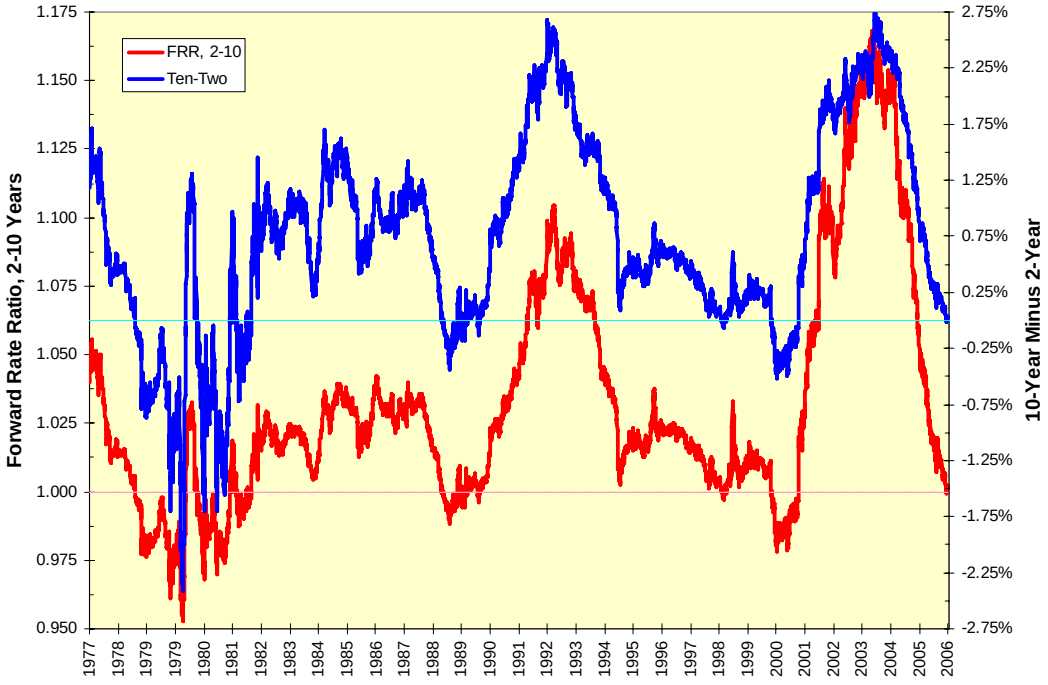
Welcome The Flat Yield Curve

The comedian Don Novello in his Father Guido Sarducci character used to offer to teach the phrase "como esta usted" for the late 1970s rate of $300. His logic was years after you left a Spanish class that was all you would remember, anyway. Economics professors must feel the same way about the connection between the shape of the yield curve and the prospects for a recession. This is the one thing all students seem to remember years after their last class in the Dismal Science.

The rule is hardly reliable, and this has consequences for bond traders. Let's take the most-watched measure of the yield curve, the spread between the ten-year and two-year Treasury note yield. We can depict this two different ways, the absolute spread and the forward rate ratio (FRR). The forward rate ratio is simply the rate at which you can lock in borrowing for the eight-year period starting two years from now, divided by the ten-year rate itself. A FRR greater than 1.00 indicates a positively sloped yield curve; a FRR less than 1.00 indicates inversion.

Unlike the absolute spread, which treats each basis point as the same regardless of whether the ten-year rate was 1981's 16% or 2004's 4%, the FRR gives you the slope of the yield curve between these two segments – do you remember tangents from those long-ago trigonometry classes? As a result, the violent steepening of the yield curve between 2001 and 2004 and its equal violent flattening show up more vividly with the FRR than with the absolute spread.

Chart 1: Inversions Happen Frequently



We Are All Swap Players Now

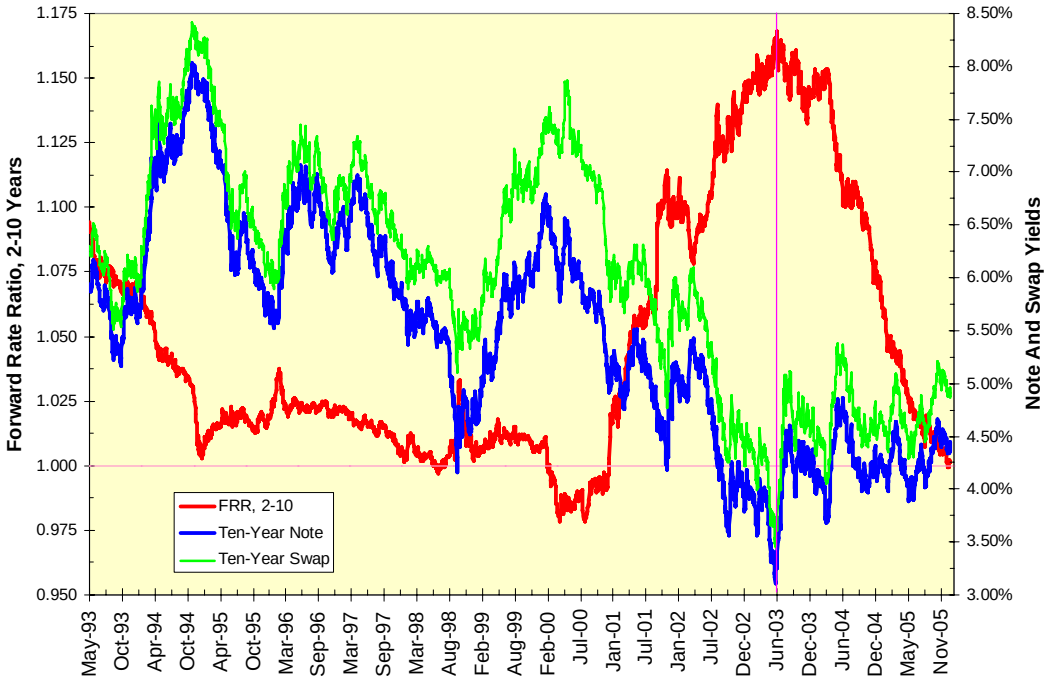
How are you in your daily life affected by the yield curve? Chances are you have not stopped to ask yourself this question, and that is precisely the point. For many, the answer lies in whether you are a net borrower or lender at any given maturity. If you have a savings or money market account, you are helped by the higher short-term rates seen since mid-2004. If you have an adjustable-rate mortgage, you will be hurt by rising long-term rates when that mortgage resets. The changes in the yield curve create patterns of winners and losers across the economy, which is why it is simplistic to use it as a predictor of recession.

More important, are you running or affected by a business with a capital budget? If the answer is yes, as it is for most of us, are you affected by rising long-term or short-term interest rates? The answer, increasingly, is you are affected by both in the form of swap rates. In the old days, meaning prior to the Depository Institution Deregulation Act of 1980, the flow of credit was regulated largely through banks. No more: Your mortgage is likely held as part of a Fannie Mae pool, your auto loan and credit card statement is likely held as part of an asset-backed security and corporations themselves now go straight to the capital markets to borrow commercial paper.

The very concept of banks borrowing at the short-end of the curve to lend at the long-end of the curve has been replaced by everyone borrowing and lending along the swap curve. This is one reason why the importance of the Federal Reserve tweaking the target overnight interbank rate by 25 basis points is so overblown in its economic impact: Unless you are a bank looking to balance its reserve requirements, you can neither borrow nor lend at this rate.

The swap curve is really nothing more than the present value of various maturities along the yield curve. Players in this market can and do fix this rate and hedge their exposures by buying and selling strips of Eurodollar futures. While a regular bond or loan has fixed payments and the settlement of a principal amount, swap players pay and receive the difference between prevailing rates and this fixed swap rate not over an exchanged principal amount, but rather simply over a notional amount. It is the variations across the entire yield curve, the swap rate that determines the cost of capital to borrowers and therefore is far more important than any given interest rate, say the ten-year Treasury rate, across the curve.
How have swap rates been affected by the steepening of the yield curve, and how do they relate to ten-year note rates? Once the curve began to flatten in 2003, long-term Treasury rates bounded up from their 45-year lows into a trading range in which they have remained. Swap yields, which had been well over Treasury yields in 1999-2000, moved only slightly higher than Treasury yields. Both Treasury and swap yields remained well below their 1990s levels. Yes, the curve flattened, but so what? The cost of capital remained in a low and tight range. This bullish flattening of the yield curve hardly qualifies as a recession trigger.

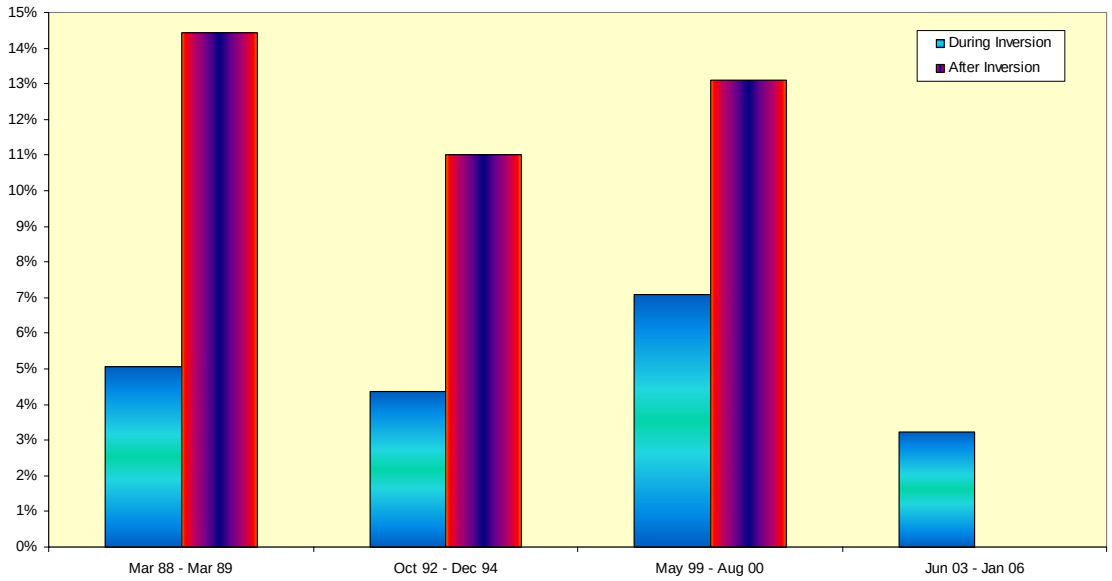
Chart 2: Did Long-Term Rates Rise As Curve Flattened?



Post-Inversion Bond Markets

Why should bond traders be concerned with yield curve inversions and when they end? The simple reason is average annual total returns on long-maturity bonds increase after yield curves start to steepen. In each of the previous three episodes of yield curve flattening and inversion going back to the late 1980s (the index used began after the late 1970s inversion), average annual total returns during the periods of curve steepening exceeded the returns during periods of flattening.

Chart 3: Average Annual Total Return On Long Bonds Pre- And Post-Inversion



Granted, each of those inversions was a bearish flattening, a period in which long-term rates rose, but that cannot change several truisms about fixed-income mathematics. As short-term rates fall, the cost of financing a long-term bond position falls apace. Moreover, the bonds themselves begin to "roll down the curve." A ten-year note today is a 9-year 364-day note tomorrow, and each bond will become more valuable over time as it gets discounted at the lower short-term rates.

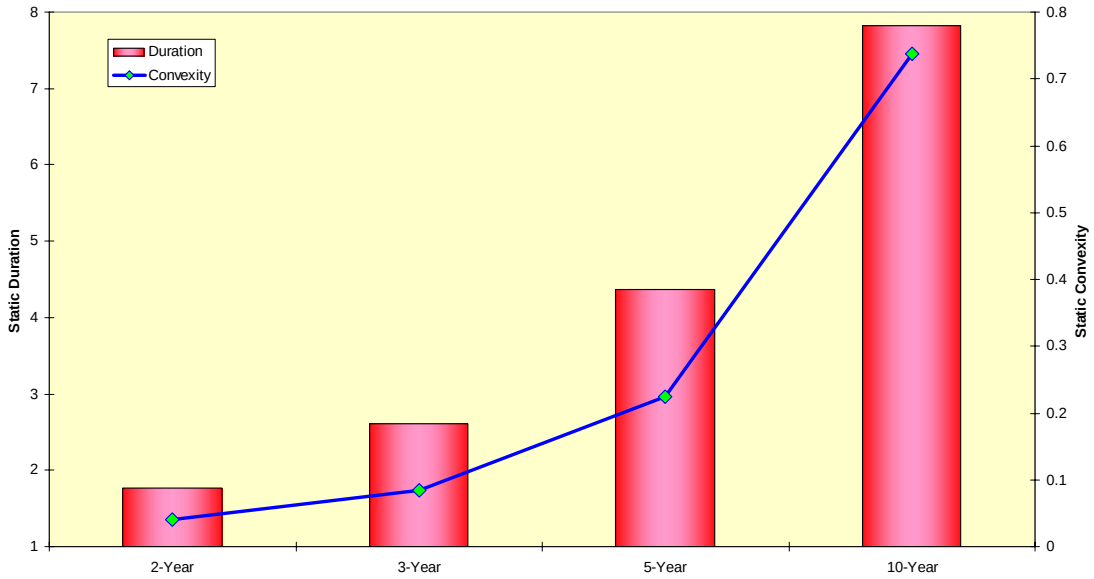
Well, you may argue, long-term interest rates were much higher in those periods and we are mathematically precluded from seeing similar drops from our current yield levels. Hmm; the author can recall various bond market sages saying the same thing in 1985 when bond yields were at 9%, and we do have the Japanese experience in recent memory. As yields fall, each successive basis point decline becomes increasingly more valuable.

This now gets into duration and convexity. Duration is the weighted average maturity of its cash flows; the present value of the payments serves as the weights. A normal bond's duration increases as its maturity increases and inversely to the coupon level. The rate of change of duration is the bond's convexity; a normal bond's convexity also should rise with its maturity and move inversely to its coupon level. The greater a bond's convexity, the more it will rise in price for a given fall in yields.

Traders familiar with options but unfamiliar with bonds may find it useful to think of duration and convexity as being parallel to delta and gamma. Delta is the expected change in an option's prices with respect to the stock's price, and gamma is the rate of change in delta with respect to the stock's price.

The bullish flattening of the yield curve has kept coupon yields low at the long end of the curve. As a result, the convexity of the bonds along the Treasury yield curve is rising rapidly with the bonds' duration.

Chart 4: Active Treasury Duration And Convexity



We can construct a duration-neutral trade along the yield curve, sort of like a delta-neutral option spread. At the time of this writing, the static duration of the 4.50% Treasury due November 15, 2015 was 4.428 times greater than the 4.25% Treasury due November 30, 2007. A duration-weighted trade between these two notes, the active two-year with a convexity of .041 and the active ten-year with a convexity of .737, would result in a positive convexity of [.737 – 4.428 * .041], or .555.

Just as option traders learn quickly how "free" gamma is an important attribute for any trade, bond traders learn to seek convexity. The particular configuration of the market at present allows traders to borrow short and lend long at a small interest rate penalty and pick up convexity. When they cannot make this trade, the inversion will stop, the cost of financing long bond inventories will fall, and regular investors can make money the old-fashioned and simple way, just by buying bonds.

Moving Past Inversion

How will you know when the inversion ends? One way, depicted in Chart 5, is to watch the shape of the entire yield curve, beginning with the federal funds rate. If we take the history of both the federal funds rate and the spread between it and the two-year note and overlay the troughs of each inversion we can see a distinctive pattern. The trough occurs right at the point of the Federal Reserve's last rate hike and is followed by an inversion of the federal funds rate – two-year note spread.

Chart 5: The Short End And Inversions