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Chapter 14

Finance 300

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Why Cost of Capital Is Important

- We know that the return earned on assets depends on the risk of those assets
- The return to an investor is the same as the cost to the company
- Our cost of capital provides us with an indication of how the market views the risk of our assets
- Knowing our cost of capital can also help us determine our required return for capital budgeting projects

Required Return

- The required return is the same as the appropriate discount rate and is based on the risk of the cash flows
- We need to know the required return for an investment before we can compute the NPV and make a decision about whether or not to take the investment
- We need to earn at least the required return to compensate our investors for the financing they have provided

Cost of Equity

- The cost of equity is the return required by equity investors given the risk of the cash flows from the firm
  - Business risk
  - Financial risk
- There are two major methods for determining the cost of equity
  - Dividend growth model
  - SML, or CAPM

The SML Approach

- Use the following information to compute our cost of equity
  - Risk-free rate, R_f
  - Market risk premium, $E(R_M) - R_f$
  - Systematic risk of asset, β

$$R_E = R_f + \beta_E (E(R_M) - R_f)$$

Example - SML

- Suppose your company has an equity beta of .58, and the current risk-free rate is 6.1%. If the expected market risk premium is 8.6%, what is your cost of equity capital?
  - $R_E = 6.1 + .58(8.6) = 11.1\%$

Example – Cost of Equity

- Suppose our company has a beta of 1.5. The market risk premium is expected to be 9%, and the current risk-free rate is 6%.
  - Using SML: $R_E = 6\% + 1.5(9\%) = 19.5\%$

Cost of Debt

- The cost of debt is the required return on our company's debt
- We usually focus on the cost of long-term debt or bonds
- The required return is best estimated by computing the yield-to-maturity on the existing debt
- We may also use estimates of current rates based on the bond rating we expect when we issue new debt
- The cost of debt is NOT the coupon rate
- We will use YTM (I will give to you on Exam, will not need to calculate)

The Weighted Average Cost of Capital

- We can use the individual costs of capital that we have computed to get our "average" cost of capital for the firm
- This "average" is the required return on the firm's assets, based on the market's perception of the risk of those assets
- The weights are determined by how much of each type of financing is used

Capital Structure Weights

- Notation
  - E = market value of equity = # of outstanding shares times price per share
  - D = market value of debt = # of outstanding bonds times bond price
  - V = market value of the firm = D + E
  - Can get weights below given only the Debt-to-Equity ratio.
- Weights
  - w_E = E/V = percent financed with equity
  - w_D = D/V = percent financed with debt

Example: Capital Structure Weights

- Suppose you have a market value of equity equal to $500 million and a market value of debt equal to $475 million.
  - What are the capital structure weights?
    - V = 500 million + 475 million = 975 million
    - w_E = E/V = 500 / 975 = .5128 = 51.28%
    - w_D = D/V = 475 / 975 = .4872 = 48.72%

Taxes and the WACC

- We are concerned with after-tax cash flows, so we also need to consider the effect of taxes on the various costs of capital
- Interest expense reduces our tax liability
  - This reduction in taxes reduces our cost of debt
  - After-tax cost of debt = $R_D(1-T_C)$
- Dividends are not tax deductible, so there is no tax impact on the cost of equity
- WACC = $w_E R_E + w_D R_D(1-T_C)$

Extended Example: WACC - I

- Equity Information
  - 50 million shares
  - $80 per share
  - Beta = 1.15
  - Market risk premium = 9%
  - Risk-free rate = 5%
- Debt Information
  - $1 billion in outstanding debt (face value)
  - Current quote = 110
  - Coupon rate = 9%, semiannual coupons
  - 15 years to maturity
- Tax rate = 40%

Extended Example: WACC - II

- What is the cost of equity?
  - $R_E = 5 + 1.15(9) = 15.35\%$
- What is the cost of debt?
  - N = 30; PV = -1,100; PMT = 45; FV = 1,000; CPT I/Y = 3.9268
  - $R_D = 3.927(2) = 7.854\%$
- What is the after-tax cost of debt?
  - $R_D(1-T_C) = 7.854(1-.4) = 4.712\%$

Extended Example: WACC - III

- What are the capital structure weights?
  - E = 50 million (80) = 4 billion
  - D = 1 billion (1.10) = 1.1 billion
  - V = 4 + 1.1 = 5.1 billion
  - w_E = E/V = 4 / 5.1 = .7843
  - w_D = D/V = 1.1 / 5.1 = .2157
- What is the WACC?
  - WACC = .7843(15.35%) + .2157(4.712%) = 13.06%

Table 14.1 Cost of Equity

I. The Cost of Equity, R_E

A. Dividend growth model approach (from Chapter 8):

$$R_E = D_1/P_0 + g$$

where D_1 is the expected dividend in one period, g is the dividend growth rate, and P_0 is the current stock price.

B. SML approach (from Chapter 13):

$$R_E = R_f + \beta_E \times (R_M - R_f)$$

where R_f is the risk-free rate, R_M is the expected return on the overall market, and β_E is the systematic risk of the equity.

Table 14.1 Cost of Debt

II.	The Cost of Debt, R_D
	A. For a firm with publicly held debt, the cost of debt can be measured as the yield to maturity on the outstanding debt. The coupon rate is irrelevant. Yield to maturity is covered in Chapter 7.
	B. If the firm has no publicly traded debt, then the cost of debt can be measured as the yield to maturity on similarly rated bonds (bond ratings are discussed in Chapter 7).

Table 14.1 WACC

III. The Weighted Average Cost of Capital, WACC

A. The firm's WACC is the overall required return on the firm as a whole. It is the appropriate discount rate to use for cash flows similar in risk to those of the overall firm.

B. The WACC is calculated as:

$$\text{WACC} = (E/V) \times R_E + (D/V) \times R_D \times (1 - T_C)$$

where T_C is the corporate tax rate, E is the *market* value of the firm's equity, D is the *market* value of the firm's debt, and $V = E + D$. Note that E/V is the percentage of the firm's financing (in market value terms) that is equity, and D/V is the percentage that is debt.