

## **How Interest Rate Changes Impact Bond Prices**

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### **Long-Term Investment Cautions**

- When interest rates rise, bond prices fall. When interest rates decline, bond prices rise.
- The longer the term (maturity) of the bond, the *greater the impact* of a change in interest rates.
- Changes in interest rates impact 2- to 30-year debt instruments, as well as other fixed-income securities, such as preferred stocks, tax-exempts, zero coupon bonds, utility stocks, etc.
- *The best strategy:* Buy long-term securities when interest rates are high and short-term securities when they're low.

**You lose a percentage of your long-term holdings every time interest rates move higher.**

## Interest Rates and Bond Prices

Many investors, seeing low interest rates for short-term investments and the volatile stock market, are moving into the bond market for higher yields.

Fixed-income, long-term investment vehicles, including preferred stocks, corporate bonds, tax-exempts, zero coupon bonds, utility stocks, and any and all 2- to 30-year debt instruments, do have a place in your portfolio. But don't move too many assets too fast without considering all the possible consequences.

If bonds are part of your portfolio, you want to be able to quantify the risk and track their price by tracking interest rates. Here's what you need to know.

*Fact #1:* Interest rates move inversely to bond prices. Increase interest rates and the prices of bonds fall; decrease interest rates and bond prices increase. The reason is obvious. Investors put their money where the return is greatest. Let's say you own a 5%, \$10,000 bond paying \$500 a year in interest and maturing in 10 years. If interest rates increase to 7%, there's no appeal to your investment paying 2% less. In order to sell your bond, you are going to have to reduce its price to make up that difference in interest.

For example, just for the first year's shortfall of 2% in interest, you would have to drop your 5% bond's price to \$9,810 to yield a 7% return to the buyer (\$500 interest *plus* \$190 price discount divided by \$9,810 yields a 7% return).

Keep in mind that the impact of changing interest rates on bond prices is immediate and dramatic. If interest rates increase *today*, your bond's value drops *today*. In fact, even an *anticipated* increase in interest rates will cause bond prices to drop to reflect the lower projected interest over the *full term* of the bond. That's explained next.

*Fact #2:* The longer the term of the bond (e.g., 30-year versus 3-year bonds), the more sensitive the bond is to changing interest rates and the more dramatic are the changes in the market price of the bond.

For example, let's look at three 6% bonds, maturing in 3, 15, and 30 years. If you own \$10,000 of each bond and long-term interest rates increase by *only* one percentage point, say, from 6% to 7%, here's the negative effect on the prices of the three bonds.

## Interest Rate Increases to 7%

| <u>Term of Bond</u> | <u>Current Value</u> | <u>Price to Yield 7%</u> | <u>Net Change</u> | <u>Percent Decline</u> |
|---------------------|----------------------|--------------------------|-------------------|------------------------|
| 3-Year Bond         | \$10,000             | \$9,738                  | -\$ 262           | - 2.6%                 |
| 15-Year Bond        | \$10,000             | \$9,089                  | -\$ 911           | - 9.1%                 |
| 30-Year Bond        | \$10,000             | \$8,759                  | -\$1,241          | -12.4%                 |

Look at the 3-year and 30-year price difference of \$979 (\$1,241 less \$262); the difference represents an additional loss of \$979 or about 10% on your 30-year bond. **In fact, the loss is 4.7 times greater on your 30-year bond than on your 3-year bond.**

*Looked at another way:* If you currently are holding a \$10,000 long-term, fixed-income investment yielding 6%, a one-percentage-point increase in the interest rate (to 7%) results in the "opportunity loss" of \$100 interest (1% times \$10,000). Over 3 years, you would have \$300 less interest. On a 30-year bond, assuming interest rates hold at 7%, the lost interest will total \$3,000 (1% x 30 years x \$10,000). Even though these projected opportunity losses don't consider the time value (present value) of the interest payments received over future years — that's what is called the *yield-to-maturity* — they do show the dramatic effect of lost interest (\$100 in year one vs. \$3,000 over 30 years).

*The risk:* You can **lose a high percentage** of your current fixed-income holdings every time interest rates move higher. As shown in the table above, a one-percentage-point increase in the interest rate (from 6% to 7%) results in a 9.1% decline in price on the 15-year bond and a 12.4% decline for the 30-year bond. The decline can be even more dramatic:

If rates increase three percentage points (from 6% to 9%), the value of a \$10,000 bond will drop to \$6,917, a decline of 31%.

*Reducing the risk:* You can buy bonds with different maturity dates, referred to as *laddering* an investment. *Example:* With \$100,000 allocated to bonds in your retirement portfolio, you can purchase \$50,000 of bonds due in one year, \$25,000 in five years, and \$25,000 in 10 years. This approach spreads out the risk and gives you more flexibility if interest rates rise. You don't have as much money locked up

for such a long period and as the earlier due dates arrive, you can reinvest those amounts. For more information on *laddering* your investment purchases, please see Exhibit 1, page 7.

*The point:* Keep tracking interest rates because the reverse is also true. If you're holding high-interest-rate securities and rates drop, change the negative numbers and declines in the table on the prior page to positive figures and you will get an idea of the potential gains. The numbers are not exactly interchangeable, but they're close.

### **A Note on Zero Coupon Bonds**

Be aware that the market price of zero coupon bonds can be more volatile than regular bonds. The appeal of these bonds is their discounted purchase price and sometimes high yields. On a zero bond, the discount when you buy the bond represents the interest you will be paid for the *full* term of the bond. For example, a zero bond with a \$10,000 face value maturing in 15 years could be purchased at \$5,550, a \$4,450 discount which reflects imputed interest of \$4,450 at a current interest rate of 4%. If interest rates increase to 7%, your zero coupon bond will drop substantially in value, to about \$3,620, a loss of \$1,930 or 35% on your original investment of \$5,550.

*Caution on buying zero coupon bonds:* They carry what is called a “phantom tax” — you pay income taxes on the accrued interest each year even though you don't receive the interest. If the bonds are being held in a tax-sheltered retirement account, that's not a problem. But if you need *current* income or the bonds will be in a taxable account, you may want to stay away from zero coupon bonds.

\* \* \*

Interest rates are still at a relatively low level and no one can say for certain where they're headed and how much they will rise. But we do know one historical fact: Eventually, interest rates will increase and with each percentage-point increase, the prices of bonds and other long-term investments will drop. Invest long-term at low interest rates and you can lose a substantial amount of your capital if or when interest rates rise.

*The best strategy:* Buy long-term securities when interest rates are high and

short-term securities when they're low. If you believe interest rates will rise, invest short-term. Invest long-term if you think they will drop. But don't tie up so many assets long-term that you may need to cash them in before maturity. You never want to have to sell long-term investments in a hurry. You've got to be willing and financially able to wait out interest rate fluctuations if you want to avoid losses on your long-term investments.

Fixed-income investments should be carefully considered because they are most effective when interest rates are high and you are willing to make the long-term commitment to holding the investment to maturity. This is particularly true for retirement plans. □

## **References —**

*Exhibit 1: Investing When Interest Rates Are Low, next page*

*Exhibit 2: Are Zero Coupon Bonds Right for You? — page 8*

## Investing When Interest Rates Are Low

*The problem:* The current interest rate paid on short-term certificates of deposit (CDs) is low, in the 2% to 4% range. *How can you increase your return and income without taking on more risk?*

*The strategy:* Ladder your CDs. This technique involves taking the total money you want to commit to fixed-income securities and dividing it into smaller, equal portions and investing each portion for varying time periods. For example, you invest one portion each in 180-day and one-year CDs. Then invest the third and fourth portions in a 2-year and a 5-year CD. Finally, take the fifth portion and put it into a high-quality, short-term bond fund.

*Many uses:* We use bank CDs in this explanation, but the concept of laddering your investment purchases applies to many investment instruments, including corporate bonds, tax-exempts, zero coupon bonds, and Treasury obligations, all of which can have varying yields and maturity dates. (Laddering doesn't apply to money-market funds since they have no maturity dates.)

*The result:* You increase your overall interest income and you have the opportunity to increase it even more if interest rates move higher. *How:* By re-investing the earlier maturities as they come due and are paid to you.

*Why this approach works:* Each CD earns a different interest rate, with the longer maturities earning the highest rates. By laddering your investments, you **will earn more on average** than if you bought a single, short-term maturity. In addition, you will *always* have a CD maturing every year or two, giving you cash to reinvest at higher rates if interest rates increase. As the longer maturities come due, you might want to adjust some of them to shorter maturities so you always have one or two CDs coming due within one year. That means you always will have cash available to invest if interest rates move upward. □

## Are Zero Coupon Bonds Right for You?

Zero coupon bonds are popular with investors because of their discounted purchase price and sometimes higher yields.

Basically, zero coupon bonds pay no current interest; that is, the interest has been stripped, i.e., it is not included as part of the purchase price. Instead, zero coupon bonds sell at a deep discount from face value. For example, a bond with a face value of \$10,000, maturing in 15 years, may sell for only \$5,550 today. In this case, the discount is \$4,450, which will give an investor an effective annual rate of return of about 4% if the bond is held to maturity in 15 years.

Also, the yields on zero coupon bonds tend to be somewhat higher than for regular bonds. There are two other considerations to keep in mind, however.

*First*, a portion of the discount from the face value will be taxable income each year even though you didn't receive the interest for that year. That's called a *phantom tax*. Furthermore, the amount of income you have to report each year is not simply 1/15th of the total discount of \$4,450, using the example above. It starts low and increases every year. Your broker will give you the amounts. Because of this tax treatment, zero coupon bonds are more suitable for an IRA, Keogh, or other retirement funds where the income is not taxed until withdrawn.

*Second*, long-term zero coupon bonds tend to be more volatile in price than other bonds. That is, when interest rates fall, they increase rapidly in value; when interest rates increase, their price can fall just as rapidly. So get good advice before buying zero coupon bonds. □

**With a one-point drop in interest rates, the 30-year bond's price drops 4.7 times more than a 3-year bond.**

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