

FN 201 : Lecture Note 8

Cost of Capital

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Outline

- Estimate the components of cost of capital:
 - Cost of equity
 - Cost of debt
 - Cost of preferred stock
- Calculate the weighted average cost of capital of the firm (WACC)

Cost of Capital

The Cost of Capital

- The terms *required return*, *discount rate*, and *cost of capital* all refer to the cost of capital in an investment project
- The cost of capital represents **the overall cost of financing** to the firm
 - use “Weighted Average Cost of Capital: WACC”
- Cost of capital estimates are used for:
 - capital budgeting decisions
 - financing decisions
 - operating decisions

Cost of Capital vs. Capital Structure

- A firm's financial policy is about **choosing its capital structure** – the mixture of debt and equity
- For now, we **assume the firm has a fixed debt to equity ratio** – its target capital structure
- A firm's **overall cost of capital reflects the required return on the firm's assets as a whole** – a mixture of the returns needed to compensate its creditors and its shareholders

Components of Capital

- Cost of Equity
 - Retained Earning
 - New Common Stock
- Cost of Debt
- Cost of Preferred Stock

Cost of Equity

- Common stock equity is available through retained earnings (R/E) or by issuing new common stock:

Common equity = Retained Earning + New common stock

- Why is there a cost for **retained earnings**?
 - Earnings can be **reinvested or paid out** as dividends
 - Investors could **buy other securities**, and earn a return.
 - Thus, there is an ***opportunity cost*** if earnings are retained
- The cost of **new common stock** is **higher** than the cost of retained earnings because of **flotation costs**
 - selling and distribution costs (such as sales commissions)

Cost of Equity

- Dividend Growth Model Approach
- Capital Asset Pricing Model (CAPM)

Cost of Equity – Dividend Growth Model Approach

- PV of dividend growing perpetuity
- According to the *constant growth (Gordon)* model

From: $P_o = \frac{D_1}{R_E - g}$ Rearranging:

Note:

Cost of Equity – Dividend Growth Model Approach

Example:

1) Summerdahl Resort's common stock is currently trading at \$36 a share. The stock is expected to pay a dividend of \$3.00 a share at the end of the year ($D_1 = \$3.00$), and the dividend is expected to grow at a constant rate of 5% a year. What is its cost of common equity?

2) Radon Homes' current EPS is \$6.50. It was \$4.42 five years ago. The company pays out 40% of its earnings as dividends, and the stock sells for \$36.

- a. Calculate the historical growth rate in earnings.
- b. Calculate the next expected dividend per share, D_1 .

Assume that the past growth rate will continue.

- c. What is Radon Homes' cost of equity, R_E ?

Cost of Equity – Dividend Growth Model Approach

Cost of equity with “**flotation cost**”

selling and distribution costs (such as sales commissions) of new securities

Flotation cost will cause stock price decrease and thus total money received

Example:

Messman Manufacturing will issue common stock to the public for \$30. The expected dividend and the growth in dividends are \$3.00 per share and 5%, respectively. If the flotation cost is 10% of the issue's gross proceeds, what is the cost of external equity, R_E ?

Cost of Equity – Dividend Growth Model Approach

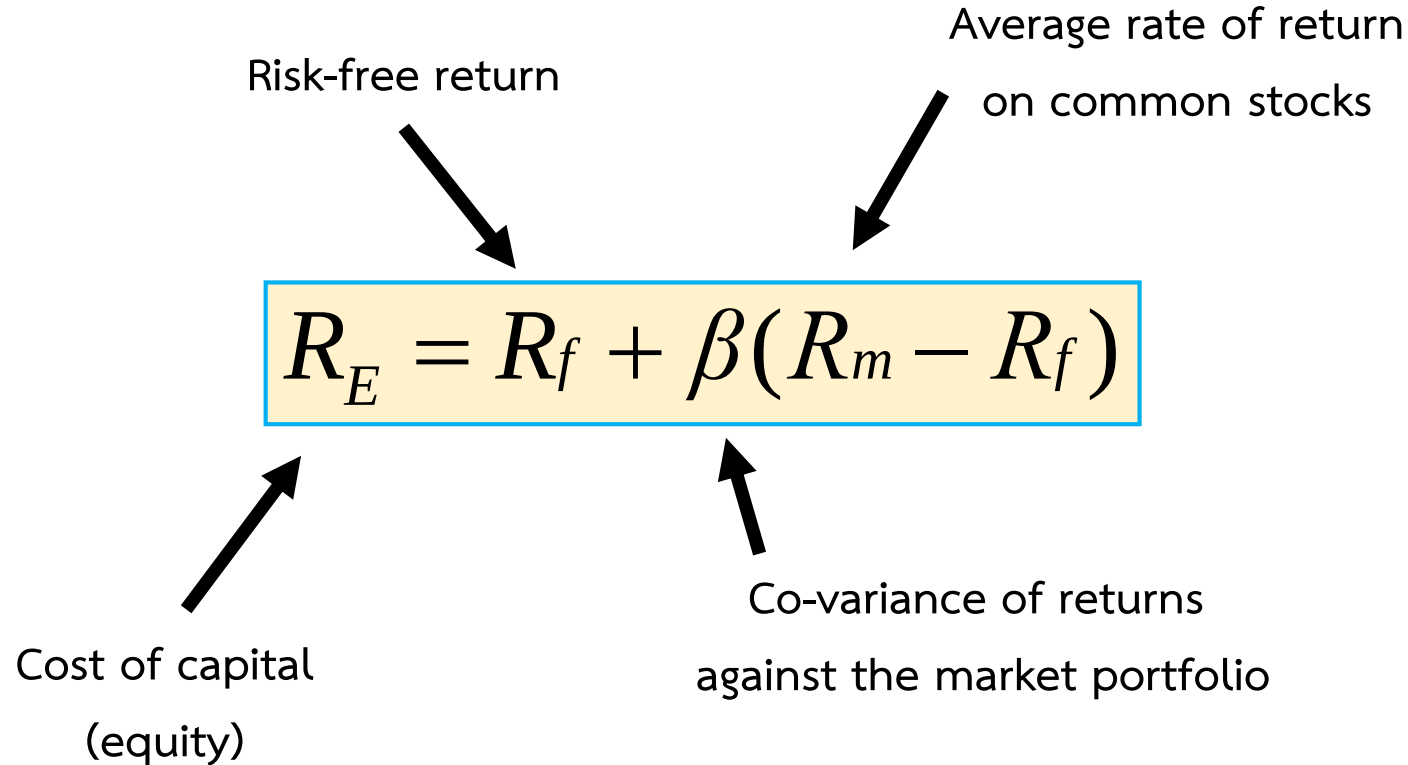
- Advantages:

- Very Simple

- Disadvantages:

- Applicable only for **dividend paying firms**
(otherwise can use earnings growth)
- Uses **historical data** to predict future growth
- Very **sensitive to the estimated growth rate**
- The approach does **not explicitly consider risk**

Cost of Equity – CAPM



Cost of Equity – CAPM

Example:

- Booher Book Stores has a beta of 0.8. The yield on a 3-month T-bill is 4% and the yield on a 10-year T-bond is 6%. The market risk premium is 5.5%, and the return on an average stock in the market last year was 15%. What is the estimated cost of common equity using the CAPM?
- The earnings, dividends, and stock price of Shelby Inc. are expected to grow at 7% per year in the future. Shelby's common stock sells for \$23 per share, its last dividend was \$2.00, and the company will pay a dividend of \$2.14 at the end of the current year.
 - a. Using the discounted cash flow approach, what is its cost of equity?
 - b. If the firm's beta is 1.6, the risk-free rate is 9%, and the expected return on the market is 13%, then what would be the firm's cost of equity based on the CAPM approach?

Cost of Equity – CAPM

- Advantages:

- It explicitly **adjusts for risk**
- It is **more applicable** to companies other than those with steady dividend growth / do not pay dividend

- Disadvantages:

- If the estimates of **the market risk premium and beta are poor**, the resulting cost of equity can be *inaccurate*
- **Uses historical data** to predict future returns

Cost of Debt – Tax Effect on Debt Financing

	<u>with stock</u>	<u>with debt</u>
EBIT	400,000	400,000
- interest expense	<u>0</u>	<u>(50,000)</u>
EBT	400,000	350,000
- taxes (34%)	<u>(136,000)</u>	<u>(119,000)</u>
EAT	264,000	231,000

- Now, suppose the firm pays \$50,000 in dividends to the shareholders

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- dividends	<u>(50,000)</u>	<u>0</u>

Cost of Debt

- The cost of debt is the return required by lenders (observable)
= **yield to maturity** on the firm's bonds outstanding.

Note that the coupon rate is not the cost of debt!

- Since interest is tax deductible to the firm, the actual cost of debt is less than the yield to maturity:

➤ The cost of debt should also be **adjusted for flotation costs**
(associated with issuing new bonds)

Cost of Debt

Example:

- LL Incorporated's currently outstanding 11% coupon bonds have a yield to maturity of 8%. LL believes it could issue new bonds at par that would provide a similar yield to maturity. If its marginal tax rate is 35%, what is LL's after-tax cost of debt?
- XYZ Company has bonds outstanding with 7 years left before maturity. The bonds are currently selling for \$804.38 per \$1,000 face value. The interest is paid annually at a rate of 12 percent. The firm's tax rate is 40 percent. Calculate the after-tax cost of debt.

Cost of Debt

Cost of debt with “flotation cost”

$$P_0^* = \sum_{t=1}^N \frac{\text{Coupon}}{(1+r_d)^t} + \frac{\text{Price}}{(1+r_d)^N}$$

when

$$P_0^* = \text{Flotation cost adjusted price}$$

Example:

- Suppose a company will issue new 20-year debt with a par value of \$1,000 and a coupon rate of 9%, paid annually. The tax rate is 40%. If the flotation cost is 2% of the issue proceeds, then what is the after-tax cost of debt?
- Prescott Corporation issues a \$1,000 par, 20 year bond paying the market rate of 10%. Coupons are annual. The bond will sell for par since it pays the market rate, but flotation costs amount to \$50 per bond. What is the pre-tax and after-tax cost of debt for Prescott Corporation?

Cost of Preferred Stock

- Preferred stocks are stocks **with dividend priority over common stocks**.
- They pay **a fixed dividend rate**, every period, as long as the firm exists.
- A share of preferred stock is essentially **a perpetuity**.

The cost of preferred stock, R_p , is therefore:

$$P_0 = \frac{D}{R_{PS}}$$

Cost of Preferred Stock

Example:

- In its capital structure, ABC Corporation has preferred stock paying a dividend of \$5 per share and selling for \$23. The company's tax rate is 40 percent. Calculate (a) the before-tax cost preferred stock, and (b) the after-tax cost of preferred stock.
- Duggins Veterinary Supplies can issue perpetual preferred stock at a price of \$50 a share with an annual dividend of \$4.50 a share.

Cost of Preferred Stock

Cost of debt with “flotation cost”

when

$$P_0^* = \text{Flotation cost adjusted price}$$

Example:

- Burnwood Tech plans to issue some \$60 par preferred stock with a 6% dividend. A similar stock is selling on the market for \$70. Burnwood must pay flotation costs of 5% of the issue price. What is the cost of the preferred stock?
- Nortel Networks also has 10,000 preferred shares outstanding. These preferred shares have a market value of \$56 per share and pay a 10 percent dividend rate on a par value of \$100. What is the required rate of return by preferred shareholders? What is the market value of preferred shares?

Weighted Average Cost of Capital: WACC

Weighted Average Cost of Capital: WACC

- The company cost of capital is the **weighted average** of required returns from all source of firm's capital (WACC)

$$WACC = W_D R_D (1 - T) + W_E R_E + W_{PS} R_{PS}$$

Weighted Average Cost of Capital: WACC

Example:

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

<i>Source of Capital</i>	<i>Cost</i>
Bonds (after tax)	$R_D(1-t) = 6.0\%$
Preferred Stock	$R_{PS} = 11.9\%$
Common Stock	$R_S = 16.25\%$

Assume that Gallagher's desired capital structure is 40% debt, 10% preferred and 50% common equity. Given **Gallagher's tax rate is 40%**. What is firm's WACC?

Weighted Average Cost of Capital: WACC

Q: Market values or book values?

A: always use market values!

- **Market value of equity:**

$E = \text{number of shares} \times \text{market price per share}$

- **Market value of debt:**

$D = \text{number of bonds outstanding} \times \text{market price per bond}$

- If there are multiple bonds, do the same for each bond and add.

- If debt is not publicly traded, then find a similar publicly traded bond and use the yield to discount the bond's payments

Weighted Average Cost of Capital: WACC

Example: Market Value vs. Book Value

Suppose the Schoof Company has this *book value* balance sheet:

Current assets	\$30,000,000	Current liabilities	\$10,000,000
Fixed assets	50,000,000	Long-term debt	30,000,000
		Common equity	
		Common stock	
		(1 million shares)	1,000,000
		Retained earnings	39,000,000
Total assets	<u>\$80,000,000</u>	Total claims	<u>\$80,000,000</u>

The current liabilities consist entirely of notes payable to banks, and the interest rate on this debt is 10%, the same as the rate on new bank loans. These bank loans are not used for seasonal financing but instead are part of the company's permanent capital structure. The long-term debt consists of 30,000 bonds, each with a par value of \$1,000, an annual coupon interest rate of 6%, and a 20-year maturity. The going rate of interest on new long-term debt, r_d , is 10%, and this is the present yield to maturity on the bonds. The common stock sells at a price of \$60 per share. Calculate the firm's *market value* capital structure.

Weighted Average Cost of Capital: WACC

Longstreet Communications Inc. (LCI) has the following capital structure, which it considers to be optimal: debt = 25%, preferred stock = 15%, and common stock = 60%. LCI's tax rate is 40%, and investors expect earnings and dividends to grow at a constant rate of 6% in the future. LCI paid a dividend of \$3.70 per share last year (D_0), and its stock currently sells at a price of \$60 per share. Ten-year Treasury bonds yield 6%, the market risk premium is 5%, and LCI's beta is 1.3. The following terms would apply to new security offerings.

Preferred: New preferred could be sold to the public at a price of \$100 per share, with a dividend of \$9. Flotation costs of \$5 per share would be incurred.

Debt: Debt could be sold at an interest rate of 9%.

Common: New common equity will be raised only by retaining earnings.

- a. Find the component costs of debt, preferred stock, and common stock.
- b. What is the WACC?

Question?