Trading Strategies

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September 22, 2008

Agenda: Trading Strategies

- Riding the yield curve
- On vs off the run
- Cheap/rich

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Riding the Yield Curve

Suppose we observe a "standard" upward sloping yield curve. For the sake of argument, assume

maturity	1	2	5	10
cpn	5	5	5	5
ytm	2	3	4	4.5
price	102.94	103.82	104.45	103.95

Bonds pay annual coupon.

Lets consider long positions in each of these bonds. Our investment horizon is one year. Suppose we are willing to bet that *the yield curve will not change*. Which bond is a better investment?

- The one year yields a return of exactly 2%.
- The two year will have a price of 102.94 after holding it for one year. The return is

$$\frac{102.94 + 5}{103.82} - 1 = 3.97\%.$$

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- The five year will have a price of 104.37 after holding it for one year (3.8% ytm). The return is

$$\frac{104.37 + 5}{104.45} - 1 = 4.72\%.$$

- The ten year will have a price of 104.01 after holding it for one year (4.45% ytm). The return is

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How it works

The yield curve ride is good for two reasons

- The long bonds have higher ytm's
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What could go wrong

Suppose we had a parallel shift in the yield curve

maturity	1	2	5	10
old ytm	2	3	4	4.5
new ytm	3	4	5	5.5

What would be the returns to riding the yield curve?

We get

- one year: 2%
- two year: 2.06%
- five year: 1.2 %
- 10 year: -2%

Being long bonds is bad when interest rates go up. We lose the most by being long the long term bonds because these have higher *interest rates sensitivity*.

On vs Off the Run

Off the run bonds tend to sell at a discount relative to on the run. Soon after their inception, the Hedge Fund "Long Term Capital Management" (LTCM) fronted by Nobel price winners Merton/ Scholes sold the spread between on and off the run 30 year bonds.
The trade is described in "When genius failed."
It is simple. Sell the liquid newly issued 30 year bond short, and then buy the last 30 year issued, now a 29.5 year bond. Now wait six months (or even less). Now the 30 year is a 29.5 and the 29.5 is a 29 and prices more or less converged.

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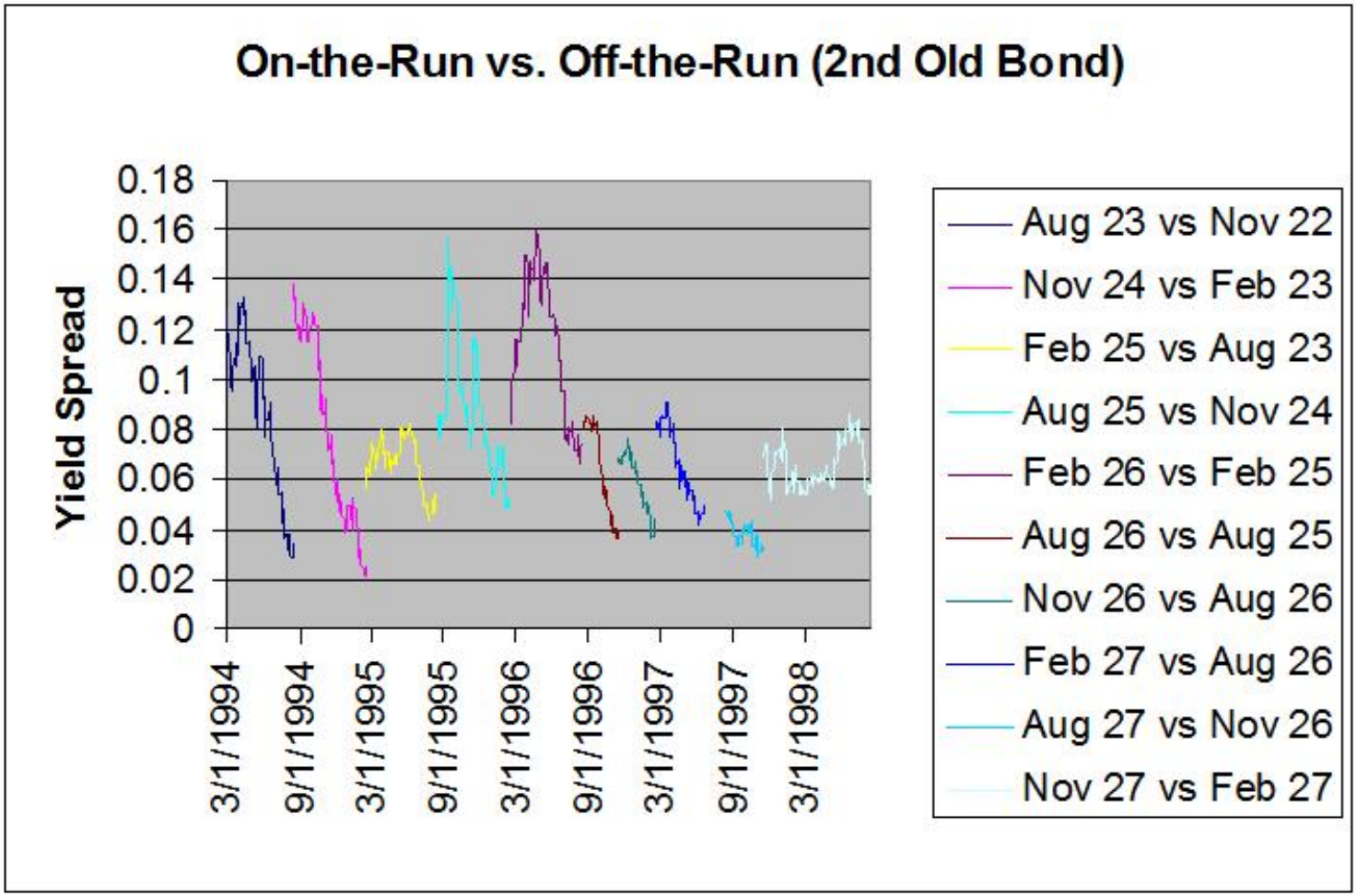

Figure: On and Off the run spreads. Source: Eric Rosenfeld, Itcm

Cheap-Rich

Consider the pricing errors from last time:

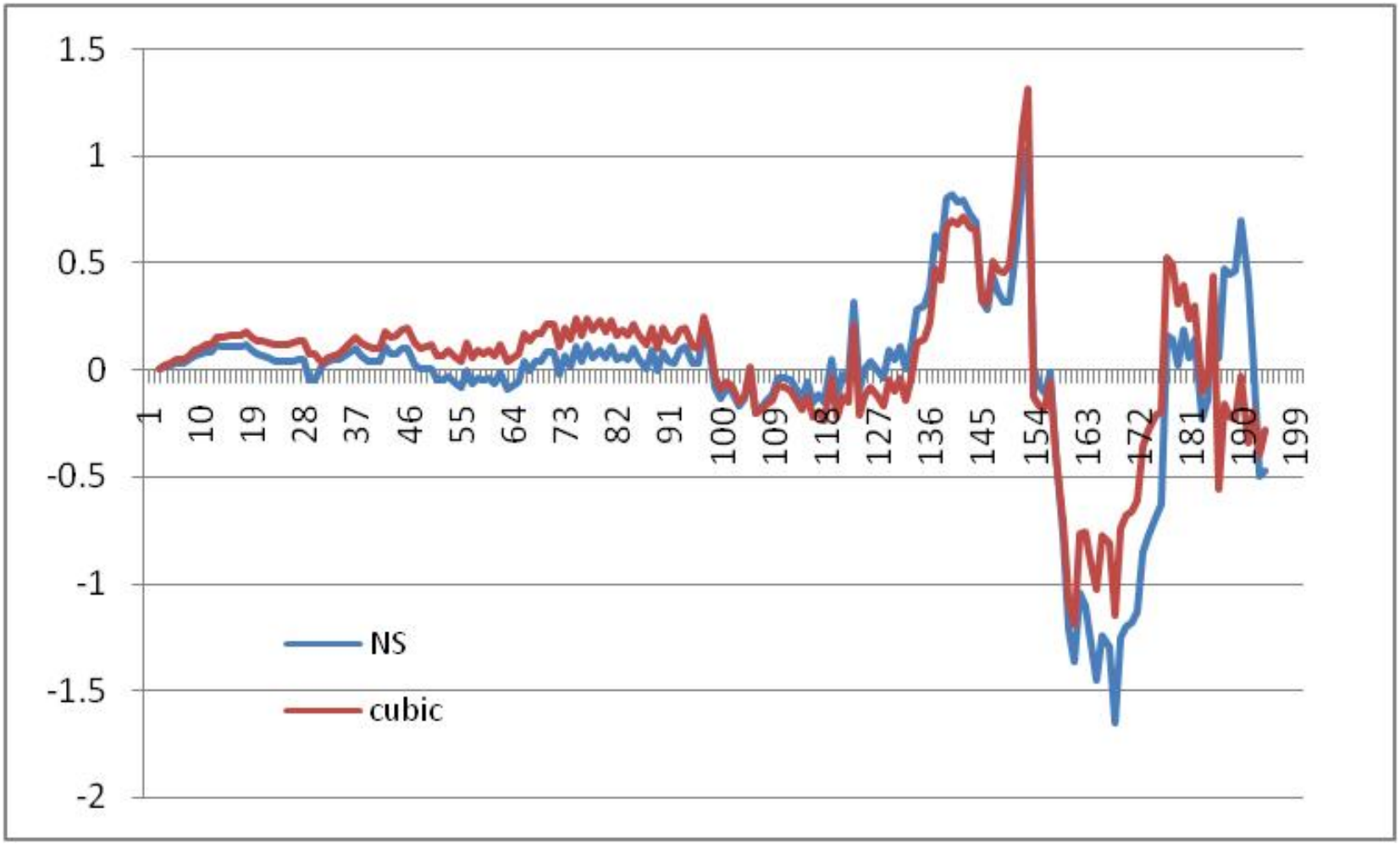

Figure: Pricing errors for NS and CS curve fitting.

Barbell/Butterfly

This is a long/short strategy involving three bonds. Positions are determined relative to a fitted yield curve model. We'll find one over (under) priced bond, and sell (buy) this bond. This position is hedged in two other bonds with as similar maturity and coupon as possible.

Lets try.

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Consider

Table: July 15, 08 Pricing Errors (mkt - model)

cusip	maturity	ASK	NS-error	CS-error
912828DX5	6/15/2010	102.594	0.0861	0.1989
912828JC5	6/30/2010	100.914	-0.0101	0.0983
912828DZ0	7/15/2010	102.828	0.0844	0.1921

- 6/30/2010 maturity fair or slightly underpriced
- 6/15/2010 and 7/15/2010 overpriced

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- 6/30/2010 maturity fair or slightly underpriced
- 6/15/2010 and 7/15/2010 overpriced

Lets buy 100 M worth of 6/30/10, sell (short) 50 M worth of 6/15/10 and 7/15/12.

We are betting that the prices of these bonds will adjust so that the pricing errors approach zero.

6/30/10 is called the body and 6/15/10 and 7/15/12 are called the wings of the butterfly.

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The cash flow from this trade is zero at inception. We will own

$$\frac{-50,000,000}{102.5940062} = 487,357$$

of the 6/15/10,

$$\frac{100,000,000}{102.8046875} = -990,942$$

of the 6/30/10, and

$$\frac{-50,000,000}{102.828125} = 486,248$$

units of 7/15/10.

On Sept 16, 2008, the prices were

Table: Sept 16, 2008 Prices

cusip	maturity	ASK
912828DX5	6/15/2010	104.5247609
912828JC5	6/30/2010	102.8046875
912828DZ0	7/15/2010	104.845788

Assuming we can trade at the ask, we earn

$$\begin{aligned} &-487357 \times 104.5247609 \\ &\qquad + 990942 \times 102.8046875 \\ &\qquad - 486248 \times 104.845788 \\ &\qquad\qquad \approx -48,446 \quad (1) \end{aligned}$$

In total profit on this trade.

Incorporating B/A spreads

It is true that our trade would have lost 48 K if we were able to trade at the asking prices. Of course, we typically cannot. Consider a 6 cent B/A spread for each bond. Our trading costs are approximately

$$0.5 \times 6 + 6 + 0.5 \times 6 = 12$$

cents per every hundred dollar traded.
The total trading costs on the 200 M trade is

$$200,000,000 \times 12/10,000 = 240,000$$

so the trade is even more unprofitable if you cannot transact inside the b/a.

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Let's try another one...

Consider

Table: Sept 16, 08 Pricing Errors (mkt - model)

cusip	maturity	coupon	dirty ASK	Pr. error
912810EY0	11/15/2026	6.5	126.2024457	0.295
912810FB9	11/15/2027	6.125	122.0309103	0.442
912810PU6	5/15/2037	5	109.7038044	-0.284

Note that these pricing errors are larger relative to each other than the first example.

Lets do the same trade.

We will short the “middle” long the two other bonds in equal dollar amounts.

So buy 50 M worth of 26 and 37. Short 100 M of 27.

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On Sept 16 these bonds traded at

Table: Sept 16, 08 Pricing Errors (mkt - model)

cusip	maturity	dirty ASK
912810EY0	11/15/2026	133.9735054
912810FB9	11/15/2027	129.7055027
912810PU6	5/15/2037	117.9952446

We make 568,763 and a quarter.

Comments

- The way this trade was structured, it is not an arbitrage trade. By holding the position for only two months, we can easily lose if market prices move against us.
- We are hoping that the prices of the three securities will converge
- We will discuss risk reduction strategies such as *duration neutral portfolios* later.