

## Corporate Bond Ladders versus an Active Single Maturity (*Bullet*) strategy

### Executive summary:

It is common for individual fixed income investors to construct portfolios utilizing a “ladder” strategy, purchasing bonds over a specific time frame, 5 or 10 years for example, and in equal installments – an issue coming due each calendar year. This approach is fairly straight forward; however, we find that investors pursuing this type of strategy give up potential return. This is apparent in an environment characterized by an upward sloping credit curve, a higher yield received for longer maturity corporate bonds relative to shorter maturities, which is almost always the case for the 5 – 10 year part of the credit curve for US Investment Grade corporate bonds. We will examine the impact the credit curve has on each approach, discuss optimal portfolio structure and look at what investors could expect in the event of rising interest rates for both laddered and “bullet” portfolios.

### US Treasury yield curve & US credit curve

To provide some context to the current interest rate environment it is helpful to analyze the historic and current shape of the US Treasury yield curve (see chart). During the period from January 1, 1981 to January 31, 2020, the Treasury yield curve exhibited a positive slope 67% of the time, flat 23%, and inverted (higher short-term rates) 10%. The average slope (the difference in yield between a 2-year and a 10-year treasury bond) over this period was 1.02%, the largest 2.71% (2/22/10), and the least was -1.71%, representing an inverted curve (5/21/81). Today the difference between the 2-year and 10-year US Treasury bond is positive 0.12% (2/25/2020)<sup>1</sup>.



Since we are discussing US corporate bond portfolios, our discussion needs to include the relationship of the US credit curve to the US Treasury curve. The shape of the US credit curve tends to be different from the US Treasury curve as it includes the credit spread that corporate bonds pay to compensate investors for the additional risk of these securities. This spread relationship alters the shape of the credit curve and it tends to be positively sloped between 5 and 10 years no matter what the shape of the US Treasury curve is.



As illustrated in the chart, the difference between the yield on a 10 year (blue line) and 5 year (red line) high quality corporate bond has been positive, even in periods when the yield curve is inverted (as indicated by the red ovals)<sup>ii</sup>. This relationship exists due to the compensation or spread for credit risk being priced greater over time thus providing a positive slope to the credit curve no matter what the shape the Treasury curve takes. In addition, the 5 to 10 year portion of the credit curve has historically been the steepest portion of the curve relative to other time periods.

### Optimal Portfolio Structure

Why would someone spend a considerable amount of time analyzing the structure and shape of the credit curve when determining which maturities are most attractive for a client's portfolio? What a bullet portfolio is attempting to do is to position bond purchases on the credit curve where it is optimal to maximize the potential return due to bond curve roll<sup>iii</sup>. To achieve this, it is critical to determine where the steepest portion of the credit curve is at any given time and position on it accordingly. There are major advantages to this approach versus simply buying equal amounts of securities along a stated maturity ladder. When properly constructed, a ladder portfolio does provide a level of interest rate protection, by eliminating some key interest rate risk and typically having a shorter average duration versus a bullet portfolio that may position itself further out on the credit curve. However, for an investor with a total return objective, the benefit of that protection has often not been realized or clouded by lower returns over time while waiting for higher rates, a costly trap many investors have fallen into over the past several years. A ladder strategy may be more appropriate when assets are needed at a specific point in time to match specific liabilities. If there is no specific liability matching needed, building a laddered portfolio can lead to significant yield give-up, loss of potential appreciation from bond curve roll and introduce another risk, reinvestment risk. Reinvestment risk lies in not being able to obtain the same comparable coupon as the annually maturing or sold bond and reinvesting it at a lower yield than the original security. In contrast a "bullet" strategy that focuses on a particular maturity, such as 10 years, will not be subject to annual reinvestment risk as often, as bonds will not be maturing or sold annually. Initially the bullet portfolio will be subject to more duration risk, variation in price due to change in interest rates, since it will have a longer duration than the collective average of the ladder portfolio. In addition, the average maturity/duration of the bullet will decrease due to the passage of time by rolling down the credit curve, unlike the ladder where a constant average maturity is preserved.

**The ladder portfolio thus realizes less potential bond curve roll as the portfolio is staggered evenly across a wide variety of maturities while the active, bullet approach is targeting the portion of the credit curve where bond curve roll can be maximized.** This is a very important point when considering structuring a bond ladder versus an active bullet portfolio as optimizing the portfolio on the most attractive portion of the yield curve enhances the opportunity for total return.

### Rising Rate Environment

One of the most common reasons investors consider utilizing bond ladders is to help insulate their fixed income portfolio from the effects of rising interest rates. The rationale is that if rates rise the total return of a portfolio with a laddered structure should do better, as one is able to reinvest pieces of the ladder on an annual basis at higher rates. That seems very logical but there are several flaws in that thought process. Historically, interest rate anticipation is extremely challenging as the following parameters need to be assessed: (1) timing – when will the rate move occur, (2) what part of the credit curve will the move impact, and (3) what is the extent of the change. In addition, the slope of the yield curve upon initiation of the portfolio will be a primary determinant on how much bond curve roll, or potential appreciation, can be anticipated for the bonds. To illustrate the difference between the two approaches we compare two hypothetical corporate bond ladders and a bullet portfolio under three different plausible interest rate scenarios at various points over a 3-year period. There are an infinite amount of interest rate scenarios that can be illustrated however we have selected three, for simplicity, as possible outcomes in today's environment. The portfolios are created by taking the current US Treasury yield curve<sup>iv</sup> and applying a credit spread<sup>v</sup> to each maturity creating a corresponding, A-rated corporate bond. The two laddered strategies are comprised of equal weighted securities with annual maturities ranging from 1 – 10 years in the first one and 5 – 10 years in the second. The bullet portfolio is targeting the entire portfolio with an initial 10-year maturity. We also assume that bonds are purchased at par value, coupon payments will be re-invested at current rates and that the credit spread remains constant. The hypothetical returns presented are for the current period, annualized basis, and cumulative basis for each scenario.

### Scenario 1

**The current interest rate environment remains intact.** While we know that interest rates and the shape of the credit curve are constantly changing we show this analysis to illustrate as if rates were to remain exactly the same for the 3 year time period.

	Year 1			Year 2			Year 3		
	period %	annual %	cum ret %	period %	annual %	cum ret %	period %	annual %	cum ret %
1-10 year ladder	2.30%	2.30%	2.30%	2.30%	2.30%	4.65%	2.30%	2.30%	7.05%
5-10 year ladder	2.65%	2.65%	2.65%	2.65%	2.65%	5.37%	2.65%	2.65%	8.17%
10 year bullet	3.01%	3.01%	3.01%	2.86%	2.94%	5.96%	2.70%	2.86%	8.82%

### Scenario 2

**A Change in Monetary Policy by the Federal Reserve.** A change to tightening monetary policy would impact the front-end of the yield curve the greatest as maturities 2- years and less are the most sensitive to these alterations. This scenario would have the effect of a continued flattening of the yield curve due to a greater increase in short-term rates versus longer maturities. This scenario is approximated by using the swap rate curve which is a forward-looking consensus view of market participants of what rates will be which is characterized by a current 2-year Treasury rate of 1.41% and 1.35% at the end of the 3 year time period.

	Year 1			Year 2			Year 3		
	period %	annual %	cum ret %	period %	annual %	cum ret %	period %	annual %	cum ret %
1-10 year ladder	2.51%	2.51%	2.51%	2.09%	2.30%	4.65%	2.06%	2.22%	6.81%
5-10 year ladder	2.91%	2.91%	2.91%	2.35%	2.63%	5.32%	2.32%	2.52%	7.77%
10 year bullet	3.36%	3.36%	3.36%	2.51%	2.93%	5.95%	2.36%	2.74%	8.45%

### Scenario 3

**Interest rates move higher by 2% in year 1 across the entire yield curve.** A parallel shift in the yield curve is typically not common, and a low probability event, but is provided as a shock exercise to show the effects of such a move in the 3 year time period.

	Year 1			Year 2			Year 3		
	period %	annual %	cum ret %	period %	annual %	cum ret %	period %	annual %	cum ret %
<b>1-10 year ladder</b>	-5.60%	-5.60%	-5.60%	4.32%	-0.76%	-1.52%	4.31%	0.90%	2.73%
<b>5-10 year ladder</b>	-8.61%	-8.61%	-8.61%	4.67%	-2.19%	-4.34%	4.66%	0.04%	0.13%
<b>10 year bullet</b>	-11.88%	-11.88%	-11.88%	4.88%	-3.86%	-7.57%	4.72%	-1.08%	-3.20%

In summary, the scenarios above demonstrate that the higher starting yield of a 10-year bullet portfolio and the passage of time, as the portfolio rolls down the yield curve, can be more beneficial under a static and a degree of increasing interest rate environments. The scenario (3) of a parallel interest rate shock does favor the laddered portfolios; however, attempting to time this low probability event could prove costly over a considerable period of time in lost potential returns.

By no means are these three scenarios exhaustive as iterations can be derived and tested. Our goal is to simply illustrate the potential additional return that investors leave on the table in a normal interest rate environment by only utilizing a ladder strategy within their fixed income portfolio. We also wanted to provide some color regarding the impact of rising rates on a fixed income portfolio in the context that market values are temporarily impaired and improve due to the passage of time, a concept known as rolling down the yield curve<sup>vi</sup>. These scenarios do not contemplate an environment where interest rates decline in the future, a scenario which would clearly favor the bullet approach due to its longer initial duration, higher initial coupon and lower reinvestment risk.

In conclusion, the use of a laddered approach, a bullet approach, or combination of the two should be analyzed to fit the investors objectives of specific liability matching or attempting to achieve overall total return. Utilizing only the laddered approach in fear of rapidly rising interest rates may negatively impact the opportunity for overall potential returns.

<sup>i</sup> Federal Reserve Bank of St. Louis, 10-Year Treasury Constant Maturity Minus 2-Year Treasury Constant Maturity (T10Y2Y), retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/T10Y2Y>, February 25, 2020

<sup>ii</sup> U.S. Department of the Treasury, 10-Year High Quality Market (HQM) Corporate Bond Spot Rate (HQMCB10YR) & 5-Year High Quality Market (HQM) Corporate Bond Spot Rate (HQMCB5YR), retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/HQMCB10YR>, February 25, 2020. The spot rate for any maturity is defined as the yield on a bond that gives a single payment at that maturity. This is called a zero coupon bond. Because high quality zero coupon bonds are not generally available, the HQM methodology computes the spot rates so as to make them consistent with the yields on other high quality bonds. The HQM yield curve uses data from a set of high quality corporate bonds rated AAA, AA, or A that accurately represent the high quality corporate bond market.

<sup>iii</sup> The term "bond curve roll" refers to a strategy of selling bonds before they mature in an effort to profit from rising prices. In bond markets, prices rise when yields fall, which is what tends to happen as bonds approach maturity. To learn more on the matter we encourage you to read the 1/31/2016 WSJ article "What Is Rolling Down the Yield Curve?" at: <https://www.wsj.com/articles/what-is-rolling-down-the-yield-curve-1454295695>

<sup>iv</sup> As of 2/20/20

<sup>v</sup> Credit spread derived from the Barclays US Credit Index as of 2/20/20

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