Market Magical Mystery Tour

The last human being to wander this planet, or any other planet of your choosing, will still be contemplating the same mysteries of the universe and human nature that perplexed the ancients. None of the translated Egyptian hieroglyphs or Mesopotamian cuneiform tablets shed any light on the yield curve, and after 4,500 or so years of trying, what makes anyone think an actual answer exists?

In fact, it is probably easier to take the same route traversed by Werner Heisenberg in his Uncertainty Principle, which states you cannot have full information about both a particle's velocity and location simultaneously. A yield curve reflects the sum total of the market's expectations for interest rates, inflation, monetary policy and while we are at it, all of the forward rates between any two maturities along that curve. The information embodied in that yield curve in turn affects the actions of traders, who immediately undertake actions that change it.

To fix both the yield curve and to convince all traders simultaneously that all further market activity is pointless would require an immediate cessation of all new information into the market, a condition akin to death or to that end-of-time state noted above. Pretty heavy stuff, isn't it?

Credibility Paradox
While we are still in the mind games department, consider the following statement:

> **Any credible forecast of interest rates is inherently self-defeating.**

The key word here is "credible." Market commentators are like the proverbial billion monkeys with a billion typewriters: At some point, one of the monkeys will either rewrite the collected works of Danielle Steele by chance or will make consecutive accurate forecasts, whichever comes first, and will be anointed the *guru du jour*. Supplicants will come from miles around to hear the monkey's next utterance, and - here's the catch - will act upon it.

So let's say the monkey forecasts a 1% rise in ten-year note yields for a one-year period starting six months from now. What will borrowers do? A rational borrower will borrow today for eighteen months and then re-lend the funds for six months; this locks in the current forward rate from six months to eighteen months. A rational lender will withhold funds from the ten-year note market and simply lend at the money market rate, say six-month bills, while waiting for those juicy higher rates to arrive.

The end result is a surplus of funds available for lending today at the six-month horizon and a dearth of funds available today for lending at the ten-year note horizon. Six-month rates plunge and ten-year rates rise. The original credible forecast for higher rates starting six months from now is defeated and turned into the reality of higher ten-year rates today by virtue of the fact the monkey's forecast was credible.

The cycle will repeat ad infinitum; anyone reading this can recall the parade of market guru's who have risen and fallen in his or her lifetime. It will always be thus and in fact cannot happen in any other way. If, as the prospectus says, past performance does predict future results, we are left with the conundrum of what else we should use in basing our investment decisions. Certainly we will not invest with someone who has proven his or her inability in the recent past to earn a profit. We chase performance, and performance wants to be chased, and if that does not describe most aspects of the human condition, what does?

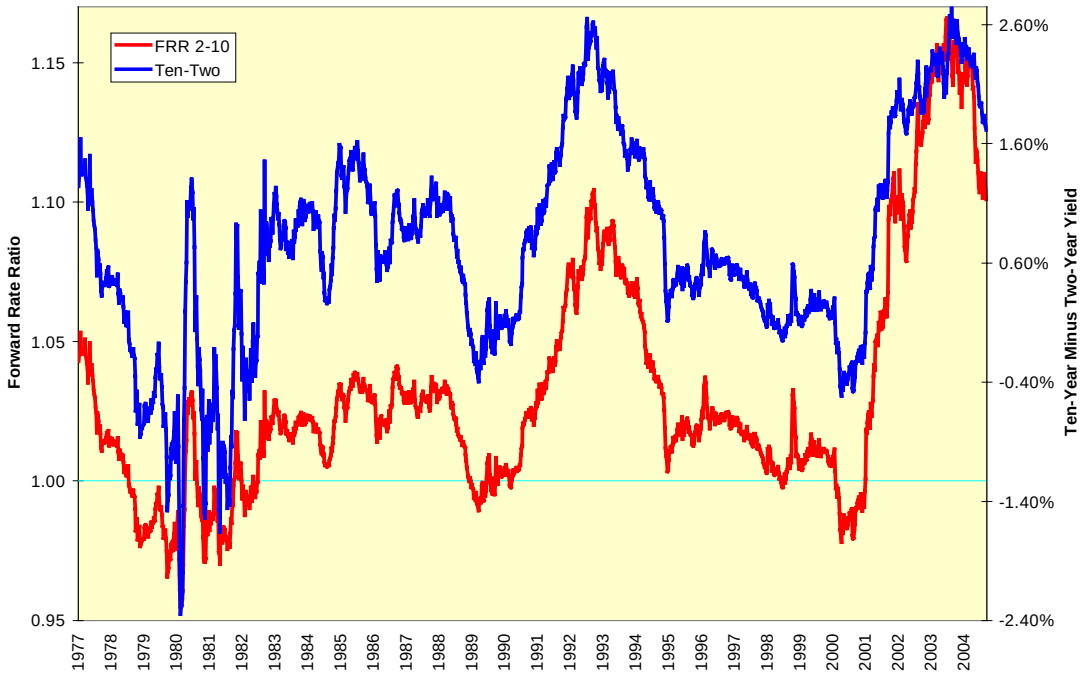
Forward March
The shifting back and forth between borrowing/lending at one maturity today as opposed to borrowing/lending at a different maturity at some point in the future throws off information in the form of changes in the yield curve. While there are several ways to measure these changes, the most common being to simply take the arithmetic difference between two yields such as the ten-year minus the two-year, the one preferred here is the forward rate ratio (FRR). Unlike arithmetic differences, which often expand and contract as rates rise and fall, the forward rate ratio is normalized to the level of interest rates itself.

For example, the FRR between two years and ten years, which involves borrowing for an eight-year period starting two years from today, is calculated as:

$$FRR_{2,10} = \frac{\left[\frac{(1+TenYear)^{10}}{(1+TwoYear)^{2}}\right]^{(1/8)} - 1}{TenYear}$$

If the yield curve is positively sloped, that is if ten-year rates exceed two-year rates, the FRR will be greater than 1.00. An inverted yield curve, one in which two-year rates exceed ten-year rates will have a FRR less than 1.00. A comparison of the FRR between two- and ten-year notes and their simple arithmetic difference is depicted below.

Chart 1
Same Data, Different Story



While the two measures tell the same story qualitatively, all we need to do is look at how they described the historic easing of interest rates between 2001 and 2003 to see why the FRR should be the preferred measure. The FRR hurtled past previous highs seen during the last major easing cycle, that of 1991-1992, while the simple arithmetic difference only barely exceeded that period's highs.

The difference lies in the comparative steepness of the two yield curves, a measure of greater than academic importance. This so-called carry trade is the basis for commercial bank profits; they borrow short and lend long and thus benefit from the steeper curve. It is also critical to the economics of real estate, corporate bonds, adjustable rate mortgages and all other financial market instruments dependent on investor willingness to take risk in the fixed income markets.

Comparative Forward Rate Ratios

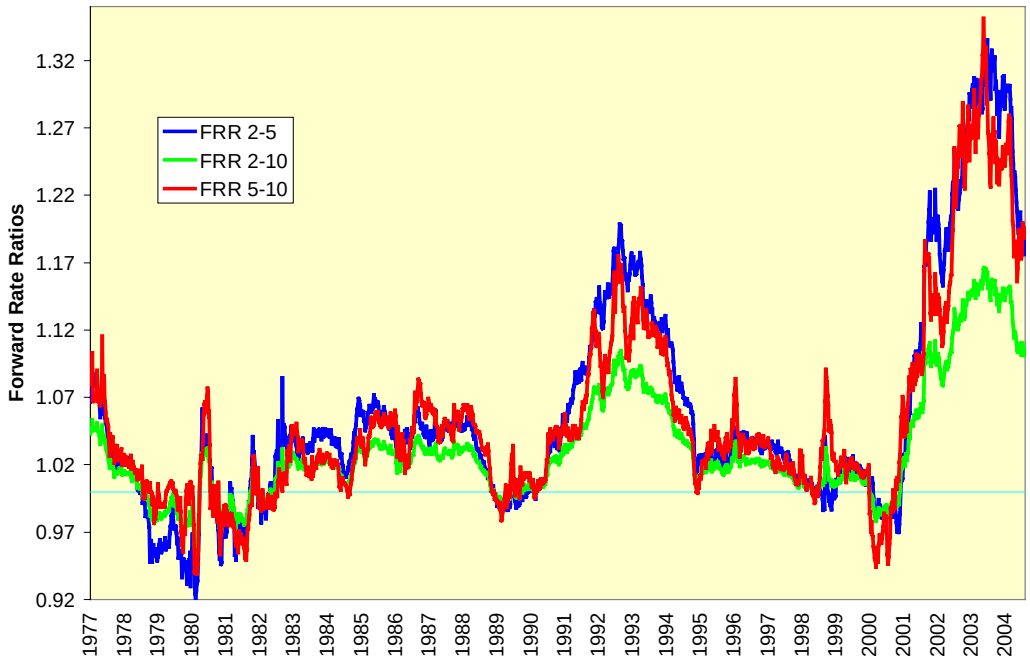
While the FRR between any two maturities is a summary measure of that segment of the yield curve, it is not descriptive of the yield curve as a whole. Different segments change at non-parallel rates. Reasons for this behavior abound and include the need for borrowers and lenders to congregate at one maturity (market segmentation), or to accommodate changing perceptions of inflation risk (liquidity premium) or even to express a forecast of yields themselves (pure expectations).

The convexity of the underlying bonds or second derivative of the bonds' price with respect to their yield, divided by their price comes into play as well. The greater the convexity of a longer-dated note, the more its price will appreciate for a given decline in yield, and all else held equal this will make the yield curve flatter at long maturities than it would be otherwise. In fact, if the market were convinced there never would be any inflation in the future, the expected shape of the yield curve would be inverted at the long end to account for convexity's desirability. Only

inflation and its resulting liquidity premium produce the characteristic positively sloped yield curve we designate as "normal."

The non-parallel shifts of the yield curve at three different segments, two-five years, two-ten years and five-ten years are depicted below.

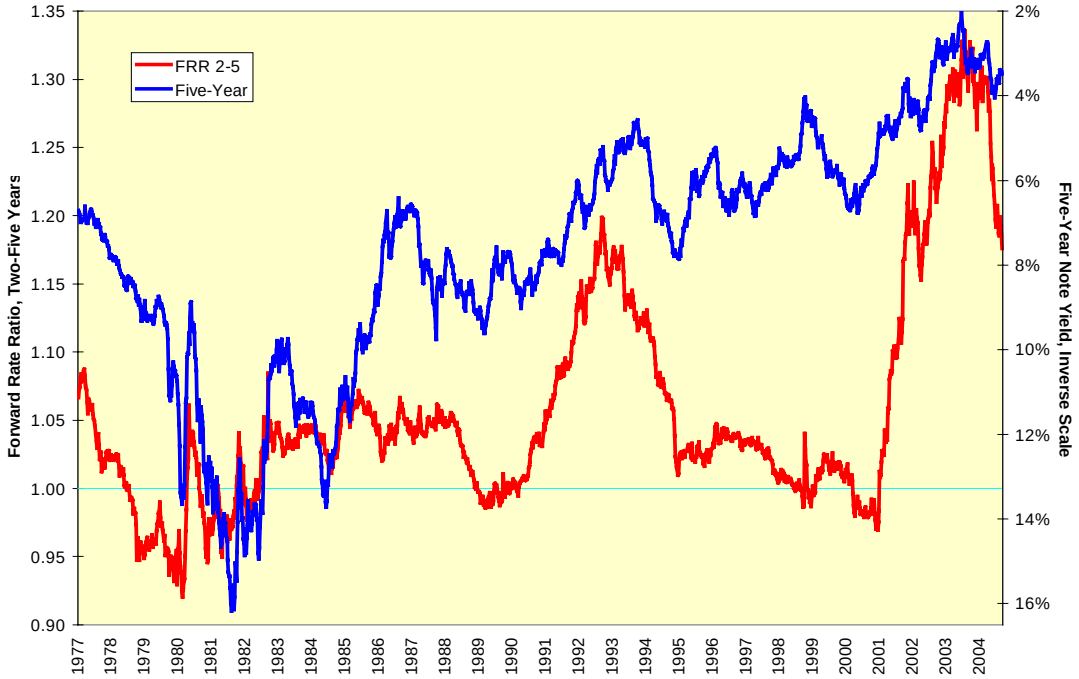
Chart 2
Yield Curve Shifts Are Not Parallel



Forward Rates And Rates

So saying, how do we make a few dollars off of this information? One way is to use the FRR as a predictive tool for underlying rates themselves. Let's take a quick look at this method's efficacy along the two-five year segment of the yield curve.

Chart 3
An Imperfect Predictor



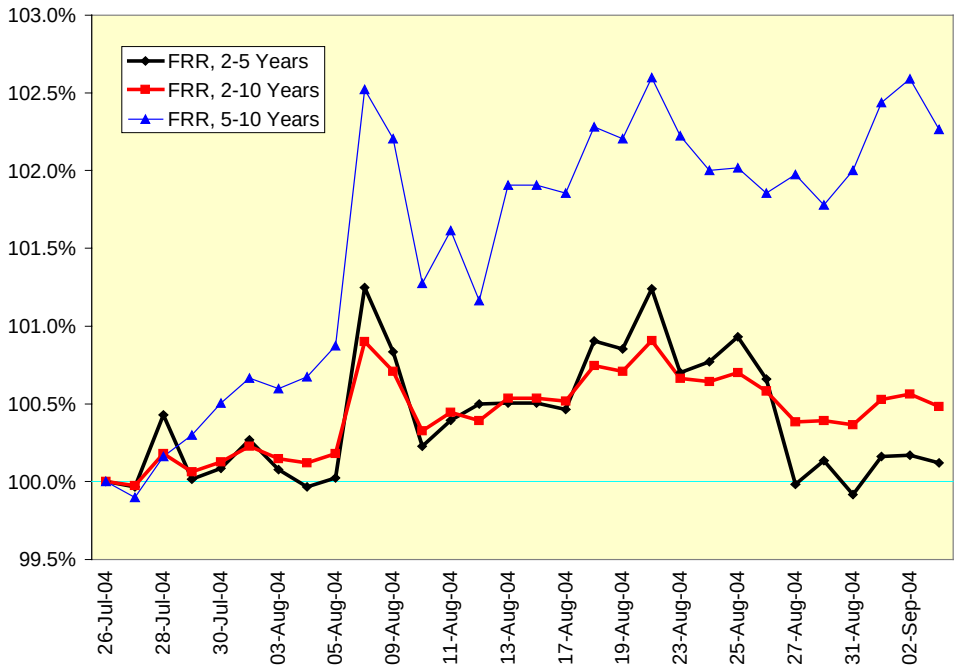
While the field of trading system design is filled with those who cannot take no for an answer, there is little in this relationship to suggest the presence of a "yes." Since the September 1981 peak in interest rates, five-year note yields have been in a secular decline; their recent approach of 2% may be a multi-generation low unless some policy error puts us into a Japan-like situation. During the past two decades, yield curves got massively steeper in both the 1991-1992 and 2001-2003 periods, and inverted during the 1989 and 1999-2000 periods. All we can say is that in general, yields are more apt to decline during a period of yield curve steepening than flattening. However, trading profits derive from greater specificity than "apt" implies.

Trade The Spread

Another way is to look at the FRR itself as a trading instrument. A steeper yield curve means either short rates are falling faster or rising more slowly than long rates, so we should look to buy the short end of the curve and sell the long end. The opposite holds true for a flatter yield curve. The relative sizes of the trades on each side can be adjusted for the relative duration, or percentage price change of a bond for a given change in its yield.

This is the approach taken in the Simons Research daily market letter on Treasury note yield curve trades. The shape of the yield curve as defined by the FRR values between the three maturity segments noted above are the object of the analysis, not the individual note futures themselves. Of course, the yield curve trades are effected through trades on the individual note futures. The FRR numbers, when viewed over the short trading window of thirty days, provide a sensitive barometer on yield curve changes and are far trendier than the outright note futures themselves, which are notorious for sudden and vacuum-like reversals. A sample chart from the close of business on September 3, 2004 is depicted below. The FRR values are indexed to the values of thirty trading days ago to provide them with a common scale.

Chart 4
Key Forward Rate Ratio Movement Over Past 30 Trading Days



Each of the three yield curve pair's positions produces a buy/sell combination that may work at cross-purposes. Therefore they are netted together into a single table for the aggregate position.

Technical Data Bank: Spread Positions

Spread	Value	Signal	Short Maturity	Long Maturity
FRR, 2-5 Years	1.19	Buy Two / Sell Five	3	-2
FRR, 2-10 Years	1.11	Buy Two / Sell Ten	5	-2
FRR, 5-10 Years	1.20	Buy Five / Sell Ten	3	-2

		Current Net Portfolio:	Previous Net Portfolio:	Required Trades:
Net Portfolio:	Two-year	8	8	0
	Five-year	1	1	0
Dec. Contracts	Ten-year	-4	-4	0

The best approach to insoluble problems is avoidance; the gain from banging your head on the wall is going to be minimal at best and may actually have some negative consequences depending on your neck strength and the wall's coefficient of restitution. No one has the interest rate forecasting problem solved, and given the Credibility Paradox discussed earlier, no one ever will solve the problem. Ask yourself how much of your trading profits derive from outright interest rate positions, and while you are at it, ask yourself how many of the trading disasters of the past twenty years have come from interest rate miscalculations. Orange County, Daiwa Bank and Long Term Capital Management may spring to mind.

Yield curves can be tricky to trade; they still are subject to the bond market's propensity to capitalize instantly and in the extreme every last piece of economic news. This is the business we have chosen. However, they are more given to longer-term persistent moves with lower volatility than we can find in the outright note futures.