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Interest Rates and Monetary Policy

Glenn D. Rudebusch

In the postwar period, the ultimate objectives of the Federal Reserve–namely full employment and stable prices–have remained unchanged; however, the Fed has modified its operational and intermediate objectives for monetary policy several times in response to changes in the economic environment. For example, in 1970, the Federal Reserve formally adopted monetary targets in an attempt to use an intermediate nominal objective or anchor to resist slowly rising inflation. Furthermore, from 1979 through the early 1980s, a narrow monetary reserve aggregate was ostensibly used as the operational instrument of policy. This period, however, was the high-water mark for money.

Over the past 15 years, the Federal Reserve and many other central banks have increasingly relied on interest rates, to the almost complete exclusion of monetary or reserve aggregates, both as sources of information for determining policy and as operating instruments for conducting policy. For example, when announcing its policy action on March 25, 1997, the Federal Open Market Committee stated that it had "decided today to tighten money market conditions slightly, expecting the federal funds rate to rise 1/4 percentage point to around 5-1/2 percent." This explicit characterization by the FOMC of a monetary policy action in terms of a change in the overnight federal funds rate is just one signal of the current preeminence of interest rates in the conduct of monetary policy. This latest shift in the conduct of policy from money to interest rates has been spurred by two developments: first, the breakdown of traditional relationships between money and economic activity largely brought on by innovations in payment and transactions technologies; second, the increasing sophistication of financial markets and central banks regarding information about the future as embedded in financial instruments (including, for example, the emergence of derivatives and inflation-indexed debt).

One key aspect of interest rates that has become particularly important for the operation of monetary policy is the term structure relationship of short- and long-term rates. This *Economic Letter* reviews some of the issues involved in answering two crucial questions for central banks: (1) How should information in the term structure be interpreted and used for conducting monetary policy? and (2) How will central bank actions, especially those expressed as changes in a short-term interest rate, affect the term structure of interest rates and, in turn, the rest of the economy?

Interpreting the term structure

One way in which interest rates appear to be playing a larger role in monetary policy is as informational indicators. For example, current expectations about future inflation may help determine how the economy will perform in later years. Therefore, central banks are interested in obtaining information about current expectations from forward-looking financial markets in order to help predict future paths for inflation and output.

In obtaining such information from financial markets, central banks have relied on the "Expectations Theory" of the term structure. This theory states that longer-term interest rates are set according to market expectations of future shorter-term rates; specifically, rates will be set so that a representative investor is indifferent between holding a long-term bond or a sequence of short-term bonds covering the same length of time. For example, as a first approximation, the current two-month interest rate should equal the average of the current one-month rate and the market's expectation of the one-month rate that will prevail one month from now–the so-called one-month forward rate.

The short end of the term structure, say maturities of less than six months, is one area of particular interest for central banks. At this horizon, according to the expectations theory, interest rates primarily reflect market expectations about very near-term monetary policy settings of the overnight rate (as described in Rudebusch 1995a, b). Central banks are interested in forward rates at this short horizon in part to understand market expectations of the immediate path of the policy rate. Given such expectations, central banks can evaluate whether their near-term policy intentions are being appropriately communicated to markets. In the U.S., the market for federal funds futures, which has traded only since 1988, provides particularly clear readings on forward policy rates over the next few months (see Rudebusch 1996).

Besides obtaining near-term *interest rate expectations*, central banks also are interested in the term structure at the five- to ten-year horizon in order to get an indication of the market's *inflation expectations*. According to common wisdom, the nominal yield on a bond equals, to a first approximation, the real yield plus the average expected inflation rate (the so-called Fisher equation). Assuming that changes in real interest rates are known (or can be ignored), then changes in nominal rates can be translated into changes in inflation expectations. Central banks are keenly aware of the importance of such inflation expectations both as inputs to forecasts of future inflation and economic activity and as measures of the credibility of the central bank's current stance of monetary policy in achieving the long-run goal of price stability. Goodfriend (1993), for example, argues that inflation expectations obtained from the term structure have had a major influence on the conduct of monetary policy by the Federal Reserve.

Still, it should be stressed that interpreting the term structure is not without some ambiguity, in part, because the application of the expectations theory to obtain interest rate expectations from the term structure is not always straightforward. For example, an investor considering the choice between a long-term bond and a sequence of short-term bonds may demand a premium in the latter case for facing the interest rate uncertainty involved in the period-by-period rollover of debt. Thus, in general, the two-month rate equals the average of the current and future one-month rates plus a (possibly negative) term premium. An unobservable term premium that varies over time certainly hinders the process of interpreting the term structure.

Although the evidence is not unambiguous (see, for example, Rudebusch 1995b and Campbell 1995), it appears that a time-varying term premium is not too severe a problem for obtaining interest rate expectations at short horizons–especially with high-frequency (say, daily) data–which are often the focus of particular interest to central banks. However, a time-varying term premium is more likely to be an important consideration at the long maturities used to obtain inflation expectations. Furthermore, movements in real interest rates at long horizons may be unclear, so that the translation of nominal forward rates to inflation expectations may be especially uncertain. There is, however, one recent development that may help alleviate this second problem. The U.S. Treasury has started to issue inflation-indexed debt, which should help pin down movements in the real interest rate. Indeed, the Bank of England has used indexed debt, which has been issued in Great Britain for over a decade, to obtain estimates of real rates and inflation expectations. As described by Deacon and Derry (1994), the Bank of England has found that the difference between the nominal and real term structure provides a useful measure of inflation expectations.

Affecting the term structure

Besides interpreting the term structure of interest rates, central banks also may be interested in altering it through shifts in monetary policy. In the common textbook description of the transmission of monetary policy, as encapsulated for example in the so-called IS-LM model, the supply of money plays an important role. The equilibrium of money supply by the central bank and money demand by the public (the LM curve) provides an interest rate, which in turn helps to

determine the demand for output (via the IS curve). Currently, however, many central banks appear uninterested in the quantity of money and instead focus directly on interest rates. For example, the Federal Reserve Board's new large-scale macroeconomic model of the U.S. economy that is designed to aid in understanding the effects of monetary policy contains roughly 300 equations but includes not a single money supply variable (see Brayton, et al. 1997).

Many central banks have simply taken a short-term interest rate as their direct operating instrument. (For example, the popular Taylor (1993) Rule description of Federal Reserve behavior assumes that the stance of monetary policy is well represented by the federal funds rate.) In this case, the monetary transmission mechanism operates from the short-term rate to real spending on goods and services (that is, simply via the IS curve). Of course, none of the important sectors of real spending–housing, investment, or consumption–depends directly on the overnight federal funds rate. Instead, spending depends on longer-term interest rates. In this way, gauging how changes in the short rate induced by the central bank affect the entire term structure of longer-term rates will be a crucial link in understanding the monetary transmission mechanism.

Cook and Hahn (1989) provide some of the earliest information on the effects of central bank actions on the term structure. They searched for the days on which the *Wall Street Journal* reported that the Federal Reserve had changed the federal funds rate. Then, for those days, they correlated the actual changes in longer-term rates with the funds rate changes. They found a substantial correlation that diminished, but never disappeared, as the maturity of the longer-term security was increased. For example, even the yield on a 10-year bond would typically rise 10 to 15 basis points on the day that the funds rate was increased by a percentage point. In a sense then, the federal funds rate, as the instrument of Fed policy, is the tip of the term structure tail that wags the dog of the economy.

Of course, the movements in longer rates following a policy action are not always the same. According to the expectations theory, these movements reflect both the immediate change in the funds rate as well as market expectations about future policy actions, which may vary with the exact circumstances. For example, as described in Campbell (1995), the 10-year rate jumped by almost twice as much as the increase in the funds rate at the time of the Fed tightening in February 1994

instead of the typical muted response described by Cook and Hahn. Such variability in financial market responses is an important source of the uncertainty associated with the real effects of monetary policy actions.

Conclusion

In the U.S. and other countries, interest rates are a key feature of the conduct of monetary policy; therefore, central banks are concerned about both how to interpret information from the term structure of interest rates and how their actions affect the term structure. Research suggests that, while short-term forward rates can give fairly accurate readings of interest rate expectations in the short run, longer-term rates give less clear readings of inflation expectations. As for monetary policy's effects on the term structure, although research shows that longer-term rates do tend to react when the fed funds rate moves, the size of this response can vary substantially.

Glenn Rudebusch
Research Officer

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