The Cost of Capital for the Regulated Firm:

Background Issues

Neil Quigley
Industry Specific Regulation

- Industry specific regulation uses estimates of cost to set prices / revenues
  - Cost includes the competitive return on investment (cost of capital).
- Quite different from standard Commerce Act determinations of the past
  - Public benefits (counterfactual)
  - Use of market power
Commerce Commission Consideration of the Cost of Capital

- Airports
- Electricity Lines
- Fonterra
- TSO business of Telecom
  (supply of local access services to commercially non-viable customers)

Time for an assessment of the trends
Significance

• If the WACC is too high the network operator is over-compensated and investment is encouraged.

• If the WACC is too low, the network operator is under-compensated and investment will be discouraged.

• Very large dynamic efficiency costs of a WACC that is too low.
Regulated Industries

• Associated with substantial fixed and irreversible investment

• Implications:
  – The location as well as the quantum of investment, matters
  – Options created and destroyed by regulation or investment have substantial value
Regulated Industries

• Regulation sets a maximum return not a guaranteed return

• Regulated firm is exposed to competition, technical change and movements in customers that will affect return:
  – The risk of asset stranding is material
The Commission’s Approach

The weighted average cost of capital (WACC) as measured by a post-tax form of the capital asset pricing model (CAPM)

=  

The appropriate measure of the rate of return required by investors in regulated firms
The Commission’s Approach

Key drivers of the WACC are:

• Risk-free rate
• Market Risk Premium
• Beta – a measure of the sensitivity of asset returns to market returns
The Commission’s Approach

• Only systematic risk matters

“...the TSO cost of capital is only concerned with compensation for non-firm specific risk, and therefore firm-specific risks ...need not be compensated..”

– An assumption of the model and a statement of fact?
The Commission’s Approach

• Firms with similar elasticities of demand and regulatory review periods, but in different industries, will have comparable asset betas.

Unregulated firms in the same industry are not comparable: they share industry-specific rather than systematic risk, and systematic risk does not affect beta.
The Commission’s Approach

Incentive regulation affects only firm-specific risk so does not affect the required return.

\[
\text{RoR for Rate of Return Regulation} = \text{RoR for Price Cap (incentive) Regulation}
\]
The Commission’s Approach

• Firm-specific risk should be captured in the cash flows rather than reflected in the required rate of return.

– What does this mean?
The Commission’s Approach

• Possible interpretations:
  – Investors do not require compensation for firm specific risk
  – The risk is symmetrical around the expectation and therefore offsetting
  – The expected cash flows are adjusted to compensate for both the expectation and the uncertainty around that expectation
  – Full ex post compensation for firm specific risk is to be provided through adjustment of the cash flows
The Commission’s Approach

If regulation:

Reduces systematic risk (eg insulating cash flows from market shocks),

But

Increases firm-specific risk (eg. greater exposure to competition)

The required rate of return falls.
<table>
<thead>
<tr>
<th>Type</th>
<th>WACC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity Lines</td>
<td>6.9%</td>
</tr>
<tr>
<td>Airports - Auckland</td>
<td>8.4%</td>
</tr>
<tr>
<td>Airports – Wellington</td>
<td>9.3%</td>
</tr>
<tr>
<td>Airports – Christchurch</td>
<td>8.9%</td>
</tr>
<tr>
<td>TSO</td>
<td>6.0%</td>
</tr>
</tbody>
</table>
Why Do Airports Have A Higher WACC?

- Higher income elasticity of demand
- No fixed price element in charges
- Competition and technical change may provide greater risk of stranding in electricity lines and telecommunications, but (in the CAPM) this does not affect the required return
The Commission’s Approach

• The risk-free rate should be the rate of return on government bonds
  – at the beginning of the regulatory period and
  – having the same duration as the regulatory period.
The Acid Test

• Is the Commission’s approach appropriate for the task of calculating the rate of return required by investors in regulated firms?
The Cost of Capital for the Regulated Firm:

Summary and Conclusion

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CAPM

• Assumptions are unrealistic
  – This is not unusual in theoretical models
  – CAPM has no role for the issues that have been the focus of microeconomics for 30 years (e.g., information asymmetries)

• Inconsistent with practitioner evidence

• Widespread skepticism about rate of return estimates based on the CAPM
Assumptions and Conclusions

- The exclusion of firm specific risk rests on the perfect market assumptions of the CAPM.
- The claim that specific risk does not affect the required rate of return is an assumption of the CAPM, not an empirical fact.
- Rejecting compensation for specific risk because it does not affect the required rate of return in the CAPM effectively offers assumptions as conclusions.
No Easy Solution

• Hard to “prove” alternative views
• Can’t value every option
• No simple model of how to make adjustments for the limitations of CAPM.
• Declining to acknowledge the limits of the CAPM is not an adequate response.
Term of the Risk Free Rate

- Substantial implications for the WACC
- Clear in respect of rate of return regulation, but has no role for specific risk associated with incentive regulation
- A major challenge for those who use the long-term rate
  - If long rates just provide some adjustment for firm-specific risk, it is time to develop a better and more explicit methodology.
Asset Beta

• In a rate of return framework and CAPM world, shocks that are fully compensated by the regulator will not affect Beta

• Firm specific risk in a regulatory framework where compensation is not provided is still to be addressed
  – This issue assumes greater importance under incentive regulation than it did with rate of return regulation
Asset Stranding

• A specific example of violation of the assumptions of the CAPM
  – Irreversible investment given uncertain demand
Asset Stranding

• Rate of return regulation imposes risk on customers, whereas incentive regulation imposes risk on the firm’s shareholders.
  – Other things equal, the CAPM says that investors will require the same rate of return under both regimes.
Regulated Industries

• High levels of firm specific risk associated with irreversible investment
  – Often exacerbated by the effects of regulation

• Greater divergence between the CAPM and the market’s required return than in other industries
Overall

- The Commission has provided a rigorous application of the CAPM, and has advanced our understanding of its application to regulated industries.
- The assumptions of the CAPM are unrealistic, and strong enough to drive perverse conclusions about the rate of return where market risk is small and specific risk is large.
Overall

• The limitations of CAPM are most apparent under incentive regulation
  – Systematic risk is relatively low and specific risk is relatively high

• The CAPM provides a starting point for thinking about the required return for the regulated firm, not the end point.