

THE REGULATORY COST OF CAPITAL II: WHAT IS THE MARKET RISK PREMIUM?

GLENN BOYLE
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21 JUNE 2005

CORPORATE MEMBERS

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The Market Risk Premium

- **What is it?**
- **Why is it important?**
- **How can it be estimated?**



Why is the Market Risk Premium so important?

- $WACC_j = \alpha E[R_j] + (1-\alpha)E[r_j]$
- So need an estimate of $E[R_j]$
- CAPM: $E[R_j] = R_f + \beta_j\{E[R_m] - R_f\}$

Or

$$E[R_j] = R_f + \beta_j(\text{MRP})$$



CAPM Parameters

- R_f relatively easy to estimate
- Very little information about β in most cases
- MRP not observable, but LOTS of data



Estimation Methods

- **Historical**
- **Forward-looking**
- **Fundamental**



DO WE REALLY NEED TO KNOW THE MARKET RISK PREMIUM?

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Depends which one...

- MRP must depend on risk
- So MRP varies through time
- $E[R_m - R_f]$ or $E_t[R_m - R_f]$?

Unconditional or Conditional ?



In practice...

- Usual *implementation* of CAPM ignores time variation in risk.
- Usual *statement* of CAPM throws away important content: ignores CAPM predictions for MRP itself.



The CAPM

- $E[R_j] = R_f + \beta_j \{E[R_m] - R_f\}$
- **Relative pricing model: Circularity**
- **Market risk premium a free parameter: ignores CAPM predictions**
- **Overlooks important equilibrium condition**



Efficient Set Maths

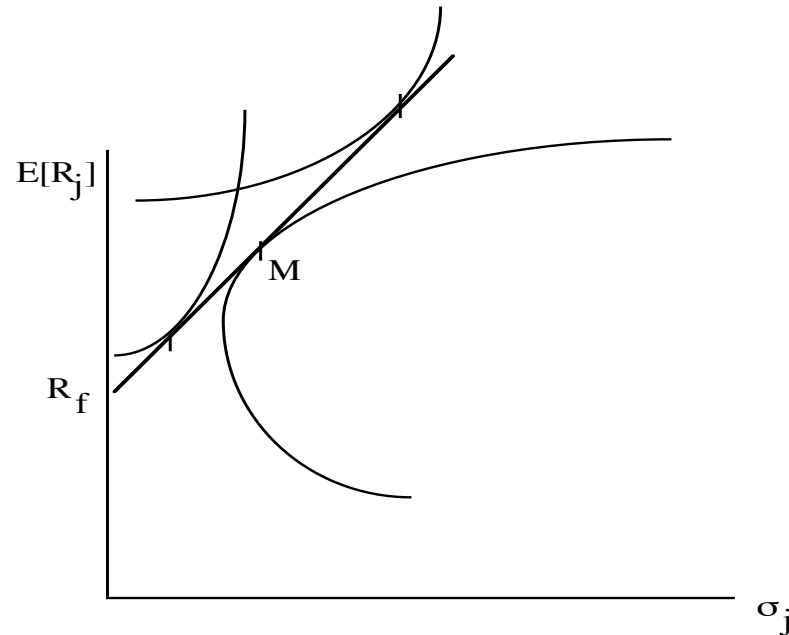
- For any efficient portfolio e

$$E[R_j] = (1-\beta_{je})R_f + \beta_{je} E[R_e]$$

- Demand equals supply for all risky assets
 $E[R_j] = (1-\beta_j)R_f + \beta_j E[R_m]$
- But ignores requirement that riskless asset market clears



Graphically



- **Excess of riskless borrowing over lending, so can't be full market equilibrium.**
- **Market risk premium must fall**

Riskless Asset Equilibrium

- $E[R_m] - R_f = (1/\gamma) \sigma_m^2$

where $1/\gamma$ is the average risk aversion of all investors

- In full CAPM equilibrium, market risk premium isn't a free parameter



Intuition

$$\{E[R_m] - R_f\} / \sigma_m^2 < (>) 1/\gamma$$

⇒ Rate at which market portfolio *offers* to trade off risk and return is less (greater) than the rate required by investors

⇒ MRP rises (falls)



Practical Advantages

- **Conditional versus unconditional estimates**

$$E_t[R_m - R_f] = (1/\gamma) \sigma_{mt}^2$$

- **Precision of the variance estimate:
increases with the number of observations**

**Precision of expected return estimate:
increases only with length of the data series**



Practical Disadvantages

- γ unobservable
- **Solution**
 - Assume constant γ**
 - Use unconditional version of MRP equation**
$$1/\gamma = \{E[R_m] - R_f\} / \sigma_m^2$$
 - Substitute this back into conditional version**

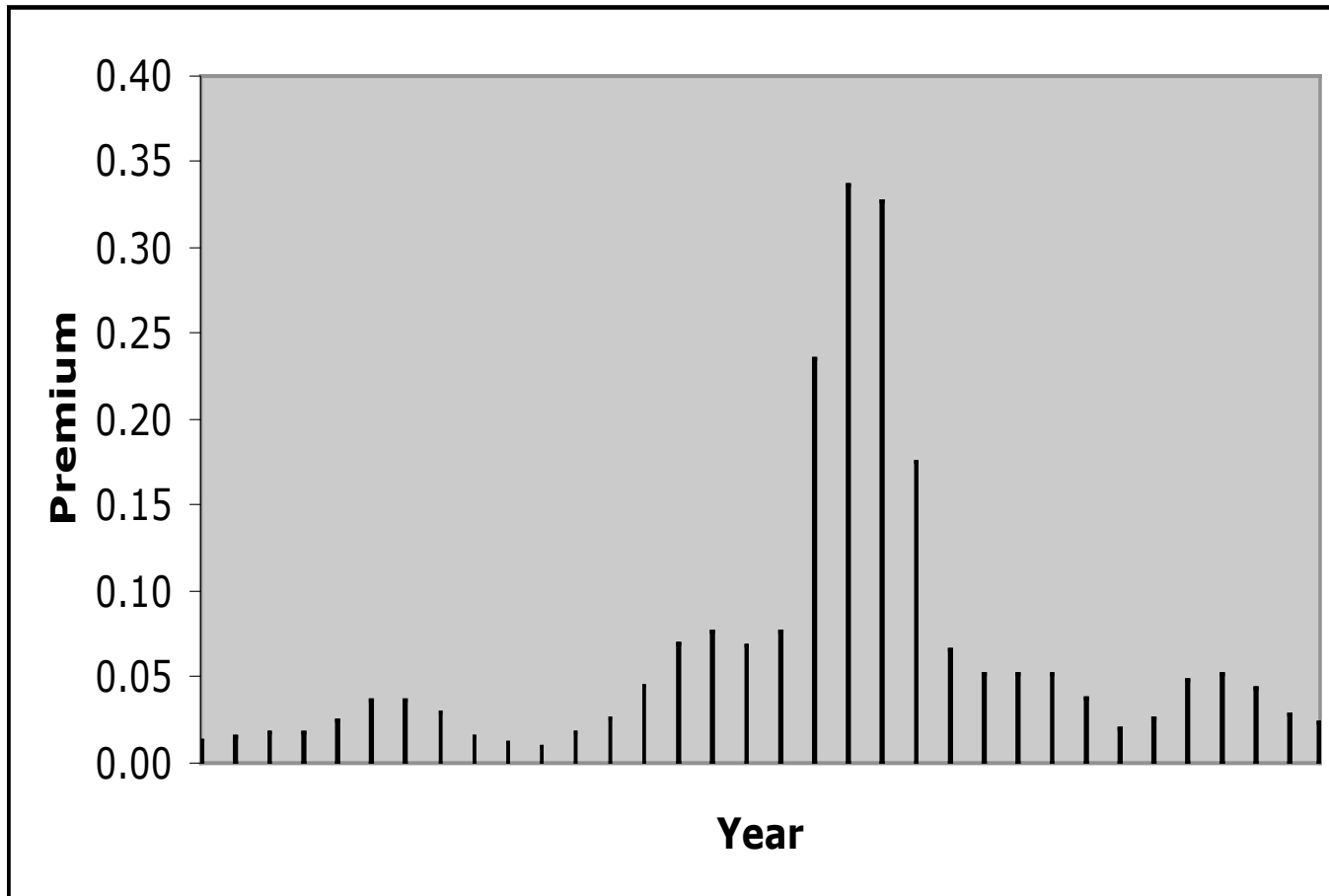


NZ Data Application

- $1/\gamma = 1.42$ (Lally and Marsden, 2004)
- **Conditional σ^2_m estimated from 36 months prior returns**



Results



Results cont

Time-Variation in the Market Price of Risk: Summary Statistics

	Average	Maximum	Minimum
<i>Full Sample</i>			
1970-2003	0.064	0.336	0.009
<i>Sub-Samples</i>			
1970-79	0.021	0.037	0.011
1980-89	0.096	0.336	0.009
1990-2003	0.071	0.327	0.020



Questions

- **Is it really plausible that the price of risk went from less than 1% in the early part of the 1980s to more than 30% by the end?**
- **Does it seem reasonable that the average-risk firm (i.e., $\beta_j = 1$) in 2003 had a cost of equity only 2.3 percentage points above the riskless rate of interest?**



Conclusion

- **Not good news for CAPM-based approaches to estimating the cost of capital.**
- **Using standard CAPM in applications requires a willingness to ignore both theoretical consistency (equilibrium in all markets) and empirical reality (time-variation in market risk).**
- **But fundamental approach leads to implausible swings in estimates.**



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Some Concluding Thoughts

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Summary of current MRP Estimates (non-tax-adjusted)

HISTORICAL: 3.4% - 6.3%

FORWARD-LOOKING: 2.8% - 5.8%

RISK-BASED: about 2%



Conclusion

- **Discussion will continue...**
- **Estimating MRP far from an exact science**
- **Will the MRP continue to be so important?**

