

FRBSF WEEKLY LETTER

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The Recent Behavior of Interest Rates

Long-term interest rates have gone up sharply since the beginning of the year. This rise has been attributed to a number of factors, including a stronger U.S. economy, stronger foreign economies, a rise in inflation expectations, as well as the Fed's moves to increase short-term rates over this period. In this *Weekly Letter* I look at the recent behavior of interest rates in an effort to determine how much support the data offer to each of these factors.

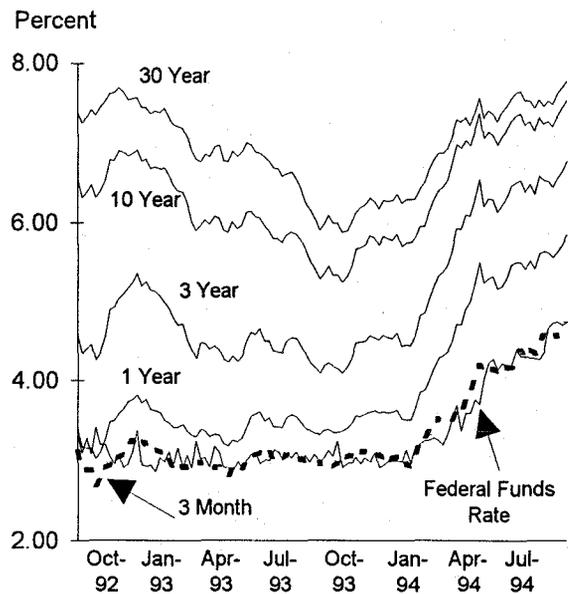
Alternative explanations

As Figure 1 illustrates, rates have risen at all maturities since the beginning of this year; for instance, the rate on 3-month Treasury bills over the first three weeks of September was about 160 basis points higher than in January, the rate on 1-year T-bills was roughly 215 basis points higher, and the rate on 10-year bonds was about 165 basis points higher.

This increase in rates has been attributed to a variety of factors. Foreign rates have risen dramatically over this period. Since financial markets are becoming increasingly integrated worldwide, the recent rise in U.S. rates could reflect developments abroad. However, it is quite possible that the causation worked in the other direction. In this context, it is worth pointing out that U.S. long-term rates began to increase prior to rates in the other G-7 countries, though long-term rates in some of these countries have risen by more than U.S. rates since then.

Some have suggested that long-term rates rose in response to an increase in expected inflation; this is because higher inflation in the future will push up short-term rates at that time, and long-term rates today reflect what is expected to happen to short rates in the future. The evidence on this explanation is mixed. In support of it, analysts point to a run-up in commodity prices, as well as a fall in the value of the dollar. Contradicting it, however, are surveys of expected inflation that show no signs of an increase large enough to explain the recent rise in rates; for instance, a survey by the Federal Reserve Bank of Philadelphia showed that, at 3.5 percent, the

Figure 1
Treasury Term Structure
Weekly Averages



rate of inflation expected to prevail over the next 10 years was the same in September as it had been in December 1993. In addition, the fall in the dollar generally has been confined to declines against the yen and the mark; if concerns about higher inflation were behind the dollar's decline, one would have expected the dollar to decline against all currencies.

A more likely explanation is that interest rates rose because of increasing strength in the economy. The economy was growing very rapidly in late 1993, and this could very well account for the fact that rates bottomed out around October 1993 (see Figure 1), well before the Fed began increasing short-term rates. The rise in rates in late 1993 serves as a useful reminder of the fact that interest rates would move over the course of the business cycle even if the Fed took no action.

Of course, the Fed did raise the federal funds rate from 3 percent to 4.75 percent in a series of five

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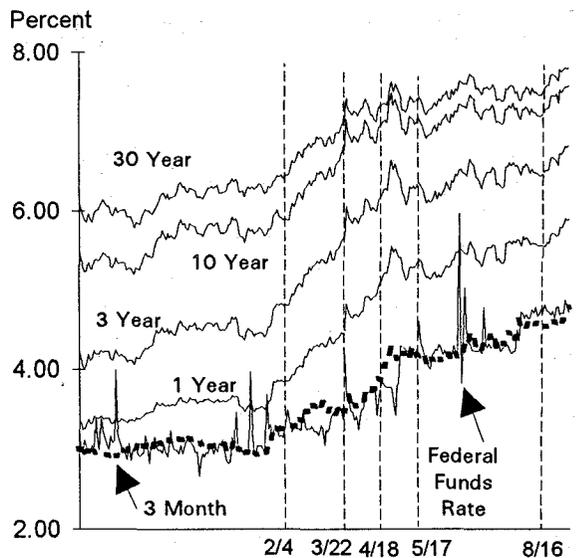
moves that began February 4. Since market rates have risen sharply over this period as well, some have held the Fed responsible for the rise in rates.

In assessing the validity of this explanation it is important to remember that the Fed has acted in response to growing evidence of a robust economy. Indeed, Barro (1994) argues that the Fed had little choice but to raise the interest rate—given a desire to maintain a low and stable rate of inflation. He points out that “. . . real interest rates are determined by the interplay between the supply and demand of credit, determined by the willingness of people all over the world to save, and their desire to invest.” Stronger economic growth means a greater demand for funds to invest, which puts upward pressure on interest rates. In this situation, the Fed’s unwillingness to raise interest rates would only lead to higher inflation. Thus, the Fed’s decision to raise rates was really dictated by its desire to keep inflation low in the face of a strong economy.

While this explanation appears consistent with the general trend of interest rates over this period, it does not answer important questions about the timing of recent changes in interest rates. Figure 2 plots daily observations on interest rates of different maturities since last October and highlights the dates of Fed actions to raise rates. Note that the rise in interest rates (at all maturities) since the Fed began to raise rates is substantially greater than the rise in rates beforehand. In addition, rates at maturities of one year and longer rose sharply when the Fed first raised rates (on February 4); a similar pattern is evident when the Fed raised rates the second time. However, rates at the 10- and 30-year maturities have shown little net change immediately after the last two increases in the funds rate (though long rates have gone up again recently, most likely in response to further evidence of a strong economy).

The response of long-term rates to the Fed’s actions provides information that can be used to distinguish among various hypotheses. First, the increase in long-term rates immediately after the initial increase in short rates means that it is unlikely that inflation expectations are the cause of the rise in long rates. If anything, the Fed’s action was intended to keep inflation from rising. It is sometimes suggested that markets might interpret the rate increases as a signal that inflation is likely to go up, on the grounds that the Fed has superior information about future inflation. How-

Figure 2
Daily Treasury Term Structure



ever, it is hard (even as an insider) to point to any relevant information that the Fed does not make public. Second, it also suggests that the explanation that relies upon strength in the economy is incomplete. If the Fed were simply reacting to widely perceived signs of strength in the economy, there would be no reason for long rates to rise when short rates were raised.

Anticipating the Fed’s behavior

The timing of the changes in long-term rates suggests that the Fed’s action was a surprise to market participants; if the action had been anticipated, its effect already would have been incorporated in prevailing long-term rates. The direction of the response also allows us to infer something about the nature of the surprise. Long rates should have fallen if the move provided information about the relative importance the Fed attaches to inflation. In other words, if markets interpreted the rise in the funds rate as evidence that the Fed was more serious about inflation than they had believed, this move should have led them to lower their expectations of future inflation, causing long rates to fall.

Thus, the nature of the response suggests that the Fed’s action did not provide information about a shift in the weights it attaches to various objectives; instead, it seems to have provided information about the course of action the Fed would follow in pursuit of those objectives. In other words, market participants know that the Fed

wants low inflation, but they do not know when it will perceive a need to act to keep inflation low. Market participants also know that the Fed has acted gradually in the past. Thus, a move to increase the funds rate after a period of falling or stable rates signals to markets that the Fed thinks it needs to act to keep inflation low, and this move is likely to be followed by further rate increases. Recognizing this, markets react to a shift in the stance of monetary policy by immediately raising long-term interest rates by more than the initial increase in the funds rate.

Support for this explanation can be found in a variety of sources. For instance, after the Fed's first move earlier this year, market commentators pointed out that the central bank would not confine itself to a mere 25-basis point increase in the funds rate, since such a move would do little to restrain either aggregate demand or inflation. Thus, the move on February 4 was likely to be the first of many such moves. By the second quarter of this year, a number of private sector estimates began to circulate on how far the Fed would move once it began to raise rates. It is not hard to believe that this information was reflected in long rates as well.

The fact that long rates did not react much to funds rate increases after the first two or three Fed actions also is consistent with this hypothesis. Specifically, it implies that the Fed's actions to raise rates were no longer much of a surprise, since the markets already had incorporated a rising funds rate in their forecasts by this time. Indeed, long rates actually declined when the funds rate increase on May 17 was accompanied by a statement to the effect that the Fed was unlikely to raise rates again in the near future.

Some qualifications

This hypothesis leaves some things unexplained as well. It is hard to argue that the funds rate increase on February 4 caught markets completely by surprise. Given past patterns of Fed behavior, the mounting evidence of a strong economy should have led markets to become more and more convinced that the Fed would act soon. This should have begun to push up long-term rates in advance of the Fed's actions. Thus, the fact that long rates rose relatively little before

the Fed's action but have risen so much since then suggests markets were very surprised by what the Fed did; the extent of this surprise is puzzling.

In one sense, the puzzle is not new; a number of studies have documented anomalous behavior at the long end of the bond market, independent of what causes short rates to move, or whether short rates move at all. In the present context, these studies present evidence suggesting that—even before the current episode—a signal that the Fed was going to raise rates in the near future would cause long rates to go up by more than would be warranted by expected future short rates. (See Hardouvelis, for instance.) Unfortunately, while the anomalous behavior of long-term rates has been well-documented, it has not been explained.

Conclusions

This *Weekly Letter* has looked at some of the hypotheses explaining the recent rise in interest rates. While part of the rise may be due to an increase in expected inflation, this explanation contradicts several key pieces of evidence, and therefore is unlikely to account for a large portion of the increase in rates. The rise in rates is more obviously related to signs of strength in the economy, both directly and indirectly through anticipations of how the Fed will respond in order to keep inflation in check. Even if one accepts this explanation, however, the relatively large increase in long rates in response to the Fed's initial moves remains hard to explain.

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Index to Recent Issues of *FRBSF Weekly Letter*

DATE	NUMBER	TITLE	AUTHOR
3/18	94-11	New Measures of the Work Force	Motley
3/25	94-12	Industry Effects: Stock Returns of Banks and Nonfinancial Firms	Neuberger
4/1	94-13	Monetary Policy in a Low Inflation Regime	Cogley
4/8	94-14	Measuring the Gains from International Portfolio Diversification	Kasa
4/15	94-15	Interstate Banking in the West	Furlong
4/21	94-16	California Banks Playing Catch-up	Furlong/Soller
4/29	94-17	California Recession and Recovery	Cromwell
5/6	94-18	Just-In-Time Inventory Management: Has It Made a Difference?	Huh
5/13	94-19	GATS and Banking in the Pacific Basin	Moreno
5/20	94-20	The Persistence of the Prime Rate	Booth
5/27	94-21	A Market-Based Approach to CRA	Neuberger/Schmidt
6/10	94-22	Manufacturing Bias in Regional Policy	Schmidt
6/24	94-23	An "Intermountain Miracle"?	Sherwood-Call/Schmidt
7/1	94-24	Trade and Growth: Some Recent Evidence	Trehan
7/15	94-25	Should the Central Bank Be Responsible for Regional Stabilization?	Cogley/Schaan
7/22	94-26	Interstate Banking and Risk	Levonian
8/5	94-27	A Primer on Monetary Policy Part I: Goals and Instruments	Walsh
8/19	94-28	A Primer on Monetary Policy Part II: Targets and Indicators	Walsh
9/2	94-29	Linkages of National Interest Rates	Throop
9/9	94-30	Regional Income Divergence in the 1980s	Sherwood-Call
9/16	94-31	Exchange Rate Arrangements in the Pacific Basin	Glick
9/23	94-32	How Bad is the "Bad Loan Problem" in Japan?	Huh/Kim
9/30	94-33	Measuring the Cost of "Financial Repression"	Huh/Kim

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