Justification for cost of equity parameters

Report for Aurizon Network

30 June 2014

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

Contents

1. Background and conclusions

Overview and instructions

1. SFG Consulting (**SFG**) has been retained by Aurizon Network (**Aurizon**) to provide some comments on the how its proposed return on equity parameters could be best justified. Aurizon has proposed:

    a) A risk-free rate set to the contemporaneous yield on 10-year government bonds. The average yield over Aurizon's averaging period was 3.99%;

    b) A market risk premium (inclusive of imputation credits with gamma set to 0.25) of 7%;

    c) An equity beta (based on 55% gearing) of 1.0; and

    d) Gamma set to 0.25.

2. We devote a separate section of this report to each of those parameters. In each section, we first set out a brief summary of the key reasons to support the proposed estimate, and then set out further supporting information.

3. Aurizon advises that a material adverse movement in any one or more of these parameters will result in financial ratios deteriorating to the extent that there would be a material risk of a credit rating downgrade.

SFG CONSULTING

2. Risk-free rate

Proposed estimate

4.   The proposed approach is to set the risk-free rate according to the yield on 10-year government bonds. We are advised that he average yield over Aurizon's averaging period was 3.99%.

5.   Reasons to support the proposed approach include:

a)   The dominant commercial practice is to set the term of the risk-free rate in accordance with the life of the assets being financed – reflecting the fact that the CAPM is a one-period model. The relevant assets in this case have extremely long lives in the order of 25 years or more. The dominant commercial practice in such settings is to use a ten-year term – commensurate with the longest liquid market for Australian government bonds;

b)   The dominant practice of independent expert valuation practitioners is to set the risk-free rate to the yield on 10-year government bonds;

c)   The dominant practice of corporate finance professionals is to set the risk-free rate to the yield on 10-year government bonds;

d)   The dominant practice of other Australian regulators is to set the risk-free rate to the yield on 10-year government bonds. In particular:

i)   The AER has recently confirmed its use of a 10-year term;

ii)   IPART has recently moved from using a 5-year term to a 10-year term; and

iii)   The ERA has recently used a 10-year term for rail assets; and

e)   Incenta (2013 Term) advise that a 10-year term is appropriate.

Supporting information

Market practice

6.   There is broad agreement that the dominant practice of market practitioners and valuation professionals is to set the term of the risk-free rate to 10-years on the basis that this is the longest observable term for Australian government bonds. For example, SFG (2013 ENA IER) note that the overwhelming majority (94%) of expert assessments in the 2012/13 sample group employed a term assumption for the risk-free rate of ten years. Several reports indicated that the use of a 10-year term assumption was standard practice amongst independent experts in Australia. For example, in its report to ING Real Estate Community Living Group, Deloitte stated that:

> The 10-year bond rate is a widely used and accepted benchmark for the risk free rate in Australia.[1]

---

[1] Deloitte (2012), ING Real Estate Community Living Group – Independent expert's report and Financial Services Guide, 24 April 2012, p.93.

SFG CONSULTING

7. In its report for Hastings Diversified Utilities Fund (a firm with regulated infrastructure investments), Grant Samuel noted that:

> The ten year bond rate is a widely used and accepted benchmark for the risk free rate. Where the forecast period exceeds ten years, an issue arises as to the appropriate bond to use. While longer term bond rates are available, the ten year bond market is the deepest long term bond market in Australia and is a widely used and recognised benchmark. There is a limited market for bonds of more than ten years. In the United States, there are deeper markets for longer term bonds. The 30 year bond rate is a widely used benchmark. However, long term rates accentuate the distortions of the yield curve on cash flows in early years. In any event, a single long term bond rate matching the term of the cash flows is no more theoretically correct than using a ten year rate. More importantly, the ten year rate is the standard benchmark used in practice.[2]

Regulatory practice

8. The current Australian regulatory practice is also to use a ten year term to maturity when estimating the risk-free rate. For example, in its recent draft Rate of Return Guideline, the AER concluded that:

> On balance, we are more persuaded by the arguments for a 10 year term, than the arguments for a five year term.[3]

9. The AER also notes that the Australian Competition Tribunal advocates the use of a 10-year term:

> The Australian Competition Tribunal (the Tribunal) decided in its 2003 GasNet decision that 10 years is the appropriate term of the risk free rate in the CAPM. The Tribunal came to this view on the basis of two reasons:
> • as the MRP was estimated using a 10 year risk free rate, consistency demands that a 10 year risk free rate be used in the CAPM, and
> • it is a convention of economists and regulators to use a relatively long-term risk free rate where the life of the assets is relatively long.[4]

10. IPART, which has previously adopted a 5-year term to maturity, has recently announced that it will now adopt a 10-year term:

> We agree with stakeholder views that increasing the TTM [term to maturity] from 5 years to 10 years for all industries is more consistent with our objective for setting a WACC that reflects the efficient financing costs of a benchmark entity operating in a competitive market.[5]

11. In summary, the independent expert evidence and Australian regulatory determinations support the view that investors determine their required return on equity by adding their estimate of the risk premium to the 10-year government bond yield.

---

[2] Grant Samuel (2012), Hastings Diversified Utilities Fund – Independent Expert's report, 3 August 2012, p.4.
[3] AER Rate of Return Guideline – Explanatory Statement, p. 49.
[4] AER Draft Rate of Return Guideline – Explanatory Statement, p. 182.
[5] See IPART (2013), Review of WACC Methodology, December, p. 12.

SFG CONSULTING

The "present value principle"

12. IPART has previously used the 5-year government bond yield to equate the term of bonds to the length of the regulatory period – in accordance with what it called a "present value principle." IPART now states that a 10-year term:

> …is more consistent with our objective for setting a WACC that reflects the efficient financing costs of a benchmark entity.[6]

13. Even if a "present value principle" did supplant the need to set the allowed return commensurate with the efficient financing costs of a benchmark efficient entity, it does *not* require that the term of the risk-free rate must be equal to the length of the regulatory control period. The AER has recently considered this issue in some detail and has provided the following summary of the argument:

> In Lally (2012), the argument for a five year term relies on the 'present value principle'— the principle that the net present value (NPV) of cash flows should equal the purchase price of the investment.
>
> Lally stated that the present value principle is approximately satisfied only if the term of equity matches the regulatory control period. Lally illustrated this point using a numerical example in which there is no risk, so the return on equity equals the risk free rate. The example sets allowed revenues at the beginning of the regulatory control period using the yield to maturity on a five year risk free bond. Lally showed that in this example, the 'present value principle' is approximately satisfied: the NPV of the cash flows is approximately equal to the book value of the assets.
>
> The reason why the principle is satisfied is that the structure of the bond payments and the structure of the regulatory payments are similar…The core intuition behind the argument for a five year term is that the cash flows from the building block model have a similar structure to the cash flows from a five year bond. Put simply, the argument is that an equity investment in a regulated business is—at least in respect of its term—like an investment in a five year bond.
>
> The central issue in the debate about the term of equity, therefore, is the extent to which the cash flows from an equity investment in a regulated business are like the cash flows from a five year bond.[7]

14. However, the AER goes on to note that the cash flows from an equity investment in a regulated business are *not* like the cash flows from a five year bond in a very important respect – whereas a bondholder receives a known payment at maturity, the infrastructure equity owner does not. Rather, infrastructure equity (like all equity) is risky and the value of shares five years into the future cannot possibly be known with certainty. In this regard, the AER states that:

---

[6] See IPART (2013), Review of WACC Methodology, December, p. 12.
[7] AER Draft Rate of Return Guideline Explanatory Statement, p. 183, and see AER Final Guideline, p. 49.

SFG CONSULTING

> In Lally's calculation above…the assumption is that the investor receives a cash payment equal to the RAB in the final year of the regulatory control period…these assumptions may not hold in reality.[8]

15. The AER goes on to cite a report by Incenta (2013 Term):

> …investors are unlikely to evaluate regulated assets with reference to a 5 year bond because – unlike the case of the bond – the residual value at the end of each 5 year period is inherently risky. This is because the residual value is not returned in cash, but rather comprises a 'value' whose recovery remains at risk from future regulatory decisions and changes in the market (both technological changes and changes to customer preferences).[9]

16. The AER concludes its discussion of this issue with the following summary:

> …the argument for a five year term would be correct only if after five years, in the event that 'they [the owners of the regulated business] choose to walk away from the asset, they would be fully compensated'…however, the owners are not, in reality, guaranteed of such compensation—the problem is that there is no guarantee that the secondary market will deliver a price equal to the value of the equity component of the RAB.[10]

17. In summary, the AER and IPART have recently questioned whether adopting a 5-year term is in fact consistent with a "present value principle" and have determined that other factors (such as considerations of efficient financing practice, the internal consistency of their decisions, and the desire to be consistent with best practice valuation) lead them to adopt a 10-year term.

18. In adopting a 10-year term, the AER recently concluded that:

> On balance, we are more persuaded by the arguments for a 10 year term, than the arguments for a five year term.[11]

19. The AER also notes that the Australian Competition Tribunal advocates the use of a 10-year term:

> The Australian Competition Tribunal (the Tribunal) decided in its 2003 GasNet decision that 10 years is the appropriate term of the risk free rate in the CAPM. The Tribunal came to this view on the basis of two reasons:
> • as the MRP was estimated using a 10 year risk free rate, consistency demands that a 10 year risk free rate be used in the CAPM, and
> • it is a convention of economists and regulators to use a relatively long-term risk free rate where the life of the assets is relatively long.[12]

Conclusion

---

[8] AER Draft Rate of Return Guideline Explanatory Statement, p. 183, and see AER Final Guideline, p. 49.
[9] AER Draft Rate of Return Guideline Explanatory Statement, p. 183, and see AER Final Guideline, p. 49.
[10] AER Draft Rate of Return Guideline Explanatory Statement, p. 184, and see AER Final Guideline, p. 49.
[11] AER Draft Rate of Return Guideline Explanatory Statement, p. 181, and see AER Final Guideline, p. 49.
[12] AER Draft Rate of Return Guideline Explanatory Statement, p. 182, and see AER Final Guideline, p. 49.

SFG CONSULTING

20. The market practice and the recent considered Australian regulatory practice is to use the 10-year government bond yield to estimate the risk-free rate. Use a five-year term would be at odds with market and regulatory practice and would be difficult to justify.

SFG CONSULTING

3. Market risk premium

Proposed approach

21. The proposed estimate of the market risk premium (including imputation credits with gamma set to 0.25) is 7% p.a.

22. Reasons to support the proposed estimate include:

    a) The historical excess returns (Ibbotson) approach currently produces an MRP estimate of 6.63%;

    b) The historical return on the market (Wright) approach currently produces an MRP estimate of 7.72%;

    c) Lally (2013 QCA MRP) advises that the dividend discount model approach currently produces an MRP estimate in the range of 7.15% to 8.25%;

    d) Survey data (inclusive of imputation credits with gamma set to 0.25) suggests a current MRP estimate of at least 7.08%;

    e) Independent experts are currently using an MRP (inclusive of imputation credits with gamma set to 0.25) of at least 7.08%;

    f) IPART recently concluded that the contemporaneous MRP (inclusive of imputation credits with gamma set to 0.25) was 7.9%;[13] and

    g) The AER recently concluded that the contemporaneous MRP (inclusive of imputation credits with gamma set to 0.5) was 6.5%.

Supporting information

Corrected and updated historical excess returns

23. Australian regulators have traditionally relied on historical excess returns compiled by Brailsford, Handley and Maheswaran (2008, 2012), updated from time to time by Associate Professor Handley in reports commissioned by the AER.

24. In a submission to the AER in June 2013, NERA (2013)[14] identified and corrected a number of inaccuracies in the adjustments that were made in the Brailsford et al (2008, 2012) calculations. In particular, the data for part of the period examined by Brailsford et al were sourced from Lamberton (1961). The Lamberton data reported the mean dividend yield where the mean was taken only over those companies that paid dividends. Consequently, it overstated the dividend yield in that it

---

[13] IPART Fact Sheet – WACC Update, p. 1. IPART provides two estimates of MRP. One is a contemporaneous MRP that corresponds with a risk-free rate equal to the contemporaneous yield on government bonds. IPART adopts an estimate of 7.9% for the contemporaneous MRP. IPART also sets out an estimate of the long-run historical average MRP that would be paired with a long-run historical average risk-free rate. That estimate is not relevant in the current context, because a long-run historical average risk-free rate will not be used.

[14] NERA (2013), *The market, size and value premiums*, June.

SFG CONSULTING

excluded from the calculation those companies that did not pay any dividends at all.[15] This led Brailsford et al to adjust all of the Lamberton data points using an adjustment based on the proportion of firms that paid no dividends in 1966. NERA show that the proportion of firms that paid no dividends in 1966 was materially different to the proportion that paid no dividends during each of the years actually covered by the Lamberton data. That is, the Brailsford et al adjustment is inaccurate in such a way that it creates a systematic downward bias.

25. NERA (2013) correct the bias in the Brailsford et al (2008, 2012) estimates and go on to make a more accurate and appropriate adjustment according to the proper contemporaneous proportion of non-dividend-paying stocks for each year of the Lamberton data period.[16] There is no legitimate reason for refusing to use the more accurate data provided by NERA (2013).

26. Estimates based on the corrected data, through to the end of 2013, are set out in Table 1 below.

Table 1
Current estimates of MRP from historical data: Ibbotson approach

	Theta=0.35	Theta=0.7
Required return on the market	10.62%	10.75%
Market risk premium	6.63%	6.76%

Source: NERA data through to 2011, updated from RBA publications.

Current estimates from the Wright approach

27. Lally (2013 QCA MRP) advises the QCA to also have regard to have regard to what is known as the "Wright" approach when estimating MRP.[17] This approach involves estimating the average historical real return, adjusting for expected inflation, and subtracting the contemporaneous risk-free rate. The use of the Wright approach has also been proposed in the AER's Draft Guideline[18] and is used extensively by UK regulators.

28. In implementing the Wright approach we have used:

   a) Data from 1883 to 2013, inclusive; and

   b) The NERA (2013) correction for the inaccuracy of the Brailsford et al (2012) dividend yield adjustment.

29. The Wright approach currently produces the estimates set out in Table 2 below:

---

[15] This is not a criticism of Lamberton (1961), who was simply reporting the average yield for dividend-paying companies. The point here is that some adjustment to his data is required (for non-dividend-paying companies) if it is to be used for the purposes of estimating the historical MRP.

[16] We review this correction and update the data through to the end of 2013 in the following sub-section of this report.

[17] Lally (2013), p. 6.

[18] AER (2013), Draft Rate of Return Guideline, pp. 7, 16, 18.

SFG CONSULTING

Table 2
Current estimates of MRP from historical data: Wright approach

	Theta=0.35	Theta=0.7
Required return on the market	11.71%	11.83%
Market risk premium	7.72%	7.84%

Source: NERA data through to 2011, updated from RBA publications.

Dividend discount models

30. Lally (2013 QCA MRP)[19] notes that the QCA (2012) Cornell estimate of MRP is 8.7%. This figure is the mid-point of the QCA's estimated range of 7.58% to 9.57%.[20] Lally (2013 QCA MRP) also notes that subsequent studies have reported DDM estimates of MRP of 8.5%, 8.0% and 7.9%.[21]

31. IPART (2013) has recently published a contemporaneous MRP estimate of 7.9%, which is based largely on a range of dividend growth models.[22]

32. Lally (2013) makes a number of downward adjustments to standard DDM estimates and obtains an MRP estimate of 7.15% (the mid-point of a range of 5.9% to 8.4%) which is materially below all of the other estimates set out above.[23] He notes that this estimate is conditional on gamma being set to 0.25. For gamma set to 0.5 his point estimate increases to 8.25% (range of 7.0% to 9.5%).

33. Although there are arguable issues in relation to all of the Lally (2013) adjustments (including the adjustment for imputation credits), we leave those arguments for another time and adopt the Lally (2013) DDM estimates as set out in Table 3 below.

Table 3
Current estimates of MRP from the Lally DDM approach

	Gamma=0.25	Gamma=0.5
Required return on the market	11.14%	12.24%
Market risk premium	7.15%	8.25%

Source: Lally (2013 QCA MRP).

Survey responses

34. SFG (2013 QCA MRP) explains why our view is that survey responses on what people think the MRP might be are unreliable and should be afforded no weight.

Like-with-like comparison is required

35. If survey responses are to be used, they must be converted from the ex-imputation MRP that respondents report, to the with-imputation MRP that is used by Australian regulators. That is, the

---

[19] Lally (2013), p. 59.
[20] QCA (2012), p. 11.
[21] Lally (2013), p. 59.
[22] IPART (2013), p. 70.
[23] Lally (2013), p. 60.

SFG CONSULTING

QCA uses an MRP estimate that includes the benefit of imputation credits, whereas the survey estimates do not. Specifically, the regulatory approach is as follows:

a) Estimate the total required return on equity (including the benefits of imputation credits) using a with-imputation estimate of MRP (that also includes the benefits of imputation credits);

b) Estimate the return that shareholders obtain from their receipt of imputation credits; and

c) Estimate the ex-imputation return that the firm is allowed to generate as the difference between (a) and (b), and set allowed revenues accordingly.

36. The relationship between the ex-imputation credit return that will be generated by the firm's allowed revenues,[24] and the with-imputation total required return[25] is well-known from Officer (1994):[26]

$$r_{e,Ex\,IC} = r_{e,With\,IC} \left[\frac{1-T}{1-T(1-\gamma)} \right].$$

37. This equation is examined in detail in Gray and Hall (2006) and Gray and Hall (2008). Its use in the regulatory setting is explained by IPART (2013) and this same approach is embedded into the AER's post-tax revenue model and the regulatory models used by other Australian regulators.

38. By analogy, one cannot directly compare an ex-GST price in one store against a with-GST price in another – but there is a well-known formula to convert one definition of price into the other.[27]

Surveys report ex-imputation returns

39. KPMG (2013) explicitly acknowledge the difference between with-imputation and ex-imputation returns by showing how their base ex-imputation MRP would have to be grossed-up to incorporate the benefits of imputation.[28]

40. None of the Fernandez surveys make any mention of imputation credits. In our view, the most reasonable interpretation is that the survey responses represent unadjusted ex-imputation MRP estimates – the same definition of MRP that is used for all other countries in the Fernandez surveys.

41. In this regard, Lally (2013 MRP) notes that the Fernandez survey:

> does not invite respondents to include imputation credits to the extent they think appropriate, because an MRP of this type is sought here. However, given that the survey asks the respondent for the MRP estimate that they are using, respondents could reasonably be expected to have included imputation credits in their estimate to the extent that they thought to be appropriate.[29]

---

[24] In (c) above.
[25] In (a) above.
[26] Officer (1994), Equation 7, p. 6.
[27] The with-GST price can be obtained by multiplying the ex-GST price by 1.1.
[28] KPMG (2013), p. 17.
[29] Lally (2013 MRP), Footnote 15, p. 30.

SFG CONSULTING

42. However, all of the evidence suggests that the dominant market practice is to make no adjustment for imputation credits anywhere in the valuation process. Consequently, it seems unlikely that a material number of survey respondents would have provided a grossed-up with-imputation estimate of MRP. The vast majority of respondents are likely to have provided a standard ex-imputation estimate of MRP. Consistent with this view, McKenzie and Partington (2012 MRP)[30] have advised the AER that:

> the survey evidence suggests that imputation credits are not typically allowed for in project evaluation or expert valuations, so it would seem unlikely that they would typically be added to the market risk premium.[31]

43. In summary, the relevant evidence suggests that the survey estimates of MRP should be interpreted as standard ex-imputation estimates.

44. McKenzie and Partington (2012 MRP) go on to conjecture about reasons why survey respondents may be providing standard ex-imputation estimates of MRP. For example, they conjecture that survey respondents may believe that imputation credits will be taken into account elsewhere in the valuation process so that there is no need to take them into account in the MRP estimate or that they may simply be regurgitating long-run historical excess return estimates.[32] However, the reason for the provision of an estimate of the ex-imputation required return on equity is not really important here. The key point is that, in both of the above cases, the survey participant will have provided a standard *ex-imputation* estimate of MRP, which cannot be directly compared with the regulatory *with-imputation* estimate of MRP.

Like-with-like comparisons

45. In their recent WACC Review, IPART (2013) devoted substantial consideration to the exact question of how an ex-imputation estimate of MRP should be converted to a with-imputation estimate. IPART begins by noting that it is well-known from Officer (1994) that the with-imputation and ex-imputation required returns on equity are linked by the familiar equation:[33]

$$r_{e,ExIC} = r_{e,WithIC}\left[\frac{1-T}{1-T(1-\gamma)}\right].$$

46. For example, if the ex-imputation MRP is considered to be 6.0% and the risk-free rate is 3.99%, the estimate of the ex-imputation required return on the market is 9.99%. The corresponding with-imputation required return, and the with-imputation MRP is reported in Table 4 below:

Table 4
Current estimates of MRP from survey responses

	Gamma=0.25	Gamma=0.5
Required return on the market	11.06%	12.13%
Market risk premium	7.07%	8.14%

Source: Based on ex-imputation MRP of 6% and risk-free rate of 3.99%.

---

[30] McKenzie, M. and G. Partington, 2012, *Supplementary report on the market risk premium*, Report to the AER, February 22.
[31] McKenzie and Partington (2012 MRP), p. 16.
[32] McKenzie and Partington (2012 MRP), p. 16.
[33] Officer (1994), Equation 7, p. 6.

SFG CONSULTING

Independent expert reports

Use of independent expert reports

47. Lally (2013 QCA)[34] recommends that the QCA should have regard to independent expert valuation reports when estimating MRP.[35] He proposes that these reports should receive equal weight to survey responses.

48. The AER's recent Guideline materials also conclude that information from independent expert valuation reports is relevant evidence that should be considered.[36] In particular, the Guideline materials state that "takeover and valuation reports" will be used to inform the estimate of the return on equity.[37]

49. In its Guideline materials the ERA indicates that independent expert valuation reports (which the ERA refers to as "brokers' estimates" even though they are compiled by independent expert valuation and accounting firms rather than brokers) "have potential to provide relevant information."[38] However, the ERA provides no real guidance on precisely how it considers that these reports should be used.

Recent estimates

50. SFG (2013 IE), in a report submitted to the AER in June 2013, examine all of the 154 independent expert valuation reports from January 2008 to April 2013 that set out a cost of capital calculation. Incenta (2014) provide a summary of independent expert valuation reports through to April 2014. They report that, on average, independent experts continue to:

    a) Adopt a risk-free rate above the prevailing government bond yield;

    b) Adopt an ex-imputation market risk premium above 6%; and

    c) Add other "uplift" factors beyond the Sharpe-Lintner CAPM estimate.

51. The Incenta (2014) results are summarised in Table 5 below. The key result from this table is the fact that independent expert valuation practitioners continue to adopt ex-imputation MRP estimates that are at least 6%, and on average above 6%. They also employ other techniques that have the effect of increasing the estimate of the required return on equity above the estimate that would be produced by a mechanical implementation of the Sharpe-Lintner CAPM.

---

[34] Lally, M., 2013, *Response to submissions on the risk-free rate and the MRP*, Report for the QCA, 22 October.
[35] Lally (2013 QCA), p. 5.
[36] AER (2013), Rate of Return Guideline, pp. 14, 16.
[37] AER (2013), Rate of Return Guideline, pp. 14, 16.
[38] ERA Rate of Return Guideline, Appendix 29, Paragraph 65.

SFG CONSULTING

Table 5
Estimates of market risk premium

Parameter	Mechanistic CAPM	Independent experts
10/12 to 04/13		
Risk-free rate	3.05%	3.47%
MRP	6.50% (including imputation)	6.62% (ex-imputation)
04/13 to 04/14		
Risk-free rate	3.74%	4.10%
MRP	6.50% (including Imputation)	6.34% (ex-imputation)

Source: Incenta (2014), Table 3.2, p. 19.

Incorporation of imputation credits

52. SFG (2013 IE) note that the uniform practice of independent experts is to make no allowance for imputation credits when estimating MRP (or in any part of the cost of capital estimation process). In this regard, SFG (2013 IE) report that:

> For the entire sample over the period 2008 – 2013, we were unable to find any independent expert report that made any adjustment in relation to dividend imputation. No adjustments of any kind were made to any cash flows and no adjustments of any kind were made to any discount rates.
>
> We identified nineteen independent expert reports in 2012/13 that made a specific reference to dividend imputation in relation to cost of capital. Every one of these reports concluded that no adjustment should be made to any cash flows or to any discount rates.[39]

53. Incenta (2014) also note that the independent expert estimates "are not directly comparable to the AER's rate of return on equity as they have not been adjusted for dividend imputation."[40]

54. Consequently, ex-imputation MRP estimates from independent expert reports would have to be routinely converted into the corresponding with-imputation estimate of MRP (as set out above) for use in the regulatory process.

55. An ex-imputation estimate of MRP of 6% (which we consider to be conservative for the reasons set out above) implies the with-imputation estimates of MRP and the required return on the market in Table 6 below.

---

[39] SFG (2013 IE), Paragraphs 88-89.
[40] Incenta (2014), p. 19.

SFG CONSULTING

Table 6
Current estimates of MRP from independent expert reports

	Gamma=0.25	Gamma=0.5
Required return on the market	11.06%	12.13%
Market risk premium	7.07%	8.14%

Source: Based on ex-imputation MRP of 6% and risk-free rate of 3.99%.

Summary of estimates

56. The current estimates of MRP are summarised in Table 7 below. This evidence clearly supports an MRP of at least 7%.

Table 7
Current estimates of MRP

Method	MRP	Market Return
Ibbotson	6.63	10.62
Wright	7.72	11.71
DDM	7.15	11.14
Surveys	7.07	11.06
Independent Experts	7.07	11.06
Mean	**7.13**	**11.12**
Median	**7.07**	**11.06**

57. In its UT3 decision, the QCA determined that the required return on equity for the average firm was 11.19%. If the QCA were to set the MRP to 7% in its UT4 determination, it would be slightly reducing its estimate of the required return on equity for the average firm to 10.99%. By contrast, if the QCA were to set the MRP to 6% in its UT4 determination, it would need to justify why it believes that the required return on equity for the average firm has fallen materially to 9.99%.

SFG CONSULTING

4. Equity beta

Recommendation

58. We recommend that the equity beta (based on 55% gearing) should be set to 1.

59. Reasons to support the recommended approach include:

    a) The ERA has recently adopted an equity beta of 1.56 (based on 20% gearing) for the TPI rail network. This is equivalent to an equity beta in the range of 2.54 to 2.77 when gearing is set to 55%. The ERA has used North American rail companies as comparators;

    b) The ERA has recently adopted an equity beta of 0.93 (based on 25% gearing) for the Brookfield rail network. This is equivalent to an equity beta in the range of 1.41 to 1.55 when gearing is set to 55%. The ERA has used rail and transport companies (including Aurizon) as comparators;

    c) In their independent expert report for the Brookfield/Prime Infrastructure sale of WestNet Rail (now Brookfield Rail) Grant Samuel adopted an equity beta of 1.0 to 1.1 based on gearing of 20-25%. This is equivalent to an equity beta in the range of 1.52 to 1.96 when gearing is set to 55%. Grant Samuel have used North American rail companies as comparators. Grant Samuel have not used any energy network businesses as comparators for this regulated rail network;

    d) Standard and Poor's have indicated that they consider Brookfield Rail to be the closest available comparator for the CQCN. Standard and Poor's also consider other transport companies to be comparators. Standard and Poor's do not use energy network businesses as comparators for this regulated rail network;

    e) The current estimate of equity beta for Aurizon Ltd, re-geared to 55% debt, is in the range of 1.31 to 1.49.

Supporting information

60. Incenta (2013 QCA Beta) estimate beta with reference to gas and electricity network businesses. They give no weight to evidence from rail businesses. The exact opposite practice is adopted by:

    a) The ERA in their Brookfield Rail and TPI regulatory decisions;

    b) Grant Samuel in their independent expert report for Brookfield Rail; and

    c) Standard and Poor's in their rating of Aurizon Network.

61. All of these cases involve regulated rail networks. In all of these cases, rail networks were used as comparators for the rail network in question. In none of these cases were any gas or electricity network businesses used as comparators for the rail network in question.

62. A summary of the equity beta values adopted in other regulatory determinations and independent expert valuation reports is set out in Table 8 below. Four estimates are provided from the Grant Samuel independent expert report – corresponding to every combination of equity beta and gearing.

SFG CONSULTING

Table 8
Relevant beta estimates

	TPI	Brookfield	GS1	GS2	GS3	GS4	Aurizon	Incenta
Equity beta	1.56	0.93	1	1	1.1	1.1	0.81	0.42
Gearing	0.2	0.25	0.2	0.25	0.2	0.25	0.17	0
New gearing	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55
B/M regeared	2.77	1.55	1.78	1.67	1.96	1.83	1.49	0.93
QCA asset beta	1.31	0.75	0.85	0.81	0.93	0.88	0.71	0.42
QCA equity beta	2.54	1.41	1.60	1.52	1.77	1.68	1.31	0.73

63. Table 8 shows that the re-levered (to 55%) equity beta estimates adopted by other regulators, independent experts and for Aurizon itself are all materially above 1.0. The same conclusion holds whether estimates are re-geared using the procedure adopted by the QCA or the procedure adopted by all other Australian regulators.

64. A re-geared (to 55%) equity beta materially below 1.0 can only be maintained if no material weight is applied to any rail or transport comparators. Such a practice would be inconsistent with the approach adopted by other regulators, independent valuation experts, and credit rating agencies. In our view, it would amount to the disregarding of relevant information.

65. To be clear, we do not suggest that the QCA should mechanistically adopt the ERA's beta estimates, or mechanistically adopt the same set of comparators as the ERA has adopted. Rather, we simply note that:

   a) The practice of other regulators, independent valuation experts, and credit rating agencies is to use other rail and transport companies as comparators; and

   b) An equity beta estimate materially below 1.0 cannot be supported unless zero weight is applied to rail and transport comparators.

66. If any material weight is applied to the comparators that have been adopted by the ERA (even in conjunction with the energy network firms that Incenta have used), the result would be a re-geared equity beta of at least 1.0.

SFG CONSULTING

5. Gamma

Recommendation

67. We recommend that gamma should be set to 0.25.

68. Reasons to support the recommended approach include:

      a) The Australian Competition Tribunal has determined that gamma should be set to 0.25 and
          the AER had erred in seeking to adopt a higher value;

      b) IPART sets gamma to 0.25;

      c) The ERA sets gamma to 0.3;

      d) The uniform practice of independent expert valuation professionals is to set gamma to 0;

      e) Surveys suggest that practitioners also make zero adjustment for imputation credits;

      f) Queensland Treasury Guidelines require that gamma must be set to 0; and

      g) Although the AER currently proposes to increase gamma back to 0.5, it is well known that
          such a move will inevitably result in action being taken before the Tribunal.

Supporting information

Market practice

69. Evidence of the practice of other regulators, independent expert valuation professionals, corporate
     treasuries, and Treasury guidelines is set out in our report to the QCA, SFG (2013, QCA Gamma).

The difference between the redemption rate and the value of distributed credits

70. The gamma of 0.5 that is proposed in the AER's Guideline is based on a market-wide distribution
     rate (F) of 0.7 and a theta (θ) of 0.7. The theta value is based on the AER's assessment that 70% of
     the imputation credits that are distributed go to domestic residents who value them at full face value.
     Our report to the QCA, SFG (2014 QCA Gamma) explains why the AER's approach to estimating
     gamma is incorrect. Lally (2013) also sets out a range of problems and inconsistencies in the AER's
     approach.

71. However, even if the AER's approach is accepted, domestic residents will not value imputation
     credits at their full face value. There are a number of reasons why the value of distributed imputation
     credits that is reflected in share prices may be less than the face value of those credits, including:

      a) Some of the credits that are distributed to shareholders are never redeemed. There are, in
          turn, a number of reasons why a distributed credit might not be redeemed, including:

          i)   Credits distributed to non-resident investors cannot be redeemed under the dividend
               imputation legislation;

SFG CONSULTING

ii) Credits distributed to resident investors who sell the shares within 45 days of their purchase cannot be redeemed;[41] and

iii) Some credits distributed to resident investors are not redeemed because some investors fail to keep the required records and simply do not claim them. For example, Handley and Maheswaran (2008) report that, on average 8% of the credits distributed to resident individuals are never redeemed.[42]

b) There is a time delay in obtaining any benefit from imputation credits. Whereas dividends are available to the investor as soon as they are paid, the imputation credits that are attached to that dividend only have value after the investor's end-of-year tax return is filed and processed. This time delay can be up to two years for a credit that is distributed directly from a company to an individual shareholder. The time delay can be even greater when credits are distributed through other companies or trusts;

c) There are administrative costs involved in the redemption of imputation credits. The investor must maintain records of all credits that are received and redeem them by preparing the necessary schedules for the investor's tax return. This involves time and expenses such as accountant fees. By contrast, when an investor buys shares, they provide bank account details and all dividends are automatically transferred into that account without any action required of the investor. That is, it is more costly to convert imputation credits into value;

d) Imputation credits are taxed as income in the same way that dividends are taxed. When an investor receives a franked dividend, their taxable income is increased by the amount of the dividend plus the face value of the credit. Both components are then taxed at the investor's marginal tax rate; and

e) If dividend imputation leads resident investors to hold more domestic dividend-paying shares than they otherwise would (because they are attracted by the possibility of receiving imputation credits) their portfolios will become more concentrated and the resulting loss of diversification comes at a cost. A rational investor would continue to increase the concentration of their portfolio until the marginal benefit of the last imputation credit equalled the marginal cost of losing diversification. That is, the last imputation credit would be of no net benefit.[43]

72. This last point about portfolio diversification is particularly important and has been recognised by Lally (2013) and other regulators:

> The ERA (2013, page 5) goes even further and asserts that even domestic investors would value franking credits less than their face value because they must incur risk, pay transaction costs, and sacrifice international diversification opportunities by purchasing Australian stocks with imputation credits.[44]

---

[41] The so-called "45 day Rule" took effect in July 1997. It prevents resident investors from redeeming imputation credits unless they own the shares for 45 days around the payment of the relevant dividend.
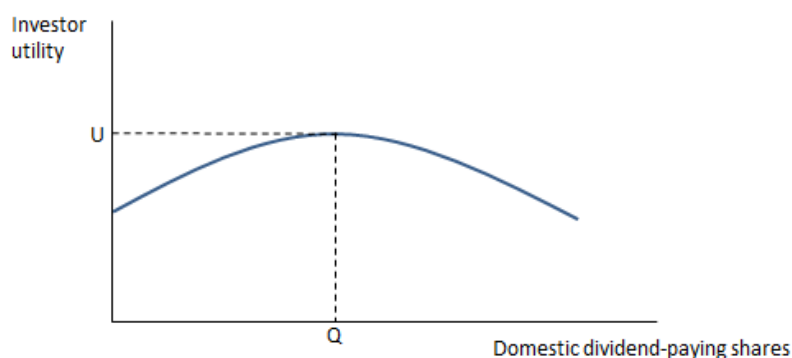
[42] This figure includes credits that are not redeemed due to the 45-day Rule and, for the pre-2000 period, credits that are not redeemed because the shareholder has taxable income below the tax-free threshold. The latter is likely to be immaterial as it is unlikely that a material proportion of shares are owned by residents whose income is below the tax-free threshold.

[43] This effect is explained in more detail in Paul Lajbcygier and Simon Wheatley (2012), "Imputation credits and equity returns," *The Economic Record*, 88, 283, 476-494.

[44] Lally (2013), p. 16. The reference to ERA (2013) appears to be a reference to Vo, Gellard and Mero (2013).
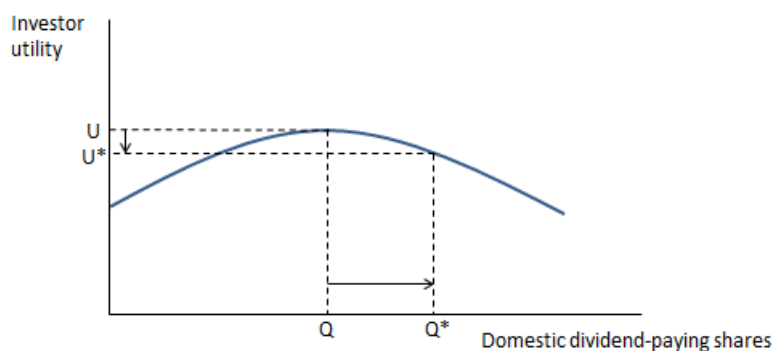
SFG CONSULTING

73. To explore the portfolio diversification point in more detail, first consider Figure 1 below in a market with no dividend imputation. That figure shows the utility[45] of a particular investor as a function of the proportion of their wealth that is invested in domestic dividend-paying shares (as opposed to domestic shares that do not pay dividends, international shares, or other assets such as real property, term deposits, bank balances and so on). Figure 1 shows that the optimal investment in domestic dividend-paying shares is at Q, because this maximises the investor's utility at U.

Figure 1
Optimal portfolio holding of domestic dividend-paying shares

74. If the investor moved away from their optimal investment in domestic dividend-paying shares (Point Q), the result would be a loss of utility, in which case the investor would be worse off. This is illustrated in Figure 2 below, which shows that an over-investment in domestic dividend-paying shares (at Q*) leads to a reduction in utility (U*).

Figure 2
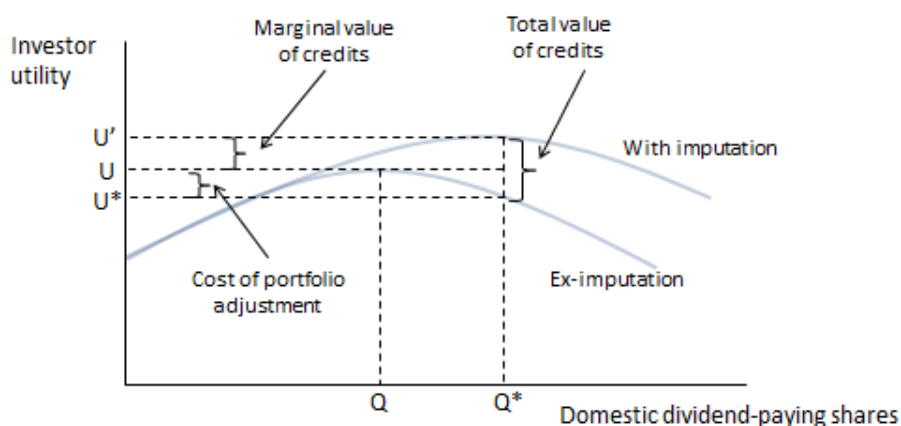**Sub-optimal portfolio holding of domestic dividend-paying shares**

75. Now suppose that imputation is introduced into this market, as illustrated in Figure 3 below. The domestic investor is likely to alter their portfolio by increasing their investment in domestic dividend-paying shares. This causes the investor to move away from their optimal portfolio, which comes at a cost – reducing utility from U to U*. However, that cost is more than compensated by the value that the investor receives from imputation credits. When the value of imputation credits is included, the curve shifts and the optimal investment in domestic dividend-paying shares is at Q*, producing utility

---

[45] Utility is the economic concept of well-being or satisfaction. The basis of most economic models is the notion that individuals will act to maximise their utility.

SFG CONSULTING

of U'. This optimum occurs at the point where the marginal benefit of the next imputation credit is exactly offset by the marginal cost of further concentration of the investor's portfolio. That is, the last dollar of imputation credits that the investor receives has a negligible marginal benefit.

Figure 3
Australian government bond yields and the proportion of domestic ownership

76. Figure 3 also shows clearly that the net benefit that this investor receives from imputation credits is to increase utility from U to U'. This net benefit is obtained by subtracting the cost of portfolio adjustment from the total value of the credits. In summary, the value that the investor obtains from imputation credits comes at a cost – the cost of concentrating the investor's portfolio into domestic dividend-paying shares.

77. In summary, imputation credits distributed to resident investors are not valued at their full face value and it would be inappropriate to select a value for gamma based on the assumption that they were.

78. Moreover, as we explain in our previous report (SFG, 2014 QCA Gamma) the AER's assertion that 70% of distributed imputation credits go to resident investors is incorrect in any event.

The ERA approach

79. The ERA adopts the same market-wide distribution rate of 0.7 that has been adopted by the Tribunal, AER and IPART. However, rather than use the theta estimate of 0.35 that was adopted by the Tribunal, the ERA now uses an estimate of theta of 0.45 that is based on its own empirical study. Our report to the QCA, SFG (2013 QCA Gamma) outlines the problems with the ERA study. The ERA study has been submitted to peer-reviewed publications twice and has been rejected in the first round twice. Consequently, it should not be preferred to the SFG study that was accepted by the Tribunal.

SFG CONSULTING

References

Australian Competition Tribunal, 2011, Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9, 12 May.

Australian Competition Tribunal, 2010, Application by Energex Limited (Distribution Ratio (Gamma)) (No 3) [2010] ACompT 9, 24 December.

Australian Competition Tribunal, 2010, Application by Energex Limited (No 2) [2010] ACompT 7, 13 October.

Australian Energy Regulator, 2013, *Rate of return guideline – Explanatory Statement*, December.

Brailsford, T., J. Handley and K. Maheswaran, 2008, Re-examination of the historical equity risk premium in Australia, *Accounting and Finance* 48, 73-97.

Brailsford, T., J. Handley and K. Maheswaran, 2012, The historical equity risk premium in Australia: Post-GFC and 128 years of data, *Accounting and Finance*, 237-247.

Economic Regulation Authority of Western Australia, 2013, *Final Rate of Return Guideline*, 16 December.

ERA, 2014, *Review of the method for estimating the weighted-average cost of capital for the freight and urban railway networks*, 4 June.

Grant Samuel, 2010, *Independent experts report in relation to the proposal from Brookfield Infrastructure Partners LP*, 24 September.

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

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

Incenta, 2013 QCA Beta, *Review of regulatory capital structure and asset/equity beta for Aurizon Network*, 9 December.

Incenta, 2014, *Update of evidence on the required return on equity from independent expert reports*, May.

Incenta, 2013 Term, *Term of the risk-free rate for the cost of equity*, Report for the ENA, June.

IPART, 2013, *Review of WACC Methodology*, December.

KPMG, 2013, Valuation Practices Survey 2013, www.kpmg.com.au.

Lally, M., 2013 QCA MRP, *Response to submissions on the risk-free rate and the MRP*, Report for the QCA, 22 October.

Lally, M., 2013, *Estimating Gamma*, Report for the QCA, 25 November.

Lally, M., 2013, *The estimation of gamma*, Report for the AER, 23 November.

SFG CONSULTING

Lamberton, D., 1961, "Ordinary share yields: A new statistical series," *Sydney Stock Exchange Official Gazette*, 14 July.

McKenzie, M. and G. Partington, 2012, *Supplementary report on the market risk premium*, Report to the AER, February 22.

NERA, 2013, *The market, size and value premiums*, June, http://www.aer.gov.au/sites/default/files/Report%2015%20-%20ENAMRPReport28062013%20Final.pdf.

Queensland Competition Authority, 2009, *QR Network draft access undertaking: Draft Decision*, December.

SFG Consulting, 2014 QCA Gamma, *An appropriate regulatory estimate of gamma*, 16 January.

SFG Consulting, 2014 QCA MRP, *An appropriate regulatory estimate of the market risk premium*, 16 January.

SFG Consulting, 2014 QCA Beta, *Systematic risk of Aurizon Network,* 20 January.

SFG Consulting, 2013, *Evidence on the required return on equity from independent expert reports*, Report for the Energy Networks Association, June.

Vo, D., B. Gellard and S. Mero, 2013, *Estimating the market value of franking credits: Empirical evidence from Australia*, Working paper.

SFG CONSULTING