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It Isn't a Forecast

We're horrified because somebody is counterfeiting boxtops,
the basis of the world's economy.

— Fiduciary Blurt, Chair of the World Economic Council, in "Box Top Robbery," The Adventures of Rocky and Bullwinkle

How low can they go?

On January 25, 2012 the Federal Open Market Committee, the Federal Reserve's monetary policy-making group, announced its intention to keep short-term rates extremely low until at least late 2014, nearly three years from now. Business reporters and market analysts were quick to ask how the Fed could know that it wouldn't need to raise rates for that long. Some dismissed the announcement as nothing more than Fed jawboning. The action had little effect on short-term interest rates, but short rates weren't the target of the action. By the weekend, the yield on the 10-year US Treasury note fell by 15 basis points, from 2.08% on January 24 to 1.93% on the 27th. How could the Fed's announcement about short-term rates affect the ten-year Treasury? And why would the Fed take such a step?

Unlike most other central banks around the world, the Federal Reserve operates under a dual mandate. The Fed's job is to try to maintain price stability and reasonably full employment at the same time. Its counterparts in Europe, Japan, and the United Kingdom focus primarily on fighting inflation, and will usually only adopt an easy money policy if deflation becomes a serious possibility, or to counter a threat to the stability of the banking system, as the European Central Bank is currently doing.

Because of the Fed's dual mandate, its monetary actions are often overtly counter-cyclical. The Fed may raise interest rates, tightening money and credit, to try to slow economic growth and forestall inflation when the US economy is in a strong part of its cycle. On the other hand, the Fed will often respond to an economic slowdown by lowering interest rates, risking inflation that could result from an easy money policy in an effort to stimulate economic growth, and thus employment.

Most of the time, the Fed's challenge is to balance the two parts of its mandate. Fight inflation too hard, and employment may suffer. Stimulate employment too energetically, though, and the economy may overheat, leading to high inflation. The Fed's main instrument of monetary policy is its target for the Fed Funds rate, the interest rate at which banks lend reserve balances to one another overnight. Lowering the rate tends to increase the availability of credit in the banking system, which generally stimulates the economy, but ordinarily carries with it the worry of excessive inflation. Since the financial crisis of 2008, however, the Fed's main worry has been not inflation, but a contraction of credit that could lead to a deflationary spiral. In December of 2008, the Federal Open Market Committee announced that it would adopt a target of 0 to 0.25% for the Fed Funds rate. The target has remained at that level ever since.

Once short-term rates reached essentially zero, a casual observer might imagine that the Fed had reached the boundary of monetary stimulus. Instead, once they had driven short-term rates to near zero, the Fed perceived the need for further monetary stimulus, so they began working on lowering longer-term rates as well. Several of its steps, like the purchase of longer-dated Treasury securities, have been direct, open market operations aimed at lowering longer-term rates. The announcement specifying a period for short-term rates to stay low was an additional measure designed to keep longer-term rates low.

The Fed's January 25 announcement was similar to one it made about six months earlier, on August 9. In the earlier announcement, the Fed said they would keep short-term rates exceptionally low into mid-2013. That similarity makes it easy to misread the January 25 announcement as an update to an earlier forecast of how long the Fed expects to need to keep monetary policy so easy. It isn't. To see why it's part of the Fed's campaign to manage longer-term rates, we need to take a bit of a technical tour of the world of forward interest rates. What we'll see is that by committing to keep short rates low for about three years, the Fed has applied downward pressure on rates much further out on the yield curve.

The Forward Rate Curve

To understand the idea behind the forward rate curve, let's work through a simple, stylized example. Suppose I can buy two zero-coupon Treasury securities, a five-year issue (maturing in 2017, say) yielding an annualized 2%, and a ten-year issue (maturing in 2022) yielding an annualized 3%. The five-year should trade at $90.57 per $100 face value, and the ten-year should trade at $74.41.[1] In a sense, investing $74.41 in the ten

[1] To obtain these numbers, note that if I earn 2%, compounded annually for five years, it will come to a 10.41% gain. After a gain of 10.41% on an investment of $90.57, I would have $100. The ten-year

year is like investing that amount in the five-year today, along with a commitment that after the first five years (in 2017, in other words), I can reinvest the proceeds for a second five years (from 2017 to 2022) at a rate that will bring my overall result to $100 at the final maturity in 2022. So, what if I took $74.41 and invested today in the five-year, yielding 2%? After five years, I would have $82.15. If I could then invest that $82.15 for five more years, so that I would have $100 in 2022, that would represent a yield of 4.01% (assuming annual compounding again) for the five years from 2017 to 2022. That 4.01% is a forward rate — an implied five-year rate for a period starting five years from now, which we derive from current rates. In a sense, the forward rate curve gives us a way of looking at the ten-year return as consisting of the five-year return, concatenated onto a forward return for the second five years.

It's tempting to think of forward rates as forecasts, but they really aren't quite that. What the forward rate in my example says is that if in five years the yield on a five-year zero-coupon note has risen to 4.01%, then an investor buying a ten-year zero today would be just as well off five years from now as one buying the five-year today, and then rolling the proceeds into another five-year note. In that sense, it says that the market has priced in a rise in the five-year rate from 3% today to 4.01% five years from now.

Recent data on the forward rate curve

The example in the previous section gives the basic idea behind the forward rate curve, but I simply invented the specific numbers I used. The chart below shows the same type of analysis, but based on actual data from a series that researchers at the Federal Reserve maintain.[2] The chart shows three curves, each showing a measure of the yield on US Treasury securities of various maturities out to thirty years, all as of August 8, 2011, the day before the Fed's first announcement. The blue curve is the par yield curve, an estimate for each maturity of the yield that a US Treasury note trading at par would produce, if such a note existed. A bond trades at par if its yield to maturity exactly equals its stated interest, or coupon rate. So if we say that the par yield at ten years is 2.47%, we mean that a note with a maturity of exactly ten years would trade at par if its coupon were 2.47%. The red curve is the zero coupon yield curve, showing the yield on a zero-coupon bond at each maturity. Zero-coupon bonds make just one payment, at maturity. Since they don't pay current interest, they trade at significant discounts to par. The gain to the investor is the difference between that discount purchase price and the future redemption at par. The red and blue curves are from the Fed research file I reference in

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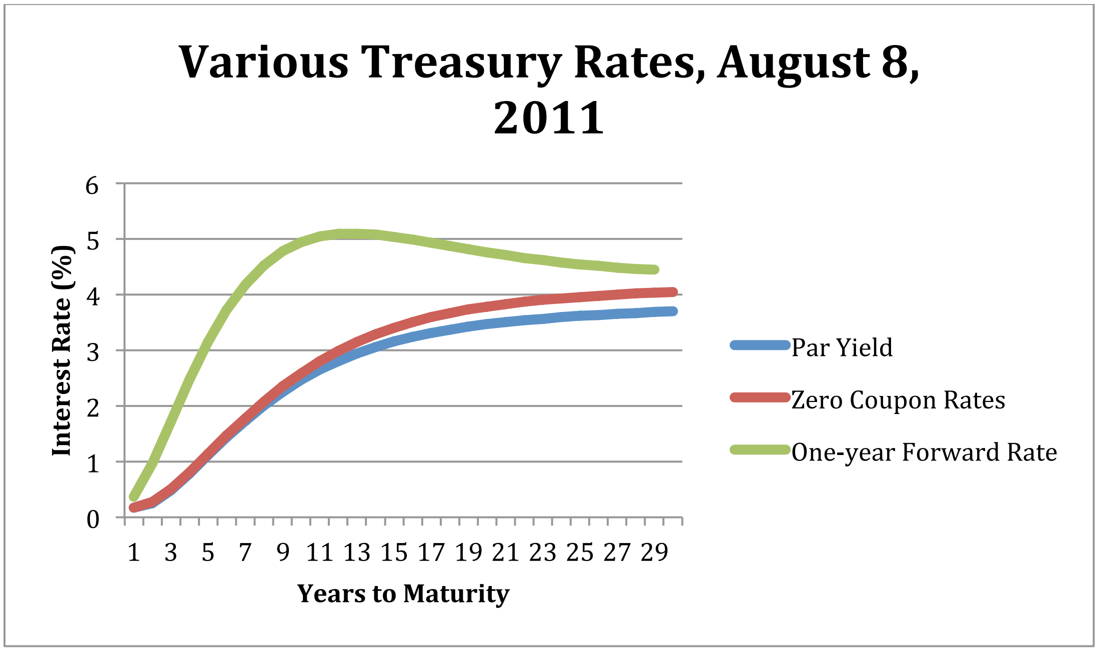
calculation is similar. The cognoscenti will realize that I'm ignoring certain normal bond market conventions to simplify the math, but they'll also realize that the point is the same.

[2] The series began in a 2006 paper, Refet S. Gurkaynak, Brian Sack, and Jonathan H. Wright, "The US Treasury Yield Curve: 1961 to the Present," Federal Reserve Board Finance and Economics Discussion Series (FEDS) paper 2006-28, June 2006, at http://www.federalreserve.gov/pubs/feds/2006/200628/.

the footnote. The green curve is my estimate, which I derived from the zero-coupon curve, of the one-year forward rate at each date.[3] For example, the five-year point on the green curve gives the one-year return, for the period starting five years from now, implicit in the other interest rate curves.



The three curves are closely related. Remember that a regular, coupon-paying bond promises an interest payment every six months, and then the return of principal at maturity. One way to analyze such a bond is by thinking of each of those payments as a zero-coupon (single payment at maturity) bond — a series of small ones representing the coupon payments, and a large one representing the principal. In the US Treasury market, Treasury STRIPS are just this type of bond. They are pieces of US Treasuries representing individual interest or principal payments. If we use the zero-coupon curve to price each individual payment of a hypothetical par bond, and then add up the resulting prices to calculate the price of the whole bond, they sum has to be par (100% of face value). To derive the one-year forward rates, I regarded each zero-coupon yield as a series of one-year returns. For example, the one-year zero-coupon yield is 0.173%, and the two-year is 0.271%. As in my five- and ten-year example earlier, if a two-year zero

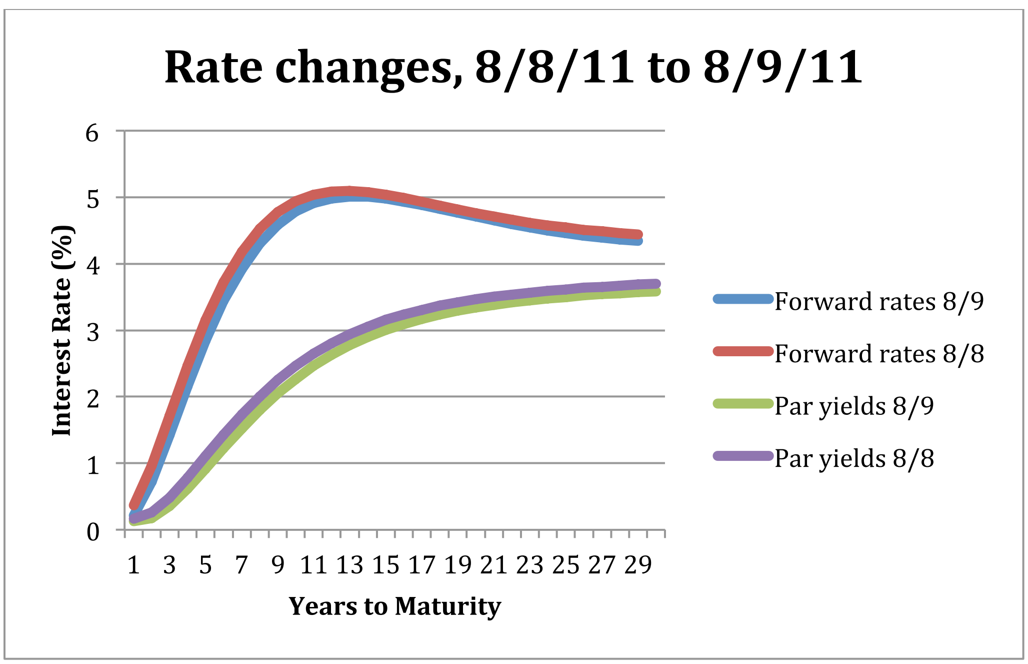
[3] Sources: Fed researchers maintain an up-to-date time series file (with a disclaimer that it is not an official Fed data release) at http://www.federalreserve.gov/econresdata/researchdata/feds200628.xls. Par Yield and Zero Coupon rates from feds200628.xls. One-year forward rates: Author calculation from data in same source.

returns 0.271% per year over the two years, but just 0.173% for the first year, then the return for the second year must be 0.37%, and so forth.[4]

We now can see what the Fed really did in announcing that rates would stay very low for a specific length of time: the Fed effectively drove down forward rates. Last August's announcement lowered forward rates out to the two-year point on the curve. The January announcement, pushing the date to late 2014, applied downward pressure to forward rates out almost to the three-year point. Even if longer-dated forward rates stayed unchanged, the effect of the Fed's action would be to drive yields lower throughout the yield curve.

So how did they do?

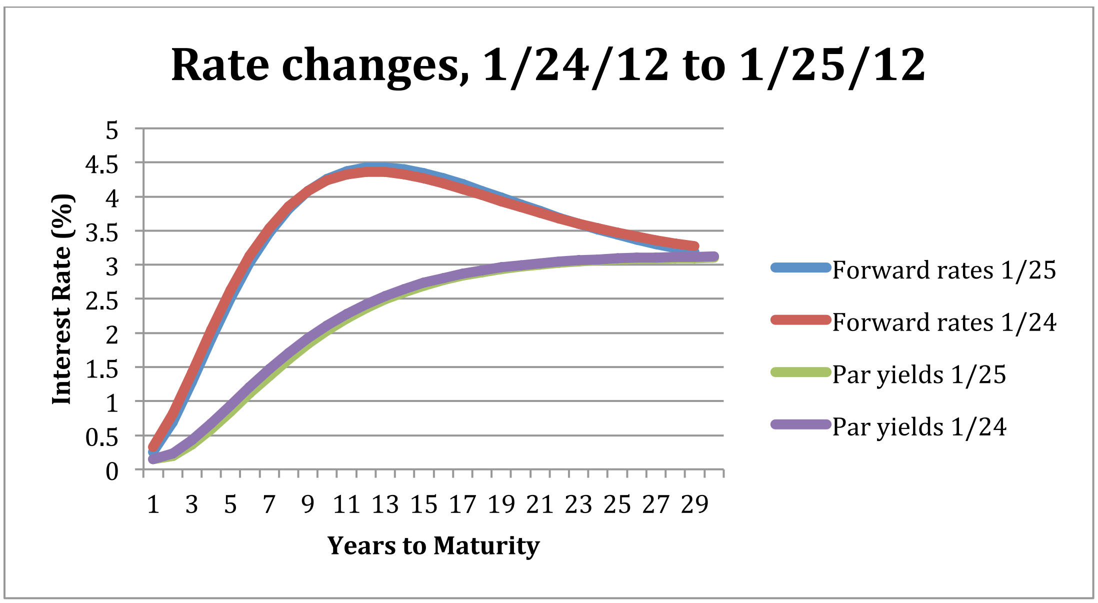
The Fed's announcement had an immediate effect on the whole yield curve. This graph shows the change in both the par yield curve and the one-year forward rate curve from August 8, 2011 to the next day, after the announcement.



[4] For the mathematically inclined, note that I've estimated a series of one-year forward rates using annual data. Gurkaynak, Sack, and Wright pressed this process to its mathematical limits, producing a series of instantaneous forward rates. While their approach is more mathematically interesting, my figures are close enough for our purposes.

The announcement seems to have driven forward rates lower far beyond the two-year span of the announcement. The one-year forward rate a year out fell from 0.37% to 0.21%, as we might expect, but the rate ten years out also fell, from 4.94% to 4.78%. Overall, the effect on long-term interest rates was rather significant. The ten-year par yield fell from 2.47% on August 8 to 2.27% on August 9, and the 30-year yield fell from 3.70% to 3.58%. So if the Fed's goal was to drive long-term interest rates lower, the announcement had its desired effect.

As the next graph shows, the January announcement didn't have such a dramatic effect. Since the Fed's previous announcement was still in effect, the shift in forward rates was smaller, and beyond about seven years, the effect on forward rates was negligible. The move did have some effect, though — the par yield curve shifted lower for short to intermediate maturities. The ten-year yield was 2.11% on January 24, and it was 2.04% on January 25. Yield shifts at longer maturities, however, were small, and could easily have been the result of general market news.



Conclusion — Not Just Jawboning

Once they had driven short-term interest rates to zero, the Fed could only apply further stimulus by pushing longer-term interest rates lower as well. When the Federal Reserve announced that they would be holding short-term interest rates low for a definite period, first until mid-2013, and then until late in 2014, it wasn't just an exercise in Fed jawboning. Nor was it really a forecast about how long the Fed thinks the economy will remain weak enough to require very low rates. Rather, it was part of the Fed's ongoing program of unusual steps aimed at managing rates at longer-term maturities.

The rate announcements of August 9, 2011 and January 25, 2012 were part of coherent series of policy measures, which included its asset purchase program (QE2), and its maturity-adjustment program ("Operation Twist.") All of these measures aimed to hold longer-term interest rates lower. QE2 operated through the purchase of Treasury securities of maturities longer than the usual T-bill range in which the Fed's open market operations usually operate. Operation Twist explicitly involved buying even longer-dated issues. And announcing a term for maintaining very low short-term rates operated to lower all rates, by holding down the short end of the forward rate curve.

While all Treasury yields remain near historic lows, it's worth noting that the effect of the Fed's January 25 announcement was less potent than that of the announcement on August 9. Whether that means that the announcement was less of a surprise, or that the medicine has become less effective, remains uncertain. Either way, for the past three and a half years, the Fed has consistently signaled that its main concern is not inflation, but the possibility that deflation could take hold. Its recent actions indicate that the Fed continues to follow its anti-deflation course.

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