Cost of equity: Update report for Jemena Gas Networks' averaging period – 19 January to 16 February 2015

Report for Jemena Gas Networks

27 March 2015

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Contents

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1. Preparation of this report

1. This report was prepared by Professor Stephen Gray and Dr Jason Hall. Professor Gray and Dr Hall acknowledge that they have read, understood and complied with the Federal Court of Australia's *Practice Note CM 7, Expert Witnesses in Proceedings in the Federal Court of Australia*. Professor Gray and Dr Hall provide advice on cost of capital issues for a number of entities but have no current or future potential conflicts.

1. Preparation of this report

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2. Introduction

2.1   Overview and instructions

1.   SFG Consulting has been retained by Jemena Gas Networks (**JGN**) to provide an update report in which we estimate the required return on equity for a benchmark energy network, using a risk free rate estimated over the averaging period of 19 January to 16 February 2015. We have been asked to note that yields on Commonwealth Government Securities have fallen since the AER draft decision for JGN and assess what, if any, impact this reduction has had on the required return on equity.

2.   On the 27th of November 2014 the Australian Energy Regulator (**AER**) released a draft determination for JGN. The determination relates to the five year regulatory period from 1 July 2015 to 30 June 2020. In the AER's draft determination for JGN, the AER relied upon an estimate of the risk-free rate of 3.55% estimated over 20 trading days from 17 September to 15 October 2014.[1] The AER also estimated the market risk premium at 6.50%.[2] So at the time of the draft determination for JGN the AER determined that the expected return on the market was 10.05%.[3]

3.   In response to the draft determination, JGN submitted an expert report authored by us entitled *The required return on equity for a benchmark efficient entity*[4] (**earlier report**). In the earlier report we set out a figure for the risk free rate of interest of 2.64% estimated over the 20 trading days from 2 January 2015 to 30 January 2015.[5] In our earlier report we found that an appropriate estimate of the market risk premium was 8.17%.[6] So the earlier report calculated the expected return on the market to be 10.81%.[7] Our estimate of the market risk premium was based upon a weighted average of market risk premium estimates implied by historical excess returns, historical real returns, survey evidence and analyst earnings and dividend forecasts. With respect to the market return implied by analyst earnings and dividend forecasts we conducted the analysis with respect to the two month period ending 31 December 2014.[8]

4.   In the current report we have been asked to adopt a risk free rate estimated over the 20 trading days from 19 January 2015 to 16 February 2015, being JGN's actual averaging period. Over this period our estimate of the risk free rate is 2.53%.[9] We have also estimated the market risk premium over this period to be 8.25%. Therefore, in this report we calculate the expected return on the market to be 10.87%.

5.   In the above paragraphs we refer to three different estimates of the risk free rate made at different times (3.55% from 15 October 2014, 2.64% from 30 January 2015 and 2.53% from 16 February 2015). If the AER continues to adopt an estimate of the market risk premium of 6.50% and an equity beta estimate of 0.7 in the Sharpe-Lintner Capital Asset Pricing Model (CAPM)[10] the corresponding cost of equity estimates are 8.10%, 7.19% and 7.13%. The cost of equity will fall by 0.97% due to a reduction in government bond yields.

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[1] JGN draft determination, Attachment 3, Sub-section 3.1, Table 3-1, pp. 10 to 11.

[2] JGN draft determination, Attachment 3, Sub-section 3.1, Table 3-1, pp. 10 to 11.

[3] That is, expected market return = risk free rate + market risk premium = 0.0355 + 0.0650 = 10.05%.

[4] SFG (2015 Cost of equity).

[5] SFG (2015 Cost of equity), Section 4, para. 80 and 114. The figure of 2.64% used in the earlier report is based upon daily yields on government bonds with maturities closest to 10 years, and applying linear interpolation to make an estimate of the 10 year bond yield.

[6] SFG (2015 Cost of equity), Section 4, Table 5, p. 33.

[7] That is, expected market return = risk free rate + market risk premium = 0.0264 + 0.0817 = 10.81%.

[8] Dividend yields

[9] As with our previous analysis the figure of 2.53% is based upon daily yields on government bonds with maturities closest to 10 years, and applying linear interpolation to make an estimate of the 10 year bond yield.

[10] Sharpe (1964) and Lintner (1965),

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2.2 Terms of reference

6. We have been provided with terms of reference that require us to comment on specific issues. The terms of reference are attached to this report.

2.3 Structure of this report and conclusions

7. Our report is structured as follows. In Section 3 we look at historical and current 10 year government bond yields. The point of this section is that by placing primary reliance on historical excess returns to estimate the market risk premium, the AER is making the assumption that the same factors leading to a decline in government bond yields necessarily lead to a decline in required equity returns.

8. In Section 4 we provide our estimate of the market risk premium compared to the 6.5% market risk premium estimate of the AER from the JGN draft determination. We consider that the manner in which the AER has estimated the market risk premium leads to the cost of equity being understated, relative to the prevailing cost of equity for a benchmark efficient energy network. This means that the AER's allowed rate of return will not meet the allowed rate of return objective in the Rules.[11]

9. The AER considers historical excess returns to be the most robust source of evidence for estimating the market risk premium. In contrast, historical real market returns are irrelevant to the AER's estimate of the market risk premium. This differential treatment of two different returns series occurs despite the AER's view that there is no clear evidence that a low government bond yield implies a low expected market return (which the AER assumes by placing primary reliance on excess returns), or a high market risk premium (which the AER dismisses by giving no consideration to historical real returns).

10. Further, the AER itself generates evidence that implies that the expected market return does not generally decline merely because of declines in government bond yields. Using the AER's preferred method of estimating the market return from analyst forecasts, the data suggests there is no relationship between expected market returns and government bond yields.

11. In Section 5 we provide updated cost of equity estimates for a benchmark energy network based upon the recent estimates of the risk free rate.

12. Our conclusion is that the cost of equity for a benchmark energy network is 9.90%. This is underpinned by the following assumptions:

    a) Risk free rate = 2.53% (versus the most recent AER estimate of 3.55%);

    b) Market risk premium = 8.25% (versus the most recent AER estimate of 6.50%);

    c) Expected equity market return = 10.87% (versus the most recent AER estimate of 10.05%);

    d) Expected inflation = 2.50% (assumed by both JGN and the AER);

    e) Expected real market return = 8.07% (versus the most recent AER estimate of 7.37%); and

    f) Equity premium for a benchmark energy network = 7.37% (versus the most recent AER estimate of 4.55%).

13. If, in its final decision, the AER was to maintain a market risk premium of 6.50%, an equity beta estimate of 0.7, and estimated a risk free rate of 2.53%, the differences in the cost of equity from our report and that of the AER are summarised in Table 1.

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[11] According to NGR 87(3), "the allowed rate of return objective is that the rate of return for a service provider is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services."

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Table 1. Composition of the cost of equity from this report and the AER parameters (%)

Parameter	Our report	AER[12]
Risk free rate	2.53	2.53
Market risk premium	8.25	6.50
Equity risk premium as a proportion of market risk premium (equivalent beta)	0.89	0.70
Equity risk premium	7.37	4.55
Cost of equity	9.90	7.08

Disaggregation of the differences in the cost of equity estimates:

AER estimate of the cost of equity	7.08
+ Impact of the difference in market risk premium (8.25% vs 6.50%)	+ 1.39[13]
+ Impact of the difference in relative risk (beta = 0.70 vs equiv. beta = 0.89)	+ 1.43[14]
= Our estimate of the cost of equity	= 9.90

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[12] Assuming there are no changes to AER parameters aside from the risk free rate.

[13] If equity beta = 0.70 the difference in the cost of equity under two alternative market risk premium assumptions is $0.70 \times (0.0825 - 0.0650) = 0.70 \times 0.0175 = 1.22\%$. If equity beta = 0.89 the difference in the cost of equity under two alternative market risk premium assumptions is $0.89 \times (0.0825 - 0.0650) = 0.89 \times 0.0175 = 1.56\%$. On average, the differential impact of the market risk premium assumptions is 1.39%.

[14] If market risk premium = 6.50% the difference in the cost of equity under two alternative beta assumptions is $0.0650 \times (0.89 - 0.70) = 0.0650 \times 0.19 = 1.26\%$ (if all decimal places are retained). If market risk premium = 8.2% the difference in the cost of equity under two alternative beta assumptions is $0.0825 \times (0.89 - 0.70) = 0.0825 \times 0.19 = 1.56\%$ (if all decimal places are retained). On average, the differential impact of the relative risk assumptions is 1.43%.

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3. Expected market returns and yields of government bonds

3.1   Recent movements in government bond yields

14. Australian government bond yields are at their lowest level since the RBA series of reported yields began in July 1969. In Figure 1 we illustrate 10 year nominal government bond yields, yields on inflation-adjusted bonds, and the implied inflation rate, from July 1969 to February 2015.[15] The figure shows a general decline in government bond yields since the peak of 17.18% in August 1982.[16]

Figure 1. 10 year government bond yields from July 1969 to February 2015
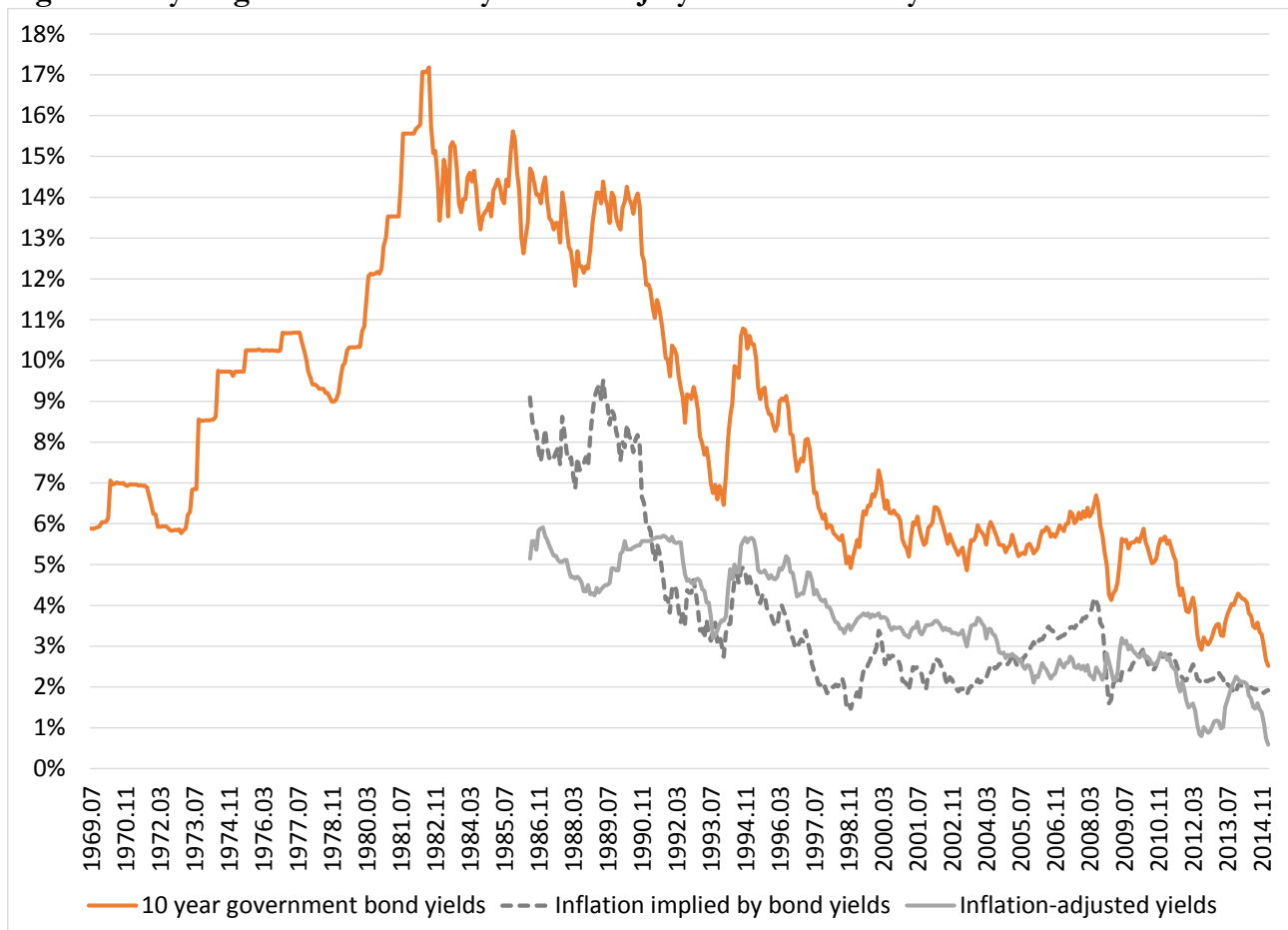
15. The decline in government bond yields over time can be summarised with reference to a few distinct time periods. The intent of these summary statistics is not to enter into a debate over particular cut-off points associated with different interest rate regimes. Rather, the intent is simply to show that there are substantial differences in estimates of the risk free rate in different market conditions, and the Rules require that estimates of the cost of equity for a benchmark energy network are commensurate with the prevailing market conditions. So we present average government bond yields over different time periods in Table 2.

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[15] All yields are expressed as effective annual rates, converted from the nominal yields reported by the Reserve Bank of Australia (**RBA**), assuming semi-annual compounding. So the effective annual rate = $(1 + \text{nominal rate} \div 2)^2 - 1$. The bond yields are the monthly average bond yields as reported by the RBA.

[16] We discuss the implications of government bond yield over an even longer time period in a subsequent sub-section.

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Table 2. Average yields over different time periods (%)

Period	Years	Government bond yield
July 1969 to June 1986[17]	17.0	10.63
July 1986 to August 1995[18]	9.2	11.38
September 1995 to June 2008[19]	12.8	6.19
July 2008 to December 2013[20]	5.5	4.61
January 2014 to January 2015[21]	1.1	3.61
February 2015[22]	0.1	2.52
July 1986 to February 2015	28.7	7.44
July 1969 to February 2015	45.7	8.63
19 January 2015 to 16 February 2015	**0.1**	**2.53**

16. Consider the 12.8 year period from September 1995 to June 2008. This is a period prior to the global financial crisis. For every month of this period the implied inflation rate from bond yields was 4.00% or less. Over this time period the average yield on government bonds was 6.19%, the average yield on inflation-adjusted bonds was 3.41% and the average implied inflation rate was 2.70%. Subsequent to the global financial crisis we have observed a persistent decline in government bond yields.

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[17] This period coincides with the availability of data on government bond yields from the RBA.

[18] This period coincides with the availability of data on inflation-adjusted bonds from the RBA.

[19] This period coincides with the implied inflation rate falling to 4.00%. The implied inflation rate has remained below 4.00% ever since September 1995, with the exception of May 2008 and June 2008 when the implied inflation rate was 4.18% and 4.11%, respectively.

[20] This period coincides with the beginning of the decline in government bond yields that was associated with the onset of the global financial crisis.

[21] Over December 2013 average government bond yields were 4.29%. In the following 13 months, yields fell in every month except one. So this time period coincides with recent declines in government bond yields.

[22] This period coincides with the most recent full month at the time of writing.

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4. Estimating the market risk premium

4.1 Introduction

17. In this section we document our estimates of the market risk premium. The implications of 10 year government bond yields being at historically low levels are significant for any regulated business if the relevant regulator has a practice of adopting a relatively inflexible estimate of the market risk premium. Our calculations of the market risk premium indicate that not only is the market risk premium above the 6.5% proposed to be adopted by the AER, but that it is increasing.

18. In a report dated 6 June 2014, authored by us and submitted by JGN with its access arrangement revision proposal, the market risk premium was calculated to be 7.21%.[23] The relevant risk free rate estimation period ended 12 February 2014. Our most recent estimate of the market risk premium is 8.25% for the risk free rate estimation period ended 16 February 2015.

19. Where the market risk premium is increasing and 10 year government bond yields are falling, a fixed or largely inflexible approach to estimating the market risk premium will result in the overall regulatory allowance for the cost of equity falling when required returns in the market have not fallen, or at least not to the same extent as the fall in the 10 year government bond yields. That is, the adoption of a fixed or relatively inflexible approach to estimating the market risk premium will not pick up the increase in market risk premium that we have calculated has occurred from February 2014 to February 2015.

4.2 Our perspective on estimating the market return and the market risk premium

20. Our estimate of the market risk premium is computed as a weighted average of market risk premium estimates from four different approaches as described below.[24] Under this weighting scheme, there is 50% weight assigned to information that reflects past returns, and 50% weight assigned to information embedded in analyst forecasts and share prices.

  a) 20% weight is applied to an estimate of the market risk premium derived from historical excess returns;

  b) 20% weight is applied to an estimate of the market risk premium derived from historical real market returns;

  c) 10% weight is applied to an estimate of the market risk premium from survey evidence (which also represents an estimate based upon historical information because the surveys considered by the AER almost invariably report a market risk premium estimate of 6.0% regardless of when the survey was undertaken);

  d) 50% weight is applied to an estimate of the market risk premium derived from share prices and analyst earnings and dividend forecasts.

21. In our opinion, the weighting scheme proposed by us to measure the market risk premium provides an appropriate avenue for prevailing conditions to be reflected in the market risk premium. Particularly in circumstances where the risk free rate is falling, and there is evidence that the market risk premium is increasing and there is no reason to believe that overall equity returns required by equity investors are falling (or at least not to the extent of the decrease in the risk free rate), it is important to adopt a methodology that allows the market risk premium to vary. A failure to do so will not provide an allowed rate of return that is commensurate with efficient financing costs.

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[23] SFG (2015 ROE).

[24] This weighting scheme is consistent with what we proposed in our report of June 2014 (SFG, 2014 ROE, Section 3, Table 13, p. 83).

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4.3 AER's perspective on estimating the market return and market risk premium

22. The perspective of the AER is that information on historical excess returns, market return estimates from analyst forecasts (what the AER refers to as its "DGM estimate"), and historical real returns have distinct roles. The figures appearing in this sub-section are based upon the risk free rate assumption of 3.55% that is used by the AER in the JGN draft determination.

  a) **Historical excess returns are the primary evidence.** Information from historical excess returns is considered by the AER to be the most relevant source of information for estimating the market risk premium. The AER states that "this is the most robust source of evidence for estimating a 10 year forward looking MRP."[25] On the basis of historical excess returns, the AER estimates that the market risk premium lies within a range of 5.1% to 6.5%, with a best estimate from this information of 6.0%.[26]

  b) **Market returns from analyst forecasts have some relevance.** Market return estimates implied by analyst forecasts are then used by the AER to form a range for the estimate of the market risk premium, in combination with historical excess returns. On the basis of analyst forecast information, the AER estimates a range for the market risk premium of 6.6% to 7.8%.[27]

    The AER's best estimate of the market risk premium from analyst forecasts is 7.4%. The figure of 7.4% is based upon the AER's preferred three-stage dividend discount model, and the AER's preferred long-term nominal growth estimate of 4.6%.[28] The AER states that its two-stage model results are only intended as a cross-check on its inferences from its three-stage model.[29]

  c) **Historical real returns have no impact.** Information on historical real market returns are given no substantial role in the AER's estimate of the cost of capital. The AER states that it does not consider material reliance should be placed on historical real returns (which the AER and others have termed *the Wright approach*).[30] Rather, the AER uses historical real returns as part of other information at the end of the AER's estimation process to inform the final estimate of the cost of equity. We have previously noted that this effectively constrains historical real returns from having any impact on the allowed return on equity.[31]

23. The AER's perspective on historical excess returns, market returns implied by analyst forecasts and historical real returns is summarised in Table 3. The table shows point estimates and the AER's reported range in brackets.

24. The table illustrates that if historical real returns were considered as part of the AER's estimate of the market risk premium, and given any material weight, the market risk premium would increase. Under the AER's current assumptions, the AER is estimating a real market return of 7.37%, when the AER's estimate of the average real market return from 1958 to 2013 was 9.0%. So the AER is assuming that equity investors will earn lower real returns than observed in the past over the time period the AER considers most reliable.

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[25] JGN draft determination, Attachment 3, Sub-section B.1, p. 194.
[26] JGN draft determination, Attachment 3, Sub-section B.1, p. 194. The AER estimates of historical excess returns incorporate an assumption that distributed imputation credits were worth 60% of face value since imputation was introduced in July 1987.
[27] JGN draft determination, Attachment 3, Sub-section B.2, p. 200. The AER estimates of the market risk premium from analyst forecasts incorporate an assumption that distributed imputation credits are worth 60% of face value.
[28] JGN draft determination, Attachment 3, Sub-section B.2, Table 3-41, p. 200.
[29] JGN draft determination, Attachment 3, Sub-section C.2.4, p. 222.
[30] JGN draft determination, Attachment 3, Sub-section 3.4.1, p. 28;
[31] SFG (2015 Cost of equity), Section 4, para. 148.

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Table 3. Information relating to the market risk premium compiled by the AER (%)

Information	Excess returns	Real returns	Analyst forecasts	AER Conclusion
Role	Primary evidence	No impact	Secondary evidence	
Market risk premium	6.0[32] (5.1 to 6.5)	8.18 (6.53 to 9.30)	7.4[33] (6.6 to 7.8)	6.5 (5.1 to 7.8)
Market return	9.55 (8.65 to 10.05)	11.73 (10.09 to 12.85)	10.95 (10.15 to 11.35)	10.05 (8.65 to 11.35)
Real market return	6.88 (6.00 to 7.37)	9.0[34] (7.4 to 10.1)	8.24 (7.46 to 8.63)	7.37 (6.00 to 8.63)

4.4   Estimates of the expected market return from analyst forecast information

25.   The requirement of the AER is to estimate the expected return in the prevailing market conditions. The AER has never adopted an estimate of the market risk premium outside of the very narrow range of 6.0% to 6.5%. The AER has stuck to its narrow range in unprecedented bull markets and economic boom times and through severe financial crises. So the AER's approach to estimating the required return on the market is to assume that there is never a material widening of the market risk premium.

26.   The AER's approach is inconsistent with the AER's own estimates of the expected market return from share prices and analyst earnings and dividend forecasts. We applied the AER's dividend discount model estimation approach to ASX200 consensus dividend forecast information from January 2006 to December 2014.

27.   So we produced a time series of what the expected market return would be over this nine year time period, assuming a 4.6% long term growth rate[35] and a transition to long term growth over forecast years three to ten. We also compiled our own estimates of the expected market return based upon analyst earnings and dividend forecasts. In both cases we have adjusted for imputation credit value on the same basis, by making an adjustment to dividends and assumed credits are worth 60% of face value.[36] The market return estimates are illustrated in Figure 4.

28.   Under both approaches to estimating the market return using analyst forecasts, the recent falls in government bond yields have not been associated with a corresponding reduction in market return estimates. At the end of December 2014 the spread between government bond yields and expected market returns was approximately 8% under both market return estimates.

29.   Consider the AER's estimates of expected market returns over time. The reason why there is a widening of the market risk premium in recent months is because the market return estimate relies upon two inputs – short term dividend yield projections over two years, and long term growth. Neither of these parameter inputs has fallen in recent months when government bond yields have fallen.

30.   For the expected market return to have fallen in line with the fall in government bond yields would require a reduction in dividend yields, or a reduction in long term growth expectation, or both. On the AER's own analysis, neither of these changes is present in recent months.

[32] AER stated best estimate of the market risk premium on the basis of historical excess returns.

[33] Our inference as to the AER's best estimate of the market risk premium derived from analyst forecasts based upon the AER's preferred three-stage dividend discount model and the AER's preferred long-term growth assumption of 4.6%.

[34] Our inference as to the AER's best estimate of the historical real market return based upon the AER's concerns over data from prior to 1958.

[35] Our view is that a 5.6% long term growth rate is more appropriate but we adopt the 4.6% long term growth rate in order to estimate what the expected market return would be under AER assumptions.

[36] Market return estimates are averaged every two months consistent with the AER's preference.

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Figure 2. Estimates of the market return from analyst earnings and dividend forecasts
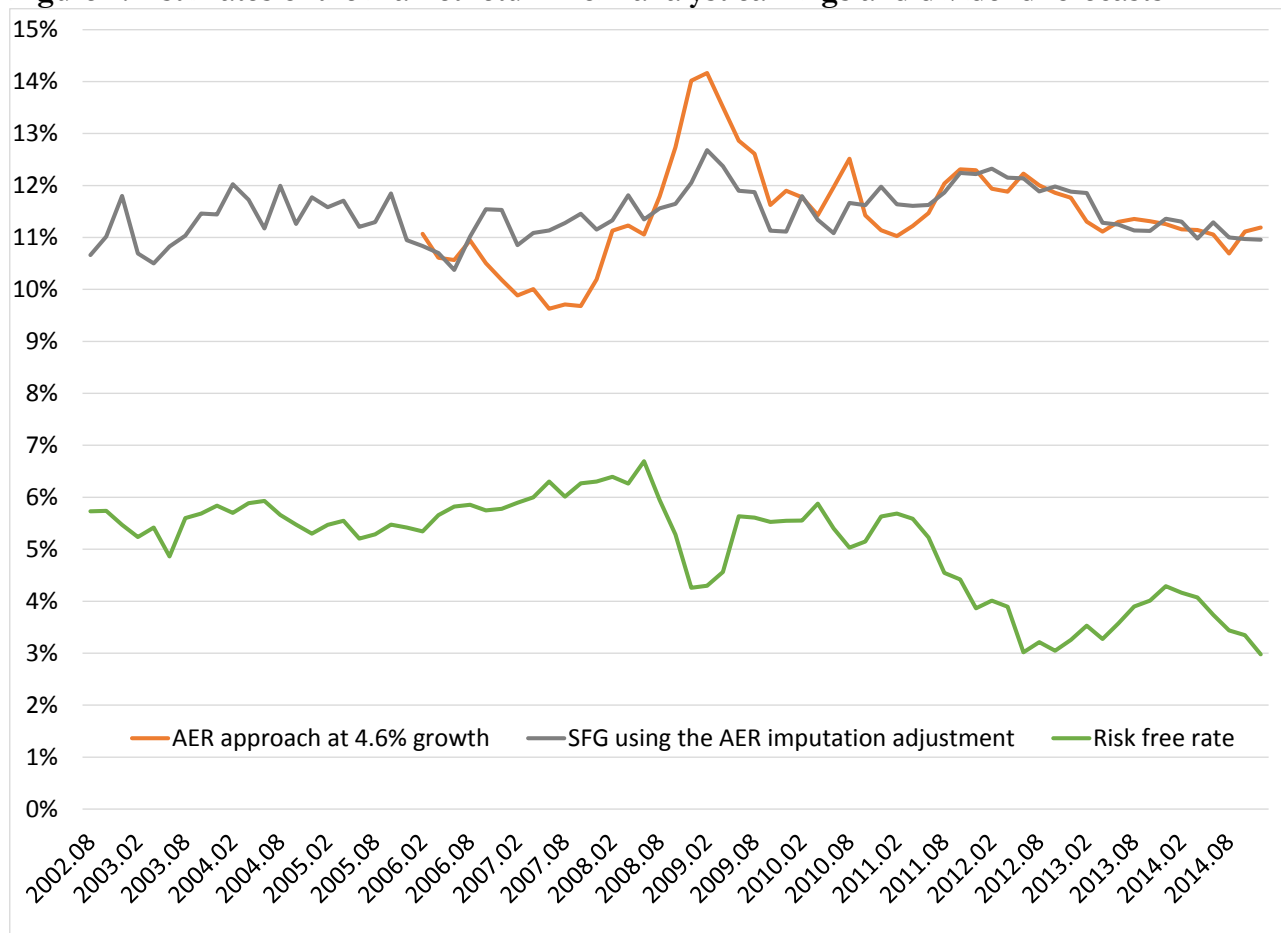
31. The key point is that the AER's treatment of historical information is at odds with its consideration of what determines expected market returns. The AER has formed a view that the best estimate of long term growth is independent of government bond yields at any point in time. The AER has also formed a view that dividend yields have no reliable association with government bond yields. Jointly, this implies a view that expected market returns are independent of government bond yields, and so a reduction in government bond yields implies a widening of the market risk premium.

4.5 The AER's individual estimates of the market risk premium

32. In the JGN draft determination of November 2014, the AER made estimates of the market return and market risk premium from three different approaches – excess returns, analyst forecasts, and real returns. We documented those assumptions elsewhere in the current report and summarise those estimates in Table 4. The figures in Table 4 show that the AER's conclusion on the market risk premium (6.50%) spans 35.71% of the distance from the AER's estimate from excess returns (6.00%) to the AER's estimate from analyst forecasts (7.40%).[37]

33. We repeated the computations using figures reported in the AER rate of return guideline.[38] In this instance the AER's conclusion on the market risk premium (6.50%) spans 45.45% of the distance from the AER's estimate from excess returns (6.00%) to the AER's estimate from analyst forecasts (7.10%).[39]

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[37] $(0.0650 - 0.0600) \div (0.0740 - 0.0600) = 0.0050 - 0.0140 = 35.71\%$.

[38] The rate of return guideline does not specify a risk free rate so we computed the average annualised yield to maturity on 10 year government bonds for the 20 trading days ending 29 November 2013.

[39] $(0.0650 - 0.0600) \div (0.0710 - 0.0600) = 0.0050 - 0.0110 = 45.45\%$.

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34. This means that, as the AER's contemporaneous estimate of the market risk premium increased, the AER's conclusion on the market risk premium became further away from the AER's contemporaneous estimate of the market risk premium. If the AER was to maintain a market risk premium assumption at the more recent government bond yield of 2.53%, with an unchanged estimate of the expected market return from analyst forecasts, then the distance from the excess returns estimate (6.00%) to the estimate implied from analyst forecasts (8.42%) would be only 20.65%.[40]

35. These distances also provide a metric for estimating what the market risk premium would be, at the current risk free rate of 2.53%, if there was no change to the AER's dividend discount model estimate of expected returns (10.95%). We have the AER's estimate of the market risk premium from historical excess returns (6.00%) and an estimate of the market risk premium from analyst forecasts (8.42%).[41]

    a) If the market risk premium spans 35.71% of the distance from the lower figure from excess returns (6.00%) to the higher figure from analyst forecasts (8.42%) the implied market risk premium would be 6.86%.[42]

    b) If the market risk premium spans 45.45% of the distance from the lower figure from excess returns (6.00%) to the higher figure from analyst forecasts (8.42%) the implied market risk premium would be 7.10%.[43]

36. These computations suggest that the recent fall in government bond yields since the AER rate of return guidelines and the JGN draft determination were published lead to an increase in the market risk premium to above 6.50%. There is nothing special about rounding the market risk premium to the nearest half a percent, and there is no reason to think that 6.50% is an upper bound to the market risk premium. The AER's range of market risk premium estimates based upon historical excess returns (5.1% to 6.5%) is simply the AER's estimate of the excess returns we would expect at typical government bond yields and typical expectations for risk in the market. It is not a basis for constraining the market risk premium at 6.5%.

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[40] $(0.0650 - 0.0600) \div (0.0842 - 0.0600) = 0.0050 - 0.0242 = 20.65\%$.

[41] Market risk premium = Market return – risk free rate = 10.95% - 2.53% = 8.42%.

[42] Estimated market risk premium = $0.0600 + 0.3571 \times (0.0842 - 0.0600) = 0.0600 + 0.3571 \times 0.0242 = 0.0600 + 0.0086 = 6.86\%$.

[43] Estimated market risk premium = $0.0600 + 0.4545 \times (0.0842 - 0.0600) = 0.0600 + 0.4545 \times 0.0242 = 0.0600 + 0.0110 = 7.10\%$.

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Table 4. AER's estimates of expected market returns and market risk premiums (%)

Approach	Risk free rate	Market risk premium	Market return	Real market return
Panel A: JGN draft determination				
Excess returns	3.55	6.00	9.55	6.88
Analyst forecasts	3.55	7.40	10.95	8.24
Real returns	3.55	8.18	11.73	9.00
Conclusion	3.55	6.50	10.05	7.37
Percentage distance from the estimate from excess returns to the estimate from forecasts				35.71
Panel B: Rate of return guideline				
Excess returns	4.17	6.00	10.17	7.48
Analyst forecasts	4.17	7.10	11.27	8.56
Real returns	4.17	7.56	11.73	9.00
Conclusion	4.17	6.50	10.67	7.97
Percentage distance from the estimate from excess returns to the estimate from forecasts				45.45
Panel C: Estimates that are consistent with the previous distance between conclusions and individual estimates				
Excess returns	2.53	6.00	8.53	5.88
Analyst forecasts	2.53	8.42	10.95	8.24
Real returns	2.53	9.20	11.73	9.00
Conclusion if distance = 35.71%	**2.53**	**6.86**	**9.39**	**6.73**
Conclusion if distance = 45.45%		**7.10**	**9.63**	**6.96**
Distance if market risk premium remains 6.50%				**20.65**

4.6   Conclusion

37. In Table 5 we summarise the manner in which we have estimated the market return and market risk premium. The table can be contrasted with Table 5 from our earlier report.[44]

38. Our estimate of the expected market return is 10.78% and the market risk premium is 8.25%. In reaching this conclusion we have made imputation adjustments to our dividend discount model analysis, and the implied market return from independent expert reports, that is consistent with the JGN's post-tax revenue model as adopted by the AER in the JGN draft determination.[45]

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[44] SFG (2015 Cost of equity), Section 4, p. 33.

[45] The issue of the adjustment for imputation has been covered in detail in other expert reports we have provided to the AER.

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Table 5. SFG estimates of the market risk premium (%)

Estimation method	Market return	Market risk premium	Real market return	Weighting
Historical excess returns	9.09[46]	6.56[47]	6.43[48]	20
Historical real returns	11.64[49]	9.11[50]	8.92[51]	20
Dividend discount model	11.37[52]	8.84[53]	8.65[54]	50
Independent expert reports	9.44[55]	6.91[56]	6.77[57]	10
Weighted average	10.78[58]	8.25[59]	8.07[60]	100

[46] Market return = Risk free rate + market risk premium = 0.0253 + 0.0656 = 9.09%.

[47] NERA (2015), p. iv; Section 3, p. 26; Sub-section 3.4.3, Table 3.3, p. 42.

[48] Real market return = (1 + Nominal market return) ÷ (1 + Inflation) = 1.0909 ÷ 1.0250 − 1 = 6.43%.

[49] Nominal market return =(1 + Real market return) × (1 + Inflation) − 1 = 1.0892 × 1.0250 − 1 = 11.64%.

[50] Market risk premium = Market return − risk free rate = 0.1164 − 0.0253 = 9.11%.

[51] NERA (2015), p. iv, Sub-section 3.4.3, Table 3.6, p. 43.

[52] Market return including adjustment for imputation assuming gamma = 0.25 and following the adjustment that is in the AER's post-tax revenue model. Market return incl. imputation = Market return excl. imputation ÷ [(1 − tax rate) ÷ (1 − tax rate × (1 − gamma))] = [(1 − 0.30) ÷ (1 − 0.30 × (1 − 0.25))] = 0.1027 ÷ [0.700 ÷ 0.775] = 0.1027 ÷ 0.9032 = 11.37%

[53] Market risk premium = Market return − risk free rate = 0.1137 − 0.0253 = 8.84%.

[54] Real market return = (1 + Nominal market return) ÷ (1 + Inflation) − 1 = 1.1137 ÷ 1.0250 − 1 = 8.65%.

[55] Market risk premium excluding imputation = 6.00%. Market return excluding imputation = Market risk premium + Risk free rate = 0.0600 + 0.0253 = 8.53%. Market return including adjustment for imputation assuming gamma = 0.25 and following the adjustment that is in the AER's post-tax revenue model. Market return incl. imputation = Market return excl. imputation ÷ [(1 − tax rate) ÷ (1 − tax rate × (1 − gamma))] = [(1 − 0.30) ÷ (1 − 0.30 × (1 − 0.25))] = 0.1027 ÷ [0.700 ÷ 0.775] = 0.0853 ÷ 0.9032 = 9.44%.

[56] Market risk premium incl. imputation adjustment = Market return including imputation adjustment − risk free rate = 0.0944 − 0.0253 = 6.91%.

[57] Real market return = (1 + Nominal market return) ÷ (1 + Inflation) = 1.0944 ÷ 1.0250 − 1 = 6.77%.

[58] 0.0909 × 0.20 + 0.1164 × 0.20 + 0.1137 × 0.50 + 0.0944 × 0.10 = 0.0182 + 0.0233 + 0.0569 + 0.0094 = 10.78%.

[59] Market risk premium = 0.1078 − 0.0253 = 8.25%.

[60] Real market return = (1 + Nominal market return) ÷ (1 + Inflation) = 1.0944 ÷ 1.0250 − 1 = 6.77%.

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5. Cost of equity of a benchmark energy network

39. Given an estimate of the market risk premium of 8.25%, our estimate of the required return on equity for a benchmark efficient entity is 9.90%.[61] In Table 6 we summarise the manner in which we have arrived at this conclusion. We have explained the detail of our estimation procedures and the reasons for the differential weights in a previous report, SFG (2014 ROE). Components of the return on equity calculations are set out in our companion reports, SFG (2015 Beta), SFG (2015 FFM) and SFG (2015 DDM).

Table 6. SFG estimates of the required return on equity for a benchmark efficient entity (%)

Model	Cost of equity	Equivalent beta	Weighting
Sharpe-Lintner CAPM	9.27	0.82	12.5
Black CAPM	9.88	0.89	25.0
Fama-French model	9.87	0.89	37.5
Dividend discount model	10.28	0.94	25.0
Weighted average	9.90	0.89	100.0

40. The table also shows an estimate of the *equivalent beta* which is a computation to illustrate the beta estimate which, if embedded in the Sharpe-Lintner CAPM, would give the same cost of equity. This allows us to disaggregate the difference between our cost of equity estimate, and the cost of equity estimate that would result from maintaining the assumptions that equity beta is 0.70, and the market risk premium is 6.50%. Under these latter assumptions from the AER draft determination the cost of equity would be 7.08%,[62] which is 2.82% lower than our estimated cost of equity. In Table 7 we present this disaggregation.

41. The table shows that the 2.82% difference in the cost of equity estimates is allocated almost equally between disagreement over the market risk premium (8.25% versus 6.50%) and disagreement over the relative risk of a benchmark energy network compared to the market (equivalent betas of 0.89 versus 0.70).

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[61] A simple average cost of equity estimate is 9.83%.

[62] Cost of equity = risk free rate + beta × market risk premium = $0.0253 + 0.70 \times 0.0650 = 7.08\%$.

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Table 7. Composition of the cost of equity from this report and the AER parameters (%)

Parameter	Our report	AER[63]
Risk free rate	2.53	2.53
Market risk premium	8.25	6.50
Equity risk premium as a proportion of market risk premium (equivalent beta)	0.89	0.70
Equity risk premium	7.37	4.55
Cost of equity	9.90	7.08
Disaggregation of the differences in the cost of equity estimates:		
AER estimate of the cost of equity		7.08
+ Impact of the difference in market risk premium (8.25% vs 6.50%)		+ 1.39[64]
+ Impact of the difference in relative risk (beta = 0.70 vs equiv. beta = 0.89)		+ 1.43[65]
= Our estimate of the cost of equity		= 9.90

42. It is worth repeating the conclusion from our earlier report as to why the AER's cost of equity analysis differs materially from our analysis. The reason for the divergence in the cost of equity estimate we report above, and which results from the AER approach, is that the AER's sequential approach constrains the impact that evidence classed by the AER as secondary can have on the conclusions. The AER framework has led to the following constraints on parameter inputs and models:

   a) The Fama-French model[66] is not given consideration because it is not considered by the AER to be better than the Sharpe-Lintner CAPM, despite being able to better explain the historical stock returns we have actually observed. The Sharpe-Lintner CAPM is the primary evidence and the secondary evidence is given no consideration.

   b) The market risk premium is constrained at 6.50%, the boundary of what the AER would expect in normal market conditions, despite the AER's own analysis of real returns implying a market risk premium of 9.20% and the AER's own dividend discount model analysis implying a market risk premium of 8.42%.

   c) The equity beta input in the Sharpe-Lintner CAPM is constrained at 0.7, a boundary based entirely on analysing stock returns from nine Australian-listed companies (of which four remain listed), despite considerable evidence available to the AER that the larger sample of international-listed firms has higher beta estimates.

43. In aggregate, the constraints embedded in the AER framework lead to the AEMC rule change having no impact on the AER's estimated cost of equity. In our view the cost of equity estimate we present above takes account of all relevant evidence and represents the prevailing cost of funds.

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[63] Assuming there are no changes to AER parameters aside from the risk free rate.

[64] If equity beta = 0.70 the difference in the cost of equity under two alternative market risk premium assumptions is $0.70 \times (0.0825 - 0.0650) = 0.70 \times 0.0175 = 1.22\%$. If equity beta = 0.89 the difference in the cost of equity under two alternative market risk premium assumptions is $0.89 \times (0.0825 - 0.0650) = 0.89 \times 0.0175 = 1.56\%$. On average, the differential impact of the market risk premium assumptions is 1.39%.

[65] If market risk premium = 6.50% the difference in the cost of equity under two alternative beta assumptions is $0.0650 \times (0.89 - 0.70) = 0.0650 \times 0.19 = 1.26\%$ (if all decimal places are retained). If market risk premium = 8.2% the difference in the cost of equity under two alternative beta assumptions is $0.0825 \times (0.89 - 0.70) = 0.0825 \times 0.19 = 1.56\%$ (if all decimal places are retained). On average, the differential impact of the relative risk assumptions is 1.43%.

[66] Fama and French (1993).

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6. Declaration

44. We confirm that we have made all the inquiries that we believe are desirable and appropriate and no matters of significance that we regard as relevant have, to our knowledge, been withheld from the Court.

_____   _____

Professor Stephen Gray   Dr. Jason Hall

SFG CONSULTING

7. References

Australian Energy Regulator, 2013 Guideline, *Better regulation – Rate of return guideline,* December.

Australian Energy Regulator, 2014, *Draft decision on Jemena Gas Networks (NSW) Ltd – Access Arrangement 2015–20,* November.

Fama, E.F., and K.R. French, 1993, "Common risk factors in the returns on stocks and bonds," *Journal of Financial Economics,* 33, 3–56.

Jemena Gas Networks (NSW) Ltd, 2014, *2015–20 Access Arrangement Information: Appendix 9.3 return on equity proposal,* 5 June.

Lintner, J., 1965, "The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets," *Review of Economics and Statistics,* 13–37.

National Gas Rules, 2015, Version 25.

NERA Economic Consulting, 2015, *Historical estimates of the market risk premium,* February.

SFG Consulting, 2014 Beta, *An appropriate regulatory estimate of equity beta,* May.

SFG Consulting, 2014 Black, *Cost of equity in the Black Capital Asset Pricing Model,* May.

SFG Consulting, 2014 FFM, *The Fama French model,* May.

SFG Consulting, 2014 DDM, *Alternative versions of the dividend discount model and the implied cost of equity,* May.

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

SFG Consulting, 2015 Cost of equity, *The required return on equity for a benchmark efficient entity,* February.

Sharpe, W., 1964, "Capital asset prices: A theory of market equilibrium under conditions of risk," *Journal of Finance,* 19, 424–442.

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8. Appendix: Terms of reference and qualifications

46. This report was prepared by Professor Stephen Gray and Dr Jason Hall. Professor Gray and Dr Hall have made all they enquiries that they believe are desirable and appropriate and that no matters of significance that they regard as relevant have, to their knowledge, been withheld.

47. Professor Gray and Dr Hall have been provided with a copy of the Federal Court of Australia's "Guidelines for Expert Witnesses in Proceeding in the Federal Court of Australia." The Report has been prepared in accordance with those Guidelines, which appear in the terms of reference.

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Expert Terms of Reference

Return on equity, updated for 19 January to 16 February 2015

Jemena Gas Networks
2015-20 Access Arrangement Review

AA15-570-0077

Version A – 27 March 2015

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Version	Status	Date	Prepared	Checked	Authorised
A	Final	27/03/15	E Grace-Webb	G+T	E Grace-Webb

Contents

1 Background

Jemena Gas Networks (**JGN**) is the major gas distribution service provider in New South Wales (**NSW**). JGN owns more than 25,000 kilometres of natural gas distribution system, delivering approximately 100 petajoules of natural gas to over one million homes, businesses and large industrial consumers across NSW.

JGN submitted its revised Access Arrangement proposal (**proposal**) with supporting information for the consideration of the Australian Energy Regulator (**AER**) on 30 June 2014. The revised access arrangement will cover the period 1 July 2015 to 30 June 2020 (July to June financial years). The AER published its draft decision on this proposal on 27 November 2014. JGN submit its revised proposal on 27 February 2015.

As with all of its economic regulatory functions and powers, when assessing JGN's revised Access Arrangement under the National Gas Rules and the National Gas Law, the AER is required to do so in a manner that will or is likely to contribute to the achievement of the National Gas Objective, which is:

> "to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas."

For electricity networks, the AER must assess regulatory proposals under the National Electricity Rules and the National Electricity Law in a manner that will or is likely to achieve the National Electricity Objective, as stated in section 7 of the National Electricity Law.

Where there are two or more possible decisions in relation to JGN's revised Access Arrangement that will or are likely to contribute to the achievement of the National Gas Objective, the AER is required to make the decision that the AER is satisfied will or is likely to contribute to the achievement of the National Gas Objective to the greatest degree.

The AER must also take into account the revenue and pricing principles in section 24 of the National Gas Law and section 7A of the National Electricity Law, when exercising a discretion related to reference tariffs. The revenue and pricing principles include the following:

> "(2) A service provider should be provided with a reasonable opportunity to recover at least the efficient costs the service provider incurs in—
>
> > a) providing reference services; and
> >
> > b) complying with a regulatory obligation or requirement or making a regulatory payment.
>
> (3) A service provider should be provided with effective incentives in order to promote economic efficiency with respect to reference services the service provider provides. The economic efficiency that should be promoted includes—
>
> (a) efficient investment in, or in connection with, a pipeline with which the service provider provides reference services…

[…]

(5) A reference tariff should allow for a return commensurate with the regulatory and commercial risks involved in providing the reference service to which that tariff relates.

(6) Regard should be had to the economic costs and risks of the potential for under and over investment by a service provider in a pipeline with which the service provider provides pipeline services."

Some of the key rules that are relevant to an access arrangement and its assessment are set out below.

Rule 74 of the National Gas Rules, relating generally to forecasts and estimates, states:

(1) Information in the nature of a forecast or estimate must be supported by a statement of the basis of the forecast or estimate.

(2) A forecast or estimate:

(a) must be arrived at on a reasonable basis; and

(b) must represent the best forecast or estimate possible in the circumstances.

Rule 87 of the National Gas Rules, relating to the allowed rate of return, states:

(1) Subject to rule 82(3), the return on the projected capital base for each regulatory year of the access arrangement period is to be calculated by applying a rate of return that is determined in accordance with this rule 87 (the allowed rate of return).

(2) The allowed rate of return is to be determined such that it achieves the allowed rate of return objective.

(3) The allowed rate of return objective is that the rate of return for a service provider is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services (the allowed rate of return objective).

(4) Subject to subrule (2), the allowed rate of return for a regulatory year is to be:

(a) a weighted average of the return on equity for the access arrangement period in which that regulatory year occurs (as estimated under subrule (6)) and the return on debt for that regulatory year (as estimated under subrule (8)); and

(b) determined on a nominal vanilla basis that is consistent with the estimate of the value of imputation credits referred to in rule 87A.

(5) In determining the allowed rate of return, regard must be had to:

(a) relevant estimation methods, financial models, market data and other evidence;

(b) the desirability of using an approach that leads to the consistent application of any estimates of financial parameters that are relevant to the estimates of, and that are common to, the return on equity and the return on debt; and

(c) any interrelationships between estimates of financial parameters that are relevant to the estimates of the return on equity and the return on debt.

Return on equity

(6) The return on equity for an access arrangement period is to be estimated such that it contributes to the achievement of the allowed rate of return objective.

(7) In estimating the return on equity under subrule (6), regard must be had to the prevailing conditions in the market for equity funds.

[Subrules (8)–(19) omitted].

The equivalent National Electricity Rules are in clauses 6A.6.2 (for electricity transmission) and 6.5.2 (for electricity distribution).

In its revised proposal, JGN submitted the expert report of SFG (the **Earlier Report**), as a suitable qualified independent expert (**Expert**), on use of relevant financial models to estimate the return on equity component of the rate of return, in a way that complies with the requirements of the National Gas Law and Rules and National Electricity Law and Rules, including as highlighted above.[1] This report used a 2 – 30 January 2015 averaging period to estimate the return on equity using each relevant financial model.

In this context, JGN seeks a further report from SFG that updates the return on equity estimates from each relevant financial model for a 19 January – 16 February 2015 averaging period.

2 Scope of Work

The Expert will provide an opinion report that:

1. Updates estimates of the return on equity from the Earlier Report to use the averaging period of 19 January to 16 February 2015; and

2. Notes that yields on Commonwealth Government Securities have fallen since the AER Draft Decision for JGN and assesses what, if any, impact this reduction has had on the required return on equity.

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[1] *SFG*, February 2015, *The required return on equity for the benchmark efficient entity*.

3 Information to be Considered

The Expert is also expected to consider the following additional information:

- such information that, in Expert's opinion, should be taken into account to address the questions outlined above;

- relevant literature on the rate of return;

- the AER's rate of return guideline, including explanatory statements and supporting expert material;

- material submitted to the AER as part of its consultation on the rate of return guideline; and

- previous decisions of the AER, other relevant regulators and the Australian Competition Tribunal on the rate of return and any supporting expert material, including the recent draft decisions for JGN and electricity networks in ACT, NSW and Tasmania.

4 Deliverables

At the completion of its review the Expert will provide an independent expert report which:

- is of a professional standard capable of being submitted to the AER;

- is prepared in accordance with the Federal Court Practice Note on Expert Witnesses in Proceedings in the Federal Court of Australia (CM 7) set out in Attachment 1, and includes an acknowledgement that the Expert has read the guidelines [2];

- contains a section summarising the Expert's experience and qualifications, and attaches the Expert's curriculum vitae (preferably in a schedule or annexure);

- identifies any person and their qualifications, who assists the Expert in preparing the report or in carrying out any research or test for the purposes of the report;

- summarises JGN's instructions and attaches these term of reference;

- includes an executive summary which highlights key aspects of the Expert's work and conclusions; and

- (without limiting the points above) carefully sets out the facts that the Expert has assumed in putting together his or her report, as well as identifying any other assumptions made, and the basis for those assumptions.

The Expert's report will include the findings for each of the items defined in the scope of works (Section 2).

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[2] Available at: http://www.federalcourt.gov.au/law-and-practice/practice-documents/practice-notes/cm7.

5 Timetable

The Expert will deliver the final report to Jemena Regulation by **27 March 2015**.

6 Terms of Engagement

The terms on which the Expert will be engaged to provide the requested advice shall be:

- as provided in accordance with the Jemena Regulatory Consultancy Services Panel arrangements applicable to the Expert.

ATTACHMENT 1: FEDERAL COURT PRACTICE NOTE

Practice Note CM 7
EXPERT WITNESSES IN PROCEEDINGS IN THE FEDERAL COURT OF AUSTRALIA

Commencement

1.   This Practice Note commences on 4 June 2013.

Introduction

2.   Rule 23.12 of the Federal Court Rules 2011 requires a party to give a copy of the following guidelines to any witness they propose to retain for the purpose of preparing a report or giving evidence in a proceeding as to an opinion held by the witness that is wholly or substantially based on the specialised knowledge of the witness (see **Part 3.3 - Opinion** of the *Evidence Act 1995* (Cth)).

3.   The guidelines are not intended to address all aspects of an expert witness's duties, but are intended to facilitate the admission of opinion evidence[3], and to assist experts to understand in general terms what the Court expects of them.   Additionally, it is hoped that the guidelines will assist individual expert witnesses to avoid the criticism that is sometimes made (whether rightly or wrongly) that expert witnesses lack objectivity, or have coloured their evidence in favour of the party calling them.

Guidelines

1.   General Duty to the Court[4]

1.1   An expert witness has an overriding duty to assist the Court on matters relevant to the expert's area of expertise.

1.2   An expert witness is not an advocate for a party even when giving testimony that is necessarily evaluative rather than inferential.

1.3   An expert witness's paramount duty is to the Court and not to the person retaining the expert.

2.   The Form of the Expert's Report[5]

2.1   An expert's written report must comply with Rule 23.13 and therefore must

    (a)   be signed by the expert who prepared the report; and

    (b)   contain an acknowledgement at the beginning of the report that the expert has read, understood and complied with the Practice Note; and

    (c)   contain particulars of the training, study or experience by which the expert has acquired specialised knowledge; and

    (d)   identify the questions that the expert was asked to address; and

    (e)   set out separately each of the factual findings or assumptions on which the expert's opinion is based; and

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[3]   As to the distinction between expert opinion evidence and expert assistance see *Evans Deakin Pty Ltd v Sebel Furniture Ltd* [2003] FCA 171 per Allsop J at [676].

[4]   The "*Ikarian Reefer*" (1993) 20 FSR 563 at 565-566.

[5]   Rule 23.13.

<blockquote>

(f) set out separately from the factual findings or assumptions each of the expert's opinions; and

(g) set out the reasons for each of the expert's opinions; and

(ga) contain an acknowledgment that the expert's opinions are based wholly or substantially on the specialised knowledge mentioned in paragraph (c) above[6]; and

(h) comply with the Practice Note.

</blockquote>

2.2 At the end of the report the expert should declare that "[the expert] has *made all the inquiries that* [the expert] *believes are desirable and appropriate and that no matters of significance that* [the expert] *regards as relevant have, to* [the expert's] *knowledge, been withheld from the Court.*"

2.3 There should be included in or attached to the report the documents and other materials that the expert has been instructed to consider.

2.4 If, after exchange of reports or at any other stage, an expert witness changes the expert's opinion, having read another expert's report or for any other reason, the change should be communicated as soon as practicable (through the party's lawyers) to each party to whom the expert witness's report has been provided and, when appropriate, to the Court[7].

2.5 If an expert's opinion is not fully researched because the expert considers that insufficient data are available, or for any other reason, this must be stated with an indication that the opinion is no more than a provisional one. Where an expert witness who has prepared a report believes that it may be incomplete or inaccurate without some qualification, that qualification must be stated in the report.

2.6 The expert should make it clear if a particular question or issue falls outside the relevant field of expertise.

2.7 Where an expert's report refers to photographs, plans, calculations, analyses, measurements, survey reports or other extrinsic matter, these must be provided to the opposite party at the same time as the exchange of reports[8].

3. Experts' Conference

3.1 If experts retained by the parties meet at the direction of the Court, it would be improper for an expert to be given, or to accept, instructions not to reach agreement. If, at a meeting directed by the Court, the experts cannot reach agreement about matters of expert opinion, they should specify their reasons for being unable to do so.

<div align="right">

J L B ALLSOP
Chief Justice
4 June 2013

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[6] See also *Dasreef Pty Limited v Nawaf Hawchar* [2011] HCA 21.

[7] The *"Ikarian Reefer"* [1993] 20 FSR 563 at 565

[8] The *"Ikarian Reefer"* [1993] 20 FSR 563 at 565-566. See also Ormrod *"Scientific Evidence in Court"* [1968] Crim LR 240

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Academic Qualifications

1995   Ph.D. (Finance), Graduate School of Business, Stanford University.
Dissertation Title: Essays in Empirical Finance
Committee Chairman: Ken Singleton
1989   LL.B. (Hons), Bachelor of Laws with Honours, University of Queensland.
1986   B.Com. (Hons), Bachelor of Commerce with Honours, University of Queensland.

Employment History

2000-Present   Professor of Finance, UQ Business School, University of Queensland.
1997-2000   Associate Professor of Finance, Department of Commerce, University of Queensland and Research Associate Professor of Finance, Fuqua School of Business, Duke University.
1994-1997   Assistant Professor of Finance, Fuqua School of Business, Duke University.
1990-1993   Research Assistant, Graduate School of Business, Stanford University.
1988-1990   Assistant Professor of Finance, Department of Commerce, University of Queensland.
1987   Specialist Tutor in Finance, Queensland University of Technology.
1986   Teaching Assistant in Finance, Department of Commerce, University of Queensland.

Academic Awards

2006   Outstanding Professor Award, Global Executive MBA, Fuqua School of Business, Duke University.
2002   Journal of Financial Economics, All-Star Paper Award, for Modeling the Conditional Distribution of Interest Rates as a Regime-Switching Process, JFE, 1996, 42, 27-62.
2002   Australian University Teaching Award – Business (a national award for all university instructors in all disciplines).
2000   University of Queensland Award for Excellence in Teaching (a University-wide award).
1999   Outstanding Professor Award, Global Executive MBA, Fuqua School of Business, Duke University.
1999   KPMG Teaching Prize, Department of Commerce, University of Queensland.
1998   Faculty Teaching Prize (Business, Economics, and Law), University of Queensland.
1991   Jaedicke Fellow in Finance, Doctoral Program, Graduate School of Business, Stanford University.
1989   Touche Ross Teaching Prize, Department of Commerce, University of Queensland.
1986   University Medal in Commerce, University of Queensland.

Large Grants (over $100, 000)

- Australian Research Council Linkage Grant, 2008—2010, Managing Asymmetry Risk ($320,000), with T. Brailsford, J.Alcock, and Tactical Global Management.
- Intelligent Grid Cluster, Distributed Energy – CSIRO Energy Transformed Flagship Collaboration Cluster Grant, 2008-2010 ($552,000)
- Australian Research Council Research Infrastructure Block Grant, 2007—2008, Australian Financial Information Database ($279,754).
- Australian Research Council Discovery Grant, 2006—2008, Capital Management in a Stochastic Earnings Environment ($270,000).
- Australian Research Council Discovery Grant, 2005—2007, Australian Cost of Equity.
- Australian Research Council Discovery Grant, 2002—2004, Quantification Issues in Corporate Valuation, the Cost of Capital, and Optimal Capital Structure.

- Australian Research Council Strategic Partnership Grant, 1997—2000, Electricity Contracts and Securities in a Deregulated Market: Valuation and Risk Management for Market Participants.

Current Research Interests

Benchmark returns and the cost of capital. Corporate Finance. Capital structure. Real and strategic options and corporate valuation. Financial and credit risk management. Empirical finance and asset pricing.

Publications

Gray, S., I. Harymawan and J. Nowland, (2014), "Political and government connections on corporate boards in Australia: Good for business?" *Australian Journal of Management,* forthcoming.

Brailsford, T., S. Gray and S. Treepongkaruna, (2013), "Explaining the bid-ask spread in the foreign exchange market: A test of alternate models," *Australian Journal of Management*, forthcoming.

Faff, R., S. Gray and M. Poulsen, (2013), "Financial inflexibility and the value premium," *International Review of Finance*, forthcoming.

T. Fitzgerald, S. Gray, J. Hall and R. Jeyaraj, (2013), "Unconstrained estimates of the equity risk premium" *Review of Accounting Studies,* 18, 560-639.

Gray, S. and J. Nowland, (2013), "Is prior director experience valuable?" *Accounting and Finance,* 53, 643-666.

Chen, E. T., S. Gray and J. Nowland, (2012), "Family representatives in family firms" *Corporate Governance: An International Review*, 21(3), 242-263.

Treepongkaruna, S., R. Brooks and S. Gray, (2012), "Do Trading Hours Affect Volatility Links in the Foreign Exchange Market?" *Australian Journal of Management*, 37, 7-27.

Chen, E. T., S. Gray and J. Nowland, (2012), "Multiple founders and firm value" *Pacific Basin Finance Journal*, 20, 3, 398-415.

Chan, K-F., R. Brooks, S. Treepongkaruna and S. Gray, (2011), "Asset market linkages: Evidence from financial, commodity and real estate assets," *Journal of Banking and Finance*, 35, 6, 1415-1426.

Parmenter, B, A. Breckenridge, and S. Gray, (2010), 'Economic Analysis of the Government's Recent Mining Tax Proposals', *Economic Papers*: *A Journal of Economics and Policy*, 29(3), September, 279-91.

Gray, S., C. Gaunt and Y. Wu, (2010), "A comparison of alternative bankruptcy prediction models," *Journal of Contemporary Accounting and Economics*, 6, 1, 34-45.

Feuerherdt, C., S. Gray and J. Hall, (2010), "The Value of Imputation Tax Credits on Australian Hybrid Securities," *International Review of Finance*, 10, 3, 365-401.

Gray, S., J. Hall, D. Klease and A. McCrystal, (2009), "Bias, stability and predictive ability in the measurement of systematic risk," *Accounting Research Journal*, 22, 3, 220-236.

Treepongkaruna, S. and S. Gray, (2009), "Information volatility links in the foreign exchange market," *Accounting and Finance*, 49, 2, 385-405.

Costello, D., S. Gray, and A. McCrystal, (2008), "The diversification benefits of Australian equities," *JASSA*, 2008, 4, 31-35.

Gray, S. and J. Hall, (2008), "The Relationship Between Franking Credits and the Market Risk Premium: A Reply," *Accounting and Finance*, 48, 1, 133-142.

Gray, S., A. Mirkovic and V. Ragunathan, (2006), "The Determinants of Credit Ratings: Australian Evidence," *Australian Journal of Management*, 31(2), 333-354.

Choy, E., S. Gray and V. Ragunathan, (2006), "The Effect of Credit Rating Changes on Australian Stock Returns," *Accounting and Finance*, 46(5), 755-769.

Gray, S. and J. Hall, (2006), "The Relationship Between Franking Credits and the Market Risk Premium," *Accounting and Finance*, 46(3), 405-428.

Gray, S. and S. Treepongkaruna, (2006), "Are there non-linearities in short-term interest rates?" *Accounting and Finance*, 46(1), 149-167.

Gray, P., S. Gray and T. Roche, (2005), "A Note on the Efficiency in Football Betting Markets: The Economic Significance of Trading Strategies," *Accounting and Finance*, 45(2) 269-281.

Duffie, D., S. Gray and P. Hoang, (2004), "Volatility in Energy Prices. In V. Kaminski," (Ed.), *Managing Energy Price Risk: The New Challenges and Solutions* (3rd ed.). London: Risk Books.

Cannavan, D., F. Finn and S. Gray, (2004), "The Value of Dividend Imputation Tax Credits in Australia," *Journal of Financial Economics*, 73, 167-197.

Gray, S. and S. Treepongkaruna, (2003), "Valuing Interest Rate Derivatives Using a Monte-Carlo Approach," *Accounting and Finance*, 43(2), 231-259.

Gray, S., T. Smith and R. Whaley, (2003), "Stock Splits: Implications for Investor Trading Costs," *Journal of Empirical Finance*, 10, 271-303.

Gray, S. and S. Treepongkaruna, (2003), "On the Robustness of Short-term Interest Rate Models," *Accounting and Finance*, 43(1), 87-121.

Gray, S. and S. Treepongkaruna, (2002), "How to Value Interest Rate Derivatives in a No-Arbitrage Setting," *Accounting Research Journal* (15), 1.

Gray, P. and S. Gray, (2001), "A Framework for Valuing Derivative Securities," *Financial Markets Institutions & Instruments*, 10(5), 253-276.

Gray, P. and S. Gray, (2001), "Option Pricing: A Synthesis of Alternate Approaches," *Accounting Research Journal*, 14(1), 75-83.

Dahlquist, M. and S. Gray, (2000), "Regime-Switching and Interest Rates in the European Monetary System," *Journal of International Economics*, 50(2), 399-419.

Bollen, N., S. Gray and R. Whaley, (2000), "Regime-Switching in Foreign Exchange Rates: Evidence from Currency Options," *Journal of Econometrics*, 94, 239-276.

Duffie, D., S. Gray and P. Hoang, (1999), "Volatility in Energy Prices. In R. Jameson," (Ed.), *Managing Energy Price Risk* (2nd ed.). London: Risk Publications.

Gray, S. and R. Whaley, (1999), "Reset Put Options: Valuation, Risk Characteristics, and an Example," *Australian Journal of Management*, 24(1), 1-21.

Bekaert, G. and S. Gray, (1998), "Target Zones and Exchange Rates: An Empirical Investigation," *Journal of International Economics*, 45(1), 1-35.

Gray, S. and R. Whaley, (1997), "Valuing S&P 500 Bear Market Warrants with a Periodic Reset," *Journal of Derivatives*, 5(1), 99-106.

Gray, S. and P. Gray, (1997), "Testing Market Efficiency: Evidence from the NFL Sports Betting Market," *The Journal of Finance*, 52(4), 1725-1737.

Gray, S. (1996), "Modeling the Conditional Distribution of Interest Rates as a Regime- Switching Process," *Journal of Financial Economics*, 42, 27-62.

Gray, S. (1996), "Regime-Switching in Australian Interest Rates," *Accounting and Finance*, 36(1), 65-88.

Brailsford, T., S. Easton, P.Gray and S. Gray, (1995), "The Efficiency of Australian Football Betting Markets," *Australian Journal of Management*, 20(2), 167-196.

Duffie, D. and S. Gray, (1995), "Volatility in Energy Prices," In R. Jameson (Ed.), *Managing Energy Price Risk,* London: Risk Publications.

Gray, S. and A. Lynch, (1990), "An Alternative Explanation of the January Anomaly," *Accounting Research Journal*, 3(1), 19-27.

Gray, S. (1989), "Put Call Parity: An Extension of Boundary Conditions," *Australian Journal of Management*, 14(2), 151-170.

Gray, S. (1988), "The Straddle and the Efficiency of the Australian Exchange Traded Options Market," *Accounting Research Journal*, 1(2), 15-27.

Teaching

Fuqua School of Business, Duke University, Student Evaluations (0-7 scale):

- Financial Management (MBA Core): Average 6.5 over 7 years.
- Advanced Derivatives: Average 6.6 over 4 years.
- Empirical Issues in Asset Pricing: Ph.D. Class

1999, 2006   Outstanding Professor Award, Global Executive MBA, Fuqua School of Business, Duke University.

UQ Business School, University of Queensland, Student Evaluations (0-7 scale):

- Finance (MBA Core): Average 6.6 over 10 years.
- Corporate Finance Honours: Average 6.9 over 10 years.

2002   Australian University Teaching Award – Business (a national award for all university instructors in all disciplines).
2000   University of Queensland Award for Excellence in Teaching.
1999   Department of Commerce KPMG Teaching Prize, University of Queensland.
1998   Faculty Teaching Prize, Faculty of Business Economics and Law, University of Queensland.
1998   Commendation for Excellence in Teaching, University-wide Teaching Awards, University of Queensland.
1989   Touche Ross Teaching Prize, Department of Commerce, University of Queensland.

Board Positions

2002 - Present: Director, Financial Management Association of Australia Ltd.
2003 - Present: Director, Moreton Bay Boys College Ltd. (Chairman since 2007).
2002 - 2007: External Risk Advisor to Board of Enertrade (Queensland Power Trading Corporation Ltd.)

Consulting

Managing Director, Strategic Finance Group: www.sfgconsulting.com.au.

Consulting interests and specialties, with recent examples, include:

- **Corporate finance**
  ⇒ **Listed multi-business corporation:** Detailed financial modeling of each business unit, analysis of corporate strategy, estimation of effects of alternate strategies, development of capital allocation framework.

- **Capital management and optimal capital structure**
  ⇒ **State-owned electricity generator:** Built detailed financial model to analyze effects of increased leverage on cost of capital, entity value, credit rating, and stability of dividends. Debt of $500 million issued.

- **Cost of capital**
  ⇒ **Cost of Capital in the Public Sector:** Provided advice to a government enterprise on how to estimate an appropriate cost of capital and benchmark return for Government-owned enterprises. Appearance as **expert witness** in legal proceedings that followed a regulatory determination.
  ⇒ **Expert Witness:** Produced a written report and provided court testimony on issues relating to the cost of capital of a cable TV business.
  ⇒ **Regulatory Cost of Capital:** Extensive work for regulators and regulated entities on all matters relating to estimation of weighted-average cost of capital.

- **Valuation**

- ⇒ **Expert Witness:** Produced a written report and provided court testimony. The issue was whether, during a takeover offer, the shares of the bidding firm were affected by a liquidity premium due to its incorporation in the major stock market index.
- ⇒ **Expert Witness:** Produced a written report and provided court testimony in relation to valuation issues involving an integrated mine and refinery.

- **Capital Raising**
  - ⇒ Produced comprehensive valuation models in the context of capital raisings for a range of businesses in a range of industries including manufacturing, film production, and biotechnology.

- **Asset pricing and empirical finance**
  - ⇒ **Expert Witness:** Produced a written report on whether the client's arbitrage-driven trading strategy caused undue movements in the prices of certain shares.

- **Application of econometric techniques to applied problems in finance**
  - ⇒ **Debt Structure Review:** Provided advice to a large City Council on restructuring their debt portfolio. The issues involved optimisation of a range of performance measures for each business unit in the Council while simultaneously minimizing the volatility of the Council's equity in each business unit.
  - ⇒ **Superannuation Fund Performance Benchmarking:** Conducted an analysis of the techniques used by a large superannuation fund to benchmark its performance against competing funds.

- **Valuation of derivative securities**
  - ⇒ **Stochastic Volatility Models in Interest Rate Futures Markets:** Estimated and implemented a number of models designed to predict volatility in interest rate futures markets.

- **Application of option-pricing techniques to real project evaluation**
  - ⇒ **Real Option Valuation:** Developed a framework for valuing an option on a large office building. Acted as arbitrator between the various parties involved and reached a consensus valuation.
  - ⇒ **Real Option Valuation:** Used real options framework in the valuation of a bio-tech company in the context of an M&A transaction.

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Experience

2013-15	Ross School of Business, The University of Michigan (Lecturer in Finance)
2008	Ross School of Business, The University of Michigan (Visiting Assistant Professor in Finance)
2014-15	Frontier Economics (Director)
2000-15	SFG Consulting (Director)
2000-12	University of Queensland Business School, The University of Queensland (Senior Lecturer)
1997-99	Credit Suisse First Boston (Equities analyst)

Education

2005	PhD in finance from The University of Queensland
2003	Chartered Financial Analyst designation by the CFA Institute
1996	Bachelor of Commerce with First Class Honours from The University of Queensland

Research

Journal articles

Impact of sector versus security choice on equity portfolios, with Ben McVicar, *Applied Financial Economics*, 2013, 23 (12), 991 – 1004.

Unconstrained estimates of the equity risk premium, with Stephen Gray, Tristan Fitzgerald and Ravi Jeyaraj, *Review of Accounting Studies*, 2013, 18 (2), 560 – 639.

Market risk exposure of merger arbitrage in Australia, with Matthew Pinnuck and Matthew Thorne, *Accounting and Finance,* 2013, 53 (1), 185 – 215.

The value of imputation credits on hybrid securities, with Clinton Feuerherdt and Stephen Gray, *International Review of Finance,* 2010, 10 (3), 365 – 401.

Forecast accuracy and stock recommendations, with Paul Tacon, *Journal of Contemporary Accounting and Economics,* 2010, 6 (1), 18 – 33.

Speculation and e-commerce: The long and the short of IT, with Colin Ferguson, Matthew Pinnuck and Frank Finn, *International Journal of Accounting Information Systems,* 2010, 11 (2), 79 – 104.

Bias, stability and predictive ability in the measurement of systematic risk, with Stephen Gray, Drew Klease and Alan McCrystal, *Accounting Research Journal,* 2009, 22 (3), 220 – 236.

Leveraged superannuation, with Peter Dunn and Scott Francis, *Accounting and Finance,* 2009, 49 (3), 505 – 529.

Persistence in growth versus market expectations, with Matthew Tochterman, *Australian Journal of Management,* 2008, 33 (1), 169 – 199.

Relationship between franking credits and the market risk premium: A reply, with Stephen Gray, *Accounting and Finance,* 2008, 48 (1), 133 – 142.

Comment on 'Regulation and the term of the risk free rate: Implications of corporate debt', *Accounting Research Journal,* 2007, 20 (2), 81 – 86.

Valuation of mining projects using option pricing techniques, with Shannon Nicholls, *JASSA,* 2007, Issue 4 (Summer), 22 – 29.

Relationship between franking credits and the market risk premium, with Stephen Gray, *Accounting and Finance,* 2006, 46 (3), 405 – 428.

Electronic commerce investments, the resource-based view of the firm, and firm market value, with Colin Ferguson and Frank Finn, *International Journal of Accounting Information Systems*, 2005, 6 (1), 5 – 29.

Auditor conservatism and voluntary disclosure: Evidence from the Year 2000 systems issue, with Peter Clarkson and Colin Ferguson, *Accounting and Finance*, 2003, 43 (1), 21 – 40.

Working papers

Portfolio rebalancing and mutual fund tournament behavior, with Paul Tacon, Finance and Corporate Governance Conference 2011, FIRN Frontiers in Finance Conference 2011, Financial Management Association Annual Meeting 2012.

The impact of security analyst recommendations on the trading of mutual funds, with David Costello, AFAANZ Conference 2010 (Winner Best Paper in Finance), Australasian Finance and Banking Conference 2010.

Forecasting stock returns using investor flows under short-sales constraints, with Paul Tacon, Australasian Finance and Banking Conference 2011, Finance and Corporate Governance Conference 2012, AFAANZ Conference 2012, Financial Management Association Annual Meeting 2012, Southern Finance Association Annual Meeting 2012.

Presentations

Accounting and Finance Association of Australia and New Zealand Conference (5) 2005, 2007, 2009-10, 2012

Asian Finance Association Conference 2009

Australasian Finance and Banking Conference (2) 2008, 2010

Australian National University Seminar Series 2012

Coal Trade, hosted by AIC Worldwide 1999

Coaltrans Asia, hosted by Coaltrans Conference Limited 1999

Contemporary Accounting Research/Journal of Contemporary Accounting and Economics Joint Symposium 2009

CPA Mining and Energy Conference 2006

Financial Management Association 2012

First Annual Private Equity Conference, hosted by Television Education Network 2007

JBWere Family Business Conference 2010

Melbourne Centre for Consumer Finance Investment & Regulatory Symposium 2008

PhD Conference in Economics and Business, hosted by University of Western Australia 2003

Southern Finance Association 2012

University of Melbourne Seminar Series (2) 2005, 2010

University of Queensland Seminar Series 2008

Referee activity

Accounting and Finance (8 reviews) 2003, 2005, 2009-13

Accounting Research Journal (3 reviews) 2002, 2006, 2010

Applied Financial Economics (3 reviews) 2012-13

Australian Journal of Management 2012

Contemporary Economic Policy 2011

European Financial Management 2014

Financial Review 2013

International Journal of Emerging Markets 2013

International Review of Finance 2012

MIS Quarterly 2003

Quarterly Journal of Finance and Accounting 2010

Quarterly Review of Economics and Finance 2012

Research grants

PricewaterhouseCoopers/Accounting and Finance Association of Australia and New Zealand 2006: Returns, tax and volatility – Superannuation choice with a complete information set ($8,500)

Australian Research Council Discovery Grant 2002-4: Quantification issues in corporate valuation, the cost of capital and optimal capital structure ($126,000)

UQ New Staff Research Start-up Fund: The competitive advantage of investments in electronic commerce ($10,000)

Research students

PhD (1 student)

2012 – Paul Tacon

Honours (20 students)

2012 – Edward Parslow (Carnegie Wylie)

2011 – James Lamb (Port Jackson Partners)

2010 – Jeremy Evans (JP Morgan), Sarah Thorne (JP Morgan), Alexandra Dwyer (Reserve Bank of Australia)

2009 – Tristan Fitzgerald (UNSW), David Costello (National Australia Bank), William Toe (Ernst & Young)

2008 – Ben McVicar (Credit Suisse), Matthew Thorne (Credit Suisse)

2007 – Sam Turner (ABN Amro Morgans)

2006 – Paul Tacon (PhD, UQ), Ravi Jeyaraj (Navis Capital), Thomas Green (Crescent Capital), Alexander Pascal-Bossy (Macquarie)

2005 – Angela Gill (Wilson HTM), Andrew Wagner (Macquarie)

2004 – Matthew Tochterman (M. Fin. Eng., UC Berkeley), Justyna Lewandowska (JP Morgan), An Pham (UBS)

Masters (2 students)

2003 – Scott Francis (A Clear Direction Financial Planning), Hernando Barrero (PricewaterhouseCoopers)

PhD reader

Damien Cannavan 2012

Teaching

Ross School of Business, The University of Michigan

Valuation (2014-2015; MBA students; avg. rating 4.0)

Corporate Investing Decisions (2014; BBA students avg. rating 4.2)

Corporate Financing Decisions (2015; BBA students)

Corporate Financial Policy (2008; MBA students; avg. rating 4.3)

UQ Business School, The University of Queensland (Mean teacher ratings out of a possible 5.0)

Awarded undergraduate teaching prize 2009

Empirical Finance Honours (2009-12; PhD and Honours students; avg. rating 4.1)

Corporate Finance Honours (2005 & 2011; PhD and Honours students; avg. rating 4.7)

Investments & Portfolio Management (2002-7, 2009-10 & 2012; B.Com, MBA & M.Com students; avg. rating 3.8)

Corporate Finance (2002-4, 2006-10 & 2012; B.Com, MBA and M.Com students; avg. rating 3.8)

Finance (2005-6; M.Com students; avg. rating 3.7)

Corporate Finance and Investments (Mt Eliza Business School, Beijing 2003; MBA students)

Technology Valuation and Project Evaluation (Singapore 2004; Masters of Technology Management students)

Auditing (Summer 2000/1-2001/2; B.Com, MBA and M.Com students; avg. rating 3.8)

Executive education

Risk Management and Financial Analysis (Rabobank 2000-10)

Financial Analysis of Innovative Investments (UQ Business School 2007)

Credit Analysis (Queensland Treasury Corporation 2005)

Capital Management (UQ Business School 2004)

Making Critical Financial Decisions (UQ Business School 2003)

Business Valuation and Analysis (UQ Business School 2003)

Cost of Capital Estimation (UQ Business School 2003)

Analysis of Real Options (Queensland Treasury 2003)

Student competitions

Rotman International Trading Competition

Manager of the UQ Business School trading team (2007 & 2009-12) which competes annually at the University of Toronto amongst 50 teams. UQ is the 9th most successful entrant from 66 schools which have competed in any of the same years, finishing 3rd in 2010, 6th in 2007, 11th in 2009, 14th in 2011 and 18th in 2012.

UBS Investment Banking Competition

Judge for the UQ section 2006-7 & 2009-12. Faculty representative at the national section 2008.

JP Morgan Deal Competition

Judge for the UQ section 2007-8.

Wilson HTM Research Report Competition

Delivered two workshops as part of the 2006 competition and was one of three judges.

Industry engagement

From 2000-15, I have provided consulting services as a director of SFG Consulting and Frontier Economics (from November 2014). A selection of projects is listed below.

Retail electricity and gas margins in NSW (Independent Pricing and Regulatory Tribunal 2012)

In 2006-7 and 2009-10 I acted as part of a team which was engaged to estimate electricity costs and margins for electricity and gas retailers in NSW. We have been reappointed for 2012-13. My role related to the estimation of a profit margin which would allow the retailer to earn a return commensurate its systematic risk. The approach developed was novel in that the margin was derived without reference to any pre-defined estimate of the asset base. Rather, the margin was a function of the potential increases or decreases in cash flows which would result from changes in economic conditions. Reports are available from IPART.

Advice on rules to determine regulated rates of return (Australian Energy Markets Commission 2012)

The AEMC is considering changes to the rules relating to regulation of electricity and gas networks. Independent rule change proposals have been put forward by the Australian Energy Regulator and the Energy Users Association of Australia. Both groups argue that application of the existing rules by the regulator generate upwardly-biased estimates of the regulated rate of return. As part of a team I am currently providing advice to the commission on whether the rule change proposals provide evidence on an upward bias, and if so, whether the proposed amendments are likely to reduce the extent of any bias.

Expert evidence relating to regulated rates of return (Electricity network businesses 2011)

In April 2011 the Australian Competition Tribunal heard an appeal by electricity networks on the regulated rate of return set by the Australian Energy Regulator. The issue was the value of dividend imputation tax credits. The Tribunal directed us to perform a dividend drop-off study to estimate the value of a distributed credit. Largely on the basis of our evidence the Tribunal determined that an appropriate value for a distributed credit was 35 per cent of face value. The Tribunal determination is available on its website and our expert report is available on request.

Estimation of risks associated with long-term generation contracts (New South Wales Treasury 2010)

In 2010 the NSW Government privatised a segment of its electricity industry, by selling three electricity retailers and entering into two generation agreements termed GenTrader contracts. The state-owned generators agreed to provide generation capacity in exchange for a charge. The generators also agreed to pay penalties in the event that their availability was less than agreed. As part of a team, I provided advice to NSW Treasury on the risks associated with the contracts. The estimated penalties resulting from this analysis are used by NSW Treasury in their budgeting role and in providing forward-looking analysis to the Government.

Litigation support relating to asset valuation (Alcan 2006-7)

In 2006-7 I acted as part of a team which provided litigation support to Alcan in a dispute with the taxation authority in the Northern Territory. The dispute related to whether Alcan was required to pay stamp duty as a result of its acquisition of an additional 30 per cent interest in Gove Alumina Limited. One issue was whether the acquisition was land-rich, meaning that the proportion of the asset considered to be land exceeded a threshold triggering stamp duty.

Methodology for evaluating public-private partnerships (Queensland Treasury Corporation 2005)

In 2005 I acted as part of a team which advised QTC on evaluating public-private partnerships, which typically require subsidies to appeal to the private sector. We rebutted the conventional wisdom, adopted in NSW and Victoria, that the standard valuation approach is flawed for negative-NPV projects. Furthermore, we developed a technique to incorporate systematic risk directly into expected cash flows, which are then discounted at the risk-free rate.

Litigation support

Insolvency proceedings relating to the collapse of Octaviar (Public Trustee of Queensland 2008-9)

Valuation of resource assets (Compass Resources 2007-8, Westpac Banking Corporation 2007)

Appeals against regulatory determinations (Envestra 2007-8, Telstra 2008)

Advice on whether loan repayments correspond to contract terms (Qld Dept. of Fair Trading 2005)

Advice on whether port and channel assets were contributed and hence not part of regulated assets (Comalco 2004-5)

Valuation

Management performance securities (Collins Foods Group 2006-11, GroundProbe 2008-9)

Ordinary shares in the context of an equity raising (Auscript 2007-8)

Intangible assets (Inbartec 2007)

Resources assets (Senex Energy 2012, Chalco 2007, Bank of Queensland 2007)

Cost of capital estimation, advice and regulatory submissions

Transport (Qantas 2008, QR National 2005 & 2012)

Water (Essential Services Commission of South Australia 2012, ActewAGL 2012, IPART 2011, Metropolitan utilities in Victoria 2004 & 2006-7, QCA 2002-3)

Energy networks (Economic Regulation Authority in Western Australia 2009, Hong Kong Electric 2007, Envestra 2006-7 & 2012, Powercor 2005, AGL 2004, Energex 2003-4, Ergon Energy 2003-4)

Local government networks (Queensland Competition Authority 2009)

Electricity generation (National Generators Forum 2008)

Environmental consulting (Ecowise 2007)

Listed vs unlisted infrastructure funds across alternative European equity markets (ABN AMRO Rothschild 2007)

Forestry assets (Queensland Department of Natural Resources 2004)

Portfolio performance measurement

Performance evaluation and benchmark derivation (Friday Investments 2010-12, Zupp Property Group 2011-12)

Corporate finance

Economic impact assessment of a proposed development of a retail shopping complex (Lend Lease 2006)

Impact of an acquisition on dividend growth, earnings per share and share price (AGL 2003-4)

Estimation of the optimal capital structure for electricity generation and distribution (NSW Treasury 2001-2)

Review of the debt valuation model used by the Snowy Hydroelectric Authority (NSW Treasury 2002)

Estimation of the optimal contract terms for coal sales to an electricity generator (NSW Treasury 2001-2)

Econometrics

Scoping study into the determinants of changes in tax debt in Australia (Australian Taxation Office 2007)

Interests

I am interested in sport as a participant and spectator. I finished 3rd on three occasions in the Brisbane Half Marathon (2005 & 2009-10), 8th in the Toronto Half Marathon (2002) and 3rd in the Australian Universities Marathon Championships (2003). I have finished 21 marathons, recording a best time of 2:47:54 in the Chicago Marathon 2011. From 1994-96 I was a member of The University of Queensland tennis team, which placed 1st at the Australian University Games in 1994.