Derivation of WACC margins

Market Frictions

I use equation (3) in Kerins et al (2003) which, in familiar notation, states

$$k_e = R_f + (\sigma_p/\sigma_m)\ MRP \qquad (1)$$

where:

k_e is the cost of equity capital

σ_p is the standard deviation of returns on the project

σ_m is the standard deviation of returns on the market portfolio

R_f is the riskless interest rate

MRP is the market risk premium

To apply equation (1) to NGC, I estimate σ_p and σ_m using daily returns data for the year ending 31 July 2003. This yields

$$\hat{\sigma}_m = 0.100 \qquad \text{(from the SE40 gross index)}$$

$$\hat{\sigma}_p = 0.267$$

I also use van Zijl and Verster's (2003) estimates for R_f and MRP

$$R_f = 0.0586$$

$$MRP = 0.09$$

Plugging all these back into equation (1) yields

$$k_e = 0.0586 + (0.267/0.100)\ 0.09 = 0.299 \qquad ||$$

Timing Flexibility

I use the hurdle rate formula derived in McDonald (1999) and Jagannathan and Meier (2002). In familiar notation, this states

$$WACC^{+} = (WACC - \delta) + \delta \left(\frac{b}{b-1}\right)$$

so that

$$WACC^{+} - WACC = \frac{\delta}{b - 1}$$

where:

δ is the project's 'dividend yield'

$$b = \left(\frac{1}{2} - \frac{R_f - \delta}{\sigma_p^2}\right) + \sqrt{\frac{2R_f}{\sigma_p^2} + \left(\frac{1}{2} - \frac{R_f - \delta}{\sigma_p^2}\right)^2}$$

Based on NGC's \$0.09 dividend and a current market price of \$1.60, I set δ equal to 0.056. Combined with the estimates for R_f and σ_p listed above, this yields

$$WACC^{+} - WACC = \frac{0.056}{0.836} = 0.067$$

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