FRBSF WEEKLY LETTER

Number 95-23, June 23, 1995

Federal Reserve Policy and the Predictability of Interest Rates

On February 4, 1994, the Fed raised its intended level for the overnight federal funds rate by a quarter of a percentage point. Immediately following this policy action, one-month interest rates and other short-term rates rose as well. Most economists would interpret these market rate reactions in the context of the "Rational Expectations Theory" of the term structure of interest rates. This theory states that longer-term interest rates are set according to market expectations of future shorter-term rates: For example, as a first approximation, the current one-month interest rate should equal the average of the current overnight rate and the market's expectation of the next 29 days of overnight rates. According to this theory, the market rate movements after the Fed policy action reflected both the immediate change in the overnight rate as well as market expectations about future policy actions that would affect the overnight rate.

Thus, to understand the term structure of interest rates, it is necessary to understand how the Fed conducts policy, in terms of the goals and strategies that the Fed pursues, as well as the tactics by which it operates to affect the overnight funds rate. This *Letter* examines the tactics of monetary policy in order to shed some light on the behavior of the short-end of the yield curve. This *Letter* also describes some possible explanations for the choice of these particular operational tactics. (For a recent discussion of the goals of monetary policy, see Judd and Trehan 1995.)

Predictability of short-term interest rates

This *Letter* focuses on the ability of spreads between short-term interest rates of various maturities to predict future interest rate movements. One implication of the Rational Expectations Theory of the term structure is that the spread between longer-term and shorter-term rates should be able to forecast future changes in the shorter-term rate. However, many researchers have empirically tested this implication and have obtained disparate results: Term spreads appear to be able to predict future changes in interest rates of only certain maturities.

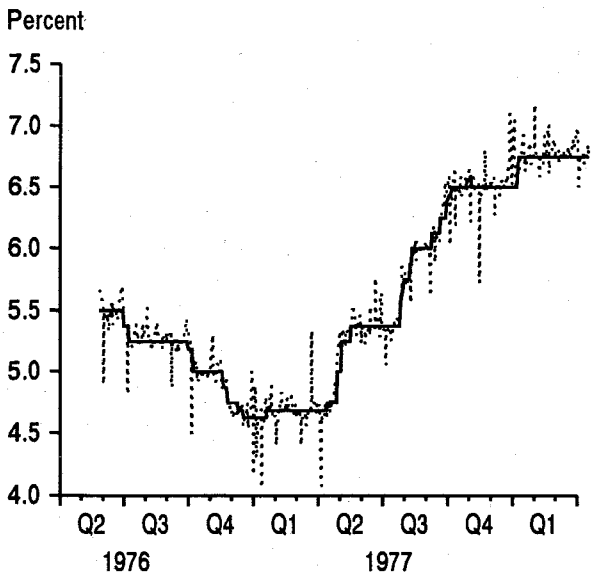
Specifically, spreads between money market rates, like the three-month bill rate, and the overnight rate appear to have predictive information about future changes in the overnight rate. In addition, spreads between very-short-term monthly bill rates seem to have predictive information about future changes in short rates at horizons of less than two months. For example, the spread between one-month and two-month Treasury bill rates is able to predict some future changes in the one-month rate. However, yield spreads involving bills with maturities between three and twelve months have essentially no predictive information for future changes in these rates. For example, with postwar data, many researchers have found essentially no information in the spread between yields on three-month and six-month Treasury bills for forecasting future changes in the three-month rate.

Federal Reserve interest rate targeting

In Rudebusch (1995), I explain the disparate evidence on the predictability of short-term interest rates with an explicit econometric model of the Fed's day-to-day operating procedures, which, over much of the past two decades, can be roughly construed as targeting interest rates. In essence, my argument is that the way in which the Fed targets interest rates, for example, its "smoothing" of rates, implies the predictability of interest rate movements only at certain horizons.

The Fed's interest rate targeting behavior can be broadly summarized with three attributes. First, the Fed does not peg the market funds rate to the target rate on a daily basis. Indeed, because the Fed typically only enters the market to influence the spot rate once each day, large deviations of the market rate from the target rate are allowed. This is apparent in Figure 1, which provides an illustrative sample of daily data from the mid-70s on the target federal funds rate (solid line) as well as the actual market rate (dashed line). The average daily deviation is a couple tenths of a percentage point; however, any given day's deviation from the target rate is

Figure 1
Federal Funds Rate



largely eliminated by the following day. Thus, although the funds rate is not pegged to the target each day, the Fed does appear to enforce the target over the course of a few days.

Second, the Fed engages in short-term interest rate "smoothing"—that is, the target level of the federal funds rate is not adjusted continuously but in limited amounts at a restrained, deliberate pace. As a broad characterization, target changes are conducted in small, standardized steps, very often only one-quarter or one-half of a percentage point in size. In addition, target changes are seldom immediately reversed; for example, an increase in the target rate is usually not followed very soon after by a decrease. Thus, a typical policy action is implemented with gradual increases or decreases (but not both) in the target rate. This attribute is reflected in the "step-function" appearance of the target rate in the figure, where a series of closely-spaced, small target changes are made in the same direction.

Third, there is a persistence to the target level. Abstracting from the short-term interest rate smoothing considerations, the target rate is generally set at a level the Fed expects to maintain. The interest smoothing considerations suggest that during the first several weeks after a target change there is a higher probability that the target rate will change again in the same direction than in a different direction; however, after a month or two have passed, the likelihood of a change in the same direction is not greater than the likelihood of a change in a different direction. That is, beyond a horizon of one or two months, there are no movements planned in the future to react to information already known.

Fed behavior and interest rate predictability

The three attributes of the Fed's interest rate targeting behavior appear to be able to account for the various term structure results described above. For example, the fact that the spread between short-term money market rates and the federal funds rate predicts future movements in the funds rate can be explained, at least in part, by the transitory daily deviations from the persistent target rate. If today's funds rate is unusually high relative to the target, it can be expected that tomorrow's funds rate (and future daily rates) will return to the target level; thus, the current three-month rate, which is an average of those future daily rates, will remain close to the target funds rate. In this way, the spread between the overnight funds rate and the three-month rate is a good predictor of the change from the current daily rate to the average daily rate that prevails over the next three months.

The other predictive information that is available at the very short end of the term structure—for example, the ability of the one-month and two-month rate spread to predict future short rates—likely reflects the gradual nature of policy actions. Suppose that a major piece of information arrives that clearly requires a large target change; following its interest rate smoothing precepts, the Fed accomplishes this change with a sequence of gradual target adjustments. The gap in timing between the release of the new information and the completion of the policy action will generate predictable changes in interest rates at very short horizons, which will be incorporated into yield spreads.

Finally, the evidence for the absence of predictive information in the three- to twelve-month range of the term structure can likely be associated with the third attribute of Fed behavior, namely, target persistence. If market participants (rationally) expect the Fed to maintain the current funds rate target, then term spreads between various interest rates will not be able to predict future changes in interest rates. In essence, the term spreads have no predictive information

because there is none available for them to incorporate: Beyond a couple of months, future policy actions are unpredictable.

The rationale for Fed behavior

In light of this analysis, the question arises as to why the Fed has conducted policy in this manner. Some speculations are offered below.

The reason for allowing daily transitory deviations from the target rate may simply be that any benefit from eliminating such volatility for the conduct of monetary policy is modest, especially relative to the cost of having to enforce targets more closely. In addition, useful operational information about demand and supply in the market for reserves may be obtained by allowing transitory daily deviations from the target to develop.

The short-run smoothing of interest rates evident in the gradual target adjustments of limited size in a single direction may be of much greater import. The Federal Reserve, as well as the financial press, appears to interpret the purpose of such smoothing to be the avoidance of "undue stress" on financial markets; thus, the increases in short-term rates in early 1994 were "measured and deliberate" so as not to unsettle financial markets. Besides gradual adjustments, interest rate smoothing also discourages quick reversals of the direction of target changes. Such reversals are thought to "whipsaw" the market and also contribute to disorder.

A similar rationale of stabilizing or steadying markets also could be given for the persistence of the target rate. However, there is a more subtle reason why the Fed might impart a persistent (or random-walk) behavior to the Fed funds rate. Clearly, output and prices do not respond to daily fluctuations in the overnight funds rate but only to rates of, at the very least, several months maturity. Thus, for the Fed to attain its macroeconomic goals, it must be able to manipulate these longer-term rates. However, such rates are determined by market expectations of future funds rates; thus, by presenting the markets with a clear path for the future funds rate, the Fed can influence the longer-term rates. A constant funds rate is the path that likely communicates policy intentions most clearly and perhaps most credibly to markets. Thus, the pursuit of macroeconomic stabilization may impart a high degree of persistence to the funds rate.

Glenn Rudebusch
Research Officer

References

Judd, John P. and Bharat Trehan. 1995. "Has the Fed Gotten Tougher on Inflation?" *FRBSF Weekly Letter* (March 31).

Rudebusch, Glenn D. 1995. "Federal Reserve Interest Rate Targeting, Rational Expectations, and the Term Structure." *Journal of Monetary Economics* (April) pp. 245–274.