YIELDS

<table>
<thead>
<tr>
<th>Type of Bonds</th>
<th>Yield Comparison (Assuming bonds are held to maturity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discount bonds</td>
<td>nominal yield &lt; current yield &lt; YTM &lt; YTC</td>
</tr>
<tr>
<td>Par bonds</td>
<td>nominal yield = current yield = YTM = YTC</td>
</tr>
<tr>
<td>Premium bonds</td>
<td>nominal yield &gt; current yield &gt; YTM &gt; YTC*</td>
</tr>
<tr>
<td></td>
<td>* True in most cases</td>
</tr>
</tbody>
</table>

2.6. INTEREST RATES AND BOND PRICES

As interest rates rise, the prices of bonds decline in the secondary market because investors can invest their money in higher-paying new issues. This is considered market risk, also called interest rate risk, for bond investors. Market risk is greater for long-term bonds than short-term bonds because there is more opportunity for interest rates to rise over the bond’s life. To reduce market risk, investors could invest in short-term bonds over long-term bonds, because when interest rates rise, the prices of long-term bonds fall faster than the prices of short-term bonds.

Sensitivity to interest rates. Because there is more time for interest rates to move in an undesirable way, the prices of long-term bonds are more sensitive to changes in interest rates than the prices of short-term bonds. Short-term bonds also tend to be more liquid than long-term bonds because investors don’t have to tie their money up for as long. Because of their lower risk and greater liquidity, short-term bonds typically pay lower yields than long-term bonds with similar credit ratings.

We often say that long-term bonds have a higher duration than short-term bonds. Duration is a measure of a bond’s sensitivity to changes in interest rates. A bond’s duration expresses the percentage change in the price of a bond that would result from a 1% change in yield.

A bond with a high duration is more sensitive to interest rate changes than a bond with a low duration. If a bond has a duration of 5, its price will decrease roughly 5% with a 1% increase in interest rates, while a bond’s price will decrease 10% if it has a duration of 10. So, in other words, duration measures the risk of interest rate volatility.

Another way of thinking about duration is to think about when the principal and interest will be paid to the investor. The more interest paid later in the life of the bond, the more sensitive the bond is to interest rate changes. Bonds with lower coupon rates pay a greater portion of their payments at the end of the bond’s life than bonds with higher coupon rates, so bonds with lower coupon rates have higher durations than bonds with higher coupon rates.

Zero coupon bonds have the highest duration among bonds of a comparable maturity because all the payments are made at maturity. Additionally, longer term bonds take
more time until all the interest and principal are paid, so they have higher durations than shorter term bonds.

**Note:** A zero coupon bond, which does not pay interest but only the principal at maturity, has a duration equal to its time to maturity. However, don’t confuse the word duration with time to maturity. Except in the instance of zero coupon bonds, they are not synonymous.

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### SAMPLE QUESTION

**ABC has a bond with a duration of 10. XYZ has a similar bond with a duration of 8. Which of the following are true?**

I. If interest rates fall by 1%, ABC’s bond price will decrease by about 10%.

II. If interest rates rise by 1%, XYZ’s bond price will decrease by about 8%.

III. XYZ’s bond is more sensitive to interest rate changes than ABC’s bond.

IV. ABC’s bond is more sensitive to interest rate changes than XYZ’s bond.

A. II and III
B. I and III
C. I and IV
D. II and IV

**Answer:** D. Duration measures the sensitivity of a bond’s price to changes in interest rates. A duration of 10 means that a 1% change in interest rates will result in about a 10% change in price. Since price and interest rates have an inverse relationship, for ABC’s bond, a 1% decrease in interest rates will result in a 10% increase in price. For the XYZ bond with a duration of 8, if interest rates rise by 1%, the price will fall by about 8%. Because the ABC bond has a higher duration than the XYZ bond, it is more sensitive to interest rate changes.

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### 2.6.1. BOND POINTS AND BASIS POINTS

Bonds are “quoted” in the market in terms of their price and their yield to maturity. A bond quote means the price at which a bond is trading—that is, its market price. The market price for bonds is quoted as a percentage of the bond’s par value. Percentages are expressed in terms of bond points. A bond point represents one hundredth or 1% of par. Thus, 10 bond points is 10% of par, and five bond points is 5% of par. Because corporate bonds typically have a par value of $1,000, one bond point is equal to $10.

Corporate bonds are typically quoted in increments of one-eighth (see first two examples, following). They may also be quoted in decimals of bond points (see third example, following).

1. A discount bond quoted at 97 ¾ will have a market price of 97.125% of par, or $971.25 ($1,000 x 0.97125). Another way of calculating this is first thinking that 97 bond points equals $970. An eighth of a bond point is equal to an eighth of $10, or $1.25. So $970 + $1.25 = $971.25.
2. A premium bond quoted at 101 ⅜ will have a market price of 101.375% of par, or $1,013.75 ($1,000 x 1.01375).

3. A discount bond quoted at 97.5 will have a market price of 97.5% of par, or $975 ($1,000 x 0.975).

A bond’s yield to maturity is expressed in terms of basis points. A basis point equals one hundredth of a percentage point, and it represents the smallest increment of change in a bond’s yield.

One hundred basis points is 1%; 25 basis points is 0.25%. So when a bond’s yield to maturity increases from 4.25% to 4.79%, the bond yield is said to have increased by 54 basis points.

2.6.1.1. Bond Notation

Corporate bond listings typically show the coupon (interest) rate, maturity date, and the last price. A listing may also show the current yield (“Cur Yld”) and the volume traded (“Vol”), such as the listing below:

<table>
<thead>
<tr>
<th>CORPORATE BOND LISTING EXAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bonds</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>ABC 6 ¾ 24</td>
</tr>
<tr>
<td>XYZ 6 ¾ 30</td>
</tr>
</tbody>
</table>

The companies issuing the bonds are listed in the first column; in this case, ABC and XYZ. This is followed by the interest rate paid on the bond and an “s” if the payments are made semiannually. For example, ABC’s bonds pay “6s,” which means 6%, in two semiannual payments. The two-digit number following the interest rate indicates the year the bond matures: ABC in 2024 and XYZ in 2030. The ABC bonds have a current yield of 5.7% based on their closing price of 105 ½% of par (or $1,053.75), and the XYZ bonds have a current yield of 6.7% based on their closing price of 99 ½% of par (or $991.25). For ABC, the volume traded the day before (indicated by the number 20) was $20,000, and the price rose ½ of a bond point, or $2.50. For XYZ, the volume traded the day before (indicated by the number 10) was $10,000, and the price fell by ½ of a bond point, or $1.25.

If a question on the exam says “an investor sells 5M of bonds,” it means that the investor has sold $5,000 worth of bonds, or five $1,000 bonds. In finance, “M” is often used to represent $1,000, while “MM” is used to represent $1 million.

2.6.1.2. Yield Spread

A yield spread is the difference between a bond’s yield and some benchmark yield. Yield spreads are also called credit spreads. The most common spread compares the yield of a bond against the yield of a U.S. Treasury security of a similar maturity. Treasury securities
are perceived to be virtually risk-free, so they serve as a useful benchmark to which to compare a bond’s yield. For example, you may want to compare the yield of a 10-year corporate bond with a 10-year Treasury note. If the 10-year Treasury note currently yields 1% and the 10-year corporate bond yields 5%, the yield spread is 4%. This means investors currently demand a risk premium of 4%, or 400 basis points, for the corporate bond because of its higher perceived risk. A risk premium of 4% means that the corporate bond must pay 4% more than the Treasury note in order for the bond to be worth the additional risk. If the yield on the corporate bond declines to 3%, the yield spread or risk premium declines to 2%.

When credit spreads widen, the value of lower-grade bonds decreases more than that of higher-grade bonds. When credit spreads narrow, the value of lower-grade bonds increases more than that of higher-grade bonds. A narrowing in the yield spread means bond investors are more confident the corporate issuer will not default. This is often a sign of good economic conditions ahead. In contrast, when a yield spread widens, it means that investors are less confident that the issuer will continue to make its interest payments. This can be a negative sign for the economy and suggest that a contraction is coming.

2.6.1.3. **Bid-Ask Spreads**

The difference between the price at which investors are willing to buy bonds and the price at which they are willing to sell them is called the **bid-ask spread**. The **bid price** is the maximum price a buyer is willing to pay, and the **ask price** is the minimum price a seller is willing to accept. A dealer who quotes a price of 99 ¼ – 99 ¾ is indicating a willingness to buy at $991.25 and sell at $998.75. The spread represents the dealer’s profit. The bid-ask spread is a key indicator of the liquidity of a security. A bond that trades at a smaller spread is generally one that trades more frequently (it is more liquid) than one that has a larger spread (it is less liquid).

**SAMPLE QUESTION**

*If the bid-ask spread of a corporate bond is 98 ½% – 99 ¼%, what is the spread in dollars?*

**Answer:** $15.00. Recall that the face value of a corporate bond is $1,000. The bid price in dollars on a corporate bond is therefore 98 ½% = 0.98375 x $1,000 = $983.75. The ask price is 99 ¼% = 0.99875 x $1,000 = $998.75. The spread is the difference between bid and ask, $998.75 – $983.75 = $15.00.