BONDS

A bond is an interest-only loan that your firm takes out. Your firm gets money at the beginning (from the investor buying it), your firm pays a set amount of periodic interest (in the form of coupons), and then your firm pays back its entire face value at the end of the loan.

WATCH THE DIRECTION OF THE CASH!

PV comes to your firm, so it's positive. PMTs and FV leave your firm, so they are negative.

N - The Number of Periods

- **It starts with the years to maturity (how long until the end of the loan):**
  - "matures in X years" / "matures X years from today"
  - "an X-year bond"
  - "bond has a duration of X years"
- **That YTM gets modified by the frequency of the payments:**
  - "Annually" N = YTM (stays the same)
  - "Semiannually" N = YTM x 2
  - "Quarterly" / "Every Three Months" N = YTM x 4
  - "Monthly" N = YTM x 12
- **Watch out for the tricks!**
  - "short-term bond with no coupons that matures in three months" is going to have an N of just .25! Why? Because YTM is an annualized rate (see I/Y section), and three months is a quarter of the year.

PMT - Payment

- **It starts with how much $ coupons will pay in a year:**
  - "Annual coupon rate of X%"
    - *This is a percent based on face value (par). So, "a coupon rate of 7.2%" means that every year coupons are paying 7.2% of $1000, or .072 x $1000, which is $72. That $72 is either in one annual coupon, or two semi-annual coupons of $36 each (72 / 2 = 36), four quarterly coupons of $18 each (72 / 4 = 18), etc.*
  - "An annual coupon of $X"
  - "interest payments of $X"
- **Then gets modified to match the number of periods:***
  - "Annually" PMT stays the same
  - "Semiannually" / "Pays seminannual coupons" PMT / 2
  - "Quarterly" / "Every Three Months" PMT / 4
  - "Monthly" PMT / 12
- **Watch out for the brain teasers!**
  - "an X% semiannual coupon bond" is still telling you an ANNUAL rate. It will need to be changed to $PMT (% x FV), and then divided by the period ($PMT / 2).
  - "pays a coupon of $X quarterly" is saying what $ each of this year's four coupons will be. So it's ALREADY modified!

I/Y - Interest Rate Per Period

- **It starts with an annualized rate:**
  - "the yield to maturity is X%"
  - "has a yield to maturity of X%"
  - "the return required by bond holders is X%"
  - "market interest rates are X%"
  - "market is requiring a return of X% annually"
  - "the discount rate"
- **Then gets modifed to match the payment periods:**
  - "Annually" I/Y stays the same
  - "Semiannually" I/Y / 2
  - "Quarterly" / "Every Three Months" I/Y / 4
  - "Monthly" I/Y / 12

FV - Future Value

- "has a face value of $X" / "a $X face value"
- "par"
- Almost always $1,000

PV - Present Value

- **It starts with the selling price:**
  - "similar bonds are currently priced at $X" / "similar bonds are quoting at $X"
    - *Nobody's going to buy your bond for more than another firm's bond that has the same terms. So similar bond prices are what your prices are, too.*
  - "priced at par" / "Priced at X% of par"
    - *Par is face value. So, "a bond priced at 95.4% of par" means PV = $954*
  - "bought a bond for $X"
  - "the price of the bond"
  - "was priced at $X"
  - "the current market price"
- **Then it gets reduced by flotation costs (if mentioned):**
  - "flotation costs of $X per bond"
  - "X% flotation costs" (need to convert to $, which is X% of Sale Price)
  - "transaction fees of"
    - *Your firm is paying a company to sell this for you, so if there are flotation costs, PV = $Sale Price - $Flotation*

Current Yield Is NOT Yield to Maturity

Every once in a blue moon, a bond problem will ask for "Current Yield." That's NOT the same as solving for I/Y! Why not? It's not accounting for the time value of money.

Current Yield = Annual Coupon / Current Market Price

Note: Take a look at that formula. It's *exactly* like how to find the cost of Preferred Stock:

Kps = D / V_0

If you look closer, you'll see that it's also just the Gordon Growth Model, but with 0% growth:

Kcs = (D_1 / V_0) + g

They're all the same! You're just finding a rate by putting PMT over PV!

Unique Bond with Different Coupon Rates

Also a super-rare problem: a bond pays different coupon amounts each year. Don't panic, its just a NPV Cash Flow calculation!

A unique 4-year bond with a FV of $1,000 that pays a coupon of $48 in year 1, $55 in year 2, $62 in year 3, and $79 in year 4. If the YTM is 9.5%, what is the market price of the bond?

Simply solve it by doing Cash Flow on your calculator:

CFo = 0
C01 = 48
CO2 = 55
C03 = 62
C04 = 1079 *Remember, bonds also pay FV at the end ($79 + $1000)
I = 9.5
Solve for NPV to give you the market price of the bond: $887.45