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January 2015

# SYNTHETIC DURATION MANAGEMENT

**Chris Haskamp, CFA**
Portfolio Manager

**Emily Pechacek**
Investment Specialist

With U.S. interest rates at fifty-year lows, some investors are attempting to manage the duration of their fixed income portfolios. Synthetic duration management via futures contracts may be an appropriate and useful tool in that effort.

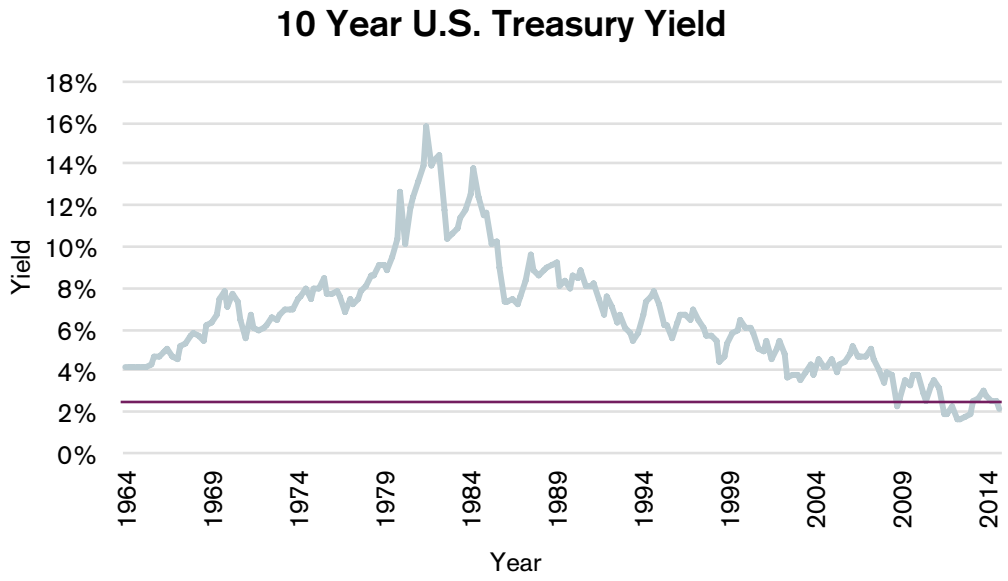
**Parametric**
3600 Minnesota Drive
Suite 325
Minneapolis, MN 55435
**T** 952 767 7700
**F** 952 767 7701
www.ParametricPortfolio.com

## A HISTORICAL CONTEXT FOR BOND YIELDS

Since peaking in 1981, U.S. Treasury bond yields have steadily declined. The Federal Reserve's interventionist monetary policy in the wake of the Global Financial Crisis has helped pushed Treasury yields to fifty-year lows.

Figure 1: 10 Year U.S. Treasury Yield

**RATES LOOK LOW...**

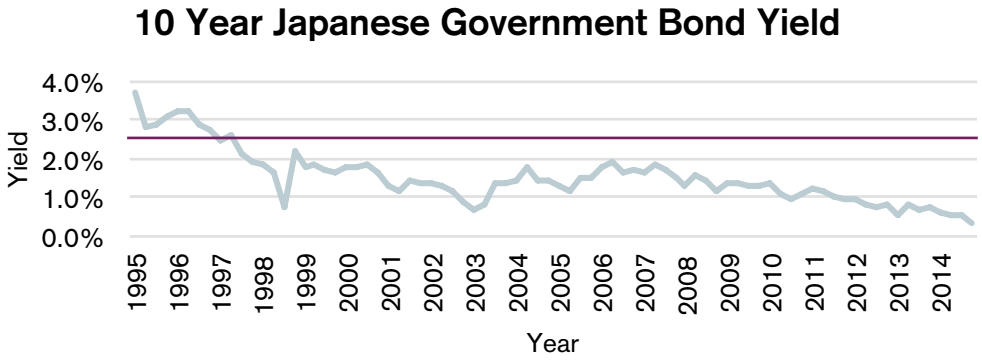



Source: Bloomberg; Date Created: 1/13/15.

Although yields are historically low, an imminent shift toward higher rates is not inevitable. Consider Japanese Government Bond 10 year yields, which fell below 2.2% (approximately the current U.S. 10 year yield) in 1997 and continued to fall in the seventeen years since.

Figure 2: 10 Year Japanese Government Bond Yield

**...AS THEY DID IN JAPAN BEFORE THEY WENT EVEN LOWER**

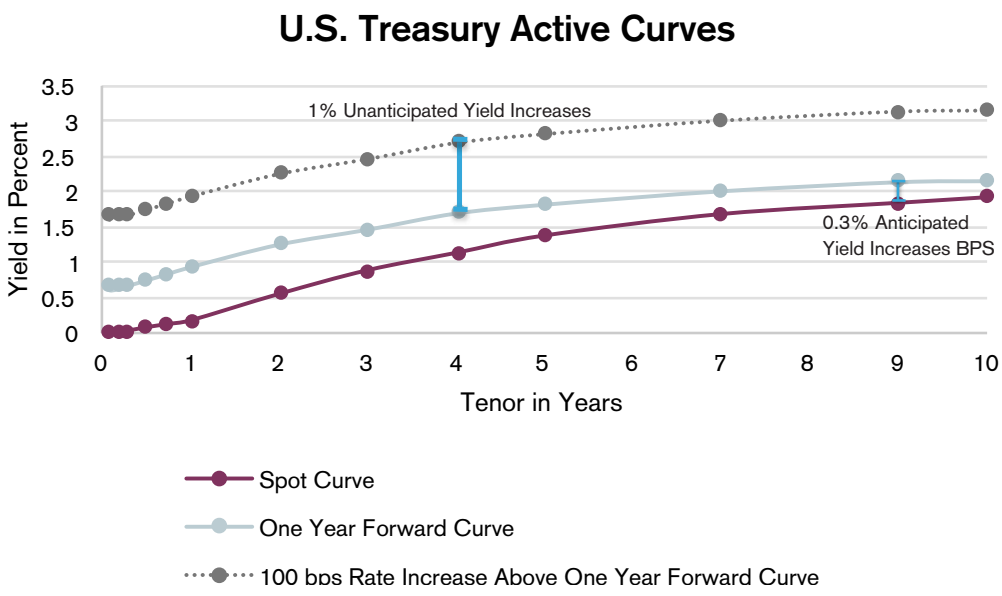



Source: Bloomberg; Date Created: 1/13/15.

If and when Treasury rates will begin to rise is unknowable. However, the market's expectations on yield changes appear to be already incorporated into current bond prices as reflected by the upward sloping term structure. The current term structure is very positive (i.e. Ten Year Treasury Notes earn a higher yield than the current 90-day Treasury Bill compounded 40 times) and echoes the market's

expectation for an increase in rates. This "positive carry" is expected to offset falling fixed-income prices as rates rise. However, should rate increases exceed market expectations, considerable total return losses may result. Consider U.S. Treasuries as an example. An investor who purchases a Ten Year Treasury Note today (1/13/15) expects to earn an annualized yield of 1.9% over the next ten years (note that the note holder does not earn a flat 1.9% in each year; rather, the expected returns for each of the next ten years together annualize to a 1.9% return). This yield prices in the assumption that next year, the nine year annualized yield will be 2.1%, a 0.3% increase from the current 1.8% nine year annualized yield (remember, today's 10 year bond will be a 9 year bond in one year). If the nine year yield does in fact increase by 0.3% or less over the next year, the investor should still earn a positive return.

Figure 3: U.S. Treasury Active Curves




Source: Bloomberg; Date Created: 1/13/15.

However, imagine that one year from today, the spot curve is one percent higher than it is expected to be today. The nine year yield would be 3.1%, much higher than the nine year yield the investor locked in when purchasing the Ten Year Treasury Note in the present. In this example, the investor in the ten year note, would face market value losses. As the current Ten Year Treasury Note duration is 8.8 years, an instantaneous one percent shift in the yield curve represents an unexpected price loss of 8.8%.

Investors should keep in mind that coupon-bearing instruments (like the U.S. Treasury Ten Year Note) will not suffer a total return loss equal to its price reduction. Interest payments are unaltered by changes in price and soften the scale of the loss because total return is the sum of price changes and coupons received. Further, even after a price loss, a bond will continue to earn positive coupon return and positive price return as maturity nears and its price approaches par. Ultimately over its life, a bond does return the yield established at its issuance. The true loss may be in opportunity cost: a low-yielding instrument consumes capital that may otherwise be invested in a higher returning instrument.

## PHYSICAL STRATEGIES FOR MANAGING DURATION

When the goal is to manage duration by means of moving asset positions, investors have a few choices. Investors that anticipate a rate increase could allocate fund assets away from existing fixed-income benchmark allocations to shorter duration benchmarks, cash, or another asset class entirely. However, even if an investor managed to predict market moves correctly, which may be difficult, implementation challenges make such a strategy less than ideal. Certain entities face complex challenges, like the need for committee approval or investment policy changes, which may slow implementation. The process of physical movements of capital (letters to managers, settlement, liquidity limited to month end, etc.) may also hamper the efficiency of physical exposure changes. Moreover, in actively managed portfolios, asset allocation decisions which may be driven solely by duration considerations may disrupt investments in carefully selected, alpha-producing managers. The strategy may also hinge on the availability of new managers and the speed with which they can be selected.

Given these considerations, some investors will reject a physical-asset based response to interest rate management and seek instead to manage duration of their fixed income portfolio through a synthetic (futures-based) duration management program.

**Example: Cut the Barclays U.S. Capital Aggregate Duration in Half via Synthetics**

**BARCLAYS U.S. CAPITAL AGGREGATE DURATION: 5.57 YEARS**

**POSITION ALLOCATION: $100,000,000**

**DESIRED TARGET DURATION: 2.785 YEARS**

**Synthetic Duration Adjustment - Sell 2.785 Years of Pure Duration**

| Instrument | DV01 Index Equivalant |
|---|---|
| T-Note (2 Year) | $(4,960,000) |
| T-Note (5 Year) | $(11,675,000) |
| T-Note (10 Year) | $(11,605,000) |
| T-Bond | $(21,760,000) |
| Total | $(50,000,000) |

Source: Parametric;
Date Created:1/13/15.

## SYNTHETIC DURATION MANAGEMENT

Synthetic instruments provide investors a toolkit to help to manage portfolio wide exposures in a customized manner. This includes managing the duration of the portfolio based on the unique objectives and views of a given investor, while preserving the active views of fixed-income managers relative to the benchmark.

Synthetic duration management may employ Treasury futures contracts to adjust total portfolio duration. As a U.S. Treasury sovereign debt instrument, Treasury futures can be used to alter the duration risk profile of a portfolio while leaving the credit risk profile intact. To lower duration, investors sell Treasury futures in a proportion that mimics their fixed income benchmark, effectively selling the benchmark's duration, but not its credit risk. This can achieve a very precise duration target simply by altering the total notional exposure of the portfolio's Treasury futures positions.

Potential benefits include:

**Active decision making**: If an active manager opts to maintain a different duration than that of their specific benchmark index, synthetic instruments allow changes to the portfolio duration relative to the benchmark leaving the actively created difference in duration intact.

**Flexibility in targeting**: Different funds will choose to set their ongoing duration target using different methods. The duration target can be considered a tactical decision which is periodically reevaluated by the Fund CIO, Investment Committee, or other entity. Alternatively, investors can establish an automated schedule for responding to changes in interest rates. Such a schedule could, for example, mechanically adopt a longer duration position as rates rise. For some funds, this may be the preferred method as it reduces the behavioral risk associated with tactical decision making, and eliminates the timing challenges that may be associated with a committee review.

**Ease of implementation**: Futures have low trading costs and trade nearly around the clock, which allows for quick and relatively frequent position adjustments. Margin requirements are generally less than 5% of the target portfolio, which makes futures a cash-efficient and accessible vehicle for many portfolios.

## COSTS AND RISKS

**Trading costs**: One-way transaction costs for U.S. Treasury futures contracts are currently (as of 1/13/2015) estimated at about one basis point. Total annual maintenance costs (including initiation, closing, and four rolls) are currently estimated between three and five basis points.

**Cost of carry**: When the yield curve is upward sloping (like today) a hedge may lose value even if rates increase. This outcome reflects the cost of carry associated with an upward sloping term structure. Stated another way, any "Treasury equivalent" yield that would have been earned on the physical position is lost once a covering hedge is put in place.

**Margin liquidity risk:** As with all futures contracts, investor's must account for potential margin requirements. If interest rates move contrary to expectations, additional capital may be required to maintain the hedge position.

**Basis risk**: Basis risk may stem from an investors attempt to hedge duration risk against an existing actively managed portfolio. The Treasury futures' duration adjustment could deviate from the desired target or be an improper match to the benchmark index's yield curve. Moreover, active fixed income managers may have durations that deviate from the benchmark's duration.

## CONCLUSION

Futures-based duration adjustment allows investors to adjust their rate duration only, without altering the alpha seeking and credit risk aspects of their fixed income portfolio. If interest rates rise more quickly than the markets expect, fixed income investments could experience meaningful losses. When used in this way, futures contracts may allow for the efficient, flexible, and low cost execution of duration risk management.