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

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21 JUNE 2005
The Market Risk Premium

- What is it?
- Why is it important?
- How can it be estimated?
Why is the Market Risk Premium so important?

- \( \text{WACC}_j = \alpha E[R_j] + (1-\alpha)E[r_j] \)

- So need an estimate of \( E[R_j] \)

- \( \text{CAPM: } E[R_j] = R_f + \beta_j(E[R_m] - R_f) \)

Or

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

- $R_f$ relatively easy to estimate
- Very little information about $\beta$ 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

- \( E[R_m] - R_f = \left( \frac{1}{\gamma} \right) \sigma^2_m \)
  where \( \frac{1}{\gamma} \) is the average risk aversion of all investors

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

\[ \frac{E[R_m] - R_f}{\sigma^2_m} < (>) \frac{1}{\gamma} \]

\[ \Rightarrow \] Rate at which market portfolio offers to trade off risk and return is less (greater) than the rate required by investors

\[ \Rightarrow \] MRP rises (falls)
Practical Advantages

• Conditional versus unconditional estimates

\[ E_t[R_m - R_f] = \frac{1}{\gamma} \sigma^2_{mt} \]

• 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

- \( \gamma \) unobservable

- Solution
  i. Assume constant \( \gamma \)
  ii. Use unconditional version of MRP equation
      \[
      1/\gamma = \frac{\{E[R_m] - R_f\}}{\sigma^2_m}
      \]
  iii. Substitute this back into conditional version
NZ Data Application

- $1/\gamma = 1.42$ (Lally and Marsden, 2004)

- Conditional $\sigma^2_m$ estimated from 36 months prior returns
Results
### Results cont

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

<table>
<thead>
<tr>
<th></th>
<th>Average</th>
<th>Maximum</th>
<th>Minimum</th>
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<tbody>
<tr>
<td><strong>Full Sample</strong></td>
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<td></td>
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<tr>
<td>1970-2003</td>
<td>0.064</td>
<td>0.336</td>
<td>0.009</td>
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<tr>
<td><strong>Sub-Samples</strong></td>
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<tr>
<td>1970-79</td>
<td>0.021</td>
<td>0.037</td>
<td>0.011</td>
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<tr>
<td>1980-89</td>
<td>0.096</td>
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<tr>
<td>1990-2003</td>
<td>0.071</td>
<td>0.327</td>
<td>0.020</td>
</tr>
</tbody>
</table>
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?