



CBOT® Treasury Futures

YIELD CURVE SHIFTS MAKE TRADING OPPORTUNITIES

The twists and turns of the Treasury yield curve can wreak havoc with a portfolio, but they can also create interesting trading opportunities for proprietary traders or portfolio managers in search of enhanced returns. Using CBOT Treasury futures, you can design a variety of trades that can serve both risk management and yield enhancement purposes.

The deep liquidity of the CBOT Treasury futures markets means you can capitalize on your yield curve expectations quickly and for relatively low transaction costs. It is also important to realize that, should your outlook change, you can reverse a strategy like this one as easily and cost-effectively as you can initiate it.

Structuring a Yield Curve Trade

When you design such trades, the one wrinkle to be aware of is that discussions of the yield curve proceed in yield terms while futures trade in price terms. If your trade preparation follows a simple four-step process, you can make the appropriate adjustments with relative ease. In planning a yield curve trade, you should:

- develop a yield curve outlook
- review spread logic
- filter out extraneous factors
- consider possible results

Developing a Yield Curve Outlook

The first task in designing a yield curve trade is to decide how you think the Treasury yield curve will react to interest rate developments during the term of the trade.

In general, when yields are falling, the yield curve will steepen. When yields are rising, the yield curve will flatten. These shifts happen because shorter-term yields typically

respond more to an event like a Fed policy shift than do longer-term yields. Consider a simple example. The yield curve slope is simply the difference between the longer-term yield and the shorter-term yield. Suppose that yields perform as in Exhibit 1. Initially the yield curve shape (or slope) is 71 basis points (bps). The Change column shows that the 5-year yield subsequently drops 20 bps while the 10-year yield drops 10 bps. This results in the yields in the Final Yield column which defines an 81 bp slope, 10 bps steeper than initially.

Exhibit 1: Falling Yields, Steeper Slope

Futures Maturity	Initial Yield (%)	Change (bps)	Final Yield (%)
5-year	2.84	-20	2.64
10-year	3.55	-10	3.45
slope	0.71		0.81

The converse is also true. When yields rise, the yield curve will typically flatten, as Exhibit 2 illustrates.

Exhibit 2: Rising Yields, Flatter Slope

Futures Maturity	Initial Yield (%)	Change (bps)	Final Yield (%)
5-year	2.84	20	3.04
10-year	3.55	10	3.65
slope	0.71		0.61

It is important to note that from time to time, events can interrupt the normal pattern. For example, the Fed may be tightening, which would normally lead to a flatter Treasury yield curve. However, if the market concludes that what the Fed is doing won't be enough to control growing inflation, the longer-term yields, which are more sensitive to inflation fears than shorter-term yields, may rise more than shorter-term yields do. If this happens, the yield curve can steepen even though yields are rising.

Even in the absence of a Fed move, supply and demand imbalance in one sector may cause a nontypical yield curve

If you expect the spread to widen (the spread widening is the same as the yield curve steepening), you can buy the spread by going long 5-year futures and going short 10-year futures. When the yield curve steepens, the 5-year yield will fall relative to the 10-year yield, and the 5-year price will rise relative to the 10-year price. That is, a long position in 5-year futures will gain more than a short position in 10-year futures will lose. Exhibit 3 shows that a 20 bp yield drop, given an initial 2.88% 5-year yield, boosted the 5-year futures price 0-30+ (prices are cited in points and 32nds unless otherwise noted, and the + notation indicates half a 32nd or a half tick). At the same time, a 10 bp yield drop,

Exhibit 3: Price Responses to Falling Yields

Futures Maturity	Initial Price	Yield Change (in bps)	Final Price	Difference
5-year	111-29	-20	112-27+	0-30+
10-year	112-18	-10	113-07+	0-21+

shift. Suppose extra heavy issuance and slack demand in the 5-year sector force that yield up at a time when yields are generally falling. This can alter the yield curve shape. In the extreme case, the 5-year to 10-year segment could flatten when, normally, you would expect it to steepen.

given an initial 3.58% 10-year yield, boosted the 10-year futures price 0-21+, 9 ticks less.

Expecting the yield curve to flatten, you can sell the curve by going short the 5-year and long the 10-year. Because the 5-year price will fall more than the 10-year price, the short

Exhibit 4: Price Responses to Rising Yields

Futures Maturity	Initial Price	Yield Change (in bps)	Final Price	Difference
5-year	111-29	20	110-30+	0-30+
10-year	112-18	10	111-29	0-21

Awareness of such factors as these can inform your yield curve outlook, but whatever your expectation for yield curve change, you can structure a yield curve spread trade to capitalize on it.

Review Spread Logic

The logic of spread trading is straightforward. If you expect a thing to rise in value, you typically want to buy it. If you expect its value to decline, you typically want to sell. It follows that if you expect the yield curve to steepen, you will want buy the spread. You buy or sell a yield curve spread in terms of what you do on the short maturity leg of the trade.

position in the 5-year will gain more than the long position will lose. Exhibit 4 illustrates.

Filtering Out Extraneous Effects

The one thing yet lacking is that a true yield curve spread filters out directional effects. It responds only to changes in the shape of the yield curve. Suppose that, expecting the yield curve to steepen, you bought the curve only to see both yields drop 10 bps. Exhibit 5 shows how the futures prices would change given this 10 bp parallel shift in the yield curve.

Exhibit 5: Price Responses to Rising Yields

Futures Maturity	Initial Price	Yield Change (in bps)	Final Price	Difference
5-year	111-29	-10	112-12	0-15
10-year	112-18	-10	113-07+	0-21+

Obviously, a spread position long the 5-year and short the 10-year would generate a loss even though the yield curve has not changed shape. This is hardly a satisfactory outcome when what you want is a position that will benefit from changes in yield curve shape, and nothing else.

To filter out directional effects and design a trade that will respond only to yield curve shape change, you can calculate a spread ratio much as you would a hedge ratio. For example, given a 5-year futures DV01 of \$47.54 and a 10-year futures DV01 of \$66.45, you can divide the 5-year DV01 by the 10-year DV01 to generate a 0.7154 spread ratio ($47.54/66.45 = 0.7154$).

Expecting the yield curve to steepen, this ratio indicates that you should go long 1,000 5-year Treasury futures and short 715 10-year Treasury futures. This spread position should generate essentially no result in the case of a parallel shift in the yield curve, regardless of yield direction. It should generate gains any time the yield curve steepens—again, regardless of yield direction. It should generate losses in all other cases.

Assessing a Variety of Outcomes

Exhibit 6 shows parallel shifts, curve steepenings, and curve flattenings with both falling and rising yields. It amply makes the case for properly ratioed yield curve spreads.

You can easily replicate these results on a spreadsheet. The first column shows the DV01s for the two futures contracts. A DV01 indicates approximately what one futures contract will gain or lose in dollars for every 1 bp change in yield. The second column shows the yield change in basis points. The third column shows the number of contracts required at each futures maturity to balance price sensitivities to yield change on each leg the spread trade. The minus sign on the 10-year contract number indicates a short position. If you were selling the spread, the minus would be on the 5-year contract number. Finally, the result column is the product of the values in the other four columns, and the spread result is the sum of the two maturity results. Exhibit 6 shows how this spread typically performs given six different yield curve

changes. A spreadsheet set up in this way will help you explore the potential of this kind of trade.

A spread trade structured in this way should respond only to a change in the shape of the yield curve. You can see from the two parallel shifts that, regardless of yield direction, a parallel shift produces essentially no result. Note that the \$282.50 residual reflects nothing more than rounding error. This amount is inconsequential given the scale of the trade. The next two scenarios show that whether yields go up or down, as long as the yield curve steepens, this trade will generate a gain. The last two scenarios show that, regardless of yield direction, if the yield curve flattens, this trade will lose money.

Conclusion

A yield curve spread trade is a speculative trade, but it shifts the burden of speculation from taking a position on interest rate or price direction to taking a position on what you expect the yield curve to do. This gives you an extra way to be right, for you have no concern for price direction, only for yield curve steepening or flattening. Further, because spread trades implemented with CBOT futures receive margin credits, this kind of trade can be a low-cost means to capitalize on your yield curve outlook or to defend your portfolio from adverse yield curve shifts.

Exhibit 6: Assessing Yield Curve Trade Potential***Parallel Shift—Yields Down***

Futures contract	DV01	Yield Change (in bps)	Number of Contracts	Result
5-year	47.54	-10	1000	475,400.00
10-year	66.45	-10	-715	-475,117.50
Spread Result				282.50

Parallel Shift—Yields Up

Futures contract	DV01	Yield Change (in bps)	Number of Contracts	Result
5-year	47.54	10	1000	-475,400.00
10-year	66.45	10	-715	475,117.50
Spread Result				-282.50

Curve Steepens—Yields Down

Futures contract	DV01	Yield Change (in bps)	Number of Contracts	Result
5-year	47.54	-20	1000	950,800.00
10-year	66.45	-10	-715	475,117.50
Spread Result				475,682.50

Curve Steepens—Yields Up

Futures contract	DV01	Yield Change (in bps)	Number of Contracts	Result
5-year	47.54	10	1000	475,400.00
10-year	66.45	20	-715	950,235.00
Spread Result				474,835.00

Curve Flattens—Yields Down

Futures contract	DV01	Yield Change (in bps)	Number of Contracts	Result
5-year	47.54	-10	1000	475,400.00
10-year	66.45	-20	-715	-950,235.00
Spread Result				-474,835.00

Curve Flattens—Yields Up

Futures contract	DV01	Yield Change (in bps)	Number of Contracts	Result
5-year	47.54	20	1000	-950,800.00
10-year	66.45	10	-715	475,117.50
Spread Result				-475,682.50

