Calculating The Cost of Capital:

Background Issues

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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)
- Gas Pipelines

*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.
Infrastructure 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

• Only systematic risk (captured in beta) 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.

\[ \text{RR for Rate of Return Regulation} = \text{RR for Price Cap (incentive) Regulation} \]

• Capture firm specific risk in the cash flows (?)
The Commission’s Approach

- 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>Asset Beta</th>
<th>WACC[1]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity Lines</td>
<td></td>
<td>6.9%</td>
</tr>
<tr>
<td>Airports - Auckland</td>
<td></td>
<td>8.4%</td>
</tr>
<tr>
<td>Airports – Wellington</td>
<td></td>
<td>9.3%</td>
</tr>
<tr>
<td>Airports – Christchurch</td>
<td></td>
<td>8.9%</td>
</tr>
<tr>
<td>Gas Pipelines</td>
<td></td>
<td>6.1 – 8.5%</td>
</tr>
<tr>
<td>TSO</td>
<td></td>
<td>7.1%</td>
</tr>
</tbody>
</table>
Why Do Airports Have A Higher WACC?

• Higher income elasticity of demand
• No fixed price element in charges
• Greater risk of stranding in gas, electricity lines and telecommunications, but (in the CAPM) this does not affect the required return
The Acid Test

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

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 on the CAPM
Assumptions and Conclusions

• 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

• No simple model of how to make adjustments for the limitations of CAPM
• Can’t value every option
• Using the long-term bond for the risk free rate introduces a premium but is theoretically unsatisfactory
• Declining to acknowledge the limits of the CAPM is not an adequate response
Asset Stranding

- A specific example of violation of the assumptions of the CAPM
  - Irreversible investment given uncertain demand
- Assumes much more importance under incentive regulation than it did under rate of return regulation
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

• Great 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.