An updated estimate of the required return on equity

REPORT PREPARED FOR ERGON ENERGY

July 2015

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1 Background and conclusions

1.1 Overview and instructions

1 SFG Consulting (**SFG**) has been retained by a number of businesses, including Ergon Energy, to prepare a series of reports on the estimation of the required rate of return on equity under the new National Electricity Rules (**NER**). In particular, SFG prepared a report dated 6 June 2014 and titled *The required return on equity for regulated gas and electricity network businesses* and a further report dated 25 February 2015 and titled *The required return on equity for the benchmark efficient entity*.

2 In some of our previous work in relation to the return on equity for the benchmark efficient entity, we were requested to advise how the AER's preferred foundation model, the Sharpe-Lintner Capital Asset Pricing Model (**SL CAPM**), would need to be estimated in order to make appropriate use of all relevant estimation methods, financial models, market data and other evidence as required under the NER, in order to produce an estimate that best reflects the efficient financing costs of the benchmark firm. As would be expected, the resulting estimate is equivalent to the estimate we would recommend using a multi-model approach.[1] Thus, the estimates of the final return on equity from the multi-model approach that are set out in this report are identical to the estimates that we would obtain from our implementation of an SL CAPM foundation model – because they reflect the same pieces of relevant evidence being given the same weight.

3 In November 2014, SFG merged with Frontier Economics and hence this update is provided as a Frontier Economics report. Specifically, we have now been retained by Ergon Energy to update the estimates from our previous report to account for new data that has become available since the previous report was prepared. In particular, this report uses an updated estimate of the risk-free rate based on a 20-day averaging period that ends on 17 July 2015.

1.2 Conclusion

4 In our view, as at 17 July 2015, the best estimate of the required return on equity for the benchmark efficient entity is 10.11%.

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[1] In our view, models other than the SL CAPM are also relevant and should be estimated with those estimates used to inform the allowed return on equity. Our preferred multi-model approach simply estimates each of the relevant models and assigns each weight based on their relative strengths and weaknesses. Under the AER's foundation model approach, all other evidence must be incorporated by making adjustments to SL CAPM parameters. If the appropriate adjustments are made to properly reflect the evidence from other models, the final result will be identical.

2 Risk-free rate

5 In this report we adopt a 20-day averaging period ending on 17 July 2015. The average yield on 10-year Commonwealth government bonds (expressed as an annualised return) is 3.02% p.a.

3 Market risk premium

3.1 Historical excess returns

6 The historical excess return estimate of MRP uses annual data, updated at the end of each calendar year. Consequently, no additional data has become available since our previous report and this estimate remains unchanged.[2]

3.2 Wright estimate

7 The Wright approach begins with a long-term historical estimate of the average real return on a broad market portfolio. This calculation also uses annual data, so the average real return on the market portfolio remains unchanged from our previous report. This real return is then converted into a nominal return using expected inflation. We adopt the same inflation estimate as in our previous report, 2.5% p.a. Consequently, the resulting estimate of the required return on the market remains unchanged from our previous report, as set out in Table 1 below.

8 Under the Wright approach, the MRP is estimated by subtracting the contemporaneous risk-free rate from the estimate of the nominal market return. Since this report adopts a lower risk-free rate, the estimate of MRP rises accordingly.

3.3 Dividend discount model

9 As for the Wright approach, the DDM produces an estimate of the required return on the market portfolio. No additional data has become available since our earlier report, in which case the estimate of the required return on the market remains unchanged, as set out in Table 1 below.

10 Under the DDM, the MRP is estimated by subtracting the contemporaneous risk-free rate from the estimate of the nominal market return. Since this report adopts a lower risk-free rate, the estimate of MRP rises accordingly.

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[22] The calculations throughout this report have all been performed using numbers computed to many decimal places. All intermediate calculations are reported to two decimal places. Consequently, figures may not add exactly due to rounding errors. That is, the final calculations have been performed using inputs with many decimal places of accuracy, rather than as calculations based on the rounded (to two decimal places) estimates of various inputs.

3.4 Independent expert reports

11 In our previous report, we noted that independent expert reports uniformly quote estimates of MRP that do not include imputation credits. We adopted a (conservative) estimate of 6% for this ex-imputation MRP. We continue to adopt that estimate in this report.

12 Our previous report also demonstrated how to convert an ex-imputation estimate of MRP into a with-imputation estimate of MRP, as required by the Australian regulatory process. This procedure is set out in Officer (1994) and is currently used by IPART. This procedure depends, in part, on the contemporaneous risk-free rate. Since we adopt a different risk-free rate in this report, our independent expert report estimates of the required return on the market and MRP vary somewhat from our earlier report.

3.5 Summary

13 Our updated estimates of MRP, are summarised in Table 1 below. As for our previous report, we adopt an estimate of theta of 0.35, and an estimate of gamma of 0.25.

14 We apply the same relative weights to the various estimates as were employed in our previous report, for the same reasons as set out in our previous report.

15 We consider that the final estimates set out in Table 1 below are commensurate with the prevailing conditions in the market for equity funds in July 2015.

Table 1: Estimates of the required return on the market and MRP

Method	MRP	Required return on the market	Weighting
Historical excess returns	**6.56%**	**9.58%**	**20%**
Historical real returns (Wright)	**8.62%**	**11.64%**	**20%**
Dividend discount model	**8.35%**	**11.37%**	**50%**
Independent expert valuation reports	**6.97%**	**9.99%**	**10%**
Weighted average	***7.91%***	***10.93%***	***100%***

Source: Risk-free rate of 2.85% for 20-day period ending 17 July 2015. Gamma set to 0.25, theta to 0.35. Calculation methods and justification for weighting scheme is set out in SFG (2014).

4 Financial models

4.1 Sharpe-Lintner CAPM

16 For the Sharpe-Lintner CAPM, we adopt a risk-free rate of 3.02% and an expected return on the market of 10.93%, which equates to a market risk premium of 7.91%, as set out above. We maintain the CAPM beta estimate of 0.82 from our previous report. This produces an estimate of the required return on equity of 9.48%:

$$\begin{aligned} r_e &= r_f + \beta(r_m - r_f) \\ &= 3.02\% + 0.82(10.93\% - 3.02\%) = 9.48\%. \end{aligned}$$

4.2 Black CAPM

17 For the Black CAPM, we adopt the zero-beta premium of 3.34% from our previous report. Adding this to the risk-free rate of 3.02% provides an estimate of the required return on a zero-beta asset of 6.36%. Consequently, the required return on equity is estimated as:

$$\begin{aligned} r_e &= r_z + \beta(r_m - r_z) \\ &= 6.36\% + 0.82(10.93\% - 6.36\%) = 10.09\%. \end{aligned}$$

4.3 The Fama-French three-factor model

18 When estimating the Fama-French model, we revise our estimates of the risk-free rate (3.02%) and the required return on the market portfolio (10.93%), as set out above. In all other respects, we adopt the same parameter values as in our previous report.

19 Consequently, the Fama-French model produces an estimate of the ex-imputation required return on equity of 10.10%:

$$\begin{aligned} r_e &= r_f + \beta \times MRP + s \times SMB + h \times HML \\ &= 3.02\% + 0.78(10.93\% - 3.02\%) - 0.19\% + 1.15\% = 10.10\%. \end{aligned}$$

4.4 Dividend discount model

20 As in our previous report, we use the dividend discount model to estimate the required return on equity for the benchmark firm by using the fact that the risk premium for comparable firms averages 94% of the risk premium of the market.

This implies a dividend discount model estimate of the with-imputation required return of the benchmark comparable firm of 10.45%.[3]

4.5 Aggregation of available evidence

21 The estimates of the (with-imputation) required return of the benchmark firm are set out in Table 2 below. We apply the same weights to each estimate for the same reasons as set out in our earlier report. The resulting estimate of the required return on equity for the benchmark firm is 10.11%.

Table 2: Estimates of the required return on equity for a benchmark efficient entity

Method	Return on equity	Weighting
Sharpe-Lintner CAPM	**9.48%**	**12.5%**
Black CAPM	**10.09%**	**25.0%**
Fama-French model	**10.10%**	**37.5%**
Dividend discount model	**10.45%**	**25.0%**
Weighted average	***10.11%***	***100%***

Source: Risk-free rate of 2.85% for 20-day period ending 17 July 2015. Gamma set to 0.25, theta to 0.35. Calculation methods and justification for weighting scheme is set out in SFG (2014).

22 We have also been asked to compute the overall required return on equity based on a simple equally-weighted average over the estimates from the four relevant financial models. The simple average is 10.03%.

[3] 3.02 + 0.94 × 7.91 = 10.45.

5 References

SFG Consulting, 2014, *The required return on equity for regulated gas and electricity network businesses*, 6 June.

SFG Consulting, 2015, *The required return on equity for the benchmark efficient entity*, 25 February.

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