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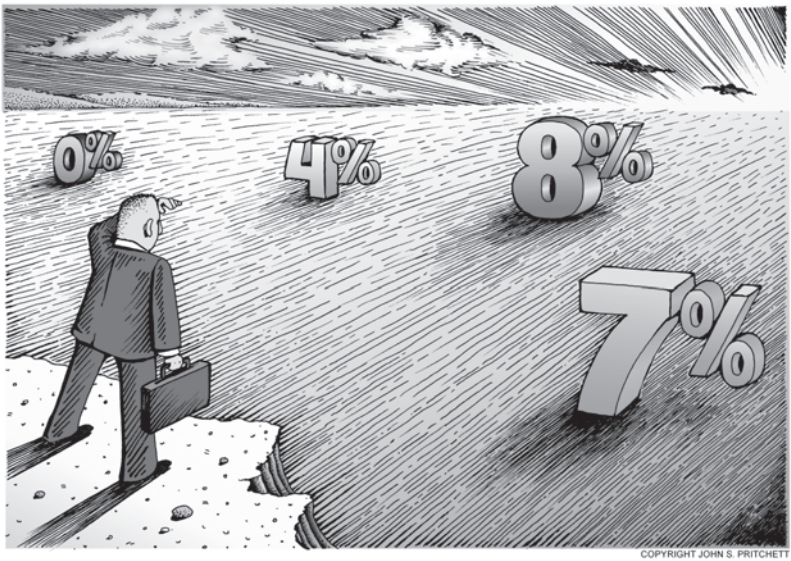
Active Fixed Income: A Primer



Active Fixed Income: A Primer

Most investors have a basic understanding of equity securities and may even spend a good deal of leisure time reading about stocks and watching equity-focused news shows. Mention bonds and you often get a glazed look.

When it comes to fixed income strategy, some investors are familiar with the simplest approach: buying bonds and holding until maturity. Using this strategy, the investor's return is approximately the average yield of the bonds in the portfolio. However, few have an appreciation of the techniques and potential advantages of active management. This primer looks at active fixed income management and the methods used in the effort to add value.

There are two basic ways to add value: generate a total return above what a buy and hold (or yield only) strategy would generate; or reduce volatility from a fixed income portfolio so that more risk can be taken elsewhere in pursuit of greater overall portfolio rewards.

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Active Bond Management Overview

The Relationship Between Bond Valuation and Interest Rates

On a day-to-day basis, interest rates change in the marketplace. Yet the basic metrics of an issued bond remain the same since the coupon rate and maturity date are set when the bond is issued. As interest rates change, an existing bond becomes more or less attractive. When interest rates rise, the present value of the bond's remaining cash flows declines, and the bond is worth less. When interest rates fall, the bond is worth more.

The most commonly used methods of active management are:

Interest Rate Risk Management: Using duration* to manage interest rate exposure seeks to take gains in falling rate environments while protecting principal in rising rate environments. During periods of rising rates, this active management strategy can also reduce the opportunity cost of locking into lower rates for longer maturity periods.

Maturity Structure Management: Yield curve analysis seeks to build a portfolio which can demonstrate an improved risk versus reward balance by taking advantage of anticipated changes in the shape of the yield curve. For instance, a "barbell structure" (defined in more detail later) tends to perform well when the yield curve flattens. Short-term bonds can be reinvested at higher rates as they mature and longer-term bonds can appreciate as long-term rates fall.

Sector Exposure Management: The relative attractiveness of Government, Agency and Corporate sectors can also be managed to help achieve gains or preserve principal in various business and economic

* Here we define duration as a measure of how a bond's price is affected by changes in interest rates. For example, a portfolio with a duration of three years would be expected to rise 3% if interest rates were to fall 1%.

environments. If a flight to safety is expected to drive the yield of Treasuries lower, Treasury prices will rise relative to other bonds, offering the opportunity to realize gains. When the economy is moving from contraction to expansion, yield premiums (also known as "spreads") on corporate bonds often narrow, driving their prices higher and allowing them to outperform other sectors.

Credit Spread Management: The risk-to-reward ratio within investment grade corporate bonds can provide opportunities similar to those offered across sectors. Active managers will increase or decrease a portfolio's exposure to high quality or lower quality corporate bonds based on anticipated changes in their relative spread levels due to their outlook for the economy, corporate profits, and market supply/demand factors.

Credit Risk Management: The bond market can be inefficient at the security level. A combination of quantitative and qualitative analyses can often identify opportunities (or avoid risks) on individual bonds in much the same way managers seek to add value to individual stock portfolios.

Reinvestment Risk Management: A buy-and-hold strategy may result in bonds maturing at a poor time in the interest rate cycle. Often the proceeds are reinvested into another bond or set of bonds without regard for current or prospective market conditions. An active bond manager may invest to take advantage of changing market conditions and look to optimize reinvestment of maturing bonds.

Building a bond portfolio with a desired risk-to-reward profile is more complex than simply picking bonds. To avoid pitfalls and optimize opportunities, an investor must determine the maturities, structure, sectors and credit qualities appropriate for the objectives of a client portfolio.

Duration Management

(Using Interest Rate Movements To Add Value)

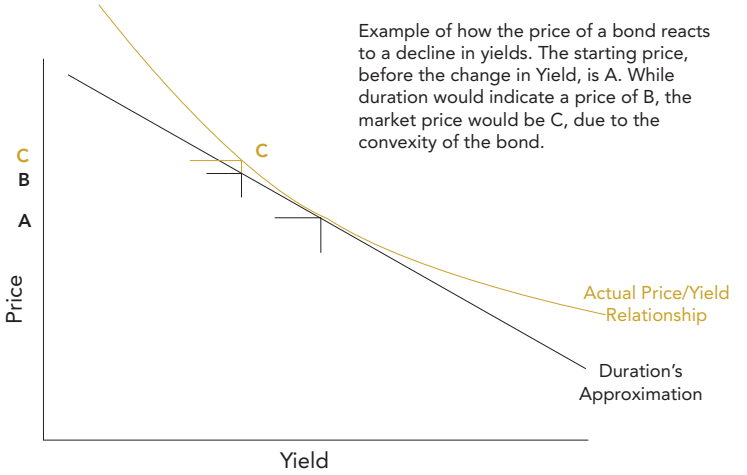
Most people look at the maturity of a bond to gauge the security's risk. Maturity, however, only looks at the time until repayment of principal - to accurately measure a security's risk, both principal and coupon payments must be considered. The use of two metrics better define a security's risk: Duration and Convexity.

Duration: Duration is a measure of a bond's sensitivity to changes in interest rates, which takes into consideration all cash flows of a bond—both principal and interest payments. All cash flows are discounted to their present value.

Duration can quantify the change in a bond's price for changes in its yield. For a 1% change in interest rates, a bond's price will change (inversely) by an amount roughly equal to its duration. For example, in early 2016 a Treasury Note with a coupon of 1.125%, due 2/28/2021, had a duration of 4.9 years. If interest rates fell 1% that bond would rise approximately 4.9% in value as per duration.

All things equal, the larger a bond's coupon the shorter its duration, because a greater proportion of the cash payments are received earlier. A zero coupon bond's duration is equal to its maturity, as nothing is paid until maturity.

Convexity: Convexity is the change in a bond's price that is not accounted for or predicted by duration. Duration alone can accurately estimate price changes for a bond resulting from relatively small changes in rates (<50 basis points). The bigger the change in rates and the longer the change takes, the less accurate duration becomes. In the above example, duration assumes a linear relationship. In practice, the bond would rise more than indicated by duration alone, the additional amount attributable to convexity.



Example of how the price of a bond reacts to a decline in yields. The starting price, before the change in Yield, is A. While duration would indicate a price of B, the market price would be C, due to the convexity of the bond.

Source: Madison Investments

An illustration of how duration affects returns is as follows:

Assumptions:

- $100,000 1.125% Treasury Bond (at par)
- 5 Year Maturity
- 4.88 Year Duration
- Change in rates over 1 year period

Scenario #1	Rates remain unchanged		
	Interest Earned	$1125	
	Price Change	$ 0	
	Total Return	$1125	1.125%
Scenario #2	Rates rise 1%		
	Interest Earned	$1125	
	Price Change	$(4880)	
	Total Return	$(3755)	(3.755%)
Scenario #3	Rates fall 1%		
	Interest Earned	$1125	
	Price Change	$4880	
	Total Return	$6005	6.005%

The chart and table illustrate that during periods of rising interest rates, principal risk or price change risk is amplified, which can significantly affect the total return of a bond portfolio. When rates fall, principal gains can enhance and add to the overall return of the portfolio. In today's environment of ultra-low interest rates, where coupon income represents a very small portion of overall total return, getting the duration decision correct can have a significant impact on overall bond portfolio returns.

An active fixed income manager using duration management attempts to reduce duration, and thus risk, during rising interest rate periods, while increasing duration and opportunity during falling interest rate periods.

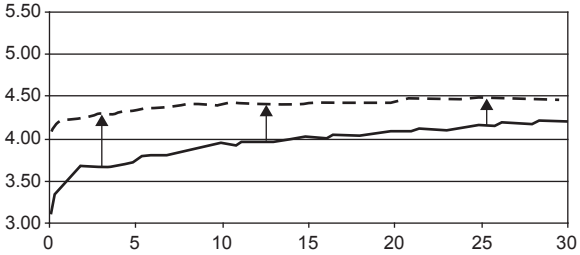
Active Yield Curve Management

(It's Still About Duration)

The "yield curve" is a graphical depiction of the relationship between interest rates and the maturity of a series of bonds. To create this picture, we plot interest rates on the vertical axis and years to maturity on the horizontal axis and connect the dots. Typically, the yield curve is positively sloped, meaning the longer the time period until the bond's maturity, the higher the interest rate.

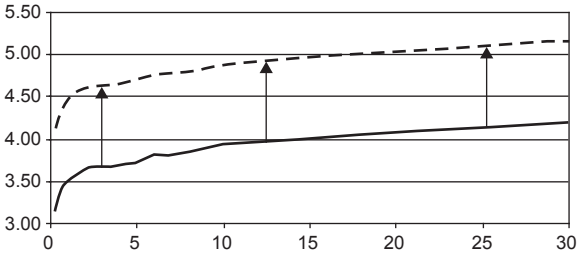
Sometimes, the yield curve becomes "flat" (yields similar regardless of maturity) or "inverted" (shorter maturities yield more than longer maturities). There are several dynamics at work (e.g., the economy, Federal Reserve policy) to cause these atypical configurations. Active yield curve management strategies, which anticipate these changes, can position a bond portfolio to benefit from a change in the yield curve's shape.

Flattening Yield Curve



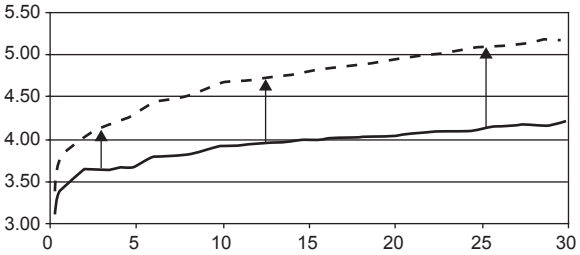
When the **yield curve flattens**,
a barbell portfolio structure tends to perform best.

Parallel Yield Curve Shift



A more “curve neutral” approach performs best when
the **yield curve shifts** in a parallel fashion.

Steeper Yield Curve



A **steeper yield curve** forecast suggests
a more bulleted portfolio structure to achieve optimum results.

Source: Madison Investments

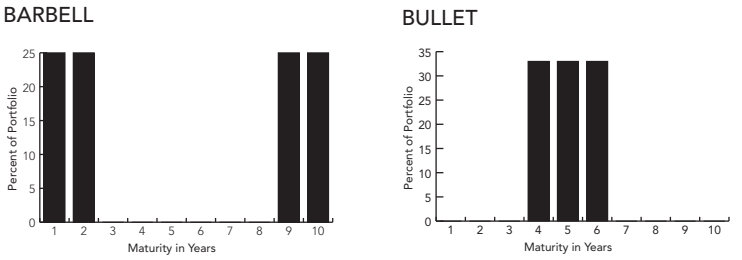
For example, if short-term rates are expected to remain stable and longer term rates are expected to increase, the yield curve is expected to steepen. In this scenario, a portfolio with a higher weighting in short to intermediate maturity bonds should outperform an index with more exposure to longer maturity bonds. See the illustration below and note that a "bullet" portfolio with only intermediate exposure outperforms the "barbell" portfolio with long and short exposure. The equal duration means, both portfolios have the same overall interest rate risk, but their sensitivity to the change in the yield curve's shape results in different total returns.

	Bullet	**Barbell**
Portfolio	5-year	2-year and 10-year
Duration	4.85 years	4.85 years
Return	.066%	(0.88%)

Source: Madison Investments

As the chart above suggests, it is possible to obtain similar portfolio characteristics using different mixes of bonds. Here is a graphic representation of Bullet and Barbell portfolios which have similar durations and maturities.

Similar 5-Year Maturity Structures



Source: Madison Investments

Sector and Spread Management

(Understanding Spreads and How They Impact Returns)

One of the tools active fixed income managers use to add value to client portfolios is "spread product." The term "spread" refers to the yield advantage a particular type of bond has over a similar maturity Treasury bond. Spread product refers to those securities whose returns are measured by how their spread changes relative to Treasuries. The spread exists because investors demand compensation for risk. For example, it is considered riskier to invest in corporate bonds than Treasury bonds, so the corporate bond must have a higher yield than a Treasury to entice investors to buy. When the spread gets too small investors sell and when the spread gets too large, investors buy.

In the scenario below, the corporate bond yields 2.79%, or 1.25% more than the yield on the Treasury bond. However, this yield relationship is rarely static.

BASE CASE

	10-Year Corporate	10-Year Treasury	Spread
Yield	2.79%	1.54%	1.25%
Duration	8.3 years	8.3 years	

Source: Madison Investments

In the next scenario, the yield on the corporate bond increases while the Treasury yield remains the same. This means the spread between the two securities grows, or widens, from 1.25% to 1.50%. This would generally happen because investors, believing that the risk for corporate bonds has increased, sell corporates, driving yields up. Even though both securities have a similar duration (and therefore overall interest rate risk), the return on the corporate bond is lower due to the loss of principal from a rising yield.

SPREAD WIDENS

	10-Year Corporate	10-Year Treasury	New Spread
Yield	3.04%	1.54%	1.50%
Duration	8.3 years	8.3 years	
Total Return	**0.70%**	**1.54%**	

Source: Madison Investments

Conversely, when investors believe that the risks for corporate bonds have decreased, or that they are yielding too much relative to Treasuries, they will buy corporates, driving spreads tighter. In this case, the spread has narrowed from the base case 1.25% to 1.00%. Again, both securities have similar duration, but the corporate bond fares better because its yield decreases versus the Treasury yield, which remains the same. As the yield decreases, the bond gains in price.

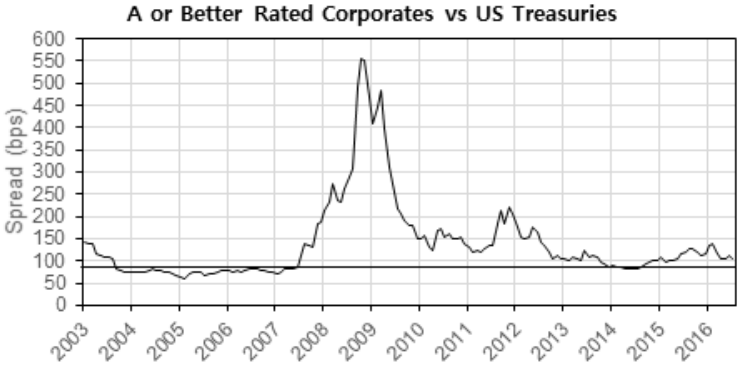
SPREAD TIGHTENS

	10-Year Corporate	10-Year Treasury	New Spread
Yield	2.54%	1.54%	1.00%
Duration	8.3 years	8.3 years	
Total Return	**4.93%**	**1.54%**	

Source: Madison Investments

From a portfolio management standpoint, there are different ways to control corporate exposure. For example, if a manager felt that spreads were due to widen, they could overweight corporates, but do so in short maturities. Although the manager would have a greater percentage exposure, the exposure would be heavily weighted toward low duration/risk securities that would not react much to changing rates or spreads. In a period of expected spread tightening the manager would lengthen duration exposure to corporates. In either case, managing the exposure relative to spread levels and forecasts can have a meaningful impact

on portfolio returns. The table below illustrates this point well. Investors would want to overweight corporate bonds in periods like 2009 to 2010 when spreads were tightening, but not during the financial crisis of 2007 to 2009, when spreads widened considerably.



Source: Barclays Risk Analytics

Bonds often described as "spread products" include:

Corporate Bonds
High-Yield Bonds
Government Agency Bonds
Emerging Market Debt
Asset-backed Securities (ABS)
Mortgage-backed Securities (MBS)

Asset-backed securities, or ABS, are bonds created from various types of consumer debt. Similarly, mortgage-backed securities, or MBS, are created from residential and commercial mortgages. Municipal bonds are not traded as spread products because their tax-exempt status does not allow for a reliable comparison with taxable bonds.

Credit Risk Management

(Separating the Wheat from the Chaff in Individual Bonds)

Some value-added strategies in fixed income are more narrowly focused, concentrating on individual areas of the market (government bonds only, corporate bonds only). In this respect, they can be similar to equity strategies that hone in on specific styles such as growth versus value, or limited stock market sectors such as Financials, Technology or Health Care. While still using many or all of the techniques described above (duration/yield curve/sector-spread) to manage risk, they also overlay a level of security specific research (bond-picking), that focuses on adding value from individual security selection in much the same manner as a stock picker researches and picks stocks.

What is credit risk?

Some parts of the bond market offer a rather generic level of risk at the individual security level. For example, all U.S. Treasury bonds are of a similar "credit risk profile" because they are backed by the full faith and credit of the U.S. Government (rely on the promise of the United States to repay the bonds at maturity, whether that maturity is in three months or 30 years). In the corporate bond market, there are over 15,000 issuers with very different individual risk profiles. Analyzing these individual issuers is called analyzing "credit risk" because the process of buying a corporate bond is simply buying a publicly traded loan or credit. Similar to analyzing an individual stock, a credit analyst researches the bond issuer's balance sheet, income statement, and periodic financial reports to form an opinion of the safety of the issuer's financial position and likelihood of repayment of interest and principal. The credit analyst also analyzes the bond indenture – a formal document which lays out the issuer's responsibilities to bond buyers and the buyer's remedies if things don't go as planned. Based on such data, the credit analyst forms an opinion on the quality of the bond, which can be used to compare it to other issues in the marketplace.

There are several Nationally Recognized Security Rating Organizations (NRSROs) who conduct research and publish bond ratings for investors to use as a guideline in assessing credit quality. Moody's and Standard and Poor's (S&P) are two of the most widely known of these NRSROs. These firms publish ratings at the time a bond is issued and update them periodically when rated issuers file financial statements. Below is the NRSRO rating scheme in descending order of credit quality.

Moody's	S&P 500 Index	
Aaa	AAA	
AA	Aa	
A	A	
Baa	BBB	Cut-off for "Investment Grade" Quality
Ba	BB	Issuers at this level and below are co+++nsidered "High Yield"
B	B	
Caa	CCC	
Ca	CC	
C	C	
D	D	A rating of "D" is usually reserved for a defaulted issue

Source: Madison Investments

While NRSRO ratings are a valuable, publicly available guideline for assessing the quality of a bond issuer, a true credit manager only uses NRSRO ratings as a starting point in their evaluation of the issuer's risk profile.

The credit risk manager seeks to add value by identifying individual bonds that may be mispriced given the manager's opinion of the creditworthiness of the issuer. If an issuer is currently out of favor with the market, but the manager's credit analysis concludes that the market's sentiment is misplaced or short-sighted, the manager will buy the bonds at an attractive spread, hoping that the spread will narrow and the bond's

price will rise as their thesis on the issuer plays out. Similarly, if the corporate bond manager feels that the bonds of an issuer currently held in the portfolio are selling at too small of a risk premium compared to the manager's evaluation the issuer's risk, the manager will sell the issuer's bonds and "swap" into another issuer's bonds. Repeating this process as opportunities become available in the marketplace provides an additional source of incremental return for a portfolio already actively managing the other risks of bond investing.

Common Questions on Fixed Income

What is the difference between Current Yield and Yield To Maturity?

Current yield and yield to maturity (YTM) are two very different yield calculations. Current yield is a snapshot measure of yield that relates annual coupon payments to the price being paid for the bond. It is a good measure of the income potential of a portfolio. For example, if a bond has a coupon of 3% and the bond's current market value is $97 ($970 face value), then the current yield is 3% divided by $97, or 3.09%. A good rule of thumb is that coupon, current yield, and yield to maturity will all be the same if a bond is priced at par (100). If a bond is at a discount (less than par), yield to maturity and current yield will be higher than the coupon. If a bond is at a premium (greater than par), yield to maturity and current yield will be lower than the coupon.

Yield to maturity is the internal rate of return that equates all future cash flows of a bond to its current price. It is a stronger yield measure relative to current yield since YTM takes into account the reinvestment rate (the yield at which cash flows can be reinvested.)

Are there trading cost benefits for a bond manager?

Yes, because portfolio managers are buying bonds for many accounts at once, and generally buying in significant volume. The principle here is no different than a large discount retail store, which can buy paper towels at a much cheaper price than the local grocery store because they are taking delivery in bulk. Similarly, when shopping for bonds on "the street," a portfolio manager is coming in with a large order and can, therefore, negotiate a better price. Bond portfolio managers generally do not pay an overt "commission" on their bond trades but rather incur a cost that is the difference between the "bid/offer spread" or the price at which the buyer bids and price at which the seller offers. This transaction cost is in essence built into the price at which the bond is acquired. The more bonds traded, the smaller the spread.

What are the additional risks of investing in international bonds?

The primary risk associated with international bonds relates to currency. If cash bonds are not hedged, the exchange rate of foreign currencies relative to the U.S. dollar can be volatile. Much of this volatility can be diversified away, but gaining access to enough markets to create that diversification requires a high account minimum. That illustrates another risk of investing internationally – liquidity. Liquidity in foreign markets can ebb and flow without warning, particularly in countries that exercise excessive regulatory or political control over their own currency and bond markets. Finally, with respect to international corporate bonds, varying accounting practices make credit analysis more challenging than for domestic companies alone, where uniform accounting rules are applied. Emerging Markets investing introduces a whole new basket of risks (including political stability, economic stability, hyperinflation, etc.).

Why would I invest in a premium bond? Don't I lose money?

This is among the most common misconceptions in fixed income investing. The theory goes as follows: if I buy a bond at a premium price of $1050 and it matures at $1000, haven't I lost $50? The straight answer is yes, but it is important to remember that the bond was trading at a premium price because it paid a premium coupon. If the current market coupon was 4%, that bond was likely paying 5%. Let's say the bond had a 10-year maturity. Although it lost $50 due to premium amortization, it gained a net $10 per year in cash flow (the $50 paid by the premium bond less the $40 paid by the current coupon bond). After 10 years, the premium bond has paid the investor a total of an extra $100. Less the $50 premium amortization, the owner of the premium bond comes out $50 ahead of the owner of the par bond. From a portfolio management standpoint, premium bonds are desirable in a period of rising interest rates. Since duration is basically a function of coupon and time to maturity, the bond with the higher coupon is less susceptible to rising interest rates.

How often do I receive interest on my bonds and how is it paid?

Interest on bonds is generally paid semi-annually on dates coinciding with the bond's maturity. So a 3% bond maturing on December 15th will pay interest equal to 1.5% of the par value in December and 1.5% of the par value in June. Typically, interest will be paid directly to your account where the bond is held (your custodian), generally, your broker/dealer or bank trust department, and will be credited to your account on the date that it is paid. Your custodian is responsible for ensuring that interest due on your bond is paid and credited to your account on the date it is due.

New bond investors often wonder, "Why does the value of my account appear to drop right after I've opened it?" More often than not, this has to do with something called "accrued interest." When bonds are first purchased for your account, the buyer (your account) is required to pay to the seller the amount of interest earned but not yet paid by the issuer since the last interest payment date. This amount is called accrued (or earned) interest. For example, if a bond last paid its coupon interest in June, and the bond is sold in August, the seller of the bond earned two months of interest by holding it before its sale. The buyer compensates the seller by paying this interest earned at the time of purchase. When the next coupon interest date comes in December, the holder of the bond will be paid the full interest due since the last interest payment date (June in this case). As a result, the buyer will net four months of interest during this first six month period of owning the bond (six months interest paid by the issuer in December less the two months paid to the seller when the bond was purchased in August). This is intended to make sure that the holder of a bond receives the interest due for all of the days they owned the bond.

Back to the original question of why an account value can appear to drop right after it is opened. Unfortunately, not all brokerage firms and custodians choose to (or are able to) include accrued

interest on their customer's statements as part of the value of their account. So the first question to ask your broker/custodian if you notice a drop in your account's value after opening it is, "Does the value of my account reflected on my statement include accrued interest on my bond holdings?" If it does not, chances are the missing accrued interest explains the difference.

Active Management vs. Indexing

The use of passive index-based products (index funds and ETFs) has become an increasingly hot topic in a period of low nominal interest rates when investors are keen to keep costs to an absolute minimum. Using a passive approach, investors try to capture the return of an index[1] (i.e., the Barclays Capital U.S. Aggregate Bond Index). The purpose of this strategy is to focus on capturing the return of the asset class; in this case, bonds. The advantage to indexing is that it takes the human element out of investing: investors purchase shares of an index mutual fund or an exchange-traded fund (ETF) and earn the return of the index with low tracking error and, usually, low management fees. However, due to fees, the returns can be expected to be less than the index.

Investors who choose active management, on the other hand, are seeking enhanced returns relative to a particular index. While this strategy generally entails greater tracking error and higher management fees, there are potential advantages. Portfolio managers can customize portfolios for investors who seek a different objective than the overall market (less risk, more risk, more liquidity, etc.). Furthermore, active management gives the investor the opportunity to generate a return profile different than a particular index. For example, while index funds and ETFs provide 100% of the ups and downs of the index, an active manager may seek to capture a majority of the upside, but limit downside exposure. Similarly, by using a manager that is actively managing its risks, an investor could benefit from reduced volatility relative to an index. There are a number of ways for fixed income portfolio managers to accomplish their objectives: duration management, yield curve management, sector selection (i.e., Treasuries vs. corporates), and credit selection.

While indexing may be appropriate for some investors looking only for exposure to an asset class, it is important to evaluate what one is getting. Investors are attracted to these investments when returns

are favorable, asking the question, "Why not get these returns with the lower fee?" However, that attitude typically changes when index performance is negative.

Another passive approach to fixed income investing is to create a bond ladder. This process involves buying bonds in staggered maturities so that one issue matures, for example, every year. Sometimes this is done to match cash flow needs.

Sometimes the argument goes as follows: "Ladder your bond portfolio; that way, if interest rates rise, you have short bonds coming due to invest at the new, higher rates. If interest rates fall, you have the longer bonds locked in at the old, higher rates." While this is a valid argument for investors only concerned with income and/or principal return, it ignores some fundamental principles of fixed income investing.

[1]Investors cannot invest directly in an index.

Glossary of Terms

Active Bond Management—An approach to buying and holding bonds which applies any number of disciplines to attempt to produce returns in excess of passive management in which bonds are simply held to maturity.

Asset-Backed Securities (ABS)—Bonds made up of a collection of consumer debts.

Agencies—A bond or other debt security issued by a government agency or government-sponsored agency such as Freddie Mac or Fannie Mae, and are the highest quality debt securities after Treasuries.

Barbell Structure—A bond portfolio comprised of short and longer-term bonds, whose average produce a portfolio with an intermediate maturity, which will react to market conditions in a manner that differs from a portfolio of intermediate bonds.

Bullet Structure—A portfolio of bonds whose individual maturities are similar in term.

Callable Bond—A bond that an issuer can retire prior to its maturity date.

Convertible Bond—A bond which contains an option for exchange for a fixed number of shares of the bond issuer's common stock.

Convexity—The rate of change in a bond's duration, a refinement of duration which reflects the change in a bond's price that is not accounted for or predicted by duration.

Coupon Rate—The annual interest paid on a bond, based on a percentage of its par or face value.

Current Yield—A snapshot measure of yield, measured by coupon divided by current price.

Duration—A measure of interest rate sensitivity. For example, a portfolio with a duration of three years would be expected to rise 3% if interest rates were to fall 1%. It is measured in years because it can also be used to measure the time it takes to recover one's original investment taking all cash flows into account.

High-Yield Bonds—Also known as junk bonds, high-yield bonds are bonds issued by companies that are considered to be at a greater risk of failing to make interest and principal payments on schedule.

Mortgage-backed Securities—Bonds made up of a collection of residential or commercial mortgages.

Spread—The yield difference between a Treasury bond and a bond of the same duration that has additional risks, such as a corporate bond.

Total Return—The actual rate of return realized over some evaluation period. Considers all sources of return: coupon interest, interest on coupon interest, and any capital gain/loss.

Volatility—The degree of variation of returns for a given security or market index.

Yield Curve—A graph showing the various yields of similar types of securities that vary in their maturity dates. A flat yield curve is one in which short-term bonds have yields similar to longer bonds.

Yield to Maturity—The rate of return on a bond calculated on the basis of purchase price, redemption price, the total interest payments, and the number of months or years until maturity. The yield to maturity is greater than the current yield when the bond is selling at a discount, and less when the bond is at premium.

550 Science Drive • Madison, Wisconsin 53711

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