PRICE REGULATION & ACCOUNTING III:

Cost of Capital Overview

NARUC Energy Regulatory Partnership Program
The Public Services Regulatory Commission of Armenia
and The Iowa Utilities Board

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REVENUE REQUIREMENT = COST OF SERVICE

RR = O + D + T + **_ROR_** * (RB)

- RR = revenue requirement
- O = operating expenses
- D = depreciation expense
- T = taxes
- **_ROR = a fair rate of return_**
- RB = rate base

RATE OF RETURN

What goes into determining a fair rate of return?

- Simply speaking, it must include normal profits as well as interest on debt capital and dividends on preferred stock.

- Mechanically, we use a weighted average cost of capital (**WACC**) to calculate "**ROR**."

WACC EXAMPLE

	Amount	Percent	Cost Rate	Weight
Debt	$ 500	50%	6%	3.0%
Preferred Equity	$100	10%	8%	0.8%
Common Equity	$400	40%	12%	4.8%
Total	$1,000			8.6%

WACC: 6.0%*50% + 8%*10% + 12%*40% = 8.6%

COMPONENTS OF "ROR"

A number of component issues:

- Capital structure issues (Leslie)

- Senior securities rates (Leslie)

- Cost of Equity (Chancy)

COST OF EQUITY OVERVIEW

JUDICIAL GUIDANCE

- Bluefield (1923)

- Hope (1944)

- Permian Basin (1968)

BLUEFIELD (1923)

- "The return should be reasonably sufficient to _assure confidence in the financial soundness_ of the utility and should be adequate, under efficient and economical management to maintain and support its credit and to enable the utility to _raise (necessary capital)_."

- A fair return <u>can change</u> along with economic conditions and capital markets

HOPE (1944)

- "The return to the *equity* owner should be _commensurate with returns on investments in other enterprises having corresponding risks_. That return, moreover, should be sufficient to assure confidence in the _financial integrity_ of the enterprise, so as to maintain its credit and _attract capital_."

- It is the _end result_ that is important and not the methods used to arrive at the rates.

PERMIAN BASIN(1968)

"[T]he 'end-result' of the Commission's orders must be measured as much by the success with which they protect those (broad public) interests as by the effectiveness with which they maintain credit ... and ... attract capital."

WHAT MAIN STANDARDS COME FROM THIS JUDICIAL HISTORY?

- Comparable Earnings

- Financial Integrity

- Capital Attraction

- End-result Doctrine

WHAT FORM HAVE THESE STANDARDS TAKEN IN PRACTICE?

- These collectively reflect the economic concept of "opportunity cost" principle.

- A utility and its investors should be afforded an <u>opportunity</u> (not a guarantee) to earn a return <u>commensurate with returns</u> they could expect to achieve on investments of <u>similar risk</u>.

ARE THERE OTHER GUIDELINES TO ALSO CONSIDER?

- Balancing of investor and consumer interests.

- Efficient and economical management is a necessary prerequisite.

- No single rate can be considered fair at all times.

- Concept represents a "zone of reasonableness."

COST OF COMMON EQUITY

- What do investors **expect** (up front) as a return for investment of a given risk?

- We don't know!

  - Analysts use models and theories, using data from capital markets, to make <u>educated guesses</u>!

TYPICAL COST OF EQUITY MODELS

- Discounted Cash Flow Models (DCF)

- Risk Premium Models (RPM)

- Capital Asset Pricing Models (CAPM)

- Comparative Earnings Models (CEM)

VARIABILITY IN APPLICATION

- Some put main reliance on just one model - others argue for many.

- Form of models varies.

- Data inputs vary.

- Adjustments vary.

- Risk assessment varies.

- Proxies vary.

- <u>Judgment</u> needed at every step.

PROXIES

- Models require data.

- If utility is not publicly traded, then analysts use publicly traded companies whose risk is comparable to the utility's operations.

- Generally comparable companies (proxies) are analyzed in addition to utility or its parent.

DISCOUNTED CASH FLOW (DCF) MODEL

K = D/P + g, where:

- K= cost of equity estimate
- P = stock price per share
- D = dividend per share
- D/P = dividend yield
- g = sustainable growth rate

SIMPLE DCF EXAMPLE

Assume:

- P = $10;
- D = $1; and
- g = 2%

Calculation of cost of equity estimate:

- K = D/P + g
- K = $1/10 + 2% = 12%

RECENT CASE– DCF DIFFERENCES

	Utility	OCA	Intervener
Dividend	$D_0(1+0.5g)$	D_0	$D_0(1+g)$
Price	Spot & average of daily hi/lows for 2 months	Test year daily Average	Average of weekly hi/lows over 13 weeks
Growth	Analysts' 5-yr. forecasts of Earnings per Share	Emphasized history o Internal Growth o Book Value per Share	Analysts' 5-yr. forecasts of Earnings per Share
Proxies	o Electric o Combination Electric/Gas o Parent	o Combination Electric/Gas o Parent	o Group of Electric & Combination Electric/Gas

D_0 = Most recent indicated annualized dividend; OCA = Office of Consumer Advocate

RESULTING DCF ESTIMATES

Party	Methods Used	Results
Utility	Indicated DCF Return (using 18 utility proxies)	9.49 - 10.13%
Utility	Recommended DCF Return (rejecting 9 out of 18 utility proxies)	10.44 - 11.51%
OCA	DCF Return (using parent and 5 utility proxies)	8.6 - 10.1%
Intervener	2-stage growth DCF Return (using 17 utility proxies)	9.96%

RISK PREMIUM METHOD (RP)

- K = cost of debt + risk premium:

    - Based on assumption that riskier security deserves a higher return than less risky ones.

- Is it as easy as it looks?

    - Easy to add two numbers.
    - Difficult to ascertain the risk premium, an "unknown" that must be estimated.
    - Easy to mismatch the two numbers.

HOW ARE RISK PREMIUMS ESTIMATED?

- Historic (ex post) — comparing past returns on debt and equity.

- Expected (ex ante) — compares an estimated market cost of equity for a period with the yield on debt for that period.

- Survey.

- Implied RP — compares authorized returns with debt yields.

POINTS OF CONTENTION

- What bond yield to use for R_F ?

- Which periods to study?

    - RP estimates are very sensitive to time period studied

- Does the RP vary inversely with interest rates?

- Even how to calculate averages.

    - arithmetic versus geometric

BOARD RP METHOD

K = A-rated utility bond average + risk premium (RP), where RP ranges from 250 - 450 basis points.

Recent Case example:

K = 6.49% + (250 to 450) b.p. = 8.99% -10.99%

RP RESULTS IN RECENT CASE

Party	Methods Used	Results
Utility	RP using Utility Proxies	11.3 - 11.54%
Utility	RP using Deregulated Generation Proxies	14.25%
OCA	Did not use method	
Intervener	RP using Utility Proxies	9.96 - 10.06%
Board Method	Using latest 12-month average A-rated bond yield	8.99 - 10.99%

CAPITAL ASSET PRICING MODEL

K = R$_F$ + β (R$_M$ - R$_F$), where:

- K = required equity return
- R$_F$ = risk free rate
- β = beta (a measure of risk)
- R$_M$ = return on the market
- R$_M$ – R$_F$ = market risk premium

CAPM EXAMPLE

Assume:

- $R_F = 6.0\%$
- $\beta = 0.5$, not atypical for a utility
- $R_M = 14\%$

$K = 6.0\% + .05*(14\%-6.0\%) = 10\%$

POINTS OF CONTENTION

- What bond yield to use for R_F ?

- How to calculate R_M and on what market proxy?

- What betas to use?

- Arithmetic versus geometric averaging.

- Validity of CAPM sometimes an issue.

CAPM RESULTS IN RECENT CASE

Party	Methods Used	Results
Utility	CAPM using Utility Proxies	11.38 - 11.85%
Utility	CAPM using Deregulated Generation Proxies	15.12%
OCA	CAPM of Parent and Utility Proxies	9.3 - 10.1%
Intervener	CAPM	10.45%

COMPARABLE EARNINGS METHOD

- Examines realized earnings on book common equity for enterprises with comparable risks.

- The Board has rejected due to its emphasis on accounting returns rather than market returns.

BASIC APPROACH

- Select set of proxy companies by screening on a number of risk criteria:

  - Beta
  - Quality ratings, etc.

- Calculate average return on net worth of proxy companies.

- Adjust result as needed to reflect differences between proxies and utility.

ARGUMENTS FOR

- Easy to calculate.

- Uses readily available accounting data.

- Uses minimum amount of subjective judgment.

- Consistent with "corresponding risk" standard of <u>Bluefield</u> and <u>Hope</u> cases.

ARGUMENTS AGAINST

- Not a market-based cost of common equity.

- Does not measure the current cost of capital necessary to attract capital or investors' return requirements.

- Accounting practices among companies differ.

- Reflects survivor bias.

COMPARABLE EARNINGS RESULTS IN RECENT CASE

Party	Methods Used	Results
Utility	Comparable Earning Model using Utility Proxies	14.32 - 15.5%
Utility	Comparable Earning Model using Deregulated Generation Proxies	14.52%
OCA	Argued against	
Intervener	Argued against	

SUMMARY OF CASE

Analysis Considered by Board	Staff's Recommended Emphasis to Board
DCF Analysis	9.2 - 10.13%
Risk Premium Analysis	8.99 - 10.99%
CAPM Analysis	Limit weight
Comparable Earnings Analysis	Do not use
Average authorized returns—other states; for reality check only	10.3 - 10.4%
Resulting Board Decision**	**10.1%**

** Simplified for illustration. Actual Board decision also considered other variables.

TO SUM UP AND RECAP

- Judicial Standards support cost of equity capital as estimate of a fair rate of return on equity.

- Application of models present educated guesses.

- And from that, the Board chooses the <u>allowed return on equity</u> (which feeds into the WACC).

ANYTHING ELSE?

- Yes, it's not this simple!

- But this 1,000 foot flyover gives an overview.

- The job is to identify an island of rationality among the sea of conflicting data and theory.

- And like a pilot landing a plane, as long as the Board hits a zone of reasonableness, its doing it's job!

QUESTIONS?

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