An appropriate regulatory estimate of the market risk premium

Report for Aurizon Ltd

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1. Background and conclusions

Overview and instructions

1. SFG Consulting (**SFG**) has been retained by Aurizon Ltd (**Aurizon**) to provide our views on the estimation of the market risk premium (**MRP**) parameter in the context of regulatory weighted-average cost of capital (**WACC**) estimation.

2. In particular, we have been asked to respond to the following reports and submissions:

   a) Lally (2013), *Response to submissions on the risk-free rate and the MRP*, report commissioned by the QCA;

   b) McKenzie and Partington (2013), *Review of Aurizon Network's draft access undertaking*, report commissioned by the Queensland Resources Council; and

   c) Queensland Resources Council (2013), *WACC submission*, submission to QCA.

Summary of conclusions

3. Our primary conclusions are:

   a) A spot risk-free rate based on the 10-year government bond yield should be used; and

   b) The QCA's current approach to estimating MRP effectively produces a fixed value of 6% in all market conditions. This outcome is untenable in that it suggests that severe financial crises serve to *lower* the required return on equity capital.[1] We agree with the augmentation of this approach that is proposed by Lally (2013). The augmented approach, when applied to the most recently available data, produces an MRP estimate of 7%, which is consistent with the most recent Australian regulatory estimate of 6.9% from IPART.[2]

[1] Which suggests that governments could create business investment booms by causing financial crises.
[2] See IPART (2013), Review of WACC Methodology, December.

2. Questions to be considered by Authority members

Risk-free rate

4. In this section, we set out the key questions in relation to the risk-free rate that must be answered by the Authority members, together with our proposed answers.

5. **Question 1: Should a spot rate or some historical average be used?** [3]

   There is broad agreement that a spot/contemporaneous risk-free rate should be used, and paired with a spot/contemporaneous estimate of MRP.

   However, the current QCA approach effectively pairs a spot risk-free rate with an historical estimate of MRP. Consequently, the QCA should carefully consider the proposals that have been made by stakeholders and its own consultants for updating its approach for estimating the contemporaneous MRP and also recent regulatory developments in this regard.

6. **Question 2: Should the term of the risk-free rate be set to 5 years (or the length of the regulatory control period in question) or 10 years?** [4]

   The term of the risk-free rate should be set to 10 years for the following reasons:

   a) Market practice is to adopt a 10-year term;

   b) The leading regulatory practice is to adopt a 10-year term (AER, IPART, ACT). Indeed, IPART has recently decided to change from using a 5-year term to using a 10-year term;

   c) Adopting a 10-year risk-free rate for cost of equity would be consistent with the 10-year risk-free rate that the QCA's consultants have recommended for cost of debt; and

   d) Regulators have recently identified flaws in the argument that the NPV=0 principle requires that the term of the risk-free rate should match the regulatory period. Indeed, for long-term equity the NPV=0 principle would seem to require that a long-term risk-free rate should be used.

Market risk premium

7. In this section, we set out the key questions in relation to MRP that must be answered by the Authority members, together with our proposed answers.

8. **Question 1: Is the Authority comfortable with an approach that implies that the GFC and ensuing European debt crisis resulted in equity capital being cheaper than at any other time in post-war history?** [5]

   In our view, the proposition that a severe financial crisis can result in a material reduction in required returns on equity is self-evidently ridiculous. This would imply that government could generate an investment boom by precipitating a financial crisis – to drive down the cost of equity capital. If,

[3] See the first part of Section 3 of this report.
[4] See the second part of Section 3 of this report.
[5] See Section 4 of this report.

however, the Authority *is* of the view that financial crises *can* lower the cost of equity capital it should explain why.

9. **Question 2: Is it time for a revision of the QCA approach to estimating the MRP?** [6]

The QCA has been using the same approach to estimate MRP since its last WACC review 10 years ago. In practice, that approach has produced a fixed estimate of 6%, which generates acceptable outcomes in "normal" market conditions but is not flexible enough to accommodate conditions such as financial crises. Other regulators and the QCA's own consultant recommend that the current QCA approach should be augmented and we support the proposed revisions.

10. **Question 3: Should the QCA have regard to the Wright approach?** [7]

The QCA should have regard to the Wright approach when estimating the required return on the market (or MRP) for use in the Sharpe-Lintner CAPM. In this regard, we note that:

a) Lally (2013) recommends that the QCA methodology for estimating MRP should be expanded to include the Wright approach;

b) In its recent draft Guideline, the AER has indicated that it will have regard to the Wright approach; and

c) The Wright approach is used extensively by UK regulators.

We also note that the Ibbotson and Wright approaches lie at opposite ends of a spectrum. The Ibbotson approach effectively assumes that the MRP is constant so that the required return on equity varies one-for-one with changes in the risk-free rate. The Wright approach effectively assumes that the real required return on the market is constant so that the MRP varies inversely with changes in the risk-free rate. In our view, both approaches provide relevant evidence and regulators should have some regard to both.

11. **Question 4: Should the QCA have regard to evidence from independent expert valuation reports?** [8]

The QCA should have regard to estimates of MRP from independent expert valuation reports for the following reasons:

a) These reports provide evidence of current market practice – actual transactions occur in reliance on them;

b) Lally (2013) recommends that the QCA methodology for estimating MRP should be expanded to include evidence from independent expert reports; and

c) In its recent draft Guideline, the AER has indicated that it will have regard to independent expert valuation reports.

[6] See Section 4 of this report.
[7] See Section 5 of this report.
[8] See Section 6 of this report.

12. **Question 5: Should the QCA use the best available data?** [9]

The most up-to-date data should be used. Where an error or inaccuracy has been identified in a data set and corrected, the updated data should be used.

The best available estimates for all of the approaches identified by Lally (2013) are set out in Section 7 of this report.

13. **Question 6: What MRP value does the Lally (2013) approach produce?** [10]

Lally (2013) examines a number of techniques for estimating MRP, computes the median, and rounds to the nearest full percentage point, recommending a final value of 6%.

Maintaining that approach, and all of the Lally (2013) estimates, would produce an MRP estimate of 7% if any **one** of the following changes were made:

a) Examine the mean instead of the median of the range of estimates. We note that the QCA's practice has always been to examine the mean estimate and that the reasons for focussing entirely on the median estimate are unconvincing; or

b) Use the Ibbotson data that has been updated to the end of 2012 and corrected for the Brailsford dividend yield error; or

c) Omit the Siegel approach on the basis that it is not used by any other Australian regulator; or

d) Give the historical data one-part weighting by taking the mean of the Ibbotson and Siegel approaches (rather than including both, which has the effect of doubling the weight applied to the historical data); or

e) Use the 2013 Fernandez survey estimate rather than the 2012 estimate; or

f) Omit the Fernandez estimate (due to its unreliability) and set the "survey" estimate solely on the basis of independent expert valuation reports (instead of 50/50 weighted with the Fernandez figure).

If any **one** of these changes were made the Lally (2013) approach would already produce an MRP estimate of 7%.[11]

[9] See Section 7 of this report.
[10] See Section 8 of this report.
[11] Of course we do not suggest that the QCA should make only one of the changes set out in this list. Rather, we recommend that the QCA should expand the range of information on which it relies and use the best and most recent data for *all* of its estimation approaches. The point we make here is that any one of a list of reasonable steps would lead the QCA to an estimate of 7% even under the approach advocated by Lally (2013) and maintaining all other parameter estimates adopted by Lally (2013). In other words, an MRP estimate of 6% could only be maintained by rejecting every one of the proposed updates and corrections on the list above.

3. The risk-free rate

Questions to be addressed

14. Two questions arise in relation to the risk-free rate:

    a) Should a spot rate or some historical average be used?

    b) What term should be used?

Spot rate or historical average?

15. In relation to the first question, our view is that the use of a spot/contemporaneous risk-free rate (commensurate with the prevailing conditions in the market) should be paired with a spot/contemporaneous estimate of the market risk premium (also commensurate with the prevailing conditions in the market).

16. This view appears to be uncontroversial in the current circumstances in that the same approach has been proposed by Lally (2013), the QRC WACC submission and the Aurizon submission.

17. In a number of regulatory cases in other jurisdictions, various stakeholders have noted that the regulator has adopted an MRP estimate based on the long-run average of historical data and proposed that consistency requires that an historical average risk-free rate should be adopted. The best example of this approach is a series of IPART water decisions where the regulator itself noted that it had no means of estimating the contemporaneous MRP and that its 6% estimate of MRP reflected the average conditions over the historical data set that was used to produce that estimate. IPART noted that, given its MRP estimate was an historical average estimate, consistency required that it must estimate the risk-free rate on the same basis. In particular, 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.[12]

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.[13]

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.[14]

and:

[12] IPART (2012), p. 107.
[13] IPART (2012), p. 107.
[14] IPART (2012), p. 107.

> 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).[15]

18. 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.[16]

19. 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:

> 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.[17]

20. In our view, the use of long-term average estimates for the risk-free rate and MRP is a second-best solution. The preferred solution is to obtain contemporaneous estimates of both parameters. Consistent with this view, IPART has gone on to develop a method for estimating the contemporaneous MRP – commensurate with the prevailing conditions in the market. Its contemporaneous estimate is based on versions of the dividend discount model and the consideration of various indicator variables that have been shown to be related to risk premiums. IPART's approach is to pair the spot risk-free rate with its contemporaneous estimate of MRP (which is currently set at 6.9%).[18]

21. The view that:

    a) The risk-free rate and MRP must be estimated on the same basis; and

    b) The best approach is to obtain a spot/contemporaneous estimate of both parameters

    is consistent with the recommendations of Lally (2013) who states that the NPV=0 principle requires the use of the spot/prevailing estimates for both the risk-free rate and MRP.[19] Lally (2013) goes on to note that:

> It is uncontroversial that the Ibbotson approach [based on long-run historical data] to estimating the MRP produces an estimate of the average MRP over the historical period used in the estimation rather than one that is commensurate with prevailing conditions,

[15] IPART (2012), p. 102.
[16] IPART, Sydney Desalination Plant Final Decision, p. 94.
[17] IPART, Sydney Desalination Plant Final Decision, p. 94.
[18] See IPART (2013), Review of WACC Methodology, December. IPART's approach in full is to have regard to both an historical estimate (where the risk-free rate and MRP are both estimated from long-run historical data) and a contemporaneous estimate (based on spot/contemporaneous estimates of both the risk-free rate and MRP). The key point is that the risk-free rate and MRP must be estimated on the same basis.
[19] Lally (2013), p. 4

> and clearly would not be suitable if it were the only means by which the MRP were estimated by the QCA.[20]

22. However, the effect of the QCA's current approach for estimating MRP is to produce estimates that are exactly the same as they would have been if the historical Ibbotson approach *were* the only means by which the QCA estimated MRP. In particular, the Ibbotson approach alone would have produced an MRP estimate of 6% since the inception of the QCA, and the QCA has used an estimate of 6% in all of its decisions to date. In effect, the QCA's current approach is to pair a spot risk-free rate with an historical MRP estimate and there is general agreement that such a mis-match is unsuitable.

23. In summary, there is broad agreement about the principle that spot/prevailing estimates should be used for both the risk-free rate and MRP. However, the QCA's current approach for estimating MRP has simply re-produced the historical estimate (of 6%) in all of its decisions across a range of market conditions. Consequently, the QCA approach for estimating MRP needs to be revised so that it produces a prevailing estimate – to give proper effect to the principle about which there is broad agreement. Lally (2103) provides some recommendations in this regard, which are discussed at length in Sections 5 and 6 of this report.

Regulatory control period or 5-year or 10-year term?

Two proposals

24. The second question in relation to the CAPM risk-free rate is the term that should be used. Two different terms have been proposed in the Australian regulatory setting – a short term based on the length of the regulatory control period and a longer term of 10 years based on the maximum length of reliable data. In most cases, the length of the regulatory control period is 5 years, in which case the issue is whether a 5-year or 10-year term should be used. For Aurizon Network, the regulatory control period is four years. In this case, a 4-year term could be used or 5-year data could be used as a close proxy. In any event, the issue is whether a short (4 or 5 year) or long (10-year) term should be used.

No guidance from CAPM

25. The first point to note is that there is broad agreement that the CAPM itself provides no guidance on this issue. The CAPM is a one-period model where the period is of unspecified length. Under the CAPM, investors buy assets at the beginning of the period and hold them until the end of the period. For this reason, the most common practice is to set the term to approximate the life of the assets.

Market practice is to adopt a 10-year term

26. There is also 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) 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

[20] Lally (2013), pp. 11-12.

> Australia.[21]

27. 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.[22]

28. In summary, the independent expert evidence supports the use of a ten year term to maturity when estimating the risk-free rate:

    a) 94% of the relevant reports adopted a 10-year term assumption; and

    b) The few reports that did not use a 10-year term assumption explained that the reason for not doing so was that they were adopting a term assumption that matched the lives of the assets being valued.

Leading regulatory practice is to adopt a 10-year term

29. The current Australian regulatory practice is 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.[23]

30. 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.[24]

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

[21] Deloitte (2012), *ING Real Estate Community Living Group – Independent expert's report and Financial Services Guide*, 24 April 2012, p.93.
[22] Grant Samuel (2012), ***Hastings Diversified Utilities Fund – Independent Expert's report***, 3 August 2012, p.4.
[23] AER Draft Rate of Return Guideline Explanatory Statement, p. 181.
[24] AER Draft Rate of Return Guideline Explanatory Statement, p. 182.

> 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.[25]

Consistency considerations support the use of a 10-year term

32. One of the reasons for IPART's decision to adopt a 10-year term is to preserve consistency between the risk-free rate that is used to compute the cost of debt and the risk-free rate that is used to compute the cost of equity:

> the same risk-free rates should be used to estimate the implied MRPs and the cost of equity…our final decision is to use a TTM of 10 years in estimating the cost of debt for all industry (sic). This also means that we will use the 10-year risk-free rate to estimate the cost of equity.[26]

33. In this regard, we note that Incenta (2013) have recently advised the QCA that a term of 10 years should be used when estimating the cost of debt:

> A benchmark term of debt at issuance of 10 years is appropriate.[27]

NPV=0 arguments are being afforded less weight

34. The primary reason for use of a 5-year term (or other term matching the length of the regulatory control period) has been the so-called NPV=0 principle. 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.

[25] See IPART (2013), Review of WACC Methodology, December, p. 12.
[26] See IPART (2013), Review of WACC Methodology, December, p. 19.
[27] Incenta (2013), p. 22.

> 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.[28]

35. 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:

> 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.[29]

36. The AER goes on to cite a report by Incenta (the QCA's other WACC advisor):

> …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).[30]

37. 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.[31]

38. In summary, the AER and IPART have recently questioned whether adopting a 5-year term is in fact consistent with the NPV=0 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.

The Lally (2013) term structure argument

39. Lally (2013) cites a report by Ernst and Young (2012) which shows that independent expert valuation reports were adopting a risk-free rate of 4.4% and a MRP of 6.3% (total market return of 10.7%) at a time when the QCA would have adopted a risk-free rate of 3.1%. He notes that one interpretation of this evidence is that the independent expert reports are consistent with the use of a 7.6% MRP in the QCA framework.[32] However, Lally (2013) argues that:

[28] AER Draft Rate of Return Guideline Explanatory Statement, p. 183.
[29] AER Draft Rate of Return Guideline Explanatory Statement, p. 183.
[30] AER Draft Rate of Return Guideline Explanatory Statement, p. 183.
[31] AER Draft Rate of Return Guideline Explanatory Statement, p. 184.
[32] That is, a 7.6% MRP together with the QCA's 3.1% risk-free rate would produce the same 10.7% market return that was being used by independent experts in the same market conditions.

> This line of argument presumes that the QCA is engaged in the same exercise as the valuers and therefore ought to be using the same parameter values. However the two exercises are fundamentally different, and this readily explains the difference in rates.[33]

40. In particular, Lally (2013) argues that there may be a term structure of required returns such that equity investors may require lower returns over the earlier years of their investment. He goes on to present an example in which an independent expert may estimate that the required return on equity is 9.5% p.a. over 10 years and 10.6% p.a. over 20 years. His point is that a regulator may seek a short-run estimate (9.5%) whereas the independent expert valuation professionals may be reporting a long-term estimate (10.6%). In our view, there are a number of problems with this argument, each of which is considered below.

*Regulators **should** be estimating the required return on long-term equity*

41. Lally (2013) conjectures that the independent experts are computing the required return on long-run equity capital and that the QCA seeks to compute something other than the required return on long-term equity capital. This argument is out of step with recent pronouncements by other regulators. For example, the AER has recently determined that allowing a return on equity that is commensurate with the return required by long-term providers of equity capital is precisely what it *should* be doing. In particular, the AER recognises:

> the long term nature of cash flows in equity investment, in general, and the long lived nature of the assets in an infrastructure business (such as electricity and gas service providers), in particular.[34]

42. The AER also states that:

> in applying the CAPM, practitioners assume that the equity investment for an ongoing business is long term. This is because it generates a potentially infinite stream of cash-flows. Pratt and Grabowski (2010) and Damodaran (2008) both propose that, in general, an equity investment in an ongoing business is long term. They suggest, therefore, that for an ongoing business, the term of the equity should be measured as the duration of the long-term—and potentially infinite—series of cash flows.[35]

and concludes that it will allow a return on equity that is commensurate with the return required by long-term providers of equity capital, consistent with the notion that:

> The term of the return on equity should match the long life of those cash flows and assets.[36]

43. Similarly, IPART concludes that regulators should set the allowed return so as to be consistent with the efficient financing costs of the benchmark entity. IPART concludes that the efficient financing practice of the sorts of infrastructure businesses that are regulated is to raise long-term debt and long-term equity and consequently IPART has adopted a 10-year term for both.

[33] Lally (2013), p. 23.
[34] AER Draft Rate of Return Guideline – Explanatory Statement, p. 181.
[35] AER Draft Rate of Return Guideline – Explanatory Statement, p. 182.
[36] AER Draft Rate of Return Guideline – Explanatory Statement, p. 182.

44. In our view, setting the allowed return on equity to a sufficient level to attract the required amount of long-term equity capital is exactly what the regulator should seek to do and we note that the AER has recently re-confirmed the same view.

There is no evidence that independent experts are using a term structure of required returns

45. One key premise of the equity term structure argument is that independent experts are computing two different cost of equity figures – one that applies to short-term cash flows and one that applies to subsequent cash flows – and that they report only some sort of average of the two. However, this seems quite unlikely for a number of reasons. First, if independent experts were computing two different rates it is likely that they would mention this in their reports. However, the practice of independent experts is to report a single discount rate. Moreover, the average rate cannot be estimated directly – it can only be computed from the two separate discount rates. It is likely that the two rates would have been reported if they had been computed. Second, the equity term structure argument suggests that independent experts adopt different discount rates depending on whether the project life is 10 years or longer. However, there is no evidence to suggest that independent experts have ever, or would ever, adopt that practice. Third, the average depends on the pattern of cash flows for the project in question. This would imply that an independent expert would use different discount rates for projects in the same industry, and with the same life, if those projects had a different pattern of cash flows. However the evidence contradicts that implication.

The NPV=0 principle for long-term equity

46. Another key premise of the equity term structure argument is that the time horizon for equity investments is equal to the length of the regulatory period. However, the AER and IPART consider long-term equity investments. For example, suppose it was the case that the required return over the regulatory period was 9.5% p.a. and that the long-term required return was 10.6% p.a. (consistent with the Lally (2013) example). Also suppose that this term structure remains constant over time.[37] Now consider the outcome if:

    a) Investors provide long-term equity capital; but

    b) The regulator sets allowed returns based on the short end of the term structure (consistent with the regulatory period).

47. In this case, investors would require a return of 10.6% p.a. on average over the (long) life of their investment. However, the regulator would allow only 9.5% in every successive determination. Consequently, there would be no way of providing the required return to long-term equity investors.

48. In summary, the evidence suggests that independent expert valuation professionals are computing a single discount rate for each project and that they would use the same discount rate whether the project had a life of 10 years or longer. Consequently, there is no evidence to suggest that, having stated a single discount rate in their report, independent experts would apply a lower rate to cash flows from the first 10 years of the project. Rather, the evidence suggests that the market practice would be to value the cash flows from the first 10 years of the project using the single discount rate that is set out in the report. To the extent that the allowed rate of return is lower than this market

[37] The use of a constant term structure simplifies the discussion. All that is required to make the relevant point is that the term structure is upward-sloping on average.

rate, the allowed cash flows will be insufficient to support the RAB value and the NPV=0 principle will be violated.[38]

The consistency principle and issues in relation to rounding

49. The risk-free rate appears in two places in the CAPM equation and the consistency principle[39] requires that the same value should be used in both places. In this regard, Lally (2013) notes that:

> SFG (2012a, section 2.3) argues that use of the five year risk free rate within the first term of the CAPM requires that it also be used in estimating the MRP, that the QCA instead uses the ten-year risk free rate in estimating the MRP, that the QCA (in part) justify this on the grounds that MRP estimates from these two risk free rates are not statistically significantly different, and SFG considers that this argument is wrong…As with SFG, I do not agree with this rationale for using the ten rather than the five year risk free rate for estimating the MRP. However, the QCA also note that using five rather than ten year bond yields does not change the rounded estimate, in accordance with their practice of rounding. I concur with the QCA's latter reasoning.[40]

50. That is, the use of inconsistent risk-free rates is justified only on the grounds that restoring consistency is unlikely to change the estimate of MRP given the coarse (1%) rounding that the QCA applies. However, there are two strong arguments against this proposition:

    a) It is good regulatory practice to correct any errors or inconsistencies whenever they are identified. It is not good regulatory practice to retain errors or inconsistencies on the basis that each one is individually might be unlikely to affect the final outcome;

    b) Under the revised approach proposed by Lally (2013), the MRP is set to the median of five estimates. At present, the Ibbotson approach produces the median estimate. Using data updated to 2012, the Ibbotson estimate is very close to 6.5%. Consequently even a few basis points could quite conceivably result in the MRP estimate changing from 6% to 7%.

Summary and recommendations

51. Our key conclusions and recommendations in relation to the risk-free rate are:

    a) A spot/contemporaneous risk-free rate should be used, and paired with a spot/contemporaneous estimate of MRP;

    b) The current QCA approach effectively pairs a spot risk-free rate with an historical estimate of MRP. Consequently, the QCA should carefully consider the proposals that have been made by stakeholders and its own consultants for updating its approach for estimating the contemporaneous MRP and also recent regulatory developments in this regard;

    c) The term of the risk-free rate should be set to 10 years for the following reasons:

        i) Market practice is to adopt a 10-year term;

        ii) The leading regulatory practice is to adopt a 10-year term (AER, IPART, ACT);

[38] Lally (2013), p. 21 notes that Queensland Treasury Corporation has made a similar submission.
[39] And the Tribunal's GasNet decision.
[40] Lally (2013), p. 44.

iii) Adopting a 10-year risk-free rate for cost of equity would be consistent with the 10-year risk-free rate that the QCA's consultants have recommended for cost of debt; and

iv) Regulators have recently identified flaws in the argument that the NPV=0 principle requires that the term of the risk-free rate should match the regulatory period. Indeed, for long-term equity the NPV=0 principle would seem to require that a long-term risk-free rate should be used.

4. Background

The QCA framework

52. The QCA uses the Sharpe-Lintner Capital Asset Pricing Model (**CAPM**) to estimate the required return on equity capital supplied to the benchmark regulated entity:

$$r_e = r_f + \beta_e\left(r_m - r_f\right)$$

where r_f represents the risk-free rate of interest, β_e represents the systematic risk of equity in the benchmark efficient firm, and r_m represents the required return on equity on the market portfolio (or, equivalently, the required return on equity for a stock with average risk).

53. Sometimes, the market risk premium (**MRP**) is defined to be the required return on the market (or on a firm with average risk) in excess of the risk-free rate:

$$MRP = r_m - r_f$$

in which case the CAPM can be written as:

$$r_e = r_f + \beta_e \times MRP\,.$$

54. Of course, defining the MRP in this way implies that:

$$r_m = r_f + MRP\,.$$

MRP varies over time

55. It is well accepted that the MRP varies over time as market conditions change. For example the AER states that:

> Evidence suggests the MRP may vary over time.[285] In their advice to the AER, Professor Lally and Professor Mackenzie and Associate Professor Partington have expressed the view that the MRP likely varies over time.[41]

56. Similarly, IPART (2013) has developed a whole process for separately estimating the historical MRP using long-term averages and the current MRP using current market data.[42]

57. The QCA also states that "the market risk premium is forward-looking"[43] which also implies that it may change with market conditions.

[41] AER (2013), Rate of Return Guideline: Explanatory Statement, p. 91.
[42] IPART (2013), Review of WACC Methodology: Final Report, p. 2.
[43] QCA MRP Discussion Paper, p. 9.

The last decade and the QCA's decisions

58. The last 10 years has represented one of the most tumultuous periods ever observed in Australian financial markets. We have witnessed one of the largest and most sustained bull markets on record[44] and the greatest financial crisis since the Great Depression.[45]

59. The QCA has not updated its process for estimating MRP since its last WACC review in 2004. This process would have led to an MRP estimate of 6% at any time over the last 10 years. Indeed, the QCA has set the MRP to 6% in every decision it has ever made. Whereas this process, and the 6% estimate that it almost inevitably produces, might result in acceptable regulatory outcomes in "normal" market conditions, it can produce nonsensical outcomes in unusual market conditions – especially conditions where estimates of the risk-free rate are at historical lows. It is for this reason that:

    a) Australian regulatory practice has moved to a more flexible approach for estimating WACC parameters (and particularly MRP). The primary reason for this shift was a view that a fixed 6% MRP produces unreasonable allowed returns on equity during periods of financial crisis when risk premiums are clearly elevated and government bond yields are low. For example, when implementing such a change to the National Gas Rules and National Electricity Rules, the Australian Energy Markets Commission (AEMC) stated that:

> fixing WACC parameters for long periods produces results that may not reflect current market conditions. Further, it limits the set of information available for estimating parameter values.[46]

    b) The QCA's own expert has recommended that the process for estimating MRP should be revised to include consideration of a wider set of evidence.

60. The remainder of this section reviews the QCA's current approach and demonstrates that a constant 6% estimate produces nonsensical outcomes during unusual market conditions, such as the period that followed the Lehman Brothers collapse. Subsequent sections then set out the changes to the process for estimating MRP that have been adopted by other Australian regulators, and those that have been recommended by Lally (2013).

The QCA's process for determining MRP

61. The process that the QCA uses to determine MRP is set out in its MRP Discussion Paper.[47] The QCA approach considers four approaches for estimating MRP:

    a) **Ibbotson**: Average of excess stock return (market return less risk-free rate) since 1883.

    b) **Siegel**: Ibbotson estimate less a deduction to account for the extent to which inflation is deemed to have been higher than expected.

[44] The All Ordinaries increased by 148% between March 2003 and October 2007.
[45] The All Ordinaries index fell by 54% between October 2007 and March 2009, credit spreads increased six-fold by some estimates, lending markets were closed for some periods, and governments were forced to guarantee bank deposits even for AA+ rated institutions.
[46] AEMC (2012), Final Rule Change Determination, p. 40.
[47] QCA (2012), MRP Discussion Paper, p. 11.

c) **Cornell**: A version of the dividend discount class of models. The market return is estimated as the discount rate that would equate the present value of expected dividends to current stock prices.

d) **Surveys**: The mean response for Australian MRP from the unpublished surveys conducted by Spanish academic Pablo Fernandez.

62. Each of these approaches is given equal weight by computing the mean of the four estimates. The QCA's practice has been to compute a number of versions of the Cornell method and to adopt the mid-point of the resulting range as the value to be used when computing the mean across the four estimates. The resulting mean is then rounded to the nearest full percentage point.[48]

63. In our previous report,[49] we submitted that the QCA process for estimating MRP essentially guarantees a value of 6% in every case. Neither McKenzie and Partington (2013) nor Lally (2013) dispute this conclusion. In our view, this conclusion is clearly demonstrated by the fact that the QCA has set MRP to 6% in every one of its decisions. The current QCA process sets MRP to 6% during bull markets and periods of record economic growth. It set MRP to 6% during the peak of the GFC. It set MRP to 6% when the debt risk premium was 1%, and it set MRP to 6% when the debt risk premium was 4% DRP. In summary, the current QCA approach is to fix the MRP to 6%.

64. Consequently, the current QCA approach implies that the required return on equity for the average firm is:

$$r_m = r_f + 6\% .$$

65. The current QCA approach implies that the required return on equity for the average firm rises and falls directly with the risk-free rate. This in turn implies that the required return on equity is perfectly positively correlated with the risk-free rate.

Government bond yields are at historical lows

66. In our previous report, we noted that the GFC and ensuing debt crisis led to sharp falls in government bond yields. If allowed equity returns are set as a fixed margin to the risk-free rate, this leads to the allowed return on equity declining 1:1 with falls in the government bond yield. Our previous report contained Figure 1 below, which shows the pattern of allowed returns on equity, under the current QCA approach, for a benchmark regulated firm with equity beta of 0.8.[50]

[48] QCA (2012) MRP Discussion Paper, p. 12.
[49] SFG (2013), Response to the QCA Discussion Paper on risk-free rate and market risk premium, Section 3.
[50] SFG (2013), Response to the QCA Discussion Paper on risk-free rate and market risk premium, p. 12.

Figure 1. Allowed return on equity under the current QCA approach

67. In a report for the Queensland Resources Council (**QRC**), McKenzie and Partington (2013) dispute the submission that Commonwealth Government Security (**CGS**) yields are currently at historically low levels. They compare the current 10-year CGS yield with the average from the 1883-1972 period, noting that the current yield at the time of their report (4.02%) "is reasonably close to the long run average (4.23%)."[51] This leads McKenzie and Partington to conclude that:

> The current environment is nothing more than a return to the 'normal' long run interest rate regime.[52]

68. In our view, there are a number of reasons to reject this conclusion. Generally, a comparison with the most recent 40 years would be more relevant than a comparison with a period that begins in the 1880s and ends more than 40 years ago. But this is particularly the case for CGS yields which were set on an entirely different basis during the historically dated period that McKenzie and Partington prefer. In particular, prior to August 1982, CGS yields were not market rates at all. Prior to 1982, the so-called TAP system was used whereby the Australian government fixed the yield and then issued as many government bonds as the market demanded at the set rate. Thus, the yields were not a market rate at all, but a number that was set from time to time by the government of the day. The current tender system (whereby government fixes the supply of bonds to be issued and a market clearing price is determined) was introduced in August 1982. The Australian Office of Financial Management (**AOFM**) notes that:

> The Australian Government first introduced competitive price tenders for Treasury Bonds in August 1982. The key feature of this approach is that the issuer sets the volume of securities issued while the market determines the issuance yield.[53]

69. The AOFM explains the historical system as follows:

> Prior to tenders, the Australian Government borrowed through individual cash loans and a more flexible continuous offer mechanism known as the TAP system. Under these

[51] McKenzie and Partington (2013), p. 16. The current yield on 10-year CGS at the time of this report was 3.97%.
[52] McKenzie and Partington (2013), p. 16.
[53] AOFM Annual Report 2010-2011, p. 1.

> arrangements the Government set the yield and the market would determine how much was purchased.
>
> The financial environment in which the TAP system operated was very different to that of today. [54]

70. Moreover, the historical system was not compatible with the free and flexible interest rates that are available today and it caused the intertwining of monetary policy and government debt management:

> The TAP mechanism was not sustainable with increasingly flexible interest rates. As a result, a tender system was first adopted for short-term Treasury Notes in December 1979 and for Treasury Bonds in August 1982. The move to a tender approach supported the Government moving to fully funding its Budget without recourse to central bank financing. This effectively separated monetary policy from debt management.[55]

71. The AOFM concludes that the key risk-free market yield was not "freed up" until the tender system was put in place in 1982:

> The adoption of tenders for debt issuance was critical in freeing up the key risk-free market yield in the economy. This proved essential for the financial innovation that was to occur in the financial markets in the following years.[56]

72. McCray (2000) notes that under the TAP system, the majority of government bonds were issued to institutions that were effectively forced (by government regulation) to buy and hold:

> The market was essentially 'buy and hold' in its orientation and distinguished by a variety of 'captive market' arrangements, which obliged financial institutions to hold specified proportions of their assets in the form of government securities. In like manner, life insurance offices and pension funds were provided with significant tax concessions in return for holding 30 per cent of their assets in public securities.[57]

73. The captive market had two effects. First, it resulted in there being no effective secondary market, since the institutions that bought at issuance were required to hold through to maturity:

> One consequence of these captive market arrangements was that there was only a very limited secondary market in government securities. Derivatives markets as they are known today did not exist…In summary, captive investor arrangements discourage the taking of positions in the market and, in doing so, act to inhibit liquidity and secondary market development.[58]

74. The captive market also had the effect of artificially reducing the yield:

[54] AOFM Annual Report 2010-2011, p. 1.
[55] AOFM Annual Report 2010-2011, p. 1.
[56] AOFM Annual Report 2010-2011, p. 1.
[57] McCray (2000), p. 5.
[58] McCray (2000), p. 9.

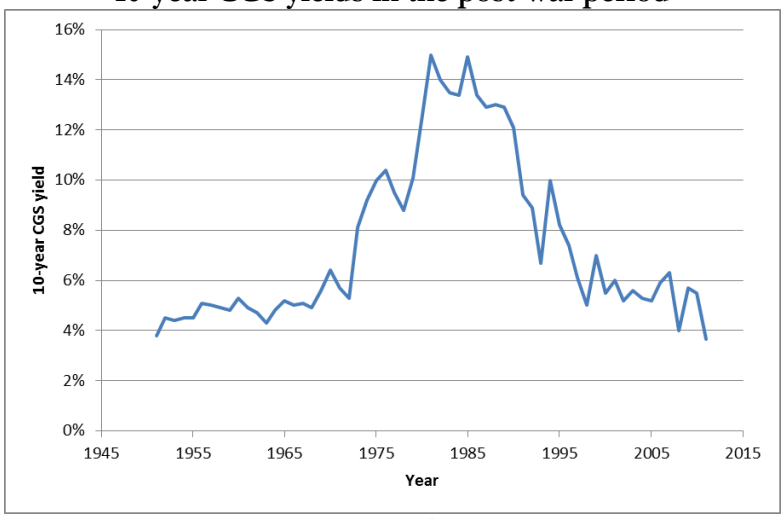
> …the arrangements also ensured a continued demand from growing financial institutions for government securities and doubtless assisted the authorities to issue government bonds at lower interest rates than would otherwise have been the case.[59]

75. McKenzie and Partington (2013) now conclude that the current low CGS yields may be "nothing more than a return to the 'normal' long run interest rate regime."[60] In summary, McKenzie and Partington now conclude that, although current CGS yields are lower than at any time in the last 40 years, they are "reasonably close" to the yields that were artificially set by government 50 or more years ago.

76. Our view is that a more careful and appropriate interpretation of the relevant evidence is that CGS yields have not been this low since governments ceased artificially fixing them and allowed them to become market prices.

77. Even setting aside the McKenzie and Partington (2013) comparison of apples and oranges, the fact remains that CGS yields in the period since the onset of the GFC have been lower than at any time since World War Two, as illustrated in Figure 2 below.

Figure 2
10-year CGS yields in the post-war period



Source: RBA

78. Consequently, it is a fact that the QCA approach of estimating the required return on equity by using the CAPM with a fixed MRP of 6% leads inevitably to the conclusion that equity capital has been cheaper since the onset of the GFC than at any other time since WWII.

Key question for QCA

79. In summary, the current QCA approach leads inevitably to the conclusion that equity capital has been cheaper since the onset of the GFC than at any other time since WWII. The first key question for the QCA to address is whether it considers this conclusion to be plausible. If so, it should explain why. If not, it must change its approach to estimating MRP. We note that changes have been adopted by other Australian regulators and that changes have been recommended by the QCA's consultant. We

[59] McCray (2000), p. 9.
[60] McKenzie and Partington (2013), p. 16.

support these proposed changes (which are discussed in some detail below) and recommend that the QCA might take the current opportunity to augment its approach for estimating MRP.

5. The correlation between the risk-free rate and the return on the market: The Wright approach

Recommendation of the Wright approach

80. One of the key augmentations to the current QCA approach that has been proposed is the so-called "Wright" approach. The inclusion of this approach for estimating MRP has been recommended by Lally (2013)[61] and has also been proposed in the AER's Draft Guideline.[62]

The QCA approach vs. the Wright approach

81. The current QCA approach represents one end of a theoretical spectrum. The QCA approach effectively sets the MRP to the constant value of 6%, in which case the estimate of the required return on equity varies 1:1 with changes in the risk-free rate:

$$r_m = r_f + 6\%.$$

82. The other end of the theoretical spectrum is to assume that the required return on equity is effectively constant, in which case the MRP will vary over time inversely with changes in the risk-free rate.

The Wright approach to estimating the required return on the market portfolio

Implementation of the Wright approach

83. The approach at the other end of the theoretical spectrum is what has become known, in the Australian regulatory setting, as the Wright approach. This approach assumes that the real required return on the market (or average stock) is constant. This approach is at the other end of the theoretical spectrum in that it implies that the real risk-free rate and the MRP are perfectly negatively correlated – any increase in the real risk-free rate is exactly offset by a corresponding decrease in the MRP such that the real required return on the market remains constant.

84. The Wright approach involves the following steps:

a) Estimate the real return on the market portfolio each year for some historical period using the Fisher relation:

$$r_{m,t}^{real} = \frac{1 + r_{m,t}^{nominal}}{1 + inflation_t} - 1.$$

b) Take the average real market return over the relevant historical period.

c) Use the Fisher relation, and a contemporaneous estimate of expected (forward-looking) inflation to obtain an estimate of the nominal required return on the market:

$$r_m^{nominal} = \left(1 + \overline{r_m^{real}}\right)\left(1 + E[inflation]\right) - 1.$$

[61] Lally (2013), p. 6.
[62] AER (2013), Draft Rate of Return Guideline, pp. 7, 16, 18.

85. The Wright approach produces a direct estimate of the required return on the market. The implied MRP can be determined by deducting the contemporaneous estimate of the risk-free rate.

Recommended use of the Wright approach

86. In their report for the QRC, McKenzie and Partington (2013) conclude that the Wright approach should not be given any weight:

> The relation between the risk-free rate and the MRP, if any, is not sufficiently well established to form the basis for a regulatory adjustment to the MRP.[63]

87. Conversely, the Lally (2013) report recommends that the Wright approach *should* be given material weight:

> I consider that the set of methodologies considered by the QCA should be augmented by one involving estimating the expected real market cost of equity from the historical average actual real return and then…converting the estimate of the expected real market cost of capital to its nominal counterpart.[64]

88. In recommending that the Wright approach should be used, Lally (2013) recognises that the two approaches set out above are the end points of a spectrum. The first assumes that the MRP is constant so that the required return on the market varies one-for-one with the risk-free rate. The second assumes that the (real) expected return on the market is constant so that the MRP varies one-for-one with the risk-free rate. Lally (2013) concludes that the evidence on which end of the spectrum should be preferred is "not decisive"[65] and consequently recommends that both approaches should be given some weight.

89. In its recent draft Guideline,[66] the AER has stated that it too will have regard to the Wright approach when determining the allowed return on equity. In setting out its reasons for having regard to the Wright approach, the AER noted that the Wright approach is likely to produce allowed returns on equity that are more stable over time than those produced by its previous mechanistic implementation of the Sharpe-Lintner CAPM:

> …the Wright approach for implementing the Sharpe–Lintner CAPM will result in estimates of the return on equity that may be relatively stable over time. The informative use of these implementations of the Sharpe–Lintner CAPM, in addition to other information, is expected to lead to more stable estimates of the return on equity than under our previous approach.[67]

90. The AER also noted that more stability in the allowed return on equity was favoured by a broad cross section of stakeholders and is more likely to properly reflect the efficient financing costs of a benchmark efficient entity.[68]

[63] McKenzie and Partington (2013), p. 18.
[64] Lally (2013), p. 3.
[65] Lally (2013), p. 6.
[66] AER (2013), Draft rate of return guideline, p. 7.
[67] AER (2013), Draft rate of return guideline: Explanatory statement, p. 13.
[68] AER (2013), Draft rate of return guideline: Explanatory statement, p. 69.

91. The AER also considers the Wright approach to have the attractive features of transparency and replicability – relative to its previous mechanistic implementation of the CAPM:

> …we consider that implementing the Wright approach is more transparent and replicable than our standard implementation of the Sharpe–Lintner CAPM.[69]

92. Lally (2013) also notes that the Wright approach is used extensively by UK regulators.[70]

Current estimates from the Wright approach

93. We have computed the average real return on the market portfolio using:

    a) Data from 1883 to 2012, inclusive;

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

    c) An estimate of the value of distributed imputation credits of 0.35, consistent with the recent Tribunal decision.

94. The average real return on the market portfolio (including imputation credits with theta set to 0.35) is 8.8%. If expected inflation is set to 2.5% (the mid-point of the RBA target band), an 8.8% real return is consistent with a nominal return of 11.6% (using the standard Fisher relation). That is, if the current real return is expected to be the same as the long-run historical average, the current nominal required return is 11.6%. If the current risk-free rate is estimated on the basis of the current 10-year government bond yield of 3.97% (as we recommend), the implied MRP is 7.6%.

95. If instead we use the current QCA estimate of the value of distributed imputation credits (0.625) the estimate of the current nominal required return on the market is 11.7%. If we also use the QCA approach of setting the risk-free rate equal to the 5-year government bond yield, the implied MRP is 8.3%.

96. Lally (2013) states that the implementation of this approach (presumably based on the QCA estimates of the risk-free rate and the value of distributed imputation credits) is 7.5%.[71] The difference in the Lally (2013) estimate results from the fact that:

    a) His historical data have not been updated to the end of 2012;

    b) His data does not correct for the Brailsford et al dividend yield inaccuracy;[72] and

    c) He uses an approximation for the effects of dividend imputation rather than a specific adjustment for each year since the commencement of imputation.

Comparison of the Ibbotson and Wright approaches

97. The key differences between the Ibbotson and Wright approaches are illustrated in Figure 3 and Figure 4 below. These figures show data from 1996 because the Wright approach requires an

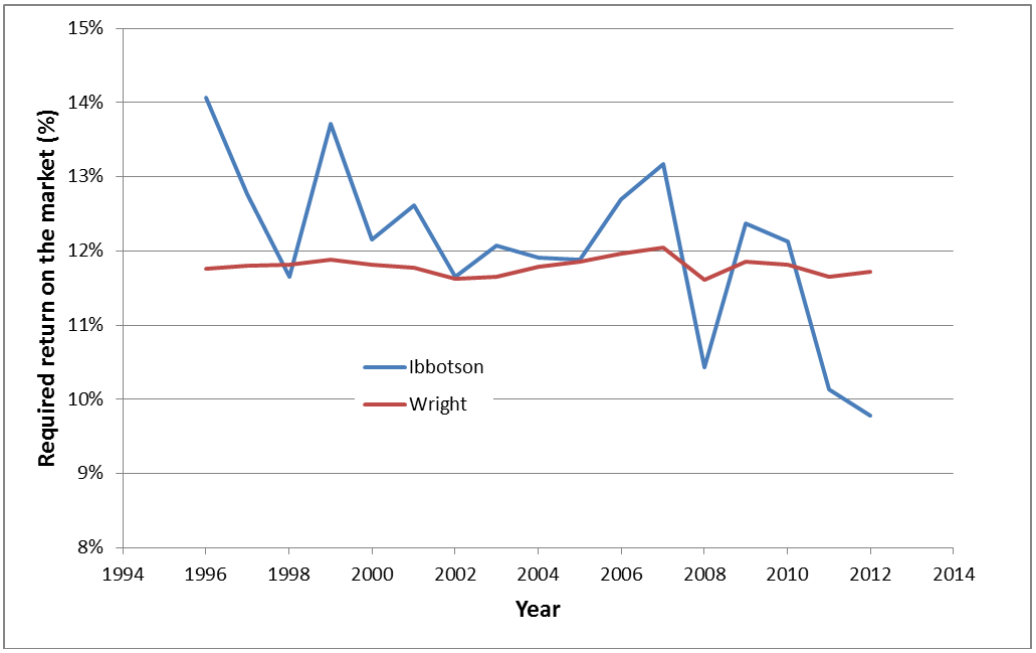
[69] AER (2013), Draft rate of return guideline: Explanatory statement, p. 186.
[70] Lally (2013), p. 13.
[71] Lally (2013), p. 6.
[72] See Paragraph 137 below.

estimate of expected inflation and any such estimate prior to 1996 would be controversial. In 1993 the RBA began inflation targeting and since 1996 inflation has generally remained within (or close to) the RBA target band of 2-3%.

98. The Ibbotson approach produces a very stable estimate of MRP, in which case the required return on the market varies directly with the risk-free rate. By contrast, the Wright approach produces a very stable estimate of the required return on the market, in which case the MRP varies inversely with the risk-free rate.

99. Figure 3 shows that the Wright estimate of the required return on the market is stable throughout the period. By contrast the Ibbotson approach implies that equity is more expensive than average during economic expansions and bull markets (the late 1990s and mid 2000s) and cheaper than average during financial crises (the dramatic reduction in 2008). The implausibility of the implications from the Ibbotson approach should be taken into account when considering how much weight it should be afforded.

Figure 3
Comparison of Ibbotson and Wright estimates of the required return on the market



Source: SFG calculations.

100. Figure 4 shows that the Wright estimate of the market risk premium varies over different market conditions – the implied MRP is lower than average during economic expansions and bull markets (the late 1990s and mid 2000s) and higher than average during financial crises (the dramatic increase in 2008). This is consistent with the notion that the perceived amount of risk and the price of risk fall during expansions and rise during crises. By contrast, the Ibbotson approach implies that the MRP is essentially constant across all market conditions.

Figure 4
Comparison of Ibbotson and Wright estimates of MRP

Source: SFG calculations.

Conclusions and recommendations

101. Our primary conclusion from this section of the report is that regulators should have regard to the Wright approach when estimating the required return in the market (or market risk premium) for use in the Sharpe-Lintner CAPM. In this regard, we note that:

    a) Lally (2013) recommends that the QCA methodology for estimating MRP should be expanded to include the Wright approach;

    b) In its recent draft Guideline, the AER has indicated that it will have regard to the Wright approach; and

    c) The Wright approach is used extensively by UK regulators.

102. We also note that the Ibbotson and Wright approaches lie at opposite ends of a spectrum. The Ibbotson approach effectively assumes that the MRP is constant so that the required return on equity varies one-for-one with changes in the risk-free rate. The Wright approach effectively assumes that the real required return on the market is constant so that the MRP varies inversely with changes in the risk-free rate. In our view, both approaches provide relevant evidence and regulators should have some regard to both.

103. Moreover, in "average" market conditions,[73] both approaches will produce similar estimates of the required return on the market and MRP. When market conditions are not average, careful consideration must be given to the relative weights to be applied to each of the two approaches. For

[73] Average market conditions would be characterised as conditions in which the risk-free rate and risk premiums were close to their long-run means.

example, in the current market conditions the Ibbotson approach implies that the required return on the market is well below its average level whereas the contemporaneous evidence from dividend discount models and independent expert reports suggests that the reverse is true. This evidence would be relevant when considering the relative weight to be applied to the Ibbotson approach in the current market circumstances.

6. Information from independent expert valuation reports

Recommended use of independent expert reports

104. Lally (2013) recommends that, when estimating MRP, the QCA should have regard to the independent expert valuation reports that are prepared as part of the process of corporate transactions such as mergers, acquisitions and divestitures.[74] Those independent expert reports that contain a discounted cash flow valuation set out some details about the discount rate. Thus, information about the MRP value being used by independent experts can be obtained from these reports. In this regard, Lally (2013) concludes that:

> In respect of alternative methods for estimating the MRP, I consider that the survey-based MRP estimates should draw upon those from recent reports by independent valuation experts as well as from the Fernandez surveys with averaging over the results from these two sources.[75]

105. In its Draft Guideline, the AER states that it also proposes to have regard to information from independent expert valuation reports.[76]

Evidence from independent expert reports

Role of independent expert reports

106. In a submission to the AER, SFG (2013) note that independent expert valuation reports that are prepared as part of the process of corporate transactions (such as mergers, acquisitions and divestitures) are:

a) Governed by the Corporations Law and ASX Listing Rules;

b) Regulated by the Australian Securities and Investments Commission;[77] and

c) Form the basis of numerous transactions involving the investment of material amounts of equity capital.

107. For these reasons, information from independent expert valuation reports is likely to be relevant evidence for the purpose of determining allowed returns in the regulatory setting.

Regulatory allowed returns on equity are materially lower than independent expert estimates

108. SFG (2013) examine all of the independent expert valuation reports from January 2008 to April 2013 that set out a cost of capital calculation. Figure 5 below shows a comparison between:

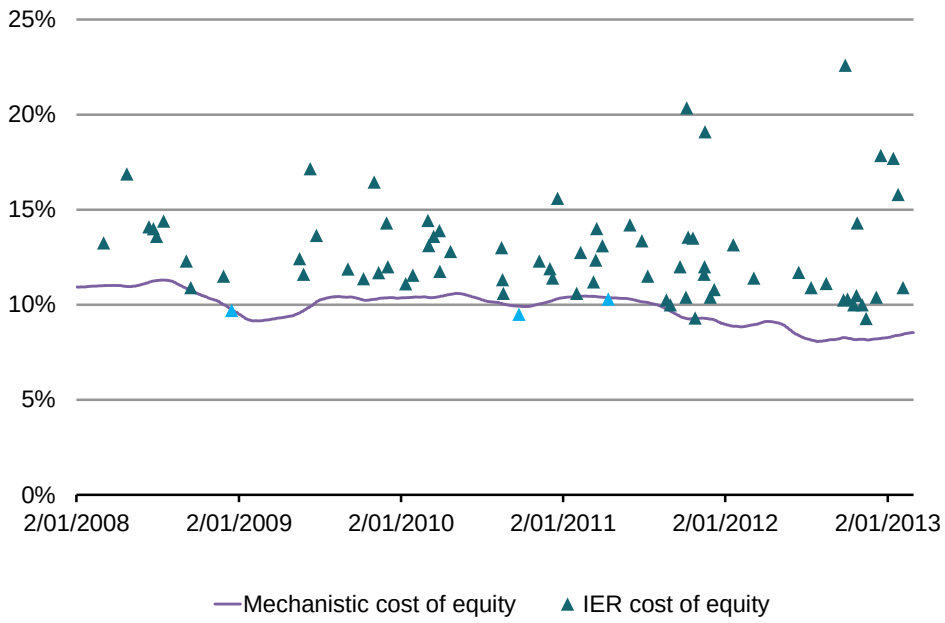
a) Mechanistic estimates of the required return on the market (10-year government bond yield plus 6%); and

b) Independent expert estimates of the final required return on equity for firms for which the independent expert adopted an equity beta estimate between 0.75 and 1.25. They restricted the sample to this set of firms with an equity beta estimate close to 1.0 to ensure a reasonable

[74] Lally (2013), p. 5.
[75] Lally (2013), p. 3.
[76] AER (2013), Draft Rate of Return Guideline, pp. 7, 16, 18.
[77] See ASIC Regulatory Guides 111 and 112.

basis of comparison with an estimate of the required return on the market (which also has a beta of 1.0).

Figure 5
Expert report cost of equity estimates (for beta estimates between 0.75 and 1.25) compared to mechanistic market cost of equity (for beta of 1.0)



Source: SFG analysis

109. The striking feature of this graph is that, with three exceptions, every one of the independent expert estimates of the required return on equity is higher than the mechanistic estimate. The three exceptions all have equity beta estimates between 0.75 and 0.80 – below the market beta of 1.0 – and all have cost of equity estimates that are only marginally below the mechanistic estimate of the market cost of equity.

110. SFG (2013) also determine, for each report in their sample, the overall cost of equity capital estimated by the independent expert. The average cost of equity capital calculated for the entire sample (2008-2013) is 14.4%, within a range of 9.3% to 35%.

111. They then compare:

a) The independent expert's estimate of the required return on equity for each firm; with

b) An estimate formed by inserting the following values into the Sharpe-Lintner CAPM:

i) Contemporaneous 10-year government bond yield for risk-free rate;

ii) 6% for market risk premium; and

iii) The equity beta estimate adopted by the independent expert.

112. The average estimate of the required return on equity from the former approach is 14.4%, and the average from the latter approach is 11.1%.

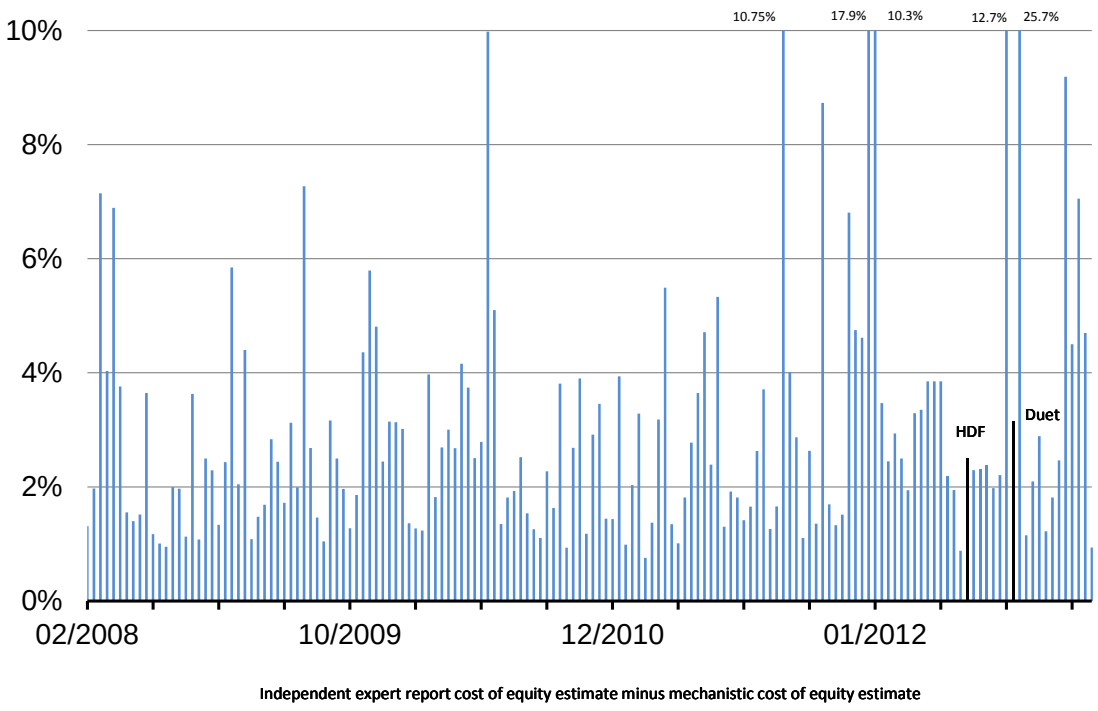
113. The pair-wise comparisons of the two estimates for each asset are set out in Figure 6 below, which shows that in every case the mechanistic estimate is below the figure that is adopted in the

independent expert report. In that figure, the vertical scale is capped at 10% to show sufficient detail, but in a number of cases the difference is even greater than that. In almost every case, the difference is greater than 1% and the difference is greater than 2% in many cases.

114. The results for the 2012-13 period are particularly striking. In almost every case the difference between the two estimates exceeds 2% and the average differential of 4.1% is substantially higher than for the earlier period.

115. Highlighted in the graph are the differences between the expert estimate and the mechanistic estimate for the only two utilities companies in the data (Hastings Diversified Fund and the Duet Group) in the recent period sub-sample. Both show that the market-based assessment of the cost of equity is materially higher than the mechanistic approach would suggest. That is, the approach that the independent experts have taken in the Hastings and Duet cases has resulted in estimates of the required return on equity that are materially greater than the mechanistic approach would suggest – in line with all of the other expert reports in the sample.

Figure 6
Difference between expert report and adjusted mechanistic estimates of cost of equity



Source: SFG analysis

MRP estimates from independent expert reports

116. Lally (2013) refers to the Ernst and Young (2012) MRP estimates that were extracted from independent expert valuation reports. SFG (2013) have updated the EY dataset to include independent expert reports from 2013, and we refer to these updated results in the remainder of this report.

117. The process for extracting MRP estimates from independent expert valuation reports is difficult in some respects because the independent experts do not employ the mechanistic implementation of the CAPM that is adopted by the QCA. In particular, over the 2012-2013 period, it was common for

independent experts to state that they were using a form of CAPM but to increase their estimate of the required return on equity by:

a) Using a value of the risk-free rate that exceeded the spot government bond yield; and/or

b) Adding an uplift margin to the CAPM estimate of the required return on equity.

118. In some cases, the independent expert identified that they were adding a margin to the CAPM estimate in relation to the current market conditions, in other cases the margin was said to be due to firm specific factors (such as size), and in other cases no precise reason was given for the margin.

119. Thus, a difficulty arises because the independent experts are not using the CAPM in the same way that the QCA uses it. However, it is possible to obtain a like-with-like comparison of estimates of the required return on the market – this being the sum of the risk-free rate and MRP. It is less clear whether uplift margins should be included as they are linked to firm-specific factors in some cases.

120. The set of independent expert reports examined by SFG (2013) includes 34 reports from the 2012-2013 period. The mean MRP value set out in those reports is 6.4%.[78] On average, these reports use a risk-free rate that is 0.5% higher than the spot government bond yield at the time of the report. Consequently, an MRP estimate of 6.9% would have to be paired with the spot government bond yield in order to match the independent expert estimate of the required return on equity for the average firm. We interpret these as conservative estimates of MRP in the sense that a number of reports also apply further uplift margins, but in many cases it is unclear how much of the margin is due to market conditions and how much relates to firm-specific characteristics. Finally, we note that neither the 6.4% nor 6.9% estimates can be compared directly with the other QCA estimates of MRP. This is because the QCA estimates include the benefits of imputation credits whereas the independent experts do not. We discuss the adjustments that are required in the following section.

Adjustment for imputation

121. None of the 34 independent expert reports made any adjustment to any cash flow or any discount rate in relation to dividend imputation credits. That is, none of the reported MRP values have been grossed-up to include any assumed value of imputation credits. By contrast the QCA practice is to gross up its estimate of MRP to reflect a gamma value of 0.5. That is, the independent expert MRP estimates cannot be directly compared with regulatory MRP estimates because one includes the assumed value of imputation credits and one does not.

122. Another way to see this is to note that the independent experts apply their discount rate directly to cash flows that do not include any imputation credits. Combining a risk-free rate of 4% (commensurate with current market conditions) with a 6.4% MRP would imply that the average firm would require a return of 10.4% net of any imputation credits. Thus, a share that generated cash flows of $10.40 per year[79] in perpetuity would have a present value of $100.

123. By contrast, Australian regulatory practice is to compute an MRP and consequently an allowed return on equity that *includes* the assumed value of imputation credits. The regulator will then allow the firm to generate cash flows that are sufficient to provide only a portion, $\frac{1-T}{1-T(1-\gamma)}$, of the total return

[78] In seven of the reports, a range was presented for MRP. For these cases, we adopted the mid-point of the range as a point estimate.

[79] These are cash flows generated by the firm – there are no imputation credits included in this figure.

on equity – the balance of the return being assumed to come in the form of imputation credits. Suppose, for example, that the equity portion of the RAB is $100 and the regulator sets MRP to 7.5%, including the assumed value of imputation credits where gamma is 0.25 (consistent with the 2011 Tribunal decision and regulatory decisions since then). In this case, the regulatory estimate of the total required return on equity for the average firm will be 11.5%. The regulator will then allow the firm to generate cash flows of $10.40 per year since:

$$r_e \frac{1-T}{1-T(1-\gamma)} = 11.5\% \frac{1-0.3}{1-0.3(1-0.25)} = 10.4\%.$$

124. If an independent expert were valuing that regulated firm, they would discount the (ex-imputation) cash flows of $10.40 per year[80] at their (ex-imputation) discount rate of 10.4% per year, yielding a present value of $100 – which is equal to the RAB and therefore consistent with the NPV=0 principle.

125. In summary, the independent expert ex-imputation MRP estimate of 6.4% would be consistent with a regulatory MRP estimate (including the assumed value of imputation credits) of 7.5% in this case.

126. In the Final Report of its recent review of WACC methodology, IPART (2013) advises that it will adopt exactly the same process as set out above to convert ex-imputation estimates of MRP into with-imputation (regulatory) estimates of MRP.[81]

127. Applying this adjustment to the two MRP estimates and for different values of gamma produces the with-imputation regulatory estimates of MRP that are set out in Table 1 below.

Table 1. With-imputation MRP estimates from independent expert reports

	Gamma	
Ex-imputation estimate	**0.25**	**0.5**
6.40%	7.51%	8.63%
6.90%	8.07%	9.24%

Source: Independent expert reports,
SFG calculations using the IPART (2013) adjustment.

[80] That is, the cash flows that are generated by the firm – no imputation credits.
[81] IPART (2013), Review of WACC Methodology: Final Report, pp. 17-18.

7. Current estimates of the required return on the market and MRP

Overview

128. Recall that the QCA uses the Sharpe-Lintner CAPM to estimate the required return on equity:

$$r_e = r_f + \beta_e\left(r_m - r_f\right).$$

129. Some of the estimation approaches provide a direct estimate of the required return on the market, r_m whereas others provide an estimate of $MRP = \left(r_m - r_f\right)$. In the latter case, the contemporaneous risk-free rate must be added back to provide an estimate of the required return on the market – that is, $r_m = MRP + r_f$. In this section, we review the range of methods that might be used to estimate the required return on the market and MRP.

Ibbotson methodology

The consistency principle

130. As set out in Paragraphs 49 and 50 above, the consistency principle requires that the same value must be used for the risk-free rate in the two places that it appears in the CAPM equation. Our recommendation is that the 10-year risk-free rate should be used in both places for the reasons set out in Section 3 of this report.

131. If, however, the QCA decides to adopt a 5-year estimate of the risk-free rate, consistency requires that the Ibbotson MRP estimate must be based on excess returns relative to 5-year government bonds. To do otherwise would be to embed a systematic bias in the estimate of the required return on equity such that the estimate of the expected return on equity for the average firm would be:

$$r_m^{estimate} = r_m^{true} - \left(\overline{r_{f,10yr}} - \overline{r_{f,5yr}}\right)$$

132. This would embed a systematic downward bias since, on average, 10-year government bond yields are higher than 5-year government bond yields.

133. As set out in Paragraphs 49 and 50 above, there is no suggestion that using inconsistent estimates of the risk-free rate in the CAPM equation is in any way appropriate – only that correcting the inconsistency may not change the final allowed return on equity. However, it is not good regulatory practice to retain errors or inconsistencies on the basis that each one (individually) might be unlikely to affect the final outcome. Best practice regulation is to correct any errors or inconsistencies whenever they are identified so that the final outcome (whatever it may be) is based on correct and consistent inputs.

Use of arithmetic average only

134. The QCA approach is to take the arithmetic average of historical excess returns using the entire history of data compiled by Brailsford, Handley and Maheswaran (2008, 2012), adjusted for the QCA's estimate of the value of imputation credits. The QCA states that:

> The Authority currently uses the Brailsford *et al* (2008, 2012) data series to estimate the historical market risk premium, including any relevant adjustments for the effects of

> dividend imputation since its introduction. As discussed previously, the Brailsford *et al* data identifies and corrects significant errors in a part of the early (i.e. pre-1958) return series. Importantly, the problems and adjustments made are well identified and documented.[82]

135. We agree with Lally (2012) that:

> if historical average returns are used, they should be arithmetic rather than geometric averages.[83]

and we note that the practice of the QCA is to use the arithmetic mean and in the terms of reference for Lally (2013) the QCA directed that no further comment on this issue was required.

136. Consequently, the geometric mean estimates cited in the QRC WACC Submission[84] would seem to be irrelevant and should be given no weight.

Use of best available data

137. We also agree with the QCA approach of using the best possible data and evidence, where "the problems and adjustments made are well identified and documented." In this regard, a recent report by NERA (2013) identifies and corrects a number of errors and inaccuracies in the adjustments that were made in the Brailsford et al (2008, 2012) calculations. The data for part of the period examined by Brailsford et al was sourced from Lamberton (1958). 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 excluded from the calculation those companies that did not pay any dividends at all. 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 and it creates a systematic downward bias.

138. NERA (2013) correct the bias in the Braisford 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. NERA report an historical estimate of 6.5% based on a 0.35 (theta) value assigned to distributed imputation credits. If the 0.35 estimate was replaced by the QCA's current estimate of 0.625, the historical mean estimate of MRP would rise to 6.6%.

Estimate for average market conditions

139. Lally (2013) notes that the Ibbotson approach produces an estimate of the MRP that is commensurate with the average market conditions over the period from 1883 to the present. It does not present an estimate of the MRP that is commensurate with the prevailing conditions in the market for equity funds. Specifically, Lally (2013) states that:

[82] QCA (2013), The risk-free rate and market risk premium: Discussion Paper, p. 22.
[83] Lally (2012), p. 5, repeated at pp. 32 and 34.
[84] QRC WACC Submission, p. 13.

> It is uncontroversial that the Ibbotson approach to estimating the MRP produces an estimate of the average MRP over the historical period used in the estimation rather than one that is commensurate with prevailing conditions, and clearly would not be suitable if it were the only means by which the MRP were estimated by the QCA.[85]

140. However, as noted in Paragraphs 21 to 23 above, the effect of the QCA's current approach for estimating MRP is to produce estimates that are exactly the same as they would have been if the historical Ibbotson approach *were* the only means by which the QCA estimated MRP. In particular, the Ibbotson approach alone would have produced an MRP estimate of 6% since the inception of the QCA, and the QCA has used an estimate of 6% in all of its decisions to date. In effect, the QCA's current approach is to pair a spot risk-free rate with an historical MRP estimate and there is general agreement that such a mis-match is unsuitable.

141. That is, the effect of the QCA's current approach for estimating MRP is to reproduce the historical estimate (of 6%) in all of its decisions across a range of market conditions. This gives weight to the proposals that have been made for revising the QCA's approach to estimating MRP.

Best available estimate

142. The best available estimate using the corrected Brailsford et al (2008, 2012) data, and based on 10-year government bond yields and theta of 0.35 is 6.5%. If theta is set to 0.625, the estimate increases to 6.6%.

Siegel adjustment

Implementation and effect of the Siegel approach

143. In its MRP Discussion Paper, the QCA explains that the Siegel approach is based on the hypothesis that, in the historical sample period prior to 1990, inflation turned out to be higher than expected, and that this caused real returns on government bonds to be lower than they would otherwise have been. In particular, the QCA parameterises the Siegel approach as:

$$MRP_S = MRP_I + \left(\overline{r_r} - r_r^e\right)$$

where $\overline{r_r}$ is the observed long-run average historical real risk-free rate and r_r^e is an estimate of the long-run average real risk-free rate that the market was expecting over the relevant historical period.[86]

144. The QCA Discussion Paper indicates that the observed long-run average historical real risk-free rate is 1.9%.[87] Lally (2013) indicates that the QCA currently considers that the market was expecting (on average) a real risk-free rate of 3.8%.[88] These figures are consistent with the fact that the net effect of the Siegel adjustment is to reduce the historical MRP estimate by 1.9% (3.8 - 1.9 = 1.9).[89] In summary, the basis of the Siegel adjustment is that (over the long-run historical period) investors were expecting a real risk-free rate of 3.8%, but it turned out to be 1.9% and this occurred because inflation turned out to differ from expectations.

[85] Lally (2013), pp. 11-12.
[86] QCA MRP Discussion Paper, p. 22, Equation 11.
[87] QCA MRP Discussion Paper, p. 22.
[88] Lally (2013), p. 12. The QCA's MRP Discussion Paper refers to an estimate of 4% (p. 22).
[89] QCA MRP Discussion Paper, p. 11.

Was historical inflation unexpected?

145. The Siegel adjustment hinges on the notion that historical inflation turned out to be higher (on average) than what the market was expecting. NERA (2013) present two pieces of evidence to support the notion that historical inflation was not materially higher than expected on average – the Livingston survey and the ASA-NBER survey both indicate some periods of under-estimation and some periods of over-estimation of inflation. Neither survey indicates that unexpected inflation differs from zero using standard metrics.

146. Lally (2013) makes two responses to the evidence that unexpected inflation was not significantly different from zero:

    a) He notes that, although the relevant studies report that expected and actual inflation are not significantly different, the statistical confidence interval extends into a region where actual inflation could have been somewhat higher than expected inflation. In our view, this response should receive no weight. Of course it is true that the confidence interval covers a region where unexpected inflation is positive. It also covers a region where unexpected inflation is negative. This is precisely what it means for something to be insignificantly different from zero. The standard interpretation here would be that there is no evidence (at conventional levels) that historical inflation systematically exceeded expectations; and

    b) He develops a theoretical example in which there was zero inflation for 60 years, very high inflation for 20 years, then zero inflation again for 20 years. He claims that, in this scenario, it is theoretically possible that "the problem identified by Siegel in respect of long-term bonds may still be present even if one-year ahead inflation forecasts are on average correct."[90] Of course, inflation was *not* zero for 60 years, high for 20 years, then zero again. Moreover, as NERA (2013)[91] note, the "Siegel problem" relates to holding period returns on 10-year bonds whereas historical MRP estimates in Australia use a new bond *every year*. Finally, it is of course possible to contrive a different theoretical example to demonstrate the reverse.

147. In summary, the basis for the Siegel approach is that actual inflation exceeded expected inflation, on average, over the relevant historical period. The relevant evidence suggests that this premise is yet to be established.

Does anyone else use the Siegel approach?

148. A number of submissions to the QCA Discussion Paper pointed out that the QCA was unique among Australian regulators in applying the Siegel adjustment to its estimate of the historical MRP. Others submissions pointed out that the Siegel adjustment is also not used by 99.5% of the respondents to the Fernandez surveys. Lally (2013) provides two responses to this evidence about the QCA's unique reliance on the Siegel adjustment, each of which is addressed below.

Regulatory use of the Siegel adjustment

149. Lally (2013) notes that one other regulator (the New Zealand Commerce Commission) does have regard to the Siegel adjustment.

150. Lally (2013) defines the Wright approach to be a "Siegel variant" and points to the use of the Wright approach by UK regulators. We acknowledge that UK regulators have regard to the Wright

[90] Lally (2013), p. 29.
[91] NERA (2013), p. 26.

approach and we also note that the AER has recently announced that it will have regard to the Wight approach. We also recommend that the QCA should have regard to the Wright approach and we note that Lally (2013) also recommends that the QCA should have regard to the Wright approach. However, the Wright approach is not the Siegel approach and it is misleading to call it a "Siegel variant."

151. The Siegel approach makes an adjustment for the extent to which historical inflation is considered to have been higher than what was expected. The Wright approach makes an adjustment for the extent to which future inflation is expected to differ from historical inflation.

152. If it is the case that one considers historical inflation to have been higher than what was expected (which the QCA does), and if it is the case that the current nominal government bond yield is lower than its historical average (which is an empirical fact) the Siegel and Wright approaches will result in adjustments in opposite directions. In particular, the QCA Discussion Paper states that the base Ibbotson historical MRP estimate is 6.2% and that the Siegel approach involves a *downward* adjustment of 1.9% leaving an adjusted estimate of 4.3%.[92] Lally (2013) reports that the Wright approach would currently produce an MRP estimate of 7.5%, which is an *upward* adjustment of 1.3% relative to the Ibbotson value.

153. If there are two approaches that each make adjustments for the same thing, but one makes a slightly different adjustment than the other, then the two approaches can reasonably be called "variants." However, if there are two approaches that each make adjustments for different things, where one involves an upward adjustment and one involves a downward adjustment, calling one a "variant" of the other is misleading. Moreover, claiming that evidence of one being used supports the acceptance of the other is even more misleading.

154. Lally (2013) appears to argue that the two approaches are variants in that they both make adjustments that are somehow related to the general topic of inflation. But by way of analogy, one cannot argue that AFL is generally accepted by noting that other countries play soccer and rugby, which are also generally based on the use of a ball.

155. In summary, but for the NZCC, the QCA is unique in the world in applying the Siegel adjustment.

Use by survey respondents

156. Lally (2013) notes that the Fernandez surveys indicate that a negligible number of respondents cite the work of Siegel as one of the pieces of evidence that they use to inform their estimate of MRP. He notes that 99.5% of respondents indicate that their MRP estimate is not informed by the work of Siegel.[93] Associate Professor Lally provides three lines of response to this evidence:[94]

    a) He implies that little weight should be afforded to the fact that the survey respondents do not use the Siegel approach because:

> The respondents to these surveys are academics, analysts, and managers rather than investors per se.[95]

[92] QCA MRP Discussion Paper, p.
[93] Lally (2013), p. 23.
[94] Lally (2013), p. 23.
[95] Lally (2013), p. 23.

That is, Associate Professor Lally suggests that the survey respondents' estimates are reliable and should be afforded material weight, but that their stated reasons for arriving at those estimates are unreliable and should be disregarded.

b) He suggests that some of the 6% of respondents who indicate that their estimate is informed by "historical data" and some of the 4.5% of respondents who indicate that their estimate was informed by "experience" may "also have been influenced by Siegel even though they did not indicate in their survey response that they were influenced by Siegel.

c) He notes that a number of respondents state that their estimate has been informed by information from a textbook rather than an original source and he suggests that these observations should be removed from the sample. In fact, the vast majority of survey respondents indicate that their estimate is based on either the Ibbotson estimate, a textbook or historical data. Thus, the vast majority of survey responses are based on backward-looking historical information and are not forward-looking estimates of MRP. This is consistent with the fact that the survey responses for Australia effectively reproduce the long-run historical estimate. This implies that the survey estimate should not be treated as being independent of the historical estimate and it should not be treated as a forward-looking estimate.

What is the best estimate of the expected real risk free rate?

157. As set out above, the Siegel approach is estimated as:

$$MRP_S = MRP_I + \left(\overline{r_r} - r_r^e\right)$$

where $\overline{r_r}$ is the observed long-run average historical real risk-free rate and r_r^e is an estimate of the long-run average real risk-free rate that the market was expecting over the relevant historical period.

158. Lally (2013) proposes estimates of 2.4% for the historical average real long-term bond yield and 3.6% for the long-term expected real risk-free rate. We have replicated these estimates and concur with both of them.

159. Consequently, the best estimates of the Siegel approach using the corrected and updated Brailsford et al (2008, 2012) data are:

$$6.5\% + 2.4\% - 3.6\% = 5.3\%$$ for theta of 0.35; and

$$6.6\% + 2.4\% - 3.6\% = 5.4\%$$ for theta of 0.625.

Dividend discount models

Should dividend discount models be used?

160. The QCA's long-standing practice has been to have regard to dividend discount models in the form of the Cornell model. Lally (2013) recommends that the QCA should continue to have regard to dividend discount models.

161. The AER has also recently indicated that it will also have regard to dividend discount (or "growth") models:

> The market risk premium range would be estimated with regard to theoretical and empirical evidence—based on evidence including historical excess returns, survey evidence, financial market indicators and dividend growth model estimates.[96]

for the reason that:

> …the underlying financial theory of the model—that the price of an asset should be equal to the present value of the expected future cash flows from that asset—is well accepted and sound.[97]

162. IPART has also recently decided that it will place substantial reliance on three different forms of dividend discount model in estimating the contemporaneous market risk premium.[98]

163. By contrast, McKenzie and Partington (2013) are at odds with the current regulatory direction and with the advice of Lally (2013) when they advise the QRC that:

> We are not aware of any estimates of implied market risk premiums in Australia that we would consider to be reasonably reliable and objective….we do not consider Australian implied cost of capital estimates.[99]

164. This conclusion is also at odds with Truong and Partington (2007) who conclude that:

> Cost of capital estimates from the CAPM provide the weakest explanation of future stock returns…A variant of the dividend discount model provides the best cost of capital estimates when judged by their ability to explain the cross section of future returns and their association with firm risk characteristics.[100]

Which dividend discount model should be used?

165. There are a range of methodological choices that can be made when implementing a dividend discount model. These choices include:

a) How to estimate the short-run and long-run dividend growth rates;

b) How the process might revert from the short-run growth rate to the long-run growth rate;

c) Whether any adjustment should be made to growth rates to reflect possible new equity issues in the future;

d) Whether there is a term structure of required returns such that current required returns may differ from long-run required returns; and

e) The data set and period that should be used in the estimation.

[96] AER (2013), Draft rate of return guideline, p. 17.
[97] AER (2013), Draft rate of return guideline: Explanatory statement, p. 188.
[98] IPART (2013), WACC methodology: Draft report, p. 17.
[99] McKenzie and Partington (2013), p. 21.
[100] Truong and Partington (2007), p. 1.

166. Every one of these issues involves detailed technical arguments and each would warrant a full chapter in a report. Indeed, all of these issues have already been the subject of much detailed technical debate in other regulatory settings.[101] Consequently, we set aside detailed arguments about these points for another time and consider the estimates that have been reported by QCA (2012) and Lally (2013).

Current estimates

167. Lally (2013)[102] notes that the QCA (2012) Cornell estimate is 8.7%. This figure is the mid-point of the QCA's estimated range of 7.58% to 9.57%.[103] Lally (2013) also notes that subsequent studies have reported DDM estimates of 8.5%, 8.0% and 7.9%.[104]

168. IPART has recently published a contemporaneous MRP estimate of 7.9%, which is based largely on a range of dividend growth models.[105]

169. Lally (2013) makes a number of downward adjustments in relation to the methodological choices set out above. He 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.[106] He notes that this estimate is conditional on gamma being set to 0.25 (and theta set to 0.625). For gamma set to 0.5 (and theta set to 0.625) his point estimate increases to 8.25% (range of 7.0% to 9.5%).

170. 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 in the remainder of this report.

Surveys

Background

171. The QRC WACC submission, McKenzie and Partington (2013) and Lally (2013) all recommend that some weight should be afforded to survey responses. Our previous report in this matter notes that McKenzie and Partington (2011, 2012) conclude that survey evidence suffers from "potential problems" and sets out a list of those problems.[107] Our previous report also notes that the Australian Competition Tribunal has recently 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.

[101] For example, see our submission to the AER Rate of Return Guideline process at http://www.aer.gov.au/sites/default/files/ENA%2C%20Attachment%202%20-%20SFG%20Report%20-%20Reconciliation%20of%20DDM%20estimatesl%2C%20Submission%20to%20draft%20AER%20rate%20of%20return%20guideline%20-%2011%20Oct%202013.pdf.
[102] Lally (2013), p. 59.
[103] QCA (2012), p. 11.
[104] Lally (2013), p. 59.
[105] IPART (2013), p. 70.
[106] Lally (2013), p. 60.
[107] SFG (2013), p. 19.

> 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.[108]

172. 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.

173. Our previous report explains that:

> None of these requirements are met by the survey responses on which the QCA has previously relied.[109]

Reliability

174. The QRC WACC submission refers to a single survey – Fernandez et. al. (2013a), which asks respondents about MRP values for 2012. McKenzie and Partington (2013) note that the survey cited by the QRC has been superseded by a more recent survey by the same author, Fernandez (2013b), which asks respondents about MRP values for 2013. McKenzie and Partington (2013) note that the more timely survey reports a mean MRP estimate of 6.8% compared with 6% from the previous survey. However:

    a) The results are based on only 17 participants;

    b) There is no information about the qualifications of respondents;

    c) There is no information about the non-response rate;

    d) There is no information about what the respondents use their estimate of MRP for (e.g., classroom examples vs. long-term equity investment decisions);

    e) There is no information about the values that participants use for other WACC parameters (e.g., whether they are using higher values of the risk-free rate in lieu of a higher value for MRP); and

    f) There is a wide dispersion of estimates among the 17 participants.

175. In our view, it is difficult to imagine that any survey could fare worse against the criteria set out by the Tribunal.

[108] Application by Envestra Ltd (No 2), ACompT 3, Paragraphs 162-163.
[109] SFG (2013), Paragraph 96.

176. McKenzie and Partington (2013) also refer to a survey compiled by Asher (2011). That survey has also been superseded by a more recent survey by the same author, Asher (2012). Both of these survey reports are two-page notes in a magazine. The Asher (2012) survey is sandwiched between letters to the editor and the puzzle page, which notes that the name of the South Australian town of Glenelg is a palindrome. Moreover, more than 12% of the respondents indicated that there was no risk premium at all and the text commentary indicates that respondents provided different answers for assets in different risk classes. This is a clear indication that the respondents were not providing estimates of MRP for use in the Sharpe-Lintner CAPM. In our view, the Asher surveys should receive no weight at all.

Representativeness

177. Lally (2013) suggests that the Fernandez surveys may not reflect the views of investors who actually provide equity capital in the market. He suggests that actual equity investors may arrive at their estimate of MRP using a different set of information to that used by survey respondents. In particular, he states that:

> However, the respondents to these surveys are academics, analysts and managers rather than investors per se.[110]

178. The fact that the survey results do not reflect the views or requirements of actual investors is another factor that might lead to them being afforded less weight.

Stability

179. In our previous report (SFG 2013a), we stated that survey estimates of MRP, like estimates using the long-run average of historical excess returns, are "very slow-moving over time." Lally (2013) takes issue with this conclusion on the basis that a new survey tends to be available every year, stating that "SFG's claim is false."[111] However, the issue is not about how frequently the estimate can be updated, but about whether it changes over time. The long-run historical average can also be updated every year, but it clearly will not change materially from one year to the next.

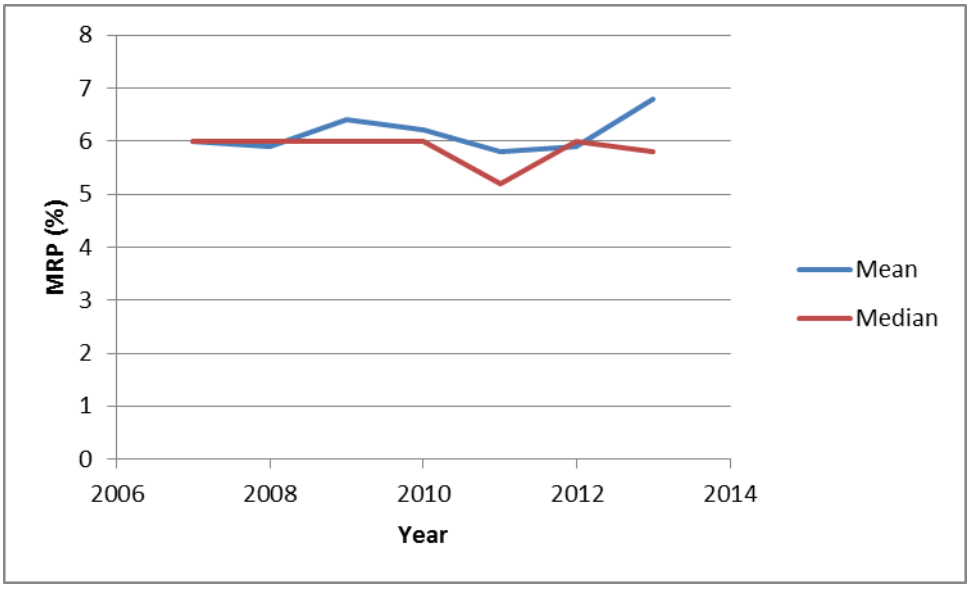
180. Lally (2013) also notes that the QCA has previously used the Fernandez surveys to inform its estimate of MRP. The mean and median MRP estimates for Australia from the Fernandez surveys are set out in Figure 7 below. These figures clearly *are* very slow-moving over time. Indeed Fernandez himself notes that:

> The median has been remarkably stable: 6% for USA and Australia.[112]

and even Lally (2013), later in his report, concludes that between 2007 and 2012 "there has been no significant movement"[113] in the Fernandez survey results.

[110] Lally (2013), p. 23.
[111] Lally (2013), p. 7.
[112] Fernandez (2010), p. 6.
[113] Lally (2013), p. 64.

Figure 7
Fernandez survey MRP estimates



Source: Fernandez surveys.

181. The period covered by Figure 7 includes the last year of a remarkable bull market and the peak of the GFC and European debt crises, yet the estimate is essentially stuck at 6% throughout. That is, there is something about the phrasing of the questions and the nature of the small sample of respondents that (empirically) has had the effect of producing an estimate of close to 6% over all market conditions since 2007.

182. The Fernandez surveys pertaining to 2012 and 2013 both report that the vast majority have based their MRP values on the Ibbotson estimate, historical data, or textbooks. The fact that the vast majority of respondents have provided MRP values that are historical averages that are very slow to move (rather than contemporaneous forward-looking estimates) is consistent with the stability of the survey averages over different market conditions.

183. In our view, it is difficult to reconcile this evidence with Associate Professor Lally's conclusion that survey methods "are likely to respond quickly to changes in the true MRP."[114] Rather, the survey evidence appears to simply regurgitate the long-run historical average excess return.

Incorporation of imputation credits

184. 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 MRP estimates – the same definition of MRP that is used for all other countries. However, it is possible that some survey respondents may have provided adjusted MRP estimates that do reflect their particular estimate of the effect of imputation credits. In this regard, Lally (2013) conjectures that:

    a) Some academic respondents may have adjusted their estimate of MRP to reflect their own estimate of the effect of imputation credits; and

[114] Lally (2013), p. 9.

b) Although the market practice is to make no adjustment at all in relation to imputation credits, some practitioners may "have been influenced to some degree by the 6% estimate generally used by Australian regulators and this estimate does incorporate the effects of imputation."[115]

185. All of this points to at least three additional reasons why the Fernandez survey results should not be afforded any material weight:

a) There is no way of knowing whether the results reflect an unadjusted MRP or an MRP that reflects some assumed value of imputation credits. That is, we have an estimate, but there is no way of knowing what it is an estimate of;

b) There is no way of knowing how many respondents may have made an adjustment for imputation credits, or what adjustment they might have made. To the extent that any of the respondents made an adjustment that is inconsistent with the regulator's estimate of gamma, the survey MRP value is not comparable to the regulatory MRP estimate. In particular, the QCA's estimate of 0.625 for the value of distributed imputation credits is unique, in which case there is no reason to suggest that any survey respondent would have provided an MRP estimate that is consistent with the QCA definition; and

c) To the extent that survey respondents may simply be regurgitating previous regulatory estimates (as Lally (2013, p.15) conjectures), the survey produces output that is neither independent nor forward-looking.

186. In our view, it is highly likely that the Fernandez survey participants have provided ex-imputation estimates of MRP, consistent with the dominant market practice. In this case, the ex-imputation estimates would have to be adjusted using the IPART procedure set out in Paragraphs 120 to 126 above.

Best available estimate

187. Lally (2013) states that the mean of the most recent Fernandez survey should be used.[116] In particular, he states that the 2012 survey results are now available and he cites the mean of 5.9%. However, Fernandez (2013b), which was released in June of this year, reports a mean estimate of 6.8%. Our recommendation is that the Fernandez survey results should not be used for all of the reasons set out above. However, if they are to be used, the most recent estimate of 6.8% should be adopted. Application of the IPART adjustment for imputation credits would produce a regulatory MRP estimate of 7.96%.[117]

Independent expert reports

188. Evidence from independent expert valuation reports is reviewed in Section 6 above and the best currently available estimates are summarised in Table 1.

Wright approach

189. The Wright approach is considered in detail in Section 5 above. Consequently, in this section we consider only the best currently available estimate.

[115] Lally (2013), p. 15.
[116] Lally (2013), p. 59.
[117] Based on gamma of 0.25 and a risk-free rate of 4%.

190. When implementing the Wright approach, Lally (2013) apparently uses historical excess returns data and inflation to the end of 2010 which produces an historical average real market return of 8.3%.[118] Updating this data to the end of 2012 and correcting the Brailsford et al data for the dividend yield approximation error produces a revised estimate of 8.9% for theta set to 0.25 and 9.0% for theta set to 0.625.

191. We follow Lally (2013) in using expected inflation of 2.5% (the mid-point of the RBA target band). This results in contemporaneous estimates of the nominal required return on the market of 11.6% (theta=0.25) and 11.7% (theta=0.625).

192. Subtracting the current 10-year government bond yield of approximately 4% yields MRP estimates of 7.6% (theta=0.25) and 7.7% (theta=0.625). These values compare with the Lally (2013) estimate of 7.5%. The increase in the estimate that comes from updating the excess return data is approximately offset by the increase in government bond yields.[119]

[118] Lally (2013), p. 60.
[119] Lally (2013) uses the July 2013 5-year government bond yield of 3.7% whereas we use the current 10-year yield of 4%.

8. Selecting a single estimate

Current QCA approach

Summary of current estimates

193. The QCA's MRP Discussion Paper states that the QCA compiles its estimate of MRP by assigning equal weight to the Ibbotson, Siegel, Cornell and survey methods, taking the mean across those four estimates, and then rounding to the nearest full percentage point. The Discussion Paper sets out recent QCA estimates for each of the four approaches and reports the mean and median of the four values, and these estimates are summarised in Table 2 below. Since the mean and median are both close to 6%, and because the QCA adopts the practice of rounding to the nearest whole percentage point, the MRP estimate would be set to 6% – the same value that the QCA has used in every one of its decisions to date.

Table 2. QCA and Lally estimates of MRP

Method	QCA Discussion Paper	Lally (2013)
Ibbotson	6.21	6.20
Siegel	4.32	5.00
Cornell	8.70	8.25
Surveys	5.80	6.10
Wright	--	7.50
Mean	6.26	6.61
Rounded mean	**6**	**7**
Median	6.01	6.20
Rounded median	**6**	**6**

Source: QCA MRP Discussion Paper, Lally (2013).

Stability of QCA estimates

194. As set out above, there are issues with all of the estimates that are set out in the QCA's MRP Discussion Paper. Some estimates are dated and have been superseded by more recent estimates, others are based on inaccurate data that has since been corrected, and so on. We return to those issues below. In this section, we note that (a) the current QCA process has produced an estimate of 6% in every set of market conditions that the QCA has ever had cause to examine, and (b) Lally (2013) recommends that the QCA should augment its approach to estimating MRP.

195. First, we note that the Ibbotson estimate is the mean over more than 100 observations. Consequently, it will not change materially from one year to the next – as illustrated in Figure 4 above.

196. The Siegel estimate is based on the Ibbotson estimate (which is highly stable over time), but is adjusted by the QCA using the average indexed bond yields from 1986. This shorter series is more susceptible to change from year to year, in which case the Siegel estimate may be somewhat more variable over time than the Ibbotson estimate. The manner in which the QCA estimates the Siegel value ensures that it will always be lower than the Ibbotson value, at least for the foreseeable future.

197. The survey approach has produced essentially the same estimate across a whole range of different market conditions, as illustrated in Figure 7 above. The likely reason for this is that the vast majority of survey respondents report that they have based their MRP values on the Ibbotson estimate,

historical data, or textbooks. The fact that the vast majority of respondents have provided MRP values that are historical averages that are very slow to move (rather than contemporaneous forward-looking estimates) is consistent with the stability of the survey averages over different market conditions. But whatever the reason, it is highly likely that the survey approach will continue to provide the same stable values in the future as it has in the past.

198. This leaves the Cornell approach as the only approach that is likely to vary materially with different market conditions. The Cornell approach produces MRP estimates that are materially higher than average during financial crises and materially lower than average during economic expansions.

199. The mean across the four QCA estimates is 6.26%. Rounded to the nearest percentage point, this produces a regulatory value of 6%.

200. Given the values from the other three approaches, any Cornell estimate between 5.6% and 9.7% would result in a mean estimate between 5.5% and 6.5% that would be rounded to 6%. That is, the forward-looking Cornell estimate could take any value within a wide range and the final QCA estimate of MRP will still be 6%.

201. The median of the four estimates is (by definition) equal to the mean of the two central estimates. It is impossible for the rounded median estimate to ever exceed 6%. Whether the Cornell estimate is 7% or 27%, the median will be obtained by taking the mean of the two central estimates, which will be rounded to 6%. Regardless of how high the Cornell estimate might be, the rounded median will never exceed 6%.

202. Of the four approaches that underlie the current QCA approach, only the Cornell approach varies with market conditions producing higher than average estimates during financial crises and lower than average estimates during sustained economic expansions. However, according to the estimates in the QCA's MRP Discussion Paper:

    a) The rounded mean estimate will only move from 6% to 7% if the Cornell estimate exceeds 9.7%. To move the rounded mean estimate to 8%, the Cornell estimate would have to exceed 13.7%; and

    b) The rounded median estimate cannot exceed 6%, regardless of how high the Cornell estimate might be – in which case the Cornell estimate would not appear to be receiving the same weight as the other approaches, or indeed any material weight at all.

The Lally (2013) recommendations

203. Lally (2013) suggests that the QCA approach should be augmented to include the Wright approach. He also updates the estimates of some of the other approaches, as set out in Table 2 above. In particular, the Siegel and Cornell estimates are updated to include more recent data and the survey estimate is updated as the average of (a) the mean estimate from the 2012 Fernandez survey (5.9%) and (b) Associate Professor Lally's interpretation of the evidence from independent expert reports (6.3%).

204. The mean estimate over the five approaches recommended by Lally (2013) is 6.61%, which rounds to 7%. However, Lally (2013) focuses on the median estimate from the five approaches. He notes that the median of his estimates of the four approaches currently used by the QCA is 6.1%.[120] He then states that:

[120] The mean of the two central estimates is 6.15% (Lally's survey estimate of 6.1% and his Ibbotson estimate of 6.2%).

> Adding the 7.5% result from this [Wright] methodology to the earlier four results, the median of these five approaches increases marginally to 6.2%.[121]

205. Lally (2013) goes to note that this median estimate rounds to 6% and concludes that this:

> suggests that 6% is an appropriate MRP estimate for Australia. This matches the QCA's view. So I consider that the QCA's use of the spot risk free rate and an MRP estimate of 6% is reasonable under current conditions.[122]

206. The mean of the five estimates reported by Lally (2013) is 6.61%, which rounds to 7%. In our view, this is the current estimate from the proper application of the QCA/Lally approach to the estimates reported by Lally (2013). We consider mean and median estimates in more detail below.

Updated and corrected estimates

207. As set out above, some of the Lally (2013) estimates are dated and have been superseded by more recent estimates and others are based on inaccurate data that has since been corrected. In particular:

a) The **Ibbotson** estimate should be updated to include data up to the end of 2012 and it should be corrected for the inaccuracy in the Brailsford et al (2008, 2012) dividend yield adjustment. This produces an estimate of 6.5% (6.6% for gamma=0.5);

b) The **Siegel** estimate should be updated to include data up to the end of 2012 and it should be corrected for the inaccuracy in the Brailsford et al (2008, 2012) dividend yield adjustment. This produces an estimate of 5.3% (5.4% for gamma=0.5);

c) We adopt the **dividend discount model** estimates from Lally (2013), saving debate about the range of methodological choices that could be made for another time. The relevant MRP estimates are 7.15% (for gamma=0.25) and 8.25% (for gamma=0.5).

d) The **Fernandez survey** estimate should be updated to use the mean estimate from the 2013 survey. Lally (2013) calculations use the mean of the Fernandez survey responses for 2012. If the Fernandez survey information is to be used, the mean of the survey response for 2013 should be used and that figure is 6.8%. As explained in Section 7, that figure requires adjustment to include the assumed value of imputation credits. Applying the IPART adjustment produces an MRP estimate of 8.0% (9.7% for gamma=0.5);

e) Evidence from **independent expert valuation reports** is reviewed in Section 6 above and the best currently available estimates are summarised in Table 1.

f) The **Wright** estimate should be adjusted to include data up to the end of 2012 and it should be corrected for the inaccuracy in the Brailsford et al (2008, 2012) dividend yield adjustment. This produces an MRP estimate of 7.6% (7.7% for gamma=0.5);

208. These updates and corrections lead to a mean value of 6.9% and a median value of 7.2% (for gamma set to the current regulatory value of 0.25), as summarised in Table 3 below. In our view, the

[121] Lally (2013), p. 6. In this case the Ibbotson estimate (6.2%) is the central estimate of the five.
[122] Lally (2013), p. 70.

proposed Lally (2013) approach currently produces an MRP estimate of 7% (with gamma set to 0.25).[123]

Table 3. Updated estimates of MRP

Method	Lally (2013)	Updated and corrected Gamma=0.25	Updated and corrected Gamma=0.5
Ibbotson	6.20	6.54	6.64
Siegel	5.00	5.34	5.44
Cornell	8.25	7.15	8.25
Surveys	6.10	7.74	8.87
Wright	7.50	7.63	7.66
Mean	6.61	6.88	7.37
Rounded mean	**7**	**7**	**7**
Median	6.20	7.15	7.66
Rounded median	**6**	**7**	**8**

Source: Lally (2013), SFG calculations.

Assessment of Aurizon submission

209. We have been instructed to assess the reasonableness of Aurizon Network's proposed MRP estimate of 7%. We do this in the context of the Lally (2013) report for the QCA. In particular, we maintain the approach and estimates from Lally (2013) and we consider what incremental changes would be required to produce an MRP estimate of 7%, consistent with Aurizon Network's proposal. Any **one** of a number of incremental changes would produce mean and median estimates of 7%, consistent with the Aurizon proposal.[124]

Using the mean estimate produces an MRP of 7%

210. We begin by noting that the approach and estimates set out in Lally (2013) produce a mean of 6.61%, which would round to 7% under the Lally approach. Lally (2013) advises that he has focused on the median for the following reason:

> Since some of these results are bands rather than point estimates, the mean cannot be determined and therefore the median is considered.[125]

211. This is a reference to the dividend discount estimate, which Lally (2013) reports as a range. However, it is a simple matter to take the mid-point of the range and to use that figure when determining the

[123] As set out in Paragraph 224 below, our view is that the QCA should give further consideration to a number of outstanding issues including the range of evidence that it considers and its coarse rounding to the nearest full percentage point. The QCA is out of step with current regulatory practice in both of these aspects. However, the point that we make here is that even the QCA/Lally approach, properly implemented using the best available data, already produces estimates that are consistent with the submission from Aurizon.

[124] Of course we do not suggest that the QCA should make only one of the changes set out in this list. Rather, we recommend that the QCA should expand the range of information on which it relies and use the best and most recent data for *all* of its estimation approaches. The point we make here is that any one of a list of reasonable steps would lead the QCA to an estimate of 7% even under the approach advocated by Lally (2013) and maintaining all other parameter estimates adopted by Lally (2013). In other words, an MRP estimate of 6% could only be maintained by rejecting every one of the proposed updates and corrections set out below.

[125] Lally (2013), p. 63.

mean of the various approaches. This is precisely what the QCA has done in its MRP Discussion Paper.[126] Moreover, the QCA notes that its practice has always been to focus on the mean estimate:

> In arriving at a mean estimate, the Authority has attributed each method equal weight to date. The Authority then rounds the mean estimate to the nearest whole percent.[127]

212. Moreover, using the mean estimate is the only way of giving effect to the QCA's intention of applying equal weight to each of the estimates.

213. Associate Professor Lally has also indicated that the median estimate is less sensitive to the case where one approach produces an implausible outlier estimate. However, there is no suggestion that any of the Lally (2013) estimates in the present case are implausible outliers, in which case that issue does not arise.[128]

214. We note that the mean estimate of Lally (2013) already produces an MRP of 7%.

Updating the Ibbotson estimate produces an MRP of 7%

215. Next, we note that if the Ibbotson estimate is updated to reflect the most recently available data, and correcting for the error in the Brailsford dividend yield adjustment, the mean and median would *both* suggest a 7% MRP – even if no other changes are made at all to the Lally (2013) calculations. This is demonstrated in Table 4 below, where the single change is highlighted.

Table 4. Lally (2013) estimates of MRP with updated Ibbotson value

Method	Lally (2013)	Updated and corrected
Ibbotson	6.20	6.64
Siegel	5.00	5.00
Cornell	8.25	8.25
Surveys	6.10	6.10
Wright	7.50	7.50
Mean	6.61	6.70
Rounded mean	**7**	**7**
Median	6.20	6.64
Rounded median	**6**	**7**

Source: Lally (2013), SFG calculations.
Updated Ibbotson estimate; no other changes from Lally (2013).

Eliminating the Siegel estimate produces an MRP of 7%

216. If the Siegel estimate is eliminated, on the basis that its inclusion is contrary to standard regulatory practice, the mean and median would both suggest a 7% MRP – even if no other changes are made at all to the Lally (2013) calculations. This is demonstrated in Table 5 below, where the single change is highlighted.

[126] QCA (2012), MRP Discussion Paper, Table 3.1, p. 11.
[127] QCA (2012), MRP Discussion Paper, p. 10.
[128] In general, a better approach to the issue of one estimation method producing an implausible estimate would be to (a) consider carefully why that method was producing an implausible estimate in the particular circumstances, and (b) to eliminate the estimate if a particular method was incapable of producing a plausible estimate.

Table 5. Lally (2013) estimates of MRP without Siegel estimate

Method	Lally (2013)	Updated and corrected
Ibbotson	6.20	6.20
Siegel	5.00	
Cornell	8.25	8.25
Surveys	6.10	6.10
Wright	7.50	7.50
Mean	6.61	7.01
Rounded mean	**7**	**7**
Median	6.20	6.85
Rounded median	**6**	**7**

Source: Lally (2013), SFG calculations.
Siegel estimate eliminated; no other changes from Lally (2013).

Averaging the Ibbotson and Siegel estimates produces an MRP of 7%

217. Another way of processing the Siegel estimate is to consider that there are two schools of thought in relation to how the historical excess returns data should be analysed. One view is that the historical data should be used as is (Ibbotson) and the other is that it should be adjusted (Siegel). If equal weight is given to these two approaches (in the same way as Lally (2013) produces a single "survey" estimate as the mean of two approaches), the mean and median would both suggest a 7% MRP – even if no other changes are made at all to the Lally (2013) calculations. This is demonstrated in Table 6 below, where the single change is highlighted.

Table 6. Lally (2013) estimates of MRP with single weight placed on historical data

Method	Lally (2013)	Updated and corrected
Ibbotson	6.20	5.60
Siegel	5.00	
Cornell	8.25	8.25
Surveys	6.10	6.10
Wright	7.50	7.50
Mean	6.61	6.86
Rounded mean	**7**	**7**
Median	6.20	6.80
Rounded median	**6**	**7**

Source: Lally (2013), SFG calculations.
Single estimate used for historical data (average of Ibbotson and Siegel estimates);
no other changes from Lally (2013).

Using the most recent Fernandez survey produces an MRP of 7%

218. The Lally (2013) calculations use the mean of the Fernandez survey results for 2012. Using the mean of the Fernandez survey results produces a mean and median MRP estimate of 7% – even if no other changes are made at all to the Lally (2013) calculations, and even if no adjustment is made to the Fernandez figure in relation to imputation credits. In particular, we use the Fernandez 2013 estimate of 6.8%. This is averaged with the Lally (2013) estimate from independent expert reports of 6.3% to produce a single survey estimate of 6.55%. In our view, an upward adjustment should be made in relation to imputation credits similar to that made by IPART – and this would serve to further

increase the estimate of MRP as set out in Paragraphs 120 to 126 above. However, even without any imputation adjustment, simply updating the ex-imputation figure for the 2013 is already enough to produce an MRP estimate of 7%. This is demonstrated in Table 7 below, where the single change is highlighted.

Table 7. Lally (2013) estimates of MRP with updated Fernandez estimate

Method	Lally (2013)	Updated and corrected
Ibbotson	6.20	6.20
Siegel	5.00	5.00
Cornell	8.25	8.25
Surveys	6.10	6.55
Wright	7.50	7.50
Mean	6.61	6.70
Rounded mean	**7**	**7**
Median	6.20	6.55
Rounded median	**6**	**7**

Source: Lally (2013), SFG calculations.
Updated Fernandez estimate (with no adjustment for imputation credits); no other changes from Lally (2013).

Using independent expert valuation reports instead of the Fernandez survey

219. As set out above, we have reservations about the reliability of the Fernandez survey results. If the survey estimate is based entirely on independent expert reports (rather than averaged with the Fernandez figure), the MRP estimate would be 7%. The relevant estimates from independent expert reports are set out in Table 1 above. In Table 8 below, we show that even with a "survey" estimate of 6.4%, the mean MRP estimate rounds to 7% and the median is at the knife-edge value of 6.4%. In relation to the figures in Table 1, we have submitted that two issues must be considered:

    a) Independent expert report estimates are ex-imputation values that must be adjusted for the assumed value of imputation credits in the manner proposed by IPART. This leads to examination of the second or third columns of Table 1; and

    b) Independent experts do not always implement the CAPM in the same way as regulators. Consequently, there may be more consistency between the independent expert and regulatory definitions of the required return on the market than MRP. This leads to examination of the second row of Table 1.

220. If any positive weight at all is applied to either of these submissions, the median value will increase from 6.4% to above 6.5%, which would round to 7%.

Table 8. Lally (2013) estimates of MRP with updated Fernandez estimate

Method	Lally (2013)	Updated and corrected
Ibbotson	6.20	6.20
Siegel	5.00	5.00
Cornell	8.25	8.25
Surveys	6.10	6.40
Wright	7.50	7.50
Mean	6.61	6.67
Rounded mean	**7**	**7**
Median	6.20	6.40
Rounded median	**6**	**6**

Source: Lally (2013), SFG calculations.
Updated Fernandez estimate (with no adjustment for imputation credits); no other changes from Lally (2013).

Updated and corrected estimates

221. The Aurizon proposed estimate for MRP is 7%, which is entirely consistent with the rounded estimate from the QCA/Lally approach applied to the current data.

222. The only way to maintain an estimate of 6% from the QCA/Lally approach is if:

a) The mean estimate is disregarded and 100% weight is applied to the median estimate; *and*

b) The Ibbotson estimate is not updated to reflect the most recent data *and* the inaccurate Brailsford et al dividend yield adjustment is not corrected; *and*

c) The Siegel historical estimate is included as an estimate in its own right – it is not eliminated *nor* even averaged with the Ibbotson historical estimate; *and*

d) The Fernandez survey data for 2012 is used instead of the data for 2013; *and*

e) The independent expert evidence is interpreted as providing a with-imputation estimate even though the reports clearly state that no adjustment has been made for imputation credits; *and*

f) The independent evidence is interpreted in a way that systematically understates the experts' estimates of the required return on the market.

223. In our view, it would be inappropriate to make any one of these assumptions, let alone all of them. Consequently, there is no proper basis for maintaining a 6% MRP estimate in the current market conditions.

Issues for future consideration

224. In our view, there remain a number of issues that are worthy of further consideration by the QCA, but which have not been addressed in detail in the current report (which has focused on the key issues that require immediate resolution as part of the Aurizon Network UT4 process). Issues for future consideration include:

a) The form(s) of dividend discount models that should be used. In particular:

i) IPART propose the use of several forms of dividend discount models that differ in some respects to the Cornell approach that is currently adopted by the QCA;[129] and

ii) Best practice implementation of dividend discount models is to simultaneously estimate required returns and dividend growth rates from observed share prices;

b) Whether additional sources of evidence should also be considered. For example, IPART[130] and the AER[131] each identify additional evidence that will inform their estimates of MRP; and

c) Whether rounding the final MRP estimate to the nearest full percentage point is consistent with best regulatory practice.

[129] See IPART (2013), Review of WACC Methodology.
[130] See IPART (2013), Review of WACC Methodology.
[131] AER Draft Rate of Return Guideline.

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