Lecture 9

Capital Structure and Cost of Capital

Chapter 13/376

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Topics Covered

- Cost of Capital
- Weighted Average Cost of Capital (WACC)
- Measuring Capital Structure
- Calculating Required Rates of Return
- Issues in using WACC
- Valuing Entire Business: Discounted cash flow (DCF)

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13.1.Cost of Capital

- Cost of Capital – The return the firm's investors could expect to earn if they invested in securities with comparable degrees of risk.
- Capital Structure – The firm's mix of long term debt and equity financing.

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Cost of Capital (Contd)

Example

Geothermal Inc. has the following capital structure. Given that Geothermal pays 8% for debt and 14% for equity, what is the Company Cost of Capital?

Market Value Debt	\$194	30%
Market Value Equity	\$453	70%
Market Value Assets	\$647	100%

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Cost of Capital (Contd)

Example:

Geothermal Inc. has the following capital structure. Given that Geothermal pays 8% for debt and 14% for equity, what is the Company Cost of Capital?

$$\text{Portfolio Return} = (0.3 x 8\%) + (0.7 x 14\%) = 12.2\%$$

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13.2.WACC

- Weighted Average Cost of Capital (WACC) – The expected rate of return on a portfolio of all the firm's securities.
- Company cost of capital = Weighted average of debt and equity returns.

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WACC (Contd)

- Taxes are an important consideration in the company cost of capital because interest payments are deducted from income before tax is calculated.

$$\text{After - tax cost of debt} = \text{pretax cost x } (1 - \text{tax rate}) = r_{debt} \text{ x } (1 - Tc)$$

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Cost of Capital (Contd)

Example

Geothermal Inc. has the following capital structure. Given that Geothermal pays 8% for debt and 14% for equity, what is the Company Cost of Capital?

$$\text{Portfolio Return} = (0.3x8\%) + (0.7x14\%) = 12.2\%$$

Interest is tax deductible. Given a 35% tax rate, debt only costs us 5.2% (i.e. 8 % x 0.65).

$$WACC = (0.3x5.2\%) + (0.7x14\%) = 11.4\%$$

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WACC (Contd)

Weighted average cost of capital=

$$WACC = \left[\frac{D}{V} \text{ x } (1 - Tc) r_{debt}\right] + \left[\frac{E}{V} \text{ x } r_{equity}\right]$$

Where:

D: market value of Debt
E: market value of Equity
V = D+E
r_{debt}: cost of debt
r_{equity}: cost of equity
T_c: corporate tax rate

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WACC (Contd)

<u>Three Steps to Calculating Cost of Capital</u>

1. Calculate the value of each security as a proportion of the firm's market value.
2. Determine the required rate of return on each security.
3. Calculate a weighted average of these required returns.

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WACC (Contd)

Cost of equity is usually calculated based on CAPM:

$$r_{equity} = r_f + \beta\,(r_m - r_f)$$

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WACC (Contd)

- ***<u>Example</u>*** *– Executive Fruit has issued debt, preferred stock and common stock. The market value of these securities are $4mil, $2mil, and $6mil, respectively. The required returns are 6%, 12%, and 18%, respectively.*

  Q: Determine the WACC for Executive Fruit, Inc.

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WACC (Contd)

Example – continued

Step 1

Firm Value = 4 + 2 + 6 = $12 mil

Step 2

Required returns are given

Step 3

$$WACC = \left[\frac{4}{12} x(1-.35).06\right] + \left(\frac{2}{12} x.12\right) + \left(\frac{6}{12} x.18\right)$$

$$= .123 \text{ or } 12.3\%$$

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13.3.Measuring Capital Structure

- In estimating WACC, **do not** use the ***Book Value*** of securities.
- In estimating WACC, **use** the ***Market Value*** of securities.
- Book Values often do not represent the true market value of a firm's securities.

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Measuring Capital Structure (Contd)

Market Value of Bonds - PV of all coupons and par value discounted at the current interest rate.

Market Value of Equity - Market price per share multiplied by the number of outstanding shares.

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Measuring Capital Structure (Contd)

Big Oil Book Value Balance Sheet (mil)			
Bank Debt	$	200	25.0%
LT Bonds	$	200	25.0%
Common Stock	$	100	12.5%
Retained Earnings	$	300	37.5%
Total	$	800	100%

Common stock: 100 million shares, par value $1
-> Book value of Equity = Common stock + Retained earnings
= $400 million

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Measuring Capital Structure (Contd)

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LT Bonds	$	200	25.0%
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Total	$	800	100%

If the long term bonds pay an 8% coupon and mature in 12 years, what is their market value assuming a 9% YTM?

$$PV = \frac{16}{1.09} + \frac{16}{1.09^2} + \frac{16}{1.09^3} + \ldots + \frac{216}{1.09^{12}}$$
$$= \$185.70$$

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Measuring Capital Structure (Contd)

Big Oil MARKET Value Balance Sheet (mil)		
Bank Debt (mil)	$ 200.0	12.6%
LT Bonds	$ 185.7	11.7%
Total Debt	$ 385.7	24.3%
Common Stock	$ 1,200.0	75.7%
Total	$ 1,585.7	100.0%

Common stock: 100 million shares at the price of $12

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Required Rates of Return

- Bonds

$$r_d = YTM$$

- **Common Stock:** use CAPM or DDM

$$r_e = CAPM$$
$$= r_f + \beta(r_m - r_f)$$

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Required Rates of Return (Contd)

Dividend Discount Model (DDM)

Perpetuity Growth Model

$$P_0 = \frac{Div_1}{r_e - g}$$

$$\boxed{r_e = \frac{Div_1}{P_0} + g}$$

(for mature companies with relatively stable growth rates and dividends: public utility company).

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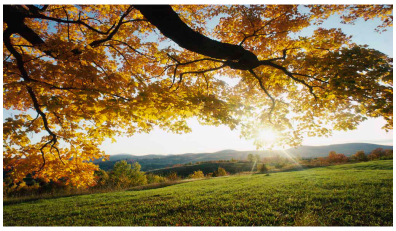
Cost of retained Earnings

- Cost of Retained Earnings= cost of common stock.

Cost of Retained Earnings = cost of common stock

END OF LECTURE

THANKS FOR YOUR ATTENTION!



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