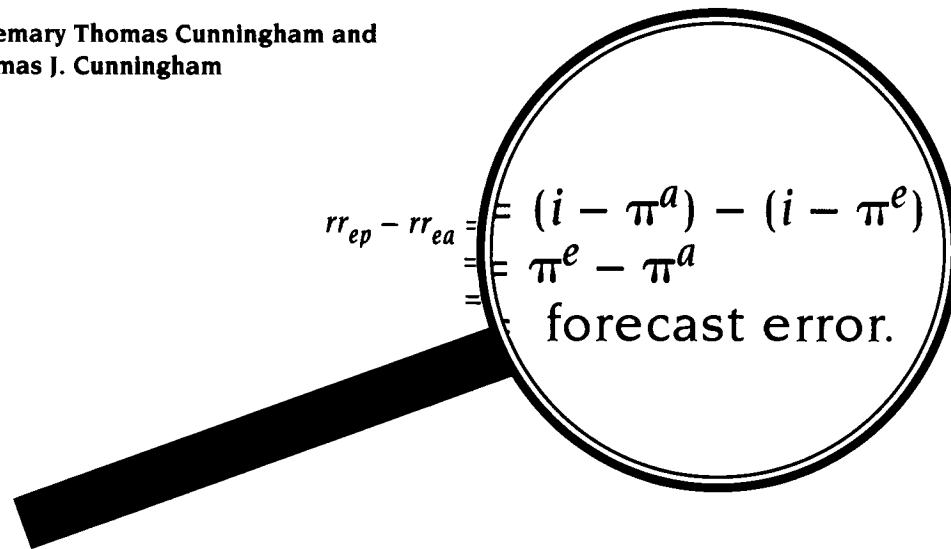


Recent Views of Viewing the Real Rate of Interest

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The question of whether monetary authorities have any influence over real interest rates has had economists' attention for a long time. The authors review various theoretical approaches to this issue and recent evidence in this article. They include a report on their own recent research based on a small, opening economy. Consistent with some earlier empirical work, their findings suggest an avenue of influence for the monetary authority over real interest rates.

Interest rates play a pivotal role in determining economic activity, and thus the behavior of the real, or inflation-adjusted, rate of interest is central to understanding macroeconomic dynamics. Investment expenditures, consumer durable expenditures, and saving are particularly sensitive to movements in real rates of interest.

This article is an attempt to understand recent developments in economic theory relating to the real rate of interest and, in particular, the ability of the monetary authority to influence it. Several perspectives deserve attention. If real processes and preferences

within the economy give rise to the real rate, the real rate then conveys information about the economy's preference for consumption now rather than in the future (that is, it represents the intertemporal marginal rate of substitution). If the real rate is thought of as the marginal product of capital, it provides information about the potential profitability of investment. In either case the monetary authority has no influence over the real rate process. If the real rate is viewed as being the outcome of a market for loanable funds, however, monetary policy does gain some influence over its behavior. Finally, if the economy is small relative to the rest of the world and open to international capital flows, the real rate may be influenced by, and indicate something about, relevant world conditions.

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Understanding the real rate of interest has been quite problematic ever since Irving Fisher (1930) made the distinction between the ex ante and the ex post real rate of interest. Because the ex post real rate of interest is simply the nominal rate of interest less the rate of inflation, it can be observed. In contrast, the ex ante real rate cannot be observed because it is the nominal rate of interest minus the expected rate of inflation. The ex ante real rate is the one that influences economic decisions and should be thought of as the real rate of interest even with the obvious problem it presents.

A recent solution to the dilemma posed by the ex ante real rate's being unobservable focuses on the problem of expectation formation and imposes some restrictions on that process in order to approximate an ex ante real rate of interest series. This article provides an overview of the theory behind the problem, followed by a discussion of the proposed solution and the implications of the restrictions it imposes. The concluding sections present applications of the solution, including recent research based on a small, opening economy, and summarize the role of the monetary authority in relation to real interest rates.

Economic Theory and the Real Rate of Interest

In Fisher's (1930) division of nominal interest rates, he claimed that the nominal (observed) rate of interest, i , was composed of the real rate of interest, rr ; an adjustment for the inflation (denoted by π) that was expected to occur over the relevant time period, π^e ; and the cross product of the two, $\pi^e \times rr$. Thus the basic Fisher equation is

$$i = rr + \pi^e + (\pi^e)(rr).$$

Most empiricists ignore the cross-product term since it is quite small under conditions of modest inflation and real rates of interest.¹ The resulting equation for the real rate of interest is

$$rr = i - \pi^e.$$

There are two prevalent misuses of the Fisher equation. First, assuming that the real rate is constant (usually 2 or 3 percent), any change in nominal interest rates could be interpreted as a change in expected inflation. Although many claim that the real rate of interest may be constant over the long run, drawing inferences about expected inflation in short-run analysis frequently results in error.

A more problematic misapplication of Fisher's work is the substitution of *observed* rates of inflation (as in ex post real rates of interest) for *expected* rates (as in ex ante rates) in the construction of a real rate of interest series. Although the two are not interchangeable, the substitution is frequently made because of the problem associated with observing the expected rate of inflation.² The difference between the ex post and ex ante rate is the forecast error for inflation during the period in question, and this error can be substantial, as may have been the case of fixed-rate mortgages in the 1960s. During that time, the ex post rate of return on mortgages seemed to be negative, by a large margin, and it seems unlikely that lenders would have made fixed-rate loans on the basis of negative ex ante rates.

Before developing the issue of the substitutability of the ex post for the ex ante real rate and the assumptions and restrictions that the substitution implies, an overview of various theories of the real interest rate's behavior is in order. The theories provide alternative approaches to interpreting movements in the real interest rate and to assessing the effectiveness of policy, particularly monetary policy, in influencing the real rate.

The most familiar class of model wherein monetary policy—the actions of the central bank—has any influence over the real interest rate is the Keynesian “liquidity effect,” which views the rate of interest as representing the price of holding on to money. From this perspective, it follows that a relative increase in the money supply should lower interest rates.

A problem with this approach, however, is that the Keynesian paradigm has trouble accounting for inflation. The Keynesian world is one in which prices are essentially fixed. In a fixed-price world—without inflation and thus

without any inflation premium—a decrease in “the rate of interest” is equivalent to a decrease in the real interest rate. The idea of fixed prices may be a useful assumption in certain situations but clearly is inappropriate for contemporary thinking about the effects of money supply increases. Because of this shortcoming, the Keynesian model has fallen out of favor for policy analysis.³

The monetary authority also has some influence over the real rate of interest in the loanable funds model, according to which the real rate of interest is the outcome of market interaction between savers, who supply funds, and borrowers, who demand funds. The real interest rate is the price that adjusts to clear the market, with aggregate inflation expectations simply added to the real rate outcome.

In this model the monetary authority exerts its influence over the real rate in two ways. First, by conducting open market operations the central bank directly enters the market to purchase or sell securities. Second, to the extent that the central bank can influence the operations of other financial intermediaries, usually through reserve requirements, it can induce others to provide funds to the market, thereby influencing the real rate.

A more prevalent way of thinking about the real interest rate centers on the real side of the economy and equates the real interest rate with the marginal product of capital (the output associated with adding one additional unit of capital to the economy). The argument is that if this marginal product of capital is greater than the real rate of interest, borrowing the money to add to the capital stock is profitable. The agent making the investment must pay the real rate of interest on the debt created to purchase the capital but receives the additional output, the real return, from that added capital. The difference is profit to the investing agent. As long as the profits are positive—that is, as long as the real interest rate is less than the real return on that investment (the marginal product of capital)—additional investment will continue because it is profitable.

As the additional investment occurs, two things happen. First, the demand for capital bids up the real interest rate. At the same time, the additional investment drives down

the marginal product of capital, decreasing the profitability of added capital. The investment process ends when real profitability reaches zero (that is, when the marginal product of capital equals the real rate of interest).

The marginal product of capital model has gained popularity because of its explanatory power. It results from general equilibrium models, which attempt to describe an entire economy and can portray the interaction among various markets and potential transmission of disturbances from one sector to the rest of an economic system. For example, any disturbance to individuals’ savings preferences will show up as disturbances in the real interest rate and thus in the amount of in-

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vestment undertaken in the aggregate economy. Similarly, technological innovations that raise the marginal product of capital would stimulate investment, and disturbances to the supply of production inputs (oil supply shocks, for example) would alter the productivity of capital, affecting investment and the real rate.

In the marginal product of capital model only real factors influence the real rate of interest. Purely nominal disturbances have no effect. In Keynesian terminology, it is as if the economy suffered no “money illusion.” What matters is not money prices but real prices, as though everyone in the economy could immediately understand the distinction between general changes in the price level—simple inflation—and relative changes in the

prices of goods, representing some real difference in the economy.

Modifications to the marginal product of capital model give the monetary authority some influence, albeit temporary, over the real rate of interest by assuming that economic agents cannot make the above distinction correctly and instantaneously. During the period in which economic agents are sorting out relative price changes from general price level changes, the monetary authority may influence the real rate. Ultimately, when agents understand the changes and have full and complete information, the monetary authority loses control over any real facet of the economy and has influence over only the nominal price level.

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The central theme of this “policy ineffectiveness” result is that the monetary authority has no influence over real activity except what these informational disparities make possible.⁴ Additional assumptions about how the economy learns over time could make these informational disparities quite short-lived and reduce the monetary authority’s control to that of the inflation rate only.

If in fact the monetary authority influences only the inflation rate, the Fisher equation indicates that there will be a somewhat perverse effect on the observed nominal interest rates: a policy of monetary ease (supplying relatively more money) would result in higher nominal interest rates as the markets translate the faster growth rate of money into higher expected inflation.

In principle, the difference between this model and the Keynesian model can be tested empirically. Thomas J. Cunningham (1987) described the difficulties of detecting liquidity effects and concluded that models allowing the monetary authority its perverse influence on interest rates are generally the most appropriate for describing the economy; that is, it is largely accepted that the real rate of interest is beyond the influence, even in the short run, of the monetary authority. Some recent evidence challenges this view, however, and will be discussed below.

An alternative way to view the real interest rate in a general equilibrium setting is to envision the real return on saving as a reward for abstaining from consumption. Imagine that at the end of the production cycle there exists a set of goods that can either be consumed directly or invested in the next production cycle. Firms want the output to be invested productively and are willing to offer a real reward to consumers willing to forgo some consumption. The reward is the real rate of interest. As discussed earlier, firms will be willing to offer a real return up to the value of the marginal product of capital.

The consumer, on the other hand, must weigh the value of consumption now against its value later. Because future consumption is less desirable to consumers, they must be induced to delay some consumption by being given the potential for greater consumption in the future—the real return on savings.

From the consumption standpoint, this real rate of interest represents consumers’ rate of time preference for consumption now versus consumption later. If the real interest rate is higher than a consumer’s rate of time preference, the consumer will save more because the ultimate reward for saving is considered relatively large. By the same token, if the real interest rate is less than the rate of time preference, the consumer will save less.

Ultimately the real rate of interest must coincide with the economy’s aggregate rate of time preference—a real factor over which the monetary authority has no effect. Taken with the demand for capital discussed above, the real interest rate grows out of the interaction between the marginal product of capital and the aggregate rate of time preference, neither

of which the central bank influences. The real rate of interest is, according to the logic of this model, exogenous to monetary policy.

Thus far the discussion of the behavior of real interest rates has assumed an economy that is not open to international capital flows. Particularly as the economies of the world are becoming increasingly integrated, this assumption can be misleading. The implications of an open economy for monetary policy and the real rate of interest hinge on the type of exchange rate regime to which the monetary authority commits itself: a fixed exchange rate, tying the value of the currency to that of another currency, a basket of currencies, or some commodity; or a flexible exchange rate, whereby market forces determine the international value of domestic money.

Operating under a fixed exchange-rate system, the monetary authority will use monetary policy to stabilize the currency's international value.⁵ Committed to this exchange-rate regime, monetary policy cannot deviate from a course of keeping exchange rates constant. Consequently, many questions concerning the influence of the monetary authority become moot. Problems of the domestic economy's price level stability and movements in the real interest rate are beyond the immediate concern of the monetary authority and are resolved by interaction with the rest of the world. Any difference in the domestic real rate of interest from the world real rate would immediately be arbitrated away by a sufficiently large flow of capital toward the relatively higher return.

Flexible exchange rates, on the other hand, allow monetary authorities to pursue a monetary policy independent of pure exchange-rate considerations. Because the monetary authority does not have to conduct policy in a manner exclusively designed to stabilize the exchange rate, it is free to pursue other goals. Indeed, a major impetus for the breakdown of the post-World War II Bretton Woods agreement (establishing a fixed-rate regime) was the difficulty of coordination among the major central banks with differing policy goals.

Under a flexible exchange-rate system, currencies are traded on an open market, much as any other financial instrument. Rela-

tive supply and demand will determine a currency's international value. Interest rates can differ among countries without engendering a large capital flow because the international return on domestic investments is no longer simply the domestic interest rate but the domestic interest rate plus the change in the currency's international value during the period the investment is held. Thus any difference in real returns between domestic economies can be equalized by a real change in the relative value of the currencies.

In the framework of the models discussed above, opening the economy to international financial markets simply shifts the level of discussion from that of the nation to that of the world. World real rates of return tend to equalize, and, if a nation's economy is sufficiently small and open relative to the rest of the world, its adjustment process can be quite quick. At the extreme, the small open economy has no ability to control independently its domestic real rate of interest, price level, and exchange rate. The three must simultaneously adjust to equate (among other things) real rates of return with the rest of the world.

With the exception of the work discussed below, there is little evidence that the monetary authority can influence real interest rates. Indeed, what evidence there is to support the notion that the monetary authority has any influence over even nominal interest rates suggests that the effect is to raise, not lower, nominal interest rates; an increase in the money supply (or money supply growth rates) will lead to an increase in nominal interest rates so that an "easy money" policy actually is associated with higher, not lower, nominal interest rates.

Two hypotheses have been put forth to explain this result. The "policy anticipations" or "expected liquidity" hypothesis suggests that a liquidity effect does exist but that an unexpected increase in the money supply today leads to expectations of lower money growth rates in the future; nominal interest rates rise because of an expected liquidity effect in the future. This is a popular explanation for results during the period from 1979 to 1982, when the Federal Reserve System had an operating procedure

focused on targeting monetary growth rates, thus giving the central bank a motive to ensure that deviations in the expected path of money growth were eventually offset. A second hypothesis, the inflation expectations hypothesis, argues that an increase in current money supply growth causes expectations that inflation will rise, thereby pushing up nominal interest rates according to a straightforward Fisher effect.⁶

Two important conclusions follow from the foregoing empirical analysis. First, there is substantial evidence that an easing of monetary policy will lead to higher nominal interest rates. The second, and more important, point is that monetary policy cannot claim to influence the real rate of interest. The problem, however, discussed above, is that the relevant measure of real rates of interest is unobservable and thus out of the reach of simple econometric models. It is to the solution of this problem that attention is now turned.

How to Solve the Problem: An Application of Rational Expectations

Fredric Mishkin of Columbia University has recently exploited rational-expectations restrictions to construct a real interest-rate time series useful for econometric inquiry. "Rational expectations" theory maintains simply that economic agents cannot systematically be fooled in forming expectations; that is, people may be continuously incorrect in their expectations, but the mistakes they make are unpredictable. Stated simply, people learn enough from their mistakes that they do not repeat the same error.

This simple insight turns out to be rather powerful in practice. Consider the real interest rate equations described above. The goal is to be able to derive the ex ante real rate of interest, which, to repeat with added notation, is

$$rr_{ea} = i - \pi^e.$$

However, we are able to observe only the ex post real rate of interest,

$$rr_{ep} = i - \pi^a,$$

where π^a represents the actual rate of inflation. The difference between these two measures of the real rate is simply the inflation forecast error:

$$\begin{aligned} rr_{ep} - rr_{ea} &= (i - \pi^a) - (i - \pi^e) \\ &= \pi^e - \pi^a \\ &= \text{forecast error.} \end{aligned}$$

According to the rational expectations hypothesis, the mathematical expectation of the forecast error is zero. Thus, as long as the notion and implications of rational expectations theory are acceptable, the observable ex post real rate of interest series can be directly substituted for the unobservable, but economically important, real rate of interest.

Applications of the Solution

Mishkin has used rational expectations to investigate, among other things, the effects of monetary policy changes on real interest rates, the economic effects of high real interest rates in the United States during the 1980s, and the equality of real interest rates across countries. The approach and work is relatively new. While the rational expectations restrictions discussed above seem rather simple and innocuous, the notion of empirically estimating real rates of interest is quite controversial.

Mishkin's work with John Huizinga (1986) indicates that monetary policy has been the source of the high real interest rates of the 1980s in the United States. In particular, the researchers conclude that the high real interest rates of that decade were the result of the regime change adopted by the Fed in order to disinflate the U.S. economy.

Huizinga and Mishkin focus not only on the high level of real interest rates in the early 1980s and its relation to the Fed's policy changes of October 1979 and October 1982 but also on what they term the significant shift in the stochastic process of real interest rates—the behavior of the real rate series as it bounces around over time.

In October 1979 the Federal Reserve System changed its policy from one of targeting interest rates to targeting nonborrowed reserves. In October 1982 the Fed switched to a borrowed reserve target. Huizinga and Mishkin explored the possibility that, after the policy changes of 1979 increased uncertainty about interest rates, money supply growth and inflation played a role in real interest-rate movements. In addition, they investigated a similar regime change that took place in 1920 when, in response to high inflation rates, the Fed dramatically increased the discount rate twice.

Using data from 1953 to 1984, Huizinga and Mishkin employ rational expectations theory to describe the ex ante real rate of interest as a linear function of a constant, the one-month nominal interest rate, the one-month inflation rate lagged one and two months, and a supply-shock variable (measured as the logarithm of the relative price of fuel and related products in the producer price index) lagged one month. In substituting the ex post real rate for the ex ante real rate, they substituted the nominal interest rate on the one-month bill less the rate of inflation calculated from the consumer price index.

To test whether or not monetary policy regime changes influence the manner in which these variables affect the real rate of interest, Huizinga and Mishkin tested for the equality of the coefficients during various time periods. They found that a shift did indeed occur in these coefficients in October 1979 and October 1982. While in all sample periods a significant negative relationship exists between real rates and expected inflation, the relationship between real and nominal interest rates in the 1979-82 period differs from those in the pre-1979 and the post-1982 periods. In the 1953-79 and 1982-84 periods, there is a significant negative relationship between real and nominal interest rates, whereas in the 1979-82 period the relationship is significantly positive.

Huizinga and Mishkin hypothesized that if a break occurred during the early 1980s in the stochastic process of real interest rates, there should also be breaks in the process during other periods of monetary policy regime changes. Although the exact data series used

for the latter time periods were not available in the 1916-27 period, Huizinga and Mishkin worked using comparable data and again tested for the equality of coefficients before and after the monetary policy change in 1920. The results of their tests indicate that, similar to the effect of the monetary policy regime changes of the early 1980s, there was a significant shift in the stochastic process of real interest rates.

Mishkin (1988) explains that because there is not one real rate of interest, monetary policy may affect various sectors of the economy differently. In particular, he claims that during the 1980s agriculture bore a disproportionate share of the disinflationary burden. This situation occurred not only because farmers depended heavily on debt markets in financing production but also because real interest rates were much higher in that sector than in the economy as a whole.

According to Mishkin the relevant real interest rate for the agricultural sector is not one that should be calculated with a broad-based price index such as the consumer price index but rather with one that reflects the prices of farm products. To do this, he constructed a real rate of interest series by subtracting the rate of increase in the farm products component of the producer price index from the one-month Treasury bill rate for the period from January 1953 to December 1986.

Using the relevant real interest rate for the agricultural sector for the periods from January 1953 to October 1979 and from November 1979 to December 1986, Mishkin then estimated essentially the same equation as in Huizinga and Mishkin (1986). The results indicated that the only significant explanatory variable in either period was the one-month Treasury bill rate.

Mishkin also compares his estimates of real interest rates in the agricultural sector with real interest rates for the economy as a whole. In his plot of the two graphs, the real rate for the farm sector appears to be an amplified movement of the real rate for the overall economy. Mishkin confirms this conclusion by regressing the estimated agricultural real rate with the overall real rate and finds that there is a statistically

significant comovement between the two and that the agricultural real rate moves more than one-for-one with the overall real rate. From this information, he concludes that the agriculture sector bore much of the burden of the disinflationary period of the early 1980s.

Using data from the Eurodeposit market for seven industrialized nations, Mishkin (1984) also investigated the equality of real interest rates across countries. Again, if a nation is engaging in free trade and there are no restrictions on the mobility of capital, then real interest rates should be equal across countries. If his theory is correct, domestic monetary authorities have no control over real interest rates and their ability to use expansionary or contractionary monetary policy to influence economic activity is therefore constrained.

Mishkin investigated the equality of real interest rates across the United States, Canada, the United Kingdom, France, West Germany, the Netherlands, and Switzerland from the second quarter of 1967 to the second quarter of 1979. He calculated the ex ante real rate of interest two ways: the three-month Eurodeposit rate less the rate of change in the consumer price index and the three-month Eurodeposit rate less the rate of change in the wholesale price index for a particular country. The results indicated that these nations' real interest rates were not equal. Mishkin asserts that real interest rates may differ across countries because risk premiums may differ and because transactions costs and the lack of perfect substitutability of goods implies the violation of purchasing power parity; it does not necessarily imply that real rate arbitrage opportunities exist.

He also asked whether real rates at least moved similarly over time from economy to economy even if they were not strictly equal among nations. The results imply that real rates of interest do not move in similar ways across nations. Mishkin's results indicate that, although capital markets may be integrated, real rates may differ across countries and the domestic monetary authorities may therefore be able to employ monetary policy to influence economic activity.

Real Interest Rates in a Small, Open Economy

We recently began some work that has been in part motivated by Mishkin's work concerning real rates of interest and adopts his restrictions (Cunningham and Cunningham 1990). It centers, though, on the theoretical conformity of the behavior of real rates of interest in a small, open economy. Although real rates of interest may not be equal or move similarly over time across the developed nations that Mishkin studied, the situation may be quite different for a small, open economy with which a relatively large economy such as the United States is a major trading partner.

For a small, open economy the actions of the domestic monetary authorities may determine real rates of interest, or world (U.S.) real interest rates may be the primary influence on real interest rates. The idea that domestic monetary forces control real interest rates simply extends Huizinga and Mishkin's work to small, open economies. The possibility that world real interest rates have the greater influence is in accord with standard open economy macroeconomic theory and, if true, would indicate that U.S. monetary policy has not only domestic effects but also influence over economic activity in at least some other nations.

To investigate the behavior of real interest rates in a small open economy, we looked at the case of the Republic of China on Taiwan from October 1985 through January 1990. Taiwan is an interesting subject because in July 1987 the country moved from a functionally closed economy to one that is essentially open. Prior to financial liberalization, foreign investment was limited to certain types of direct investment in manufacturing, and domestic investment in foreign firms was restricted. In July 1987 reforms were enacted that opened capital markets, relaxing foreign exchange restrictions and permitting international capital flows.

To examine the relative influences of domestic monetary policy and the U.S. real rate of interest on the real interest rate in Taiwan, we regressed the real rate of interest in Taiwan on the growth rate of the domestic

money supply, growth in industrial production, and the real rate of interest in the United States. The results could indicate one of three situations. First, the real interest rate in Taiwan could have been affected by the U.S. real rate of interest even before the economy was opened financially because of the fact that the real side of the economy was relatively open, thereby potentially bringing the domestic marginal product of capital in line with the world (U.S.) marginal product of capital. Second, the real rate of interest could have been influenced by the action of the domestic monetary authorities before July 1987 and influenced by U.S. real interest rates thereafter, with the domestic monetary authority's having lost whatever control it had had prior to the financial opening. And third, the primary influence on real interest rates both before and after financial liberalization could have been the domestic monetary authority only.

Our preliminary results are consistent with standard economic theory. They provide some evidence of conditions similar to a liquidity effect and are consistent with Mishkin's work in that, both before and after the financial opening of the economy, the change in the domestic money supply is a significant explanatory variable of real interest rates in Taiwan. The results, however, also indicate that after financial liberalization, U.S. real rates of interest influenced real interest rates in Taiwan.

Overall, our results have intuitive appeal. There is some evidence that before the financial opening of an economy, the domestic

monetary authority can influence real rates of interest. After the financial opening, the monetary authority still has some influence, but world real interest rates also become important. The significance of the study is tempered by a somewhat small data set, however, and preliminary results should best be considered simply suggestive. At the same time, the validity of the results is supported by their consistency with standard open-economy macroeconomic theory.

Conclusion

The question of whether the monetary authority may have some influence over real interest rates is far from settled. A substantial body of empirical work shows a direct relationship between money growth rates and nominal interest rates.

Nevertheless, the work discussed above intimates an avenue of influence for the monetary authority over real interest rates. Mishkin's work suggests a liquidity effect (in the real interest rate) for developed economies, and our work extends that result to a newly industrialized economy. Our work also suggests that the overall influence of the monetary authority in a small, open economy may be tempered substantially by real rate movements in the rest of the world. Nonetheless, economies with financial markets in a limited state of development may find the judicious use of monetary policy effective in influencing real rates of interest.

Notes

¹ This article's analysis also ignores tax complications and the term structure. The information about economic expectations contained in the term structure is a separate issue from that discussed here, which relies on the convenient conventional assumption that there is "an" interest rate.

² Some surveys are attempting to address this issue and can be expected, eventually, to provide a potentially useful source of data for certain countries during certain times.

³ An early attempt to solve this problem came, independently, from Robert Mundell and James Tobin. The Mundell-Tobin effect allowed for the incorporation of inflation into the Keynesian IS-LM model, and the ef-

fect of this inflation was to reduce marginally the real rate of interest while raising the equilibrium level of income. See Blanchard and Fischer (1989, 546).

⁴ The concept is now pervasive enough to show up in undergraduate economics texts.

⁵ One of the most frequently forgotten rules of economic policy is the assignment principle, which says that for each and every policy target there must be a policy instrument—that is, for every economic variable to be influenced (inflation, unemployment, exchange rates, and so forth), the policymaker needs to have a policy instrument (such as money growth or government spending) to manipulate. The dilemma facing the monetary authority is that it is limited to using the

policy instrument to target one economic variable at a time. For example, suppose the monetary authority wishes to target a specific rate of inflation. If it adopts a policy of money growth designed to engender the desired effect, it cannot respond to nominal interest rate movements without abandoning the initial policy. Having chosen the rate of inflation as the target,

the policymaker must accept whatever happens to other economic variables, including perhaps undesired consequences.

⁶These hypotheses are described in Cunningham and Cunningham (1991), Cunningham and Hardouvelis (1987), and an excellent review by Sheehan (1985) and touched on in Cunningham (1987).

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