FEDERAL RESERVE BANK OF ST. LOUIS

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REVIEW

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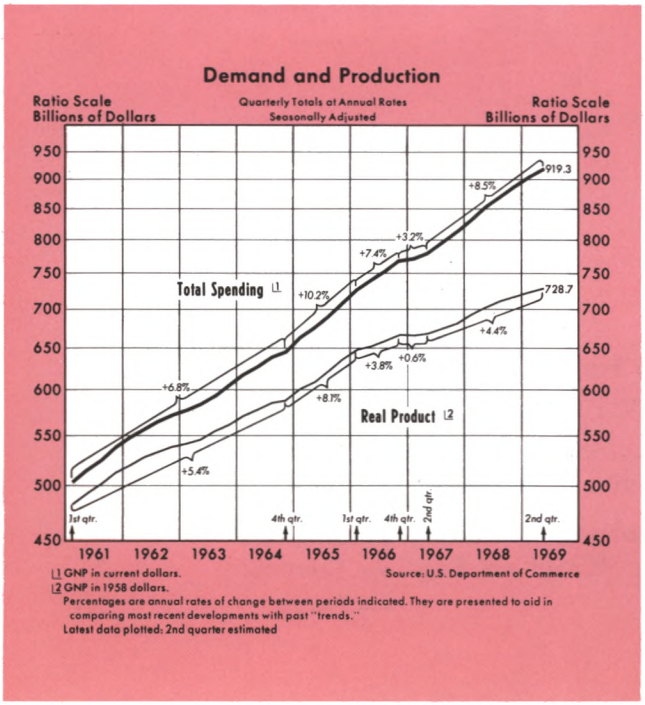
Credit Flows and Recent Interest Rate Trends

STRINGENT CREDIT CONDITIONS in 1969 similar to the late summer of 1966 have been haunting lenders and would-be borrowers. High interest rates, in the presence of intense resource use and a monetary policy which seeks to reduce the growth of total spending, have been forboding to those who desire to finance near-term purchases. Some fear that current monetary developments will culminate in a severe reduction in credit flows relative to what is believed necessary to maintain growth of production.



Current high interest rates have resulted primarily from the buildup of excessive total spending, loan demand and inflationary pressures in recent years. To some extent they also reflect recent monetary restraint, which, in the short-run, has tended to intensify upward rate movements. Undue severity of impact on production and employment can probably be minimized by avoiding the degree of restraint — nine months of zero growth in money — which occurred in 1966 and was followed by return to excessive monetary stimulus and two years of accelerating inflation. However, whether a more gradual approach to restraint can more effectively change expectations and cause less total disruption in financial markets, compared to a more pronounced restraint over a shorter period, may be debatable.

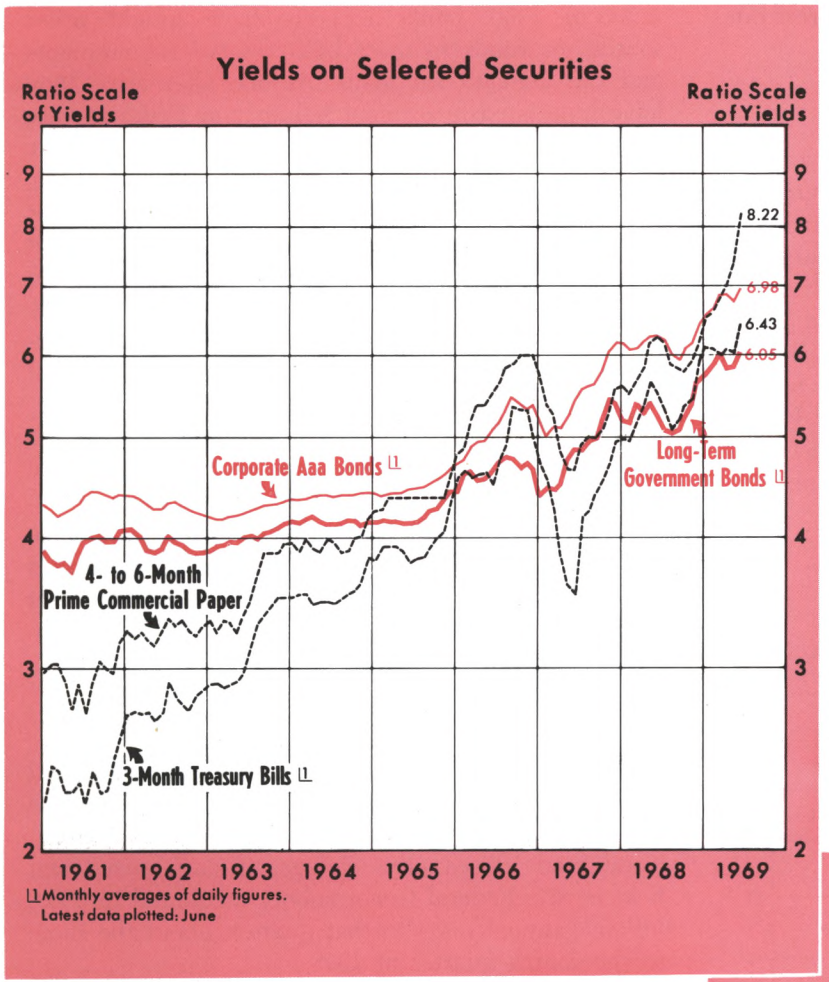
Interest Rates

Both long- and short-term interest rates generally moved upward from last fall to June. Rates reached

Table I

MARKET INTEREST RATES
(Weekly Averages of Quoted Annual Yields)

	Peak in Fall 1966	Peak in June 1969
3-month Treasury bills	5.55	6.65
4- to 6-month prime commercial paper	6.00	8.55
3- to 5-year Governments	5.83	6.77
Long-term Governments	4.87	6.09
State and local governments	4.04	5.60
Corporate Aaa Bonds	5.52	7.03



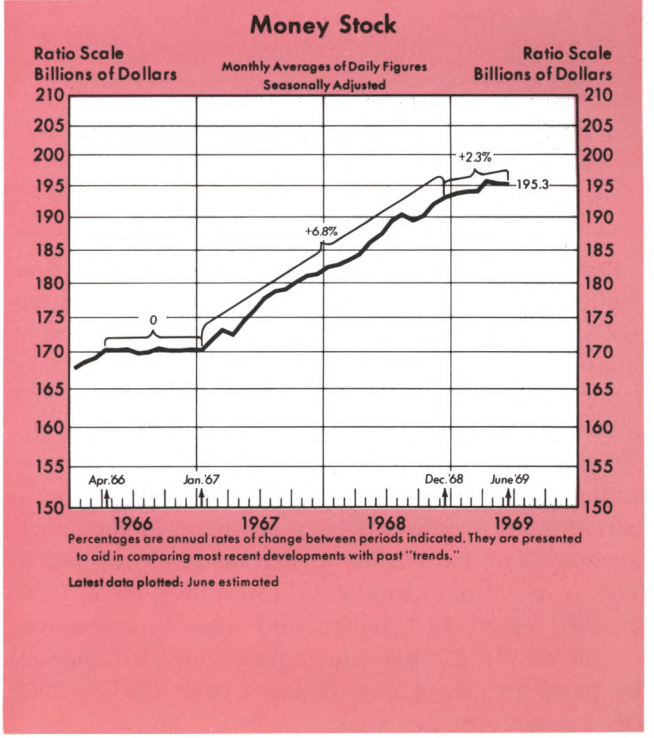
than the previous historic peak reached in late March this year.

In the period of 1966 popularly referred to as the "credit crunch," most interest rates peaked between late August and October. The rates on most of these market instruments are now one or more percentage points higher than they were in the 1966 period.

Recent increases in interest rates have resulted from continued strong demand for loan funds at a time of restriction in the current supply, as reflected in slower growth of monetary aggregates such as the money stock. Such slower growth of monetary aggregates is an important step toward reducing the growth of total spending, demand for loan funds, and the inflationary pressures and expectations which have raised demands for credit and the level of nominal interest rates in the past three years. While the initial impact of monetary restraint is likely to raise interest rates, the later result of slower spending growth is likely to reduce credit

historically high levels in December, and then most of them continued upward. Yields on three-month Treasury bills, however, drifted lower on balance during the first five months of 1969 to less than 6 per cent, compared with 6.20 per cent in the last week of December and about 5 per cent last August. Recently the three-month Treasury bill rate has risen sharply, reaching 6.94 in early July. Other short-term rates, such as on commercial paper and secondary market certificates of deposit, rose more steadily from August through June. Yields on four- to six-month commercial paper rose from 5.88 per cent in late August to 6.38 per cent in late December, and to 8.50 per cent in late June.

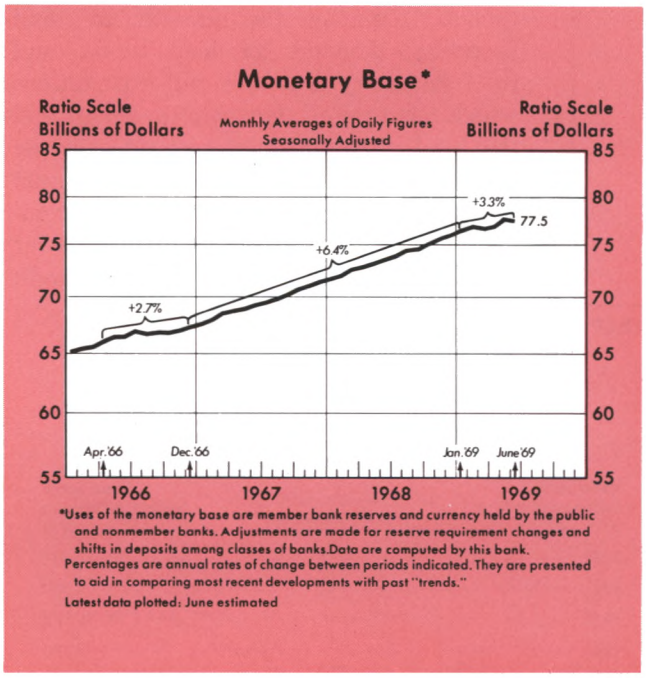
Rates on long-term securities rose from last fall to late March and then eased somewhat during April and early May. Rates on long-term Government bonds rose substantially in late May, reaching 6.11 per cent in the week ending May 30, and subsequently remained in a narrow range through June and into early July. Yields on highest grade corporate bonds averaged 7.03 per cent in early July, slightly higher



demands, the rate of price increases, and interest rates (the price of credit).

Monetary Aggregates

The money stock, consisting of currency held by the public and private demand deposits, has grown at a 2.3 per cent annual rate since last December, less than half the rate of the previous two years. The growth of the monetary base, which largely determines the trend growth of money, slowed to a 3.3 per cent rate from January to June, also less than half the growth rate in 1967 and 1968. The monetary base, in turn, is influenced strongly by the growth of Federal Reserve credit, which rose at a 5.1 per cent rate from January to June, slower than the 10 per cent rate of the previous twelve months.



Recent marked moderation of growth rates of time deposits and bank credit appear to have been interpreted by some as indicating a still greater degree of tightness. Since last December, large certificates of deposit at commercial banks have declined by $7.7 billion, and total time and savings deposits have declined at a 4.9 per cent rate. Disintermediation resulting from low Regulation Q ceilings relative to market interest rates has been the main factor affecting time deposits. Disintermediation also occurred in 1966, when from August to December large CD's declined about $2.7 billion and total time deposits rose at only a 2.3 per cent annual rate. In contrast, the trend growth of time deposits from 1957 to 1965 was 12 per cent per year.

As in 1966, banks recently have sought other sources of funds to meet both reserve requirements and the demand for loans. As one alternative they have liquidated investment holdings of Federal, state and local government securities. Since last December total bank credit has risen at a 3.6 per cent annual rate, while investments have declined at a 10.4 per cent rate and total loans have increased at a 11.2 per cent rate. Loans increased only slightly faster than this in the previous year. In addition to reducing security holdings in their asset portfolios, banks have borrowed Eurodollars, Federal funds, and from Federal Reserve Banks. During June, Federal funds and three-month Eurodollars traded at an average of 8.90 per cent and 11.0 per cent respectively. The basic rate on member bank borrowing through the Federal Reserve discount window has been 6 per cent since early April. A sharp increase in these borrowings during May and continuing in June was an important factor increasing Federal Reserve credit and the monetary base in these months.

Total Credit Flows

Higher interest rates and a banking system strained by disintermediation did not significantly reduce the total flow of credit in the economy in the first quarter. Total funds raised (less changes in cash raised and held by the Federal Government) amounted to $98.8 billion (annual rate) in that quarter, about the same as the fourth quarter of 1968.

Even though preliminary information does not indicate a decline in the total flow of credit in the first quarter, most demands for credit in that quarter could be met only at higher interest rates. In the second quarter pressures in financial markets, as measured by interest rates, intensified. Information on total credit flows in that quarter are not yet available.

In 1966, from the second to the third quarter — the period in which interest rates peaked — total funds raised declined by about $7.7 billion. There were larger declines in the preceding and subsequent quarters.

Channels of Credit Flows

Strains in credit markets are associated with changes in the paths of flows as well as with changes in total flows. The institutions or sectors of the economy holding funds before they are transferred to the unit which purchases goods and services can be considered the channel of flow. A part of the table entitled "Saving, Investment, and Financial Flows" in the Federal Reserve *Bulletin* describes this aspect of

Table II

DIRECT LENDING IN CREDIT MARKETS
(Billions of dollars)

	1966				1967				1968				1969[a]
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I
Total net of U.S. Govt. cash	87.3	76.4	68.7	48.7	74.9	59.1	91.2	102.2	108.6	99.8	93.7	98.3	98.8
Federal Reserve System	2.5	−0.1	6.6	4.2	2.9	−0.3	7.9	4.5	7.7	7.0	7.7	−3.2	*
Commercial banks, net	22.7	28.0	14.1	6.8	41.9	40.3	37.2	24.6	23.7	34.3	45.1	52.3	3.5
Nonbank finance, net	28.0	16.7	21.0	24.2	29.0	35.0	38.1	27.4	30.6	27.8	28.6	31.3	30.7
U.S. Government	11.1	10.0	7.8	2.8	6.1	0.8	5.0	8.0	12.2	9.0	6.2	5.1	8.6
Foreign	−1.3	1.2	−4.1	−1.6	3.3	3.6	.9	5.1	.4	−1.5	2.6	7.0	−3.5
Private domestic nonfin.	24.5	20.6	23.2	12.3	−8.1	−18.6	2.3	32.7	34.1	23.3	3.6	5.9	59.7
Households	14.0	15.3	11.0	1.9	−13.1	−18.1	−1.3	16.7	11.1	18.0	−10.8	−6.5	10.1
Business	5.7	1.4	3.4	2.5	1.2	−5.6	.2	5.9	11.4	5.8	6.5	6.1	25.7
State and local govts.	5.0	5.4	7.0	7.3	3.2	7.7	6.5	13.7	8.5	2.3	10.8	9.1	21.3
Less net security credit	.3	1.5	−1.9	−0.6	−.5	2.5	3.1	3.5	−3.0	2.7	2.9	2.8	−2.6

Source: Federal Reserve *Bulletin*
[a]Data is preliminary and based on incomplete information.
*Amount insignificant in terms of billions of dollars.

credit flows (See Table II). Sources of funds to spenders are the Federal Reserve System, commercial banks, nonbank financial institutions, the U.S. Government, foreign governments, state and local governments, and households and business firms.

Commercial banks traditionally perform a major role in channeling funds to spenders. In the first quarter of 1969, however, net funds advanced directly in credit markets by commercial banks was greatly reduced from $52.3 billion in the fourth quarter last year. Net funds advanced by nonbank financial institutions changed little from last year, holding at around $30 billion in the first quarter, according to preliminary figures. Households, businesses, and state and local governments advanced $59.7 billion directly in credit markets in that quarter, largely offsetting the decline in the flow from commercial banks.

In 1966 the channels of credit flows also shifted. From the second to the third quarter credit flows through banks declined from $28 billion to $14 billion. Flows through nonbank financial institutions increased from $16.7 billion to $21 billion, and flows through private domestic nonfinancial sectors increased from $20.6 billion to $23.2 billion.

Credit Flows

The Commerce Department expects business spending on plant and equipment to be $72.2 billion in 1969, or 12.5 per cent higher than in 1968. Some of the increase has been and will be financed by a runoff of corporate liquidity. During 1968 corporate liquidity was built up by an unusually large amount, a development which was facilitated by the rapid growth of the monetary base and money stock. However, much of the increase in business investment will have to be financed through money and capital markets.

Credit demands of the Federal Government have been substantially reduced. Due to the Revenue and Expenditure Control Act passed last year, the Federal budget is estimated to have had about a $1 billion surplus during the fiscal year ending June 30, 1969, compared with a deficit of $25.2 billion in the previous fiscal year. During the first half of calendar 1969 there was a net repayment of Federal debt amounting to about $12 billion, compared with net borrowing of $4.2 billion in the first half of 1968. If the surtax is continued at the 10 per cent rate in the second half of 1969, credit demands of the Federal Government are estimated to be about $6 billion compared with $11.1 billion in the second half of 1968. Credit demands of the Federal Government are typically larger in the second half of the year.

So far in 1969, state and local governments have apparently been the sectors most restricted in issuing new debt by high nominal interest rates. The Federal Reserve Board estimates that state and local governments offered $0.9 billion of bonds in the first quarter, less than the $1.2 billion in the first quarter of last year and down from $1.5 billion in the fourth quarter. In some cases legal limits on the interest rates which could be offered prevented state or local jurisdictions from issuing debt. There has also been greater voter reluctance to approve bond issues.

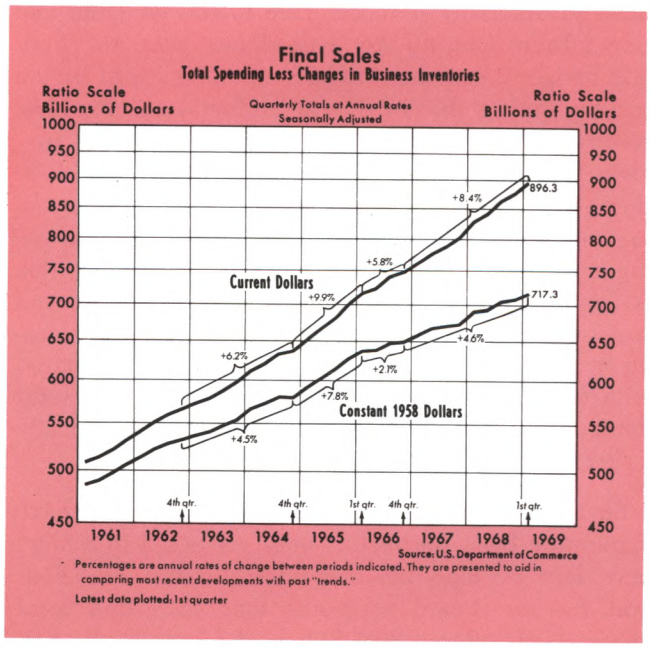
The net increase in mortgage debt in the first quarter of 1969 was $7.7 billion, compared with $7.5 billion in the fourth quarter of 1968, according

to an estimate by the Federal Reserve Board. This includes a $5.4 billion net increase in residential (excluding farm) mortgages, compared with $5.2 billion in the fourth quarter. Much of this increase probably represents an increase in mortgages on existing structures. Private nonfarm housing starts declined from January to May.

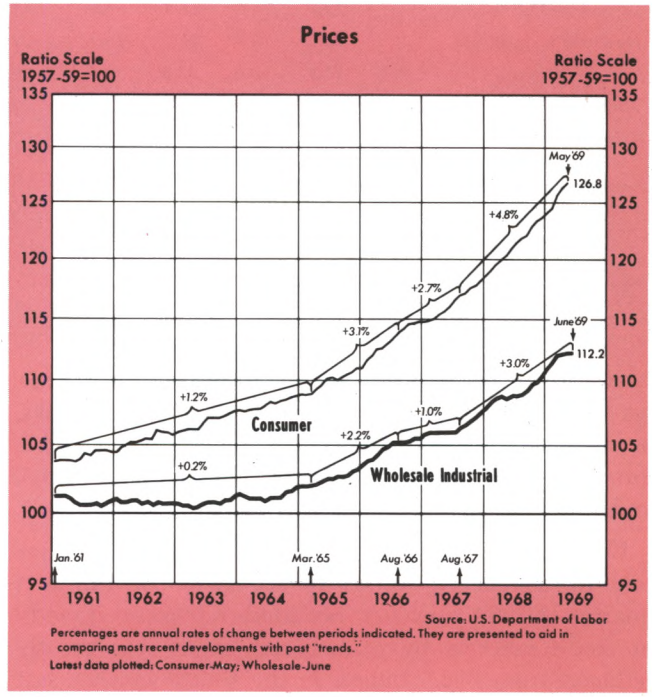
Other Economic Developments

Total spending in the economy rose at a 7.4 per cent annual rate in the first quarter, down from a 9.4 per cent rate last year. The moderation was largely due to slower growth of inventories. Final sales, which is total spending less changes in inventories, increased at a 9.2 per cent rate in the first quarter, the same as in 1968.

Real product increased at a 2.9 per cent annual rate in the first quarter, compared with a 5.4 per cent increase during 1968. Industrial production grew at a 5.9 per cent annual rate in the first five months of 1969, compared with a 4.1 per cent increase in the previous year.



Prices have increased even more rapidly in 1969 than in the past three inflationary years. During the first quarter, prices, as measured by the GNP deflator, increased at a 4.6 per cent annual rate, compared with a 3.5 per cent rate in the previous three years. Consumer prices rose at a 6 per cent rate in the first five months of 1969, compared with 4.7 per cent last year. Wholesale industrial prices increased at a 3.7 per cent rate from December to June, compared with 2.6 per cent in 1968. Due mostly to a large jump in May, wholesale prices of farm products and processed foods and feeds have risen at a 13.5 per cent rate since December, compared with 3.4 per cent in the previous year.



Summary

The interest rate increases of the first half of 1969 have been due in part to growing demand for loan funds and in part to less rapid monetary expansion. The increased demand for loan funds has possibly resulted in considerable measure from anticipations of continued inflation. Whether the restriction of monetary expansion has been great enough to adequately restrain total spending, and moderate price increases and interest rates, is not certain. However, experience suggests that if recent stabilization policies slow the growth of total spending and final sales, moderation in price increases and interest rates will follow.

Total flows of credit have not decreased, but have been growing less rapidly than last year. Regulations influencing the channels of credit flows have contributed greatly to strains in the money markets.[1] Regulation Q, for example, has forced the financial process into different and, most likely, less efficient channels. This development has created an uneasiness in the financial world because of the special and unnecessary restraint on commercial banks.

[1]See Clifton B. Luttrell, "Interest Rate Controls – Perspective, Purpose, and Problems," in the September 1968 issue of this *Review*.

An Explanation of Federal Reserve Actions (1933-68)*

IN RECENT YEARS there has been a noticeable shift in professional opinion with respect to the impact of Federal Reserve actions on national income. More economists now acknowledge that these actions play a key short-run role in the determination of total demand. Monetary studies, using United States as well as foreign data, have given considerable support to this position.[1] Parallel with the increased recognition of Federal Reserve actions as an important determinant of national income has been an escalation of the controversy over the proper interpretation of monetary policy. For example, the financial press has at times expressed concern that restrictive policy statements are not always followed by restrictive actions.

This public controversy about the alleged discrepancy between some monetary policy statements and Federal Reserve actions is based upon a fundamental controversy within the economics profession over the proper measure of Federal Reserve actions. Economists of a neo-Keynesian persuasion believe that Federal Reserve actions have their primary effect on the economy through changes in interest rates. According to this view, high or rising interest rates indicate restrictive monetary influences on the economy, while low or falling interest rates indicate easy monetary influences. By this measure the Federal Reserve has almost always followed appropriate countercyclical stabilization policies. Interest rates have generally been rising when the Federal Reserve called for tight money, and falling when it called for easy money.

Economists who consider that the Federal Reserve has its primary effect on the economy through changes in monetary aggregates, such as the money stock or the monetary base, consider that an accelerating aggregate is a sign of expansionary monetary influences on the economy and a decelerating aggregate is a sign of restrictive monetary influences. On the basis of aggregate measures, Federal Reserve actions have been criticized for not always being consistent with stated monetary policy.

The intent of this article is to examine the reasons Federal Reserve actions, as measured by monetary aggregates, have not always been consistent with stated monetary policy. This discrepancy is largely explained by the fact that while monetary policy is typically stated in terms of attempting to stabilize income, employment, prices and the balance of payments around some desired level or growth rate, Federal Reserve actions are actually responsive to a wider set of objectives. As the "bank of last resort", the Federal Reserve has a responsibility to insure the institutional viability of the nation's financial system. As the fiscal agent of the Federal Government, the Federal Reserve has a responsibility for insuring a receptive market for Treasury issues of new debt. When these other objectives are added to the stabilization objectives, we have a more complete view of Federal Reserve actions and an explanation for the observed discrepancies between monetary policy statements which are related to stabilization objectives and actual Federal Reserve actions.

In the following sections indexes will be constructed to represent the Federal Reserve's stabilization and other objectives. Building on these indexes, evidence is presented showing that for the past 36 years the Federal Reserve has acted in a consistent manner with respect to these objectives.

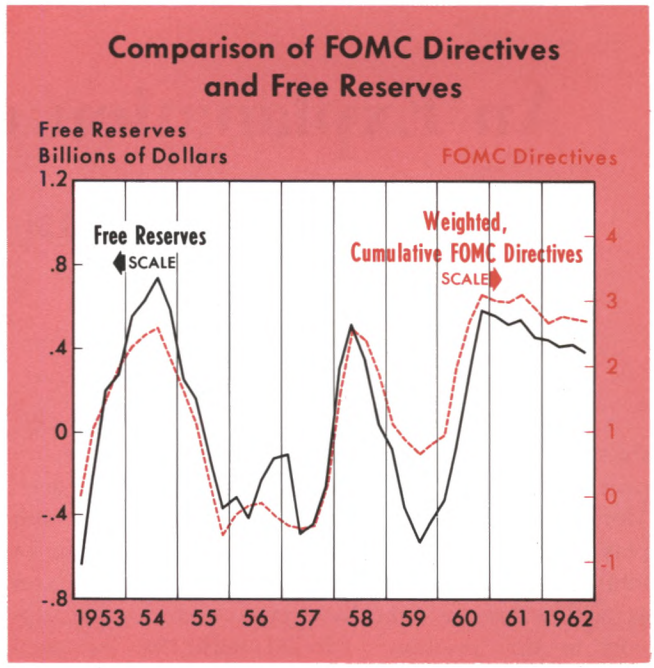
*The authors give special thanks for helpful comments on earlier drafts to: Leonall Andersen, Karl Brunner, David Fand, Harry Johnson, Allan Meltzer, David Rowan and William Yohe. The authors are solely responsible for any remaining errors.

[1]For example, see "Monetary and Fiscal Actions: A Test of Their Relative Importance in Economic Stabilization" by Leonall C. Andersen and Jerry L. Jordan, available as Reprint No. 34 and taken from the November 1968 issue of this *Review*. Also see Milton Friedman, et al., *Varieties of Monetary Experience* (Chicago: University of Chicago Press, 1969), and Michael W. Keran, "Monetary Policy and the Business Cycle – The Foreign Experience," this *Review*, November 1967. In the neo-Keynesian tradition, the MIT-FRB model also shows the strong impact of monetary actions.

Measuring Monetary Policy or Stabilization Objectives

Monetary policy is defined in this article as the Federal Reserve's response to stabilization goals, that is, achieving target levels of income, employment, prices and the balance of payments. Most economists who have examined the basis of monetary policy have approached it by postulating a behavioral link between these stabilization objectives and some indicator of monetary policy, such as free reserves, the money stock or the Treasury-bill rate. This approach to measuring monetary policy has several important drawbacks.[2] For the reasons given in footnote 2 and in the Appendix, this study does not attempt to link stabilization objectives to ultimate target values of income, employment and prices. Instead, a proxy variable will be used as a summary measure of the stabilization policy objectives of the central bank.

The proxy used is free reserves. Movements in free reserves are highly correlated with changes in the policy directives of the Federal Open Market Committee (FOMC), which is the key monetary policy-making body of the Federal Reserve. The accompanying chart illustrates this close association between the level of free reserves and a quantification of FOMC directives. This quantification of the FOMC directives was constructed from a procedure developed by Professors Karl Brunner and Allan Meltzer.[3] They examined the policy directives from March 1946 to December 1962 and assigned a value between +1 and −1 to each directive, according to whether it called for ease or tightness relative to current conditions. If the Federal Reserve had been following a restrictive policy but did not wish to be any more restrictive, the FOMC directive would call for no change and the number assigned to that directive would be zero. A move toward restraint was assigned a negative value and a move toward ease, a positive value. To measure the progressive easing or tightening reflected in FOMC directives over time, the assigned values were accumulated. It is these accumulated values which are plotted in the accompanying chart.[4]



The quantified FOMC directives are plotted only from 1953 to 1962, because directives prior to 1953 were largely concerned with stabilizing the market price of Government securities and thus were irrelevant to our present purpose of measuring stabilization objectives. Directives, after 1962, were not quan-

[2]First, the policy objectives may not be independent of one another. Attempts to achieve one target (eliminating inflation) may cause a movement away from another desired target (reducing unemployment). Because it may be impossible to satisfy, simultaneously, two policy targets with one policy tool, the policymaker may choose to achieve one target one time and the other another time. Given the statistical tools at hand, it may not be possible for the economist to discriminate between these varying responses. Second, the preferences of the policymaker with respect to achieving desired levels of alternative target variables may be interdependent. For example, the disutility of the policymaker associated with missing a price stability target may not be independent of how far other stabilization targets are missed. Finally, there are serious statistical difficulties in constructing a systematic statement of the Federal Reserve's response to discrepancies between observed and desired levels of target variables when the observed values of the target variables show little variation during a significant part of the period. These issues are discussed more fully in the Appendix.

[3]Karl Brunner and Allan Meltzer, "An Alternative Approach to the Monetary Mechanism," House of Representatives, Committee on Banking and Currency, Subcommittee on Domestic Finance, U.S. Government Printing Office, August 17, 1964. The scale and thus the absolute values assigned to each directive is arbitrary. Only the sign is important. The same absolute values of the accumulated directives at different points in time are not necessarily comparable.

[4]There are two interpretations which can be put on the accumulation procedure. First, it could imply that when the directive called for tighter money market conditions than those previously prevailing, monetary policy is tighter. Second, it could imply that policy is not tighter, but that previous tightening in money market conditions had not achieved the desired objectives, and that greater tightening in money market conditions is necessary to achieve the desired tightening in policy. In the first case, desired policy is always realized, and therefore, the cumulative directive measures a change in desired policy. In the second case, desired policy differs from the observed index, and the progressive tightening in the directive represents an attempt to eliminate the discrepancy, so the accumulative directive is always moving in the right direction. Either interpretation of the directive is consistent with the accumulation procedure. The shorter the time period, the more likely that the second interpretation is correct, and the longer the time period, the more likely the first interpretation is correct. The use of quarterly observations in this study supports the first interpretation.

tified by Karl Brunner and Allan Meltzer in their 1964 article.[5] Virtually every change in the FOMC directives after 1952 was related to an expressed concern for inflation, unemployment or the balance of payments. For this reason the directives are considered a good indicator of the stabilization objectives of the Federal Reserve.[6] The patterns of movement in the free reserve and FOMC directive series are quite close. Every turning point in free reserves and even the magnitudes of most changes are fairly accurately reflected in the quantification of the directives. The correlation coefficient between free reserves and the accumulation of the Brunner-Meltzer quantification of the directive for the period 1953-62 is 0.87. The authors used the Brunner-Meltzer procedure to quantify the directives in the period 1963 to 1968, and the relationship with free reserves was unchanged (correlation coefficient of 0.86).

The use of free reserves as a proxy measure of stabilization objectives of the Federal Reserve has also been followed by other economists who have attempted to analyze Federal Reserve behavior. Most of these economists assumed that the full concern of the Federal Reserve was directed toward stabilizing the growth of income, employment, prices and attaining equilibrium in the balance of payments. With only stabilization objectives in mind, their results led them to conclude that free reserves are "the most reliable indicator of monetary policy."[7] Finally, the Federal Reserve itself seems to place strong reliance on free reserves as a measure of monetary policy:

> "A downward trend in net free reserves over a period of several months preceding a particular action confirms that Federal Reserve policy has been tending to become somewhat less stimulative with regard to the growth of credit and money than it had been earlier . . . In general, the net reserve position of member banks is an important gauge of pressure on bank reserves. When net free reserves rise, the result is increased marginal availability of reserves which the banking system can readily use to expand credit . . .[8]"

Free reserves are used in this article only as a proxy for the stabilization objectives of the FOMC. Their use should not be taken to imply that we consider free reserves to have any causal impact on bank behavior. The evidence marshaled against free reserves as an important causal link in the monetary process is impressive.[9] In this article we assume that the ultimate stabilization goals with respect to income, employment, prices and the balance of payments, when filtered through the preference function of the FOMC, are approximated by the level of free reserves.

Measuring Other Federal Reserve Objectives

An assumption of this paper is that stabilization of income, employment and prices is an important, but not the only objective of the Federal Reserve. Two other objectives embedded in the Federal Reserve history and practices are: (1) assisting the United States Treasury Department "to make a market" during periods of debt financing, a practice which is generally referred to as "even-keel"; and (2) performing the role of bank of last resort by protecting financial institutions and financial markets from collapse or serious "disorderly conditions."

The even-keel objective may be a carryover of the Federal Reserve's single-minded policy during and just after World War II of pegging the market price of Government securities. This policy was pursued with the expectation that unless the capital value of the public's and banks' recently increased holdings of Government debt was maintained at, or close to, its face value, a large share of it would be redeemed or sold in the open market, making debt management difficult. Until this policy was officially abandoned after the March 1951 Accord with the Treasury, Federal Reserve actions were strictly subordinated to the needs of debt management. The Accord was designed

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[5]Meltzer has very recently extended the quantification through March 1969. However, it was not available in time to be used in this paper.

[6]Even-keel is mentioned many times in the FOMC directives, but only as a reason for delaying a change in policy, never as a reason for taking action.

[7]See John Wood, *A Model of Federal Reserve Behavior,* Staff Economic Study No. 17, Board of Governors of the Federal Reserve System, p. 14. William G. Dewald and Harry G. Johnson, "An Objective Analysis of the Objectives of American Monetary Policy, 1952-61," *Banking and Monetary Studies,* ed. Deane Carson (Homewood, Illinois: Richard D. Irwin, 1963), and James W. Christian, "A Further Analysis of the Objectives of American Monetary Policy," *The Journal of Finance,* volume XXIII, June 1968, have found that the movement in free reserves can be explained as a response aimed at achieving stabilized values for income, employment, prices and the balance of payments. Separately, Dewald "Free Reserves, Total Reserves and Monetary Control," *Journal of Political Economy,* April 1963, indicates that the monetary policy can be closely approximated by the movement in free reserves.

[8]*The Federal Reserve System: Purposes and Functions,* 5th Edition, Board of Governors of the Federal Reserve System, Washington, D.C., 1963, pp. 222-23.

[9]See A. James Meigs, *Free Reserves and the Money Supply* (Chicago: University of Chicago Press, 1962).

to allow the Federal Reserve to pursue stabilization objectives with respect to income, employment and prices – objectives which became increasingly important with the intensification of the Korean War.

The even-keel objective is designed to stabilize Government security prices during the period when the Treasury is in the market. An even-keel period can last for as long as several weeks for each issue of securities. It is believed that private dealers, who are the initial purchasers, need to be assured that they will not face the risk of a capital loss in order to induce them to "make a market" in Government securities.[10] Because these dealers borrow short-term funds to finance their inventories of Government securities, even-keel amounts to providing a "neutral" short-term money market during the period of Treasury financing.

The second nonstabilization objective of the Federal Reserve is related to its role as the bank of last resort and guardian of the U.S. financial system. The financial panic of 1907 was the *cause celebre* that eventually led to establishment of the Federal Reserve System in 1914. The Federal Reserve's concern with the viability of the financial system is not simply due to a desire to protect this one segment of the economy. The history of depressions in the United States has shown that the deepest and most severe have been associated with financial panics. A major criticism of the Federal Reserve's behavior in the early Thirties is that the major depression of that period was exacerbated by the financial collapse, which some argue the Federal Reserve could have prevented.

According to some authorities, the Federal Reserve's objective of maintaining the viability and solvency of financial institutions and markets is more difficult to achieve during periods of extended prosperity when interest rates are rising. There are several sources of financial instability: general financial panic, special problems for savings and loan associations (S&L's), and the housing industry. Hyman Minsky has discussed the conditions which could lead to a general financial collapse.[11] His model implies a behavior pattern of the following sort. Prosperity and economic boom conditions interact with expectations in a way which makes it likely that with rising interest rates, private persons and institutions assume liquidity-debt ratios which are relatively narrow and therefore vulnerable to a slowdown in the growth of either income or the money stock. According to Minsky, the Federal Reserve should be cautious of aggressively engaging in restrictive monetary actions during periods of extended prosperity, because "disorderly" markets may develop and possibly snowball into a full-scale financial panic such as occurred in the early Thirties.

Conversely, during periods of extended economic slowdown, private persons and institutions assume liquidity-debt ratios which are relatively large and, therefore, a potential source of future inflation. During such periods, the Federal Reserve may be cautious of aggressive easy monetary actions because it would add to inflated liquidity positions and consequently frustrate monetary control in the future.[12]

However, the Federal Reserve is not only concerned with the possibility of overall financial instability. It has two additional financial concerns related to interest rates which are narrower in their focus. First, for certain financial institutions, high and rising interest rates by themselves can bring about financial instability. In particular, by borrowing short and lending long, the S&L's have created portfolios which have left them vulnerable to upward secular shifts in interest rate levels. During periods of rapidly rising interest rates, S&L's become "locked-in" to their long-term, relatively low interest rate assets, which means that their net worth will decline and their profit margins will be depressed. Another objective related to interest rates is the Federal Reserve's desire to lower rates to encourage the growth of interest-rate-sensitive sectors of the economy, such as housing construction.

In the spirit of quantitative analysis in which this article is written, we attempt to measure the even-keel and financial system objectives of the Federal Reserve. Because there is no generally accepted measure of even-keeling, or of the Federal Reserve's role as the bank of last resort, a certain amount of experimentation was conducted. Even-keel is mentioned in the FOMC directives whenever the Treasury is

[10]In addition, the Federal Reserve has taken the position that Government security dealers, during a Treasury financing, should not receive a capital gain as a result of the Federal Reserve's role in the market.

[11]Hyman Minsky's position is presented in "Can 'It' Happen Again," *Banking and Monetary Studies*, ed. Deane Carson (Richard D. Irwin, 1963).

[12]Federal Reserve *Annual Report*, 1937, p. 2. In referring to the increase in reserve requirements in March and May 1937, the reason given " . . . was in the nature of a precautionary measure to prevent an uncontrollable expansion of credit in the future." At that time the Aaa corporate bond yield was 3.3 per cent; the consumer price index was 16 per cent lower than in 1929, and the unemployment rate was 14 per cent.

refinancing old debt or financing new debt. However, a new debt issue is presumed to require greater Federal Reserve action than refinancing old debt. In the former case, the net increase in supply of securities to the market would be equal to the size of the new debt issue; in the latter case, there would be no net increase in the supply of securities because the Treasury would have paid off the holders of old Government securities. Thus, most important Federal Reserve actions are assumed to be associated with the issue of new debt. This is measured by changes in the national debt held outside of the trust accounts of the Federal Government (ΔD).[13]

We have selected, as our proxy of the Federal Reserve's concern for the viability of financial institutions, the deviations of the corporate Aaa bond yield from its "normal" level.[14] Interest rates which are higher than "normal" are taken as a signal to the Federal Reserve that financial institutions are more vulnerable to restrictive monetary actions by the Federal Reserve. In addition, higher than normal rates have an adverse effect on S&L's and the housing construction industry, which the Federal Reserve finds undesirable. On the other hand, lower interest rates would be indicative of high liquidity-debt ratios, implying a concern on the part of the Federal Reserve that highly liquid, that is, sloppy financial markets would make control of future inflation difficult.[15] The behavior of the Federal Reserve under these circumstances would be to act in a way to increase the supply of funds when the interest rate was above normal and to act in a way to decrease the supply of funds when the interest rate was below normal.

[13]There may be some justification for including debt held in the Government's trust funds in the total because the Treasury manipulates purchases and sales by the trust funds according to the needs of smooth debt management.

[14]In the context of this article, the normal interest rate is one at which the financial system is in long-run equilibrium. Theoretically, that would equal the real rate of return on risk-free investment plus an adjustment for price expectations. Most studies indicate that when prices are changing relatively slowly (as in the United States), price expectations are adjusted after a 15-20 year lag.

[15]This concern about future inflation should not be confused with stabilization objectives. Stabilization objectives represent a concern with *present* levels of income and employment. The financial objective in this case represents a concern that the highly liquid state of financial institutions would make *future* anti-inflationary actions less effective. The Federal Reserve did not expect that its raising reserve requirements in 1937 would do anything more than "sop up" the unneeded excess reserves of member banks. The fact that it led to a sharp recession in 1938 was an unintended and undesired consequence.

Measuring Federal Reserve Actions

The criteria used for selecting a particular monetary aggregate as the measure of Federal Reserve actions are: (1) that its value be dominated by the actions of the Federal Reserve, and (2) that it have an important and measurable effect on total demand.

With respect to the first criterion, the Federal Reserve has three traditional tools which it can control completely: open market operations, changes in reserve requirements, and the discount rate.[16] Open market operations are measured by changes in Federal Reserve holdings of Government securities, changes in reserve requirements by changes in the dollar amount of required reserves (holding the dollar value of deposits and their distribution by class of bank constant), and the discount rate by the amount of borrowing of member banks. It is widely acknowledged that open market operations and changes in reserve requirements are the primary monetary tools, and that the discount rate is at best only of secondary influence.

One way to combine the two primary tools into one quantifiable measure of Federal Reserve actions is by adding a "reserve adjustment" to changes in Federal Reserve holdings of Government securities.[17] This series (adjusted Federal Reserve holdings of Government securities) meets the first criterion, because the value can change only if the Federal Reserve takes some action on the open market or changes reserve requirements. However, this series does not satisfy the second criterion, that of having an important and measurable influence on total demand. Previous research published in this *Review* and elsewhere has presented theoretical justification and empirical evidence which indicate that the monetary base has an important influence on total spending. The dominant source component of the monetary base is Federal Reserve holdings of Government securities adjusted for changes in reserve requirements.[18] This can be seen in Table 1, which lists all sources of the monetary base.

[16]The Federal Reserve also has an array of regulations, A through Z, which are designed to influence conditions in certain specified markets. It is our position that however substantial the impact of these regulations on the affected markets, their impact on the total economy is small; thus, they are not considered in this article.

[17]See Leonall C. Andersen and Jerry L. Jordan, "The Monetary Base – Explanation and Analytical Use," in the August 1968 issue of this *Review*.

[18]Without the reserve adjustment, Federal Reserve holdings of Government securities is a component of the source base. The difference between the source base and the monetary base is this same reserve adjustment.

Table I

MONETARY BASE (B)
(Millions of dollars)

	December 1968
Adjusted Holdings of Government Securities (GS_A)	$57,008†
Member Bank Borrowings (R_B)	765
Federal Reserve Float (F)	3,251
Gold Plus Foreign Currency (G + FC)	12,560††
Treasury Currency Outstanding (C_T)	6,810
Other (O)	— 2,887†††
Total	$77,507

†Adjusted for reserve requirement changes and shifts in deposits between class of banks.
††The foreign currency represents Federal Reserve holdings in connection with swap transactions.
†††Includes Treasury cash holdings, Treasury and foreign deposits with the Federal Reserve, and other Federal Reserve accounts.

The monetary base (B) can be defined as:

$$B = GS_A + R_B + F + (G + FC) + C_T + O$$

where Federal Reserve holdings of Government securities (adjusted) are under direct control, and other components, such as float, gold and foreign currency holdings, and Treasury currency, are not under direct control of the Federal Reserve. Float depends upon the amount of check transactions and therefore on the level of business activity; gold and foreign currency holdings are related to the U.S. balance of payments and international monetary conditions.

The sources of the monetary base which are outside direct control of the Federal Reserve could have an important impact on domestic money market conditions because of their effect on the reserve positions of member banks. Consequently, if the Federal Reserve wishes to prevent these flows from influencing money markets, it must take defensive actions by changing its holdings of Government securities. Thus, in addition to the primary goals of economic stabilization, even-keel and financial objectives of the Federal Reserve have a narrow technical objective of avoiding disturbances to the money markets caused by movements in these noncontrollable sources of the base.

To analyze how much Federal Reserve actions are directed toward offsetting the influences of these noncontrollable sources of the monetary base on money markets, a regression of the following first difference form was tested:

$$\Delta GS_A = a_0 + a_1\Delta R_B + a_2\Delta F + a_3\Delta(G + FC) + a_4\Delta C_T + a_5\Delta O$$

Changes in adjusted holdings of Government securities is on the left-hand side, and changes in the other sources of the monetary base, which the Federal Reserve does not directly control, are on the right-hand side. If the Federal Reserve acts to prevent all or part of the movements in these uncontrolled sources of the base from influencing money markets, it would show up in the form of statistically significant coefficients between (GS_A) and each of the variables on the right-hand side. Using monthly data from January 1953 to December 1968, the following results were obtained (numbers in parentheses are t values):[19]

$$\Delta GS_A = .132 - \underset{(5.11)}{.81}\ \Delta R_B - \underset{(2.49)}{.49}\ \Delta F - \underset{(11.01)}{1.02}\ \Delta(G + FC) + \underset{(.91)}{.50}\ \Delta C_T + \underset{(7.68)}{.91}\ \Delta O \qquad R^2 = .52$$

Except for Treasury currency, all of the coefficients are statistically significant at the 5 per cent level, which means the probability that there is no "real" relation between the dependent and independent variables is less than one in twenty.

Not only does the Federal Reserve respond to these other components of the monetary base, but its response is such as to offset their influence on the monetary base. That is, if the amount of float, member bank borrowings, or gold inflow should increase, this would, *ceteris paribus,* add to the monetary base as can be seen in Table 1. Because the coefficients of each of these variables are negative[20] and close to one in absolute value, it is possible to deduce that adjusted Federal Reserve holdings of Government securities has been manipulated in a way that the monetary base will not change significantly. In the process of achieving its short-term money market objectives, the Federal Reserve has tended, in effect, to offset uncontrolled movements in the monetary base.

Under these circumstances, Federal Reserve actions can be measured either as changes in adjusted holdings of Government securities, with this measure related to three primary objectives and one technical money market objective, or as changes in the monetary base related to just the three primary objectives. Because it has been demonstrated that the monetary base has an important impact on total demand, it is desirable to use this variable. In addition, it is necessary to use the monetary base if we wish to analyze

[19]The variables in all regressions are seasonally adjusted unless otherwise specified.

[20]ΔO has an expected sign and magnitude of +1 because it refers to changes in other Federal Reserve accounts. These other accounts consist largely of Treasury and foreign deposits which are liabilities of the Federal Reserve, and, as such, are entered as negative values of the source base as illustrated in the above table. In this case, an increase in this variable would decrease the monetary base, and therefore the appropriate offset would be an increase in Federal Reserve holdings of Government securities.

the actions of the monetary authorities in the prewar period when the Treasury department exercised a dominant role in monetary actions.

For the postwar period, equally satisfactory and consistent results are obtained using either ΔB or ΔGS_A to measure Federal Reserve actions. A choice between these two variables depends upon whether or not one desires to give explicit consideration to technical money market objectives. If these objectives are important, then ΔGS_A is appropriate. If not, ΔB is appropriate.

Federal Reserve Actions — The Explanation

The beginning of this article referred to the alleged discrepancy between monetary policy and Federal Reserve actions. We have defined monetary policy as reflected in the directives of the FOMC and proxied by the level of free reserves. In addition, Federal Reserve actions other than those related to short-term money market considerations can be measured by changes in the monetary base. It is clear from even casual inspection of the chart on page 17 that the two series are not closely related. There is a pronounced cyclical pattern in both series, which moved together in 1958-59 and 1966-67, but not in 1953, 1955, 1963-64 and 1968. The absence of a systematic relation between the two series is confirmed by the following regression, which relates the Federal Reserve action variable ΔB and the monetary policy or economic stabilization variable FR.

$$\Delta B = .428 + \underset{(.86)}{0.11(FR)} \qquad R^2 = .012$$

The value of the coefficient (0.11) is not statistically significant, and explains only 1 per cent of the variation in Federal Reserve actions (ΔB). We will explain this discrepancy between stated monetary policy and Federal Reserve action by its desire to achieve even-keel and financial objectives.

There are undoubtedly other influences on Federal Reserve actions, such as changes in the personnel of the Federal Reserve's decisionmaking apparatus, and changes in Presidential Administration. In spite of these obvious limitations, we believe our attempts to explain Federal Reserve behavior are reasonably satisfactory.

The accompanying table shows the regression relationships between our measure of Federal Reserve actions (ΔB) and proxies of the stabilization, even-keel and financial objectives which this paper asserts the Federal Reserve has desired to achieve. There are two panels of results, one for quarterly central differences and one for quarterly first differences. In each panel, the first column presents the results for the period since the Korean War, 1953 to 1968. The second column shows the results for the war and

Table II

RELATIONS BETWEEN FEDERAL RESERVE ACTIONS (ΔB) AND OBJECTIVES — FEDERAL RESERVE STABILIZATION (FR), EVEN-KEEL (ΔD), AND FINANCIAL ($r-r_n$)

(Billions of Dollars)

	Quarterly Central Differences			Quarterly First Differences		
	I/1953 - IV/68[2]	I/1940 - IV/52	III/1933 - IV/1939	I/1953 - IV/68	I/1940 - IV/52	III/1933 - IV/1939
Free Reserves (stabilization objective)	.21 (2.36)	.010 (.35)	.29 (5.64)	.21 (2.16)	.01 (.37)	.33 (5.70)
ΔD (even-keel objective)	.031 (1.56)	.077 (9.67)	—.70 (—4.37)	.030 (1.51)	.07 (6.32)	—.43 (2.89)
$r-r_n$ (financial objective)	.279 (6.73)	.254 (.61)	.241 (1.44)	.287 (6.73)	.469 (.81)	.362 (2.15)
X (Dummy Variable)[1]			.885 (3.53)			.955 (2.52)
R^2	.61	.67	.72	.52	.46	.70

Note: Figures given are regression coefficients; the "t" statistics appear below each coefficient, enclosed by parentheses.

[1]This variable was used to account for the rise in gold price in February 1934. It assumes the value of 1 in I/1934 and II/1934 and 0 for all other quarters.

[2]It is necessary to use quarterly data for comparability with other periods. Actually, the results are even better using monthly data January 1953 to December 1968.

$$\Delta B = .23\ FR + .024\Delta D + .309\ (r-r_n) \qquad R^2 = .44$$
$$(3.17) \quad (2.32) \quad (10.54)$$

The R^2 is much lower because of greater randomness in the variables, but the t-values are significant at a higher confidence level, probably because the Federal Reserve's time horizon with respect to its objectives is closer to one month than one quarter. The normal interest rate is identical with that using quarterly data ($r_n = 2.9$).

early postwar years, 1940 to 1952. The third column shows the results for the period 1933 to 1939. Each of these results will be analyzed in turn.

Mature Postwar Period — I/1953 to IV/1968

A substantial proportion of the variations in Federal Reserve behavior (ΔB) is explained by our proxies of Federal Reserve stabilization, financial and even-keel objectives. The signs of all the coefficients are positive, which is as would be expected. An increase in FR would indicate an easy money policy and therefore an increase in ΔB. An increase in the national debt would require additional even-keel actions of the Federal Reserve and therefore an increase in ΔB. An increase in interest rates would cause an increase in the Federal Reserve's concern for the stability of the financial system and therefore an increase in ΔB.[21]

To evaluate properly the policy implications of these results, we must determine which of the explanatory variables has made the largest contribution to changes in the monetary base (ΔB). Such an evaluation cannot be done by simply comparing the values of the regression coefficients, because the explanatory variables are all in different dimensions. However, the regression coefficients can be standardized by computing beta coefficients.[22] The beta coefficients for the 1953-68 period are 0.21 for the stabilization objectives, 0.16 for the even-keel objectives and 0.68 for the financial objective. These results suggest that in the postwar period Federal Reserve behavior was dominated by the consideration of protecting the financial system, while stabilization policy and even-keel objectives were of secondary and about equal importance.[23] If we attempt to scale Federal Reserve behavior with respect to these explanatory variables, about one-fifth can be explained by stabilization objectives, while the remainder can be explained in terms of achieving even-keel and financial objectives.

Similar results are achieved when Federal Reserve actions are measured by changes in adjusted Federal Reserve holdings of Government securities (ΔGS_A) when the short-term money market objective is included. Using monthly central difference data from January 1953 to December 1968, the results are as follows:[24]

$$\Delta GS_A = \underset{(2.38)}{+ .207(FR)} \underset{(2.39)}{+ .03\ \Delta D} \underset{(8.39)}{+ .309(r\text{-}r_n)} \underset{(7.16)}{- .93\ \Delta R_B}$$
$$\underset{(3.62)}{- .59\ \Delta F} \underset{(10.89)}{- .85\ \Delta(G + FC)} \underset{(1.56)}{- .74\ \Delta C_T} \underset{(9.11)}{+ .90\ \Delta O}$$
$$R^2 = .69$$

The coefficients are almost identical with respect to stabilization, even-keel and financial objectives, as in the case of using the monetary base (ΔB) as the dependent variable. With respect to the short-term money market objective, the results are about the same as those presented on page 12. The monetary base and adjusted Federal Reserve holdings of Government securities are equally consistent measures of Federal Reserve actions. As stated earlier, the choice between them depends upon whether one wishes to explain these actions with or without reference to short-term money market objectives.

War and Early Postwar Period — I/1940 to IV/1952

During World War II and the early postwar period it has been generally considered that Federal Reserve actions were dominated by the desire to support the U.S. Treasury in financing the large and rising national debt. Our results clearly indicate that financing the national debt played the dominant role in Federal Reserve behavior during this period. The debt variable is highly significant statistically, while

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[21]The normal interest rate in the financial objective, r_n, is the product of a ratio computed from the coefficient with respect to r and the value of the constant term. This procedure simultaneously suppresses an unrealistic negative constant term and eliminates the implication that any positive value for r will lead to an increase in the monetary base. Using this procedure, the normal interest rate is 2.8 per cent for 1953-68, 2.9 per cent for 1933-39 and 2.4 per cent for 1940-52. Considering the method of calculation, the values are quite close.

A variety of other techniques were tried to determine the value of $r\text{-}r_n$. Various arbitrary values of r_n were selected and deviations were computed of a cubic, quadratic and linear form. The results of these experiments are similar to the results reported here.

[22]"Beta coefficients" are used to determine the "typical impact" or importance of the explanatory variables in a regression. It should be noted that beta coefficients are equivalent to the regression coefficients of a regression run on "standardized" variables of the form X_j/S_{jj}, where X_j is the variable, and S_{jj} is its standard deviation. An analysis based on beta coefficients, instead of regression coefficients, eliminates the necessity of assessing the impact that the units of measurement have on the relative sizes of the coefficients in a regression, and this reduces the possibility of a faulty interpretation of the regression results. See Arthur S. Goldberger, *Econometric Theory* (John Wiley & Sons, 1964), pp. 197-98.

[23]When the coefficients were estimated for the period 1953-65 their values were about the same as those reported for the period 1953-68. However, the beta coefficient for interest rates was lower and about equal to the product of the other two. This is as would be expected because the financial objective has been of increased importance in the 1966-68 period.

[24]FR and $r\text{-}r_n$ are variables measured at monthly levels, so the estimated monthly coefficients were multiplied by three to make them comparable with the coefficients estimated with quarterly data.

the other variables are not. The beta coefficients for stabilization and financial objectives are insignificant, and for ΔD are .809. The debt variable dominated ΔB in the war and early postwar period.

Prewar Period — III/1933 to IV/1939

The Federal Reserve went through a chaotic and trying experience during the 1929-33 period because of the Great Depression, the international monetary collapse and the domestic financial panic. The Federal Reserve apparently withdrew from active monetary management during the period 1933-39. This lack of action can be seen from the fact that Federal Reserve credit changed very little from early 1933 to the end of 1939 and varied on the average by less than $47 million per quarter, compared with $635 million per quarter in 1953-68.[25]

In effect, the Treasury Department carried on active monetary management during this period by the rate at which it permitted the monetization of the large gold inflows. It is interesting to note that in spite of the different economic conditions and the Treasury's performing the active role of monetary management during much of the period, the behavior of the monetary authority was similar to its behavior in the 1953-68 period relative to the same set of explanatory factors. The stabilization (FR) and financial system ($r\text{-}r_n$) objectives are significant, and their coefficients have about the same value in both periods. The even-keel variable (ΔD) is statistically significant; however, the sign of its coefficient is opposite that of the sign for the mature postwar period.[26] For reasons explained in footnote 26, this is largely due to the Treasury Department assuming active monetary management in this period. The beta coefficients for this period were 0.85 for stabilization, 0.25 for financial and −0.62 for even-keel objectives. Considering the magnitude of the decline in employment, prices and income, which occurred in the early Thirties, it is not surprising that the beta coefficients imply that the major factors determining monetary authority behavior in the middle and late Thirties were stabilization objectives related to increasing income and employment. An important factor explaining the relatively low beta coefficient for the financial objective was that $r\text{-}r_n$ did not change much during this period. The large size of its coefficient implies that, if it had varied significantly, it would have played a more significant role in determining Federal Reserve actions.

A Statistical Digression

An examination of the differences between the value of ΔB estimated by the equation and the actual value of ΔB for the period 1953 to 1968 indicates the presence of what, in statistics, is called serial correlation in the residuals. The usual interpretation is that some important explanatory variable has been omitted. As indicated before, a potentially serious deficiency in our explanation of Federal Reserve behavior is not taking account of the changes in Presidential Administration. Although the laws establishing the Federal Reserve and the practices which have developed over the years provide it with more autonomy than is enjoyed by most central banks, it is not completely insensitive to the desires and wishes of the President and his immediate advisers. Thus, it is possible that Federal Reserve's behavior may differ between Presidential Administrations. This possibility was tested very crudely by introducing a "dummy" variable, X_1, to see if Federal Reserve actions other than for previously stated objectives differed between the two administrations.[27] The re-

[25]See various issues of the Federal Reserve *Bulletin*.

[26]The different signs of the coefficient of the even-keel variable (ΔD) in the prewar and mature postwar periods can be explained by two factors:

(1) In the prewar period even-keel needs were insignificant, while in the mature postwar period they were large.

(2) The Treasury was the major monetary authority in the prewar period, while the Federal Reserve performed that role in the mature postwar period.

Even-keel considerations were not important in financing the growing Government debt in the middle and late Thirties because short-term money markets were on average very liquid, and the demand for default-free Government securities by a strongly risk-averting public was great. In the mature postwar period, short-term money markets were on the average much less liquid, and the public's demand for Government securities as a protection against the risk of default of private securities was small. This explains why the even-keel variable (ΔD) was positive in the mature postwar period and nonpositive in the prewar period.

The even-keel variable (ΔD) was negative in the prewar period because the Treasury Department was in active control of monetary management. This control of the monetary base was achieved by regulating the rate at which the Treasury monetized the heavy gold inflows of the middle and late Thirties. The Treasury reduced the growth in the monetary base by financing the gold inflow out of general Government funds, thereby increasing the national debt by more than would otherwise have been the case. The Treasury increased the growth in the monetary base by monetizing current gold inflows plus accumulated Treasury gold stock through sales of gold certificates to the Federal Reserve, thereby reducing the size of the national debt from what it otherwise would have been.

[27]The dummy variable assumes the value of zero for I/1953 to II/1962 and the value of one from III/1962 to IV/1968. The third quarter of 1962 was selected for two reasons. First, this was the first quarter when the Federal Government budget was under the complete control of the incoming Democratic Administration. Second, the link between the Presidential Administration and the Federal Reserve is informal and adaptive, and it is reasonable to assume that a change in Federal Reserve behavior would occur gradually.

sults of the test using quarterly central difference data (billions of dollars) and the monetary base (ΔB) from 1953 to 1968 are as follows:

$$\Delta B = \underset{(2.92)}{.18(FR)} + \underset{(2.00)}{.03\ \Delta D} + \underset{(3.11)}{.112(r\text{-}r_n)} + \underset{(7.85)}{.428X_1}$$

$$R^2 = .81$$

The results using adjusted Federal Reserve holdings of Government securities monthly for the same period are as follows:

$$\Delta GS_A = \underset{(2.01)}{.159(FR)} + \underset{(3.25)}{.04\ \Delta D} + \underset{(2.67)}{.117(r\text{-}r_n)} + \underset{(6.71)}{.155\ X_1} - \underset{(8.69)}{1.02\ \Delta R_B} - \underset{(3.41)}{.50\ \Delta F} - \underset{(12.70)}{.89\ \Delta(G + FC)} - \underset{(1.65)}{.70\ \Delta C_T} + \underset{(9.56)}{.85\ \Delta O}$$

$$R^2 = .75$$

The fact that the coefficient of the dummy variable, using monthly data, is only one-third of the coefficient when quarterly data was used (.155 versus .428) is due to the difference in time dimension (monthly data compared to quarterly data). The results of these tests are very similar. In both cases a larger percentage of Federal Reserve actions is explained by explicitly accounting for the change in administrations, and serial correlation in the residuals is substantially reduced. The values of the coefficients of the other variables were not changed significantly except for $r\text{-}r_n$, which has a lower value. The dummy variable undoubtedly overstates the difference between the two administrations because it seems to capture some of the influence of the interest rate variable.

Summary of Results

Before summarizing our results, it is important to note that Federal Reserve behavior in the period 1929-33 has been characterized by most students as "inappropriate." The monetary policy objective of stabilizing income and employment was pursued in a most timid manner and was easily displaced by international monetary concern.[28] For example, when the United Kingdom went off the gold standard in September 1931, the Federal Reserve temporarily switched to a highly restrictive policy, even though it was widely recognized that the United States was in the midst of a serious depression. As that depression deepened, some banks failed because the Federal Reserve did not perform the fundamental central banking task of acting as the "bank of last resort." This weakened public confidence in the financial system, triggering a run on many banks. The massive number of bank failures which ensued, deepened and intensified the depression of income and employment.

In contrast with the early Thirties, the results presented in this paper indicate that the monetary authorities have since behaved in a more consistent manner. Three objectives have determined their behavior: a stabilization objective with respect to income, employment and prices; a financial objective with respect to protecting the financial system from the recurrence of the events of the early Thirties, and the objective of supporting the Treasury Department in its debt-financing role, otherwise known as "even-keel." This consistency of behavior is observed irrespective of whether the Treasury (1933-39) or the Federal Reserve (1953-68) is performing the monetary management role.

During the middle and late Thirties when employment and income were at historic lows relative to the previous business cycle peak, our results indicate that stabilization objectives related to increasing employment and income dominated the behavior of the monetary authority.[29] The monetary authority's behavior related to protecting the stability of the financial system can be detected during this period, but it was of secondary importance because those financial institutions which had survived the "events" of the early Thirties were highly liquid. The even-keel objective was insignificant in this period because the public, at that time, needed little encouragement to purchase default-free Government securities.

During the Fifties and Sixties employment was relatively high and income was growing at a generally satisfactory rate. Our results indicate that during this mature postwar period Federal Reserve actions were dominated by a desire to insure the stability of the financial system, especially in later years. This, of course, does not mean that income stabilization objectives never influenced Federal Reserve actions in the postwar period. On a number of occasions, such as in 1959 and 1966, stabilization objectives dominated Federal Reserve actions. However, when there was a conflict between objectives, the financial invariably dominated.

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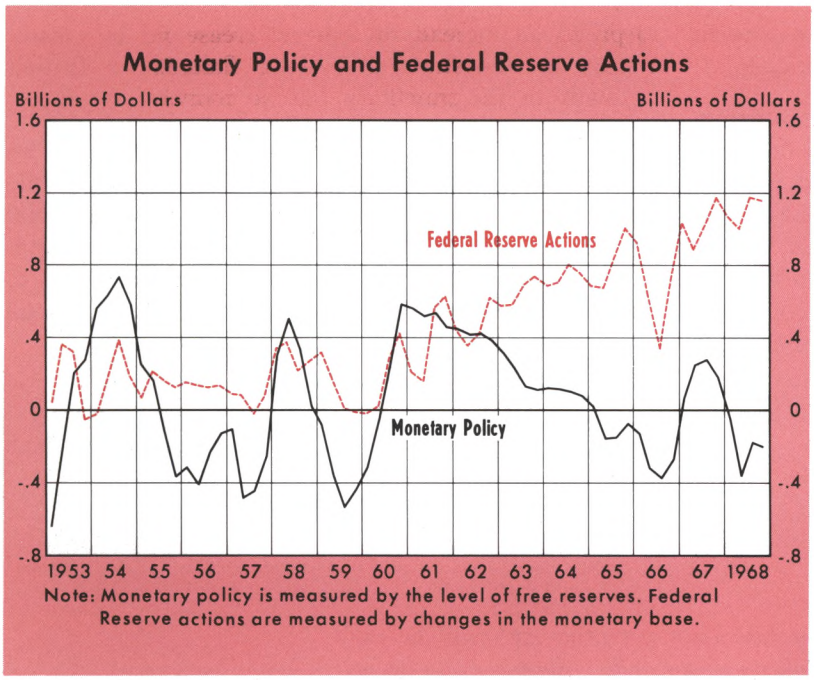
[28] Milton Friedman and Anna Jacobson Schwartz, *A Monetary History of the United States, 1867-1960* (Princeton: Princeton University Press, 1963), chapter 7. This is the most detailed and complete history of the monetary events in the 1929-33 period.

[29] There was one relatively short period in the first half of 1937 when monetary policy related to stabilization objectives became restrictive. This was the only period in the middle and late Thirties when monetary authorities' concern for the stability of the financial system overrode their concern for increasing employment and income. See page 11, footnote 15 for further discussion of this issue.



A clear example of this fact can be found by contrasting Federal Reserve behavior in 1966 and 1968. In the first half of both years, monetary policy, related to economic stabilization, was equally "tight." However, Federal Reserve actions, measured by changes in the monetary base, were tight in 1966, while they were not tight in 1968. (Contrast free reserves and the monetary base in the above chart.) The difference between these two experiences was that the Federal Reserve was far more sensitive to consequences of its actions on financial markets in 1968 than it was in 1966. After the "credit crunch" of 1966, a great deal had been written about the "disorderly" financial markets and the threat this had posed to the stability of the financial system. Another factor contributing to the relatively easy monetary actions in 1968 was the large growth in the national debt, which had required that the even-keel objective be implemented frequently. This was not half so important in 1966 because of the smaller Government deficit.

Conclusions

The intent of this article is to show that Federal Reserve actions are not solely dictated by economic stabilization objectives. The Federal Reserve has independent even-keel and financial objectives which have, at times in the past, interfered with economic stabilization. This article by no means provides a definitive explanation of Federal Reserve actions. There may be other objectives which the Federal Reserve attempts to achieve, or there may be better ways of measuring the even-keel and financial objectives than the ones we have chosen. With this caveat, certain conclusions can be offered.

The behavior of the monetary authority with respect to stabilization and other objectives has been consistent. Our results imply that the monetary authority does in fact make some value judgments which discriminate between important objectives and less important objectives. The monetary authority cannot be criticized for behaving in an inconsistent manner.

A criticism which might be directed at the Federal Reserve is that some of the objectives they have chosen, or their relative weights have not been appropriate. The question as to whether or not the Federal Reserve has acted in an appropriate manner is not attempted in this paper. The answer to such a question would require more knowledge about the structure of the economy than is presented here. In general, the answer would depend on whether or not Federal Reserve actions have their dominant influence directly on income, employment and prices. If they do, the monetary behavior should be directed exclusively toward achieving desired levels of these variables because of their overwhelming impact on the welfare of our citizens.

If, on the other hand, monetary actions have their dominant influence on the financial system and perhaps on interest-rate-sensitive segments of the economy, such as the housing industry, it would be more appropriate for financial objectives to dominate the behavior of the monetary authorities. Because monetary actions would have relatively little direct influence on income, employment and prices in such a case, the monetary authority could only influence them indirectly by achieving its financial objectives.[30]

A considerable amount of evidence has developed in recent years which indicates that the behavior of the monetary authority has a substantial direct influence on income, employment and prices, which operates with a relatively short lag. Under such conditions, the appropriate behavior of the Federal Reserve in the 1953-68 period should have been to stabilize income, employment and prices, while, in fact,

[30]Outside of major war and national mobilization, there is no reasonable set of circumstances in which Federal Reserve actions should be dominated by even-keel objectives.

their behavior was dominated by a desire to prevent short-run instability in the financial system.

Behavior dominated by financial objectives is potentially destabilizing. Federal Reserve actions designed to protect the financial system in a period of high and rising interest rates result in a more rapid growth in the monetary base than would otherwise be the case. This, in turn, leads to a rapid growth in income, employment (until the full employment constraint is reached) and prices. The inflationary price rises lead to an increase in interest rates and to greater strain on the financial system, inducing a further growth in the monetary base.

If Federal Reserve actions have their dominant influence on income, employment and prices, while Federal Reserve behavior is dominated by financial objectives, this will lead not only to increased instability in income, employment and prices, but also to increased instability in the long run for the financial system.

MICHAEL W. KERAN
CHRISTOPHER T. BABB

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Two important issues not yet dealt with will be discussed in the following Appendix. Raising these issues earlier would have interrupted the development of the main body of the article.

APPENDIX

The present study, which relates the actions of the Federal Reserve to its objectives, differs from previous similar studies in two fundamental ways. First, the present study uses free reserves as a measure of the Federal Reserve's intent of policy with respect to its economic stabilization objectives, instead of relating the Federal Reserve's actions directly to its ultimate stabilization objectives. The use of free reserves as a proxy for the intent of economic stabilization policy, we feel, surmounts several serious structural problems which existed in earlier empirical models of Federal Reserve policy and actions.

Second, the present study relates Federal Reserve actions to a larger and more comprehensive set of Federal Reserve objectives than was previously considered relevant. In addition to the traditional economic stabilization objective with its output, price level, employment, and balance-of-payments dimensions, a case was developed in the text for the inclusion of even-keel and financial stability objectives.

Various Approaches Relating the Federal Reserve's Objectives to Its Actions

The use of free reserves as a measure of the Federal Reserve's intent of economic stabilization policy becomes more reasonable after an examination of previous studies of the Federal Reserve's behavior. We will consider such studies by Dewald and Johnson (1963)[1] and John Wood (1965).[2] In addition, Christian's (1968) critique of the Dewald and Johnson article is also examined.[3] No attempt is made in the following discussion to present

[1]See William G. Dewald and Harry G. Johnson, "An Objective Analysis of the Objectives of American Monetary Policy, 1952-1961," *Banking and Monetary Studies,* ed. Deane Carson (Homewood, Illinois: Richard D. Irwin, 1963).

[2]John Wood, *A Model of Federal Reserve Behavior,* Staff Economic Study No. 17, Board of Governors of the Federal Reserve System.

[3]James W. Christian, "A Further Analysis of the Objectives of American Monetary Policy," *The Journal* of *Finance,* volume XXIII, June 1968.

a complete review of these articles. John Wood's model is considered first, because at first glance it appears to embody the ideal approach to studying the Federal Reserve's behavior.

A Model of Federal Reserve Behavior

Using the tools of micro-economic analysis, Wood develops a consistent model which connects an assumed FOMC disutility preference function to a policy model with economic structural relations. Within each of his model's structural equations, an adjusted first difference of free reserves is included as the Federal Reserve's intermediate financial target variable. The basic justification for this specification is that through its ability to affect free reserves, "the Federal Reserve conceives itself as influencing the economy."[4] Yet, in spite of the theoretical sophistication of his economic model, the empirically based conclusions of Wood's study about FOMC behavior and policy add little to what was already known from much simpler models. The economic relations in Wood's model are such as to prevent him from "partitioning" the regression coefficients of his reduced-form equation into the preference and structural parameters contained in his theoretical model.

The specification of Wood's contemporaneous structural model within the disutility framework made it impossible for him to disentangle the mixtures of "weights" and "effects" present in the reduced-form regression coefficients. Whether or not these consequences might be remedied by an "appropriate" specification of time lags appears to be an unanswered question. The present study avoided the problems associated with "utility" functions through the use of free reserves as a summary measure of the intent of the FOMC's economic stabilization policy.

One implication of Wood's work appears to be that economists might profitably study the behavior of the Federal Reserve within the context of reduced-form models, involving time lags. This implication holds because the results of using fully specified structural models may be undecipherable. If appropriate time lags exist between actions and their impacts, reduced-form models can be set up where causation operates predominately in one direction. Such situations permit a relatively unambiguous interpretation of regression coefficients.

A Reduced-Form Model

In setting up our model of Federal Reserve behavior, we also benefited from an examination of some of the existing reduced-form models in this area. Specifically, an examination of certain problems inherent in Dewald and Johnson's reduced-form model guided us in the specification of our model.

Using the regression equation of the "reaction function" type, Dewald and Johnson (D-J) attempted to unearth two aspects of monetary behavior: (1) the relative importance of the various monetary policy objectives, and (2) the average lag period between a change in the "performance measure" of a policy objective and the response of monetary policy to that change. Related to the latter goal of the study was an attempt to determine which indicator best measures monetary policy.

From an examination of the standard errors of their regression coefficients, Dewald and Johnson concluded that high employment and growth were the principal monetary objectives pursued by the Federal Reserve during the period of the study (1952-62). Also, when the money supply was used as the monetary policy variable, a long and possibly destabilizing lag of nine months was implied for the response of monetary policy to undesired changes in the economy. Nevertheless, they selected the money supply as the best proxy for monetary policy. Free reserves also provided acceptable statistical results.

Weaknesses in the Approach

Christian suggests that certain weaknesses existed in the D-J approach which would call their conclusions into question. Christian observed an instability in regression coefficients when the model was run for various overlapping subperiods contained within the total period used in the D-J study. This finding raises a number of questions. Since each of the D-J regression equations fits within the framework of the Koyck distributed-lag model, the instability in the coefficients of their respective lagged dependent variables suggests that there is no simple average period of policy response. In addition, policy objectives which appeared to be very important in one regression period turned out to be insignificant in another. The latter result has two possible interpretations. First, the Federal Reserve's appraisal of its disutility associated with being off target for one policy objective may not be independent of how close other policy objectives are to their targets. Second, "instable coefficients" reflect a structural incompatibility among certain pairs of policy objectives which prevents their being achieved simultaneously through the use of one policy tool. Yet, even if policy goals are both independent and stable, regression coefficients may be biased in some indeterminate way as a result of insufficient variations in some of the "performance measures" of the economy, in either all or part of the regression period selected.[5]

Another problem with the D-J model is that the contemporaneousness of the policy function with the structural relations of the economy means that the coefficients of the D-J regressions are indeterminate mixtures of "effects" among the variables within the economy and "weights" of the respective "performance measures" within the Federal Reserve's preference calculus.[6] The last-mentioned assumption of the D-J study (which also played an important role in John Wood's study) effec-

[4]Wood, p. 16.

[5]Christian, pp. 465-477. In addition, the lack of consistency among the regression results for different periods may also reflect the exclusion of "performance measures" of policy objectives which are considered to be very important by the Federal Reserve. This problem was considered in the main body of the article and in the discussion of nonstabilization objectives.

[6]In his article "A Model of Federal Reserve Behavior," John Wood was perhaps the first economist who explicitly criticized Dewald and Johnson for failing to recognize this problem when they analyzed their regression results (see footnote 32).

tively eliminated the possibility of drawing conclusions about policy preferences from the D-J reaction function model.

Dewald and Johnson attempted to achieve too much within the confines of a simple model. Basically, there are two problems with the D-J study which we feel were effectively eliminated from the present study. The first problem concerns the difficulties of relating the economic stabilization component of Federal Reserve actions to the ultimate economic stabilization objectives. The second problem is that of indeterminate mixtures of economic feedback "effects" and policy "weights" within the regression coefficients.

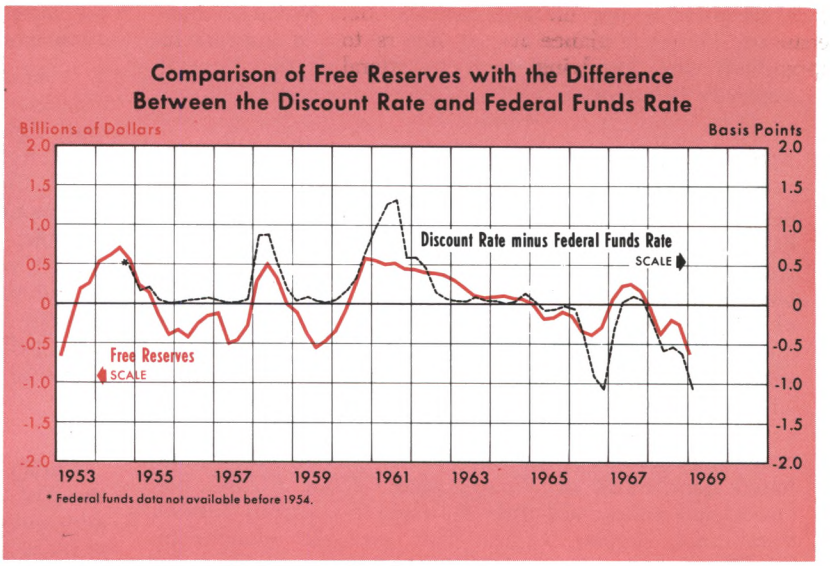
Relative to the first problem, instead of relating monetary policy directly to a set of stabilization objectives, the present study uses a single variable, free reserves, as a proxy for the Federal Reserve's intent of policy with respect to the economic stabilization objectives. The actual level of free reserves which indicates a certain degree of tightness or ease allows us to avoid the problem of measuring the tradeoffs between the various stabilization objectives.

Relative to the second problem, the present study arrived at a regression equation relationship between the three proxy variables of the Federal Reserve's objectives and the monetary base, which involves a one-way direction of causation due to the lag in the effect of changes in the base on total demand, as shown in other studies. With policy decisions and the proxy variables being predominantly influenced by the level of current economic activity, the coefficients of the regression equation appear to be fairly unbiased measures of policy weights.

The Logical Consistency of Using Three Proxy Variables Within The Reduced-Form Equation

In the process of setting up the reduced-form equation, the question arises as to the logical consistency of including the even-keel and financial stability objectives in the regression equation separately from the free reserves variable which, we argue, accurately reflects the net thrust of FOMC directives. This approach is reasonable because the open market desk operates in a context in which there is no rigid link between open market operations and the level of free reserves. That is, the Federal Reserve can control free reserves without changing its adjusted holdings of Government securities.

With its control of the discount rate, and its ability to buy and sell in the open market, the Federal Reserve has enough tools to achieve both a free reserves target and to carry on open market operations relative to its even-keel and financial stability objectives, quite independently of the free reserves contraint. This condition



serves as a justification for asserting that even-keel and financial stability objectives are not implicitly contained within the free reserves variable, but can be added to it in a regression equation which is used as an explanation of the movement in adjusted holdings of Government securities. If a rigid link existed between free reserves and open market operations, then the trading desk could not achieve even-keel and financial stability objectives which were inconsistent with the desired free reserves target.

Given the existence of the profit motive on the part of the member banks, the movements in borrowing from the Federal Reserve, which are the dominant component of free reserves, could be induced by changes in the difference between the discount rate and the rate for alternative sources of funds, such as the Federal funds rate. In fact, we feel that there is substantial evidence which indicates that this difference does a satisfactory job of explaining movement in free reserves. In the above chart, the difference between the discount rate and the Federal funds rate is plotted along with the level of free reserves. The following regression equation expresses the extent of that association:

IV/1954 to II/1962:

$$FR = -0.23 + \underset{(8.35)}{0.83}\,(R_D - R_F) \qquad R^2 = .71$$

III/1962 to IV/1968:

$$FR = 0.104 + \underset{(6.32)}{0.55}\,(R_D - R_F) \qquad R^2 = .63$$

where R_D is the Federal Reserve Bank of New York discount rate and R_F is the Federal funds rate.

This mode of explaining movements in free reserves operates quite independently of the movements in the monetary base. The monetary base seems to be the best measure of "effective" open market operations after allowing for the Federal Reserve's defensive operations against the other source components of the base. Consequently, the monetary base can legitimately be regarded as an additive linear function of the separate proxies for the economic stabilization, even-keel and financial stabilization objectives.

EDITOR'S NOTE:

The following "Comment" is in response to the article, "International Monetary Reform and the 'Crawling Peg'" by George W. McKenzie, which appeared in the February 1969 issue of this REVIEW. *J. Herbert Furth is Faculty Associate in Residence, School of Professional Studies, for the Foreign Service Institute in the Department of State, and was formerly an adviser to the Board of Governors of the Federal Reserve System. The "Comment" reflects his personal opinion, and should not be interpreted as representing the views of the Foreign Service Institute.*

Professor McKenzie is Assistant Professor of Economics at Washington University in St. Louis. His "Reply" follows immediately after Mr. Furth's "Comment."

International Monetary Reform and the "Crawling Peg"—Comment

by J. HERBERT FURTH

PROFESSOR McKENZIE, in his article on the "crawling peg,"[1] believes that the replacement of fixed par values by a "crawling peg" would

(a) "increase the effectiveness of monetary policy in achieving domestic goals";
(b) "avoid the periodic exchange crises and uncertainty of the present system"; and
(c) reduce "the incentive for countries to impose controls on international transactions."[2]

The following comments are designed to show that the institution of a "crawling peg" is unlikely to achieve the first two results, and that the third result would be achieved at excessive cost.

Professor McKenzie bases his reasoning mainly on an application of the Mundell theorem,[3] according to which monetary policy, under conditions of fixed exchange rates, has no impact on the level of domestic economic activity. It therefore becomes necessary first to discuss the conditions under which the Mundell theorem may be applied in practice.

[1]George W. McKenzie, "International Monetary Reform and the 'Crawling Peg,'" in the February 1969 issue of this *Review*, pp. 15-23.

[2]Ibid, pp. 15 and 16.

[3]Ibid, p. 17.

Assumptions Underlying the Mundell Theorem

This highly interesting and important theorem is valid (as Professor Mundell himself realizes) only under the following assumptions:

(1) All international capital flows are exclusively determined by interest rate differentials.
(2) Exchange rates are so rigidly fixed that there is no forward exchange premium or discount.
(3) International capital is so flexible that the smallest interest rate differential sets flows in motion.

It should be unnecessary to point out that, as a rule, none of these assumptions conforms even approximately to economic reality.

Interest Sensitivity of International Capital Flows

International capital movements include primarily three types: flows of money-market funds; credits financing international trade; and equity investments, including both portfolio and "direct" investments.

Of these three types, only the first is interest-sensitive. The volume of trade credits depends almost exclusively on the volume of trade. The volume of

equity investments depends on expected profit (not interest) rates: that of portfolio investments mainly on short-run, that of "direct" investments mainly on very long-run expectations. While is it true that an autonomous rise in market interest rates may indicate a rise in expected profit rates, this is not true of a rise in interest rates resulting from restrictive monetary policies. Such policies actually tend to reduce the expected profit rate, at least in the short run: when the Federal Reserve tightens its policies, the stock exchange turns bearish (unless the market believes that the policies will be ineffective). Hence, restrictive monetary policies tend to induce an *outflow* rather than an inflow of portfolio investment funds. Finally, temporary fluctuations in interest rates are extremely unlikely to affect very long-run profit expectations, and therefore extremely unlikely to influence the volume of "direct" investments.

Rigidity of Exchange Rates

The only main category of capital movements that is highly interest-sensitive, the flow of money-market funds, is sensitive to "covered" rather than "uncovered" interest rate differences.[4] As any table showing changes in "covered" interest rate differences will prove, the movements of interest and forward exchange rates tend to offset each other – in part, completely, or even more than completely. Hence, a rise in gross money-market rates is not much more likely to set in motion a large inflow of money-market funds than to set in motion an outflow, or – most often – to leave the flow substantially unchanged. Moreover, even if a large inflow were to occur, it would "finance" rather than "correct" the payments deficit since a flow of money-market funds creates liquid liabilities in exactly the same amount as liquid assets, and thus does not affect the country's net international liquidity position.

Interest Rate Differentials

Finally, even insofar as capital flows might be sensitive to interest rate differences, the costs and risks of international placements make it unlikely for capital flows to become significant unless the differences exceed some minimum, usually estimated at about ½ of 1 per cent. As long as monetary policy is conducted so moderately (and successfully) that a larger jump is avoided, it is not likely to induce substantial capital flows, even in the absence of conflicting movements of forward exchange rates. And even when the minimum limit is exceeded, the flows cannot be expected to be so large as to offset completely the change in domestic liquidity resulting from the policy action. In the United States, for instance, the volume of domestic bank deposits may change by as much as $25 billion in one month – an amount larger than the total of all deposits with U.S. banks held by foreigners, and about 15 times as large as the largest monthly change in U.S. liquid liabilities to foreigners recorded in recent years.

For these reasons, the Mundell theorem cannot be applied for policy purposes, except perhaps under rather unique conditions: say, within the Common Market after its complete monetary integration (a situation which obviously would exclude the use of a "crawling peg"); or at best – as Professor Mundell himself believes – to Canada in relation to the United States.

Limits to Domestic Effectiveness of Monetary Policy

This is not to deny that international capital flows may well limit the effectiveness of monetary policies; but unfortunately, institution of a "crawling peg" would not eliminate such countervailing flows – on the contrary, it would tend to magnify them.

Domestic banks will always seek to nullify the effects of tight monetary policies by replenishing the funds withdrawn from the market by the central bank. The recent "borrowing" of Eurodollars by U.S. banks, for instance, reached a peak of more than $10 billion, although interest rates in the Eurodollar market have been uniformly higher than those in the U.S. market.

Professor McKenzie himself states that under the "crawling peg" system, too, tight monetary policies will result in a capital inflow; with the difference, however, that the flow will result in an appreciation of the country's exchange rate.[5] This "crawling" appreciation will indeed tend to increase imports and reduce exports; but at the same time, it will accelerate the capital inflow as long as the market believes that the rise in rates will continue: the effect of the gross interest rate differential resulting from the action of the central bank will be magnified by the effect of the rise in the forward exchange rate, resulting from the expectation of continued appreciation.

Professor McKenzie asserts that the inflow of capital, while sufficient to offset exactly the deterioration

[4] "Covered" interest rate differences are gross differences plus (minus) forward exchange premiums (discounts).

[5] McKenzie, p. 21.

in the trade balance (so that there would be "no balance-of-payments deficit or surplus"), will *not* be sufficient to offset the contractive effect of that deterioration on the level of domestic economic activity — so that there would be a "further decrease in aggregate spending."[6] But this remarkable relationship of the magnitudes involved is asserted without any theoretical or empirical evidence.

Actually, it seems more likely that the effect of the appreciation on exports and imports will be small,[7] while a forward exchange premium equivalent to 2 per cent per year, added to an interest rate difference of, say, ½ of 1 per cent, may well attract large amounts of money-market funds — in any case, much larger amounts than would be attracted by the gross interest rate difference without the addition of a forward exchange premium! Hence, anti-inflationary monetary policy would probably be less effective, not more effective, than under the present system.

Avoidance of Exchange Crises

Under the present system, "exchange crises" have been neither as numerous nor as severe as the critics of the system believe: none of them has seriously interfered with the continuous expansion in international commerce nor with the continuous improvement in economic welfare — the only meaningful standard of economic institutions. Actually, since 1958 — when the present system began to operate with the re-establishment of convertibility of the major European currencies — there have been only four events that could be called "exchange crises" of major currencies: the revaluation of the German mark (and the Netherlands guilder) in 1961; the difficulties of sterling since 1964; the difficulties of the French franc since May 1968; and the difficulties of the U.S. dollar over virtually the entire period.

The problem of the U.S. dollar will be discussed in the next section. The problem of the French franc has been obviously unconnected with the present payments system: until the outbreak of political unrest in May 1968, the French economy was in reasonable external as well as domestic equilibrium, and under no conceivable payments system would the franc have been "crawling" downward in exchange markets before that date. True, after the outbreak of the unrest, the franc would presumably have sharply depreciated under a system of freely fluctuating exchange rates. But if the assessment of the difficulties by the French authorities (sudden capital flight triggered by political rather than economic fears) was correct, such depreciation would have been an unnecessary and harmful disturbance of the French economy; and if the assessment was wrong, the appropriate remedy would have been an immediate devaluation (which under the present system was not only possible but actually recommended), not a chronic downward "crawling" of the franc.

The sterling crisis has been due to a difference of opinion between the market, which considered the British payments deficit due to a structural weakness of the British economy, and the British authorities, which considered it due to monetary overexpansion. Apparently, both sides were right; hence, the British efforts to correct the deficit by tight domestic policies were in vain — incidentally proving that tight monetary policies do not necessarily lead to offsetting capital inflows under the present system! — but a "crawling peg" would have been equally unsuccessful: the inflationary stimulus given to British import-competing and export industries by the depreciation of sterling would have reinforced the existing inflationary pressures and thus made stringent anti-inflationary domestic policies even more necessary as well as more difficult; and at the same time, the certainty of a continuation of the "crawling" depreciation for many years to come would have reinforced the tendency toward capital flight. Since it appears that a 14 per cent devaluation combined with quite restrictive monetary and fiscal policies has not sufficed to restore the British economy to equilibrium over a period of 15 months, the effect of a "crawling" depreciation — which, at Professor Meade's rate, would have amounted to only 2½ per cent over the same period — would obviously have been even less satisfactory.

It might indeed have been better if the British devaluation had come in the spring of 1964 rather than in the fall of 1967; but the present system did not make such a move any more impossible in 1964 than it did in 1967 — and at a rate of "crawling" depreciation limited to 2 per cent per year, the pound sterling would now, in the first quarter of 1969, still be overvalued by about 5 per cent even if the depreciation had started at the time of the first difficulties! Hence, Britain's payments balance (and its domestic economic policies) would probably have been over the past five years in worse shape under a "crawling peg" system than under the present system.

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[6]Ibid, p. 21.

[7]Professor McKenzie correctly points out that Professor Meade, the most eminent advocate of a "crawling peg," wants to limit the annual change in exchange rates to a maximum of 2 per cent.

Just as the sterling crisis should be attributed to the failure of the British authorities to bring about an adjustment in the British economy – in real as well as in monetary terms – to the loss of its capital income from abroad and of technological leadership at home, so the German mark "crisis" should be attributed to the failure of the German authorities to bring about an adjustment in German consumption and investment "mores" to the astonishing improvement in German productivity. True, a radical revaluation of the mark might have helped. But the 5 per cent revaluation of the mark early in 1961 failed to reduce the German export surplus – which amounted to 6.6 billion marks in 1961 as against 5.2 billion in 1960 –; and under Professor Meade's "crawling peg" system, the appreciation over a one-year period would have been less than half of the amount of the actual revaluation, and thus would have had even less of a dampening effect on the trade balance; while in the absence of a drastic change in the domestic policies of the German authorities, the continuing upward "crawl" or the mark, together with the continued rise in domestic output, would have sparked rather than retarded the inflow of foreign – equity as well as money-market – funds. If the mark had continued to "crawl" upward over the entire period elapsed since 1961, the appreciation of the mark would by now have reached about 16 per cent. In this case, Germany's current-account surplus would indeed presumably have been smaller in recent years but the capital inflow would presumably have been larger. Hence, it is not at all certain that the aggregate payments surplus of Germany would have been substantially smaller than it has been under the present system.

Professor McKenzie cites the Canadian experiment over the period 1950-62 in favor of his proposal. Even Professor Mundell admits that this experiment was a failure.[8] If he attributes that failure to inappropriate monetary policies of the Canadian authorities, he merely echoes the defenders of the present system, who also attribute any difficulty to inappropriate policies rather than to the nature of the system. But there is one difference: under the present system, only political obstacles (and human error, inevitable under any system) prevent the authorities from choosing an appropriate policy mix, say, restrictive fiscal and monetary policies (with fixed exchange rates) if a payments deficit coexists with domestic inflation, and devaluation combined with expansionary policies when it coexists with domestic unemployment. But under the "crawling peg" system, the policy mix would be *necessarily* inappropriate: the expansionary effect of a "crawling" depreciation would counteract the contractive effect of restrictive monetary policies on the domestic economy whenever a payments deficit was associated with domestic inflation; and the need to hold domestic interest rates above those of other financial centers by an amount at least equal to the annual "crawl" rate (in order to avert capital flight) would make it difficult if not impossible to take the expansionary monetary measures needed to supplement the domestic effect of the "crawling" depreciation whenever the payments deficit was associated with domestic unemployment.[9]

Reduction of Controls on Capital Flows

Neither under the present nor under any alternative payments system is it inevitable or (excepting the case of a clearly temporary emergency, in which a "crawling peg" would be obviously inapplicable) appropriate for a country to try to correct a payments imbalance by imposing controls on current-account transactions.

It is true, however, that under the present system there is one (and only one) case in which controls over capital flows become appropriate. Under the present system, the U.S. dollar is not merely a domestic but also an international currency, and its devaluation would put the entire international payments mechanism into jeopardy. Hence, when the United States suffers simultaneously from a persistent and large payments deficit and persistent and serious domestic unemployment, it cannot use the remedy of devaluation that would be the first choice for any other country under similar circumstances.

This is not the place to discuss whether this restraint on U.S. policies is too large a price to pay for the advantages of the present system – advantages not just for the United States but (perhaps even more so) for the world as a whole – or whether con-

[8]McKenzie, p. 22.

[9]The effect of the "crawl" limit on the interest rate differential the monetary authorities must try to maintain in order to avert unwanted inflows or outflows of money market funds makes it impractical to replace the 2 per cent limit proposed by Professor Meade by a 4 per cent limit, as suggested by Professor McKenzie in his reply. It would be hard enough, say, for a country with an upward "crawling" currency to execute anti-inflationary policies while trying to prevent domestic money market rates from rising higher than 2 per cent *below* the rates prevailing in the rest of the world. But if the difference were to be widened to 4 per cent, and money market rates abroad were about 4 per cent, the country would have to prevent money market rates from rising above zero! On the other hand, a country with a downward "crawling" currency would have to try to execute anti-deflationary policies while preventing money-market rates from falling below 8 per cent!"

trols over capital flows — admittedly an evil — seriously endanger a satisfactory working of the world economy. Suffice it to note that capital flows among industrial countries — and only these flows are important in this context — usually do not reflect wide disparities in the productivity of capital; that they are as often as not actually inconsistent with optimal resource allocation, being induced by differences in tariffs, taxes, and monopolization rather than by differences in productivity; and that they often pose political problems for all countries concerned that may well offset any economic advantage.

In any case, the reason that speaks against a devaluation of the U.S. dollar applies just as much to a depreciation by means of a "crawling peg." No foreign country and no business concern or individual abroad can be expected to accept and hold a currency which is continuously depreciating in terms of its exchange value. In fact, if the dollar were one day devalued in such a manner that the financial community became convinced of its future stability, optimists might well believe that the international role of the dollar could survive the shock. But a "crawling" depreciation (at whatever rate) would be more likely than not to mean the end of the present international payments mechanism.

Opinions may (and do) differ about the possibility of replacing the present system with a fundamentally different and better one; but the proponents of the "crawling peg" should realize that they are talking not of a minor improvement but of a revolutionary change; and they should explain how they intend to deal with problems such as the magnitude of international dollar obligations — probably about $100 billion — that make the exchange value of the U.S. dollar — in contrast to that of any other currency — an international rather than a purely domestic concern.

Conclusion

These comments have been restricted to Professor McKenzie's paper and thus are not a complete evaluation of the "crawling peg" proposal. For instance, they do not deal with the questions of whether (or rather, under what circumstances) the proposal will stimulate or inhibit currency speculation; make domestic policies more or less dependent upon balance-of-payments considerations; and tend to aggravate or to mitigate international financial disequilibrium.

The present international payments mechanism — like all human institutions — is clearly imperfect, and any effort to make it less imperfect is welcome. But in this observer's opinion, the introduction of a "crawling peg" — despite its endorsement by so many eminent theorists — would be more likely to impair than to improve its working.

The Reply to this Comment begins on next page.

International Monetary Reform and the "Crawling Peg"—Reply

by GEORGE W. McKENZIE

THE PURPOSE of my article, "International Monetary Reform and the 'Crawling Peg,'" was to propose that a more flexible system of international exchange rates should be substituted for the current mechanism, in light of the periodic exchange crises that the world has experienced over the past few years. My analysis emphasized how international financial variables could affect domestic monetary conditions, since I felt that this was a subject that had been largely neglected in recent public discussions.[1]

Furth's Comment contends that: (1) the assumptions of my analysis regarding financial relationships are false; (2) the recent international financial crises are really not as serious as they are made out to be, and hence, (3) there is no need to modify the present international monetary system in the direction of the "crawling peg." The purpose of this Reply is to argue that Furth's reasoning is factually or logically incorrect, and, as a result, his conclusions about the undesirability of the "crawling peg" are invalid.

Assumptions of the Analysis

Furth fails to recognize that one of the reasons for making simplifying assumptions in economic analysis is to clarify *in detail* the relationships between a *few* important variables.[2] In this way, it is possible to shed some light on economic processes which otherwise are extremely complicated and difficult to understand.

For policy purposes, however, it is desirable that our analysis be as close an approximation to reality as is necessary to give accurate answers. I would argue that, in light of our current knowledge, the framework presented in my article does indeed represent a reasonable approximation of reality. To see this, let us examine the three points raised in the Comment.

International Portfolio Investment

The analysis of international portfolio flows is considerably more complicated than Furth suggests. There may indeed be sophisticated foreign security traders who will liquidate part of their holdings of foreign equities during a period when monetary actions are restrictive. But will these people bring their funds home or reinvest them in short-term foreign assets? If they reinvest them in short-term foreign assets, a deterioration in the portfolio account will merely be offset by an improvement in the short-term capital account. And, of course, there will be long-term investors who will merely try to weather out any potential storm.

Evidence presented by Rhomberg suggests that during the period when Canada operated under a system of flexible exchange rates, both direct and portfolio investment moved in the same direction as short-term capital in response to changes in Canadian

[1]For additional discussion of financial relationships, see: R. A. Mundell, "Capital Mobility and Stabilization Policy Under Fixed and Flexible Exchange Rates," *Canadian Journal of Economics and Political Science*, November 1963; J. Carter Murphy, "Moderated Exchange Rate Variability," *National Banking Review*, December 1965; Ronald McKinnon and Wallace Oates, "The Implication of International Economic Integration for Monetary, Fiscal and Exchange Rate Policy," *Princeton Studies in International Finance*, November 16, 1966 and James C. Ingram, "A Proposal for Financial Integration in the Atlantic Community," *Factors Affecting the United States Balance of Payments*, Joint Economic Committee, 87th Congress, 2nd Session (1962).

[2]For a more detailed discussion of some of the problems of economic analysis, see Ernest Nagel, "Assumptions in Economic Theory," *American Economic Review*, May 1963.

interest rates.[3] That is, an increase in yields on Canadian investments tended to attract foreign funds, predominantly from the United States.

Covered Interest Arbitrage

Although Furth correctly argues that the flow of money-market funds responds to "covered" rather than "uncovered" interest rate differentials, this modification does not alter the conclusions of my paper.[4]

For example, consider the following *hypothetical* situation: interest rates in both Germany and France are roughly the same and there are no expectations of any exchange rate adjustments. As a result, there should be no spread between current and forward exchange rates. If the three-month forward cost of francs to Germans was, say .81 deutsche mark (DM), as compared to a spot rate of .80DM, covered interest rate arbitragers would be induced to purchase French short-term assets and to sell their receipts forward. In this manner, the arbitragers would earn not only interest but also the difference between the spot and forward exchange rates. In the process, the *demand* for spot francs would increase, bidding their price up, while the increased *supply* of forward francs would bid the latter's price down. Hence, the spread between the two rates would be eliminated.

Let us again assume an initial situation where interest rates are equal in the two countries and there is no spread between the spot and forward rates. Then let us suppose that the German Central Bank undertakes restrictive policies which raise yields on short-term assets. Interest rate arbitragers will then purchase these assets and at the same time sell their mark proceeds forward in order to cover their investment. As a result, the spot franc price of marks will increase, and the forward rate will fall until the spread just offsets the interest-rate differential.

Of course, under the rules of the International Monetary Fund, spot exchange rates cannot vary significantly from their predetermined par value.[5] This is a major point which Furth neglects. French authorities would intervene in the spot market after selling part of their reserves of gold. As a result, cash balances in Germany would increase, *moderating* the initial attempt at a restrictive monetary policy. The conclusions are the same as those of my original article.[6]

Hence, Furth is in *error* when he states that, "a rise in gross money-market rates is not much more likely to set in motion a large inflow of money-market funds than to set in motion an outflow or – most often – to leave the flow substantially unchanged." The fact that movements of interest and forward exchange rates tend to offset each other is *because of* sensitive capital flows. In addition, as I have just explained, Furth is incorrect in asserting that a country's net international liquidity position will be unaffected. He has neglected the impact of exchange rate stabilization policies necessitated by the rules of the International Monetary Fund.

Exchange Risks

I disagree with Furth's statement that exchange risks or the other impediments mentioned in my article have severely restricted the mobility of capital. During the 1960's, the development of European currency markets has brought the financial centers of the world closer together.[7] As a result, European authorities have had to be concerned with the possibility of large flows into or out of a particular banking system and its consequent implications for national monetary policy. For example, a country undertaking a restrictive monetary action will find that higher yields on short-term assets have attracted funds from abroad, and that this will tend to offset any decline in commercial bank reserves brought about by the restrictive policies. For this reason, European countries have often imposed controls on international capital movements to increase the effectiveness of monetary policy.[8]

The importance of such relationships cannot be underestimated. Today, restrictive monetary actions

[3]Rudolf Rhomberg, "A Model of the Canadian Economy Under Fixed and Fluctuating Exchange Rates," *Journal of Political Economy*, February 1964, p. 10.

[4]For a detailed discussion of covered interest arbitage, as well as the hedging and speculative operations discussed in my article, see: Alan R. Holmes and Francis H. Schott, *The New York Foreign Exchange Market*, Federal Reserve Bank of New York, 1965.

[5]For a discussion of this particular point, see Holmes and Schott, p. 55.

[6]George W. McKenzie, "International Monetary Reform and the 'Crawling Peg,'" in the February 1969 issue of this *Review*, pp. 15-23.

[7]For a more detailed explanation of the "Euro-currency" and Eurodollar markets, see Fred H. Klopstock, "Euro-Dollars in the Liquidity and Reserve Management of United States Banks," *Review* of the Federal Reserve Bank of New York, July 1968; John E. Leimone, "The Euro-Dollar Markets," *Review* of the Federal Reserve Bank of Atlanta, August 1968 and Alan R. Holmes and Fred H. Klopstock, "The Market for Dollar Deposits in Europe," *Review* of the Federal Reserve Bank of New York, November 1960.

[8]See Rodney H. Mills, "The Regulation of Short-Term Capital Movements," *Staff Economic Studies*, Board of Governors of the Federal Reserve System, May 22, 1968. Also, McKenzie, p. 18.

in the United States have encouraged American banks to tap European markets for funds. This, in turn, has caused interest rates in Europe to rise and has contributed to a growing concern over a potential slowdown in growth and a rise in unemployment there later this year.

Monetary Policy, Speculation and the "Crawling Peg"

Furth argues that institution of greater exchange rate flexibility through a "crawling peg" system would actually make anti-inflationary monetary policy less effective than under the present system. In support of this conclusion, he claims that once the exchange rate moves in a particular direction, people will expect it to continue moving in that direction, and hence there will be destabilizing international capital flows. Neither theory nor empirical evidence supports this assertion. Sven Arndt recently concluded that under a flexible exchange rate system, "speculators' expectations will be a slowly changing variable which possesses considerable inertia, and that speculative sales and purchases will have a dampening effect on movements in the exchange rate."[9]

Actually, a strong case can be made that speculation is more destabilizing under the present system than would be the case under a "crawling peg." Today, it is usually quite clear in which direction the exchange rate will be altered in response to a prolonged payments deficit or surplus. Under a crawling peg, however, the exchange rate can move in either direction. Hence, the risk in taking a speculative position is increased.

In addition, if people believe that the ultimate equilibrium exchange rate requires further adjustment, then the capital flows described by Furth will actually be facilitating the movement to a new equilibrium.[10] A country undertaking restrictive monetary actions will experience a capital inflow as yields rise. This leads to a "crawling" appreciation which in turn causes a decline in the production of exports and import-competing substitutes. The restrictive monetary action is effective. If people expect the appreciation to continue, there will be an additional capital inflow which causes the exchange rate to appreciate further. This *reinforces* rather than weakens the impact of the restrictive policy. The capital flows, which Furth claims would be "unwanted," are actually fulfilling an important economic function.

This sequence of events depends on two conditions, however. The first is that exports and import-substitutes should be sufficiently sensitive to changes in relative prices. Recent empirical evidence suggests that this is the case, at least for industrialized nations.[11] The second condition is that the degree of exchange rate variability possible under the "crawling peg" should be great enough to assure the effectiveness of monetary policy. As I pointed out in my article:

> If the peg is allowed to "crawl" at a slow rate, monetary policy will be almost as ineffective as under a fixed exchange rate system. If, however, the range of potential variability is reasonably wide, then monetary policy can be expected to have an influence on domestic economic activity within a relatively short period.[12]

Thus, Furth's claim that the effect of an exchange rate change on exports and imports will be small, because the annual rate of crawl would be limited to two percent can actually be interpreted as a case for *greater* variability, say four per cent.[13]

Furth claims that the greater variability would bring about a conflict between international and domestic objectives. This argument again hinges on the assumption that once an exchange rate movement occurs, people will speculate that it will continue to move in that direction. Such behavior could cause a divergence between spot and forward rates up to the limit of the crawl. However, as I have pointed out above, both theory and fact do not support the likelihood of this happening.

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[9]Sven Arndt, "International Short-Term Capital Movements: A Distributed Lag Model of Speculation in Foreign Exchange," *Econometrica,* January 1968, p. 69. Arndt's results are derived from Canadian data for the period when that country operated under a flexible exchange rate system.

[10]See McKenzie, p. 20 and Milton Friedman, "The Case for Flexible Exchange Rates," *Essays in Positive Economics,* (Chicago: University of Chicago Press, 1953).

[11]For comments on these results, see Ernest H. Preeg, "Elasticity Optimism in International Trade," *Kyklos,* 1967, pp. 460-69.

[12]McKenzie, pp. 21-22. Within the limits of exchange rate variation prescribed by the "crawling peg" system, the autonomous demand for and supply of foreign exchange will be equal, and there will be no deficit or surplus, contrary to Furth's argument. However, should it be necessary for countries to dispose of or accumulate international reserves to keep exchange rates within prescribed limits, then there would be deficits or surpluses as under the present system. The greater the variability allowed, however, the smaller these imbalances will be.

[13]This was approximately the average annual rate of change in Canada's rate when it operated under a flexible system.

Avoidance of Exchange Crises

Furth argues that "the revaluation of the German mark (and the Netherlands guilder) in 1961; the difficulties of sterling since 1964; the difficulties of the French franc since May 1968; and the difficulties of the U.S. dollar *over virtually the entire period*" (my italics) were not as important as the critics of the system believe. This is a classic understatement.

David Rowan argued convincingly that the British decision to maintain a disequilibrium parity entailed the cost of slower economic growth and periods of reduced economic activity.[14] Certainly, the British or French citizen today must be unhappy at having to endure austerity measures, ostensibly for balance of payments reasons. In addition, the periodic uncertainty and speculation has frequently widened the spread between spot and forward exchange rates so as to make hedging extremely costly. If exchange rate adjustment is to come (Furth seems to believe that it may at times be desirable), then it seems much more efficient to spread the adjustment over a period of time so as to minimize the impact of the attendant costs.[15]

Finally, I cannot agree with Furth's statement that the "problem of the French franc has been obviously unconnected with the present payments system." Speculation that inflation following large wage increases would place the franc in disequilibrium and hence necessitate a devaluation certainly is an economic reason for a capital outflow. His argument that if a devaluation of the franc was warranted, it should have been immediate and not a chronic downward "crawling" of the franc again neglects the costs of a large adjustment concentrated within a relatively short period of time. It is a moot question, of course, whether speculators could have anticipated France's political difficulties and hence spread the exchange rate adjustment over a longer period of time.

Implications of the "Crawling Peg" for the United States

Furth states, without any supporting analysis, that the role of the U.S. dollar in the international economy would be seriously undermined under a "crawling peg" exchange rate system. This conclusion is doubtful. In fact, institution of the "crawling peg" system may very well lend greater stability, not only to the U.S. dollar but to all currencies as well.

[14]David C. Rowan, "Towards a Rational Exchange Policy: Some Reflections on the British Experience," in the April 1969 issue of this *Review*.

[15]McKenzie, pp. 16-17.

It is important that we take a very close look at how greater exchange rate flexibility would affect us. First, we are the world's dominant importer and exporter. Second, we are a major international financial center, providing short-term assets and long-term loans to the rest of the world. Third, foreign governments hold significant portions of their international liquidity positions in terms of dollars.

The Impact on Trade in Goods and Services

By definition, the "crawling peg" means greater variability in the prices paid for imports and those received for exports. On the supply side, this will affect the profitability of those sectors producing exports and import-substitutes as well as the profitability of marketing imported goods. On the demand side, consumers will adjust their expenditures in response to the relative prices changes in order to get the most for their dollar.

For the United States, such adjustments will have a smaller impact than for many of our trading partners simply because international trade is not as great a proportion of our economic activity. The question then is: do the responses to exchange rate variations under the crawling peg involve a greater or a smaller cost than under the present system?

After the British devaluation, an American company that had not hedged its sterling assets or export receipts would have suffered a large capital loss within a short period of time. Under the "crawling peg," the exchange rate adjustment and the losses could have been spread out over a longer period of time. In addition, under such a system, U.S. exporters expecting foreign exchange receipts would not be lulled into a false sense of security, but would hedge as a matter of course.

Under any exchange rate system, it is important that the cost of hedging activities should be kept within reasonable bounds. Today, a U.S. exporter expecting receipts from a country which might devalue could find the cost of hedging as high as ten or twenty per cent on an annual basis. The alternative for the exporter is to take a chance that devaluation will not occur. But this leaves him open to potential losses possibly greater than the cost of hedging. Thus, under such conditions, the present system can only discourage international trade rather than encourage it as its proponents claim.

The Impact on the Capital Account

Since the return to currency convertibility in 1959, international capital movements have become in-

creasingly important items in the balance of payments accounts of all countries. Under the present system, during periods of uncertainty a widening spread between spot and forward rates is capable of generating large international capital flows. The implications of such movements are quite important for the U.S., given the key role it plays in the "Eurocurrency" markets.

Basically, a Eurodollar is created when an American or foreigner transfers a dollar deposit to an account in a foreign bank, where he receives a higher interest rate. The foreign bank will then lend the dollars, usually at an interest rate lower than a borrower could obtain in the United States. Thus, if foreigners lost confidence in dollars, large outflows of funds could reduce the base on which the Eurodollar market operates and undermine the whole process of international financial intermediation.

Under the "crawling peg" however, the spot and forward exchange rates would be kept within close proximity by natural market forces and, hence, large speculative flows would be discouraged. In addition, the greater variability of exchange rates over the short-run would increase the risk involved in currency speculation, although it would not eliminate flows of this nature.

The impact of greater exchange rate variability on U.S. long-term investment is difficult to evaluate. Currently, such investors are open to large potential capital losses if a country should devalue. The crawling peg system would spread such losses over time rather than concentrating them within a short period. And, of course, long-term investors would receive capital gains in countries whose currency was appreciating. At present, such uncertainties do not discourage long-term U.S. investment abroad. And during the period when Canada operated its flexible system, American investment in that country grew rapidly.

The Impact on the International Liquidity Position of the United States

Under the "crawling peg" system, exchange rates would be allowed to vary within predetermined limits during any period of time. In order to assure that rate movements do not exceed the predetermined bounds, countries would be obliged to hold stocks of international reserves which they would use to intervene in exchange markets when necessary. However, because exchange rates vary over time, this means that the value of a country's reserves may also change.

Many countries hold a portion of their international reserves in the form of dollars, the United States holds gold and a small amount of foreign currencies. Under a crawling peg system, should foreign currencies depreciate in terms of the dollar, the value of the stock of reserves to foreigners would increase while the value of our foreign currency reserves would decline.[16] However, this need cause no difficulties. Foreigners would find that their stock of international liquidity is increasing just at a time when it is needed to stabilize the exchange rate within the limits prescribed for the crawling peg. Similarly, the United States finds the value of its foreign currency reserves declining at a time when they need them least. In addition, because part of the international adjustment takes the form of an exchange rather than entirely reserve movements, the demand for international liquidity should be significantly smaller than under the current system. The implications of these circumstances, however, depend heavily on how central banks determine their desired holdings of international reserves.

Since the supply of gold is limited and the demand for consumer and industrial uses is growing, adoption of the crawling peg would provide a desirable opportunity to abandon gold as a reserve asset. However, it would seem useful to provide for some form of reserve assets to supplement the use of foreign exchange. Presumably, this could take the form of the proposed Special Drawing Rights (SDR's). However, because SDR's are a media of exchange between governments, there would exist no free market for them. Consequently, they would have to be pegged in terms of some currency, and most likely this would be the dollar.[17]

A major argument in my original article was that international reserve movements under the present system are likely to have an offsetting impact on domestic monetary policies. This is much more likely to be the case for European countries than the United States. In order to preserve the viability of the system under current conditions, European authorities have an incentive to hold dollars rather than to place additional pressure on our gold stock. As a result there

[16]This assumes that no arrangements have been made to cover foreign exchange reserves. Today under swap arrangements, one country can borrow foreign exchange from another, thereby adding to its reserves, while being guaranteed that it can repay the loan at the original exchange rate. This would occur even though a revaluation might have occurred in the interim.

[17]This would involve an alteration in the present proposal, which links SDR's to gold.

is little direct effect on our monetary base when we have an international payments imbalance. However, a foreign central bank by accepting dollars for its own currency, will increase the monetary base of its own country.

Conclusions and a Suggestion

The conclusions of my original article still stand. However, I do not want to imply that application of the "crawling peg" or any other form of exchange rate flexibility can be achieved easily. Certainly more discussion is warranted concerning the formula to be used. For example, should the peg be based on a moving average of past exchange rates? How wide should the band of variability around the "crawling peg" be? How long a moving average should be adopted? Would it be necessary to develop additional hedging facilities?

The answers to these and other questions lie in the views of the business and banking communities. However, they have been strangely silent. Before additional discussion can proceed, it is necessary to elicit the reactions of those who actually are involved in international transactions to learn how much exchange rate variability they would be willing to accept and how they would react to it. In other words, a dialogue needs to be established.

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