



Bond Basics: Yield Curve Strategies.

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The yield curve is a graph which depicts the relationship between yields and maturity for bonds of the same asset class and credit quality. Yield curves can be created for any type of fixed income security, including US Treasuries, investment grade and high yield corporate bonds, and municipal bonds. The US Treasury yield curve is widely considered the market benchmark, as it is often used as a basic reference point by investors to evaluate market conditions and relative value between fixed income securities. The chart below illustrates a yield curve for US Treasuries on March 13th, 2015.



In addition to providing a useful way to review and compare the yields which various types of fixed income securities offer, the yield curve can also be used to determine investor expectations for future market conditions. Currently, the US Treasury market is positively sloped, meaning that yields rise as maturities extend. For example, the yield on the 2 year Treasury is 0.65%, while the yield on the 10year and 30year Treasuries are 2.11% and 2.70% respectively. While the yield curve is typically upward sloping it can also be flat or even downward sloping (i.e. short maturity bond have a higher yield than longer maturities).

Historically, the slope of the yield curve has been a good leading indicator of economic activity. Due to the fact that the yield curve summarizes where investors think interest

rates are headed, it indicates their expectations for the economy. There are four general shapes the yield curve can take:

- 1) **Normal:** A normal yield curve is one which is upward-sloping. The longest maturity bonds offer the highest yield while the shortest maturity bonds offer the lowest yields. This scenario is considered 'normal' because longer-term securities generally bear the greatest investment risks (inflation risk, reinvestment risk, price volatility, and while not a factor for US Treasuries – default risk and credit risk). As a result the longer the time to maturity, the higher interest rate a bond should have at that point in time. An upward sloping yield curve also generally signals that investors expect the economy to expand.
- 2) **Flat:** A flat yield curve is one where short-term rates are about the same as long-term rates. It is generally a sign that there is a lot of uncertainty about the outlook for the economy, interest rates and inflation. The yield curve was very flat in July 2007, just a few months before the beginning of the financial crisis.
- 3) **Inverted:** An inverted yield curve occurs when long-term yields fall below short-term yields. An inverted yield curve indicates that investors expect the economy to slow or decline in the future, and this slower growth may lead to lower inflation and lower interest rates. An inverted yield curve typically indicates that the Federal Reserve is 'tightening' monetary policy, which has the effect of limiting the money supply and makes credit less available. An inverted yield curve is often viewed as a harbinger of an economic recession.
- 4) **Humped:** A humped yield curve indicates an expectation of higher rates in the middle of the maturity periods covered, perhaps reflecting investor uncertainty about specific economic policies or condition, or it may reflect a transition of the yield curve from normal to inverted or vice versa. However, other technical factors such as lower supply of long-term bonds or an increased demand for long-term bonds may cause a humped yield curve.

The shape of the yield curve changes over time as interest rates change in the marketplace. Short-term Treasury yields are influenced to a large degree by the monetary policy set by the Federal Reserve. Meanwhile, longer maturity yields are influenced largely by the market's expectation of future inflation and the risk premium demanded for longer-term bonds. Yield curve strategies involve positioning a portfolio to capitalize on expected changes in the shape of the Treasury yield curve.

A shift in the yield curve refers to the relative change in the yield for each Treasury maturity. A parallel shift in the yield curve is a shift in which the change in the yield on all maturities is the same. A nonparallel shift in the yield curve indicates that the yield for maturities does not change uniformly across the curve. Historically, two types of nonparallel yield curve shifts have been observed: a twist in the slope of the yield curve and a change in the humpedness of the yield curve. A flattening of the yield curve indicates that the yield spread between the yield on a long-term and a short-term Treasury has decreased. This can be the result of either short term rates increasing more than longer term rates or long term rates declining more than short term rates. One potential reason that the yield curve may flatten is that the market expects the Federal Reserve to

increase the Fed Funds rate in the near future or potential due to lower longer term inflation expectations. Conversely, a steepening of the yield curve indicates that the yield spread between a long-term and a short-term Treasury has increased. The yield curve will steepen when long-term yields increase in relation to short-term yields, or long-term yields decline by less than short-term yields. Commonly the yield curve will steepen if the market increases its expectation for inflation or if the market demands a higher risk premium.

During times of a normal upward sloping yield curve, additional return opportunities are presented from 'rolling down the yield curve'. Roll down is the concept that if the yield curve is upward sloping as a bond gets closer to maturity, or rolls down the yield curve, it is valued at successively lower yields and therefore higher prices. Under this strategy, a bond can be held for a period of time as it appreciates in price and is sold before maturity to realize the gain. As long as the yield curve does not flatten too much over the holding period, this strategy can add to the total return of a bond portfolio.

The other type of nonparallel shift, a change in the humpedness of the yield curve, is referred to as a butterfly shift and will not be covered further in this whitepaper.

In portfolio strategies that seek to capitalize on expectations based on short-term movements in yields, the dominant source of return is the impact on the price of the securities in the portfolio. This means that the maturity of the securities in the portfolio will have an important impact on the portfolio's return. The key point is that for short-term investment horizons, the spacing of the maturity of bonds in the portfolio will have a significant impact on the total return.

There are three yield curve strategies which investors can use:

- 1) **Bullet strategies:** In a bullet strategy, the bond portfolio is constructed with the maturities highly concentrated at one point on the yield curve. For example, most of the bonds in the portfolio will mature in 10 years.
- 2) **Barbell strategies:** In a barbell strategy, the maturities of the securities included in the portfolio are concentrated at two extreme maturities, such as 2 years and 30 years.
- 3) **Laddered Strategies:** In a laddered strategy, portfolios are invested equally in bonds maturing periodically, usually annually. The staggered maturity schedule means that a portion of the portfolio matures each year. As a bond matures, the money is reinvested in the longest maturity to maintain the maturity structure.

Each of these strategies will result in different performance when the yield curve shifts. The actual performance will depend on both the type of yield curve shift and the magnitude of the shift. In general, a bullet strategy will outperform when the yield curve steepens, while a barbell will outperform when the yield curve flattens. Overtime a laddered portfolio tends to outperform. A laddered portfolio is similar to creating a diversified portfolio of stocks including multiple asset classes rather than concentrating a portfolio in one particular section or region. In a single year, one particular sector of the

stock market will outperform others, but over a longer time frame, a diversified portfolio will typically achieve a better return with lower volatility.

It is also important to highlight at this point a shortcoming of duration, which is a very commonly used measure in fixed income portfolio management. Duration as a measure is only accurate for a parallel shift in the yield curve. As discussed above, movements in the yield curve are frequently not parallel, i.e. the yield curve either steepens or flattens as interest rates change. The advantage of using duration is it provides a quick estimate of the price change for a bond portfolio given a parallel shift in interest rates. However, the disadvantage is that two portfolios with the same duration may perform quite differently when the yield curve moves in a non-parallel fashion. To measure a portfolio's exposure to a non-parallel shift in the yield curve, an investor should use *key rate duration*. This measure focuses on the direction and magnitude of changes in the yield curve for 11 key maturity periods along the yield curve (3 months, 1 year, 2 years, 3 years, 5 years, 7 years, 10 years, 15 years, 20 years, 25 years, and 30 years). The impact of any type of shift can be quantified using key rate durations. For example, the impact to a portfolio of a steepening yield curve can be found by decreasing the key rates at the short end of the yield curve and increasing the key rates at the long end of the yield curve and then determining the change in the portfolio's value.

In summary, the yield curve has many uses including serving as a leading indicator of economic conditions for investors, being a benchmark for the valuation of fixed income securities relative to the US Treasury yield curve, and as a portfolio management tool to try to create additional return.

Previous Bond Basics whitepapers on ['Key Factors Affecting Bond Prices'](#) and ['Premium Bonds'](#) can be found by clicking the title hyperlinks.