QUICK AND DIRTY

Here's a primer on how to calculate the yield to maturity for bonds purchased at a premium or discount.

BY EDWARD BROWN

With the growing sophistication of today's consumer market, many financial planners have expanded their horizons beyond the traditional packaged investments like mutual funds and limited partnerships. A new emphasis on asset allocation and diversification has forced them to learn how to navigate through such previously unfamiliar investment options as bullion, small capitalization stocks and an investment that is in some ways the most complicated of all: bonds.

Why are bonds regarded as complex financial instruments? They are, after all, almost painfully simple in concept. The bond holder lends money to the U.S. government, a municipal entity or a corporation and requires that only the interest be paid semiannually until the end of the loan—the day the bond matures. At that point, the original loan amount—the bond's face amount—is paid back in full. The complexity, of course, lies in the movements of interest rates between the day the loan is made and the day it comes due. The financial planner who is allocating assets based not only on asset classes but also on liquidity and maturity dates can hardly avoid purchasing bonds on the secondary market. These bonds are offered at yields to maturity that fluctuate daily and will differ dramatically from the coupon yield. The purchase price is determined by the current market rates and by the credit rating of the company—which can also change dramatically between the time of purchase and maturity.

Planners who want to calculate the precise yields to maturity on their clients' bond holdings or prospective purchases can use several software packages to create a simple spreadsheet that will yield a figure that is accurate to as many digits as they like. However, most practitioners don't need that kind of precision to make daily buy and sell decisions. Is there a simpler way to obtain yield to maturity figures that are accurate to within a few tenths of a percent? Is it possible to get this result in a few minutes with a pencil and paper or a few seconds with a pocket calculator?

Fortunately, it is. If you purchased a corporate bond at par (let's say the face amount is $100 to keep the numbers simple) on Jan. 1, 1988, with a coupon of 13.25% and a maturity date of Jan. 1, 1994, then your current yield is 13.25%. Your yield to maturity is also 13.25% because your initial purchase price is the same as the maturity price. On Jan. 1, 1994, you will receive the same $100 that you originally invested. If, however, you are able to purchase the same bond for $71, then you will have a higher current yield (18.66%). This is relatively easy to calculate. Your purchase price is 71% of the face amount (71/100). If you divide the yield on the face amount (13.25%) by 0.71, then you have the current yield on the bond purchased on the secondary market.

Your yield to maturity (22.06%) is even higher, because on Jan. 1, 1994, you will receive $100 for the $71 you invested. Thus you have increased your principal amount, which in effect gives you a higher rate of return. Calculating the yield to maturity is somewhat more complicated but can be accomplished in six easy steps.

First, divide the coupon by the purchase price. In the example above, divide 13.25% by 0.71, or divide $13.25 by 71, and you'll get the same 18.66% we calculated. This gives you the current yield.

Second, subtract the purchase price from the maturing value. In the example above, you subtract $71 from $100 to get $29. This gives you the dollar value of the discount.

Third, divide the discount by the purchase price.

Fourth, divide this amount by two. Using our example, you divide $29 by $71 to get 40.85%, which divided in half equals 20.425%.

Why do you divide by two? Some of the discount occurs immediately and some occurs at maturity, so the average discount is earned somewhere in the middle. This method introduces an imprecision but also greatly increases the simplicity of the calculations, allocating half the discount to the early years and half to the later ones.

Fifth, divide the answer in step four by the number of years until maturity—20.425/6 = 3.40%. This answer will produce the extra interest that is being earned in addition to the current yield.

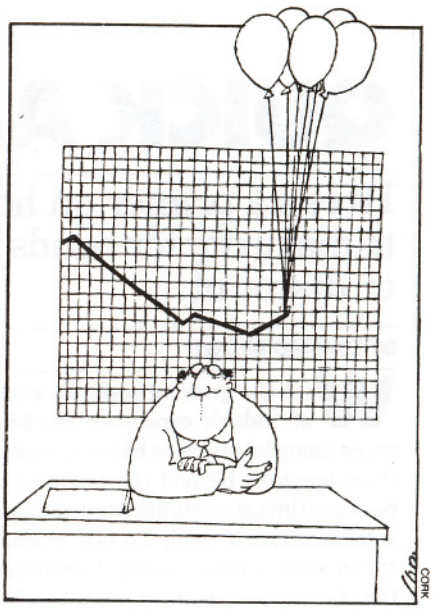
Finally, add the answer in step five to the answer in step one. The result—22.06%—is the approximate yield to maturity. Of course, the full calculation will make a more precise allowance for the actual time elements involved, but this formula should give an accurate yield to within a few tenths of a percent.

Suppose the bond was purchased at a premium. Simply apply the same formula, but in step six subtract the result of step five from the result of step one. Suppose, for example, that the same bond yielding 13.25% is purchased at $115 instead of $71. Then the current yield is 13.25%/$115, or 11.52%. The difference between the face amount and the purchase price is now -$15 ($100-$115), which, when divided into the purchase price, gives a total 13.04% premium ($15/$115).

Bond yields to maturity fluctuate daily and will differ dramatically from coupon yield.

Dividing 13.04% by two results in 6.52%, which, when divided by the six years until maturity, gives a premium (or negative yield) of 1.09% (6.52%/6). By subtracting 1.09% from 11.52%, we arrive at a yield to maturity of 10.43%.

Planners whose clients own bond portfolios will also have to make tax projections on those investments. In general, a discounted bond need not be amortized over the remaining years, and the value of the discount—$29 in our



simplified example—does not have to be included in the client's income unless the bond is an original discount issue. (If you are uncertain, call the issuing company or transfer agent and find out if the bond was originally issued at a discount.) In our example, the 29-point difference should be treated as capital gains in the year the bond is redeemed.

If, however, the bond was acquired at $115, the 15-point difference between the premium and par may be amortized over the remaining life of the bond and written off on the individual's tax return as an itemized deduction on Schedule A under the heading *miscellaneous expense.* It is not subject to the 2% floor. It is, however, subject to investment interest limitations. Of course, if the premium is amortized over the life of the bond, there is no gain or loss, for tax purposes, when the bond is redeemed at its face value.

For most consumers, the real issues on bond purchases are current income and, of course, the taxes they will have to pay. However, the yield to maturity is the yardstick experts use to price bonds in the secondary market, so the planner who wants to value the client's portfolio must be able to make yield to maturity calculations. In this period when economists are arguing over whether we will experience runaway inflation or a severe recession, some asset allocation models are calling for up to 60% of a client's assets in bonds—which indicates that these calculations may be useful to the planner for many years to come.□