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Cost of Capital and Capital Structure Issues

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Cost of Capital

- The rate of return that must be earned on investment projects



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Financial Capital

Funds used to finance the purchase and/or construction of

- physical capital (gross plant and equipment),
- materials and supplies,
- inventories of fuel, and
- to provide cash working capital



Investor-Provided Financial Capital

- Debt
- Preferred stock
- Common Equity



Investor-Provided Financial Capital

- Debt - borrowed money that must be returned with interest
 - Long-term
 - Short Term
- Holders of bonds receive fixed interest payments for a specified time period and the principle amount loaned



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Investor-Provided Financial Capital

- *Common Equity = Common stock + retained earnings*
- *Equity, or common stock = ownership in the utility*
- *Preferred Stock is a hybrid between stock and debt*



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Standard for Fair Rate of Return

- Bluefield Water Works and Improvement Co. vs. Public Service Comm'n of West Virginia, 262 U.S. 679 (1923),
 - Established
 - **Comparable Earnings**
 - **Financial Integrity**
 - **Capital Attraction**



Standard for Fair Rate of Return

- Federal Power Comm'n vs. Hope Natural Gas Co., 320 U.S. 591(1944)
 - Established
 - **End Result Doctrine**



Return On Equity

- Commensurate with the returns on investments in other enterprises with similar risks
- Sufficient to assure confidence in the financial integrity of the utility so as to maintain its credit and to attract capital.



Return On Equity

- There is no single scientifically correct method for determining the proper return
- Capital Cost is one of the most controversial parts of a rate case



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Weighted Average Cost of Capital

- Capital Structure is the relative portions of debt and equity

Utilities typically have capital structure with debt and equity between 40% to 60%.

- The cost of capital is a weighted average costs of all elements in the capital structure



Weighted Average Cost of Capital

An example:

A company financed by

Debt	=	40%
<i>Preferred Stock</i>	=	10%
<i>Equity</i>	=	50%



Weighted Average Cost of Capital

An example:

A company debt cost

Debt interest	=	7.0%
Cost of preferred stock	=	8.5%
Cost of equity	=	10.0%



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Weighted Average Cost of Capital

An example:

The overall weighted average cost of capital (WACC) for this company is:

Debt	$7.0\% \times 40\% = 2.80\%$
<i>Preferred Stock</i>	$8.5\% \times 10\% = 0.85\%$
<i>Common Equity</i>	$10.0\% \times 50\% = \underline{5.00\%}$
	8.65%



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Cost of Debt and Equity

- *Cost of debt is relatively easy to determine*
 - *The after tax cost of debt is typically used for the embedded cost*
- *Cost of preferred stock is also easily calculated*

$$\text{Cost of Preferred stock} = Dps/P$$

where Dps = Preferred Dividend

P = Net issuing price



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Cost of Debt and Equity

- *Equity is issued, sold and traded in the form of shares through a stock exchange.*
- *Return on Equity is forward looking and more difficult to compute than the cost of debt*
- *Return on Equity compensates investors for placing their money in the utility.*



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Cost of Debt and Equity

- *Investors, by making the investment in the equity of a utility, forego the opportunity to invest elsewhere.*
- *Investors should be compensated for their investment so that their expected rate of return on the utility investment is equivalent to the returns they could expect on an investment of comparable risk.*



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How is ROE measured?

- *Primary Techniques Used*
 - *Discounted Cash Flow Method*
 - *Capital Asset Pricing Model (CAPM)*
 - *Risk Premium Approach*
 - *Comparable Earnings Approaches*



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Discounted Cash Flow

- Derived from present value theory
- Value of a financial asset is determined by its ability to generate future earnings
- Current stock price is represented by the future cash flows of owning the stock and the proceeds from the final sale of the stock
- Current stock price give investors an indication of the expected flow of future dividends
- Investors attribute a discount to future dividends
 - A future dividend is valued less than a dividend received today
- Model is used to estimate the rate at which future cash flows are discounted to equal the current stock price



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Discounted Cash Flow

Where:

$K_e = D_1/P_0 + g$

K_e = Investor's expected ROE

D_1 = Expected annual dividend

P_0 = Current market price per share of stock

g = Expected growth rate of future dividends



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Discounted Cash Flow

- The formula makes the following assumptions:
 - A constant expected average growth rate for dividends and earnings
 - A discount rate in excess of the expected growth rate
 - An expected constant price-earnings ratio in which the growth in stock price equals the growth in earnings and dividends



Discounted Cash Flow

- ***Example:***

- *Expected dividend* = \$2.40
- *Stock price* = \$32.00
- *Forecasted growth rate* = 7%
- *Expected return*
$$\$2.40/\$32.00 + 7\% = 14.5\%$$



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Capital Asset Pricing Model

- *Return on equity equals the risk free rate plus a risk premium that is measured in terms of the individual stock return's correlation with market returns, and the market risk premium*



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Capital Asset Pricing Model

- Forward looking model
- Based on the concept of risk and return
- Recognizes that investors diversify their investments
- Very structured and easy to use
- Inputs are readily available to make the computation
- Assumptions have to be made that may not reflect true conditions such as the capital market



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Capital Asset Pricing Model

- Investors require a ROE proportionate with the investment risk.
- Higher risk investments must offer investors higher returns while
- Less risky investments require lower returns
- Investors are reluctant to take on risk,
 - If investors take risk, then they require compensation for bearing the risk
 - Investors must be attracted away from risk-free investments
 - To attract investors away from risk-free investments, a "risk premium" must be offered



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Capital Asset Pricing Model

Theoretical Variables

$$K_e = R_f + R_{P_i}$$

Where:

K_e = the investor's required return on equity

R_f = the "risk free" rate of return

R_{P_i} = the risk premium required by investors



Capital Asset Pricing Model

Explicit Variables

$$K_e = R_f + B(R_m - r_f) + SP$$

Where: K_e = Required return on investment

R_f = Current risk free rate of return

B = Investment beta

R_m = Historic rate of return on the market portfolio

r_f = Historic rate of return on U.S. Treasury Securities



Capital Asset Pricing Model

- **$R_f = \textit{Risk-Free Rate}$**
- Yield offered on a 10, 20 or a 30 year U.S. Treasury Bonds



Capital Asset Pricing Model

- ***B = Investment beta***
 - Beta is the systematic risk of a security as estimated by regressing the security's returns against the market portfolio's returns. The slope of the regression is beta.



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Capital Asset Pricing Model

- ***B*** = *investment beta*
 - Compare over a long horizon how returns on a particular stock vary and co-vary with the returns in the entire market
 - A beta greater than one occurs if a stock's return is more volatile than overall market returns, which indicates a risk greater than the market portfolio
 - A beta less than one occurs if a stock's return is less volatile than the returns on the market portfolio, which indicates risk is less than the market portfolio
 - Public utilities generally have betas of less than one



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Capital Asset Pricing Model

- ***B*** = *the investment beta*
 - **Criticisms**
 - Beta is not wholly accepted as a comprehensive risk measure
 - True beta may be difficult to determine
 - Beta Cannot be measure prospectively



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Capital Asset Pricing Model

- **R_m = Return on the market portfolio**
 - Historical returns can be used as an estimate



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Capital Asset Pricing Model

- **r_f = Historic rate of return on U.S. Treasury Securities**
 - Historic arithmetic mean of income of long-term U.S. Government Securities



Capital Asset Pricing Model

Explicit Variables

$$K_e = R_f + B(R_m - r_f) + SP$$

Where: K_e = Required return on investment

R_f = Current risk free rate of return

B = Investment beta

R_m = Historic rate of return on the market portfolio

r_f = Historic rate of return on U.S. Treasury Securities



Capital Asset Pricing Model

- ***Example:***

- *Risk Free Rate* = 5%
- *Beta of a stock* = .80
- *Expected market return* = 10%
- *Return on Equity*
 - $5\% + .80(10\% - 5\%) = 9\%$



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Risk Premium Approach

- *Riskier securities deserve a higher return than less risky securities*
- *ROE equals the long term cost of debt plus a risk premium*



Risk Premium Approach

- ***Example:***

- Long Term cost of debt = 7%
- Risk premium = 4%
- Cost of equity = 11%



Comparable Earnings Approach

- *Would investors accept a company's ROE based on the company's market-to-book ratio?*
- A market-to-book ratio close to 1 indicates the company is able to attract capital through investors



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Return on Equity

- *Use of Models*
 - *Witness and Commission must use Judgment*
 - *Diverse results achieved*
 - *Different Conclusions drawn*



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Return on Equity

- *Often more than one model is provided to test the results of the favored model.*
- *Other financial indicators may be considered such as*
 - *bond ratings*
 - *market-to-book ratios*
 - *interest coverage*
 - *dividend coverage*
 - *debt-to-equity ratios*



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Rate of Return

- Insufficient Rate of Return
 - Quality of service affected
 - Lower debt ratings
 - Market Price of Stock
 - Higher Interest Rates



Is ROR Guaranteed?

NO

- *The rate of return is allowed but not guaranteed*
- *The actual rate of return a company earns could be different from what is allowed*
- *The rates are set in such a manner that the company could make the allowed return if all forecasts come true*



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Factors Affecting WACC

- *Factors company cannot control:*
 - *Level of interest rates*
 - *Taxes*
- *Factors company can control:*
 - *Capital Structure*
 - *Dividend Policy*
 - *Investment Policy*



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Resources

The Ibbotson Associates Studies
PricewaterhouseCoopers Studies
National Association of Regulatory Utility
Willamette Management Associates