Testing the reasonableness of the regulatory allowance for the return on equity

Report for Aurizon Network

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SFG CONSULTING
Level 1, South Bank House
Cnr. Ernest and Little Stanley St
South Bank, QLD 4101

PO Box 29
South Bank, QLD 4101

Email: s.gray@sfgconsulting.com.au
Office: +61 7 3844 0684
Phone: +61 419 752 260

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1. Background and conclusions

Instructions

1. SFG Consulting (**SFG**) has been retained by Aurizon Network (**Aurizon**) to provide advice in relation to the estimation of the required return on equity and the regulatory market risk premium (**MRP**) for use in the Capital Asset Pricing Model (**CAPM**).

2. We have been asked to specifically examine the approach adopted by the Queensland Competition Authority (**QCA**) in its 2009 and 2010 Draft Decisions for QR Network (**QRN**, the name formerly used by Aurizon). We consider the outcomes of adopting that approach and maintaining the same parameter estimates, but for an update to the estimate of the risk-free rate. The primary objective of this report is to examine the reasonableness of the outcomes of such a mechanical update in light of the relevant market evidence.

Summary of conclusions

Core reasoning

3. In its recent decisions, the QCA has adopted a market risk premium of 6%. This is the same estimate as the QCA had adopted prior to the global financial crisis (**GFC**). This estimate is based primarily on estimates of the mean of historical excess returns. An estimate based on a long-term historical average will (obviously) reflect the average of the conditions in the market for funds that applied during the relevant historical period.

4. The QCA then combines its estimate of MRP (based on a long-term historical average) with a contemporaneous estimate of the risk-free rate (which is currently at historical lows) to produce its estimate of the required return on equity. The result of this approach at the current time is an estimate of the required return on equity that is also at historical lows.

5. Consequently, the central question is whether or not the QCA's approach to estimating these two parameters would presently produce an estimate of the required return on equity that is reasonable or even plausible.

6. In our view, there is substantial evidence to support the conclusion that the prevailing conditions in the market for funds (insofar as they relate to financial risk premiums) are *not* now commensurate with the conditions prior to the GFC.

7. The most compelling such evidence is the fact that the market for funds now requires materially higher risk premiums (three- or four-fold higher) when investing in debt securities. It is implausible to suggest that the same market for funds would not require higher risk premiums when investing in equity securities.

8. It is our view that the only reasonable interpretation of the empirical data is that equity risk premiums remain at elevated levels. When interpreting the data, it is important to note that a mechanical update of the QCA approach in the 2010 QRN Decision would not imply that the current required return on equity is commensurate with its long-run average. Rather, that approach would imply that the current MRP is commensurate with its long-run average. This, in turn, would imply that the required return on equity is currently lower than at any time on record. Consequently, the observable data would only support the return on equity estimated using such an approach if it also indicated that

required returns were at historical lows. In our view, no reasonable interpretation of any of the observed data would support such an interpretation.

Implications of the current QCA practice for determining the allowed return on equity

9. The current practice of the QCA is to determine the allowed return on equity by adding a constant premium of 4.8% to the contemporaneous estimate of the risk-free rate of interest. This approach has the following implications:

    a) The current estimate of the required return on equity is the lowest ever on record. This implies that equity investors are more prepared to make equity investments requiring lower returns than ever before;

    b) Whereas debt risk premiums are currently three- to four-fold higher than pre-GFC levels, equity risk premiums have not increased at all. That is, a market that requires a three- to four-fold increase in risk premiums when investing in debt securities in the benchmark firm, requires no additional risk premium at all when investing in riskier equity securities in the same firm;

    c) A material number of investors will require lower returns on residual equity in the firm than they would require on first-ranking investment grade debt in the same firm;

    d) The firm could materially lower its cost of capital by employing 100% equity finance; and

    e) Investors in firms that the QCA considers to be comparable could reasonably expect to receive a return that is at least 35% higher than what would be allowed to investors in the regulated firm.

Historical mean excess returns produce an estimate of MRP that is commensurate with historical conditions in the market for funds

10. There is broad agreement that the risk premiums that equity investors require vary over time. That is, the MRP is not constant, but varies over time.

11. The mean of historical excess returns is only capable of providing an estimate of the long-run average level of the MRP – commensurate with the average conditions in the market over the historical period. This does not necessarily provide a contemporaneous estimate of the MRP that is commensurate with the prevailing conditions in the market. The best illustration of this point comes from the AER's last WACC Review. It is common ground that during 2008 and early 2009 financial risk premiums increased materially. The AER specifically recognised this point in its WACC Review and accordingly increased its estimate of MRP.[1] At the same time that risk premiums were materially increasing, global stock markets plummeted. This, in turn, has the effect of reducing the historical mean of excess returns. That is, just when financial risk premiums are going up, the mean of historical excess returns is going down.

12. In general, the mean of historical excess returns moves in the opposite direction to the risk premiums that are commensurate with the prevailing conditions in the market for funds. When risk premiums

[1] AER (2009), Final Decision, Electricity transmission and distribution network service providers, Review of the weighted average cost of capital (WACC) parameters, May 2009; pages 237-238. "The AER also notes that there may be an inverse relationship between the short term historical excess return and the short term forward looking MRP."

rise, stock prices fall and the historical mean falls, and when risk premiums fall, stock prices rise and the historical mean rises. Consequently, the mean of historical excess returns does not provide an estimate of MRP that is commensurate with the prevailing conditions in the market for funds, but rather one that is commensurate with the average conditions in the market over the historical period.

The use of survey information

13. The QCA has used survey data to support its estimate of MRP.

14. The Australian Competition Tribunal recently indicated[2] that three conditions must be met for survey responses to be given any material consideration:

    a) The survey must be timely – there must have been no change in the prevailing conditions in the market for funds since the survey was administered;

    b) There must be clarity about precisely what respondents were asked so that there is no ambiguity about how to interpret their responses; and

    c) The survey must reflect the views of the market and not a sample that is small, unresponsive, or without sufficient expertise.

15. None of these requirements are met by the survey responses on which the QCA has relied:

    a) Timeliness – the key feature of the prevailing conditions in the market for funds is the historically low government bond yield. The yield on 10-year government bonds is currently around 3%. Any surveys that were administered in materially different market conditions cannot provide any estimate of the MRP that is commensurate with the prevailing conditions in the market for funds;

    b) Clarity – survey responses in relation to MRP are notoriously vague and ambiguous. On this measure, survey responses could only be considered if:

        i) Respondents were asked about what they actually do, not if they were asked to predict the future;

        ii) Respondents were also asked what estimate they used for the risk-free rate;

        iii) Respondents were also asked whether they made any other adjustments to reflect current market conditions;

        iv) Respondents were also asked to set out the time horizon for which their response applies; and

        v) Respondents were also asked to specify whether their estimate of MRP was to be used in the CAPM to produce an estimate of the total required return, which would then be multiplied by $\frac{1-T}{1-T(1-\gamma)} = \frac{1-0.3}{1-0.3(1-0.5)} = 0.82$ when estimating the firm's cost of capital, consistent with the regulatory approach. This last question would determine

[2] Application by Envestra Ltd (No 2) [2012] ACompT 3.

whether respondents were reporting an MRP estimate on the same basis as that used by the QCA.

Only if all of these requirements are met will the survey response be consistent with the QCA's definition and use of MRP.

c) Sample – the Tribunal requires that the weight applied to survey data must reflect the non-response rate and the expertise of the sample respondents.

16. In our view, the best information about the prevailing conditions in the market for funds comes from traded prices drawn from the market for funds, rather than from survey responses. We note that this view is consistent with the recent directions from the Tribunal.

The use of dividend growth models

17. It is well accepted, including by the AER,[3] that dividend growth models currently indicate that required returns on equity remain at elevated levels.

18. At a minimum, this sort of information should be used to test the reasonableness of setting the allowed return on equity to the *lowest* level ever on record – which would be the outcome of mechanically extending the QCA's 2010 QRN methodology to the current market data.

The use of other evidence

19. It is our view that the only reasonable interpretation of the empirical data is that equity risk premiums remain at elevated levels. The most direct piece of evidence is the fact that debt risk premiums remain near their historical highs. It is implausible to suggest that the same market for funds would require materially higher than average risk premiums when investing in debt securities but not when investing in equity securities. Dividend yields and P/E ratios also indicate that required returns on equity are higher than average.

20. When interpreting this data, it is important to note that, a mechanical update of the 2010 QRN Decision for changes in government bond yields would not imply that the required return on equity is comparable to the long-run average. Rather, it would imply that the required return on equity is currently lower than at any time on record. Consequently, the observable data would only support the return on equity that would be allowed under such an approach if it also indicated that required returns were at historical lows. In our view, no reasonable interpretation of any of the observed data would support such an interpretation.

Other regulators accept that the current historical lows in government bond yields imply that the prevailing conditions in the market for funds are not commensurate with pre-GFC conditions

21. IPART has recently concluded that "there may be an inconsistency between using short term data for the risk free rate and using long term data for the MRP…there may be an inversely proportional relationship between the MRP and the risk free rate,"[4] and that "In the current market circumstances, there is some evidence to support the view that expectations for the MRP have risen as bond yields have fallen,"[5] and further that "we recognised that there may be a discrepancy between the use of

[3] Envestra Draft Decision, Appendix B, p. 39.
[4] IPART (2012), p. 107.
[5] IPART (2012), p. 107.

short term yields on the risk free rate and long term averages for the MRP, particularly in the current market."[6]

22. In a series of recent cases, IPART has worked within its regulatory constraints to allow a return on equity above that which would be obtained by adding a fixed premium to the government bond yield. In these cases, IPART has allowed a return on equity that is close to its long-run historical mean estimate of the required return on equity. This allowed return on equity can be obtained by:

    a) Increasing the risk free rate from the contemporaneous estimate to a longer-term average estimate of 5.2 to 5.4%; or

    b) Adopting a contemporaneous MRP estimate of 7.5 to 7.8%.

Conclusions in relation to QRN proposal

23. A mechanical update of the approach adopted by the QCA in its 2010 Draft Decision for QRN would currently produce an estimate of the allowed return on equity of 7.46%.

24. We conclude above that investors in firms that the QCA considers to be comparable firms, could reasonably expect to receive returns on equity investments of at least 11.5% p.a. – given the QCA's estimates of parameters such as equity beta (0.8) and gamma (0.5).

25. We also noted that, in a series of recent decisions, IPART has carefully considered the current conditions in the market for funds and has departed from the approach of mechanically updating its own parameter estimates. This has led IPART to adopt an allowed return on equity of approximately 10.2% for a firm with an equity beta of 0.8.[7]

26. We have been advised that Aurizon Network proposes to submit an upper bound of 10.16% for the allowed return on equity. This is in line with the return on equity recently allowed by IPART and is conservative when compared with the return that investors could reasonably expect to receive from the firms that the QCA considers to be comparable.

27. In our view, QRN's proposed range for the allowed return on equity, of 8.56% to 10.16%, is conservative in light of the evidence set out above. We draw this conclusion in relation to the headline allowed return on equity. In this report, we follow the IPART approach of testing the reasonableness and plausibility of the headline allowed return on equity – we focus on individual parameter estimates in our companion reports. In our view, an allowed return on equity below the range submitted by QRN cannot be considered to be commensurate with the prevailing conditions and would not provide QRN's shareholders with a return that is commensurate with the risks involved.

[6] IPART (2012), p. 107.

[7] If the allowed return on equity is computed by adopting a longer-term average risk-free rate of 5.4%, the allowed return for a firm with an equity beta of 0.8 is 5.4% + 0.8 × 6% = 10.2%.

2. Does the previous QCA approach produce an allowed return on equity commensurate with the prevailing conditions in the market for funds?

Requirements of QCA Act

28. The Queensland Competition Authority Act 1997 states that in relation to access arrangements, the objective is to:

> promote the economically efficient operation of, use of and investment in, significant infrastructure by which services are provided, with the effect of promoting effective competition in upstream and downstream markets.[8]

and that:

> The pricing principles in relation to the price of access to a service are that the price should generate expected revenue for the service that is at least enough to meet the efficient costs of providing access to the service and include a return on investment commensurate with the regulatory and commercial risks involved.[9]

29. In this report, we focus on the allowed return on equity and we summarise the requirements of the QCA Act in testing whether the allowed return is commensurate with the prevailing conditions in the market. If the allowed return is materially less than that which is commensurate with the prevailing conditions in the market, it would not promote the economically efficient investment in infrastructure – as capital would not be provided if the returns on offer were below what is required by investors given the prevailing conditions in the market. Moreover, if the allowed return is materially less than that which is commensurate with the prevailing conditions in the market, it cannot be said to be at least enough to provide a return on investment that is commensurate with the commercial risks involved.

Update to QCA's previous approach

30. The QCA's last detailed WACC review for QRN was reported in its 2010 Draft Decision. In that case, the QCA adopted the following parameter estimates when determining the allowance for the required return on equity:

    a) Risk-free estimated as the yield on 5-year Commonwealth Government Securities;

    b) Equity beta of 0.8; and

    c) Market risk premium (**MRP**) of 6%.

31. These parameter estimates currently combine[10] to produce an allowed return on equity of 7.46% p.a.:

$$\begin{aligned} r_e &= r_f + \beta_e \times MRP \\ &= 2.66\% + 0.8 \times 6\% = 7.46\%. \end{aligned}$$

[8] QCA Act, s.69E.
[9] QCA Act, s.168A.
[10] That is, using the current yield on 5-year Commonwealth Government Securities as at October 2012.

32. In its 2010 Draft Decision, the QCA set the allowed return on debt as the sum of:

    a) An estimate of the yield to maturity of 10-year BBB+ corporate bonds;[11]

    b) An allowance for the use of interest rate swaps; and

    c) An allowance for debt refinancing costs.

33. The QCA determined the allowed return on debt on the basis of the firm raising 10-year BBB+ debt finance from investors, and then converting that 10-year debt into 5-year debt using a combination of interest rate swaps and credit default swaps. The QCA noted that the regulated business is not *required* to raise and manage its debt finance in this manner, but rather this was the QCA's estimate of an efficient means of raising and managing debt.

34. In the analysis that follows, we make a number of comparisons between the returns that would be available to debt and equity investors in the regulated firm. In this regard, we note that debt investors would receive the yield to maturity, but not the allowance for interest rate swaps or debt refinancing costs. Consequently, our focus is on the yield to maturity of 10-year BBB+ corporate bonds.

35. We note that the AER has recently estimated the yield to maturity of 10-year BBB+ corporate bonds to be 6.74%. For the purposes of our comparative analysis, we take this as an estimate of the current return to be paid to debt investors in the regulated firm.

Current estimates imply that equity capital is now cheaper than ever before

36. Figure 1 below shows the current allowed return on equity is at its lowest level ever, materially lower than historical allowances. This figure has been constructed by applying the CAPM to contemporaneous regulatory estimates of the relevant parameters. In particular:

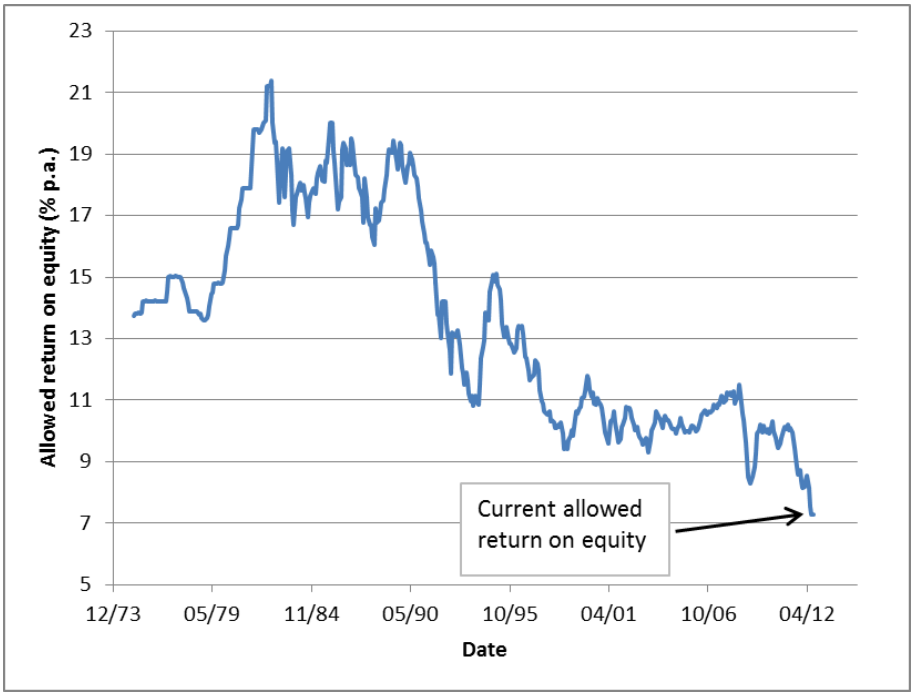
    a) The risk-free rate has been set to the yield on 5-year Commonwealth Government securities;

    b) The market risk premium has been fixed at 6%; and

    c) Equity beta has been fixed at 0.8.

[11] The QCA disaggregated this into three components – the yield on 5-year government bonds, the difference between the yields on 5-year corporate and government bonds, and the difference between the yields on 10-year and 5-year corporate bonds. The sum of the three components is the yield on 10-year corporate bonds.

Figure 1. Allowed return on equity for QRN under the QCA approach and parameter estimates



Source: Reserve Bank of Australia.
Estimates of the return on equity are computed as the return that the QCA would have adopted if it had applied its approach and current parameter estimates to the government bond market data at the time.

37. Figure 1 above implies that equity capital is currently cheaper than at any time since 1975 – that investors are more prepared to make equity investments requiring lower returns than ever before. That is, the current estimate obtained by applying the QCA 2010 approach could only be said to be commensurate with the prevailing conditions in the market for funds if those prevailing conditions were such that equity capital really was now cheaper than at any time since records have been kept.

Equity capital is not really cheaper than ever before

38. The return on equity under the approach adopted by the QCA in its 2010 QRN decision implies that equity capital is now cheaper than ever before. This allowed return would only be commensurate with the prevailing conditions in the market for funds if market investors really were requiring lower returns on equity capital than ever before. But any reasonable analysis would conclude that they are not.

39. For example, Zenner and Junac (2012) note that US government bond yields are currently low, but conclude that the cost of equity is now relatively high – and certainly not the lowest on record:

> So even with a relatively low Treasury rate, the currently high equity risk premium leads to a cost of equity higher than it has been historically. The cost of equity has been lower almost 68% of the time, primarily driven by a market risk premium that has been lower 97% of the time.[12]

[12] Zenner and Junac (2012), p. 3.

40. Zenner and Junac (2012) reach this conclusion by comparing, over time, a number of relatively simple methods for estimating the prevailing cost of equity and the prevailing equity risk premium. They do not suggest that these methods produce accurate or definitive point estimates of either. Rather, they compare current values with historical values to determine whether the current cost of equity and the current equity risk premium are likely to be high or low relative to historical levels. Their conclusion is that:

> The debt risk premia (i.e., credit spreads) for both investment grade and high yield debt remain elevated relative to history. More strikingly, the equity risk premia, however estimated, have rarely been this high.[13]

41. They go on to conclude that the MRP is currently higher than in 97% of their sample period – the record highs in MRP more than counteract the record lows in government bond yields.

42. Although the Zenner and Junac analysis relates to the US market, we note that the relevant conditions are the same in the Australian financial markets – government bond yields are at historical lows and corporate debt spreads remain at elevated levels.

43. Of course this is just one example of an analysis that leads to the conclusion that equity capital in the market for funds is not cheaper than ever before, and we consider a further range of evidence below. Our point here is simply that no reasonable analysis would conclude that equity capital is now cheaper than ever before. Yet that is what the approach adopted by the QCA in its 2010 QR N decision currently implies. This goes to the issue of whether the allowed return would be at least sufficient to provide a return that is commensurate with the risks involved in providing the service.

44. In our view, it is reasonable to conclude that required returns on equity in the Australian market are *not* currently lower than at any time on the historical record.

Regulatory estimates of debt and equity risk premiums are inconsistent

45. Figure 2 below shows:

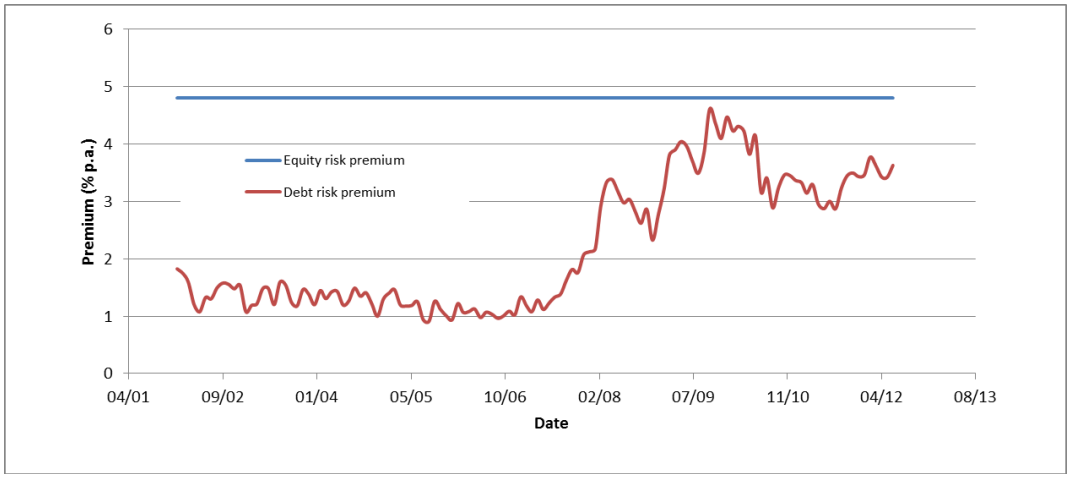
    a) the allowed regulatory equity risk premium (computed as set out in Paragraph 36 above); and

    b) an estimate of debt risk premium computed as the difference between the 10-year government bond rate and the 10-year Bloomberg BBB fair value rate, where the Bloomberg fair value curve has been extrapolated as required on the basis of the Bloomberg AAA fair value curve).[14]

[13] Zenner and Junac (2012), p. 3.

[14] We use this extrapolation method as a close approximation of the paired bonds method to illustrate the relative movements in the regulatory DRP over time.

Figure 2. Allowed risk premiums on equity and debt under QCA approach and parameter estimates



Source: Reserve Bank of Australia, Bloomberg, QCA regulatory determinations.
Estimates are computed as the risk premiums that the QCA would have adopted if it had applied its approach to the relevant market data at the time.

46. Figure 2 shows that the debt risk premium has increased materially since 2008. Prior to 2008, the DRP largely varied within the range of 1-2%, with some observations below 1%. In recent years, the DRP has generally varied within the range of 3-4%, with some observations above 4%. That is, the DRP is 3-4 times greater than what it was prior to 2008.

47. By contrast, the QCA's estimates of the premium that investors in the benchmark firm would require for bearing equity risk has not increased over the same period.

48. It is unlikely that there could be any circumstances whereby debt investors would be requiring materially higher risk premiums, but equity investors would be requiring lower risk premiums. These are the same investors in the same market for funds. It is illogical to expect that they would require risk premiums several times higher when buying debt securities, but then require lower risk premiums when buying equity securities. McKenzie and Partington (2011) provide similar advice to the AER:

> Similar to the equity premium, bond spreads also have fundamental determinants and the directional relationships are likely to be such that spreads and risk premiums are positively correlated. Given these commonalities, it is possible that the equity market risk premium might be related to the corporate bond spread, Damodoran (2011) finds that while a relationship clearly exists, the noise in the ratios is too high for any useful rule to be developed. He does argue that there is enough of a relationship however, that this approach may be useful to test to see whether the equity risk premiums make sense, given how risky assets are being priced in other markets.[15]

49. That is, even if it is not possible to construct a precise mathematical link between debt and equity risk premiums, information about debt risk premiums (which are more directly observable) can be used to "see whether the equity risk premiums make sense."

[15] McKenzie and Partington (2011), Paragraph 106.

50. Finally, we note that debt risk premiums are effectively observable whereas equity risk premiums are compiled from assumptions and estimates of economic models. Consequently, it is the debt risk premium that provides the more direct and objective evidence about the prevailing conditions in the market for funds.

51. Figure 2 above shows that the prevailing conditions in the market for funds require higher risk premiums. In this case, a reduction in the assumed equity risk premium is not commensurate with the prevailing conditions in the market for funds. To put this into perspective, and consistent with Figure 2 above, prior to the GFC the regulatory premium for taking on equity risk was approximately 500 basis points higher than the regulatory premium for debt risk.[16] The QCA's 2010 QRN approach would currently imply that the premium for taking on equity risk is now approximately 100 basis points.[17] In our view, the suggestion that the premium for equity risk has fallen to this extent is implausible.

The return on equity is below the return on debt for some investors

Return net of imputation credits

52. Under the QCA's regulatory model, the CAPM estimate of the required return on equity includes the assumed value of dividend imputation franking credits. The proportion of the total return that is assumed to come in the form of imputation credits is:

$$\frac{\gamma T}{1-T(1-\gamma)},$$

where T is the relevant corporate tax rate and γ represents the extent to which dividend imputation is assumed to affect the cost of equity capital.

53. It then follows that the proportion of the return from sources other than imputation credits (i.e., from dividends and capital gains) is:[18]

$$\frac{1-T}{1-T(1-\gamma)}.$$

54. Using the values for γ and T from the QCA's 2010 QRN Decision, the return to equity holders from dividends and capital gains is:

$$r_e\left[\frac{1-T}{1-T(1-\gamma)}\right] = 7.46\%\left[\frac{1-0.3}{1-0.3(1-0.5)}\right] = 6.14\%.$$

[16] With an equity beta of 1.0 and MRP of 6%, the premium for equity risk is 6%. Prior to the GFC the DRP was in the order of 1%.

[17] With an equity beta of 0.8 and MRP of 6%, the premium for equity risk is 4.8%, to be compared with a current DRP of 3.67%.

[18] This adjustment factor is derived in Officer (1994) and is common across the Australian regulatory framework. For example, Appendix 1 shows that this exact adjustment to the required return on equity is embedded within the National Electricity Rules and the AER's post-tax revenue model.

Return available to non-resident investors

55. It is generally agreed that non-resident investors receive no benefit from Australian imputation tax credits. Consequently, that class of investors receives an expected return on equity of only 6.14% from the benchmark firm. By contrast those same investors can receive a fixed rate of return of 6.74% from investment grade debt in the same benchmark firm.

56. Debt holders in the benchmark firm receive a fixed rate of return. They will receive a fixed return of exactly 6.74% p.a., so long as the firm is able to remain solvent. At this stage, we note that:

    a) The QCA assumes that the regulated firm has a strong investment grade credit rating; and

    b) Although debt holders have provided only 55% of the benchmark firm's finance, they are entitled to first-ranking claim over 100% of the firm's cash flows.

    For these reasons, we consider it reasonable to assume that debt investors would invest in the benchmark firm reasonably expecting to receive the fixed return of 6.74%. This applies to resident and non-resident investors alike.

57. Those same non-resident investors also have the opportunity of investing in equity in the benchmark firm. An equity investment is clearly much riskier than a fixed rate investment grade loan. Lenders have the first claim over all of the firm's cash flows and assets. Equity investors have the last-ranking residual claim – whatever is left after debt holders are paid in full. A materially greater risk requires a materially greater expected return.

58. However, under the QCA's 2010 approach, non-resident investors would be allowed a (risky) expected return of 6.14% on their equity investment. That is, the QCA's 2010 approach implies that a material number of investors will invest in residual equity in the benchmark firm for a lower return than they could receive on first-ranking investment grade debt in the same firm. In our view, this is neither reasonable nor plausible.

QCA approach produces estimates that are inconsistent with assumed capital structure

59. In its 2010 QRN Decision, the QCA adopted an asset beta estimate of 0.45. This represents the QCA's estimate of the systematic risk facing equity holders if the firm was financed entirely by equity. The QCA's estimate then implies that, if the firm was financed entirely by equity, shareholders would currently require a total return of:

$$\begin{aligned} r_e &= r_f + \beta_e \times MRP \\ &= 2.66\% + 0.45 \times 6\% = 5.36\%. \end{aligned}$$

60. This also represents an estimate of the WACC, as it would be if the firm was currently financed entirely by equity. But this estimate of WACC is materially below the QCA's estimate of WACC based on the QCA's assumed efficient financing structure. That is, according to the QCA's own estimates, the regulated firm's cost of capital could be materially reduced if it employed 100% equity financing.

61. It is not clear how the estimate of the required return on equity under the QCA's 2010 approach could be considered to be reasonable or plausible when the process used to produce that estimate

implies that the regulated firm could materially reduce its cost of capital by removing all debt financing.

Allowed return on equity is materially below reasonable estimates of expected returns from the QCA's comparable firms

Overview

62. It is well-known that, in a dividend imputation system, there are three components to the return to equity holders:

    a) Dividends;

    b) Capital gains, and

    c) Imputation tax credits.

63. In this section of the report, we calculate a lower bound on each of the three components of return that investors might reasonably expect to receive from the firms that the QCA considers to be comparable. Taken together, this provides a lower bound on the aggregated return that investors might reasonably expect to receive from an investment in one of the QCA's comparable firms. This lower bound can then be compared with the allowed regulatory return as one test of the reasonableness of the allowed return on equity.

Lower bound on the return from dividends

64. The QCA relied primarily on a set of six comparable firms when estimating beta and other firm-specific parameters in its 2010 Review. The currently available dividend yields on those firms are set out in Table 1 below.

Table 1. Current dividend yields for comparable firms

Company	Dividend yield (% p.a.)
APA	7.2
DUE	7.8
ENV	6.5
HDF	3.8
SKI	6.2
SPN	7.6

Source: Morningstar, 18/10/2012.

65. We note that these are currently available dividend yields. For example, if an investor were to buy shares in APA today, and if APA was to simply maintain its current dividend with no increase in dividends at any time in the future, that investor would receive a return of 7.2% p.a. on their investment every year in perpetuity. We note that this calculation is based on current observable dividend yields that are currently available to investors in the set of firms the AER has identified as being comparable to the benchmark firm. These numbers are not forecasts, they are currently available returns by buying shares at current market prices. Moreover, an investor who buys the shares today, will receive that dividend yield so long as the firm is able to maintain its dividends –

regardless of whether the dividend yield in the future might increase or decrease. No forecast of what may or may not occur in the future is required to support this conclusion.

66. To the extent that these firms are likely to increase their dividends over time,[19] the return from dividends that is currently available should be considered to be a lower bound. If the level of dividends is increased in the future, those higher dividends would represent a higher return on the initial investment than the figures set out above. We note that the historical experience has been for firms, on average, to increase dividends over time and that brokers are currently forecasting material increases in the earnings and dividends of all of the comparable firms over future years, as set out in Table 2 below.

Table 2. Consensus forecasts of earnings and dividend growth

Company	Earnings growth (% p.a.)	Dividend growth (% p.a.)
APA	8.00	1.00
DUE	23.50	3.10
ENV	12.20	4.20
HDF	73.50	7.20
SKI	22.50	6.20
SPN	-0.80	2.90

Source: Morningstar.

67. We make no use of the forecasted increases in earnings and dividends, other than to note that they imply that the currently available return from dividends should be interpreted as a lower bound of the return that investors might presently expect from dividends from the comparable firms.

68. The average dividend yield[20] for the comparable firms set out in Table 1 above is 6.9%. Consequently, if an investor invested proportionally across all six comparable firms, and if all of those firms simply maintained their current dividend forever with no growth whatsoever, that investor would obtain an annual return of 6.9% on their investment in perpetuity.

69. We note that the current dividend yield for HDF is approximately half that of the other comparable firms. This is due to the fact that:

    a) HDF is currently the subject of a takeover offer. Two parties have been bidding for control of HDF and have made a series of escalating offers. The current HDF stock price reflects the control premium embedded in the takeover offer that is currently being considered by HDF security holders. Prior to the competing takeover bids, the HDF dividend yield was 6.6% – in line with the other comparable firms[21]; and

[19] Note that the relevant time horizon here is the indefinite future – there is an expectation that the dividend being paid by the average comparable firm will increase over the long-term indefinite future.
[20] Weighted by market capitalisation.
[21] Datastream reports that on 1 November 2011 the dividend yield on HDF was 6.6%. The share price has since been bid up from $1.60 on 1 November 2011 to $2.70 as at the end of October 2012 – an increase of nearly 70%. This results in a corresponding decrease in the dividend yield, which is based on historical dividends that have already been paid.

b) The current HDF stock price reflects current expectations of very high growth in earnings and dividends – materially higher than for the other comparable firms, as set out in Table 2 above.

70. Because the figures for HDF are materially different from those for the other five firms, we also report the average dividend yield after omitting HDF from the sample – 7.2% p.a.

71. In the remainder of this section we conservatively adopt an average dividend yield of 7% for the sample of comparable firms. That is, we consider that investors in comparable firms might reasonably expect to be able to receive a return of at least 7% from dividends alone.

Lower bound on the return from capital gains

72. In its proposal, Aurizon proposes an estimate of expected inflation of 2.5%,[22] and we adopt this as a reasonable estimate of expected inflation. This implies that if the share price of the average comparable firm just maintains its real value, with no real appreciation at all, investors will receive a nominal return of 2.5% in the form of capital gains.

73. As for dividends, the historical experience has been, and the future expectation is, that share prices provide real returns to investors. For this reason the assumption that share prices will just maintain their value (over the long-term future) and will provide no real return at all to investors should be considered to be a lower bound.

Lower bound on the return including imputation credits

74. As noted above, Officer (1994), the paper on which the whole CAPM-WACC regulatory framework is based, presents specific formulas to compute, for a given estimate of gamma, the return from imputation credits. In particular, he shows that the return from dividends and capital gains only must be "grossed up" to reflect the value of imputation credits by multiplying by a factor of:

$$\frac{1-T(1-\gamma)}{1-T}$$

where T is the corporate tax rate and γ represents the extent to which imputation is assumed to affect the corporate cost of capital.

75. In the present case we have:

$$(7\%+2.5\%)\frac{1-0.3(1-0.5)}{1-0.3}=11.5\%.$$

76. That is, a lower bound on the return including the QCA's estimate of the value of imputation credits is 11.5%.

[22]The AER has also recently adopted the same estimate, which is the mid-point of the RBA target band – see Envestra Draft Decision, p. 43.

Conclusions

77. We have used the QCA's 2010 approach (with current government bond yields) to compute a lower bound on the return that investors might reasonably expect from an investment in the QCA's set of comparable firms. The result is a lower bound in the sense that:

    a) The return from dividends is based on the currently available dividend yield from the average firm (7%). The lower bound estimate assumes that the firm simply maintains the current dividend and there is no growth in dividends whatsoever;

    b) The return from capital gains is based on recent regulatory estimates of expected inflation (2.5%). The lower bound estimate assumes that the firm's share price will just maintain its value and will provide no real return at all to investors; and

    c) The adjustment for imputation credits is based on the QCA's estimate of gamma (0.5) and the corporate tax rate (30%).

78. This all implies that investors in the shares of the QCA's set of comparable firms would reasonably expect to receive a return of at least 11.5%. This can be compared with an allowed return on equity of only 7.46% if the QCA's 2010 approach is updated using current government bond yields. An allowed return of 7.46% could not be considered to be at least sufficient to provide a return that is commensurate with the risks involved in providing the service if investors in firms that the QCA considers to be comparable can reasonably expect to receive a return that is materially higher.

3. Historical mean excess returns produce an estimate of MRP that is commensurate with historical conditions in the market for funds

79. There is broad agreement that when using historical excess returns data to estimate MRP a long data series is required to obtain statistically reliable results. This consideration, together with considerations of data quality, has led to analysis focusing on the period from 1958 – slightly more than 50 years of annual data. An analysis of long-run historical data produces (indeed, is only capable of producing) an estimate of the long-run average level of the MRP.

80. There is also broad agreement that the risk premiums that equity investors require vary over time. That is, the MRP is not constant, but varies over time. In some conditions in the market for funds, investors will require a higher premium for bearing equity risk, and in other conditions in the market for funds they will require a lower premium for bearing equity risk. Similarly, the debt risk premium changes over time as conditions in the market for funds change. For example, McKenzie and Partington (2011) have recently advised the AER that:

> the market risk premium has fundamental determinants (whatever they may be) and these may change over time, in which case the market risk premium changes.[23]

81. The use of CAPM parameter estimates that are conditional on the relevant information that is available at the time (i.e., conditional on the prevailing conditions in the market for funds) is also consistent with the framework adopted by the AER. In a recent report for the AER, Davis (2011) concludes that:

> The AER approach could, I suggest, be viewed as an "implicit conditional CAPM" approach in which there is regular review of beta, the risk free rate and the MRP.[24]

and

> there is some support for a "conditional" CAPM in which forward looking expected returns depend on some stochastic factor(s) additional to the expected Market Risk Premium (which itself may be variable).[25]

82. The AER accepts this interpretation of the framework it uses to estimate the required return on equity:

> As noted by Professor Davis, the AER is using an 'implicit conditional CAPM' approach.[26]

83. Within this framework, there is a long-run unconditional mean estimate of MRP and a conditional mean estimate that varies above and below the long-run unconditional mean over time. The conditional estimate is based on (statistically speaking, it is "conditional" on) all relevant information that is available at the time.

[23] McKenzie and Partington (2011), Paragraph 5.
[24] Davis (2011, p. 9).
[25] Davis (2011, p. 11).
[26] Envestra Queensland Gas Network, Final Decision, June 2011, Appendix B, p. 41.

84. The fact that the AER increased its estimate of MRP to 6.5% in its last WACC Review is further support for the notion that there is broad agreement that the risk premiums that equity investors require vary over time – that is, that the estimate of MRP that is commensurate with the prevailing conditions in the market for funds changes over time as the conditions in the market change.

85. The mean of historical excess returns is only capable of providing an estimate of the long-run average level of the MRP – commensurate with the average conditions in the market over the historical period. It is not capable of providing a contemporaneous estimate of the MRP that is commensurate with the prevailing conditions in the market. The best illustration of this point comes from the AER's last WACC Review. During 2008 and early 2009, global stock markets plummeted. Adding the large negative returns from this period to the existing sample of historical excess returns causes the mean to fall. But in such market conditions, risk premiums are higher, not lower. Indeed a primary cause of the stock price declines was an increase in risk premiums. The AER recognised this point in its WACC Review and increased its estimate of MRP even though the mean of historical excess returns had fallen.

86. The QCA also noted this point in its 2010 Decision for QRN. In particular, the QCA noted that the dramatic falls in stock prices would have actually led to the historical average estimate of MRP being lower, at a time when risk premiums in financial markets were clearly not lower.[27]

87. In general, the mean of historical excess returns moves in the opposite direction to the risk premiums that are commensurate with the prevailing conditions in the market for funds. When risk premiums rise, stock prices fall and the historical mean falls, and when risk premiums fall, stock prices rise and the historical mean rises. Consequently, the mean of historical excess returns does not provide an estimate of MRP that is commensurate with the prevailing conditions in the market for funds, but rather one that is commensurate with the average conditions in the market over the historical period.

88. Consequently, the central question is whether or not the prevailing conditions in the market for funds are commensurate with the average conditions over the historical averaging period. In the remainder of this report we consider a number of aspects of this central question.

89. In the 2010 Draft Decision for QRN,[28] the QCA noted that its MRP estimate of 6% was based on:

    a) Historical excess returns;[29]

    b) Survey data; and

    c) Estimates from the dividend growth model (**DGM**).

90. As explained above, historical excess returns are only capable of providing information about the average conditions over the historical period. Consequently, it is the survey data and the DGM methods that must be used to determine whether the current conditions in the market for funds are commensurate with the average historical conditions. We examine these methods below.

[27] QRN 2010 Draft Decision, p. 41.
[28] QRN 2010 Draft Decision, p. 41.
[29] Estimated as the mean historical excess return and using different downward adjustments.

4. The use of survey responses

Overview

91. There have been a number of regulatory developments on the appropriate use of survey data since the 2010 Draft Decision. The use of survey data has been the subject of merits review before the Australian Competition Tribunal and has also featured prominently in the AER's recent Draft Decisions for Victorian gas businesses.

Current AER use of survey responses

92. In its recent Draft Decisions, the AER concludes that:

> Survey evidence reflects the forward looking MRP when applied in practice. It is subject to limitations, such as the uncertainty on imputation credit adjustment. However, based on its own review and the advice from McKenzie and Partington, the AER considers survey based estimates of the MRP are relevant to inform the forward looking MRP. In this decision, it considered a range of survey evidence conducted in different time periods and targeted at different respondents. The evidence supported a forward looking MRP of 6 per cent as the best estimate in the current circumstances.[30]

93. The AER sought advice on this issue from McKenzie and Partington (2011, 2012) who conclude that survey evidence suffers from "potential problems."[31] The problems with survey data include:

a) the wording of the survey questions is unclear – it is generally not known precisely what respondents were asked to provide;

b) the surveys typically do not explain how those surveyed were chosen;

c) a majority of those surveyed did not respond;

d) it is unclear what incentives were provided to ensure respondents would provide accurate responses, or whether respondents face incentives to provide self-serving responses;

e) whether respondents supplied MRP estimates that use continuously compounded or not continuously compounded returns is unclear;

f) the risk-free rate that respondents use is unclear;

g) whether the respondents supplied MRP estimates that include the assumed effect of dividend imputation tax credits is not made explicit;

h) the relevance of some of the surveys is unclear given changes in market conditions since the surveys were conducted.

[30] Envestra Draft Decision, Appendix B, p. 34.
[31] McKenzie and Partington (2012), p. 19.

Recent guidance from the Tribunal: Requirements that must be met for survey responses to be used

94. The Tribunal has recently had regard to the use of qualitative evidence such as survey responses. In relation to surveys, the Tribunal noted that the survey evidence on which the regulator (the AER in that case) had sought to rely has been criticised for not providing a sufficient real world context to give the survey results any real meaning and concluded that:

> Surveys must be treated with great caution when being used in this context. Consideration must be given at least to the types of questions asked, the wording of those questions, the sample of respondents, the number of respondents, the number of non-respondents and the timing of the survey. Problems in any of these can lead to the survey results being largely valueless or potentially inaccurate.
>
> When presented with survey evidence that contains a high number of non-respondents as well as a small number of respondents in the desired categories of expertise, it is dangerous for the AER to place any determinative weight on the results.[32]

95. In essence, the Tribunal requires that three conditions must be met for survey responses to be given any material consideration:

    a) The survey must be timely – there must have been no change in the prevailing conditions in the market for funds since the survey was administered;

    b) There must be clarity about precisely what respondents were asked so that there is no ambiguity about how to interpret their responses; and

    c) The survey must reflect the views of the market and not a sample that is small, unresponsive, or without sufficient expertise.

96. None of these requirements are met by the survey responses on which the QCA has previously relied:

    a) Timeliness – the key feature of the prevailing conditions in the market for funds is the historically low government bond yield. The yield on 10-year government bonds is currently below 3%. Any surveys that were administered in materially different market conditions cannot provide any estimate of the MRP that is commensurate with the prevailing conditions in the market for funds;

    b) Clarity – survey responses in relation to MRP are notoriously vague and ambiguous. On this measure, survey responses could only be considered if:

        i) Respondents were asked about what they actually do, not if they were asked to predict the future;

        ii) Respondents were also asked what estimate they used for the risk-free rate (one possible practice being to maintain a constant long-run average estimate of MRP and to match it

[32] Application by Envestra Ltd (No 2), ACompT 3, Paragraphs 162-163.

with a long-run average estimate of the risk-free rate, such as was adopted by the Tribunal in the Energy Australia Case[33]);

iii) Respondents were also asked whether they made any other adjustments to reflect current market conditions (one possible practice being to select a WACC value from near the top of a reasonable range, such as was adopted by IPART in the NSW Retail Electricity Price Review, 2012);

iv) Respondents were also asked to set out the time horizon for which their response applies. To the extent that the AER is of the view that different MRP estimates apply to different time horizons, only survey responses that relate to the 10-year time horizon that is adopted by the AER would be relevant; and

v) Respondents were also asked to specify whether their estimate of MRP was to be used in the CAPM to produce an estimate of the total required return, which would then be multiplied by $\frac{1-T}{1-T(1-\gamma)} = \frac{1-0.3}{1-0.3(1-0.5)} = 0.82$ when estimating the firm's cost of capital, consistent with the QCA's regulatory approach.

Only if all of these requirements are met will the survey response be consistent with the QCA's definition and use of MRP.

c) Sample – the Tribunal requires that the weight applied to survey data must reflect the non-response rate and the expertise of the sample respondents.

Adjustment for imputation credits

97. Under the Australian regulatory approach, the estimate of MRP must reflect the assumed value of imputation credits. Surveys rarely include information about whether MRP estimates have been adjusted to reflect an assumed value of franking credits. Even rarer is information about precisely what adjustment (if any) has been made. On this issue, McKenzie and Partington (2012) conclude that:

> Given that we don't really know whether survey responses do, or do not, allow for imputation credits and given that any adjustment for imputation would likely lie within the margin of measurement error, it seems best to take the survey evidence at face value, but tempered by the uncertainty about whether an imputation adjustment is needed.[34]

98. The overwhelming weight of evidence is that market practitioners make no adjustment for imputation credits. The AER has recently stated that:

> The AER agrees that the clear evidence is that the majority of market practitioners do not make any adjustment for the value of imputation credits.[35]

99. In summary, we require an estimate of MRP that includes the regulator's assumed value of imputation credits. There is "clear evidence" that market practitioners make no such adjustment.

[33] ACompT 8 (2009).
[34] McKenzie and Partington (2012), p. 18.
[35] WACC Review Final Decision, p. 407.

Consequently an adjustment is required. The required adjustment is not complicated and does not have to be estimated – it is a mechanical function of the regulator's parameter estimates. Indeed, in a report for the AER, Handley (2008) demonstrates that an estimate of the required return that does not reflect the assumed value of imputation credits (r_e^*) can be simply converted into one that does reflect the assumed value of imputation credits (r_e) by applying an adjustment factor as follows:

$$r_e^* = r_e\left[\frac{1-T}{1-T(1-\gamma)}\right].$$

100. In summary, an adjustment should be made and Handley (2008) has set out precisely how to do it. There is "clear evidence" that survey respondents make no adjustment for imputation credits, in which case the adjustment set out by Handley (2008) must be applied to avoid an apples-with-oranges comparison.

101. Moreover, even if a small number of survey respondents did indicate that they had made an adjustment in relation to imputation credits, it is highly unlikely that any would have assumed precisely the same value for gamma as the QCA proposes to use. Consequently, an adjustment would still have to be made to avoid an apples-with-oranges comparison.

Conclusions in relation to survey data

102. In our view, the best information about the prevailing conditions in the market for funds comes from traded prices drawn from the market for funds, rather than from survey responses. We note that this view is consistent with the recent directions from the Tribunal.

5. Dividend growth models

QCA approach

103. In the 2010 Draft Decision for QRN,[36] the QCA noted that its MRP estimate of 6% was based on:

a) Historical excess returns;[37]

b) Survey data; and

c) Estimates from the dividend growth model (**DGM**).

104. The QCA examined two versions of the dividend growth model – the Cornell method and the discounted dividends model. The QCA provided more detail on these two models in the 2009 Draft Decision for QRN:

> *Cornell method (5.68%)* – forward-looking approach where short term forecasts of the growth rate in earnings per share converge upon the forecast long-run GDP growth rate over time;
>
> *discounted dividends model (3.66%)* – forward-looking approach where expected growth rates in earnings per share for all future years are assumed to be equal and convergence is immediate.[38]

105. In its 2010 Draft Decision, the QCA referenced its 2009 Draft Decision and used the same estimates of MRP from the Cornell method and the discounted dividends model.

Recent estimates

106. In its recent Draft Decisions for Victorian Gas Businesses, the AER reviewed a range of dividend growth model estimates and concluded that:

> The AER notes DGM analysis is producing high positive MRP estimates.[39]

107. However, the AER placed no weight on DGM estimates on the basis that it identified a number of reasons why it is not possible to precisely quantify the link between the DGM estimate and the CAPM MRP.[40] In our view it does not follow that, just because a piece of information is not used to obtain a point estimate of MRP, it should be disregarded entirely. For example, even if one concludes that the DGM should not be used to obtain a point estimate for MRP, knowing that the current estimates are materially above the long-run average is useful in determining whether the prevailing conditions in the market are commensurate with the long-run average.

108. In summary, all of the DGM estimates recently reviewed by the AER indicate that required returns on equity are currently materially higher than their average level, and this fact is accepted by the AER.

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[36] QRN 2010 Draft Decision, p. 41.
[37] Estimated as the mean historical excess return and using different downward adjustments.
[38] QRN 2009 Draft Decision, p. 14.
[39] Envestra Draft Decision, Appendix B, p. 39.
[40] Envestra Draft Decision, Appendix B, pp. 34-39.

Even if these estimates are not directly used to estimate the regulatory return on equity or the MRP, they still have some relevance. In particular, the fact that the DGM estimates all suggest that required returns on equity are higher than average is relevant in assessing whether it reasonable to set the allowed return on equity to the lowest level ever on record.

109. A number of commercial market practitioners have also reached the conclusion that DGM-type methods are currently pointing toward materially higher than average required returns on equity. As noted above, Zenner and Junac (2012) conclude that:

> the equity risk premia, however estimated, have rarely been this high.[41]

and that:

> even with a relatively low Treasury rate, the currently high equity risk premium leads to a cost of equity higher than it has been historically. The cost of equity has been lower almost 68% of the time, primarily driven by a market risk premium that has been lower 97% of the time.[42]

110. Nelson, Ferrarone and McGuire (2012) use a multi-stage DGM (similar to the Cornell method on which the QCA has previously relied) to estimate the implied market risk premium. Their methodology is summarised in Appendix 2. They report a current MRP estimate for the Australian market of approximately 7.5%. This estimate does not include any assumed value of dividend imputation tax credits. If gamma is set to 0.5 as in the QCA's 2010 QRN Decision, the total implied required return on equity for the average firm (equity beta of 1.0) is approximately 11.5%, with an implied MRP (including imputation credits) of approximately 8.5%.[43]

111. When interpreting these results, we note the views recently expressed by the AER. As set out above, the AER has identified a number of reasons why it believes that DGM estimates should not be used as the basis for a point estimate of MRP. The primary concern of the AER is that, at some times in the past, some DGM estimates have been too low to be considered reasonable or even plausible. However, even if these estimates are not used as the basis for determining a point estimate, the fact that all DGM estimates are materially above their long-run averages suggests that required returns on equity are at above-average levels. For example, the Nelson Ferrarone and McGuire (2012) estimates suggest that the MRP is currently higher than at any point in the last 20 years. At a minimum, this sort of information should be used to test the reasonableness of setting the allowed return on equity to the *lowest* level ever on record – which would be the outcome of mechanically extending the QCA's 2010 QRN methodology to the current market data.

112. By analogy, there is no precise and accepted mathematical formula that links credit ratings to the probability of default. However, it is clear that bonds with lower ratings are more likely to default. In our view, it is reasonable to conclude that bonds with lower ratings are more likely to default, even though there is no precise mathematical relationship between ratings and default probabilities. Similarly, it would seem reasonable to conclude from the DGM evidence that required returns on

[41] Zenner and Junac (2012), p. 3.

[42] Zenner and Junac (2012), p. 3.

[43] Assuming a risk-free rate of approximately 3% and MRP of approximately 7.5%, the required return on equity for the average firm is 10.5%. Grossing up for the assumed value of imputation credits gives: $10.5\%\left[\frac{1-0.3(1-0.5)}{1-0.3}\right]=11.5\%$ which implies a grossed-up MRP of 8.5%.

equity are elevated levels. It would also seem to be quite unreasonable to conclude, on the basis of DGM evidence, that required returns on equity are currently at historical lows.

6. Other evidence of the required return on equity

Overview

113. In the 2010 Draft Decision for QRN,[44] the QCA noted that its MRP estimate of 6% was based on:

a) Historical excess returns;

b) Survey data; and

c) Estimates from dividend growth models.

114. That is, historical data is used to estimate the historical MRP and survey data and the dividend growth model is used to conclude that the historical estimate is appropriate as the current estimate.

115. In Section 4 above, we set out reasons why survey data should be afforded no weight. In Section 5 we explain why it would seem reasonable to conclude from the DGM evidence that required returns on equity are elevated levels and why it would also seem to be quite unreasonable to conclude, on the basis of DGM evidence, that required returns on equity are currently at historical lows.

116. In this section, we examine other evidence that is relevant in determining whether the current values of the required return on equity and MRP are above or below their long-run average levels.

Other relevant evidence

117. In our view, there is substantial evidence to support the conclusion that current equity risk premiums are not now commensurate with the conditions prior to the GFC. The most compelling such evidence is the fact that the market for funds now requires materially higher risk premiums when investing in debt securities. It is implausible to suggest that the same market for funds would not require higher risk premiums when investing in equity securities.

118. Figure 3 below shows that the regulatory estimate of the risk premium on debt in the benchmark firm is now 3-4 times higher than the pre-GFC regulatory estimate. In our view, it is implausible to suggest that a market that requires a three- to four-fold increase in risk premiums when investing in debt securities in the benchmark firm, would require no additional risk premium at all when investing in equity securities in the same firm.

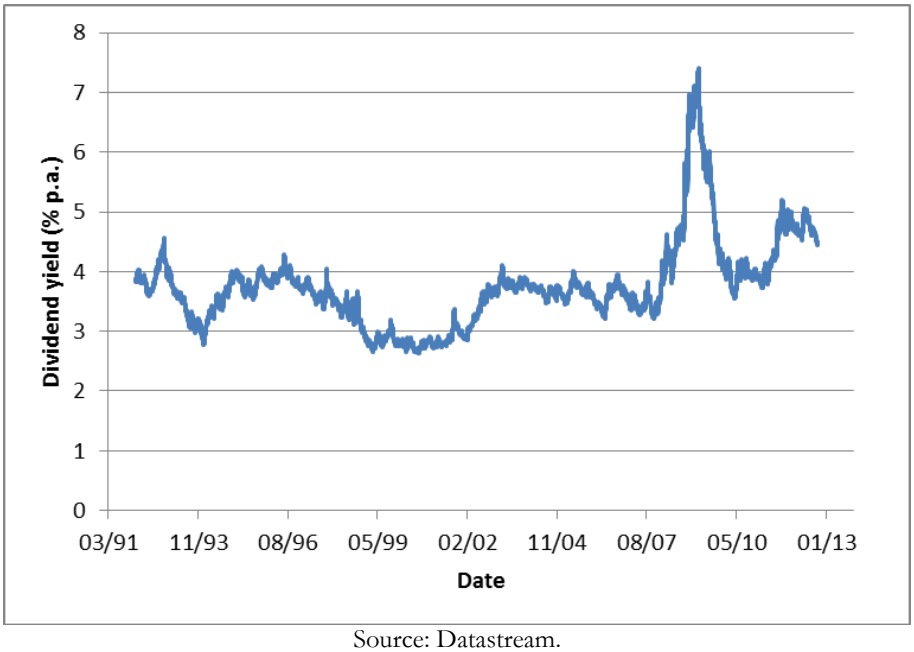
[44] QRN 2010 Draft Decision, p. 41.

Figure 3. Regulatory risk premiums on debt

Source: Reserve Bank of Australia, Bloomberg, various regulatory determinations.

119. Figure 4 below shows the dividend yield on the ASX 200 index over the last 20 years. A higher dividend yield is indicative of a higher required return on equity – a high dividend yield occurs when stock prices are low relative to dividends, indicating that the market is applying a high discount rate to dividends. Figure 4 shows that the current dividend yield is greater than almost 90% of the observations over the last 20 years and above almost every observation from outside the GFC/European debt crisis period. This indicates a high required return on equity relative to the last 20 years.

Figure 4. ASX dividend yield

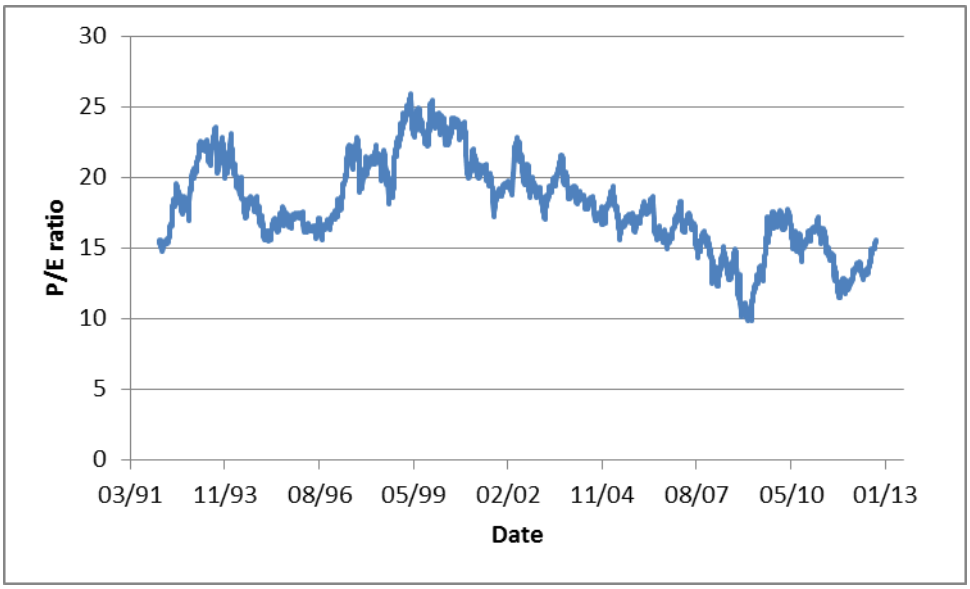


Source: Datastream.

120. In summary, Figure 4 indicates that required returns are currently high relative to the last 20 years. If the approach of the 2010 QRN Decision is mechanically updated only for changes in government bond yields, the allowed return on equity would be lower than at any time on record.

121. Figure 5 below shows the price earnings (**P/E**) ratio for the ASX 200 index over the last 20 years. A lower P/E ratio is indicative of a higher required return on equity – a low P/E ratio occurs when stock prices are low relative to earnings, indicating that the market is applying a high discount rate to earnings. Figure 5 shows that the current P/E ratio is lower than more than 80% of the observations over the last 20 years and below almost every observation from outside the GFC/European debt crisis period. This indicates a high required return on equity relative to the last 20 years.

Figure 5. ASX price/earnings ratio



Source: Datastream.

122. In summary, Figure 5 indicates that required returns are currently high relative to the last 20 years. If the approach of the 2010 QRN Decision is mechanically updated only for changes in government bond yields, the allowed return on equity would be lower than at any time on record.

123. Option implied volatilities have also been used as an indicator of perceived risk. We note that the AER has concluded that this measure should receive limited weight due to a number of issues with implied volatility data, including the three-month time horizon of the options that are generally used, the variability of the data over short periods, a number of measurement issues, and the lack of an explicit and accepted link between short-term volatility and required returns.[45] The AER also notes that option implied volatilities are currently at long-term average levels.[46] That is, to the extent that option implied volatilities do provide some indication of required returns, the current data would indicate returns that are commensurate with the long-term average. However, if the approach of the 2010 QRN Decision is mechanically updated only for changes in government bond yields, the allowed return on equity would be lower than at any time on record.

[45]Envestra Draft Decision, Appendix B, pp. 45-46.
[46]Envestra Draft Decision, Appendix B, pp. 45-46.

Conclusions

124. It is our view that the only reasonable interpretation of the empirical data is that equity risk premiums remain at elevated levels. The most direct piece of evidence is the fact that debt risk premiums remain near their historical highs. It is implausible to suggest that the same market for funds would require materially higher than average risk premiums when investing in debt securities but not when investing in equity securities. Dividend yields and P/E ratios also indicate that required returns on equity are higher than average.

125. When interpreting this data, it is important to note that, a mechanical update of the 2010 QRN Decision for changes in government bond yields would not imply that the required return on equity is comparable to the long-run average. Rather, it would imply that the required return on equity is currently lower than at any time on record. Consequently, the observable data would only support the return on equity that would be allowed under such an approach if it also indicated that required returns were at historical lows. In our view, no reasonable interpretation of any of the observed data would support such an interpretation.

7. Regulatory recognition of the relationship between risk-free rates and market risk premium

NSW retail electricity prices

126. In its recent Review of Retail Electricity Prices, IPART noted that stakeholders submitted:

> that there is a negative relationship between the risk free rate and the MRP. In periods of high investor risk aversion, there is a flight from risky assets to safe assets, or a 'flight to quality'. This tends to push up the price and pushdown the yields on safe assets. For this reason, falling risk free rates tend to be associated with rising investor risk premiums (and vice versa). The use of the short term measure of the risk free rate and the long term MRP have resulted in a situation where the reduced yield on the risk free rate has been reflected in the WACC, but the corresponding increase in the MRP has not.[47]

127. After considering this issue, IPART concluded that:

> We note that there may be an inconsistency between using short term data for the risk free rate and using long term data for the MRP. As stakeholders have noted, there may be an inversely proportional relationship between the MRP and the risk free rate.[48]

and that:

> In the current market circumstances, there is some evidence to support the view that expectations for the MRP have risen as bond yields have fallen.[49]

and further that:

> we recognised that there may be a discrepancy between the use of short term yields on the risk free rate and long term averages for the MRP, particularly in the current market.[50]

Tribunal precedent

128. IPART further noted that the Australian Competition Tribunal has also previously recognised that a contemporaneous estimate of the risk-free rate would be consistent with a contemporaneous estimate of MRP (one that is commensurate with the prevailing conditions in the market for funds) and would be inconsistent with a long-run average estimate of MRP (which would be consistent with the average conditions in the market for funds over a long historical period):

> We note that the ACT varied the AER's final determination because "the Tribunal considers that an averaging period during which interest rates were at historically low levels is unlikely to produce a rate of return appropriate for the regulatory period."[51]

[47] IPART (2012), p. 104.
[48] IPART (2012), p. 107.
[49] IPART (2012), p. 107.
[50] IPART (2012), p. 107.
[51] IPART (2012), p. 108.

129. The Tribunal case that considers the relationship between government bond yields and the market risk premium is the Energy Australia Case.[52] One of the applicants in that case, TransGrid, was regulated under Chapter 6A of the National Electricity Rules, which required the risk-free rate to be estimated using appropriate market data, whereas estimates of beta and market risk premium were fixed and could not be changed.

130. TransGrid submitted that there was a clear relationship between government bond yields and risk premiums in financial markets and that adding a long-run average estimate of MRP to an historically low estimate of the risk-free rate would produce a nonsensical outcome – it would imply that equity finance was cheaper than it had ever been, right at the peak of the GFC.

131. Because the Rules required a "normal" estimate of MRP to be used, TransGrid proposed to use an estimate of the risk-free rate from "normal" times, rather than the highly unusual estimate from the time of the determination – so that the two parameters were estimated consistently in order to produce a sensible estimate of the required return on equity. The AER insisted on estimating the risk-free rate as the yield on government bonds at the time of the determination – and then adding the fixed long-run average estimate of MRP.

132. The Tribunal noted that:

> The Applicants submitted that these facts demonstrated that basing a risk free rate on the AER's specified averaging periods would not achieve the objective of an unbiased rate of return consistent with market conditions at the date of the final decision. They appealed to expert opinion that the market risk premium was far higher than its deemed value while the risk free rate was abnormally low, so that the return required by investors was much higher than the AER's specified averaging period would generate.[53]

and concluded that:

> The Tribunal considers that an averaging period during which interest rates were at historically low levels is unlikely to produce a rate of return appropriate for the regulatory period.[54]

133. The Tribunal allowed TransGrid to use an estimate of the risk-free rate drawn from more normal times, to be consistent with the long-run average estimate of MRP that was required under the Rules.

IPART approach – implicit consistency of risk-free rate and MRP

134. The regulatory framework governing IPART's review of retail electricity prices effectively requires that its previous estimate of MRP (a range of 5.5% to 6.5%) must be maintained and that a contemporaneous estimate of the risk-free rate must also be used.[55] However, as set out above, IPART recognised that:

    a) an estimate of the risk-free rate that is commensurate with the prevailing conditions in the market for funds; paired with

[52] [2009] ACompT 8.
[53] [2009] ACompT 8, Paragraph 112.
[54] [2009] ACompT 8, Paragraph 114.
[55] IPART estimated the risk-free rate and MRP with reference to the yield on 10-year Commonwealth Government Securities.

b) an estimate of MRP that is commensurate with the average conditions in the market for funds over the last 50 years

would give rise to an inconsistency that is likely to produce an inappropriate estimate of the required return on equity, "particularly in the current market."

135. Consequently, IPART worked within its regulatory constraints to produce a more sensible and appropriate outcome. Specifically, IPART selected a final WACC estimate from near the top of the reasonable range that it had estimated. IPART explains that:

> we have not selected the midpoints of the ranges for our point estimate of the WACC values. The methodology set down in our 2010 determination required the use of short term averages for the market-based parameters, and long term averages for other parameters. As noted by some stakeholders, there could potentially be a disparity between using short term averages of market data for some parameters and long term averages for others. The risk free rate has been affected by market volatility and prolonged weak market conditions. The change in market conditions has potentially created a disparity between the risk free rate (for which we use short term averages) and the MRP (for which we use long term averages). In the current market circumstances, there is some evidence to support the view that expectations for the MRP have risen as bond yields have fallen. However, it is difficult to measure these short term variations in expectations for the MRP.[56]

136. That is, IPART has used an approach for increasing its estimate of the required return on equity by selecting a WACC estimate from above the mid-point of what it considers to be a reasonable range:

> Rather than adjusting the risk free rate or revaluing the MRP, we made a judgment when selecting the WACC point estimate from within the range.[57]

137. It is possible to reverse-engineer the estimates of the risk-free rate or MRP that would be required to produce the WACC point estimate adopted by IPART. For example, IPART adopts a pre-tax real WACC estimate of 7.1% for electricity generation businesses. This implies a required return on equity of 11.2%.[58] This estimate of the required return on equity is consistent with either:

a) Increasing the risk free rate from the contemporaneous estimate of 3.7% to a longer-term average estimate of 5.2%; or

b) Adopting a contemporaneous MRP estimate of 7.5%.

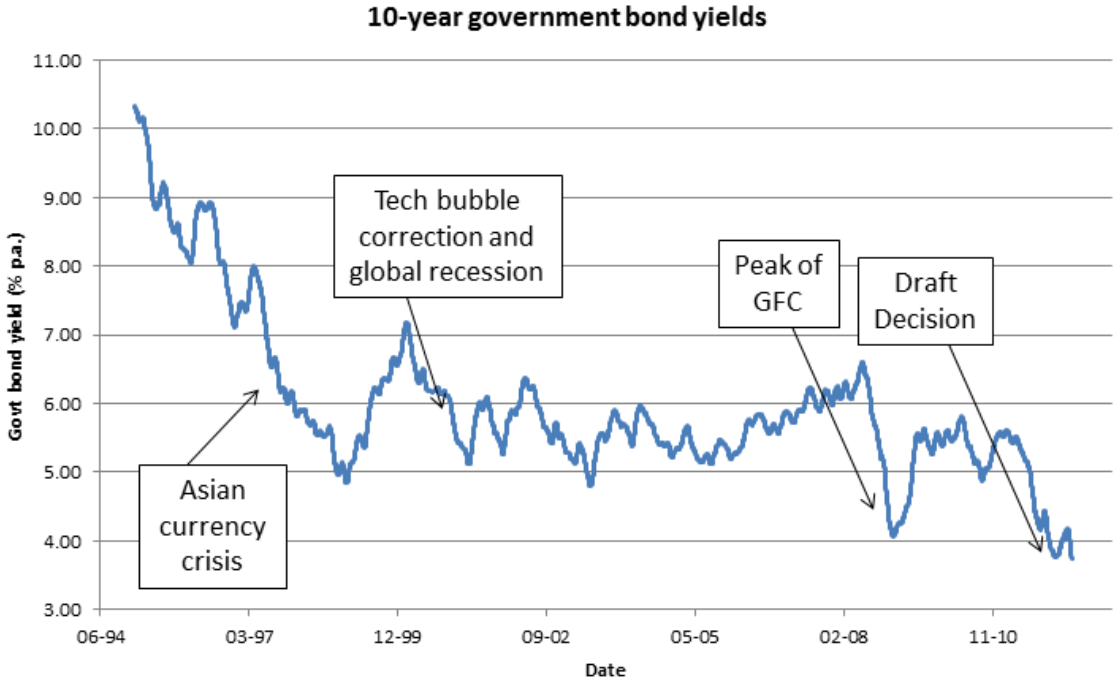
Submissions to IPART

138. A number of factors led IPART to conclude that it should increase the allowed return on equity as a result of government bond yields being at historical lows. First, there is clear evidence that government bond yields tend to decline during periods of financial crisis, as set out in Figure 6 below,

[56] IPART (2012), p. 102.
[57] IPART (2012), p. 107.
[58] That is, if the required return on equity is set to 11.2% and all other parameters are set to their mid-point estimates, the pre-tax real WACC estimate is 7.1%.

which shows the time series of 20-day moving average of the yield on 10-year Commonwealth Government bonds.[59]

Figure 6. 10-year government bond yields



Source: Reserve Bank of Australia.

139. Second, it is well-known, and generally accepted by finance academics and financial market professionals, that periods of historically low government bond yields are caused by a phenomenon known as a "flight to quality." During periods of market turmoil and uncertainty, many investors are willing to pay a premium for "safe haven" assets such as government bonds in developed economies. That is, many investors sell out of higher-risk investments and "park" funds in government bonds. This bids up the price of government bonds and pushes yields down to very low levels.

140. The flight-to-quality effect implies that government bond yields are likely to be at their historical lows at precisely the same time that risk premiums are at their historical highs. Figure 6 above shows that government bond yields were driven down sharply during the Asian currency crisis in 1997 and during the bursting of the tech bubble and global recession in early 2001.

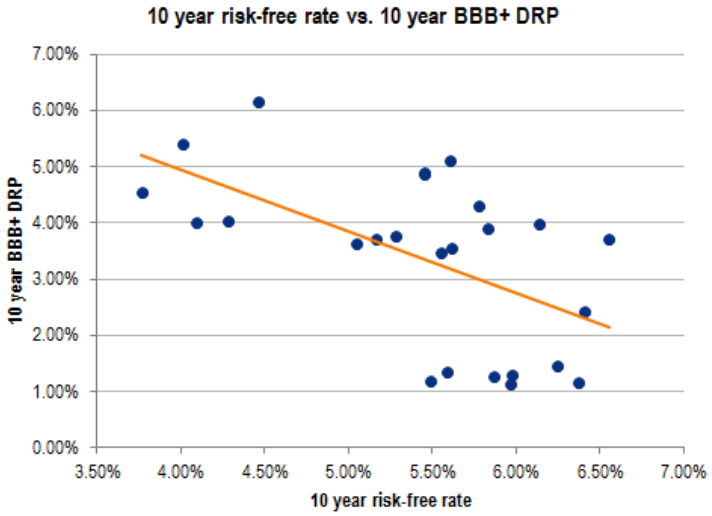
141. The previous record low for Australian 10-year government bond yields was during the height of the Global Financial Crisis, but even that low has been surpassed in recent times due to developments in the European debt crisis.

142. Queensland Treasury Corporation (**QTC**) have also examined the relationship between 10-year Commonwealth Government bond yields and risk premiums in financial markets. Figure 7 below shows the relationship between 10-year government bond yields and estimates of the 10-year debt

[59] This figure is part of the material that led IPART to modify its previous approach to obtain a more commercially reasonable outcome. The reference to the Draft Decision in that figure is a reference to IPART's retail electricity draft decision, which was subsequently amended.

risk premium.[60] That figure shows that debt risk premiums are heightened when government bond yields are very low. That is, at times when investors are requiring high premiums for bearing risk, government bond yields tend to be very low – consistent with a flight-to-quality effect.

Figure 7. Inverse relationship between government bond yields and risk premiums in financial markets

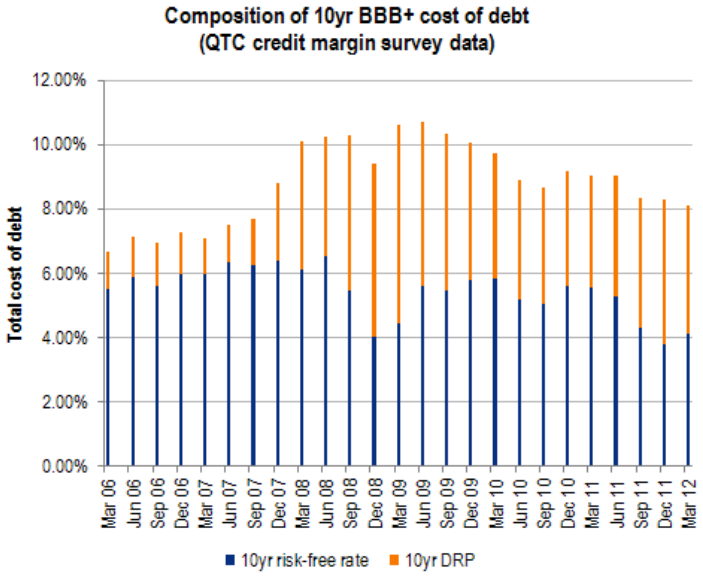


Source: Queensland Treasury Corporation.
The debt risk premium is based on QTC's quarterly credit margin survey data.
The data in the figure is from the March 2006 to the March 2012 QTC surveys.

143. QTC also show that the total corporate bond yield is much more stable over time than either of its component parts – the 10-year government bond yield and the DRP. Figure 8 below shows that changes in government bond yields are largely offset by changes (in the opposite direction) in debt risk premiums and vice versa. That is, the total return required by investors has been more stable over time than either of the component pieces.

[60] The debt risk premium is based on QTC's quarterly credit margin survey data. The data in the figure is from the March 2006 to the March 2012 QTC surveys.

Figure 8. Offsetting effect of government bond yields and risk premiums in financial markets



Source: Queensland Treasury Corporation.
The debt risk premium is based on QTC's quarterly credit margin survey data.
The data in the figure is from the March 2006 to the March 2012 QTC surveys.

Sydney desalination plant

144. In its review of the Sydney Desalination Plant, IPART specifically recognised the disparity that may arise in certain market circumstances if a long-term historical estimate of MRP is paired with a short-term contemporaneous estimate of the risk-free rate:[61]

> The risk free rate and debt margin have been affected by market volatility and the prolonged weak market following the credit crisis of 2008. The change in these factors has potentially created a disparity between these parameters (for which we use short term average data) and the market risk premium (for which we use long term average data). However, the effects of this disparity are mitigated by our decision to use a point estimate of 6.7%, which is 80 basis points higher than the midpoint of our estimated WACC range. In doing so, we had strong regard to the calculated WACC using longer term averages for market parameters.[62]

145. IPART went on to state that the required return on equity is likely to be more stable than each of its component pieces (risk-free rate and MRP):

> We acknowledge the argument that there may be greater stability in the sum of the market risk premium and the risk free rate (ie, the expected market return) than in the individual components.[63]

146. IPART concluded that pairing a long-term historical average estimate of MRP with a contemporaneous estimate of the risk-free rate in the current Australian market would produce an

[61] IPART used 5-year government bond yields as a proxy for the contemporaneous risk-free rate in this case.
[62] IPART, Sydney Desalination Plant Final Decision, p. 80.
[63] IPART, Sydney Desalination Plant Final Decision, p. 94.

unreasonable outcome, in which case a different approach would be required. IPART concluded that its:

> approach is to look at the long term averages as a reference point for the sum of the market risk premium and risk free rate.[64]

147. The standard regulatory approach is to estimate the required return on debt as the sum of contemporaneous estimates of the risk-free rate and DRP. As set out above, risk-free rates and financial risk premiums tend to move in opposite directions, offsetting one another, so that the total required return remains relatively stable. In the Sydney Desalination case, the total required return on debt was identical whether a pair of historical estimates or a pair of contemporaneous estimates was used. The fall in the contemporaneous risk-free rate was exactly offset by the increase in the risk premium, as set out in Table 3 below.

Table 3. Sydney Desalination Plant: Regulatory estimates of the required return on debt

	Historical estimates	Contemporaneous estimates
Risk-free rate	5.40%	3.90%
Risk premium	2.00%	3.50%
Total required return	7.40%	7.40%

Source: IPART, Sydney Desalination Plant Final Decision, p. 95.

148. In the Sydney Desalination Plant case, IPART recognised (as set out above) that in the prevailing market conditions there would be a disparity between a contemporaneous estimate of the risk-free rate and its standard fixed estimate of MRP. Table 4 below shows that the (then) contemporaneous risk-free rate of 3.9% paired with a constant 6% estimate of MRP would imply a required return on equity of 9.9% p.a. for the average firm.[65] IPART considered this to be unreasonable and instead adopted a value of 11.4%, which is consistent with either:

    a) Increasing the risk free rate from the contemporaneous estimate of 3.9% to a longer-term average estimate of 5.4%; or

    b) Adopting a contemporaneous MRP estimate of 7.5%.

Table 4. Sydney Desalination Plant: Regulatory estimates of the required return on equity

	Mixed estimates	Historical estimates	Contemporaneous estimates
Risk-free rate	3.90%	5.40%	3.90%
Risk premium	6.00%	6.00%	7.50%
Total required return	9.90%	11.40%	11.40%

Source: IPART, Sydney Desalination Plant Final Decision, p. 95.
SFG calculations.

[64] IPART, Sydney Desalination Plant Final Decision, p. 94.
[65] That is, a firm with an equity beta of 1.0.

Sydney Water

149. In its review of Sydney Water, IPART again recognised the disparity that may arise in certain market circumstances if a long-term historical estimate of MRP is paired with a short-term contemporaneous estimate of the risk-free rate:[66]

> The risk free rate has been affected by market volatility and prolonged weak market conditions. The change in these factors has potentially created a disparity between the risk free rate (for which we use short-term average data) and the market risk premium (for which we use long-term average data). In the current market circumstances, there is some evidence to support the view that expectations for the market risk premium have risen as bond yields have fallen. However, it is difficult to measure these short-term variations in expectations for the market risk premium. To guide our decision making on the point estimate for the WACC we estimated the long-term averages of the risk free rate, debt margin, inflation adjustment and the market risk premium.[67]

150. IPART went on to explain that:

> We note that there may be an inconsistency between using short-term data for the market-based parameters and using long-term data for the MRP and the equity beta. In particular, there may be an inversely proportional relationship between the MRP and the risk free rate. In periods of high investor risk aversion, there is a flight from risky assets to safe assets. This tends to push up the price and push down the yields on safe assets. For this reason, falling risk free rates tend to be associated with rising investor risk premiums (and vice versa).[68]

151. IPART concluded that pairing a long-term historical average estimate of MRP with a contemporaneous estimate of the risk-free rate in the current Australian market would produce an unreasonable outcome, in which case a different approach would be required. IPART concluded that its:

> We have addressed the potential problem of combining a long-term average for the MRP and a short-term average for the risk free rate by having regard to the long term averages for both in choosing a WACC at the top end of the current range.[69]

152. In the Sydney Water case, IPART again recognised that in the prevailing market conditions there would be a disparity between a contemporaneous estimate of the risk-free rate and its standard fixed estimate of MRP. Table 5 below shows that the (then) contemporaneous risk-free rate of 3.6% paired with a constant 6% estimate of MRP would imply a required return on equity of 9.6% p.a. for the average firm.[70] IPART considered this to be unreasonable and instead adopted a value of 11.4%, which is consistent with either:

    a) Increasing the risk free rate from the contemporaneous estimate of 3.6% to a longer-term average estimate of 5.4%; or

[66] IPART used 5-year government bond yields as a proxy for the contemporaneous risk-free rate in this case.
[67] IPART, Sydney Water Final Decision, p. 198.
[68] IPART, Sydney Water Final Decision, p. 210.
[69] IPART, Sydney Water Final Decision, p. 210.
[70] That is, a firm with an equity beta of 1.0.

b) Adopting a contemporaneous MRP estimate of 7.8%.

Table 5. Sydney Water: Regulatory estimates of the required return on equity

	Mixed estimates	Historical estimates	Contemporaneous estimates
Risk-free rate	3.60%	5.40%	3.60%
Risk premium	6.00%	6.00%	7.80%
Total required return	9.60%	11.40%	11.40%

Source: IPART, Sydney Water Final Decision, p. 204.
SFG calculations.

8. Aurizon Network's proposed return on equity

153. We have noted above that a mechanical update of the approach adopted by the QCA in its 2010 Draft Decision for QRN would currently produce an estimate of the allowed return on equity of 7.46%. We concluded that such an allowed return is implausibly low and is not commensurate with the prevailing conditions in the market for funds. It does not provide QRN's shareholders with a return that is commensurate with the risks involved.

154. We further concluded that investors in firms that the QCA considers to be comparable firms, could reasonably expect to receive returns on equity investments of at least 11.5% p.a. – given the QCA's estimates of parameters such as equity beta (0.8) and gamma (0.5).

155. We also noted that, in a series of recent decisions, IPART has carefully considered the current conditions in the market for funds and has departed from the approach of mechanically updating its own parameter estimates. Rather, IPART has acknowledged that such an approach would produce an implausibly low allowed return on equity in the current market conditions. This has led IPART to adopt an allowed return on equity of 11.4% for a firm of average risk (equity beta of 1.0). This implies an allowed return on equity of approximately 10.2% for a firm with an equity beta of 0.8.[71]

156. We have been advised that Aurizon Network proposes to submit an upper bound of 10.16% for the allowed return on equity. This is in line with the return on equity recently allowed by IPART and is conservative when compared with the return that investors could reasonably expect to receive from the firms that the QCA considers to be comparable.

157. In our view, QRN's proposed range for the allowed return on equity, of 8.56% to 10.16%, is conservative in light of the evidence set out above. We draw this conclusion in relation to the headline allowed return on equity. In this report, we follow the IPART approach of testing the reasonableness and plausibility of the headline allowed return on equity – we focus on individual parameter estimates in our companion reports. In our view, an allowed return on equity below the range submitted by QRN cannot be considered to be commensurate with the prevailing conditions and would not provide QRN's shareholders with a return that is commensurate with the risks involved.

[71] If the allowed return on equity is computed by adopting a longer-term average risk-free rate of 5.4%, the allowed return for a firm with an equity beta of 0.8 is 5.4% + 0.8 × 6% = 10.2%.

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Appendix 1: Consistency between cash flow and discount rate adjustments for gamma

158. The following calculations set out the AER's implementation of the building block approach under the National Electricity Rules (**Rules**). The point of this exercise is to show that the adjustment in relation to franking credits that is required under the Rules is equivalent to the adjustment to the discount rate in Paragraph 53 above. The QCA Act is less prescriptive, so this appendix cites references to the National Electricity Rules and the AER's Post-tax Revenue Model (PTRM). The AER's recent Envestra Draft Decision is used as the basis for this example, but nothing hinges on the specific parameter estimates – this appendix is simply designed to establish that the outcome is the same whether the adjustment for the assumed value of imputation credits is made to the discount rate or to the cash flows.

159. Rule 6.5.2(b) requires the use of the CAPM to estimate the required return on equity. In the Envestra Draft Decision, the AER implemented the CAPM as follows:

$$\begin{aligned} k_e &= r_f + \beta \times MRP \\ &= 2.98\% + 0.8 \times 6.0\% = 7.78\%. \end{aligned}$$

160. Rule 6.5.2(b) also requires that the required return on debt is to be calculated by adding a debt risk premium to the risk-free rate. In the Envestra Draft Decision, the AER's implementation of this step was as follows:

$$\begin{aligned} k_d &= r_f + DRP \\ &= 2.98\% + 3.76\% = 6.74\%. \end{aligned}$$

161. Rule 6.5.2(b) also requires the rate of return to be computed according to the nominal post-tax WACC formula that is usually called the "vanilla" WACC. In the Envestra Draft Decision, the AER's implementation of this step was as follows:

$$\begin{aligned} WACC &= k_e \frac{E}{V} + k_e \frac{D}{V} \\ &= 7.78\% \times 0.4 + 6.74\% \times 0.6 = 7.16\%. \end{aligned}$$

162. Consider a generic benchmark firm with initial RAB of 1,000. Consequently, the cash flow that must be available to provide a return to investors over the first year of the regulatory control period is:

$$7.16\% \times 1{,}000 = 71.6.$$

163. The amount of equity financing is 40% of the RAB, or 400.The return to equity holders is computed by multiplying the amount of equity by the required return on equity:[72]

$$7.78\% \times 400 = 31.1.$$

[72] The amount of debt financing is 60% of the RAB, or 600.The return to debt holders is computed by multiplying the amount of debt by the required return on debt: $6.74\% \times 600 = 40.4$. Note that the return to equity plus the return to debt is equal to the total required return from applying the aggregated WACC to the RAB, as above: $31.1 + 40.4 = 71.6$.

164. Rule 6.5.3 requires the estimated cost of corporate tax to be computed as a function of the pre-tax income, the corporate tax rate (30%), and the AERs assumed value of gamma (0.25) from the Draft Decision.

165. In the absence of certain firm-specific complexities,[73] the firm's pre-tax income is computed as:

$$ETI = \frac{Total\ Return\ to\ Equity}{(1 - r(1-\gamma))} = \frac{31.1}{(1 - 0.3(1-0.25))} = 40.2\,.$$

166. Rule 6.5.3 is then implemented as follows:[74]

$$\begin{aligned} ETC_t &= (ETI_t \times r_t)(1-\gamma) \\ &= (40.2 \times 0.3)(1-0.25) = 9.0. \end{aligned}$$

167. Rule 6.4.3 provides that the annual revenue requirement is to be computed as the sum of a number of "building block" components. For this illustration, we assume that regulatory depreciation is 50 and operating expenses are 100. We note that the choice of values for these two elements is irrelevant to the calculations being performed below as they simply wash out of the analysis – whatever these costs are, the revenue requirement is simply increased to accommodate them and the pre-tax profit, tax paid, and assumed value of franking credits is unchanged. The implementation of Rule 6.4.3 is then as follows:[75]

Return on Equity		31.1
Return on Debt		40.4
Regulatory Depreciation		50
Operating Expenses		100
Tax Payable	12.0	
Less Value of Imputation Credits	-3.0	9.0
Annual Revenue Requirement		**230.6**

168. Note that the estimated cost of corporate tax (8.3 in the last two rows of the table above) is *added* here and has the effect of *increasing* the annual revenue requirement. That is, annual revenues must be sufficient to pay the expected tax cost.

169. Now consider the equity holders, who are entitled to the residual cash flow, after all expenses have been met. The cash flow to equity holders is set out in the following table:

Total revenue	230.6
-Interest to debt holders	40.4
-Regulatory Depreciation	50
-Operating Expenses	100
-Corporate tax	12.0
Cash flow to equity	**28.1**

[73] Such as a difference between tax and regulatory depreciation, and customer contributions that are outside the regulatory framework except for the effect they have on tax paid.

[74] The PTRM sets this out as the difference between corporate tax payable and the assumed value of franking credits. In this case, corporate tax payable is pre-tax income multiplied by the corporate tax rate $40.2 \times 0.3 = 12.0$ and the assumed value of franking credits is equal to the amount of tax paid (which is also the amount of franking credits created) multiplied by the assumed value of gamma $12.0 \times 0.25 = 3.0$ in which case the expected tax cost is $12.0 - 3.0 = 9.0$.

[75] Note that some items may not add exactly due to rounding.

170. That is, the equity holders receive the residual cash flow of 28.1. In addition, the firm pays corporate tax of 12.0, which creates franking credits with a face value of 12.0. Each of these franking credits is assumed to be worth 25% of its face value, giving a total value of $0.25 \times 12.0 = 3.0$. The total return to equity holders is then:

$$\begin{aligned} \textit{Return to Equity} &= \textit{Residual Cash Flow} + \textit{Assumed Value of Franking Credits} \\ &= 28.1 + 3.0 = 31.1. \end{aligned}$$

171. Consequently the proportion of the total return to equity that is assumed to be delivered in the form of franking credits is:

$$\frac{\textit{Assumed Value of Franking Credits}}{\textit{Return to Equity}} = \frac{3.0}{31.1} = 9.7\%.$$

172. Non-resident investors do not benefit from franking credits. Consequently, they receive only the 90.3% of the return to equity that is provided by means other than franking credits. This means that the return on equity available to non-resident investors is:

$$0.903 \times 7.78\% = 7.0\%.$$

173. Note that the return available to non-resident investors here is:

$$k_e \frac{1-T}{1-T(1-\gamma)} = 7.78\% \times \frac{1-0.3}{1-0.3(1-0.25)} = 7.0\%,$$

exactly as set out in Paragraph 53 above.

Appendix 2: UBS dividend growth model methodology

174. This appendix sets out the dividend growth methodology adopted by Nelson, Ferrarone and McGuire (2012), as it appears in that publication.

Deriving the Implied Risk Premium

The equity risk premium (ERP) reflects the difference between equity market returns and the returns on the 'risk-free' asset, typically the government bond or Treasury bill rate. The premium amounts to the added compensation required to hold the riskier asset-equities. Keeping all else constant, changes in the equity risk premium have a straightforward impact on stock prices: a rise in the equity risk premium depresses stock prices, and vice versa. It follows that a high equity risk premium is associated with depressed stock prices, a low premium with elevated stock prices.

Estimates of the ERP vary according to the model employed. An important distinction must be made between historic and forward-looking measures of the equity risk premium. The basic problem with ex-post (historical) premiums, calculated as the observed difference between past returns on stocks and government bonds, is that past patterns may not hold in the future.

The alternative we employ is a measure of the *ex ante* (or 'forward-looking') risk premium, which attempts to capture investor expectations. This implied equity risk premium is derived from a discounted cash flow model, which equates discounted future streams of earnings (cash flows) to prevailing market valuations. The equilibrating factor is the discount rate, which is the sum of the risk-free rate and the equity risk premium. Subtracting the long-term bond yield from the discount rate yields the implied equity risk premium.

In order to construct a historical series for the ERP it is necessary to gather information on what investors believed the future would look like at any given point of time in the past. Since such expectations can not be known with certainty, suitable proxies must be found. The approach used here assumes that cash flows grow proportionally to earnings, whose expected growth rate at any point in time is given by the consensus IBES estimates. These earning estimates span an initial horizon of five years. Thereafter, we assume earnings (cash flow) growth decays to its long-run equilibrium growth rate, which is proportional to forward-looking, dynamic estimates for nominal GDP.

Model specification

In the context of developing a DCF model to determine the implied risk premium, it is important to identify and discuss the underlying assumptions used in its construction.

Return to Shareholders

The first assumption concerns the return to shareholders. Typically, dividends are considered as the return to shareholders. However, dividends may not fully capture the true capacity of companies to repay investors. For example, cash can also be returned to shareholders via share buy backs. We therefore assume that shareholder returns are bestproxied by free cash flow to equity (FCFE). This can be described as a model where potential dividends and share buy-backs are discounted and therefore represents a measure of what a firm can afford to pay out.

The formula for FCFE expresses the cash flows available to equity after meeting all financial commitments, including debt repayments, and after covering capital expenditure and working capital needs.

FCFE = Net Income - ((Common Equity % Total Capital) x (Capital Expenditure - Depreciation & Amortisation +(-) △ Working Capital + Acquisitions)) - Preferred Dividends

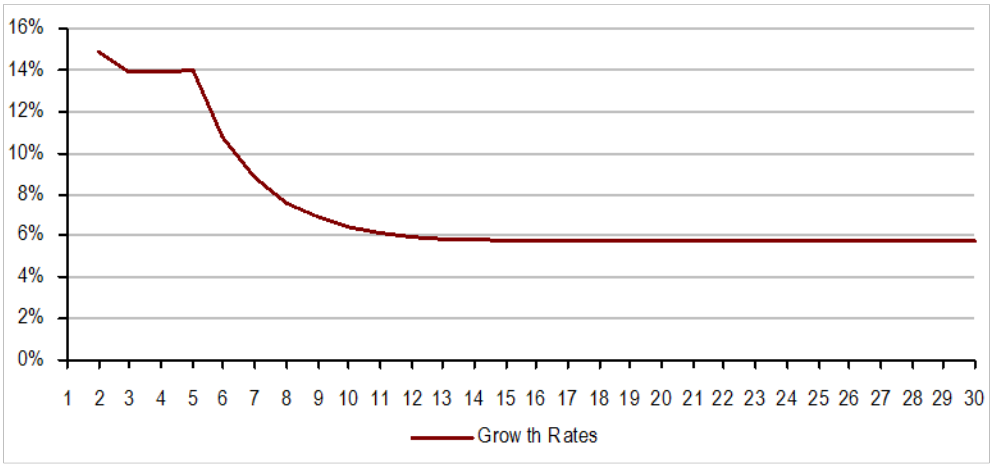
If we assume that net capital expenditures and working capital changes are financed using a mixture of debt and equity, the effect on cash flows to equity can be expressed as common equity as a % of total capital. We then take the net

income and convert it to a cash flow by deducting the reinvestment needs such as capital expenditures and acquisitions. Depreciation is added back to earnings because it is a non cash charge deducted in the accounts to arrive at net income. Changes in working capital will be deducted or added to net income depending on whether an increase or decrease has occurred. Increases in working capital drain a firms cash flow, while decreases in working capital increase the cash flow available for distribution.

Three-stage model

There exists several versions of the DCF model, from the simplest Gordon growth model to multi stage models. The Gordon growth model assumes that a company will grow at a stable rate into the future, and while this may hold true for sectors such as regulated utilities it is not representative of the future of the majority of companies. We therefore turn to a more complex three stage model, which breaks the DCF model into 3 different stages of growth.

We employ the IBES one-year and 3-5 year estimates as proxies for the first two earnings stages, respectively. In most cases, however, the 3-5 year IBES forecasts are significantly higher than reasonable estimates for long-run nominal economic growth, a condition that cannot exist in perpetuity. (Otherwise profits would gradually absorb all of national income). A transition therefore must occur between the growth rates forecast by analysts for the first five years and the long run sustainable earnings growth rate. Accordingly, from the fifth year the model fades earnings growth rates exponentially to the long run forecasts for economic growth. To make the model tractable, we must specify a terminal period, for which we have chosen 30 years.



Source: UBS

Terminal growth

A key assumption of any DCF model is the value of terminal growth. We believe that terminal growth assumptions should change with changes in expected long-run nominal economic growth (owing to shifting assumptions about factors such as labor force growth, productivity, or inflation). Instead of assuming a constant terminal value for growth, we therefore employ long-term economic forecasts to tie down terminal earnings growth estimates. In the case of the U.S., the Livingston Survey provided by the Federal Reserve Bank of Philadelphia offers long-term nominal GDP estimates from 1990. (From 1985-the beginning of the IBES series-until 1990 we employ trailing 10-year nominal GDP growth to proxy terminal growth.). For non-US countries and regions, we use the consensus forecasts for long-term economic growth provided by Consensus Economics.