PRIMER ON CREDIT SPREADS

- Among our recent commentaries, several serve to familiarize our readers with the extensive mathematical toolkit behind fixed income portfolio management. Specifically, our August 2012 and October 2012 commentaries have focused on the quantification of interest rate risk and the mathematics involved with modeling the term structure of interest rates.
- In this commentary, we focus on another important aspect of fixed income portfolio management, which is the measurement of the return premium offered to investors.
- This return premium, which typically is referred to as a spread over a benchmark rate of return (U.S. Treasuries), is the investor's expected compensation for a risky bond beyond the benchmark rate of return. Spreads are an important component of expected returns to non-Treasury fixed income securities. It has been our experience, however, that spreads are frequently misunderstood. Further, we have found it to be common practice in industry parlance to use the term loosely, failing to distinguish between different types of spreads. For this reason, we devote this month's commentary to an introduction to different types of spreads, highlighting the usefulness of spreads in fixed income portfolio management as well as the relative advantages and disadvantages of different spread measures.

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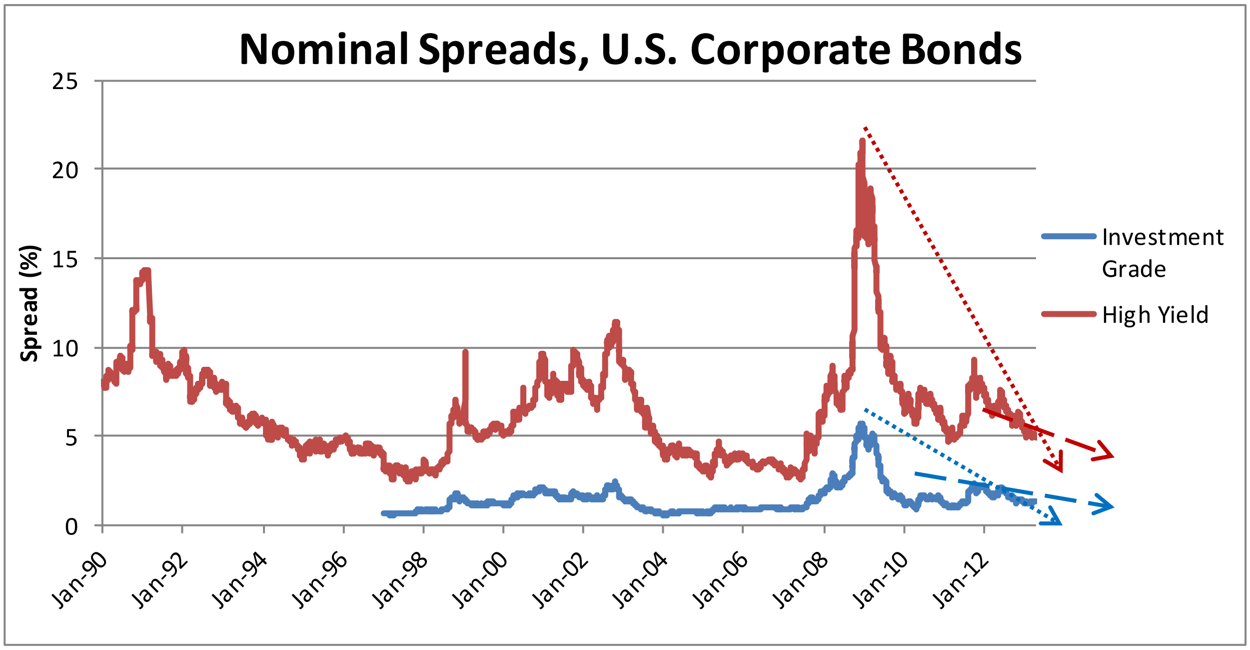
The topic of spreads is timely given the Investment Committee's recent repositioning of the fixed income portfolios. Spreads factor in meaningfully to our portfolio decisions, providing an important tool for measuring the expected returns to risks. Readers will recall that the Investment Committee recently shortened the duration (interest rate exposure) and spread exposures of the portfolios. A driving factor in this decision is the recent decrease to uncomfortably low levels of credit spreads, particularly those in the high yield sector. The second derivative of this dynamic is also a signal the investment committee considers to measure the speed at which spreads are changing.

There are multiple ways of measuring spreads. We begin with a picture of historical "nominal" yield spreads for investment grade and high yield U.S. corporate bonds. The nominal spread simply is the difference between the corporate bond yield-to-maturity and that of the corresponding U.S. Treasury bond having identical maturity.

The following exhibit clearly demonstrates the recent dynamics of credit spreads in the U.S. The spreads have declined to the point where it is the investment committee's opinion that the market prices seem to largely ignore the risk of default. Beyond the levels, the dynamics of the spreads are also important. In the exhibit, we indicate with arrows the long-term directional changes and the short-term directional changes of both the high yield and investment grade spreads. The longer term trends, as indicated with the long-dashed lines, illustrate the dramatic declines in spreads since the financial crisis of 2008-09. This trend continued through the first quarter of 2013, but the shorter term trend lines, as indicated by the dotted-lines, show that the trend slowed significantly (the 2nd derivative). The reduced rate of spread compression is consistent with the committee's views that spreads have reached uncomfortably low levels and inhibit the attractiveness of the asset class. The slowing dynamic (decreasing second derivative) indicates that the likelihood of spread-driven price appreciation is coming to an end. Note that we have been rewarded handsomely over the past few years for exploiting this dynamic with our over-weight to credit.

Exhibit 1: Nominal Spreads



SOURCE: Bloomberg

Our description of spreads focuses on the three common measures of spreads: the nominal spread, the Z-spread and the option-adjusted spread (OAS). Each spread has theoretical and conceptual advantages and disadvantages. Certain types of spreads are more appropriate than others depending on the features of the bond(s) considered. We offer an elementary presentation of spreads and compare and contrast the different ways of measuring spreads. Readers should always be wary of generic references to "spreads." The type of spread and how it is computed are important in understanding its content and implications within the investment decision process.

NOMINAL SPREADS

The nominal spread, as presented earlier, is simply the difference between a bond's yield-to-maturity and that of the corresponding U.S. Treasury bond having the same maturity. Yield-to-maturity, which is an internal rate of return, makes several important assumptions that have implications for their use when measuring rate of return. First, the yield-to-maturity assumes all cash flows are discounted at the same rate, regardless of when they occur. A second assumption is that all cash flows may be reinvested at the yield-to-maturity. A third assumption is that the investment will be held until the maturity date to earn the yield-to-maturity. Implicitly, yield to maturity assumes the term structure of interest rates is flat. Clearly the yield-to-maturity ignores the possibilities of changes in the timing and magnitudes of cash flows through these assumptions.

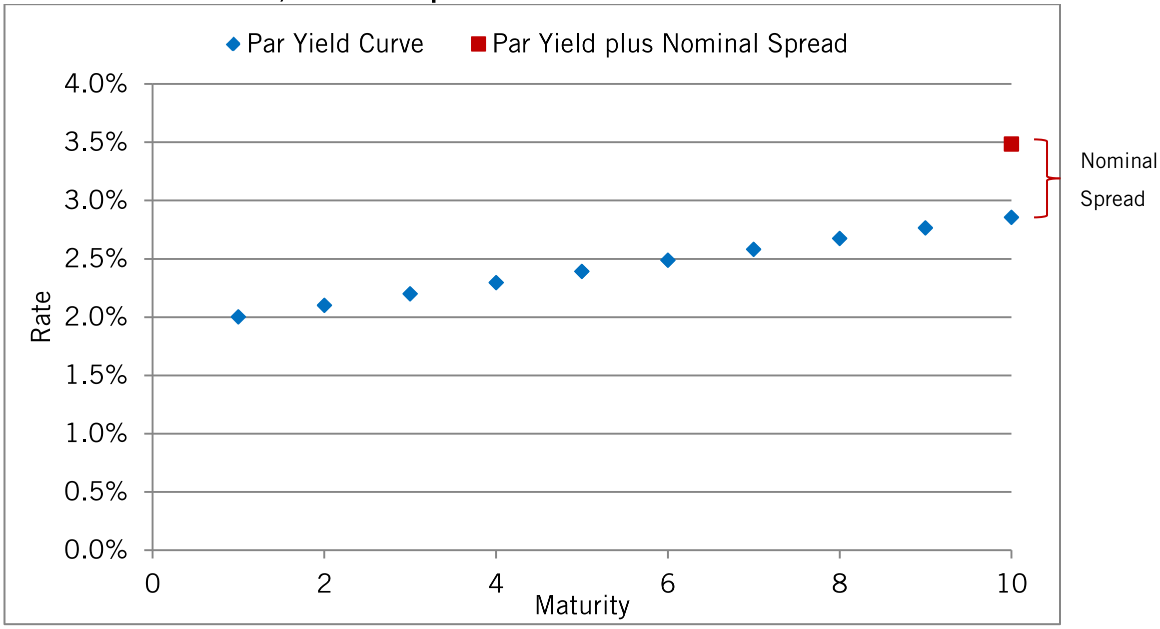
As mentioned in previous commentaries, bond characteristics determine a particular bond's sensitivity to interest rate changes. For example, holding all else constant, lower (higher) coupon bonds have higher (lower) durations. Since the nominal spread computation is the difference in the yields-to-maturity of two bonds maturing at the same time, the spread comparison is based on time-to-maturity, not on equivalent effective durations. Our readers may benefit from referring to our previous commentary describing interest rate risk, and effective duration in particular (August 2012). It is worth mentioning at this point that the Investment Committee takes into account spreads, but makes the comparison based on effective duration, not term-to-maturity.

To illustrate the computation of a nominal spread, consider a representative 5-year corporate bond having a 3.5% yield-to-maturity while the corresponding Treasury bond with the same maturity has a 2.9% yield. The nominal spread in this case is 60 basis points, or 0.60%.

The nominal spread, while appealing for its simplicity, suffers from several unrealistic assumptions. First, the assumption that all cash flows are discounted using the same rate is unrealistic, which is to say that the term structure of interest rates is rarely flat. Recall from our previous commentary (September 2012), that the term structure of interest rates are the discount rates corresponding to particular points in time. Specifically, these spot rates (zero rates) are the discount rates used to discount a cash flow at a specific future date to a present value.[1]

Rarely has there been a time when the term structure has been flat, which occurs only when the discount rates for all future time periods are the same. In fact, longer-term rates are typically higher than short-term rates. When the term structure is not flat, two otherwise identical bonds having different coupon rates will have different yields-to-maturity, and thus different nominal spreads. Thus, investment analysis based on nominal spreads may be biased when the term structure is not flat. The following exhibit illustrates the nominal spread for a 10-year corporate bond. Note the yield to maturity of the 10-year corporate bond lies above the Treasury par curve, which is the yield-to-maturity on Treasury bonds priced at their par value.

Exhibit 2: Illustration, Nominal Spread



SOURCE: Datastream

Nearly all corporate bonds contain embedded option features. For example, many bonds may be called by the issuer prior to maturity. Additionally, some corporate bonds are putable, meaning the bondholder has the right to force the issuer to refund the bond at the bondholder's discretion. Due to these embedded option features, which are ignored completely by the nominal spread computation, the bond cash flows may be significantly altered. For example, when interest rates decline, the issuer is likely to exercise a call option to re-finance the bonds at a lower interest rate. As illustrated in our September 2012 commentary, the call option truncates the

[1] Yield-to-maturity is a geometric average of the spot rates. The weights are influenced by the shape of the term structure and the timing and magnitudes of the cash flows.

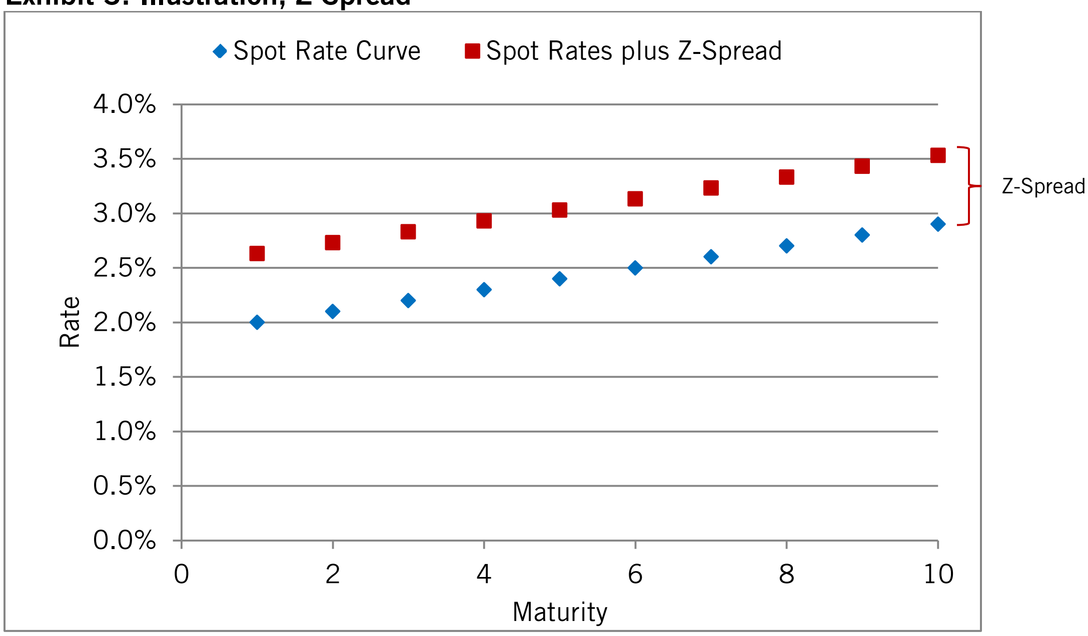
upside potential, to the detriment of the bond investor. Given the prevalence of optionality features in bonds, an ideal spread measure of spreads will account for the impact of the option features on bond returns. Thus, in practice, we need to consider more complete and realistic measures of spread.

ZERO-VOLATILITY SPREADS (Z-SPREADS)

As defined above, the term structure of interest rates depict interest rates corresponding to various future points in time. Comprising the term structure are the spot, or zero, rates which correspond to cash flows scheduled for specific points in time. The Z-spread, often referred to as the static spread, is a constant number (of basis points) such that, when added to each spot rate, the present value of the bond's scheduled cash flows equals its market price.

The following figure illustrates the Z-spread for the corporate bond mentioned above. Note the Z-spread is the constant amount added to the term structure (spot rates) across all times, as opposed to comparing yield-to-maturities at a single point in time. The Z-spread and nominal spread are identical only when the term structure is completely flat. The difference between these two measures increases as the geometry of the term structure diverges from horizontal (positively or negatively sloped).

Exhibit 3: Illustration, Z-Spread



SOURCE: Datastream

Relative to nominal spreads, the Z-spread has attractive properties. Whereas the nominal spread considers the yields-to-maturity of bonds sharing the same term to maturity, and thus uses the par-curve as a reference point, the Z-spread accounts for the geometry of the term structure of interest rates. This is an advantage of the Z-spread over the nominal spread since the par curve is influenced, not only by the shape of the term structure, but also by the coupon rates on outstanding debt. However, both measures ignore the future changes in rates.

Recall from our October 2012 commentary on the use of no-arbitrage term-structure models, that future interest rates are uncertain. Such uncertainty requires a model of the term structure to account for the probability distribution of future rates. Since Z-spreads only consider the current term-structure of interest rates, however, they ignore uncertainty associated with future interest rates. Thus, the Z-spread is often referred to as the zero-volatility spread since it implicitly assumes the embedded options have zero value and neither the issuer or investors will exercise any embedded option features. Importantly, the Z-spread assumes the bonds' cash flows will not be altered and that the bond will be held to maturity. The Z-spread improves on the nominal spread as it does not suffer from the assumption that the term structure is flat. It does, however, suffer from the assumption that interest rates are not volatile. Thus, the Z-spread is relevant only to bonds without option features that alter the bonds' cash flows (timing and magnitude). When analyzing bonds having embedded option features, which encompasses nearly the universe of corporate bonds, accounting for volatility is important since volatility is the driver of valuation for the embedded option features. For this purpose, we next turn to Option-Adjusted Spreads (OAS), which improve on the Z-spread by considering the impact of interest rate volatility.

OAS

The spread measures considered thus far share the common assumption that a bonds embedded option features have no value and will not alter the bonds' cash flows. Since this is clearly not the case, we require a more sophisticated spread measure, capable of accounting for the probabilistic future evolution of interest rates which will determine the timing and magnitude of bond cash flows. For example, consider a corporate bond issuer that has the right to call the bond from investors at 101 percent of par (i.e. when the present value of its cash flows is greater than 101). The issuer is likely to call the bond when interest rates are low. Unfortunately for the bondholders, the issuer's call option truncates the value of their bond since the coupon payments stop in the state of the world (low interest rates) when those coupons are most valuable to the investor. In our August 2012 commentary, we present graphics of the price truncation that occurs at low interest rates. In addition to corporate bonds, call options are also important when evaluating mortgage-backed securities (MBS). Since the homeowner may pre-pay or curtail the loan balance, and is more likely to do so when interest rates have declined since the loan origination, it is important to account for the likelihood that principal is returned early to the bond holder and reinvested at a lower interest rate.

Clearly, a spread measure accounting for embedded option features requires a probabilistic depiction of interest rates. As we summarized previously, interest rate models make critical assumptions about interest rate properties. These assumptions are critical for producing solutions to the model, but have potential to influence the outcome, in this case the measured spread, particularly through assumptions about the behavior of interest rate volatility which is the driver of option value. Binomial interest rate trees are commonly used for the purpose of computing OAS.[2]

To illustrate OAS, we refer back to our recent commentary on no-arbitrage term structure models (September 2012), as a quick refresher on interest rate models. Recall the models range from the fairly simplistic to highly parsimonious based on the assumed properties of the interest rate process through time. For example, the popular model of Black-Derman-Toy (BDT), assumes the short rate (one-period rate) follows a mean-reverting process. An attractive property of the model is that the slope of the volatility curve determines the properties of interest rate mean reversion.

The Black-Derman-Toy model assumes the short rate follows the process:

[2] Other term structure models commonly used by practitioners include trinomial trees and finite difference methods for partial differential equations, Monte-Carlo and general equilibrium. The Innealta Investment Committee is well versed in all of these approaches and deploys them as needed.

$$d\,\ln(r) = \left(\theta(t) + \frac{\sigma'(t)}{\sigma(t)}\ln(r)\right)dt + \sigma(t)dz$$

Where σ(t) is the volatility term structure. The model is similar to the Black-Karasinski model, and in fact, the only difference arises in the mean reversion term. The slope of the volatility curve, σ'(t), plays an important role, influencing mean-reversion in the model. When σ'(t) < 0, i.e. the volatility cure is downward sloping, the short rate mean reverts. Conversely, when σ'(t) > 0, i.e. the volatility cure is positively sloped, the short rate grows unboundedly. When σ'(t) = 0, the model reduces to the Kalotay Williams and Fabozzi model.

The evolution of the rate across times *k* to *k+1* is:

$$r_{k+1} = r_k e^{\left(\theta_k - \frac{\sigma\prime(t)}{\sigma(t)} ln r_k\right)\tau + \sigma_k \varepsilon_k \sqrt{\tau}}$$

Binomial interest rate models show how short-term interest rates change over time, based on the current term structure of interest rates and level of volatility. At each interval in time, the binomial model assumes the interest rate may take one of two values. While trinomial trees are sometimes used, and are sometimes advantageous, we focus on binomial representations for ease of illustration. The exhibit below illustrates the BDT interest rate lattice for a positively sloped term structure where the short rate is 1% and 20% volatility.

Exhibit 4 deserves some closer analysis. Note the asymmetry across the spread of rates through time. This characteristic is particularly acute due to the extremely low levels of nominal rates in the current environment. The zero boundary forces a particular distortion toward upward interest rate scenarios. It implies that as volatility increases the asymmetry will increase and the number of increased states of interest rates far exceed those of lower rates. This property is consistent with most theoretically sound interest rate models. The resulting deleterious pricing consequences across all fixed income markets and sectors are obvious.

Exhibit 4: BDT Binomial Interest Rate Tree

					5.01%
				3.74%	
			2.76%		3.35%
		2.01%		2.50%	
	1.44%		1.85%		2.24%
1.00%		1.35%		1.67%	
	0.96%		1.24%		1.50%
		0.90%		1.12%	
			0.83%		1.00%
				0.75%	
					0.67%
Time in Years	1	2	3	4	5

SOURCE: Innealta Capital

For simplicity, we assume the time-steps in the above binomial interest rate tree are annual. The tree may be used to value any bonds having six or fewer years to maturity and making annual coupon payments. Note that today, the one-year interest rate is 1%, and according to the model, the one year rate after one year may increase to 1.44% or decline to 0.96%. The tree values are driven by the current spot rates, the level of interest rate volatility and the model's assumptions about the interest rate process.

Exhibit 5 illustrates the binomial tree's usefulness for pricing of a six-year bond making annual coupon payments. Referring back to the August 2012 commentary, recall that construction of the bond price proceeds by discounting the bond's par value and coupon payments using the rates from the interest rate tree and accounting for any embedded option features. Exhibit 5 illustrates the bond pricing tree based on the BDT interest rate tree presented above for a six-year bond paying $3.00 coupon. To value bonds using the binomial lattice, we proceed using the process of "backwardation," which involves starting at the right-most nodes and working backwards through the tree. At the terminal nodes (maturity), the bond holder receives the par value, as indicated by 100.00 V at each node. The bond holder also received the final coupon payment, indicated by 3.00 C. The present value at the immediately preceding time steps is determined by discounting the potential payoffs using the corresponding rates. For example, computation of the bond price at the top node at t=5 years in the tree is done by discounting the $100 par promised at maturity plus the coupon payment ($3.00) at the corresponding rate on the interest rate lattice above (3.74%). Using backwardation, we solve for the current price of the bond, which is 108.65. Note the tree does not contain a coupon payment next to the current price since we assume the bond having exactly 6 years remaining until maturity has just made its coupon payment.

Exhibit 5: Valuation of Straight Bond

						100.00 V
						3.00 C
					98.09 V	
				98.21 V	3.00 C	100.00 V
				3.00 C		3.00 C
			99.70 V		99.66 V	
		102.12 V	3.00 C	100.69 V	3.00 C	100.00 V
		3.00 C		3.00 C		3.00 C
	105.17 V		102.65 V		100.75 V	
	3.00 C	105.25 V	3.00 C	102.40 V	3.00 C	100.00 V
108.65 V		3.00 C		3.00 C		3.00 C
	108.29 V		104.69 V		101.48 V	
	3.00 C	107.42 V	3.00 C	103.57 V	3.00 C	100.00 V
		3.00 C		3.00 C		3.00 C
			106.09 V		101.98 V	
			3.00 C	104.37 V	3.00 C	100.00 V
				3.00 C		3.00 C
					102.32 V	
					3.00 C	100.00 V
						3.00 C
Time(Years)	1	2	3	4	5	6

SOURCE: Innealta Capital

Next, we extend the analysis to account for embedded option features. Consider the same bond, but that the bond is callable from years 3 to 6 at 101.00 (1,010 for 1,000 par). Exhibit 6 illustrates the valuation of this callable bond. The value of the call option is the difference between the value of the callable bond and the value of the other-wise identical non-callable bond above. In this example, the call option value is 1.32, or $10.32 for $1,000 par.

Exhibit 6: Valuation of Callable Bond

						100.00 V
						3.00 C
					98.09 V	
				98.21 V	3.00 C	100.00 V
				3.00 C		3.00 C
			99.70 V		99.66 V	
		101.78 V	3.00 C	100.69 V	3.00 C	100.00 V
		3.00 C		3.00 C		3.00 C
	104.36 V		101.96 V		100.75 V	
107.33 V	3.00 C	103.94 V	3.00 C	101.00 V	3.00 C	100.00 V
3.00 C		3.00 C		3.00 C		3.00 C
	106.44 V		102.73 V		101.00 V	
	3.00 C	104.99 V	3.00 C	101.00 V	3.00 C	100.00 V
		3.00 C		3.00 C		3.00 C
			103.14 V		101.00 V	
			3.00 C	101.00 V	3.00 C	100.00 V
				3.00 C		3.00 C
					101.00 V	
					3.00 C	100.00 V
						3.00 C
Time in Years	1	2	3	4	5	6

SOURCE: Innealta Capital

Call Period: Between Years 3 and 6

Option Adjusted Spread (OAS) is similar to the Z-Spread in that it is a constant spread across the bond's term-to-maturity, but has the added advantage of accounting for embedded option features. Computation of OAS proceeds by first establishing an interest rate tree to value the bond while accounting for all embedded option features. The reader may be interested to refer to our previous commentary for examples of the pricing procedure (August 2012).

Assume the market price of the bond, however, is not 107.33, as determined in the above exhibit. The price of the bond is in fact 102.0. The difference stems from the fact that the callable bond's corporate issuer is of lower credit quality than the US Treasury. Recall that it is the benchmark interest rates that went into the construction of the term structure. That term structure was an input to the interest rate model used to build the binomial tree. Thus, the credit spread in this case enters into the analysis as a constant rate added to each interest rate node on the binomial tree. Solving for the OAS is an iterative procedure to solve for the OAS that equates the bond's price to its market price. Exhibit 7 contains the solution where the bond's price is 102.0.

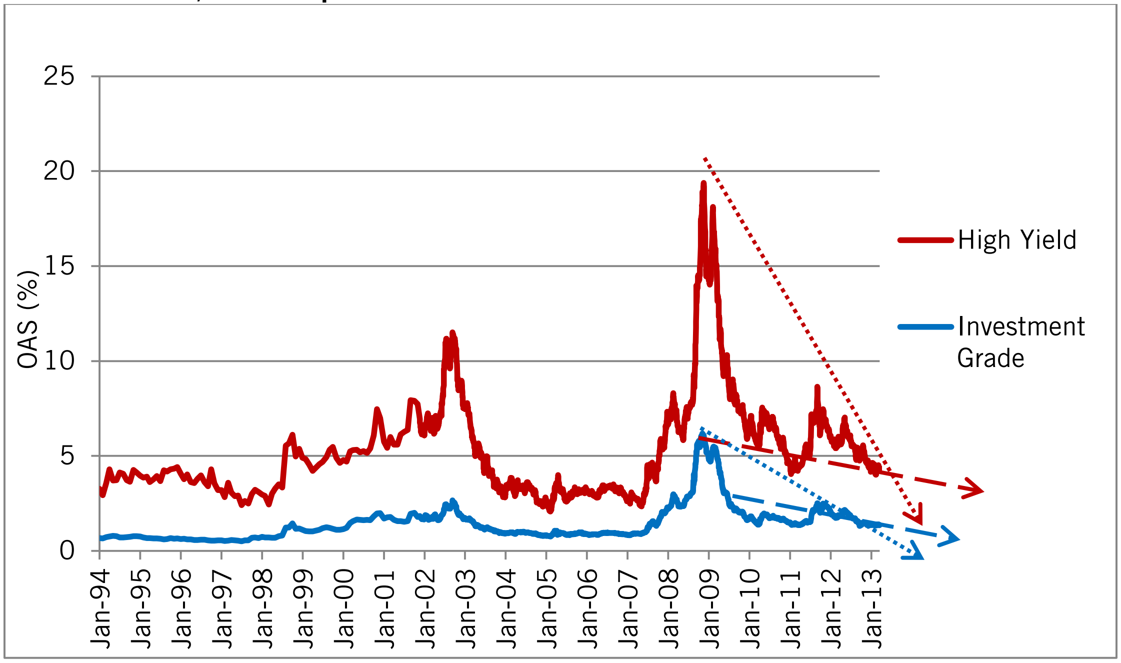
Exhibit 7: Computation of OAS

						100.00 V
						3.00 C
					97.05 V	
				96.14 V	3.00 C	100.00 V
				3.00 C		3.00 C
			96.59 V		98.59 V	
		97.93 V	3.00 C	98.54 V	3.00 C	100.00 V
		3.00 C		3.00 C		3.00 C
	99.81 V		99.42 V		99.65 V	
102.00 V	3.00 C	100.82 V	3.00 C	100.20 V	3.00 C	100.00 V
		3.00 C		3.00 C		3.00 C
	102.53 V		101.21 V		100.37 V	
	3.00 C	102.52 V	3.00 C	101.00 V	3.00 C	100.00 V
		3.00 C		3.00 C		3.00 C
			102.00 V		100.86 V	
			3.00 C	101.00 V	3.00 C	100.00 V
				3.00 C		3.00 C
					101.00 V	
					3.00 C	100.00 V
OAS =	113 bps					3.00 C
Time in Years	1	2	3	4	5	6

SOURCE: Innealta Capital

To illustrate the current levels of spreads, we present the OAS for investment grade and high yield U.S. Corporates over the last ten years. Clearly OAS peaked for both sectors during the financial crisis of 2008-09, which is when we drastically over-weighted credit exposures in our portfolios. In a similar fashion to the nominal yield analysis presented earlier, the OAS levels are clearly low by historical standards and illustrate the large secular decline that led the Investment Committee to re-evaluate the expected returns-to-risk attractiveness of this asset class.

Exhibit 8: OAS, U.S. Corporates



SOURCE: Bloomberg

It is worth noting that the interest rate volatility assumptions used in the term structure model play a critical role in the evaluation of OAS. What's amazing to us is the extent to which market participants and data providers mention OAS without ever providing details into the underlying volatility assumptions that critically drive the end result! It seems that OAS show that interest rate volatility is approaching the level of zero, providing further evidence the current levels of spreads do not compensate investors sufficiently on a risk-adjusted basis. Further, the long-term trends (dotted lines) show much steeper rates of decline compared to the shorter-term trend lines (long dashed lines). The conjunction of the decline in the spread levels and the slowing rate of that decline suggest the asset class has realized much of the possible gains attributable to spread compression, which suggests that returns going forward will be less than over the past 3 years during the period of declining spreads.

CONCLUSION

This commentary marks the third installment of our commentaries covering the basic tools and analytics driving the management of our fixed income portfolio. It is an especially timely article having come on the heels of recent adjustments to the portfolio.

Spreads are a critical component of the expected returns to risky bonds. We have illustrated three common measures of spreads, and focused the discussion on the relative advantages and disadvantages of each. Each spread measure has its place in the investment decision process when applied in the proper context.

Given embedded option features in nearly all corporate and mortgage-backed bonds, the estimation of spreads is a complicated process requiring the use of interest rate models depicting the probabilistic interest rate movements. Although a complicated process, it is one with which the Innealta team has a vast amount of experience and expertise.

An important driver of the recent changes to the fixed income portfolios has been the level and dynamics of spreads. As the team seeks to maximize expected returns per unit of risk, accurate spread measurement and an understanding how to properly quantify spreads, is critical to our investment analysis. Simple comparison of yields-to-maturity can be dangerous for the reasons mentioned above, namely: yield-to-maturity as a measure of return makes several very strong and un-realistic assumptions, the term-structure of interest rates and interest rate volatilities drive the valuation of embedded option features, and comparison based on maturity is meaningless (duration is the proper numeraire).

The Investment Committee's analysis of fixed income investment opportunities takes into account the level of rates, spreads and volatility. In our opinion, in the current market environment, U.S. high yield and credit do not properly reward investors, which is a driver of our recent portfolio changes. This represents a material departure from our assessment and investment decisions over the previous four years during which we have performed exceptionally well.

Going forward, we are concerned with the price risks associated with increases in the level of rates, spreads and volatility. Years of accommodative monetary policy have artificially placed downward pressure across the entire term structure creating a multi-year period of negative real rates at almost all points along maturity spectrum. As the Federal Reserve begins preparing capital markets for the eventual reduction of its enormous asset purchases, we believe that this can result in upward pressure on all three of our measures all along the maturity spectrum across most fixed income sectors. Add to this concern the likelihood of increases in both the velocity of money and the money multiplier and it is not difficult to appreciate the potential for an interest rate dynamic that produces upward pressure in all three measures that would negatively impact fixed income valuations.

Domestically, the non-accelerating inflation rate of unemployment (NAIRU) may be far nearer to current employment levels than many pundits want to believe. The U.S. labor market continues to suffer from structural problems, leading to higher natural unemployment levels than many realize—and this includes the Federal Reserve who has historically been among the worst offenders of misunderstanding the macroeconomic backdrop. Incorporate the plausibility of economists completely miscalculating the actual output gap and we have the potential for inflationary scenarios that few seem to be even considering (yes, this includes the Fed). Further adding to our concern is that monetary policy throughout the entire developed world is becoming as dangerous to the interest rate dynamic as our own domestic monetary policy, as evidenced by central bank policies in the Eurozone, U.K. and Japan.

The magnitude of fiscal deficits and unfunded public liabilities continue to loom as a harbinger of future crises. Current levels of debt relative to GDP are unsustainable and have reached levels that have been found by leading economists to hinder economic growth. Despite recent criticism, including a data-entry error and accusations of selective presentation of results, of this seminal research by Reinhart and Rogoff, the evidence overwhelmingly suggests current levels of debt are unsustainable without real consequences. It is fascinating to witness the frenetic responses to what amounts to nothing more than a few academic econometricians identifying standard weaknesses of most statistically based empirical analysis.

We particularly enjoy the historical anecdotes that are now being used to "prove" that fiscal profligacy is sound policy. Elected leaders and media pundits throughout the developed world are desperate to bludgeon theory in order to fit the Keynesian narrative. What's concerning is that even when these anecdotal examples are taken in their entirety it is very easy to show the absolute ineffectiveness of the very policy being promulgated. It is maddening to read and listen to pundits fanatically pushing an agenda while purposefully ignoring theory and evidence. Of course, we have become somewhat desensitized to the sheer stupidity of policy makers due to what boils down to horrifically poor leadership. Leadership requires decision making which in turn needs to be visionary if we are going to correct the failures of the past decade. It will require fiscal and monetary policies that properly understand the tradeoffs of short-term inconveniences and long-term prosperity. Unfortunately, throughout most of the developed world we have an absolute vacuum when it comes to visionary policy makers. It seems to us that most current policy makers need to reacquaint themselves with the definition of insanity as credited to Albert Einstein. We have stated several times that ideology and sound economic policy are mutually exclusive.

Further, we cannot ignore that the cycle of deleveraging in the private sector continues to drag on the economy, which takes place naturally in the wake of a major crisis. Such deleveraging has important economic implications and hampers real economic growth. While government stimulus efforts may have offset a portion of the impact from private sector deleveraging, societal deleveraging will place further downward pressure on growth thus perpetuating the structural deterioration of the aforementioned employment dynamic. This reinforcing cycle cannot be broken under the current policies.

Simultaneously, numerous risks internationally remain ready to percolate above the surface at any point in time. The European crisis continues to rage, where economic growth is buried under heavy austerity measures and unemployment levels exceed 50% for young workers in economically important Spain. Italy, Spain, Portugal, Greece, Cyprus and Luxembourg all present meaningful risks to the preservation of the European Union as well as the economic prosperity of the region. Geopolitical risks from the Korean peninsula, Iran and Syria may ignite further economic volatility at any moment. Even more frightening is the recent reminder of domestic terrorism. All of these have the possibility to dramatically and discretely alter the recent asymptotic dynamic of risk across every asset class in every financial market. Current equity market valuations and credit spreads seemingly ignore the realization of any such adverse events for the foreseeable future. It seems that the risk premium has virtually disappeared throughout the capital markets.

Having considered all these factors, and having witnessed the steep decline in spreads across the domestic high yield and corporate bond market sectors, the team decided to reduce exposures to these sectors in favor of sectors that currently offer more attractive expected returns to risk. The presentation of spreads presented herein is timely to further illustrate for our readers the process driving our recent decisions and illustrating the process through which we add value for our clients. Finally, realize that it is with considerable deliberation that Innealta makes these non-trivial changes to our portfolios.

PORTFOLIO UPDATE

Recent decisions in regard to the use of the extra collateral within our Risk-Based Opportunity Portfolios have included the closure of our long exposure to expectations for short-term market volatility, a round-trip investment in a leveraged inverse (short) Europe exposure and another round-trip investment in a long Gold Miners ETF.

As noted last month, on March 15, we initiated a position in the ProShares VIX Short-Term Futures ETF (VIXY), which seeks to reflect changes in expectations for short-term equity market volatility. With portfolio weights initially set at 4%, 5% and 6%, in the Conservative, Moderate and Growth portfolios, in that order, we added 1% to the target for each position on April 9 and again on April 11. We exited the investment on April 17, with that ETF having seen a total return using end-of-day prices of 3.2%, 41.2% annualized, over the full course of the investment.

On April 10, we added a two-times (2x) inverse European market exposure (via the ProShares UltraShort MSCI Europe ETF, ticker: EPV) to the Risk-Based Opportunity portfolios. The weights in the Conservative, Moderate and Growth portfolios were 3%, 4% and 5%, in that order. We sold the position on April 17 for a total return, using end-of-day prices, of 6.2%, 2,165% annualized. On April 24, we executed a similar purchase of EPV in the Risk-Based Portfolios.

And on April 15, we purchased an unleveraged long position the U.S. gold mining equity space via the Market Vectors Gold Miners ETF (GDX) at weights of 3%, 4% and 5% in the Conservative, Moderate and Growth portfolios, respectively. We added 1% to the target for each of those positions on April 17 and exited the position on April 24. The total return for the ETF over that entire time frame using end-of-day prices was 4.2%, 424% annualized.

IMPORTANT INFORMATION

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Sector ETFs, such as Real Estate Investment Trusts ("REITs") are subject to industry concentration risk, which is the chance that stocks comprising the sector ETF will decline due to adverse developments in the respective industry.

The use of leverage (borrowed capital) by an exchange-traded fund increases the risk to the fund. The more a fund invests in leveraged instruments, the more the leverage will magnify gains or losses on those investments.

Country/Regional risk is the chance that world events such as political upheaval or natural disaster will adversely affect the value of securities issued by companies in foreign countries or regions. Country/Regional risk is especially high in emerging markets.

Emerging markets risk is that chance that stocks of companies located in emerging markets will be substantially more volatile, and substantially less liquid, than the stocks of companies located in more developed foreign markets.

Securities rated below investment grade, commonly referred to as "junk bonds", may involve greater risks than securities in higher rating categories. Junk bonds are regarded as speculative in nature, involve greater risk of default by the issuing entity, and may be subject to greater market fluctuations than higher rated fixed income securities.

Diversification does not protect against loss in declining markets.

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Innealta's competitive advantage is its quantitative investment strategy driven by a proprietary econometric model created by Dr. Gerald Buetow, Innealta's Chief Investment Officer. The firm's products include Tactical ETF Portfolios, a U.S. Sector Rotation Portfolio and a Country Rotation Portfolio. Innealta aims to beat appropriate benchmark performance by tactically managing portfolios utilizing a proprietary econometric model. By harnessing the benefits of ETFs, Innealta is able to provide investors with exposure to multiple asset classes and investment styles in highly liquid, low cost portfolios.

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