



**NEW ZEALAND INSTITUTE FOR THE STUDY  
OF COMPETITION AND REGULATION INC.**

# **The WACC: A Sceptic's View**

Glenn Boyle

*ISCR*

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## **CORPORATE MEMBERS**

Contact Energy Ltd

Fonterra Co-operative  
Dairy Group Limited

Meridian Energy Ltd

New Zealand Post Ltd

NGC

Powerco

Telecom Corporation  
of New Zealand Ltd

Transpower New Zealand Ltd

Vector Ltd

Victoria University of Wellington

Westpac Institutional Bank

# Standard Approach to Cost of Capital

- Use CAPM to estimate expected return on equity.
- Combine with observed cost of debt to estimate WACC: min expected return sufficient to cover debt costs and provide acceptable return to stockholders.
- EITHER use WACC to calculate NPV  
OR compare WACC (hurdle rate) with IRR.

# Technical Assumption

Can use financial market prices to value new projects.

- But new project cannot alter set of available investment opportunities (Spanning)
- If it does, its introduction changes risk of existing securities
- Then cannot use current securities prices to infer risk of new project

# Spanning

- “(Without spanning), much of what is taught on capital budgeting would go out the window.” (Martin Weingartner, Journal of Finance, 1977)
- Hope that financial markets are sufficiently deep and liquid

# Some implications of the Standard Approach

- Only systematic risk matters
- Cost of capital for any project is the same regardless of the firm that undertakes it.
- Project that could wipe firm out can have same (or lower) cost of capital than safer project.

# Example

(Rene Stulz, FPE, 1999)

- Firm has market value of \$120m and cash of \$110m
- Coin toss: Heads +\$102m; Tails -\$100m
- No systematic risk; no time value
- WACC = 0
- NPV = \$1m > 0

**BUT WOULD ANY SANE FIRM TAKE IT?**

# Problems with the Standard Approach

Standard Approach takes no account of

- total risk (volatility)
- indirect costs

In a perfect static world, these don't matter

In an imperfect dynamic world, former creates latter.

# The Standard Approach and Total Risk: The CAPM

John Cochrane:

- "We once thought that the CAPM provided a good description of why average returns on some stocks, portfolios, funds, or strategies were higher than others. Now we recognise that the average returns of many investment opportunities cannot be explained by the CAPM..."
- "In sum, it now appears that investors can earn a substantial premium for holding dimensions of risk unrelated to market movements..."



# The CAPM cont.

- CAPM can only explain at most 11% of variation in NZ stock returns
- "Relying on the CAPM ... for cost of capital calculations ... is dubious." (Bartholdy et al, 1997)

# Why does the CAPM perform poorly?

- Parameter measurement errors
- Missing factors: Non-traded assets
  - high (low) demand for good (bad) hedges
- Human Capital
  - prefer stocks that do well in recessions

# Two-beta CAPM

(Campbell and Vuolteenaho, 2003)

- Betas reflect common variation in cashflows?
- “Whether (gold prospectors) strike it rich is not likely to depend on the performance of the market portfolio  
Therefore, an investment in gold has a high standard deviation but a relatively low beta.” (Brealey and Myers, 1991)
- Ignores common variation in expected returns (discount rates)
- So actually have two sources of beta risk, each with different premium
- Two-beta model works better

# The Standard Approach and Indirect Costs

- New project that costs  $I$  changes firm value  $F$  by

$$(F_{\text{after}} - F_{\text{before}}) = (V^{\text{project}} - I) + (A_{\text{after}} - A_{\text{before}})$$

- So

$$WACC^+ = WACC (1 + \Delta A/I)$$

$$\text{for } \Delta A = (A_{\text{after}} - A_{\text{before}})$$

# Indirect Costs I: Market frictions

- Project with high total risk can weaken the firm's financial position
- Weaker financial position can adversely affect value of other firm projects/opportunities: indirect cost
- Standard approach assumes financing is unconstrained and costless, i.e., frictionless market: firm's financial position has no effect on cost of project

# Example: Catastrophe Reinsurance

- High volatility of returns on catastrophe reinsurance, but diversifiable and thus should not command a risk premium
- In 1996, Berkshire Hathaway agreed to sell \$1.05 billion of reinsurance to the California Earthquake Authority
  - Probability of BH having to pay anything = 1.7%
  - Premium was \$113 million (633% of the expected loss!) vs SA premium of \$17.85 million

# Indirect Costs II: Timing Flexibility

- Most projects can be delayed and are at least partly irreversible
- Firm holds an 'option' to invest at the 'best' date
- When investment begins, firm sacrifices option
- 'Loss' of option is an additional cost of project
- More total risk makes option more valuable

# Indirect Costs III: Other Sources

- Asymmetric information
- Subordinated securities
- Human resource constraints



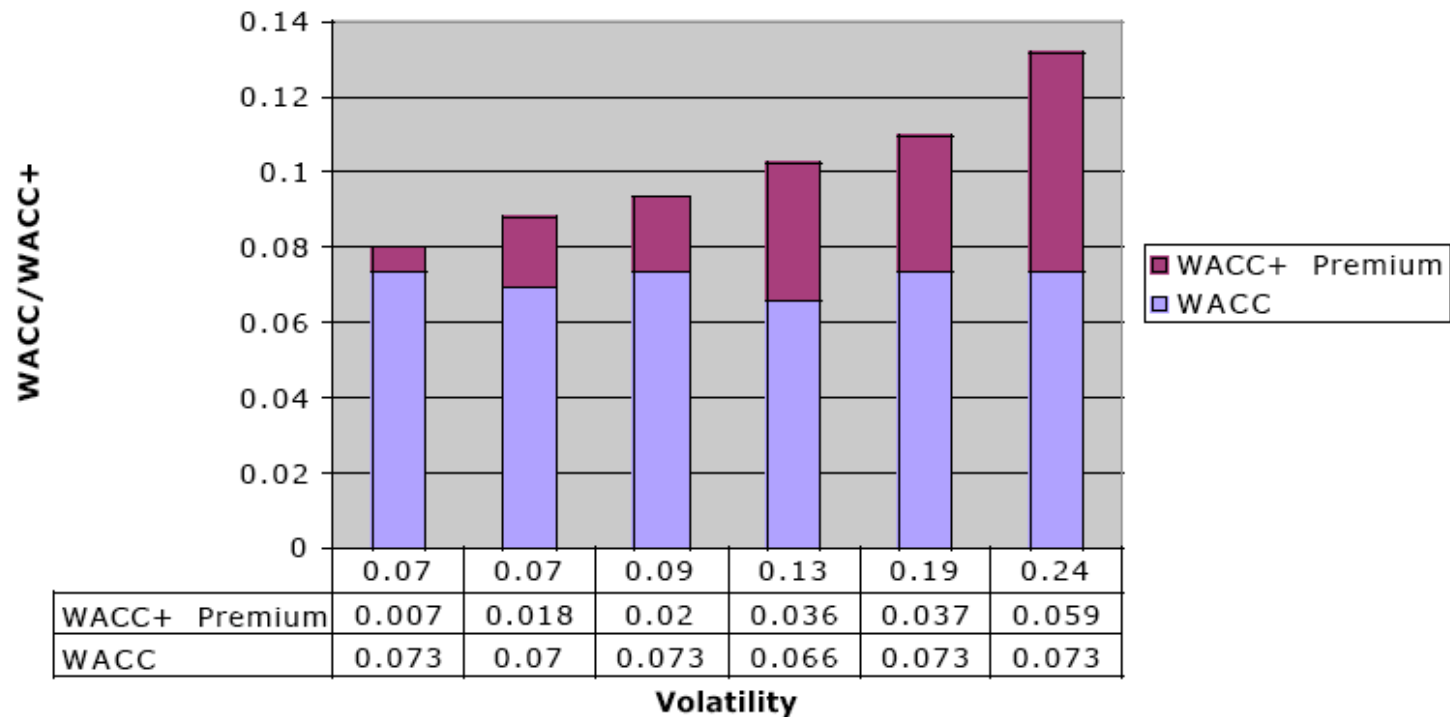
# Conclusion

**TOTAL RISK MATTERS!**



# How much does total risk matter?

**BOYLE AND GUTHRIE ESTIMATES**



# Summary

- Systematic risk matters, but so does total risk
- Quantifying how much total risk matters isn't easy
- Popular 'rules-of-thumb' may be justified after all.