

INTEREST RATES:

Yield Curve Shifts Create Trading Opportunities

The twists and turns of the U.S. Treasury yield curve can wreak havoc on a portfolio, but with U.S. Treasury futures, they can also generate interesting trading opportunities for those in search of enhanced returns.

Proprietary traders and portfolio managers are well aware of the damage that changes in the U.S. Treasury yield curve can inflict on a fixed-income portfolio. However, those who anticipate these yield curve shifts will find that U.S. Treasury futures may be used to design a variety of trades that can serve both risk management and yield enhancement purposes.

The deep liquidity of the 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 yield curve outlook change, you can reverse your strategy as easily and cost effectively as you initiated it.

Structuring a Yield Curve Trade

As you design a yield curve trade, you need to be aware that discussions of the Treasury yield curve take place in yield terms, while Treasury 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 outcomes

Developing a Yield Curve Outlook

The first task in designing a yield curve trade is to decide how you expect the Treasury yield curve to 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 is 97 basis points (bps). As 5-year and 10-year Treasury cash yields drop 20 bps and 10 bps, respectively, the yield curve steepens by 10 bps to 107 bps.

Exhibit 1:
Falling Yields, Steeper Slope

	Initial Yield (%)	Change in Yield (bps)	Final Yield (%)
On-the-run 5-year note	1.99	-20	1.79
On-the-run 10-year note	2.96	-10	2.86
Slope	0.97		1.07

The converse is also true. When yields rise, the yield curve will typically flatten. As Exhibit 2 illustrates, the yield curve flattens by 10 bps to 87 bps as 5-year and 10-year Treasury cash yields increase 20 bps and 10 bps, respectively.

Exhibit 2:
Rising Yields, Flatter Slope

	Initial Yield (%)	Change in Yield (bps)	Final Yield (%)
On-the-run 5-year note	1.99	+20	2.19
On-the-run 10-year note	2.96	+10	3.06
Slope	0.97		0.87

It is important to note that from time to time, events can interrupt normal yield curve dynamics. For example, the Fed may be in a tightening mode, which would normally lead to a flatter Treasury yield curve. However, if the market concludes that what the Fed is doing will not be enough to control growing inflation, 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 an idiosyncratic yield curve shift. Suppose extra heavy Treasury issuance and slack demand in the 5-year sector force that yield to rise at a time when yields are generally falling. This can alter the yield curve slope. In the extreme case, the 5-year to 10-year segment could flatten when, normally, you would expect it to steepen.

Awareness of factors such as these can influence your yield curve outlook. 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 the yield curve to steepen, you typically want to buy the spread. If you expect the yield curve to flatten, you will want to sell the spread. You buy or sell a yield curve spread in terms of what you do on the short maturity leg of the trade.

If you expect the spread to widen (i.e., to steepen), you can buy the spread by going long 5-Year Treasury Note futures and short 10-Year Treasury Note futures. When the yield curve steepens, the 5-year Treasury cash yield will fall relative to the 10-year Treasury cash yield, and the 5-Year Note futures price will rise relative to the 10-Year Note futures price. That is, a long position in 5-Year Note futures will gain more than a short position in 10-Year Note futures will lose.

Exhibit 3 shows that a 20 bp drop in the initial 5-year cash yield of 1.99 percent boosted the 5-Year Note futures price by 30-32nds. At the same time, a 10 bp yield drop in the initial 10-year cash yield of 2.96 percent, boosted the 10-Year Note futures price by 24-32nds. (Please note that 5-Year Note futures trade in points and quarter-32nds whereas 10-Year Note futures trade in points and half-32nds.)

Exhibit 3:
Price Responses to Falling Yields

	Initial Futures Price	Change in Cash Yield (bps)	Final Futures Price	Difference in Futures Price
5-Year Note Futures	119-080	-20	120-060	0-300
10-Year Note Futures	123-010	-10	123-050	0-240

If you expect the yield curve to flatten, you can sell the spread by going short 5-Year Note futures and long 10-Year Note futures. Because the 5-Year Note futures price will fall more than the 10-Year Note futures price, the short position in the 5-Year Note futures will gain more than the long position in the 10-Year Note futures will lose. This is illustrated in Exhibit 4.

Exhibit 4:
Price Responses to Rising Yields

	Initial Futures Price	Change in Cash Yield (bps)	Final Futures Price	Difference in Futures Price
5-Year Note Futures	119-080	+20	118-100	0-300
10-Year Note Futures	123-010	+10	122-090	0-240

Filtering Out Extraneous Effects

True yield curve spread filters out directional effects (i.e., changes due to parallel shifts in the yield curve) and responds only to changes in the slope of the yield curve (i.e., non-parallel shifts). Suppose you bought the spread only to see 5-year and 10-year cash yields drop 10 bps. Exhibit 5 shows how the 5-Year and 10-Year Note futures prices would change given a parallel shift of 10 bps in the yield curve.

Exhibit 5:
Price Responses to Falling Yields

	Initial Futures Price	Change in Cash Yield (bps)	Final Futures Price	Difference in Futures Price
5-Year Note Futures	119-080	-10	119-230	0-150
10-Year Note Futures	123-010	-10	123-250	0-240

Obviously, a spread position that is long 5-Year T-Note futures and short 10-Year T-Note futures 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.

The goal is to filter out directional effects and design a spread trade that will respond only to changes in the shape of the yield curve. In order to do this you will need to create a spread that insures that the gains (losses) of the shorter-term maturity futures position offset the losses (gains) of the longer-term maturity futures position when the curve moves in a parallel manner. The best way to create this trade is to match the dollar value of a 1-bp change (DV01) in the yield of the shorter-term maturity futures position and that of the longer-term maturity futures position. A DV01 indicates approximately what one futures contract will gain or lose in dollars for every 1-bp change in yield.

For example, given a 5-Year Note futures DV01 of \$47.94 and a 10-Year Note futures DV01 of \$77.91, you can divide the 5-Year Note futures DV01 by the 10-Year Note futures DV01 to generate a spread ratio of 0.6153 ($47.94 / 77.91 = 0.6153$).

If you expect the yield curve to steepen, this ratio indicates that you should go long 1,000 5-Year Note futures and short 615 10-Year Note futures. This spread position should generate gains any time the yield curve steepens, no results in the case of a parallel shift in the yield curve, and losses any time the yield curve flattens.

The goal is to filter out directional effects and design a trade that will respond only to a change in the shape of the yield curve.

Assessing a Variety of Outcomes

Exhibit 6 shows long yield curve spread positions under six different scenarios: parallel shifts, curve steepenings, and curve flattenings with both falling and rising interest rates. 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. The second column shows the Treasury cash yield change in basis points. The third column shows the number of contracts required to create a DV01-weighted spread trade. The fourth column is the product of the values in the other three columns. Finally the *Spread*, is the net of the gains and losses of the individual futures legs of the spread trade. A spreadsheet set up in this way will help you explore the potential of this kind of trade.

A DV01-weighted spread trade structured like this should respond only to a change in the shape of the yield curve. You can see from the two parallel shift scenarios that, regardless of yield direction, a parallel shift produces essentially no result. Note that the \$253.50 residual reflects nothing more than rounding error, and 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 if the yield curve flattens, this trade will lose money regardless of yield direction.

Exhibit 6: Assessing Yield Curve Trade Potential

Parallel Shift — Yields Down

	Futures DV01	Change in Cash Yield (bps)	Number of Contracts	Result
5-Year Note Futures	\$47.97	-10	Long 1,000	+\$479,400.00
10-Year Note Futures	\$77.91	-10	Short 615	-\$479,146.50
Spread				+\$253.50

Parallel Shift — Yields Up

	Futures DV01	Change in Cash Yield (bps)	Number of Contracts	Result
5-Year Note Futures	\$47.97	+10	Long 1,000	-\$479,400.00
10-Year Note Futures	\$77.91	+10	Short 615	+\$479,146.50
Spread				-\$253.50

Curve Steepens — Yields Down

	Futures DV01	Change in Cash Yield (bps)	Number of Contracts	Result
5-Year Note Futures	\$47.97	-20	Long 1,000	+\$958,800.00
10-Year Note Futures	\$77.91	-10	Short 615	-\$479,146.50
Spread				+\$479,653.50

Exhibit 6: Continued

Curve Steepens— Yields Up

	Futures DV01	Change in Cash Yield (bps)	Number of Contracts	Result
5-Year Note Futures	\$47.97	+10	Long 1,000	-\$479,400.00
10-Year Note Futures	\$77.91	+20	Short 615	+958,293.00
Spread				+478,893.00

Curve Flattens— Yields Down

	Futures DV01	Change in Cash Yield (bps)	Number of Contracts	Result
5-Year Note Futures	\$47.97	-10	Long 1,000	+\$479,400.00
10-Year Note Futures	\$77.91	-20	Short 615	-\$958,293.00
Spread				-\$478,893.00

Curve Flattens— Yields Up

	Futures DV01	Change in Cash Yield (bps)	Number of Contracts	Result
5-Year Note Futures	\$47.97	+20	Long 1,000	-\$958,800.00
10-Year Note Futures	\$77.91	+10	Short 615	+\$479,146.50
Spread				-\$479,653.50

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 rate or price direction, only for yield curve steepening or flattening. Further, because spread trades implemented with U.S. Treasury futures receive margin credits, this type of strategy can be a low-cost means to capitalize on your yield curve outlook or to defend your portfolio from adverse yield curve shifts.

For more information, visit www.cmegroup.com/interestrates.



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