

## 4.5: Yield-to-Maturity (YTM)

The YTM represents the EXPECTED return on the bond if it was purchased at the current price AND held until maturity. We can also use the YTM to tell us what the current required return is for the market. We solve for this by using the same approach we used to solve for interest rates (or discount rates, rates of return, growth rates) in Chapter Three (Time Value of Money) — by solving for the I/Y with the 5-key approach on our financial calculator. We know the bond price (provides PV), coupon rate (provides PMT), number of years until maturity (provides N), and maturity (par) value (provides FV of \$1000). The only thing we don't know is the I/Y (which is the yield to maturity). In order to get the YTM, we are solving for the rate of return that makes the PV of cash flows (coupon payments and par value) equal to the current bond price (B0).

Again, let's work through a brief example: Assume that I am considering buying a bond that pays a 7.5% coupon and can purchase this bond for \$1095. If this bond has 10 years remaining until maturity, what is my YTM? Again, the first step is to find the coupon payment.

Annual coupon  $\Rightarrow 0.075 * \$1000 = \$75$

Semi-Annual (every 6 months) Coupon  $\Rightarrow \$75/2 = \$37.50$

Now I know that I can buy this bond for \$1095 today and in return I will receive cash flows of \$37.50 twice per year for each of the next 10 years PLUS \$1000 at the end of the 10th year. Remember, we are trying to find the discount rate where the PV of the cash flows is equal to \$1095.

### Financial Calculator:

2 P/Y

20 N

-1095 PV

37.50 PMT

1000 FV

Compute I/YR  $\Rightarrow 6.21\%$

Two quick notes on the YTM calculation. First, the PMT and FV must both be the same sign and opposite of the PV. This is because the bondholder will receive both the coupon payment (PMT) and the par value (FV) as a result of paying the current price for the bond (PV). Second, if the bond is trading at a premium, the YTM will be less than the coupon rate. Alternatively, if the bond is trading at a discount, the YTM will be greater than the coupon rate.

Video [Yield-to-Maturity](#)



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