

Should the Federal Reserve Establish A Real Interest Rate Target?

By Carl E. Walsh

During the last several years, the United States has experienced unsatisfactory real economic performance and high levels of market interest rates. At the same time, innovations in financial markets and deregulation have raised questions about the usefulness of monetary aggregates as guides to the implementation of monetary policy. During much of this period, the Federal Reserve was using nonborrowed reserves as its policy instrument for achieving target rates of growth in various monetary aggregates. Until October 1979, the Federal Reserve had used the federal funds rate as its policy instrument for implementing monetary policy.¹

¹ For a discussion of the change in operating procedures that took place in October 1979, see Stephen H. Axilrod and David E. Lindsey, "Federal Reserve System Implementation of Monetary Policy: Analytical Foundations of the New Approach," *American Economic Review*, May 1981, pp. 246-52, and J. A. Cacy, "Monetary Policy in 1980 and 1981," *Economic Review*, Federal Reserve Bank of Kansas City, December 1980, pp. 18-25.

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The introduction of new financial assets and the decontrol of many interest rates have forced the Federal Reserve over the past five years to redefine the monetary aggregates (1980), to establish targets for "shift-adjusted" aggregates in an effort to allow for the impact of new deposit accounts (1981), and to move away from a close adherence to target ranges for the narrow aggregate, M1 (1982-83). The difficulties that have arisen in connection with the use of monetary aggregates as a guide for monetary policy have led to a search for additional variables that might be used in setting policy. In its report to Congress in February, for example, the Federal Reserve announced it was establishing target ranges for the growth of total domestic nonfinancial debt.²

Proposals have also been made that the Federal Reserve supplement its targets for monetary aggregates with targets for real interest rates. Legislation introduced last year in the 97th Congress, for example, would require the Federal Reserve to announce target ranges

² The usefulness of a credit aggregate as an intermediate target variable for monetary policy has been argued by Benjamin M. Friedman, most recently in "Using a Credit Aggregate Target to Implement Monetary Policy in the Financial Environment of the Future," in *Monetary Policy Issues in the 1980s*, Federal Reserve Bank of Kansas City, 1982.

for short-term real rates of interest consistent with historical levels.³

The design of monetary policy and the way it is implemented can have important consequences for the economy. For that reason, a policy that tried to achieve targets for interest rate variables would likely have implications for real GNP, unemployment, and inflation that were different from those of a policy trying to achieve target growth rates for monetary aggregates.

This article examines the implications of using real interest rates—market interest rates adjusted for expected inflation—as a guide for the conduct of monetary policy. Such an examination is needed to evaluate the possible consequences of the recently proposed Congressional legislation. As it is the recent behavior of interest rates that has motivated the renewed interest in real rate targeting, the first section looks at the behavior of real interest rates over the past 20 years. The second section evaluates the usefulness of real rates as intermediate target variables in the conduct of monetary policy. The third section examines the policy implications of establishing real interest rate targets, while the final section summarizes the results of the analysis.

REAL INTEREST RATES

A nominal rate of interest measures the return on an asset, or the cost of a liability, in dollar terms. A real rate of interest measures the return on an asset, or the cost of a liability, in terms of purchasing power over goods and services. For example, if prices are rising, part of the dollar return measured by the nominal interest rate is simply a compensation for the

³ Senate bill S.2807 calls for annual targets, while H.R.7218 would require monthly targets. Unlike the other two bills, H.R.6967 would have the Federal Reserve establish targets for long-term interest rates.

decline in the purchasing power of the dollar. The real rate of return during periods of inflation, then, is less than the nominal rate of return. The realized real rate of interest is usually approximated by the nominal (market) rate of interest minus the rate of inflation over the holding period of the asset.⁴ If the nominal rate of interest for a one-year financial instrument is 10 percent and inflation that year averages 8 percent, the realized real rate is 2 percent.

The realized real rate of interest, however, does not relate directly to the economic behavior of firms or individuals. Though individuals can observe the current market rate of interest, they must forecast the rate of inflation in order to estimate the expected real return. It is this expected real rate of interest that is likely to affect economic behavior.

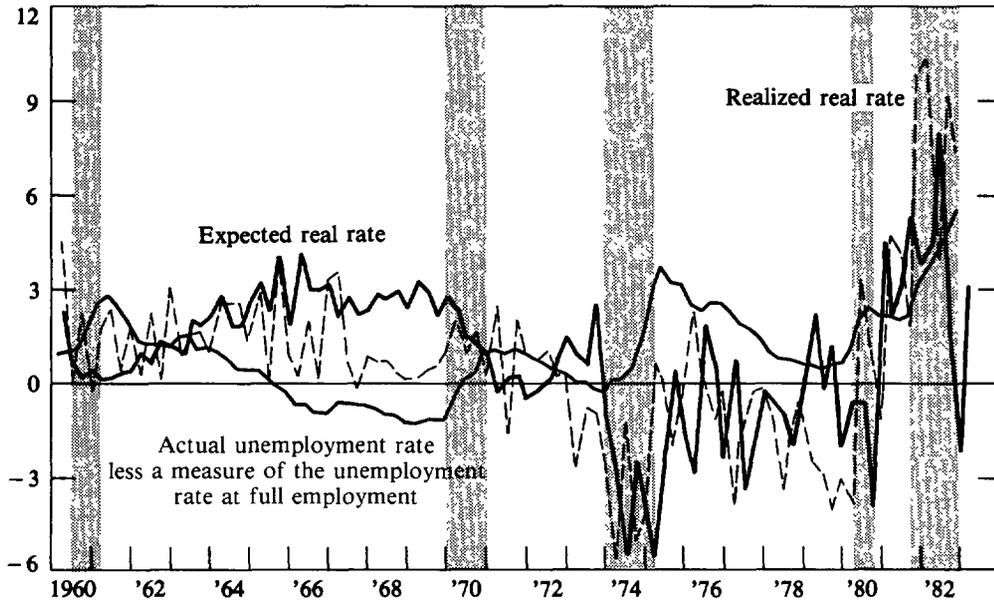
Chart 1 presents one estimate of the expected real rate of return on 3-month Treasury bills from the first quarter of 1960 to the fourth quarter of 1982. This series was obtained by subtracting an estimate of anticipated inflation over each quarter from the new issue rate on Treasury bills for the first week of the quarter.⁵ The realized, or *ex post*, real rate is also shown. The difference between the two series is due to unanticipated inflation.

The behavior of both the expected and the realized real rates were very different during the first and second halves of this 23-year period. Table 1 gives the means and standard deviations for both interest rate series for the entire period and for the subperiods before and after

⁴ If i is the nominal rate of interest and p is the rate of inflation, the *ex post* or realized real return is given by $r = (1 + i)/(1 + p) - 1$. This can be rearranged to yield $r = i - p - rp$. Since the last term, rp , is likely to be small, it is usually neglected and r is approximated by $i - p$.

⁵ The expected rate of inflation for quarter i is equal to the predicted value obtained from an ARIMA model estimated over quarters $i - 1$ to $i - 21$.

Chart 1
CYCLICAL UNEMPLOYMENT AND EXPECTED AND REALIZED REAL INTEREST RATES ON 3-MONTH TREASURY BILLS



the first oil price shock. The realized real rate averaged 0.81 percent for the entire period, but it averaged almost zero (0.09 percent) in the period since the first quarter of 1973. As Chart 1 shows, with inflation usually higher than nominal interest rates, real rates (both expected and realized) were generally negative from 1973 to 1979. In 1981 and 1982, however, real rates on 3-month Treasury bills were very high.

These last two years have witnessed a major movement in realized real rates. For 3-month Treasury bills the swing has been from a negative 3.7 percent in the first quarter of 1980 to 7.6 percent in the fourth quarter of 1982. There was a similar change in the estimated expected real rate, although this series peaks in the second quarter of 1982 and then falls dramatically during the second half of 1982. The high realized real rate for 1981 and 1982—the highest since the Great Depression—was a major factor in leading to calls for the Federal Reserve to set real interest rate

targets. Since the U.S. economy has suffered high unemployment during the past two years, proponents of real rate targeting argue that the high real interest rates since early 1980 have caused the high rate of unemployment.⁶

Chart 1 also includes a graph of the difference between the total civilian unemployment rate and an estimate of the unemployment rate at full employment.⁷ For reference, the shaded regions indicate business cycle recessions as dated by the National Bureau of Economic Research. The actual unemployment rate less the estimated rate at full employment averaged 0.42 percent in the 1960s. During that decade, the expected real rate averaged 2.12

⁶ See, for example, Senator Byrd's speech calling for the Federal Reserve to lower real interest rates (*Congressional Record*, August 3, 1982).

⁷ The estimated unemployment rate at full employment is from the *Survey of Current Business*, April 1982, Table 2, p. 25.

Table 1
MEAN AND STANDARD DEVIATIONS IN REALIZED AND EXPECTED 3-MONTH
TREASURY BILL RATES
 (Percentage)

	1960:I—1982:IV		1960:I—1972:IV		1973:I—1982:IV	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Realized Real Rate	0.81	2.82	1.37	1.20	0.09	3.96
Expected Real Rate	0.97	2.34	1.80	1.19	-0.11	2.97

percent. The expected real rate was much lower in the 1970s, averaging minus 0.56 percent, while the average deviation of actual unemployment from full employment was 1.25. Decade averages show a negative association between cyclical unemployment and the expected real rate of interest, not a positive association. Only during the 1980s have high expected real rates and high unemployment seemed to be associated.

Given this overview of the recent behavior of real yields on 3-month Treasury bills, the next section evaluates the usefulness of real interest rates as a guide to the conduct of monetary policy.

REAL INTEREST RATES AS INTERMEDIATE POLICY TARGETS

The ultimate goals of monetary policy—output and price stability—are only loosely related to the policy instruments, such as nonborrowed reserves or the federal funds rate, which the Federal Reserve can fairly directly control. As a result, policymakers have found it helpful to use intermediate policy targets in formulating policy actions. These intermediate targets, as the name suggests, occupy a middle ground between goals and instruments. In theory, they are closely related to the ultimate policy goals but are also relatively closely tied to the instruments of policy.⁸ The Federal Reserve, for

⁸ For more complete discussions of intermediate policy targets, see Benjamin M. Friedman, "Targets, Instruments,

example, establishes target growth rates for various monetary aggregates in the belief that these aggregates are closely related to the variables of ultimate interest, such as the rate of inflation. A path for a policy instrument, such as nonborrowed reserves, is then specified which is expected to achieve the targeted path for the monetary aggregates. Numerous authors have discussed the desirable properties which an intermediate target should process.⁹ Three of the most important are measurability, reliability in its linkage with goals, and controllability. These three criteria are used here in evaluating the potential of a real rate of interest as an intermediate target. For each one, the real rate is compared to the monetary aggregates the Federal Reserve currently uses as intermediate targets.

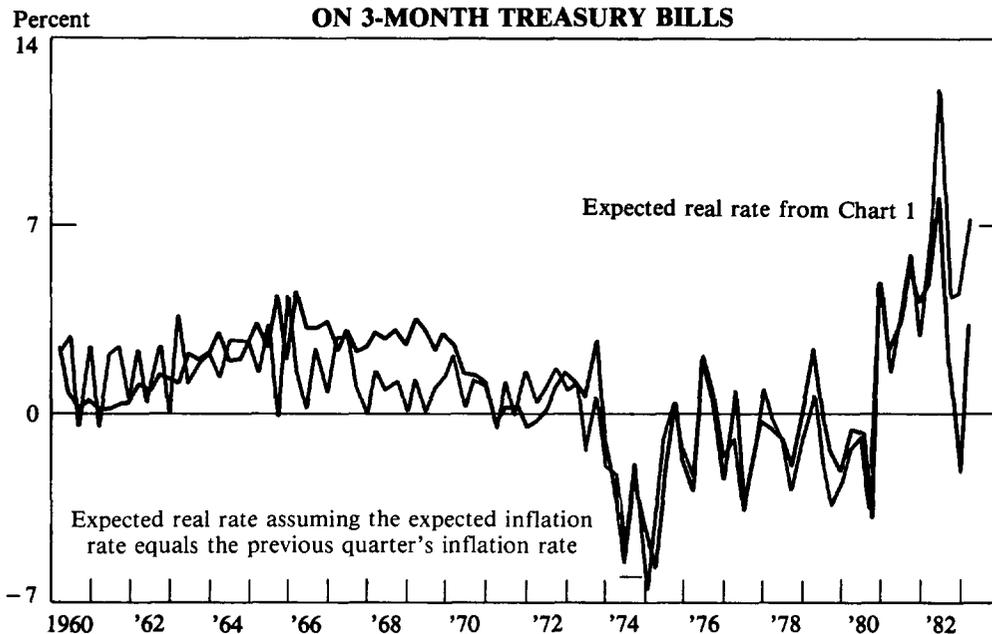
Measurability

The expected real rate of interest is the nominal rate of interest less the anticipated rate of inflation. Market rates of interest are easily

and Indicators of Monetary Policy," *Journal of Monetary Economics*, October 1975, pp. 443-73; Benjamin M. Friedman, "The Inefficiency of Short-Run Monetary Targets for Monetary Policy," *Brookings Papers on Economic Activity*, 1977:2, pp. 293-335; and Gordon H. Sellon, Jr., and Ronald L. Teigen, "The Choice of Short-Run Targets for Monetary Policy, Part I: A Theoretical Analysis," *Economic Review*, Federal Reserve Bank of Kansas City, April 1981, pp. 3-16.

⁹ See, for examples, Edward J. Kane, "Selecting Monetary Targets in a Changing Financial Environment," and Ben-

Chart 2
TWO MEASURES OF THE EXPECTED REAL RATE
ON 3-MONTH TREASURY BILLS



measured, but that is not true for the market's expectation of future inflation. The unobservability of current expectations about future inflation is one of the main disadvantages of the real rate of interest as an intermediate target.

Chart 2 shows two measures of the expected real 3-month Treasury bill rate. The first corresponds to the estimate used in Chart 1. The second is based on the assumption that the expected rate of inflation over the coming quarter is the same as the previous quarter's actual rate of inflation. While these two measures tend to move together over the entire period, they often diverge.¹⁰ Both, for example, fell during the

third quarter of 1982. The first measure continued to fall in the fourth quarter, however, while the second rose slightly. The policy response would have depended on which measure the Federal Reserve had chosen as a basis for policy. This, of course, is a problem shared by the monetary aggregates as often some are above target while others are below target.

Even if the expected rate of inflation could be measured accurately, a serious problem in choosing any measure of the expected real rate to guide policy is that the real rate relevant for economic behavior could be different for different sectors of the economy. This is true for two reasons. First, for individuals and firms, the relevant interest rate is the after-tax expected real rate of interest. Since effective tax rates differ across both individuals and firms, the concept of "the" expected real rate of interest is as much a theoretical abstraction as "the" money supply. Second, the relevant real

jamin M. Friedman, "Using a Credit Aggregate Target to Implement Monetary Policy in the Financial Environment of the Future," both in *Monetary Policy Issues in the 1980s*, Federal Reserve Bank of Kansas City, 1982.

¹⁰ The correlation between these two measures of the expected real rate was 0.626 for the 1973:Q1-1982:Q4 period but -0.133 for the 1960:Q1-1972:Q4 period.

cost of capital to a firm depends not only on its effective tax rate but also on any expected change in the relative price of the firm's output. In the 1970s, for example, the price of housing rose much faster than the general price level. The relevant cost of capital was much lower for the housing industry during this period than it was for industries whose relative prices were falling. During a balanced inflation, all prices are rising at the same rate; relative prices are constant. During actual inflations, relative prices are not constant; the real cost of capital may be high for some sectors, low for others.

The difficulties in translating the concept of an expected real rate of interest into an operational magnitude that can be used for policy purposes are shared by the money stock. The Federal Reserve has tried to deal with the problem by setting targets for a number of monetary aggregates. One reason for the recent suggestions that the real interest rate be used as an intermediate policy target is the feeling that the monetary aggregates have become less and less useful as measures of any underlying liquidity concept that might be relevant to economic behavior. While recognizing that there may be as many real rates of interest as there are individuals and firms, the hope is that all these rates would tend to move together so that focusing on one measure would not be too misleading.

In addition to there being many monetary aggregates, the aggregates, unlike interest rates, are subject to large data revisions so that weekly movements in M1, for instance, may contain little information about the true movement in the money stock. One study suggests, for example, that if M1 had been growing at a 5 percent annual rate, it would require about four months of M1 growth averaging 8 percent before one could say with 95 percent probability that the trend growth was no longer 5 percent.¹¹ It has also been necessary to redefine the

monetary aggregates (in 1980) in recognition of the availability of new types of transaction accounts.¹² Continual financial deregulation and innovation may lead to further problems in measuring and interpreting monetary aggregates.

Linkage with goals

The real rate of interest could be useful as a guide to the conduct of monetary policy if it were closely and reliably related to the variables of ultimate policy interest. The picture given by Chart 1 suggests, however, that any relationship between the expected real rate and the deviation of the unemployment rate from full employment varied over the 1960-82 period. These two series, in fact, were negatively correlated during the pre-OPEC period and positively correlated in the post-OPEC period.¹³ To understand the relationship between real rates of interest and policy goal variables, it is necessary to examine the determinants of real rates. It is useful to distinguish between factors influencing real rates in the short run, over a business cycle, and factors determining real rates over the long run. A standard closed-economy IS-LM model provides a convenient framework for analyzing the forces affecting both real interest rates and their linkages with the goals of monetary policy.

An IS-LM model is a simple representation of equilibrium in the market for goods and ser-

¹¹ David Pierce, "Trend and Noise in the Monetary Aggregates," in *New Monetary Control Procedures*, Vol. II, Board of Governors of the Federal Reserve System, February 1981.

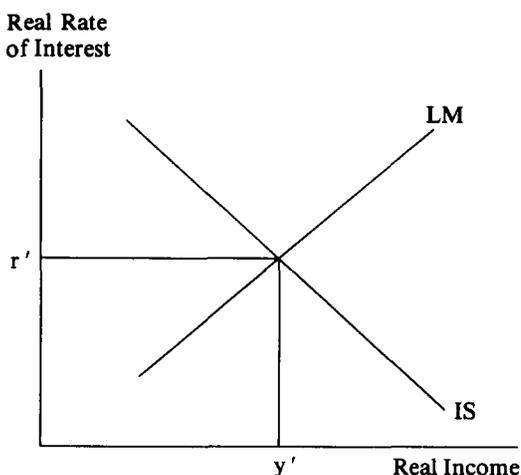
¹² For an evaluation of the redefined aggregates, see Neil Berkman, "The New Monetary Aggregates: A Critical Appraisal," *Journal of Money, Credit, and Banking*, May 1980, Part 1, pp. 134-54.

¹³ This correlation was -0.74 for 1960:Q1-1972:Q4, while it was 0.22 for 1973:Q1-1982:Q4.

vices and in financial markets. In the market for goods and services, three components of aggregate demand are usually distinguished. These are consumption, investment, and government purchases. In a closed economy, the three components add up to total income. Aggregate demand is likely to depend negatively on the real rate of interest. A rise in the real rate will increase the cost of capital and reduce the opportunities for profitable investment. A rise in the real rate is also likely to cause consumers to increase saving, thereby reducing current consumption. This negative relationship between aggregate demand and the real rate is illustrated in Figure 1 by the curve labeled IS.

To understand the short-run behavior of real income and real interest rates, it is necessary to incorporate financial markets into the analysis. In a very simple case where all financial assets can be classified as either money or nonmoney, equilibrium in financial markets would require that the real demand for money equal the real supply of money. A rise in income increases the demand for real money balances as individuals engage in more transactions. With a fixed real supply of money, a rise in income leads to an excess demand for money that could be eliminated by an increase in the opportunity cost of holding money. The opportunity cost of holding money is usually represented by the difference between the return yielded by money (traditionally taken to be zero¹⁴) and the yield on nonmoney financial assets. This difference is the market rate of interest, or the anticipated

Figure 1
IS AND LM CURVES DRAWN FOR A
GIVEN EXPECTED RATE OF INFLATION



real rate of interest plus the expected rate of inflation. For a given expected rate of inflation and supply of real money balances, this positive relationship between income and the real rate needed to achieve financial market equilibrium is illustrated by the LM curve in Figure 1.¹⁵

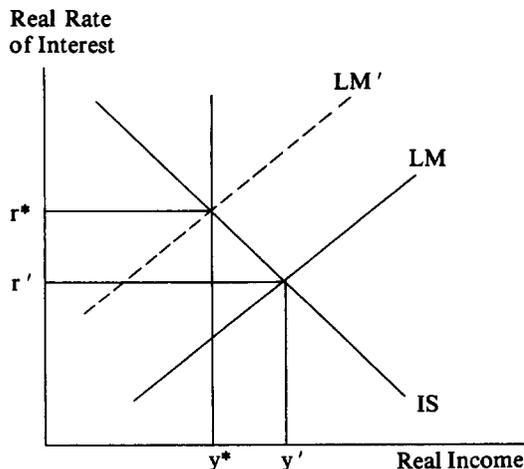
The short-run equilibrium is at (y', r') , where both the market for goods and services and the money market are in equilibrium. Changes in the nominal supply of money, the price level, or the expected rate of inflation produce shifts in the LM curve that affect the real rate. An increase in the real money supply, for example, moves the LM curve to the right, leading to a lower real rate of interest in the short run.

Figure 1 can be used in examining why the relationship between real income, or the unemployment rate, and the expected real rate of

¹⁴ If money pays a market-determined interest rate, the LM curve will tend to become steeper as fluctuations in market interest rates lead to smaller fluctuations in the opportunity cost of holding money. For a discussion of some of the issues that arise when money is interest bearing, see Bryon Higgins and Jon Faust, "NOW's and Super NOW's: Implications for Defining and Measuring Money," *Economic Review*, Federal Reserve Bank of Kansas City, January 1983.

¹⁵ An increase in the expected rate of inflation, by increasing the nominal rate associated with any given real rate of interest, would tend to reduce the demand for money and shift the LM curve to the right.

Figure 2
EFFECT OF MONETARY POLICY ON
THE REAL RATE OF INTEREST



interest is not likely to remain constant over time. The expected real rate and real output are determined at the intersection of the IS and LM curves. Shifts in the IS curve cause both r and y to change and lead the two variables to move in the same direction. A rightward shift in the IS curve, for example, causes both r and y to rise. Since the rise in y would be associated with a fall in the unemployment rate, the expected real rate and the unemployment rate would appear to be negatively related.

Movements in r and y caused by shifts in the LM curve, however, would cause r and y to be negatively related. A leftward shift in the LM curve, for example, causes r to rise and y to fall. This would lead to a positive correlation between the expected real rate and the unemployment rate. The observed movements of these two variables will depend on whether IS or LM shifts dominate. The sources of shocks to the U.S. economy in the first and second halves of the 1960-82 period were very different. The 1964 tax cut and the increased expenditures associated with the Vietnam War,

for example, represented disturbances in the IS curve, while the oil price increases of the 1970s were more in the nature of aggregate supply shocks. It is not surprising, therefore, that the relationship between the expected real rate and the unemployment rate varied over these years.

Figure 1 illustrates the short-run determination of the real interest rate. In the long run, the real rate also depends on the economy's productive technology, its capital stock, and the choices individuals make in deciding on their supply of labor. All of these are factors that determine the economy's full employment, or natural, rate of output. This natural rate of output is generally assumed to be independent of monetary factors. It is represented in Figure 2 by the vertical line drawn at an income level, y^* . The value of the real rate of interest that equates the aggregate demand for goods and services to the economy's natural rate of output is given by r^* .

Suppose, as shown in Figure 2, that $y' > y^*$. With production higher than the full employment level, prices will tend to rise. This rise in the price level reduces the real supply of money, shifting the LM curve to the left. This process continues until income declines to y^* , the real rate rises to r^* , and the LM curve has shifted to LM' .

The long-run equilibrium real rate, then, is r^* . Fluctuations in the LM curve away from LM' generate short-run movements of the real rate, but they are eventually offset by price adjustments that shift the LM back to LM' . The value of r^* is determined by y^* and the IS curve. The real interest rate depends on the economy's capital stock, labor force, and technology, and on investment and consumption-savings decisions. The analysis suggests that any effects of monetary policy on the real rate are likely to be only temporary as the real rate will tend to return to r^* .

This brief discussion of the determinants of

real interest rates suggests that any linkage between the variables of ultimate policy interest and real rates are complex and variable. While the focus here is on the way the relationship between real rates and real output can vary depending on the source of the disturbance to the economy, similar conclusions would hold regarding the connection between real rates and inflation. A changing relationship between goal variables and a potential intermediate policy variable is also a problem with the various monetary aggregates. To achieve a stable relationship between the monetary aggregates and policy goals, for example, the Federal Reserve has found it necessary over the last four years to redefine the aggregates and use "shift-adjusted" measures.

Controllability

A key issue in assessing the usefulness of a real interest rate measure in the design of monetary policy is its controllability. While the ability of the Federal Reserve to control short-term fluctuations in the monetary aggregates is often debated, there is little question about the long-run dependence of monetary aggregates on Federal Reserve actions. As has been shown, however, the long-run, or average, value of the real rate is likely to be independent of monetary policy. This raises serious questions about short-term control of the real rate.

The position of the LM curve in Figure 2 depends in part on the real quantity of money. Monetary policy can influence the real rate in the short run as long as policy can produce systematic changes in the real quantity of money, thereby shifting the LM curve. Only if policy-induced changes in the monetary aggregates produced immediate jumps in the general price level is the short-run behavior of real interest rates likely to be independent of monetary policy. Existing empirical evidence suggests such immediate price responses do not

occur.¹⁶ Monetary policy can affect real interest rates in the short run.

That the Federal Reserve can control real rates in the short term does not imply that it can affect real rates for any appreciable time. Also, since the real rate tends to return to its long-run equilibrium value, any series of short-run policies designed to keep the real rate away from this equilibrium value is likely to produce economic instability. Suppose, for example, that the equilibrium real interest rate is 3 percent but the Federal Reserve tries to fix the real rate at 1 percent. In the short run, the Federal Reserve might be successful in lowering the real rate below 3 percent by increasing the nominal money supply, shifting the LM curve to the right. Over time, however, prices would tend to rise faster than the money supply, reducing the real supply of money and shifting the LM curve back to its original position. Only further increases in monetary expansion would keep the real rate from rising. The attempt to keep the real rate below 3 percent would lead to accelerating inflation.

Monetary policy, however, might be able to limit fluctuations of the real rate around its long-run equilibrium value. The desirability of such a policy is examined in the next section. Such a policy requires that the Federal Reserve correctly identify the equilibrium real rate of interest. If the economy's natural rate of output

¹⁶ A once and for all change in the level of the money stock would affect real interest rates unless there was an immediate and proportional change in the general price level. An increase in the rate of growth of the money stock would initially affect real interest rates unless there was an immediate jump in the price level sufficient to reduce the real stock of money in line with the lower real demand for money associated with higher inflation expectations. For empirical evidence that such price changes do not occur, see Frederic S. Mishkin, "Does Anticipated Monetary Policy Matter? An Econometric Investigation," *Journal of Political Economy*, Vol. 90, No. 1, February 1982, pp. 22-51.

and its IS curve were fixed, identifying the equilibrium real rate would not be a serious problem. Unfortunately, both y^* and the IS curve are subject to persistent random shocks caused by changes in the prices of imported factors of production, changes in government purchases of goods and services, changes in perceived investment opportunities, and a host of other factors. The equilibrium rate varies over time, and a fixed real rate target would soon become outdated.

Problems of measuring the real rate, identifying the equilibrium rate, and controlling the real rate in the short run all suggest that monetary policy should not try to fix a target for the real rate of interest. There may be a role for the real rate, however, as a guide to the implementation of policy. The next section examines whether the Federal Reserve should look at real interest rates in setting its policy instruments or should only consider its monetary aggregate targets.

POLICY IMPLICATIONS OF SETTING REAL INTEREST RATE TARGETS¹⁷

Recent proposals have called for the Federal Reserve to establish targets for both monetary aggregates and for short-term real interest rates. In setting its policy instrument, the Federal Reserve would have to decide how much weight to give to achieving its monetary aggregate targets and how much to give to achieving its real rate target. This section considers the types of disturbances that would call for weight to be given to a real interest rate target.

For the purposes of this discussion, the Federal Reserve is assumed to be able to identify the long-run equilibrium real interest rate

and to establish this rate as its target real rate. The money supply target is taken to be a constant money supply rule.¹⁸

Within the IS-LM framework, a distinction can be made between two types of disturbances. The first is a temporary deviation of the IS curve from its average position. This will be described as an aggregate demand shock and could result from unpredictable movements in consumer spending, investment, or government purchases of goods and services. The second type of disturbance is one which results in an unpredictable shift in the LM curve. Shifts in the LM curve could result from movements in the price level, changes in the expected rate of inflation, or shifts in money demand or banking industry behavior resulting from financial innovation or deregulation.

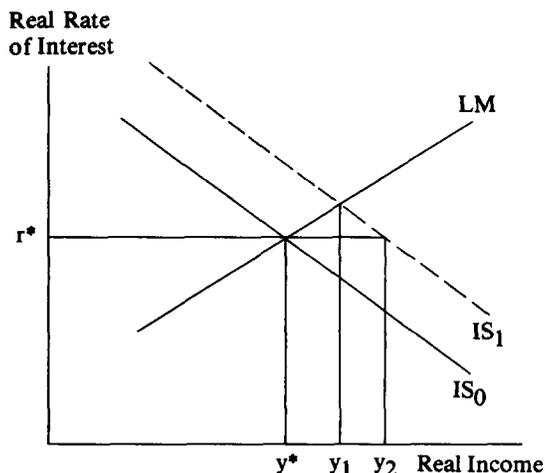
Suppose a rightward shift in the IS curve causes it to move from IS_0 to IS_1 , as shown in Figure 3; the curve then gradually returns to IS_0 . If the Federal Reserve is not targeting real interest rates, output and the real rate of interest will both rise as a result of this demand shock. The rise in the real rate, by reducing interest-sensitive private spending, helps stabilize aggregate demand and partially offsets the initial shock. This is shown in Figure 3 by the rise in income from y^* to y_1 , which is less than the horizontal shift in the IS curve. Any attempt to keep the real rate equal to the target rate, r^* , would act to eliminate the automatic stabilization mechanism that movements in the real interest rate provide. If aggregate demand shocks were the only type of disturbances affecting the economy, the Federal Reserve should not try to achieve a constant real rate target.

Factors affecting the income and interest rate values that equate the real demand for money

¹⁷ This section is based on Paul Jenkins and Carl E. Walsh, "The Real Rate, Credit Markets, and Economic Stabilization," mimeo, May 1983.

¹⁸ Assuming, instead, a constant growth rate target for the money stock would not affect the analysis.

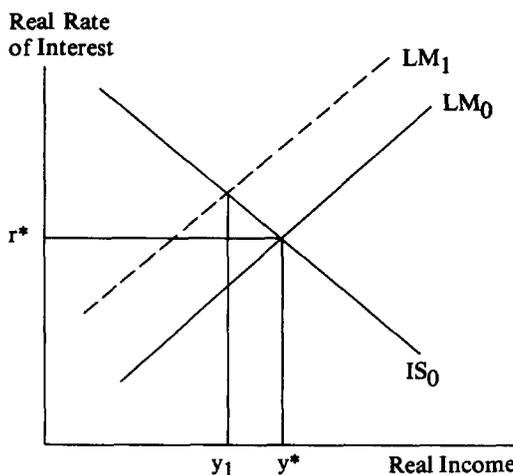
Figure 3
EFFECT ON y AND r OF A SHIFT
IN THE IS CURVE



to the real supply of money can produce shifts in the LM curve. Figure 4 illustrates a disturbance which results in a leftward shift in the LM curve. If the money demand shock is permanent or if the shift is due to a supply shock that persists for several periods, the LM curve, under a constant money growth target, will remain to the left of LM_0 until prices have fallen relative to the nominal quantity of money, thereby increasing the real supply of money. The original leftward shift in the LM curve leads to a rise in the real rate of interest above r^* . This, in turn, reduces aggregate demand and output. Income could be stabilized in this case by stabilizing the real interest rate. Achievement of a real interest rate target would stabilize the economy in response to price level or money demand disturbances.

Any actual economy is subject to both of these basic disturbances and the monetary authority may not be able to determine accurately the extent to which each type is responsible for fluctuations in output, interest rates, or prices. The weight to be given to the real in-

Figure 4
EFFECT ON y AND r OF A SHIFT
IN THE LM CURVE



terest rate target would depend on the relative importance of the two types of shocks. If, for example, it was believed that instability of the money demand function was the main source of economic fluctuations, a large weight should be given to a real interest rate target.

CONCLUSION

This article has briefly discussed some of the issues involved in an evaluation of the recent calls for the Federal Reserve to establish targets for real interest rates in addition to its targets for the monetary aggregates. It has been shown that, even when the long-run equilibrium real rate can be identified, an attempt should be made to stabilize real interest rates only in response to price level, money demand, or financial sector shocks. In the event of aggregate demand shocks, efforts to keep real rates from adjusting would amplify the fluctuations in output.

Financial innovations and deregulation of the banking industry have combined in recent years with the inherent instability of money

demand¹⁹ to produce large, frequent disturbances of the type that would best be neutralized by a policy of real interest rate stabilization. However, the difficulties of correctly identifying the equilibrium real rate and the inability of monetary policy to have more than a temporary effect on real rates argue strongly against any attempt to direct policy toward the achievement of a target real interest rate.

Despite these considerations, estimated expected real interest rates could play a useful role in the conduct of monetary policy. The rise in real rates beginning in the middle of 1980 may have been a contributing factor in the recent recession in the United States. An effort by the Federal Reserve to dampen the rise in real rates might have produced an appropriately more expansionary monetary policy during the early phase of the recession. However, if the high market interest rates were due not to high real

¹⁹ See, for example, John P. Judd and John L. Scadding, "The Search for a Stable Money Demand Function," *Journal of Economic Literature*, September 1982, pp. 993-1023.

rates but to high expectations of future inflation, a more expansionary monetary policy would have been inappropriate. The associated appreciation of the dollar against foreign currencies, though, suggests that the high nominal rates were, in fact, a reflection of high real interest rates.²⁰

Problems of measuring, controlling, and identifying the equilibrium real rate of interest all suggest that the Federal Reserve should not establish a real interest rate target. Financial innovation, deregulation of the banking industry, and the instability of money demand, on the other hand, all suggest that the Federal Reserve should monitor and use as informational variables estimates of the real rate of interest in formulating monetary policy.

²⁰ Jeffrey A. Frankel shows that a rise in the expected rate of inflation which increased nominal interest rates, leaving real rates unchanged, would produce a depreciation of the dollar against foreign currencies. See his "On the Mark: A Theory of Floating Exchange Rates Based on Real Interest Differentials," *American Economic Review*, Vol. 69, No. 4, September 1979, pp. 610-22.