**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.

### 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” \( N = \text{YTM} \) (stays the same)
  - “Semiannually” \( N = \text{YTM} \times 2 \)
  - “Quarterly” / “Every Three Months” \( N = \text{YTM} \times 4 \)
  - “Monthly” \( N = \text{YTM} \times 12 \)

- **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” \( \text{PMT} \) stays the same
  - “Semiannually” / “Pays semianannual coupons” \( \text{PMT} / 2 \)
  - “Quarterly” / “Every Three Months” \( \text{PMT} / 4 \)
  - “Monthly” \( \text{PMT} / 12 \)

- **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 \( \text{PMT} \times \text{X%} \text{ x FV} \), and then divided by the period (\( \text{PMT} / 2 \)).
  - “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 modified to match the payment periods:**
  - “Annually” \( \text{I/Y} \) stays the same
  - “Semiannually” \( \text{I/Y} / 2 \)
  - “Quarterly” / “Every Three Months” \( \text{I/Y} / 4 \)
  - “Monthly” \( \text{I/Y} / 12 \)

### 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.
  - “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, \( \text{PV} = \text{Sale Price} - \text{Flotation} \)

### 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:

\[ \text{Kps} = \frac{\text{D}}{\text{V}_{0}} \]

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

\[ \text{Kcs} = \frac{\text{(D1 / V0) + g}}{g} \]

- 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:

\[ \text{Cfo} = 0 \]
\[ \text{C01} = 48 \]
\[ \text{C02} = 55 \]
\[ \text{C03} = 62 \]
\[ \text{C04} = 1079 \]

\[ \text{I} = 9.5 \]

Solve for NPV to give you the market price of the bond: $887.45

©2018 Ron Daniel, All Rights Reserved | ronDaniel.com | Get tutoring on Wyzant | Email | LinkedIn