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# FRBSF WEEKLY LETTER

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## Real Interest Rates

In his latest Humphrey-Hawkins testimony before Congress, Federal Reserve Chairman Greenspan suggested that real interest rates could come to play a larger role in the formulation of monetary policy. This *Weekly Letter* discusses what that role might be and describes what we know about the behavior of short-term real rates in the U.S. since the 1960s. Our review suggests that while it is unlikely that real interest rates will provide information about how to conduct policy in the short run, they are likely to be useful in helping to avoid policy settings that are untenable in the long run.

### Real rates and policy

The real rate of interest can be defined as the nominal rate minus the expected rate of inflation. Thus, if the nominal rate on 3-month T-bills is 4 percent, and the expected rate of inflation is 3 percent, then the real rate on 3-month T-bills would be 1 percent. Real rates are important because they provide a measure of the value of resources today versus tomorrow (abstracting from inflation), so they play a central role in people's decisions about saving, consuming, and investing. Therefore, real rates figure prominently in most kinds of models of the macroeconomy, as well as in discussions of how monetary policy affects the economy.

In thinking about the role of real interest rates in monetary policy it is useful to have a concept of the equilibrium real rate. For our purposes the equilibrium real rate can be defined as the rate that would equate economy-wide demand and supply in the long run, once short-run disturbances have worked themselves out. Factors that shift demand or supply could cause this rate to vary over time. For instance, the equilibrium real rate would rise if individuals decided to consume more today and reduce the amount they had been saving for the future.

The Fed cannot keep the real interest rate away from its equilibrium level in the long run without generating either an acceleration or a deceleration in inflation. Consider, for example, what would happen if the Fed tried to keep the real rate artificially low. An increase in the rate of

money growth initially would push down both real and nominal interest rates, given that the inflation rate would not adjust at once to the higher money growth. However, faster money growth would raise inflation expectations eventually, so the inflation rate would adjust as would interest rates. To keep real interest rates artificially low, the Fed would need to raise the rate of money growth further; of course, then the rate of inflation would rise further and the whole cycle would begin again. It turns out that this description of what would happen if the Fed tried to keep real interest rates too low is not entirely hypothetical; the Fed's attempts to stimulate the economy during the 1970s (through what amounted to a policy of extremely low real interest rates) led to steadily rising inflation that was finally checked at great cost during the 1980s. Thus, historical experience suggests that the Fed would not find the real interest rate a useful target. This does not mean that the real rate cannot be used in the policymaking process; the Fed could still use it as an indicator—that is, the Fed could use the information contained in the real interest rate to help determine the appropriate stance of policy.

However, using the real rate of interest as a monetary policy indicator is not a straightforward task either. For one thing, it is difficult to determine what the equilibrium rate is at any point in time, because real interest rates are affected by many factors. To get a sense of how many different factors may be involved, consider how many different explanations have been offered for the unusually high real rates of the 1980s. Among the candidates: tighter monetary policy, easier fiscal policy, an increase in the rate of return to capital, a slow adjustment of expectations to declining inflation, as well as the savings and loan crisis.

### Short-term real rates since 1960

In view of these problems it may seem that we could get a better sense of the equilibrium level of real rates simply by looking at the historical data we have. But things are not so straightforward there either. One problem is that we cannot observe the real rate that is likely to be most relevant to decisionmaking. An individual's decision

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about whether to borrow money, for example, is based on the real rate of interest she expects to pay at the time she borrows the money; that is, it is the nominal rate less the rate of inflation expected over the life of the loan. Economists call this the *ex ante* real rate. Since we cannot observe this rate directly, we must resort to making an estimate about the public's expectation of inflation over the relevant horizon and then subtracting this estimate from the observed nominal rate. Errors in estimating expected inflation translate into errors in estimating the real rate. Further, since inflation in the near term (say over the next three months) is easier to predict than inflation in the long run (say over ten years), estimates of long-term real rates are likely to be more problematic than estimates of short-term real rates.

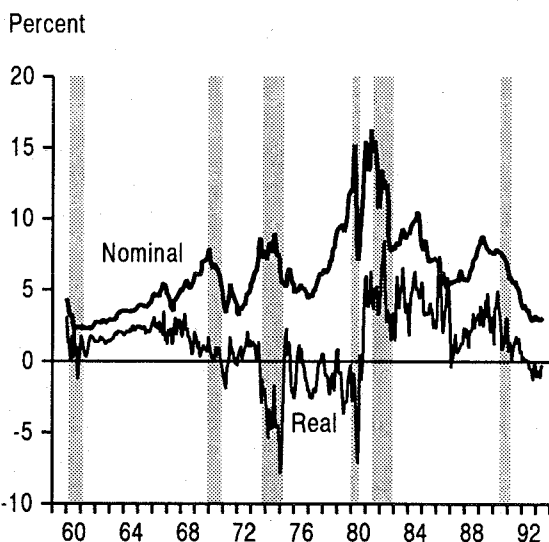
Keeping these caveats in mind, we now turn to the data itself. The figure plots the nominal and estimated real interest rates on 3-month Treasury bills since 1960. The estimate of the real rate was constructed by subtracting expected inflation from the nominal rate, with expected inflation modeled as a function of lagged inflation alone. The shaded areas represent recessions.

Over this period, the nominal rate has been rather volatile, ranging between 3 and 16 percent. Although the real rate is less volatile than the nominal rate, it does tend to move around quite a bit. Further, shocks to the 3-month real rate appear to persist for a long time, and the rate shows little tendency to return to a central value or mean; that is, it appears to be "nonstationary." Empirical studies on the issue are divided, with some concluding that the real rate is nonstationary while others disagree.

If real rates are nonstationary, then the concept of the equilibrium real rate would have little operational significance for monetary policy. For example, a fall in the measured real rate could be the result of a permanent decline in the equilibrium real rate, in which case it would have no implication for the stance of monetary policy; or it could be the result of easy monetary policy, in which case it would suggest that monetary policymakers would need to reverse direction at some point in the future.

Even if real rates are *not* strictly nonstationary, the figure indicates that it still would be difficult to devise an operational measure of the equilibrium real rate. This is because the short-term

## 3-Month T-Bill Rate



rate shows a tendency to hover around different values for extended periods of time. One can make out at least three different phases in the figure. The first phase coincides roughly with the 1960s, when real rates were low but positive, and averaged 1.7 percent. The second covers the 1970s, when real rates were generally negative, and averaged  $-0.9$  percent. Short real rates were noticeably higher in the 1980s, when they averaged 3.1 percent. Real rates have averaged 0.9 percent in the 1990s, although it is too soon to tell whether this marks a new phase. Some researchers have suggested that the change in the behavior of real rates (especially from the 1970s to the 1980s) is associated with a change in the monetary policy regime; however, others have pointed out that similar regime changes in other countries have not had the same impact. (See Bonser-Neal 1990 for a discussion.)

Short-term real interest rates show little evidence of systematic variation over the cycle, once these longer-run patterns are allowed for. Thus, real rates were low but positive during the two recessions over the 1960s (averaging less than 1 percent in the two recessions), negative during the 1973–1975 recession (averaging  $-4.2$  percent), and noticeably high during the 1981–1982 recession (averaging 4.4 percent). This behavior is not surprising, given that different factors are likely responsible for different recessions. Thus, it is generally agreed that the 1981–1982 recession was caused by tighter monetary policy, which

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would tend to push up real rates in the short run. By contrast, adverse supply shocks are believed to have played a larger role in the 1973–1975 recession; these shocks as well as the generally easier policy followed by the Fed during this period would tend to reduce real rates in the short run. In general, then, it seems difficult to predict how short real rates would behave over the cycle without further information about what was going on.

Could nominal rates be used to infer the underlying behavior of real rates? A look at the figure shows that the answer is no, since the two do not move in the same way relative to each other. Once again, this is not surprising, since different factors will have different effects on the two rates. Rising inflation in the 1970s, for example, was associated with higher nominal rates but lower real rates. This negative relationship between real rates and inflation has been noted by various researchers for other time periods and other countries as well, but has not been satisfactorily explained. (See, for instance, Mishkin 1988.) By contrast, real and nominal rates moved closely together over the 1979–1982 period, when the Fed moved nominal rates to combat inflation. Note also that real and nominal rates have moved closely together since the mid-1980s, implying that inflation expectations have not changed much over the period.

### **Conclusions and policy implications**

Real interest rates are affected by a large number of factors, and it is difficult to know where the

“equilibrium rate” would be at any point in time. The problem is made worse by the fact that the *ex ante* real rate cannot be observed directly. Having to estimate these rates naturally introduces error into this process.

The fact that we are uncertain about the equilibrium rate does not mean that real rates have no role to play in setting monetary policy. While it is difficult to determine the correct level of real interest rates at any point in time, it is easier to tell whether a given level of rates is outside some reasonable range. For example, if there is one clear lesson for monetary policy from the 1970s, it is that short-term real rates should not be forced below zero for long periods. Thus, while it is unlikely that real interest rates can be used to provide a day-to-day guide for monetary policy, they can provide warnings about extreme policy settings.

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### **References**

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- Mishkin, Robert F. 1988. “Understanding Real Interest Rates,” NBER Working Paper No. 1204.

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