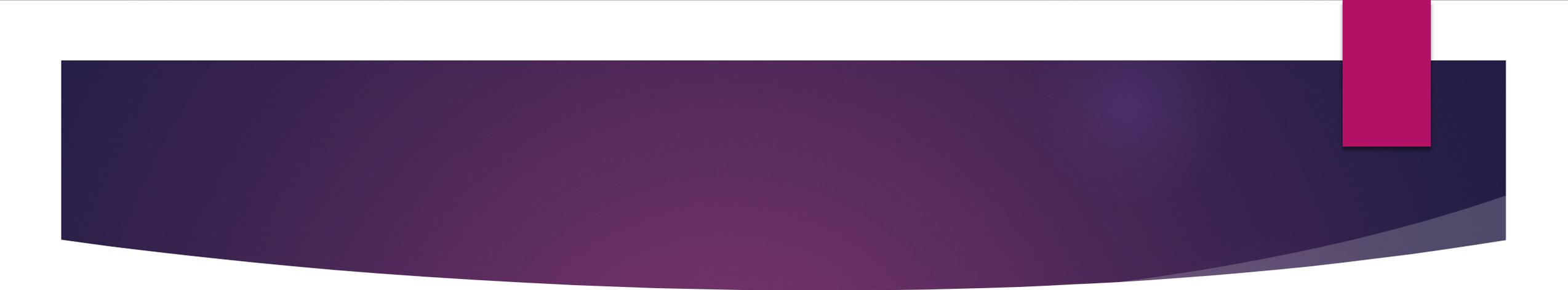


Chapter 4: The Cost of Capital

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- ▶ Definition of Cost of Capital
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 - ▶ Types of Cost of Capital
 - ▶ Weighted Average Cost of Capital (WACC)
 - ▶ Marginal Cost of Capital

Definition of Cost of Capital

Cost of capital is a company's calculation of the minimum return that would be necessary in order to justify undertaking a capital budgeting project, such as building a new factory.

Financial Structure

Financial structure refers to the mix of debt and equity that a company uses to finance its operations. This composition directly affects the risk and value of the associated business. The financial managers of the business have the responsibility to deciding the best mixture of debt and equity for optimizing the financial structure.

Capital Structure

- Capital structure is the particular combination of debt and equity used by a company finance its overall operations and growth.
- Equity capital arises from ownership shares in a company and claims to its future cash flows and profits. Debt comes in the form of bond issues or loans while equity may come from of common stock, preferred stock, or retained earnings. Short-term debt is also considered to be part of the capital structure.

Types of Cost of Capital

- ▶ Cost of Debt
- ▶ Cost of Preferred Stock
- ▶ Cost of Equity

Cost of Debt

Cost of debt is the effective interest rate that a company pays on its debts, such as bonds and loans. Cost of debt can refer to the before-tax cost of debt, which is the company's cost of debt before taking taxes into account, or the after-tax cost of debt. The key difference in the cost of debt before and after taxes lies in the fact that interest expenses are tax-deductible.

Cost of Debt (cont.)

- ▶ Required rate of return for creditors
- ▶ e.g. Suppose that a company issues bonds with a **before tax cost of 10%**.
- ▶ Since interest payments are tax deductible, the true cost of the debt is the **after tax cost**.
- ▶ If the company's tax rate (state and federal combined) is 40%, the after tax cost of debt
- ▶ $AT k_d = 10\%(1-.4) = 6\%$.

Cost of Preferred Stock

- ▶ Cost to raise a dollar of preferred stock.

$$\text{Required rate } k_p = \frac{\text{Dividend } (D_p)}{\text{Market Price } (P_p) - F}$$

- ❖ **Example**: You can issue preferred stock for a net price of \$42 and the preferred stock pays a \$5 dividend.
- ❖ The cost of preferred stock:

$$k_p = \frac{\$5.00}{\$42.00} = 11.90\%$$

Cost of Equity

▶ Two Types of Equity Financing

- ▶ Retained Earnings (internal common equity)
- ▶ Issuing new shares of common stock (external common equity)

Cost of Equity (cont.)

▶ Cost of Internal Common Equity

- ▶ Management should retain earnings only if they earn as much as stockholder's next best investment opportunity of the same risk.
- ▶ Cost of Internal Equity = opportunity cost of common stockholders' funds.
- ▶ Two methods to determine

- ▶ Dividend Growth Model

- ▶ Capital Asset Pricing Model

Cost of Common Equity

- ▶ Cost of Internal Common Stock Equity
 - ▶ Dividend Growth Model

$$k_s = \frac{D_1}{P_0} + g$$

Cost of Common Equity (cont.)

► Example:

The market price of a share of common stock is \$60. The dividend just paid is \$3, and the expected growth rate is 10%.

$$k_s = \frac{D_1}{P_0} + g$$

$$k_s = \frac{3(1+0.10)}{60} + 0.10 = 0.155 = 15.5\%$$

Cost of Common Equity (cont.)

- ▶ Cost of Internal Common Stock Equity
 - ▶ Capital Asset Pricing Model

$$k_S = k_{RF} + \beta(k_M - k_{RF})$$

Cost of Common Equity (cont.)

► Example:

The estimated Beta of a stock is 1.2. The risk-free rate is 5% and the expected market return is 13%.

$$k_S = k_{RF} + \beta(k_M - k_{RF})$$

$$k_S = 5\% + 1.2(13\% - 5\%) = 14.6\%$$

Cost of Common Equity (cont.)

- ▶ Cost of New Common Stock
 - ▶ Must adjust the Dividend Growth Model equation for floatation costs of the new common shares.

$$k_n = \frac{D_1}{P_0 - F} + g$$

Cost of Common Equity (cont.)

► Example:

If additional shares are issued floatation costs will be 12%. $D_0 = \$3.00$ and estimated growth is 10%, Price is \$60 as before.

$$k_n = \frac{D_1}{P_0 - F} + g$$

$$k_n = \frac{3(1+0.10)}{52.80} + 0.10 = 0.1625 = 16.25\%$$

Weighted Average Cost of Capital

- ▶ Weighted average cost of capital (WACC) represents a firm's average after-tax cost of capital from all sources, including common stock, preferred stock, bonds, and other forms of debt. WACC is the average rate that a company expects to pay to finance its assets.

Weighted Average Cost of Capital (An Example)

Gallagher Corporation estimates the following costs for each component in its capital structure:

<i>Source of Capital</i>	<i>Cost</i>
Bonds	$k_d = 10\%$
Preferred Stock	$k_p = 11.9\%$
Common Stock	
Retained Earnings	$k_s = 15\%$
New Shares	$k_n = 16.25\%$

Gallagher's tax rate is 40%

Weighted Average Cost of Capital (An Example) [cont.]

If using retained earnings to finance the common stock portion the capital structure:

$$WACC = k_a = (WT_d \times AT k_d) + (WT_p \times k_p) + (WT_s \times k_s)$$

Assume that Gallagher's desired capital structure is 40% debt, 10% preferred and 50% common equity.

$$WACC = 0.40 \times 10\% (1 - 0.4) + 0.10 \times 11.9\% + 0.50 \times 15\% = 11.09\%$$

Weighted Average Cost of Capital (An Example) [cont.]

If using a new equity issue to finance the common stock portion the capital structure:

$$WACC = k_a = (WT_d \times AT k_d) + (WT_p \times k_p) + (WT_s \times k_s)$$

Assume that Gallagher's desired capital structure is 40% debt, 10% preferred and 50% common equity.

$$WACC = 0.40 \times 10\% (1-0.4) + 0.10 \times 11.9\% + 0.50 \times 16.25\% = 11.72\%$$

Marginal Cost of Capital

- ▶ Gallagher's weighted average cost will change if one component cost of capital changes.
- ▶ This may occur when a firm raises a particularly large amount of capital such that investors think that the firm is riskier.
- ▶ The WACC of the next dollar of capital raised is called the marginal cost of capital (MCC).

Graphing the MCC Curve

- ▶ Assume now that Gallagher Corporation has \$100,000 in retained earnings with which to finance its capital budget.
- ▶ We can calculate the point at which they will need to issue new equity since we know that Gallagher's desired capital structure calls for 50% common equity.

Graphing the MCC Curve (cont.)

$$\text{Breakpoint} = \frac{\text{Available Retained Earnings}}{\text{Percentage of Total}}$$

$$\text{Breakpoint} = (\$100,000)/.5 = \$200,000$$