

How well do you know your bonds?

Suppose that you buy a newly issued, ten-year, 5% bond for \$1,000. You know that you will receive a \$25 interest payment every six months for nine-and-a-half years and a final payment of \$1,025 at the end of ten years when the bond matures. In all, you receive 20 interest payments totaling \$500.

That's 5% *simple interest*, or *current yield*, disregarding the possibility that you may choose to reinvest your interest in order to keep your money in productive use. This is where the idea of *yield-to-maturity* (YTM) comes in.

Buying that newly issued bond, you normally would be quoted a YTM of 5%—based on the doubtful assumption that you'll be able to reinvest all your interest payments to earn the same 5% return. This process would give you a total of \$639 in interest, the result of compounding a 5% return semiannually for ten years.

Market risk

In the real world, however, bonds trade in a marketplace in constant flux. *Market risk* arises as interest rates change in response to economic conditions. These changes affect the value of existing bonds. A rise in prevailing rates makes the interest paid by existing bonds less attractive to investors. Falling rates, on the other hand, boost a bond's value.

When you buy a bond at a *discount*, that current yield will be supplemented by a return of the full face value at maturity. So the YTM will be higher than the current yield. Paying a *premium*, however, you won't get back your full purchase price when the bond is redeemed. So your YTM is lower than the current yield. The YTM, although not perfect, provides the more accurate projection of your *total return*.

What's the duration?

Just how much will a given change in interest rates affect the value of a bond in your portfolio? That depends on several factors, including the time to maturity and the difference between prevailing interest rates and the rate at which the bond was issued. (Bonds trading at a discount to their face value will swing more sharply than comparable issues trading at a premium.)

A measure that takes all the relevant factors into consideration is a bond's *duration* or the *average duration* of a bond fund or individual portfolio. Derived by a complex formula, duration is the average of the present values of a bond or bond portfolio's cash flows weighted by the time remaining until they are payable. Duration can be quite useful in estimating market risk—providing a close approximation of the effect of changes in interest rates on a bond's value:

- If a 20-year bond's duration is 12, you know that a change of 1% in interest rates will cause the bond's price to rise or fall approximately 12%.
- If an intermediate-term bond fund has a duration of 3.5, that 1% change in interest rates will raise or lower the fund's share price by about 3.5%.

A bond's duration also can help an investor compensate for *reinvestment risk*. Although a rise in interest

rates lowers a bond's market value, it also gives an investor a higher yield on reinvested interest payments. Likewise, lower rates raise bond values but reduce reinvestment yields.

A bond or bond portfolio's duration approximates the time in years at which the price change from a change in interest rates will be balanced by the increased or decreased return from reinvestment. Thus, by matching a bond investment's duration to the time at which you will have need of the proceeds, you can be fairly certain that your total return will meet your expectations.

As you can see, managing a bond portfolio can be a challenge. Of course, we'll be happy to calculate the YTM and duration of your existing holdings or intended purchases, and help you to make adjustments to fit the requirements of your financial plan.

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Any developments occurring after January 15, 2007, are not reflected in this article.