# Rate of Return 

Finance Department
Financial Analysis Division
Public Utility Bureau

## Overview



- Rate of Return
- Cost of Short and Long-Term Debt
- Cost of Preferred Stock
- Cost of Common Equity
- Capital Asset Pricing Model (CAPM)
- Discounted Cash Flow (DCF) Model
- Comparable Samples
- Capital Structure


## Re-Cap: Rate of Return is multiplied to Rate Base to calculate the Required Operating Income.



## Three Types of Rates of Return

- Accounting Based - Earned Rate of Return: Actual rate of return on investment realized from operations.
- Finance Based - Cost of Capital (also known as the weighted average cost of capital or cost of money): Rate of return utility needs to meet its contractual obligations to debt and preferred stock investors and rate of return expectations of common stock investors.
- Legal Based - Authorized Rate of Return: Rate of return on rate base set by the Commission.
> If regulation functioned perfectly, the 3 rates of return would equal.


## Cost of Capital

| Capital Structure Component | Balance |  | Ratio to Total Capital (A) | Cost <br> (B) | Weighted Cost <br> $(A) \times(B)$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Short-Term Debt | \$ | 75,000,000 | 7.50\% | 5.00\% | 0.38\% |
| Long-Term Debt |  | 450,000,000 | 45.00\% | 7.00\% | 3.15\% |
| Preferred Stock |  | 50,000,000 | 5.00\% | 6.00\% | 0.30\% |
| Common Equity |  | 425,000,000 | 42.50\% | 10.00\% | 4.25\% |
| Total Capital | \$ | 1,000,000,000 | 100.00\% |  | 8.08\% |

- Rate of return is developed from a utility's cost of capital.
- Cost of capital equals sum of component costs of the capital structure after each is weighted by its proportion to total capital.


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- Cost of short-term debt, long-term debt, and preferred stock are usually directly observable. Their costs can be calculated from the interest or dividend rate on the security (e.g. bond, note, preferred share) and the expenses incurred to issue the security (e.g., legal and underwriting fees).
- Cost of common equity is not directly observable. Financial models are used to estimate this cost. The ICC and its Staff most often rely on the Discounted Cash Flow ("DCF") model and Capital Asset Pricing Model ("CAPM").


## Components of an Asset's Rate of Return



- Time Value of Money (Real risk-free rate): compensation to investors to induce them to divert wealth from consumption to savings (i.e., investment). Based on premise $\$ 1$ today is worth more than $\$ 1$ tomorrow.
- Expected Inflation: compensation for anticipated decline in purchasing power.
- Risk Premium: compensation for bearing the risk that the real return on the investment will be less than anticipated (e.g., default risk, liquidity risk).


## Risk and Return



- Investors are averse to risk. Thus, they require higher returns from investments in securities with greater risks.
- Standard deviation measures dispersion or variability. A higher standard deviation means greater variability, hence greater risk.


## Embedded Cost of Debt Schedule

| North Shore Gas Company |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  |  |  |  |  |
| Embedded Cost of Long-Term Debt |  |  |  |  |  |  |  |  |  |  |  |
| September 30, 2006 |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  | Annualized |  |  |
|  |  | Date |  |  | Unamortized | Unamortized |  | Annual | Amort. of | Annualized | Annualized |
|  | Coupon | Issued/ | Maturity | Face Amount | Discount or | Debt Expense | Carrying | Coupon | Discount or | Amort. of | Interest |
| Debt Issue Type | Rate | Reacquired | Date | Outstanding | (Premium) | (Gain) | Value | Interest | (Premium) | Debt Expense | Expense |
|  | [A] | [B] | [C] | [D] | [E] | [F] | [G]=[D-E-F] | [H] ${ }^{\text {a }}$ A ${ }^{\text {d }}$ ] | []] | [J] | $[\mathrm{K}]=[\mathrm{H}=1+\mathrm{J}]$ |
|  |  |  |  |  |  |  |  |  |  |  |  |
| First Mortgage Bonds: |  |  |  |  |  |  |  |  |  |  |  |
| Series M | 5.000\% | 12/18/98 | 12/01/28 | \$ 29,250,000 | \$ | \$ 1,046,000 | \$ 28,204,000 | \$ 1,463,000 | \$ | \$ 47,000 | \$ 1,510,000 |
| Series N-2 | 4.540\% | 04/29/03 | 05/01/13 | 40,000,000 | 21,000 | 528,000 | 39,451,000 | \$ 1,816,000 | 3,000 | \$ 80,000 | 1,899,000 |
| Sub-Total |  |  |  | 69,250,000 | 21,000 | 1,574,000 | 67,655,000 | 3,279,000 | 3,000 | 127,000 | 3,409,000 |
|  |  |  |  |  |  |  |  |  |  |  |  |
| Loss on Reacquired Debt |  |  |  |  |  |  |  |  |  |  |  |
| Series J | 8.000\% | 12/05/02 | 11/01/20 | - | - | 760,000 | $(760,000)$ | - | - | 54,000 | 54,000 |
| Series K | 6.375\% | 01/19/99 | 12/01/28 | - | - | 1,265,000 | $(1,265,000)$ | - | - | 57,000 | 57,000 |
| Series M | 5.000\% | Various | 12/01/28 | - | - | 14,000 | $(14,000)$ | - | - | 1,000 | 1,000 |
| Sub-Total |  |  |  | - | - | 2,039,000 | $(2,039,000)$ | - | - | 112,000 | 112,000 |
|  |  |  |  |  |  |  |  |  |  |  |  |
| Total |  |  |  | \$ 69,250,000 | \$ 21,000 | \$ 3,613,000 | \$ 65,616,000 | \$ 3,279,000 | \$ 3,000 | \$ 239,000 | \$ 3,521,000 |
|  |  |  |  |  |  |  |  |  |  |  |  |
| Embedded Cost of Long-Term Debt ( $\mathrm{K} \div \mathrm{G}$ ) |  |  |  |  |  |  |  |  |  |  | 5.37\% |

## Embedded Cost of Debt Schedule (continued)

- Face Amount Outstanding: Remaining principle amount to be repaid.
- Discount and Premium: Difference between the face amount of the debt and its original sale price.
- Expense: Costs incurred to issue the debt including administrative, legal, and regulatory fees.
- Unamortized Balance: Portion of capitalized costs that remain unrecovered.
- Amortization: Annual recovery of capitalized costs.


## Cost of Common Equity

Capital Asset Pricing Model (CAPM)
A risk premium model based on the theory that the market-required rate of return for a risk bearing security equals the risk-free rate of return plus a risk premium that investors expect in exchange for assuming the risk associated with that security.


- Risk-free rate $\left(\mathbf{R}_{\mathrm{f}}\right)$ : the return available on a security with no risk. Proxies often considered to measure $\mathbf{R}_{\mathrm{f}}$ are U.S. Treasury bills and bonds.
- Beta $\left(\boldsymbol{\beta}_{\mathrm{j}}\right)$ : the measure of market risk for security $j$.
- Market risk premium ( $\mathbf{R}_{\mathrm{M}}-\mathbf{R}_{\mathrm{f}}$ ): the expected rate of return for the market portfolio ( $\mathbf{R}_{\mathbf{M}}$ ) minus the risk-free rate $\left(\mathbf{R}_{\mathbf{f}}\right)$.


## What is Beta ( $\beta$ )?

- Beta measures the quantity of market risk in a security. The higher the quantity of risk, the higher the beta.
- The beta of the market equals one by definition. Thus, beta is < 1 for companies less risky than the market; and beta $>1$ for companies riskier than the market.
- Since the rates of return on utility common stocks are less variable than the market of common stocks as a whole, utility betas are lower than one.


## Cost of Common Equity

## Basic Discounted Cash Flow Model



- The DCF model shows that the cost of equity is a combination of the dividend yield on the stock plus growth in future cash flows (i.e., dividends).
- This model posits the stock price equals the sum of the discounted value of each dividend.
- Dividends are cash distributions from the company to stockholders of a portion of the company's earnings. Earnings equals revenues less accrued costs.


## Methods for Selecting Samples

- "Pure Play" Companies that operate primarily in the same industry as the Illinois utility service for which rates are under review.
- Credit Ratings measure default risk of fixed income securities rather than common equity risk but are a function of the same business and financial risks as common equity.
- Financial Ratio Analysis selects those utility companies with operating and financial ratios that are closest to Illinois utility.
> These three methods are NOT mutually exclusive. Staff often combines three or four approaches to select and evaluate samples


## Capital Structure

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The weighted average cost of capital is the sum of the weighted cost of each component of the capital structure. Each capital structure component cost is weighted by the ratio of the amount of that component to the amount of total capital.

