

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:

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

Example:

3) Spencer Supplies' stock is currently selling for \$60 a share. The firm is expected to earn \$5.40 per share this year and to pay a year-end dividend of \$3.60.

- a. If investors require a 9% return, what rate of growth must be expected for Spencer?
- b. If Spencer reinvests earnings in projects with average returns equal to the stock's expected rate of return, then what will be next year's EPS?

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

Cost of equity with “flotation cost”

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Cost of Equity – Dividend Growth Model Approach

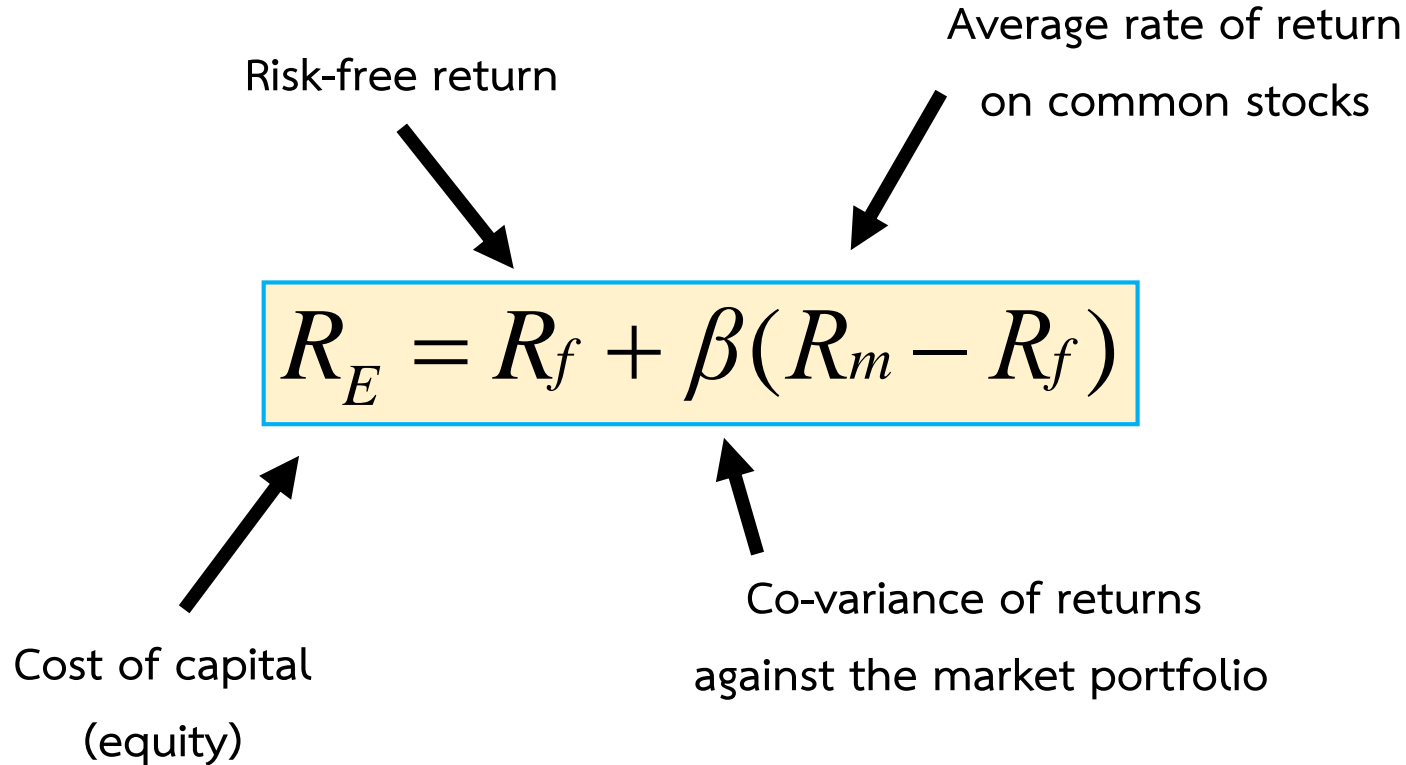
- Advantages:

- 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?
- Nortel Networks has some common equity outstanding. The book value of equity is \$6 million, and the book value per share is \$60. Now the common shares are selling for \$40 per share in the market. It is estimated that the beta for the common equity is 1.5, and the rate of return on Canadian T-bills is 2 percent and the expected return on the TSE300 is 5 percent.
 - And what is the market value of common equity?
 - What is the required rate of return by common shareholders?

Cost of Equity – CAPM

Example:

- 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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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”

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

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?

Cost of Debt

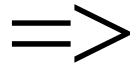
Example:

- 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:



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”

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

Q: Market values or book values?

A:

- **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	<u>39,000,000</u>
Total assets	<u><u>\$80,000,000</u></u>	Total claims	<u><u>\$80,000,000</u></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

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)	$R_D = 6.0\%$
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

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?

Other effects on the cost of capital

Other effects on the cost of capital

How would each of the factors in the following table affect a firm's cost of debt, $R_D(1 - T)$; its cost of equity, R_E ; and its weighted average cost of capital, WACC? Indicate by a plus (+), a minus (-), or a zero (0) if the factor would raise, lower, or have an indeterminate effect on the item in question. Assume that all other factors are held constant. Note that several of the parts probably have no single correct answer.

	Effect on		
	$R_D(1 - T)$	R_E	WACC
a. The corporate tax rate is lowered.			
b. The Federal Reserve tightens credit.			
c. The firm uses more debt.			
d. The firm doubles the amount of capital it raises during the year.			
e. The firm expands into a risky new area.			
f. Investors become more risk averse.			

Question?