

INVESTMENT NEWSLETTER

CONSIDERING YIELD TO WORST

“Yield to maturity is often considered to be a more comprehensive measure of the rate of return because it includes more aspects of a bond investment.”

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Investors often consider yield when assessing the expected return of a bond. Yield to maturity equates the current price of a bond to its coupon structure. However, yield to maturity is only a relevant metric if the investor receives all coupon payments up to a bond’s maturity date. In the case of callable bonds, or bond funds that include callable bonds, yield to worst—or the lowest potential yield—may be a better measure to compare bonds and bond funds.

To understand why yield to worst should be considered when comparing bond funds, it is helpful to review the various types of yield. A bond is a form of debt that governments, corporations, or other entities, such as municipalities, can issue when they require capital. Bonds represent money loaned by investors and borrowed by issuers. In return for the loan, the issuer is obligated to make payments at a specified rate of interest (or coupon) on agreed-upon dates during the life of the bond.¹ In the US, most coupons are paid semiannually and can be based on fixed rates or floating rates. When a bond matures, the issuer must repay to the investor the principal of the bond plus the final coupon payment.

Yields and market prices are inversely related; as yields decrease, market prices increase.

While the coupon rate is the annual payout as a percentage of the principal of the bond, yield considers the price the investor paid for the security. For instance, yield to maturity is calculated by finding the discount rate that equates the present value of a bond’s cash flows to its market price. Yield to maturity is often considered to be a more comprehensive measure of the rate of return because it includes more aspects of a bond investment. Yield to maturity factors in the market price of the bond, principal, coupon payment, and time to maturity. Note, however, that yield to maturity assumes the bond will be held to maturity. For some bonds, the issuer has the option—but no obligation—to call (redeem) the bond, generally at par value plus accrued interest, at any time on or after a specified call date. Consider the example in **Exhibit 1**, a bond with a par value of \$1,000 issued with a 20-year maturity that becomes callable 10 years after issuance. If this bond was issued at par with a 3% coupon, its yield to maturity at issuance would be 3%. After five years, if market interest rates declined to 2%, the market price of the bond would be \$1,129, a premium relative to the bond’s par value of \$1,000. Yields and market prices are inversely related; as yields decrease, market prices increase. In this example, however, the bond issuer has the option to call the bond before maturity at \$1,000. As such, an investor thinking about purchasing this bond in the secondary market should consider the yield to call of 0.39% in addition to the 2% yield to maturity.



Exhibit 1 Applied Math

Yield to Maturity vs. Yield to Call: 20-year bond, 15 years to maturity with 3% annual coupon and callable 10 years to maturity at \$1,000

Yield to Maturity = 2%

$$\$1,129 \text{ market price (15 years remaining)} = \frac{\$30}{(1+YTM)} + \frac{\$30}{(1+YTM)^2} + \frac{\$30}{(1+YTM)^3} + \dots + \frac{\$1,030}{(1+YTM)^{15}}$$

Yield to Call (5 years to first call date) = 0.39%

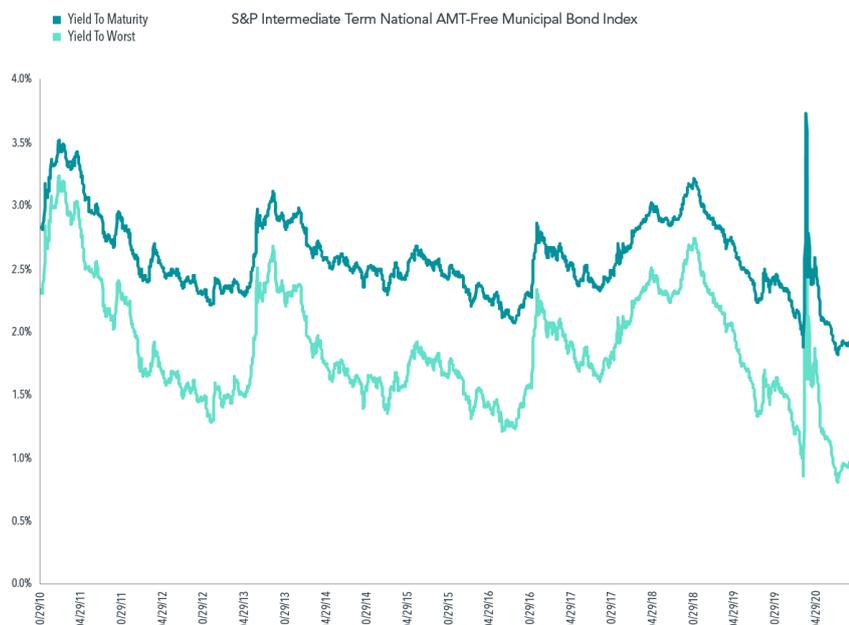
$$\$1,129 \text{ market price} = \frac{\$30}{(1+YTC)} + \frac{\$30}{(1+YTC)^2} + \frac{\$30}{(1+YTC)^3} + \frac{\$30}{(1+YTC)^4} + \frac{\$1,030}{(1+YTC)^5}$$

In the example in Exhibit 1, the market price is solved for by discounting the remaining 15 coupon payments and \$1,000 principal payment using the current 2% market rate. Yield to call is calculated in a similar manner as yield to maturity. But instead of the maturity date, yield to call uses a specific call date (prior to maturity) within the bond's call schedule and call price—which is generally par value. Using the same example, the bond's yield to call is less than its yield to maturity because the \$1,129 market price is amortized to the shorter call date, which is 10 years before the maturity date. The yield-to-call rate reflects the possibility that an investor paying the current market price of \$1,129 for the bond might not receive the additional \$30 coupon payments for each of the 10 years after the call date.

Bonds with multiple call dates will have multiple yield to calls in addition to a yield to maturity. Yield to worst is the lowest of all the potential yield to calls and the yield to maturity. **Exhibit 2** illustrates the yield to worst for the S&P Intermediate Term National AMT-Free Municipal Bond Index,² a potential proxy for an intermediate municipal bond portfolio. Notice that the actual yield received for bonds in the index may be materially lower than the yield to maturity.

Exhibit 2 Calls in Question

National Intermediate AMT-Free Municipal Bond Yields



When examining municipal bonds that have recently become eligible to be called, we find that many of those bonds have been called. For instance, in January 2010 there were 395 municipal bonds issued with maturities ranging from 10 to 35 years, of which 353 were callable, and 346 have indeed been called.³ The average call price of those bonds was par value. Bond issuers should be expected to act in their own best interest to minimize their cost of capital. In practice, this could mean issuing new bonds at a lower coupon rate and

redeeming a bond paying a coupon higher than current market rates. Since call dates may be years in the future, investors generally will not know if, or when, a bond will be called. To account for funds holding bonds with call features, investors may benefit by comparing bond funds using the more conservative yield-to-worst basis.

1. Assuming that the bond is a coupon-paying security.
2. S&P Intermediate Term National AMT-Free Municipal Bond Index measures the performance of investment-grade municipal bonds that are exempt from US federal income tax and the alternative minimum tax.
3. Source: Bloomberg Barclays Municipal Bond Index as of October 8, 2020.

Source: Dimensional Fund Advisors LP

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