and yields. Savings and investment decisions may influence the outcome through their influence on income and thereby on the income streams generated by assets and through the resulting changes and transactions demand for money or the increase in the value of equities relative to fixed income assets. But a poor investment outlook and a low propensity to save can generate the

same income as a strong investment outlook and a high propensity to save. At any given moment, the income effect counts, the rates of accumulation do not (though in the long run different rates of asset accumulation will matter).

That proposition was in the center of Keynes' argument though he did not, of course, make much reference to the growth aspect of his analysis since he was interested in a very short-run analysis.

In his model of interest-rate determination saving and investment appear only through the influence of the position of the MEC schedule and the propensity of save on income and thereby on the transactions demand for money.[5] That treatment of the role of savings and investment appeared startling at the time and produced a rapid flow (cumulating to a large stock) of literature on liquidity preference versus loanable funds. After several rounds, it appears that Keynes finally agreed that variations in savings and investment flows might cause some transitory frictions which he regarded as relatively unimportant.

In fact, however, in his anxiety to overturn the traditional interest-rate analysis, which turned on the role of the interest rate in equating savings and investment flows, Keynes went too far in de-emphasizing the significance of the disturbances created by short-run variations in sector savings and investment balances. The fact that the disturbances have no effect in a frictionless world does not entitle us to ignore this effect in the real world — particularly when we are concerned with short-run cyclical phenomena.

In addition, most portfolio theorists agree that wealth holders respond only gradually to changes in asset yields which change the optimal allocation of their portfolio. The response lag is usually attributed to the transactions costs, and the costs of obtaining information. In portfolio equations, it is usually assumed that portfolio holders act to eliminate, in each time period, some fraction of the discrepancy between their actual portfolio and the optimal portfolio for the current asset yields.

The adjustment lags have the effect, of course, of reducing the short-run elasticity of demand for any asset (with respect to asset-yield differentials) to a fraction of its long-run value. Conversely, the amount of a given change in yield differentials required for short-period adjustment to a change in the composition of wealth is greatly magnified by portfolio adjustment lags. That consideration is in itself sufficient to justify our greater concern with short-period changes in

---

[5]The wealth effects of income and interest-rate changes could have been incorporated into the model without much difficulty but Keynes neglected these.

the composition of savings and investment flows than would be warranted in a frictionless world. However, that general argument is greatly strengthened by some more specific aspects of our financial markets and institutions.

The balance between the flows and receipts of expenditures for individual households and firms is constantly shifting for a variety of reasons. Some of these shifts are anticipated by the households or firms in question, others are surprises — pleasant and otherwise. In either case most households and firms expect frequent shifts from a net inflow of funds to a net outflow and back again. The literature on the transactions demand for money shows that rational spending units will find it economical to hold an average cash balance — sacrificing interest income — in order to avoid the transactions costs of shifting in and out of income-yielding assets to adjust to surpluses and deficits arising from its nonfinancial operations.

Precisely analogous argument shows that it pays to hold an average balance in non-money liquid assets, e.g., time and savings deposits and short-term marketable securities. The optimum amount and composition of such balances will depend on the transactions costs for acquisitions and withdrawals from various kinds of assets, on the scale of operation of the spending unit and on the variability of its surpluses and deficits. For businesses a rather similar argument applies on the liability side to the choice between financing deficits by issuance of long-term securities or by bank borrowing and commercial paper.

Because of these transactions considerations, any portfolio model will reflect the fact that households will hold more liquid assets in their portfolios (at any given set of interest rates) than would be the case if liquid assets were held only for risk dilution purpose.

These considerations apply to the average amounts or proportions of liquid assets and short-term debts in portfolios. But to the extent that liquid assets and liabilities are actually used to *buffer* short-run movements in the surplus or deficit (on nonfinancial accounts) of households and firms, changes in those surpluses and deficits will be reflected in the rate of flow of funds into and out of various types of liquid assets. Many of these shifts cancel out within sectors but cyclical changes in nonfinancial activity are reflected in intersectoral shifts in the composition of surpluses and deficits. Different sectors buffer these shifts in their financial position in different ways. Consequently short-run changes in surpluses and deficits are reflected in changes in the flows of funds into and out of different financial markets. Our model indicates that changes in the savings of house-

holds are reflected initially in nearly equivalent changes in the flow of funds into currency and various kinds of deposits.[6] Nonfinancial corporations adjust to short-run flows through sales of liquid assets, bank borrowing, and commercial paper issues. Banks in turn adjust to an imbalance between loan demand and the inflow from demand deposits and consumer time deposits by the sale of liquid assets, variations in free reserves, and more aggressive placement of negotiable CDs. The Federal government —a big swinger in the surplus and deficit world — tends to adjust its position largely through short security issues.

In the short run therefore the composition of surpluses and deficits among the different sectors of the economy can have considerable influence on short-term interest rates and on the flow of funds through the different types of financial intermediaries. This, in turn, has significant implications for the markets for mortgages and municipal securities. Over somewhat longer periods the cumulative composition of surpluses and deficits among the sectors can have significant influence on the term structure of interest rates because of the low (or moderate) run elasticities implied by the stock adjustment process. Our model is keyed to the sector surpluses and deficits in order to bring out these effects as clearly as possible.

IV. THE STRUCTURE OF THE FINANCIAL MODEL

Unlike most existing models of the financial process, the present model reflects a primary concern with the savings-investment function of the financial system. thus, it begins with the sector surpluses and deficits of the national income accounts. The model itself can be viewed as an elaboration of this basic savings and investment accounting identity. In the absence of valuation problems, these income flows are measures of the net increment to financial assets and liabilities for each individual sector. The treatment of these sector surpluses or deficits implies that the underlying income and investment flows are predetermined for purposes of this financial sector model.

They are, of course, endogenous elements of a complete income-expenditure model. We are mainly concerned here with the financial system but in order to conduct simulation experiments which take account of the mutual feedbacks between the financial system and

---

[6]If the flows are not quickly reversed, the resulting portfolio imbalance is gradually eliminated by a stock adjustment process which shifts households into other asset forms.

the income-expenditure system, we have constructed an aggregate-demand model. Although it is, by today's standards, a relatively compact model (85 equations), it follows the outlines of the widely known large-scale models. The model includes expenditure equations for all the sectors whose surpluses and deficits appear in the financial model. It also, of course, provides equations which determine the intersectoral distribution of income. Finally, it contains 25 equations for determination of wage and price-level changes. Because the aggregate-demand model contains no important new wrinkles, we shall not discuss it in detail here but turn at once to the structure of the financial model.

The savings-investment identity which provides the basic organizational framework of the financial model is shown in equation (1). Five major sectors are recognized and the classification of each as a deficit or surplus sector is simply one of expositional ease. The deficits of business, Federal Government, state and local governments, and the foreign sector are equivalent to household savings plus the statistical discrepancy.

$$(1) \; DEFB + DEFGF + DEFGSL + DEFFOR - SURH - STAT = 0$$

The definition of each sector's deficit in terms of National Income Account items is shown in Table 1. There are some minor divergencies from the accounts which are spelled out at the bottom of the table. The most important of these is the division of residential construction and capital consumption allowances between business and households, and the inclusion of foreign direct investment and profit repayments as nonfinancial flows of the business sector. As a result of this method of relating the financial and real sectors, the present model of the financial sector is fully consistent in its basic approach to most existing income-expenditure models and analytical results can be carried over from one to the other.

In its treatment of financial assets and liabilities, the model follows the general structure of the Flow-of-Funds Accounts. However, the present structure of the accounts is too large and complex to provide a useful summary framework for examining the allocation of credit. Without aggregation any financial model quickly founders in a sea of different assets and institutions. The present model reflects our attempts to obtain a strategic simplification of the credit markets; and it is intended to be illustrative of an underlying framework for evaluating a wide range of different issues.

TABLE I

SOURCES AND USES OF FUNDS BY SECTOR
(LINKING THE REAL AND FINANCIAL SECTORS)

Business Sector Deficit		30.4
Gross domestic investment[1]	117.5	
Direct foreign investment[2]	3.6	
less: Retained earnings	15.4	
Foreign branch profits[2]	2.3	
Inventory valuation adjustment	—4.4	
Capital consumption allowances[1]	77.4	
Federal Government Deficit		12.9
Total expenditures	204.5	
less: Total revenue	191.6	
State and Local Deficit[3]		3.9
Total expenditures	132.1	
Retirement credit to households	6.8	
less: Total revenue	135.0	
Foreign Deficit		—.9
Exports	62.9	
Foreign branch profits[2]	2.3	
less: Imports	59.3	
Transfers from U.S.	3.2	
Direct foreign investment	3.6	
Household Surplus[4]		51.0
Disposable income	689.5	
Retirement credit from S & L governments	6.8	
Capital consumption allowances	9.0	
less: Personal outlays	634.7	
Residential home purchases	19.6	
Statistical Discrepancy (NIA)		—4.7

[1] Excludes component of residential investment and depreciation attributed to household sector.

[2] Included herein but not in NIA definitions.

[3] Differs from NIA definitions by inclusion of pension fund payments to established funds as an expenditure.

[4] See footnotes (1) and (3).

Sources: Tables 4, 6, 10, 12, 13, and 14 of National Income and Product tables, *Survey of Current Business,* April, 1972; and Table 1 of Flow of Funds, 4th Quarter 1971.

Asset Categories

The model differentiates among four major categories of financial assets: deposit accounts, negotiated loans, liquid marketable securities, and income-yielding long-term market assets.

Deposits Accounts include demand and time deposits at commercial banks, saving and loan shares, savings bank deposits, and life insurance company reserves. Their most distinguishing characteristics as an asset are a high degree of liquidity and the absence of any risk of capital gains and losses. The yields on these assets, while competitive in the long run, display far less cyclical variation than yields on marketable securities. Second, they represent the major portion of the liabilities of those financial intermediaries whose investment policies differ substantially from those of their depositors. Thus, for example, the allocation of household assets between deposit accounts and other instruments will be shown to be of primary importance to the mortgage market.

Negotiated loans include consumer credit, residential mortgages, and bank loans to business. These instruments are characterized by very limited liquidity because of the absence of a developed resale market. They are dominated by the institutions on the lending side; and the equilibrating of demand and supply in the short run is heavily influenced by nonrate factors such as credit rationing, institutional rigidities, and government regulations. Negotiated loans are not in most cases general-purpose financial instruments; and the portfolio selection model, used for other assets and liabilities, is frequently inappropriate for both demand and supply.

Liquid Marketable Securities include short-term U.S. government securities, commercial paper, and short-term state and local debt.[7] These assets are characterized by very substantial short-run variations in the volume outstanding and in their distribution among types of

[7]The definition of liquid U.S. government securities is somewhat unconventional in that it includes all agency issues and marketable debt under five years. The five-year cutoff was used instead of one year because of a substantial volume of transactions in securities in excess of one year. The intermediate-term securities also are held in substantial volume by sectors such as business which we would normally expect to have primarily a liquidity interest in financial assets. These factors implied that the one- to five-year securities are viewed as a highly-liquid investment. There is also a statistical problem of sharply defining the cutoff at one year. With so much movement between one year and over within individual sectors, it was virtually impossible to estimate a stable demand function that could distinguish between a one- and a two-year security. The series actually includes all securities under four years and a linearly declining proportion of those from four to six years. The procedure was followed in an attempt to eliminate the sudden shifts in the data resulting from the simple aging by which a long-term security on one day suddenly becomes a short-term security on the next.

holders, and together with deposits provide the major source of liquidity. Since liquid assets are useful primarily as a buffer against unanticipated future payments, the pattern of such holdings will be heavily influenced by short-run flow disturbances.

The category of income-yielding *long-term financial assets* includes U.S. bonds, corporate bonds and stocks, commercial mortgages, and state and local bonds. Unlike negotiated loans, these securities are frequently traded in impersonal competitive markets. On average, they provide a yield substantially above that of liquid assets, but only at the risk of substantial short-run capital gains and losses. The decision to hold such securities is dominated by income consider-ations of relative yield and risk.

Although these securities can be distinguished on the supply side by issuing sector, they are highly substitutable for each other from the viewpoint of the marginal purchaser. As a result, the observed market-clearing rates are highly colinear with each other and its is difficult to estimate stable demand functions. In general, because of this high degree of substitution, we find a limited economic interest in the composition of these asset holdings by an individual investor class. However, at some stages in the model it is of interest to separ-ate out one or more of these assets (e.g., municipal bonds) for special treatment.

The above classification does leave a residual category of financial assets. The residual group combines a large number of relatively minor items, the most significant of which are trade credit, unallo-cated assets, and the statistical discrepancies between the National Income Accounts' measures of sector deficits or surpluses and those of the Flow-of-Funds Accounts. These assets are characterized by the lack of a measured market-clearing price which could be used to estimate market demand and supply functions.

In the introductory section, we indicated that the lack of a homogenous security market provided a primary rationale for examining the behavior of the bond market rather than simply the demand and supply of money balances. The above asset classification is intended to reflect the major areas among which the lack of homogeneity is of greatest interest. The usual portfolio selection model of financial analysis is most appropriate in the market for long-term marketable securities when relative yield and risk are of primary concern. The demand for liquid marketable securities, how-ever, is heavily influenced by the magnitude of actual and anticipated variations in receipts and expenditures. Deposit accounts are of special interest because of the restricted nature of the investment

decision of the financial intermediaries. The negotiated-loan markets are deserving of special treatment because of the importance of credit rationing, regulations, and institutional market practices.

Financial Market Participants

In addition to the five categories of ultimate savers and investors discussed earlier, the model has been expanded to include the activities of four financial intermediaries: commercial banks, savings and loan associations, savings banks, and life insurance companies. The model could obviously be enlarged to include others such as pension funds, other insurance, or credit unions. However, at present these institutions either are not large enough to affect seriously the model or have asset structures similar enough to those of the holders of their liabilities so as not to seriously influence the performance of the model.

The four financial intermediaries that are identified specifically are of particular importance in the markets for negotiated loans. For example, they account for over 80 percent of residential mortgage loans, and commercial banks dominate the markets for short-term business and consumer loans. These intermediaries also are strongly influenced by Federal regulations on portfolio composition, both assets and liabilities, and restrictions on offered interest rates. The regulations governing commercial-bank behavior are a major element of the mechanism by which monetary policy changes are transmitted throughout the financial system.

The resulting financial model is composed of a set of demand and supply equations for each of the major asset categories disaggregated among five nonfinancial sectors and four financial institutions. Since not every sector is active in each market and because they usually appear only as a supplier or demander of funds, the actual number of equations is substantially less than the number of cells implied by the full matrix of financial assets and participants.

V. BEHAVIOR OF INDIVIDUAL ECONOMIC UNITS

An individual economic unit must make a large number of choices in adjusting its balance sheet to changes in net worth, interest rates, investment opportunities, and other factors. This decision process is too complex to be fully considered within a small statistical model, which is to be applied to aggregate time-series data. In order to obtain useful results within the confines of the available data, some

simplifying assumptions must be made in order to focus on those aspects of major economic interest. We have followed a practice of grouping alternatives into broad sets of similar choices which are viewed as part of a recursive decision-making process of moving from the large to the small. For example, the individual consumer is viewed as making an initial allocation of his current wealth between current consumption, investment in physical assets, and investment in financial assets. The allocation among alternative choices within these major groups is viewed as a subsequent stage of the decision process. Our primary concern is with the secondary step of allocating net financial wealth among alternative financial assets and liabilities. But here, too, the approach remains quite aggregative.

The Determinants of Desired Stocks

The formulation of the demand for and supply of individual financial assets or set of financial assets draws heavily on the model of portfolio selection developed by Markowitz, Tobin, and others. According to this view, the demand for a specific financial asset.is a demand for a desired *stock* of the asset in question rather than a flow rate of purchase. Thus, the demand of an individual investor is constrained by his net financial wealth.[8]

Individual assets and classes of assets are distinguished on the basis of relative yields, risks, and liquidity. The demand functions of individual actors in the financial markets differ in terms of the amount and composition of their real wealth, their "tastes" with respect to yield, risk, and liquidity, and in some cases legal constraints (e.g., the reserve identity for commercial banks, portfolio restrictions on savings and loan associations).

A direct measure is available only for the yield aspect of most assets. Since this is the current market rate, it is not the expected yield actually called for. This shortcoming is particularly important for long-term marketable securities where the capital gain or loss component may be a major part of the yield.

But the data problem is even more severe for risk and liquidity where no direct measures are available. In cross-sectional analysis, where the emphasis is on explaining why asset structures of individual investor portfolios differ, the standard deviation of observed

[8]In these works, the mean and standard deviation of a subjectively determined probability distribution are used to measure the yield and risk associated with a financial asset. This simplification provides strong conclusions with regard to the pattern of optimal portfolio selection, in particular that the overall utility of the portfolio will be increased by diversification.

yields is a frequently used measure of risk. But risk is a difficult concept to quantify within a time-series model. The problem is complicated by the need to distinguish changes in relative rather than overall risk.

The present model incorporates risk and liquidity primarily as constant characteristics of an asset. Thus, they served as major criteria in the classification of individual assets and liabilities among different categories such as deposit accounts, liquid marketable securities, and long-term assets. Investor "tastes" for risk and liquidity then are implicitly reflected in the functions determining the behavior of these groups. Since a concept similar to the interest rate is not available to measure the return or benefits derived from liquidity or low risk, they may also be represented by the ratio of existing liquid (or risky) asset holdings relative to net wealth. To the extent that assets can be classified into categories of liquidity and risk, these compositional variables (e.g., the ratio of liquid assets to net worth) may reflect implicit costs and benefits to the investor of risk and liquidity. This implicit return aspect is a major behavioral rationale for the inclusion of existing stocks of other asset groups in the individual asset-demand equations.

Short-Run Adjustments

While the factors of relative yield, risk, and liquidity may provide an adequate explanation for long-run patterns of portfolio composition, they are but part of the explanation of short-run market patterns. First, investors cannot be expected to adjust their actual stocks instantaneously. Investor inertia, transactions costs, and uncertainty are all contributing factors. In addition, many securities do not have ready resale markets and a complete adjustment must await the maturing of existing claims. Legal regulations may also hamper the adjustment process. Examples of this type are ceiling limits on deposit rates and restrictions of either a maximum or minimum nature on the proportion of an institution's portfolio which may be represented by a specific asset. These elements at times may impart an element of discontinuity to individual demand and supply curves.

Second, the long-run stock analysis must be modified to allow for numerous short-term flow disturbances. In particular, liquid asset positions are dominated by unanticipated fluctuations in the real income flows against which they are designed to provide a buffer. Cyclical changes in retained earnings, inventory investment, and unpaid tax liabilities are some of the more obvious examples within the

business sector. The financial intermediaries are also faced with unanticipated changes in deposits and loan demand which must be matched by compensatory changes in other assets or liabilities.

Summary Form of the Typical Equation

In summary, the basic behavioral assumption that underlies the individual equation is one of portfolio selection whereby the individual actor tries to align the distribution of the stocks of financial assets within his portfolio in response to relative yields. The response to changes in wealth and yields is specified to occur with a partial lagged adjustment. In addition, the actual short-run adjustment pattern is distorted by changes in nonfinancial flows.

These behavioral assumptions can be stated in equation form as follows: The desired stock of each asset or liquidity is assumed to depend upon a vector of interest rates, r; a wealth constraint, W; and other factors, X (e.g., income or transactions requirements),

$$A_i^* = a_i + \sum_j b_{ij} (r_j W) + c_i W + \sum_k d_{ik} \cdot X_k .$$

The interest-rate terms are scaled by the net-worth constraint and all of the equations are estimated in linear form. In those situations where liquidity is an important consideration, the ratio of liquid assets to wealth is included as a measure of the implicit yield on such assets. Because net worth is used as a scale parameter, it appears several times in the equation and its net influence should not be obtained by reference to the c_i coefficient alone. The total wealth effect can only be deduced for specific fixed values of the interest-rate terms. Where significant, a trend term is included as proxy for other secular factors not specified in the equation. This prevents such influences from being attributed to the interest rates which have a strong trend component.

The short-run stock adjustment process is generalized somewhat to include the lagged stocks of other assets and various flow disturbance terms, Z.

$$\Delta A_i = \sum_j \lambda_{ij} [A_j^* - A_{j-1}] + \tau_k \cdot Z$$

In addition, the asset equations for each sector are given a common

structure to the extent feasible. This reduces the sensitivity of the equation results to the choice of which asset to treat as a residual.

However, the equation form does vary substantially among the various sectors in response to different structural restrictions upon the actors. In individual situations, various symmetry conditions of rate response have been imposed by prior restrictions. Variables were also excluded from the final equation when their coefficients were both small and insignificant.

Balance-Sheet Restrictions

The overall formulation of desired stocks and the adjustment to discrepancies between actual and desired stocks is sharply constrained by the need to maintain income- and balance-sheet restrictions at all points in time. Within a fixed net wealth constraint, an increase in the holdings of one financial asset must be matched by a corresponding decline in others or by an increase in liabilities. Compositional responses to changes in a specific interest rate or non-rate factor must sum to zero over the whole portfolio. This implies, at the extreme, that each individual demand equation must include the entire list of variables contained in the equations for competing assets. An alternative statement of the same point is that within a portfolio of n assets there can be only n-1 independent demand equations, since the equation for the final asset can be deduced by subtraction.[9]

There are several alternative approaches to the estimation of equations within the balance-sheet restriction. The first involves the estimation of n-1 independent equations. The equation for the nth asset is then implied as a residual. As a result, the residual-equations structure may be sharply distorted. For example, the cross-effects of interest-rate terms may be quite diffuse so that they are statistically insignificant in equations for competing assets. The elimination of such terms, however, implicitly assigns all of the cross-effect to the residual asset, since the sum of the coefficients must equal zero. The same is true of the adjustment process whereby the assets' own lagged stock is included. Perfect symmetry would require its inclusion in the other equations. Thus each equation in the set of n-1 must include the same set of right-hand variables.

___

[9] A far more detailed discussion of the importance of balance sheet restrictions and other constraints appears in W. Brainard and J. Tobin, "Pitfalls in Financial Model Building", *American Economic Review* (Papers and Proceedings), 58 May 1968, pp. 99-122. Of course, these problems are not unique to models of the financial sector, but they are more obvious in areas where compositional factors are so important.

The problem with the above approach is that it leads to a rapid proliferation in the number of coefficients to be estimated. With limited data the result is multicolinearity, a high risk of spurious correlations, and highly inefficient estimates. Alternatively, equations may be formulated in a very simple context, reducing the number of coefficients to be estimated, but ignoring the complexities of the decision process that are frequently important.

A second approach involves the estimation of the entire set of n equations in a simultaneous-estimation procedure which incorporates all of the balance-sheet restrictions. This is obviously the preferred method of estimation when one is certain that the original specification is correct. But the combination of a large number of independent variables and probable errors in specification can wreak havoc with the estimates. A specification error in one subset of the equations will distort the results for all. It is difficult to evaluate individual equations since coefficient standard errors are not available. In addition, the quality of the original data frequently does not justify an approach which gives so much freedom to the estimation technique in allocating rate effects.[10]

At this stage of the analysis we did not feel that our equation specifications justified the use of the second method. We have followed a more eclectic approach of estimating the equations on an individual basis. Variables are frequently not carried over from equation to equation if they were not significant at a reasonable probability level.

An attempt was made to limit the number of independent variables in an individual equation to those of dominant importance. Simplifying assumptions not fully justified by theory were sometimes made if they reduced other problems (e.g. multicolinearity, spurious correlations, and autocorrelation). The procedure of limiting the disaggregation to major asset categories frequently reduced the number of required variables and simplified the equation structure.

In particular, the lagged stocks of all other assets were not always included in the individual equations. Since total net worth usually does appear, their absence only implies the lack of differential effects on the asset in question. For example, the absence of lagged time deposits in an equation for savings and loan shares only implies that

---

[10]Problems of aggregation and measurement error result in situations when the statistical discrepancy is the major balancing item. In computing the least-squares regression, deviations from the mean are treated equally for all asset classes despite the fact that the data may vary in quality.

their influence is no different from that of other deposits or market securities, or that the difference is not of major statistical importance. Frequently, a check was made to insure that the implicit structure of the residual-asset category was not substantially different from that implied by a direct estimate. Thus, the implied structure of the residual equation influenced but did not constrain the estimates of the other equations. We readily confess that the equations are not reality but only illustrative of some of the major forces.

Market Clearing

In principle the procedure outlined above should lead to a system consisting of demand or supply equations for every sector (and financial intermediary) and every asset type. (Of course there would be some blanks since some assets do not appear at all in the balance sheets of some sectors.) In a theoretical model with no residual category, no error terms, and no rationing, net supply of each asset could be set equal to zero. The simultaneous solution of the whole set of equations would then produce the set of equilibrium interest rates. The model proceeds along that line but does not follow it to the end. Most of our equations are in fact supply and demand equations for assets and liabilities, sector by sector. But for a number of reasons we have taken a somewhat different approach to market clearing.

In each market the supply or demand equation for one sector has been omitted and a rate equation fitted instead. If the conditions mentioned above were satisfied, this would simply amount to rewriting the missing equation with the rate instead of the quantity on the left-hand side. For example, there is no equation for the supply of bank loans to business. There is an equation for the demand for bank loans and an equation for the bank lending rate containing the quantity of bank loans on the right-hand side. The solution of the two equations (for given values of the other variables) may be regarded as market clearing through the equating of supply and demand. In fact, for a variety of reasons the rate equations are not strictly simple demand or supply equations solved for the rate. In particular, the mortgage-market equations are organized in such a way as to permit some short-run rationing and a corresponding short-run disequilibrium in the rate. In the case of the bond markets, the household demand for bond equations are replaced by rate equations but the included equations have to be regarded as reduced forms from the solution of a larger system, because the yield on equities cannot be used.

VI. SPECIAL FEATURES OF THE MODEL

The authors have spent several years in building this model so to us everything about it is special, but the financial-model buff will soon recognize that many of the equations are essentially old stuff — differing in detail but not in essence from the treatment of corresponding sectors in other models. In three areas — commercial banking, the bond markets, and the mortgage market — we have departed from standard practice to an extent warranting special notice even in a short outline of the model.

Commercial Banking

In spite of the rapid growth of other financial institutions, commercial banks remain at the heart of our financial system. They hold a wider range of assets than any other class of institutions and deal on the deposit side with all sectors of the economy. Because the business sector uses variations in bank borrowing to buffer short-term fluctuations in surpluses and deficits, banks transmit the effects of short-term changes in business financing needs to the rest of the market. At the same time Federal Reserve open-market operations are directly reflected in bank reserve positions, and it is the banking system's response to changes in reserve positions which links Federal Reserve action to the rest of the market.

Our model of the commercial banking system differs fundamentally from others in the nature of the output. The 17 equations devoted to the commercial banking system do not explain the money supply. Instead they represent — when taken together — the banking system's demand for various kinds of assets. By adding equations from other sectors one can deduce the determinants of the money supply but only as a memo item. Banks enter into the model directly as demanders of assets — business loans, long- and short-term Federal securities, municipal bonds, etc. and as suppliers of such liabilities as negotiable certificates of deposit.

Second, in determing the actions of banks we have placed great weight on the tension between the demand for business loans and what might be called the passive supply of funds — the supply resulting from increases in unborrowed reserves, and time deposits (without a change in rates). This excess loan demand equation (F-7 in Appendix B) brings together the two driving forces mentioned above — business loan demand and open-market policy. Though subject to many qualifications, we have accepted the hypothesis that, primarily

for reasons of long-term profit maximization, banks will attempt to accomodate the bulk of the fluctuations in their business customers' demand for loans.

Rates will be adjusted to reflect the marginal cost of funds and the competitive position as reflected in the amount of excess loan demand. There may also be marginal rationing. But for the most part, if a customer is willing to pay the rate (including, of course, such competitively determined adjustments elsewhere in the portfolio. Those adjustments include sales — or reductions in purchases — of securities, increases in rates for consumer time deposits, CDs, Euro-dollars, or increased borrowing from the Federal Reserve. The equations for bank deposit rates and for assets other than business loans are strongly influenced by the excess loan demand variable. To put it shortly — and with some lack of precision — when the Federal Reserve provides banks with sufficient reserves to accommodate business loan demand passively, the rest of the market is insulated. When Federal Reserve policy does not provide enough reserves, the excess loan demand is passed to the rest of the market through bank sales of securities or bank issues of additional short-term liabilities.

An important variable in determination of money-supply bank assets (and at times a variable used rightly or wrongly as a target by the Federal Reserve System) is the level of free reserves. Our treatment of free reserves starts with a fairly standard stock adjustment mechanism in which the desired level of excess reserves (scaled to adjust for demand deposit reserve ratios) is a function of the bill rate; and the change in free reserves is a fraction of the gap between the target and the previous period's actual reserves. Adding the lagged stock to both sides makes actual free reserves positively related to bill rates, the scale of demand deposits, and positively related to the last period's actual free reserves. This is a fairly standard approach but it neglects important dynamic elements. We find statistically, and we believe that we are in accord with other evidence, that the *level* of free reserves is strongly influenced by changes in excess loan demand.

We have reflected Federal Reserve pressure to limit member bank borrowing by introducing a variable which is zero when free reserves are positive (for the system), but has a negative value when system free reserves are negative. Disregarding the rest of the equation for the moment and considering only member bank borrowing, the equation suggests that a one-time blip from zero to a positive value of excess loan demand will cause banks to borrow. In the following period about 60 percent of the borrowing will be repaid and so long as excess loan demand remains zero the borrowing will fade away in

ensuing quarters. While the coefficients may give excessive precision to the time path, the general idea appears to be consistent with discount window policy and bank appreciation of it. It will be noted that in this dynamic part of the equation, the level of free reserves (or borrowing) is related to the change in excess loan demand — that is, to flows of lending and open-market purchases. When excess loan demand becomes positive and increases steadily, borrowing will tend to rise cumulatively until the lagged stock terms balance off the flow terms.

The reader will note that interest-rate terms play a relatively small role in this equation. It is usual to suppose that member-bank borrowing is sensitive to the spread between the discount rate and the funds rate. The funds rate itself is, however, determined by the interactions among the banks which have been aggregated here. Indeed, in a more disaggregated model the funds rate would become an endogenous variable explained in large measure by the same variables which are supposed to determine the quantity of borrowing. In such a model the discount rate (if regarded as exogenous) would appear as a determinant of both the quantity of borrowing and the funds rate. It would in our view, however, appear more significantly as a determinant of the funds rate than of the amount borrowed. Moreover, there is considerable doubt as to the legitimacy of regarding the discount rate as an independent variable since the discount rate is often adjusted to keep it in line with the funds rate. Thus, while it is easy to find statistically significant coefficients on the discount rate, their economic significance is doubtful. The bill rate can be viewed as a measure of the costs of holding excess reserves for liquidity purposes.

To sum up, the banking system plays a major role as a demander of securities and as a supplier of time deposits and short-term marketable securities. Bank action in these markets is driven by the interaction of business loan demand — generated in turn by business surpluses and deficits and by Federal Reserve open-market operations.

Marketable Securities

In the case of marketable securities, we have estimated ordinary supply and demand equations for total long-term marketable securities, total short-term marketable securities, and municipal securities for sectors other than households. The resulting net supply of each type of securities must then be held by households. As noted above,

we could have completed the model by computing the household demands for securities and setting supply equal to demand. Instead, however, we have computed equations for various interest rates in which the rates appear on the left-hand side and the quantities of securities (actually various portfolio ratios) which must be absorbed by households — the net supply from other sectors — appear on the right-hand side.

There are several reasons for this choice. First, it is statistically more efficient. We have a linked set of household portfolio equations including those for several types of deposits and for different kinds of marketable securities. In these equations the deposit rates are exogenous since they are influenced only slightly by short-period movements in household portfolios. On the other hand, the quantities of securities to be absorbed by households are largely determined by events in the nonfinancial world and by monetary policy decisions which are little influenced by household portfolio decisions in the short run. The rates required to induce households to take the necessary amounts of securities are determined by household action including random shifts in the portfolio tastes of households. In OLS estimates there will be less simultaneous-equation bias when we normalize on the rate instead of on the quantities.

In effect, we have started from a set of simultaneous portfolio equations for households in which the quantities are functions of the yields on the different assets. Taking the quantities as predetermined, we have then solved for the yields in terms of the quantities. The yields which appear on the left side are current market yields. The right-hand side variables therefore include not only the composition of portfolio variables but also the measures of expected price changes which influence current security prices.

Variables intended to represent interest-rate expectations appear in a number of equations for the supply of or demand for securities. On the supply side the timing of corporate bond issues is significantly influenced by the rate of change of interest rates. Issues are deferred when rates move up rapidly and brought forward as rates decline [Eq. A4]. As one might expect, corporate short-term borrowing responds in the opposite way [Eq. A3]. State and local long-term borrowing responds to the rate of change of rates in roughly the same way as corporate borrowing.

On the demand side we find that the choice between long- and short-term securities by mutual savings banks and savings and loan associations is influenced by the spread between bond yields and a

moving average of short yields.[11] In choosing between long and short securities the household sector, represented by equations for long and short rates (H6 and H7), appears to respond to a) the difference between bond yields and a moving average of short rates and b) the rate of change of short rates.

There has been a good deal of debate in recent years over the merits of the so-called expectational theories of interest rates and the theories which emphasize the importance of the composition of securities in the market. Our model indicates that both factors are important. The moving averages of short rates which appear in the expectational models show up as significant in our equations of bond yields. But the composition of the volume of securities also shows up — as portfolio theories suggest it should — as an important factor. The simulations described below indicate that the cyclical swings in the relative volume of long- and short-term securities play a considerable role in producing term-structure changes.

The Mortgage Market

The demand for mortgages (supply of mortgage funds) comes primarily from savings and loan associations, mutual savings banks, life insurance companies, commercial banks, and Federal agencies. Without going into details, it is fair to say that except for the exogenous elements in FNMA and FHLB policy, the mortgage-demand equations are fairly straightforward examples of the general class of portfolio adjustment equations described in the previous section. Since the major purchasers of mortgages are intermediaries, the demand for mortgages is, of course, heavily influenced by the flow of funds to the intermediaries and thus ultimately reflects (a) household portfolio decisions, (b) Federal Reserve controls on the growth of banking assets, and (c) competition by corporations for short-term funds from banks and long-term funds from life insurance companies. While a chain of interactions resulting from those considerations is fairly elaborate, its basic logic is fairly straightforward and well understood.

---

[11]We did not find a similar response on the part of life insurance companies whose short security holdings have remained at rather low levels for most of the period studied. However, since life insurance companies play such an important role in the bond markets, it may be that a change in their expectations forces changes in actual long-term rates rather than quantities. Life insurance rate expectations may therefore be reflected in the equations for the rates themselves.

The supply of mortgages — demand for mortgage funds — is more complex and less well understood and has received remarkably little attention in the literature. In the long run it seems reasonable to regard the supply of mortgages as dependent on the demand for the underlying capital — housing units — and by the portfolio choices of actual or potential owners of owner-occupied or rental housing units (and also in the aggregate by the forces governing the mix of owner-occupied and rental housing). Unfortunately, our knowledge of the ultimate determinants of housing demand is very limited, particularly in regard to the influence of a change in mortgage interest rates.

Moreover, while the demand for mortgage funds is basically related to the value of the stock of housing, much of the adjustment of the stock of mortgages through the stock of housing is associated with the refinancing connected with change of ownership. The rate of sale of existing houses fluctuates in the short run with the rate of construction of new units. Thus new building contributes to mortgage demand directly — since new units must be financed — and indirectly through its effect on the refinancing of old units. When the rate of home building increases, the percentage rate of growth of mortgages outstanding will tend to increase for both reasons.

Most of the observed fluctuations in the rate of home building in the postwar period have resulted from fluctuations in the supply of mortgage funds with a good deal of rationing. Observed changes in the rate of building therefore tell us very little about the demand for new construction. In the very short run, however, it can be argued that — in the absence of rationing — builders will tend to expand their activities when vacancies are low and contract them when the vacancy rate is high. The vacancy rate can therefore be used as a measure of short-run variation in the position of a demand function for mortgage funds. We can therefore write

$$\Delta\%\text{MTGR} = f(\text{VAC}, r_{\text{mort}}, r_{\text{mrk}}) + \text{trend}$$

where the interest-rate terms reflect the effect of interest rates on home occupancy costs and on the optimal leverage ration and the trend takes account of rising capital values and the "maturation" of mortgage portfolios in the postwar period.

If we supposed that the mortgage market was always cleared by prompt changes in interest rates, we could estimate the parameters in the demand function and determine the mortgage interest rate by setting the demand function equal to the supply of mortgage funds.

It is clear however that mortgage rates do not change quickly enough to clear the market when the supply of mortgage funds shifts

rapidly as it often does. We assume, therefore, when there is a gap between the supply and the demand for mortgage funds, that lenders shift the rate in the appropriate direction but not enough to eliminate the gap. Second, we assume that lenders lend the amount consistent with their supply function at the new rate, rationing out the excess demands. Third, we assume that the rate of change of the rate will also be affected by the differential between existing mortgage rates and competing asset yields and by the rate of growth of the intermediaries' total portfolios. A combination of the considerations determining the demand for mortgage funds and the rate adjustment considerations just mentioned leads to equation H-10 of Appendix B. This is, of course, a very crude representation of a very complex process, but it does seem to catch the major factors at work in the mortgage market.

The Link from the Financial to the Real Sector

Changes in financial variables impringe back upon the real sector through three aggregage demand categories: residential construction, business fixed investment, and state and local governments' construction expenditures. For the most part these equations follow the empirical work of previous models and require few specific comments.

The residential construction equation (A7 of Part II of Appendix B) simply translates a given change in the mortgage stock into a corresponding amount of expenditures. Since the expenditures are measured at annual rates, the equation implies that about 50 percent of the increase in the mortgage stock at the margin is reflected in higher construction in the current period with a further 25 percent in the following six months. The proportion of mortgage lending allocated to new construction versus the purchase of existing homes rises during periods of rapid household formation. Also the market for new housing appears to be more sharply affected by increased lending costs.

We also found it necessary to adjust the data of 1970 to 1971 for a very substantial rise in the refinancing of mortgages issued during the previous tight-money period. Ideally, it would be preferable to incorporate this refinancing phenomenon within the equation itself; but at present the number of observations is too limited to obtain meaningful results. The importance in recent years of refinancing is evident in the 237 percent increase between 1969 and 1971 in mortgage assets by savings and loans originated for purposes other than the purchase of a new or existing home.

The business-investment equations closely follow the neoclassical formulation used empirically by Bischoff in the FRB-MIT-PENN model. One implication of his particular formulation is that the effects of interest rates will be delayed behind those of output. Our equations differ only in two respects. First, the equations are not of a pure accelerator type where investment is related only to *changes* in the desired stock. They also include a level-of-output term. Second, our formulation of the firm's discount rate uses only the corporate bond rate with a coefficient of 1.0. Bischoff also includes a coefficient of 1.0 on the dividend-price ratio with a coefficient of 2.0 on the bond rate.

The state and local construction equation relates expenditures to a moving average of GNP (as a general scale variable) and interest rates. We have also included a measure of those Federal grants-in-aid which can be used for construction outlays.

As with most existing models, these linkages to the real sector are not fully satisfactory. We do not adjust the nominal interest rate for price effects as required by a real rate-of-interest formulation. Yet, we firmly believe that if the rate of inflation affects the nominal rate of interest, it must do so through the demand for physical assets. Thus, we do not include the rate of inflation in the interest-rate equations since total *financial* wealth is used as the balance-sheet restriction.[12] Since the rate of inflation can normally be expected to offset some of the influence on the real rate of interest of a changing nominal rate, our investment equations may overstate the influence of financial market changes on real output. On the other hand, we have not included a capital-gains impact on consumption as has been done in some of the larger models.

The Link From the Financial Sector

Within this model, the process by which events in the real sector affect the financial sector is more complex than is implied by models which utilize the aggregate demand and supply for money. This complexity results from the fact that the distribution of income and expenditures among the major sectors as well as the level of aggregate demand influences the supply and demand for various types of securities.

---

[12]We also did not find a significant statistical influence for previous rates of inflation if they were added to the rate equations as presently formulated.

The business sector finances fluctuations in its deficit primarily through variations in the amount of long-term debt and bank loans. State and local governments also are heavily dependent upon the longer-term capital markets. At the other extreme, the Federal government meets most of its immediate financing needs through its direct access to the short-term securities market. Such distinctions would be of little importance if the markets for financial assets other than money really were homogeneous as implied by a money-model approach; but this view is not supported by our empirical results.

On the savings side, households dominate the market for interest-bearing deposits which are of such importance for the residential mortgage market and homebuilding. In addition, the link between household savings on an income basis and their demand for financial assets is not a simple one. While their current consumption and investment in residential structures typically match the major proportion of their income flow, many of these expenditures are not financed out of current income, and thus need not be offset by a reduced rate of purchase of financial assets. Consumer credit and mortgages are two financial liabilities which are closely linked to the purchase of real assets. Most households do not view such debt as simply the negative equivalent of bonds or deposit accounts. Thus, they are not treated as homogenous elements of the households' decision with respect to the allocation of their financial wealth.[13]

The links to the financial sector are spelled out in greater detail in Appendix B. In addition, the pattern of sector deficits and its implications for credit markets and interest rates is discussed in the following analysis of some simulation results.

VII. SIMULATION RESULTS

The major characteristics of the model can be summarized by examining results of several standard "multiplier" simulations. These examples provide an opportunity to trace through the flow of the model and more adequately highlight the dynamic patterns of responses implied by the individual equations. All of the following exercises use data of the 1965-70 period as the baseline or control simulation. Consequently the results reflect the specific institutional

---

[13]We have also adjusted household savings and the deficit of state and local governments for contributions to employee pension funds. This provides a more symmetric treatment relative to private pension funds. A matching adjustment is not made for the Federal government since no independent fund is maintained.

framework that existed during the period. Because of major non-linearities associated with rate ceilings and changes in regulation that occurred during that period, the multipliers that are obtained for that period cannot be viewed as being fully applicable to all other periods.

Unborrowed Reserves Multiplier

Within the present structure of the model, changes in unborrowed reserves are the primary index of the effectiveness of monetary policy. The results of a simulation of a $1 billion increase in unborrowed reserves are shown in Table 2 of Appendix A. To put the magnitude of this increase in perspective, it is about a 5 percent increase and can be compared to the average annual increase of $1.5 billion between 1965 and 1970 — the period of simulation.

The use of the six-month period introduces some simultaneous — within-period feedbacks — which somewhat blur the causal sequences for our simulation results. However, the model's first-period responses show how the effects of changes in unborrowed reserves are transmitted through the financial system into the real system and back again. The Federal Reserve open-market purchase in itself increases demand for government securities while at the same time increasing bank reserves. Banks respond to the improved reserve position, in part, by acquiring additional short-term securities. This results in a sharp decline (100 basis points) in bill rates and bank CD rates. The fall in short rates leads to substantial shifts of funds into time deposits and shares at thrift institutions and commercial banks. While the rise in unborrowed reserves and the inflow of time deposits permit a large increase in bank-earning assets, business loan demand is little changed. Our model of bank behavior implies that, since the excess loan variable has shown a sharp decline, Federal funds rates will fall and free reserves will increase. The simulation shows that in the initial period about half of the $1-billion reserve injection is absorbed into free reserves. The temporary increase in free reserves is drawn down to approximately the initial position in the next two periods.

The increase in commercial-bank reserves strengthens commercial-bank demand for state and local securities which helps to produce a 60 basis point drop in the rates for those securities. The shift of household funds into commercial banks and thrift institutions leads to a rise in mortgage lending and residential construction of over $1 billion in the initial period. The interest-rate decline also generates an increase of over $1.5 billion in business-fixed investments, while the

resulting increase in income increases consumer expenditures by $1 billion. The total first-period rise in GNP is a little over $3 billion. In the first period these real-sector changes have limited financial implications.

An interesting side effect of the reserve injection is the expectationally induced shift in corporate financing. In spite of the sharp fall in short rates, corporations raise $1.1 billion more in the long markets and correspondingly smaller amounts in short markets. This shift is the result of the expectations effects induced by the sharp decline in current market rates. And, of course, the shift in corporate financing toward the long end retards the decline in long rates.

The impact of monetary policy on real output is spread over a long period; real output reaches a peak at the end of two and a half years. However, the maximum change in real output is a very substantial $20 billion. There is an immediate increase in residential construction in the first few periods with a peak of $3.2 billion after 18 months. The long lag in the total monetary impact is accounted for by business investment which reaches its peak increase of $7.3 billion at the end of three years. The increase in state and local construction is also very gradual.

The impact on output does not appear to be greatly dissimilar from those reported in some other studies. The total effect on real output is close to that found by Gramlich for a reduced form of estimates although the lags reported here appear to be somewhat longer. However, the impact is greater than that reported for previous versions of the FRB-MIT-Penn Model. This appears to be the result of a stronger response of business investment to interest-rate and output changes. This is amplified by a greater long-term impact of the policy change on market interest rates. The interest-rate response is heavily conditioned by the composition of debt issued in the capital markets and this aspect will be discussed more fully at the end of this section.

The policy change results in a substantial shift of deficit and surplus positions of the business and government sectors. The sharp rise in business investment results in much higher levels of business long-term borrowings. On the other hand, with expenditures being largely exogenous, substantial budget surpluses are generated by the Federal Government. This is reflected in the financial sector in a decline of outstanding short-term Federal securities. Thus, the particular assumptions of this model with regard to debt management result in a substantial maturity redistribution of credit-market assets. This pattern is amplified by the increase in state and local bond issues resulting from higher capital expenditures.

The nonbank intermediaries realize a higher level of deposit liabilities over the period of simulation. The most rapid deposit growth is concentrated in the first two years. But a major portion of these deposits are converted into larger holdings of mortgage assets with relatively small increases in their holdings of credit-market assets. The conversion of deposits into mortgages is facilitated by the fact that the mortgage rate initially declines by less than the bond rate and higher housing-vacancy rates begin to have a significant depressing influence only in the second and subsequent years. Life insurance companies do increase their holdings of long-term credit market assets; and FHLBB advances to savings and loans decline because the rate charged on these advances was held at its former exogenous level which has the effect of making such loans unattractive to S&Ls as market rates fall.

The above portfolio adjustments of borrowers and other lenders result in reduced household holdings of both short- and long-term securities for the first three years. But thereafter, their holdings of long-term securities rise and their holdings of short-term securities continue to decline. After six years total long-term assets have increased by $6.1 billion, all of which has been absorbed by households. On the other hand, total short-term assets have increased by $21 billion with households absorbing $18 billion. The drop in Federal securities outstanding accounts for nearly all of the decline in short-term assets.

In response to these changes the short-term rate falls in the first six months by a full percentage point, and then begins to gradually return to former levels as aggregate demand and the total amount of borrowing rises. The 3-5 year bond rate also reaches its minimum in the first year but the subsequent recovery is more gradual. The long-term corporate bond rate continues to decline throughout the first two years and then begins to rise at a very gradual rate. This gradual response results in part from the long lag of the bond rate behind the Treasury bill rate implied by the bond rate equation.

The recovery of interest rates is further delayed by the particular pattern of debt management implied in the simulation, whereby short-term credit-market assets decline sharply (reflecting a continuing Federal government surplus) and long-term securities increase (reflecting greater business borrowing). In each of the three primary market-rate equations (RG3M, RG35, and RBAA), the decline in household holdings of short-term instruments has more of a depressive effect on rates than the upward pressure exerted by the rise in long-term instruments. Thus, the debt-management policies followed

in this simulation are an important component of the total expansionary effect. If the decline in government borrowing was more heavily concentrated in long-term securities, market rates would have recovered more rapidly and the rise in investment would have been choked off.[14]

Mortgage Purchases by the Federal National Mortgage Association. The exchange by FNMA of government marketable debt for residential mortgages is representative of an increasingly common type of financial policy. This might be classified as a type of debt management, but is substantially different from previous emphasis on the maturity distribution of the debt. An exercise in which FNMA mortgage assets are permanently raised by $1 billion is shown in Table 3 of Appendix A.

An increase in FNMA mortgage holdings is obtained primarily from mortgage companies which originate the mortgages in the primary market. Consequently there is little immediate effect on the mortgage portfolios of the financial intermediaries. The rise in FNMA purchases is nearly fully reflected in a larger total mortgage stock. This in turn is translated into a correspondingly higher level of residential construction in the first year. The multiplier effect of the higher construction expenditures on other demand components is also substantial because of the complementary impact on consumer durable-goods purchases.

About $.7 billion of the increased borrowing by FNMA is initially reflected in larger household holdings of short-term assets. However, only about $.2 billion is drawn away from interest-bearing deposit accounts. Although personal savings do not rise, household financial wealth increases by $.6 billion because part of the increased flow of mortgage funds is used to finance existing homes, so that household mortgage liabilities rise by more than their construction expenditures. In addition, households finance a portion of rising consumption with additional consumer credit. The remaining portion of the

---

[14]The conclusion of this model that debt management can have a substantial impact on the term structure of interest rates is at variance with several previous studies. Our results must be regarded as tentative, but they were obtained consistently from a variety of different formulations of the rate equation. Part of the difference in the results may be traceable to our use of the corporate bond rate as the basic measure of long-term yields. Thus, it includes a risk premium as well as liquidity and expectational effects. However, the tax laws have resulted in serious distortions in the government bond rate as a measure of long-term yields in recent years. Of possibly greater significance is our use of private as well as public debt instruments in measuring effects of debt maturity. Private long-term issues (corporate and State and local government) have grown enormously in the postwar period. In contrast, an index of the maturity of the Federal debt (used in prior studies) has consistently declined over the period. Thus, the debt maturity measure based on Federal securities alone is inversely correlated with that of the market as a whole.

FNMA financing is largely accounted for by a rise in business hold-
ings of short-term assets and lower levels of FHLB advances. A rise of
about 10 basis points in short-term rates is associated with these
shifts in asset holdings. Thus, in spite of some negative feedbacks on
alternative sources of mortgage funds, the FNMA operations do serve
to stimulate homebuilding in the short run.

However, the relationship between mortgage lending and residen-
tial construction is a flow relationship so that no further stimulative
effects are realized beyond the initial increase in the mortgage stock.
In fact, aggregate demand will be reduced in future periods as the
need to finance the mortgage purchases through higher government-
agency lending raises market interest rates. This secondary effect
reduces deposit inflows into the mortgage-lending institutions and
causes some realignment of their portfolios toward the higher-yield
credit-market assets. Business investment is restrained and the rate of
expansion of the mortgage stock, and thus residential construction,
declines. After the first 18 months the level of total demand is lower
than in the control simulation.

Market interest rates initially rise in response to greater agency
borrowing and private credit demands. In subsequent periods market
rates decline back toward their former levels with some evidence of a
long cycle. Because of the long lags, it is not clear what the equilib-
rium values would be but it appears to be a process of long damped
cycles heading towards a zero long-term effect.

Federal Purchases Multiplier. The effects of increasing Federal
purchases of goods by $1 billion in constant 1958 dollars are shown
in Table 4 of Appendix A. This provides a representative measure of
the implied effectiveness of fiscal policy. Real output is raised by
$1.9 billion at annual rates in the first six months and reaches a peak
of $3.4 billion 18 months after the original stimulus. Thereafter the
increment to aggregate demand gradually declines to $1.2 billion
after four and a half years. In the subsequent periods the model
appears to follow a pattern of long damped oscillations declining
towards zero. The current dollar multipliers, which rise from $2
billion in the first period to $4.4 billion after two years, may appear
to be rather large; but this is simply because the price deflators (base,
1958 = 1.00) are very large during the period of simulation. For
example, the constant dollar government stimulus of $1 billion is
valued at $2.1 billion in current dollars at the end of the simulation
period.

The simulation incorporates an assumption of an exogenous
supply of unborrowed reserves. Therefore, the initial increase in
demand raises interest rates and leads to offsetting reductions in the

demand categories of state and local expenditures, residential construction, and business investment. This response of aggregate demand to higher market rates is delayed and is not of major importance in the first year. Residential construction is reduced in the second and subsequent years both because higher market rates lead to lower deposits in the mortgage-lending institutions and because these institutions realign their own portfolios in the direction of higher-yield marketable securities. The accelerator effects of output dominate business investment in the first 18 months, but thereafter higher borrowing costs push the increment to investment demand back toward zero.

These multipliers seem to be slightly larger than those of other recent econometric models such as those of FRB-MIT-Penn and the Wharton Forecasting Unit. A substantial portion of these differences can be traced to the investment equations. Our equations imply a higher marginal capital-output ratio than is typically found in other models. Interest rates do very little to hold down the investment response in the first year because of lags in the adjustment of the bond rate to higher short-term rates and because the primary influence of interest rates on investment occurs in the second and third years. In addition, these equations are not pure accelerator-type formulations where investment is related only to *changes* in the desired capital stock. They include a level-of-output term. Finally, the present version of the model is estimated by ordinary least squares and the induced responses may be overestimated because of simultaneous-equation bias.

The tendency of the model to display a damped cycle reflects the delayed response of investment to higher market-interest rates. As a result, the initial rise in total output stimulates business investment; however, this accelerator effect becomes weaker in future periods as the negative influence of higher interest rates begins to dominate. But the effect of lower investment on total demand during this second phase causes the current interest rates to decline. Thus, there is a third phase during which investment and total output again increase. This cycle is amplified by the accelerator-type response of inventory investment and consumer durables.

The increase in Federal purchases is only partially offset by higher taxes and lower unemployment transfers so that there is a continuing need for Federal deficit financing. The magnitude of this need is somewhat arbitrary as it depends upon the assumptions with regard to other expenditures and tax policy. We have assumed that tax rates are exogenous so that revenue rises slightly more than proportionally with current-dollar GNP. On the other hand, only purchases of goods

and services are adjusted for inflation. Other expenditures are held basically constant in current-dollar terms with some negative effect from unemployment benefits. As a result of these assumptions, the demands placed on the capital market are less than half of the original expenditure stimulus. We have assumed that this deficit will be largely financed by increased issues of short-term government securities.

The business financing deficit follows the pattern of fixed investment with substantial borrowing needs occurring during periods of high investment. The fluctuations in corporate profits and inventory investment show strong accelerator effects and largely offset each other. For the first 18 months business borrowing is concentrated in short-term liabilities — principally bank loans. But these demands are shifted into long-term marketable securities in following periods as interest rates level out or decline from their peaks.

State and local demands on the capital market are reduced as construction outlays are reduced and there is a positive, though small, increase in tax revenue.[15] This is reflected in lower long-term bond financing. The deficit of foreigners is reduced by high imports and exogenous constant-dollar exports. This is financed by a combination of more Euro-dollar loans to U.S. banks and higher foreign holdings of time deposits and short-term assets.

As a result of these changes in the basic-sector deficits, there is initially a substantial increase in total short-term debt financing with very little increase in long-term credit market instruments. This is amplified by the sale of short-term assets on the part of commercial banks to finance the higher level of bank loans. In future periods these effects are translated into the long-term market as business and the Federal government shift an increasing proportion of their financing to longer-term debt. It is partially offset by the lower level of state and local securities. This shift in composition of credit-market issues is evident in the $.6 billion rise in short-term securities at the end of one year compared to a net increase of less than $.1 billion for long-term assets. After six years long-term securities are above previous levels by $1.6 billion compared to $1.8 billion for short-term securities.

Since unborrowed reserves are held constant, commercial banks are unable to expand significantly their total assets. In fact, the decline of time deposits in response to higher market rates results in

[15]The elasticity of state and local revenue is low with respect to GNP because we have assumed that tax rates are exogenous. In addition, state and local expenditures are affected more by inflation than Federal expenditures in the model because of a much larger role of purchases of goods and services in total expenditures.

a redistribution of their liabilities toward demand deposits with a higher reserve requirement. They are forced to sell off some short-term securities to finance larger holdings of consumer credit and business loans. Nonbank intermediaries do reduce their holdings of residential mortgages, but this potential increase in funds available for credit market assets is partially offset by a lower level of deposit liabilities.

As a result of the above portfolio readjustments, the household sector is required to pick up most of the total increase in short-term assets plus those sold off by commercial banks. The total short-term holdings of households and pension funds under these circumstances rise by more than the increase in total outstandings. The nonbank intermediaries make a more substantial contribution to the long-term end of the market, so that the increase in household holdings of long-term credit-market assets is consistently less than 50 percent of the increase in total outstandings.

Within the framework of this model, the increase in household holdings of credit-market assets provides the primary impetus for higher market-interest rates. The three-to-five year bond rate is affected both by the level of household credit market asset-holdings relative to total financial wealth and the rate of change of this ratio. Second, there is a pronounced effect of asset composition on interest rates with a $1 billion rise in short-term assets having a larger short- and long-run effect on market rates than a $1 billion increase in long-term assets. Since the changes in credit-market holdings of the first few years are concentrated in the short end of the market, short-term market rates respond quickly to the rise in aggregate demand and reach their cyclical peak after 18 months. Long-term rates move more slowly with the increase in the first 18 months. Long-term rates move more slowly with the increase in the first 18 months being only one-half of the rise in short rates. But they continue to rise in future periods with a long-run increase greater than that for short- and intermediate-term rates. Since the longer-term rates provide the primary link back to the real sector, this delayed response gives an additional explanation for the substantial lag in monetary influence on total demand.

VIII. CONCLUSION

The present model and many of its implications must be regarded as tentative. At this point, we have emphasized the fact that the model produces a solution and that the behavior of the aggregates appear plausible relative to prior expectations. But many of the specific parameter estimates are subject to error and later revision.

Flow-of-funds models are still in their infancy and the quality of the available data for the knowledge of individual sectors' behavior is limited.

However, taken as a whole, the model provides an impressive amount of evidence that financial structure does matter. Particularly, in the short run, financial assets other than money reflect a lack of homogeneity in several dimensions. The multiplicity of significant relative interest-rate effects in the individual equations is demonstrative of the usefulness of the portfolio-balance approach to monetary analysis. Yet the formal theory must be significantly modified to incorporate *flow* as well as *stock* effects. The financial markets seem to be a world where both flows and stocks matter with both extremes being equally implausible. We hope that this model will provide a general framework within which more advanced work on specific sectors and markets can be evaluated.

BIBLIOGRAPHY

1. Anderson, W. H. Locke. *Corporate Finance and Fixed Investment.* Boston: Graduate School of Business Administration, Harvard University, 1964.

2. Board of Governors of the Federal Reserve System Staff Study. *Ways to Moderate Fluctuations in Housing Construction.* Washington: Federal Reserve, 1972.

3. Board of Governors of the Federal Reserve System. *Flow of Funds Accounts, 1945-1970,* and periodical supplements.

4. Bosworth, Barry. "Patterns of Corporate External Financing." *Brookings Papers on Economic Activity,* II (2:1970), 253-279.

5. Brainard, William C., and Tobin, James. "Pitfalls in Financial Model-Building." *American Economic Review,* LVII (May, 1968), 99-122.

6. De Leeuw, Frank. "A Model of Financial Behavior." Duesenberry et. al. (eds.), *The Brookings Quarterly Econometric Model of the United States.* Chicago: Rand McNally & Company, 1965.

7. De Leeuw, Frank, and Gramlich, Edward. "The Federal Reserve-M.I.T. Econometric Model." *Federal Reserve Bulletin,* LIV (January, 1968), ll-40.

8. De Leeuw, Frank, and Gramlich, Edward. "The Channels of Monetary Policy: A Further Report on the Federal Reserve - M.I.T. Model." *Journal of Finance,* XXIV (May, 1969), 265-290.

9. Duesenberry, James S. "The Portfolio Approach to the Demand for Money and Other Assets." *Review of Economic and Statistics,* XLV (Supplement, February, 1963), 9-24.

10. Duesenberry, James S. "A Process Approach to Flow of Funds Analysis," *The Flow of Funds Approach to Social Accounting*, (National Bureau of Economic Research, Studies in Income and Wealth, No. 26). Princeton: Princeton University Press, 1967.

11. Fair, Ray C., and Malkiel, Burton G. "The Determination of Yield Differentials Between Debt Instruments of the Same Maturity." *Journal of Money, Credit and Banking*, III (November, 1971), 733-749.

12. Goldfeld, Stephen M. *Commercial Bank Behavior and Economic Activity.* Amsterdam: North-Holland Publishing Company, 1966.

13. Goldfeld, Stephen M. "An Extension of the Monetary Sector." Duesenberry et. al. (eds.), *The Brookings Model: Some Further Results.* Chicago: Rand McNally & Company, 1969.

14. Goldsmith, Raymond W. *A Study of Savings in the United States.* (National Bureau of Economic Research). Princeton: Princeton University Press, 1955.

15. Gramlich, E. M. "The Usefulness of Monetary and Fiscal Policy as Discretionary Fiscal Tools." *Journal of Money, Credit, and Banking*, III (May, 1971), 506-32.

16. Gramlich, E. M. and Jaffee, D. M. *Savings Deposits, Mortgages, and Housing.* Lexington: D. C. Heath and Co., 1972.

17. Gurley, John G., and Shaw, Edward S. "Financial Aspects of Economic Development." *American Economic Review*, XLV (September, 1955), 515-538.

18. Gurley, John G., and Shaw, Edward S. "Financial Intermediaries and the Saving-Investment Process." *Journal of Finance*, XI (May, 1956), 257-276.

19. Gurley, John G., and Shaw, Edward S. *Money in a Theory of Finance.* Washington: The Brookings Institution, 1960.

20. Hodgman, Donald R. *Commercial Bank Loan and Investment Policy.* Bureau of Economic and Business Research, University of Illinois, 1963.

21. Jaffee, Dwight W. *Credit Rationing and the Commercial Loan Market.* New York: John Wiley & Sons, Inc., 1971.

22. Jones, Lawrence D. *Investment Policies of Life Insurance Companies.* Boston: Graduate School of Business Administration, Harvard University, 1968.

23. Kessel, Reuben A. "The Cyclical Behavior of the Term Structure of Interest Rates." Guttentag (ed.), *Essays on Interest Rates*, vol. II (National Bureau of Economic Research, General Series No. 93). New York: Columbia University Press, 1971.

24. Lintner, John. "The Valuation of Risky Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets." *Review of Economics and Statistics,* SLVII (February, 1965), 13-37.

25. Malkiel, Burton Gordon. *The Term Structure of Interest Rates.* Princeton: Princeton University Press, 1966.

26. Markowitz, Harry. "Portfolio Selection." *Journal of Finance,* VII (March, 1952), 77-91.

27. Meiselman, David. *The Term Structure of Interest Rates.* Englewood Cliffs: Prentice-Hall, 1962.

28. Modigliani, Franco. "Monetary Policy and Consumption," *Consumer Spending and Monetary Policy: The Linkages.* (Federal Reserve Bank of Boston, June 1971).

29. Modigliani, Franco, Rasche, Robert, and Cooper, J. Philip. "Central Bank Policy, the Money Supply and the Short-Term Rate of Interest." *Journal of Money, Credit and Banking,* II (May, 1970), 166-218.

30. Modigliani, Franco, and Sutch, Richard. "Innovations in Interest Rate Policy." *American Economic Review,* LVI (May, 1966), 178-197.

31. Petersen, John E. "Response of State and Local Governments to Varying Credit Conditions," *Federal Reserve Bulletin* (March, 1971).

32. Robinson, Roland I. *Money and Capital Markets.* New York: McGraw Hill Book Company, 1964.

33. *The Report of the President's Commission on Financial Structure and Regulation.* U.S. Government Printing Office, 1972.

34. *Report of the Commission on Mortgage Interest Rates.* U.S. Government Printing Office, 1969.

35. Sharpe, William F. "Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk." *Journal of Finance*, XIX (September, 1964), 425-442.

36. Taylor, Stephen. "Uses of Flow-of-Funds Accounts in the Federal Reserve System." *Journal of Finance,* XVIII (May, 1963), 249-258.

37. Tobin, James. "Liquidity Preference as Behavior Toward Risk." *Review of Economic Studies,* XXV (February, 1958), 65-86.

38. Tobin, James. "An Essay on the Principles of Debt Management." Commission on Money and Credit, *Fiscal and Debt Management Policies.* Englewood Cliffs: Prentice-Hall, 1963.

APPENDIX A

Simulation Results

Table 2   Unborrowed Reserves Multiplier

Table 3   Federal National Mortgage Association
Mortgage Purchase Multiplier

Table 4   Federal Purchases Multiplier

Table 5   Actual Values of Data

TABLE 2

CHANGES IN SELECTED VARIABLES FOR A $1 BILLION INCREASE IN UNBORROWED RESERVES

2.1 National Income Accounts
(Seasonally adjusted at annual rates)

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
GROSS NATIONAL PRODUCT(1958$)	3.1	8.9	14.8	18.5	20.2	19.8	18.2	15.7	13.4	12.3	11.2	10.4
PERSONAL CONSUMPTION	1.0	3.1	5.3	7.0	8.2	8.8	8.8	8.2	7.5	7.2	6.8	6.6
FIXED INVESTMENT	1.6	4.4	6.8	8.3	9.0	8.8	8.0	6.9	5.7	5.1	4.3	3.8
PRODUCER DURABLE GOODS	0.4	1.3	2.7	4.0	4.7	4.8	4.4	3.9	3.4	3.1	2.9	2.9
NONRESIDENTIAL CONSTRUCTION	0.1	0.3	0.9	1.6	2.2	2.5	2.4	2.2	1.7	1.4	1.2	1.1
RESIDENTIAL CONSTRUCTION	1.2	2.8	3.2	2.7	2.1	1.5	1.2	0.8	0.6	0.6	0.2	-0.2
INVENTORY INVESTMENT	0.5	1.3	2.5	2.9	2.5	1.5	0.4	-0.4	-0.8	-0.9	-0.7	-0.5
NET EXPORTS	-0.1	-0.3	-0.5	-0.7	-0.9	-1.0	-1.0	-1.0	-1.0	-1.1	-1.2	-1.3
GOVERNMENT PURCHASES												
FEDERAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
STATE AND LOCAL	0.2	0.4	0.7	1.0	1.4	1.7	1.9	2.0	2.0	1.9	1.9	1.8
GROSS NATIONAL PRODUCT	3.2	9.4	16.2	21.3	24.9	26.9	28.1	28.5	29.4	31.8	34.3	37.2
DISPOSABLE INCOME	1.0	3.4	6.4	9.3	11.9	13.8	15.2	16.1	17.0	18.9	20.9	23.1
DISPOSABLE INCOME(1958$)	1.0	3.3	5.9	8.0	9.6	10.3	10.2	9.4	8.6	8.3	8.0	7.7
PERSONAL SAVING	0.1	0.2	0.7	1.2	1.7	1.9	2.0	1.8	1.8	2.2	2.6	3.0
PRICES WAGES AND PRODUCTIVITY												
PRODUCTIVITY CHANGE(%)*	0.32	0.43	0.19	-0.05	-0.14	-0.19	-0.18	-0.18	-0.13	-0.07	-0.14	-0.15
WAGE CHANGE(%)*	0.02	0.06	0.13	0.21	0.29	0.34	0.36	0.37	0.37	0.37	0.37	0.37
NONFARM DEFLATOR CHANGE(%)*	-0.03	-0.03	0.04	0.10	0.17	0.22	0.26	0.28	0.29	0.30	0.32	0.32
UNEMPLOYMENT RATE	-0.001	-0.003	-0.006	-0.009	-0.011	-0.012	-0.011	-0.011	-0.010	-0.010	-0.009	-0.009

*Not in annual rates

2.2 Business Sector

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
EXTERNAL FINANCING DEFICIT*	0.4	1.6	4.3	6.5	8.1	8.0	7.4	6.5	5.7	5.5	5.6	6.0
CUMULATIVE FINANCING DEFICIT	0.2	1.0	3.2	6.4	10.4	14.4	18.1	21.4	24.2	27.0	29.8	32.8
UNPAID TAX LIABILITIES – FED.	0.3	0.9	1.3	1.6	1.1	1.0	0.9	0.6	0.5	0.4	0.4	0.4
UNPAID TAX LIABILITIES – S&L	0.0	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.0	0.0	-0.0
LONG TERM FINANCING	1.1	2.3	2.9	3.5	4.0	5.1	6.6	8.2	10.0	11.9	13.8	16.0
CORPORATE BONDS	0.6	1.1	0.8	0.5	0.7	1.8	3.5	5.3	7.2	8.9	10.6	12.3
CORPORATE STOCK	-0.0	-0.2	-0.3	-0.5	-0.7	-0.9	-0.9	-0.9	-0.9	-0.7	-0.6	-0.4
COMMERCIAL MORTGAGES	0.5	1.3	2.4	3.5	4.0	4.1	4.0	3.8	3.7	3.7	3.8	4.1
RESIDENTIAL MORTGAGE LIABILITIES	0.2	0.6	1.1	1.5	1.9	2.3	2.7	3.0	3.2	3.5	3.6	3.8
SHORT TERM FINANCING	-1.1	-1.9	-0.4	2.0	5.1	7.2	8.7	10.0	10.8	11.6	12.5	13.4
BANK LOANS	-0.5	-0.9	0.9	3.1	6.0	7.7	8.7	9.5	9.9	10.2	10.8	11.5
OPEN MARKET PAPER	-0.6	-1.0	-1.3	-1.2	-0.9	-0.5	-0.0	0.5	0.9	1.3	1.6	1.9
LIQUID ASSETS	-0.6	-0.1	0.6	1.2	1.2	0.9	0.7	0.6	0.5	0.5	0.5	0.6
MONEY	0.2	0.6	0.8	0.8	0.8	0.8	0.9	0.9	1.0	1.1	1.1	1.2
TIME DEPOSITS	-0.1	-0.1	-0.2	-0.1	-0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
MARKETABLE SECURITIES	-0.7	-0.5	-0.0	0.4	0.4	0.1	-0.2	-0.4	-0.6	-0.7	-0.7	-0.6

2.3 Federal Government

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
BUDGET SURPLUS*	1.0	2.9	4.9	6.2	6.8	6.8	6.8	6.5	6.2	6.1	5.8	5.8
CUMULATIVE FINANCING DEFICIT	-0.5	-2.0	-4.4	-7.6	-11.0	-14.4	-17.8	-21.0	-24.1	-27.2	-30.1	-33.0
UNPAID TAX LIABILITIES(+)	0.3	0.9	1.3	1.6	1.1	1.0	0.9	0.6	0.5	0.4	0.4	0.4
FHLBA ADVANCES(+)	-1.2	-1.4	-2.0	-2.8	-3.2	-3.5	-3.3	-2.8	-2.3	-1.7	-0.7	-0.6
FNMA MORTGAGES(+)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CURRENCY(-)	0.02	0.08	0.16	0.24	0.32	0.38	0.43	0.46	0.49	0.53	0.60	0.67
UNBORROWED RESERVES(-)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
LONG TERM DEBT	-0.1	-0.3	-0.9	-1.8	-3.1	-4.7	-6.3	-8.0	-9.7	-11.3	-12.8	-14.3
SHORT TERM DEBT	-2.4	-3.3	-5.5	-8.2	-11.3	-13.6	-15.3	-16.6	-17.7	-18.7	-19.2	-20.6

*Flow variable measured at annual rates

89

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
NIA BUDGET SURPLUS*	-0.1	-0.1	-0.3	-0.6	-0.9	-1.4	-1.9	-2.2	-2.5	-2.7	-2.9	-3.2
CUMULATIVE FINANCING DEFICIT	0.0	0.1	0.2	0.5	1.0	1.7	2.6	3.7	5.0	6.3	7.8	9.3
UNPAID TAX LIABILITIES	0.0	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.0	0.0	-0.0
LONG-TERM BONDS	0.6	1.2	1.6	1.6	1.1	0.8	0.7	1.0	1.5	2.2	3.2	4.4
SHORT-TERM DEBT	0.3	0.4	0.2	-0.1	-0.5	-0.8	-1.0	-1.2	-1.5	-1.7	-2.0	-2.3
FINANCIAL ASSETS	0.8	1.4	1.4	0.7	-0.6	-1.9	-3.1	-4.1	-5.0	-5.8	-6.6	-7.2
TIME DEPOSITS	0.9	1.1	1.1	0.4	-0.4	-1.0	-1.6	-2.1	-2.3	-2.3	-3.0	-3.8
SHORT TERM MARKET SECURITIES	0.2	0.1	-0.2	-0.4	-0.5	-0.4	-0.3	-0.3	-0.4	-0.8	-0.7	-0.7
LONG TERM MARKET SECURITIES	-0.3	0.2	0.6	0.7	0.3	-0.5	-1.2	-1.7	-2.3	-2.7	-2.8	-2.8

2.5 Commercial Banks

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
MONEY SUPPLY	2.50	3.71	5.42	6.23	7.00	7.31	6.89	6.32	5.94	5.78	6.13	6.31
CURRENCY	0.02	0.08	0.16	0.24	0.32	0.38	0.43	0.46	0.49	0.53	0.60	0.67
TIME DEPOSITS	4.6	7.3	9.6	9.1	8.2	8.0	7.8	7.4	7.6	7.9	8.1	8.0
HOUSEHOLDS	3.7	6.2	8.6	8.7	8.6	9.0	9.2	9.3	9.6	9.9	10.8	11.4
BUSINESS	-0.1	-0.1	-0.2	-0.1	-0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
STATE AND LOCAL GOVERNMENTS	0.9	1.1	1.1	0.4	-0.4	-1.0	-1.6	-2.1	-2.3	-2.3	-3.0	-3.8
FOREIGN	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3
EURODOLLAR LOANS	0.0	0.0	-3.4	-3.1	-2.8	-2.8	-2.7	-2.6	-2.7	-2.9	-2.9	-2.8
EARNING ASSETS	6.6	10.3	10.5	11.0	11.1	11.1	10.4	9.7	9.4	9.4	9.8	9.8
BANK LOANS TO BUSINESS	-0.5	-0.9	0.9	3.1	6.0	7.7	8.7	9.5	9.9	10.2	10.8	11.5
RESIDENTIAL MORTGAGES	0.2	0.8	1.6	2.1	2.4	2.4	2.1	1.7	1.4	1.0	0.8	0.6
CONSUMER CREDIT	0.2	0.8	1.4	1.9	2.3	2.6	2.8	2.8	2.7	2.7	2.6	2.6
STATE AND LOCAL BONDS	2.0	3.0	3.3	3.2	2.8	2.4	1.9	1.5	1.1	1.0	0.9	0.8
U.S. GOVERNMENT BONDS	0.4	0.8	1.1	1.1	0.9	0.5	0.1	-0.3	-0.7	-1.1	-1.4	-1.6
OTHER LONG TERM ASSETS	0.3	0.6	0.8	1.0	1.0	1.0	1.0	0.9	0.9	0.8	0.8	0.8
FREE RESERVES	0.54	0.31	0.04	-0.08	-0.10	-0.12	-0.07	-0.01	0.05	0.07	0.05	0.06
SHORT TERM CREDIT ASSETS	3.7	4.9	1.4	-1.4	-4.3	-5.5	-6.1	-6.5	-5.9	-5.3	-4.8	-4.9
MEMBER BANKS												
DEMAND DEPOSITS	2.09	3.06	4.43	5.02	5.62	5.77	5.40	4.88	4.52	4.30	4.44	4.54
TIME DEPOSITS	3.79	6.08	7.82	7.40	6.65	6.56	6.20	6.02	5.95	6.14	6.15	6.15
EXCESS LOAN DEMAND	-8.69	-9.66	-8.46	-5.09	-2.00	-0.37	0.75	1.26	1.41	1.22	1.47	1.71
UNBORROWED RESERVES	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

*Flow variables measured at annual rates

2.6 Nonbank Intermediaries

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
SAVINGS AND LOAN												
DEPOSITS	2.7	4.4	5.7	6.9	7.7	8.8	9.7	10.6	11.7	13.2	13.3	14.2
FEDERAL HOME LOAN ADVANCES	-1.2	-1.4	-2.0	-2.8	-3.2	-3.5	-3.3	-2.8	-2.3	-1.7	-0.7	-0.6
RESIDENTIAL MORTGAGES	0.7	1.9	3.0	3.9	4.8	5.9	7.2	8.6	10.0	11.4	12.3	12.7
SHORT TERM ASSETS	0.5	0.4	-0.0	-0.5	-0.7	-0.8	-0.6	-0.4	-0.1	0.2	0.3	0.6
LONG TERM ASSETS	0.2	0.4	0.5	0.4	0.1	-0.2	-0.6	-0.9	-1.0	-0.9	-0.7	-0.3
SAVINGS BANKS												
DEPOSITS	0.6	1.0	1.3	1.6	1.8	2.1	2.3	2.6	3.0	3.4	3.5	3.8
RESIDENTIAL MORTGAGES	0.3	0.7	1.3	2.0	2.6	3.2	3.6	3.9	4.1	4.2	4.3	4.4
SHORT TERM ASSETS	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
LONG TERM ASSETS	0.2	0.2	-0.0	-0.3	-0.7	-1.0	-1.2	-1.2	-1.1	-0.9	-0.7	-0.6
LIFE INSURANCE COS.												
RESERVES	0.4	0.8	1.2	1.6	1.9	2.1	2.4	2.6	2.7	2.9	3.0	3.2
RESIDENTIAL MORTGAGES	0.1	0.2	0.6	1.2	1.8	2.4	2.9	3.2	3.3	3.2	3.0	2.9
SHORT-TERM ASSETS	0.1	-0.1	-0.2	-0.3	-0.3	-0.3	-0.4	-0.5	-0.5	-0.6	-0.6	-0.6
LONG TERM ASSETS	0.2	0.7	1.0	1.0	0.7	0.4	0.2	0.2	0.4	0.7	1.1	1.4

2.7 Household Sector

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
PERSONAL SAVING*	0.1	0.2	0.7	1.2	1.7	1.9	2.0	1.8	1.8	2.2	2.6	3.0
RESIDENTIAL INVESTMENT*	1.3	3.2	3.8	3.2	2.6	2.0	1.7	1.3	1.2	1.2	0.7	0.2
NET FINANCIAL INVESTMENT*	-0.8	-2.0	-2.1	-1.3	-0.0	0.5	0.7	0.9	1.0	1.4	2.1	2.9
CONSUMER CREDIT LIABILITIES	0.3	1.1	2.4	3.6	4.7	5.5	6.2	6.6	6.7	6.9	7.0	7.2
RESIDENTIAL MORTGAGE LIABILITY	1.0	3.1	5.5	7.7	9.7	11.5	13.1	14.4	15.5	16.4	16.7	16.9
NET ACCUM. OF FIN. ASSETS*	1.8	3.8	5.1	5.7	6.1	5.9	5.3	4.3	3.5	3.6	3.0	3.4
STOCK OF FINANCIAL ASSETS	0.9	2.8	5.4	8.2	11.3	14.2	16.8	19.0	20.7	22.5	24.0	25.8
DEPOSITS												
TIME DEPOSITS	3.7	6.2	8.6	8.7	8.6	9.0	9.2	9.3	9.6	9.9	10.8	11.4
SAVINGS AND LOAN DEPOSITS	2.7	4.4	5.7	6.9	7.7	8.8	9.7	10.6	11.7	13.2	13.3	14.2
SAVINGS BANK DEPOSITS	0.6	1.0	1.3	1.6	1.8	2.1	2.3	2.6	3.0	3.4	3.5	3.8
LIFE INSURANCE RESERVES	0.4	0.8	1.2	1.6	1.9	2.1	2.4	2.6	2.7	2.9	3.0	3.2
SHORT TERM MARKET ASSETS	-6.8	-9.3	-11.6	-11.3	-10.8	-11.7	-12.4	-13.0	-14.4	-15.7	-16.5	-17.8
LONG TERM ASSETS	-1.0	-2.3	-3.4	-3.9	-3.6	-2.3	-0.3	1.5	3.2	4.3	5.1	6.2

*Flow variable measured at annual rates

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
MARKET RATES												
THREE MONTH BILL RATE	-1.087	-0.984	-0.784	-0.325	-0.075	-0.161	-0.243	-0.308	-0.451	-0.543	-0.512	-0.450
3-5 YEAR BOND RATE	-1.176	-1.170	-1.323	-1.017	-0.833	-0.840	-0.783	-0.738	-0.796	-0.829	-0.830	-0.823
CORPORATE BAA BOND RATE	-0.456	-0.768	-0.948	-1.065	-1.049	-1.056	-1.000	-0.903	-0.852	-0.823	-0.830	-0.844
CONVENTIONAL MORTGAGE RATE	-0.460	-0.579	-0.710	-0.744	-0.714	-0.737	-0.736	-0.715	-0.725	-0.748	-0.672	-0.683
STATE AND LOCAL BOND RATE	-0.595	-0.751	-0.900	-0.846	-0.786	-0.794	-0.772	-0.742	-0.761	-0.784	-0.778	-0.773
INSTITUTIONAL RATES												
CERTIFICATE OF DEPOSIT RATE	-1.025	-1.028	-0.844	-0.382	-0.093	-0.118	-0.170	-0.221	-0.354	-0.448	-0.428	-0.366
SAVINGS BANK DEPOSIT RATE	-0.121	-0.235	-0.331	-0.248	-0.205	-0.176	-0.141	-0.105	-0.075	-0.045	-0.124	-0.090
S&L DEPOSIT RATE	-0.079	-0.196	-0.299	-0.218	-0.181	-0.147	-0.114	-0.081	-0.056	-0.026	-0.122	-0.072
HOUSEHOLD DEPOSIT RATE	-0.038	-0.076	-0.119	-0.122	-0.097	-0.077	-0.057	-0.037	-0.024	-0.016	-0.038	-0.027
BANK LOAN RATE	-0.672	-0.944	-0.956	-0.783	-0.578	-0.517	-0.475	-0.432	-0.458	-0.491	-0.495	-0.472

2.9 Residential Mortgage Markets

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
TOTAL LIABILITIES	1.2	3.7	6.5	9.2	11.6	13.8	15.8	17.4	18.7	19.9	20.3	20.6
HOUSEHOLDS	1.0	3.1	5.5	7.7	9.7	11.5	13.1	14.4	15.5	16.4	16.7	16.9
BUSINESS	0.2	0.6	1.1	1.5	1.9	2.3	2.7	3.0	3.2	3.5	3.6	3.8
TOTAL ASSETS												
SAVINGS AND LOAN	0.7	1.9	3.0	3.9	4.8	5.9	7.2	8.6	10.0	11.4	12.3	12.7
SAVINGS BANKS	0.3	0.7	1.3	2.0	2.6	3.2	3.6	3.9	4.1	4.2	4.3	4.4
LIFE INSURANCE	0.1	0.2	0.6	1.2	1.8	2.4	2.9	3.2	3.3	3.2	3.0	2.9
COMMERCIAL BANKS	0.2	0.8	1.6	2.1	2.4	2.4	2.1	1.7	1.4	1.0	0.8	0.6
FEDERAL (FNMA)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ADDENDA												
FHLBA ADVANCES	-1.2	-1.4	-2.0	-2.8	-3.2	-3.5	-3.3	-2.8	-2.3	-1.7	-0.7	-0.6
MORTGAGE RATE	-0.460	-0.579	-0.710	-0.744	-0.714	-0.737	-0.736	-0.715	-0.725	-0.748	-0.672	-0.683
MORTGAGE STOCK CHANGE(%)	0.55	1.02	1.08	0.97	0.81	0.65	0.53	0.36	0.22	0.17	-0.03	-0.11
VACANCY RATE(%)	0.00	0.00	0.01	0.07	0.12	0.16	0.17	0.17	0.17	0.17	0.17	0.15

2.10 Long Term Credit Market Instruments

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
TOTAL ISSUES	1.6	3.2	3.6	3.2	2.0	1.2	1.0	1.2	1.9	2.9	4.2	6.1
BUSINESS	1.1	2.3	2.9	3.5	4.0	5.1	6.6	8.2	10.0	11.9	13.8	16.0
CORPORATE BONDS	0.6	1.1	0.8	0.5	0.7	1.8	3.5	5.3	7.2	8.9	10.6	12.3
CORPORATE STOCK	-0.0	-0.2	-0.3	-0.5	-0.7	-0.9	-0.9	-0.9	-0.9	-0.7	-0.6	-0.4
COMMERCIAL MORTGAGES	0.5	1.3	2.4	3.5	4.0	4.1	4.0	3.8	3.7	3.7	3.8	4.1
STATE AND LOCAL GOVERNMENTS	0.6	1.2	1.6	1.6	1.1	0.8	0.7	1.0	1.5	2.2	3.2	4.4
FEDERAL GOVERNMENT	-0.1	-0.3	-0.9	-1.8	-3.1	-4.7	-6.3	-8.0	-9.7	-11.3	-12.8	-14.3
HOLDERS												
COMMERCIAL BANKS	2.3	3.9	5.0	5.3	5.2	4.7	4.0	3.3	2.8	2.4	2.3	2.2
SAVINGS AND LOANS	0.2	0.4	0.5	0.4	0.1	-0.2	-0.6	-0.9	-1.0	-0.9	-0.7	-0.3
SAVINGS BANKS	0.2	0.2	-0.0	-0.3	-0.7	-1.0	-1.2	-1.2	-1.1	-0.9	-0.7	-0.6
LIFE INSURANCE	0.2	0.7	1.0	1.0	0.7	0.4	0.2	0.2	0.4	0.7	1.1	1.4
STATE AND LOCAL GOVERNMENT	-0.3	0.2	0.6	0.7	0.3	-0.5	-1.2	-1.7	-2.3	-2.7	-2.8	-2.8
FOREIGN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HOUSEHOLDS AND OTHERS	-1.0	-2.3	-3.4	-3.9	-3.6	-2.3	-0.3	1.5	3.2	4.3	5.1	6.2

2.11 Short Term Credit Market Instruments

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
TOTAL ISSUES	-2.7	-3.8	-6.5	-9.5	-12.7	-14.8	-16.3	-17.4	-18.3	-19.1	-19.5	-21.0
BUSINESS	-0.6	-1.0	-1.3	-1.2	-0.9	-0.5	-0.0	0.5	0.9	1.3	1.6	1.9
U.S. GOVERNMENT	-2.4	-3.3	-5.5	-8.2	-11.3	-13.6	-15.3	-16.6	-17.7	-18.7	-19.2	-20.6
STATE AND LOCAL GOVERNMENT	0.3	0.4	0.2	-0.1	-0.5	-0.8	-1.0	-1.2	-1.5	-1.7	-2.0	-2.3
COMMERCIAL BANKS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FOREIGN SECTOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HOLDERS												
BUSINESS	-0.7	-0.5	-0.0	0.4	0.4	0.1	-0.2	-0.4	-0.6	-0.7	-0.7	-0.6
STATE AND LOCAL GOVERNMENT	0.2	0.1	-0.2	-0.4	-0.5	-0.4	-0.3	-0.3	-0.4	-0.8	-0.7	-0.7
FOREIGN	-0.0	0.1	3.8	3.9	4.0	4.4	4.7	4.8	5.0	5.2	5.2	5.1
COMMERCIAL BANKS	3.9	5.3	1.6	-1.5	-4.8	-6.2	-7.1	-7.7	-7.4	-7.0	-6.8	-7.2
SAVINGS AND LOANS	0.5	0.4	-0.0	-0.5	-0.7	-0.8	-0.6	-0.4	-0.1	0.2	0.3	0.6
SAVINGS BANKS	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
LIFE INSURANCE	0.1	-0.1	-0.2	-0.3	-0.3	-0.3	-0.4	-0.5	-0.5	-0.6	-0.6	-0.5
HOUSEHOLDS AND OTHERS	-6.8	-9.3	-11.6	-11.3	-10.8	-11.7	-12.4	-13.0	-14.4	-15.7	-16.5	-17.8

TABLE 3

CHANGES IN SELECTED VARIABLES FOR $1 BILLION INCREASE IN FNMA MORTGAGE PURCHASES

3.1 National Income Accounts
(Seasonally adjusted at annual rates)

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
GROSS NATIONAL PRODUCT(1958$)	2.0	1.2	0.4	-0.8	-1.4	-1.8	-1.7	-1.2	-0.7	-0.1	0.2	0.3
PERSONAL CONSUMPTION	0.7	0.5	0.3	-0.1	-0.4	-0.6	-0.7	-0.6	-0.5	-0.2	-0.1	0.0
FIXED INVESTMENT	1.1	0.5	-0.0	-0.3	-0.5	-0.7	-0.7	-0.5	-0.3	-0.0	0.1	0.2
PRODUCER DURABLE GOODS	0.2	0.3	0.1	-0.1	-0.3	-0.4	-0.4	-0.3	-0.2	-0.1	0.0	0.1
NONRESIDENTIAL CONSTRUCTION	0.0	0.1	0.0	-0.0	-0.1	-0.2	-0.2	-0.2	-0.1	-0.0	0.0	0.0
RESIDENTIAL CONSTRUCTION	0.8	0.2	-0.2	-0.2	-0.1	-0.1	-0.0	-0.0	0.0	0.0	0.1	0.1
INVENTORY INVESTMENT	0.3	0.2	0.2	-0.4	-0.4	-0.5	-0.2	-0.0	0.1	0.2	0.2	0.2
NET EXPORTS	-0.1	-0.1	-0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	-0.0
GOVERNMENT PURCHASES												
FEDERAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
STATE AND LOCAL	-0.0	-0.0	-0.0	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
GROSS NATIONAL PRODUCT	2.0	1.3	0.7	-0.5	-1.1	-1.6	-1.6	-1.3	-0.8	-0.3	0.1	0.2
DISPOSABLE INCOME	0.7	0.6	0.6	0.1	-0.3	-0.6	-0.7	-0.7	-0.5	-0.3	-0.1	-0.0
DISPOSABLE INCOME(1958$)	0.7	0.6	0.4	-0.1	-0.5	-0.7	-0.8	-0.7	-0.5	-0.2	-0.1	0.0
PERSONAL SAVING	0.0	0.0	0.1	-0.0	-0.1	-0.1	-0.1	-0.0	0.0	0.0	-0.0	-0.0
PRICES WAGES AND PRODUCTIVITY												
PRODUCTIVITY CHANGE(%)	0.20	-0.17	-0.12	-0.04	0.04	0.02	0.03	0.02	0.01	0.01	0.00	0.00
WAGE CHANGE(%)	0.01	0.01	0.03	0.01	-0.00	-0.02	-0.02	-0.02	-0.02	-0.01	-0.01	-0.00
NONFARM DEFLATOR CHANGE(%)	-0.02	0.03	0.03	0.01	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.00
UNEMPLOYMENT RATE	-0.001	-0.001	-0.001	-0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.000	-0.000

3.2 Business Sector

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
EXTERNAL FINANCING DEFICIT*	0.3	0.4	0.5	-0.3	-0.7	-0.9	-0.8	-0.5	-0.2	0.1	0.2	0.2
CUMULATIVE FINANCING DEFICIT	0.2	0.4	0.6	0.5	0.1	-0.3	-0.7	-0.9	-1.0	-1.0	-0.9	-0.7
UNPAID TAX LIABILITIES – FED.	0.2	0.1	-0.0	-0.2	-0.1	-0.1	-0.1	-0.1	-0.0	0.0	-0.0	-0.0
UNPAID TAX LIABILITIES – S&L	0.0	0.0	0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	0.0	0.0	0.0
LONG TERM FINANCING	-0.0	-0.0	-0.0	0.0	0.2	0.2	0.1	-0.1	-0.2	-0.3	-0.4	-0.4
CORPORATE BONDS	-0.0	-0.1	0.0	0.1	0.2	0.2	0.1	-0.1	-0.2	-0.4	-0.4	-0.4
CORPORATE STOCK	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
COMMERCIAL MORTGAGES	-0.0	-0.0	-0.1	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
RESIDENTIAL MORTGAGE LIABILITIES	0.1	0.1	0.1	0.0	0.0	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2
SHORT TERM FINANCING	0.1	0.3	0.5	0.3	-0.1	-0.4	-0.5	-0.6	-0.5	-0.4	-0.3	-0.3
BANK LOANS	0.0	0.2	0.3	0.2	-0.2	-0.5	-0.5	-0.5	-0.4	-0.3	-0.2	-0.2
OPEN MARKET PAPER	0.0	0.1	0.1	0.2	0.1	0.1	0.0	-0.0	-0.1	-0.1	-0.1	-0.0
LIQUID ASSETS	0.3	0.1	-0.1	-0.2	-0.2	-0.1	0.0	0.0	0.1	0.0	-0.0	-0.1
MONEY	0.0	0.0	-0.0	-0.1	-0.1	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
TIME DEPOSITS	0.0	-0.0	-0.0	-0.0	-0.0	0.0	0.0	-0.0	-0.0	-0.1	-0.1	-0.0
MARKETABLE SECURITIES	0.2	0.1	-0.0	-0.1	-0.1	-0.0	0.0	0.1	0.1	0.1	0.1	0.0

3.3 Federal Government

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
BUDGET SURPLUS*	0.7	0.4	0.1	-0.3	-0.4	-0.6	-0.6	-0.4	-0.2	-0.0	0.1	0.1
CUMULATIVE FINANCING DEFICIT	-0.3	-0.5	-0.6	-0.4	-0.2	0.1	0.4	0.6	0.7	0.7	0.7	0.6
UNPAID TAX LIABILITIES(+)	0.2	0.1	-0.0	-0.2	-0.1	-0.1	-0.1	-0.1	-0.0	0.0	-0.0	-0.0
FHLBA ADVANCES(+)	0.1	0.1	0.1	0.1	0.1	0.1	0.0	-0.1	-0.2	-0.3	-0.4	-0.4
FNMA MORTGAGES(+)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
CURRENCY(–)	0.01	0.01	0.01	0.01	-0.00	-0.01	-0.01	-0.01	0.00	0.01	0.01	0.01
UNBORROWED RESERVES(–)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LONG TERM DEBT	-0.0	-0.1	-0.2	-0.2	-0.2	-0.1	-0.0	0.1	0.2	0.3	0.3	0.3
SHORT TERM DEBT	0.9	0.7	0.6	0.7	0.9	1.1	1.3	1.3	1.3	1.1	1.0	0.8

*Flow variable measured at annual rates

3.4 State and Local Governments

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
NIA BUDGET SURPLUS*	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
CUMULATIVE FINANCING DEFICIT	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2	-0.3	-0.3	-0.4	-0.5
UNPAID TAX LIABILITIES	0.0	0.0	0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	0.0	0.0	0.0
LONG-TERM BONDS	-0.0	-0.1	-0.2	-0.2	-0.1	-0.1	-0.0	-0.0	-0.1	-0.1	-0.2	-0.2
SHORT-TERM DEBT	-0.0	-0.1	-0.1	-0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
FINANCIAL ASSETS	-0.1	-0.1	-0.1	-0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.3
TIME DEPOSITS	-0.1	-0.1	-0.1	-0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.2
SHORT TERM MARKET SECURITIES	-0.0	-0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0
LONG TERM MARKET SECURITIES	0.0	-0.0	-0.0	-0.0	-0.1	0.0	0.1	0.1	0.2	0.2	0.2	0.1

3.5 Commercial Banks

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
MONEY SUPPLY	0.34	0.39	0.29	0.20	-0.04	-0.10	-0.03	0.12	0.26	0.32	0.28	0.17
CURRENCY	0.01	0.01	0.01	0.01	-0.00	-0.01	-0.01	-0.01	0.00	0.01	0.01	0.01
TIME DEPOSITS	-0.1	-0.4	-0.6	-0.6	-0.3	-0.2	-0.3	-0.2	-0.5	-0.6	-0.6	-0.3
HOUSEHOLDS	-0.0	-0.3	-0.5	-0.5	-0.4	-0.3	-0.4	-0.4	-0.5	-0.5	-0.5	-0.3
BUSINESS	0.0	-0.0	-0.0	-0.0	-0.0	0.0	0.0	-0.0	-0.0	-0.1	-0.1	-0.0
STATE AND LOCAL GOVERNMENTS	-0.1	-0.1	-0.1	-0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.2
FOREIGN	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.1	-0.1	-0.1
EURODOLLAR LOANS	0.0	0.0	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1
EARNING ASSETS	0.2	-0.0	-0.1	-0.2	-0.3	-0.2	-0.2	-0.0	-0.1	-0.1	-0.1	-0.0
BANK LOANS TO BUSINESS	0.0	0.2	0.3	0.2	-0.2	-0.5	-0.5	-0.5	-0.4	-0.3	-0.2	-0.2
RESIDENTIAL MORTGAGES	0.0	-0.0	-0.0	-0.1	-0.1	-0.1	-0.1	-0.0	-0.0	0.0	0.0	-0.0
CONSUMER CREDIT	0.1	0.2	0.2	0.1	0.0	-0.1	-0.1	-0.2	-0.1	-0.1	-0.0	0.0
STATE AND LOCAL BONDS	0.0	-0.1	-0.1	-0.1	-0.1	-0.0	0.0	0.1	0.1	0.1	0.1	0.1
U.S. GOVERNMENT BONDS	-0.0	-0.0	-0.1	-0.1	-0.1	-0.1	-0.0	0.1	0.1	0.1	0.1	0.1
OTHER LONG TERM ASSETS	0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	0.0	0.0	0.0	-0.0
FREE RESERVES	-0.04	-0.03	-0.02	-0.00	0.01	0.02	0.01	-0.01	-0.02	-0.02	-0.02	-0.01
SHORT TERM CREDIT ASSETS	0.1	-0.3	-0.4	-0.2	0.2	0.5	0.6	0.6	0.3	0.1	-0.0	0.0
MEMBER BANKS												
DEMAND DEPOSITS	0.28	0.32	0.23	0.16	-0.03	-0.07	-0.01	0.11	0.22	0.26	0.22	0.13
TIME DEPOSITS	-0.07	-0.32	-0.47	-0.51	-0.26	-0.18	-0.20	-0.20	-0.39	-0.49	-0.42	-0.19
EXCESS LOAN DEMAND	0.18	0.57	0.73	0.50	-0.05	-0.37	-0.45	-0.43	-0.18	0.03	0.10	0.01
UNBORROWED RESERVES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

*Flow variables measured at annual rates

3.6 Nonbank Intermediaries

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
SAVINGS AND LOAN												
DEPOSITS	-0.1	-0.3	-0.4	-0.5	-0.5	-0.5	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
FEDERAL HOME LOAN ADVANCES	0.1	0.1	0.1	0.1	0.1	0.1	0.0	-0.1	-0.2	-0.3	-0.4	-0.4
RESIDENTIAL MORTGAGES	-0.1	-0.2	-0.3	-0.4	-0.5	-0.5	-0.6	-0.7	-0.8	-0.9	-0.9	-0.9
SHORT TERM ASSETS	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	-0.0	-0.0	-0.1
LONG TERM ASSETS	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	0.0	0.1	0.1	0.0	0.0	-0.0
SAVINGS BANKS												
DEPOSITS	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2
RESIDENTIAL MORTGAGES	-0.1	-0.1	-0.2	-0.2	-0.2	-0.3	-0.4	-0.4	-0.4	-0.5	-0.5	-0.5
SHORT TERM ASSETS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LONG TERM ASSETS	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3
LIFE INSURANCE COS.												
RESERVES	0.0	0.0	-0.0	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
RESIDENTIAL MORTGAGES	0.0	-0.0	-0.1	-0.1	-0.2	-0.2	-0.3	-0.4	-0.4	-0.4	-0.4	-0.5
SHORT-TERM ASSETS	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
LONG TERM ASSETS	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2

3.7 Household Sector

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
PERSONAL SAVING*	0.0	0.0	0.1	-0.0	-0.1	-0.1	-0.1	-0.0	0.0	0.0	-0.0	-0.0
RESIDENTIAL INVESTMENT*	0.9	0.2	-0.2	-0.2	-0.1	-0.1	-0.0	-0.0	0.0	0.1	0.1	0.1
NET FINANCIAL INVESTMENT*	-0.6	-0.2	0.3	0.2	0.0	-0.1	-0.0	-0.0	-0.0	-0.0	-0.1	-0.1
CONSUMER CREDIT LIABILITIES	0.2	0.3	0.3	0.2	-0.0	-0.2	-0.3	-0.4	-0.4	-0.3	-0.2	-0.1
RESIDENTIAL MORTGAGE LIABILITY	0.8	0.5	0.3	0.2	0.0	-0.1	-0.3	-0.4	-0.5	-0.6	-0.7	-0.7
NET ACCUM. OF FIN. ASSETS*	1.3	-0.4	-0.1	-0.4	-0.7	-0.7	-0.6	-0.4	-0.2	-0.0	0.0	-0.0
STOCK OF FINANCIAL ASSETS	0.6	0.4	0.4	0.2	-0.2	-0.5	-0.8	-1.0	-1.1	-1.1	-1.1	-1.1
DEPOSITS												
TIME DEPOSITS	-0.0	-0.3	-0.5	-0.5	-0.4	-0.3	-0.4	-0.4	-0.5	-0.5	-0.5	-0.3
SAVINGS AND LOAN DEPOSITS	-0.1	-0.3	-0.4	-0.5	-0.5	-0.5	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
SAVINGS BANK DEPOSITS	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2
LIFE INSURANCE RESERVES	0.0	0.0	-0.0	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
SHORT TERM MARKET ASSETS	0.7	1.0	1.3	1.1	0.8	0.6	0.7	0.7	0.8	0.9	0.9	0.8
LONG TERM ASSETS	-0.2	-0.2	-0.2	-0.1	-0.0	-0.1	-0.3	-0.6	-0.8	-0.9	-0.9	-0.9

*Flow variable measured at annual rates

3.8 Interest Rates

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
MARKET RATES												
THREE MONTH BILL RATE	0.108	0.086	0.091	0.022	-0.033	-0.029	-0.003	0.012	0.037	0.043	0.035	0.024
3-5 YEAR BOND RATE	0.099	0.078	0.108	0.056	0.017	0.014	0.020	0.015	0.027	0.023	0.018	0.014
CORPORATE BAA BOND RATE	0.034	0.049	0.074	0.079	0.066	0.059	0.051	0.037	0.030	0.028	0.026	0.026
CONVENTIONAL MORTGAGE RATE	-0.026	0.049	0.054	0.038	0.018	0.009	0.003	-0.007	-0.011	-0.019	-0.024	-0.034
STATE AND LOCAL BOND RATE	0.043	0.050	0.070	0.058	0.038	0.033	0.033	0.028	0.032	0.031	0.028	0.023
INSTITUTIONAL RATES												
CERTIFICATE OF DEPOSIT RATE	0.101	0.084	0.095	0.000	-0.024	-0.030	-0.009	0.003	0.000	0.000	0.000	0.023
SAVINGS BANK DEPOSIT RATE	-0.007	0.008	0.017	0.011	0.007	0.004	0.002	0.000	-0.000	-0.001	-0.004	-0.003
S&L DEPOSIT RATE	-0.005	0.007	0.014	0.009	0.006	0.003	0.002	0.000	-0.000	-0.000	-0.004	-0.002
HOUSEHOLD DEPOSIT RATE	0.003	0.005	0.009	0.009	0.006	0.003	0.002	0.000	-0.000	0.000	0.001	0.001
BANK LOAN RATE	0.057	0.065	0.090	0.068	0.031	0.013	0.011	0.007	0.016	0.023	0.025	0.022

3.9 Residential Mortgage Market

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
TOTAL LIABILITIES	0.9	0.6	0.4	0.2	0.0	-0.2	-0.3	-0.5	-0.6	-0.7	-0.8	-0.9
HOUSEHOLDS	0.8	0.5	0.3	0.2	0.0	-0.1	-0.3	-0.4	-0.5	-0.6	-0.7	-0.7
BUSINESS	0.1	0.1	0.1	0.0	0.0	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2
TOTAL ASSETS												
SAVINGS AND LOAN	-0.1	-0.2	-0.3	-0.4	-0.5	-0.5	-0.6	-0.7	-0.8	-0.9	-0.9	-0.9
SAVINGS BANKS	-0.1	-0.1	-0.2	-0.2	-0.2	-0.3	-0.4	-0.4	-0.4	-0.5	-0.5	-0.5
LIFE INSURANCE	0.0	-0.0	-0.1	-0.1	-0.2	-0.2	-0.3	-0.4	-0.4	-0.4	-0.4	-0.5
COMMERCIAL BANKS	0.0	-0.0	-0.0	-0.1	-0.1	-0.1	-0.1	-0.0	-0.0	0.0	0.0	-0.0
FEDERAL (FNMA)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
ADDENDA												
FHLBA ADVANCES	0.1	0.1	0.1	0.1	0.1	0.1	0.0	-0.1	-0.2	-0.3	-0.4	-0.4
MORTGAGE RATE	-0.026	0.049	0.054	0.038	0.018	0.009	0.003	-0.007	-0.011	-0.019	-0.024	-0.034
MORTGAGE STOCK CHANGE(%)	0.39	-0.14	-0.09	-0.07	-0.07	-0.07	-0.07	-0.05	-0.04	-0.02	-0.02	-0.02
VACANCY RATE(%)	0.00	0.01	0.04	0.05	0.04	0.04	0.05	0.05	0.06	0.06	0.07	0.08

3.10 Long Term Credit Market Instruments

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
TOTAL ISSUES	-0.1	-0.2	-0.4	-0.4	-0.2	-0.0	0.0	0.0	-0.1	-0.2	-0.2	-0.3
BUSINESS	-0.0	-0.0	-0.0	0.0	0.2	0.2	0.1	-0.1	-0.2	-0.3	-0.4	-0.4
CORPORATE BONDS	-0.0	-0.1	0.0	0.1	0.2	0.2	0.1	-0.1	-0.2	-0.4	-0.4	-0.4
CORPORATE STOCK	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
COMMERCIAL MORTGAGES	-0.0	-0.0	-0.1	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
STATE AND LOCAL GOVERNMENTS	-0.0	-0.1	-0.2	-0.2	-0.1	-0.1	-0.0	-0.0	-0.1	-0.1	-0.2	-0.2
FEDERAL GOVERNMENT	-0.0	-0.1	-0.2	-0.2	-0.2	-0.1	-0.0	0.1	0.2	0.3	0.3	0.3
HOLDERS												
COMMERCIAL BANKS	0.0	-0.0	-0.2	-0.2	-0.2	-0.2	-0.1	0.1	0.1	0.1	0.1	0.1
SAVINGS AND LOANS	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	0.0	0.1	0.1	0.0	0.0	-0.0
SAVINGS BANKS	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3
LIFE INSURANCE	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
STATE AND LOCAL GOVERNMENTS	0.0	-0.0	-0.0	-0.0	-0.1	0.0	0.0	0.1	0.2	0.2	0.2	0.1
FOREIGN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HOUSEHOLDS AND OTHERS	-0.2	-0.2	-0.2	-0.1	-0.0	-0.1	-0.3	-0.6	-0.8	-0.9	-0.9	-0.9

3.11 Short Term Credit Market Instruments

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
TOTAL ISSUES	0.9	0.8	0.7	0.9	1.1	1.3	1.4	1.4	1.3	1.1	1.0	0.9
BUSINESS	0.0	0.1	0.1	0.2	0.1	0.1	0.0	-0.0	-0.1	-0.1	-0.1	-0.0
U.S. GOVERNMENT	0.9	0.7	0.6	0.7	0.9	1.1	1.3	1.3	1.3	1.1	1.0	0.8
STATE AND LOCAL GOVERNMENT	-0.0	-0.1	-0.1	-0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
COMMERCIAL BANKS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FOREIGN SECTOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HOLDERS												
BUSINESS	0.2	0.1	0.0	-0.1	-0.1	-0.0	0.0	0.1	0.1	0.1	0.1	0.0
STATE AND LOCAL GOVERNMENT	-0.0	-0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0
FOREIGN	0.0	0.1	-0.1	-0.1	-0.0	-0.1	-0.1	-0.2	-0.3	-0.3	-0.2	-0.1
COMMERCIAL BANKS	0.0	-0.4	-0.4	-0.2	0.3	0.5	0.6	0.6	0.4	0.2	0.1	0.1
SAVINGS AND LOAN	-0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	-0.0	-0.1
SAVINGS BANKS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LIFE INSURANCE	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
HOUSEHOLDS AND OTHERS	0.7	1.0	1.3	1.1	0.8	0.6	0.7	0.7	0.8	0.9	0.9	0.8

TABLE 4

CHANGES IN SELECTED VARIABLES FOR A $1 BILLION INCREASE IN FEDERAL PURCHASES, 1958 DOLLARS

4.1 National Income Accounts
(Seasonally adjusted at annual rates)

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
GROSS NATIONAL PRODUCT(1958$)	1.9	2.6	3.4	3.2	3.0	2.4	1.9	1.5	1.2	1.3	1.7	2.2
PERSONAL CONSUMPTION	0.4	0.8	1.2	1.4	1.4	1.3	1.1	0.9	0.8	0.7	0.9	1.1
FIXED INVESTMENT	0.2	0.5	0.7	0.7	0.5	0.4	0.2	0.0	-0.1	-0.0	0.1	0.3
PRODUCER DURABLE GOODS	0.2	0.4	0.6	0.6	0.5	0.4	0.2	0.1	0.1	0.1	0.2	0.3
NONRESIDENTIAL CONSTRUCTION	0.0	0.1	0.1	0.2	0.1	0.1	0.0	0.0	-0.0	0.0	0.0	0.1
RESIDENTIAL CONSTRUCTION	-0.0	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2	-0.1	-0.1
INVENTORY INVESTMENT	0.3	0.4	0.7	0.3	0.2	-0.1	-0.2	-0.2	-0.2	-0.1	0.0	0.1
NET EXPORTS	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
GOVERNMENT PURCHASES												
FEDERAL	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
STATE AND LOCAL	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1
GROSS NATIONAL PRODUCT	2.0	2.9	4.0	4.2	4.4	4.2	4.2	4.2	4.4	5.0	6.1	7.3
DISPOSABLE INCOME	0.7	1.2	1.8	2.1	2.3	2.3	2.4	2.5	2.6	2.9	3.5	4.1
DISPOSABLE INCOME(1958$)	0.7	1.1	1.5	1.6	1.6	1.4	1.2	1.0	0.8	0.9	1.1	1.3
PERSONAL SAVING	0.3	0.3	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.4	0.5	0.5
PRICES WAGES AND PRODUCTIVITY												
PRODUCTIVITY CHANGE(%)	0.17	-0.02	-0.02	-0.05	-0.02	-0.03	-0.00	-0.01	-0.01	0.00	0.02	0.00
WAGE CHANGE(%)	0.01	0.02	0.05	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05
NONFARM DEFLATOR CHANGE(%)	-0.01	0.02	0.03	0.04	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.04
UNEMPLOYMENT RATE	-0.001	-0.001	-0.002	-0.002	-0.002	-0.002	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001

4.2 Business Sector

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
EXTERNAL FINANCING DEFICIT*	-0.0	0.3	0.8	0.7	0.5	0.1	-0.1	-0.2	-0.2	-0.1	0.2	0.5
CUMULATIVE FINANCING DEFICIT	-0.0	0.1	0.5	0.9	1.1	1.2	1.1	1.0	0.9	0.9	1.0	1.2
UNPAID TAX LIABILITIES – FED.	0.2	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
UNPAID TAX LIABILITIES – S&L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LONG TERM FINANCING	0.0	0.0	0.0	0.1	0.3	0.5	0.7	0.9	0.9	1.0	1.0	1.1
CORPORATE BONDS	-0.0	-0.0	-0.1	0.0	0.2	0.3	0.4	0.5	0.4	0.4	0.4	0.4
CORPORATE STOCK	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
COMMERCIAL MORTGAGES	0.0	0.0	-0.0	-0.0	-0.1	-0.0	0.0	0.1	0.1	0.1	0.2	0.2
RESIDENTIAL MORTGAGE LIABILITIES	-0.0	-0.0	-0.0	-0.0	-0.1	-0.1	-0.2	-0.2	-0.3	-0.3	-0.4	-0.4
SHORT TERM FINANCING	-0.1	0.0	0.4	0.5	0.6	0.4	0.3	0.2	0.2	0.2	0.3	0.4
BANK LOANS	-0.1	0.0	0.3	0.4	0.3	0.2	0.0	-0.1	-0.1	-0.1	-0.1	-0.0
OPEN MARKET PAPER	0.0	0.0	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4
LIQUID ASSETS	0.1	0.2	0.1	0.0	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0
MONEY	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
TIME DEPOSITS	0.0	0.0	0.0	-0.1	-0.1	0.0	0.0	0.0	-0.0	-0.1	-0.1	-0.0
MARKETABLE SECURITIES	0.1	0.1	0.0	0.1	-0.1	-0.2	-0.2	-0.1	0.0	0.1	0.1	-0.0

4.3 Federal Government

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
BUDGET SURPLUS*	-0.5	-0.3	-0.0	-0.1	-0.2	-0.4	-0.5	-0.6	-0.6	-0.6	-0.5	-0.3
CUMULATIVE FINANCING DEFICIT	0.3	0.4	0.4	0.5	0.6	0.7	1.0	1.3	1.5	1.8	2.1	2.2
UNPAID TAX LIABILITIES(+)	0.2	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
FHLBA ADVANCES(+)	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.2	0.2	0.0	-0.0
FNMA MORTGAGES(+)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CURRENCY(–)	0.01	0.02	0.03	0.04	0.04	0.05	0.05	0.05	0.06	0.07	0.08	0.09
UNBORROWED RESERVES(–)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LONG TERM DEBT	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.6	0.7	0.8	1.0
SHORT TERM DEBT	0.4	0.6	0.6	0.6	0.6	0.7	0.9	1.1	1.2	1.3	1.3	1.3

*Flow variable measured at annual rates

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
NIA BUDGET SURPLUS*	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
CUMULATIVE FINANCING DEFICIT	-0.0	-0.1	-0.2	-0.2	-0.3	-0.3	-0.4	0.4	-0.5	-0.6	-0.6	-0.8
UNPAID TAX LIABILITIES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LONG-TERM BONDS	-0.0	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2	-0.3	-0.3	-0.3	-0.4	-0.4
SHORT-TERM DEBT	-0.0	-0.0	-0.1	-0.1	-0.0	-0.0	0.0	0.0	0.0	0.1	0.1	0.1
FINANCIAL ASSETS	-0.0	-0.0	-0.1	-0.1	-0.1	0.0	0.1	0.2	0.2	0.3	0.4	0.4
TIME DEPOSITS	-0.0	-0.1	-0.1	-0.3	-0.0	0.0	0.1	0.1	-0.1	-0.0	-0.0	0.2
SHORT TERM MARKET SECURITIES	-0.0	-0.0	0.0	0.2	-0.0	0.0	0.0	-0.0	0.1	0.2	0.2	-0.0
LONG TERM MARKET SECURITIES	0.0	0.0	0.0	0.0	-0.0	-0.0	0.0	0.1	0.2	0.2	0.2	0.2

4.5 Commercial Banks

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
MONEY SUPPLY	0.12	0.30	0.42	0.58	0.33	0.30	0.28	0.29	0.48	0.52	0.59	0.58
CURRENCY	0.01	0.02	0.03	0.04	0.04	0.05	0.05	0.05	0.06	0.07	0.08	0.09
TIME DEPOSITS	-0.0	-0.2	-0.4	-1.0	-0.5	-0.3	-0.2	-0.3	-0.9	-1.1	-1.1	-0.7
HOUSEHOLDS	-0.0	-0.1	-0.3	-0.6	-0.4	-0.3	-0.3	-0.4	-0.7	-0.9	-0.9	-0.7
BUSINESS	0.0	0.0	0.0	-0.1	-0.1	0.0	0.0	0.0	-0.0	-0.1	-0.1	-0.0
STATE AND LOCAL GOVERNMENTS	-0.0	-0.1	-0.1	-0.3	-0.0	0.0	0.1	0.1	-0.1	-0.0	-0.0	0.2
FOREIGN	-0.0	-0.0	-0.0	-0.1	-0.1	-0.0	-0.0	-0.0	-0.1	-0.1	-0.1	-0.1
EURODOLLAR LOANS	0.0	0.0	0.2	0.4	0.2	0.1	0.1	0.1	0.3	0.4	0.4	0.2
EARNING ASSETS	0.1	0.1	0.1	-0.1	-0.1	0.0	0.1	0.0	-0.2	-0.3	-0.2	0.0
BANK LOANS TO BUSINESS	-0.1	0.0	0.3	0.4	0.3	0.2	0.0	-0.1	-0.1	-0.1	-0.1	-0.0
RESIDENTIAL MORTGAGES	0.0	0.0	-0.0	-0.0	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
CONSUMER CREDIT	0.1	0.2	0.3	0.5	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.8
STATE AND LOCAL BONDS	0.0	-0.0	-0.0	-0.1	-0.2	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2
U.S. GOVERNMENT BONDS	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3
OTHER LONG TERM ASSETS	0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.1	-0.1	-0.1
FREE RESERVES	-0.01	-0.03	-0.04	-0.03	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	-0.03	-0.04
SHORT TERM CREDIT ASSETS	0.1	-0.1	-0.4	-0.8	-0.8	-0.5	-0.4	-0.4	-0.5	-0.6	-0.6	-0.6
MEMBER BANKS												
DEMAND DEPOSITS	0.10	0.24	0.33	0.45	0.24	0.21	0.19	0.20	0.35	0.37	0.41	0.40
TIME DEPOSITS	-0.04	-0.14	-0.32	-0.80	-0.43	-0.22	-0.16	-0.26	-0.72	-0.86	-0.85	-0.52
EXCESS LOAN DEMAND	0.00	0.24	0.68	1.16	0.93	0.67	0.52	0.52	0.83	0.90	0.94	0.85
UNBORROWED RESERVES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

*Flow variables measured at annual rates

4.6 Nonbank Intermediaries

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
SAVINGS AND LOAN												
DEPOSITS	-0.0	-0.1	-0.2	-0.3	-0.3	-0.4	-0.4	-0.6	-0.8	-0.9	-0.8	-0.9
FEDERAL HOME LOAN ADVANCES	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.2	0.2	0.0	-0.0
RESIDENTIAL MORTGAGES	-0.0	-0.0	-0.1	-0.1	-0.2	-0.2	-0.3	-0.4	-0.6	-0.8	-0.9	-1.0
SHORT TERM ASSETS	-0.0	-0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
LONG TERM ASSETS	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	0.0	0.0	0.1	0.1	0.1
SAVINGS BANKS												
DEPOSITS	-0.0	-0.0	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2
RESIDENTIAL MORTGAGES	-0.0	-0.0	-0.1	-0.1	-0.2	-0.2	-0.3	-0.4	-0.4	-0.5	-0.5	-0.6
SHORT TERM ASSETS	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LONG TERM ASSETS	-0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3
LIFE INSURANCE COS.												
RESERVES	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
RESIDENTIAL MORTGAGES	0.0	0.0	-0.0	-0.0	-0.1	-0.1	-0.2	-0.3	-0.3	-0.4	-0.4	-0.4
SHORT-TERM ASSETS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
LONG TERM ASSETS	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.4

4.7 Household Sector

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
PERSONAL SAVING*	0.3	0.3	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.4	0.5	0.5
RESIDENTIAL INVESTMENT*	-0.0	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2	-0.1	0.0
NET FINANCIAL INVESTMENT*	0.3	0.3	0.4	0.4	0.3	0.3	0.2	0.3	0.4	0.5	0.5	0.5
CONSUMER CREDIT LIABILITIES	0.1	0.3	0.5	0.8	0.9	1.0	1.0	1.0	0.9	0.9	1.0	1.1
RESIDENTIAL MORTGAGE LIABILITY	-0.0	-0.0	-0.1	-0.2	-0.4	-0.6	-0.8	-1.0	-1.3	-1.5	-1.7	-1.9
NET ACCUM. OF FIN. ASSETS*	0.4	0.6	0.7	0.5	0.3	0.1	-0.1	-0.2	-0.3	-0.1	0.2	0.4
STOCK OF FINANCIAL ASSETS	0.2	0.5	0.9	1.2	1.4	1.4	1.4	1.3	1.1	1.1	1.2	1.4
DEPOSITS												
TIME DEPOSITS	-0.0	-0.1	-0.3	-0.6	-0.4	-0.3	-0.3	-0.4	-0.7	-0.9	-0.9	-0.7
SAVINGS AND LOAN DEPOSITS	-0.0	-0.1	-0.2	-0.3	-0.3.	-0.4	-0.4	-0.6	-0.8	-0.9	-0.8	-0.9
SAVINGS BANK DEPOSITS	-0.0	-0.0	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2
LIFE INSURANCE RESERVES	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
SHORT TERM MARKET ASSETS	0.2	0.5	1.0	1.4	1.4	1.2	1.2	1.4	1.6	1.7	1.8	2.0
LONG TERM ASSETS	-0.1	-0.1	-0.1	0.0	0.2	0.4	0.5	0.5	0.5	0.6	0.7	0.7

*Flow variables measured at annual rates

4.8 Interest Rates

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
MARKET RATES												
THREE MONTH BILL RATE	0.042	0.074	0.114	0.099	0.060	0.029	0.025	0.057	0.066	0.062	0.061	0.087
3-5 YEAR BOND RATE	0.037	0.063	0.108	0.100	0.081	0.067	0.064	0.090	0.089	0.080	0.077	0.101
CORPORATE BAA BOND RATE	0.015	0.035	0.065	0.087	0.098	0.103	0.104	0.111	0.113	0.109	0.112	0.121
CONVENTIONAL MORTGAGE RATE	0.009	0.021	0.042	0.055	0.056	0.054	0.053	0.063	0.063	0.057	0.044	0.050
STATE AND LOCAL BOND RATE	0.016	0.031	0.057	0.071	0.064	0.059	0.058	0.072	0.082	0.083	0.081	0.086
INSTITUTIONAL RATES												
CERTIFICATE OF DEPOSIT RATE	0.040	0.069	0.105	0.000	0.074	0.041	0.034	0.061	0.000	0.000	0.000	0.095
SAVINGS BANK DEPOSIT RATE	0.002	0.007	0.015	0.013	0.011	0.009	0.007	0.006	0.004	0.002	0.008	0.005
S&L DEPOSIT RATE	0.002	0.005	0.012	0.010	0.008	0.006	0.004	0.003	0.003	0.001	0.008	0.004
HOUSEHOLD DEPOSIT RATE	0.001	0.003	0.008	0.009	0.009	0.007	0.005	0.004	0.003	0.002	0.005	0.004
BANK LOAN RATE	0.023	0.046	0.085	0.106	0.105	0.089	0.081	0.092	0.097	0.100	0.103	0.117

4.9 Residential Mortgage Market

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
TOTAL LIABILITIES	-0.0	-0.0	-0.1	-0.3	-0.5	-0.7	-0.9	-1.2	-1.5	-1.8	-2.1	-2.3
HOUSEHOLDS	-0.0	-0.0	-0.1	-0.2	-0.4	-0.6	-0.8	-1.0	-1.3	-1.5	-1.7	-1.9
BUSINESS	-0.0	-0.0	-0.0	-0.0	-0.1	-0.1	-0.2	-0.2	-0.3	-0.3	-0.4	-0.4
TOTAL ASSETS												
SAVINGS AND LOAN	-0.0	-0.0	-0.1	-0.1	-0.2	-0.2	-0.3	-0.4	-0.6	-0.8	-0.9	-1.0
SAVINGS BANKS	-0.0	-0.0	-0.1	-0.1	-0.2	-0.2	-0.3	-0.4	-0.4	-0.5	-0.5	-0.6
LIFE INSURANCE	0.0	0.0	-0.0	-0.0	-0.1	-0.1	-0.2	-0.3	-0.3	-0.4	-0.4	-0.4
COMMERCIAL BANKS	0.0	0.0	-0.0	-0.0	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
FEDERAL(FNMA)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ADDENDA												
FHLBA ADVANCES	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.2	0.2	0.0	-0.0
MORTGAGE RATE	0.009	0.021	0.042	0.055	0.056	0.054	0.053	0.063	0.063	0.057	0.044	0.050
MORTGAGE STOCK CHANGE(%)	-0.00	-0.01	-0.04	-0.06	-0.07	-0.07	-0.07	-0.09	-0.09	-0.09	-0.06	-0.05
VACANCY RATE(%)	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03

4.10 Long Term Credit Market Instruments

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
TOTAL ISSUES	0.0	0.0	0.0	0.1	0.3	0.6	0.9	1.0	1.2	1.3	1.5	1.6
BUSINESS	0.0	0.0	0.0	0.1	0.3	0.5	0.7	0.9	0.9	1.0	1.0	1.1
CORPORATE BONDS	-0.0	-0.0	-0.1	0.0	0.2	0.3	0.4	0.5	0.4	0.4	0.4	0.4
COMMERCIAL MORTGAGES	0.0	0.0	-0.0	-0.0	-0.1	-0.0	0.0	0.1	0.1	0.1	0.2	0.2
STATE AND LOCAL GOVERNMENTS	-0.0	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2	-0.3	-0.3	-0.3	-0.4	-0.4
FEDERAL GOVERNMENT	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.6	0.7	0.8	1.0
HOLDERS												
COMMERCIAL BANKS	0.0	0.1	0.1	-0.0	-0.0	-0.1	-0.0	-0.0	-0.1	-0.1	-0.1	-0.0
SAVINGS AND LOANS	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	0.0	0.0	0.1	0.1	0.1
SAVINGS BANKS	-0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3
LIFE INSURANCE	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.4
STATE AND LOCAL GOVERNMENT	0.0	0.0	0.0	0.0	-0.0	-0.0	0.0	0.1	0.2	0.2	0.3	0.2
FOREIGN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HOUSEHOLDS AND OTHERS	-0.1	-0.1	-0.1	0.0	0.2	0.4	0.5	0.5	0.5	0.6	0.7	0.7

4.11 Short Term Credit Market Instruments

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
TOTAL ISSUES	0.4	0.6	0.6	0.7	0.8	1.0	1.2	1.4	1.6	1.7	1.8	1.8
BUSINESS	0.0	0.0	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4
U.S. GOVERNMENT	0.4	0.6	0.6	0.6	0.6	0.7	0.9	1.1	1.2	1.3	1.3	1.3
STATE AND LOCAL GOVERNMENT	-0.0	-0.0	-0.1	-0.1	-0.0	-0.0	0.0	0.0	0.0	0.1	0.1	0.1
COMMERCIAL BANKS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FOREIGN SECTOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HOLDERS												
BUSINESS	0.1	0.1	0.0	0.1	-0.1	-0.2	-0.2	-0.1	0.0	0.1	0.1	-0.0
STATE AND LOCAL GOVERNMENT	-0.0	-0.0	0.0	0.2	-0.0	0.0	0.0	-0.0	0.1	0.2	0.2	-0.0
FOREIGN	0.0	0.1	-0.0	-0.1	0.1	0.3	0.3	0.3	0.1	0.0	0.0	0.2
COMMERCIAL BANKS	0.1	-0.1	-0.5	-0.8	-0.8	-0.5	-0.4	-0.4	-0.5	-0.5	-0.5	-0.5
SAVINGS AND LOAN	-0.0	-0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
SAVINGS BANKS	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LIFE INSURANCE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1
HOUSEHOLDS AND OTHERS	0.2	0.5	1.0	1.4	1.4	1.2	1.2	1.4	1.6	1.7	1.8	2.0

TABLE 5

ACTUAL VALUES OF SELECTED VARIABLES

5.1 National Income Accounts
(Seasonally adjusted at annual rates)

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
GROSS NATIONAL PRODUCT(1958$)	606.0	629.6	652.1	664.1	669.1	681.2	699.0	714.4	724.1	727.2	721.8	722.4
PERSONAL CONSUMPTION	390.7	404.8	415.2	421.0	427.3	433.0	446.5	459.0	467.4	470.9	475.5	478.4
FIXED INVESTMENT	87.7	92.7	95.8	95.0	92.1	95.1	98.5	99.1	103.8	103.7	100.5	99.4
PRODUCER DURABLE GOODS	42.4	45.7	48.8	51.4	50.5	50.7	51.7	52.8	55.5	56.1	54.9	53.2
NONRESIDENTIAL CONSTRUCTION	21.4	23.2	24.2	23.8	23.0	22.2	23.5	23.2	23.8	24.8	24.0	23.2
RESIDENTIAL CONSTRUCTION	23.9	23.8	22.9	19.7	18.6	22.2	23.2	23.2	24.6	22.8	21.7	23.0
INVENTORY INVESTMENT	9.9	9.4	13.7	15.9	7.0	9.4	6.3	7.9	7.5	8.1	3.9	5.9
NET EXPORTS	6.2	6.2	5.2	3.2	4.1	3.2	1.3	0.6	-0.4	0.8	1.9	2.4
GOVERNMENT PURCHASES												
FEDERAL	56.8	59.1	62.9	68.0	73.9	75.5	77.9	78.2	75.0	71.9	66.9	62.5
STATE AND LOCAL	55.5	58.0	60.0	62.2	65.1	66.0	68.9	70.3	71.9	72.9	73.7	74.9
GROSS NATIONAL PRODUCT	669.2	700.6	736.4	763.3	779.5	808.4	845.7	882.7	915.3	945.3	964.9	988.0
DISPOSABLE INCOME	460.3	486.2	502.9	520.8	537.4	555.3	581.7	600.3	619.1	649.7	677.6	701.5
DISPOSABLE INCOME(1958$)	424.2	445.5	454.1	463.7	473.3	481.8	495.5	502.5	507.7	519.2	529.2	537.2
PERSONAL SAVING	24.8	32.1	30.4	34.7	38.5	42.3	42.9	36.6	32.9	43.6	51.1	58.6
PRICES WAGES AND PRODUCTIVITY												
PRODUCTIVITY CHANGE(%)	1.06	2.11	1.44	0.54	0.38	1.18	1.80	0.81	-0.44	-0.45	-0.10	1.92
WAGE CHANGE(%)	2.02	1.81	2.10	2.05	2.62	2.50	3.32	3.20	3.15	3.37	3.08	3.57
NONFARM DEFLATOR CHANGE(%)	0.83	0.35	1.05	1.78	1.56	1.69	1.71	1.86	2.24	2.44	2.49	2.40
UNEMPLOYMENT RATE	0.048	0.042	0.038	0.037	0.038	0.039	0.036	0.035	0.034	0.036	0.045	0.055

5.2 Business Sector

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
EXTERNAL FINANCING DEFICIT*	16.9	17.4	22.1	24.5	15.1	18.6	18.8	23.0	30.2	35.1	32.9	30.9
CUMULATIVE FINANCING DEFICIT	227.5	236.2	247.2	259.5	267.0	276.3	285.7	297.2	312.3	329.9	346.3	361.8
UNPAID TAX LIABILITIES – FED.	17.7	18.3	16.9	17.6	12.7	13.2	15.8	14.8	13.5	12.3	10.3	9.3
UNPAID TAX LIABILITIES – S&L	1.5	1.6	1.7	1.8	1.9	2.1	2.6	2.8	2.5	2.1	1.7	1.3
LONG TERM FINANCING	345.7	351.3	362.1	369.2	379.2	391.9	401.5	411.3	422.2	434.8	449.9	469.7
CORPORATE BONDS	110.1	113.9	120.0	124.9	132.0	140.6	147.0	154.3	161.7	168.0	177.6	190.8
CORPORATE STOCK	183.3	182.9	184.3	184.1	184.8	186.4	186.6	185.6	186.2	189.9	193.0	196.7
COMMERCIAL MORTGAGES	52.3	54.5	57.7	60.1	62.4	64.8	67.9	71.4	74.3	76.9	79.3	82.3
RESIDENTIAL MORTGAGE LIABILITY	37.8	39.7	41.6	41.9	44.1	46.6	48.4	50.4	52.6	54.6	56.9	60.8
SHORT TERM FINANCING	85.7	93.6	101.4	107.1	112.6	116.6	123.1	134.1	146.8	158.4	164.8	164.2
BANK LOANS	76.2	83.7	90.4	92.8	96.0	98.7	103.6	112.0	121.2	128.6	132.8	131.7
OPEN MARKET PAPER	9.5	9.9	11.0	14.4	16.5	17.9	19.4	22.1	25.6	29.8	32.0	32.5
LIQUID ASSETS	70.4	71.1	73.1	67.7	65.7	72.7	76.6	78.4	79.6	78.4	80.4	77.6
MONEY	32.8	33.0	33.9	33.6	33.3	35.4	36.2	36.8	37.0	38.7	38.8	39.2
TIME DEPOSITS	12.5	13.1	13.4	11.7	12.9	13.8	13.8	14.2	13.4	11.8	11.5	13.5
MARKETABLE SECURITIES	25.1	24.9	25.7	22.3	19.5	23.5	26.6	27.4	29.1	27.9	30.1	24.9

5.3 Federal Government

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
BUDGET SURPLUS*	4.6	–2.1	2.2	–2.7	–12.1	–12.7	–10.5	–2.5	10.7	5.5	–8.6	–17.2
CUMULATIVE FINANCING DEFICIT	221.0	222.0	220.9	222.2	228.3	234.6	239.8	241.1	235.7	232.9	237.2	245.8
UNPAID TAX LIABILITIES(+)	17.7	18.3	16.9	17.6	12.7	13.2	15.8	14.8	13.5	12.3	10.3	9.3
FHLBA ADVANCES(+)	5.9	6.0	7.1	6.9	4.6	4.4	5.2	5.3	6.8	9.3	10.7	10.6
FNMA MORTGAGES(+)	2.1	2.5	3.7	4.4	4.6	5.5	6.7	7.2	8.3	11.0	13.9	16.4
CURRENCY(–)	35.00	36.30	37.40	38.30	39.30	40.40	41.90	43.40	44.70	46.00	47.70	49.00
UNBORROWED RESERVES(–)	21.282	21.713	21.956	22.724	23.557	24.422	25.262	26.665	26.539	26.352	26.793	28.477
LONG TERM DEBT	59.8	55.2	52.5	49.0	44.7	42.1	43.9	45.1	41.1	36.5	35.0	34.6
SHORT TERM DEBT	124.5	128.1	134.4	136.5	137.8	150.7	156.9	160.1	163.8	171.8	181.4	189.6

*Flow variable measured at annual rates

5.4 State and Local Governments

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
NIA BUDGET SURPLUS*	1.2	0.8	1.5	1.0	−2.3	−0.8	−0.2	−0.5	−0.2	1.5	3.7	1.9
CUMULATIVE FINANCING DEFICIT	78.9	79.9	81.2	82.6	85.4	88.0	90.3	93.1	95.7	97.4	99.3	101.3
UNPAID TAX LIABILITIES	1.5	1.6	1.7	1.8	1.9	2.1	2.6	2.8	2.5	2.1	1.7	1.3
LONG-TERM BONDS	91.4	94.8	97.9	99.9	103.0	106.4	110.2	116.3	119.0	121.7	126.5	131.7
SHORT-TERM DEBT	5.2	5.5	5.9	6.2	6.8	8.0	8.1	8.1	9.7	10.7	11.7	14.5
FINANCIAL ASSETS	32.6	34.8	37.0	38.4	40.0	43.1	45.5	48.8	49.8	50.1	53.8	57.9
TIME DEPOSITS	10.6	12.2	12.6	13.5	15.7	15.9	16.5	19.1	16.7	13.2	17.1	23.2
SHORT TERM MARKET SECURITIES	12.1	12.0	13.8	13.6	13.5	16.2	17.3	18.4	20.0	24.7	25.3	25.6
LONG TERM MARKET SECURITIES	9.9	10.6	10.6	11.4	10.8	11.0	11.7	11.4	13.1	12.2	11.4	9.0

5.5 Commercial Banks

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
MONEY SUPPLY	163.10	168.00	171.70	171.70	177.30	183.10	190.10	197.40	202.20	203.70	209.40	214.80
CURRENCY	35.00	36.30	37.40	38.30	39.30	40.40	41.90	43.40	44.70	46.00	47.70	49.00
TIME DEPOSITS	136.1	146.5	155.2	159.8	174.5	183.7	190.4	204.3	201.2	195.2	206.1	232.8
HOUSEHOLDS	107.2	115.2	122.7	128.3	138.8	146.4	153.2	163.8	164.2	161.9	168.9	189.4
BUSINESS	12.5	13.1	13.4	11.7	12.9	13.8	13.8	14.2	13.4	11.8	11.5	13.5
STATE AND LOCAL GOVERNMENTS	10.6	12.2	12.6	13.5	15.7	15.9	16.5	19.1	16.7	13.2	17.1	23.2
FOREIGN	5.8	6.0	6.4	6.3	7.1	7.6	6.9	7.3	6.8	8.4	8.6	6.7
EURODOLLAR LOANS	5.4	4.7	5.0	7.6	6.6	8.3	10.6	10.6	18.4	18.6	16.6	11.6
EARNING ASSETS	248.2	261.1	272.2	277.9	295.9	310.3	323.6	341.9	350.8	348.5	364.4	384.0
BANK LOANS TO BUSINESS	76.2	83.7	90.4	92.8	96.0	98.7	103.6	112.0	121.2	128.6	132.8	131.7
RESIDENTIAL MORTGAGES	30.4	32.3	33.9	34.8	35.6	37.5	39.2	41.3	43.5	44.9	45.3	45.8
CONSUMER CREDIT	45.5	48.6	51.1	51.5	52.8	55.4	58.4	63.3	66.9	69.3	70.2	72.7
STATE AND LOCAL BONDS	36.3	38.9	40.5	41.2	46.8	50.3	52.6	58.9	59.6	59.1	62.5	69.8
U.S. GOVERNMENT BONDS	17.5	15.8	14.6	13.4	12.4	10.5	12.0	13.4	11.2	7.9	6.4	6.0
OTHER LONG TERM ASSETS	14.3	15.1	16.3	17.2	18.5	19.6	21.0	22.4	23.6	24.0	24.6	26.0
FREE RESERVES	−0.16	−0.05	−0.33	−0.21	0.32	0.06	−0.32	−0.35	−1.04	−0.87	−0.68	−0.08
SHORT TERM CREDIT ASSETS	54.4	55.6	56.3	56.1	62.6	70.9	69.6	70.4	67.2	67.2	70.2	80.5
MEMBER BANKS												
DEMAND DEPOSITS	115.30	115.40	117.60	115.20	118.70	123.50	127.70	132.40	134.50	134.30	134.70	139.70
TIME DEPOSITS	112.40	121.20	126.60	129.40	140.80	149.90	151.80	165.80	158.10	151.50	155.70	179.90
EXCESS LOAN DEMAND	−83.64	−82.88	−79.66	−77.21	−90.56	−96.06	−91.08	−95.90	−74.04	−59.60	−60.61	−90.44
UNBORROWED RESERVES	21.28	21.71	21.96	22.72	23.56	24.42	25.26	26.66	26.54	26.35	26.79	28.48

5.6 Nonbank Intermediaries

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
SAVINGS AND LOAN												
DEPOSITS	106.0	110.4	112.3	114.0	119.9	124.6	128.2	132.0	135.0	135.9	138.7	146.8
FEDERAL HOME LOAN ADVANCES	5.9	6.0	7.1	6.9	4.6	4.4	5.2	5.3	6.8	9.3	10.7	10.6
RESIDENTIAL MORTGAGES	96.1	100.1	103.4	104.4	106.3	110.3	114.2	118.5	123.5	127.3	130.4	135.9
SHORT TERM ASSETS	4.8	5.0	5.2	5.9	7.5	8.3	8.8	8.6	9.4	9.5	10.9	12.7
LONG TERM ASSETS	11.8	12.2	12.2	12.1	12.0	12.3	12.9	13.7	13.4	13.3	12.8	13.5
SAVINGS BANKS												
DEPOSITS	50.9	52.7	53.6	55.3	58.1	60.4	62.4	64.6	66.2	67.2	68.6	71.6
RESIDENTIAL MORTGAGES	38.3	40.2	41.2	42.3	43.6	44.7	45.5	46.7	47.8	48.6	49.1	49.9
SHORT TERM ASSETS	3.0	3.0	3.1	3.2	3.2	3.4	3.8	3.5	3.8	3.5	3.7	3.9
LONG TERM ASSETS	12.6	12.5	12.5	12.6	13.9	15.0	16.0	17.1	17.7	18.0	18.7	20.0
LIFE INSURANCE COS.												
RESERVES	114.0	117.1	119.9	122.3	125.5	128.9	131.9	135.1	137.9	140.3	143.0	146.4
RESIDENTIAL MORTGAGES	37.1	38.4	39.7	40.5	41.2	41.5	41.6	41.8	42.0	42.1	42.4	42.7
SHORT-TERM ASSETS	1.2	1.1	0.9	1.2	1.5	1.3	1.4	1.6	1.6	2.4	2.7	3.4
LONG TERM ASSETS	88.9	91.6	93.9	95.5	98.0	101.5	105.0	108.5	111.3	113.3	116.2	118.6

5.7 Household Sector

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
PERSONAL SAVING*	24.8	32.1	30.4	34.7	38.5	42.3	42.9	36.6	32.9	43.6	51.1	58.6
RESIDENTIAL INVESTMENT*	27.2	27.3	26.7	23.4	22.5	27.7	29.7	30.6	33.3	31.9	30.4	31.9
NET FINANCIAL INVESTMENT*	16.9	22.8	21.9	27.8	34.5	35.9	34.1	29.2	23.8	36.2	47.7	54.3
CONSUMER CREDIT LIABILITIES	96.6	102.1	107.0	109.6	112.1	116.1	121.8	130.0	136.7	141.7	144.5	147.7
RESIDENTIAL MORTGAGE LIABILITY	198.5	206.3	213.4	218.6	222.4	229.1	236.6	244.0	252.5	260.2	266.1	272.7
NET ACCUM. OF FIN. ASSETS*	43.1	49.5	45.7	43.5	47.1	57.3	60.3	60.5	54.2	61.7	65.2	73.8
STOCK OF FINANCIAL ASSETS	1187.9	1240.8	1293.0	1345.6	1401.4	1463.7	1529.0	1596.0	1661.3	1732.0	1806.3	1886.9
DEPOSITS												
TIME DEPOSITS	107.2	115.2	122.7	128.3	138.8	146.4	153.2	163.8	164.2	161.9	168.9	189.4
SAVINGS AND LOAN DEPOSITS	106.0	110.4	112.3	114.0	119.9	124.6	128.2	132.0	135.0	135.9	138.7	146.8
SAVINGS BANK DEPOSITS	50.9	52.7	53.6	55.3	58.1	60.4	62.4	64.6	66.2	67.2	68.6	71.6
LIFE INSURANCE RESERVES	114.0	117.1	119.9	122.3	125.5	128.9	131.9	135.1	137.9	140.3	143.0	146.4
SHORT TERM MARKET ASSETS	26.5	29.7	35.0	41.4	38.0	37.8	42.5	45.6	53.1	63.1	69.0	56.3
LONG TERM ASSETS	364.2	365.6	373.0	379.0	381.0	386.7	392.2	392.8	399.8	414.0	425.5	443.6

* Flow variable measured at annual rates

5.8 Interest Rates

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
MARKET RATES												
THREE MONTH BILL RATE	3.881	4.010	4.592	5.115	4.085	4.518	5.277	5.389	6.139	7.179	6.935	5.840
3-5 YEAR BOND RATE	4.100	4.350	4.945	5.380	4.675	5.470	5.705	5.490	6.275	7.450	7.740	6.945
CORPORATE BAA BOND RATE	4.805	4.930	5.330	6.005	5.930	6.525	6.925	6.945	7.485	8.145	8.870	9.345
CONVENTIONAL MORTGAGE RATE	5.830	5.905	6.230	6.665	6.510	6.580	6.960	7.340	7.735	8.300	8.575	8.525
STATE AND LOCAL BOND RATE	3.062	3.269	3.503	3.833	3.562	3.912	4.162	4.232	5.010	5.894	6.354	5.890
INSTITUTIONAL RATES												
CERTIFICATE OF DEPOSIT RATE	4.245	4.375	5.145	5.500	4.965	5.025	5.680	5.890	6.000	6.000	6.750	6.905
SAVINGS BANK DEPOSIT RATE	4.170	4.200	4.324	4.712	4.775	4.791	4.818	4.860	4.921	4.968	5.542	5.817
S&L DEPOSIT RATE	4.333	4.370	4.508	4.821	4.972	4.974	5.023	5.086	5.166	5.199	5.762	5.846
HOUSEHOLD DEPOSIT RATE	3.828	3.974	4.424	4.733	4.725	4.756	4.836	4.866	4.880	4.885	5.543	5.591
BANK LOAN RATE	4.810	4.965	5.515	6.135	5.870	5.785	6.430	6.580	7.420	8.655	8.505	8.115

5.9 Residential Mortgage Rate

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
TOTAL LIABILITIES	236.4	246.1	255.0	260.5	266.5	275.8	284.9	294.4	305.1	314.9	323.1	333.6
HOUSEHOLDS	198.5	206.3	213.4	218.6	222.4	229.1	236.6	244.0	252.5	260.2	266.1	272.7
BUSINESS	37.8	39.7	41.6	41.9	44.1	46.6	48.4	50.4	52.6	54.6	56.9	60.8
TOTAL ASSETS												
SAVINGS AND LOAN	96.1	100.1	103.4	104.4	106.3	110.3	114.2	118.5	123.5	127.3	130.4	135.9
SAVINGS BANKS	38.3	40.2	41.2	42.3	43.6	44.7	45.5	46.7	47.8	48.6	49.1	49.9
LIFE INSURANCE	37.1	38.4	39.7	40.5	41.2	41.5	41.6	41.8	42.0	42.1	42.4	42.7
COMMERCIAL BANKS	30.4	32.3	33.9	34.8	35.6	37.5	39.2	41.3	43.5	44.9	45.3	45.8
FEDERAL(FNMA)	2.1	2.5	3.7	4.4	4.6	5.5	6.7	7.2	8.3	11.0	13.9	10.4
ADDENDA												
FHLBA ADVANCES	5.9	6.0	7.1	6.9	4.6	4.4	5.2	5.3	6.8	9.3	10.7	10.6
MORTGAGE RATE	5.830	5.905	6.230	6.665	6.510	6.580	6.960	7.340	7.735	8.300	8.575	8.525
MORTGAGE STOCK CHANGE(%)	4.09	4.11	3.63	2.17	2.27	3.49	3.32	3.33	3.62	3.22	2.60	3.24
VACANCY RATE (%)	2.68	2.65	2.55	2.38	2.29	2.20	1.92	1.91	1.73	1.77	1.76	1.77

5.10 Long Term Credit Market Instruments

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
TOTAL ISSUES	566.0	571.3	583.2	589.3	599.2	613.9	629.8	648.1	658.4	669.5	687.9	713.9
BUSINESS	345.7	351.3	362.1	369.2	379.2	391.9	401.5	411.3	422.2	434.8	449.9	469.7
CORPORATE BONDS	110.1	113.9	120.0	124.9	132.0	140.6	147.0	154.3	161.7	168.0	177.6	190.8
CORPORATE STOCK	183.3	182.9	184.3	184.1	184.8	186.4	186.6	185.6	186.2	189.9	193.0	196.7
COMMERCIAL MORTGAGES	52.3	54.5	57.7	60.1	62.4	64.8	67.9	71.4	74.3	76.9	79.3	82.3
STATE AND LOCAL GOVERNMENTS	91.4	94.8	97.9	99.9	103.0	106.4	110.2	116.3	119.0	121.7	126.5	131.7
FEDERAL GOVERNMENT	59.8	55.2	52.5	49.0	44.7	42.1	43.9	45.1	41.1	36.5	35.0	34.6
HOLDERS												
COMMERCIAL BANKS	68.2	68.9	70.8	69.3	74.3	75.8	81.2	90.4	88.0	83.0	84.8	89.4
SAVINGS AND LOANS	11.8	12.2	12.2	12.1	12.0	12.3	12.9	13.7	13.4	13.3	12.8	13.5
SAVINGS BANKS	12.6	12.5	12.5	12.6	13.9	15.0	16.0	17.1	17.7	18.0	18.7	20.0
LIFE INSURANCE	88.9	91.6	93.9	95.5	98.0	101.5	105.0	108.5	111.3	113.3	116.2	118.6
STATE AND LOCAL GOVERNMENT	9.9	10.6	10.6	11.4	10.8	11.0	11.7	11.4	13.1	12.2	11.4	9.0
FOREIGN	5.7	5.3	5.5	5.6	5.9	6.2	7.0	8.5	9.7	10.5	10.8	11.9
HOUSEHOLDS AND OTHERS	364.2	365.6	373.0	379.0	381.0	386.7	392.2	392.8	399.8	414.0	425.5	443.6

5.11 Short Term Credit Market Instruments

	1965-1	1965-2	1966-1	1966-2	1967-1	1967-2	1968-1	1968-2	1969-1	1969-2	1970-1	1970-2
TOTAL ISSUES	141.9	146.0	153.8	159.5	164.1	179.6	187.2	193.2	203.4	219.7	235.9	243.0
BUSINESS	9.5	9.9	11.0	14.4	16.5	17.9	19.4	22.1	25.6	29.8	32.0	32.5
U.S. GOVERNMENT	124.5	128.1	134.4	136.5	137.8	150.7	156.9	160.1	163.8	171.8	181.4	189.6
STATE AND LOCAL GOVERNMENT	5.2	5.5	5.9	6.2	6.8	8.0	8.1	8.1	9.7	10.7	11.7	14.5
COMMERCIAL BANKS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	4.2	7.5	2.3
FOREIGN SECTOR	2.6	2.6	2.5	2.5	3.0	3.0	2.8	2.8	3.0	3.1	3.3	3.9
HOLDERS												
BUSINESS	25.1	24.9	25.7	22.3	19.5	23.5	26.6	27.4	29.1	27.9	30.1	24.9
STATE AND LOCAL GOVERNMENT	12.1	12.0	13.8	13.6	13.5	16.2	17.3	18.4	20.0	24.7	25.3	25.6
FOREIGN	14.9	15.1	14.3	13.0	14.2	15.1	13.3	15.2	13.6	14.4	18.1	24.0
COMMERCIAL BANKS	54.3	56.5	56.9	58.7	66.1	75.6	73.9	74.8	73.6	75.2	78.9	92.8
SAVINGS AND LOAN	4.8	5.0	5.2	5.9	7.5	8.3	8.8	8.6	9.4	9.5	10.9	12.7
SAVINGS BANKS	3.0	3.0	3.1	3.2	3.2	3.4	3.8	3.5	3.8	3.5	3.7	3.9
LIFE INSURANCE	1.2	1.1	0.9	1.2	1.5	1.3	1.4	1.6	1.6	2.4	2.7	3.4
HOUSEHOLDS AND OTHERS	26.5	29.7	35.0	41.4	38.0	37.8	42.5	45.6	53.1	63.1	69.0	56.3

APPENDIX B

The following equation listing is presented in two parts: the financial sector and the real sector. Within the financial sector the equations are grouped by major behavioral sectors. The variable nomenclature represents an attempt to follow a mnemonic system. The first set of symbols is based on the name of the financial instrument in question. This is followed by an "L" for variables which are liabilities for the sector in question. The final set of symbols identify the specific sector. For example, LCMILB is Long-term Credit Market Liabilities of Business. A list of variable definitions is given at the end of each major section.

All flow variables, principally those of the national income accounts, are measured at annual rates. First differences are indicated by "Δ". Percentage changes are repesented by "$\Delta\%$."

TABLE OF CONTENTS

PART I. CREDIT MARKET SECTORS

PART II. REAL SECTORS

TABLE I

SOURCES AND USES OF FUNDS BY SECTOR
(LINKING THE REAL AND FINANCIAL SECTORS)

Business Sector Deficit		30.4
Gross domestic investment[1]	117.5	
Direct foreign investment[2]	3.6	
less: Retained earnings	15.4	
Foreign branch profits[2]	2.3	
Inventory valuation adjustment	−4.4	
Capital consumption allowances[1]	77.4	
Federal Government Deficit		12.9
Total expenditures	204.5	
less: Total revenue	191.6	
State and Local Deficit[3]		3.9
Total expenditures	132.1	
Retirement credit to households	6.8	
less: Total revenue	135.0	
Foreign Deficit		−.9
Exports	62.9	
Foreign branch profits[2]	2.3	
less: Imports	59.3	
Transfers from U.S.	3.2	
Direct foreign investment	3.6	
Household Surplus[4]		51.0
Disposable income	689.5	
Retirement credit from S & L governments	6.8	
Capital consumption allowances	9.0	
less: Personal outlays	634.7	
Residential home purchases	19.6	
Statistical Discrepancy (NIA)		−4.7

[1]Excludes component of residential investment and depreciation attributed to household sector.

[2]Included herein but not in NIA definitions.

[3]Differs from NIA definitions by inclusion of pension fund payments to established funds as an expenditure.

[4]See footnotes (1) and (3).

Sources: Tables 4, 6, 10, 12, 13, and 14 of National Income and Product tables, *Survey of Current Business,* April, 1972; and Table 1 of Flow of Funds, 4th Quarter 1971.

TABLE II
Financial Portfolio by Sector

1. Business

Assets	Liabilities
Cumulative Income Deficit	Short-Term Loans
Liquid Assets	Bank Loans
Time Deposits	Short-Term Credit Market Instruments
Money Balances	Long-Term Credit Market Instruments
Short-Term Credit Market Instruments	Corporate Bonds
Consumer Credit	Commercial Mortgages
	Corporate Stock
	Unpaid Tax Liabilities
	Residential Mortgages
	Residential Liabilities

2. Federal Government

Assets	Liabilities
Cumulative Income Deficit	Currency
Unpaid Tax Liabilities	Unborrowed Reserves
FHBB Advances	Short-Term Credit Market Instruments
FNMA Mortgage Assets	Long-Term Credit Market Instruments
Other Mortgage Assets	Residual Liabilities
Loans to Foreigners	
Official Reserve Assets	

3. State and Local Governments

Assets	Liabilities
Cumulative Income Deficit	Short-Term Debt
Unpaid Tax Liabilities	Long-Term Debt
Financial Assets	Residual Liabilities
Time Deposits	
Short-Term Credit Market Instruments	
Long-Term Credit Market Instruments	

4. Foreign Sector

Assets	Liabilities
Cumulative Income Deficit	Short-Term Credit Market Instruments
Time Deposits	Long-Term Credit Market Instruments
Short-Term Credit Market Instruments	U.S. Gov't Loans to Foreigners
Long-Term Credit Market Instruments	U.S. Official Reserve Assets
Eurodollar Loans to U.S. Banks	Residual Liabilities

5. Households and Residual Sectors

Assets	Liabilities
Time Deposits	Cumulative Income Surplus
Savings and Loan Deposits	Residential Mortgages
Savings Bank Deposits	Consumer Credit
Life Insurance Reserves	
Short-Term Credit Market Instruments	
Long-Term Credit Market Instruments	
Residual Assets	

6. Commercial Banking

Assets	Liabilities
Unborrowed Reserves	Time Deposits
Free Reserves	Demand Deposits
Bank Loans	Eurodollar Loans
Residential Mortgages	Short-Term Credit Market Instruments
Consumer Credit	Long-Term Credit Market Instruments
Short-Term Market Instruments	
Long-Term Market Instruments	
Residual Assets	

7. Nonbank Intermediaries

Assets	Liabilities
Residential Mortgages	Deposits
Short-Term Credit Market Instruments	FHLBB Advances
Long-Term Credit Market Instruments	
Residual Assets	

A. *Business Sector*

A1 *External Financing Deficit*

$$DEF*B = IFIXER + ICRB + INV + IDFOR - RE - CCAB - IVA - ZBFOR$$
$$+ 2.0 (CCB - CCB_{-1})$$

A2 *Cumulative Business Deficit*

$$KDEFB = KDEFB_{-1} + .5 \cdot DEFB,$$

or

$$KDEFB = BCPLB + SLB + MTGC + STKLB + MTGRLB + TCXLB - LAB + JKLB$$

A3 *Short-term Debt*

$$\Delta SLB = .328 (DEFB - 2 \cdot \Delta MTGC) - .523 \Delta TCXLB + .0032(RG3M - RG3M_{-2}) \cdot KDEFB$$
$$\quad (6.7) \qquad\qquad\qquad\qquad (4.3) \qquad\qquad (4.5)$$

$$+ .716 \, STKRET - .237 \, SLB_{-1} + .161 \, BCPLB_{-1} + .112 \, MTGC_{-1}$$
$$(6.6) \qquad\qquad (5.3) \qquad\quad (3.8) \qquad\quad (2.2)$$

$$- 4.343 \, DMY7002 - 3.532$$
$$(4.5) \qquad\qquad (3.1)$$
$$R^2 = .96$$
$$SE = .80$$

A4 *Corporate Bonds*

$$\Delta BCPLB = [-.0025 (RG3M - RG3M_{-2}) + .0010 \, TIME] \cdot KDEFB + .176 \, STKRET$$
$$(6.9) \qquad\qquad\qquad\qquad (6.5) \qquad\qquad\qquad (2.8)$$

$$- .274 \, BCPLB_{-1} + .105 (SLB - LAB)_{-2} + 13.704$$
$$(8.0) \qquad\qquad (5.4) \qquad\qquad (10.1) \qquad R^2 = .98$$
$$SE = .49$$

A5 *Corporate Stock*

a. New Issues

$$STKIB = [.019 - .0036RDP + .0022 \, RBAA] \cdot KDEFB - .162 \, STKLB_{-1}$$
$$(3.6) \quad (4.0) \qquad (5.2) \qquad\qquad\qquad (7.4)$$

$$+1.067 \, DMYSTKIB + 26.840$$
$$(7.2) \qquad\qquad (7.4) \qquad\qquad R^2 = .96$$
$$SE = .28$$

b. Net Change in Outstandings

$$\Delta STKLB = STKIB - STKRET$$

A6 *Commercial Mortgage Liabilities*

$$\Delta MTGC = [.020 - .0014 \, RBAA + .0011 \, RBAA_{-4}] \cdot \frac{(GNP + GNP_{-1})}{2}$$
$$(3.4) \quad (7.4) \qquad\qquad (8.2)$$

$$+ .052 (SLB - LAB)_{-2} + .087 \, TIME - .256 \, MTGC_{-2} - 4.562$$
$$(4.0) \qquad\qquad (2.2) \qquad (3.2) \qquad\quad (2.1)$$
$$R^2 = .93$$
$$SE = .28$$

A7 *Liquid Assets*

$$RES = KDEFB - SLB - BCPLB - MTGC - STKIB - TCXLB$$
$$\Delta LAB = -.820 \Delta RES - .055 \, RES_{-1} - .512 \, LAB_{-1} + [.0043 \, RG3M - .0029 \, RBAA] \cdot KDEFB$$
$$(7.8) \qquad\quad (2.5) \qquad (4.4) \qquad (2.9) \qquad\quad (3.0)$$

$$+ 15.246$$
$$(4.2) \qquad\qquad\qquad\qquad R^2 = .81$$
$$SE = 1.32$$

A8 *Components of Short-term Debt*

a. Open Market Paper

$$\Delta OMPLB = [.015\, RMALB - .0081\, \frac{RG3M + RG3M_{-1}}{2} + .053]\cdot SLB$$
$$\quad\quad\quad\quad (5.0)\quad\quad\quad (2.6)\quad\quad\quad\quad\quad\quad\quad (4.5)$$

$$\quad\quad - .519\, OMPLB_{-1} - 2.716$$
$$\quad\quad\quad (10.2)\quad\quad\quad (5.6)$$
$$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad R^2 = .86$$
$$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad SE = .51$$

b. Bank Loans

$$BLB = SLB - OMPLB$$

A9 *Components of Liquid Assets*

a. Time Deposits

$$TDB = [-.264 + .023\, \frac{RCD + RCD_{-1}}{2} - .021\, \frac{RG3M + RG3M_{-1}}{2}]\cdot \frac{LAB + LAB_{-1}}{2}$$
$$\quad\quad\quad (3.6)\quad (4.6)\quad\quad\quad\quad\quad\quad (5.2)$$

$$\quad\quad + .348\, DMYTDB + 10.220$$
$$\quad\quad\quad (5.1)\quad\quad\quad\quad\quad (4.5)$$
$$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad R^2 = .95$$
$$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad SE = .48$$

b. Short-term Market Instruments

$$SCMIB = [-.027\, \frac{RCD + RCD_{-1}}{2} + .031\, \frac{RG3M + RG3M_{-1}}{2}]\cdot \frac{LAB + LAB_{-1}}{2}$$
$$\quad\quad\quad\quad (4.0)\quad\quad\quad\quad\quad\quad (6.1)$$

$$\quad\quad + .704\, LAB - .020\, SF - 10.919$$
$$\quad\quad\quad (11.8)\quad\quad (5.0)\quad\quad (4.3)$$
$$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad R^2 = .95$$
$$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad SE = .70$$

c. Money Holdings

$$MDB = LAB - TDB - SCMIB$$

BCPLB	= Corporate bond liability
CCAB	= Capital consumption allowances
DEFB	= External deficit
DMY7002	= Penn Central crisis
DMYSTKJB	= Dummy for large single stock issue
DMYTDB	= Trend adjustment for introduction of certificates of deposit
ICRB	= Residential investment
IDFOR	= Foreign direct investment
IFIXER	= Fixed investment except residential
INV	= Inventory accumulation
IVA	= Inventory valuation adjustment
JKLB	= Unallocated liabilities and statistical discrepancy
KDEFB	= Cumulative deficit
LAB	= Liquid asset holdings
MDB	= Money balances
MTGC	= Commercial mortgages
RBAA	= Corporate bond yield
RCD	= Certificate of deposit rate
RDP	= Dividend/price yield
RG3M	= Three month treasury bill rate
SCMIB	= Short-term market assets
SF	= Final sales
SLB	= Short-term debt

STKIB	= Corporate stock issues
STKRET	= Corporate stock retirements
TDB	= Time deposits
TIME	= Trend: 1959: 1 = 1.0
TCXLB	= Unpaid tax liabilities
ZBFOR	= Foreign branch profits

<div style="text-align:center">

B. *Federal Government*
(Includes General Government, Agencies, and Federal Reserve)

</div>

B1 *Cumulative Federal Deficit*

$$KDEFGF = KDEFGF_{-1} + .5 \,(EXPENGF - TGF)$$

B2 *Short-term Federal Debt*[1] (Under 5 years)

$$SCMILGF = KDEFGF + TCXGF + MTGRGF + FNMA + FHLBA + LUSFOR + ORAFG - UBR$$
$$- CURR - LCMILGF - JKLGF$$

[1] Endogenous variables include KDEFGF, TCXGF, FHLBA, and CURR

DEFINITIONS:

CURR	= Currency component of money supply
EXPENGF	= Federal Government expenditures
FHLBA	= Federal Home Loan Bond advances
FNMA	= Mortgage assets of Federal National Mortgage Association
JKLGF	= Net miscellaneous liabilities — federal government
KDEFGF	= Cumulative net financial liability — federal government
LCMILGF	= Long-term credit market liabilities — federal government
LUSFOR	= U.S. government loans to foreigners
MTGRGF	= Federal government mortgage assets
ORAGF	= U.S. official reserve assets
SMCILGF	= Short-term credit market liabilities — federal government
TCXGF	= Unpaid tax liabilities
TGF	= Federal government receipts
UBR	= Unborrowed reserves

<div style="text-align:center">

C. *State and Local Governments*

</div>

C1 *Cumulative Financing Deficit*

$$KDEFGSL = KDEFGSL_{-1} + .5 \,(EXPENGSL - TCGSL) + \Delta PFGSL$$

C2 *Long-term Borrowing*

$$\Delta BGSL1 + = [-.078 + .0031\,TIME - .012\,(RGSL - RGSL_{-2})] \cdot KDEFGSL$$
$$\qquad (.9) \quad (3.6) \qquad\quad (6.6)$$
$$+ \Delta BGSL1-_{-2} - .213\,BGSL1 + _{-1} + 8.733$$
$$\qquad\qquad (4.2) \qquad\qquad (1.8)$$

$R^2 = .82$
$SE = .49$

C3 *Short-term Borrowing*

$$\Delta BGSL1- = .138\,\Delta KDEFGSL + [-.157 + .0012\,TIME + .0072\,(RGSL - RG3M)] \cdot KDEFGSL$$
$$\qquad (1.4) \qquad\qquad (2.2) \quad (3.0) \qquad (5.5)$$
$$-.394\,BGSL1-_{-2} + 5.957$$
$$\quad (2.2) \qquad\qquad (1.8)$$

$R^2 = .80$
$SE = .37$

C4 *Financial Assets*

$$FASGSL = -KDEFGSL + BGSL1+ + BGSL1- - TCXGSL + JKLGSL$$

C5 *Distribution of Financial Assets*

   a. Time Deposits

$$TDGSL = [1.000 - .0043 \text{ TIME} + .052 \text{ RCD} - .060 \text{ RG3M}] \cdot FASGSL$$
$$(5.5)(3.0)(10.4)(15.8)$$
$$- 10.429 R^2 = .998$$
$$(4.7) SE = .37$$

   b. Short-term marketable securities

$$SCMIGSL = [-1.218 + .018 \text{ TIME} - .043 \text{ RCD} + .039 \text{ RG3M}] \cdot FASGSL$$
$$(3.4)(7.8)(5.3)(4.8)$$
$$- .507 \text{ } FASGSL_{-1} + 21.546 R^2 = .996$$
$$(2.6) SE = .583$$

   c. Long-term marketable securities

$$LCMIGSL = FASGSL - SCMIGSL - TDGSL$$

DEFINITIONS:

BGSL1+	= Long-term state and local bond liabilities
BGSL1−	= Short-term state and local liabilities
FASGSL	= State and local financial assets
KDEFGSL	= Cumulative financial deficit
LCMIGSL	= Long-term credit market assets
RBAA	= Corporate bond rate
RCD	= Large certificate of deposit
RGSL	= State and local bond rate
RG3M	= 3 month bill rate
SCMIGSL	= Liquid credit market assets
TDGSL	= Time deposits — state and local governments
EXPENGSL	= State and local government expenditures
JKLGSL	= Residual liabilities of state and local governments
TCXGSL	= Unpaid corporate tax liabilities

D. *Foreign Sector*

D1 *Cumulative Financial Deficit*

$$KDEFFOR = KDEFFOR_{-1} + EX - M + ZBFOR - IDFOR - VFORPER - VFORGF$$

D2 *Foreign Time Deposits*

$$TDFOR = .495 \text{ RCD} - .542 \text{ RG3m} + .795 \text{ DMYTDFOR} - .873 \text{ TDFOR} + 1.041$$
$$(1.6)(2.8)(7.9)(5.5)(4.3)$$
$$ R^2 = .98$$
$$ SE = .28$$

D3 *Short-term Credit Market Assets*

$$SCMIFOR = -DEFFOR - TDFOR - EDCB - LCMIFOR + LCMILFOR + OMPLFOR + LUSFOR$$
$$+ ORAGF + JKLFOR$$

DEFINITIONS:

DMYTDFOR = Dummy variable for change in time deposits of foreign official institutions, 1969-70
EDCB   = Eurodollar loans to U.S. banks
IDFOR   = Foreign direct investment
JKLFOR   = Net Miscellaneous liabilities — foreign
KDEFFOR   = Net financial liabilities — foreign
LCMIFOR   = Long-term credit market assets — foreign
LCMILFOR = Long-term credit market liabilities — foreign
LUSFOR   = U.S. government loans to foreigners
OMPLFOR   = Open market paper liabilities — foreign
ORAGF   = U.S. official reserve assets
PBFOR   = Foreign branch profits
RCD   = Certificate of deposit rate
RG3M   = Three-month Treasury bill rate
SCMIFOR   = Short-term credit market assets — foreign
TDFOR   = Time deposits — foreign
VFORGF   = Federal transfers to foreigners
VFORPER   = Personal transfers to foreigners
ZBFOR   = Foreign branch profits

E. *Household Sector*

E1 *Net Accumulation of Financial Assets*

$$\text{NAFA} = \text{PSAV} - \text{ICRH} + \text{CCAH} + (\Delta\text{MTGRLH} + \Delta\text{CCH} + \Delta\text{PFGSL}) \cdot 2.0$$

E2 *Household Financial Assets*

$$\text{KNAFA} = \text{KNAFA}_{-1} + .5\,\text{NAFA} + \Delta\text{CG}$$

E3 *Savings and Loan Deposits*

$$\Delta\text{SL} = .126\,\text{NAFA} + .001\,[73.03 + .8\,\text{RSL} - .435\,\text{TIME} + 4.450\,(\text{RSL} - \text{RTDH})$$
$$\quad (2.4) \qquad\qquad (2.0)\ \ (\text{constr})\ \ (1.7) \qquad (3.7)$$
$$\quad + 2.204\,(\text{RSL} - \text{RG35})]\cdot\text{KNAFA}_{-1} - .218\,\text{SL}_{-1} - 30.999$$
$$\quad\ \ (10.9) \qquad\qquad\qquad\qquad\qquad (3.2) \qquad (2.0)$$
$$R^2 =$$
$$SE = .74$$

E4 *Savings Bank Deposits*

$$\Delta\text{SB} = .025\,\text{NAFA} + .001\,[29.615 + .400\,\text{RSB} - .169\,\text{TIME}$$
$$\quad (\text{constr}) \qquad\qquad (3.2)\ \ (\text{constr}) \qquad (2.8)$$
$$\quad + .766\,(\text{RSB} - \text{RTDH}) + .592\,(\text{RSB} - \text{RG35})]\cdot\text{KNAFA}_{-1}$$
$$\quad\ \ (1.7) \qquad\qquad\qquad (8.1)$$
$$\quad - .229\,\text{SB}_{-1} - 9.075$$
$$\quad\ \ (2.8) \qquad (2.4) \qquad\qquad\qquad R^2 =$$
$$\qquad\qquad\qquad\qquad\qquad\qquad\qquad SE = .31$$

E5 *Time Deposits*

$$\Delta\text{TDH} = .145\,\text{NAFA} + .001\,[.393\,\text{TIME} + .766\,(\text{RTDH} - \text{RSB})$$
$$\quad\ \ (2.0) \qquad\qquad (6.3) \qquad (\text{constr})$$
$$\quad + 4.450\,(\text{RTDH} - \text{RSL}) + 2.355\,(\text{RTDH} - \text{RG35}) + .8\,\text{RTDH}$$
$$\quad\ \ (\text{constr}) \qquad\qquad\qquad (4.5) \qquad\qquad\qquad (\text{constr})$$
$$\quad + 1.95\,(\text{RCD} - \text{RG3M})]\cdot\text{KNAFA}_{-1} - .470\,\text{TDH}_{-1} + 12.714$$
$$\quad\ \ (3.2) \qquad\qquad\qquad\qquad\qquad (8.8) \qquad (10.6)$$
$$R^2 = .93$$
$$SE = 1.34$$

E6 *Life Insurance Reserves* (minus policy loans)

$$\Delta LI = .052\,NAFA + .001\,[67.212 - .359\,TIME - .242\,RG35] \cdot KNAFA_{-1}$$
$$(2.6)(2.6)(4.9)$$

$$- .356\,LI_{-1} - 3.692$$
$$(2.6)(1.9)R^2 = .96$$
$$SE = .15$$

E7 *Consumer Credit Liabilities*

$$\Delta CCH = .450\,CD + .236\Delta CD_{-1} + .318\,TIME - .531\,CCH_{-1} - 14.913$$
$$(10.4)(3.6)(8.5)(10.6)(10.0)$$
$$R^2 = .93$$
$$SE = .58$$

E8 *Residential Mortgage Liabilities*

$$MTGRLH = PMTGRH \cdot MTGR$$

DEFINITIONS:

CCAH	= Capital consumption allowance on residential housing
CCH	= Consumer credit liabilities
CD	= Consumer durable good expenditures
CG	= Capital gains (trend)
ICRH	= Residential construction expenditures of households
KNAFA	= Total financial wealth
LI	= Life insurance reserves less policy loans
MTGRLH	= Residential mortgage liabilities
NAFA	= Net accumulation of financial assets
PFGSL	= State and local government pension fund reserves
PSAV	= Personal savings
RCD	= Rate on large certificates of deposit
RG35	= 3-5 year Treasury-Bond Rate
RSB	= Savings bank deposit rate
RSL	= Savings and loan deposit rate
RTDH	= Household time deposit rate
SB	= Savings bank deposits
SL	= Savings and loan deposits
TDH	= Household time deposits
TIME	= Trend, quarterly, 194601 = 1.0
YD	= Disposable personal income

F. *Commercial Banks*

F1 *Time Deposits*

a. Total

$$TDCB = TDH + TDB + TDGSL + TDFOR$$

b. *Member Banks*

$$TDFRB = PTD \cdot TDCB$$

F2 *Required Reserves*

$$RR = UBR - FR$$

F3 *Demand Deposits*

a. Member Bank

$$DDFRB = (RR - ZTD \cdot TDFRB)/ZDD$$

b. Total (money supply definition)

$$DDCB = (DDFRB - DDGFFRB)/PDD$$

F4 *Bank Earning Assets* (balance sheet constraint)

$$EACB = DDCB + TDCB + EDCB + OMPLCB - RR$$

F5 *Consumer Credit Assets*

$$\Delta CCCB = .592 \Delta CCH + .171 RBAA_{-1} - .019 \Delta LNEXCB_{-1}$$
$$\quad (15.2) \qquad (2.2) \qquad\qquad (2.9)$$

$$- .013 \, TIME - .269$$
$$\quad (1.7) \qquad (1.1) \qquad\qquad\qquad R^2 = .95$$
$$\qquad\qquad\qquad\qquad\qquad\qquad\qquad SE = .31$$

F6 *Residential Mortgage Assets*

$$\Delta MTGRCB = [.029 + .00087(RMC - RBAA)_{-1} - .023 \, RLNEXCB_{-1}]$$
$$\quad (3.5) \quad (2.0) \qquad\qquad\qquad (3.3)$$

$$\cdot EACB_{-1} + .140 \, BGSLCB_{-1} - .297 \, MTGRCB_{-1} + .622$$
$$\qquad\qquad (5.7) \qquad\qquad (3.6)$$
$$\qquad\qquad\qquad\qquad\qquad\qquad R^2 = .96$$
$$\qquad\qquad\qquad\qquad\qquad\qquad SE = .18$$

F7 *Excess Loan Demand* (member banks)

Levels version

$$LNEXCB = [.8 \, (BLB + CCCB + MTGRCB)] - [\frac{(1 - ZDD) \cdot UBR - ZTD \cdot TDFRB}{ZDD} + TDFRB]$$

Ratio version

$$\frac{.8 \, (BLB + CCCB + MTGRCB)}{\frac{(1 - ZDD) \cdot UBR - ZTD \cdot TDFRB}{ZDD} + TDFRB}$$

F8 *Free Reserves*

$$\frac{FR}{ZDD} = -.202 \, \Delta LNEXCB + .086 \, \Delta LNEXCB_{-1} + .357 \, \Delta(EDCB + OMPLCB)$$
$$\quad (5.5) \quad\quad\quad (2.5) \qquad\qquad (3.6)$$
$$+ .472 \, (\frac{FR}{ZDD})_{-1} - .608 \, FRNEG_{-1} + [-.187 + .0015 \, TIME - .016 \, RG3M]$$
$$\quad (3.2) \qquad\quad (2.7) \qquad\quad (2.0) \quad (3.6) \qquad (5.1)$$
$$\cdot \frac{(DDFRB + DDFRB_{-1})}{2} + 15.030$$
$$\qquad\qquad\qquad (2.0)$$
$$\qquad\qquad\qquad\qquad R^2 = .93$$
$$\qquad\qquad\qquad\qquad SE = .80$$

$$FRNEG = (\frac{FR}{ZND} - ABS(\frac{FR}{ZDD}))/2.0$$

F9 *U.S. Government Long-Term Bonds*

$$\Delta \, BUS5{+}CB = .522 \, \Delta BUS5{+}GF + .059 \, EACB + [.115 - .0014 \, TIME_{-1}] \cdot EACB_{-1}$$
$$\quad (12.8) \qquad\qquad (1.9) \qquad (2.1) \quad (4.1)$$
$$- .129 \, BUS5{+}CB_{-1} - 14.275$$
$$\quad (3.0) \qquad\qquad (3.5) \qquad\qquad R^2 = .93$$
$$\qquad\qquad\qquad\qquad\qquad\qquad SE = 70$$

127

F10 *State and Local Government Securities*

$$\Delta \text{BGSLCB} = .148\,\text{EACB} - .112\,\Delta\text{LNEXCB} - .087\,(\text{MTGRCB}_{-1} + \text{CCCB}_{-1} + \text{BLB}_{-1})$$
$$\qquad (6.7) \qquad\quad (7.4) \qquad\qquad\quad (5.2)$$

$$\qquad - .326\,\text{BGSLCB}_{-1} - 10.793$$
$$\qquad\quad (3.8) \qquad\qquad\quad (5.9)$$

$$R^2 = .93$$
$$SE = .62$$

F11 *Other Long-Term Securities*

$$\Delta \text{0LCMICB} = .020\,\text{EACB} - .015\,\Delta\text{LNEXCB} + [.021 - .016\,\text{RLNEXCB}_{-1}]$$
$$\qquad\qquad (2.1) \qquad\quad (2.6) \qquad\qquad (1.6) \quad (3.4)$$

$$\qquad \cdot .258\,\text{OLCMICB}_{-1} - 3.127$$
$$\qquad\quad (2.2) \qquad\qquad\quad (4.6)$$

$$R^2 = .94$$
$$SE = .14$$

F12 *Short-Term Credit Market Assets*

$$\text{SCMICB} = \text{EACB} - \text{BLB} - \text{CCCB} - \text{MTGRCB} - \text{FR} - \text{BGSLCB} - \text{BUS5+CB}$$
$$\qquad - \text{OLCMICB} + \text{LCMILCB} - \text{JKACB}$$

F13 *Eurodollar Loans*

$$\text{EDCB} = -.360\,\text{TDCB} + .064\,\Delta\text{LNEXCB} + 2.380\,\text{TIME} - 6.695\,\text{DMYEDCB} - 133.406$$
$$\qquad\quad (13.7) \qquad\quad (2.9) \qquad\qquad (14.2) \qquad (6.2) \qquad\qquad (12.8)$$

$$R^2 = .98$$
$$SE = .76$$

F14 *Negotiable Certificate of Deposit Rate*

  Desired rate

$$\text{RCD*} = .943\,\text{RG3M} + 4.118\,\text{RLNEXCB}_{-1} - 1.782$$
$$\qquad\quad (17.6) \qquad (6.2) \qquad\qquad\quad (6.2)$$

$$R^2 = \text{N.A.}$$
$$SE = .12$$

  Actual rate

$$\text{RCD} = \text{RCD*} \qquad , \qquad \text{RCD*} \le \text{CRCD}$$
$$\text{RCD} = \text{CRCD} \qquad , \qquad \text{RCD*} > \text{CRCD}$$

F15 *Household Time Deposit Rate*

$$\Delta\text{RTDH} = .046\,(\text{CRTDH} - \text{RTDH}_{-1}) \cdot (\text{RBAA} - \text{RTDH}_{-1}) + .290\,\text{RLNEXCB}_{-1}$$
$$\qquad\qquad (5.9) \qquad\qquad\qquad\qquad\qquad\qquad\qquad (1.5)$$

$$\qquad + .058\,\Delta\text{RBAA} + .463\,\Delta\text{CRTDH} - .182\,\text{DMYRTDH} - .025$$
$$\qquad\quad (2.7) \qquad\qquad (8.2) \qquad\qquad (6.7) \qquad\qquad\quad (2.3)$$

$$R^2 = .97$$
$$SE = .03$$

F16 *Bank Loan Rate*

$$\text{RMALB} = .509\,\text{RBAA} + 2.079\,\text{RLNEXCB} + 6.077\,\text{RLNEXCB}_{-1} + .219\,\Delta\text{RDIS}$$
$$\qquad\qquad (12.2) \qquad (1.8) \qquad\qquad (4.7) \qquad\qquad\quad (3.2)$$

$$\qquad + .358\,\text{DMYRMALB} \cdot (\text{RG3M} - \text{CRCD}) - 2.080$$
$$\qquad\quad (12.1) \qquad\qquad\qquad (8.7)$$

$$R^2 = .99$$
$$SE = .13$$

DEFINITIONS:

BLB	Bank loans to business
BGSLCB	State and local government securities
BUS5 + CB	U.S. bonds over 5 years – commercial banks
BUS5 + GF	U.S. bonds over 5 years – total
CCCB	Consumer credit assets – banks
CCH	Consumer Credit Liabilities – Households
CRCD	Ceiling rate on RCD
CRTD	Ceiling rate on RTOH
CURR	Currency component of money supply
DDCB	Demand deposit component of money supply
DDGFFRB	Federal government deposits
DDFRB	Member bank demand deposits
DMYCD	Dummy variable for introductions of CDs
DMYEDCB	Dummy variable for introduction of reserve requirement on Eurodollar loans
DMYRTDH	Dummy variable for ceiling rate change and introduction of small certificates in 1966
DMYRMALB	1.0 after 1962 for introduction of negotiable certificates of deposit
EACB	Total bank earning assets
EDCB	Eurodollar loans
FR	Free reserves
JKACB	Residual assets -- commercial banks
LNEXCB	Excess loan demand level
MTGRCB	Residential mortgages
MD	Money supply
OLCMICB	Other marketable securities
OMPLCBL	Open market paper liabilities
PDD	Ratio of member bank demand deposits to total
PTDL	Ratio of member bank time deposits to total
RBAAL	Corporate bond rate
RCDL	Large certificate of deposit rate
RDIS	Discount rate
RG3M	Treasury bill rate
RLNEXCB	Excess loan demand (ratio)
RMALB	Bank loan rate
RMC	Conventional mortgage rate
RR	Required reserves
RTDH	Household time deposit rate
SCMICB	Short-term marketable securities – commercial banks
TDB	Business time deposits
TDCB	Time deposits – total
TDFOR	Foreign time deposits
TDFRB	Member bank time deposits
TDGSL	Saving and loan government time deposits
TDH	Household time deposits
TIME	Time trend 194601 = 1
UBR	Unborrowed reserves
ZDD	Reserve required on demand deposits
ZTD	Reserve requirement on time deposits

G. Nonbank Financial Intermediaries

G1 Residential Mortgage Assets

a. Savings and loan associations

$$\Delta \text{MTGRSL} = (.637 + .096 \, \Delta \text{RMC}) \cdot \Delta \text{SL} + .658 \, \Delta \text{FHLBA}$$
$$\quad\quad\quad (15.8) \;\; (3.1) \quad\quad\quad\quad\quad (5.8)$$
$$+ (.220 + .011 \, \text{RMC} - .005 \, \text{RBAA}) \cdot \text{SL}_{-1} - .289 \, \text{MTGRSL}_{-2}$$
$$\quad (6.5) \;\;\; (2.1) \quad\quad (1.7) \quad\quad\quad\quad\quad (5.5)$$
$$+ .078$$
$$\;\; (.4)$$

$$R^2 = .99$$
$$SE = .22$$

where

$$\text{FHLBA} = -.429 \, \Delta \text{SL} + .256 \, \Delta \text{SL}_{-1} + .22 \, \Delta \text{MTGRSL}_{-1} - .009 \, (\text{RFHLB}_{-1} - \text{RMC}_{-1})$$
$$\quad\quad\quad (10.4) \quad\quad (4.2) \quad\quad\quad (2.4) \quad\quad\quad\quad (3.4)$$
$$+ (-.482 + .0004 \, \text{TIME}_{-2}) \cdot \text{SL}_{-2} + .517 \, \text{MTGRSL}_{-2}$$
$$\quad (4.6) \;\;\; (2.4) \quad\quad\quad\quad (3.9)$$
$$- .562 \, \text{FHLBA}_{-2} - .091$$
$$\quad (3.3) \quad\quad\quad\quad (.2)$$

$$R^2 = .92$$
$$SE = .90$$

b. Mutual savings banks

$$\Delta \text{MTGRSB} = .486 \, \Delta \text{SB} + .011 \, (\text{RMC} - \text{RBAA}) \cdot \text{SB}$$
$$\quad\quad\quad\quad (9.) \quad\quad\quad (3.6)$$
$$+ .015 \, (\text{RMC}_{-1} - \text{RBAA}_{-1}) \cdot \text{SB}_{-1} + .168 \, \text{SB}_{-1}$$
$$\quad (3.1) \quad\quad\quad\quad\quad\quad\quad (4.9)$$
$$- .201 \, \text{MTGRSB}_{-2} - 1.763$$
$$\quad (5.0) \quad\quad\quad\quad (3.4)$$

$$R^2 = .86$$
$$SE = .17$$

c. Life insurance companies

$$\Delta \text{MTGRLI} = .387 \, (\Delta \text{LI} + \Delta \text{LI}_{-1})/2.0 + .0087 \, (\text{RMC}_{-1} - \text{RBAA}_{-1}) \cdot \text{LI}_{-1}$$
$$\quad\quad\quad\quad (3.3) \quad\quad\quad\quad\quad\quad\quad\quad (5.2)$$
$$+ .063 \, \text{LI}_{-1} + .0053 \, (\text{RMC}_{-2} - \text{RBAA}_{-2}) \cdot \text{LI}_{-2}$$
$$\quad (4.3) \quad\quad (2.7)$$
$$- .195 \, \text{MTGRLI}_{-2} - 1.695$$
$$\quad (4.7) \quad\quad\quad\quad (4.6)$$

$$R^2 = .88$$
$$SE = .20$$

G2 Short-Term Credit Market Assets

a. Savings and loan associations

$$\Delta \text{SCMISL} = .579 \, \Delta (\text{SL} + \text{FHLBA} - \text{MTGRSL})$$
$$\quad\quad\quad\quad (11.3)$$
$$+ (-.092 - .044 \, \text{RBAA}_{-1} + .112 \, \text{XRG3M}_{-1}) \cdot$$
$$\quad (3.3) \;\; (\text{constr}) \quad\quad (10.4)$$
$$(\text{SL}_{-1} + \text{FHLBA}_{-1} - \text{MTGRSL}_{-1}) - .237 \, \text{SCMISL}_{-1} + .860$$
$$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad (2.9) \quad\quad\quad\quad (3.9)$$

$$R^2 = .99$$
$$SE = .25$$

b. Mutual savings banks

$$\Delta SMISB = .123 \, \Delta (SB - MTGRSB) + (.094 - .024 \, RBAA_{-1} + .033 \, XRG3M_{-1}) \cdot$$
$$\quad\quad (2.2) \quad\quad\quad\quad\quad\quad (1.5) \quad (3.0) \quad\quad\quad (3.1)$$

$$(SB_{-1} - MTGRSB_{-1}) - .684 \, SCMISB_{-1} + 1.164$$
$$\quad\quad\quad (3.9) \quad\quad\quad\quad (2.1)$$

$$R^2 = .49$$
$$SE = .14$$

c. Life insurance

$$\Delta SCMILI = .464 \, \Delta (LI - MTGRLI) - .411 \, \Delta (LI_{-1} - MTGRLI_{-1})$$
$$\quad\quad\quad (4.5) \quad\quad\quad\quad\quad (3.7)$$

$$+ (.193 + .0011 \, RG3M) \cdot (LI - MTGRLI_{-1}) - .124 \, LI_{-1}$$
$$\quad (3.1) \quad (1.8) \quad\quad\quad\quad\quad\quad\quad\quad (3.3)$$

$$- .700 \, SCMILI_{-1} - .388$$
$$\quad (3.7) \quad\quad\quad (.9)$$

$$R^2 = .69$$
$$SE = .20$$

G3 *Long-Term Credit Market Assets*

a. Savings and loan associations

$$\Delta LCMISL = .222 \, \Delta (SL + FHLBA - MTGRSL)$$
$$\quad\quad\quad (4.4)$$

$$+ (.366 + .044 \, RBAA_{-1} - .087 \, XRG3M_{-1}) \cdot$$
$$\quad (5.7) \quad (3.8) \quad\quad\quad (5.2)$$

$$(SL_{-1} + FHLBA_{-1} - MTGRSL_{-1}) - .349 \, LCMISL_{-1} - .812$$
$$\quad\quad\quad\quad\quad\quad\quad\quad (5.1) \quad\quad\quad\quad (5.6)$$

$$R^2 = .89$$
$$SE = .20$$

b. Mutual savings banks (Full Adjustment)

$$LCMISB = .633 \, \Delta (SB - MTGRSB) - .027 \, SB_{-1}$$
$$\quad\quad (9.7) \quad\quad\quad\quad\quad\quad (1.9)$$

$$+ (.754 + .026 \, RBAA_{-1} - .033 \, XRG3M_{-1}) \cdot (SB_{-1} - MTGRSB_{-1})$$
$$\quad (10.8) \quad (1.9) \quad\quad\quad (1.6)$$

$$+ 1.321$$
$$\quad (2.3)$$

$$R^2 = .999$$
$$SE = .15$$

c. Life insurance companies

$$\Delta LCMILI = .544 \, \Delta (LI - MTGRLI) + .316 \, \Delta (LI_{-1} - MTGRLI_{-1})$$
$$\quad\quad\quad (4.5) \quad\quad\quad\quad\quad\quad (2.2)$$

$$+ .184 \, LI_{-1} + (.483 - .0029 \, RG3M_{-1}) \cdot (LI_{-1}) - MTGRLI_{-1})$$
$$\quad (3.1) \quad\quad (3.6) \quad (3.7)$$

$$- 3.456$$
$$\quad (3.7)$$

$$R^2 = .96$$
$$SE = .26$$

131

G4 *Savings and Loan Deposit Rate*

   a. Pre-1966 (before ceiling rate imposed)

$$RSL = .598\,RESL + 1.55\,RMC + .089\,CRTDH + 2.813\,MTGRSL_{-1}/SL_{-1}$$
$$\quad (4.6) \qquad\quad (4.5) \qquad\quad (4.8) \qquad\qquad (2.7)$$

$$+\,.457\,RSL_{-1} - 4.862$$
$$\quad (5.1) \qquad\qquad (4.5)$$

$$R^2 = .997$$
$$SE = .028$$

   b. Post-1966 (ceiling rate period)

$$\Delta RSL = .258\,(CRSL - RSL_{-1}) \cdot (RMC - RSL_{-1}) + .215\,\Delta PCDSL - .019$$
$$\qquad\quad (24.5) \qquad\qquad\qquad\qquad\qquad\qquad (2.3) \qquad\qquad (1.8)$$

$$RSL \leq CRSL$$

$$R^2 = .99$$
$$SE = .022$$

G5 *Mutual Savings Bank Deposit Rate*

   a. Pre-1966 (before ceiling rate imposed)

$$RSB = .205\,RESB + .262\,RMC + 2.142\,(MTGRSB/SB)_{-1}$$
$$\quad (1.5) \qquad\quad (6.1) \qquad\quad (1.5)$$

$$+\,.161\,DMYRSB + .614\,RSB_{-1} - 1.069$$
$$\quad (4.7) \qquad\qquad (5.3) \qquad\quad (5.0)$$

$$R^2 = .997$$
$$SE = .031$$

   b. Post 1966 (ceiling rate period)

$$\Delta RSB = .242\,(CRSB - RSB_{-1}) \cdot (RMC - RSB_{-1}) - .049$$
$$\qquad\quad (10.8) \qquad\qquad\qquad\qquad\qquad\qquad (2.1)$$

$$RSB \leq CRSB$$

$$R^2 = .93$$
$$SE = .054$$

G6 *Asset Earnings Yields*

   a. Savings and loan associations

$$RESL = .110 \sum_{i=0}^{-3} .25\,RMC_i + .874\,RESL_{-1} + .079$$
$$\quad\;\; (7.5) \qquad\qquad\qquad (33.0) \qquad\quad (1.0)$$

$$R^2 = .997$$
$$SE = .029$$

   b. Mutual savings banks

$$RESB = .040 \sum_{i=0}^{-3} .25\,RMC_i + .984\,RESB_{-1} - .098$$
$$\quad\;\; (5.7) \qquad\qquad\qquad (120.5) \qquad\quad (5.0)$$

$$R^2 = .999$$
$$SE = .015$$

DEFINITIONS:

CRSB	Ceiling rate — savings banks
CRSL	Ceiling rate — savings and loan
CRTDH	Ceiling rate — household time deposits
DMYRSB	Dummy variable, 1962 and after = 1.0
FHLBA	Federal home loan bank advances
LCMILI	Long-term credit market assets — life insurance companies
LCMISB	Long-term credit market assets — savings banks

LCMISL	Long-term credit market assets — savings and loan
LI	Life insurance reserves
MTGRLI	Residential mortgage assets — life insurance companies
MTGRSB	Residential mortgage assets — savings banks
MTGRSL	Residential mortgage assets — savings and loan
PCPSL	Weight on certificate rate used in constructing RSL
RBAA	Corporate bond rate
RESB	Rate earned on assets — savings banks
RESL	Rate earned on assets — savings and loan
RFHLBA	Rate charged on FHLB advances
RG3m	Three month treasury bill rate
RSB	Deposit rate — savings banks
RSL	Deposit rate — savings and loans
SCMILI	Short-term credit market assets — life insurance companies
SCMISB	Short-term credit market assets — savings banks
SCMISL	Short term credit market assets — savings and loan
T	Time trend, 194601 = 1
XRG3M	$\sum_{i=0}^{7} w_i\, RG3M$, w_i's = .20, .175, .15, .125, .10, .075, .05, .025

H. *Market Interest Rates*

H1 *Short-term Credit Market Securities*

SCMI = SCMILGF + OMPLB + OMPLCB + OMPLFOR + BGSL1

H2 *Long-term Credit Market Securities*

LCMI = BCPLB + STKLB + MTGC + BUS5 + GF + BCSL1+ + LCMILCB
+ LCMILFOR + BUSSBH

H3 *Short-term Credit Market Assets — Households*

SCMIR = SCMI − SCMIB − SCMIGSL − SCMIFOR − SCMICB − SCMISB
− SCMISL − SCMILI − SCMIE

H4 *Long-term Credit Market Assets — Households*

LCMIR = LCMI − LCMIGSL − LCMIFOR − BUS5 + CB − BGSLCB
+ BGSL1 − CB − OLCMICB − LCMISB − LCMISL − LCMILI
− LCMIE

H5 *Three-five Bond Rate*

$$RG35 = 1.0\ RDEP + 64.634\ LCMIR/KNAFA_{-1} + 161.007\ SCMIR/KNAFA_{-1}$$
(constr)   (3.7)   (13.3)

$$- 26.634\ LCMIR_{-1}/KNAFA_{-2} - 95.354\ SCMIR_{-1}/KNAFA_{-2}$$
(1.3)   (7.2)

$$+ .174\ TIME - 27.102$$
(5.5)   (5.6)

$$R^2 = .92$$
$$SE = .20$$

H6 *Three-month Bill Rate*

RG3M = .716 RG35 + .225 RG35$_{-1}$ + 43.734 SCMIR/KNAFA$_{-1}$
     (6.1)   (2.4)   (2.3)

      − 29.283 LCMIR$_{-1}$/KNAFA$_{-2}$ − 1.816 XRG3M$_{-1}$
        (3.7)   (9.2)

      + 33.739 (.5C + .5C$_{-1}$)/KNAFA + .248 TIME + 11.277 (1000/KNAFA$_{-1}$)
       (2.5)   (4.2)   (4.0)

      − 27.747
       (3.5)

$$R^2 = .99$$
$$SE = .14$$

H7 *Corporate Bond Rate — BAA*

RBAA = .373 ΔRG3M + .144 ΔRG3M$_{-1}$ + 1.264 XRG3M$_{-1}$
     (8.6)   (3.2)   (7.8)

      + .843 (RDEP1 + RDEP1(-1))/2.0 + 28.600 LCMIR/KNAFA$_{-1}$
       (2.5)   (5.1)

      + 37.725 SCMIR$_{-1}$/KNAFA$_{-1}$ + .080 TIME − 18.420
       (3.6)   (4.6)

$$R^2 = .99$$
$$SE = .14$$

H8 *Weighted Average Deposit Rates* (used above; weights are taken from household deposit equations)

RDEP1 = (.592 RSB + 2.204 RSL + 2.355 RTDH)/5.151

RDEP = (.725 RDEP1 + 1.953 RCD)/7.104

H9 *State and Local Bond Rate*

RGSL = .135 RBAA + .259 RG35 − 44.477 TIME/KNAFA
     (1.6)   (6.7)   (2.9)

      − 38.596 (SB + SL + TDH + LI)/KNAFA
       (5.8)

      + 4.109 (BGSL − BGSLCB)/(LCMIR + SCMIR) + 15.888
       (1.6)   (4.8)

$$R^2 = .99$$
$$SE = .11$$

H10 *Conventional Mortgage Rate*

ΔRMC = −.135 Δ%MTGR − .051Δ%MTGR$_{-1}$ − .262 VAC$_{-1}$ + .196 RG35
     (3.6)   (1.7)   (3.3)   (5.0)

      −.066 ΔPXFI − .283 RMC$_{-1}$ + 1.791
       (3.7)   (4.3)   (4.0)

$$R^2 = .90$$
$$SE = .098$$

PXPFI = Δ%(.7SL + .23SB + .03EACB + .05LI)

H11 *Dividend — Price Ratio*

$$RDP = .393\ RBAA - .392\ RBAA_{-1} - .471\ (ZB + CCACORP)/DIV$$
$$(3.6)\qquad (3.4)\qquad\quad (3.0)$$

$$+ .198\ (ZB_{-1} + CCACORP_{-1})/DIV_{-1} + .475\ D6202 - .038\ T60$$
$$(1.2)\qquad\qquad\qquad\qquad\qquad (2.6)\qquad\quad (2.7)$$

$$+ .498\ RDP_{-1} + 5.258$$
$$(3.6)\qquad\quad (2.6)$$

$$R^2 = .87$$
$$SE = .18$$

DEFINITIONS:

BCPLB	Corporate bond liability — Business
BGSL1	State and local short-term debt
BGSL1 — CB	State and local short-term debt — commercial banks
BGSLCB	State and local government debt — commercial banks
BUS5 + CB	Long-term U.S. government securities — commercial banks
BUS5 + GF	Long-term U.S. government securities
BUSSBH	U.S. government savings bonds
C	Total consumption
CCACORP	Corporate capital consumption allowances
D6202	Dummy variable, 196202 = 1.0
DIV	Corporate dividend payments
KNAFA	Household financial assets
LCMI	Long-term credit market assets
LCMIFOR	Long-term credit market assets — foreign assets
LCMIGSL	Long-term credit market assets — S&L government assets
LCMIE	Long-term credit market assets — Residual
LCMILCB	Long-term credit market assets — Commercial bank liability
LCMILFOR	Long-term credit market assets — Foreign liability
LCMILF	Long-term credit market assets — Life insurance assets
LCMIR	Long-term credit market assets — Household assets
LCMISB	Long-term credit market assets — Savings banks assets
LCMISL	Long-term credit market assets — Savings and loan assets
LI	Life insurance company reserves
MTGR	Residential mortgage stock
OLCMICB	Other long-term assets — Commercial banks
OMPLB	Open market paper — Business liability
OMPLCB	Open market paper — Commercial bank liability
OMPLFOR	Open market paper — Foreign liability
RBAA	Corporate bond rate
RDEP	Weighted average deposit rate (includes CD rate)
RDEP1	Weighted average deposit rate (excludes CD rate)
RDP	Dividend-price ratio
RGSL	State and local bond rate
RG35	3-5 U.S. government securities rate
RG3m	3 month bill rate
RMC	Conventional mortgage rate
SB	Savings bank deposits
SCMI	Short-term credit market instruments
SCMIB	Short-term credit market instruments — Business assets
SCMICB	Short-term credit market instruments — Commercial bank asset
SCMIE	Short-term credit market instruments — Residual
SCMIFOR	Short-term credit market instruments — Foreign assets
SCMIGSL	Short-term credit market instruments — S&L government assets
SCMILGF	Short-term credit market instruments — Federal government liability
SCMILI	Short-term credit market instruments — Life insurance assets
SCMIR	Short-term credit market instruments — Household assets

SCMISB	Short-term credit market instruments — Savings bank assets
SCMISL	Short-term credit market instruments — Savings and loan assets
SL	Savings and loan deposits
T60	Trend — constant after 1959
TDH	Household time deposits
TIME	Trend 194601 = 1.0
VAC	Residential vacancy rate
XRG3M	$\sum_{i=0}^{7} w_i$ RG3M, w_i's = .20, .175, .15, .125, .10, .075, .05, .025
ZB	Corporate profits

I. *Consumer Credit*

I1 *Household Consumer Credit Liabilities*

$$\Delta CCH = .450\ CD + .236\ CD_{-1} + .318\ TIME - .531\ CCH_{-1} - 14.913$$
$$\quad\quad (10.4) \quad\quad (3.6) \quad\quad (8.5) \quad\quad (10.6) \quad\quad (10.0)$$
$$R^2 = .93$$
$$SE = .58$$

I2 *Commercial Bank Consumer Credit Assets*

$$\Delta CCCB = .592\ \Delta CCH + .171\ RBAA_{-1} - .019\ \Delta LNEXCB_{-1}$$
$$\quad\quad\quad (15.2) \quad\quad (2.2) \quad\quad\quad (2.9)$$
$$- .013\ TIME - .269$$
$$\quad (1.7) \quad\quad (1.1)$$
$$R^2 = .95$$
$$SE = .31$$

I3 *Consumer Credit Assets of Credit Unions and Residual*

$$\Delta CCU + E = .069\ \Delta CCH + .0735\ RBAA_{-1} - 2.05$$
$$\quad\quad\quad\quad (9.3) \quad\quad\quad (6.9) \quad\quad\quad (3.7)$$
$$R^2 = .90$$
$$SE = .08$$

I4 *Business Consumer Credit Assets*

$$CCB = CCH - CCCB - CCCU + E$$

DEFINITIONS:

CCCB	Consumer credit assets — Commercial banks
CCB	Consumer credit assets — Business
CCCU + E	Consumer credit assets — Credit unions and other
CCH	Consumer credit liabilities — Households
CD	Consumer durable good expenditures (SAAR)
LNEXCB	Excess loan demand — Commercial banks
RBAA	Corporate bond rate
TIME	Trend 194601 = 1.0

PART II. REAL SECTORS

A. *Aggregate Demand Sector*

A1 *Automobile Demand*

$$\Delta CDCAR58 = -0.291 + 0.116\ \Delta(\frac{YD - VG}{PC}) - 0.272\ CDCAR58_{-1} - 1.337\ \Delta U$$
$$\qquad (.60)\quad (2.72)\qquad\qquad\qquad (5.14)\qquad\qquad\qquad (2.68)$$

$$+ 0.096\ \Delta C58_{-1} + 0.211 \cdot .5(\frac{SAVEPER_{-1}}{PC_{-1}} + \frac{SAVEPER_{-2}}{PC_{-2}})$$
$$(2.01)\qquad\quad (7.29)$$

$$+ 2.425\ \Delta DMY55 + 1.092\ DMYCAR$$
$$(4.59)\qquad\qquad (7.91)$$

$$R^2 = .913$$
$$SE = .72$$

A2 *Durable Goods*

$$\Delta CD58 = 1.619 - 0.0714\ CD58_{-1} + 0.310\ \Delta ICR58 + .200\ \Delta(\frac{YD - VG}{PC})$$
$$(2.78)\quad (2.50)\qquad\qquad (2.50)\qquad\qquad (3.67)$$

$$+ 2.425\ \Delta DMY55 + .213 \cdot .5(\frac{SAVEPER_{-1}}{PC_{-1}} + \frac{SAVEPER_{-2}}{PC_{-2}})$$
$$(3.90)$$

$$+ 1.115\ DMYCAR + 0.129\ \Delta C58_{-1} - 1.398 \Delta U$$
$$(6.98)\qquad\qquad (2.59)\qquad\qquad (2.45)$$

$$R^2 = .925$$
$$SE = .83$$

A3 *Nondurables and Services*

$$\Delta CNS58 = 2.060 + 0.295\ \Delta YD58 + 0.116\ \Delta YD58_{-1}$$

$$R^2 = .671$$
$$SE = 1.17$$

A4 *Nonfarm Inventories*

$$INVEAF58 = -25.767 - 0.410\ INVEAF58_{-1} + 0.176\ SF58 + 0.108\ SF58_{-2}$$
$$(6.89)\qquad (6.78)\qquad\qquad\qquad (5.99)\qquad\quad (2.42)$$

$$1.667 \cdot .5\ \Delta(\frac{OEQD_{-1}}{PXPNF_{-1}} + \frac{OEQD_{-2}}{PXPNF_{-2}}) - 0.396\ TIME + 1.510\ DMYINV58$$
$$(6.30)\qquad\qquad\qquad\qquad\qquad (5.30)\qquad\qquad (5.88)$$

$$R^2\ .895$$
$$SE = 1.419$$

A5 *Imports*

$$M58 = -12.755 + .031\ XPNF58 + .510\ DMYUSCANAUTO + 1.504\ DMYM58$$
$$(2.51)\quad (8.71)\qquad\quad (7.22)\qquad\qquad\qquad (4.66)$$

$$- 5.304\ PM + .271\ M58_{-1} + 21.135\ PXPNF$$
$$(1.54)\qquad (2.41)\qquad\quad (3.60)$$

$$R^2 = .99$$
$$SE = .506$$

A6 *Investment in Producers Durable Equipment*

$$IPDE58 = -19.287 + .0725 \cdot (\frac{XPNF58 + XPNF58_{-1}}{2})$$

$$+ \sum_{i=0}^{5} b_i (PDEREAL_{-i-1} \cdot XPNF58_{-i}) + \sum_{i=0}^{5} C_i (PDEREAL_{-i} \cdot XPNF58_{-i})$$

$$- .303 \; TIME + .0776 \; KIPDE(-1)$$
$$\quad (7.11) \qquad (constr)$$

$b_0 = .0229$	$c_0 = -.0222$
$b_1 = .0272$	$c_1 = -.0227$
$b_2 = .0238$	$c_2 = -.0196$
$b_3 = .0159$	$c_3 = -.0145$
$b_4 = .00715$	$c_4 = -.00856$
$b_5 = .000715$	$c_5 = -.00327$

Sum of weights $\quad = .0977 \qquad\qquad\qquad = -.0909$
$\qquad\qquad\qquad (4.02) \qquad\qquad\qquad\qquad (3.50)$

$$R^2 = .99$$
$$SE = .60$$

a. Real Price of Capital

$$PDEREAL = \frac{PXPNF}{PIPDE \cdot (PDEDEP + RDIS) \cdot PDETAX}$$

b. Discount Rate

$$RDIS = .01 \; (RBAA + 4.5)$$

c. Tax Adjustments

$$PDETAX = (1.0 - PDEITC - RTCGF * PDEZAD)/(1.0 \; RTCGF)$$

A7 *Nonresidential Construction*

$$ICER58 = 3.66 + \sum_{i=2}^{7} b_i \; RDIS_{-i} - .112 \; TIME$$
$$\quad (8.13) \qquad\qquad\qquad (6.51)$$

$$+ .303 \cdot .5 \; (IPDE58 + IPDE58_{-1}) + .0305 \; KICER_{-1}$$
$$\quad (9.75) \qquad\qquad\qquad\qquad (constr)$$

$b_2 = -65.359$
$b_3 = -81.009$
$b_4 = -86.041$
$b_5 = -80.457$
$b_6 = -64.255$
$b_7 = -37.437$

Sum of weights $\quad = -414.556$
$\qquad\qquad\qquad (4.75)$

$$R^2 = .832$$
$$SE = .683$$

A8 *Residential Construction*

$$ICR58 = 21.943 + 1.055 \; \Delta MTGR58 + .47040 \; \Delta MTGR58_{-1} - .1343 \; TIME$$
$$\quad (21.0) \quad\; (11.1) \qquad\qquad (4.75) \qquad\qquad\qquad (5.80)$$

$$+ 6.036 \; \Delta PHH - 3.743 \cdot .5 \; (RMC_{-1} - RBAA_{-1} + RMC_{-2} - RBAA_{-2})$$
$$\quad (2.25) \qquad\qquad (7.26)$$

$$+ 0.991 \; DMYICR58$$
$$\quad (3.592)$$

$$MTGR58 = \frac{MTGR - MTGR_{-1}}{PICR}$$

$$R^2 = .971$$
$$SE = .46$$

138

A9 *Total Private Fixed Investment*

IFIX58 = IPDE58 + ICER58 + ICR58

A10 *Construction by State and Local Governments*

$$\text{ICVGSL58} = 2.385 + .02805 \cdot .333\ (\text{GNP58}_{-1} + \text{GNP58}_{-2} + \text{GNP58}_{-3})$$
$$\quad (4.60 \quad (13.21)$$
$$+ 1.1366\ \text{VAIDI58}$$
$$\quad (8.03)$$
$$- 2.177 \cdot .166\ (\text{RGSL} + \text{RGSL}_{-1} + \text{RGSL}_{-2} + \text{RGSL}_{-3} + \text{RGSL}_{-4} + \text{RGSL}_{-5})$$
$$\quad (9.88)$$

$$R^2 = .969$$
$$SE = .50$$

A11 *State and Local Government Purchases of Goods and Services*

GSL58 = ICVGSL58 − GSLO58

A12 *Gross National Product*

GNP58 = CD58 + CNS58 + .INVEAF58 + EX58 − M58 + IPDE58
       + ICER58 + ICR58 + GSL58 + .INVAF58 + GF58

A13 *Private Nonfarm GNP*

XPNF58 = GNP58 − XGG58 − XAF58

A14 *Index of Manufacturing Capacity*

$$\Delta\text{KMFRB} = 0.188 + .0719\ \text{IPDE58} + .495\ \Delta\text{KMFRB}_{-1} - .0188\ \text{KMFRB}_{-1}$$
$$\quad (2.15) \quad (8.56) \qquad (7.06) \qquad (6.72)$$

$$R^2 = .98$$
$$SE = .12$$

A15 *Manufacturing Production Index*

$$\text{XMFRB} = -6.152 + .103\ \text{XPNF58} + .199\ \text{CD58} + .297\ .\text{INVEAF58}$$
$$\quad (3.46) \quad (9.88) \qquad (3.87) \qquad (6.38)$$
$$+ .104\ \text{GF58} + .677\ \text{OEQD58}_{-1} + .478\ \text{OEQD58}_{-2}$$
$$\quad (3.08) \qquad (3.16) \qquad (2.59)$$

$$R^2 = .99$$
$$SE = .74$$

A16 *Capacity Utilization*

KUMFRB = XMFRB/KMFRB

B. *Prices, Wages, and Employment*

B1 *Productivity*

$$\text{PROD} = -.946 + .0446\%\ \Delta\text{XPNF58} + .0107\%\ \Delta\text{XPNF58}_{-1} - .0151\%\ \Delta\text{XMFRB}$$
$$\quad (1.31) \quad (10.0) \qquad (1.89) \qquad (6.74)$$
$$-.00917\%\ \Delta\text{XMFRB}_{-1} + .278\ \text{KUMFRB}_{-1} + 2.04(\frac{\text{LCM20+}}{\text{LC}}) + .010\ \text{TIME}$$
$$\quad (3.43) \qquad (2.04) \qquad (2.07) \qquad (3.33)$$
$$+ .734\ \text{PROD}_{-1}$$
$$\quad (7.95)$$

$$R^2 = .999$$
$$SE = .016$$

139

B2 *Manhours — Private Nonfarm*

MHPNF = XPNF58/PROD

B3 *Average Hours Per Employee*

$$\text{MH/EPNF} = .422 + .643 \text{ MH/EPNF}_{-1} + .00482\% \ \Delta\text{MHPNF} + .451(\frac{\text{LCM20+}}{\text{LC}})$$
$$\quad\quad (7.31)\ (15.0) \quad\quad\quad (11.8) \quad\quad\quad (8.67)$$

$$R^2 = .99$$
$$SE = .0035$$

B4 *Employment — Private Nonfarm*

EPNF = MHPNF / MH/EPNF

B5 *Total Employment*

$\Delta E = .7\ \Delta(\text{EPNF} + \text{EEGF} + \text{EEGSL})$

B6 *Labor Force Participation Rate — Male 20 and Over*

$$\text{LCPRM20+} = .886 - .000795\ \text{TIME} + .457(\frac{\text{LAF}}{\text{NC}}) + .129\ \text{RU}$$
$$\quad\quad (149.0)\ (41.6) \quad\quad (3.16) \quad\quad (2.48)$$

$$R^2 = .98$$
$$SE = .0030$$

B7 *Labor Force Participation Rate — Excluding Males 20 and Over*

$$\text{LCPREM20+} = .357 + .00103\ \text{TIME} - .390(\frac{\text{LAF}}{\text{NC}}) - .311\ \text{RU}$$
$$\quad\quad (26.6)\ (23.7) \quad\quad (1.19) \quad\quad (2.64)$$

$$R^2 = .943$$
$$SE = .0018$$

B8 *Civilian Labor Force*

LC = LCPRM20+ · NCM20+ + LCPREM20+ · NCEM20+

B9 *Unemployment Rate*

$$RU = 1 - \frac{E}{LC}$$

B10 *Unemployment Rate — Males 25 and Over*

$$\text{RUM25+} = -.0874 - .000519\% \ \Delta\text{XPNF58} + .781\ \text{RU} + .144\ \text{RUM25+}_{-1}$$
$$\quad\quad (8.15) \quad (2.28) \quad\quad\quad (12.4) \quad (1.76)$$
$$\quad\quad + .129(\frac{\text{LCM20+}}{\text{LC}})$$
$$\quad\quad (7.52)$$

$$R^2 = .987$$
$$SE = .00136$$

B11 *Index of Hourly Earnings — Private Nonfarm*

$$\% \ \Delta\text{AHEPNF} = 2.71 - 27.69\ \text{RUM25+} - .467\ \text{DMYGP}$$
$$\quad\quad (9.68)\ (5.37) \quad\quad (4.07)$$
$$\quad\quad + .485 \cdot .5 \cdot (\% \ \Delta\text{PC} + \% \ \Delta\text{PC}_{-1})$$
$$\quad\quad (4.41)$$

$$R^2 = .85$$
$$SE = .25$$

B12 *Index of Earnings Plus Supplements*

AAHEPNF = AHEPNF · (WSS/WS)

140

B13 *Wage Rate — Private Nonfarm*

$\% \Delta \text{WRPNF} = .221 + .828\% \Delta \text{AAHEPNF} + .0958\% \Delta \text{GNP}$
$\phantom{\% \Delta \text{WRPNF} =} (.83) \quad (8.47) \phantom{+ .828\% \Delta \text{AAHEPNF}} (1.957)$

$$R^2 = .726$$
$$SE = .43$$

B14 *Unit Labor Costs*

$\text{ULC} = \text{WRPNF}/\text{PROD}$

B15 *Wages, Salaries, and Supplements — Private Nonfarm*

$\text{WSSPNF} = \text{XPNF58} \cdot \text{ULC}$

B16 *Wages, Salaries, and Supplements*

$\text{WSS} = \text{WSSPNF} + \text{XGG58} \cdot \text{PXGG} + \text{WSSAF}$

B17 *Wages and Salaries*

$\text{WS} = \text{WSS} - \text{TWER} - \text{YOL}$

B18 *Private Nonfarm Price Deflator*

$\% \Delta \text{PXPNF} = -.0268 + .040\% \Delta \text{KUMFRB} - 34.598(\text{ULC} - \text{ULCB})$
$\phantom{\% \Delta \text{PXPNF} =} (.72) \quad (3.64) \phantom{+ .040\% \Delta \text{KUMFRB}} (3.32)$

$$+ .469(\% \Delta \text{PXPNF}_{-1} - \sum_{i=1}^{6} b_i \% \Delta \text{ULCB}_{-i-1})$$
$$(5.129) \phantom{+ .469(\% \Delta \text{PXPNF}_{-1} - \sum_{i=1}^{6} b_i} (\text{constr})$$

$$+ .08\% \Delta(\frac{\text{TXGSL}_{-1} + \text{TXGF}_{-1}}{\text{XPNF58}_{-1}}) + \sum_{i=0}^{5} b_i \% \Delta \text{ULCB}_{-i}$$

$$+ .08\% \Delta(\frac{\text{TXGSL} + \text{TXGF}}{\text{XPNF58}})$$
$$(\text{constr})$$

$b_0 = .36$
$b_1 = .25$
$b_2 = .15$
$b_3 = .08$
$b_4 = .05$
$b_5 = .03$

$$R^2 = N.\,A.$$
$$SE = .214$$

$$\text{ULCB} = \text{WRPNF}/(1.012 * \sum_{i=0}^{3} c_i \, \text{PROD})$$
$$(\text{constr})$$

$c_0 = .4$
$c_1 = .3$
$c_2 = .2$
$c_3 = .1$

B19 *Consumption Deflator*

$\% \Delta \text{PC} = .00113 + .255\% \Delta \text{PC}_{-1} + .0530\% \Delta \text{PXAF} + .64901\% \Delta \text{PXPNF}$
$\phantom{\% \Delta \text{PC} =} (.016) \quad (3.08) \phantom{+ .255\% \Delta \text{PC}_{-1}} (6.23) \phantom{+ .0530\% \Delta \text{PXAF}} (8.50)$

$$R^2 = .925$$
$$SE = .20$$

B20 *Residential Construction Deflator*

$\% \Delta \text{PICR} = .551 + .729\% \Delta \text{PXPNF}$
$\phantom{\% \Delta \text{PICR} =} (1.52) \, (2.81)$

$$R^2 = .193$$
$$SE = 1.09$$

B21 *Nonresidential Construction Deflator*

% ΔPIFIXER = $-$.252 + 1.23% ΔPXPNF
      (1.60) (11.4)

$$R^2 = .855$$
$$SE = .41$$

B22 *Export Deflator*

% ΔPEX = $-$.171 + 1.12% ΔPXPNF + 1.41 DMYM58
      (.56)   (5.21)   (3.06)

$$R^2 = .598$$
$$SE = .786$$

B23 *Federal Government Purchaser Deflator*

% ΔPGF = .0724 + 1.526% ΔPXPNF
      (.195)   (5.759)

B24 *State and Local Government Purchaser Deflator*

% ΔPGSL = .876 + 1.049% ΔPXPNF
        (4.63) (7.76)

$$R^2 = .646$$
$$SE = .565$$

B25 *General Government Deflator*

% ΔPXGG = .115 + 1.283% ΔAHEPNF$_{-1}$
        (.257) (6.37)

C. *Current Dollar Output and Income Distribution*

C1 *Consumption*

C = C58 · PC

C2 *Nonresidential Construction*

IFIXER = PIFIXER (IPDE58 + ICER58)

C3 *Residential Construction*

ICR = PICR · ICR58

C4 *Inventories*

.INV = .INVEAF58 + .INV-INVEAF58

C5 *Federal Government Expenditures*

GF = PGF · GF58

C6 *Net Exports*

EX-M = EX58 · PEX — PM · M58

C7 *Gross National Product*

GNP = C + IFIXER + ICR + .INV + GF + EX-M + GSL

142

C8 *Capital Consumption Allowances*

    a. Corporate capital consumption allowances

$$\Delta CCACORP = .156 + .0356\Delta XPNF + .0354\ \Delta XPNF_{-1}$$
$$\quad\quad\quad\quad (.69)\quad (3.03)\quad\quad\quad (2.97)$$

$$R^2 = .561$$
$$SE = .59$$

    b. Total capital consumption allowances

$$CCA = CCACORP + CCAH + CCAO$$

C9 *Indirect Business Taxes and Nontax Accruals to the Federal Government Accruals to the Federal Government*

$$\frac{TXGF}{GNP} = .0256 + .799\ RDCAR + 1.180\ DIBT + .0000545\ TIME$$
$$\quad\quad (54.1)\quad (8.43)\quad\quad\quad (22.8)\quad\quad\quad (15.0)$$

$$R^2 = .99$$
$$SE = .00026$$

C10 *Indirect Business Taxes and Nontax Accruals to State and Local Governments*

$$\Delta TXGSL = .192 + .0119\ \Delta(C \cdot RTXGSL) + .506\ \Delta TXGSL_{-2}$$
$$\quad\quad\quad (1.62)\ (7.03)\quad\quad\quad\quad\quad (5.58)$$

$$R^2 = .90$$
$$SE = .35$$

C11 *Corporate Return on Capital*
(Profits, Capital Consumption, and Net Interest)

    a. Property income

$$PY = XPNF - TXGSL - TXGF - WSSPNF$$

    b. Corporate return on capital

$$ZBX = -19.65 + .627\ PY + .0847\ KUMFRB \cdot PY + .197 \cdot .5\ (PY + PY_{-1})$$
$$\quad\quad\quad (34.39)\ (83.8)\quad (11.05)\quad\quad\quad\quad\quad (7.32)$$
$$\quad - .664\ STAT$$
$$\quad\ (10.72)$$

$$R^2 = .99$$
$$SE = .45$$

C12 *Corporate Profits Before Tax Including Inventory Valuation*

$$ZB = ZBX - INTBUS - CCACORP$$

C13 *Corporate Inventory Valuation Adjustment*

$$IVACORP = .221 - .00595\%\ (PXPNF \cdot INVEAF_{-1})$$
$$\quad\quad\quad\quad (.80)\quad (8.72)$$

$$R^2 = .69$$
$$SE = .99$$

C14 *Corporate Profits Tax Accruals to the Federal Government*

$$\Delta TCGF = -.181 + .872\ \Delta[RTCGF \cdot (ZBU - TCGSL)]$$
$$\quad\quad\quad (.927)\ (27.7)$$
$$\quad - .0148\ (ZBU - ZB_{-2} - TCGSL + TCGSL_{-2})$$
$$\quad\ (1.26)$$
$$\quad + .00371\ TIME - ITC$$
$$\quad\ (1.39)$$

$$R^2 = .981$$
$$SE = .317$$

C15 *Corporate Profits Tax Accruals to State and Local Governments*

TCGSL = RTGSL · ZBU

C16 *Employers Contribution to Social Security*

$$\frac{TWER}{WS} = .0099 + .361 \ OASIR + .073 \ OASIC$$
$$\phantom{\frac{TWER}{WS} =} (.399) \quad (39.1) \qquad (8.8)$$
$$+ .00414 \ (RTUIGSL + RTUIGF) - .514 \ OASIB/AHEPNF$$
$$ (16.9) \qquad\qquad\qquad (2.87)$$
$$- .00229 \ (AHEPNF/OASIB)$$
$$ (3.34)$$

$$R^2 = .99$$
$$SE = .00053$$

C17 *Personal Contribution to Social Security*

$$\frac{TWPER}{WS} = -.0268 + .360 \ OASIR + .0556 \ OASIC + .000527 \ OASDHIMED$$
$$\phantom{\frac{TWPER}{WS} =} (1.488) \ (40.29) \qquad (9.83) \qquad\quad (7.24)$$
$$- .0469 \ OASIB/AHEPNF - .0006724 \ (AHEPNF/OASIB)$$
$$ (.359) \qquad\qquad\qquad (1.33)$$

$$R^2 = .99$$
$$SE = .000368$$

C18 *Dividends*

$$\frac{DIV}{(ZAU + CCACORP)} = .356 - .00248\% \ (ZAU + CCACORP)$$
$$\phantom{\frac{DIV}{(ZAU + CCACORP)} =} (17.7) \ (3.85)$$
$$- .00153\% \ (ZAU_{-1} + CCACORP_{-1})$$
$$ (2.86)$$
$$- .513 \ (\frac{ZBU + CCACORP}{GNP})$$
$$ (1.1)$$
$$- 1.069 (\frac{ZBU_{-2} + CCACORP_{-2}}{GNP_{-2}}) - .000137 \ TIME$$
$$ (2.4) \qquad\qquad\qquad\qquad (2.5)$$

$$R^2 = .78$$
$$SE = .0057$$

C19 *Unemployment Insurance Beneficiaries*

$$\Delta UIBEN = -.0174 + .612 \ \Delta U - .068 \ \Delta U_{-1}$$
$$ (1.12) \quad (17.34) \qquad (2.18)$$

$$R^2 = .91$$
$$SE = .090$$

C20 *State Unemployment Insurance Benefits*

VUSGF = UIBEN · (VUSGF/UIBEN)

C21 *Government Transfer Payments to Persons*

VG = VUSGF + VGSL + VPERGF − VUSGF

C22 *Personal Income*

YP = GNP − TXGF − TXGSL − ZB − TWER − TWPER + VG + DIV
   − CCA + SUBG − WALDP − WALDGF − WALDGSL + INTGF
   + INTGSL + INTC − STAT

144

C23 *Federal Government Personal Tax and Nontax Receipts*
   TPGF = RTPGF (YP − VG + TWPER)

C24 *State and Local Government Personal Tax and Nontax Receipts*
   TPGSL = RTPGSL (YP − VG + TWPER)

C25 *Disposable Income*
   YD = YP − TPGF − TPGSL

D. *Miscellaneous Equations and Identities*

D1 *Personal Savings*
   SAVEPER = YD − C − INTC − VFORPER

D2 *New Orders − Equipment and Defense, Excluding Autos*
   OEQD58 = −8.346 + .257DOD58 + .0604 XPNF58 − .168 TIME
   (12.356)(6.363)   (15.6)   (8.64)
   + .074 · .3 Δ(XPNF58 + XPNF58$_{-1}$ + XPNF58$_{-2}$)
   (4.08)

R^2 = .988
SE = .42

D3 *Durable Consumption − Current Dollars*
   CD = PCD · CD58

D4 *Residential Construction Expenditures − Households*
   ICRH = RICRH · ICR

D5 *Undistributed Profits*
   RE = ZAU − DIV

D6 *Final Sales*
   SF = GNP − .INV

D7 *State and Local Government Receipts*
   TGSL = TPGSL + TCGSL + TXGSL + VAID + VAIDI

D8 *State and Local Government Expenditures*
   EXPENGSL = GSL + VGSL + INTGSL − SURPGSL − WALDGSL

D9 *Corporate Tax Payments to State and Local Governments*
   TCPGSL = −.138 + .202 TCXGSL$_{-1}$ + .644 TCPGSL$_{-1}$ + .329 TCGSL$_{-1}$
   (1.22) (1.70)   (4.89)   (1.72)
   + .959 DMY196901
   (3.79)

R^2 = .97
SE = .214

145

D10 *Corporate Tax Payments to the Federal Government*
First Half of Year

$$TCPGF = -1.122 + 1.233 \cdot .5(TCGF_{-1} + TCGF_{-2})$$
$$\quad (.468) \quad (9.50)$$
$$\quad - .889 \, (TAXSCHED1_{-2} \cdot TCGF_{-3}) + .947 \, (TAXSCHED1 \cdot TCGF_{-1})$$
$$\quad (12.3) \qquad\qquad\qquad (9.0)$$
$$\quad - .400[TAXSCHED2_{-2} \cdot .5(TCGF_{-1} + TCGF_{-2})]$$
$$\quad (4.8)$$
$$\quad + 1.065 \, TAXSCHED1 \cdot \Delta TCGF - 2.565 \, DMYTCP1968$$
$$\quad (4.85) \qquad\qquad\qquad (2.62)$$
$$R^2 =$$
$$SE = .9654$$

Second Half of Year

$$TCPGF = .719 + .705 \, TCGF_{-1} + .271 \, TCGF_{-2} - 3.74 \, DMYTCP1968$$
$$\quad (.88) \quad (9.8) \qquad\qquad (4.0) \qquad\qquad (5.52)$$
$$R^2 =$$
$$SE = .731$$

D11 *Unpaid Tax Liabilities to State and Local Governments*

$$\Delta TCXGSL = .5(TCGF - TCPGF)$$

D12 *Unpaid Tax Liabilities to Federal Government*

$$\Delta TCXGF = .5(TCGF - TCPGF)$$

D13 *Federal Government Receipts*

$$TGF = TPGF + TCGF + TXGF + TWER + TWPER - TWGSL$$

D14 *Federal Expenditures*

$$EXPENGF = VG + GF + VAID + INTGF + SUBGF - WALDGF$$
$$\quad - VGSL + VFORGF$$

D15 *Stock of Producers Durable Equipment*

$$KIPDE = IPDE58 + .9224 \, KIPDE_{-1}$$

D16 *Stock of Nonresidential Construction*

$$KICER = ICER58 + .9695 \, KICER_{-1}$$

D17 *Stock of Residential Construction*

$$KICR = ICR58 + .988 \, KICR_{-1}$$

D18 *Nonfarm Inventory Stock*

$$INVEAF58 = .INVEAF58 + INVEAF58_{-1}$$

D19 *Housing Vacancy Rate*

$$\Delta VAC = -.423 - .145(RMC_{-1} - RBAA_{-1})$$
$$\quad (5.56) \quad (3.69)$$
$$\quad - .31047(\% \, \Delta PHH_{-2} - \% \, \Delta ICR58_{-2})$$
$$\quad (5.64)$$
$$R^2 = .572$$
$$SE = .078$$

DEFINITIONS OF VARIABLE NAMES FOR REAL SECTOR:

.INV	Total inventory accumulation
.INVAF58	Farm inventory accumulation — 1958 dollars
.INVEAF58	Non-farm inventory accumulation — 1958 dollars
AAHEPNF	Fixed weight wage index adjusted for fringe benefits
AHEPNF	Fixed weight wage index (excludes overtime in mfg.)
C	Total consumer expenditures
C58	Total consumer expenditures — 1958 dollars
CCA	Total capital consumption allowances
CCACORP	Corporate capital consumption allowances
CCAH	Capital consumption allowances — Households
CCAO	Capital consumption allowances — Other
CD	Consumer durable goods expenditures
CD58	Consumer durable goods expenditures — 1958 dollars
CDCAR58	Consumer expenditures on automobiles — 1958 dollars
CNS58	Consumer expenditures on nondurables and services — 1958 dollars
DIBT	Impact of changes in Federal indirect tax rates
DIV	Corporate dividend payments
DMY55	Dummy variable for 1955 change in credit terms
DMYCAR	Dummy variable of auto strikes
DMYGP	Dummy variable for wage and price guideposts
DMYICR58	Dummy variable for rise of mortgage refinancing in 1971
DMYINV58	Dummy variable for strikes
DMYM58	Dummy variable for strikes
DMYTCP68	Dummy variable for 1968 midyear tax surcharge
DMYUSCAN	Dummy variable for U.S.-Canadian automobile agreement
DODMPCA	Department of Defense military prime contract awards
E	Total employment — Household survey
EEGF	Federal government employment — Establishment survey
EEGSL	State and local government employment — Establishment survey
EPNF	Private non-farm employees — Establishment survey
EX — M	Net exports
EX — M58	Net exports — 1958 dollars
EX58	Exports — 1958 dollars
EXPENGF	Federal government expenditures
EXPENGSL	State and local government expenditures
GF	Federal government purchases of goods and services
GF58	Federal government purchases of goods and services — 1958 dollars
GNP	Gross National Product
GNP58	Gross National Product — 1958 dollars
GSL	State and local government purchases of goods and services
GSL58	State and local government purchases — 1958 dollars
GSLO58	State and local government purchases except construction
ICER58	Nonresidential construction — 1958 dollars
ICR	Residential construction
ICR58	Residential construction — 1958 dollars
ICVGSL58	State and local government construction — 1958 dollars
IFIX58	Fixed investment — 1958 dollars
IFIXER	Nonresidential fixed investment
INTBUS	Net interest paid by business
INTC	Consumer interest payments
INTGF	Federal government interest payments
INTGSL	State and local government interest payments
INVEAF58	Non-farm inventory stock
IPDE58	Investment in producer durable equipment — 1958 dollars
ITC	Investment tax credit
IVACORP	Corporate inventory valuation adjustment
KICER	Stock of non-residential structures — 1958 dollars

147

KICR	Stock of residential structures — 1958 dollars
KIPDE	Stock of producer durable equipment — 1958 dollars
KMFRB	Federal Reserve index of manufacturing capacity
KUMFRB	Federal Reserve index of manufacturing capacity utilization
LC	Civilian labor force
LCEM20+	Civilian labor force — except males over 20 years of age
LCM20+	Civilian labor force — males over 20 years of age
LCPREM20+	Labor force participation rate — except males over 20 years of age
LCPRM20+	Labor force participation rate — males over 20 years of age
M58	Imports — 1958 dollars
MH/EPNF	Hours per man per year — Private non-farm sector
MHPNF	Total manhours — Private nonfarm sector employees
MTGR	Residential mortgage stock
NC	Civilian population — 16 years and over
NCEM20+	Civilian population except males 20 years and over
NCM20+	Civilian population — males 20 years and over
OASIB	OASI wage ceiling
OASIC	OASI ratio of covered employment to total
OASIR	OASDHI tax rate (employer and employee)
OEQD	Orders for equipment and defense goods
PC	Consumer expenditure deflator
PDECTAX	Impact of taxes on rental price of capital
PDEDEP	Depreciation rate used in rental price of capital
PDEITC	Rate of investment tax credit
PDEREAL	Relative rental price of capital
PDEZAD	Present value of capital depreciation allowances
PEX	Export deflator
PGF	Government purchases deflator
PGSL	State and local government purchases deflator
PHH	Potential rate of household formation (demographic projection)
PICR	Residential construction deflator
PIPDE	Producer durable equipment deflator
PM	Import price deflator
PROD	Output per manhour — Private non-farm sector
PXAF	Agricultural output deflator
PXGG	General government output deflator
PXPNF	Private non-farm output deflator
RBAA	Corporate bond rate
RDCAR	Excise tax rate on automobiles
RDIS	Discount rate for rental price of capital
RE	Corporate retained earnings
RGSL	State and local bond rate
RMC	Conventional mortgage rate
RTCGF	Maximum tax rate on corporate profits — Federal government
RTCGSL	Effective state and local tax rate on corporate profits
RTPGF	Effective tax rate on personal income — Federal government
RTPGSL	Effective tax rate on personal income — State and local governments
RTUI	Unemployment insurance tax rate
RTXGSL	State and local sales and gasoline tax rate
RU	Unemployment rate
RUM25+	Unemployment rate — Males 25 years of age and over
SAVEPER	Personal saving
SF58	Final sales — 1958 dollars
STAT	Statistical discrepancy
SUBG	Subsidies less surplus of government enterprises
SUBGF	Subsidies less surplus — Federal government
SUBGSL	Subsidies less surplus — State and local governments
TAXSCHED1	Proportion of Federal corporate tax liability paid in first half of year
TAXSCHED2	Proportion of Federal corporate tax liability paid in second half of year

148

TCGF	Corporate profits taxes — Federal government
TCGSL	Corporate profits taxes — State and local governments
TCPGF	Corporate tax payments — Federal government
TCPGSL	Corporate tax payments — State and local governments
TCXGF	Unpaid corporate tax liabilities — Federal government
TCXGSL	Unpaid corporate tax liabilities — State and local governments
TGF	Receipts — Federal government
TGSL	Receipts — State and local governments
TIME	Trend 194601 = 1.0
TPGF	Personal taxes — Federal government
TPGSL	Personal taxes — State and local governments
TWER	Employer contributions to social insurance
TWGSL	State and local government payments to social insurance
TWPER	Personal Contributions to Social Insurance
TXGF	Indirect business taxes — Federal government
TXGSL	Indirect business taxes — State and local governments
U	Total unemployed persons
UIBEN	Unemployment insurance beneficiaries
ULCB	Normal unit labor costs
VAC	Vacancy rate — Residential housing
VAID	Grants-in-aid
VAIDI	Grants-in-aid for capital projects
VFORGF	Federal government transfers to foreigners
VFORPER	Personal transfers to foreigners
VG	Federal government transfers
VGSL	State and local government transfers
VUSGF	Unemployment insurance benefits
WALDGF	Wage accruals less disbursements — Federal government
WALDGSL	Wage accruals less disbursements — State and local governments
WALDP	Wage accruals less disbursements — Private
WRPNF	Compensation per manhour — Private non-farm sector
WS	Total wages
WSS	Total wages plus supplements
WSSPNF	Wages plus supplements — Private non-farm sector
XAF58	Agricultural output — 1958 dollars
XGG58	General government output — 1958 dollars
XMFRB	Federal Reserve index of manufacturing output
XPNF	Output — Private non-farm sector
XPNF58	Output — Private non-farm sector — 1958 dollars
YD	Disposable income
YD58	Disposable income — 1958 dollars
YOL	Other labor income
YP	Personal income
ZAU	Corporate profits after taxes
ZB	Corporate profits plus IVA
ZBU	Corporate profits before taxes
ZBX	Property income

DISCUSSION

DWIGHT M. JAFFEE*

The long-awaited unveiling of the Bosworth-Duesenberry model (hereafter the B-D model) is a significant occasion. It marks the transition from general, although large, models of the financial sector characterized by the Federal Reserve-M.I.T.-Penn model (hereafter the FMP model) to more specific models that follow Flow of Funds accounting directly. Indeed, the B-D model is only the first of at least several attempts to model the flow of funds.

In this context, I think it is useful to consider in rather broad scope the nature of flow-of-funds models. The questions that can be considered range from the basic goals and uses of the models, through the framework and specification, and to the details of estimation and simulation procedures. An alternative possibility would be to consider the B-D model itself in detail. The description of the B-D model, which I think is really excellent, however, is in a form that focuses attention on the general characteristics of these models. Also, as the authors indicate, "the financial model buff will soon recognize that many of the equations are essentially old stuff — differing in detail but not in essence from the treatment of corresponding sectors in other models". Still, the key and novel features of the B-D model will be used to illustrate most of the points.

The following discussion covers six main topics, and to keep the discussion brief, I shall just proceed from one topic to the next.

The Goals and Uses of Flow-of-Funds Models

From the B-D paper, it is clear that three major uses of the model are intended. First, their model is capable of generating multiplier values for the primary tools of monetary and fiscal policy. These are illustrated, for example, in their reported simulation experiments for

*Associate Professor of Economics, Princeton University.

an increase in, respectively, unborrowed reserves and government expenditures. The results they obtain are quite in line with those obtained from the FMP model: monetary policy operates slowly but with a strong cumulative effect; fiscal policy has a strong short-run impact, but then cycles toward what appears to be a zero long-run value. This general consistency of the results with other models is reassuring, but the long-run properties of the model and the related multipliers should be better understood.

The second major use of the model concerns the evaluation of the secondary policy tools. Examples of secondary tools would include discount-rate policy, selective credit controls, and HUD housing subsidies. Another example, illustrated in the paper with a simulation, is the FNMA supply of mortgage funds. It is clear that an important comparative advantage of large scale flow-of-funds models is in the evaluation of a wide variety of such secondary tools. Unfortunately, the B-D model, like earlier models, does not make many of these tools explicit in the model. Instead, one must rely on the expertise of the model-builders to modify correctly the model for the calculation of the multipliers.

The third major use of the model concerns the evaluation of basic structural changes in the financial markets. As an example, Bosworth and Duesenberry indicate that appraisal of the Hunt Commission proposals could be carried out with the model. I am sure they are right, but my own experience with the FMP model was that this is a very difficult process, and I see no way in which the structure of their model is going to make it easier.

There are two further general points that can be made concerning the uses of the model. First, there is a question of evaluating the effects of inflation on financial-market and real-sector activity. The experience with the FMP model has been that such an evaluation requires careful specification of nominal versus real rates of interest, of capital gains and their effects, and, of course, of inflationary expectations. This is all very difficult, and I am afraid it remains as an important area for further work. Second, there is the possibility of using the flow of funds models in a forecasting mode. Again based on experience with the FMP model, I would expect the B-D model to forecast reasonably well; however, the problem up to now has been one of the practicalities of the large size of the model and the requirements for recent data and the updating of the model itself, and I do not think Bosworth and Duesenberry have solved this.

The Structure of Flow-of-Funds Models

A prime virtue of flow-of-funds models is the discipline of flow-of-funds accounting. We are forced to recognize the full list of market participants, the full array of market instruments, and the various identities relating all of them. Unfortunately, the first thing we do, and Bosworth and Duesenberry face this issue directly, is to aggregate across both institutions and instruments. The appropriate level of aggregation, and the way the aggregates are formed, therefore become questions themselves. The B-D solutions to these problems are all well discussed and reasonable.

One related point in the Bosworth-Duesenberry discussion, however, is of general interest and deserves further mention. A distinction is drawn by the authors between the "term-structure, risk-structure" approach for financial sectors characteristic of the FMP model. It is my view, on the other hand, that this distinction is simply one of coefficient estimates, not of basic structure. The underlying theory of the "term-structure, risk-structure" approach is that certain assets and liabilities are *perfect substitutes.* The implication of perfect substitutes in terms of the model is that certain coefficients become zero and therefore that certain variables do not enter the final specification. The misunderstanding with respect to the FMP model, however, has been that the perfect substitutes were assumed as an *a priori* judgment. This, in fact, was not the case. The FMP model assumed a general structure not distinctly different from the B-D framework, and it was only in the estimation that certain coefficients turned out to be small or zero.

This of course raises the question whether Bosworth and Duesenberry have found these same coefficients to be small or zero. I do not intend here to go into the details of their estimation to provide an answer, and, in fact, comparative simulations will be really the best way to get at the issue. From a survey of their equations, however, it is at least my guess that the B-D model is much closer to the FMP in these respects than might be thought.

Individual and Sector Behavior

The basic behaviorial postulate of financial-market models, and now of the B-D flow-of-funds model, remains the stock-adjustment principle. Individual units are assumed to strive toward some equilibrium portfolio of assets and liabilities, but the adjustment process is assumed to require significant time. One major problem with this

approach, of course, is the specification and estimation of the equilibrium portfolio. Bosworth and Duesenberry have a fine discussion of the issues relating to this problem, and then proceed in what is now a fairly standard way. A second major problem with the approach concerns the dynamic elements of the adjustment process. This received a great deal of attention in the FMP model, and Bosworth and Duesenberry pushed the analysis even further. Specifically, the major new element of their model is what they call the excess-loan-demand variable. This variable is effectively the difference between the increment in loan demand at commercial banks and the funds available from deposit growth for meeting this demand. The excess-demand variable is used in the B-D model as a dynamic element in a number of their equations, and it appears to work very well.

Institutional and Structural Change

The specification of institutional and structural change in models of financial markets have been increasingly a major concern of mine — and this includes both my own work on the FMP model and the B-D flow-of-funds effort. The mortgage and housing markets provide an excellent example of the problems. Over the last 10 to 15 years there have been significant changes in the regulation and institutional structure of time-deposit markets, mortgage markets, and the housing sector. To be more specific, in time-deposit markets we have seen the imposition of binding ceilings and the tremendous growth in "special" and "premium" rate accounts; and in the area of mortgage lending, the tax laws relating to mortgage loans and reserve accounts, as well as other Federal Home Loan Bank Board regulations, have changed significantly. In the housing markets, HUD subsidy programs have grown to the point where an important proportion of all housing starts are apparently HUD subsidized. My concern is whether we have given enough attention to the specification of these changes in our models. If we are really serious about using our models to evaluate proposals such as the Hunt Commission's, then we must view these historic changes as opportunites for enriching our coefficient estimates, not as nuisance factors to be avoided in the simplest way possible.

Estimation and Simulation

With respect to estimation and simulation procedures, Bosworth and Duesenberry continue three traditions that I think are worthy of

more careful inspection. First, the estimation of financial market
models tends to ignore the problems of simultaneous-equations bias.
Second, the normalization of specific equations with respect to
dependent variables is based on rather loose consideration of market-
clearing and credit-rationing activities. Third, the role of macro-
economic monetary and fiscal policy is treated as exogenous in both
estimation and simulation. On each of these questions, more serious
attention is required. To give just one example, in a recent *Brookings
Papers* study of Blinder and Goldfeld, the endogenous role of govern-
ment policy is studied carefully. They are able to show that the bias
in *estimation* introduced by ignoring endogenous government activ-
ity is small, whereas the interpretation of *simulation* results is greatly
affected by ignoring the same factor. Further study of these
problems, and implementation of the results in our models, would be
an important step forward.

Conclusion

   The discussion so far has accentuated the negative, both in terms
of the general state of financial-market models and in terms of the
B-D model which I have used as the primary example. In fact, how-
ever, I think the overall outlook is very bright, and the B-D effort
illustrates just how far we have come: In terms of the specification,
estimation, and simulation of their model, factors that would have
been major problems five years ago are now treated with standard
procedures, and the model is definitely meeting their major goals.
Furthermore, the problems that do remain, both the points I have
raised and the many points discussed by Bosworth and Duesenberry,
are now explicitly identified. Consequently, without doubt, we
should look to a continuing improvement and useful future for flow-
of-funds models, and the model will be an important step along the
way.

Federal Debt Management:

An Economist's View

from the Marketplace

HENRY KAUFMAN*

I welcome the opportunity to express my views on Federal debt management. This subject was much discussed in the period immediately following World War II, but it has received only limited attention in recent years, even though important changes have occurred in the management of our Federal debt. It has been subordinated in importance to other important official policy requirements. Many modifications in fiscal and monetary policy have gained the spotlight recently. For example, there has been the emphasis on managing the monetary aggregates and on the role of the dollar internationally. Both of these policy developments have had, in fact, an impact on Federal debt management. The large deficit in our balance of payments and the resulting dollar weakness eased the financing task of the U.S. Treasury in recent years when Federal budget deficits were extraordinarily large. The monetarist approach, which made considerable headway in credit-policy implementation in recent years, is also beginning to make its imprint on the theory and implementation of Federal debt management.

The neutrality theory of debt management has gained support not only as an approach advocated by the monetarists but also by many market participants. This approach favors that Treasury financing be simplified, routinized, and regularized. The objective is to prevent debt management from being a source of instability and to ease the task of coordinating Treasury debt operations and Fed open market operations. The neutrality theory is, of course, in sharp contrast to the counter-cyclical and pro-cyclical approaches of debt management, which were in favor immediately following World War II. The

*Partner and Economist, Salomon Brothers.

former favors the issuance of long-term debt in economic boom in order to reduce liquidity and the issuance of short-term debt in recessions in order to increase liquidity. The latter places considerable emphasis on debt lengthening and minimizing interest cost.

While I have some leanings toward the neutrality theory, both from a theoretical and market viewpoint, many helpful hints for future debt-management policies can be learned from an examination of the changing role of the U.S. Government market. I want to begin by reviewing these changes, thereafter examine some of the new techniques of debt management and, finally, venture forth with some suggestions of my own. In addition, I want to urge that Federal debt management should not be confined to U.S. Treasury debt but also should include improved surveillance over the debt policies of the burgeoning credit agencies. I am not commenting on the role of the Federal Reserve or of the U.S. Trust funds in the Government market because this subject is being covered by other participants in this Conference.

The Size of the Market

U.S. Government securities are still the most eminent obligations in the American securities market. All of their attractive features are still present, and most inter-market comparisons continue to be grounded to Government issues. U.S. Governments, however, are no longer the overwhelming market force in our credit markets as they were a few decades ago.

In the short-term sector, private domestic holdings of Treasury bills increased by only $2 billion to $47 billion from 1966 to 1972, despite a $39 billion increase in these obligations. This is because almost all of the increase was absorbed by the Federal Reserve, U.S. Trust Accounts, and especially by foreign central banks. As shown in Table 1, during the same period of time, however, the volume of outstanding private domestic money market obligations increased by $56.5 billion. Consequently, the volume of private domestic Treasury bill holdings as a percent of all U.S. money market obligations held privately declined from 57 percent in 1966 to 35 percent in 1972. Most of this decline occurred in the period from 1970 to 1972 when foreign central banks purchased a substantial volume of bills.

From a market viewpoint three points are worth noting briefly at this juncture. First, private money market obligations have become increasingly important to temporary holders of funds, although no private money market obligation enjoys all of the excellent features

TABLE 1

OUTSTANDING MONEY MARKET OBLIGATIONS, END OF CALENDAR YEAR
($ billions)

	1966	1967	1968	1969	1970	1971	1972
Total Treasury Bills	64.7	69.9	75.0	80.6	87.9	95.7	103.9
Less Holdings of:							
Fed & U.S. Trust Accounts	13.9	13.5	19.8	23.1	26.7	31.6	30.4
Foreign Central Banks (est.)	6.1	6.6	5.1	3.5	11.5	25.5	26.9
Private Domestic Holdings	44.7	44.8	50.1	54.0	49.7	38.6	46.6
Plus: Commercial Paper	13.3	16.5	20.5	31.7	31.8	31.1	34.7
Negotiable C.D.s	15.6	20.4	22.8	10.9	26.1	34.0	44.9
Federal Agency Discount Notes	1.0	1.5	3.0	3.8	3.4	2.2	1.6
Bankers Acceptances	3.6	4.3	4.4	5.5	7.1	7.9	6.9
Total Private Domestic Holdings of Money Market Obligations	78.2	87.5	100.8	105.9	118.1	113.8	134.7
Treasury Bills as % of Total	57	51	50	51	42	34	35

157

of Treasury bills. The commercial paper market, for example, has a limited secondary market at best, while bankers' acceptances and agency discount notes are relatively small markets. The volume of outstanding negotiable C.D.s, however, has not only increased substantially to where it now exceeds the private domestic holdings of Treasury bills, but they also have an improved secondary market although not yet equalling the resiliency of the secondary market in bills. Second, there is a plethora of money market obligations of very short maturity, but the volume diminishes rapidly beyond three months whereas Treasury bills are still the most important haven for short-term funds out to one year. Third, because of the changing dimensions of our money market, Treasury bill yields have at times not provided as accurate a gauge of money market conditions as they did years ago.

The U.S. Government coupon market is no longer the largest market. At the end of calendar 1972, the volume of outstanding publicly held U.S. Government coupon issues totalled $108 billion (see Table 2). This compares with $210 billion of corporate bonds (including $143 billion publicly offered), $161 billion of municipal bonds and $56 billion of Federal credit agencies. From the end of 1962 to 1972, the volume of publicly held U.S. Government coupon issues actually contracted by $1.1 billion while there was an increase of $120 billion in corporate bonds, $81 billion in municipals, and $46 billion in Federal credit agencies.

In addition to the difference in size between the publicly offered corporate bond market and the U.S. Government coupon market, there are other important differences that are quite instructive from a market viewpoint. Corporate bonds, for example, are available over a much wider maturity structure than U.S. Government coupon issues. This is illustrated in Table 3, which shows the volume of outstanding publicly offered corporate bonds and U.S. Government coupon issues held publicly scheduled to mature from the year 1973 to 2008 and over. In each of the years from 1973 through 1978, the scheduled volume of maturities of U.S. Governments exceeds that of corporate bonds. Thereafter, with the exception of 1980, the volume of maturing corporate bonds far exceeds that of U.S. Governments in each year. Indeed, there are many years in which there are no scheduled maturities of U.S. Governments but a substantial volume for outstanding corporate bonds. Between 1980 and the year 2000 there are currently no U.S. Governments scheduled to mature in 1987, 1988, 1989, 1991, 1996, 1997, 1999 and beyond.

Another difference between these two markets concerns the size of the average issue which is far larger for Governments than for

TABLE 2

VOLUME OF OUTSTANDING ISSUES IN THE MAJOR SECTORS OF THE BOND MARKETS

($ Billions)

End of Year	Straight Corporate Bonds			U.S. Govts. (Coupon Issues Publicly Held)	Federal Agencies (Coupon Issues)	Municipal Bonds	Total
	Total	Publicly Offered	Privately Placed				
1947	26.1	14.1	12.0	119.7	1.6	13.9	161.3
1952	44.2	22.2	22.0	88.7	2.6	26.6	162.1
1958	72.3	41.3	31.0	98.0	6.2	54.7	231.2
1962	90.1	52.7	37.4	108.8	10.4	75.1	284.4
1967	130.4	75.6	54.8	109.4	24.0	106.8	370.6
1972	209.7	142.7	67.0	107.7	56.1	161.3	534.8

TABLE 3

OUTSTANDING AMOUNT OF PUBLICLY OFFERED CORPORATE BONDS AND PUBLICLY HELD
U.S. GOVERNMENT COUPON ISSUES CLASSIFIED BY YEAR OF FINAL MATURITY
($ Billions)

Maturity Year	Corporate Bonds (as of 9/30/72)	U.S. Govts. (as of 12/15/72)	Range of Coupons(%) Corporate Bonds	U.S. Govts.*
1973	0.6	17.7	3 to 10 3/4	4 to 8 1/8
1974	2.1	22.7	Below 3 to 10 3/4	3 7/8 to 7 3/4
1975	4.0	16.9	Below 3 to Above 11	5 3/4 to 7
1976	3.4	12.9	Below 3 to 9 3/4	5 3/4 to 7 1/2
1977	3.4	3.6	Below 3 to Above 11	7 3/4 to 8
1978	3.3	9.5	Below 3 to 9 3/8	6 to 6 1/4
1979	4.2	3.0	Below 3 to 9 3/4	6 1/4
1980	2.6	2.9	Below 3 to 10 3/4	3 1/2 to 4
1981	2.4	0.4	Below 3 to Above 11	7
1982	2.7	1.7	Below 3 to 10 3/4	6 3/8
1983	2.8	1.2	3 to 5 5/8	3 1/4
1984	2.4	1.1	Below 3 to 7 5/8	6 3/8
1985	2.5	1.5	Below 3 to 10 3/4	3 1/4 to 4 1/4
1986	3.4	0.4	Below 3 to Above 11	6 1/8
1987	3.9	0.0	Below 3 to Above 11	—
1988	5.2	0.0	3 to Above 11	—
1989	3.1	0.0	3 to 10 3/4	—
1990	5.3	3.2	Below 3 to Above 11	3 1/2
1991	4.7	0.0	Below 3 to 9 3/4	—
1992	6.4	2.3	4 to 8 1/8	4 1/4
1993	4.5	0.2	3 to 8 1/8	4
1994	4.2	1.0	4 to 9 3/4	4 1/8
1995	6.9	0.9	3 to 10 3/4	3
1996	8.2	0.0	Below 3 to 9 3/8	—
1997	6.4	0.0	3 1/2 to 8 7/8	—
1998	4.5	2.6	3 1/2 to 9 3/4	3 1/2
1999	4.3	0.0	Below 3 to 9 3/4	—
2000	8.2	0.0	Below 3 to 9 1/8	—
2001	8.0	0.0	Below 3 to 9 1/8	—
2002	4.9	0.0	3 1/2 to 9 1/8	—
2003	1.2	0.0	Below 3 to 9 1/8	—
2004	1.1	0.0	3 to 9 1/8	—
2005	1.2	0.0	4 to 9 7/8	—
2006	1.2	0.0	4 1/2 to 8 7/8	—
2007	1.2	0.0	4 to 8 7/8	—
2008 & Over	5.9	0.0	3 to 9 1/4	—
TOTAL**	140.4	105.4		

*1½% coupons not included.
**May not add due to rounding.

corporates. In the longer maturities, however, this frequently consists of one large issue for Governments. In addition, while corporate bonds have a smaller average size, they are available in a wide range of coupons and, of course, credit quality. Only recently has the longer-dated Government market been enlarged with the addition of several higher coupon issues. The preponderance of longer-dated Governments still consists of low coupon issues, having been originally issued many years ago when interest rates were low. Since the Government received permission to issue $10 billion of bonds with coupons above 4¼ percent, two long bond issues amounting to $1.2 billion and four medium maturity bonds totalling $7.1 billion have been marketed. This new effort to enlarge the size of the longer-term Government bond market continues to be retarded, however, by the retirement of outstanding "flower" bonds which are mainly used in payment of estate tax purposes. An estimated $828 million or 5.5 percent of the outstanding issues with a maturity of 1990 and above were retired in 1972 through these types of tax payments. Since the start of 1966, $3.0 billion of these bonds or 17.7 percent of the amount outstanding at that time have been retired through the payment of estate taxes.

The Investors

Despite its large size, the U.S. Government market does not enjoy broad investor participation in the private sector. Among private investors, three groups dominate the market. These are commercial banks, foreigners (mainly official institutions) and individuals.

Generally, the commercial bank participation in the U.S. Government market has continued to be very much a function of monetary policy. During periods of monetary ease banks have purchased a substantial amount of Governments and, in turn, they have liquidated a substantial amount during monetary restraint. They held $66.6 billion or 25.5 percent of the privately held U.S. Treasury debt at the end of 1972 (see Table 4) as compared with $56.2 billion or 25.9 percent at the end of 1967. Several important structural changes have occurred, however, in commercial bank participation in the U.S. Government market. With the increasing emphasis on liability management, large commercial banks have substantially reduced their reliance on Governments as a secondary reserve. The smaller regional and country banks, however, having less costly and interest-sensitive liabilities than larger banks, are today a larger investor in U.S. Governments than the large money center banks. In

TABLE 4

U.S. TREASURY DEBT
($ Billions)

	Annual Net Increases in Amounts Outstanding						Amounts Outstanding 12/31/72E
	1967	1968	1969	1970	1971	1972E	
OUTSTANDING:							
Treasury Debt	15.4	13.4	10.2	20.8	34.9	20.7*	449.8
Less Holdings of: U.S. Trust Funds	7.2	3.4	12.5	8.1	8.9	6.2*	116.9
Federal Agencies	0.0	−0.1	−0.2	1.7	−1.5	−0.4	2.3
Fed. Res. Banks	4.8	3.9	4.2	4.9	8.1	−0.3	69.9
Privately Held	3.4	6.2	−6.3	6.1	19.4	15.2	260.7
OWNERSHIP:							
Mutual Savings Banks	−0.4	−0.5	−0.6	−0.1	0.1	0.2	3.5
Savings & Loan Associations	1.5	0.4	−1.0	0.2	0.7	1.4	13.7
Life Insurance Companies	−0.2	−0.2	−0.3	−0.1	−0.2	−0.1	3.7
Fire & Casualty Companies	−0.7	−0.3	0.4	0.0	0.2	0.0	5.0
Private Noninsured Pension Funds	−0.2	0.4	0.0	0.2	0.0	0.9	3.1
State & Local Retirement Funds	−0.3	−0.7	−0.8	−0.6	−0.2	−0.6	2.6
Open-End Mutual Funds	−0.5	0.2	−0.5	0.2	−0.3	0.2	0.7
Total Nonbank Investing Institutions	−0.8	−0.7	−2.8	−0.2	0.3	2.0	32.3
Commercial Banks	6.3	2.0	−9.8	7.0	3.2	1.7	66.6
Credit Unions	0.1	0.2	0.1	0.5	1.1	0.6	3.0
Business Corporations	−0.9	0.1	−1.8	−3.0	2.6	−1.5	6.2
State & Local Governments	0.1	1.2	2.6	0.0	−0.1	2.8	19.1
Foreigners	1.3	−1.5	−2.9	9.2	26.3	8.6	55.5
Residual: Individuals & Miscellaneous	−2.7	4.9	8.3	−7.4	−14.0	1.0	78.0
Total Ownership	3.4	6.2	−6.3	6.1	19.4	15.2	260.7

*In October 1972, Gross Treasury Debt outstanding and Trust Fund holdings were increased $4.5 billion to reflect a non-recurring accounting change. Accordingly, we have reduced the net increases for 1972 in these two items by $4.5 billion each.

recent years, moreover, the smaller banks in particular have been the largest bank buyers of intermediate- and longer-maturity issues. Large commercial banks, however, continue to be large distributors of U.S. Governments through their trading departments.

The active participation of foreign investors in the U.S. Government market is, of course, a recent development and reflects largely the investment of surplus dollars by foreign official institutions. Their takedown of U.S. Governments in just the past few years is staggering. Foreign holdings of U.S. Governments totalled $63.1 billion or 23.7 percent of total publicly held Treasury debt at the end of March 1973 as compared with $20.6 billion or 9.0 percent at the end of 1970. Foreign holdings of U.S. Governments at present exceed the holdings of even the largest domestic institutional investor group, the commercial banks. Their holdings of Treasury bills, in fact, were an estimated $25.5 billion, only $7.5 billion short of the amount held by the Federal Reserve at the end of March. Consequently, Federal debt management from hereon cannot ignore foreign holdings, which are bound to have substantial impact on market developments if they increase or decrease in size or composition. Moreover, we can no longer say that the size of the Federal debt is inconsequential because we owe it to ourselves.

The direct participation of the individual investor has been exceedingly volatile. It has hinged mainly on the extent to which open-market interest rates have exceeded deposit rates. Thus, when this interest rate spread favored market rates in 1969, the individual and miscellaneous group bought net $8.3 billion. Incidentally, this occurred in a year in which the unified budget of the Treasury was in surplus and the total publicly held Treasury debt actually decreased. When the yield spread favored deposit rates in 1971, this group liquidated $14 billion even though the unified budget was substantially in deficit and privately held Treasury debt rose sharply.

One aspect concerning Federal debt management and the individual investor deserves considerable discussion and analysis. It is the occasional attempt by the Treasury to deter the individual as a direct investor in U.S. marketable obligations. In other words, the Treasury does not want U.S. Government obligations to be a disintermediation instrument. This was one of several reasons that encouraged the Treasury to raise the minimum denomination of Treasury bills to $10,000. In addition, because of the fear of compounding the disintermediation problem, the Treasury has occasionally limited its financing to the money market sector and to rights offerings instead of cash financing. I feel that these are fruitless measures and do not

deter disintermediation in the credit market as a whole. Disinter-
mediation is determined by monetary and fiscal policies, reflecting
efforts to slow credit availability to curb economic excesses. Raising
the minimum denomination of securities and other well-intended
debt management efforts just raise the level of interest rates at which
disintermediation is likely to occur and shift part of the disinter-
mediation process to other sectors of the credit market.

The other participants in the U.S. Government market are small in
the aggregate considering the large size of the market. Non-bank
investing institutions, which are the major investors in corporate
bonds, held only $32.3 billion or 12.4 percent of the privately held
Treasury debt at the end of 1972, and they have been net sellers for
most of the time during the past decade. This is in sharp contrast to
the active role played by key British non-bank investing institutions
in the Gilt-edged market. These institutions hold about 25 percent of
the marketable Government debt in the United Kingdom.

The lack of breadth and depth of the long-term Government bond
market largely accounts for the absence of the non-bank investing
institutions. Despite the recent marketing of several new long-term
issues, this market is still dominated by "flower" bonds. For most of
the past five years, the yield spreads between these long Government
issues and high-grade corporate bonds have been extraordinarily
wide. These issues have been bought in the secondary market mostly
by individuals for estate tax payments, occasionally by the Federal
Reserve, and by speculative accounts when policies of monetary ease
were pursued. Since the issuance of new longer-dated Governments
late last year, the "flower" bonds have been under increasing price
pressure but they are still yielding substantially less than either the
two new long Governments or corporate bonds.

Finally, in this summary of investors in U.S. Governments, let me
briefly mention business corporations and State and local Govern-
ments. They confine most of their investments to the short-term
sector. For State and local Governments, their purchases are partly
influenced by legal requirements while business corporations have
considerably widened their temporary investment alternatives in
recent years.

Recent Debt Management Changes

Before offering some suggestions for improving debt management,
let me briefly summarize some of the important changes that have
occurred recently in debt management policies and acknowledge

some of the accomplishments. The more important ones have been the following:

The restriction on the issuance of long-term bonds at interest rates above 4¼ percent has been pierced. While the initial emission of new bonds above 4¼ percent has been limited to $10 billion, the way has been cleared for working towards a balanced maturity structure of the U.S. debt market.

The routinizing of U.S. Treasury financing gained considerable impetus when the Treasury decided to embark last year on a quarterly auction of a 2-year note. This type of financing was interrupted, however, a few months ago as a result of the large accumulation of Treasury cash balances.

The auction technique, which for many years was largely confined to the selling of Treasury bills, has also been used in recent years for raising cash through note and bond offerings.

The controversial "Dutch" auction has been used two times within the past six months to distribute new bond offerings. I will comment on this technique later.

The task of refunding maturing coupon issues has been substantially reduced in the last two years. As shown in Table 5, at the start of this year the volume of coupon issues maturing in calendar 1973 was only $9 billion. The coupon refunding requirement for 1972 was $16 billion and $23 billion for 1970 and 1971. The reduced refunding task was accomplished through substantial advance and pre-refunding operations and by enlarging the volume of bill financing.

The 9-month bill auction was eliminated and the 1-year bill auction was shifted to a four-week interval instead of on a monthly basis.

Treasury cash management mobility was improved by re-classifying more banks which hold Tax and Loan Accounts as "C" banks.

A Federal Financing Bank that will centralize the financing requirements of the budgeted credit agencies is in the process of receiving Congressional approval.

TABLE 5

VOLUME OF OUTSTANDING MARKETABLE GOVERNMENT SECURITIES AT START OF YEAR
($ Billions)*

	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
Treasury Bills	51	57	60	65	70	75	81	88	98	104
Other Issues Due Within 1 Year	38	32	33	40	34	34	37	35	22	26
Total Short-Term	89	89	93	105	104	109	118	123	120	130
Due Over 1 Year	118	124	121	113	122	128	118	125	142	140
Total Marketable	207	213	214	218	226	237	236	248	262	270
Less: Held by Fed & U.S. Govt. Trust Accounts	46	49	54	59	66	69	73	79	88	89
Publicly Held	161	164	160	159	160	168	163	169	174	181

VOLUME OF MATURING GOVERNMENTS OTHER THAN BILLS, HELD BY THE PUBLIC

	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
1st Quarter	5	3	3	4	2	5	6	6	4	2
2nd Quarter	5	5	5	4	4	6	5	6	4	5
3rd Quarter	5	3	6	5	5	3	6	4	4	1
4th Quarter	5	5	4	3	7	8	6	7	5	1
Total	20	16	18	16	18	22	23	23	16	9

RATIOS (%)

	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
Treasury Bills to Total Due Within 1 Year	57	64	65	62	67	69	69	72	82	80
Governments Due Within 1 Year to Total Marketable Debt	43	42	43	48	46	46	50	50	46	48

AVERAGE MATURITY (IN YEARS, MONTHS)

	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
Total Marketable Debt	5,1	5,0	5,0	4,7	4,1	4,0	3,8	3,4	3,4	3,1

*May not add due to rounding.

166

Suggestions

I should like to confine my suggestions to two interrelated aspects of Federal debt management that are of importance to the marketplace. These are cash management and financing techniques.

The cash position of the U.S. Treasury has had a tendency to swing from feast to famine, reflecting most of the time the imbalances between revenue and expenditure flows. Generally, expenditures are spaced quite evenly through the fiscal year while revenues show substantial peaks and valleys from one tax date to another. For example, revenue collections are highly concentrated in the last four months of the fiscal year when about 38 percent of total revenues for the fiscal year are usually collected. In the last few years, Treasury cash management has also been complicated by the inflow of dollars from the issuance of non-marketable issues to foreign official institutions. Moreover, as indicated in Table 6, the U.S. Treasury must contend with strong intra-monthly seasonals. During some months Treasury cash balances (excluding debt transactions) decline sharply in the first half and rise sharply in the second half.

To eliminate the seasonal shortfall in cash, the Treasury has relied on tax anticipation bill financing and on borrowing directly from the Federal Reserve just before tax payment dates. While TABs are an important source of seasonal funds when the United States is not running up huge payments deficits abroad, their use as a tax payment instrument by corporations is actually diminishing. In 1968, $4.3 billion or 39 percent of $11 billion in maturing TABs were turned in for tax payments. The balance were redeemed for cash. The ratio of TABs turned in for tax payments to total maturing TABs was 34 percent in 1969, 28 percent in 1970 and 31 percent in 1971. The ratio rose to 40 percent in 1972 but the volume of TAB financing at that time was only $7 billion. TABs are still an easy way to raise temporary funds for the Treasury but they are not as important a liquid asset as they were years ago to investors when money market instruments with tax date maturities were scarce. Now they are readily available in small and large denominations.

Little has been done thus far to smooth out the seasonal imbalances between Treasury revenues and expenditures. Perhaps both could be adjusted somewhat. Some expenditures (for example, revenue-sharing payments) might possibly be more concentrated in the fourth quarter of the fiscal year when revenues are large. I should also like to suggest that the large swings in Treasury cash balances during important tax payment months of March, April, June,

TABLE 6

NET CHANGE IN U.S. TREASURY OPERATING BALANCES FOR SELECTED PERIODS EXCLUDING DEBT TRANSACTIONS
($ Billions)

Period		1970	1971	1972
March	1-15	−3.0	−3.2	−4.3
	16-31	+2.9	−0.4	+5.7
April	1-15	−2.7	−4.2	−5.8
	16-30	+7.0	+12.3	+6.1
June	1-15	−2.4	−3.2	−0.7
	16-30	+6.8	+ 3.7	+1.8
Sept.	1-15	−2.7	−3.3	−1.4
	16-30	+4.3	+ 4.5	+7.4
Dec.	1-15	−4.5	−0.4	−6.3
	16-31	+6.0	+ 8.6	+7.4

September and December (see Table 6) might be reduced if a discount were offered to those who would pay their taxes early. This is the same concept used by business in attempting to speed up the collection of their receivables. The discount offered by the U.S. Treasury to taxpayers could be varied according to the length of the anticipatory payment.

Another way to achieve optimum cash balances would be to issue 28-day Treasury bills on the day of the weekly auction of 3 and 6-month bills. Each auction of 28-day bills would vary in size, depending on the cash requirements for the period immediately ahead, thus helping to smooth out weekly cash balance requirements.

Repurchase agreements with recognized dealers in U.S. Government securities might be another way the Treasury could optimize its cash position. These agreements can be written for a day or two or longer and the securities involved are U.S. Governments. The balances of "C" banks could become somewhat more volatile but in the aggregate might not fluctuate as widely as generally expected under these new conditions.

Concerning other financing techniques and debt extension efforts, several procedures now in use deserve to be supported. These are the use of auctions to sell securities and the efforts to establish a routine and periodic pattern for the distribution of new notes and bonds. These procedures have at least two benefits. They let the market determine the issue price and not the Treasury, and they tend to minimize the need for even keel operations by the Federal Reserve.

Some market participants favor an offering of long bonds as part of each quarterly refunding or perhaps on a steady schedule of twice or three times a year. Their argument centers around the need to extend maturity and to limit the uncertainty concerning the Treasury's financing strategy. They claim that an announcement of long-term financing intentions and the establishment of a routine schedule of such financing would remove uncertainty from the market and improve its functioning. Moreover, this would eliminate the hesitancy among some investors who feel that the Treasury will refrain from issuing longer-dated issues when interest rates are high and tends to issue long when they are low. A systematic scheduling of new long bonds would also help institutional investors in planning their investment programs.

A few of these arguments are overemphasized, although I do not disagree with the idea of a somewhat more systematic approach to long-term Treasury financing. There is no way the Treasury can avoid some long financing, regardless of the level of interest rates, considering the shortening that has occurred in the average maturity of the marketable debt. There is, however, nothing wrong with efforts by the Treasury to finance its borrowings at low interest rates as long as this effort is compatible with other debt management objectives. One of these objectives should be a broad investor participation, which can be facilitated through a debt structure that offers a wide array of coupons and maturities.

Criticism of "Dutch" Auctions

In the distribution of new long-term bonds, however, I disagree with the "Dutch" auction procedure. I do not believe that it accomplishes its two basic objectives, which are to minimize costs and, even more importantly, to achieve a wider distribution. Two such auctions have been held within the last six months. One was an issue of 6¾s due in 1933 totalling $627 million and the other was an issue of 7s due in 1997 totalling $650 million. The interest cost savings were small at best. The first issue, which came to market in early December 1973, was priced too aggressively and therefore at some savings to the Treasury, and the second issue could probably have been marketed more cheaply through other financing techniques. Both of these two issues did not achieve the major objective of a broad distribution. A high concentration of both issues was sold to investors in the Second Federal Reserve District.

The major weakness of the "Dutch" auction technique is that it assumes a perfect credit market in which all supply and demand

forces readily assert themselves and thus there is no need for an investment banking function to facilitate the distribution of securities. There are not only imperfections in the credit market, but also a wide range of participants with varying size, requirements, and investment management talent. Under the current market arrangements, these investors can be reached best through securities dealers. They are in a position to create an awareness of the new issue, to ascertain investor interest, to evaluate for investors the relative value of the new issue and to arrange portfolio swaps to facilitate the successful marketing of the new obligation. In contrast, the "Dutch" auction provides no incentives to U.S. Government dealers to help in the distribution process and instead of creating a wide institutional following, it probably confines institutional support to a few that are large in size. The use of competitive syndicate bidding or regular auctions are probably the most effective ways to achieve broad institutional participation in the long-term U.S. Government market.

Lastly, it seems that the Treasury could also increase the incentives to commit funds long in the U.S. Government market. This could be done through offerings containing a variation of maturity and interest-rate conversion features. For example, some offerings of new notes would contain provisions allowing the holder to exchange the note for a long-dated bond at a stipulated coupon within the first year or two of the life of the new note. Other notes might be convertible during the terminal year of the obligation. These types of offerings would reduce the cost of note financing and accelerate the extension of the maturity of the marketable debt.

Federal Credit Agency Financing

Concerning Federal credit agency financing, I share many of the views expressed by Bruce MacLaury in his excellent paper on the subject. From a market viewpoint, however, I want to add a few comments pertaining to the rapid growth of this market, the need to have an all-inclusive Federal financing strategy incorporating direct U.S. debt and all Federal agency borrowings, and to place before this symposium some of the other shortcomings of this type of financing.

While the establishment of the Federal Financing Bank will be a welcomed development, it does not go far enough in bringing either order or adequate surveillance over the burgeoning credit agencies. All the off-budget agencies will escape the discipline of the new bank and, of course, of the budget itself. The relationship between the U.S. Treasury and the various federally sponsored agencies is not

well-defined. The Treasury seems to have some influence in scheduling and in setting the maturity of their new issues, but I suspect that this power is waning and is being immobilized by the increasing large volume of new agency offerings. During the 12 months ended April 1973, the monthly gross volume of new Federal agency financing (excluding short-term discount notes) averaged $2.4 billion with a high of $3.6 billion in March and a low of $1.8 billion in August (see Table 7). The monthly net new volume allowing for retirements averaged $900 million.

Many of these agencies are privatized in the legal sense but most market participants still regard them as the responsibility of the U.S. Government. Some have contingent lines of credit with the U.S. Government, which also plays an important role in setting their policies and in choosing their management.

In appraising the efficacy of Federal credit agency financing, therefore, let me raise five issues which I originally introduced at this Bank's Conference on "Housing and Monetary Policy" in October 1970. These are:

1. *The Problem of Enlarging Credit Demands.* The Federal agencies transfer a regional or local demander of credit into a national demander of credit with efficient financing alternatives in the money market and national money and capital markets. There is nothing wrong with this objective by itself. However, our problems in the credit markets during the past five years and perhaps in the 1970s is not really how to make demands more effective. Isn't the heart of the problem how to generate a larger supply of genuine savings in order to finance future requirements in a non-inflationary way?

Federal agency financing does not do anything directly to enlarge the supply of savings. Its main thrust is on the demand side. In contrast, as agency financing bids for the limited supply of savings with other credit demanders, it helps to bid up the price of money. I suspect this is a rather costly way to redistribute savings flows. It causes considerable distortions and hampers monetary policy implementation as I shall explain later.

2. *Who Will Be Rationed Out?* With the continued proliferation in Federal agency financing, there should be no doubt that agency demands will grow even larger in absolute and relative terms. Therefore, if the agencies will be accommodated in the credit market, you must ask, "Who will do without funds? Who will be rationed out? Who will be the new disadvantaged in the credit market? How will they fare in their individual sectors as they are denied funds?" It is

TABLE 7

MONTHLY VOLUME OF FEDERAL CREDIT AGENCY FINANCING
FOR 12 MONTHS ENDED APRIL 1973*
($ Millions)

1972		Fed. Land Banks	FHLB	FIC	Bank for Co-op	FNMA	GNMA	Ex-Im Bank	Farmers Home Admin.	All Others	Total Gross	Total Net
May	Gross	0	0	722	317	0	695	200	0	38	1972	
	Net	0	−200	+108	+36	0	+695	+200	0	+38		+877
June	Gross	0	0	488	289	1000	200	0	0	0	1977	
	Net	0	0	+85	−51	+600	−250	0	0	0		+384
July	Gross	719	0	475	288	0	150	0	300	150	2082	
	Net	+277	0	+53	−58	0	+115	0	+300	+150		+837
Aug.	Gross	0	400	563	434	0	0	400	0	0	1797	
	Net	0	0	−31	−13	0	0	+400	0	0		+356
Sept.	Gross	585	0	508	0	700	0	0	400	160	2353	
	Net	+139	0	−71	0	+100	0	0	+400	+60		+628
Oct.	Gross	862	0	342	360	0	161	0	0	375	2100	
	Net	+216	0	−85	+97	0	−239	0	0	+375		+364
Nov.	Gross	0	1000	540	331	0	200	300	0	196	2567	
	Net	0	+440	−94	+14	0	+150	+300	0	+196		+1006
Dec.	Gross	0	0	491	338	1000	205	0	600	227	2861	
	Net	0	0	−67	+49	+400	+180	0	+600	+227		+1389
1973												
Jan.	Gross	347	673	591	0	0	323	0	0	320	2254	
	Net	+59	+266	+77	0	0	+323	0	0	+320		+1045
Feb.	Gross	0	1000	544	568	0	217	0	0	80	2409	
	Net	0	+250	+62	+134	0	+217	0	0	+80		+743
March	Gross	0	1200	790	0	800	140	0	500	165	3595	
	Net	0	+1200	+99	0	+100	+140	0	+500	+165		+2204
April	Gross	1000	0	660	536	0	0	0	500	150	2846	
	Net	+567	0	+185	+176	0	−200	−400	+500	+150		+978
Total	Gross	3513	4273	6714	3461	3500	2291	900	2300	1861	28813	
	Net	+1258	+1956	+321	+384	+1200	+1131	+500	+2300	+1761		+10811

*Does not include discount notes.

172

unlikely to be the large well-known corporations or the U.S. Govern-
ment. It is likely to be some State and local governments, medium-
sized and smaller businesses, some private mortgage borrowers not
under the Federal umbrella, and some consumer sectors.

3. *Impact of Federal Agency Programs on Economic and Financial
Concentration.* With the increase in agency financing, I feel that
business will increasingly recognize that Government is harnessing
financial resources to finance governmental objectives without
adopting encompassing and meaningful national budgets. The failure
to adopt meaningful national budgets will surely trigger another
credit clash. This next clash, perhaps a few years off, will be a
ferocious battle between the demands of Government and its power-
ful agencies on the one hand and those of private credit demanders
on the other. In this confrontation, the credit demands of consumers
small business, lower-rated corporations, privately financed mort-
gages, and local governments will be casualties eventually, despite the
introduction of the dual prime loan rate. There will be no room for
them in the capital markets as the Government and large well-rated
businesses struggle for the limited volume of available funds. This is
bound to contribute to additional economic and financial concen-
tration in the United States.

4. *The Problems for Monetary Policy.* There are two conflicting
objectives as the monetary authorities move to restraint. The seem-
ingly laudable objective of agency financing is to sustain the housing
market and other programs. The objectives of both fiscal and mone-
tary restraint is to slow down or decrease overall economic activity.
The result is a very costly delay in the economy's response to mone-
tary restraint. Indeed, the credit demands of the agencies contribute
importantly to a sharp escalation in interest rates and to the rising
costs of housing.

This is quite evident by looking at the sequence of events as
restraint unfolds. In the early stages of restraint, thrift institutions
are encouraged to continue making a large volume of mortgage
commitments by the Federal agencies even though the net inflow of
savings is starting to slow down. At this stage, the net result is to
intensify the competition for scarce real resources, to lift costs, to
sustain inflationary expectations, and to temporarily immobilize
monetary restraint. Indeed, the high level of construction encourages
additional business spending, thus complicating the task of the
authorities. As monetary restraint persists, liquidity standards are
lowered by the private sector. The decline in savings flows to thrift
institutions accelerates. As the agencies provide funds to offset the

savings outflow, the situation is further aggravated by the attractive market rates on the issues of the Federal agencies, which cause further disintermediation from the deposit institutions. In essence, the Federal agencies do not increase the total supply of funds in our financial system. They do, however, inflate the demand.

5. *The Problems for Federal Budgeting.* The de-budgeting or privatizing of Federal agencies brings these operations outside of the discipline of the Federal budget. To date, our leaders take credit in a political sense for the operations of these agencies. They disclaim them, however, in terms of the high interest rates created by their credit demands. They fail to integrate them in official fiscal plans or in budgeting the wide-ranging demands of Government on economic and financial resources.

It would be highly beneficial if the Government adopted encompassing budgets including the federally sponsored programs which are now excluded but still make demands on the economy and the credit markets. This is not to say that the programs outside the budget are not deserving but by including them the priorities of the Federal Government will be well-defined and ranked. It will also improve the alignment of the limited supply of new savings with the demand for funds, and thereby avoid much of the tension created by the current approach and would raise the value of the budget as a meaningful economic and financial document.

DISCUSSION

R. BRUCE RICKS*

Let me first summarize Henry Kaufman's paper as I read it and distill it.

He cites statistics to show that: 1) Treasury debt is a decreasing portion of total debt; 2) little Treasury debt other than low coupon "flower" bonds are available beyond 1978; and 3) foreigners and small banks hold an increasing share of Treasury debt while U. S. nonbank investing institutions are net sellers, individuals are in and out, and corporations and State and local governments stay short.

Mr. Kaufman then relates a list of recent changes in Federal debt management. These include improved issuance techniques, routinizing some issues, lengthening maturities and the proposed Federal Financing Bank.

Then Mr. Kaufman proceeds to several suggestions. He proposes smoothing out the Treasury's cash position through improved tax collection, revenue sharing and such fine tuning as 28-day bills and repos. He proposes offering (through a competitive underwriting) some long-term bonds each quarter with a variety of coupon, maturity, and conversion features. Finally, Mr. Kaufman reintroduces issues brought up at the October, 1970 Conference concerning Federal agency financing. Unfortunately, his only suggestion on this subject is one which has been heard a number of times — the need for comprehensive, all-inclusive Federal budgets so that "priorities will be well-defined and ranked."

His suggestions for fine tuning Treasury debt management are better addressed by technicians in that Department, though I would expect no major disagreement with most of his points. I would like to spend my time on his suggestion for incorporating, and in some cases reincorporating, government-guaranteed debt in the Federal budget.

*President, R. Bruce Ricks, Inc.

I must speak in opposition to Mr. Kaufman's suggestion today and not because I am opposed to the general concept that budgets should be comprehensive — I am sure none of us has problems with that *as a concept*. Instead I ask how would the concept be implemented, with the best degree of bureaucratic efficiency we are reasonably entitled to expect? And do we like the system, thus implemented, suffi-ciently to accept the concept as practicable? My answer to this is no.

It seems to me there are two broad types of Federal debt guar-antee. The first is where the issuer is created by Congress; the debt issuance is a part of a national policy of credit assistance to a group of borrowers, most of whom either do not have access to credit in the private capital markets or would have to pay socially unaccept-able rates; and in the absence of a debt guarantee, the Federal Government would be prepared to make direct loans — the guarantee or line of credit is probably a well advertised part of the debt offer-ing. I would include in this category Farm Credit and Farmers Home notes, the Student Loan program, the Import-Export Bank and Housing agencies.

The second type of guarantee is where the credit would not be made available if proposed initially as a direct government loan; the decision to guarantee may be made when the danger or fact of default on private debt is at hand; the guarantee decision is made because the public interest is better served, or served with less detriment than it would be by default and bankruptcy of the borrower. I place in this category the Lockheed loan guarantee, discussions of loans to railroads and the like.

Now, Mr. Kaufman neither explains what he means by Federal agencies or which borrowers he wants in the budget, nor does he speak to the extremely important question of whether borrowing limits, terms, maturities, and interest rates would be part of the annual Congressional appropriation hearings process. If this last is the case, I submit Mr. Kaufman would be far more bothered by the rigidities and delays of that process than he is of the present situation.

Perhaps the suggestion of inclusion of Federal agency borrowing in the budget is for informational purposes and similar to that already in the appendix to the Federal budget (if anyone cares to read it) and such other sources as the Annual Economic Report by the CEA, *Fortune* Magazine's interesting effort "An Annual Report of the Federal Government" (May 1973), work by Brookings, and Henry Kaufman's own fine work at Salomon Brothers where supply and demand for credit are estimated. Such work and a substantial increase in these efforts is commendable provided one does not take

the estimates too seriously, since they are estimates of residual or contingency suppliers of credit; in fact our degree of accuracy in forecasting flows for the primary suppliers is far from good.

I do think Mr. Kaufman puts down too abruptly the ability of the Treasury (and OMB) to influence fund flows. Referring to offerings by agencies he says, "the Treasury seems to have some influence over scheduling and setting the maturity of (agencies') new issues but its power is waning and being immobilized by the large volume of new agency offerings." I think this is a significant understatement of both the present and the possible influence by the Treasury over agency financing. It is my impression that almost all agency debt managers have a great deal of respect for the Treasury's preemptive role in the issue calendar and for the factors it must consider in debt management. The fact that agency offerings have grown and agencies have proliferated does not change this relationship of respect. If the Treasury wanted to request more comprehensive financing plans be submitted to it by agencies and more discussion between agencies in a given credit area, such as housing, as to how much credit is needed and who would supply it, the Treasury could certainly do so, and I would encourage more such contingency planning. However, there is a considerable difference between (1) contingency planning by and among the agencies themselves and with the Treasury together with the periodic discussions some of the agencies have with OMB and (2) an annual fixed amount of debt sale which might be established in an appropriations process. Wide swings in the need for residual credit for various agencies within fiscal years make highly formal fixed annual budgeted levels extremely difficult – perhaps counterproductive.

Federal agency debt may indeed be complicating the life of Treasury debt management staff. However, a number of steps have been taken in recent years which have streamlined and "routinized" agency financing and debt management to go along with the improvements in Treasury debt management.

First, most difficult and beneficial has been maturity lengthening to get what, in the 1969 crunch, were huge refundings out of the way of new money raising. According to Salomon Brothers, as of May 31, 1973, 42 percent of the $61.4 billion Federal agency debt was 1-5 year maturity and 26 percent was over 5 years – a total of 68 percent over one year compared to 51 percent in 1967. Since the Treasury's main market problem is with the volume of new issues rather than the level of outstanding debt, this extension helps tremendously.

Second, the market for agency debt has broadened considerably due to the educational efforts by the agencies and market makers.

Third, some agencies can issue discount notes or other short-term paper to assist in their own cash management. This is particularly important as agencies shift to a quarterly issue schedule. Other agencies should be given a similar authority.

Fourth, some agencies are developing computer-assisted models and other planning and forecasting tools to better analyze their credit needs and alternative ways of meeting them. Staffing in debt management has improved.

I could go on with a list which is familiar to many of you. Suffice it to illustrate that alongside Mr. Kaufman's list of improvements in Treasury debt management is a companion one for agencies — much of it with the encouragement and technical assistance of the Treasury.

Certainly, some borrowers are rationed out in a period of credit stringency and, as Mr. Kaufman points out and Governor Andrew Brimmer has eloquently documented, it is not the large multi-national corporation or its commercial bank. The agencies were in many cases set up specifically to give students, home purchasers, small farmers and others an increased ability to compete for funds with the large corporate and financial borrowers and the Treasury. That they are doing so with increasing efficiency should be cause for satisfaction rather than alarm. Continuing improvement, coordination, and analysis of credit-access tradeoffs should be pursued. Henry Kaufman's concept of inclusion in the formal budget should not be embraced without thorough analysis of the possible rigidities introduced — rigidities which in my judgment are likely to be counterproductive.

What is Debt Management All About?

EDWARD M. ROOB*

An early program for these meetings entitled my paper, "Emerging Problems in Debt Management." I would like to put my remarks in a somewhat broader context, namely, to consider the question, "What is debt management all about?" Clearly there are a number of possible answers; some would be of interest primarily to market participants; others to academicians; still others to a more general audience. It seems to me that from the standpoint of the Treasury many of our objectives in debt management revolve around a continuing effort to ensure that the U.S. Government security remains the best in the world. It is in this context that I believe we must consider the various technical and special policy aspects of debt management.

From a practical standpoint of course, making these securities the best in the world means that buyers will pay a relatively high price for them with consequent savings to the taxpayer. This in turn requires that a smoothly functioning secondary market must exist wherein investors and traders can move freely into and out of them, from one to another maturity area and from issue to issue with a minimum of transaction cost. The combination of high quality and liquid secondary markets in turn allows the Treasury to achieve a maximum degree of flexibility in the amounts, timing and maturity of the issues it sells.

Potentially we can use this flexibility to help promote economic stabilization. Henry Wallich's paper considered a number of aspects of this question. It seems to me that in one important sense debt

management is less important than it used to be: Treasury's borrow-
ing operations are no longer the dominant force in the total U.S.
credit picture, although the growth in agency borrowing and Federal
credit programs are offsetting some of this relative decline as Bruce
MacLaury points out.

Nonetheless, I believe that Treasury borrowing operations and
debt management policies may continue to play a role in overall
economic stabilization policy. Our choice of maturity and the timing
of our borrowing operations can still have an influence on the flow
of credit and relative interest rates in financial markets and therefore
on the economy.

On a day-to-day, year-to-year basis maintaining and improving the
quality of U.S. Government securities is a continuing job requiring
flexibility and adaption of new initiatives in our operations. I would
like to address myself to the following questions: What have we done
to accomplish our objectives? Have we been entirely successful?
What are some of the problems we have faced and are likely to face
in the future?

Achieving the Objectives

Of the significant changes in Federal financing activities in recent
years it is clear that some have been forced upon us by the changing
character and scope of Federal financing and the general U.S.
financial environment, some have come from our own initiative.
Realistically, not all of the changes in the environment in which we
work have been entirely beneficial to the market, to orderly debt
management or to flexible Federal financing.

For the most part, however, we hope the changes we have made
have led or will lead to a better meshing of Federal financing
operations with the market demands of other borrowers and to a
continuing improvement in the functioning and efficiency of the
market for Federal and federally sponsored obligations.

The major changes that we have initiated in direct Federal
financing over the last few years have been:

    (1) the greater use of auctions;
    (2) an increased reliance on cash as opposed to exchange
        financings;
    (3) an increased emphasis on long-term securities; and
    (4) a continuing effort toward greater regularization of
        Treasury financing operations.

The possibility of auctioning Treasury coupon-bearing obligations had been discussed by economists in and outside of the Treasury for a number of years. There were a good many reasons why we did not make great use of auctions until recently, not the least of which was the normal conservatism of all debt managers. In addition to this, however, few borrowings in the note and bond area were for cash; price experience with the cash offerings was good; and there was concern about market reaction to a cash auction since — whatever the facts — the Treasury's limited experiment with syndicate bond auctions in the early 1960s had left a sour taste in the mouths of many market participants.

As the 1960s ended the situation was somewhat different. There was a greater need for cash financing due to large budget deficits, part of which we felt should be in the coupon area. While the problem seems to me easily exaggerated, a considerable body of opinion concerned with the difficulties for monetary authorities in maintaining a so-called even keel during periods of Treasury financing felt that auction techniques could ameliorate these difficulties. Moreover, security prices had become more volatile, increasing the attractiveness of auction sales as a means of achieving close pricing of new issues, while at the same time eliminating the uncertainties inherent in guessing allotment percentages in fixed-price offerings.

We undertook our first tentative steps toward establishing note and bond auctions as a routine option for our borrowing operations in late 1970 with the sale of a 6¾ percent, 18-month note auction. Since then, auctions, in both the traditional and uniform-price forms, have become the major method of pricing new Treasury notes and bonds.

In the process of developing and refining the auction technique, we have experimented in the sale of very long-term maturities, where the price fluctuation risk is greater, with so-called "Dutch" auctions. We have also now had experience in auctioning long notes under a variety of market conditions. The "Dutch" auction in which all subscribers receive the security at the same price, and thus far there have been only two, were thought to have both advantages and disadvantages. The major advantage cited for the Dutch auction is that it would provide a basis for greater confidence in bidding and thus attract a greater volume of bidding and more interest by non-professional investors. On the other hand a supposed disadvantage of the technique is that it would short-circuit the professional underwriters by removing any dealer spread that they may gain.

Results of Auctions

The results of the two auctions which we have held, admittedly a small sample, indicate an interesting response. First, there is only scant evidence that the Dutch auctions attracted a significantly different type of bidder from what would be expected of any sale of long-term maturities. Second, professional dealer interest in both of these auctions was substantial, accounting for 45 percent of awards of the 6¾s and over 60 percent of the 7s. Third, interest by other investor groups who might be attracted to the securities by the smaller price risk was in fact small. Total coverage in both auctions was substantial indicating that the Dutch auction *keeps* the professional and *may* attract other bidders. Distribution following the auction was effectively accomplished with minimal price change implying that, in fact, the dealer did perform his traditional underwriting role. The pattern of bidding may have been different from some of the hypothetical expectations, but the resulting yield established on the securities was in both cases pretty much in line with general expectations at the time of bidding. Nonetheless, our experience with Dutch auctions is still limited, and it may well be too early for us to reach much in the way of a firm conclusion on the relative success of the Dutch auction.

On the broader subject of long-term issues, the 4¼ percent interest-ceiling restrictions and the rise in the level of market rates forced the Treasury to discontinue any financing through long-term bonds after the mid-1960s. As a result, the market for long-term Treasury issues has in recent years become undesirably thin. Quotations are often only nominal, as many of you know, and trading is spotty. Not only was the Treasury's borrowing flexibility constrained by this change, but stabilization operations in the long market by both the Treasury and the Federal Reserve were necessarily limited. In a general way this was not in keeping with our desire to have the best security in all maturity areas.

The $10 billion authority granted to the Treasury in the spring of 1970 to sell long-term securities outside of the 4¼ percent ceiling provided us with the opportunity to regain our flexibility in financing and to begin the revitalization of this segment of the market. To date, we have issued some $8.5 billion of these securities. Most were in the intermediate-to-long area where market response was more predictable and the risk of undesirable rate pressures less, but $1.2 billion were sold in the 20-25 year area. This is admittedly a small, slow beginning; and many of the issues have found their way into Government account and Federal Reserve hands. But it is a beginning

and caution and prudence are needed if we are to continue the process of reestablishing the market for these issues in an orderly way without producing undesirable rate increases for other borrowers.

We hope the Congress will see fit to provide us with the authority for another tranche of long-term issues outside of the 4¼ percent ceiling and thus give us the flexibility we need to further expand our long-term borrowing activities, to give investors a broader choice of long-term Treasury obligations, and to restore at least some possibility of stabilization operations in long markets.

The third facet of direct Treasury borrowing in which I believe we have initiated significant changes in recent years is in the regularization of those activities. For many years the bill offerings and the quarterly refunding have been our only regularly scheduled borrowing activities. But in the last year alone there has been a considerable advance toward a greater variety of issues being sold or dated on a regular schedule. For example, the nine-month and one-year bill offerings, which used to come at varying points near the end of the month, have been converted to a cycle of 52-week bills which will be sold every four weeks on a regular basis when the original cycle is completed. Not only will this procedure establish a regular pattern of sales, allowing for a more orderly distribution of the bills, but it will also provide a more regularly timed instrument for investors' cash management.

Last fall we also introduced a degree of regularity in part of our note financing with the offering of two-year notes on a maturity schedule which will eventually result in a quarterly cycle. These securities, we hope, will meet the needs of both the market and the Treasury for a cash-management instrument outside the bill area. As you know, we quickly ran into problems in establishing this cycle of notes when sales of special issues to foreigners this spring resulted in a sharp runup in our cash position, obviating the need to issue the two-year securities at the end of March and June.

A Problem of Regularization

While we will fill in these gaps in the cycle later, either on quarterly or off-quarterly dates, the postponement of these issues points up an important problem in seeking greater regularization in the timing and maturity of Federal financing activities. This is the increasing difficulty of projecting the absolute size of our cash needs. We may be doing better in our projections and the relative size of the

errors may be smaller, but as the size of Government receipts and expenditures have risen, the absolute size of projection discrepancies has also tended to increase. It is this type of error that causes problems when one is trying to determine market-borrowing requirements. Of course in the last year, the changing tax picture and the unpredictable reactions of the tax-paying public to revisions in tax regulations — especially the now-famous overwithholding situation — have posed a special problem. In addition, we have had the problem of providing Treasury issues for foreign official investment of dollars acquired in foreign exchange support activities.

To some extent, these particular aspects of our cash projection problems may lessen as time goes on. Nonetheless, the Federal sector is likely to become more rather than less complex in coming years and our basic problem is not likely to go away.

All of this does not say that regularization in our borrowing activities is doomed to take a back seat. It does suggest, however, that we cannot tie down our debt-management strategy too much. Greater regularization of the timing of our operations must be accompanied by new flexibilities in other aspects of our financing which recognize that our needs themselves are not regular and, with the growing complexity of government, those needs may be subject to a greater number of unpredictable and sizable variations.

Direct Treasury borrowing operations are only one aspect of Federal finance. More and more the growth in agency needs requires us to look at the whole Federal financing pie if we are to maintain the quality of our securities and insure the flexible, efficient operation of our market. At the end of fiscal 1970, $35.7 billion of issues by the Government-sponsored agencies were outstanding. In addition, there were some $12.5 billion of securities of the agencies included in the budget. While only small changes have occurred in the volume of securities issued by the budgeted agencies, borrowing by the sponsored agencies has risen markedly. Bruce MacLaury went into these developments in detail, so I will not review them here.

However, I do want to make several points with respect to the subject. First, the Treasury takes its responsibilities of coordinating agency needs seriously. We consider it our responsibility to recognize that in the area of Federal finance, all participants, including the Treasury, must be viewed as part of the whole. Secondly, we would be delinquent in exercising our responsibilities to the market place and the agencies were we not to recognize the need for coordination of approach to the market by each agency so that all can share equitably in their ability to be financed. In the function of debt

management we do not, and are not entitled to, view our preroga-
tives of financial advisor, coordinator, and "traffic cop" as allowing
us to censor program responsibilities of the agencies; nor do we view
ourselves as having the right to set priorities as between programs
through the vehicle of accessibility to the marketplace. Therefore, it
is incumbent upon us to treat each agency with full awareness of
their needs and objectives. To this end we have added a new office to
the staff of the debt management team. The major function of this
position will be to make an overall appraisal of agency needs and
ensure that each financing request can fit into the overall objective of
keeping Federal securities as the premier credit instrument in the
world.

Changes in Agency Financing

To be sure a number of changes in the Federal agency financing
picture are likely when the Federal Financing Bank gets underway.
In particular, it should provide us with a means of achieving better
coordination of the borrowing activities of the agencies so that their
increased needs for cash will be better absorbed by the market. But
even with the Financing Bank eventually in operation the rise in the
dollar volume of Federal agency borrowing over time and the insti-
tutional changes that are going on must be recognized as adding a
new dimension to Federal finance and debt-management policy. And
aside from the purely technical considerations which are likely to
cause some problems, the size of agency financing and the widening
needs for direct Treasury financing bring into question a number of
aspects of traditional Federal financing theory and debt manage-
ment.

In the past, agency borrowing was largely considered a necessary,
but nonetheless small, part of Federal finance. As such the needs and
the effects of that borrowing on the market could be thought of as
marginal. With the agency needs growing rapidly, the Treasury can
no longer view its own financing needs in isolation. As I have said, we
have to look at the whole Federal finance pie. Among the more
important questions this has raised is whether the Treasury can look
at the traditional theory of Federal debt management and merely
expand that philosophy to embrace the agencies. Should it avoid in
its own financing activities the maturity areas needed most by
agencies? This would clearly limit our borrowing flexibility. And it
would undoubtedly affect the efficiency and operation of our
market and the attractiveness of our securities as well. However, the

agencies, and therefore the Treasury in coordinating agency financing activities, have a responsibility, implied in the Federal Financing Bank itself, to borrow on terms consistent with their program characteristics and asset structure. This factor somewhat limits our discretion in using the entire maturity spectrum to achieve market or stabilization goals. In light of these factors the Treasury increasingly needs to consider its own borrowing patterns in the context of agency maturity characteristics. It is the overall structure of Federal obligations that is really important, not Treasury or agency debt taken singly.

From the Treasury's cash management standpoint, of course, a greater concentration of borrowing in the short-term area could be desirable. The market for short-term securities is highly resilient and can take sizable additions or repayments of securities with a minimal interest-rate impact. Because of the market's resilience, announcement of new borrowing needs can be made on relatively short notice. Thus, swings in our cash needs, especially if unexpected, could be met with relative ease. Very likely a concerted movement in this direction for our cash-management borrowing requirement would necessitate some changes in our current bill offerings. I am sure that a number of alterations might be suggested; two that come to mind readily are more frequent changes in the size of the weekly bill auctions to match our particular cash needs and, perhaps as a supplementary measure, the increased use of bill strips.

There are a number of other developments that have arisen in connection with changing institutions and market arrangements which bear careful watching if we are going to insure the continued high quality of our securities and the efficient functioning of our market. From the technical point of view, the possibility exists that we will extend the book-entry system beyond its current limits. In the market we see the rise of bond funds, the development of trading accounts rather than portfolio investment accounts at a number of banks and securities houses, nationwide brokerage services in Government and agency securities, etc. This broadened interest is in some ways beneficial — speculation has a valid function. However, I cannot help but feel that some of these recent developments are based on a presumption of consistent success in outguessing the market and it is safe to assume that not everyone is going to be uniformly successful in that game. We do not need to oversell our market. Our basic interest must be to satisfy the needs of the prudent investor on the one hand and the market-making professional on the other — the groups upon which we must rely in the long run for an effective market for our securities.

Conclusions

Altogether, then, I believe that the last few years have witnessed a rather remarkable set of changes in the profile of Federal financing activities. We have not innovated for innovation's sake, of course; but we have not shrunk from new ideas where the needs of the Government and the functioning of the market for our securities could be improved by their adoption.

The changes which have taken place have certainly not come without some problems. But, in turn, the problems which have arisen — both in the sense of the general problems of debt and cash management and in the sense of the needs of particular segments of the market — have themselves led to introduction of new ideas and techniques.

I hope that this process of evolution will continue, and in fact there seems little doubt that it can do otherwise. Direct Federal financing needs are becoming increasingly complex, and the projection of those needs is more and more difficult. The growth of the agencies' needs poses further problems. And the entire market and financial environment is always changing. Each and every one of these will lead to problems and opportunities for Treasury debt managers, and from those problems and opportunities I expect will come further shifts and innovations in our borrowing and debt-management policies.

In the final analysis our guiding consideration in dealing with any of these questions must be the integrity of our securities and of our marketplace.

DISCUSSION

ELI SHAPIRO*

Managing the Federal debt in a way that keeps the cost low and the holders happy, while at the same time managing the debt so as to affect the level and structure of interest rates according to the changing needs of stabilization policy, are two central and conflicting objectives for Treasury debt managers. These conflicting goals cause the Treasury to have a schizophrenic view as to the kind of government securities market they would like to have as well as a schizophrenic position as to the manner in which they should act — given the market they seem to have. Ed Roob's paper presents several examples of these tensions and conflicting images within the Treasury. I do not want to give the impression that the Treasury seems to be alone in its confusion and inner conflict. As I hope to make clear, both the academicians and the market practitioners represented by us here also share in this two-faced view of the Treasury objectives and the market's reality.

When considering its objective of financing the Federal debt, the Treasury wants its securities to be seen by participants in the markets as the "best" of securities sold in the "best" of markets. In this light, the government market should contain a broad range of maturity alternatives with a sufficient depth of demand at any maturity, or enough substitutability among maturities that the prices of securities of different maturities are unaffected by volume of new issues or of secondary trading. In fact, the Treasury feels constrained to place new debt issues in those maturity areas not well represented by outstanding issues in order to foster this perfection and substitutability. Moreover, the Treasury seems to consider the lack of an active market in long governments, which is caused in large part by the ceiling on interest rates on bonds, to be a significant limit on its flexibility and a major weakness in the market as a whole.

*Chairman, Finance Committee, The Travelers Corporation.

A consequence of such a broad and fluid market that seems of great importance to the Treasury is that the better the market in these terms, the lower is the cost to the Treasury of financing the debt.

When debt management is the objective at issue, however, the preferred market structure would seem to be quite different. The primary objective of debt management is to affect the level of expenditures or demand by affecting the level and/or structure of interest rates in the government market and thereby the level and/or structure of all interest rates. This objective can be achieved through changes in the volume of government securities outstanding in different maturity classes only if the government-securities market is segmented and imperfect and only if other security markets are similarly segmented and imperfect. If the impact on rates of the volume of new issues of governments does not affect prices to any significant extent, then the market is as the Treasury would like it to be in order to attract investors and keep debt charges low, but it is ineffective for achieving stabilizing interest rate objectives through debt-management activities.

This inconsistency in the objecuives for the structure of the market is mirrored in an inconsistency between the objectives of low cost and effective stabilizing debt management. The Treasury seems to act as if the imperfections in the long government market pose a problem for it. Should the Treasury try to extend the maturities for which there is significant volume of securities outstanding (assuming Congress permits this) the current imperfect structure of the market is likely to cause significant increases in long government rates in response to such an increase in outstandings. This increased cost seems to cause the Treasury to avoid these maturities. On the other hand, the greater the imperfections, the bigger will be the impact on rates or "bang-per-buck" the Treasury would get from security sales or purchases made in these maturities for debt-management purposes.

For example, if the overall stabilization objective argues for higher long-term interest rates to assist in reducing some demands, an imperfect long government market implies that a sale of long governments would lead to a significant rise in long government rates and increased interest payments by the Treasury. However, as long corporates and tax-exempts responded to these increases, as private placement yields rose, and as households switched from deposits to governments, corporates, bond funds, etc., the Treasury could have a significant impact on the overall level of rates and thereby on economic activity.

The conflict between attempts to manage the debt at reasonable cost and attempts to affect the structure of rates without consideration of cost to the Treasury (because the costs are better measured by more inflation rather than interest cost to the Treasury) clearly drives the Treasury in opposite directions. Attempts to act in ways which stabilize the market so as to make it as attractive as possible to investors at times have to be undone by actions meant to surprise the market, alter rates and use the market to attempt to achieve stabilization objectives.

This inconsistency within the Treasury is broadly reflected in this meeting at Bald Peak. The academicians among us feel more and more that the empirical evidence is consistent with the view that the government security market is a highly-efficient market. In this view, the maturity distribution of the outstanding Treasury debt, and possibly even the maturity distribution of new issues, has little, if any, lasting impact on the level and structures of rates. According to this view, as other forms of short debt grow to larger and larger amounts, the Treasury's effects on short rates have been continually blunted. Duesenberry and Bosworth suggest that if there is any effect of maturity on interest rates it is the impact of all short or long debt and not just Treasury debt. Henry Kaufman has documented the relative decline of Treasury debt as a fraction of total debt outstanding. To this group, Federal debt management is a dead issue.

At the same time, some of the older academics and, I would guess, all of the market practitioners feel the the Treasury's maturity and volume choices are of enough significance to give it great attention in our assessment of the outlook for rates. As to the issue of the perfection of the market, many of us here make our living from its imperfections. In fact, it is my guess that those of us who earn a living from the market's imperfections live better than those who earn a living trying to document its perfection.

If we outside the Treasury must live with all these inconsistencies, perhaps we should be cautious before being too hard on the Treasury as it deals with them as well.

Foreign Activity in United States Treasury Securities in Fiscal Years 1971-1973

RICHARD V. ADAMS*

U.S. Treasury debt management is concerned with refunding maturing obligations and raising needed cash in ways which minimize interest costs and contribute, insofar as possible, to the attainment of national economic objectives.

For fiscal years 1971 through 1973 deficits in the Federal unified budget will total about $66 billion. If, in early 1970, the debt managers had foreseen, in the years then just ahead, consecutive deficits of $23 billion, $23 billion, and $20 billion, their dismay at the prospects for meeting their financing requirements, to say nothing of their business and economic objectives, would have been considerable. While the atmosphere in financial markets in early 1970 was very adverse, the Treasury was at least comforted by the fact that the budget for fiscal year 1971 was projected to be in surplus by $1.3 billion. Little did the debt managers know then that $23 billion would have to be raised in 1971 and an additional $43 billion in the following two years.

As events unfolded during these years the Treasury was continually forced to anticipate and plan for domestic market borrowing requirements which were much larger than those which actually materialized. One memorable debt management crisis occurred in early 1972 when revised budget estimates for fiscal 1972 projected a $38.9 billion deficit for a year which was then more than half completed, but with over half of that projected enormous deficit remaining to be financed. As is now known, this budget projection was grossly in error due largely to an underestimate of Treasury receipts, and the actual deficit turned out to be $23 billion.

However, even without the variations in budget estimates which confronted the debt managers periodically, actual developments required the Treasury to anticipate very large cash financings, in addition to refunding maturing debt which was also heavy. The

*Senior Vice President, Chemical Bank.

Treasury was concerned about the size of the deficits in terms of basic economic stabilization policy and, more immediately, because of the anticipated difficulty in meeting financing needs without placing unwanted strains on markets and/or witnessing a further inflationary shortening of the maturity structure of the debt.

Fortunately, the Treasury's domestic financing job turned out to be much less formidable than was implied by the size of the budget deficits of these years. The principal reason for this was the fact that foreigners added continuously, and at times massively, to their holdings of U.S. Treasury obligations. Table 1 summarizes the pattern of these foreign purchases:

TABLE I

FOREIGN AND INTERNATIONAL HOLDINGS OF FEDERAL DEBT
(excluding Agencies)
($ billions)

End of Month	Bills	Notes & Bonds	Total Marketables	Non-Marketables	Total
FY 1971: June 1970	7.4	1.0	8.4	6.4	14.8
Dec. 1970	12.3	.9	13.2	7.3	20.6
June 1971	18.8	1.1	19.9	10.8	30.7
Change	+11.4	+ .1	+11.5	+ 4.4	+15.9
FY 1972: June 1971	18.8	1.1	19.7	10.8	30.5
Dec. 1971	26.1	2.6	28.7	18.2	46.9
June 1972	25.7	3.8	29.5	20.5	50.0
Change	+ 6.9	+2.7	+ 9.6	+ 9.7	+19.3
FY 1973: June 1972	25.7	3.8	29.5	20.5	50.0
Dec. 1972	27.3	5.9	33.2	22.1	55.3
May 1973	24.0	7.5	31.5	29.8	61.3
Change	− 1.7	+3.7	+ 2.0	+ 9.3	+11.3
Total Change FY 1971-73 (May)	+16.6	+6.5	+23.1	+23.4	+46.5

Over $46 billion of U.S. Treasury obligations were acquired by foreigners during the fiscal years 1971-73 (through May 1973). Virtually all of these securities were bought by foreign official institutions (largely central banks) which were accumulating dollar reserves almost constantly during this period of instability and change in international monetary relationships. Although a number of countries have been net buyers of Treasury obligations, the dominant roles have been played by Germany and Japan which have acquired about two-thirds of the net purchases in the past three years and now account for well over half of the foreign ownership. The overall effect of these developments on U.S. Treasury finance is shown in Tables II-V.

TABLE II

FINANCING FEDERAL DEFICITS
($ billions)

	Fiscal Years			
	1971	1972	1973[a]	Total[a]
Budget Deficit	23.0	23.2	20.0	66.2
Changes in Cash and Misc. A/Cs	3.6	3.8	—	7.4
Borrowing From the Public	19.4	19.4	20.0	58.8
Federal Reserve	7.7	5.8	2.7	16.2
Private Investors	11.7	13.6	17.3	42.6
Foreign	15.9	19.3	11.3	46.5
Domestic	− 4.2	− 5.7	+ 6.0	− 3.9
Savings Bonds	1.7	2.9	3.4	8.0
U.S. Private Holdings of Treasury Debt	− 5.9	− 8.6	+ 2.6	−11.9

[a]Estimated

TABLE III

HOLDINGS OF MARKETABLE TREASURY DEBT 1971-73
($ billions)

		To 6/30/73[a]
Increase in Marketable Debt		30.4
Held by Foreign and International Accounts	23.1	
Held by Government Investment Accounts	3.0	
Held by Federal Reserve System	16.2	42.3
Held by U. S. Private Investors		−11.9

[a]Estimated

TABLE IV

OWNERSHIP OF U.S. TREASURY BILLS
($ billions)

	6-30-70	6-30-71	6-30-72	5-31-73	Total Change
Bills Outstanding	76.2	86.7	94.6	103.0	
Change in Holdings		+10.5	+ 7.9	+ 8.4	+26.8
Federal Reserve		+ 5.5	+ 3.4	+ 2.1	+11.0
Govt. Inv. Accts.		− .1	+ .8	− 1.1	− .4
Private Total		+ 5.1	+ 3.7	+ 7.4	+16.2
Foreign		+11.4	+ 6.9	− 1.7	+16.6
Domestic		− 6.3	− 3.2	+ 9.1	− .4

TABLE V

OWNERSHIP OF U.S. NOTES AND BONDS
($ billions)

	6-30-70	6-30-71	6-30-72	5-31-73	Total
Notes and Bonds					
Outstanding	156.4	158.8	162.6	163.0	
Change in Holdings		+ 2.4	+ 3.8	+ .4	+6.6
Federal Reserve		+ 2.3	+ 2.5	+ .4	+5.2
Govt. Inv. Accts.		+ 1.2	+ 1.0	+ 1.0	+3.2
Private Total		− 1.1	+ .3	− 1.0	−1.8
Foreign		+ .1	+ 2.7	+ 3.7	+6.5
Domestic		− 1.2	− 2.4	− 4.7	−8.3

As shown in Table I, the Treasury securities acquired by foreigners were about evenly split between marketable issues ($23.1 billion) and nonmarketable special issues ($23.4 billion). The major foreign central banks generally seem to prefer to invest their dollar reserves in marketable issues. This preference is also favored by the Treasury in most circumstances because of the cash management problems and interest costs resulting from borrowings where the Treasury has no control as to timing. The Federal Reserve, at most times during this period, found it possible to accommodate foreigners in marketable Treasuries either by purchasing for them in the open market or by selling securities from its own account and making necessary reserve adjustments in other ways.

Impact of Monetary Crises

However, during the years covered here there have been three acute international monetary crises which resulted in massive accumulations of dollars by leading foreign central banks within very short time spans. These periods were: (1) July-August 1971, just prior to the announcement of the administration's new economic policy which included devaluation; (2) July-August 1972, as the continued adverse external position of the United States severely strained the currency relationships established by the Smithsonian agreement the previous December; and, (3) February-March 1973 when the dollar was weakened by resurging inflation in the United States, by the easing of economic controls and by continued adverse U.S. balance of payments figures. This last episode, of course, culminated in a further official devaluation of the U.S. dollar.

In these three crisis periods dollar flows into foreign central banks reached such large proportions that the investment of these reserves in U.S. Treasury securities could not be handled in the open market or through sales from the Federal Reserve's portfolio. Thus, it was necessary for the Treasury to issue special nonmarketable obligations directly to foreign central banks. Of the $23.4 billion in foreign specials that has occurred since June 30, 1970, $17.6 billion, or 75 percent, were issued during the three monetary crises. There were nine days during these periods of stress in which foreigners acquired $1 billion or more of specials, and on one day the total reached $3.5 billion. During the rest of the fiscal 1971-73 period the increase in foreign holdings took place in the form of fairly steady buying of both marketables and specials.

In marketables, during the early part of this three-year period, which was also the early stage of the international monetary turmoil, foreigners purchased mainly Treasury bills. In fiscal 1971 foreigners bought $11.4 billion bills, $4.4 billion of special nonmarketables and only $.1 billion of marketable notes and bonds. As the upheaval in the foreign exchange markets persisted and intensified, foreigners came to believe that some of their accumulated dollar reserves could safely be placed in longer-term securities at higher rates. Between June 30, 1971 and April 30 of this year foreign holdings of marketable Treasury notes and bonds increased by $6.4 billion. In addition, foreigners have bought about $500 million of Federal agency debt. In no month since June 30, 1971 have foreign purchases of marketables exceeded $2.5 billion (this is in sharp contrast to the large daily swings in acquisitions of nonmarketables during crisis periods, as noted above).

Importance of Foreign Purchases

Clearly, foreign purchases of U.S. securities over the past three years have been of profound importance in financing the Federal deficits of this period. As is shown in Tables II and III, $46.5 billion, or 70 percent of the estimated $66 billion total deficit for 1971-73 was financed by foreigners. Of the estimated $30.4 billion increase in marketable debt outstanding during this period, over $23 billion, or 76 percent was acquired by foreign holders. This, together with Federal Reserve purchases of $16.2 billion and government account purchases of $3 billion, meant that U.S. private investors' holdings of marketable Treasuries will have been reduced by $11.9 billion by the end of June 1973. It is interesting to note, however, that in this fiscal year through May domestic holdings of marketable securities have

risen by $4.4 billion following total reductions of $13 billion in FY 1971-72. Smaller purchases by the Federal Reserve in this year of firming monetary policy and smaller acquisitions of marketable by foreign accounts have accounted for this turnaround in domestic holdings.

In summary, the massive U.S. Treasury financing requirements of the early '70s have been accomplished with relatively little pressure on the domestic market as a result of huge foreign purchases of U.S. issues. The problems of the United States in its external financial position have unexpectedly been of benefit to the Treasury.

Some Implications for Debt Management

There have been some problems for the markets and for the Treasury associated with the heavy foreign acquisitions of U.S. securities during the past three years.

1. Foreigners now own 19 percent of the privately held marketable Treasury debt. Foreign absorption of 76 percent of the net supply of new marketables over the past three years has been a contributing factor in the emergence of a thin, highly volatile U.S. government securities market in which relatively light trading volume produces substantial change in price. From the debt managers' viewpoint, it has sometimes been difficult to price new issues against current markets dominated by foreign activity. This has not been a particularly serious problem since the Treasury has moved toward competitive auctions in the sale of most of its securities.

On balance, it seems safe to say that if the Treasury had had to meet its 1971-73 financing requirements entirely in the U.S. money and capital markets, it could have done so only at significantly higher interest costs than those actually incurred. Foreign purchases or sales of U.S. securities do not necessarily affect the overall level of interest rates in the United States since the dollars involved remain available for investment in one or another of our financial markets. This activity does, however, affect the Treasury securities market in relation to other markets. As long as the foreigners are on the buy side of the market, the Treasury benefits in terms of relatively strong markets for its issues.

Treasury debt managers are aware of the possibility of large quick reversals of the money flows which, so far, have been all their way.

This is not regarded by Treasury as a very likely development, however. It is believed that such reflows will occur gradually in proportion to the improvement which is expected to take place over time in the U.S. balance of payments as a result of our devaluations, anticipated success in curbing domestic inflation, and positive results from the continuing negotiations on international monetary and trade reform.

Nevertheless, potential problems may exist in the area of foreign reflows. It may be true that with the exchange rates of major currencies floating against the dollar, speculative movements into or out of the dollar could not occur with the same force and speed as the dollar raids of the recent past. In a floating rate environment, movement into dollars from other currencies would tend to be the result of an actual fundamental improvement in our basic balance of payments. Such an improvement could, under some possible circumstances, occur quite rapidly. The U.S. dollar is now devalued by about 17-18 percent against the major currencies, and is probably in reasonable alignment with those currencies. The effects of these devaluations are now showing up in an improvement in our trade figures and our overall balance of payments in recent months, and this is occurring in a period of economic boom in the United States. As the economy in the months to come slows from its present heady pace and inflation subsides, the U.S. balance of payments and the dollar's position in world markets should improve. The debt management problem during a period of slower domestic growth (or recession) might be that of financing a substantial repayment of foreign officially-held debt at the same time as a deficit in the Federal budget necessitates further U.S. market borrowing. It is difficult to know what to do about such a confluence of events since, if the reflows were occurring as a result of basic changes in the reserve positions of various countries, central banks would not be in a position to defer or schedule their redemptions or sales to the convenience of the Treasury. The major source of instability in international money markets lies in the foreign private holdings of dollars which amount to $50 billion or more. It might be desirable for the United States to offer these dollar holders a longer-term Treasury security in order to absorb some of this overhang. However, as long as foreign owners of dollars believe that it will be more profitable to use their holdings as a vehicle for currency trading and speculation, they are not likely to be much interested in a U.S. Treasury security, except at rates quite out of line with U.S. rates.

The long-run answer to the problem of unstable international markets clearly lies in a fundamental and permanent improvement in the U.S. balance of payments, and we may be on the threshold of just such an improvement.

2. Some Treasury cash management problems have arisen from time to time during this period of international monetary tension. Massive investments in special nonmarketables by foreigners during a crisis period have resulted in a generally high level of Treasury cash balances. The Treasury has been sensitive to the costs of maintaining these balances which resulted from borrowings over which it has had no control as to timing. In order to minimize these costs, it has carried large cash balances — as high as $5.0 billion recently — with the Federal Reserve. Thus, some of the additional interest cost is recovered by the Treasury in the form of increased Fed earnings from its larger portfolio of securities acquired to offset the reserve impact of the higher Treasury balances. Nevertheless, the Treasury has found it necessary to maintain larger Tax and Loan account balances than it would have liked.

3. It might be argued that the increase in Treasury special issues to foreigners has added to the problem of the maturity structure of the Federal debt. Most of the foreign specials outstanding are issued as 90-day obligations with a two-day redemption privilege. There have been some longer-term specials issued but, even here, there are early redemption features which could make the nominal maturities irrelevant. Since mid-1965 the Treasury has been confronted with an ever shortening average maturity on its privately-held marketable debt which has declined from five years nine months to three years. If the foreign specials were included in this calculation, the maturity structure would be shortened even further.

However, it does not seem necessary to make too much of this issue since the foreign specials are not marketable and their sales, redemptions, or retirements do not have a direct market impact. In addition, it seems clear that if the Treasury had had to finance its massive deficits to a greater extent in the U.S. open market, it could have done so only by issuing a very large volume of short-term securities, thereby aggravating its maturity-structure problem with perhaps more inflationary consequences than was actually the case. As a matter of fact, the heavy foreign acquisition of U.S. securities in recent years has actually helped in permitting the Treasury to sell more intermediate- and longer-term securities than it otherwise might have been able to do.

DISCUSSION

THOMAS D. WILLETT*

As has been amply documented in Dick Adams' paper, in the last few years there has been a substantial increase in foreign central bank holdings of U. S. Treasury bills. The real question here is to what extent is this a problem? I tend to be in agreement with Dick's view that it has not been a major problem and, in fact, probably over the last few years has been a net benefit to the United States in terms of lower interest cost on the Federal debt.

I am in basic agreement with Dick's conclusion that during the early 1970s foreign central banks have probably on net made life easier for debt managers, certainly in terms of the interest costs on Federal debt. As he notes, this result has depended largely on the happy coincidence, from the point of view of debt management, of large deficits in both their Federal budget and in their international payments accounts. As Dick noted, during a period of balance of payments surplus, we would expect that you would get the opposite result, that borrowing rates for the Treasury would be somewhat higher than they would have been otherwise. On net, if we look toward the future, if we do not expect any systematic tendency over the long run for the United States to run payments surpluses or deficits, then we would expect over the long run there probably would not be a great net effect on borrowing costs for the Treasury.

If the past international monetary system were continued, then because of the reserve currency role of the dollar, we would expect to find systematic deficits in the U. S. balance of payments. Under this type of system, you probably would expect over time some net reduction in Treasury borrowing costs. But one of the major thrusts of international monetary reform is to establish a more symmetrical international monetary system in which there would be a much smaller, if any, reserve-currency role for the dollar. So I think the long-term expectation of a zero net balance of payments position is much more tenable for the future than you would think just on the basis of experience of the last 10 or 15 years. Thus over the long term, I doubt that there will be any substantial net effect from this source on Treasury borrowing costs.

*Deputy Assistant Secretary for Research, U.S. Department of the Treasury.

There remains, however, the shorter-term question of the problems for debt management which may be caused by the variability of foreign central bank activity in the Treasury bill market. My general feeling is that this is not too serious a problem. For one thing, while variability in an international payments position may be expected to exert greater volatility on the demands in the bill market, the present institutional arrangements under which U. S. payments imbalances generally result in similar fluctuations in holdings of Treasury bills by foreign central banks tends to insulate the overall domestic financial conditions in the United States from the effects of our international payments position.

For non-reserve countries under fixed exchange rates, an international payments imbalance, unless it is offset by deliberate policy of sterilization, will cause a multiple expansion or contraction in the domestic money supply. Indeed, it was upon this mechanism that the classical adjustment process relied. However, it has recently been emphasized by a number of writers, particularly Ron McKinnon, for a reserve-currency country like the United States, payments imbalances tend to be automatically sterilized.

During periods of payments deficit, foreign central bank purchases of Treasury bills will tend to offset the contractionary effects of the payments deficit that would otherwise occur. Likewise during periods of payments surplus, sales of Treasury bills by foreign central banks tend to counter the otherwise expansionary effect of the payments surplus.[1]

I don't believe this point was sufficiently recognized during 1969 when there was considerable concern expressed in a number of quarters that the Euro-dollar borrowings by the New York banks

[1]For more detailed discussion of this point, see Anatol Balbach, "Will Capital Reflows Induce Domestic Interest Rate Changes?" *Federal Reserve Bank of St. Louis Review*, July 1972, pp 2-5; A. E. Berger and Anatol Balbach, "Measurement of the Domestic Money Stock," *Federal Reserve Bank of St. Louis Review*, May 1972, pp 10-23; and Ronald I. McKinnon, "Sterilization in Three Dimensions," Stanford University Research Center in Economic Growth Memorandum No. 132, July 1972.

The tendency for international payments imbalances to be matched by changes in foreign holdings of Treasury bills under a reserve-currency system has much the same type of the insulating effect on U. S. domestic financial conditions as would be given by freely-floating exchange rates.

The effects on other countries are quite different, however. While a system of floating rates would offer similar insulation to other countries, under fixed rates non-reserve currencies — unless they take discretionary sterilization policies — are subject to multiple monetary expansion or contraction as the result of international payments imbalances.

If we move to a system of asset settlement for the United States under a reformed international monetary system, then on grounds of domestic financial stability, the United States should have an even greater interest than it does at present that there be a substantial degree of flexibility of exchange rates under the new international monetary system.

were undercutting the effectiveness of domestic monetary policy. To a large extent the net private borrowing from abroad was offset by a decline in foreign official capital placed in the United States.

Now, of course, these adverse changes in our payments position and our foreign official dollar holdings will not in general exactly cancel each other out so that you are left with an exactly zero impact on domestic financial conditions. Indeed this type of full cancellation would only be expected to occur when the payments imbalance was caused by a change in private foreign holdings of Treasury bills. Then you would be getting a direct switch between private and official holdings of Treasury bills. The net difference would be the greatest in cases where a payments imbalance was caused by a change in the current account. Here you would be getting, in effect, a general change in the money supply offset by equal amounts of money going directly into the bill market, and given any degree of segmentation of the financial markets, the two effects of these on the bill market would not be expected to exactly cancel. Shifts in the international capital flows would fall in between these two categories with the net effects being smaller, the more closely integrated are the various credit markets and the more closely akin to Treasury bills is the type of capital flow in question. In other words, where the variability in the balance of payments is caused by capital movements that are in markets which are very closely interdependent with the Treasury bill market, we would expect little net impact.

It is comforting to note in this regard that in general we would expect the financial markets most closely akin to the Treasury bill market to be the cause of the largest short-term variability in international payments. And that the markets for real goods and services which would be less closely linked to the Treasury bill market we would expect would be less volatile. Thus we would tend to have the more variable components of the balance of payments being closer substitutes for the Treasury bill market. Such a tendency would reduce the overall amount of net impact on the domestic financial markets caused by variability in our international accounts.

In fact, we do find, looking at this empirically, that over the past decade changes in foreign central bank holdings of Treasury bills have been associated on average with only small and apparently short-term effects on Treasury bill rates. I do not know of any published econometric work available on this, but there have been two recent, as yet unpublished studies by John Makin from the University of Wisconsin at Milwaukee and by Mike Keran who has

recently moved from St. Louis to the San Francisco Fed.[2] They found quite similar results, that a one billion dollar change in foreign official holdings of Treasury bills would tend to lower the three-month bill rate by roughly 4 to 10 basis points during the month in question. And Makin, who investigated longer-term effects, was not able to find any significant effects past the first month. I think this does indicate that there is enough substitution among financial instruments going on in that the short-term variability in the foreign central bank holdings have not been terribly unsettling to the financial markets.[3]

In closing, I would like to turn to another topic that's a little more closely in line with traditional public finance, one which was alluded to in Henry Kaufman's paper yesterday. There has been a long-held view in the literature on public finance that we do not need to worry about the burden of the public debt because after all we owe it to ourselves. As Kaufman and Adams have both amply illustrated, this statement is no longer tenable. A high proportion of the increase in short-term public debt in recent years has gone abroad.

What implications does this have for concern over the burden of the public debt? I would argue that the recent emergence of a considerable amount of foreign holdings of U. S. government debt is not of itself a reason for changing one's attitude toward the use of deficit financing for government expenditures. On the one hand there is the view put forth by James Buchanan that there is a burden from domestically held government debt as well as foreign held debt;[4] and on the other, there is not in my view any reason to consider there to be different types of burdens imposed by private or by public borrowing from abroad.

[2]Michael Keran, "A Model of the U. S. Treasury Bill Market: with Special Reference to Foreign Influences" and John Makin, "The Impact of Control Programs on the Independence of U. S. Monetary Policy" prepared for the U. S. Treasury Research Conference on the Capital Control Programs, December 7-8, 1972.

[3]Further, where there is an extremely large foreign demand which develops over a short period of time (due to a large U. S. payments deficit) the Treasury frequently issues special, non-marketable securities, hence reducing the direct impact on the Treasury securities market. However, to the extent that the issuance of such specials leads to higher Treasury holdings of cash balances, the domestic money supply will be reduced (see Berger and Balback, *op. cit.*). Thus in such instances the impact of the payments imbalance which gave rise to this issuance of the specials is not sterilized.

[4]See James M. Buchanan, *Public Principles of Public Debt* (Homewood, Ill.: Irwin, 1958). A collection of articles stimulated by Buchanan's controversial book is available in J. M. Ferguson, *Public Debt and Future Generations* (Chapel Hill, N. C.: University of North Carolina Press, 1964).

If you are worried about a burden that current economic operations are placing on future generations, the relevant concept with respect to the international sector is what is happening to net borrowing, both private and public. The basic phenomenon was that our current account deteriorated substantially during this period. Hence, our net international investment position had reversed its very strong upward trend.

To maintain balance of payments equilibrium over the long run, this implies that in the future our current-account surplus will have to be greater than it otherwise would have been. It is this requirement for a higher future current-account surplus which will place an economic burden on U. S. citizens in the future. The balance of payments always balances in a double-entry bookkeeping sense and in terms of the burden "on future generations" it makes little difference whether it is public or private borrowing which has balanced the current-account decline (or for that matter, whether it is a decline in gross U. S. lending abroad). The only difference would be if there were different interest costs on the types of borrowing or lending involved and on this score the costs of public borrowing are probably less.

We are not in a satisfactory position to make a very emphatic judgment as to whether this presumably short-term deterioration in the U. S. current account was desirable or undesirable from the standpoint of U. S. economic welfare, however. The economic analysis of the intertemporal welfare effects of trade imbalances is still in its infancy. There have been several interesting theoretical papers written on this subject in the last few years, but you get a number of arguments running in opposite directions and we do not have an adequate general synthesis at this point.[5] Thus I would be hard put to conclude whether the net effects of the recent deterioration in the current account have been desirable or undesirable for the United States in terms of the combined criteria of domestic macroeconomic stability and efficient consumption patterns over time.

I am afraid I shall have to close on this rather agnostic note. My general message is that I think that the substantial increase in the foreign official holdings of U. S. Treasury bills is a quite interesting phenomenon, but I do not see that it has major implications for U. S. economic policy.

[5]For a discussion of some of this literature see Thomas D. Willett and Edward Tower, "The Welfare Economics of International Adjustment," *Journal of Finance*, May 1971.

Federal Credit Programs

--the Issues They Raise

BRUCE K. MacLAURY*

Even in the relatively narrow context of a discussion on Federal debt management, the term "Federal agencies" covers a broad and diverse range of debt instruments. At one end of the spectrum one finds the direct obligations of government-owned agencies such as the Export-Import Bank, TVA, and the Postal Service — obligations that are virtually indistinguishable in credit standing from direct obligations of the U.S. Government itself. At the other end are the notes of private issuers, such as SBICs that are guaranteed by a government agency, in this case the Small Business Administration. In between fall every sort and description of instrument, distinguished by differing degrees of access to the Treasury in case of default, of insurance coverage as to interest and principal, of marketability based on size of issue, minimum denomination, etc., and differing degrees of explicitness in the extent to which the obligations are guaranteed, if at all.

Despite this great diversity, most market people think of the term "Federal agencies" as encompassing primarily the obligations of the so-called federally sponsored agencies that are privately owned and that operate outside the budget: the Federal National Mortgage Association, the Farm Credit System, and the Federal Home Loan Bank System. This narrower use of the term reflects both the size and the activity of these particular borrowers in the credit markets, and the fact that their obligations are sold in the open market and traded actively. Other agency issues are generally smaller, less actively traded, or tailored to specific types of investors.

*President, Federal Reserve Bank of Minneapolis.

To focus on agency issues as such, by whatever definition, how-
ever, is to miss the broader context of the Federal government's
involvement in the credit markets more generally. Before the off-
budget agencies became so large, the Federal government through
regular budget agencies had long been in the business of extending
direct loans in support of a wide variety of programs. In addition, of
course, the government had long been in the business of guaranteeing
the debt of private parties, most notably through the mortgage insur-
ance programs of the FHA and VA. Thus, while for some purposes it
is sufficient to look at the role and implications of government
agency securities, defined as bond-type instruments sold and traded
in the open market, for other purposes it is more relevant to look at
the broader aspects of the government's function as a credit-granting
and credit-guaranteeing entity.

Expansion of Federal Credit Programs

Starting from the broader perspective of the government's role in
credit markets generally, it is not hard to document the very rapid
rates of growth in federally assisted credit in recent years, both in
absolute terms and in relation to credit flows in the capital markets.
The accompanying chart, taken from Special Analysis E of the 1974
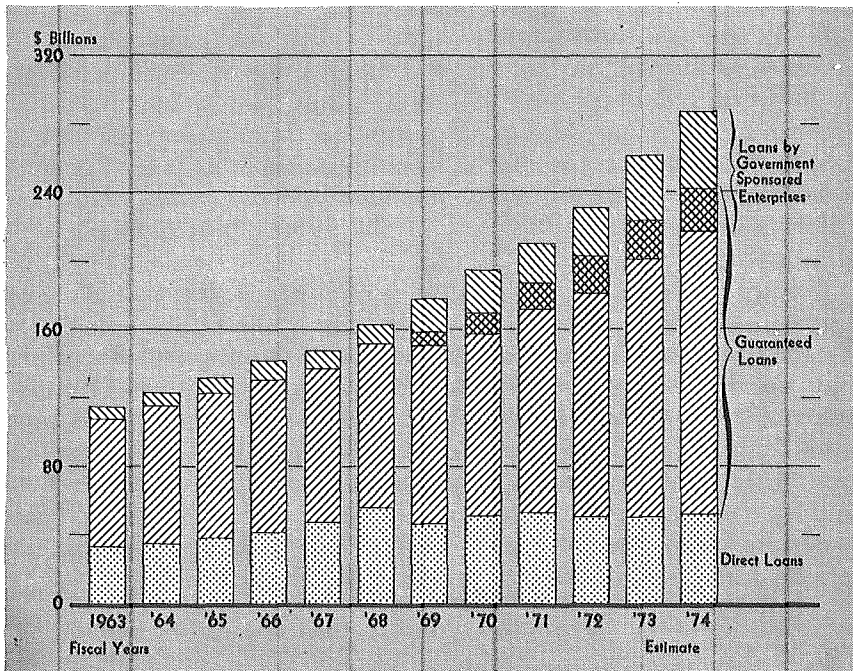
Budget, depicts graphically the accelerating trend in amounts of Federal and federally assisted credit outstanding over the last decade. As shown in the chart, total borrowing under Federal auspices is expected to reach $287 billion in 1974, a two-year increase of $55 billion and 24 percent over the 1972 level.

Another indication of the growing importance of Federal credit assistance is the increased proportion of funds raised in the credit markets that benefit from some form of Federal assistance:

FEDERALLY ASSISTED BORROWING
(Billions of $ or %)

	Amount		Percent	
	FY 1962	FY 1972e.	FY 1962	FY 1972e.
Federally Guaranteed	5	25	8	18
Sponsored Agency	1	4	2	3
Total	$6	$29	10%	21%

*Change in amount outstanding

Source: Adapted from Treasury material accompanying submission of bill to establish a Federal Financing Bank, Dec. 9, 1971.

As a proportion of funds raised, the federally assisted portion has doubled to about 20 percent over the last decade. Nor do these figures include the impact on credit markets of the increase in direct government debt issued to finance budget deficits.

As is obvious from the chart, the entire growth in federally assisted credit in recent years has taken the form of guarantees and loans by government-sponsored agencies. In fact, the volume of out-standing direct loans extended by budget departments has not increased at all on balance since 1967.

The expansion of federally assisted credit has occurred not only in aggregate amounts outstanding, but also in the proliferation of departments, programs, and off-budget agencies making use of this sort of assistance. A list of Federal, federally guaranteed, and fed-erally sponsored agencies borrowing from the public was attached to the Treasury's proposal in December 1971 to create a Federal Financing Bank (to be discussed below), and is reproduced here. Section IV of the list shows proposals for new borrowing agencies and new guarantee programs before Congress at that time. Since then, the guaranteed Washington METRO Bonds have been authorized and issued, the Farmers Home Administration has been granted broad new authority to finance rural development credit, and the Environmental Financing Authority and the National Student Loan Asso-ciation have been enacted and will probably be in operation by nex

FEDERAL, FEDERALLY-GUARANTEED, AND FEDERALLY-SPONSORED AGENCY BORROWING FROM THE PUBLIC[1]

I. Federal agencies regularly issuing in the securities market direct obligations of a type which will be eligible for sale to the Federal Financing Bank:

Credit agencies:
Export-Import Bank
Federal Housing Administration
Rural Telephone Bank

Other agencies:
Tennessee Valley Authority
U.S. Postal Service

II. Federal agencies issuing guarantees of a type for which the submission of budget plans will be required by the Federal Financing Bank Act:

A. Guaranteed obligations regularly financed in the securities market:[2]
Agriculture:
Farmers Home Administration (asset sales)

Commerce:
Maritime Administration (merchant marine bonds)

Health, Education, and Welfare:
Academic facility bonds (debt service subsidies)
Hospital facilities (asset sales)

Housing and Urban Development
College housing bonds (debt service subsidies)
GNMA mortgage-backed securities[3]
New community debentures
Public housing bonds and notes (debt service subsidies)
Urban renewal notes (debt service subsidies)

Transportation
Railroad (Amtrak, etc.)

Export-Import Bank (PEFCO, etc.)
General Services Administration (asset sales)
Small Business Administration (SBIC debentures)
Funds appropriated to the President:
International security assistance
International development assistance
Overseas Private Investment Corporation

[1]Excludes minor programs and programs in liquidation.

[2]Guaranteed borrowing includes sales of Federal loan assets on a guaranteed basis and borrowings partly guaranteed by means of debt service subsidies.

[3]Includes GNMA guarantees of mortgage-backed bonds issued by FNMA and FHLMC.

B. Other guaranteed obligations:
   Commerce:
       Economic Development Administration
       Trade adjustment assistance

   Defense:
       Defense production

   Health, Education, and Welfare:
       Health manpower training facilities
       Nurse training facilities
       Student loans

   Housing and Urban Development:
       Federal Housing Administration

   Export-Import Bank
   Small Business Administration
   Veterans Administration

III. Federal sponsored agencies whose obligations will not be eligible for sale to the Federal Financing Bank:

   Farm credit agencies:
       Banks for cooperatives
       Federal intermediate credit banks
       Federal land banks

   Federal Home Loan Banks
   Federal Home Loan Mortgage Corporation
   Federal National Mortgage Association

IV. Major proposals before Congress:

   A. New borrowing agencies:

       Environmental Financing Authority
       National Student Loan Association
       U.S. International Development Corporation
       National Development Bank
       Urban Development Bank
       National Credit Union Bank
       Rural Development Bank

   B. New guaranteed borrowings:
       Farmers Home Administration farm operating loans (asset sales)
       Transportation Department equipment trust certificates
       Washington Metropolitan Area Transit Authority
       District of Columbia government borrowing (debt service subsidies)
       Taxable municipal bonds for rural development (debt service subsidies)

Office of the Secretary of the Treasury   December 10, 1971
       Office of Debt Analysis

year. Just since 1969 when I started my assignment at the Treasury, various other new agencies and programs have come into existence, including: the Rural Telephone Bank, the U.S. Postal Service, GNMA mortgage-backed securities, new communities debentures, Amtrak, Pefco, Overseas Private Investment Corporation. Indeed, it would be rather surprising if the pressure to provide credit assistance *outside* the budget did not result in a wave of new programs and financing vehicles, each with its own constituency and special characteristics.

Another dimension to the growth in Federal credit assistance is the tendency to "upgrade" the form of instrument issued or guaranteed so that it will be more readily marketable and presumably carry a lower interest cost. This upgrading can be seen most easily in the transformation of guaranteed mortgages into guaranteed bonds through issuance of GNMA mortgage-backed securities.[1] It is also evident in the efforts to "perfect" the guarantees on various types of securities, e.g., SBIC debentures and Merchant Marine bonds, to obtain a cleaner and faster tap on the Treasury in case of default, to increase the ratio of guarantee from 90 percent to 100 percent etc.

While there is nothing inherently wrong in trying to devise characteristics for securities that will make them more marketable, the rub comes when the ultimate objective is to create securities that are indistinguishable from direct government debt, and yet still preserve some rationale for not counting the issues as a means of financing budget deficits or against the Federal debt ceiling — a clear case of trying to have one's cake and eat it too.

Why the Growth in Federal Credit Programs and Agency Securities?

If the fact of rapid expansion in Federal credit programs is self-evident, the factors stimulating this growth are more complex. The most basic question to be asked, I suppose, is why the Federal government should be involved in credit programs at all. There are a variety of answers.

First, credit assistance, just like expenditures on goods and services and transfer payments, may be used to alter in a socially desirable way (it is assumed) the allocation of resources in the economy. And indeed, it is a fact that programatic objectives can be achieved either through cash grants or credit assistance within a considerable range of overlap.

---

[1]From none in 1970, such securities jumped to $6.8 billion outstanding in 1972, and are expected to reach $15.6 billion in 1974.

Second, a case is made for Federal involvement in the credit markets (e.g., through guarantees) as a means of overcoming market imperfections. This is perhaps the purest case, where assistance is "temporary", i.e., until the market itself fills in the gaps. In practice, many of the federally assisted credit programs contain a proviso requiring the lending agency to find that private financing is not available on reasonable terms.

But the Congress has gone well beyond the "market imperfections" rationale, to provide very substantial elements of subsidy in the form of debt service grants, below market interest rates, etc. not on a temporary but on a continuing basis. The intent, of course, is again to influence the allocation of resources, but to do so in a way that leverages the Federal budget dollar. It can be argued, for example, that many worthwhile (i.e., benefits > costs) projects in the private sector would not be undertaken if the full cost of the investment had to be financed out of the investor's stream of current income. By analogy, there are presumably many worthwhile investments that could be made by the Federal government (forgetting that in an accounting sense the government has no capital budget as such) either in bricks and mortar (e.g., waste treatment plants) or education (college tuition assistance) that would not be made if the full cost had to be funded through current tax receipts whereas the stream of benefits will accrue over a long period of years.

But this argument simply makes the case for borrowing to finance a certain type of federally desired outlay. It says nothing about *who* should borrow, the government itself or the party(ies) to be assisted. As the growth in credit programs outside the budget shows, however, this is a more theoretical than a practical question. In practice, a budget dollar has a much greater scarcity value to Congress and the Administration than a dollar borrowed from the private sector — borrowed with Federal assistance maybe, but not direct Federal debt!

Indeed, there is little doubt that the single most important factor that explains the growth and proliferation of Federal credit assistance is the desire to see programs funded with a minimum use of scarce budget dollars. An early example of the effort to conserve budget dollars yet carry on programs was the ingenious development of the so-called Participation Certificate in 1966. By carefully tailoring the provisions of this instrument, the Administration sought to issue "participations" in a pool of financial assets (the claims arising out of previous direct loans) and count the transactions as sales of assets (i.e., negative expenditures) rather than as a means of financing

the deficit. This particular device gave rise to heated political debate, and the accounting practices were changed to preclude (or at least make more difficult) such practices thereafter. But the budget pressures that spawned initiatives of this sort continued, and so did the efforts to escape the budget constraints with new and different credit programs.

In 1967, the Report of the President's Commission on Budget Concepts said that "one of the most difficult questions the Commission has faced is how Federal loan outlays should be reflected appropriately in the budget." In the end, the Commission recommended, and the Administration agreed, to include direct loans within a unified budget (rather than deleting direct loan transactions from the budget as proposed by some). Prophetically, the Commission said:

> Highlighting of direct loan programs — and strict control of almost all of them within the budget — could create incentives to redirect Federal loan programs to some extent into government guarantee or insurance of private loans. These may have much the same effect on resource allocation and on economic impact as direct loans, even though Federal funds are not directly involved, and even though such guarantee and insurance programs are not reflected in the budget except for administrative expenses and defaults, and occasional provision of secondary market support.

The Commission also recommended that government-sponsored enterprises, such as FNMA, the Federal Land Banks and the Federal Home Loan Banks, which had previously been omitted from the (administrative) budget even though they were owned in part by the government, be omitted from the (unified) budget accounts when such enterprises were completely privately owned.[2]

As we have seen, since direct loans were not removed from the unified budget, they stopped growing entirely, and all of the growth in federally assisted credit took the form of loan guarantees, or loans by sponsored agencies which are practically invisible in the budget documents. In addition, the trend toward "debudgeting" of credit agencies accelerated. Not only were the Bank for Cooperatives and the Federal Intermediate Credit Banks "privatized" (i.e., government capital replaced by private capital, thus qualifying them as "100 percent privately owned" and by this criterion out of the budget), but the Federal National Mortgage Association also joined the parade.

[2]Though the volume of outstanding loans of such excluded enterprises should be shown as a prominent memorandum item.

At about the same time, and partly in consequence, the functions of the housing-oriented agencies — FNMA and FHLB — expanded from so-called secondary market operation (or in the case of FHLB, rediscounting) designed to assure liquidity to mortgages and mortgage lenders over the business cycle, to the provision of funds for the housing sector on- a more or less continuing basis. Obviously, this change in purpose implied a continued tapping of the bond markets to provide the funds.

More recently, we have seen a less subtle example of debudgetization. Since there was little hope of turning the Export-Import Bank into a "private" institution, Congress took the bull by the horns and simply declared in legislation that Ex-Im's lending would be excluded from the budget totals beginning August 17, 1971. It is not just coincidental that Ex-Im's lending is expected to jump from $250 million in FY '72 to $1.6 billion in FY '74.

Having set this precedent, one should not be surprised at the May 1973 enactment of a bill that likewise removed the REA 2 percent loans from the budget, and at the same time provided REA with broad new guarantee authority. A similar bill is now pending to debudget the AID 2-3 percent development-loan program.

In essence, the growth and proliferation of credit programs have been a consequence of the increasing scarcity of budget vs. non-budget dollars, and the vagaries of the definitions of what is included and excluded from the budget totals. Related to the scarcity of budget dollars were the massive capital expenditure programs that the Federal government sought to stimulate (if not fund) in the areas of urban renewal, public housing, mass transit, waste treatment, etc. — programs that in the private sector would indeed be funded by borrowing rather than financed out of current income.

Another spur to the expansion of Federal credit assistance has been the two bouts of very tight credit conditions that have occurred in recent years, the credit crunch of 1966, and its even tougher successor in 1969-70. Congressional concern with the impact of these periods of credit tightness on particular sectors of the economy, most notably housing, stimulated a search for ways to mitigage the impact through preferential credit facilities. Out of this search, for example, came the development of mortgage-backed securities, together with a much more active role for the housing agencies.

Increased budget pressures have thus given rise to something like a typical life cycle in which outright grants, say for construction, were replaced by direct loans, on grounds that the government was only providing temporary financing that would eventually be repaid — a

budget saving not in the short run, but certainly in the long run. The second step was to transform the direct loans into guarantee of private credits, thus costing the budget only a fraction of the total outlay and effecting the saving immediately. To be sure that the projects in fact got the necessary funding without the government having to put up much of the money, Congress authorized varying amounts of subsidies to accompany the guarantee programs, e.g., payment of all but 1 percent of interest on Section 235-236 guaranteed loans for low income housing.

Similarly, in the area of higher education, the government previously had made 3 percent direct loans to colleges for the construction of academic facilities and college housing. In 1970, this program was phased out and instead the government agreed to provide to private lenders interest-subsidy payments of all interest above 3 percent so that the cost to the colleges would not be increased.

Implications of Expanded Federal Credit Programs

The more or less unfettered expansion of Federal credit programs and the accompanying deluge of agency direct and guaranteed securities to be financed in the credit markets has undoubtedly permitted Congress and the Administration to claim that wonder of wonders — something for nothing, or almost nothing. But as with all such sleight-of-hand feats, the truth is somewhat different.

The fact is that the growth and proliferation of Federal credit programs has created, or at least exacerbated, problems on a number of fronts. Some of these problems are of interest primarily to managers of the public debt. Others have ramifications well beyond that limited concern, touching on:

1) the control of Federal expenditures generally,
2) the ability to measure the impact on the economy of "the budget"
3) the functioning of credit markets as allocators of resources.

The uncomfortable truth is that there is very little agreement on the net impact on resource allocation of the government's growing role in the credit markets.[3]

To take the debt management concerns first, the basic point is that the growth in federally assisted debt in recent years has significantly outpaced the growth in direct Federal debt. Simply in terms

---

[3]See note by John Kareken and Neil Wallace in Appendix.

of size of issues, frequency of financings and anticipating cash flow problems, the task of "managing" individual agency financing now requires the same expertise that has been built up in the Treasury to manage the national debt. Even if that expertise can be acquired — as it has been in a number of instances — it involves an inefficient duplication of talent and extra administrative costs.

Similarly, there are extra costs associated with 1) introducing new agencies to the market, 2) selling issues that are smaller than some minimum efficiently tradeable size, 3) selling securities that only in varying degree approximate the characteristics of direct government debt in terms of perfection of guarantee, flexibility of timing and maturities, "cleanness" of instrument, etc. As a result of such consid-·erations, the market normally charges a premium over the interest cost on direct government debt of comparable maturity ranging from ¼ percent on the well-known federally sponsored agencies such as FNMA, to more than ½ percent on such exotics as SBIC debentures, New Community Bonds, etc. In some cases (e.g., SBA guarantees of loans to small businesses) this premium reflects actual services rendered by the private sector, such as origination and/or servicing of loans, co-insurance, credit appraisal, etc. More often, however, the premium on guaranteed obligations far more than compensates for such services. In general, if cost of financing were the only consid- eration, it would be most efficient to have the Treasury itself provide the financing for direct loans by issuing government debt in the market.[4]

Efficiency of financing is not the only debt-management cost of the proliferation of agency issues. Since the market views the various kinds of agency and guaranteed issues as falling generally in a single category — Federal debt — it makes little sense to have one agency preparing an issue right on top of another, or the Treasury itself. The role of traffic cop in terms of timing and maturity distribution of potentially competing issues is important to the government in minimizing costs, and important to the smooth functioning of the debt market itself. The Treasury has long played this role, in some cases by legislative mandate, in other cases by custom. But it is not hard to understand that the problem of coordination has become more complex as the number of issuing entities has increased along

[4]Efficiency, however is not the only criterion. To put all the credit programs back in "the budget" without distinguishing more clearly than at present between an "income account" (i.e., the stream of expenditures) and "balance-sheet transactions" (i.e., exchanges of assets/ liabilities) might exacerbate the problems of interpreting the economic impact of "the budget", as discussed below.

with the size of their issues, and as they have asserted a greater degree of "independence" commensurate with their status "outside the budget". Paul Volcker, Undersecretary of the Treasury for Monetary Affairs, made the point effectively in a 1971 talk when he said: "We are already at the point where some Federal financing is coming to market at least three out of every five business days."

Off-budget financing of a growing number of Federal programs through use of federally assisted credit has almost certainly weakened administrative control over these programs in the Congress and in the Administration. While it would be hard to prove this point, common sense and personal experience argue strongly in its favor. Since contingent liabilities under guarantees are inevitably obscured in the complexities of the budget documents and departmental presentations, only administrative costs of such programs, and provision for defaults, are at all prominent in the review of departmental programs involving guarantees. The same is true *a fortiori* for the sponsored agencies. As a result, there is little awareness of, or interest in, the growth, in some cases explosive growth, of such programs. Nor is there any interest in the additional costs to the government over the longer run of financing loans via guarantees of private debt rather than through Treasury issues.

In welcome contrast, some members of Congress have become concerned about the cost of subsidies buried obscurely in a wide range of Federal programs, credit programs among them. As a result, I assume, Special Analysis E in the budget now presents a discussion of the subsidy element in Federal credit programs, both direct loans and guarantees. On commitments undertaken in FY 1972, the *annual* interest subsidy (i.e., the difference between the lending rate and assumed borrowing cost of 8 percent) worked out to about $880 million. The present value of this subsidy over the average life of the loans, also discounted at 8 percent, was some $7 billion. Because the President suspended new commitments under a number of the HUD programs, e.g., for urban renewal, low-rent public housing, subsidized mortgage insurance, etc., the budget shows declining subsidies over the next two years in the credit program area, *measured in terms of new commitments*. No attempt was made to value the subsidy element in outstanding loans! Perhaps, just perhaps, one of the reasons for the re-evaluation of some of these credit programs was because their true cost came to light for the first time. In general, however, I would wager that credit programs with their leveraged budget dollars will continue to escape the close scrutiny accorded direct budget outlays.

Another sort of potential "economic cost" that stems from the growth and proliferation of Federal credit programs is the homogenization of debt coming into financial markets. One function that credit markets are supposed to perform is that of distinguishing differing credit risks and assigning appropriate risk premia. For all of the criticisms leveled against the techniques and practices of the bond rating agencies and investment bankers, no one denies the usefulness — to the markets and to the economy — of evaluating the relative economic viability of different financial undertakings, and pricing issues accordingly. Indeed, this is the essence of the ultimate resource-allocation function of credit markets.

As an increasing proportion of issues coming to the credit markets bears the guarantee of Uncle Sam, the scope for the market to differentiate credit risks inevitably diminishes. With the big Federal umbrella covering a growing portion of funds moving through the credit markets, these markets become simply vehicles for mobilizing private savings, and their role in assessing credit risks is displaced or forgotten. Theoretically, the Federal agencies issuing or guaranteeing debt could perform this role, charging as costs of the programs differing rates of insurance premia. In practice, all of the pressures are against such differential pricing of risks, even if the technical expertise were available. As a result, the potential exists for reduced efficiency in resource allocation in the economy, as Federal credit programs spread.

Admittedly, it is impossible to measure the actual costs of this potential resource misallocation. Moreover, against any such costs must be set the possibility that financial markets, left to their own devices (i.e., without the Federal programs), do an even worse job than the government in channelling funds to borrowers with the highest *social* priorities. The net effect of this "homogenization" argument therefore is unfortunately in doubt. But the expansion of credit programs in particular areas should at least take explicit account of these offsetting social and economic costs. (Or more accurately, differing degrees of externalities.)

Finally, the most difficult economic question raised by the growth of Federal credit programs is the extent to which they distort assessments of the economic impact of the Federal budget on the economy. On the one hand, financial transactions are for the most part excluded from the National Income Accounts budget on grounds that such transactions simply represent exchanges of assets/liabilities and do not themselves generate income/expenditures. And the National Income Budget is generally taken to be the most useful set of accounts for analyzing the economic impact of the Federal government.

On the other hand, there are a lot of Congressmen who have been seriously deluding themselves and their constituents if the substitution of credit program assistance for outright grants, and the subsequent expansion of these credit programs, has not in fact meant increasing federally assisted claims on real resources.

Apart from this fundamental conundrum, there is the further complication of changing definitions. It would be difficult enough if we were dealing simply with changing magnitudes relative to the economy and to each other — of loans and expenditures in a consistently defined "budget". But as we have seen, major credit agencies have been "debudgeted" in recent years, so that whatever the economic impact of their programs (which can certainly be taken as greater than zero), this impact has been lost sight of by those analyzing "the budget". The same "disappearance" applies to programs that were once funded through direct loans but are now funded by guarantees of private credit. If these changes were small, they could be ignored. But in practice they amount to several billions of dollars from one year to the next.

There is by now a fair literature on the economic impact of Federal credit programs — most notably in the Staff Papers of the President's Commission on Budget Concepts — but still very little agreement on theoretical grounds and almost no valid policy guides, such as we have with the full-employment budget. Credit programs, in essence, continue to fall between the cracks — confronted directly neither by the fiscal-policy advocates nor the monetarists.

Theoretically, the monetarists could argue that there is very little to be debated here. If the monetary authorities simply stuck to their knitting and provided a steady increase in the monetary base (or some other magnitude), there would be allocation effects as the government-assisted borrowers bid away financial resources from the rest of the market, but there would be no risk of excessive credit creation overall, since this is ruled out by definition. In practice, I find this "solution" no solution at all, because the real world doesn't work in the way postulated.

A point of current interest — much attention is focused at the moment on Congress' efforts to impose on itself a more rational mechanism for controlling aggregate Federal expenditures. This is one of the more hopeful initiatives taken by that body. It would be too bad if the opportunity is missed to incorporate at the same time an overall review of federally assisted credit programs into the new budget review process.

In summary, the costs of uncontrolled expansion of Federal credit programs, and related Federal agency issues, may be thought of as

falling into two categories: debt-management costs and economic costs, with some overlap. In the first category may be listed:

1) duplication of financial expertise at various agencies
2) higher costs of marketing agency issues than for direct Federal debt, because of
   a) unfamiliarity of issues to buyers
   b) small size of individual issues
   c) varying degrees of "guarantee"
   d) inflexibility of maturities and other terms
3) greater risk of market congestion from uncoordinated issuing dates and terms.

The economic costs include:

1) less close scrutiny by Congress and the Administration of loan and guarantee programs than expenditure outlays
2) great possibilities for hidden subsidies
3) dilution of resource allocation function of credit markets by homogenization of credit risks
4) difficulty of measuring economic impact of growing Federal credit programs.

The Federal Financing Bank — A Proposal to Mitigate Some of These Problems

The problems cited above are not new. But the continued rapid growth of Federal credit programs and agency issues makes the search for some solutions more pressing.

In December 1971, the Treasury on behalf of the Administration submitted a bill to Congress to establish a Federal Financing Bank. Recognizing that it was not realistic, and perhaps not even desirable, to try to turn back the clock and route a greater portion of federally assisted credit through direct loans financed out of current receipts or direct government borrowing[5], the Treasury proposed the creation of what is essentially a financing shell. The "bank" would be authorized to buy any obligation "issued, sold, or guaranteed" by a Federal agency, and in turn finance such purchases through sale of its own securities, which would be obligations of the United States. This financing arrangement is obviously designed to consolidate under one roof the issues of many different agencies. It would achieve hopefully economies of scale, better coordination of issues, and lower program costs for the agencies concerned.

[5]E.g., for *unsubsidized* guaranteed issues, it may in fact be preferable to have the borrower pay the higher cost associated with partially guaranteed agency issues than get the "subsidy" of the government's own credit costs.

Apart from the potential benefits the bank might effect as a debt management device, another provision of the bill is designed to encourage better coordination of credit programs through more rigorous control. Specifically, agencies issuing or guaranteeing securities in the market would be required to submit financing plans in advance to the Treasury. (A second, and potentially more important control, i.e., that no Federal agency would be permitted to guarantee issues "except in accordance with a budget program submitted to the President," was deleted from the 1973 version of the bill.)

The consolidation of issues should focus attention more widely on the scope and growth of credit programs and agency issues, and hopefully permit the informed public to relate anticipated demands of federally assisted credit on the flows of funds available — just as is now done in relating Federal expenditures to resource availability in the economy.

APPENDIX

TO: Bruce K. MacLaury, President
           Federal Reserve Bank of Minneapolis

FROM: John Kareken and Neil Wallace

SUBJECT: Federal Credit Programs and Desired Investment

1. You indicated that you wanted us to take up the question "What are the macroeconomic effects of Federal credit programs?" But as you probably know, this is not a question to which one can turn to the economic literature for a satisfactory answer. We have had to make up our own. It is by no means complete. It holds only for wealth-maximizing economic units — for firms and households, that is, but probably not for nonprofit institutions such as universities and colleges. Moreover, it may be wrong. That is a possibility you will want to keep in mind when drafting your talk.

2. There being various Federal credit programs, our answer is in several parts:

    (a) Financial intermediation by the Federal government has a macroeconomic effect. More particularly, an increase in the Federal government's portfolio of private loans or equities, financed by an increase in, say, the stock of Treasury securities outstanding, is expansionary. An increase in desired investment results.

    (b) Direct lending by the Federal government has a macro-economic effect. And there is an effect when the government guarantees private-sector debts. But what these effects are is not clear. *A priori*, it is impossible to say what happens to desired investment (or, therefore, aggregate demand) when the stock of direct Federal loans or federally guaranteed debt is increased.

    (c) There are various possible Federal interest-subsidy programs and they are not all the same in their macroeconomic effects. If the Federal government subsidizes firms by giving them sums of money that are proportional to their respective outstanding debts, then desired investment increases. If the subsidy rate is the difference between the market rate of interest and some stated rate (perhaps the Federal government's own rate), then desired investment changes. But depending on circumstances, it may increase or decrease.

Financial Intermediation

3. It is not difficult to show, using the type of analysis developed by
   Professor Tobin, that financial intermediation by the Federal
   government is expansionary.[1] And why is easily explained. The
   Federal government increases the supply of Treasury securities
   and, by the same amount, its demand for private-sector loans.[2]
   Inducing the private sector to shift from loans to Treasury securi-
   ties requires a higher rate on Treasury securities, however, and a
   lower rate on private loans. Consequently, the equilibrium rate on
   private-sector loans decreases and the equilibrium rate on Trea-
   sury securities increases. And, what is most important, the
   equilibrium "supply price of capital" — as Tobin has defined it,
   the ratio of the price of a unit of existing physical capital to the
   price (reproduction cost) of a unit of new capital — also in-
   creases.[3] But an increase in the supply price of capital is expan-
   sionary, for the higher it is the greater is the incentive to produce
   new capital.
4. There are some of us, however, who are not overly fond of
   explanations that involve the supply price of capital (or models in
   which this variable appears). For one thing, if there is a market-
   determined supply price, then presumably there is a market in
   which existing capital can be bought and sold. How does the
   supply price change, except by being bid up or down in a market?
   But it is surely inappropriate to assume that there are markets for
   all kinds of existing capital.
5. Fortunately, it is possible to tell a story about financial inter-
   mediation by the Federal government without mentioning the
   supply price of capital. To make it short, we assume that what the
   government does is buy equities. It finances its purchases by in-
   creasing the supply of Treasury securities. With a government
   purchase of equities, the supply available to the private sector

---

[1] See the recent paper by Craig Swan, "A General Equilibrium Model of FNMA and
FHLB Actions" (Federal Home Loan Bank Board, February 1973).

[2] Professor Swan considers an increase in the supply of agency securities, matched by an
increase in the demand for private-sector loans, but that is because he is specifically inter-
ested in the macroeconomic effects of the operation of particular institutions. Whichever
supply is increased, whether the supply of Treasury securities or the supply of agency
securities, the result is (qualitatively) the same.

[3] The increase in the supply price of capital is not, strictly speaking, necessary. But if a
certain reasonable condition (what would seem to be a stability condition) is satisfied, then
Tobin's supply price does increase.

decreases. And on the most reasonable assumptions about port-folio behavior, the price of equities increases. In other words, the rate of return on equities (the earnings-price ratio) decreases. But a decrease in this rate is expansionary. As the rate on equities decreases, there is an increase in the number of investment proj-ects that can be undertaken with no dilution of earnings per share.

6. Thus, whether the rate of return on equities or the supply price of capital is taken as the crucial variable, straight-forward application of portfolio theory produces the conclusion that an increase in financial intermediation by the Federal government increases desired investment and is therefore expansionary.[4] Of course, only a *ceteris paribus* increase in such financial intermediation is expansionary. If an increase in such intermediation is accom-panied by, say, an appropriate change in the money stock, then only a reallocation of resources will result. There will· be more investment in industries favored by Federal financial interme-diation and less in others.

Direct Lending and Guarantees

7. We turn now to the Federal government's direct lending and its guaranteeing of private-sector liabilities. It sufficies to analyze one or the other of these activities. For whether the Federal govern-ment lends directly to a firm or guarantees its liabilities, perhaps up to some limit, the effect is the same: the firm's interest cost is decreased. Further, since the guaranteed liabilities of a private firm are just like the liabilities of the Federal government, the changes in the stocks of debt outstanding are the same; whether the Federal government makes direct loans or guarantees private-sector liabilities, there is an increase in the supply of Treasury (that is, risk-free) securities.

8. With a decrease in a firm's interest cost, current and expected dividends increase. So the price of the firm's equities increases. Since this increase results from the change in the dividend stream, there is, however, no decrease in the rate of return on equities. Nor therefore is there any increase in the number of investment projects that can be undertaken with no dilution of equity. Direct lending does not then result in an increase in desired investment.

---

[4]This conclusion requires that private-sector units view the government as an institution apart and not, as it were, simply a mutual fund holding a part of their portfolios.

9. We have said that when the stock of Federal direct loans out-
   standing increases, the (expected) dividend stream and the price
   of equities also increase. Tax payments must also increase, how-
   ever, for with more direct loans outstanding there are increased
   loan losses. So there is no increase in private-sector income (or,
   alternatively, wealth). And there is no increase in desired con-
   sumption spending. Unless, of course, the Federal government
   deliberately decreases its surplus. What is expansionary then is not
   a *ceteris paribus* increase in the stock of direct loans outstanding,
   but an increase that is accompanied by a decrease in the Federal
   budget surplus.[5]

An Alternative Analysis of Direct Lending

10. The conclusion of paragraph 8 — that direct lending does not
    change desired investment — was obtained, however, using port-
    folio theory. We suspect, however, that there is an important
    effect of Federal direct lending, an effect on the situation of
    equity owners, that cannot be taken account of within the con-
    fines of portfolio theory, and that therefore this conclusion may
    well be wrong.
11. We begin our alternative analysis by assuming, not unreasonably,
    that there is a range of future states (outcomes) for some
    arbitrarily selected firm. In some of these states, the so-called
    bankruptcy states, this equity value is zero. In all others, it is
    positive.
12. Suppose now that there is some investment project which is
    characterized by a distribution of payoffs, there being a specific
    payoff for each future state. The problem of the firm is of
    course to decide whether to undertake this project. If it has no
    direct loans from the Federal government on its books, then in
    so doing it will "value" all the payoffs, even those of bankruptcy
    states. This because bankruptcy-state payoffs are valuable to
    private-sector creditors. And if the firm undertakes this project,
    then the risk of default will decrease, allowing it to refinance its
    initial debt at a lower interest cost and thereby increase the
    return to equity owners.

---

[5]It might be that those who receive the extra dividends have a higher propensity to spend
than those who pay the taxes to cover the government's loan losses. But it might also be
that they have a lower propensity to spend. The point is that if the distribution of income is
allowed to intrude, then anything can happen.

13. And if all of the firm's debt is in the form of direct loans from the Federal government? Then, since it is borrowing at the lowest possible rate, the bankruptcy-state payoffs are worth noting.

14. So it is easy to imagine two firms — one that has no direct loans from the Federal government and one that has only direct loans — deciding differently about any particular investment project. Consider a project that pays off only in bankruptcy states. The firm with no direct loans may undertake it. The firm with only direct loans will not. Or consider a project that pays off only in nonbankruptcy states. The firm with no direct loans may not want to undertake this project. Even so, the firm with all direct loans may.

15. The conclusion is therefore that direct lending by the Federal government (or a Federal guarantee program) may increase or decrease desired investment. Without specifying in detail the payoff distributions of all the various investment projects, it is not possible to say whether such lending is expansionary or contractionary.

16. Our inclination is to accept the conclusion that direct lending is indeterminate in its effect on desired investment and to reject the conclusion of paragraph 8 (that direct lending leaves desired investment unchanged). For as we have indicated, we are not all that sure about using portfolio theory to get at the macroeconomic effects of Federal direct lending and loan-guarantee programs. The conclusion of paragraphs 3 and 5 — that financial intermediation by the Federal government increases desired investment and is therefore expansionary — was obtained using portfolio theory. So we should perhaps be suspicious of it. We are rather confident though, that we can get this conclusion by analyzing how governmental financial intermediation alters the situation of equity owners and evaluations of investment projects.[6]

Interest Subsidies

17. We consider two kinds of Federal interest-subsidy programs. The first, our fixed-subsidy program, involves a subsidy that is independent of the rate at which the subsidized form or household borrows in the market. Whatever this rate may be, the

---

[6]We should note that although the FHLB can be regarded as a governmental intermediary, the FNMA, being privately owned, cannot. It has to be regarded as part of the Federal government's loan guarantee program.

subsidized unit receives a certain number of dollars per unit of debt. The second type of program, the variable-subsidy program, involves payments that depend on the market rate of interest paid by the subsidized unit. The government pays the difference between this rate and some stated rate (which may be the same as or greater or less than the government's borrowing rate).

18. The fixed-subsidy program is in a sense expansionary. The introduction or extension of the coverage of such a program increases desired investment. With or without a fixed subsidy, the subsidized unit values all investment project payoffs, including those of bankruptcy states. But if there is a fixed subsidy, then there is additional revenue or payoff in every state. In effect, all investment projects cost less than they otherwise would.

19. If, however, a variable-subsidy program is introduced or extended to more firms and/or households, then desired investment does not necessarily increase. This type of program can be regarded as a combination of a direct or guaranteed-loan program and a fixed subsidy program, with the amount of the fixed subsidy depending on the rate that is stated or used in calculating the subsidy. If this rate is the government's borrowing rate, so that under the variable-subsidy program it pays the difference between private borrowing rates and the government rate, then this program is a direct or guaranteed-loan program. There is no (additional) fixed subsidy involved. And as we have already indicated, the introduction of a direct loan program has an indeterminate effect on desired investment.

20. Under a variable-subsidy program, however, the government may pay the difference between the subsidized units borrowing rate and a rate that is greater or less than its own rate. If it does, then there is some fixed-subsidy effect on desired investment — in addition, that is, to a direct or guaranteed-loan effect. Even so, the introduction or extension of the coverage of a variable-subsidy program that has a stated rate below the government rate does not guarantee an increase in desired investment. But it would seem to follow from what we have said that a decrease in the stated rate of a variable-subsidy program (the rate used to calculate the subsidy) is expansionary. The lower is this rate, the greater is desired investment.

DISCUSSION

WILLIAM L. WHITE*

President MacLaury's statement does four things. It documents the rapid expansion in the *volume* of federally assisted *credit* and the *number* of Federal credit *programs*. It presents three major reasons for their growth and states a number of major objections to this growth on pages 214-219. Finally it proposes a Federal Financing Bank to mitigate against some of what I shall call congestion or marketing problems and to provide some better control over the overall level and over the composition of the credit activities undertaken by each agency or activity.

In my role as discussant I find myself in a rather difficult position. Better coordination of the sale of issues and reductions in borrowing costs through the issuance of standardized securities of various maturities and in a volume that creates fairly efficient secondary markets are hard ideas to oppose. Better control over the overall level of Federal credit subsidy or insurance granting is also hard to fault. On the other hand, MacLaury is quite knowledgeable about the dimension of these problems, and therefore it is not possible for me to outdo him with a more dramatic statement of the problem. My difficulty seems to be that of trying to find a way to say that the problem is either not as severe as he says, or that its solution does not lie in the direction of a Federal Financing Bank which coordinates or orchestrates issues and which either exercises control or helps Congress exercise control over agency activities. That is the task I have taken on. Rather than see the growth in Federal credit as an explosion reflecting a lack of Congressional control, I would like to try to make the case that, in the Federal credit programs, we have seen the Congress exercising as much continuing and careful control as one can reasonably expect and that the programs are adapting to meet the new directives of such legislative activities. Moreover, rather than creating devious devices to avoid the "discipline of the budget" when dealing with these problems, the Congress with its Federal

*Professor, Harvard Graduate School of Business Administration.

227

credit activities is dealing with these problems in the ways long proposed by economists and by such groups as the Commission on Money and Credit and the Hunt Commission. Finally, as I will try to make clear, it is not obvious to me, academic that I am, that the problem of congestion and debt management are as severe as they are made out to be.

First to the issue of control. According to the budget figures referred to by President MacLaury, about 53 percent of the Federal and federally-assisted credit outstanding in 1973 arises from guarantees. About 80 percent or $116 billion originates in the FHA/VA mortgage insurance program. Approximately $13 billion of this seems to belong to subsidized housing programs and $103 billion is under the regular unsubsidized insurance program. Now, rather than growing uncontrollably, FHA/VA insurance is not growing even as fast as its market. In 1951 mortgages guaranteed by FHA/VA amounted to 32.2 percent of all private mortgages. By 1968 this figure was 30.9 percent and by 1971 25.8 percent. This does not seem to imply a program out of control. Moreover, the recent addition of the low-income subsidized housing program to FHA and the inclusion of these activities in HUD, the subsequent problems with the low income subsidy program and the recent hearings in April before the Senate Subcommittee on Housing and Urban Affairs all give witness to the close and continuing interest Congress takes in this program. These facts also seem inconsistent with the notion of an uncontrolled program.

Finally, FHA/VA mortgage insurance is likely to confront significant new competition in the near future — private mortgage insurance companies. In 1961, about $.5 million of private mortgage insurance was in force. By 1968, this had grown to $5.8 billion. During 1972, $9 billion more was written and by the end of 1972 $19 billion was outstanding. It is estimated that private mortgage insurance will rise by $13 billion in 1973 and continue to grow at a 20 percent annual rate through 1977. This would make the annual growth in 1977 about $27 billion and the stock outstanding in 1977 about $100 billion. These projections of the growth of private mortgage insurance mean that by 1977 there may be a volume of private mortgage insurance about equal to the currently existing amount of FHA/VA insurance.

Sources of Potential Expansion

There are several factors which have created this potential boom in private mortgage insurance.

The Emergency Home Financing Act of 1970 empowered FNMA and FHLMC to buy loans with loan-to-value ratios above 75 percent if they were insured by private insurers and the originator retained a 15 percent interest. In 1971, Federal and state authorities allowed S&Ls to increase their loan-to-value ratios to 95 percent if private insurance were used or loss reserves were set aside. So private mortgage insurance is growing fast. Its plan seems to be to invade the conventional market first rather than compete directly with FHA/VA. However, it will certainly pose a threat to at least a part of the FHA/VA business.

In sum, rather than see the 53 percent of the federally assisted credit which is FHA/VA mortgage insurance as uncontrolled or unthreatened by competition, a more accurate image may be that it has experienced lagging growth relative to its market, is under continuous scrutiny by Congress, and faces major new private competition. In addition, anyone who wishes to slow the growth of FHA/VA guarantees even further may be wise to try to further the development of private mortgage insurance or try to influence the Senate Subcommittee on Housing and Urban Affairs rather than create a new bureaucracy in a Federal Financing Bank.

Let me turn now to the agencies outside the budget. They have credit outstanding of $65 billion in 1973 — or about one-fourth of the Federal and federally assisted credit. About 60 percent of the credit they supply is issued by the FHLBB and FNMA with a very small portion by FHLMC. These agencies deal with the mortgage market directly through their secondary-market activities or indirectly by providing finance to S&Ls. The need for a secondary mortgage market has long been recognized by economists. The Commission on Money and Credit advocated the creation of a private secondary mortgage market. Nothing came of this and by the middle of 1960s, FNMA began to perform this function in the insured sector of the market. As recently as the Emergency Home Financing Act of 1970, Congress expanded its power to perform this function into the uninsured sector of the market. In addition Congress allowed the creation of the FHLMC to do much of the same thing. The Hunt Commission proposed the expansion of these programs as important improvements in the functioning of the mortgage market.

Thus, these activities seem hardly an uncontrolled, devious, backdown financing device. The secondary mortgage market is an idea long proposed by economists as a sensible if not critical element in a program to improve the functioning of the mortgage markets and the viability of S&Ls. It is hardly uncontrolled. The FHLBB under

Preston Martin and now Mr. Bomar seems a quite sensitive group politically and the Congress has had many recent direct dealings in this area.

In this area of a second mortgage market, as was true in the area of mortgage insurance, further competition is developing. Private mortgage insurance companies or investment bankers in conjunction with major insurance companies are packaging existing mortgage loans and issuing guaranteed collateral trust notes for sale to private investors. These activities extend further the secondary market in mortgages and could grow quite rapidly.

With respect to the FHLBB and the credit it extends to S&Ls, these activities seem quite consistent with the Congressional objective of 26 million units of housing in periods of credit tightness. It is also subject to some limits and competition. The competition for FHLBB advances can come from at least two sources. First, S&L debentures and longer-dated deposits can provide S&Ls with a more-flexible way of managing liabilities and lessen the need for FHLBB advances. Also, the FHLBB must be careful to keep its advance rates competitive with the other borrowing alternatives open to the S&Ls that borrow, such as commercial banks. In addition, the Hunt Commission proposals for blurring the distinction between commercial banks and thrift institutions, if they ever get out of the Executive Branch, would seem to offer a real threat to the future growth of FHLBB advance activity. Greater liability flexibility and greater asset symmetry with commercial banks and, say a mortgage investment tax credit for lenders, may end the rationale for FHLBB advances.

An Alternative Means of Control

Here again, rather than develop a Federal Financing Bank on top of the bureaucracy we now have, a better approach to "controlling" the credit influenced by the FHLBB may be through a response to the Hunt Commission proposals or to the Congressional committees who will act on its recommendations.

The remaining 40 percent of the credit financed by agencies outside the budget is held by the Farm Credit Banks and the Export-Import Bank. In late March, the House Ways and Means Committee held hearings on a proposal to increase the tax paid by Farm Credit Banks. I remember reading a statement by the Investment Bankers Association documenting the effects of the unfair advantage the FCBs had over truly private lenders. Hereagain, some of us may see these banks as issuing credit in too large amounts, but it is hardly

uncontrolled. Rather than a FFB, it would seem more useful to direct attention to the need for the tax subsidy offered to these banks.

There is one quite legitimate dispute with my use of the word "controlled" with respect to these Federal credit programs. Perhaps each individual program is controlled, but there is not coordinated control over all of them and certainly no integration of the aggregate of their activities with the spending and taxing activities of the Government. Perhaps the FFB would be of help here.

I think one can make a case that it cannot. There are two problems. One is political. It seems somewhat naive to me to expect the diverse set of Congressional committees which control Federal credit programs to subject themselves to a common Federal credit budget constraint when it has been impossible to get the various subcommittees of the one Appropriation Committee to relate to each other, never mind to the Ways and Means Committee. A second problem with the practicality of a FFB to assist in the control of the overall level of Federal credit programs is economic. President MacLaury reports, and the Appendix to his paper states, that we do not know even in a vague way the impact on the aggregate level of economic activity of the Federal credit programs. The Bosworth-Duesenberry model and its successors may give us some guidance on these issues but at the moment we have rather little sure evidence on which to control the programs.

Given this ignorance, how would we propose that a FFB measure the impact of different combinations of Federal and federally assisted credit programs? If in fact, we cannot measure their overall impact with any preciseness, is it not misleading to suggest a FFB can provide economic control over Federal credit activities? With no real economic basis for judging the appropriateness of a given set of Federal credit programs, a FFB might very well become another executive department exercising political judgment in an area formerly controlled by the Congress.

As I hope is becoming clear, the thrust of my argument thus far is that the major volume of federally assisted credit is associated with programs the Congress evaluates carefully and often and takes a form which, while it avoids the budget, also follows the suggestions made by most academics and public commissions. In this context the individual programs appear to be less of a problem than one might conclude from much of what is said about them. Moreover, the effectiveness of a FFB to control the overall level of these programs seems not well thought out and in my view quite questionable. The growth of Federal credit programs may present problems but it is not clear how the FFB will solve them.

Proliferation of Programs

Let me turn for a moment to the issue of the proliferation of the *number* of Federal credit programs. The problems here seem to be three. First, a Federal agency comes to market every three to five days. Second, many of the issues are small and bear high rates of interest due to the lack of public awareness or the lack of a secondary market. Finally, the argument is advanced that once we do this for one activity we get drawn into doing it for another and another and the concern is, "Where will it stop?" A different version of this argument is the one advanced by Henry Kaufman yesterday, that each new credit program advanced to protect one "weak" sector makes the others all the weaker.

I must confess some confusion on the issue of the problem that agency issues pose for the Treasury. Most of yesterday's discussion and most of the empirical evidence seems to show that the volume of Treasury or even Agency issues has little effect on interest rates. Congestion may be an administrative problem but it does not seem to be much of an economic one.

The issue of higher costs for some issues because the issues are not well known also seems less of a problem than it is sometimes made out to be. If I understand it correctly, the burden of the privately held national debt is usually thought of as a distributional one and not as a major social problem. If so, how much should we worry about a procedure that raises some debt costs by perhaps 50 basis points? Does a situation which makes an unimportant problem 10 percent worse really warrant the creation of a new bureaucracy?

On the last issue of who gets rationed out as more and more activities receive Federal credit assistance, I agree that if one of the weak sectors of the economy receives Federal credit assistance the remaining weak sectors get even weaker *and* more of the economy is protected from the quantity rationing effects of monetary policy. However, I do not think it follows that the Federal Government should not try to help weak sectors in their fight against strong. I think the logic is rather that you clearly wish to assist some, and, once assisting some, you must assist all. This means that you reduce, if not eliminate, rationing and make interest rates play a larger role in allocating credit. That this means interest rates may have to fluctuate more does not mean you should avoid these Federal credit assistance activities. Would we really prefer a system with extensive rationing and relatively stable rates to one with little or no rationing and more variable rates?

Despite all these negative comments about the need for a FFB, I guess I agree with the current Treasury position that the FFB should coordinate and pool the issues of the smaller agencies. However, I disagree with the assertion by President MacLaury that such an FFB is a necessary or efficient way of providing control over the whole Federal credit activity.

I think it is possible to make the case that the growth of Federal credit, while posing important problems, is not the dramatic problem it is made out to be — there is more control over the individual agencies than is often suggested. Moreover, an FFB charged with the responsibility to rationalize the total of Federal credit programs would have a very difficult political and economic job. I suspect a more effective approach for the time being is to work individually on each agency's activities and make the *Special Analyses of the Budget of the United States* deal regularly and lucidly with what we are learning about their individual and aggregate effects.

Even Keel Revisited

FREDERICK M. STRUBLE and STEPHEN H. AXILROD*

This article takes another look at the impact of the Federal Reserve's "even-keel" policy on financial market variables. The possible effects of this policy in the three-year period 1966 through 1968 were previously examined in "An Empirical View of 'Even-Keel'."[1] That study will be updated here by extending the time horizon under consideration to include the period from the end of 1968 through the first quarter of 1973.

The nature of the even-keel commitment was outlined at the beginning of the earlier study as follows:

> "...even-keel has meant that for a period encompassing the announcement and settlement dates of a large new security offering or refunding by the Treasury, the Federal Reserve has not made new monetary policy decisions (as contained in announcements from the Board of Governors or as specified in the second paragraph of the policy directives of the Federal Open Market Committee) that would impede the orderly marketing of Treasury securities and significantly increase risks of market disruptions from sharp changes in market attitudes in the course of a financing... The even-keel policy does not provide any assurance that particular interest rates on new or outstanding Treasury issues will be maintained."

*Senior Economist and Associate Director, respectively, Division of Research and Statistics, Board of Governors of the Federal Reserve System.

[1] Appended to Stephen H. Axilrod, "The FOMC Directive as Structured in the late 1960s: Theory and Appraisal," in *Open Market Policies and Operating Procedures — Staff Studies*, Board of Governors of the Federal Reserve System, July 1971. See pp. 28-36.

The impact of such an even-keel policy was then evaluated by examining time series data for key financial variables to determine if there were differences in behavior during, as compared with outside, even-keel periods.

The earlier study suggested that of the variables considered, only day-to-day money rates (the Federal funds rate and dealer loan rates) — and perhaps marginal reserves — showed any particularly evident effect of even-keel. These variables appeared to remain about unchanged on balance over even keel periods, although there were exceptions, even when they were rising (or falling) sharply in the time span before and after the even-keel period. On the other hand, bill rates and yields on longer-term Treasury issues appeared to show no consistently discernible difference in behavior during even-keel periods. Similarly, it appeared that the monetary and reserve aggregates — M_1, the monetary base, and the adjusted credit proxy — generally displayed no break in trend or change in degree of fluctuation during even-keel periods. And in those instances in which the aggregates did appear to grow at a relatively rapid rate of expansion in an even-keel period, it was observed that they tended to display a slower growth or to contract in the weeks subsequent to these developments.

These findings seemed to suggest that even-keel was not a major impediment to the control of the monetary aggregates, as has sometimes been asserted. It would appear, for example, that during even-keel periods, the Federal Reserve exerted at best only a very modest resistance to uptrends (or downtrends) in interest rates, that this resistance is focused only on the very shortest-term interest rates, and that it does not result in a significant and/or lasting change in the growth rates of the monetary aggregates.

Since 1968, particularly since early 1970, the Federal Reserve has placed greater emphasis on controlling the monetary aggregates. Bringing the earlier article up to date will permit us to consider, among other things, whether even-keel has assumed a new operational meaning with this shift in emphasis of policy. In addition, in the last few years, the Treasury has come to rely more frequently on the auction technique in its financing operations; this, too may have affected the Federal Reserve's and market's attitude toward even-keel, because the Treasury does not have to set a price on securities to be sold at time of announcement or in advance of the public's bid.

Summary of Even-Keel Periods

The standard time unit for an even-keel period used in this paper is one which covers the interval from a week before the Treasury announces the terms of its financing to a week after the settlement date of this financing. The actual duration of even-keel periods, of course, can and does differ from this designated unit, depending on the nature and size of the Treasury's financing operation, the general condition of financial markets at the time of the financing, the success of dealers in distributing their "takings" in the financing operation, and the FOMC's assesment of the need to make a change in its monetary policy stance.

In the previous study 13 even-keel periods encompassing about 40 percent of the three year time span examined were identified. For the time span from 1969 to the first quarter of 1973 we have identified an additional 19 even-keel periods which again encompass about 40 percent of these four and a quarter years. Of these periods, 17 surround quarterly refundings; the length of these periods varies in several instances, however, because additional financings occured in close proximity to the quarterly refundings. The other two even-keel periods identified coincided with the sale of longer-dated coupon issues (See the appendix for the details of these financing operations).

There were several financings involving the sale of tax bills or strip bills during the past four and a quarter years, but none were mentioned in the FOMC's directive, and they have, therefore, not been considered to have been even-keeled. Two relatively small auctions of short-term notes were also not classified as even-keel periods, because no mention was made of them in the FOMC's directive.

Method of Approach and Data to be Examined

In gauging the effects of even-keel reliance will be placed on the same procedure used previously; time series of key financial variables have been plotted on graphs and the periods of even-keel as designed above have been marked off. By inspection, then, a comparison is made of the behavior of variables during even-keel periods and at other times. The advantage of this approach is that it enables one to observe developments in the variables during even-keel periods in relation to longer-term trends and turning points in these trends.

For the most part, the data series examined in this study are the same as those charted in the previous article. However, in light of the

FOMC's shift to an RPD target, we substituted this series for the monetary base, the reserve measure previously used. We have also added a chart reflecting the behavior of total reserves. It does not appear that this substitution affects the conclusions to be drawn from the analysis.

Interest Rate Behavior During Even-Keel

Interest rates generally appear to have behaved in essentially the same manner during even-keel periods as they have at other times. Looking first at intermediate and long-term yields presented in Chart 2, it will be noted that trends in these yields that develop prior to even-keel periods are interrupted only infrequently during even-keel periods (indicated by the shaded areas on the chart). Similarly, yields appear to fluctuate around these trends in essentially the same way within and without the even-keel periods. Or to put this another way, one is left with the distinct impression that, if even-keel periods were not designated on the chart, it would be virtually impossible to identify these periods by focusing on the behavior of intermediate- and long-term yields.

The three month Treasury bill rates, as may be seen in Chart 1, also appear to move during even-keel periods more or less in line with the general trend established in surrounding periods. Note, for example, the generally unbroken course displayed by the bill rate during the even-keel periods enclosed by the downtrends from late 1966 to the late spring of 1967 and from late 1969 to early 1971. At times this was part of a generally flat trend. But at other times, such as around the May 1971 refunding, the bill rate was stable during most of the even-keel period while the trend over time was clearly rising. However, looking over bill-rate movements broadly, it would appear that there was no systematic tendency for the rates to behave differently inside as compared with outside even-keel periods.

If any rates reflected some stabilizing impact from even-keel, it appears to be day-to-day rates, as typified by the Federal funds rate, although looking over the whole period from 1966 through early 1973, the evidence is quite mixed. The view that even-keel caused open-market operations, as they affected money-market conditions, to be tempered somewhat (as compared with what otherwise might have happened) is given some support by the data for the late 1960s. But there appears to be less, if any, evidence of a tempering effect in the late 1970s.
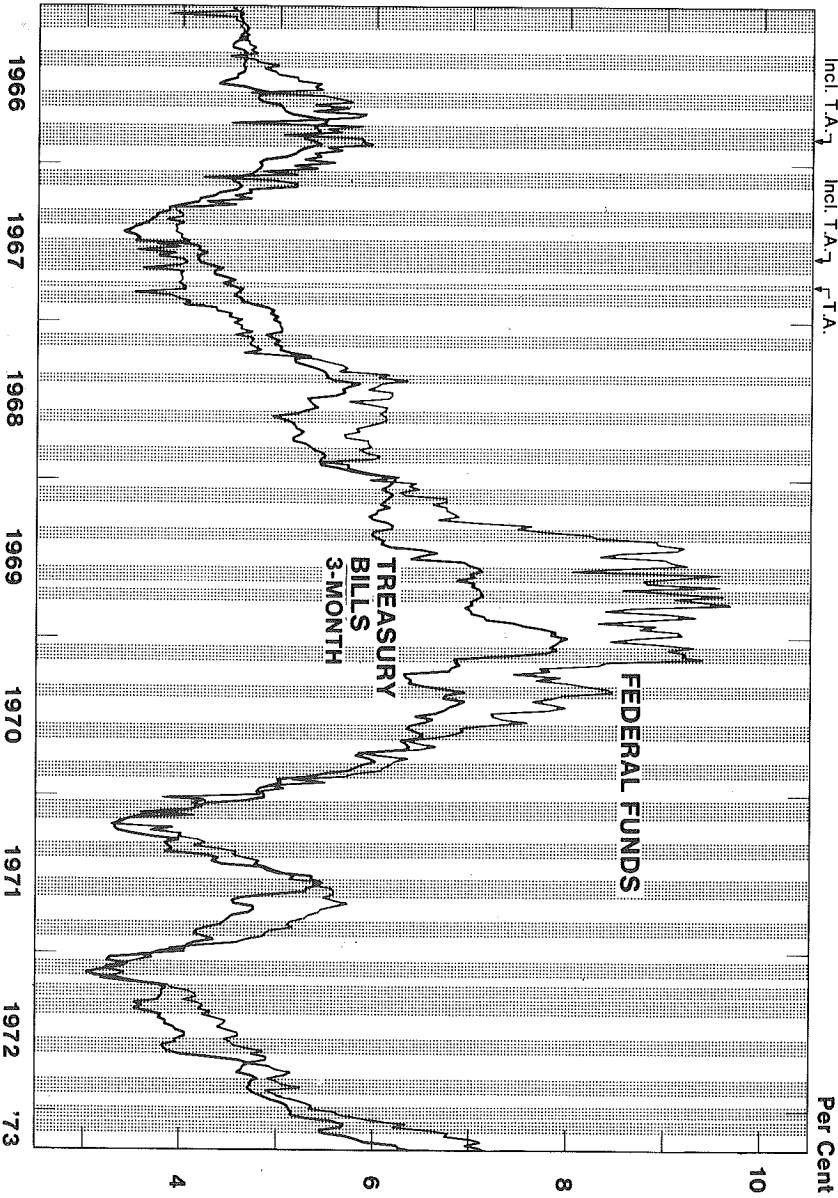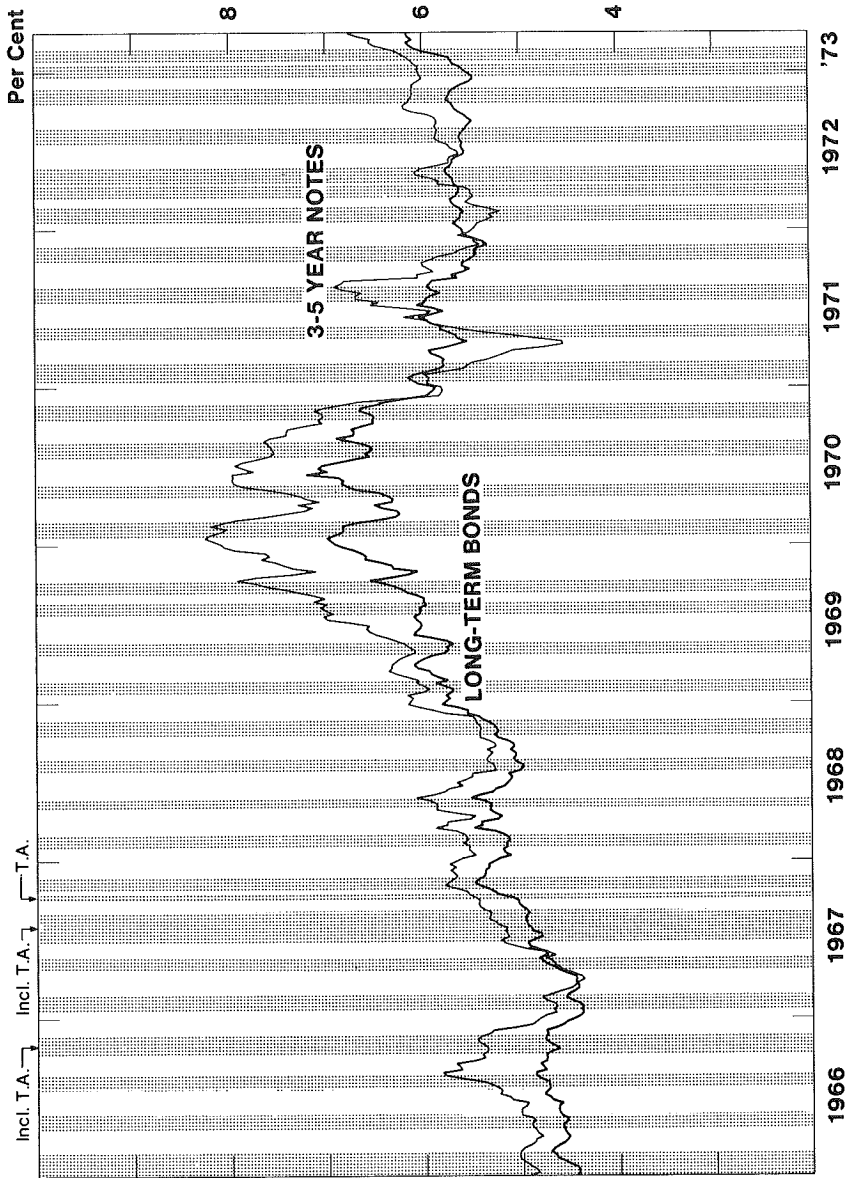
CHART 1

SHORT-TERM INTEREST RATES

Per Cent

Incl. T.A. ⌐   Incl. T.A. ⌐   ⌐ T.A.

TREASURY
BILLS
3-MONTH

FEDERAL FUNDS

1966   1967   1968   1969   1970   1971   1972   '73

4   6   8   10

CHART 2

LONG-TERM GOVERNMENT INTEREST RATES

Per Cent

Incl. T.A.   Incl. T.A.   T.A.

3-5 YEAR NOTES

LONG-TERM BONDS

8

6

4

1966   1967   1968   1969   1970   1971   1972   '73

Prepared by Board of Governors, Federal Reserve System

An explanation of a shift in behavior of money-market rates during even-keel periods in the 1970s might be found in the increased emphasis placed on the aggregates. One effect of this shift in the focus of monetary policy could well have been to reduce the significance attached by market participants to changes in day-to-day money rates. Consequently, the manager of the open-market account has perhaps found it possible during even-keel periods to permit the Federal funds rate to move more without seriously jeopardizing the state of market psychology necessary for a tolerably successful Treasury financing operation.

Reference to recent experience provides support for this conclusion. While the funds rate showed little net change in the November '72 refunding period, the rate did rise sharply and almost continuously from early December of last year through the first quarter of this year, even though there were two nearly connected periods of even-keel which covered most of the time span from late December through late February. In the first of these even-keel periods, a 20-year bond issue, amounting to $600 million, was auctioned to the public. The second involved a rights exchange of $4.7 billion of publicly held issues maturing on February 15 for a note with three years and six months to mature, as well as a subsequent auction of $1 billion of a note with six years and nine months to mature. Admittedly, the use of the auction technique in the first financing operation and the decision to backstop the rights exchange in which large attrition was expected with a note auction in the second financing operation may have reduced the constraints customarily required for such financings. Nonetheless, both financings were certainly in the class normally thought to require even-keeling — the first because the issue had a relatively long maturity and the Dutch auction approach was employed for the first time in the sale of such an issue, and the second because it did involve a rights exchange even though large attrition had been expected.

Admittedly, neither of these financings may rank as the most successful ever conducted by the Treasury, but, on the other hand, they were far from failures. This alone would appear an accomplishment, given the conditions under which they were conducted, which included a second devaluation of the dollar, an acceleration of wholesale and consumer price increases, and the strong surge displayed by the economy. One point is quite clear: against this background, the marked advance in the funds rate did not introduce a major disruption to the market's acceptance and distribution of these issues.

Marginal Reserve Measures

As can be seen in Chart 3, the even-keel constraint does not appear to have a noticeable effect on the behavior of net borrowed reserves or member bank borrowing either. As one would expect, after taking note of the behavior of the Federal funds rate, this has been especially the case in the most recent years when the Federal Reserve has placed more emphasis on monetary aggregates. Note for example, that the daily average level of weekly member bank borrowing declines very sharply from the first week of the even-keel period associated with the August 1970 refunding to the last week in this period. Or to focus again on developments from the latter part of December of last year until late February of this year, member bank borrowing increased very markedly, extending the general uptrend present over the whole first quarter. Or taking a broad view of the lines plotted on the chart, it appears that member bank borrowing (and net borrowed reserves) have fluctuated over even-keel periods essentially in about the same degree as at other times, and net changes in these variables from the beginning to the end of these periods have either been generally consistent with the trends prevailing in surrounding periods or at least did not display a systematically different pattern of behavior.

Monetary and Reserve Aggregates

An accurate appraisal of how even-keel affects monetary and reserve aggregates is an extremely complicated task, much more so, for example, than is encountered in analyzing even-keel's impact on interest rates. The effects of even-keel on interest rates, if there are any, most likely would appear to occur simultaneously with the period of even-keel. This is probably not true for the monetary aggregates, however, mainly because of lags. Demand for money, for example, is thought by many analysts to respond to changes in interest rates only after a lapse of time; thus, within this theoretical framework, if even-keel does have a generally consistent impact on M_1, it would be expected to be observed not during even-keel periods but in subsequent weeks. Or, if one takes another view of the process of M_1 growth, one might expect an even-keel induced growth in M_1 to follow the even-keel period, because M_1 might take some time to respond to the expansion of nonborrowed reserves which may have taken place while even-keel was in operation.

Treasury decisions on whether to permit banks to pay for their security acquisitions by crediting tax and loan accounts also make it

CHART 3

MARGINAL RESERVE MEASURES

Billions of Dollars

Incl. T.A. Incl. T.A. T.A.

MEMBER BANK BORROWINGS
AT F.R. BANKS

MEMBER BANK FREE RESERVES

2   1   +0I   1   2

1966   1967   1968   1969   1970   1971   1972   '73

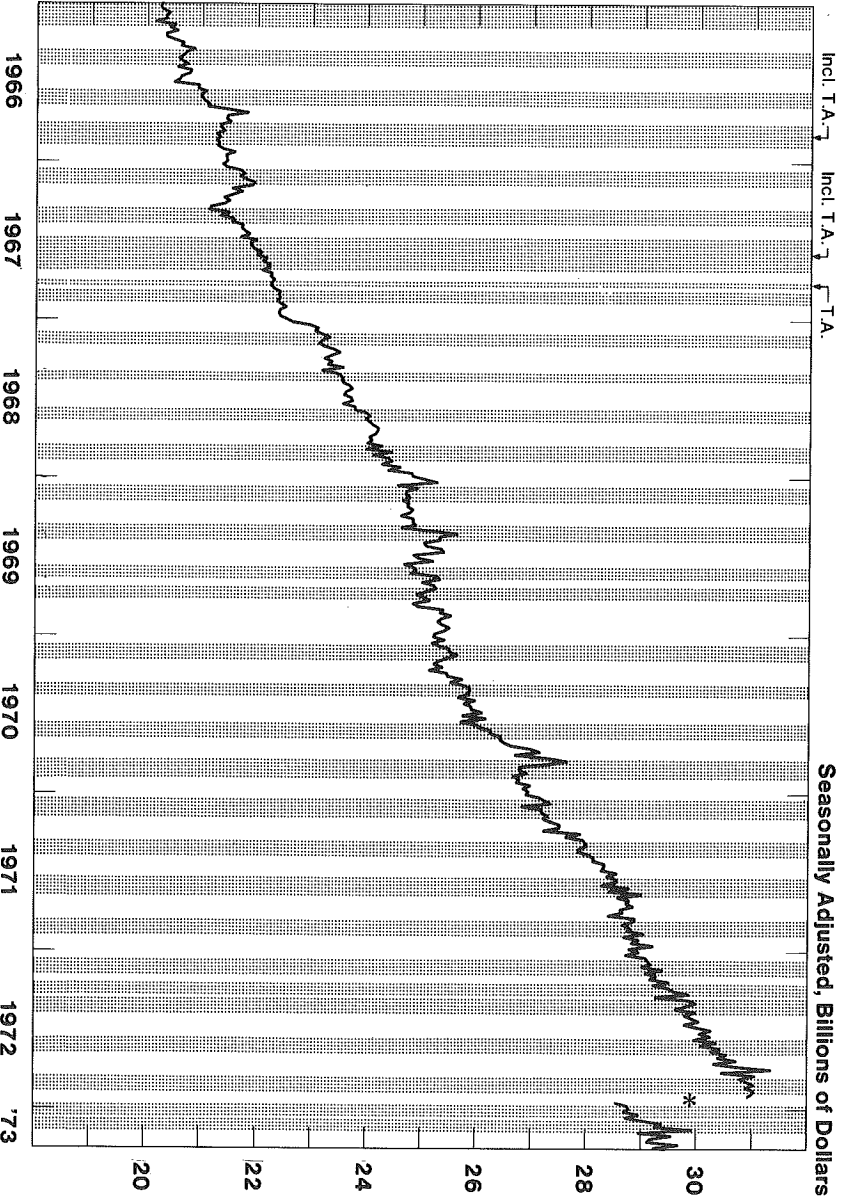Prepared by Board of Governors, Federal Reserve System

243
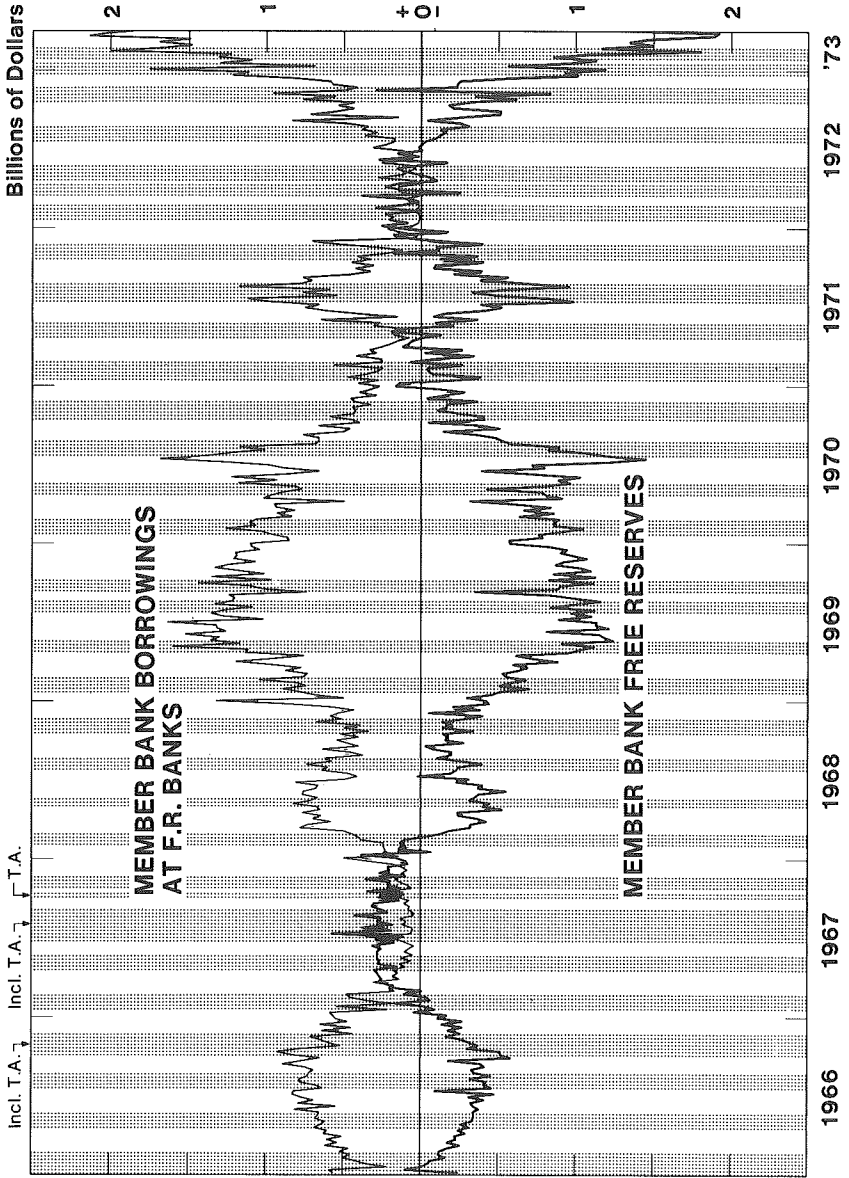
difficult to evaluate the effect of even-keel on the money supply and bank credit. During periods in which tax and loan account crediting is offered, for example, one would expect to see, other things equal, a bulge in commercial-bank assets and U. S. Government deposits, when the newly issued securities are taken into the accounts of banks and the Treasury's balance is increased simultaneously. This would represent no more than a temporary means of distributing the Treasury securities, and the reserves required to support the Government deposits would be reduced as such deposits fell and the banks sold Treasury securities to the public.

Examination of data series for M_1, the adjusted credit proxy, and the two reserve measures and total reserves does not reveal a systematic pattern of change during even-keel periods. With respect to reserves, both RPD and total reserves (Charts 4 and 6, respectively) have advanced fairly steadily since 1966. Thus, one would expect to find that both reserves measures, even if they were unaffected by even-keel conditions, increased in a large number of the even-keel periods — just as one would expect them to do in a large number of noneven-keel periods. Inspection of the chart confirms this expectation but does not reveal that these measures tended to advance at relatively more rapid rates during even-keel periods. Moreover, there are a number of instances in which both reserve measures stayed flat or declined during even-keel periods, but not relatively more often than can be observed for other periods. The best summary statement, then, would appear to be that it is not possible to identify systematic effects of even-keel on the behavior of RPD or total reserves.[2]

The performance of M_1 and the adjusted bank credit proxy during even-keel periods *vis-a-vis* noneven-keel periods has also failed to show any readily observable consistent pattern of behavior, as may be seen in Chart 5. M_1, for example, in some instances, such as in late 1969 and early 1970, appears to be rising up to the time of even-keel, to flatten during the even-keel period, and then begins increasing after the end of the even-keel period. In other instances,
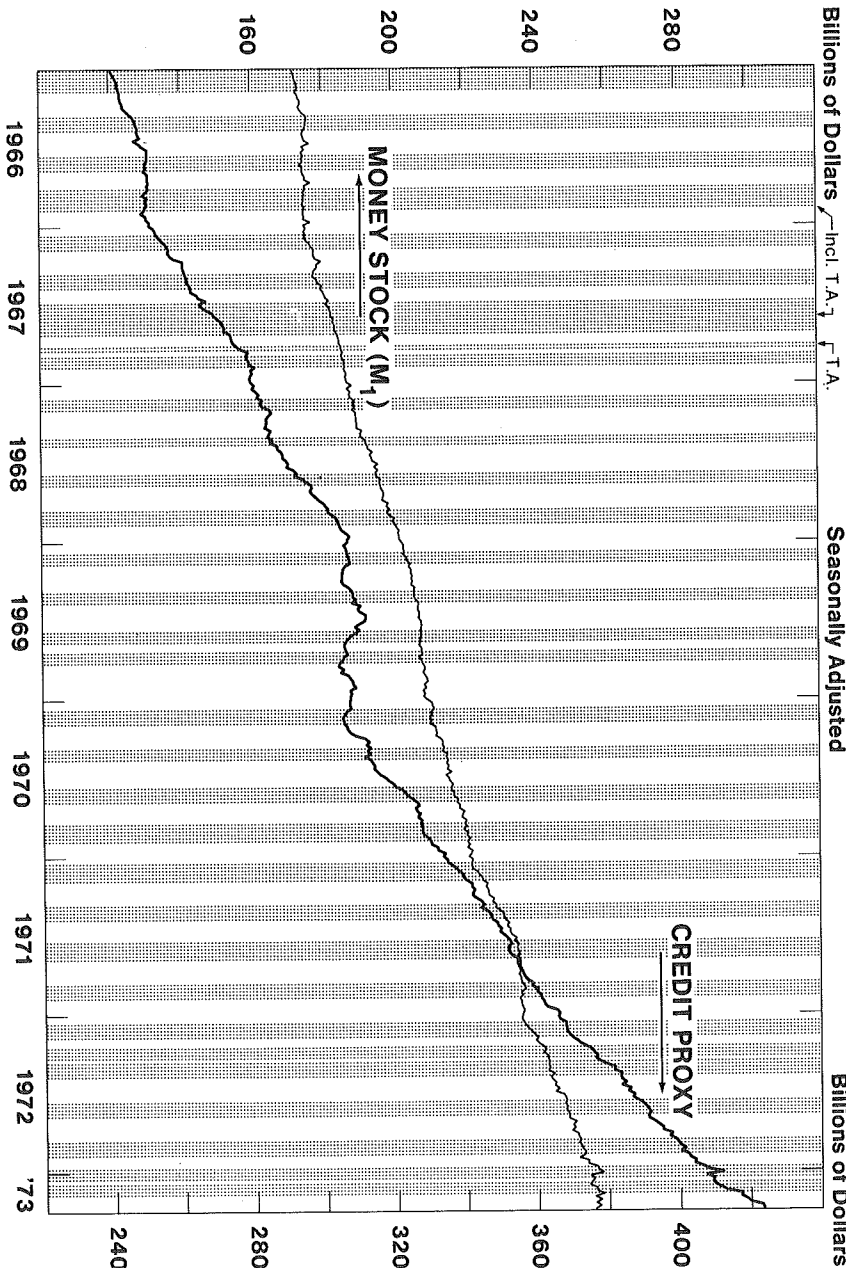
---

[2]Quite clearly, a thorough study of this question will require a much more sophisticated approach than that used here. Among the complications which would have to be considered in such a study is lagged reserve accounting. For example, bank demands for reserves in a current period are primarily determined by the volume of reserves they are required to maintain against the deposit balances of preceding weeks. Thus, if the Federal Reserve were to follow a more liberal reserve policy during an even-keel period this would probably be reflected in a decline in the volume of reserves borrowed and an increase in nonborrowed reserves rather than an increase in total reserves. One might also expect to see some increase in the volume of excess reserves.

CHART 4

RESERVES AVAILABLE FOR PRIVATE DEPOSITS

Seasonally Adjusted, Billions of Dollars

Incl. T.A.⌐   Incl. T.A.⌐   ⌐T.A.

Prepared by Board of Governors, Federal Reserve System

1966 1967 1968 1969 1970 1971 1972 '73

20 22 24 26 28 30

CHART 5

BANK CREDIT AND MONEY STOCK

Billions of Dollars   Seasonally Adjusted   Billions of Dollars

Prepared by Board of Governors, Federal Reserve System

such as in late 1971 and early 1972, M_1 shows no growth prior to even-keel, then begins increasing sharply during even-keel and continues this uptrend in subsequent time periods. Quite obviously, it is possible to see other combinations of developments on the chart. Similar statements concerning the behavior of the credit proxy could also be made.

In order to give rough consideration to the impact of tax and loan account crediting and thereby make some allowance for this factor in reading the Chart, those financings in which such crediting was allowed are indicated by the x's marked on the Chart. As may be seen, the credit proxy does rise perceptibly in the very latter part of many of these even-keel periods. It also appears that, in many cases, these increases were not subsequently offset by declines of similar magnitude. At the same time, however, the subsequent advances in the proxy appear so large relative to the increase on the day of tax and loan account crediting that it would be straining to attribute to tax and loan account crediting responsibility for the general advance in the credit proxy over any significant time period.

Summary of Findings

While clearly much more sophisticated analyses of the impact of even-keel are required, we believe that the casual empiricism of the present and earlier study does support the view that even-keel policy does not systematically tend to hold interest rates, other than one-day money-market rates, at relatively low levels during periods in which rates are rising or at relatively high levels during periods in which rates are falling. And with respect to one-day rates, it also appears that the greater emphasis placed on monetary aggregates in the formulation of monetary policy in recent years has diminished the extent to which even the overnight Federal funds rate is influenced by even-keel considerations.

Monetary and reserve aggregates appear to be similarly unaffected, although much more sophisticated procedures than used in this paper might be more helpful in analyzing this complicated question. One can offer the observation, however, that, if our assessment of the interest-rate effects of even-keel are near the mark, then it would appear unlikely that even-keel has had a profound effect on any of the aggregates. Moreover, this surmise is generally supported by our interpretation of the charted data presented in this study.[3]

[3]These conclusions are generally consistent with those obtained recently by Paul Kasriel in his nearly completed doctoral dissertation on even-keel for Indiana University. After performing a number of econometric tests covering the period 1959 to 1970, as well as sub-periods therein, he generally was unable to discover a discernible even-keel impact on financial market variables.

CHART 6

TOTAL MEMBER BANK RESERVES

Seasonally Adjusted, Billions of Dollars

Incl. T.A.   Incl. T.A.   T.A.

1966   1967   1968   1969   1970   1971   1972   '73

22   26   30   34
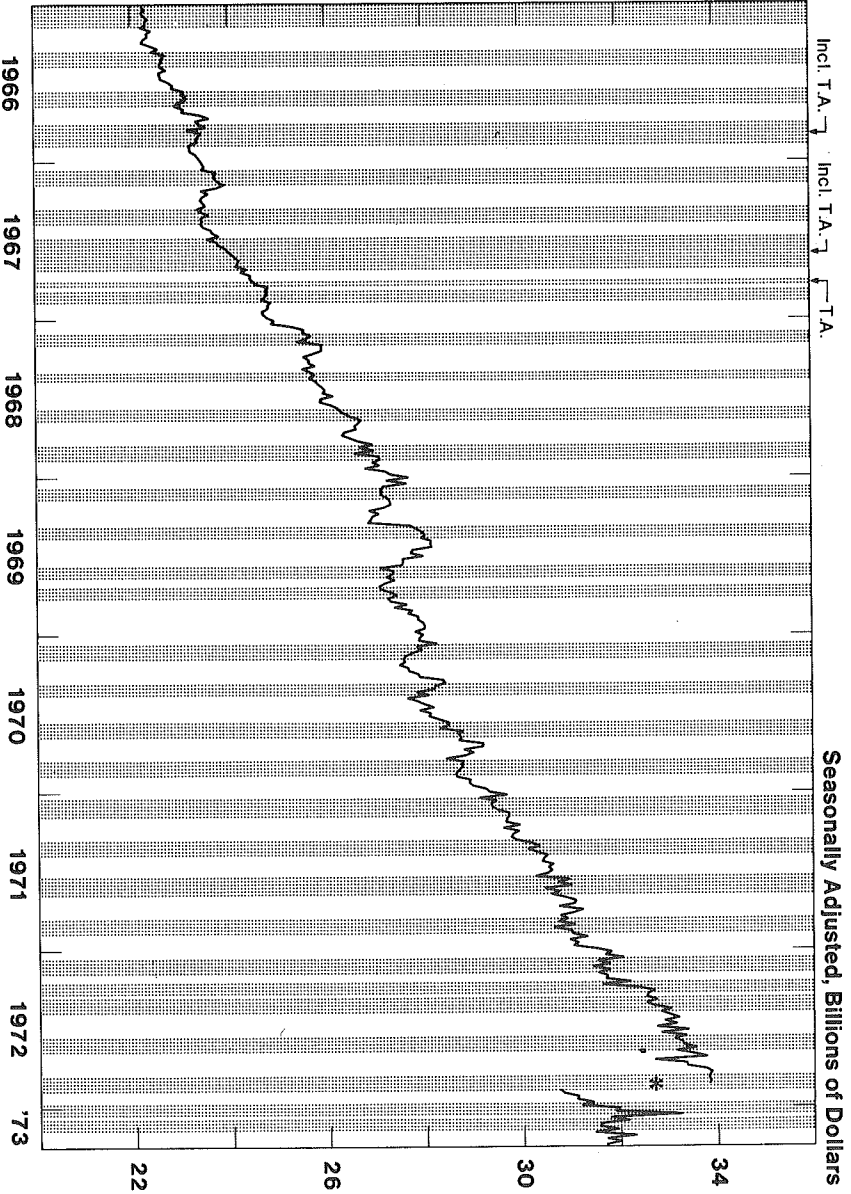
Prepared by Board of Governors, Federal Reserve System

Has the Emperor Clothes?

Given the criticism leveled at the Federal Reserve's even-keel policy by some analysts and the importance traditionally attributed to the need for an even-keel policy during Treasury financing operations by Federal Reserve and Treasury officials, the conclusions reached in this paper will presumably be viewed as surprising by many. Has even-keel been a myth after all?

The answer to that question would appear to have a number of sides to it. First, with respect to the behavior of interest rates, it should be noted that while the rates examined, including the Federal funds rate, do not appear systematically to deviate from trends during even-keel periods, neither do they display a tendency to rise relative to prevailing trends. A rise might be expected given the generally large size of the financing operations involved. Therefore, the effects of "even-keel" may be to moderate the tendency.for rates to rise in response to financing operations, and this type of impact is, at least in a sense, consistent with the customary assumption about the effect of even-keel. There is then at least a possibility that even-keel may serve to loosen the Federal Reserve's control over the monetary aggregates. It would appear unlikely, however, judging from the charted figures, that such a policy could result in a very significant expansion in the growth rate of these aggregates, certainly not to the extent that actions taken by the Federal Reserve after an even-keel period could not offset this potential.

Second, the failure to discover that interest rates are not relatively more stable during even-keel periods may simply reflect the general stance taken by the Federal Reserve in its conduct of monetary policy. That is to say, Federal Reserve policy actions are generally aimed at promoting conditions in which interest rates tend to show gradual, steady changes rather than sharp, immediate changes. Thus, against this background it is difficult to identify the separate impact of even-keel.

Third, it should be noted that while difficult to quantify, even-keel presumably does have an influence on market conditions, because it affects the psychology of the market. The market knows that the Federal Reserve stands ready to insure that a Treasury financing operation does not fail, and this most assuredly imparts an underlying confidence not clearly reflected in objective market variables.

Finally, it should be stressed that the conclusions reached pertain only to developments and attitudes prevailing in the relatively recent

past and may not be representative of even-keel's impact on financial conditions in earlier periods. There is in a very real sense much less need for even-keel today, because the private economy in general and financial markets in particular have been growing relatively to the size of Treasury financing operation. The Federal Reserve and other market participants may have adjusted to this alteration in circumstance and realigned policy and attitudes accordingly.

APPENDIX A

TREASURY FINANCINGS DURING EVEN-KEEL PERIODS

	Dates Related to Even Keel				Description of Offering			
Directive Date	Announcement Date	Books opened	Settlement date	Type	Amount [1] ($ billions)	Maturity	Attrition or Allotment Ratio	
				1969				
1/14	1/29	2/3–2/5	2/15	Rights	5.5	15 mo.	.36	(AT)
2/4						7 yr.		
4/29	4/30	5/5–5/7	5/15	Rights	6.1	15 mo.	.28	(AT)
						7 yr.		
7/15	7/30	8/4–8/6	8/15	Rights	3.2	18 mo.	.13	(AT)
8/12								
9/9	9/17	9/22–9/24	10/1	Rights	7.6	19 1/2 mo.	.24	(AT)
				1970		3 yr. 7 1/2 mo.		
						6 yr. 10 1/2 mo.		
1/15	1/28	2/2–2/4	2/16	Rights	5.6	18 mo.	.13	(AT)
						3 yr. 6 mo.		
						7 yr.		
4/7	4/29	5/5	5/15	Cash	3.7	18 mo.	1.00	(AL)
4/7	4/29	5/4–5/6	5/15	Rights	4.9	3 yr.	.29	(AT)
						6 yr. 9 mo.		
7/21	7/29	8/5	8/17	Cash	3.2	18 mo.	.10	(AL)
7/21	7/29	8/3–8/5	8/17	Rights	5.6	3 yr. 6 mo.	.15	(AT)
						7 yr.		
10/20	10/22	10/26–10/29	11/16	Rights	6.0	3 yr. 6 mo.	.11	(AT)
						5 yr. 9 mo.		
10/20	10/30	11/5	11/16	Auction	2.0	18 mo.		

[1] Offered to the public.

APPENDIX A

TREASURY FINANCINGS DURING EVEN-KEEL PERIODS

	Dates Related to Even Keel				Description of Offering		
Directive Date	Announcement Date	Books opened	Settlement date	Type	Amount 1/ ($ billions)	Maturity	Attrition or Allotment Ratio
1971							
1/12	1/20	1/25–1/27	2/16	Rights (incl. pre-refunding)	12.1	4 yr. 6 mo. / 7 yr.	2/6.8/.17 (AT)
4/6	4/28	5/3–5/5	5/17	Rights	5.9	15 mo. / 3 yr. 6 mo.	.31 (AT)
7/27	7/21	7/26–7/28	8/16	Rights	4.3	4 yr. 3 mo. / 10 yr.	.34 (AT)
7/27	7/30	8/5	8/16	Auction	2.5	18 mo.	
8/24	8/25	8/31	9/8	Auction	1.3	5 yr. 2 mo.	
	10/12	10/15	10/22	Auction	2.0	3 yr. 4 mo.	
10/19	10/27	11/1–11/3	11/15	Rights (incl. pre-refunding)	7.1	7 yr. / 15 yr.	2/3.3/.34 (AT)
10/19	11/4	11/9	11/15	Auction			
1972							
1/11	1/26	1/31–2/2	2/15	Rights (incl. adv. refunding)	5.2	4 yr. 3 mo. / 10 yr.	2/1.3/.32 (AT)

1/ Offered to the public.

2/ Amount exchanged in prefundings or advance in billions of dollars.

APPENDIX A

TREASURY FINANCINGS DURING EVEN-KEEL PERIODS

| | Dates Related to Even Keel | | | | Description of Offering | | |
Directive Date	Announcement Date	Books opened	Settlement date	Type	Amount [1] ($ billions)	Maturity	Attrition or Allotment Ratio
				1972 (cont.)			
3/21	3/21	3/28	4/3	Auction	1.7	3 yr. 1 mo.	
4/17	4/26	5/2	5/15	Auction	1.8	1 yr.	
						9 yr. 9 mo.	[2] 6.5/.25 (AT)
7/18	7/26	7/31–8/2	8/15	Rights (incl. preref. & adv. ref.)	9.2	3 yr. 6 mo.	
						7 yr.	
						12 yr.	
10/17	10/25	11/1	11/15	Auction	2.9	4 yr.	
				1973			
12/19/72	12/27	1/4	1/10	Auction	0.6	20 yr.	
1/16	1/31	2/5–2/7	2/15	Rights	2.5	3 yr. 6 mo.	.47 (AT)
1/16	1/31	2/7	2/15	Auction	1.0	6 yr. 9 mo.	
4/17	4/25	5/1	5/15	Auction	2.7	7 yr.	
						25 yr.	

[1] Offered to the public.

[2] Amount exchanged in prefundings or advance in billions of dollars.

DISCUSSION

C. RICHARD YOUNGDAHL*

Steve Axilrod and Fred Struble have studied the movements of short-term interest rates, long-term interest rates, member bank borrowings, reserves available for private deposits, bank credit, and the money supply during periods of so-called even keel and otherwise for the seven and one-half year period from 1966 through the first half of 1973. Their conclusion is that there is little evidence that the Fed's even-keel policy had much, if any, effect on any of these key monetary variables, with the possible exception of day-to-day interest rates — in particular the Federal funds rate. Even here, it seems that in most recent years the Federal funds rate does not seem to behave much differently in an even-keel period than at other times.

I am not inclined to dispute this conclusion. I agree that it would not be possible to find the even-keel periods from an examination of the variables they have studied. The authors logically raise the question, therefore: Does even keel then have any reality, for all the importance attached to it by Treasury and Fed officials? Does the emperor have clothes?

My assignment is to take a look at this problem from the standpoint of a market participant and perhaps incidentally from the standpoint of an ex-Fed official who served at a time when the impact of even keeling was far more significant than it seems to be today.

Not too many years ago, operational conflicts between debt management and monetary policy, were at the very center of the monetary stage. All of us can recall the mental paralysis that pervaded monetary thinking in the official arena, in the financial markets, and in academic circles as well, when, after World War II, the size of the debt was taken to rule out indefinitely any significant

*Chairman of the Board, Aubrey G. Lanston & Co., Inc.

use of Fed policy as an instrument for influencing economic develop-ments. For six years after the end of the War, all but the most feeble struggles to use monetary measures to restrain inflation were pre-cluded by the concerns as to how the debt could be refunded and the government financed, should the protective arm of the Fed be lifted even slightly from the shoulders of the Treasury debt managers. These fears were not held only by Treasury officials and President Truman. They were very much alive in the minds of a majority of Fed policy makers as well. And the worries did not relate to the debt-management problem alone, but to the effects of a decline in the value of the public debt on the capital structure of our banks and other financial institutions.

The major finding of a study of even-keeling today is that we have made tremendous progress in the tools and the thinking of debt managers, the Fed, and the market which has made possible this massive change over the last 22 years. In the fifties following the Accord in 1951, the flexible use of monetary policy was certainly inhibited in several periods by debt-management considerations, either real or imagined. The term "even keel"[1], which came into general use in the second half of that decade, seemed to cover a three-week or one-month period of time. When applied to the regular quarterly refunding and to cash financings, it seemed to those of us looking at monetary policy from the market side that even keel was at least one important factor that inhibited the Fed from taking timely action on a number of occasions in the fast cyclical swings of 1957, 1958, 1959 and 1960.

Both basic and technical developments have contributed to the change in importance of even keeling over the last 10 years. One key fact, mentioned by the authors, is the decline in the size of the total Treasury debt relative to the size of our financial markets. Another is that the Treasury, by advance refunding in favorable markets, has kept down the size of the quarterly maturing issues which may have to be refunded under unfavorable market conditions. Perhaps equally important, the Treasury has adopted some refunding techniques that

[1]Since the Accord, the Fed has not intervened as a direct buyer in the market during a refunding to influence the price of the "rights", the "when issued" securities, or outstanding securities in the coupon market. (There may have been one exception in the late fifties.) Intervention by the trading desk on behalf of the Treasury, however, has been common, and particularly so in the first half of the sixties. The market does not read these efforts as reflective of a Fed policy to hold a particular interest rate level but rather as an effort by the Treasury to prevent a marginal market surplus of rights from driving down quotations on the new issues, the news of which might unfavorably affect the exchange decisions of the numerous relatively unsophisticated investors that regularly participate in a Treasury finan-cing.

have introduced greater flexibility into a refunding operation and minimized the risk of a pricing mistake or of an unfavorable random event. I am thinking here, for example, of the split refunding technique, where longer maturity options are offered investors first on a rights basis, with whatever is not taken raised immediately with a cash offering. This technique avoids "attrition", if that is what the cash position of the Treasury calls for, and at the same time permits the markets to take as much of the longer-term issues as it will absorb at the offered yields. Another technique that minimizes an even-keel role is the use of the auction, which assures that a given amount of securities will be taken, leaving the price to be determined by the market.

Significance of Even Keeling

From where I sit, I believe that for some time the Fed and the Treasury have attached a great deal more significance to even keeling than has the market. To the market, even keel now means, and has for some years meant, that the Fed will not make a policy move, or allow it to appear that they have, in the middle of a Treasury refunding operation. If the Fed has been tightening, and the market expects further tightening, the fact of even keel will hardly cause dealers to load up on positions in the hope of unloading at a profit before the even-keel period ends. In a period of monetary restraint, dealers may build large positions and thus give great support to a refunding, but this will be done only if the Treasury has made an offering that looks attractive despite expectations of future monetary tightening. The success of a refunding effort depends on the debt managers, and it is in effect assumed by the market that the Fed will do what it feels is appropriate when the refunding is over. Most dealers in the Treasury market certainly do not now assume that they are assured a significant period of time after a refunding to find investment buyers for an issue, during which period nothing bad is supposed to happen.

The exact period of even keel has always been left a bit vague. As far as the market itself is concerned, it would seem adequate for the typical duration to be about two weeks. Refunding terms are usually announced on Wednesday, and it would be reasonable to hope that the Fed would not make an overt policy move during that week since the Treasury needs as calm a market as possible against which to judge the proper terms for its offerings. Typically the refunding period is over by the following Wednesday, and the even-keel period might logically continue through that week as well.

There is no reason why the Fed should not change its monetary posture before delivery date of the new issues if that is considered appropriate. Chances are that whatever the Fed does will occur well after most people in the market have seen the need for action and built into their expectations the impact of that change. Dealers and investors in Treasury securities have become fairly sophisticated about the basic factors underlying a proper monetary policy. (I might add they are also fairly cynical about the time lag between the need for action and the actuality.)

Messrs. Axilrod and Struble have concluded that even keel at present still has a significance not reflected in the variables they have used as measures because "it affects the psychology of the market." In some measure this is probably true. They state further, however, that "the market knows that the Federal Reserve stands ready to insure that a Treasury financing operation does not fail." I must confess that I have trouble with the latter statement in its baldest form. It is true that to a dealer the assurance of even keel is a psychological plus when he is making markets in large size during the period the books are open on an exchange offering. I do not believe, however, that there are many market participants who look to the Fed as an ultimate guarantor that a Treasury offering will not fail. The last time that I recall a failure threatened a Treasury financing was when the Treasury was selling a short note for cash (not at auction) in early May of 1970 to pick up the "attrition" on an 8 percent long-note offering. In that case, the Fed trading desk called the dealers and certain key banks to inquire about what these institutions might be planning to do by way of subscriptions. My recollection is that enough of them got the message so that the issue was taken up, albeit at 100 percent allotment of the subscriptions tendered. Not until after the refunding did the Fed intervene to buy coupon issues.

In summary, the decline in importance of the Fed's even-keel role in a Treasury refunding is one of the success stories in the monetary area over the past quarter century. It is one of those happy cases where everyone has grown with experience — the Treasury, the Fed, and particularly the market — and in the process a problem which once loomed large has lost its potency.

CONFERENCE PARTICIPANTS

RICHARD V. ADAMS, *Senior Vice President, Chemical Bank*
DANIEL S. AHEARN, *Senior Vice President, Wellington Management Co.*
LEONALL C. ANDERSEN, *Senior Vice President, Federal Reserve Bank of St. Louis*
STEPHEN H. AXILROD, *Associate Director, Division of Research and Statistics, Board of Governors of the Federal Reserve System*
JULIAN B. BAIRD, *Retired Chairman of the Board, First National Bank of St. Paul*
LAWRENCE BANYAS, *Economic Consultant, American Bankers Association*
ROBERT H. BETHKE, *Chairman of the Executive Committee, Discount Corporation of New York*
BARRY BOSWORTH, *Research Associate, The Brookings Institution*
PHILIP E. COLDWELL, *President, Federal Reserve Bank of Dallas*
CARL F. COOKE, *Senior Vice President, The First Boston Corporation*
G. LAMAR CRITTENDEN, *Executive Vice President, The First National Bank of Boston*
BRUCE DAVIDSON, *Economics Editor The Boston Globe*
JAMES S. DUESENBERRY, *Professor of Economics, Harvard University; Director, Federal Reserve Bank of Boston*
ROBERT W. EISENMENGER, *Senior Vice President and Director of Research, Federal Reserve Bank of Boston*
WILLIAM F. FORD, *Director of Research and Planning, The American Bankers Association*
PETER FORTUNE, *Economist, Federal Reserve Bank of Boston*
WILLIAM E. GIBSON, *Senior Staff Economist, Council of Economic Advisers*
CHARLES A. E. GOODHART, *Bank of England*
ROBERT D. HERSHEY, Jr., *The New York Times*
ALAN R. HOLMES, *Senior Vice President, Federal Reserve Bank of New York*
DWIGHT M. JAFFEE, *Associate Professor of Economics, Princeton University*
JOHN H. KAREKEN, *Professor of Economics, University of Minnesota*
HENRY KAUFMAN, *Partner and Economist, Salomon Brothers*
JOHN J. LARKIN, *Senior Vice President, First National City Bank*
DONALD E. LAWSON, *Assistant Director of Research, National Association of Mutual Savings Banks*
RALPH L. LEACH, *Chairman of the Executive Committee, Morgan Guaranty Trust Company*
MICHAEL E. LEVY, *Director, Economic Policy Research, The Conference Board*
BRUCE K. MacLAURY, *President, Federal Reserve Bank of Minneapolis*
EDWARD D. McGREW, *Executive Vice President, The Northern Trust Company*
DONALD E. MILLER, *Executive Vice President, Continental Illinois National Bank and Trust Company of Chicago*
FRANK E. MORRIS, *President, Federal Reserve Bank of Boston*
WILLIAM D. NORDHAUS, *Associate Professor of Economics, Yale University*
JAMES R. OSTAS, *Economist, Federal Reserve Bank of Boston*
JOHN PETERSEN, *Washington Director and Economist, Municipal Finance Officers Association*
LELAND S. PRUSSIA, JR., *Senior Vice President, Bank of America N. T. & S. A.*

FEDERAL RESERVE BANK OF BOSTON · · INCORPORATED MAY 18 1914 · IN ·

A-1