

# BOND BASICS: AN INVESTOR'S GUIDE

## TO THE MANY MEANINGS OF YIELD

By Annette Thau

The term "yield" can be confusing to investors because it has a number of different meanings. Even more confusing is the fact that these meanings are not directly comparable for individual bonds and for bond funds.

Let us assume that you are reading the financial pages of your favorite newspaper. You read that even though stock returns have been dismal for the last two years, bond returns have been very good. In fact, you read that over the past two years, many bond funds returned well over 15%. While the returns look pretty darn good relative to stocks, you may wonder: Does that mean I can expect to earn 15% next year if I buy bonds? If the answer is not obvious, read on.

As explained in the first article of this Bonds series ["Why Bond Prices Go Up and Down," November 2001 *AAL Journal*; available on our Web site], the direction of interest rates is one of the chief determinants of bond prices.

A strong market for bonds is one in which interest rates are declining. That causes bond prices to go up. A weak market is one in which interest rates are going up. That causes bond prices to decline. Clearly, then, since changes in interest rate levels affect bond prices, they also affect what you earn from investments in bonds.

But that is only the beginning. In order to understand what you actually earn from bonds, you need to understand two different concepts: yield and total return.

When you buy an individual bond, you can expect to receive coupon payments (usually every six months) for most bonds. When you buy a bond fund, you can expect a monthly payout of the income earned by the bond fund. That stream of income is variously described as the bond's "yield." But you also have to bear in mind that when you sell or redeem your bond (or bond fund), you may sell at a higher or at a lower price than the price you paid. That difference can be an additional source of earnings, or it may result in a loss. That change in price is one of the main factors that determines a bond's total return.

What may be confusing, however, is that the term *yield* has a number of different meanings. Even more confusing is the fact that these meanings are not directly comparable for individual bonds and for bond funds. Moreover, individual bonds are usually sold to investors and are discussed primarily in terms of yield, not returns. But discussions of bond funds often focus on total return.

This article will try to bring some clarity to this topic.

### YIELD

When you buy an individual bond, you derive income from three different sources:

- Simple interest,
- Interest on interest, and
- Return of principal at maturity, or proceeds from the sale of the bond at an earlier date.

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*Simple interest* consists of the bond's coupons, which are usually paid twice a year. Let us say you invest \$10,000 in a four-year bond, paying 8% a year, semiannually. In return, you will receive two coupon (or interest) payments of \$400 each, at six-month intervals every year. If you hold the bond until it matures, you will receive eight coupons that total \$3,200. Those eight coupons are the simple interest.

If the coupon payments are spent, only the simple interest is earned. But if the coupons are reinvested, they produce additional interest; subsequently, if those earnings are reinvested, you earn interest on that interest, and so on. That entire income stream is called, logically enough, *interest-on-interest*, or compounded interest. Both interest income, and interest-on-interest, in different combinations, lie behind the different meanings of yield.

Yield appears in a number of phrases: coupon yield, current yield and yield to maturity. Each has a very precise meaning. Let's look at each in turn.

### **Coupon Yield**

Coupon yield is set when a bond is issued. It is the interest rate paid by the bond (for example, 5½%, 7¾%), and it is listed as a percentage of par, or face value, which is the principal amount that will be owed at maturity.

The coupon yield designates a fixed dollar amount that never changes through the life of the bond. If a \$1,000 par value bond is described as having a 10% coupon, that coupon will always be \$100 for each bond, paid out in two \$50 increments for the entire life of the bond—no matter what happens to the price of the bond, or to interest rates. That is the reason bonds are called fixed-income securities.

### **Current Yield**

Almost as soon as a bond starts trading in the secondary market, it ceases to trade at par. A bond's current yield is its coupon divided by

its market price.

To illustrate, let us assume you purchased three bonds: the first you bought at par, for \$1,000; the second you bought at a premium to par, and paid \$1,200; the third you bought at a discount to par, for \$800. Each bond has a 10% coupon, and so each pays \$100 in annual coupons. Dividing the coupon (\$100) by the price results in a current yield of 10% for the par bond; 8.33% for the premium bond; and 12.5% for the discount bond. Thus, the current yield is equal to coupon yield for the par bond; the current yield is lower than the coupon yield for the premium bond; and the current yield is higher than the coupon yield for the discount bond. Current yield is quoted for fixed-income securities of any maturity, whether short or long.

### **Yield to Maturity**

You can see from the above description that current yield is based only on the coupon and the current market price. Current yield, therefore, fails to measure two important sources of income that investors earn from bonds: interest-on-interest and capital gains or losses.

Yield to maturity (YTM) is a more comprehensive measure of potential earnings than "current yield." It estimates the total amount that a bond will earn over the entire life of an individual bond, from all possible sources of income—coupon income, interest-on-interest, and capital gains or losses due to the difference between the price paid when the bond was purchased and par, the return of principal at maturity—based on a number of assumptions regarding the holding period, reinvested income and interest rates over the life of the bond.

Yield to maturity calculations are not easily made using paper and pencil, but they can easily be determined using either a financial calculator, or by using the various calculators available on the Internet.

YTM is the measure most widely quoted by brokers when selling

individual bonds. However, it is not a prediction of what you will actually earn on a bond. Your actual return is likely to differ from the YTM, perhaps considerably, because the YTM will only be realized under certain conditions, which are:

- That you hold the bond to maturity;
- That the coupons are reinvested (rather than spent); and that
- Coupons are reinvested at an interest rate equal to the yield-to-maturity.

Let's look briefly at each assumption:

### **Holding to Maturity**

The YTM quote is based on the redemption price of par (that is, \$1,000). If you sell a bond before it matures at a price other than par, then the capital gain or loss will considerably alter what you actually earn.

### **Reinvesting Coupons**

YTM calculations are based on the assumption that coupons are never spent; they are always reinvested. If you spend coupons, then you do not earn the interest-on-interest, and your return would be less than the anticipated YTM. How much less depends both on how many coupons you spend and on the maturity of the bonds.

### **Coupons are Reinvested at an Interest Rate Equal to the YTM**

This may sound like double talk, but it means that if a bond has a YTM of 7%, it is assumed that each and every coupon is reinvested at a rate of 7%. However, if in reality you reinvest coupons at a higher rate than 7%, you will earn more than the bond's stated YTM, while if you reinvest coupons at lower rates than 7%, you will earn less.

You may think that the interest-on-interest earned from reinvesting the coupons represents only an insignificant source of potential return and that, therefore, this is a minor point. But you would be wrong. Over long periods of time,

reinvestment matters enormously. To understand why, you have to understand how compounding works.

Let's assume that you have \$10,000 worth of four-year bonds with 8% coupons paid semiannually. Let's also assume you are reinvesting the \$400 in coupons received at 8%. At the end of the first year, interest-on-interest totals will be unexciting and represent only 2% of the total amount of interest earned. By the end of the fourth year, interest-on-interest will comprise about 13% of total interest income. If the bonds are allowed to continue to compound semiannually for 30 years at 8%, interest-on-interest will comprise 75% of total interest earned. Compound interest has been called the 8th wonder of the world, and it works for all investments.

### *Reinvestment Risk*

Interest-on-interest from reinvested coupons plays a big role in the earnings of a bond. Yet in the examples above, the reinvestment rate was both known in advance and constant.

In real life, of course, you cannot know at the time you buy a bond what the reinvestment rate is going to be, since you don't know where interest rates will be in the future. Moreover, the uncertainty is greater for longer maturities, since the amount represented by the interest-on-interest becomes greater on a percentage basis.

This uncertainty is known as "reinvestment risk"—the risk that coupons may have to be reinvested at a lower interest rate, in which case an investor's actual return would then be lower than the YTM quoted at the time of purchase. On the other hand, the reinvestment risk may work in your favor if coupons are reinvested at a higher rate, and that would increase the actual return above the YTM quoted at the time of purchase.

If YTM does not predict your actual return, what does it tell you? The chief usefulness of YTM quotes

is that they allow you to compare different kinds of bonds—those with dissimilar coupons, different market prices relative to par (for instance, bonds selling at premiums or discounts), and different maturities.

### **TOTAL RETURN**

Investors in fixed-income securities sometimes make the mistake of equating interest income or advertised yield with return. But this does not take into consideration what is happening to principal.

Total return for bonds consists of whatever you earn in interest income, plus or minus changes in the value of principal. (To be totally accurate, you would also subtract taxes and commission expenses from return.)

For example, let's assume that a year ago, you invested \$10,000 in a bond fund, purchasing 1,000 shares at \$10.00 each. Assume also that the bond fund was advertising a yield of 10%, or \$1.00 per share, which was maintained for the entire year. But suppose that in the meantime, interest rates have risen so that now bond funds with similar maturity and credit quality yield 11%. As a result, your bond fund is now selling for \$9.00 per share. What is the total return on that investment for the past year?

You have earned interest income (based on the monthly coupon distributions) of 10%, or \$1,000. But, that ignores the fact that your bond fund has now lost approximately \$1 per share (10% of its principal value) and that your principal is now worth \$9,000.

Add the income earnings of \$1,000 to the current value of your fund (\$9,000). Your investment is now worth \$10,000. (For the sake of simplicity, I am ignoring interest-on-interest and commission costs.) Therefore, the net return is \$0, or 0%. That is your total return, to date, even though you have received 10% interest income. Of course, if interest rates had declined, the price of your bond fund would have risen,

and your capital gains would have added to the interest income your fund distributed, and your total return would have been higher than the interest income.

The concept of total return applies equally to individual bonds.

### **BOND FUNDS**

Individual bonds and bond funds are often considered interchangeable investments. But there are important differences between the two.

All bond funds quote a yield, and in fact, most bond funds are marketed to individual investors on the basis of yield. But the yield quoted for bond funds is not equivalent to the YTM quoted for individual bonds.

Unlike individual bonds, there is no date at which the entire portfolio of a bond fund matures (with the exception of so-called target funds that invest in zero-coupon bonds). Indeed, most bond funds maintain what is known as a constant maturity. That means, for example, that if a bond fund invests in long-term bonds, then bonds are bought and sold continually to maintain a long-term maturity.

Since the entire portfolio of a bond fund does not have a single maturity date, bond funds cannot quote a YTM equivalent to that of individual bonds.

The yield quoted by bond funds is basically a variant of the current yield measure quoted for individual bonds. Technically, the yield quoted for bond funds is known as the 30-day SEC standardized yield. That number is calculated according to a formula determined by the Securities and Exchange Commission (SEC) and is primarily a snapshot of the dividend income (that is, the interest distributions) of the fund for the past 30 days. In addition, the 30-day SEC yield includes slight price increases (for discount bonds) or price decreases (for premium bonds) of bonds in the portfolio as they move toward par. But bear in mind, that this number is valid for the past

30 days only.

The price of a bond fund (its net asset value, or NAV) changes continually in response to changes in interest rates. Those changes may be minor for some types of bond funds; but major for many other types of bond funds. As a result, the price of any bond fund at *any* future date is impossible to predict.

Returns posted by bond funds for prior periods, and listed in the daily pages of newspapers, are total returns, and always include changes in the price of the bond fund (its NAV) due to changes in interest rates. But bear in mind, that these are past returns.

## WHAT THE NUMBERS TELL YOU

To sum up, when you buy an individual bond, you will be quoted the price of the bond, the coupon yield, its current yield, its years to maturity, and its yield to maturity.

What does this information convey?

- The coupon yield will tell you how much income you will receive each year you own the bond.
  - The current yield will tell you how much interest income you will receive each year relative to the price you are paying for the bond.
  - You will also know that if you hold the bond to maturity, on that date, you can redeem the bond at par.
  - The yield to maturity will give you an *estimate* of the total return of the bond, assuming the bond is held to maturity and all coupons are reinvested at a rate equal to the yield to maturity.
  - The YTM will not be your actual return. Your actual total return will be determined by a number of factors, including whether you spend dividend income or reinvest it; the rates at which you reinvest coupons; and the difference between the price you pay and your selling (or redemption) price.
- When you buy a bond fund, on the other hand, you will be quoted the fund's 30-day SEC yield. What does that information tell you?
- The 30-day SEC yield is a variant of the current yield quoted for individual bonds. It is not comparable to the YTM quoted for individual bonds. However, it will tell you how much interest income you can expect to earn from the fund.
  - Future total returns for a bond fund will be determined partly by some of the same factors that determine total return for individual bonds. But you cannot predict the price at which you can sell your bond fund at any future date.

Returning to our initial question, you can now figure out what your newspaper was telling you. If a bond fund posted a total return of 10% for the past year, you can puzzle out how much was due to dividend income and how much was capital gains. If the fund's quoted 30-day SEC yield was approximately 5%, then you now realize that last year, the 10% total return consisted of about 5% interest income and 5% gain in the price (NAV) of the fund. The interest income for next year will be approximately the same. The total return, however, will depend on the direction of interest rates. ♦

## A GUIDE TO YIELD AND TOTAL RETURN

**Coupon Yield:** The simple interest paid by a bond annually. It is set at the time of issue, and expressed as a percentage of par. A bond with a 10% coupon will pay \$100 per year, generally in two installments of \$50.

**Current Yield:** The coupon paid by a bond divided by the bond's market price. It measures the income from a bond relative to its current cost.

**Yield to Maturity:** An estimate of the total return of a bond assuming it is held to maturity and that all coupon income is reinvested at a rate equal to the yield to maturity. The yield to maturity takes into consideration all possible sources of income—coupon income, interest-on-interest, and capital gains or losses due to the difference between the price paid when the bond was purchased, and par, the return of principal at maturity.

**Total Return:** Interest income (simple interest plus interest-on-interest) plus gains or minus losses in principal. To be totally accurate, you should also subtract taxes and commission expenses.

**30-Day SEC Yield:** A yield quoted by bond mutual funds, calculated according to a formula determined by the SEC—primarily a snapshot of the interest distributions from the fund over the prior 30 days, but also includes slight price increases (for discount bonds) or price decreases (for premium bonds) of bonds in the portfolio as they move toward par. The figure is a reflection of the past 30 days and is not necessarily an indication of future return.