The Cost of Capital

1. Cost of capital
   a. Average cost of funds that the firm uses.
   b. Average rate that investors require (demand) the firm to pay for using their money.
   c. Firm’s required rate of return, \( r \), which is the minimum rate that the firm’s investments must earn to ensure value is not decreased.

2. Weighted average cost of capital (WACC)

\[
\text{WACC} = \left[ \left( \frac{\text{Proportion of debt}}{\text{Cost of debt}} \right) x \left( \text{After – tax cost of debt} \right) + \left( \frac{\text{Proportion of preferred stock}}{\text{Cost of preferred stock}} \right) x \left( \text{Cost of preferred stock} \right) + \left( \frac{\text{Proportion of common equity}}{\text{Cost of common equity}} \right) x \left( \text{Cost of common equity} \right) \right]
\]

\[
\text{WACC} = w_d x r_{dT} + w_{ps} x r_{ps} + w_s x (r_s \text{ or } r_e)
\]

\( \text{WACC} = r = \text{firm’s required rate of return} \)
The Cost of Capital

3. Component costs of capital
   a. Debt
      i. \( r_d \) = before-tax cost of debt = YTM
      ii. \( r_{dT} \) = after-tax cost of debt = \( r_d (1 - T) \)
   b. Equity
      i. Preferred stock
         \[
         r_{ps} = \frac{D_{ps}}{NP_0} = \frac{D_{ps}}{P_0 - \text{Flotation costs}} = \frac{D_{ps}}{P_0 (1 - F)}
         \]
         \( D_{ps} \) = preferred stock dividend
         \( P_0 \) = current market price of preferred stock
         \( F \) = flotation costs to issue new preferred stock
      ii. Common equity
The Cost of Capital

Cost of common equity

- Cost of retained earnings (internal equity)—a firm must invest retained earnings at a rate that is acceptable to common stockholders

- CAPM approach
  \[ r_s = r_{RF} + R_P \beta_s = r_{RF} + R_P M \beta_s = r_{RF} + (r_M - r_{RF}) \beta_s \]

- Discounted cash flow (DCF) approach
  \[ r_s = \frac{\hat{D}_1}{P_0} + g \]

- Bond-yield-plus-risk-premium approach
  \[ r_s = YTM + (3\% \text{ to } 5\% \text{ risk adjustment}) = r_d + (\text{Risk premium}) \]
The Cost of Capital

Cost of common equity

- Cost of retained earnings (internal equity), $r_s$
  - CAPM approach
  - DCF approach
  - Bond-yield-plus-premium approach

- Cost of new common stock (external equity), $r_e$

\[
re = \frac{\hat{D}_1}{NP_0} + g = \frac{\hat{D}_1}{P_0(1-F)} + g
\]

Average the results of the three approaches.
The Cost of Capital

4. Marginal cost of capital (MCC) schedule—a graph showing the different WACCs that would exist at various levels of new funds.

Which WACC the firm uses to evaluate capital budgeting projects depends on how much money the firm must raise.

- If the firm needs $100 million or less: WACC = 10% = r
- If the firm needs more than $100 million but no more than $225 million: WACC = 11% = r
- If the firm needs more than $225 million: WACC = 13% = r
4. Marginal cost of capital (MCC) schedule—a graph showing the different WACCs that would exist at various levels of new funds.

A break point (BP), or increase in WACC, is caused by an increase in at least one of the component costs of capital; that is, an increase in the cost of debt, an increase in the cost of preferred stock, an increase in the cost of retained earnings, an increase in the cost of new common equity, or any combination of these increases.