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# Calculating The Cost of Capital:

# Background Issues

Neil Quigley

# 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.

RR for Rate of Return Regulation

**=**

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.

| Type | Asset Beta | WACC[1] |
|---|---|---|
| Electricity Lines | | **6.9%** |
| Airports - Auckland | | **8.4%** |
| Airports – Wellington | | **9.3%** |
| Airports – Christchurch | | **8.9%** |
| Gas Pipelines | | **6.1 – 8.5%** |
| TSO | | **7.1%** |
| | | |

# 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?

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# 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 (eg. 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 retun 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


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# 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.